UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ Annual Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

For the fiscal year ended July 31, 2019

☐ Transition Report Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Commission File Number: 0-7928

COMTECH TELECOMMUNICATIONS CORP.

(Exact name of registrant as specified in its charter)

Delaware	**11-2139466**
(State or other jurisdiction of incorporation /organization)	(I.R.S. Employer Identification Number)
68 South Service Road, Suite 230, Melville, NY	**11747**
(Address of principal executive offices)	(Zip Code)

(631) 962-7000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $.10 per share	**CMTL**	**NASDAQ Stock Market LLC**
Series A Junior Participating Cumulative Preferred Stock, par value $0.10 per share		

Securities registered pursuant to Section 12(g) of the Act:
None
(Title of class)

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
☒ Yes ☐ No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 of Section 15(d) of the Act.
☐ Yes ☒ No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.
☒ Yes ☐ No

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data file required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

☒ Yes ☐ No

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☒	Emerging growth company	☐
Non-accelerated filer	☐	Smaller reporting company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

☐ Yes ☒ No

The aggregate market value of the registrant's voting stock held by non-affiliates of the registrant, computed by reference to the closing sales price as quoted on the NASDAQ Global Select Market on January 31, 2019 was approximately $584,329,000.

The number of shares of the registrant's common stock outstanding on September 19, 2019 was 24,267,980.

DOCUMENTS INCORPORATED BY REFERENCE.

Certain portions of the document listed below have been incorporated by reference into the indicated Part of this Annual Report on Form 10-K:

Proxy Statement for 2019 Annual Meeting of Stockholders - Part III

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PART I

PART II

PART III

PART IV

Note: As used in this Annual Report on Form 10-K, the terms "Comtech," "we," "us," "our" and "our Company" mean Comtech Telecommunications Corp. and its subsidiaries.

Note About Forward-Looking Statements

This Form 10-K contains "forward-looking statements," including statements concerning the future of our industry, product development, business strategy, continued acceptance of our products, market growth, and dependence on significant customers. These statements can be identified by the use of forward-looking terminology such as "may," "will," "should," "could," "would," "expect," "plan," "anticipate," "believe," "estimate," "predict," "potential," "continue," the negative of these terms, or other similar words or comparable terminology. All statements in this report, other than statements of historical fact, are forward-looking information. When considering forward-looking statements, you should keep in mind the risk factors and other cautionary statements included in this Form 10-K. However, the risks described in this Form 10-K are not the only risks that we face. Additional risks and uncertainties, not currently known to us or that do not currently appear to be material, may also materially adversely affect our business, financial condition and/or operating results in the future. We describe risks and uncertainties that could cause actual results and events to differ materially in *"Risk Factors"* (Part I, Item 1A of this Form 10-K), *"Management's Discussion and Analysis of Financial Condition and Results of Operations"* (Part II, Item 7 of this Form 10-K) and *"Quantitative and Qualitative Disclosures about Market Risk"* (Part II, Item 7A of this Form 10-K). We do not intend to update or revise publicly any forward-looking statements, whether because of new information, future events, or otherwise, except as required by law.

PART I
ITEM 1. BUSINESS

We are a leading provider of advanced communications solutions for both commercial and government customers worldwide. Our solutions fulfill our customers' needs for secure wireless communications in some of the most demanding environments, including those where traditional communications are unavailable or cost-prohibitive, and in mission-critical scenarios where performance is crucial. In recent years, we have benefited from an increase in market demand for global voice, video and data usage which has resulted in our Company growing.

As more fully described throughout this Form 10-K, fiscal 2019 was a successful year for Comtech. It was our fourth consecutive year of net sales growth and third consecutive year of Adjusted EBITDA (a Non-GAAP financial measure) growth. We achieved consolidated net sales of $671.8 million, consolidated net income of $25.0 million and Adjusted EBITDA of $93.5 million. We also generated $68.0 million of cash flows from operations. We completed two small acquisitions and finished the fiscal year with solid backlog. We are experiencing strong business momentum in each of our two operating segments and are confident that fiscal 2020 will be even better.

Our Business Outlook for Fiscal 2020 is discussed further in *Part II* - "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Business Outlook for Fiscal 2020.*" For a definition and explanation of Adjusted EBITDA, see *Part II* - "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Comparison of Fiscal 2019 and 2018 - Adjusted EBITDA.*"

Our Internet website is www.comtechtel.com and we make available on our website: our filings with the Securities and Exchange Commission ("SEC"), including annual reports, quarterly reports, current reports and any amendments to those filings. The reference to our website address does not constitute incorporation by reference of the information contained therein into this Form 10-K. We also use our website to disseminate other material information to our investors (on the Home Page and in the "Investor Relations" section). Among other things, we post on our website our press releases and information about our public conference calls (including the scheduled dates, times and the methods by which investors and others can listen to those calls), and we make available for replay webcasts of those calls and other presentations for a limited time.

We also use social media channels to communicate with customers and the public about our Company, our products, services and other issues, and we use social media and the Internet to communicate with investors, including information about our stockholder meetings. Information and updates about our Annual Meetings will continue to be posted on our website at www.comtechtel.com in the "Investor Relations" section.

Any materials filed with the SEC may be read and copied by the public at the SEC's Public Reference Room at 100 F Street, N.E., Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330.

We are incorporated in the state of Delaware and were founded in 1967.

Corporate Strategies

We intend to manage our business with the following principal corporate strategies:

- Seek leadership positions in markets where we can provide differentiated products and technology solutions;
- Identify and participate in emerging technologies that enhance or expand our product portfolio;
- Maximize responsiveness to our customers, including offering more integrated systems and solutions;
- Expand and further penetrate our diversified and balanced customer base; and
- Pursue acquisitions of complementary businesses and technologies.

Competitive Strengths

The successful execution of our principal corporate strategies is based on our competitive strengths, including the following:

(1) We Have Significant Exposure to Large, Growing End Markets

We believe we are well positioned to capitalize on some of the most significant technology trends occurring worldwide and that customers around the world will increasingly turn to us to fulfill their needs for secure wireless communications in some of the most demanding environments, including those where traditional communications are unavailable or cost-prohibitive, and in mission-critical scenarios where performance is crucial. These important technology trends include growth in global wireless penetration and consumption, the need for public safety agencies to seamlessly utilize precise location to connect individuals with first responders, global deployment of in-flight connectivity solutions, the rapidly expanding breadth of High Definition ("HD") and 4K broadcasting content and the need for governments to have more modern and mobile communications and transmission equipment to successfully complete mission-critical goals. We believe that all of these trends generate growth in global voice, video and data usage that, in turn, drives increased demand for the secure wireless communication solutions that we provide.

(2) We Believe We Are a Market Leader in the End-Markets That We Serve

Commercial Solutions Segment

Satellite Ground Station Technologies - We believe we are the leading provider of Single Channel per Carrier ("SCPC") satellite earth station modems, solid-state amplifiers and traveling wave tube amplifiers. Many of our key satellite earth station modems incorporate Turbo Product Code ("TPC") forward error correction technology and bandwidth compression technology which enables our customers to optimize their satellite networks by either reducing their satellite transponder lease costs or increasing data throughput. Our amplifier products are used to amplify signals carrying voice, video or data for air-to-satellite-to-ground communications and are vital to satellite communication applications such as traditional broadcast, direct-to-home ("DTH") broadcast and satellite newsgathering. We differentiate our amplifier product offerings by our ability to develop the most efficient size, weight and power profile. Certain of our amplifiers are AS-900 (an airborne quality standard) certified and when incorporated into an aircraft satellite communication system, can provide passengers with email, Internet access and video conferencing. We believe we are a leader in providing amplifiers for the growing in-flight connectivity market.

Public Safety and Location Technologies - We believe that we are a leader in public safety communication and location technologies used for routing 911 calls. We believe we have significant market share in the routing of U.S. wireless 911 calls, Voice over Internet Protocol ("VoIP") 911 calls and Text to 911 messaging. We believe we are one of two companies fulfilling the Federal Communications Commission ("FCC") requirements for Enhanced 911 ("E911") call-routing to public safety answering points ("PSAPs") for wireless and VoIP network operators. E911 refers to 911 calls for both wireline and wireless telephones that are enhanced to provide the caller's location information. We are focusing our marketing and research and development efforts to meet system standards for next generation 911 ("NG-911"), which refers to an Internet Protocol ("IP") based system that allows digital information (e.g., voice, photos, videos, text messages) to flow seamlessly from the public, through the 911 network and on to emergency responders. Our Short-Messaging Service ("SMS") Center software has been used by wireless carrier subscribers to send and receive text or data messages to and from wireless devices for almost two decades. Additionally, we offer Location Studio ™, a complete end-to-end location services platform for mobile carriers, application developers, public safety customers and enterprises.

Government Solutions Segment

Mission-Critical Technologies - We are a key supplier to large governments (particularly the U.S. government) and large prime contractors, for mission-critical technologies, primarily tactical satellite-based technology solutions, field support services and satellite component supply chain management. We are a prime contractor under several indefinite delivery, indefinite quantity ("IDIQ") defense contract vehicles or task orders, including the: (i) U.S. Army's Global Tactical Advanced Communications Systems ("GTACS") contract, (ii) U.S. Navy's Seaport Next Generation ("SeaPort-Nxg") contract, (iii) Complex Commercial SATCOM Solutions ("CS3") contract and (iv) Communications Electronics Command ("CECOM") Responsive Strategic Sourcing for Services ("RS3") contract with the U.S. Army Contracting Command - Aberdeen Proving Ground ("ACC-APG"). We provide field support sustainment services to the U.S. Army's AN/TSC-198 family of communication systems that are commonly referred to as "SNAP" (Secret Internet Protocol Router ("SIPR") and Non-secure Internet Protocol Router ("NIPR") Access Point) Very Small Aperture Terminals ("VSATs"). We also provide sustainment services for the U.S. Army's Blue Force Tracking-1 ("BFT-1") system. Our field support services include providing U.S. Department of Defense ("DoD") personnel with curriculum development and training services to support cybersecurity workforce development. Our satellite component supply chain management services include the procurement of space components, antenna systems and high reliability Electrical, Electronic and Electromechanical ("EEE") parts in support of mission-critical space programs.

High-Performance Transmission Technologies - We are a key supplier of troposcatter and radio frequency ("RF") solid-state, high-power amplifier and switching technologies. We have designed, manufactured and sold troposcatter systems (sometimes referred to as over-the-horizon microwave products and systems) for over fifty years and are one of the largest independent suppliers of solid-state, high-power microwave amplifiers, which reproduce signals with high power and are extremely complex and critical to the performance of the systems into which they are incorporated. Our adaptive troposcatter modem systems can operate at 100 megabits per second ("Mbps") and our Modular Tactical Transmission System ("MTTS") provides a high capacity, beyond-line-of-sight modular communications system designed for easy and rapid deployment. Many amplifier power and switching technologies are produced in-house by large companies; however, our expertise has created a cost-effective and technologically superior alternative to in-house sourcing. Some of the companies who have outsourced amplifier production to us include Rockwell Collins, Inc., Thales Group, European Aeronautic Defense and Space Company ("EADS"), Telephonics Corporation, Northrop Grumman Corporation, BAE Systems PLC and Raytheon Company. Our amplifiers are also used in oncology treatment systems that allow physicians to give cancer patients higher doses of radiation that are more closely focused on cancerous tissue, thereby minimizing damage to healthy tissue.

(3) We Believe We Provide Industry Leading Innovation, Capabilities and Solutions

We have established a leading position of technology innovation in our fields through internal and customer-funded research and development activities, which have yielded significant advances. Examples of our industry-leading innovation include:

Our Heights™ Networking Platform - Our Heights™ networking platform ("Heights") is the cornerstone of our current research and development efforts and is an increasing focus of our satellite earth station equipment sales and marketing efforts. Heights™ is an advanced networking platform that combines our most efficient waveforms, compression engines and the ability to provide dynamic bandwidth and power management to meet the demands of customers operating on traditional fixed satellite service systems ("FSS") while providing advantages for customers who plan to transition to high throughput satellite ("HTS") systems in the future. Heights™ is ideally suited for cellular backhaul, universal service obligation networks and other applications that require high performance in a hub-spoke environment. Heights™ solutions are designed to deliver the highest Internet Protocol bits per Hertz in its class.

Our Solacom Software Solutions - In fiscal 2019, we acquired Solacom Technologies, Inc. ("Solacom"), a leading provider of NG-911 solutions for public safety agencies. Solacom has developed a best-in-class call handling solution marketed under the Guardian brand name which provides an integrated text-to-and-from 911 solution on a unified platform. The solution provides a flexible user interface, is capable of adapting to varying customer environments and preferences, provides powerful call conferencing capabilities, enhanced reporting capabilities and offers geospatial 911 location call display directly from a customized map. Because of its advanced features, it allows us to offer an immediate upgrade path to existing and new customers and has expanded our presence in the public safety solutions market. We intend to continue to invest in product enhancements of the Guardian software including developing a cloud-based version so that we can offer software as a service (SaaS) type solutions to our public safety customers.

(4) We Have a Diverse Global Customer Base

We have established long-standing relationships with thousands of customers worldwide, including leading system and network suppliers in the global satellite (such as Intelsat), mobile cellular (such as Verizon Wireless), defense, broadcast and aerospace industries, as well as the U.S. federal government (such as the U.S. Army and Navy), U.S. state and local governments, and foreign governments. Our global commercial and government customers are increasingly seeking integrated solutions to meet their operational needs. We believe that our customers recognize our ability to develop improved technologies and to meet stringent program requirements.

Our ability to solve complex problems is well known and we believe we a have strong relationships with our customers. We hold prime positions on a number of key contracts and have had a long history of servicing key programs.

Business Segments

Fundamentally, we offer advanced secure wireless communication technologies with expertise in the satellite communications and cellular markets. We believe these markets are undergoing a period of significant growth and rapid technological change. We manage our business through two reportable operating segments: Commercial Solutions and Government Solutions. Our corporate senior management team supports the business segments by, among other things, actively seeking to exploit potential synergies that exist between the segments, including in areas such as manufacturing, technology, sales, marketing, customer support and finance.

The diagram below summarizes our key products, systems and services by our two reportable operating segments:

Commercial Solutions Segment Technologies (approximately 53.2% of fiscal 2019 net sales)		Government Solutions Segment Technologies (approximately 46.8% of fiscal 2019 net sales)	
Satellite Ground Station Technologies	**Public Safety and Location Technologies**	**Mission-Critical Technologies**	**High-Performance Transmission Technologies**
• Satellite ground station technologies such as single channel per carrier and Heights™ modems that facilitate the transmission of voice, video and data over satellite links • Solid-state and traveling wave tube amplifiers used to amplify signals from satellite ground stations	• Wireless/VoIP 911 service for network operators • NextGen 911 solutions • ESInet (Emergency Services IP Network) • Call Handling applications for PSAPs • Software and equipment for location-based and messaging infrastructure	• Tactical satellite-based communications, field support and end-to-end integration • Satellite-based mobile communications and tracking systems • Procurement of satellite-based space components, satellite-based antenna systems, and high reliability EEE parts	• Over-the-horizon microwave equipment that can transmit digitized voice, video and data over distances from 20 to 200 miles using the troposphere • Solid-state, high-power amplifiers designed for radar, electronic warfare, jamming, medical and aviation applications

Commercial Solutions Segment Representative Customers	Government Solutions Segment Representative Customers
Satellite systems integrators, wireless and other communication service providers and broadcasters Domestic and international defense customers, as well as U.S. and foreign governments, prime contractors and system suppliers such as L3Harris Technologies, Inc., General Dynamics Corporation, Raytheon Company and ViaSat, Inc. Satellite broadcasters, such as The DIRECTV Group and EchoStar Corporation End-customers also include Verizon Communications Inc., BT Group plc., China Mobile Limited, CenturyLink, Inc., Claro Argentina, Comcast Corporation, Intelsat, S.A., Speedcast International Limited, Nokia Corporation, SES S.A., Sprint Corporation and Qualcomm Incorporated	U.S. Army logistics community, the U.S. Army war-fighter community, foreign governments, the U.S. Navy, prime contractors to the U.S. Armed Forces and NATO Domestic and international defense customers, prime contractors and system suppliers such as Raytheon Company, The Boeing Company, Lockheed Martin Corporation, Telephonics® Corporation and Thales Group Medical equipment companies, such as Varian Medical Systems, Inc., and aviation industry system integrators such as Collins Aerospace (a subsidiary of United Technology Corporation) Foreign government customers in the Middle East, Europe, North Africa, Latin America and Asia Pacific and related prime contractors and systems integrators. Oil companies such as Shell Oil Company and PETRONAS

Financial information about our business segments, including net sales, operating income, Adjusted EBITDA (a Non-GAAP financial measure), total assets, and our operations outside the United States, is provided in *"Notes to Consolidated Financial Statements - Note (12) Segment Information"* included in *"Part II - Item 8. - Financial Statements and Supplementary Data."*

The markets and key technologies for each segment are further described below.

Commercial Solutions Segment

Overview

Our Commercial Solutions segment offers satellite ground station technologies (such as modems and amplifiers) and public safety and location technologies (such as 911 call routing and mapping solutions) to commercial customers and smaller government customers, such as state and local governments. This segment also serves certain large government customers (including the U.S. government) that have requirements for off-the-shelf commercial equipment.

Key Markets and Technology Solutions

Satellite Ground Station Technologies

We offer our customers one-stop-shopping for satellite ground station technologies including modems, amplifiers, converters and network software for customers who utilize satellite communications. Our products are used to modulate, demodulate and amplify signals, carry voice, video and/or data over networks and are vital to satellite communication applications, including air-to-ground communications, video broadcasting and the backhaul of cellular traffic. Our Commercial Solutions segment manufactures most of the satellite ground station equipment we sell to our customers including equipment sold by our Government Solutions segment.

We believe that the overall satellite ground station equipment industry will grow over the next few years. This growth is expected to occur as a result of widespread deployment and upgrades of ground-based systems, including satellite earth stations, as well as integration of high-performance amplifiers used for high-performance systems necessary to meet demand for high-performance applications of satellite communications technologies, such as satellite-based wireless backhaul, DTH, HD and 4K broadcasting and in-flight connectivity. We believe that Comtech is well positioned to capitalize on this demand through sales of our market leading satellite ground station technologies.

Examples of end-market applications that are driving demand for our satellite-based communication technologies include:

- ***Satellite-Based Cellular Backhaul.*** Demand for satellite-based cellular backhaul services is anticipated to grow rapidly as a result of the increased penetration of smart cellular phones and network upgrades to 3G and 4G in developing regions of the world. Ultimately, as 5G services are deployed, mobile data services will become more critical. As mobile data penetration expands and mobile data consumption increases, wireless carriers must invest in their mobile network infrastructure and businesses will require back-up communications. In developing regions of the world and in remote areas where terrestrial network infrastructure is lacking, wireless network operators often backhaul, or transport, their wireless data traffic using satellite-based networking technologies. Comtech is well positioned to serve the high-performance, high availability needs of satellite-based cellular backhaul through sales of our satellite modems including our Heights™ networking platform.

- ***New High Throughput Satellites.*** There are more than 100 new High Throughput Satellite ("HTS") payloads expected to launch over the next decade which we believe is expected to lead to increasingly complex satellite networks. As service providers work to offer connectivity to these high-speed, high-bandwidth satellites and expand their networks to handle the demand for new HTS applications, we believe our Heights™ networking platform will be incorporated into many new installations and necessary upgrades of equipment.

- ***High Definition and Ultra-High Definition Broadcasting.*** Reports indicate that in recent years, consumers have purchased millions of HD televisions and Ultra-High Definition or "4K" televisions. We believe this will require a significant amount of satellite bandwidth, which will require satellite service providers to upgrade equipment and find new ways to manage the cost and transmission efficiency of their networks. We believe that these requirements will drive increased demand for our satellite ground station technologies.

- ***In-Flight Connectivity.*** Consumer demand for anytime, anywhere connectivity is rapidly rising. As a result, airlines worldwide are deploying in-flight connectivity and entertainment systems. The deployment of in-flight connectivity and entertainment systems by airlines is creating opportunities for us to serve as a key supplier of amplifier components used for in-flight Ku-band connectivity systems. As airlines continue to move to offer higher speed satellite-based connectivity, we believe this market will experience solid demand over the next few years.

Public Safety and Location Technologies

We are a leading provider of public safety and location technologies. Our next generation solutions enable 911 call routing via cellular and over the Internet ("VoIP"). When someone places an emergency call, our technologies can identify the call as an emergency call, access the user's location information from the wireless network and route the call to the assigned public safety jurisdiction. Today, we provide public safety and location technologies to many U.S. telecommunication carriers, the largest of which is Verizon. In fiscal 2018, we signed a multi-year contract with Verizon to provide their 911 call routing via cellular service, which we believe led another customer, AT&T, to begin migration of their 911 call routing via cellular service to a competitor. Given the large market shares of those two carriers, we believe the largest portion of the market for 911 cellular call routing service is split approximately equally between us and our leading competitor.

In addition to 911 call routing, we provide systems integration, satellite and location infrastructure terminals, and linkage to NG-911 Emergency Services IP Networks ("ESInet"). In fiscal 2019, we expanded our product offerings by acquiring Solacom, a small innovative company that offers best-in-class 911 call handling solutions. We believe state and local governments have a need to upgrade existing call handling systems and upgrade old networks to more modern NG-911 systems, including 911 text messaging services, advanced data, real-time photos and other types of information sharing over IP networks.

As the U.S. adopts upgraded call handling and NG-911 solutions, we believe that other countries will do so as well. Our public safety and location technology solutions have been deployed since 2006 and are utilized by literally millions of people in more than 30 states, as well as in Australia. Many of our location technologies (such as mapping and text messaging) are embedded in our public safety and location technology offerings to help address mapping, routing and geolocations. The Federal Communications Commission ("FCC") has mandated that emergency services must incorporate certain location technology, like our own, which utilizes more precise location information. Our text messaging platforms are used by wireless carriers to provide SMS to their end-customers and are also used to communicate with 911 PSAPs through major network operators.

In order to maximize market growth opportunities, we are repositioning certain location technology solutions (previously called enterprise technology offerings) to increase our penetration into the public safety space. Although the market is competitive and the sales cycle is long, we believe demand for our public safety and location technologies are growing and customers are looking for more of an integrated solution. Our Location Studio™ platform allows customers, including public safety agencies, to build their own applications with end-customer functionality, such as maps, search, geocoding, routing and navigation, using their brand. We believe that customers are increasingly looking for an alternative to free mapping services that are subject to change by the provider and which meet their privacy and security requirements. As such, we are integrating OpenStreetMap technologies into our solution which will allow our customers to eliminate certain third-party content fees. Our location technology solution enables the determination of a cell phone's geospatial position in environments where traditional Global Positioning System ("GPS"), global navigation satellite systems and cellular technologies do not work well (such as office buildings). For our installed base of systems, we often provide ongoing operational support, including administration of system components, system optimization and configuration management. Maintenance services include tracking customer support issues, troubleshooting and developing and installing maintenance releases.

Government Solutions Segment

Overview

Our Government Solutions segment provides mission-critical technologies (such as tactical satellite-based networks and ongoing support for complicated communication networks) and high-performance transmission technologies (such as troposcatter systems and solid-state, high-power amplifiers) to large government end-users (including those of foreign countries), large international customers and domestic prime contractors.

Key Markets and Technology Solutions

Mission-Critical Technologies

With persistent threats from state and non-state actors, governments around the world are increasingly seeking ways to mitigate vulnerabilities using information and more reliable communication systems to increase decision-makers' situational awareness. In response this demand, we offer a variety of mission-critical technologies including the supply and field support of tactical satellite-based networks (including satellite modems, ruggedized routers and solid-state drives), sustainment services for the AN/TSC-198A SNAP (Secret Internet Protocol Router ("SIPR") and Non-classified Internet Protocol Router ("NIPR") Access Point), Very Small Aperture Terminals ("VSATs") and sustainment services for the U.S. Army's Blue Force Tracking-1 ("BFT-1") system. Many of our mission-critical technologies are part of integrated communication infrastructure systems such as the U.S. Military Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (also known as "C4ISR") systems and similar complicated networks for international governments.

We are recognized as an industry leader and global supplier of high reliability products. Our solutions include supply chain services such as the procurement of satellite-based space components, satellite-based antenna systems, and high reliability Electrical, Electronic and Electromechanical ("EEE") parts in support of critical National Aeronautics and Space Administration ("NASA") programs and for an international space agency. We also provide a variety of in-class and on-line training services to our customers to help them protect networks from cyber attacks.

High-Performance Transmission Technologies

We offer several unique high-performance transmission technologies that are used in sophisticated communication systems, such as electronic warfare, radar and identification friend or foe ("IFF"). As our customers push the envelope for mobility, speed and higher frequency, we believe that demand for high-performance transmission products will grow from current levels.

Our troposcatter technologies (sometimes referred to as over-the-horizon microwave systems) are extremely reliable and secure and are a cost-effective alternative and compliment to satellite communication as it does not require the leasing of expensive satellite transponder space with its attendant recurring costs. Our over-the-horizon microwave systems, which include our patented forward error correction technology, can transmit video and other broadband applications at throughputs of up to 100 Mbps. U.S. and foreign governments use our over-the-horizon microwave systems to, among other things, transmit radar tracking, run C4ISR applications and to connect remote border locations. Additionally, energy companies use our systems to enable communication links for offshore oil rigs and other remote locations, as well as for exploration activities. Our MTTS, the first truly modular, rapidly deployable transit case-based troposcatter system, has been purchased by the U.S. Army, incorporated into the SNAP family of products used by the U.S. military and designated the Tactical Transportable TROPO ("SNAP 3T") or AN/TRC 198(V3). Our newly introduced next generation troposcatter modems provide significant reductions in size, weight and power as compared to prior models and we believe these next generation modems will facilitate further market expansion.

Our solid-state, high-power amplifiers and related switching technologies are utilized in several critical applications including electronic warfare, communications, radar, IFF and medical applications such as oncology cancer treatment systems. In the electronic warfare marketplace, we support a variety of legacy systems and are participating in the ongoing migration to platforms that require smaller and lighter amplifiers. Our solutions increase the flexibility of systems by providing wider bandwidth capabilities to address communication needs. We also believe that the desire for increased situational awareness of the airspace may create increased opportunities for our radar and IFF products, which are used by government customers around the world. Our high power and highly reliable Gallium Nitride ("GaN") amplifier technology is increasingly used both to update existing radar systems for improved sensitivity and range as well as for new radar installations. In addition to technologies that enhance performance of primary radars, we also supply solutions for IFF systems that provide positive identification of radar targets.

Acquisitions

In the past several years we have acquired businesses and enabling technologies.

On February 23, 2016, we acquired TeleCommunication Systems Inc. ("TCS"), a leading provider of commercial solutions (such as public safety and location technologies) and government solutions (such as mission-critical technologies). The TCS acquisition had an aggregate purchase price for accounting purposes of $340.4 million (also referred to as the transaction equity value) and an enterprise value of $423.6 million. The TCS acquisition resulted in Comtech entering complementary markets and expanding our domestic and international commercial offerings. Our financial results for each of fiscal 2019, 2018 and 2017 include a full year of TCS operations and fiscal 2016 includes approximately five months of TCS operations.

On February 28, 2019, we completed our acquisition of Solacom, a leading provider of NG-911 solutions for public safety agencies. Although revenue contributions in fiscal 2019 were nominal, the acquisition of Solacom was a significant step in our strategy of enhancing our public safety and location technologies solutions and we believe that this acquisition will help us achieve our fiscal 2020 sales target. The Solacom acquisition had an aggregate purchase price for accounting purposes of $32.9 million.

On April 29, 2019, we acquired the state and local government NG-911 business from General Dynamics Information Technology, Inc. (the "GD NG-911 business") and at the same time announced a five-year contract award in excess of $100.0 million to develop, implement and operate a NG-911 emergency communications system for a Northeastern state. The contract began on August 4, 2019 (the start of our fiscal 2020). The acquisition strengthened Comtech's position in the growing NG-911 solutions market and we have fully integrated this business into our Commercial Solutions segment. Revenue contributions from this business in fiscal 2019 were nominal and we believe that this acquisition will help us achieve our fiscal 2020 sales target. The GD NG-911 business has a preliminary aggregate purchase price for accounting purposes of $10.0 million.

In order to position ourselves to take advantage of additional growth opportunities and meet our strategic objectives, we have followed, and will continue to follow, a disciplined approach in identifying, executing and capitalizing on acquisitions.

See "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations"* for further discussion of our recent acquisitions and ongoing acquisition efforts.

Sales, Marketing and Customer Support

Sales and marketing strategies include direct sales through sales, marketing and engineering personnel, indirect sales through independent representatives, value-added resellers, and sales through a combination of the foregoing. We devote resources to evaluating and responding to requests for proposals by governmental agencies around the world and, as needed, we employ the use of specialized consultants to develop our proposals and bids.

We intend to continue to expand international marketing efforts by engaging additional independent sales representatives, distributors and value-added resellers and by establishing additional foreign sales offices. In addition, we also leverage our relationships with larger companies (such as prime contractors to the U.S. government and large mobile wireless operators) to market our technology solutions.

We are pre-qualified as an approved vendor for certain government contracts. We collaborate in sales efforts under various arrangements with integrators. Our marketing efforts also include advertising, public relations, speaking engagements and attending and sponsoring industry conferences.

Our management, technical and marketing personnel establish and maintain relationships with customers. Our sales strategies include a commitment to providing ongoing customer support for our systems and equipment. This support involves providing direct access to engineering staff or trained technical representatives to resolve technical or operational issues.

Our products and services in many of our product lines have long sales cycles. Once a product is designed into a system, customers may be reluctant to change the incumbent supplier due to the extensive qualification process and potential redesign required in using alternative sources. In addition, in recent years, we have found that overall sales cycles for each of our product lines have significantly increased.

Sales by geography and customer type, as a percentage of related net sales, are as follows:

	Fiscal Years Ended July 31,								
	2019	2018	2017	2019	2018	2017	2019	2018	2017
	Commercial Solutions			Government Solutions			Consolidated		
U.S. government	19.2%	18.1%	15.1%	63.8%	62.2%	59.2%	40.1%	35.5%	32.7%
Domestic	53.9%	54.6%	54.4%	12.5%	14.9%	15.5%	34.5%	38.9%	38.9%
Total U.S.	73.1%	72.7%	69.5%	76.3%	77.1%	74.7%	74.6%	74.4%	71.6%
International	26.9%	27.3%	30.5%	23.7%	22.9%	25.3%	25.4%	25.6%	28.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sales to U.S. government customers include sales to the U.S. Department of Defense ("DoD"), intelligence and civilian agencies, as well as sales directly to or through prime contractors.

Domestic sales include sales to commercial customers, as well as to U.S. state and local governments. Included in domestic sales, are sales to Verizon Communications Inc. ("Verizon"), which represented 10.0% of consolidated net sales for fiscal 2018. Except for the U.S. government, there were no customers that represented more than 10.0% of consolidated net sales during fiscal 2019 and 2017.

International sales for fiscal 2019, 2018 and 2017 (which include sales to U.S. domestic companies for inclusion in products that are sold to international customers) were $170.6 million, $145.8 million and $156.5 million, respectively. When we sell internationally, we denominate virtually all of our contracts in U.S. dollars. Some of our sales to international customers are paid for by letters of credit or on an open account. From time to time, some of our international customers may require us to provide performance guarantees.

Except for the U.S., no individual country (including sales to U.S. domestic companies for inclusion in products that are sold to a foreign country) represented more than 10% of consolidated net sales for fiscal 2019, 2018 and 2017.

Backlog

Our backlog as of July 31, 2019 was $683.0 million (of which $493.9 million was attributed to the Commercial Solutions segment and $189.1 million was attributed to the Government Solutions segment). We expect that a significant portion of the backlog as of July 31, 2019 will be recognized as sales during fiscal 2020.

At July 31, 2019, 65.6% of our backlog consisted of orders for use by U.S. commercial customers, 20.0% consisted of U.S. government contracts, subcontracts and government funded programs and 14.4% consisted of orders for use by international customers (including sales to U.S. domestic companies for inclusion in products that will be sold to international customers).

Our backlog is defined as orders (sometimes also referred to herein as bookings) that we believe to be firm. Backlog that is derived from U.S. government orders relates to U.S. government contracts that have been awarded, signed and funded. Backlog for our U.S. government customers also includes amounts appropriated by Congress and allotted to the contract by the procuring government agency. Our backlog does not include the value of options that may be exercised in the future on multi-year contracts, nor does it include the value of additional purchase orders that we may receive under indefinite delivery/indefinite quantity ("IDIQ") contracts or basic ordering agreements. In some cases, such as contracts received from large U.S. based telecommunication companies, our backlog is computed by multiplying the most recent month's contract or revenue by the months remaining under the existing long-term agreements, which we consider to be the best available information for anticipating revenue under those agreements. When we acquire a company with existing contracts, we only record bookings for those contracts that meet our definition. Almost all of the contracts in our backlog (including firm orders previously received from the U.S. government) are subject to modification, cancellation at the convenience of the customer or for default in the event that we are unable to perform under the contract.

A significant portion of the backlog from our U.S. commercial customers relates to large, multi-year contracts to provide state and local governments (and their agencies) with public safety and location solutions. Although the contracts themselves represent legal, binding obligations of these governments, funding is often subject to the approval of budgets (for example, on an annual or bi-annual basis). Although funding for these multi-year contracts are dependent on future budgets being approved, we include the full estimated value of these large, multi-year contracts in our backlog given the critical nature of the services being provided and the positive historical experience of our state and local government customers passing their respective budgets.

There can be no assurance that our backlog will result in actual revenue in any particular period, or at all, or that any contract included in backlog will be profitable. There is a higher degree of risk in this regard with respect to unfunded backlog. The actual receipt and timing of any revenue is subject to various contingencies, many of which are beyond our control. The actual recognition of revenue on contracts included in backlog may never occur or may change because a program schedule could change, the program could be canceled, a contract could be reduced, modified or terminated early, funding may not be included in future budgets, or an option that we had assumed would be exercised is not exercised.

Variations in backlog from time to time are attributable, in part, to changes in sales mix, the timing of contract proposals, the timing of contract awards, delivery schedules on specific contracts and new bookings obtained through acquisitions. A large majority of the solutions in our satellite ground station technologies product line operate under short lead times. Our Government Solutions segment backlog is highly influenced by the nature and timing of orders received from the U.S. government, which is subject to unpredictable funding, deployment and technology decisions. As a result, we believe our backlog and orders, at any point in time, are not necessarily indicative of the total sales anticipated for any future period.

Manufacturing and Service

Our manufacturing operations consist principally of the assembly and testing of electronic products that we design and build from purchased fabricated parts, printed circuits and electronic components. We consider our facilities to be well maintained and adequate for current and planned production requirements. All of our manufacturing facilities, including those that serve the military market, must comply with stringent customer specifications. We employ formal quality management programs and other training programs, including the International Standard Organization's quality procedure registration programs.

We operate a high-volume technology manufacturing center located in Tempe, Arizona. This manufacturing center is operated by our Commercial Solutions segment and can be utilized, in part, by our Government Solutions segment and by third-party commercial customers, including prime contractors to the U.S. government, who can outsource a portion of their product manufacturing to us. Increased usage of our high-volume technology manufacturing center allows us to secure volume discounts on key components, better control the quality of our manufacturing process and maximize the utilization of our manufacturing capacity.

Our ability to deliver products to customers on a timely basis is dependent, in part, upon the availability and timely delivery by subcontractors and suppliers (including, at times, the U.S. government) of the components and subsystems that we use in manufacturing our products. Electronic components and raw materials used in our products are generally obtained from independent suppliers. Some components are standard items and are available from several suppliers. Others are manufactured to our specifications by subcontractors. Although we obtain certain components and subsystems from a single source or a limited number of sources, we believe that most components and equipment are available from multiple sources. Certain U.S. government contracts may require us to incorporate government furnished parts into our products. Delays in receipt of such parts can adversely impact the timing of our performance on the related contracts.

Research and Development

We have established a leading technology position in our fields through internal and customer-funded research and development activities.

Internal research and development expenses are reported as research and development expenses for financial reporting purposes and were $56.4 million, $53.9 million and $54.3 million in fiscal 2019, 2018 and 2017, respectively, representing 8.4%, 9.4% and 9.9% of total consolidated net sales, respectively, for these periods. Customer-funded research and development activities relate to the adaptation of our basic technology to specialized customer requirements which is recoverable under contracts and is reflected in net sales with the related costs included in cost of sales. Certain of our government customers contract with us from time to time to conduct research on telecommunications software, equipment and systems. During fiscal 2019, 2018 and 2017, we were reimbursed by customers for such activities in the amounts of $14.7 million, $16.9 million and $27.1 million, respectively.

Intellectual Property

We rely upon trade secrets, technical know-how, continuing technological innovation and, with respect to certain technologies, patents to develop and maintain our competitive position. The products we sell require significant engineering design and manufacturing expertise. For these technological capabilities that are not protected by patents or licenses, we generally rely on the expertise of our employees and our learned experiences in both the design and manufacture of our products and the delivery of our services.

Some of our key Commercial Solutions segment technology is protected by patents that are significant to protecting our proprietary technology. We have been issued several U.S. patents relating to forward error correction technology that is utilized in our TPC-enabled satellite modems. Due to our market leadership position, we do not expect that upon expiration of these patents, our future results will be negatively impacted.

We have a portfolio of several hundred patents worldwide relating to wireless location services, text messaging, GPS ephemeris data, emergency public safety data routing, electronic commerce and other areas. To-date, our strategy has been to avoid offensive and defensive patent litigation and focus on building meaningful partnerships with other companies through direct licensing, cross licensing, and other forms of agreements. We do not believe that any single patent or group of patents, patent application or patent license agreement is material to the Company's operations.

We have filed additional patent applications for certain apparatus and processes we believe we have invented covering key features of the location services, wireless text alerts, SMS Center, mobile-originated data and E911 network software. There is no assurance that any patent application will result in a patent being issued by the U.S. Patent and Trademark Office or other patent offices, nor is there any guarantee that any issued patent will be valid and enforceable. Additionally, foreign patent rights may or may not be available or pursued in any technology area for which U.S. patent applications have been filed.

Almost all of the products and services we sell to the U.S. government include technology and other technical know-how that we have internally developed. In past instances where we have provided government-purpose rights, to our knowledge, the U.S. government has not exercised any of these rights. To the extent that we have provided or will provide government-purpose rights in the future, we believe that given the rapidly changing nature of our technology, our future success will depend primarily on the technical competence and creative skill of our personnel, rather than any contractual protection.

Competition

Our businesses are highly competitive and are characterized by rapid technological change. Some of our competitors are substantially larger, have significantly greater financial, marketing, research and development, technological and operating resources and broader product lines than we have. Other companies are developing new technologies and the shift towards open standards such as IP-based satellite networks will likely result in increased competition. A significant technological breakthrough by others, including new companies, our existing competitors and our customers, could have a material adverse effect on our business. Our future success depends on, among other things, our ability to keep pace with such changes and developments and to respond to the increasing variety of electronic equipment users and transmission technologies.

Some large defense-based companies, such as Northrop Grumman Corporation, have subsidiaries or divisions that compete against us in one or more business segments. In addition, new and potential competitors are always emerging. Certain of our customers, such as prime contractors who currently outsource their engineering and manufacturing requirements to us, have technological capabilities in our product areas and could choose to replace our products with products they develop. In some cases, we partner or team with companies (both large and mid-tier) to compete against other teams for large defense programs. In some cases, these same companies may be among our competitors.

Listed below, in alphabetical order, are some of our competitors in each of our two business segments:

Commercial Solutions - ACTIA Group, Advantech Wireless Network Co Ltd, Agilis Satcom, AnaCom, Inc., CalAmp Corp., Codan Limited, CPI International, Inc., Datum Systems, Inc., dB Control Corp. (a subsidiary of HEICO Corp.), 8x8 Inc., ENENSYS Technologies SA, ETM, Inc., Gilat Satellite Networks Ltd., Google Inc., Here Technologies, Honeywell Aerospace, Infinite Convergence Solutions, Inc., Intermap Technologies Corporation, Iridium Communications Inc., ITS Electronics Inc., KVH Industries Inc., LM Ericsson Telephone Company, L3Harris Technologies, Inc., Mission Microwave Technologies, LLC., Motorola Solutions, Inc., ND Satcom GmbH, Newtec, Nokia Networks (a subsidiary of Nokia Corporation), NovelSat, Novra Technologies, Inc., Orbcomm, Inc., Panasonic, Paradise Datacom LLC (a subsidiary of Teledyne Technologies, Inc.), Polarity, Inc., SatixFy Israel Ltd, SatPath Systems, Inc., Spacepath Communications Limited, Speedcast International Limited, ST Engineering iDirect, Inc., Telenav, Inc., TMD Technologies LLC., TomTom N.V., ViaSat Inc. and West Corporation.

Government Solutions - Aethercomm Inc., AMERGINT Technologies, Inc., CACI International Inc., CalAmp Corp., Cubic Corporation, dB Control Corp. (a subsidiary of HEICO Corp.), DXC Technology, Empower RF Systems, Inc., Envistacom, LLC., Escape Communications, Inc., General Dynamics Corporation, International Datacasting Corporation (a subsidiary of Novra Technologies, Inc.), Kratos Defense & Security Solutions, Inc., L3Harris Technologies, Inc., Mercury Systems, Inc., NeuStar, Inc., Northrop Grumman Corporation (including the former Orbital ATK, Inc.), Raytheon Company, Teledyne Technologies, Inc., The KEYW Holding Corporation, Ultra Electronics Holdings plc. and ViaSat Inc.

We believe that competition in all our markets is based primarily on technology innovation, product performance, reputation, delivery times, customer support and price. Due to our proprietary know-how, we believe we can develop, produce and deliver products and services on a cost-effective basis faster than many of our competitors.

Employees

At July 31, 2019, we had 2,013 employees (including temporary employees and contractors), 1,189 of whom were engaged in production and production support, 423 in research and development and other engineering support, and 401 in marketing and administrative functions. None of our U.S. based employees are represented by a labor union. We believe that our employee relations are good.

U.S. Government Contracts and Security Clearances

The U.S. government operates on an October-to-September fiscal year. Generally, in February of each year, the President of the United States presents to the U.S. Congress ("Congress") the proposed budget for the upcoming fiscal year and from February through September of each year, the appropriations and authorization committees of Congress review the President's budget proposals and establish the funding levels for the upcoming fiscal year. Once these levels are enacted into law, the Executive Office of the President administers the funds to the agencies. Thereafter, we can receive orders pursuant to sole-source or competitively awarded contracts, which we describe below.

The U.S. government may be unable to complete its budget process before the end of any given government fiscal year and when the fiscal budget is not approved in a timely manner, the U.S. government is required either to shut down or be funded pursuant to a so-called "continuing resolution" that authorizes agencies of the U.S. government to continue operations but does not authorize new spending initiatives, either of which could result in reduced or delayed orders or payments for products and services we provide.

Sole-source contracts are generally awarded to a single contractor without a formal competition when a single contractor is deemed to have an expertise or technology superior to that of competing contractors or when there is an urgent need by the U.S. government that cannot wait for a full competitive process. Potential suppliers compete informally through research and development and marketing efforts. Competitively-bid contracts are awarded based on a formal proposal evaluation established by the procuring agency and interested contractors prepare bids. Competitively-bid contracts are awarded after a formal bid and proposal competition among suppliers.

The U.S. government has a stated policy direction to reduce the number of sole-source contract awards across all procuring agencies. In addition, the U.S. government is increasing the use of multiple-award IDIQ contracts to increase its procurement options. IDIQ contracts allow the U.S. government to select a group of eligible contractors for the same program. When the government awards IDIQ contracts to multiple bidders under the same program, a company that has already competed to be selected as a participant in the program must subsequently compete for individual delivery orders. As a result of this U.S. government shift toward multiple award IDIQ contracts, we expect to face greater competition for future U.S. government contracts and, at the same time, greater opportunities for us to participate in program areas that we do not currently participate in.

As a U.S. government contractor and subcontractor, we are subject to a variety of rules and regulations, such as the Federal Acquisition Regulations ("FAR"). Individual agencies can also have acquisition regulations. For example, the Department of Defense implements the FAR through the Defense Federal Acquisition Regulation supplement (commonly known as "DFARs"). For all Federal government entities, the FAR regulates the phases of any product or service acquisition, including: acquisition planning, competition requirements, contractor qualifications, protection of source selection and vendor information, and acquisition procedures. In addition, the FAR addresses the allowability of supplier costs, while Cost Accounting Standards address how those costs can be allocated to contracts. The FAR also subjects suppliers to audits and other government reviews. These reviews cover issues such as cost, performance and accounting practices relating to our contracts. The government may challenge a supplier's costs and fees. Suppliers are also required to comply with the National Industrial Security Program Operating Manual which relates to requirements regarding classified materials and programs. Suppliers who do not comply with these various regulations may lose and/or become ineligible for facility security clearances and/or participation in classified programs.

Under firm fixed-price contracts, we perform for an agreed-upon price and we can derive benefits from cost savings, but bear the risk of cost overruns. Our cost-reimbursable type contracts typically provide for reimbursement of allowable costs incurred plus a negotiated fee. Cost-plus-incentive-fee orders typically provide for sharing with the U.S. government savings accrued from orders performed for less than the target costs and costs incurred in excess of targets up to a negotiated ceiling price (which is higher than the target cost), and for the supplier to carry the entire burden of costs exceeding the negotiated ceiling price.

In fiscal 2019, $269.2 million or 40.1% of our consolidated net sales were to the U.S. government (including sales to prime contractors to the U.S. government). Of this amount, firm fixed-price and cost-reimbursable type contracts (including fixed-fee, incentive-fee and time and material type contracts) accounted for approximately $188.0 million and $81.2 million, respectively.

Regulatory Matters

In addition to the rules and regulations that pertain to us as a U.S. government contractor and subcontractor, we are also subject to a variety of local, state and federal governmental regulations.

Our products that are incorporated into wireless communications systems must comply with various government regulations, including those of the FCC. Our manufacturing facilities, which may store, handle, emit, generate and dispose of hazardous substances that are used in the manufacture of our products, are subject to a variety of local, state and federal regulations, including those issued by the Environmental Protection Agency. Our products are also subject to European Union directives related to the recycling of electrical and electronic equipment.

Our international sales are subject to U.S. and foreign regulations such as the Arms Export Control Act, the International Emergency Economic Powers Act ("IEEPA"), the International Traffic in Arms Regulations ("ITAR"), the Export Administration Regulations ("EAR") and the trade sanctions laws and regulations administered by the U.S. Department of the Treasury's Office of Foreign Assets Control ("OFAC") as well as other applicable laws relating to trade, export controls and foreign corrupt practices, the violation of which could adversely affect our operations. We cannot be certain that we will be able to obtain necessary export licenses, and such failure would materially adversely affect our operations. If we are unable to receive appropriate export authorizations in the future, we may be prohibited from selling our products and services internationally, which may limit our sales and have a material adverse effect on our business, results of operations and financial condition. We must comply with all applicable export control laws and regulations of the U.S. and other countries. Certain of our products and systems may require licenses from U.S. government agencies for export from the U.S., and some of our products are not permitted to be exported. In addition, in certain cases, U.S. export controls also severely limit unlicensed technical discussions, such as discussions with any persons who are not U.S. citizens or permanent residents. As a result, in cases where we may need an export license, our ability to compete against a non-U.S. domiciled foreign company that may not be subject to the same U.S. laws may be materially adversely affected. In addition, we are subject to the Foreign Corrupt Practices Act ("FCPA") and other local laws that generally bar bribes or unreasonable gifts to foreign governments or officials. Violations of these laws or regulations could result in significant sanctions, including disgorgement of profits, fines, and criminal sanctions against us, our officers, our directors, or our employees, more onerous compliance requirements, more extensive debarments from export privileges or loss of authorizations needed to conduct aspects of our international business. A violation of any of the regulations enumerated above could materially adversely affect our business, financial condition and results of operations. Additionally, changes in regulatory requirements which could further restrict our ability to deliver services to our international customers, including the addition of a country to the list of sanctioned countries under the IEEPA or similar legislation could negatively impact our business.

In the past, we have self-reported violations of ITAR to the U.S. Department of State, Directorate of Defense Trade Controls ("DDTC") and had an ITAR compliance audit performed by an independent auditor at the request of the DDTC. Although the audit found no violations of ITAR, we committed to the DDTC that we would enhance and maintain certain policies and procedures and we have established a company-wide Office of Trade Compliance.

In October 2014, we disclosed to OFAC that we learned during a self-assessment of our export transactions that a shipment of modems sent to a Canadian customer by Comtech EF Data Corp. was incorporated into a communication system, the ultimate end user of which was the Sudan Civil Aviation Authority. The sales value of this equipment was approximately $288,000. At the time of shipment, OFAC regulations prohibited U.S. persons from doing business directly or indirectly with Sudan. In late 2015, OFAC issued an administrative subpoena seeking further information about the disclosed transaction. We have responded to the subpoena, including alerting OFAC to Comtech's repair of three modems for a customer in Lebanon who may have rerouted the modems from Lebanon to Sudan without the required U.S. licensing authorization. In September 2018, Comtech agreed to enter into a Tolling Agreement with OFAC, which extends the statute of limitations in this matter through December 31, 2019. The Tolling Agreement was shortly followed by a second administrative subpoena seeking additional information about the disclosed transaction. In December 2018, Comtech responded to a second administrative subpoena from OFAC, answering the questions it posed and providing all the documents it sought. U.S. sanctions with respect to Sudan were revoked in 2017. Consistent with the revocation of the Sudan Sanction Regulations ("SSR"), shipments to the Sudan Civil Aviation Authority by U.S. persons are now permissible. We are not able to predict whether OFAC will take any enforcement action against us in light of the recent revocation of the SSR. If OFAC determines that we have violated U.S. trade sanctions, civil and criminal penalties could apply, and we may suffer reputational harm. Even though we take precautions to avoid engaging in transactions that may violate U.S. trade sanctions, those measures may not be effective in every instance.

In May 2018, we were informed by the Office of Export Enforcement ("OEE") of the Department of Commerce ("DoC") that it was forwarding to the DoC's Office of Chief Counsel, the results of its audit of international shipments by Comtech Xicom Technology, Inc. for further review and possible determination of an administrative penalty. We fully cooperated with the OEE in their audit and, based on our self-assessment of the approximately 7,800 individual transactions audited, have determined that six (6) transactions may not have been fully in compliance with the EAR. These six (6) items, for which export licenses were not obtained, were either spares or repaired power amplifier subassembly components valued at less than $100,000 (in aggregate) and were shipped to Brazil, Italy, Russia, Thailand and the United Arab Emirates. The EAR provides an exception to the requirement to obtain an export license for the replacement of a defective or damaged component. During our self-assessment, we determined that we inadvertently did not obtain export licenses for the spares or had evidence of the return or destruction of the defective or damaged components necessary to authorize our use of the export license exception for the replacements. Since discovering this issue, we have implemented additional controls and procedures and have increased awareness of these specific export requirements throughout the Company to help avoid similar occurrences in the future. Administrative penalties under the EAR can range from a warning letter to a denial of export privileges. A civil monetary penalty not to exceed the amount set forth in the Export Administration Act ("EAA") may be imposed for each violation, and in the event that any provision of the EAR is continued by any other authority, the maximum monetary civil penalty for each violation shall be that provided by such other authority. Administrative penalties under the EAR are currently determined pursuant to the IEEPA, which can reach the greater of twice the amount of the transaction that is the basis of the violation or approximately $300,000 per violation. We have not recorded an accrual related to a possible administrative penalty and continue to work cooperatively with the OEE.

Our financial reporting, corporate governance, public disclosure and compliance practices are governed by laws such as the Sarbanes-Oxley Act of 2002, Dodd-Frank Act of 2010, and rules and regulations issued by the SEC. The SEC has adopted rules which require, among other things, public companies to conduct certain inquiries to determine whether or not Conflict Minerals (as that term is defined in the SEC rules) that are necessary to the functionality of their manufactured products or their product's production processes originated in a Covered Country (as that term is defined in the SEC rules) and ultimately file a report with the SEC. Conflict Minerals are widely used in many industries, including the telecommunications industry and almost all of our products include component parts purchased from third-party suppliers and we must rely heavily on information received from suppliers to determine the origin of those materials. We have implemented a due diligence program consistent with the Organization for Economic Co-operation and Development guidelines to collect information concerning the country of origin of Conflict Minerals and in that regard, have adopted a policy that requires our suppliers (both public and private) to commit to a code of conduct relating to the responsible sourcing of minerals and to establish a policy to reasonably assure that the products they manufacture do not contain Conflict Minerals that originated in a Covered Country. Efforts to comply with this SEC rule have resulted in additional costs to us and, we believe, to our suppliers. As such, the availability of raw materials used in our operations could be negatively impacted and/or raw material prices could increase. Further, if we are unable to certify that our products are conflict free, we may face challenges with our customers, which could place us at a competitive disadvantage and could harm our reputation.

Laws and regulations have been enacted that affect companies conducting business on the Internet, including the European General Data Protection Regulation ("GDPR"). The GDPR imposes certain privacy related requirements on companies that receive or process personal data of residents of the European Union that are currently different than those in the United States and include significant penalties for non-compliance. Similarly, there are several legislative proposals in the United States, at both the federal and state level, that could impose new obligations in areas affecting our business, such as liability for personal data protection. In addition, some countries are considering or have passed legislation implementing data protection requirements or requiring local storage and processing of data or similar requirements that could increase the cost and complexity of delivering our services. Our costs to comply with the GDPR as well any other similar laws and regulations that emerge may negatively impact our business.

ITEM 1A. RISK FACTORS

Forward-Looking Statements

The following describes major risks to our business and should be considered carefully. Any of these factors could significantly and negatively affect our business, prospects, financial condition, or operating results, which could cause the trading prices of our equity securities to decline. The risks described below are not the only risks we may face. Additional risks and uncertainties not presently known to us, or risks that we currently consider immaterial, could also negatively affect us.

<u>Risks Related to our Business</u>

Our fiscal 2020 business outlook is difficult to forecast and operating results are subject to significant fluctuations and are likely to be volatile.

Although we currently believe overall market conditions for our business are positive and that our business performance in fiscal 2020 will be better than fiscal 2019, there can be no assurance of such results. Our business outlook is difficult to forecast and backlog (sometimes referred to herein as orders or bookings), net sales and operating results may vary significantly from period to period due to a number of factors including: sales mix; fluctuating market demand; price competition; new product introductions by our competitors; changing customer partnering procurement strategies; fluctuations in foreign currency exchange rates; unexpected changes in the timing of delivery of components or subsystems; the financial performance and impact of acquisitions; new accounting standards; political instability; regulatory developments; changes in income tax rates or tax credits; the price and expected volatility of our stock (which will impact, among other items, the amount of stock-based compensation expense we may record); and general global economic conditions.

We have experienced, and will experience in the future, significant fluctuations in bookings, net sales and operating results from period to period. For example, a sudden change in global economic conditions could have an immediate impact on a large portion of our net sales, a large amount of which are derived from products such as satellite ground station technologies, amplifier products and mission-critical technologies that generally have short order and lead times. Similarly, sales of certain of our public safety and location technologies are subject to sudden changes in wireless carrier procurement strategies, including decisions to sole-source such solutions. As a result of any such conditions or changes, bookings and backlog related to these solutions are extremely sensitive to short-term fluctuations in customer demand.

In addition, a large portion of our Government Solutions segment's net sales are derived in part from large U.S. government programs or large foreign government opportunities that are subject to lengthy sales cycles (including funding requirements) and are therefore difficult to predict.

If global economic business and political conditions deteriorate as compared to the current environment, it could have a material adverse impact on our business outlook and our business, operating results and financial condition.

Although overall current market conditions are strong, many of the end-markets for our products and services have been significantly impacted in the past by adverse global economic conditions. For example, many of our international end-customers are in emerging and developing countries that are subject to sweeping economic and political changes. Many governments around the world are under pressure to reduce their spending. In recent years, global oil and natural gas prices have been volatile and significantly impaired the ability of certain of our government customers in the oil and gas producing regions of the world to invest in telecommunications products and infrastructure. Additionally, the relative strength of the U.S. dollar against many international currencies has negatively impacted the purchasing power for many of our international end-customers because virtually all of our sales are denominated in U.S. dollars. We generate significant sales from Brazil, Russia, India and China as well as other emerging and developing countries.

The business environment is currently stable; however, a sudden change could result in the immediate suppression of end-market demand for many of our products such as satellite ground station technologies and other short-lead time products. The timing, impact, severity and duration of these conditions are impossible to predict. In addition, many of our international customers (including our Middle Eastern and African customers) rely on European bank financing to procure funding for large systems, many of which include our equipment. We believe that European financing has been and continues to be difficult to obtain. Volatility of interest rates may cause our customers to be reluctant to spend funds required to purchase our equipment or projects could be postponed or canceled.

Currently, the United Kingdom ("U.K.") is attempting to negotiate an exit from the European Union, commonly referred to as "Brexit." Although we currently do not sell any significant amount of equipment in the U.K. or maintain large operations in the U.K., adverse consequences concerning Brexit could result in a deterioration in global economic conditions, instability in global financial markets, political uncertainty, volatility in currency exchange rates, or adverse changes in the cross-border agreements currently in place, any of which could have an adverse impact on our financial results in the future.

In the past, our overall business has not been immune from adverse economic conditions. If U.S. or global economic conditions deteriorate, or political conditions become unstable, or additional economic sanctions are imposed on some of our end-customers, it could adversely impact our business in a number of ways, including:

- Difficulty in forecasting our results of operations - It is difficult to accurately forecast our results of operations during periods of adverse conditions as we cannot predict the severity or the duration of such conditions or the impact it could have on our current and prospective customers. If our current or prospective customers materially postpone, reduce or even forgo purchases of our products and services to a greater extent than we anticipate, our business outlook will prove to be inaccurate.

- Additional reductions in telecommunications equipment and systems spending may occur - In the past, our businesses have been negatively affected by uncertain economic environments in the overall market and, more specifically, in the telecommunications sector. Our customers have reduced their budgets for spending on telecommunications equipment and systems and in some cases postponed or reduced the purchase of our products and systems. In the future, our customers may again reduce their spending on telecommunications equipment and systems which would negatively impact both of our operating segments. If this occurs, it would adversely affect our business outlook, net sales, profitability and the recoverability of our assets, including intangible assets such as goodwill.

- Our customers may not be able to obtain financing - Although many of our products are relatively inexpensive when compared to the total systems or networks that they are incorporated into, our sales are affected by our customers' ability to obtain the financing they may require to build out their total systems or networks and fund ongoing operations. Many of our emerging market customers obtain financing for network buildouts from European commercial banks and/or governments. Our customers' inability to obtain adequate financing would adversely affect our net sales. In addition, if the economic environment and lack of financing results in insolvencies for our customers, it would adversely impact the recoverability of our accounts receivable which would, in turn, adversely impact our results of operations.

We have incurred indebtedness under a Credit Facility and may not be able to service that debt in the future and we must maintain compliance with various covenants that impose restrictions on our business.

On October 31, 2018, we entered into a First Amended and Restated Credit Agreement (the "Credit Facility") with a syndicate of lenders, replacing our prior Credit Agreement dated as of February 23, 2016. The new Credit Facility, as amended, provides a senior secured loan facility of up to $550.0 million consisting of: (i) a revolving loan facility with a borrowing limit of $300.0 million; (ii) an accordion feature allowing us to borrow up to an additional $250.0 million; (iii) a $35.0 million letter of credit sublimit; and (iv) a swingline loan credit sublimit of $25.0 million. The obligations under the Credit Facility are secured by substantially all of our tangible and intangible assets.

As of July 31, 2019, the amount outstanding under our Credit Facility was $165.0 million, which is reflected in the non-current portion of long-term debt on our Consolidated Balance Sheet. At July 31, 2019, we also had $2.7 million of standby letters of credit outstanding under our Credit Facility related to guarantees of future performance on certain customer contracts.

The Credit Facility matures on October 31, 2023. If we do not have sufficient funds to repay our debt when due, it may be necessary to refinance our debt through additional debt or equity financings. If, at the time of any refinancing, prevailing interest rates or other factors result in higher interest rates on such refinancing, increases in interest expense could have a material adverse effect on our business, results of operations and financial condition.

Our Credit Facility contains various affirmative and negative covenants that may restrict our ability to, among other things, permit liens on our property, change the nature of our business, transact business with affiliates and/or merge or consolidate with any other person or sell or convey certain of our assets to any one person.

As of July 31, 2019, our Secured Leverage Ratio (as defined in the Credit Facility, as amended) was 1.74x trailing twelve month ("TTM") Consolidated EBITDA (as defined in the Credit Facility, as amended) compared to the maximum allowable Leverage Ratio of 3.75x TTM Consolidated EBITDA. Our Interest Expense Coverage Ratio as of July 31, 2019 was 12.05x TTM Adjusted EBITDA compared to the Minimum Interest Expense Coverage Ratio of 3.25x TTM Adjusted EBITDA.

Given our expected future business performance, we anticipate maintaining compliance with the terms and financial covenants in our Credit Facility for the foreseeable future. However, there can be no assurance that we will be able to meet such covenants. Our ability to comply with these provisions may be affected by events beyond our control. Failure to comply with these covenants could result in an event of default, which, if not cured or waived, could accelerate our repayment obligations. Our substantial debt obligations could impede, restrict or delay the implementation of our business strategy or prevent us from entering into transactions that would otherwise benefit our business. For example:

- we may be required to dedicate a substantial portion of our cash flows from operations to payments on our indebtedness, thereby reducing the availability of our cash flows for other purposes, including business development efforts, capital expenditures, dividends or strategic acquisitions;

- if we are not able to generate sufficient cash flows to meet our substantial debt service obligations or to fund our other liquidity needs, we may have to take actions such as selling assets or raising additional equity or reducing or delaying capital expenditures, strategic acquisitions, investments and joint ventures, or restructuring our debt;

- we may not be able to fund future working capital, capital investments and other business activities;

- we may not be able to pay dividends or make certain other distributions;

- we may become more vulnerable in the event of a downturn in our business or a worsening of general economic or industry-specific conditions; and

- our flexibility in planning for, or reacting to, changes in our business and industry may be limited, thereby placing us at a competitive disadvantage compared to our competitors that have less indebtedness.

Future acquisitions of companies and investments could prove difficult to integrate, disrupt our business, dilute stockholder value or adversely affect operating results or the market price of our common stock.

As we enter fiscal 2020, we are involved with acquisition efforts to acquire companies that have complimentary solution offerings. In addition, we expect to continue to evaluate other acquisitions and investments as part of our growth plans. Such efforts may not result in an acquisition or ultimately be beneficial to us.

Future acquisitions or investments may result in the use of significant amounts of cash, potentially dilutive issuances of equity securities, incurrence of large amounts of debt, increases to amortization expense and future write-offs of the acquired intangibles. Acquisitions and investments involve risks that include failing to:

- properly evaluate the technology;

- accurately forecast the financial impact of the transaction, including accounting charges and transaction expenses;

- integrate the technologies, products and services, research and development, sales and marketing, support and other operations;

- integrate and retain key management personnel and other key employees;

- retain and cross-sell to acquired customers; and

- combine potentially different corporate cultures.

Acquisitions and investments could also:

- divert management's attention away from the operation of our businesses;
- result in significant goodwill and intangibles write-offs in the event an acquisition or investment does not meet expectations; and
- increase expenses, including expenses of managing the growth of such acquired businesses.

There can be no assurance that any future acquisition or investment will be successful within the anticipated time frame, or at all, will be as valuable as the amount we eventually pay to acquire it, and will not adversely affect our business, results of operations or financial condition. In addition, if we consummate future acquisitions using our equity securities or securities convertible into our equity securities, existing stockholders may be diluted, which could have a material adverse effect on the market price of our common stock.

Our business is highly dependent on the budgetary decisions of our government customers, including the U.S. government (including prime contractors to the U.S. government), and changes in the U.S. government's fiscal policies or budgetary priorities may have a material adverse effect on our business, operating results and financial condition.

During our fiscal years ended July 31, 2019, 2018 and 2017, sales to the U.S. government (including sales to prime contractors to the U.S. government) were $269.2 million, $202.7 million and $180.0 million or 40.1%, 35.5% and 32.7% of our consolidated net sales, respectively. In addition, a large portion of our existing backlog consists of orders related to U.S. government contracts and our Business Outlook for Fiscal 2020 and beyond depends, in part, on significant new orders from the U.S. government, which undergoes extreme budgetary pressures from time to time.

We rely on particular levels of U.S. government spending on our communication solutions, and our receipt of future orders depends in large part on continued funding by the U.S. government for the programs in which we participate. These spending levels are not generally correlated with any specific economic cycle, but rather follow the cycle of general public policy and political support for this type of spending. Government contracts are conditioned upon the continuing availability of congressional appropriations and Congress's failure to appropriate funds, or Congress's actions to reduce or delay spending on, or reprioritize its spending away from, U.S. government programs which we participate in, could negatively affect our results of operations. Because many of the items we sell to the U.S. government are included in large programs realized over a period of several years, it is difficult, if not impossible, to determine specific amounts that are or will be appropriated for our products and services. As such, our assessments relating to the impact of changes in U.S. government spending may prove to be incorrect.

The federal debt limit continues to be actively debated as plans for long-term national fiscal policy are discussed. The outcome of these discussions could have a significant impact on defense spending broadly and programs we support in particular. The failure of Congress to approve future budgets and/or increase the debt ceiling of the U.S. on a timely basis could delay or result in the loss of contracts for the procurement of our products and services and we may be asked or required to continue to perform for some period of time on certain of our U.S. government contracts, even if the U.S. government is unable to make timely payments. A decrease in Department of Defense or Department of Homeland Security expenditures, the elimination or curtailment of a material program in which we are involved, or changes in payment patterns of our customers as a result of changes in U.S. government spending could have a material adverse effect on our business, results of operations and financial condition.

Ultimately, the U.S. government may be unable to timely complete its budget process or fully agree upon spending priorities. As such, it is possible that a shutdown of the U.S. government may occur, or interim budgets may be adopted. As such, we may experience delayed orders, delayed payments and declines in net sales, profitability and cash flows. We may experience related supply chain delays, disruptions or other problems associated with financial constraints faced by our suppliers and subcontractors. All of the aforementioned conditions and factors could, in the aggregate, have a material adverse effect on our business, results of operations and financial condition. Additionally, cost cutting, efficiency initiatives, reprioritization, other affordability analyses, and changes in budgetary priorities by our governmental customers, including the U.S. government, could adversely impact both of our operating segments. We are unable to predict the impact these or similar events could have on our business, financial position, results of operations or cash flows.

Our contracts with the U.S. government are subject to unique business, commercial and government audit risks.

We depend on the U.S. government for a significant portion of our revenues. Our contracts with the U.S. government are subject to unique business and commercial risks, including:

- unexpected contract or project terminations or suspensions;
- unpredictable order placements, reductions, accelerations, delays or cancellations;
- higher than expected final costs, particularly relating to software and hardware development, for work performed under contracts where we commit to specified deliveries for a fixed-price; and
- unpredictable cash collections of unbilled receivables that may be subject to acceptance of contract deliverables by the customer and contract close out procedures, including government audit and approval of final indirect rates.

Although we take steps to mitigate our risk with respect to contracts with the U.S. government, we may not be able to do so in every instance for any of the following reasons, among others:

- Our U.S. government contracts can easily be terminated by the U.S. government - Our U.S. government contracts can be terminated by the U.S. government for its convenience or upon an event of default by us. Termination for convenience provisions provide us with little to no recourse related to: our potential recovery of costs incurred or costs committed, potential settlement expenses and hypothetical profit on work completed prior to termination.
- Our U.S. government contracts are subject to funding by the U.S. Congress - Our U.S. government contracts are conditioned upon the continuing approval by Congress of the necessary funding. Congress usually appropriates funds for a given program on a fiscal year basis even though contract performance may take more than one year. Consequently, at the beginning of a major program, the contract may not be fully funded, and additional monies are normally committed to the contract only if, and when, appropriations are made by Congress for future fiscal years. Delays or changes in funding can impact the timing of awards or lead to changes in program content. We obtain certain of our U.S. government contracts through a competitive bidding process. There can be no assurance that we will win additional contracts or that actual contracts that are awarded will ultimately be profitable.
- We can be disqualified as a supplier to the U.S. government - As a supplier to the U.S. government, we must comply with numerous regulations, including those governing security, contracting practices and classified information. Failure to comply with these regulations and practices could result in fines being imposed against us or our suspension for a period of time from eligibility for bidding on, or for award of, new government contracts. If we are disqualified as a supplier to government agencies, we would lose most, if not all, of our U.S. government customers and revenues from sales of our products would decline significantly.

In addition, all of our U.S. government contracts can be audited by the Defense Contract Audit Agency ("DCAA") and other U.S. government agencies and we can be subject to penalties arising from post-award contract audits (sometimes referred to as a Truth in Negotiations Act or "TINA" audit) or cost audits in which the value of our contracts may be reduced. If costs are found to be improperly allocated to a specific contract, those costs will not be reimbursed, and any such costs already reimbursed would be required to be refunded. TCS has recently undergone audits by the DCAA for periods prior to Comtech's fiscal 2016 acquisition of TCS and the DCAA has informed us that it is proposing retroactive contracts adjustments that, if finalized and issued, would result in the need for us to provide a refund to the U.S. government of approximately $2.4 million. We disagree with the DCAA's assessment and would vigorously protest any adjustment. We have not recorded any reserve related to these audits but ultimately an adjustment may be issued. Although we record contract revenues based upon costs we expect to realize upon final audit, we cannot predict the outcome of any such future audits and adjustments, and we may be required to materially reduce our revenues or profits upon completion and final negotiation of audits. Negative audit findings could also result in termination of a contract, forfeiture of profits, suspension of payments, fines and suspension or debarment from U.S. government contracting or subcontracting for a period of time.

Our dependence on sales to international customers exposes us to unique business, commercial and export compliance audit risks.

Sales for use by international customers (including sales to U.S. companies for inclusion in products that will be sold to international customers) represented approximately 25.4%, 25.6% and 28.4% of our consolidated net sales for the fiscal years ended July 31, 2019, 2018 and 2017, respectively, and we expect that international sales will continue to be a significant portion of our consolidated net sales for the foreseeable future. These sales expose us to certain risks, including barriers to trade, fluctuations in foreign currency exchange rates (which may make our products less price-competitive), political and economic instability, exposure to public health epidemics, availability of suitable export financing, tariff regulations, and other U.S. and foreign regulations that may apply to the export of our products. Although we take steps to mitigate our risk with respect to international sales, we may not be able to do so in every instance for any of the following reasons, among others:

- <u>We may not be able to continue to structure our international contracts to reduce risk</u> - We attempt to reduce the risk of doing business in foreign countries by seeking subcontracts with large systems suppliers, contracts denominated in U.S. dollars, advance or milestone payments and irrevocable letters of credit in our favor. However, we may not be able to reduce the economic risk of doing business in foreign countries in all instances. In such cases, billed and unbilled receivables relating to international sales are subject to increased collectability risk and may result in significant write-offs, which could have a material adverse effect on our business, results of operations and financial condition. In addition, foreign defense contracts generally contain provisions relating to termination at the convenience of the government.

- <u>We rely on a limited number of international sales agents</u> - In some countries, we rely upon one or a small number of sales agents, exposing us to risks relating to our contracts with, and related performance of, those agents. We attempt to reduce our risk with respect to sales agents by establishing additional foreign sales offices where it is practical and by engaging, where practicable, more than one independent sales representative in a territory. It is our policy to require all sales agents to operate in compliance with applicable laws, rules and regulations. Violations of any of these laws, rules or regulations, and other business practices that are regarded as unethical, could interrupt the sales of our products and services, result in the cancellation of orders or the termination of customer relationships, and could damage our reputation, any of which developments could have a material adverse effect on our business, results of operations and financial condition.

- <u>We currently price virtually all of our products in U.S. dollars</u> - Today, virtually all of our sales are denominated in U.S. dollars. Over the last few years, the U.S. dollar has strengthened significantly against many international currencies. As such, many of our international customers experienced a drop in their purchasing power as it relates to their ability to purchase our products. To date, we have not materially changed our selling prices and have experienced lower sales volumes in certain cases. If the U.S. dollar strengthens from current levels against many international currencies, our customers may reduce their spending or postpone purchases of our products and services to a greater extent than we currently anticipate which could have a material adverse effect on our business, results of operations and financial condition.

- <u>We must comply with all applicable export control laws and regulations of the U.S. and other countries</u> - Certain of our products and systems may require licenses from U.S. government agencies for export from the U.S., and some of our products are not permitted to be exported. In addition, in certain cases, U.S. export controls also severely limit unlicensed technical discussions, such as discussions with any persons who are not U.S. citizens or permanent residents. As a result, in cases where we may need a license, our ability to compete against a non-U.S. domiciled foreign company that may not be subject to the same U.S. laws may be materially adversely affected. U.S. laws and regulations applicable to us include the Arms Export Control Act, the IEEPA, the ITAR, the EAR and the trade sanctions laws and regulations administered by the U.S. Treasury Department's OFAC.

- We must comply with the FCPA and similar laws elsewhere - We are subject to the FCPA and other foreign laws prohibiting corrupt payments to government officials, which generally bar bribes or unreasonable gifts to foreign governments or officials. Violations of these laws or regulations could result in significant sanctions, including disgorgement of profits, fines, criminal sanctions against us, our officers, our directors, or our employees, more onerous compliance requirements, more extensive debarments from export privileges or loss of authorizations needed to conduct aspects of our international business. A violation of any of the regulations enumerated above could materially adversely affect our business, financial condition and results of operations. Although we have implemented policies and procedures designed to ensure compliance with these laws and regulations, there can be no assurance that our employees, contractors, agents, or subsidiaries will not violate our policies. Additionally, changes in regulatory requirements which could restrict our ability to deliver services to our international customers, including the addition of a country to the list of sanctioned countries under the IEEPA or similar legislation could negatively impact our business. For the fiscal years ended July 31, 2019, 2018 and 2017, we have conducted virtually no business with states designated as sponsors of terrorism.

- We must maintain a company-wide Office of Trade Compliance - In the past, we have self-reported violations of ITAR to the DDTC and had an ITAR compliance audit performed by an independent auditor at the request of the DDTC. Although the audit found no violations of ITAR, we committed to the DDTC that we would enhance and maintain certain policies and procedures and we have established a company-wide Office of Trade Compliance.

  In October 2014, we disclosed to OFAC that we learned during a self-assessment of our export transactions that a shipment of modems sent to a Canadian customer by Comtech EF Data Corp. was incorporated into a communication system, the ultimate end user of which was the Sudan Civil Aviation Authority. The sales value of this equipment was approximately $288,000. At the time of shipment, OFAC regulations prohibited U.S. persons from doing business directly or indirectly with Sudan. In late 2015, OFAC issued an administrative subpoena seeking further information about the disclosed transaction. We have responded to the subpoena, including alerting OFAC to Comtech’s repair of three modems for a customer in Lebanon who may have rerouted the modems from Lebanon to Sudan without the required U.S. licensing authorization. In September 2018, Comtech agreed to enter into a Tolling Agreement with OFAC, which extends the statute of limitations in this matter through December 31, 2019. The Tolling Agreement was shortly followed by a second administrative subpoena seeking additional information about the disclosed transaction. In December 2018, Comtech responded to a second administrative subpoena from OFAC, answering the questions it posed and providing all the documents it sought. U.S. sanctions with respect to Sudan were revoked in 2017. Consistent with the revocation of the SSR, shipments to the Sudan Civil Aviation Authority by U.S. persons are now permissible. We are not able to predict whether OFAC will take any enforcement action against us in light of the recent revocation of the SSR. If OFAC determines that we have violated U.S. trade sanctions, civil and criminal penalties could apply, and we may suffer reputational harm. Even though we take precautions to avoid engaging in transactions that may violate U.S. trade sanctions, those measures may not be effective in every instance.

  In May 2018, we were informed by the Office of Export Enforcement ("OEE") of the Department of Commerce ("DoC") that it was forwarding to the DoC's Office of Chief Counsel, the results of its audit of international shipments by Comtech Xicom Technology, Inc. for further review and possible determination of an administrative penalty. We fully cooperated with the OEE in their audit and, based on our self-assessment of the approximately 7,800 individual transactions audited, have determined that six (6) transactions may not have been fully in compliance with the EAR. These six (6) items, for which export licenses were not obtained, were either spares or repaired power amplifier subassembly components valued at less than $100,000 (in aggregate) and were shipped to Brazil, Italy, Russia, Thailand and the United Arab Emirates. The EAR provides an exception to the requirement to obtain an export license for the replacement of a defective or damaged component. During our self-assessment, we determined that we inadvertently did not obtain export licenses for the spares or have evidence of the return or destruction of the defective or damaged components necessary to authorize our use of the export license exception for the replacements. Since discovering this issue, we have implemented additional controls and procedures and have increased awareness of these specific export requirements throughout the Company to help avoid similar occurrences in the future. Administrative penalties under the EAR can range from a warning letter to a denial of export privileges. A civil monetary penalty not to exceed the amount set forth in the Export Administration Act ("EAA") may be imposed for each violation, and in the event that any provision of the EAR is continued by any other authority, the maximum monetary civil penalty for each violation shall be that provided by such other authority. Administrative penalties under the EAR are currently determined pursuant to the IEEPA, which can reach the greater of twice the amount of the transaction that is the basis of the violation or approximately $300,000 per violation. We have not recorded an accrual related to a possible administrative penalty and continue to work cooperatively with the OEE.

- We may be subject to future export compliance audits - We continue to implement policies and procedures to ensure that we comply with all applicable export control laws and regulations. We may be subjected to compliance audits in the future that may uncover improper or illegal activities that would subject us to material remediation costs, civil and criminal fines and/or penalties and/or an injunction. In addition, we could suffer serious reputational harm if allegations of impropriety were made against us. Each of these outcomes could, individually or in the aggregate, have a material adverse effect on our business, results of operations and financial condition. The absence of comparable restrictions on competitors in other countries may adversely affect our competitive position. In addition, in order to ship our products into and implement our services in some countries, the products must satisfy the technical requirements of that particular country. If we were unable to comply with such requirements with respect to a significant quantity of our products, our sales in those countries could be restricted, which could have a material adverse effect on our business, results of operations and financial condition.

- We may be affected by the future imposition of tariffs and trade restrictions - The current U.S. administration has signaled support for, and in some instances has taken action with respect to, major changes to certain trade policies, such as the imposition of additional tariffs on imported products, the withdrawal from or renegotiation of certain trade agreements and the imposition of certain export sanctions. Such changes could result in retaliatory actions by the United States' trade partners. For example, over the last several months, the U.S. has increased tariffs on certain imports from China, as well as on steel and aluminum products imported from various countries and imposed export sanctions on certain Chinese entities. In response, China, the European Union, and several other countries have imposed or proposed additional tariffs on certain exports from the U.S. Our inability to effectively manage the negative impacts of changing U.S. and foreign trade policies, including, in connection with our business with customers outside of the United States or with newly sanctioned entities could adversely affect our business and financial results.

Our investments in recorded goodwill and other intangible assets could be impaired as a result of future business conditions, a deterioration of the global economy or if we change our reporting unit structure.

As of July 31, 2019, goodwill recorded on our Consolidated Balance Sheet aggregated $310.5 million. Additionally, as of July 31, 2019, net intangibles recorded on our Consolidated Balance Sheet aggregated $261.9 million.

For purposes of reviewing impairment and the recoverability of goodwill and other intangible assets, our Government Solutions and Commercial Solutions segment each constitute a reporting unit and we must make various assumptions in determining their estimated fair values. Reporting units are defined by how our President and Chief Executive Officer ("CEO") manages the business, which includes resource allocation decisions. We may, in the future, change our management approach which in turn may change the way we define our reporting units, as such term is defined by Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") 350 "*Intangibles - Goodwill and Other.*" A change to our management approach may require us to perform an interim goodwill impairment test and possibly record impairment charges in a future period.

In accordance with FASB ASC 350, we perform a goodwill impairment analysis at least annually (in the first fiscal quarter of each fiscal year), unless indicators of impairment exist in interim periods. If we fail the quantitative assessment of goodwill impairment ("quantitative assessment"), we would be required to recognize an impairment loss equal to the amount that a reporting unit's carrying value exceeded its fair value; however, any loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.

On August 1, 2019 (the first day of our fiscal 2020), we performed our annual quantitative assessment and estimated the fair value of each of our reporting units using a combination of the income and market approaches. Based on our quantitative evaluation, we determined that our Commercial Solutions and Government Solutions reporting units had estimated fair values in excess of their carrying values of at least 29.0% and 122.2%, respectively, and concluded that our goodwill was not impaired and that neither of our two reporting units was at risk of failing the quantitative assessment. It is possible that, during fiscal 2020 or beyond, business conditions (both in the U.S. and internationally) could deteriorate from the current state, our current or prospective customers could materially postpone, reduce or even forgo purchases of our products and services to a greater extent than we currently anticipate, or our common stock price could decline. A significant decline in our customers' spending that is greater than we anticipate or a shift in funding priorities may also have a negative effect on future orders, sales, income and cash flows and we might be required to perform a quantitative assessment during fiscal 2020 or beyond. If assumed net sales and cash flow projections are not achieved in future periods or our common stock price significantly declines from current levels, our Commercial Solutions or Government Solutions reporting units could be at risk of failing the quantitative assessment and goodwill and intangibles assigned to the respective reporting units could be impaired.

In any event, we are required to perform the next annual goodwill impairment analysis on August 1, 2020 (the start of our fiscal 2021). If our assumptions and related estimates change in the future, or if we change our reporting unit structure or other events and circumstances change (e.g., a sustained decrease in the price of our common stock (considered on both absolute terms and relative to peers)), we may be required to record impairment charges when we perform these tests, or in other future periods. In addition to our impairment analysis of goodwill, we also review net intangibles with finite lives when an event occurs indicating the potential for impairment. We believe that the carrying values of our net intangibles were recoverable as of July 31, 2019. Any impairment charges that we may record in the future could be material to our results of operations and financial condition.

We could be negatively impacted by a systems failure, lack of or failure of a redundancy, security breach through cyber attack, cyber intrusion or otherwise, by other significant disruption of our IT networks or those we operate for certain customers, or third-party data center facilities, servers and related systems. If such occurs in some cases, we may have to reimburse our customers for damages that they may have incurred, pay contract penalties, or provide refunds.

Similar to all companies in our industry, we are under constant cyber attack and are subject to an ongoing risk of security breaches and disruptions of our IT networks and related systems, including third-party data center facilities, whether through actual breaches, cyber attacks or cyber intrusions via the Internet, malware, computer viruses, attachments to e-mails, persons inside our organization or persons with access to systems inside our organization. Actual security breaches or disruption, particularly through cyber attack or cyber intrusion, including by computer hackers, foreign governments and cyber terrorists, have increased in recent years and have become more complex. Our IT network and systems, as well as third-party data center facilities, have been and, we believe, continue to be under constant attack. We face an added risk of a security breach or other significant disruption to certain of our equipment used on some of our customer's IT networks and related systems which may involve managing and protecting information relating to public safety agencies, wireless carriers as well as national security and other sensitive government functions. Many of our systems have, or are required to have, system redundancies and back-up; in some cases, we may not have sufficient redundancy and/or redundancy and/or back-ups may fail. We may incur significant costs to prevent and respond to system failures, failure of redundancies, actual breaches, cyber attacks and other systems disruptions.

As a communications company, and particularly as a government contractor and a provider of public safety and location technologies (including 911 hosted systems), we face a heightened risk of a security breach or disruption from actual breaches, cyber attacks and other threats to gain unauthorized access to our and our customers' proprietary or classified information on our IT networks, third-party data center facilities and related systems and to certain of our equipment used on some of our customer's IT networks and related systems. These types of information and IT networks and related systems are critical to the operation of our business and essential to our ability to perform day-to-day operations, and, in some cases, are critical to the operations of certain of our customers. Although we make significant efforts to maintain the security and integrity of these types of information and IT networks and related systems, and we have implemented various measures to manage the risk of a security breach or disruption, there can be no assurance that our security efforts and measures will be effective or that actual security breaches or disruptions will not be successful or damaging. Even the most well protected information, networks, data centers, systems and facilities remain potentially vulnerable because security breaches, particularly cyber attacks and intrusions, and disruptions have occurred and will occur again in the future. Techniques used in such breaches and cyber attacks are constantly evolving and generally are not recognized until launched against a target, and in some cases are designed not to be detected and, in fact, may not be detected. In some cases, the resources of foreign governments may be behind such attacks. Accordingly, we may be unable to anticipate these techniques or to implement adequate security barriers or other preventative measures, and thus it is virtually impossible for us to entirely mitigate this risk.

A security breach or other significant disruption (including as a result of a lack of redundancy and/or failure of such redundancy) involving these types of information and IT networks and related systems could:

- Disrupt the proper functioning of these networks, data center facilities and systems and therefore our operations and/or those of certain of our customers;

- Result in the unauthorized access to, and destruction, loss, theft, misappropriation or release of proprietary, confidential, sensitive or otherwise valuable information of ours or our customers, including trade secrets, which others could use to compete against us or for disruptive, destructive or otherwise harmful purposes and outcomes;

- Compromise national security and other sensitive government functions;

- Require significant management attention and resources to remedy the damage that results;

- Make payments to our customers to reimburse them for damages, or pay them penalties or provide refunds; and

- Damage our reputation with our customers (particularly agencies of the U.S. government) and the public generally.

In addition, the cost of continually defending against cyber attacks and actual breaches has increased in recent years and future costs and any or all of the foregoing could have a material adverse effect on our business, results of operations and financial condition.

The measures we have implemented to secure information we collect and store or enable access to may be breached, which could cause us to breach agreements with our partners and expose us to potential investigation and penalties by authorities and potential claims for contract breach, product liability damages, credits, penalties or termination by persons whose information was disclosed.

We take reasonable steps to protect the security, integrity and confidentiality of the information we collect and store and to prevent unauthorized access to third-party data to which we enable access through our products, but there is no guarantee that inadvertent or unauthorized disclosure will not occur or that third parties will not gain unauthorized access despite our efforts. If such unauthorized disclosure or access does occur, we may be required to notify persons whose information was disclosed or accessed under existing and proposed laws. Because the techniques used to obtain unauthorized access, disable or degrade service, or sabotage systems change frequently and are often not recognized until launched against a target, we may be unable to anticipate these techniques or implement adequate preventative measures. We also may be subject to claims of breach of contract for such disclosure, investigation and penalties by regulatory authorities and potential claims by persons whose information was disclosed. If there is a security breach or if there is an inappropriate disclosure of any of these types of information, we could be exposed to investigations, litigation, fines and penalties. Remediation of and liability for loss or misappropriation of end user or employee personal information could have a material adverse effect on our business, results of operations and financial condition. Even if we were not held liable for such event, a security breach or inappropriate disclosure of personal, private or confidential information could harm our reputation and our relationships with current and potential customers and end users. Even the perception of a security risk could inhibit market acceptance of our products and services. We may be required to invest additional resources to protect against damage caused by any actual or perceived disruptions of our services. We may also be required to provide information about the location of an end user’s mobile device to government authorities, which could result in public perception that we are providing the government with intelligence information and deter some end users from using our services. Any of these developments could have a material adverse effect on our business, results of operations and financial condition.

Our U.S. federal, state and foreign tax returns are subject to audit and a resulting tax assessment or settlement could have a material adverse effect on our business, results of operations and financial condition. Significant judgment is required in determining the provision for income taxes.

The final determination of tax examinations and any related litigation could be materially different than what is reflected in historical income tax provisions and accruals.

Our federal income tax returns for fiscal 2017 and 2018 are subject to potential future Internal Revenue Service (“IRS”) audit. None of our state income tax returns prior to fiscal 2015 are subject to audit. TCS' federal income tax returns for tax year 2015 and the tax period from January 1, 2016 to February 23, 2016, the date we acquired TCS, are subject to potential future IRS audit. None of TCS' state income tax returns prior to calendar year 2014 are subject to audit. In addition to income tax audits, TCS is subject to ongoing state excise tax audits by the Washington State Department of Revenue. Although adjustments relating to past audits of our federal income tax returns were immaterial, a resulting tax assessment or settlement for other periods or other jurisdictions that may be selected for future audit could have a material adverse effect on our business, consolidated results of operations and financial condition.

We have significant operations in Arizona, Florida, California, Washington State, Maryland, New York and other locations which could be materially and adversely impacted in the event of a terrorist attack and government responses thereto or significant disruptions (including natural disasters) to our business.

Terrorist attacks, the U.S. and other governments' responses thereto, and threats of war could materially adversely impact our business, results of operations and financial condition. For example, our 911 hosted location-based services and satellite teleport services operations depend on our ability to maintain our computer and equipment and systems in effective working order, and to protect our systems against damage from fire, natural disaster, power loss, telecommunications failure, sabotage, unauthorized access to our system or similar events.

Although many of our mission-critical systems and equipment are designed with built-in redundancy and security, any unanticipated interruption or delay in our operations or breach of security could have a material adverse effect on our business, results of operations and financial condition. Our property and business interruption insurance may not be adequate to compensate us for any losses that may occur in the event of a terrorist attack, threat, system failure or a breach of security. Insurance may not be available to us at all or, if available, may not be available to us on commercially reasonable terms.

We operate a high-volume technology manufacturing center located in Tempe, Arizona. We expect intercompany manufacturing to increase from current levels in future periods and we intend to maximize the use of our high-volume technology manufacturing center by continuing to seek contracts with third parties to outsource a portion of their manufacturing to us. A terrorist attack or similar future event may disrupt our operations or those of our customers or suppliers and may affect the availability of materials needed to manufacture our products or the means to transport those materials to manufacturing facilities and finished products to customers. If a natural disaster or other business interruption occurred with respect to our high-volume technology manufacturing center, we do not have immediate access to other manufacturing facilities and, as a result, our business, results of operations and financial condition would be materially adversely affected.

We design and manufacture our over-the-horizon microwave equipment and systems in Florida, where major hurricanes have occurred in the past, and amplifiers in Santa Clara, California, an area close to major earthquake fault lines, and also manufacture amplifiers in Melville, New York, an area subject to hurricanes. Additionally, certain of our Commercial Solutions segment activities are conducted in Washington State which is also near a fault line. We maintain operations in Maryland near a U.S. Navy facility which is more prone to a terrorist attack. Our operations in these and other locations (such as in our high-volume technology manufacturing center located in Tempe, Arizona), could be subject to natural disasters or other significant disruptions, including hurricanes, tornadoes, typhoons, tsunamis, floods, earthquakes, fires, water shortages, other extreme weather conditions, medical epidemics, acts of terrorism, power shortages and blackouts, telecommunications failures, and other natural and man-made disasters or disruptions.

We cannot be sure that our systems will operate appropriately if we experience hardware or software failure, intentional disruptions of service by third parties, an act of God or an act of war. A failure in our systems could cause delays in transmitting data, and as a result we may lose customers or face litigation that could involve material costs and distract management from operating our business.

In the event of any such disaster or other disruption, we could experience disruptions or interruptions to our operations or the operations of our suppliers, distributors, resellers or customers; destruction of facilities; and/or loss of life, all of which could materially increase our costs and expenses and materially adversely affect our business, results of operations and financial condition.

We may be subject to environmental liabilities.

We engage in manufacturing and are subject to a variety of local, state and federal laws and regulations relating to the storage, discharge, handling, emission, generation, manufacture and disposal of toxic or other hazardous substances used to manufacture our products. We are also subject to the Restriction of Hazardous Substance ("RoHS") directive which restricts the use of lead, mercury and other substances in electrical and electronic products. The failure to comply with current or future environmental requirements could result in the imposition of substantial fines, suspension of production, alteration of our manufacturing processes or cessation of operations that could have a material adverse effect on our business, results of operations and financial condition. In addition, the handling, treatment or disposal of hazardous substances by us or our predecessors may have resulted, or could in the future result, in contamination requiring investigation or remediation, or lead to other liabilities, any of which could have a material adverse effect on our business, results of operations and financial condition.

The success of our business is dependent on compliance with FCC rules and regulations and similar foreign laws and regulations.

Many of our products are incorporated into wireless communications systems that must comply with various U.S. government regulations, including those of the FCC, as well as similar international laws and regulations. As a result, our business faces increased risks including the following:

- We must obtain various licenses from the FCC - We operate FCC licensed teleports that are subject to the Communications Act of 1934, as amended, or the FCC Act, and the rules and regulations of the FCC. We cannot guarantee that the FCC will grant renewals when our existing licenses expire, nor are we assured that the FCC will not adopt new or modified technical requirements that will require us to incur expenditures to modify or upgrade our equipment as a condition of retaining our licenses. We may, in the future, be required to seek FCC or other government approval if foreign ownership of our stock exceeds certain specified criteria. Failure to comply with these policies could result in an order to divest the offending foreign ownership, fines, denial of license renewal and/or license revocation proceedings against the licensee by the FCC, or denial of certain contracts from other U.S. government agencies.

- We are dependent on the allocation and availability of frequency spectrum - Adverse regulatory changes related to the allocation and availability of frequency spectrum and in the military standards and specifications that define the current satellite networking environment, could materially harm our business by: (i) restricting development efforts by us and our customers, (ii) making our current products less attractive or obsolete, or (iii) increasing the opportunity for additional competition. The increasing demand for wireless communications has exerted pressure on regulatory bodies worldwide to adopt new standards and reassign bandwidth for these products and services. The reduced number of available frequencies for other products and services and the time delays inherent in the government approval process of new products and services have caused, and may continue to cause, our customers to cancel, postpone or reschedule their installation of communications systems including their satellite, over-the-horizon microwave, or terrestrial line-of-sight microwave communication systems. This, in turn, could have a material adverse effect on our sales of products to our customers. Changes in, or our failure to comply with, applicable laws and regulations could materially adversely harm our business, results of operations, and financial condition.

- Our future growth is dependent, in part, on developing NG-911 compliant products - The FCC requires that certain location information be provided to network operators for public safety answering points when a subscriber makes a 911 call. Technical failures, greater regulation by federal, state or foreign governments or regulatory authorities, time delays or the significant costs associated with developing or installing improved location technology could slow down or stop the deployment of our mobile location products. If deployment of improved location technology is delayed, stopped or never occurs, market acceptance of our products and services may be materially adversely affected. Because we rely on some third-party location technology instead of developing all of the technology ourselves, we have little or no influence over its improvement. The technology employed with NG-911 services generally anticipates a migration to internet-protocol ("IP") based communication. Since many companies are proficient in IP-based communication protocols, the barriers to entry to providing NG-911 products and services are lower than exist for the traditional switch-based protocols. If we are unable to develop unique and proprietary solutions that are superior to and/or more cost effective than other market offers, our 911 business could get replaced by new market entrants, resulting in a material adverse effect on our business, results of operations and financial condition.

- Under the FCC’s mandate, our 911 business is dependent on state and local governments - Under the FCC’s mandate, wireless carriers are required to provide 911 services only if state and local governments request the service. As part of a state or local government’s decision to request 911, they have the authority to develop cost recovery mechanisms. However, cost recovery is no longer a condition to wireless carriers’ obligation to deploy the service. If state and local governments do not widely request that 911 services be provided or we become subject to significant pressures from wireless carriers with respect to pricing of 911 services, our 911 business would be harmed and future growth of our business would be reduced.

Regulation of the mobile communications industry and VoIP is evolving, and unfavorable changes or our failure to comply with existing and potential new legislation or regulations could harm our business and operating results.

As the mobile communications industry continues to evolve, we believe greater regulation by federal, state or foreign governments or regulatory authorities is likely and we face certain risks including:

- We must adhere to existing and potentially new privacy rules - We believe increased regulation is likely in the area of data privacy, and laws and regulations applying to the solicitation, collection, processing or use of personal or consumer information could affect our customers' ability to use and share data, potentially reducing our ability to utilize this information in the resale of certain of our products. In order for mobile location products and services to function properly, wireless carriers must locate their subscribers and store information on each subscriber's location. Although data regarding the location of the wireless user resides only on the wireless carrier's systems, users may not feel comfortable with the idea that the wireless carrier knows and can track their location. Carriers will need to obtain subscribers' permission to gather and use the subscribers' personal information, or they may not be able to provide customized mobile location services which those subscribers might otherwise desire. If subscribers view mobile location services as an annoyance or a threat to their privacy, that could reduce demand for our products and services and have a material adverse effect on our business, results of operations and financial condition.

  Recently, there has been a number of laws and regulations enacted that affect companies conducting business on the Internet, including the European General Data Protection Regulation ("GDPR"). The GDPR imposes certain privacy related requirements on companies that receive or process personal data of residents of the European Union that are currently different than those in the United States and include significant penalties for non-compliance. Similarly, there are a number of legislative proposals in the United States, at both the federal and state level, that could impose new obligations in areas affecting our business, such as liability for personal data protection. In addition, some countries are considering or have passed legislation implementing data protection requirements or requiring local storage and processing of data or similar requirements that could increase the cost and complexity of delivering our services. Our costs to comply with the GDPR as well any other similar laws and regulations that emerge may negatively impact our business.

- We may face increased compliance costs in connection with health and safety requirements for mobile devices - If wireless handsets pose health and safety risks, we may be subject to new regulations and demand for our products and services may decrease. Media reports have suggested that certain radio frequency emissions from wireless handsets may be linked to various health concerns, including cancer, and may interfere with various electronic medical devices, including hearing aids and pacemakers. Concerns over radio frequency emissions may have the effect of discouraging the use of wireless handsets, which would decrease demand for our services. In recent years, the FCC and foreign regulatory agencies have updated the guidelines and methods they use for evaluating radio frequency emissions from radio equipment, including wireless handsets. In addition, interest groups have requested that the FCC investigate claims that wireless technologies pose health concerns and cause interference with airbags, hearing aids and other medical devices. There also are some safety risks associated with the use of wireless handsets while driving. Concerns over these safety risks and the effect of any legislation that may be adopted in response to these risks could limit our ability to market and sell our products and services.

- The regulatory environment for VoIP services is developing - The FCC has determined that VoIP services are not subject to the same regulatory scheme as traditional wireline and wireless telephone services. If the regulatory environment for VoIP services evolves in a manner other than the way we anticipate, our 911 business would be significantly harmed and future growth of our business would be significantly reduced. For example, the regulatory scheme for wireless and wireline service providers requires those carriers to allow service providers such as us to have access to certain databases that make the delivery of a 911 call possible. No such requirements exist for VoIP service providers, so carriers could prevent us from continuing to provide VoIP 911 service by denying us access to the required databases.

All of our business activities are subject to rapid technological change, new entrants, the introduction of other distribution models and long development and testing periods each of which may harm our competitive position, render our product or service offerings obsolete and require us to continuously develop technology and/or obtain licensed technology in order to compete successfully.

We are engaged in business activities characterized by rapid technological change, evolving industry standards, frequent new product announcements and enhancements, and changing customer demands. The introduction of products and services or future industry standards embodying new technologies, such as multi-frequency time-division multiple access ("MF-TDMA") based technologies could render any of our products and services obsolete or non-competitive. The successful execution of our business strategy is contingent upon wireless network operators launching and maintaining mobile location services, our ability to maintain a technically skilled development and engineering team, our ability to create new network software products and adapt our existing products to rapidly changing technologies, industry standards and customer needs. As a result of the complexities inherent in our product offerings, new technologies may require long development and testing periods. Additionally, new products may not achieve market acceptance or our competitors could develop alternative technologies that gain broader market acceptance than our products. If we are unable to develop and introduce technologically advanced products that respond to evolving industry standards and customer needs, or if we are unable to complete the development and introduction of these products on a timely and cost effective basis, it could have a material adverse effect on our business, results of operations and financial condition or could result in our technology becoming obsolete.

New entrants seeking to gain market share by introducing new technology and new products may make it more difficult for us to sell our products and services and could create increased pricing pressure, reduced profit margins, increased sales and marketing expenses, or the loss of market share or expected market share, any of which could have a material adverse effect on our business, results of operations and financial condition. For example, many companies are developing new technologies and the shift towards open standards such as IP-based satellite networks will likely result in increased competition and some of our products may become commoditized. Our DoubleTalk® Carrier-in-Carrier® bandwidth compression technology is licensed by us from a third party that maintains patents associated with the technology. Other competitors have developed similar technologies and some may have also licensed parts or all of this compression technology.

Our Commercial Solutions segment provides various technologies that are utilized on mobile phones. Applications from competitors for location-based or text-based messaging platforms may be preloaded on mobile devices by original equipment manufacturers, or OEMs, or offered by OEMs directly. Increased competition from providers of location-based services which do not rely on a wireless carrier may result in fewer wireless carrier subscribers electing to purchase their wireless carrier's branded location-based services, which could harm our business and revenue. In addition, these location-based or text-based services may be offered for free or on a one-time fee basis, which could force us to reduce monthly subscription fees or migrate to a one-time fee model to remain competitive. We may also lose end users or face erosion in our average revenue per user if these competitors deliver their products without charge to the consumer by generating revenue from advertising or as part of other applications or services.

Our expected growth and our financial position depends on, among other things, our ability to keep pace with such changes and developments and to respond to the increasing variety of electronic equipment users and transmission technologies. We may not have the financial or technological resources to keep pace with such changes and developments or be successful in our research and development and we may not be able to identify and respond to technological improvements made by our competitors in a timely or cost-effective fashion. Any delays could result in increased costs of development or redirect resources from other projects. In addition, we cannot provide assurances that the markets for our products, systems, services or technologies will develop as we currently anticipate. The failure of our products, systems, services or technologies to gain market acceptance could significantly reduce our net sales and harm our business.

Our business is highly competitive, we are reliant upon the success of our partners, and some of our competitors have significantly greater resources than we do, which could result in a loss of customers, market share and/or market acceptance.

Our business is highly competitive. We will continue to invest in research and development for the introduction of new and enhanced products and services designed to improve capacity, data processing rates and features. We must also continue to develop new features and to improve functionality of our software. Research and development in our industry is complex, expensive and uncertain. We believe that we must continue to dedicate a significant amount of resources to research and development efforts to maintain our competitive position. If we continue to expend a significant amount of resources on research and development, but our efforts do not lead to the successful introduction of product and service enhancements that are competitive in the marketplace, our business, results of operations and financial condition could be materially adversely affected.

Several of our potential competitors are substantially larger than we are and have greater financial, technical and marketing resources than we do. In particular, larger competitors have certain advantages over us which could cause us to lose customers and impede our ability to attract new customers, including: larger bases of financial, technical, marketing, personnel and other resources; more established relationships with wireless carriers and government customers; more funds to deploy products and services; and the ability to lower prices (or not charge any price) of competitive products and services because they are selling larger volumes. Furthermore, we cannot be sure that our competitors will not develop competing products, systems, services or technologies that gain market acceptance in advance of our products, systems, services or technologies, or that our competitors will not develop new products, systems, services or technologies that cause our existing products, systems, services or technologies to become non-competitive or obsolete, which could adversely affect our results of operations.

Our Commercial Solutions segment provides public safety and location technologies to various state and local municipalities and to a large extent, we are reliant on the success of our wireless partners and distributors to meet our growth objectives. In some cases, our wireless partners may have different objectives, or our distributors may not be successful. For example, in fiscal 2019, AT&T informed us that it will move all 911 call routing solutions to a competitor in full by April 2020. We also began an evaluation and repositioning of certain of our location technology solutions within our Commercial Solutions segment in order to focus on providing higher margin solution offerings and increase our penetration into the public safety space. To date, we have ceased offering certain location technology solutions, have worked with customers to wind-down certain legacy contracts and have not renewed certain contracts. Going forward, we intend to continue to work with our partners and expand our direct and indirect sales and distribution channels in this area. If we are not successful in doing so, we may not be able to achieve our long-term business goals.

Contract cost growth on our firm fixed-price contracts, including most of our government contracts, cost reimbursable type contracts and other contracts that cannot be justified as an increase in contract value due from customers exposes us to reduced profitability and the potential loss of future business and other risks.

A substantial portion of our products and services are sold under firm fixed-price contracts. Firm fixed-price contracts inherently have more risk than flexibly priced contracts. This means that we bear the risk of unanticipated technological, manufacturing, supply or other problems, price increases or other increases in the cost of performance. Future events could result in either upward or downward adjustments to those estimates which could negatively impact our profitability. Operating margin is materially adversely affected when contract costs that cannot be billed to the customer are incurred. This cost growth can occur if initial estimates used for calculating the contract price were incorrect, or if estimates to complete increase. To a lesser extent, we provide products and services under cost reimbursable type contracts which carry the entire burden of costs exceeding a negotiated contract ceiling price.

The cost estimation process requires significant judgment and expertise. Reasons for cost growth may include unavailability and productivity of labor, the nature and complexity of the work to be performed, the effect of change orders, the availability of materials, the effect of any delays in performance, availability and timing of funding from the customer, natural disasters, and the inability to recover any claims included in the estimates to complete. A significant change in an estimate on one or more programs could have a material adverse effect on our business, results of operations and financial condition.

Ongoing compliance with the provisions of securities laws, related regulations and financial reporting standards could unexpectedly materially increase our costs and compliance related expenses.

Because we are a publicly traded company, we are required to comply with provisions of securities laws, related regulations and financial reporting standards. Because securities laws, related regulations and financial reporting standards pertaining to our business are relatively complex, our business faces increased risks including the following:

- <u>If we identify a material weakness in the future, our costs may unexpectedly increase</u> - Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002 and related SEC rules, we are required to furnish a report of management's assessment of the effectiveness of our internal controls as part of our Annual Report on Form 10-K. Our independent registered public accountants are required to attest to and provide a separate opinion. To issue our report, we document our internal control design and the testing processes that support our evaluation and conclusion, and then we test and evaluate the results. There can be no assurance, however, that we will be able to remediate material weaknesses, if any, that may be identified in future periods, or maintain all of the controls necessary for continued compliance. There likewise can be no assurance that we will be able to retain sufficient skilled finance and accounting personnel, especially in light of the increased demand for such personnel among publicly traded companies.

- Stock-based compensation accounting standards could negatively impact our stock - Since our inception, we have used stock-based awards as a fundamental component of our employee compensation packages. We believe that stock-based awards directly motivate our employees to maximize long-term stockholder value and, through the use of long-term vesting, encourage employees to remain with us. We apply the provisions of ASC 718, "*Compensation - Stock Compensation,*" which requires us to record compensation expense in our statement of operations for employee and director stock-based awards using a fair value method. In the first quarter of fiscal 2018, we adopted FASB ASU No. 2016-09 which modified certain aspects of ASC 718, including the requirement to recognize excess tax benefits and shortfalls in the income statement. The ongoing application of this standard will have a significant effect on our reported earnings, and could adversely impact our ability to provide accurate guidance on our future reported financial results due to the variability of the factors used to estimate the value of stock-based awards (including long-term performance shares which are subject to the achievement of three-year goals which are based on several performance metrics). The ongoing application of this standard could impact the future value of our common stock and may result in greater stock price volatility. To the extent that this accounting standard makes it less attractive to grant stock-based awards to employees, we may incur increased compensation costs, change our equity compensation strategy or find it difficult to attract, retain and motivate employees, each of which could have a material adverse effect on our business, results of operations and financial condition.

Also the accounting rules and regulations that we must comply with are complex. Accounting rules and regulations are continually changing in ways that could materially impact our financial statements. As further discussed in *"Notes to Consolidated Financial Statements - Note (1) - Summary of Significant Accounting and Reporting Policies"* included in *"Part II - Item 8. - Financial Statements and Supplementary Data,"* included in this Annual Report on Form 10-K, we note the following:

- We must maintain compliance with new complex revenue recognition rules - On August 1, 2018 (our first quarter of fiscal 2019), we adopted ASU No. 2014-09 *"Revenue from Contracts with Customers (Topic 606),"* which replaces numerous requirements in U.S. GAAP, including industry specific requirements, and provides a single revenue recognition model for contracts with customers. The ASU applies to all open contracts existing as of August 1, 2018. We adopted this ASU using the modified retrospective method and there was no material impact on our business, results of operations and financial condition.

- We must maintain compliance with new complex lease accounting rules - In February 2016, the FASB issued ASU 2016-02, "*Leases (Topic 842),"* to revise existing lease accounting guidance. The update requires most leases to be recorded on the balance sheet as a lease liability, with a corresponding right-of-use asset. We adopted Topic 842 on August 1, 2019, the beginning of our first quarter of fiscal 2020. Except for recording a total right -of-use asset and corresponding lease liability on our Consolidated Balance Sheet, which amount approximates 4.0% of our total consolidated assets at July 31, 2019, our adoption of Topic 842 is not expected to have a material impact to our future statements of operations or cash flows. We continue to evaluate our adoption of this new standard, as well as our ongoing financial reporting disclosures requirements.

We must comply with these new rules on a go-forward basis. Because of the uncertainties of the estimates, judgments and assumptions associated with these new accounting standards, as well as with any future guidance or interpretations related to them, we may incur additional costs and cannot provide any assurances that we will be able to comply with such complex rules.

Our costs to comply with the aforementioned and other regulations continue to increase and we may have to add additional accounting staff, engage consultants or change our internal practices, standards and policies which could significantly increase our costs to comply with ongoing or future requirements. In addition, the NASDAQ Stock Market LLC ("NASDAQ") routinely changes its requirements for companies, such as us, that are listed on NASDAQ. These changes (and potential future changes) have increased and may increase our legal and financial compliance costs, including making it more difficult and more expensive for us to obtain director and officer liability insurance or maintain our current liability coverage. We believe that these new and proposed laws and regulations could make it more difficult for us to attract and retain qualified members of our Board of Directors, particularly to serve on our Audit Committee, and qualified executive officers.

Our backlog is subject to customer cancellation or modification and such cancellation could result in a decline in sales and increased provisions for excess and obsolete inventory.

We currently have a backlog of orders, mostly under contracts that our customers may modify or terminate. Almost all of the contracts in our backlog (including firm orders previously received from the U.S. government) are subject to cancellation at the convenience of the customer or for default in the event that we are unable to perform under the contract. A portion of our backlog is determined based on contracts received from our customers (such as the U.S. government and large wireless carriers) and in certain cases, is computed by multiplying the most recent month's contract or revenue by the months remaining under the existing long-term agreements, which we consider to be the best available information for anticipating revenue under those agreements. There can be no assurance that our backlog will result in actual revenue in any particular period, or at all, or that any contract included in backlog will be profitable. As such, there is a higher degree of risk in this regard with respect to backlog. The actual receipt and timing of any revenue is subject to various contingencies, many of which are beyond our control. The actual receipt of revenue on contracts included in backlog may never occur or may change because a program schedule could change, the program could be canceled, a contract could be reduced, modified or terminated early, or an option that we had assumed would be exercised is not exercised.

A significant portion of the backlog from our U.S. commercial customers relates to large, multi-year contracts to provide state and local governments (and their agencies) with public safety and location technology solutions. Although the contracts themselves represent legal, binding obligations of these governments, funding is often subject to the approval of budgets (for example, on an annual or bi-annual basis). Although funding for these multi-year contracts are dependent on future budgets being approved, we include the full estimated value of these large, multi-year contracts in our backlog given the critical nature of the services being provided and the positive historical experience of our state and local government customers passing their respective budgets.

We record a provision for excess and obsolete inventory based on historical and projected usage trends and other factors, including the consideration of the amount of backlog we have on hand at any particular point in time. If orders in our backlog are canceled or modified, our estimates of future product demand may prove to be inaccurate, in which case we may have understated the provision required for excess and obsolete inventory. In the future, if we determine that our inventory is overvalued, we will be required to recognize such costs in our financial statements at the time of such determination. Any such charges could be materially adverse to our results of operations and financial condition.

We face a number of risks relating to the expected growth of our business. Our business and operating results may be negatively impacted if we are unable to manage this growth.

These risks include:

- <u>The loss of key technical and/or management personnel could adversely affect our business</u> - Our future success depends on the continued contributions of key technical and management personnel. Many of our key and technical management personnel would be difficult to replace and are not subject to employment or non-competition agreements. We currently have research and development employees in areas that are located a great distance away from our U.S. headquarters and some work out of their respective homes. Managing remote product development operations is difficult and we may not be able to manage the employees in these remote centers successfully. Our expected growth and future success will depend, in large part, upon our ability to attract and retain highly qualified engineering, sales and marketing personnel. Competition for such personnel from other companies, academic institutions, government entities and other organizations is intense. Although we believe that we have been successful to-date in recruiting and retaining key personnel, we may not be successful in attracting and retaining the personnel we will need to grow and operate profitably. Also, the management skills that have been appropriate for us in the past may not continue to be appropriate if we grow and diversify.

- <u>We may not be able to improve our processes and systems to keep pace with anticipated growth</u> - The future growth of our business may place significant demands on our managerial, operational and financial resources. In order to manage that growth, we must be prepared to improve and expand our management, operational and financial systems and controls. We also need to continue to recruit and retain personnel and train and manage our employee base. We must carefully manage research and development capabilities and production and inventory levels to meet product demand, new product introductions and product and technology transitions. If we are not able to timely and effectively manage our growth and maintain the quality standards required by our existing and potential customers, it could have a material adverse effect on our business, results of operations and financial condition.

- Our markets are highly competitive and there can be no assurance that we can continue to compete effectively - The markets for our products are highly competitive. There can be no assurance that we will be able to continue to compete successfully on price or other terms, or that our competitors will not develop new technologies and products that are more effective than our own. We expect the Department of Defense's increased use of commercial off-the-shelf products and components in military equipment will encourage new competitors to enter the market. Also, although the implementation of advanced telecommunications services is in its early stages in many developing countries, we believe competition will continue to intensify as businesses and foreign governments realize the market potential of telecommunications services. Many of our competitors have financial, technical, marketing, sales and distribution resources greater than ours. Recently, we have seen increased requests for proposals from large wireless carriers for sole-source solutions and have responded to several such requests. In order to induce retention of existing customer contracts and obtain business on a sole-source basis, we may ultimately agree to adjust pricing on a retroactive basis. If our sole-source proposals are rejected in favor of a competitor's proposal, it could result in the termination of existing contracts, which could have a material adverse effect on our business, results of operations and financial condition.

- We may not be able to obtain sufficient components to meet expected demand - Our dependence on component availability, government furnished equipment, subcontractors and key suppliers, including the core manufacturing expertise of our high-volume technology manufacturing center located in Tempe, Arizona, exposes us to risk. Although we obtain certain components and subsystems from a single source or a limited number of sources, we believe that most components and subsystems are available from alternative suppliers and subcontractors. During the past year or so, and as a result of overall increased industry-wide demand, lead times for many components have increased. In addition, threats of or actual tariffs could limit our ability to obtain certain parts on a cost-effective basis, or at all. A significant interruption in the delivery of such items could have a material adverse effect on our business, results of operations and financial condition. In addition, if our high-volume technology manufacturing center located in Tempe, Arizona is unable to produce sufficient product or maintain quality, it could have a material adverse effect on our business, results of operations and financial condition.

- Our ability to maintain affordable credit insurance may become more difficult - In the normal course of our business, we purchase credit insurance to mitigate some of our domestic and international credit risk. Although credit insurance remains generally available, upon renewal, it may become more expensive to obtain or may not be available for existing or new customers in certain international markets and it might require higher deductibles than in the past. If we acquire a company with a different customer base, we may not be able to obtain credit insurance for those sales. As such, there can be no assurance that, in the future, we will be able to obtain credit insurance on a basis consistent with our past practices.

We rely upon various third-party companies and their technology to provide services to our customers and if we are unable to obtain such services at reasonable prices, or at all, our gross margins and our ability to provide the services of our wireless applications business could be materially adversely affected.

Risks from our reliance with these third parties include:

- The loss of mapping and third-party content - The wireless data services provided to our customers are dependent on real-time, continuous feeds from map data, points of interest data, traffic information, gas prices, theater, event and weather information from vendors and others. Any disruption of this third-party content from our satellite feeds or backup landline feeds or other disruption could result in delays in our subscribers' ability to receive information. We obtain this data that we sell to our customers from companies owned by current and potential competitors, who may act in a manner that is not in our best interest. If our suppliers of this data or content were to enter into exclusive relationships with other providers of location-based services or were to discontinue providing such information and we were unable to replace them cost effectively, or at all, our ability to provide the services of our wireless applications business would be materially adversely affected. Our gross margins may also be materially adversely affected if the cost of third-party data and content increases substantially.

- Third-party data centers or third-party networks may fail - Many products and services of our advanced communication solutions, in particular our public safety and location technology solutions, are provided through a combination of our servers, which we house at third-party data centers, and the networks of our wireless carrier partners. Certain of our data centers are currently hosted in cloud-based applications operated by third parties such as Amazon Web Services and Microsoft or third-party facilities located in Irvine, California, San Francisco, California, Dallas, Texas and Raleigh, North Carolina, and we may use others as required. We also use third-party data center facilities in the Phoenix, Arizona area to provide for disaster recovery. As such, our business relies to a significant degree on the efficient and uninterrupted operation of the third-party data centers we use. Network failures, disruptions or capacity constraints in our third-party data center facilities or in our servers maintained at their location could affect the performance of the products and services of our wireless applications and 911 business and harm our reputation and our revenue. The ability of our subscribers to receive critical location and business information requires timely and uninterrupted connections with our wireless network carriers. Any disruption from our satellite feeds or backup landline feeds could also result in delays in our subscribers' ability to receive information.

- We must integrate our technologies and routinely upgrade them - We may not be able to upgrade our location services platform to support certain advanced features and functionality without obtaining technology licenses from third parties. Obtaining these licenses may be costly and may delay the introduction of such features and functionality, and these licenses may not be available on commercially favorable terms, or at all. Problems and delays in development or delivery as a result of issues with respect to design, technology, licensing and patent rights, labor, learning curve assumptions, or materials and components could prevent us from achieving contractual obligations. In addition, our products cannot be tested and proven in all situations and are otherwise subject to unforeseen problems. The inability to offer advanced features or functionality, or a delay in our ability to upgrade our location-based services platform, may materially adversely affect demand for our products and services and, consequently, have a material adverse effect on our business, results of operations and financial condition.

- We rely upon "open-source" software - We have incorporated some types of open-source software into our products, allowing us to enhance certain solutions without incurring substantial additional research and development costs. Thus far, we have encountered no unanticipated material problems arising from our use of open-source software. However, as the use of open-source software becomes more widespread, certain open-source technology could become competitive with our proprietary technology, which could cause sales of our products to decline or force us to reduce the fees we charge for our products, which could have a material adverse effect on our business, results of operations and financial condition.

Indemnification provisions in our contracts could have a material adverse effect on our consolidated results of operations, financial position, or cash flows.

In the ordinary course of business, we include indemnification provisions in certain of our customer contracts. Pursuant to these agreements, we have agreed to indemnify, hold harmless and reimburse the indemnified party for losses suffered or incurred by the indemnified party, including but not limited to losses related to third-party intellectual property claims. Some customers seek indemnification under their contractual arrangements with the Company for claims and other costs associated with defending lawsuits alleging infringement of patents through their use of our products and services, and the use of our products and services in combination with products and services of other vendors.

In some cases, we have agreed to assume the defense of the case. In others, the Company will negotiate with these customers in good faith because the Company believes its technology does not infringe the cited patents or due to specific clauses within the customer contractual arrangements that may or may not give rise to an indemnification obligation. It is not possible to determine the maximum potential amount the Company may spend under these agreements due to the unique facts and circumstances involved in each particular agreement.

The Company's assessments related to indemnification provisions are based on estimates and assumptions that have been deemed reasonable by management, but that may prove to be incomplete or inaccurate, and unanticipated events and circumstances may occur that might cause the Company to change those estimates and assumptions. Therefore, it is possible that an unfavorable resolution of one or more of these matters could have a material adverse effect on the Company's consolidated financial statements in a future fiscal period.

We are, from time to time, and could become a party to additional litigation or subject to claims, including product liability claims, relating to our software, government investigations and other proceedings that could cause us to incur unanticipated expenses and otherwise have a material adverse effect on our business, results of operations and financial condition.

We are, from time to time, involved in commercial disputes and civil litigation relating to our businesses. Our agreements with customers may require us to indemnify such customers. Direct claims against us or claims against our customers may relate to defects in or non-conformance of our products, or our own acts of negligence and non-performance. Occasionally, we are called upon also to provide information in connection with litigation involving other parties or government investigations. Product liability and other forms of insurance are expensive and may not be available in the future. We cannot be sure that we will be able to maintain or obtain insurance coverage at acceptable costs or in sufficient amounts or that our insurer will not disclaim coverage as to a future claim. In many cases, we are unable to obtain insurance and are self-insured. Any such claim could have a material adverse effect on our business, results of operations and financial condition.

For example, a customer that purchased a TCS 911 call handling software solution in December 2014 (which was more than one year prior to our acquisition of TCS) (the "TCS Legacy Customer") informed us that it experienced several network outages and that it would seek indemnification for any claims made against it as a result of such outages. Settlement conversations were had with this customer for several months and a mutual agreement was not reached. In September 2019, this customer filed a lawsuit which has accused us of committing fraud because, among other things, we failed to provide them with supposedly promised redundancy. We vigorously contest that we violated any contractual obligations, much less committed fraud, and have submitted notification to our insurance carriers of the lawsuit for review and consideration of coverage for potential liability that may arise from this lawsuit. We are also reviewing with counsel our multiple counter claims against this TCS Legacy Customer. For additional information related to this lawsuit, see *"Notes to Consolidated Financial Statements - Note (13)(b) - Commitments and Contingencies - Legal Proceedings and Other Matters"* included in *"Part II - Item 8.- Financial Statements and Supplementary Data,"* included in this Annual Report on Form 10-K.

Because our software may contain defects or errors, and our hardware products may incorporate defective components, our sales could decrease if these defects or errors adversely affect our reputation or delay shipments of our products.

Products as complex as ours are likely to contain undetected errors or defects, especially when first introduced or when new versions are released. Our products may not be error or defect free after delivery to customers, which could damage our reputation, cause revenue losses, result in the rejection of our products or services, divert development resources and increase service and warranty costs, each of which could have a material adverse effect on our business, results of operations and financial condition.

Software products, such as our 911 call handling software solutions, must meet stringent customer technical requirements and we must satisfy our warranty obligations to our customers. TCS had a call handling software solution developed more than ten years ago and was licensed to customers prior to our acquisition of TCS. Older versions of this software solution remain deployed by certain end-customers. In fiscal 2016, AT&T, a distributor of this small TCS product line, informed us that they did not believe we met certain contractual specifications related to performance and usability of the software solution. During fiscal 2018, we entered into a full and final warranty settlement with AT&T, pursuant to which we issued thirty-six credits to AT&T of $0.2 million, which AT&T can apply on a monthly basis to purchases of solutions from us, beginning October 2017 through September 2020. For additional information related to this warranty settlement, see "*Notes to Consolidated Financial Statements - Note (6) - Accrued Expenses and Other Current Liabilities*" included in "*Part II - Item 8.- Financial Statements and Supplementary Data*," included in this Annual Report on Form 10-K. Our current accrued warranty obligations at July 31, 2019 include $4.0 million of warranty obligations for the legacy TCS 911 call handling software solution. Our warranty liability associated with this issue was determined based on a review of contractual obligations, estimates of costs to enhance the software and include the terms of settlement with AT&T. We believe our customer support plan, which includes an intention to continue to support end-customers in exchange for an annual customer support fee, has mitigated the negative reputational impact of this issue. In fiscal 2019, 2018 and 2017, sales related to the legacy TCS 911 call handling software solution were $6.6 million, $7.0 million and $5.5 million, respectively. A significant portion of such sales were derived from our relationship with AT&T. Sales in fiscal 2020 for this old product line are expected to decline to virtually zero. Ultimately, our estimated warranty costs for this product may not be sufficient.

Our hardware products are also subject to warranty obligations and integrate a wide variety of components from different vendors.

Protection of our intellectual property is limited and pursuing infringers of our patents and other intellectual property rights can be costly.

Our businesses rely, in large part, upon our proprietary scientific and engineering know-how and production techniques. We rely on a combination of patent, copyright, trademark, service mark, trade secret and unfair competition laws, restrictions in licensing agreements, confidentiality provisions and various other contractual provisions to protect our intellectual property and related proprietary rights, but these legal means provide only limited protection. Although a number of patents have been issued to us and we have obtained a number of other patents as a result of our acquisitions, we cannot assure you that our issued patents will be upheld if challenged by another party. Additionally, with respect to any patent applications which we have filed, we cannot assure you that any patents will be issued as a result of these applications.

The departure of any of our key management and technical personnel, the breach of their confidentiality and non-disclosure obligations to us or the failure to achieve our intellectual property objectives could have a material adverse effect on our business, results of operations and financial condition. Our ability to compete successfully and achieve future revenue growth will depend, in part, on our ability to protect our proprietary technology and operate without infringing upon the rights of others. We may fail to do so. In addition, the laws of certain countries in which our products are or may be sold may not protect our products or intellectual property rights to the same extent as the laws of the U.S.

Our ability to protect our intellectual property rights is also subject to the terms of future government contracts. We cannot assure you that the federal government will not demand greater intellectual property rights or restrict our ability to disseminate intellectual property. We are also a member of standards-setting organizations and have agreed to license some of our intellectual property to other members on fair and reasonable terms to the extent that the license is required to develop non-infringing products.

Pursuing infringers of our proprietary rights could result in significant litigation costs, and any failure to pursue infringers could result in our competitors utilizing our technology and offering similar products, potentially resulting in loss of a competitive advantage and decreased revenues. Despite our efforts to protect our proprietary rights, existing patent, copyright, trademark and trade secret laws afford only limited protection. In addition, the laws of some foreign countries do not protect our proprietary rights to the same extent as do the laws of the U.S. Protecting our know-how is difficult especially after our employees or those of our third-party contract service providers end their employment or engagement. Attempts may be made to copy or reverse-engineer aspects of our products or to obtain and use information that we regard as proprietary. Accordingly, we may not be able to prevent the misappropriation of our technology or prevent others from developing similar technology. Furthermore, policing the unauthorized use of our products is difficult and expensive. Litigation may be necessary in the future to enforce our intellectual property rights or to determine the validity and scope of the proprietary rights of others. The costs and diversion of resources could significantly harm our business. If we fail to protect our intellectual property, we may not receive any return on the resources expended to create the intellectual property or generate any competitive advantage based on it.

Third parties may claim we are infringing their intellectual property rights and we could be prevented from selling our products, or suffer significant litigation expense, even if these claims have no merit.

Our competitive position is driven in part by our intellectual property and other proprietary rights. Third parties, however, may claim that we, our products, operations or any products or technology we obtain from other parties are infringing their intellectual property rights, and we may be unaware of intellectual property rights of others that may impact some of our assets, technology and products. From time to time we receive letters from third parties who allege we are infringing their intellectual property and ask us to license such intellectual property. We review the merits of each such letter and respond as we deem appropriate.

From time to time our customers are parties to allegations of intellectual property infringement claims based on our customers' incorporation and use of our products and services, which may lead to demands from our customers for us to indemnify them for costs in defending those allegations. Any litigation regarding patents, trademarks, copyrights or intellectual property rights, even those without merit, and the related indemnification demands of our customers, can be costly and time consuming, and divert our management and key personnel from operating our business. The complexity of the technology involved, and inherent uncertainty and cost of intellectual property litigation increases our risks. If any third party has a meritorious or successful claim that we are infringing its intellectual property rights, we may be forced to change our products or enter into licensing arrangements with third parties, which may be costly or impractical. This also may require us to stop selling our products as currently engineered, which could harm our competitive position. We also may be subject to significant damages or injunctions that prevent the further development and sale of certain of our products or services and may result in a material loss of revenue.

From time to time, there have been claims challenging the ownership of open source software against companies that incorporate open source software into their products. As a result, we could be subject to suits by parties claiming ownership of what we believe to be open source software. Some open source licenses contain requirements that we make available source code for modifications or derivative works under the terms of a particular open source license or other license granting third parties certain rights of further use. If we combine our proprietary software products with open source software in a certain manner, we could under certain of the open source licenses, be required to release our proprietary source code. Open source license terms may be ambiguous and many of the risks associated with usage of open source software cannot be eliminated, and could if not properly addressed, negatively affect our business. If we were found to have inappropriately used open source software, we may be required to release our proprietary source code, re-engineer our products and client applications, discontinue the sale of our products or services in the event re-engineering cannot be accomplished on a timely basis or take other remedial action that may divert resources away from our development efforts, any of which could materially adversely affect our business, results of operations, and financial condition.

A change in our relationship with our large wireless carrier customers could have a material adverse effect.

Although we have a long history of providing services to many of our wireless carrier partners, a change in purchasing or procurement strategies by a wireless carrier partner could result in the loss of business from that partner. Additionally, from time to time, we routinely perform services without a multi-period contract while we negotiate new and extended contract terms and pricing. These negotiations are complex and may take long periods of time. Even when we successfully negotiate a multi-period contract, our wireless carrier contracts, such as the ones with Verizon which accounted for 9.1% of our sales in fiscal 2019, provide for terminations with notice and provide a mechanism for the wireless carrier to renegotiate lower fees and/or change services. Fee pressure from these carriers are constant and ongoing. Thus, even when we obtain a multi-period contract term, our revenues could be suddenly and materially reduced.

Competitors offer technology that has functionality similar to ours for free, under different business models. Competition from such free offerings may reduce our revenue and harm our business. If our wireless carrier partners can offer such technology to their subscribers for free, they may elect to cease their relationships with us, alter or reduce the manner or extent to which they market or offer our services or require us to substantially reduce our subscription fees or pursue other business strategies that may not prove successful for us and could have a material adverse effect on our business, results of operations and financial condition.

Potential future business combinations among wireless network operators could result in a loss of revenue for our business.

The telecommunications industry generally is currently undergoing a consolidation phase. For example, T-Mobile US, Inc. ("T-Mobile") and Sprint Corporation have announced a merger. We currently generate several million dollars of revenue from both of these companies and we are uncertain of the impact that this merger may have on us in the future. Many of our customers, specifically wireless carrier customers of our Commercial Solutions segment, have or may become the target of acquisitions. If the number of our customers is significantly reduced as a result of this consolidation trend, or if the resulting companies do not utilize our product offerings, our business, results of operations and financial condition could be materially adversely affected.

If our wireless carrier partners change the pricing and other terms by which they offer our products to their end-customers or do not continue to provide our services at all or renegotiate lower fees with us, our business, results of operations, and financial condition could be suddenly and materially adversely affected.

We generate a significant portion of our revenue from customers that are wireless carriers, such as Verizon which accounted for 9.1% of our revenues in fiscal 2019. In addition, a portion of our revenue is derived from subscription fees that we receive from our wireless carrier partners for end-users who subscribe to our service on a standalone basis or in a bundle with other services. Future revenue will depend on the pricing and quality of those services and subscriber demand for those services, which may vary by market, and the level of subscriber turnover experienced by our wireless carrier partners. If subscriber turnover increases more than we anticipate, our financial results could be materially adversely affected.

Poor performance in or disruptions of the services included in our advanced communication solutions could harm our reputation, delay market acceptance of our services and subject us to liabilities (including breach of contract claims brought by our customers and third-party damages claims brought by end-users). Our wireless carrier agreements and certain customers require us to meet specific requirements including operational uptime requirements or be subject to penalties.

If we are unable to meet contractual requirements with our wireless carrier partners, such as Verizon, they could terminate our agreements or we may be required to refund a portion of monthly subscriptions fees they have paid us.

Risks Related to our Common Stock

Our stock price is volatile.

The stock market in general and the stock prices of technology-based companies, in particular, experience extreme volatility that often is unrelated to the operating performance of any specific public company. The market price of our common stock has fluctuated significantly in the past and is likely to fluctuate significantly in the future as well. Factors that could have a significant impact on the market price of our stock include, among others:

- strategic transactions, such as acquisitions and divestures;
- our ability to successfully integrate and manage recent acquisitions;
- issuance of potentially dilutive equity or equity-type securities;
- issuance of debt;
- future announcements concerning us or our competitors;
- receipt or non-receipt of substantial orders for products and services;
- quality deficiencies in services or products;
- results of technological innovations;
- new commercial products;
- changes in recommendations of securities analysts;
- government regulations;
- changes in the status or outcome of government audits;
- proprietary rights or product or patent litigation;
- changes in U.S. government policies;
- changes in economic conditions generally, particularly in the telecommunications sector;
- changes in securities market conditions, generally;
- changes in the status of litigation and legal matters (including changes in the status of export matters);
- cyber attacks;
- energy blackouts;
- acts of terrorism or war;
- inflation or deflation; and
- rumors or allegations regarding our financial disclosures or practices.

Shortfalls in our sales or earnings in any given period relative to the levels expected by securities analysts could immediately, significantly and adversely affect the trading price of our common stock.

Future issuances of our shares of common stock could dilute a stockholder's ownership interest in Comtech and reduce the market price of our shares of common stock.

In the future, we may issue additional securities to raise capital. We may also acquire interests in other companies by using a combination of cash and our common stock or just our common stock. We may also issue securities convertible into our common stock. Any of these events may dilute a stockholder's ownership interest in Comtech and have an adverse impact on the price of our common stock.

Provisions in our corporate documents and Delaware law could delay or prevent a change in control of Comtech.

We have taken a number of actions that could have the effect of discouraging, delaying or preventing a merger or acquisition involving Comtech that our stockholders may consider favorable.

For example, we have a classified board and the employment contract with our President and CEO, and agreements with other of our executive officers, provide for substantial payments in certain circumstances or in the event of a change of control of Comtech. In the future, we may adopt a stockholder rights plan which could cause substantial dilution to a stockholder, and substantially increase the cost paid by a stockholder who attempts to acquire us on terms not approved by our Board of Directors.

In addition, we are subject to the provisions of Section 203 of the Delaware General Corporation Law, an anti-takeover law. In general, this statute provides that, except in certain limited circumstances, a corporation shall not engage in any "business combination" with an "interested stockholder" for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

A "business combination" includes mergers, asset sales and other transactions resulting in a financial benefit to the interested stockholder. Subject to certain exceptions, for purposes of Section 203 of the Delaware General Corporation Law, an "interested stockholder" is a person who, together with affiliates, owns, or within three years did own, 15% or more of the corporation's voting stock. This provision could have the effect of delaying or preventing a change in control of Comtech.

A disruption in our dividend program could negatively impact our stock price.

We have paid quarterly dividends every quarter since September 2010.

Our ability to continue to pay quarterly dividends will depend on our ability to generate sufficient cash flows from operations in the future and maintain compliance with our Credit Facility, as amended. This ability may be subject to certain economic, financial, competitive and other factors that are beyond our control. Future dividends remain subject to compliance with financial covenants under the Company's Credit Facility, as amended, as well as Board approval. Our Board of Directors may, at its discretion, decrease the targeted annual dividend amount or entirely discontinue the payment of dividends at any time.

Additionally, our ability to declare and pay dividends and make other distributions with respect to our capital stock may also be restricted by the terms of our Credit Facility, as amended, and may be restricted by the terms of financing arrangements that we enter into in the future.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Historically, we have not owned any material properties or facilities and have relied upon a strategy of leasing. The following table lists our primary leased facilities at July 31, 2019:

Location		Property Type	Square Footage	Lease Expiration
Commercial Solutions Segment				
Tempe, Arizona	(A)	Manufacturing and Engineering	152,000	February 2021
Seattle, Washington	(B)	Network Operations, R&D, Engineering and Sales	57,000	December 2022
Santa Clara, California	(C)	Manufacturing and Engineering	47,000	April 2026
Various facilities	(D)	Engineering and General Office	35,000	Various
Westwood, Massachusetts	(E)	Network Operations	19,000	March 2023
Lake Forest, California	(F)	R&D and Engineering	18,000	July 2023
Greenwood Village, Colorado	(F)	Network Operations	17,000	July 2020
Gatineau, Canada	(G)	Network Operations, R&D, Engineering, Sales and General Office	15,000	April 2023
Moscow, Idaho	(H)	Support, Engineering and Sales	13,000	February 2025
Annapolis, Maryland	(F)	Support, Engineering and Sales	11,000	July 2026
Fremont, California	(H)	Support, Engineering and Sales	10,000	April 2020
Germantown, Maryland	(I)	Engineering and General Office	6,000	May 2025
			400,000	
Government Solutions Segment				
Orlando, Florida	(J)	Manufacturing and Engineering	99,000	April 2026
Tampa, Florida	(J)	Manufacturing (Currently Vacated)	46,000	April 2020
Melville, New York	(K)	Manufacturing and Engineering	45,000	December 2021
Cypress, California	(F)	Support, Engineering and Sales	28,000	July 2025
Germantown, Maryland	(I)	Engineering and General Office	26,000	May 2025
Various facilities	(L)	Support, Engineering and Sales	14,000	Various
Richardson, Texas	(F)	R&D and Engineering	13,000	July 2020
Annapolis, Maryland	(F)	Support, Engineering and Sales	6,000	July 2026
			277,000	
Corporate				
Annapolis, Maryland	(F)	General Office and Common Areas	2,000	July 2026
Melville, New York	(M)	Corporate Headquarters and General Office	9,600	August 2027
			11,600	
Total Square Footage			688,600	

(A) Although primarily used for our satellite earth station product lines, which are part of the Commercial Solutions segment, both of our business segments utilize, from time to time, our high-volume technology manufacturing facilities located in Tempe, Arizona. These manufacturing facilities utilize state-of-the-art design and production techniques, including analog, digital and RF microwave production, hardware assembly and full service engineering. Our leases for these facilities expire from fiscal 2020 through fiscal 2021.

(B) Our office in Seattle, Washington is used primarily for servicing and hosting our wireless and VoIP E911 public safety support services.

(C) Our Commercial Solutions segment manufactures certain amplifiers in a leased manufacturing facility located in Santa Clara, California. Our Commercial Solutions segment also operates a small office in the United Kingdom with a lease that expires in October 2021.

(D) Our Commercial Solutions segment also leases an additional twelve facilities, three of which are located in the U.S. The U.S. facilities aggregate 7,000 square feet and are primarily utilized for engineering and general office use. Our Commercial Solutions segment also operates nine small offices in Brazil, Canada, China, India, Singapore, Australia and the United Kingdom, all of which aggregate 28,000 square feet and are primarily utilized for customer support, engineering and sales.

(E) Our Commercial Solutions segment maintains office space in Westwood, Massachusetts used primarily for servicing and hosting our wireless and VoIP E911 public safety support services.

(F) We have leases for facilities in Annapolis, Maryland; Lake Forest, California and Greenwood Village, Colorado used primarily for the design and development of our software-based systems and applications and network operations. Major manufacturing and engineering facilities for our Government Solutions segment include Orlando, Florida, Cypress, California and Richardson, Texas.

(G) Our Commercial Solutions segment maintains office space in Gatineau, Canada that is utilized for network operations, R&D, engineering and sales of our public safety and location technology solutions.

(H) Our offices in Moscow, Idaho and Fremont, California are primarily used for research and development, engineering and sales of our satellite earth station products.

(I) Our Government Solutions segment leases a 32,000 square foot facility located in Germantown, Maryland, which is primarily used to support the U.S. Army's BFT-1 sustainment activities and certain cyber training activities. Our Government Solutions segment occupies 26,000 feet of the facility with the remainder utilized by our Commercial Solutions segment.

(J) Our Government Solutions segment engineers and manufactures our over-the-horizon microwave systems and tactical-based satellite equipment in a leased facility in Orlando, Florida. This segment also leases a small office in North Africa. As part of our cost reduction initiatives in our Government Solutions segment, we migrated our manufacturing and engineering activities from our Tampa, Florida facility to our Orlando, Florida facility. As the lease on Tampa, Florida facility expires in fiscal 2020, we are seeking opportunities to sublease the space for the duration of the lease.

(K) Our Government Solutions segment manufactures certain of our solid-state, high-power amplifiers in a 45,000 square foot engineering and manufacturing facility on more than two acres of land in Melville, New York and an 8,000 square foot facility in Topsfield, Massachusetts. We lease the New York facility from a partnership controlled by our President and CEO. The lease provides for our use of the premises as they exist through December 2021 with an option to renew for an additional ten-year period. We have a right of first refusal in the event of a sale of the facility. Our Massachusetts lease is currently on a month-to-month basis.

(L) Our Government Solutions segment also leases an additional four facilities located in the U.S. that are primarily used for engineering, sales and software development. Of these facilities, we are currently subleasing 6,000 square foot of the Suwanee, GA facility through August 2020. Our leases for these facilities expire from fiscal 2021 through fiscal 2023.

(M) Our corporate headquarters are located in an office building complex in Melville, New York. The lease provides for our use of the premises through August 2027.

The terms for all of our leased facilities are generally for multi-year periods and we believe that we will be able to renew these leases or find comparable facilities elsewhere.

ITEM 3. LEGAL PROCEEDINGS

Information regarding legal proceedings is incorporated herein by reference to the "*Notes to Consolidated Financial Statements – Note (13)(b) - Commitments and Contingencies – Legal Proceedings and Other Matters*" included in "*Part II - Item 8.- Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K.

ITEM 4. MINE SAFETY DISCLOSURES

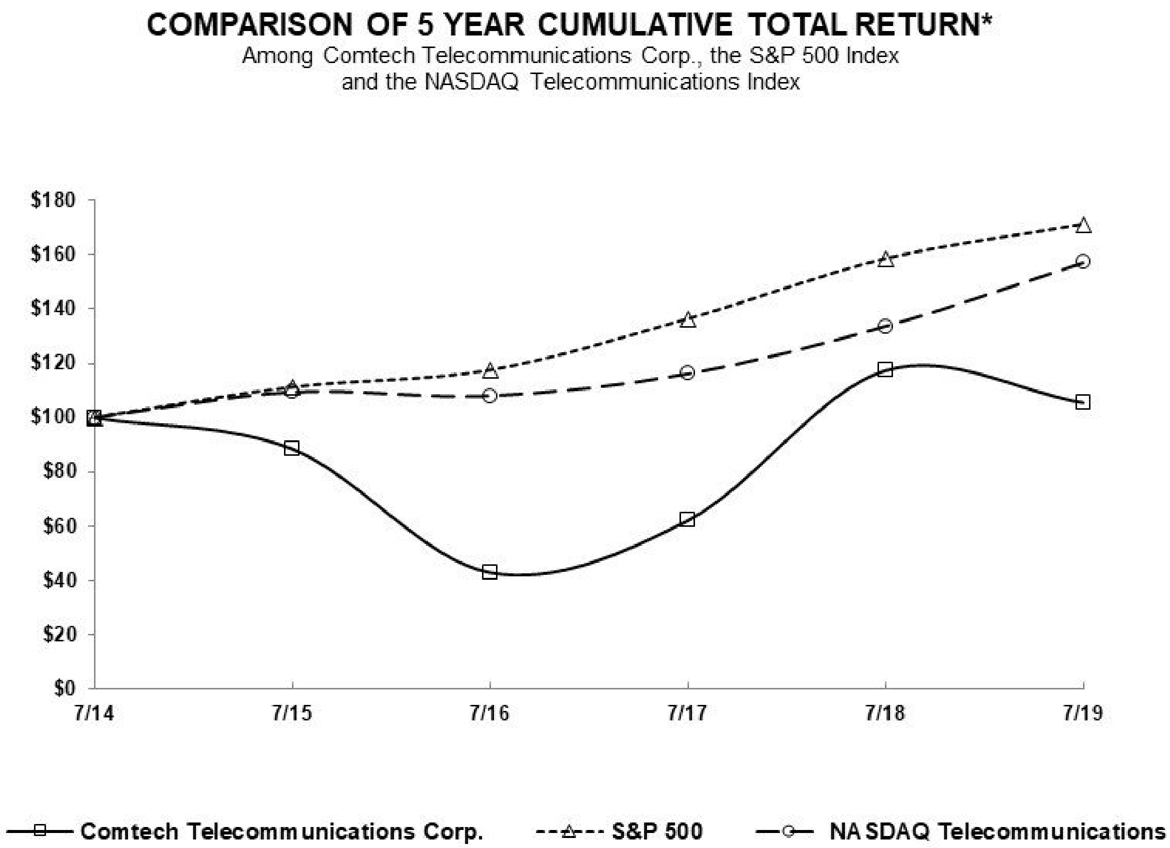
Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Stock Performance Graph and Cumulative Total Return

The graph below compares the cumulative total stockholder return on our common stock with the cumulative total return on the S&P's 500 Index and the NASDAQ Telecommunications Index for each of the last five fiscal years ended July 31, assuming an investment of $100 at the beginning of such period and the reinvestment of any dividends. The comparisons in the graphs below are based upon historical data and are not indicative of, nor intended to forecast, future performance of our common stock.



*$100 invested on 7/31/14 in stock or index, including reinvestment of dividends.
Fiscal year ending July 31.

Our common stock trades on the NASDAQ Stock Market LLC ("NASDAQ") under the symbol "CMTL."

The following table shows the quarterly range of the high and low sale prices for our common stock as reported by the NASDAQ. Such prices do not include retail markups, markdowns or commissions.

	Common Stock	
	High	Low
Fiscal Year Ended July 31, 2018		
First Quarter	$ 22.90	17.11
Second Quarter	23.90	19.30
Third Quarter	32.94	20.62
Fourth Quarter	35.38	29.36
Fiscal Year Ended July 31, 2019		
First Quarter	$ 36.94	27.15
Second Quarter	30.43	22.80
Third Quarter	27.50	20.94
Fourth Quarter	30.29	20.98

Dividends

Since September 2010, we have paid quarterly dividends. On September 26, 2018, December 6, 2018, March 6, 2019 and June 5, 2019, our Board of Directors declared a dividend of $0.10 per common share, which were paid on November 16, 2018, February 15, 2019, May 17, 2019 and August 16, 2019, respectively. On September 24, 2019, our Board of Directors declared a dividend of $0.10 per common share, payable on November 15, 2019 to stockholders of record at the close of business on October 16, 2019. The Board of Directors is currently targeting fiscal 2020 quarterly dividend payments of $0.10 per common share. Future dividends remain subject to compliance with financial covenants under our Credit Facility, as amended, as well as Board approval.

Recent Sales of Unregistered Securities

On February 28, 2019, in connection with the completion of our acquisition of Solacom Technologies Inc. ("Solacom") for cash and shares of our common stock, we issued 208,669 shares of common stock at a volume weighted average price of $26.86 per share. The shares of our common stock issued in connection with the acquisition were issued in reliance upon Section 3(a)(10) of the Securities Act of 1933, as amended, which exempts from the registration requirements any security that is issued in exchange for one or more bona fide outstanding securities where the terms and conditions of such issuance and exchange are approved, after a hearing upon the fairness of such terms and conditions at which all persons to whom it is proposed to issue securities in such exchange shall have the right to appear, by any court expressly authorized by law to grant such approval. The exchange of shares of Comtech's common stock as part of the total consideration for shares of Solacom was approved by the Superior Court of Canada, Province of Quebec, District of Montreal. See "*Notes to Consolidated Financial Statements - Note (2) - Acquisitions*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K for further information concerning the acquisition.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

We did not repurchase any of our equity securities during the fiscal year ended July 31, 2019. As of July 31, 2019 and September 23, 2019, we were authorized to repurchase up to an additional $8.7 million of our common stock, pursuant to a $100.0 million stock repurchase program that was authorized by our Board of Directors. The $100.0 million stock repurchase program has no time restrictions and repurchases may be made in open-market or privately negotiated transactions and may be made pursuant to SEC Rule 10b5-1 trading plans.

Approximate Number of Equity Security Holders

As of September 19, 2019, there were approximately 824 holders of our common stock. Such number of record owners was determined from our stockholder records and does not include beneficial owners whose shares of our common stock are held in the name of various security holders, dealers and clearing agencies.

ITEM 6. SELECTED CONSOLIDATED FINANCIAL DATA

The following table shows selected historical consolidated financial data for our Company.

Detailed historical financial information is included in the audited consolidated financial statements for fiscal 2019, 2018 and 2017.

	Fiscal Years Ended July 31, (In thousands, except per share amounts)				
	2019	2018	2017	2016	2015
Consolidated Statement of Operations Data:					
Net sales	$ 671,797	570,589	550,368	411,004	307,289
Cost of sales	424,357	346,648	332,183	239,767	168,405
Gross profit	247,440	223,941	218,185	171,237	138,884
Expenses:					
Selling, general and administrative	128,639	113,922	116,080	94,932	62,680
Research and development	56,407	53,869	54,260	42,190	35,916
Amortization of intangibles	18,320	21,075	22,823	13,415	6,211
Settlement of intellectual property litigation	(3,204)	—	(12,020)	—	—
Acquisition plan expenses	5,871	—	—	21,276	—
	206,033	188,866	181,143	171,813	104,807
Operating income (loss)	41,407	35,075	37,042	(576)	34,077
Other expenses (income):					
Interest expense	9,245	10,195	11,629	7,750	479
Write-off of deferred financing costs	3,217	—	—	—	—
Interest (income) and other	35	254	(68)	(134)	(405)
Income (loss) before provision for (benefit from) income taxes	28,910	24,626	25,481	(8,192)	34,003
Provision for (benefit from) income taxes	3,869	(5,143)	9,654	(454)	10,758
Net income (loss)	$ 25,041	29,769	15,827	(7,738)	23,245
Net income (loss) per share:					
Basic	$ 1.04	1.25	0.68	(0.46)	1.43
Diluted	$ 1.03	1.24	0.67	(0.46)	1.42
Weighted average number of common shares outstanding – basic	24,124	23,825	23,433	16,972	16,203
Weighted average number of common and common equivalent shares outstanding – diluted	24,302	24,040	23,489	16,972	16,418

	Fiscal Years Ended July 31, (In thousands)				
	2019	2018	2017	2016	2015
Other Consolidated Operating Data:					
Backlog at period-end	$ 682,954	630,695	446,230	484,005	117,744
New orders	724,056	755,054	512,593	451,278	291,621
Research and development expenditures - internal and customer funded	71,086	70,793	81,310	59,622	45,144
Adjusted EBITDA	93,472	78,374	70,705	48,062	51,761

	As of July 31, (In thousands)				
	2019	2018	2017	2016	2015
Consolidated Balance Sheet Data:					
Total assets	$ 887,711	845,157	832,063	921,196	473,877
Working capital	134,967	114,477	96,833	119,493	236,419
Debt, including capital leases and other obligations	165,757	167,899	195,802	258,649	—
Other liabilities	18,822	4,117	2,655	4,105	3,633
Stockholders' equity	535,082	505,684	480,150	470,401	401,409

Non-GAAP Financial Data

This Annual Report on Form 10-K contains a Non-GAAP financial metric for the Company titled Adjusted EBITDA, which represents earnings (loss) before income taxes, interest (income) and other expense, write-off of deferred financing costs, interest expense, amortization of stock-based compensation, amortization of intangibles, depreciation expense, estimated contract settlement costs, settlement of intellectual property litigation, acquisition plan expenses, facility exit costs and strategic alternatives analysis expenses and other. In future periods, we expect to incur expenses similar to the aforementioned items and investors should not infer from our presentation of Adjusted EBITDA that these costs are unusual, infrequent or non-recurring. These items, while periodically affecting our results, may vary significantly from period to period and may have a disproportionate effect in a given period, thereby affecting the comparability of results.

Adjusted EBITDA is a Non-GAAP financial measure used by management in assessing Comtech's operating results. Although closely aligned, Comtech's definition of Adjusted EBITDA is different than the Consolidated EBITDA (as such term is defined in our Credit Facility, as amended) utilized for financial covenant calculations and also may differ from the definition of EBITDA or Adjusted EBITDA used by other companies and therefore, may not be comparable to similarly titled measures used by other companies. Our Adjusted EBITDA is also a measure frequently requested by Comtech's investors and analysts. We believe that investors and analysts may use Adjusted EBITDA, along with other information contained in our SEC filings, in assessing our performance and comparability of our results with other companies.

Non-GAAP financial measures have limitations as an analytical tool as they exclude the financial impact of transactions necessary to conduct our business, such as the granting of equity compensation awards, and are not intended to be an alternative to financial measures prepared in accordance with GAAP. Non-GAAP financial measures should be considered in addition to, and not as a substitute for or superior to, financial measures determined in accordance with GAAP. Investors are advised to carefully review the GAAP financial results that are disclosed in our SEC filings.

The following is a reconciliation of net income (loss), the most comparable GAAP measure, to Adjusted EBITDA:

	Fiscal Years Ended July 31, (In thousands)				
	2019	2018	2017	2016	2015
Adjusted EBITDA:					
Net income (loss)	$ 25,041	29,769	15,827	(7,738)	23,245
Provision for (benefit from) income taxes	3,869	(5,143)	9,654	(454)	10,758
Interest (income) and other	35	254	(68)	(134)	(405)
Write-off of deferred financing costs	3,217	—	—	—	—
Interest expense	9,245	10,195	11,629	7,750	479
Amortization of stock-based compensation	11,427	8,569	8,506	4,117	4,363
Amortization of intangibles	18,320	21,075	22,823	13,415	6,211
Depreciation	11,927	13,655	14,354	9,830	6,525
Estimated contract settlement costs	6,351	—	—	—	—
Settlement of intellectual property litigation	(3,204)	—	(12,020)	—	—
Acquisition plan expenses	5,871	—	—	21,276	—
Strategic alternatives analysis and other	—	—	—	—	585
Facility exit costs	1,373	—	—	—	—
Adjusted EBITDA	$ 93,472	78,374	70,705	48,062	51,761

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Overview

We are a leading provider of advanced communications solutions for both commercial and government customers worldwide. Our solutions fulfill our customers' needs for secure wireless communications in some of the most demanding environments, including those where traditional communications are unavailable or cost-prohibitive, and in mission-critical and other scenarios where performance is crucial.

We manage our business through two reportable operating segments:

- Commercial Solutions - offers satellite ground station technologies (such as modems and amplifiers), public safety and location technologies (such as 911 call routing and mapping solutions) to commercial customers and smaller government customers, such as state and local governments. This segment also serves certain large government customers (including the U.S. government) that have requirements for off-the-shelf commercial equipment.

- Government Solutions - provides mission-critical technologies (such as tactical satellite-based networks and ongoing support for complicated communication networks) and high-performance transmission technologies (such as troposcatter systems and solid-state, high-power amplifiers) to large government end-users (including those of foreign countries), large international customers and domestic prime contractors.

In fiscal 2020, we have rebranded our operating segment product groups to better align with our end markets. Prior descriptions of these product lines were updated to reflect such changes.

Our Quarterly Financial Information
Quarterly and period-to-period sales and operating results may be significantly affected by either short-term or long-term contracts with our customers. In addition, our gross profit is affected by a variety of factors, including the mix of products, systems and services sold, production efficiencies, estimates of warranty expense, price competition and general economic conditions. Our gross profit may also be affected by the impact of any cumulative adjustments to contracts that are accounted for over time.

Our contracts with the U.S. government can be terminated for convenience by it at any time and orders are subject to unpredictable funding, deployment and technology decisions by the U.S. government. Some of these contracts are indefinite delivery/indefinite quantity ("IDIQ") contracts and, as such, the U.S. government is not obligated to purchase any equipment or services under these contracts. We have, in the past, experienced and we continue to expect significant fluctuations in sales and operating results from quarter-to-quarter and period-to-period. As such, comparisons between periods and our current results may not be indicative of a trend or future performance.

Critical Accounting Policies

We consider certain accounting policies to be critical due to the estimation process involved in each.

Revenue Recognition. On August 1, 2018, we adopted ASU No. 2014-09 "Revenue from Contracts with Customers (Topic 606)" or "ASC 606" applying the modified retrospective transition method. Except for new presentation or disclosure requirements, the impact of adoption was not material to our business, results of operations or financial condition. As a practical expedient, we adopted the new standard only for existing contracts as of August 1, 2018. All periods prior to August 1, 2018 will continue to be reported under the accounting standards in effect in those periods.

The core principle of ASC 606 is that revenue should be recorded in an amount that reflects the consideration to which we expect to be entitled in exchange for goods or services promised to customers. Under ASC 606, we follow a five-step model to: (1) identify the contract with our customer; (2) identify our performance obligations in our contract; (3) determine the transaction price for our contract; (4) allocate the transaction price to our performance obligations; and (5) recognize revenue using one of the following two methods:

- <u>Over time</u> - We recognize revenue using the over time method when there is a continuous transfer of control to the customer over the contractual period of performance. This generally occurs when we enter into a long-term contract relating to the design, development or manufacture of complex equipment or technology platforms to a buyer’s specification (or to provide services related to the performance of such contracts). Continuous transfer of control is typically supported by contract clauses which allow our customers to unilaterally terminate a contract for convenience, pay for costs incurred plus a reasonable profit and take control of work-in-process. Revenue recognized over time is generally based on the extent of progress toward completion of the related performance obligations. The selection of the method to measure progress requires judgment and is based on the nature of the products or services provided. In certain instances, typically for firm fixed-price contracts, we use the cost-to-cost measure because it best depicts the transfer of control to the customer which occurs as we incur costs on our contracts. Under the cost-to-cost measure, the extent of progress toward completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion, including warranty costs. Revenues, including estimated fees or profits, are recorded proportionally as costs are incurred. Costs to fulfill generally include direct labor, materials, subcontractor costs, other direct costs and an allocation of indirect costs. When these contracts are modified, the additional goods or services are generally not distinct from those already provided. As a result, these modifications form part of an existing contract and we must update the transaction price and our measure of progress for the single performance obligation and recognize a cumulative catch-up to revenue and gross profits.

  For over time contracts using a cost-to-cost measure of progress, we have an estimate at completion ("EAC") process in which management reviews the progress and execution of our performance obligations. This EAC process requires management judgment relative to assessing risks, estimating contract revenue and costs, and making assumptions for schedule and technical issues. Since certain contracts extend over a long period of time, the impact of revisions in revenue and or cost estimates during the progress of work may impact current period earnings through a cumulative adjustment. Additionally, if the EAC process indicates a loss, a provision is made for the total anticipated loss in the period that it becomes evident. Contract revenue and cost estimates for significant contracts are generally reviewed and reassessed at least quarterly.

The cost-to-cost method is principally used to account for contracts in our mission-critical technologies and high-performance transmission technologies product lines and, to a lesser extent, certain location-based and messaging infrastructure contracts in our public safety and location technologies product line. For service-based contracts in our public safety and location technologies product line we recognize revenue over time. These services are typically recognized as a series of services performed over the contract term using the straight-line method or based on our customers' actual usage of the networks and platforms which we provide.

- *Point in time* - When a performance obligation is not satisfied over time, we must record revenue using the point in time accounting method which generally results in revenue being recognized upon shipment or delivery of a promised good or service to a customer. This generally occurs when we enter into short term contracts or purchase orders where items are provided to customers with relatively quick turn-around times. Modifications to such contracts and or purchase orders, which typically provide for additional quantities or services, are accounted for as a new contract because the pricing for these additional quantities or services are based on standalone selling prices.

  Point in time accounting is principally applied to contracts in our satellite ground station technologies product line (which includes satellite modems, solid-state and traveling wave tube amplifiers) and certain contracts for our amplifiers in our high-performance transmission technologies product line. Point in time accounting is also applied to certain contracts in our mission-critical technologies product line. The contracts related to these product lines do not meet the requirements for over time revenue recognition because our customers cannot utilize the equipment for its intended purpose during any phase of our manufacturing process; customers do not simultaneously receive and or consume the benefits provided by our performance; customers do not control the asset (i.e., prior to delivery, customers cannot direct the use of the asset, sell or exchange the equipment, etc.); and, although many of our contracts have termination for convenience clauses and or an enforceable right to payment for performance completed to date, our performance creates an asset with an alternative use through the point of delivery.

  In determining that our equipment has alternative use, we considered the underlying manufacturing process for our products. In the early phases of manufacturing, raw materials and work in process (including subassemblies) consist of common parts that are highly fungible among many different types of products and customer applications. Finished products are either configured to our standard configuration or based on our customers' specifications. Finished products, whether built to our standard specification or to a customers' specification, can be sold to a variety of customers and across many different end use applications with minimal rework, if needed, and without incurring a significant economic loss.

When identifying a contract with our customer, we consider when it has approval and commitment from both parties, if the rights of the parties are identified, if the payment terms are identified, if it has commercial substance and if collectability is probable.

When identifying performance obligations, we consider whether there are multiple promises and how to account for them. In our contracts, multiple promises are separated if they are distinct, both individually and in the context of the contract. If multiple promises in a contract are highly interrelated or comprise a series of distinct services performed over time, they are combined into a single performance obligation. In some cases, we may also provide the customer with an additional service-type warranty, which we recognize as a separate performance obligation. Service-type warranties do not represent a significant portion of our consolidated net sales. When service-type warranties represent a separate performance obligation, the revenue is deferred and recognized ratably over the extended warranty period. Our contracts, from time-to-time, may also include options for additional goods and services. To date, these options have not represented material rights to the customer as the pricing for them reflects standalone selling prices. As a result, we do not consider options we offer to be performance obligations for which we must allocate a portion of the transaction price. In many cases, we provide assurance-type warranty coverage for some of our products for a period of at least one year from the date of delivery.

When identifying the transaction price, we typically utilize the contract's stated price as a starting point. The transaction price in certain arrangements may include estimated amounts of variable consideration, including award fees, incentive fees or other provisions that can either increase or decrease the transaction price. We estimate variable consideration as the amount to which we expect to be entitled, and we include estimated amounts in the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will not occur when the estimation uncertainty is resolved. The estimation of this variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of our anticipated performance and all information (e.g., historical, current and forecasted) that is reasonably available to us.

When allocating the contract’s transaction price, we consider each distinct performance obligation. For contracts with multiple performance obligations, we allocate the contract’s transaction price to each performance obligation using our best estimate of the standalone selling price of each distinct good or service in the contract. We determine standalone selling price based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, we estimate the standalone selling price taking into account available information such as market conditions, including geographic or regional specific factors, competitive positioning, internal costs, profit objectives and internally approved pricing guidelines related to the performance obligations.

Almost all of our contracts with customers are denominated in U.S. dollars and typically are either firm fixed-price or cost reimbursable type contracts (including fixed-fee, incentive-fee and time-and-material type contracts). In almost all of our contracts with customers, we are the principal in the arrangement and report revenue on a gross basis. Transaction prices for contracts with U.S. domestic and international customers are usually based on specific negotiations with each customer and in the case of the U.S. government, sometimes based on estimated or actual costs of providing the goods or services in accordance with applicable regulations.

The timing of revenue recognition, billings and collections results in receivables, unbilled receivables and contract liabilities on our Consolidated Balance Sheet. Under typical payment terms for our contracts accounted for over time, amounts are billed as work progresses in accordance with agreed-upon contractual terms, either at periodic intervals (e.g., monthly) or upon achievement of contractual milestones. For certain contracts with provisions that are intended to protect customers in the event we do not satisfy our performance obligations, billings occur subsequent to revenue recognition, resulting in what we have historically presented as unbilled receivables. Under ASC 606, unbilled receivables constitute contract assets. On large long term contracts, and for contracts with international customers that do not do business with us regularly, payment terms typically require advanced payments and deposits. Under ASC 606, payments received from customers in excess of revenue recognized to date results in a contract liability. These contract liabilities are not considered to represent a significant financing component of the contract because we believe these cash advances and deposits are generally used to meet working capital demands which can be higher in the earlier stages of a contract. Also, advanced payments and deposits provide us with some measure of assurance that the customer will perform on its obligations under the contract. Under the typical payment terms for our contracts accounted for at a point in time, costs are accumulated in inventory until the time of billing, which generally coincides with revenue recognition.

We recognize the incremental costs to obtain or fulfill a contract as an expense when incurred if the amortization period of the asset is one year or less. Incremental costs to obtain or fulfill contracts with an amortization period greater than one year were not material.

As commissions payable to our internal sales and marketing employees or contractors are contingent upon multiple factors, such commissions are not considered direct costs to obtain or fulfill a contract with a customer and are expensed as incurred in selling, general and administrative expenses on our Consolidated Statements of Operations. As for commissions payable to our third-party sales representatives related to large long-term contracts, we do consider these types of commissions both direct and incremental costs to obtain and fulfill such contracts. Therefore, such types of commissions are included in total estimated costs at completion for such contracts and expensed over time through cost of sales on our Consolidated Statements of Operations.

Remaining performance obligations represent the transaction price of firm orders for which work has not been performed as of the end of a fiscal period. Remaining performance obligations, which we refer to as backlog, exclude unexercised contract options and potential orders under indefinite delivery / indefinite quantity ("IDIQ") contracts.

Impairment of Goodwill and Other Intangible Assets. As of July 31, 2019, total goodwill recorded on our Consolidated Balance Sheet aggregated $310.5 million (of which $251.3 million relates to our Commercial Solutions segment and $59.2 million relates to our Government Solutions segment). Additionally, as of July 31, 2019, net intangibles recorded on our Consolidated Balance Sheet aggregated $261.9 million (of which $223.5 million relates to our Commercial Solutions segment and $38.4 million relates to our Government Solutions segment). Each of our two operating segments constitutes a reporting unit and we must make various assumptions in determining their estimated fair values.

In accordance with FASB ASC 350 "*Intangibles - Goodwill and Other,"* we perform a goodwill impairment analysis at least annually (in the first quarter of each fiscal year), unless indicators of impairment exist in interim periods. If we fail the quantitative assessment of goodwill impairment ("quantitative assessment"), we would be required to recognize an impairment loss equal to the amount that a reporting unit's carrying value exceeded its fair value; however, any loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.

On August 1, 2019 (the first day of our fiscal 2020), we performed our annual quantitative assessment using market participant assumptions to determine if the fair value of each of our reporting units with goodwill exceeded its carrying value. In making this assessment, we considered, among other things, expectations of projected net sales and cash flows, assumptions impacting the weighted average cost of capital, trends in trading multiples of comparable companies, changes in our stock price and changes in the carrying values of our reporting units with goodwill. We also considered overall business conditions.

In performing the quantitative assessment, we estimated the fair value of each of our reporting units using a combination of the income and market approaches. The income approach, also known as the discounted cash flow ("DCF") method, utilizes the present value of cash flows to estimate fair value. The future cash flows for our reporting units were projected based on our estimates, at that time, of future revenues, operating income and other factors (such as working capital and capital expenditures). For purposes of conducting our impairment analysis, we assumed revenue growth rates and cash flow projections that are below our actual long-term expectations. The discount rates used in our DCF method were based on a weighted-average cost of capital ("WACC") determined from relevant market comparisons, adjusted upward for specific reporting unit risks (primarily the uncertainty of achieving projected operating cash flows). A terminal value growth rate was applied to the final year of the projected period, which reflects our estimate of stable, perpetual growth. We then calculated a present value of the respective cash flows for each reporting unit to arrive at an estimate of fair value under the income approach. Under the market approach, we estimated a fair value based on comparable companies' market multiples of revenues and earnings before interest, taxes, depreciation and amortization and factored in a control premium. Finally, we compared our estimates of fair values to our August 1, 2019 total public market capitalization and assessed implied control premiums based on our common stock price of $29.54 as of August 1, 2019.

Based on our quantitative evaluation, we determined that our Commercial Solutions and Government Solutions reporting units had estimated fair values in excess of their carrying values of at least 29.0% and 122.2%, respectively, and concluded that our goodwill was not impaired and that neither of our two reporting units was at risk of failing the quantitative assessment. It is possible that, during fiscal 2020 or beyond, business conditions (both in the U.S. and internationally) could deteriorate from the current state, our current or prospective customers could materially postpone, reduce or even forgo purchases of our products and services to a greater extent than we currently anticipate, or our common stock price could decline. A significant decline in our customers' spending that is greater than we anticipate or a shift in funding priorities may also have a negative effect on future orders, sales, income and cash flows and we might be required to perform a quantitative assessment during fiscal 2020 or beyond. If assumed net sales and cash flow projections are not achieved in future periods or our common stock price significantly declines from current levels, our Commercial Solutions and Government Solutions reporting units could be at risk of failing the quantitative assessment and goodwill and intangibles assigned to the respective reporting units could be impaired.

In any event, we are required to perform the next annual goodwill impairment analysis on August 1, 2020 (the start of our fiscal 2021). If our assumptions and related estimates change in the future, or if we change our reporting unit structure or other events and circumstances change (e.g., a sustained decrease in the price of our common stock (considered on both absolute terms and relative to peers)), we may be required to record impairment charges when we perform these tests, or in other future periods. In addition to our impairment analysis of goodwill, we also review net intangible assets with finite lives when an event occurs indicating the potential for impairment. We believe that the carrying values of our net intangible assets were recoverable as of July 31, 2019. Any impairment charges that we may record in the future could be material to our results of operations and financial condition.

Provision for Warranty Obligations. We provide warranty coverage for most of our products, including products under long-term contracts, for a period of at least one year from the date of shipment. We record a liability for estimated warranty expense based on historical claims, product failure rates and other factors. Costs associated with some of our warranties that are provided under long-term contracts are incorporated into our estimates of total contract costs. There exist inherent risks and uncertainties in estimating warranty expenses, particularly on larger or longer-term contracts. If we do not accurately estimate our warranty costs, any changes to our original estimates could be material to our results of operations and financial condition.

Accounting for Income Taxes. Our deferred tax assets and liabilities are determined based on temporary differences between financial reporting and tax bases of assets and liabilities, and applying enacted tax rates expected to be in effect for the year in which we expect the differences to reverse. Our provision for income taxes is based on domestic (including federal and state) and international statutory income tax rates in the tax jurisdictions where we operate, permanent differences between financial reporting and tax reporting and available credits and incentives. We recognize potential interest and penalties related to uncertain tax positions in income tax expense. The U.S. federal government is our most significant income tax jurisdiction.

Significant judgment is required in determining income tax provisions and tax positions. We may be challenged upon review by the applicable taxing authority and positions taken by us may not be sustained. We recognize all or a portion of the benefit of income tax positions only when we have made a determination that it is more likely than not that the tax position will be sustained upon examination, based upon the technical merits of the position and other factors. For tax positions that are determined as more likely than not to be sustained upon examination, the tax benefit recognized is the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement. The development of valuation allowances for deferred tax assets and reserves for income tax positions requires consideration of timing and judgments about future taxable income, tax issues and potential outcomes, and are subjective critical estimates. A portion of our deferred tax assets consist of federal research and experimentation tax credit carryforwards, most of which was acquired in connection with our acquisition of TCS. No valuation allowance has been established on these deferred tax assets based on our evaluation that our ability to realize such assets has met the criteria of "more likely than not." We continuously evaluate additional facts representing positive and negative evidence in determining our ability to realize these deferred tax assets. In certain circumstances, the ultimate outcome of exposures and risks involves significant uncertainties. If actual outcomes differ materially from these estimates, they could have a material impact on our results of operations and financial condition.

On December 22, 2017, H.R.1, also known as the Tax Cuts and Jobs Act ("Tax Reform") was enacted in the U.S. Tax Reform significantly revised the U.S. tax code and lowered the amount of our current and future income tax expense primarily due to the reduction in the U.S. statutory income tax rate from 35.0% to 21.0%. This provision went into effect on January 1, 2018 and required us to remeasure our deferred tax assets and liabilities. During the fiscal year ended July 31, 2018, we remeasured our deferred tax assets and liabilities. The remeasurement was recorded pursuant to ASC 740 "Income Taxes" and SEC Staff Accounting Bulletin ("SAB") 118. All amounts recorded were based on available guidance on interpretation of Tax Reform and what we believed to be reasonable approaches to estimating its impact. See "*Notes to Consolidated Financial Statements - Note (10) - Income Taxes*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, for further information on the provisions of Tax Reform and its expected impact on our business.

Our federal income tax returns for fiscal 2017 and 2018 are subject to potential future IRS audit. None of our state income tax returns prior to fiscal 2015 are subject to audit. TCS's federal income tax returns for tax year 2015 and the tax period from January 1, 2016 to February 23, 2016, the date we acquired TCS, are subject to potential future IRS audit. None of TCS's state income tax returns prior to calendar year 2014 are subject to audit. Future tax assessments or settlements could have a material adverse effect on our consolidated results of operations and financial condition.

Research and Development Costs. We generally expense all research and development costs. Research and development expenses include payroll, employee benefits, stock-based compensation expense, and other personnel-related expenses associated with product development. Research and development expenses also include third-party development and programming costs. Costs incurred internally in researching and developing software to be sold are charged to expense until technological feasibility has been established for the software. Judgment is required in determining when technological feasibility of a product is established. Technological feasibility for our advanced communication software solutions is generally reached after all high-risk development issues have been resolved through coding and testing. Generally, this occurs shortly before the products are released to customers and when we are able to validate the marketability of such product. Once technological feasibility is established, all software costs are capitalized until the product is available for general release to customers. To date, capitalized internally developed software costs were not material.

Provisions for Excess and Obsolete Inventory. We record a provision for excess and obsolete inventory based on historical and projected usage trends. Other factors may also influence our provision, including decisions to exit a product line, technological change and new product development. These factors could result in a change in the amount of excess and obsolete inventory on hand. Additionally, our estimates of future product demand may prove to be inaccurate, in which case we may have understated or overstated the provision required for excess and obsolete inventory. In the future, if we determine that our inventory was overvalued, we would be required to recognize such costs in our financial statements at the time of such determination. Any such charge could be material to our results of operations and financial condition.

Allowance for Doubtful Accounts. We perform credit evaluations of our customers and adjust credit limits based upon customer payment history and current creditworthiness, as determined by our review of our customers' current credit information. Generally, we will require cash in advance or payment secured by irrevocable letters of credit before an order is accepted from an international customer that we do not do business with regularly. In addition, we seek to obtain insurance for certain domestic and international customers.

We monitor collections and payments from our customers and maintain an allowance for doubtful accounts based upon our historical experience and any specific customer collection issues that we have identified. In light of ongoing tight credit market conditions, we continue to see requests from our customers for higher credit limits and longer payment terms. Because of our strong cash position and the nominal amount of interest we are earning on our cash and cash equivalents, we have, on a limited basis, approved certain customer requests.

We continue to monitor our accounts receivable credit portfolio. Our overall credit losses have historically been within our expectations of the allowances established; however, we cannot guarantee that we will continue to experience the same credit loss rates that we have in the past. Measurement of credit losses requires consideration of historical loss experience, including the need to adjust for changing business conditions, and judgments about the probable effects of relevant observable data, including present economic conditions such as delinquency rates and the financial health of specific customers. Changes to the estimated allowance for doubtful accounts could be material to our results of operations and financial condition.

Results of Operations

The following table sets forth, for the periods indicated, certain income and expense items expressed as a percentage of our consolidated net sales:

	Fiscal Years Ended July 31,		
	2019	2018	2017
Gross margin	36.8 %	39.2%	39.6 %
Selling, general and administrative expenses	19.1 %	20.0%	21.1 %
Research and development expenses	8.4 %	9.4%	9.9 %
Settlement of intellectual property litigation	(0.5)%	—%	(2.2)%
Acquisition plan expenses	0.9 %	—%	— %
Amortization of intangibles	2.7 %	3.7%	4.1 %
Operating income	6.2 %	6.2%	6.7 %
Interest expense (income) and other	1.4 %	1.8%	2.1 %
Write-off of deferred financing costs	0.5 %	—%	— %
Income before provision for income taxes	4.3 %	4.3%	4.6 %
Net income	3.7 %	5.2%	2.9 %
Adjusted EBITDA (a Non-GAAP measure)	13.9 %	13.7%	12.8 %

For a definition and explanation of Adjusted EBITDA, see "*Item 6. Selected Consolidated Financial Data - Non-GAAP Financial Data*" and "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Comparison of Fiscal 2019 and 2018 - Adjusted EBITDA.*"

Business Outlook for Fiscal 2020

Fiscal 2019 exceeded our expectations, we finished the year with strong financial results across the board and generated consolidated:

- Net sales of $671.8 million;
- Operating income of $41.4 million;
- Net income of $25.0 million;
- Cash flows from operating activities of $68.0 million; and
- Adjusted EBITDA (a Non-GAAP financial measure discussed below) of $93.5 million.

We achieved a fiscal 2019 consolidated book-to-bill ratio (a measure defined as bookings divided by net sales) of 1.08 and ended the year with consolidated backlog of $683.0 million. Our backlog (sometimes referred to herein as orders or bookings) are more fully defined in *"Part I - Item 1. Business"* included in this Annual Report on Form 10-K and the total value of multi-year contracts that we have received is substantially higher than our reported backlog. As of July 31, 2019, our cash and cash equivalents were $45.6 million and our total debt outstanding (including capital leases and other obligations) was $165.8 million.

Anchored by our fiscal 2019 financial performance, we have strong backlog, lots of optimism and we have good business momentum. As such, we have established the following consolidated financial targets:

- Net sales are expected to be in a range of approximately $710.0 million to $730.0 million with year-over-year growth in both our Commercial Solutions and Government Solutions segments and the achievement of a consolidated book-to-bill ratio in excess of 1.0.

- Total depreciation expense is expected to approximate $13.0 million.

- Total amortization of intangible assets is expected to approximate $21.0 million.

- Total amortization of stock-based compensation expense is expected to range from approximately $12.0 million to $14.0 million.

- GAAP operating income, as a percentage of net sales, is expected to approximate 7.0% as compared to the 6.2% we achieved in fiscal 2019.

- Our interest expense rate (including amortization of deferred financing costs) is expected to approximate 4.6% with total interest expense of approximately $7.5 million in fiscal 2020. Our current cash borrowing rate is approximately 4.0%.

- Our effective income tax rate (excluding discrete tax items) is expected to approximate 23.0%.

- Adjusted EBITDA is expected to be in a range of approximately $98.0 million to $102.0 million or approximately 14.0%.

Like Comtech's business cycle for the past several years, our financial performance in the second half of fiscal 2020 is anticipated to be higher than the first half, with our first quarter of fiscal 2020 being the lowest in terms of consolidated net sales and Adjusted EBITDA. GAAP operating income in our first quarter of fiscal 2020 is expected to be lower than the $7.3 million we achieved during our first quarter in fiscal 2019, primarily due to incremental amortization of intangible assets associated with our fiscal 2019 acquisitions. In addition, in order to take advantage of additional growth opportunities and meet our strategic objectives, our GAAP operating income in the first quarter of fiscal 2020 is expected to reflect approximately $1.5 million of acquisition plan expenses for companies whose offerings are complementary to our business. Based on all of the aforementioned, we expect our first quarter consolidated net sales to approximate $168.0 million with Adjusted EBITDA at $18.1 million or slightly better than the $160.8 million of consolidated net sales and $18.0 million of Adjusted EBITDA we achieved in the first quarter of fiscal 2019. For the remaining quarters of fiscal 2020, we do expect consolidated net sales and Adjusted EBITDA to be better than the comparative quarters of fiscal 2019 with the fourth quarter being the peak quarter of the year. Regardless of timing, fiscal 2020 is expected to be a better year than fiscal 2019.

Except as discussed, the aforementioned fiscal 2020 financial targets do not include the impact of any acquisitions or the impact of any other expense we may incur in order to achieve our strategic objectives. Total acquisition plan expenses in fiscal 2020 may ultimately be higher than the $1.5 million we expect to incur in the first quarter of fiscal 2020. If order flow remains strong and we can achieve all of our fiscal 2020 business goals, it is possible that net sales and Adjusted EBITDA could be higher than our targeted amounts.

Our Business Outlook for Fiscal 2020 depends, in large part, on timely deliveries and the receipt of, and performance on, orders from our customers and could be adversely impacted if orders and/or deliveries are delayed, business conditions deteriorate, or our current or prospective customers materially postpone, reduce or even forgo purchases of our products and services. Additionally, we continue to evaluate cost reduction initiatives in our business, including in connection with the repositioning of our location technology solutions offerings. Our updated fiscal 2020 financial targets do not consider the financial impact of any additional future actions we may take in this regard.

On September 24, 2019, our Board of Directors declared a dividend of $0.10 per common share, payable on November 15, 2019 to stockholders of record at the close of business on October 16, 2019. Future dividends remain subject to compliance with financial covenants under our Credit Facility, as amended, as well as Board approval.

Additional information related to our Business Outlook for Fiscal 2020 and a definition and explanation of Adjusted EBITDA is included in the below section *"Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Comparison of Fiscal 2019 and 2018."*

Comparison of Fiscal 2019 and 2018

Net Sales. Consolidated net sales were $671.8 million and $570.6 million for fiscal 2019 and 2018, respectively, representing a significant increase of $101.2 million, or 17.7%. The significant period-over-period increase in net sales reflects higher net sales in both our Commercial and Government Solutions segments. Net sales by operating segment are discussed below.

Commercial Solutions

Net sales in our Commercial Solutions segment were $357.3 million for fiscal 2019, as compared to $345.1 million for fiscal 2018, an increase of $12.2 million, or 3.5%. Our Commercial Solutions segment represented 53.2% of consolidated net sales for fiscal 2019 as compared to 60.5% for fiscal 2018. As further discussed below, demand for our products appears strong and looking forward, we believe this segment will grow in fiscal 2020.

Bookings in our Commercial Solutions segment for fiscal 2019 were strong and our book-to-bill ratio (a measure defined as bookings divided by net sales) for this segment was 1.25. Period-to-period fluctuations in bookings is normal for this segment.

Net sales of our satellite ground station technologies during fiscal 2019 were slightly lower than fiscal 2018. In fiscal 2019, we experienced significant growth in sales to international customers as well as incremental demand from U.S. government customers. This strength was offset by order delays and lower sales for inflight communication amplifiers sold primarily to a U.S. domestic customer. Our Heights™ solutions continue to gain traction and both bookings and sales of these products were significantly higher than the amounts achieved in fiscal 2018. Based on the anticipated increase in the number of high-throughput satellites and low earth orbit and medium earth orbit satellites expected to be launched, and the migration of networks from 3G to 4G and ultimately 5G technologies in emerging countries, we believe that we are in the early stages of a multi-year period of growing demand for satellite ground station technologies which are used to backhaul cellular traffic. Sales to U.S. government customers in fiscal 2020 are also expected to remain strong with a small amount of year-to-year growth anticipated. As a result, we expect fiscal 2020 to be a year of net sales growth for our satellite earth station product line.

Net sales for fiscal 2019 of our public safety and location technology solutions were significantly higher as compared to the net sales we achieved in fiscal 2018. During fiscal 2019, we benefited from incremental sales to key wireless customers for 911 call routing and incremental sales to state and local agencies for our next-generation 911 products. The impact of the February 28, 2019 acquisition of Solacom on fiscal 2019 sales was nominal. Sales of our location technology solutions were significantly lower in fiscal 2019 as we repositioned this product line to focus on providing higher margin solutions offerings to our customers, ceased offering certain solutions and have not renewed certain contracts. Our public safety and location technology solutions have long sales cycles and are subject to difficult-to-predict changes in the overall procurement strategies of wireless carrier customers, but we believe we are positioned well. Overall market conditions remain favorable; as such, we expect fiscal 2020 to be another year of growth for our public safety and location technology solutions.

Bookings, sales and profitability in our Commercial Solutions segment can fluctuate from period-to-period due to many factors, including changes in the general business environment. As such, period-to-period comparisons of our results may not be indicative of a trend or future performance.

Government Solutions

Net sales in our Government Solutions segment were $314.5 million for fiscal 2019 as compared to $225.5 million for fiscal 2018, a significant increase of $89.0 million or 39.5%. Our Government Solutions segment represented 46.8% of consolidated net sales for fiscal 2019, as compared to 39.5% for fiscal 2018. As further discussed below, our business in fiscal 2019 was strong and demand for our products still appears robust. Looking forward, we believe that sales in our Government Solutions segment will be similar or slightly higher than the level we achieved in fiscal 2019 with the ultimate level largely determined by the timing of orders and sales.

Bookings in our Government Solutions segment for fiscal 2019 were solid and our book-to-bill ratio (a measure defined as bookings divided by net sales) in this segment for fiscal 2019 was 0.88. Period-to-period fluctuations in bookings is normal for this segment.

Net sales of our mission-critical technologies during fiscal 2019 were significantly higher as compared to fiscal 2018. Revenue growth during fiscal 2019 was driven by our successful execution on many key orders including: (i) over $78.0 million of orders to supply Manpack Satellite Terminals, networking equipment and other advanced VSAT products to the U.S. Army (which were booked pursuant to our $223.4 million Global Tactical Advanced Communication Systems ("GTACS") contract with the U.S. Army's PM Tactical Network, which has a remaining unfunded contract value of $45.5 million as of July 31, 2019); (ii) $41.4 million of orders to provide ongoing sustainment services to the U.S. Army for the AN/TSC-198A SNAP (Secret Internet Protocol Router ("SIPR") and Non-classified Internet Protocol Router ("NIPR") Access Point), Very Small Aperture Terminals ("VSATs"); (iii) $11.9 million of orders for cyber security training solutions; (iv) a $3.5 million follow-on satellite service order from a major national security solutions provider; and (v) $3.0 million of orders for antenna feeds to be incorporated into portable and inflatable 1.2-meter and 2.4-meter SATCOM terminals. In addition, we shipped $11.7 million of mobile satellite transceivers to support the U.S. Army's Blue Force Tracking-2 program (which we do not expect to repeat in fiscal 2020).

Net sales of our high-performance transmission technologies in fiscal 2019 were significantly higher than fiscal 2018 driven by increased deliveries in fiscal 2019 of troposcatter technologies (including our Modular Transportable Transmission System ("MTTS") troposcatter terminals to two foreign militaries) and an increase in both orders and sales of solid-state, high-power amplifiers and related switching technologies.

Bookings, sales and profitability in our Government Solutions segment can fluctuate dramatically from period-to-period due to many factors, including unpredictable funding, deployment and technology decisions by our U.S. and international government customers. As such, period-to-period comparisons of our results may not be indicative of a trend or future performance.

Geography and Customer Type

Sales by geography and customer type, as a percentage of related sales, for the fiscal years ended July 31, 2019 and 2018 are as follows:

	Fiscal Years Ended July 31,					
	2019	2018	2019	2018	2019	2018
	Commercial Solutions		Government Solutions		Consolidated	
U.S. government	19.2%	18.1%	63.8%	62.2%	40.1%	35.5%
Domestic	53.9%	54.6%	12.5%	14.9%	34.5%	38.9%
Total U.S.	73.1%	72.7%	76.3%	77.1%	74.6%	74.4%
International	26.9%	27.3%	23.7%	22.9%	25.4%	25.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sales to U.S. government customers include sales to the U.S. Department of Defense ("DoD"), intelligence and civilian agencies, as well as sales directly to or through prime contractors.

Domestic sales include sales to commercial customers, as well as to U.S. state and local governments. Included in domestic sales, are sales to Verizon Communications Inc. ("Verizon"). Sales to Verizon were 10.0% of consolidated net sales for fiscal 2018.

International sales for fiscal 2019 and 2018 (which include sales to U.S. domestic companies for inclusion in products that are sold to international customers) were $170.6 million and $145.8 million, respectively. Except for the U.S., no individual country (including sales to U.S. domestic companies for inclusion in products that are sold to a foreign country) represented more than 10% of consolidated net sales for fiscal 2019 and 2018.

Gross Profit. Gross profit was $247.4 million and $223.9 million for fiscal 2019 and 2018, respectively. The increase of $23.5 million reflects higher sales in both of our segments, as discussed above.

Gross profit, as a percentage of consolidated net sales, for fiscal 2019 was 36.8% as compared to 39.2% for fiscal 2018. This decrease was almost entirely driven by product mix changes as a result of the significant year-to-year increase in net sales in our Government Solutions segment. This segment historically achieves lower gross margins than our Commercial Solutions segment. Gross profit in fiscal 2018 also reflects a benefit from a $0.7 million favorable warranty settlement and a $1.0 million favorable sales and use tax settlement, both of which are reflected in our unallocated segment. Gross profit, as a percentage of related segment net sales, is further discussed below.

Our Commercial Solutions segment's gross profit, as a percentage of related segment net sales, for fiscal 2019 declined in comparison to fiscal 2018. The decrease in gross profit percentage in fiscal 2019 primarily reflects changes in products and services mix, including a significant increase in fiscal 2019 net sales of our Heights™ solutions which currently have lower gross margins than our traditional satellite ground station technologies. Looking forward, we expect our gross profit as a percentage of this segment's net sales in fiscal 2020 to be slightly lower than the amount achieved in fiscal 2019, primarily due to anticipated mix changes, including higher sales of Heights™ solutions and the cessation of sales to AT&T for 911 wireless call routing.

Our Government Solutions segment's gross profit, as a percentage of related segment net sales, for fiscal 2019 declined slightly in comparison to fiscal 2018. In fiscal 2019, we completed shipments of relatively lower margin MT-2025 satellite transceivers to the U.S. Army. As noted above, we do not expect shipments of these transceivers in fiscal 2020. Based on the mix and anticipated timing of shipments and performance related to orders currently in our backlog and the mix and timing of expected new orders and related sales, gross profit for this segment, as a percentage of related segment net sales, for fiscal 2020 is expected to be similar or slightly lower than the level achieved in fiscal 2019.

Included in consolidated cost of sales for fiscal 2019 and 2018 are provisions for excess and obsolete inventory of $6.0 million and $5.6 million, respectively. As discussed in "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Critical Accounting Policies - Provisions for Excess and Obsolete Inventory,*" we regularly review our inventory and record a provision for excess and obsolete inventory based on historical and projected usage trends.

Because our consolidated gross profit, as a percentage of consolidated net sales, depends on the volume of sales, sales mix and related gross profit for each individual segment, it is inherently difficult to forecast. Nevertheless, based on expected bookings, expected timing of our performance on orders and the anticipated mix of net sales between our Commercial Solutions and Government Solutions segments, we currently expect our consolidated gross profit, as a percentage of consolidated net sales, for fiscal 2020 to be the same or slightly lower than the percentage we achieved in fiscal 2019.

Selling, General and Administrative Expenses. Selling, general and administrative expenses were $128.6 million and $113.9 million for fiscal 2019 and 2018, respectively, representing an increase of $14.7 million, or 12.9%. As a percentage of consolidated net sales, selling, general and administrative expenses were 19.1% and 20.0% for fiscal 2019 and 2018, respectively. The decrease, as a percentage of consolidated net sales, is primarily attributable to the significant increase in our consolidated net sales.

In fiscal 2019, we began a repositioning in our Commercial Solutions segment of certain of our location technology solutions (previously called enterprise technology solutions) to increase our penetration into the public safety space. In connection with this repositioning, we ceased offering certain solutions, have worked with customers to wind-down certain legacy contracts and have not renewed certain contracts; and in doing so, we incurred $6.4 million of estimated contract settlement costs that were recorded as selling, general and administrative expenses. Additionally, we took and continue to take steps to reduce our facility footprint and we incurred $1.4 million of facility exit costs in our Government Solutions segment. Excluding such costs, our selling, general and administrative expenses for fiscal 2019 would have been $120.8 million, or 18.0% of consolidated net sales.

Amortization of stock-based compensation expense recorded as selling, general and administrative expenses was $9.3 million in fiscal 2019 as compared to $6.9 million in fiscal 2018. Amortization in fiscal 2018 includes the benefit of a $0.4 million reversal of stock-based compensation expense related to certain performance shares previously expected to be earned. Amortization of stock-based compensation is not allocated to our two reportable operating segments.

Based on our current spending plans, we expect total fiscal 2020 selling, general and administrative expenses, in dollars, in fiscal 2020 to be higher and, as a percentage of consolidated net sales, to be slightly lower than the 19.1% recorded in fiscal 2019.

Research and Development Expenses. Research and development expenses were $56.4 million and $53.9 million for fiscal 2019 and 2018, respectively, representing an increase of $2.5 million, or 4.6%. As a percentage of consolidated net sales, research and development expenses were 8.4% and 9.4% for fiscal 2019 and 2018, respectively.

For fiscal 2019 and 2018, research and development expenses of $48.2 million and $46.0 million, respectively, related to our Commercial Solutions segment, and $7.2 million and $7.0 million, respectively, related to our Government Solutions segment. The remaining research and development expenses of $1.0 million and $0.9 million in fiscal 2019 and 2018, respectively, related to the amortization of stock-based compensation expense.

Whenever possible, we seek customer funding for research and development to adapt our products to specialized customer requirements. During fiscal 2019 and 2018, customers reimbursed us $14.7 million and $16.9 million, respectively, which is not reflected in the reported research and development expenses but is included in net sales with the related costs included in cost of sales.

We continue to invest in enhancements to existing products as well as in new products across almost all our product lines. Based on our current spending plans, we expect fiscal 2020 research and development expenses, in dollars, to be higher and, as a percentage of consolidated net sales, to be slightly lower than the 8.4% achieved in fiscal 2019.

Amortization of Intangibles. Amortization relating to intangible assets with finite lives was $18.3 million (of which $14.9 million was for the Commercial Solutions segment and $3.4 million was for the Government Solutions segment) for fiscal 2019 and $21.1 million (of which $17.7 million was for the Commercial Solutions segment and $3.4 million was for the Government Solutions segment) for fiscal 2018. The decrease from $21.1 million to $18.3 million was largely the result of certain intangible assets in our Commercial Solutions segment that became fully amortized in fiscal 2018.

Our Business Outlook for Fiscal 2020 assumes total annual amortization of intangible assets of approximately $21.0 million which reflects a full year's estimate of amortization of intangibles related to our fiscal 2019 acquisitions.

Settlement of Intellectual Property Litigation. In fiscal 2019, we recorded a $3.2 million benefit in our Unallocated segment as a result of a favorable ruling issued by the U.S. Court of Appeals for the Federal Circuit related to a legacy TCS intellectual property matter. There was no comparable adjustment in fiscal 2018.

Acquisition Plan Expenses. During fiscal 2019, we incurred $5.9 million of total acquisition plan expenses. These expenses are recorded in our Unallocated segment and primarily related to our fiscal 2019 acquisitions of Solacom and the GD NG-911 business, as discussed above.

In order to position ourselves to take advantage of additional growth opportunities and meet our strategic objectives, during the first quarter of fiscal 2020, we expect to incur approximately $1.5 million of acquisition plan expenses for companies whose solution offerings are complementary to our business. There is no certainty that our acquisition plan efforts will be successful and total acquisition plan expenses in the first quarter of fiscal 2020 may ultimately be higher.

Operating Income. Operating income for fiscal 2019 was $41.4 million as compared $35.1 million for fiscal 2018. Operating income by reportable segment is shown in the table below:

	Fiscal Years Ended July 31,							
	2019	2018	2019	2018	2019	2018	2019	2018
($ in millions)	Commercial Solutions		Government Solutions		Unallocated		Consolidated	
Operating income (loss)	$ 36.1	$ 40.8	$ 29.0	$ 11.0	$ (23.6)	$ (16.7)	$ 41.4	$ 35.1
Percentage of related net sales	10.1%	11.8%	9.2%	4.9%	NA	NA	6.2%	6.2%

The decrease in our Commercial Solutions segment's operating income for fiscal 2019, both in dollars and as a percentage of related segment net sales, was driven by the $6.4 million of estimated contract settlement costs, as discussed above. Excluding such charge, operating income in our Commercial Solutions segment for fiscal 2019 would have been $42.5 million, or 11.9% of related segment net sales which was slightly higher than the amount we achieved in fiscal 2018. Looking forward, given expected sales and product mix assumptions, as discussed above, we expect fiscal 2020 operating income, both in dollars and as a percentage of related segment net sales, to be slightly higher than the 11.9% achieved in fiscal 2019.

The significant increase in our Government Solutions segment's operating income for fiscal 2019, both in dollars and as a percentage of related segment net sales, was primarily due to significantly higher net sales in this segment, offset in part by $1.4 million of facility exit costs, as discussed above. Excluding such costs, operating income in our Government Solutions segment for fiscal 2019 would have been $30.4 million, or 9.7% of related segment net sales, which was significantly higher than the amount we achieved in fiscal 2018. Looking forward, given expected sales and product mix assumptions, as discussed above, we expect fiscal 2020 operating income, in dollars, to be comparable to the amount achieved in fiscal 2019, and as a percentage of related segment net sales, to be slightly lower than the 9.2% achieved in fiscal 2019.

The increase in unallocated expenses in fiscal 2019 as compared to fiscal 2018 is primarily due to increased business and sales activity, acquisition plan expenses and an increase in amortization of stock-based compensation, offset in part by the benefit related to a legacy TCS intellectual property matter, as discussed above. In addition, unallocated operating expenses for fiscal 2018 include the benefit of the warranty settlement and the sales and use tax settlement, as discussed above. Amortization of stock-based compensation was $11.4 million and $8.6 million, respectively, for fiscal 2019 and 2018. Amortization of stock-based compensation for fiscal 2018 reflects a reversal of $0.4 million of stock-based compensation expense related to certain performance shares that were previously expected to be earned.

Excluding net costs of $10.5 million, consisting of $6.4 million of estimated contract settlement costs, $1.4 million of facility exit costs, $5.9 million of acquisition plan expenses and a $3.2 million benefit related to a legacy TCS intellectual property matter (all of which are discussed above), consolidated operating income for fiscal 2019 would have been $51.8 million, or 7.7% of consolidated net sales. Excluding the aforementioned $1.7 million of favorable adjustments in fiscal 2018, consolidated operating income for fiscal 2018 would have been $33.4 million, or 5.9% of consolidated net sales. The increase from 5.9% to 7.7% reflects the benefit of incremental sales growth and changes in overall spending, as discussed above.

Our Business Outlook for Fiscal 2020 assumes, similar to the prior three fiscal years, that we will continue to pay certain annual non-equity incentive awards in the form of fully-vested share units. Amortization of stock-based compensation can fluctuate from period-to-period based on the type and timing of stock-based awards, estimated forfeitures and the achievement of applicable performance goals. If we do not achieve our fiscal 2020 business goals, amortization of stock-based compensation expense would be lower than our current expected fiscal 2020 range.

Looking forward, unallocated operating expenses in fiscal 2020 are expected to be higher than the $23.6 million incurred in fiscal 2019. The increase in unallocated expenses is expected to be driven by: (i) increased amortization of stock-based compensation (which is not allocated to our two reportable segments) which, in fiscal 2020, is expected to range from $12.0 million to $14.0 million; (ii) increased compensation costs, including incremental costs for additional personnel to support our anticipated growth; (iii) the absence of a $3.2 million benefit from the aforementioned legacy TCS intellectual property matter; and (iv) other increased spending as a result of increased business activity assumed in fiscal 2020.

Overall, our fiscal 2020 GAAP consolidated operating income (in dollars) is anticipated to be higher than the $41.4 million we achieved in fiscal 2019, and as a percentage of consolidated net sales, to approximate 7.0% as compared to the 6.2% we achieved in fiscal 2019. Total GAAP consolidated operating income in fiscal 2020 could be further impacted by additional acquisition plan expenses other than the estimated $1.5 million anticipated to be incurred during the first quarter of fiscal 2020.

Interest Expense and Other. Interest expense was $9.2 million and $10.2 million for fiscal 2019 and 2018, respectively. Our effective interest rate (including amortization of deferred financing costs) in fiscal 2019 was approximately 5.3%. Our current cash borrowing rate (which excludes the amortization of deferred financing costs) approximates 4.0%.

Based on the type, terms, amount of outstanding debt (including capital leases and other obligations) and current interest rates, our effective interest rate (including amortization of deferred financing costs) in fiscal 2020 is anticipated to approximate 4.6%. Total interest expense in fiscal 2020 is expected to approximate $7.5 million.

Write-off of Deferred Financing Costs. In connection with the establishment of our new Credit Facility in fiscal 2019, we wrote-off $3.2 million of deferred financing costs which primarily related to the term loan portion of our prior credit facility. See "*Notes to Consolidated Financial Statements - Note (8) - Credit Facility*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, for further information. There was no comparable charge in fiscal 2018.

Interest (Income) and Other. Interest (income) and other for both fiscal 2019 and 2018 was nominal. All of our available cash and cash equivalents are currently invested in bank deposits and money market deposit accounts which, at this time, are currently yielding an immaterial interest rate.

Provision for (Benefit from) Income Taxes. The provision for income taxes was $3.9 million for fiscal 2019 as compared to a benefit of $5.1 million for fiscal 2018. Our effective tax rate (excluding discrete tax items) for fiscal 2019 was 23.25% and for 2018 was 27.0%.

During fiscal 2019, we recorded a net discrete tax benefit of $2.9 million, primarily related to: (i) the favorable resolution of the IRS' audit of our fiscal 2016 federal income tax return; (ii) discrete tax benefits for stock-based awards that were settled during fiscal 2019; and (iii) the reversal of tax contingencies no longer required due to the expiration of applicable statutes of limitation. During fiscal 2018, we recorded a net discrete tax benefit of $11.8 million which, as a result of Tax Reform, primarily related to the remeasurement of deferred tax liabilities associated with non-deductible amortization related to intangible assets and discrete tax benefits associated with stock-based awards that were settled in fiscal 2018. These benefits were offset, in part, by the finalization of certain tax deductions in connection with the filing of our federal and state tax returns for fiscal 2017. The decrease from 27.0% to 23.25% is principally attributable to the passage of Tax Reform which reduced the statutory income tax rate from 35.0% to 21.0%. Such decrease was partially offset by non-deductible transaction costs related to the acquisition of Solacom and lower tax deductions for certain executive compensation expenses as a result of Tax Reform.

Our federal income tax returns for fiscal 2017 and 2018 are subject to potential future IRS audit. None of our state income tax returns prior to fiscal 2015 are subject to audit. TCS's federal income tax returns for tax year 2015 and the tax period from January 1, 2016 to February 23, 2016, the date we acquired TCS, are subject to potential future IRS audit. None of TCS's state income tax returns prior to calendar year 2014 are subject to audit. Future tax assessments or settlements could have a material adverse effect on our consolidated results of operations and financial condition.

Looking forward, our fiscal 2020 effective tax rate, before discrete tax items is expected to approximate 23.0%.

Net Income. During fiscal 2019, consolidated net income was $25.0 million as compared to $29.8 million during fiscal 2018.

Adjusted EBITDA. Adjusted EBITDA (both in dollars and as a percentage of related net sales) for both fiscal 2019 and 2018 are shown in the table below (numbers in the table may not foot due to rounding):

	Fiscal Years Ended July 31,							
	2019	2018	2019	2018	2019	2018	2019	2018
($ in millions)	Commercial Solutions		Government Solutions		Unallocated		Consolidated	
Net income (loss)	$ 35.9	40.3	29.0	10.8	(39.9)	(21.4)	$ 25.0	29.8
Provision for (benefit from) income taxes	—	0.3	—	—	3.9	(5.4)	3.9	(5.1)
Interest (income) and other	0.1	0.2	—	0.1	—	—	—	0.3
Write-off of deferred financing costs	—	—	—	—	3.2	—	3.2	—
Interest expense	0.1	0.1	—	—	9.2	10.1	9.2	10.2
Amortization of stock-based compensation	—	—	—	—	11.4	8.6	11.4	8.6
Amortization of intangibles	14.9	17.7	3.4	3.4	—	—	18.3	21.1
Depreciation	9.3	9.5	1.9	3.1	0.8	1.1	11.9	13.7
Estimated contract settlement costs	6.4	—	—	—	—	—	6.4	—
Settlement of intellectual property litigation	—	—	—	—	(3.2)	—	(3.2)	—
Acquisition plan expenses	—	—	—	—	5.9	—	5.9	—
Facility exit costs	—	—	1.4	—	—	—	1.4	—
Adjusted EBITDA	$ 66.6	68.0	35.6	17.4	(8.8)	(7.1)	$ 93.5	78.4
Percentage of related net sales	18.6%	19.7%	11.3%	7.7%	NA	NA	13.9%	13.7%

The increase in consolidated Adjusted EBITDA, both in dollars and as a percentage of consolidated net sales, during fiscal 2019 as compared to fiscal 2018 is primarily attributable to higher consolidated net sales and operating income, as discussed above.

The decrease in our Commercial Solutions segment's Adjusted EBITDA, both in dollars and as a percentage of related segment net sales, primarily reflects the lower gross profit percentage we achieved in fiscal 2019 and higher research and development expenses, as discussed above.

The significant increase in our Government Solutions segment's Adjusted EBITDA, both in dollars and as a percentage of related segment net sales, was primarily driven by significantly higher net sales, as discussed above.

Because our consolidated Adjusted EBITDA, as a percentage of consolidated net sales, depends on the volume of sales, sales mix and related gross profit for each individual segment as well as unallocated spending, it is inherently difficult to forecast. In addition, our Business Outlook for Fiscal 2020 includes several items, the timing of which can still shift and impact our expected quarterly financial performance. Looking forward, based on the mix and anticipated timing of shipments and performance related to orders currently in our backlog and the mix and timing of expected new orders and related sales, we are targeting consolidated Adjusted EBITDA (in dollars) to be higher in fiscal 2020 as compared to the $93.5 million we achieved in fiscal 2019. As a percentage of consolidated net sales, Adjusted EBITDA is expected to be similar to the 13.9% achieved in fiscal 2019. If order flow remains strong and we are able to achieve all of our fiscal 2020 business goals, it is possible that our fiscal 2020 Adjusted EBITDA could be higher than our targeted amount.

Reconciliations of our GAAP consolidated operating income, net income and net income per diluted share for fiscal 2019 and 2018 to the corresponding non-GAAP measures are shown in the tables below (numbers and per share amounts in the table may not foot due to rounding):

	Fiscal 2019		
($ in millions, except for per share amount)	Operating Income	Net Income	Net Income per Diluted Share
Reconciliation of GAAP to Non-GAAP Earnings:			
GAAP measures, as reported	$ 41.4	$ 25.0	$ 1.03
Estimated contract settlement costs	6.4	4.9	0.20
Settlement of intellectual property litigation	(3.2)	(2.5)	(0.10)
Facility exit costs	1.4	1.1	0.04
Acquisition plan expenses	5.9	4.5	0.19
Write-off of deferred financing costs	—	2.5	0.10
Net discrete tax benefit	—	(2.9)	(0.12)
Non-GAAP measures	$ 51.8	$ 32.6	$ 1.34

	Fiscal 2018		
($ in millions, except for per share amount)	Operating Income	Net Income	Net Income per Diluted Share
Reconciliation of GAAP to Non-GAAP Earnings:			
GAAP measures, as reported	$ 35.1	$ 29.8	$ 1.24
Net discrete tax benefit	—	(11.8)	(0.49)
Non-GAAP measures	$ 35.1	$ 18.0	$ 0.75

Our Adjusted EBITDA is a Non-GAAP measure that represents earnings (loss) before income taxes, interest (income) and other, write-off of deferred financing costs, interest expense, amortization of stock-based compensation, amortization of intangibles, depreciation expense, estimated contract settlement costs, settlement of intellectual property litigation, acquisition plan expenses, facility exit costs, and strategic alternatives analysis expenses and other. Our definition of Adjusted EBITDA may differ from the definition of EBITDA used by other companies and therefore may not be comparable to similarly titled measures used by other companies. Adjusted EBITDA is also a measure frequently requested by our investors and analysts. We believe that investors and analysts may use Adjusted EBITDA, along with other information contained in our SEC filings, in assessing our performance and comparability of our results with other companies. Our Non-GAAP measures for consolidated operating income, net income and net income per diluted share reflect the GAAP measures as reported, adjusted for certain items as described. These Non-GAAP financial measures have limitations as an analytical tool as they exclude the financial impact of transactions necessary to conduct our business, such as the granting of equity compensation awards, and are not intended to be an alternative to financial measures prepared in accordance with GAAP. These measures are adjusted as described in the reconciliation of GAAP to Non-GAAP in the above tables, but these adjustments should not be construed as an inference that all of these adjustments or costs are unusual, infrequent or non-recurring. Non-GAAP financial measures should be considered in addition to, and not as a substitute for or superior to, financial measures determined in accordance with GAAP. Investors are advised to carefully review the GAAP financial results that are disclosed in our SEC filings. We have not quantitatively reconciled our fiscal 2020 Adjusted EBITDA target to the most directly comparable GAAP measure because items such as stock-based compensation, adjustments to the provision for income taxes, amortization of intangible assets and interest expense, which are specific items that impact these measures, have not yet occurred, are out of our control, or cannot be predicted. For example, quantification of stock-based compensation expense requires inputs such as the number of shares granted and market price that are not currently ascertainable. Accordingly, reconciliations to the Non-GAAP forward looking metrics are not available without unreasonable effort and such unavailable reconciling items could significantly impact our financial results.

Comparison of Fiscal 2018 and 2017

Net Sales. Consolidated net sales were $570.6 million and $550.4 million for fiscal 2018 and 2017, respectively, representing an increase of $20.2 million, or 3.7%. The period-over-period increase in net sales was due to higher net sales in both our Commercial Solutions and Government Solutions segments. Net sales by operating segment are discussed below.

Commercial Solutions
Net sales in our Commercial Solutions segment were $345.1 million for fiscal 2018, as compared to $330.9 million for fiscal 2017, an increase of $14.2 million, or 4.3%. Our Commercial Solutions segment represented 60.5% of consolidated net sales for fiscal 2018 as compared to 60.1% for fiscal 2017.

Our book-to-bill ratio (a measure defined as bookings divided by net sales) in this segment for fiscal 2018 was 1.33.

Net sales of our satellite ground station technologies in fiscal 2018 were higher than fiscal 2017, as we experienced significant growth in our sales to U.S. government customers. We experienced lower sales to international customers in fiscal 2018 as compared to fiscal 2017. Our Heights™ solutions experienced year-over-year revenue growth in fiscal 2018.

Net sales in fiscal 2018 of public safety and location technology solutions were higher as compared to the net sales we achieved in fiscal 2017.

Bookings, sales and profitability in our Commercial Solutions segment can fluctuate from period-to-period due to many factors, including changes in the general business environment. As such, period-to-period comparisons of our results may not be indicative of a trend or future performance.

Government Solutions
Net sales in our Government Solutions segment were $225.5 million for fiscal 2018 as compared to $219.5 million for fiscal 2017, an increase of $6.0 million or 2.7%. Our Government Solutions segment represented 39.5% of consolidated net sales for fiscal 2018, as compared to 39.9% for fiscal 2017.

The increase in net sales primarily reflects significantly higher net sales of our mission-critical technologies offset, in part, by significantly lower net sales of high-performance transmission technologies and the absence of $6.7 million of BFT-1 intellectual property license fees in fiscal 2018.

Our book-to-bill ratio (a measure defined as bookings divided by net sales) in this segment for fiscal 2018 was 1.31.

As of July 31, 2018, backlog for this segment was at the highest level since our acquisition of TCS in February 2016.

Bookings, sales and profitability in our Government Solutions segment can fluctuate dramatically from period-to-period due to many factors, including unpredictable funding, deployment and technology decisions by our U.S. and international government customers. As such, period-to-period comparisons of our results may not be indicative of a trend or future performance.

Geography and Customer Type
Sales by geography and customer type, as a percentage of related sales, for the fiscal years ended July 31, 2018 and 2017 are as follows:

	Fiscal Years Ended July 31,					
	2018	2017	2018	2017	2018	2017
	Commercial Solutions		Government Solutions		Consolidated	
U.S. government	18.1%	15.1%	62.2%	59.2%	35.5%	32.7%
Domestic	54.6%	54.4%	14.9%	15.5%	38.9%	38.9%
Total U.S.	72.7%	69.5%	77.1%	74.7%	74.4%	71.6%
International	27.3%	30.5%	22.9%	25.3%	25.6%	28.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Sales to U.S. government customers include sales to the U.S. Department of Defense ("DoD"), intelligence and civilian agencies, as well as sales directly to or through prime contractors.

Domestic sales include sales to commercial customers, as well as to U.S. state and local governments. Included in domestic sales, are sales to Verizon Communications Inc. ("Verizon"), which represented 10.0% of consolidated net sales for fiscal 2018. There were no customers that represented more than 10% of consolidated net sales for fiscal 2017.

International sales for fiscal 2018 and 2017 (which include sales to U.S. domestic companies for inclusion in products that are sold to international customers) were $145.8 million and $156.5 million, respectively. Except for the U.S., no individual country (including sales to U.S. domestic companies for inclusion in products that are sold to a foreign country) represented more than 10% of consolidated net sales for fiscal 2018 and 2017.

Gross Profit. Gross profit was $223.9 million and $218.2 million for fiscal 2018 and 2017, respectively. The increase of $5.7 million in gross profit dollars was largely driven by higher net sales and increased gross margins in our Commercial Solutions segment, partially offset by lower gross profit contributions from the Government Solutions segment. Gross profit in fiscal 2018 also benefited from a $0.7 million favorable warranty settlement and a $1.0 million favorable sales and use tax settlement, both of which are reflected in our unallocated segment. Gross profit, as a percentage of consolidated net sales, for fiscal 2018 was 39.2% (or 38.9% when excluding the aforementioned favorable settlements), which was slightly lower than the 39.6% achieved in fiscal 2017. This decrease was primarily driven by lower gross margins in our Government Solutions segment that was partially offset by an improvement in gross margins in our Commercial Solutions segment and the aforementioned favorable settlements. Gross profit, as a percentage of related segment net sales, is further discussed below.

Our Commercial Solutions segment's gross profit, as a percentage of related segment net sales, for fiscal 2018 was higher than fiscal 2017. The increase was primarily due to higher net sales and overall favorable product mix changes.

Our Government Solutions segment's gross profit, as a percentage of related segment net sales, for fiscal 2018 was lower than fiscal 2017. The decrease was primarily driven by significantly lower net sales of high-performance transmission technologies and the absence of $6.7 million of BFT-1 intellectual property license fees.

Included in consolidated cost of sales for fiscal 2018 and 2017 are provisions for excess and obsolete inventory of $5.6 million and $2.9 million, respectively. As discussed in "*Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations - Critical Accounting Policies - Provisions for Excess and Obsolete Inventory,*" we regularly review our inventory and record a provision for excess and obsolete inventory based on historical and projected usage trends.

Selling, General and Administrative Expenses. Selling, general and administrative expenses were $113.9 million and $116.1 million for fiscal 2018 and 2017, respectively, representing a decrease of $2.2 million. As a percentage of consolidated net sales, selling, general and administrative expenses were 20.0% and 21.1% (or 22.1% in fiscal 2017 when excluding $5.5 million of favorable adjustments related to a recovery of legal expenses from a third party and adjustments related to reserves associated with the TCS acquisition that were no longer required). There were no comparable adjustments in fiscal 2018.

The decrease in fiscal 2018 spending, both in dollars and as a percentage of consolidated net sales, is primarily attributable to the benefit of cost reduction actions previously initiated and, to a lesser extent, higher consolidated net sales during fiscal 2018, as discussed above.

Amortization of stock-based compensation expense recorded as selling, general and administrative expenses was $6.9 million in fiscal 2018 as compared to $7.1 million in fiscal 2017. Amortization in fiscal 2018 includes the benefit of a $0.4 million reversal of stock-based compensation expense related to certain performance shares previously expected to be earned.

Research and Development Expenses. Research and development expenses were $53.9 million and $54.3 million for fiscal 2018 and 2017, respectively, representing a decrease of $0.4 million, or 0.7%. As a percentage of consolidated net sales, research and development expenses were 9.4% and 9.9% for fiscal 2018 and 2017, respectively.

For fiscal 2018 and 2017, research and development expenses of $46.0 million and $44.7 million, respectively, related to our Commercial Solutions segment, and $7.0 million and $8.9 million, respectively, related to our Government Solutions segment. The remaining research and development expenses of $0.9 million and $0.7 million in fiscal 2018 and 2017, respectively, related to the amortization of stock-based compensation expense.

Whenever possible, we seek customer funding for research and development to adapt our products to specialized customer requirements. During fiscal 2018 and 2017, customers reimbursed us $16.9 million and $27.1 million, respectively, which is not reflected in the reported research and development expenses but is included in net sales with the related costs included in cost of sales.

Amortization of Intangibles. Amortization relating to intangible assets with finite lives was $21.1 million (of which $17.7 million was for the Commercial Solutions segment and $3.4 million was for the Government Solutions segment) for fiscal 2018 and $22.8 million (of which $17.7 million was for the Commercial Solutions segment and $5.1 million was for the Government Solutions segment) for fiscal 2017. The decrease in fiscal 2018 amortization was the result of certain intangibles in our Government Solutions segment that became fully amortized in fiscal 2017.

Settlement of Intellectual Property Litigation. In fiscal 2017, we recorded favorable adjustments to operating income of $12.0 million, net of estimated legal fees, to reflect lower losses than originally estimated for TCS intellectual property matters which were settled during that period. There were no comparable adjustments in fiscal 2018.

Operating Income. Operating income for fiscal 2018 was $35.1 million as compared $37.0 million for fiscal 2017. Operating income by reportable segment is shown in the table below:

	Fiscal Years Ended July 31,							
	2018	2017	2018	2017	2018	2017	2018	2017
($ in millions)	Commercial Solutions		Government Solutions		Unallocated		Consolidated	
Operating income (loss)	$ 40.8	$ 33.2	$ 11.0	$ 9.4	$ (16.7)	$ (5.6)	$ 35.1	$ 37.0
Percentage of related net sales	11.8%	10.0%	4.9%	4.3%	NA	NA	6.2%	6.7%

The increase in our Commercial Solutions segment's operating income, in dollars and as a percentage of related segment net sales, was primarily due to higher net sales, overall favorable product mix changes and the benefit of cost reduction actions previously initiated, as discussed above.

The increase in our Government Solutions segment's operating income, in dollars and as a percentage of related segment net sales, was primarily due to lower operating expenses (including lower amortization of intangibles) that was partially offset by lower gross profit contributions, as discussed above.

Unallocated operating expenses for fiscal 2018 were $16.7 million and were offset by a $0.7 million favorable warranty settlement and a $1.0 million favorable sales and use tax settlement, as discussed above. Excluding these adjustments, unallocated operating expenses for fiscal 2018 would have been $18.4 million. Unallocated operating expenses for fiscal 2017 were $5.6 million and were offset by a number of items that aggregated $18.8 million and included: (i) a $12.0 million favorable adjustment related to the settlement of certain TCS intellectual property matters; (ii) $5.5 million of favorable adjustments which related to a recovery of legal expenses from a third party and reserves associated with the TCS acquisition that were no longer required; and (iii) a $1.3 million benefit (as compared to fiscal 2016) associated with our decision to pay certain fiscal 2017 incentive compensation awards in the form of share units. Excluding these adjustments, unallocated operating expenses for fiscal 2017 would have been $24.4 million. The decrease to $18.4 million in fiscal 2018 from the $24.4 million in fiscal 2017 primarily relates to lower spending. Unallocated expenses for fiscal 2018 and 2017 include amortization of stock-based compensation of $8.6 million and $8.5 million, respectively.

Excluding the aforementioned $1.7 million and $18.8 million of favorable adjustments in fiscal 2018 and 2017, respectively, consolidated operating income for fiscal 2018 and 2017 would have been $33.4 million, or 5.9% of consolidated net sales, and $18.2 million, or 3.3% of consolidated net sales, respectively. This improvement from 3.3% to 5.9% is largely due to the benefit of cost reductions made and changes in gross profit mix and operating expenses, as discussed above.

Interest Expense and Other. Interest expense was $10.2 million and $11.6 million for fiscal 2018 and 2017, respectively. The decline in interest expense primarily reflects lower total indebtedness (excluding unamortized deferred financing costs), which declined from $200.6 million as of July 31, 2017 to $171.3 million as of July 31, 2018. Interest expense for both periods primarily reflects interest on our prior Credit Agreement dated as of February 23, 2016 (as amended by that certain First Amendment, dated as of June 6, 2017).

Interest (Income) and Other. Interest (income) and other for both fiscal 2018 and 2017 was nominal. All of our available cash and cash equivalents are currently invested in bank deposits and money market deposit accounts which, as of July 31, 2018, were yielding a blended annual interest rate of approximately 0.6%.

(Benefit from) Provision for Income Taxes. The benefit from income taxes was $5.1 million for fiscal 2018 as compared to a tax provision of $9.7 million for fiscal 2017.

During fiscal 2018, we recorded a net discrete tax benefit of $11.8 million which, as a result of Tax Reform, primarily related to the remeasurement of deferred tax liabilities associated with non-deductible amortization related to intangible assets and discrete tax benefits associated with stock-based awards that were settled in fiscal 2018. These benefits were offset, in part, by the finalization of certain tax deductions in connection with the filing of our federal and state income tax returns for fiscal 2017. Excluding discrete tax items for fiscal 2018, our effective tax rate was 27.0%.

During fiscal 2017, we recorded a net discrete tax expense of $0.5 million, primarily related to the finalization of certain tax deductions in connection with the filing of our federal and state income tax returns for fiscal 2016, offset, in part, by the reversal of tax contingencies no longer required due to the settlement of the fiscal 2014 federal income tax audit and the expiration of applicable statutes of limitation. Our effective tax rate excluding discrete tax items for fiscal 2017 was 35.75%.

The decrease from 35.75% to 27.0% is principally attributable to the passage of Tax Reform which reduced the statutory income tax rate from 35.0% to 21.0%, or a blended income tax rate of approximately 27.0%.

Our federal income tax returns for fiscal 2017 and 2018 are subject to potential future IRS audit. None of our state income tax returns prior to fiscal 2015 are subject to audit. TCS's federal income tax returns for tax year 2015 and the tax period from January 1, 2016 to February 23, 2016, the date we acquired TCS, are subject to potential future IRS audit. None of TCS's state income tax returns prior to calendar year 2014 are subject to audit. Future tax assessments or settlements could have a material adverse effect on our consolidated results of operations and financial condition.

Net Income. During fiscal 2018, consolidated net income was $29.8 million as compared to $15.8 million during fiscal 2017.

Adjusted EBITDA. Adjusted EBITDA (both in dollars and as a percentage of related net sales) for both fiscal 2018 and 2017 are shown in the table below (numbers in the table may not foot due to rounding):

	Fiscal Years Ended July 31,							
	2018	2017	2018	2017	2018	2017	2018	2017
($ in millions)	Commercial Solutions		Government Solutions		Unallocated		Consolidated	
Net income (loss)	$ 40.3	32.9	10.8	9.4	(21.4)	(26.5)	$ 29.8	15.8
Provision for (benefit from) income taxes	0.3	0.3	—	—	(5.4)	9.4	(5.1)	9.7
Interest (income) and other	0.2	(0.1)	0.1	—	—	0.1	0.3	(0.1)
Interest expense	0.1	0.2	—	—	10.1	11.4	10.2	11.6
Amortization of stock-based compensation	—	—	—	—	8.6	8.5	8.6	8.5
Amortization of intangibles	17.7	17.7	3.4	5.1	—	—	21.1	22.8
Depreciation	9.5	9.9	3.1	2.9	1.1	1.5	13.7	14.4
Settlement of intellectual property litigation	—	—	—	—	—	(12.0)	—	(12.0)
Adjusted EBITDA	$ 68.0	60.9	17.4	17.5	(7.1)	(7.6)	$ 78.4	70.7
Percentage of related net sales	19.7%	18.4%	7.7%	8.0%	NA	NA	13.7%	12.8%

The increase in consolidated Adjusted EBITDA during fiscal 2018 as compared to fiscal 2017 is primarily attributable to higher net sales and overall favorable product mix changes in our Commercial Solutions segment (which historically achieves higher gross margins than our Government Solutions segment), the benefit of cost reduction actions previously taken and the $1.7 million of benefits in fiscal 2018 that resulted from the favorable warranty and sales and use tax settlements, as discussed above.

The increase in our Commercial Solutions segment's Adjusted EBITDA, in dollars and as a percentage of related segment net sales, was primarily attributable to higher net sales, overall favorable product mix changes and the benefit of cost reduction actions previously initiated, as discussed above.

The decrease in our Government Solutions segment's Adjusted EBITDA, in dollars and as a percentage of related segment net sales, was primarily driven by significantly lower net sales of high-performance transmission technologies and the absence of $6.7 million of BFT-1 intellectual property license fees, as discussed above.

Reconciliations of our GAAP consolidated operating income, net income and net income per diluted share for fiscal 2018 and 2017 to the corresponding non-GAAP measures are shown in the tables below (numbers and per share amounts in the table may not foot due to rounding):

	Fiscal 2018		
($ in millions, except for per share amount)	Operating Income	Net Income	Net Income per Diluted Share
Reconciliation of GAAP to Non-GAAP Earnings:			
GAAP measures, as reported	$ 35.1	$ 29.8	$ 1.24
Net discrete tax benefit	—	(11.8)	(0.49)
Non-GAAP measures	$ 35.1	$ 18.0	$ 0.75

	Fiscal 2017		
($ in millions, except for per share amount)	Operating Income	Net Income	Net Income per Diluted Share
Reconciliation of GAAP to Non-GAAP Earnings:			
GAAP measures, as reported	$ 37.0	$ 15.8	$ 0.67
Settlement of intellectual property litigation	(12.0)	(7.7)	(0.33)
Non-GAAP measures	$ 25.0	$ 8.1	$ 0.34

Our Adjusted EBITDA is a Non-GAAP measure that represents earnings (loss) before income taxes, interest (income) and other, write-off of deferred financing costs, interest expense, amortization of stock-based compensation, amortization of intangibles, depreciation expense, estimated contract settlement costs, settlement of intellectual property litigation, acquisition plan expenses, facility exit costs, and strategic alternatives analysis expenses and other. Our definition of Adjusted EBITDA may differ from the definition of EBITDA used by other companies and therefore may not be comparable to similarly titled measures used by other companies. Adjusted EBITDA is also a measure frequently requested by our investors and analysts. We believe that investors and analysts may use Adjusted EBITDA, along with other information contained in our SEC filings, in assessing our performance and comparability of our results with other companies. Our Non-GAAP measures for consolidated operating income, net income and net income per diluted share reflect the GAAP measures as reported, adjusted for certain items as described. These Non-GAAP financial measures have limitations as an analytical tool as they exclude the financial impact of transactions necessary to conduct our business, such as the granting of equity compensation awards, and are not intended to be an alternative to financial measures prepared in accordance with GAAP. These measures are adjusted as described in the reconciliation of GAAP to Non-GAAP in the above tables, but these adjustments should not be construed as an inference that all of these adjustments or costs are unusual, infrequent or non-recurring. Non-GAAP financial measures should be considered in addition to, and not as a substitute for or superior to, financial measures determined in accordance with GAAP. Investors are advised to carefully review the GAAP financial results that are disclosed in our SEC filings.

Liquidity and Capital Resources

Our cash and cash equivalents increased to $45.6 million at July 31, 2019 from $43.5 million at July 31, 2018, an increase of $2.1 million. The increase in cash and cash equivalents during fiscal 2019 was driven by the following:

- Net cash provided by operating activities was $68.0 million for fiscal 2019 as compared to $50.3 million for fiscal 2018. The period-over-period increase in cash flow from operating activities reflects overall changes in net working capital requirements, principally the timing of shipments, billings and payments.

- Net cash used in investing activities for fiscal 2019 was $44.7 million as compared to $8.6 million for fiscal 2018. During fiscal 2019, we paid $35.9 million of cash in connection with our fiscal 2019 acquisitions, net of cash acquired. The remaining portion of net cash used in both periods primarily represented expenditures relating to ongoing equipment upgrades and enhancements.

- Net cash used in financing activities was $21.3 million for fiscal 2019 as compared to $40.1 million for fiscal 2018. During fiscal 2019, we entered into a new Credit Facility and repaid in full the outstanding borrowings under our Prior Credit Facility. During fiscal 2019 and 2018, we paid $9.8 million and $9.5 million, respectively, in cash dividends to our stockholders. We also made $5.0 million and $1.1 million, respectively, of payments to remit employees' statutory tax withholding requirements related to the net settlement of stock-based awards during fiscal 2019 and 2018.

The Credit Facility is discussed below and in *"Notes to Consolidated Financial Statements - Note (8) - Credit Facility"* included in *"Part II - Item 8. - Financial Statements and Supplementary Data"* included in this Annual Report on Form 10-K.

Our investment policy relating to our cash and cash equivalents is intended to minimize principal loss while at the same time maximize the income we receive without significantly increasing risk. To minimize risk, we generally invest our cash and cash equivalents in money market mutual funds (both government and commercial), certificates of deposit, bank deposits, and U.S. Treasury securities. Many of our money market mutual funds invest in direct obligations of the U.S. government, bank securities guaranteed by the Federal Deposit Insurance Corporation, certificates of deposit and commercial paper and other securities issued by other companies. While we cannot predict future market conditions or market liquidity, we believe our investment policies are appropriate in the current environment. Ultimately, the availability of our cash and cash equivalents is dependent on a well-functioning liquid market.

As of July 31, 2019, our material short-term cash requirements primarily consist of: (i) estimated interest payments under our Credit Facility; (ii) payments related to lease commitments; (iii) our ongoing working capital needs, including income tax payments; and (iv) payment of accrued quarterly dividends. We continue to focus on acquisitions to supplement our expected organic growth. If our acquisition plan is successful, we may be required to pay for such acquisition primarily with existing cash and cash equivalents and increased borrowings under our Credit Facility.

In December 2018, we filed a $400.0 million shelf registration statement with the SEC for the sale of various types of securities, including debt. The shelf registration statement was declared effective by the SEC as of December 14, 2018.

As of July 31, 2019 and September 24, 2019, we were authorized to repurchase up to an additional $8.7 million of our common stock, pursuant to our current $100.0 million stock repurchase program. Our stock repurchase program has no time restrictions and repurchases may be made in open-market or privately negotiated transactions and may be made pursuant to SEC Rule 10b5-1 trading plans. There were no repurchases of our common stock during fiscal 2019 and 2018.

On September 26, 2018, December 6, 2018, March 6, 2019 and June 5, 2019, our Board of Directors declared a dividend of $0.10 per common share, which was paid on November 16, 2018, February 15, 2019, May 17, 2019 and August 16, 2019, respectively. On September 24, 2019, our Board of Directors declared a dividend of $0.10 per common share, payable on November 15, 2019 to stockholders of record at the close of business on October 16, 2019. Future dividends remain subject to compliance with financial covenants under our Credit Facility, as amended, as well as Board approval.

Our material long-term cash requirements primarily consist of mandatory interest payments pursuant to our Credit Facility and lease commitments.

We have historically met both our short-term and long-term cash requirements with funds provided by a combination of cash and cash equivalent balances, cash generated from operating activities and cash generated from financing transactions. Based on our anticipated level of future sales and operating income, we believe that our existing cash and cash equivalent balances, our cash generated from operating activities and amounts potentially available under our Credit Facility will be sufficient to meet both our currently anticipated short-term and long-term operating cash requirements.

Although it is difficult in the current economic and credit environment to predict the terms and conditions of financing that may be available in the future, should our short-term or long-term cash requirements increase beyond our current expectations, we believe that we would have sufficient access to credit from financial institutions and/or financing from public and private debt and equity markets.

Credit Facility
On October 31, 2018, we entered into a First Amended and Restated Credit Agreement (the "Credit Facility") with a syndicate of lenders, replacing our prior Credit Agreement dated as of February 23, 2016 (as amended by that certain First Amendment, dated as of June 6, 2017 (the "Prior Credit Facility")).

The new Credit Facility provides a senior secured loan facility of up to $550.0 million consisting of: (i) a revolving loan facility ("Revolving Loan Facility") with a borrowing limit of $300.0 million; (ii) an accordion feature allowing us to borrow up to an additional $250.0 million; (iii) a $35.0 million letter of credit sublimit; and (iv) a swingline loan credit sublimit of $25.0 million.

The Credit Facility matures on October 31, 2023 (the "Revolving Maturity Date"). If we issue new unsecured debt in excess of $5.0 million with a maturity date that is less than 91 days from October 31, 2023, the Revolving Maturity Date would automatically accelerate so that it would be 91 days earlier than the maturity date of the new unsecured debt.

The proceeds of the new Credit Facility were used, in part, to repay in full the outstanding borrowings under the Prior Credit Facility, and additional proceeds of the Credit Facility are expected to be used by us for working capital and other general corporate purposes. As of July 31, 2019, the amount outstanding under our Credit Facility was $165.0 million, which is reflected in the non-current portion of long-term debt on our Consolidated Balance Sheet. At July 31, 2019, we had $2.7 million of standby letters of credit outstanding under our Credit Facility related to our guarantees of future performance on certain customer contracts and no outstanding commercial letters of credit. Since October 31, 2018, we had outstanding balances under the new Credit Facility, ranging from $150.0 million to $184.0 million. In addition, we had outstanding balances under the Revolving Loan Facility of the Prior Credit Facility, ranging from $34.9 million to $63.8 million during the three months ended October 31, 2018.

Borrowings under the Credit Facility shall be either: (i) Alternate Base Rate borrowings, which bear interest from the applicable borrowing date at a rate per annum equal to (x) the greatest of (a) the Prime Rate (as defined) in effect on such day, (b) the Federal Funds Effective Rate (as defined) in effect on such day plus 1/2 of 1.00% per annum and (c) the Adjusted LIBO Rate (as defined) on such day (or, if such day is not a business day, the immediately preceding business day) plus 1.00% per annum, plus (y) the Applicable Rate (as defined), or (ii) Eurodollar borrowings, which bear interest from the applicable borrowing date at a rate per annum equal to (x) the Adjusted LIBO Rate for such interest period plus (y) the Applicable Rate. Determination of the Applicable Rate is based on a pricing grid that is dependent upon our Secured Leverage Ratio (as defined) as of the end of each fiscal quarter for which consolidated financial statements have been most recently delivered.

The Credit Facility contains customary representations, warranties and affirmative covenants. The Credit Facility also contains customary negative covenants, subject to negotiated exceptions, including but not limited to: (i) liens, (ii) investments, (iii) indebtedness, (iv) significant corporate changes, including mergers and acquisitions, (v) dispositions, (vi) restricted payments, including stockholder dividends, and (vii) certain other restrictive agreements. The Credit Facility also contains certain financial covenants and customary events of default (subject to grace periods, as appropriate), such as payment defaults, cross-defaults to other material indebtedness, bankruptcy and insolvency, the occurrence of a defined change in control and the failure to observe the negative covenants and other covenants related to the operation of our business. In addition, under certain circumstances, we may be required to enter into amendments to the Credit Facility in connection with any further syndication of the Credit Facility.

The Credit Facility provides for, among other things: (i) no scheduled payments of principal until maturity; (ii) a maximum Secured Leverage Ratio of 3.75x trailing twelve months ("TTM") Adjusted Earnings Before Interest, Taxes, Depreciation and Amortization ("Adjusted EBITDA") and a Maximum Total Leverage Ratio of 4.50x TTM Adjusted EBITDA, each with no step downs; and (iii) a Minimum Interest Expense Coverage Ratio of 3.25x TTM Adjusted EBITDA.

As of July 31, 2019, our Secured Leverage Ratio was 1.74x TTM Adjusted EBITDA compared to the maximum allowable Secured Leverage Ratio of 3.75x TTM Adjusted EBITDA. Our Interest Expense Coverage Ratio as of July 31, 2019 was 12.05x TTM Adjusted EBITDA compared to the Minimum Interest Expense Coverage Ratio of 3.25x TTM Adjusted EBITDA. Given our expected future business performance, we anticipate maintaining compliance with the terms and financial covenants in our Credit Facility for the foreseeable future.

The obligations under the Credit Facility are guaranteed by certain of our domestic subsidiaries (the "Guarantors"). As collateral security under the Credit Facility and the guarantees thereof, we and the Guarantors have granted to the administrative agent, for the benefit of the lenders, a lien on, and first priority security interest in, substantially all of our tangible and intangible assets.

On December 6, 2018, we entered into the first amendment to the Credit Facility. The purpose of the amendment is to provide for a mechanism to replace the LIBO Rate for Eurodollar borrowings with an alternative benchmark interest rate, should the LIBO Rate generally become unavailable in the future on an other-than-temporary basis.

Capitalized terms used but not defined herein have the meanings set forth for such terms in the Credit Facility and the Prior Credit Facility, which have been documented and filed with the SEC.

Off-Balance Sheet Arrangements
As of July 31, 2019, we did not have any off-balance sheet arrangements as defined in Item 303(a)(4) of Regulation S-K.

Commitments
In the normal course of business, other than as discussed below, we routinely enter into binding and non-binding purchase obligations primarily covering anticipated purchases of inventory and equipment. We do not expect that these commitments, as of July 31, 2019, will materially adversely affect our liquidity.

At July 31, 2019, cash payments due under long-term obligations (including estimated interest expense on our Credit Facility), excluding purchase orders that we entered into in our normal course of business, are as follows:

	Obligations Due by Fiscal Years or Maturity Date (in thousands)				
	Total	2020	2021 and 2022	2023 and 2024	After 2024
Credit Facility - principal payments	$ 165,000	—	—	165,000	—
Credit Facility - interest payments	31,423	7,397	14,793	9,233	—
Operating lease commitments	44,214	11,812	16,066	9,206	7,130
Capital lease and other obligations	789	789	—	—	—
Net contractual cash obligations	$ 241,426	19,998	30,859	183,439	7,130

As discussed further in "*Notes to Consolidated Financial Statements - Note (8) - Credit Facility*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, on October 31, 2018, we entered into a new Credit Facility, replacing our Prior Credit Facility dated as of February 23, 2016. The new Credit Facility provides a senior secured loan facility of up to $550.0 million consisting of: (i) a revolving loan facility ("Revolving Loan Facility") with a borrowing limit of $300.0 million; (ii) an accordion feature allowing us to borrow up to an additional $250.0 million; (iii) a $35.0 million letter of credit sublimit; and (iv) a swingline loan credit sublimit of $25.0 million. The Credit Facility matures on October 31, 2023 (the "Revolving Maturity Date"). In addition, if we issue new unsecured debt in excess of $5.0 million with a maturity date that is less than 91 days from October 31, 2023, the Revolving Maturity Date would automatically accelerate so that it would be 91 days earlier than the maturity date of the new unsecured debt.

As discussed further in "*Notes to Consolidated Financial Statements - Note (16) - Stockholders' Equity*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, on September 24, 2019, our Board of Directors declared a dividend of $0.10 per common share, payable on November 15, 2019 to stockholders of record at the close of business on October 16, 2019. Future dividends remain subject to compliance with financial covenants under our Credit Facility, as amended, as well as Board approval.

At July 31, 2019, we have approximately $2.7 million of standby letters of credit outstanding under our Credit Facility related to our guarantees of future performance on certain customer contracts. Such amounts are not included in the above table.

In fiscal 2018, we entered into a full and final warranty settlement with AT&T, the largest customer/distributor of a small product line that we refer to as the TCS 911 call handling software solution. As discussed in *"Notes to Consolidated Financial Statements - Note (6) - Accrued Expenses and Other Current Liabilities,"* included in "*Part II - Item 8.- Financial Statements and Supplementary Data*," included in this Annual Report on Form 10-K, pursuant to the settlement agreement, we issued thirty-six credits to AT&T of $0.2 million which AT&T can apply on a monthly basis to purchases of solutions from us, beginning October 2017 through September 2020. As of July 31, 2019, the total present value of these monthly credits is $2.0 million, of which $1.7 million is included in accrued expenses and other current liabilities and $0.3 million is reflected in other liabilities (non-current) on our Consolidated Balance Sheet. These amounts are not shown in the above commitment table.

As discussed in *Notes to Consolidated Financial Statements - Note (7) - Cost Reduction Actions,"* included in "*Part II - Item 8.- Financial Statements and Supplementary Data*," included in this Annual Report on Form 10-K, during the three months ended October 31, 2018, we exited our Government Solutions segment's manufacturing facility located in Tampa, Florida and recorded a related charge of $1.4 million in selling, general and administrative expenses on our Consolidated Statement of Operations. As of July 31, 2019, the remaining estimated facility exit costs was $0.6 million which is included in "accrued expenses and other current liabilities" on our Consolidated Balance Sheet. Such amounts are not shown in the above commitment table.

In the ordinary course of business, we include indemnification provisions in certain of our customer contracts. Pursuant to these agreements, we have agreed to indemnify, hold harmless and reimburse the indemnified party for certain losses suffered or incurred by the indemnified party, including but not limited to losses related to third-party intellectual property claims. It is not possible to determine the maximum potential amount under these agreements due to a history of nominal claims in the Comtech legacy business and the unique facts and circumstances involved in each particular agreement. As discussed further in "*Notes to Consolidated Financial Statements - Note (13) - Commitments and Contingencies,*" included in "*Part II - Item 8.- Financial Statements and Supplementary Data*," included in this Annual Report on Form 10-K, TCS is subject to a number of indemnification demands and we are incurring ongoing legal expenses in connection with these matters. Our insurance policies may not cover the cost of defending indemnification claims or providing indemnification. As a result, pending or future claims asserted against us by a party that we have agreed to indemnify could result in legal costs and damages that could have a material adverse effect on our consolidated results of operations and financial condition.

We have change in control agreements, severance agreements and indemnification agreements with certain of our executive officers and certain key employees. All of these agreements may require payments by us, in certain circumstances, including, but not limited to, a change in control of our Company or an involuntary termination of employment without cause.

Our Consolidated Balance Sheet at July 31, 2019 includes total liabilities of $7.2 million for uncertain tax positions, including interest, any or all of which may result in a cash payment. The future payments related to uncertain tax positions have not been presented in the table above due to the uncertainty of the amounts and timing of any potential cash settlement with the taxing authorities.

Recent Accounting Pronouncements

We are required to prepare our consolidated financial statements in accordance with the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") which is the source for all authoritative U.S. generally accepted accounting principles, which is commonly referred to as "GAAP." The FASB ASC is subject to updates by the FASB, which are known as Accounting Standards Updates ("ASUs").

As further discussed in "*Notes to Consolidated Financial Statements – Note (1)(o) - Adoption of Accounting Standards and Updates*" included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, during fiscal 2019, we adopted:

- FASB ASU No. 2014-09 "Revenue from Contracts with Customers (Topic 606)." See *"Notes to Consolidated Financial Statements - Note (1)(d) - Summary of Significant Accounting and Reporting Policies - Revenue Recognition,"* included in "*Part II - Item 8. - Financial Statements and Supplementary Data,*" included in this Annual Report on Form 10-K, for further information.

- FASB ASU No. 2016-16, issued in October 2016, which eliminates a prior exception and now requires an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory (for example, intellectual property and property, plant and equipment) when the transfer occurs. We adopted this ASU on August 1, 2018. There was no material impact to our consolidated financial statements (including any cumulative effect adjustment) and disclosures upon such adoption.

- FASB ASU No. 2019-07, issued in June 2019, which amends various SEC guidance pursuant to the issuance of SEC Final Rule Release No. 33-10532, 33-10231, and 33-10442. This ASU clarifies or improves the disclosure and presentation requirements of a variety of Codification Topics by aligning them with the SEC's regulations, eliminating redundancies, and making the Codification easier to apply. There was no material impact to our consolidated financial statements and related disclosures upon such adoption.

In addition, the following FASB ASUs have been issued and incorporated into the FASB ASC and have not yet been adopted by us as of July 31, 2019:

- FASB ASU No. 2016-02, issued in February 2016 "Leases (Topic 842)," which requires lessees to recognize the following for all leases (with the exception of short-term leases): (i) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, initially measured at the present value of the lease payments; and (ii) a right-of-use asset, which is an asset that represents the lessee's right to use a specified asset for the lease term. In January 2018, FASB ASU No. 2018-01 was issued to permit an entity to elect an optional transition practical expedient to not evaluate under Topic 842 land easements that exist or expired before the entity's adoption of Topic 842. In July 2018, the FASB issued ASU Nos. 2018-10 and 2018-11, which provide further codification improvements and relieves the requirement to present prior comparative year results when adopting the new lease standard. Instead, companies can choose to recognize the cumulative effect of applying the new standard to leased assets and liabilities as an adjustment to opening retained earnings. In December 2018, FASB ASU No. 2018-20 was issued to simplify the implementation of Topic 842 for lessors as it relates to sales taxes, lessor costs paid directly by the lessee and recognition of variable payments for contracts with lease and non-lease components. In March 2019, FASB ASU No. 2019-01 was issued, which addresses: (i) determining the fair value of the underlying asset by lessors that are not manufacturers or dealers; (ii) presentation of sales types and direct financing leases on the statement of cash flows; and (iii) transition disclosures related to Topic 250, "Accounting Changes and Error Corrections." This latest ASU specifically provides an exception to the paragraph 250-10-50-3 that would otherwise have required interim disclosures in the period of an accounting change including the effect of that change on income from continuing operations, net income, any other financial statement line item and any affected per-share amounts. As further discussed in "*Notes to Consolidated Financial Statements - Note (1)(c)- Summary of Significant Accounting and Reporting Policies - Adoption of New Leasing Standard*" included in Part II - Item 8. - *Financial Statements and Supplementary Data*, on August 1, 2019, we adopted the new leasing standard using the modified retrospective approach. In addition, we elected certain practical expedients permitted under the transition guidance within the new standard. Except for recording a total right-of-use asset and corresponding lease liability on our Consolidated Balance Sheet, which amount approximates 4.0% of our total consolidated assets at July 31, 2019, our adoption of Topic 842 is not expected to have a material impact to our future statements of operations or cash flows.

- FASB ASU No. 2016-13 issued in June 2016 and ASU No. 2018-19 issued in November 2018, which require the measurement of expected credit losses for financial assets held at the reporting date to be based on historical experience, current conditions and reasonable and supportable forecasts. In April 2019, FASB ASU No. 2019-04 was issued to provide clarification guidance in the following areas: (i) accrued interest; (ii) recoveries; (iii) projections of the interest rate environment; (iv) consideration of prepayments; and (v) other topics. In May 2019, FASB ASU No. 2019-05 was issued to provide entities with an option to irrevocably elect the fair value option applied on an instrument by instrument basis for eligible instruments. These ASUs are effective for fiscal years beginning after December 15, 2019 (our fiscal year beginning on August 1, 2020), including interim periods within those fiscal years. All entities may adopt the amendments in this ASU earlier as of the fiscal years beginning after December 15, 2018, including interim periods within those fiscal years. Except for a prospective transition approach required for debt securities for which an other-than-temporary impairment had been recognized before the effective date, an entity will apply the amendments in this ASU through a cumulative effect adjustment to retained earnings as of the beginning of the first reporting period in which the guidance is effective (that is, on a modified-retrospective approach). We are evaluating the impact of this ASU on our consolidated financial statements and disclosures.

- FASB ASU No. 2017-11, issued in July 2017, which provides guidance on the accounting for certain financial instruments with embedded features that result in the strike price of the instrument or embedded conversion option being reduced on the basis of the pricing of future equity offerings (commonly referred to as "down round" features). On August 1, 2019, we adopted this ASU. Our adoption of this ASU did not have any impact on our consolidated financial statements and disclosures, as we did not have any financial instruments with such "down round" features.

- FASB ASU No. 2017-12, issued in August 2017, which expands and refines hedge accounting for both non-financial and financial risk components and simplifies and aligns the recognition and presentation of the effects of the hedging instrument and the hedged item in the financial statements. On August 1, 2019, we adopted this ASU. Our adoption of this ASU did not have any impact on our consolidated financial statements and disclosures, as we are currently not a party to any such hedging transactions.

- FASB ASU No. 2018-07, issued in June 2018, which expands the scope of Topic 718 to include certain share-based payment transactions for acquiring goods and services from nonemployees. On August 1, 2019, we adopted this ASU. Our adoption of this ASU did not have any impact on our consolidated financial statements and disclosures, as we currently do not have any outstanding share-based awards with nonemployees that require remeasurement.

- FASB ASU No. 2018-13, issued in August 2018, which modifies the disclosure requirements for fair value measurements in Topic 820. This ASU is effective for fiscal years, and interim periods within those fiscal years, beginning after December 15, 2019 (our fiscal year beginning on August 1, 2020). Upon the effective date, certain provisions are to be applied prospectively, while others are to be applied retrospectively to all periods presented. An entity is permitted to early adopt any removed or modified disclosures upon issuance of this ASU and delay adoption of the additional disclosures until their effective date. We are evaluating the impact of this ASU on our consolidated financial statement disclosures.

- FASB ASU No. 2018-15, issued in August 2018, which aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal use software (and hosting arrangements that include an internal use software license). The accounting for the service element of a hosting arrangement that is a service contract is not affected by the amendments in this ASU. This ASU is effective for fiscal years beginning after December 15, 2019 (our fiscal year beginning on August 1, 2020), and interim periods within those fiscal years. Early adoption is permitted, including adoption in any interim period. This ASU should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. We are evaluating the impact of this ASU on our consolidated financial statements and disclosures.

- FASB ASU No. 2018-16, issued in October 2018, which expands the list of eligible U.S. benchmark interest rates permitted in the application of hedge accounting due to broad concerns about the long-term sustainability of the LIBO Rate. This ASU adds the Overnight Index Swap ("OIS") rate, based on the Secured Overnight Financing Rate ("SOFR"), as an eligible U.S. benchmark interest rate. On August 1, 2019, we adopted this ASU. Our adoption of this ASU did not have any impact on our consolidated financial statements and disclosures, as we are currently not a party to any such hedging transactions.

- FASB ASU No. 2018-17, issued in October 2018, which requires entities to consider indirect interests held through related parties under common control on a proportional basis, rather than as the equivalent of a direct interest in its entirety when determining whether a decision-making fee is a variable interest. This ASU is effective for fiscal years beginning after December 15, 2019 (our fiscal year beginning on August 1, 2020) and for interim periods therein, with early adoption permitted. We are evaluating the impact of this ASU on our consolidated financial statements and disclosures; however, we do not expect the adoption to have any effect given that we currently do not have any indirect interests held through related parties in common control.

- FASB ASU No. 2018-18, issued in November 2018, which clarifies when certain transactions between collaborative arrangement participants should be accounted for under ASC 606 and incorporates unit-of-account guidance consistent with ASC 606 to aid in this determination. The ASU also precludes entities from presenting consideration from transactions with a collaborator that is not a customer together with revenue recognized from contracts with customers. This ASU is effective for fiscal years beginning after December 15, 2019 (our fiscal year beginning on August 1, 2020) and for interim periods therein, with early adoption permitted. We are evaluating the impact of this ASU on our consolidated financial statements and disclosures; however, we do not expect the adoption to have any effect given that we are currently not engaged in such collaborative arrangement transactions.

ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Our earnings and cash flows are subject to fluctuations due to changes in interest rates primarily from borrowings under our Credit Facility. Based on the amount of outstanding debt under our Credit Facility, a hypothetical change in interest rates by 10% would change interest expense by $0.7 million over a one-year period. Although we do not currently use interest rate derivative instruments to manage exposure to interest rate changes, we may choose to do so in the future in connection with our Credit Facility.

Our earnings and cash flows are also subject to fluctuations due to changes in interest rates on our investment of available cash balances. As of July 31, 2019, we had cash and cash equivalents of $45.6 million, which consisted of cash and highly-liquid money market deposit accounts. Many of these investments are subject to fluctuations in interest rates, which could impact our results. Based on our investment portfolio balance as of July 31, 2019, a hypothetical change in interest rates of 10% would have a nominal impact on interest income over a one-year period. Ultimately, the availability of our cash and cash equivalents is dependent on a well-functioning liquid market.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

Reports of Independent Registered Public Accounting Firm, Consolidated Financial Statements, Notes to Consolidated Financial Statements and Related Financial Schedule are listed in the Index to Consolidated Financial Statements and Schedule annexed hereto.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

As of the end of the period covered by this Annual Report on Form 10-K, an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures was carried out by us under the supervision and with the participation of our management, including our President, Chief Executive Officer and Chairman and Chief Financial Officer. Based on that evaluation, our President, Chief Executive Officer and Chairman and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by the report to provide reasonable assurance that the information required to be disclosed by us in reports filed under the Securities Exchange Act of 1934, as amended, is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms and is accumulated and communicated to management, as appropriate, to allow timely decisions regarding required disclosure. A system of controls, no matter how well designed and operated, cannot provide absolute assurance that the objectives of the system of controls are met, and no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within a company have been detected.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. All internal control systems, no matter how well designed, have inherent limitations. Therefore, even those systems determined to be effective can provide only reasonable assurance with respect to financial statement preparation and presentation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting as of July 31, 2019. In making this assessment, we used the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in *Internal Control – Integrated Framework (2013)*. Based on our assessment, we determined that, as of July 31, 2019, our internal control over financial reporting was effective based on those criteria.

Deloitte and Touche LLP, our independent registered public accounting firm, has performed an audit of our internal control over financial reporting as of July 31, 2019 based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the COSO. This audit is required to be performed in accordance with the standards of the Public Company Accounting Oversight Board (United States). Our independent auditors were given unrestricted access to all financial records and related data. Deloitte's audit reports appear on pages F-2 and F-3 of this annual report.

Changes In Internal Control Over Financial Reporting

There have been no changes in our internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act that occurred during our fiscal quarter ended July 31, 2019, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

Certain information concerning directors and officers is incorporated by reference to our Proxy Statement for the Annual Meeting of Stockholders (the "Proxy Statement") which will be filed with the Securities and Exchange Commission no more than 120 days after the close of our fiscal year.

ITEM 11. EXECUTIVE COMPENSATION

Information regarding executive compensation is incorporated by reference to the Proxy Statement, which will be filed with the Securities and Exchange Commission no more than 120 days after the close of our fiscal year.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information regarding securities authorized for issuance under equity compensation plans and certain information regarding security ownership of certain beneficial owners and management is incorporated by reference to the Proxy Statement, which will be filed with the Securities and Exchange Commission no more than 120 days after the close of our fiscal year.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information regarding certain relationships and related transactions is incorporated by reference to the Proxy Statement, which will be filed with the Securities and Exchange Commission no more than 120 days after the close of our fiscal year.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Information regarding principal accountant fees and services is incorporated by reference to the Proxy Statement, which will be filed with the Securities and Exchange Commission no more than 120 days after the close of our fiscal year.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

(a) (1) The Registrant's financial statements together with a separate index are annexed hereto.

(2) The Financial Statement Schedule listed in a separate index is annexed hereto.

(3) Exhibits required by Item 601 of Regulation S-K are listed below.

Exhibit Number	Description of Exhibit	Incorporated By Reference to Exhibit
3(a)(i)	Restated Certificate of Incorporation of the Registrant	Exhibit 3(a)(i) to the Registrant's 2006 Form 10-K
3(a)(ii)	Third Amended and Restated By-Laws of the Registrant, as of September 26, 2017	Exhibit 3(a)(ii) to the Registrant's 2017 Form 10-K
10(a)(1)*	Sixth Amended and Restated Employment Agreement, dated November 18, 2016, between the Registrant and Fred Kornberg	Exhibit 10.1 to the Registrant's Form 10-Q, filed December 7, 2016
10(a)(2)*	Amendment to Sixth Amended and Restated Employment Agreement, dated June 6, 2017, between the Registrant and Fred Kornberg	Exhibit 10.7 to the Registrant's Form 8-K, filed June 7, 2017
10(a)(3)*	Lease agreement, dated September 23, 2011, on the Melville, New York Facility	Exhibit 10(s) to the Registrant's 2011 Form 10-K
10(b)*	Second Amended and Restated 2001 Employee Stock Purchase Plan	Exhibit A to the Registrant's Proxy Statement, filed November 16, 2018
10(c)*	2000 Stock Incentive Plan, Amended and Restated, Effective March 6, 2018	Exhibit 10.1 to the Registrant's Form 10-Q, filed June 6, 2018
10(d)(1)*	Form of Stock Option Agreement pursuant to the 2000 Stock Incentive Plan	Exhibit 10(f)(7) to the Registrant's 2005 Form 10-K
10(d)(2)*	Form of Stock Option Agreement for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10(f)(8) to the Registrant's 2006 Form 10-K
10(e)(1)*	Form of Performance Share Agreement pursuant to the 2000 Stock Incentive Plan	Exhibit 10(s) to the Registrant's 2012 Form 10-K
10(e)(2)*	Form of Performance Share Agreement (eligible for dividend equivalents) (Auto Deferral) pursuant to the 2000 Stock Incentive Plan	Exhibit 10(z) to the Registrant's 2013 Form 10-K
10(f)(1)*	Form of Long-Term Performance Share Award Agreement pursuant to the 2000 Stock Incentive Plan - 2017	Exhibit 10.8 to the Registrant's Form 8-K, filed June 7, 2017
10(f)(2)*	Form of Long-Term Performance Share Award Agreement pursuant to the 2000 Stock Incentive Plan - 2018	
10(g)(1)*	Form of Restricted Stock Agreement for Employees pursuant to the 2000 Stock Incentive Plan	Exhibit 10(y) to the Registrant's 2016 Form 10-K
10(g)(2)*	Form of Restricted Stock Agreement for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10(ab) to the Registrant's 2016 Form 10-K

Exhibit Number	Description of Exhibit	Incorporated By Reference to Exhibit
10(g)(3)*	Form of Restricted Stock Agreement (eligible for dividend equivalents) for Non-employee Directors pursuant to the 2000 Stock Incentive Plan - 2019	
10(h)(1)*	Form of Restricted Stock Unit Agreement for Employees pursuant to the 2000 Stock Incentive Plan - 2017	Exhibit 10(h)(1) to the Registrant's 2017 Form 10-K
10(h)(2)*	Form of Restricted Stock Unit Agreement for Employees pursuant to the 2000 Stock Incentive Plan - 2016	Exhibit 10(z) to the Registrant's 2016 Form 10-K
10(h)(3)*	Form of Restricted Stock Unit Agreement for Employees pursuant to the 2000 Stock Incentive Plan - 2013	Exhibit 10(w) to the Registrant's 2013 Form 10-K
10(h)(4)*	Form of Restricted Stock Unit Agreement for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10.2 to the Registrant's Form 10-Q, filed June 7, 2012
10(h)(5)*	Form of Restricted Stock Unit Agreement (eligible for dividend equivalents) for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10(aa) to the Registrant's 2016 Form 10-K
10(h)(6)*	Form of Restricted Stock Unit Agreement (eligible for dividend equivalents) for Non-employee Directors pursuant to the 2000 Stock Incentive Plan - 2013	Exhibit 10(x) to the Registrant's 2013 Form 10-K
10(i)(1)*	Form of Stock Unit Agreement for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10.1 to the Registrant's Form 10-Q, filed June 7, 2012
10(i)(2)*	Form of Stock Unit Agreement (eligible for dividend equivalents) for Non-employee Directors pursuant to the 2000 Stock Incentive Plan	Exhibit 10(v) to the Registrant's 2013 Form 10-K
10(j)(1)*	Form of Share Unit Agreement (eligible for dividend equivalents) for Employees pursuant to the 2000 Stock Incentive Plan	Exhibit 10.2 to the Registrant's Form 10-Q, filed December 9, 2013
10(j)(2)*	Form of Share Unit Agreement (eligible for dividend equivalents) for Employees pursuant to the 2000 Stock Incentive Plan - 2018	Exhibit 10(j)(2) to the Registrant's 2018 Form 10-K
10(k)*	Form of Indemnification Agreement between the Registrant and the Named Executive Officers and Certain Other Executive Officers	Exhibit 10.1 to Registrant's Form 8-K, filed on March 8, 2007
10(l)(1)*	Form of Change-in-Control Agreement (Tier 2) between the Registrant and Named Executive Officers (other than the CEO) and Certain Other Executive Officers	Exhibit 10.2 to the Registrant's Form 8-K, filed June 7, 2017
10(l)(2)*	Form of Change-in-Control Agreement (Tier 2) between the Registrant and Named Executive Officers (other than the CEO) and Certain Other Executive Officers (California Employees)	Exhibit 10.3 to the Registrant's Form 8-K, filed June 7, 2017
10(l)(3)*	Form of Change-in-Control Agreement (Tier 2) between the Registrant and Named Executive Officers (other than the CEO) and Certain Other Executive Officers (Divisional/Subsidiary Presidents)	Exhibit 10.4 to the Registrant's Form 8-K, filed June 7, 2017
10(l)(4)*	Form of Change-in-Control Agreement (Tier 2) between the Registrant and Named Executive Officers (other than the CEO) and Certain Other Executive Officers (California Divisional/ Subsidiary Presidents)	Exhibit 10.5 to the Registrant's Form 8-K, filed June 7, 2017

Exhibit Number	Description of Exhibit	Incorporated By Reference to Exhibit
10(l)(5)*	Form of Change-in-Control Agreement (Tier 3) between the Registrant and Certain Non-Executive Officers	Exhibit 10.6 to the Registrant's Form 8-K, filed June 7, 2017
10(m)*	Agreement and Plan of Merger, dated as of November 22, 2015, among Comtech Telecommunications Corp., Typhoon Acquisition Corp. and TeleCommunication Systems, Inc.	Exhibit 2.1 to the Registrant's Form 8-K, filed November 23, 2015
10(n)(1)*	First Amended and Restated Credit Agreement, dated as of October 31, 2018, among Comtech Telecommunications Corp., the lenders party thereto and Citibank N.A., as administrative agent, issuing bank and swingline lender.	Exhibit 10.1 to the Registrant's Form 8-K, filed November 5, 2018
21	Subsidiaries of the Registrant	
23.1	Consent of Independent Registered Public Accounting Firm	
31.1	Certification of President, CEO and Chairman pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002	
32.1	Certification of President, CEO and Chairman pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	
32.2	Certification of Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002	
101.INS	XBRL Instance Document	
101.SCH	XBRL Taxonomy Extension Schema Document	
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document	
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document	
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document	
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document	

* Management contract or compensatory plan or arrangement.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities and Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

COMTECH TELECOMMUNICATIONS CORP.

September 24, 2019	By: /s/Fred Kornberg
(Date)	Fred Kornberg, Chairman of the Board Chief Executive Officer and President

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

	Signature	Title
September 24, 2019 (Date)	/s/Fred Kornberg Fred Kornberg	Chairman of the Board Chief Executive Officer and President (Principal Executive Officer)
September 24, 2019 (Date)	/s/Michael A. Bondi Michael A. Bondi	Chief Financial Officer (Principal Financial and Accounting Officer)
September 24, 2019 (Date)	/s/Edwin Kantor Edwin Kantor	Director
September 24, 2019 (Date)	/s/Ira S. Kaplan Ira S. Kaplan	Director
September 24, 2019 (Date)	/s/Robert G. Paul Robert G. Paul	Director
September 24, 2019 (Date)	/s/Dr. Yacov A. Shamash Dr. Yacov A. Shamash	Director
September 24, 2019 (Date)	/s/Lawrence J. Waldman Lawrence J. Waldman	Director

COMTECH TELECOMMUNICATIONS CORP. AND SUBSIDIARIES

Index to Consolidated Financial Statements and Schedule

Schedules not listed above have been omitted because they are either not applicable or the required information has been provided elsewhere in the consolidated financial statements or notes thereto.

Deloitte.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of
Comtech Telecommunications Corp.
Melville, New York

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Comtech Telecommunications Corp. and subsidiaries (the "Company") as of July 31, 2019 and 2018, the related consolidated statements of operations, stockholders' equity, and cash flows, for each of the three years in the period ended July 31, 2019, and the related notes and the schedule listed in the Index at Item 15 (collectively referred to as the "financial statements"). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of July 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended July 31, 2019, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of July 31, 2019, based on criteria established in *Internal Control-Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated September 24, 2019, expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ DELOITTE & TOUCHE LLP

Jericho, New York
September 24, 2019

We have served as the Company's auditor since 2015.

Deloitte.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of
Comtech Telecommunications Corp.
Melville, New York

Opinion on Internal Control over Financial Reporting

We have audited the internal control over financial reporting of Comtech Telecommunications Corp. and subsidiaries (the "Company") as of July 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of July 31, 2019, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by COSO.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated financial statements and financial statement schedule as of and for the year ended July 31, 2019, of the Company and our report dated September 24, 2019, expressed an unqualified opinion on those financial statements and financial statement schedule.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ DELOITTE & TOUCHE LLP

Jericho, New York
September 24, 2019

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES
Consolidated Balance Sheets
As of July 31, 2019 and 2018

Assets	2019	2018
Current assets:		
Cash and cash equivalents	$ 45,576,000	43,484,000
Accounts receivable, net	145,032,000	147,439,000
Inventories, net	74,839,000	75,076,000
Prepaid expenses and other current assets	14,867,000	13,794,000
Total current assets	280,314,000	279,793,000
Property, plant and equipment, net	28,026,000	28,987,000
Goodwill	310,489,000	290,633,000
Intangibles with finite lives, net	261,890,000	240,796,000
Deferred financing costs, net	3,128,000	2,205,000
Other assets, net	3,864,000	2,743,000
Total assets	$ 887,711,000	845,157,000
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	$ 24,330,000	43,928,000
Accrued expenses and other current liabilities	78,584,000	65,034,000
Dividends payable	2,406,000	2,356,000
Contract liabilities	38,682,000	34,452,000
Current portion of long-term debt	—	17,211,000
Current portion of capital lease and other obligations	757,000	1,836,000
Interest payable	588,000	499,000
Total current liabilities	145,347,000	165,316,000
Non-current portion of long-term debt, net	165,000,000	148,087,000
Non-current portion of capital lease and other obligations	—	765,000
Income taxes payable	325,000	2,572,000
Deferred tax liability, net	12,481,000	10,927,000
Long-term contract liabilities	10,654,000	7,689,000
Other liabilities	18,822,000	4,117,000
Total liabilities	352,629,000	339,473,000
Commitments and contingencies (See Note 13)		
Stockholders' equity:		
Preferred stock, par value $.10 per share; shares authorized and unissued 2,000,000	—	—
Common stock, par value $.10 per share; authorized 100,000,000 shares; issued 39,276,161 shares and 38,860,571 shares at July 31, 2019 and 2018, respectively	3,928,000	3,886,000
Additional paid-in capital	552,670,000	538,453,000
Retained earnings	420,333,000	405,194,000
	976,931,000	947,533,000
Less:		
Treasury stock, at cost (15,033,317 shares at July 31, 2019 and 2018)	(441,849,000)	(441,849,000)
Total stockholders' equity	535,082,000	505,684,000
Total liabilities and stockholders' equity	$ 887,711,000	845,157,000

See accompanying notes to consolidated financial statements.

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES
Consolidated Statements of Operations
Fiscal Years Ended July 31, 2019, 2018 and 2017

	2019	2018	2017
Net sales	$ 671,797,000	570,589,000	550,368,000
Cost of sales	424,357,000	346,648,000	332,183,000
Gross profit	247,440,000	223,941,000	218,185,000
Expenses:			
Selling, general and administrative	128,639,000	113,922,000	116,080,000
Research and development	56,407,000	53,869,000	54,260,000
Amortization of intangibles	18,320,000	21,075,000	22,823,000
Settlement of intellectual property litigation	(3,204,000)	—	(12,020,000)
Acquisition plan expenses	5,871,000	—	—
	206,033,000	188,866,000	181,143,000
Operating income	41,407,000	35,075,000	37,042,000
Other expenses (income):			
Interest expense	9,245,000	10,195,000	11,629,000
Write-off of deferred financing costs	3,217,000	—	—
Interest (income) and other	35,000	254,000	(68,000)
Income before provision for (benefit from) income taxes	28,910,000	24,626,000	25,481,000
Provision for (benefit from) income taxes	3,869,000	(5,143,000)	9,654,000
Net income	$ 25,041,000	29,769,000	15,827,000
Net income per share:			
Basic	$ 1.04	1.25	0.68
Diluted	$ 1.03	1.24	0.67
Weighted average number of common shares outstanding – basic	24,124,000	23,825,000	23,433,000
Weighted average number of common and common equivalent shares outstanding – diluted	24,302,000	24,040,000	23,489,000

See accompanying notes to consolidated financial statements.

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES
Consolidated Statements of Stockholders' Equity
Fiscal Years Ended July 31, 2019, 2018 and 2017

	Common Stock		Additional Paid-in Capital	Retained Earnings	Treasury Stock		Stockholders' Equity
	Shares	Amount			Shares	Amount	
Balance as of July 31, 2016	38,367,997	$ 3,837,000	$ 524,797,000	$ 383,616,000	15,033,317	$ (441,849,000)	$ 470,401,000
Equity-classified stock award compensation	—	—	8,467,000	—	—	—	8,467,000
Proceeds from issuance of employee stock purchase plan shares	64,367	7,000	687,000	—	—	—	694,000
Issuance of restricted stock, net	144,988	14,000	(14,000)	—	—	—	—
Net settlement of stock-based awards	42,115	4,000	(266,000)	—	—	—	(262,000)
Cash dividends declared ($0.60 per share)	—	—	—	(14,034,000)	—	—	(14,034,000)
Accrual of dividend equivalents, net of reversal ($0.60 per share)	—	—	—	(273,000)	—	—	(273,000)
Net income tax shortfall from settlement of stock-based awards	—	—	(248,000)	—	—	—	(248,000)
Reversal of deferred tax assets associated with expired and unexercised stock-based awards	—	—	(422,000)	—	—	—	(422,000)
Net income	—	—	—	15,827,000	—	—	15,827,000
Balance as of July 31, 2017	38,619,467	3,862,000	533,001,000	385,136,000	15,033,317	(441,849,000)	480,150,000
Equity-classified stock award compensation	—	—	8,605,000	—	—	—	8,605,000
Proceeds from exercises of stock options	13,100	1,000	325,000	—	—	—	326,000
Proceeds from issuance of employee stock purchase plan shares	44,996	5,000	850,000	—	—	—	855,000
Forfeiture of restricted stock	(10,254)	(1,000)	1,000	—	—	—	—
Net settlement of stock-based awards	193,262	19,000	(4,329,000)	—	—	—	(4,310,000)
Cash dividends declared ($0.40 per share)	—	—	—	(9,411,000)	—	—	(9,411,000)
Accrual of dividend equivalents, net of reversal ($0.40 per share)	—	—	—	(300,000)	—	—	(300,000)
Net income	—	—	—	29,769,000	—	—	29,769,000
Balance as of July 31, 2018	38,860,571	3,886,000	538,453,000	405,194,000	15,033,317	(441,849,000)	505,684,000
Equity-classified stock award compensation	—	—	11,427,000	—	—	—	11,427,000
Proceeds from exercises of stock options	8,100	1,000	215,000	—	—	—	216,000
Proceeds from issuance of employee stock purchase plan shares	43,316	4,000	922,000	—	—	—	926,000
Issuance of restricted stock	10,386	1,000	(1,000)	—	—	—	—
Net settlement of stock-based awards	145,119	15,000	(3,931,000)	—	—	—	(3,916,000)
Common stock issued for acquisition of Solacom Technologies, Inc.	208,669	21,000	5,585,000	—	—	—	5,606,000
Cash dividends declared, net ($0.40 per share)	—	—	—	(9,575,000)	—	—	(9,575,000)
Accrual of dividend equivalents, net of reversal ($0.40 per share)	—	—	—	(327,000)	—	—	(327,000)
Net income	—	—	—	25,041,000	—	—	25,041,000
Balance as of July 31, 2019	39,276,161	$ 3,928,000	$ 552,670,000	$ 420,333,000	15,033,317	$ (441,849,000)	$ 535,082,000

See accompanying notes to consolidated financial statements.

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES
Consolidated Statements of Cash Flows
Fiscal Years Ended July 31, 2019, 2018 and 2017

	2019	2018	2017
Cash flows from operating activities:			
Net income	$ 25,041,000	29,769,000	15,827,000
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization of property, plant and equipment	11,927,000	13,655,000	14,354,000
Amortization of intangible assets with finite lives	18,320,000	21,075,000	22,823,000
Amortization of stock-based compensation	11,427,000	8,569,000	8,506,000
Amortization of deferred financing costs	1,099,000	2,196,000	1,977,000
Estimated contract settlement costs	6,351,000	—	—
Settlement of intellectual property litigation	(3,204,000)	—	(12,020,000)
Write-off of deferred financing costs	3,217,000	—	—
Changes in other liabilities	(1,056,000)	—	—
Loss (gain) on disposal of property, plant and equipment	144,000	79,000	(126,000)
Provision for allowance for doubtful accounts	1,136,000	573,000	497,000
Provision for excess and obsolete inventory	6,015,000	5,628,000	2,900,000
Deferred income tax expense (benefit)	4,283,000	(6,379,000)	9,056,000
Excess income tax benefit from stock-based award exercises	—	—	(82,000)
Changes in assets and liabilities, net of effects of business acquisition:			
Accounts receivable	6,315,000	(24,578,000)	25,508,000
Inventories	(3,787,000)	(20,065,000)	7,812,000
Prepaid expenses and other current assets	915,000	787,000	(956,000)
Other assets	102,000	(140,000)	666,000
Accounts payable	(21,290,000)	13,728,000	(4,472,000)
Accrued expenses and other current liabilities	3,554,000	(3,374,000)	(21,796,000)
Contract liabilities	(127,000)	9,143,000	(2,431,000)
Other liabilities, non-current	(84,000)	(682,000)	(1,442,000)
Interest payable	151,000	234,000	(1,039,000)
Income taxes payable	(2,418,000)	126,000	1,355,000
Net cash provided by operating activities	68,031,000	50,344,000	66,917,000
Cash flows from investing activities:			
Payment for acquisition of Solacom Technologies Inc., net of cash acquired	(25,883,000)	—	—
Payment for acquisition of the GD NG-911 business	(10,000,000)	—	—
Purchases of property, plant and equipment	(8,785,000)	(8,642,000)	(8,150,000)
Net cash used in investing activities	(44,668,000)	(8,642,000)	(8,150,000)
Cash flows from financing activities:			
Net borrowings of long-term debt under Credit Facility	165,000,000	—	—
Repayment of debt under Term Loan portion of Prior Credit Facility	(120,121,000)	(18,960,000)	(33,567,000)
Net payments under Revolving Loan portion of Prior Credit Facility	(48,603,000)	(8,800,000)	(26,500,000)
Cash dividends paid	(9,789,000)	(9,538,000)	(18,872,000)
Remittance of employees' statutory tax withholdings for stock awards	(5,042,000)	(1,143,000)	(262,000)
Repayment of principal amounts under capital lease and other obligations	(1,906,000)	(2,802,000)	(3,592,000)
Payment of deferred financing costs	(1,813,000)	—	(1,085,000)
Proceeds from issuance of employee stock purchase plan shares	935,000	855,000	694,000
Proceeds from exercises of stock options	216,000	326,000	—
Payment of shelf registration costs and equity issuance costs	(148,000)	—	(626,000)
Excess income tax benefit from stock-based award exercises	—	—	82,000
Net cash used in financing activities	(21,271,000)	(40,062,000)	(83,728,000)

(Continued)

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES
Consolidated Statements of Cash Flows (continued)
Fiscal Years Ended July 31, 2019, 2018 and 2017

	2019	2018	2017
Net increase (decrease) in cash and cash equivalents	$ 2,092,000	1,640,000	(24,961,000)
Cash and cash equivalents at beginning of year	43,484,000	41,844,000	66,805,000
Cash and cash equivalents at end of year	$ 45,576,000	43,484,000	41,844,000
Supplemental cash flow disclosure			
Cash paid (received) during the year for:			
Interest	$ 7,669,000	7,291,000	10,424,000
Income taxes, net	$ 2,005,000	1,112,000	(758,000)
Non-cash investing and financing activities:			
Accrued remittance of employees' statutory tax withholdings for fully-vested share units	$ 1,787,000	2,963,000	—
Cash dividends declared but unpaid (including accrual of dividend equivalents)	$ 2,733,000	2,656,000	2,616,000
Capital lease and other obligations incurred	$ —	1,306,000	68,000
Accrued additions to property, plant and equipment	$ 902,000	719,000	1,221,000
Issuance (forfeiture) of restricted stock	$ 1,000	(1,000)	14,000
Common stock issued for acquisition of Solacom Technologies Inc.	$ 5,606,000	—	—

See accompanying notes to consolidated financial statements.

(1) Summary of Significant Accounting and Reporting Policies

(a) Principles of Consolidation

The accompanying consolidated financial statements include the accounts of Comtech Telecommunications Corp. and its subsidiaries ("Comtech," "we," "us," or "our"), all of which are wholly-owned. All significant intercompany balances and transactions have been eliminated in consolidation.

(b) Nature of Business

We design, develop, produce and market innovative products, systems and services for advanced communications solutions. We conduct our business through two reportable operating segments: Commercial Solutions and Government Solutions.

Our business is highly competitive and characterized by rapid technological change. Our growth and financial position depends on our ability to keep pace with such changes and developments and to respond to the sophisticated requirements of an increasing variety of secure wireless communications technology users, among other things. Many of our competitors are substantially larger, and have significantly greater financial, marketing and operating resources and broader product lines than our own. A significant technological or sales breakthrough by others, including smaller competitors or new companies, could have a material adverse effect on our business. In addition, certain of our customers have technological capabilities in our product areas and could choose to replace our products with their own.

International sales expose us to certain risks, including barriers to trade, fluctuations in foreign currency exchange rates (which may make our products less price competitive), political and economic instability, availability of suitable export financing, export license requirements, tariff regulations, and other United States ("U.S.") and foreign regulations that may apply to the export of our products, as well as the generally greater difficulties of doing business abroad. We attempt to reduce the risk of doing business in foreign countries by seeking contracts denominated in U.S. dollars, advance or milestone payments, credit insurance and irrevocable letters of credit in our favor.

(c) Adoption of New Leasing Standard

On August 1, 2019 (the start of our first quarter of fiscal 2020), we adopted ASU No. 2016-02 "Leases (Topic 842)," which requires lessees to recognize the following for all leases (with the exception of short-term leases): (i) a lease liability, which is a lessee's obligation to make lease payments arising from a lease, initially measured at the present value of the lease payments; and (ii) a right-of-use asset, which is an asset that represents the lessee's right to use a specified asset for the lease term. In January 2018, FASB ASU No. 2018-01 was issued to permit an entity to elect an optional transition practical expedient to not evaluate under Topic 842 land easements that exist or expired before the entity's adoption of Topic 842. In July 2018, the FASB issued ASU Nos. 2018-10 and 2018-11, which provide further codification improvements and relieves the requirement to present prior comparative year results when adopting the new lease standard. Instead, companies can choose to recognize the cumulative effect of applying the new standard to leased assets and liabilities as an adjustment to opening retained earnings. In December 2018, FASB ASU No. 2018-20 was issued to simplify the implementation of Topic 842 for lessors as it relates to sales taxes, lessor costs paid directly by the lessee and recognition of variable payments for contracts with lease and non-lease components. In March 2019, FASB ASU No. 2019-01 was issued, which addresses: (i) determining the fair value of the underlying asset by lessors that are not manufacturers or dealers; (ii) presentation of sales types and direct financing leases on the statement of cash flows; and (iii) transition disclosures related to Topic 250, "Accounting Changes and Error Corrections." This latest ASU specifically provides an exception to the paragraph 250-10-50-3 that would otherwise have required interim disclosures in the period of an accounting change including the effect of that change on income from continuing operations, net income, any other financial statement line item and any affected per-share amounts. On August 1, 2019, we adopted the new leasing standard using the modified retrospective approach. In addition, we elected certain practical expedients permitted under the transition guidance within the new standard. Except for recording a total right-of-use asset and corresponding lease liability on our Consolidated Balance Sheet, which amount approximates 4.0% of our total consolidated assets at July 31, 2019, our adoption of Topic 842 is not expected to have a material impact to our future statements of operations or cash flows.

(d) Revenue Recognition

On August 1, 2018, we adopted ASU No. 2014-09 "Revenue from Contracts with Customers (Topic 606)" or "ASC 606" applying the modified retrospective transition method. Except for new presentation or disclosure requirements, the impact of adoption, both as of August 1, 2018 and for fiscal 2019, was not material to our business, results of operations or financial condition. As a practical expedient, we adopted the new standard only for existing contracts as of August 1, 2018. All periods prior to August 1, 2018 will continue to be reported under the accounting standards in effect in those periods. As a result of ASC 606, we made the following adjustments to our Consolidated Balance Sheet as of August 1, 2018:

	As reported at July 31, 2018	Adoption of ASC 606	Balance at August 1, 2018
Accrued expenses and other current liabilities[1]	$ 65,034,000	$ (2,079,000)	$ 62,955,000
Contract liabilities, current and non-current[2]	42,141,000	2,079,000	44,220,000

[1] See *Note (6) - "Accrued Expenses and Other Current Liabilities"* for further discussion of reclassification.
[2] Formerly presented on the face of our Consolidated Balance Sheet as "Customer advances and deposits, current and non-current" prior to our adoption of ASC 606.

The core principle of ASC 606 is that revenue should be recorded in an amount that reflects the consideration to which we expect to be entitled in exchange for goods or services promised to customers. Under ASC 606, we follow a five-step model to: (1) identify the contract with our customer; (2) identify our performance obligations in our contract; (3) determine the transaction price for our contract; (4) allocate the transaction price to our performance obligations; and (5) recognize revenue using one of the following two methods:

- *Over time* - We recognize revenue using the over time method when there is a continuous transfer of control to the customer over the contractual period of performance. This generally occurs when we enter into a long-term contract relating to the design, development or manufacture of complex equipment or technology platforms to a buyer's specification (or to provide services related to the performance of such contracts). Continuous transfer of control is typically supported by contract clauses which allow our customers to unilaterally terminate a contract for convenience, pay for costs incurred plus a reasonable profit and take control of work-in-process. Revenue recognized over time is generally based on the extent of progress toward completion of the related performance obligations. The selection of the method to measure progress requires judgment and is based on the nature of the products or services provided. In certain instances, typically for firm fixed-price contracts, we use the cost-to-cost measure because it best depicts the transfer of control to the customer which occurs as we incur costs on our contracts. Under the cost-to-cost measure, the extent of progress toward completion is measured based on the ratio of costs incurred to date to the total estimated costs at completion, including warranty costs. Revenues, including estimated fees or profits, are recorded proportionally as costs are incurred. Costs to fulfill generally include direct labor, materials, subcontractor costs, other direct costs and an allocation of indirect costs. When these contracts are modified, the additional goods or services are generally not distinct from those already provided. As a result, these modifications form part of an existing contract and we must update the transaction price and our measure of progress for the single performance obligation and recognize a cumulative catch-up to revenue and gross profits.

  For over time contracts using a cost-to-cost measure of progress, we have an estimate at completion ("EAC") process in which management reviews the progress and execution of our performance obligations. This EAC process requires management judgment relative to assessing risks, estimating contract revenue and costs, and making assumptions for schedule and technical issues. Since certain contracts extend over a long period of time, the impact of revisions in revenue and or cost estimates during the progress of work may impact current period earnings through a cumulative adjustment. Additionally, if the EAC process indicates a loss, a provision is made for the total anticipated loss in the period that it becomes evident. Contract revenue and cost estimates for significant contracts are generally reviewed and reassessed at least quarterly.

The cost-to-cost method is principally used to account for contracts in our mission-critical technologies and high-performance transmission technologies product lines and, to a lesser extent, certain location-based and messaging infrastructure contracts in our public safety and location technologies product line. For service-based contracts in our public safety and location technologies product line, we recognize revenue over time. These services are typically recognized as a series of services performed over the contract term using the straight-line method, or based on our customers' actual usage of the networks and platforms which we provide.

- _Point in time_ - When a performance obligation is not satisfied over time, we must record revenue using the point in time accounting method which generally results in revenue being recognized upon shipment or delivery of a promised good or service to a customer. This generally occurs when we enter into short term contracts or purchase orders where items are provided to customers with relatively quick turn-around times. Modifications to such contracts and or purchase orders, which typically provide for additional quantities or services, are accounted for as a new contract because the pricing for these additional quantities or services are based on standalone selling prices.

  Point in time accounting is principally applied to contracts in our satellite ground station technologies product line (which includes satellite modems, solid-state and traveling wave tube amplifiers) and certain contracts for our solid-state, high-power amplifiers in our high-performance transmission technologies product line. Point in time accounting is also applied to certain contracts in our mission-critical technologies product line. The contracts related to these product lines do not meet the requirements for over time revenue recognition because our customers cannot utilize the equipment for its intended purpose during any phase of our manufacturing process; customers do not simultaneously receive and or consume the benefits provided by our performance; customers do not control the asset (i.e., prior to delivery, customers cannot direct the use of the asset, sell or exchange the equipment, etc.); and, although many of our contracts have termination for convenience clauses and or an enforceable right to payment for performance completed to date, our performance creates an asset with an alternative use through the point of delivery.

  In determining that our equipment has alternative use, we considered the underlying manufacturing process for our products. In the early phases of manufacturing, raw materials and work in process (including subassemblies) consist of common parts that are highly fungible among many different types of products and customer applications. Finished products are either configured to our standard configuration or based on our customers' specifications. Finished products, whether built to our standard specification or to a customers' specification, can be sold to a variety of customers and across many different end use applications with minimal rework, if needed, and without incurring a significant economic loss.

When identifying a contract with our customer, we consider when it has approval and commitment from both parties, if the rights of the parties are identified, if the payment terms are identified, if it has commercial substance and if collectability is probable.

When identifying performance obligations, we consider whether there are multiple promises and how to account for them. In our contracts, multiple promises are separated if they are distinct, both individually and in the context of the contract. If multiple promises in a contract are highly interrelated or comprise a series of distinct services performed over time, they are combined into a single performance obligation. In some cases, we may also provide the customer with an additional service-type warranty, which we recognize as a separate performance obligation. Service-type warranties do not represent a significant portion of our consolidated net sales. When service-type warranties represent a separate performance obligation, the revenue is deferred and recognized ratably over the extended warranty period. Our contracts, from time-to-time, may also include options for additional goods and services. To-date, these options have not represented material rights to the customer as the pricing for them reflects standalone selling prices. As a result, we do not consider options we offer to be performance obligations for which we must allocate a portion of the transaction price. In many cases, we provide assurance-type warranty coverage for some of our products for a period of at least one year from the date of delivery.

When identifying the transaction price, we typically utilize the contract's stated price as a starting point. The transaction price in certain arrangements may include estimated amounts of variable consideration, including award fees, incentive fees or other provisions that can either increase or decrease the transaction price. We estimate variable consideration as the amount to which we expect to be entitled, and we include estimated amounts in the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will not occur when the estimation uncertainty is resolved. The estimation of this variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of our anticipated performance and all information (e.g., historical, current and forecasted) that is reasonably available to us.

When allocating the contract's transaction price, we consider each distinct performance obligation. For contracts with multiple performance obligations, we allocate the contract's transaction price to each performance obligation using our best estimate of the standalone selling price of each distinct good or service in the contract. We determine standalone selling price based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, we estimate the standalone selling price taking into account available information such as market conditions, including geographic or regional specific factors, competitive positioning, internal costs, profit objectives and internally approved pricing guidelines related to the performance obligations.

Almost all of our contracts with customers are denominated in U.S. dollars and typically are either firm fixed-price or cost reimbursable type contracts (including fixed-fee, incentive-fee and time-and-material type contracts). In almost all of our contracts with customers, we are the principal in the arrangement and report revenue on a gross basis. Transaction prices for contracts with U.S. domestic and international customers are usually based on specific negotiations with each customer and in the case of the U.S. government, sometimes based on estimated or actual costs of providing the goods or services in accordance with applicable regulations. Sales by geography and customer type, as a percentage of consolidated net sales, are as follows:

	Fiscal Years Ended July 31,		
	2019	2018	2017
United States			
U.S. government	40.1%	35.5%	32.7%
Domestic	34.5%	38.9%	38.9%
Total United States	74.6%	74.4%	71.6%
International	25.4%	25.6%	28.4%
Total	100.0%	100.0%	100.0%

Sales to U.S. government customers include sales to the U.S. Department of Defense ("DoD"), intelligence and civilian agencies, as well as sales directly to or through prime contractors. Domestic sales include sales to commercial customers, as well as to U.S. state and local governments. Included in domestic sales are sales to Verizon Communications Inc. ("Verizon"). Sales to Verizon were 10.0% of consolidated net sales for fiscal 2018. Except for the U.S. government, there were no customers that represented more than 10.0% of consolidated net sales during fiscal 2019 and 2017. International sales for fiscal 2019, 2018 and 2017 (which include sales to U.S. domestic companies for inclusion in products that are sold to international customers) were $170,607,000, $145,784,000 and $156,483,000, respectively. Except for the U.S., no individual country (including sales to U.S. domestic companies for inclusion in products that are sold to a foreign country) represented more than 10% of consolidated net sales for fiscal 2019, 2018 and 2017.

The following tables summarize our disaggregation of revenue consistent with information reviewed by our chief operating decision-maker ("CODM") for the fiscal year ended July 31, 2019. We believe these categories best depict how the nature, amount, timing and uncertainty of revenue and cash flows are affected by economic factors which impact our business:

	Fiscal Year Ended July 31, 2019		
	Commercial Solutions	Government Solutions	Total
Geographical region and customer type			
U.S. government	$ 68,534,000	200,708,000	$ 269,242,000
Domestic	192,516,000	39,432,000	231,948,000
Total United States	261,050,000	240,140,000	501,190,000
International	96,243,000	74,364,000	170,607,000
Total	$ 357,293,000	314,504,000	$ 671,797,000
Contract type			
Firm fixed-price	$ 350,850,000	231,400,000	$ 582,250,000
Cost reimbursable	6,443,000	83,104,000	89,547,000
Total	$ 357,293,000	314,504,000	$ 671,797,000
Transfer of control			
Point in time	$ 177,090,000	176,067,000	$ 353,157,000
Over time	180,203,000	138,437,000	318,640,000
Total	$ 357,293,000	314,504,000	$ 671,797,000

The timing of revenue recognition, billings and collections results in receivables, unbilled receivables and contract liabilities on our Consolidated Balance Sheet. Under typical payment terms for our contracts accounted for over time, amounts are billed as work progresses in accordance with agreed-upon contractual terms, either at periodic intervals (e.g., monthly) or upon achievement of contractual milestones. For certain contracts with provisions that are intended to protect customers in the event we do not satisfy our performance obligations, billings occur subsequent to revenue recognition, resulting in what we have historically presented as unbilled receivables. Contract assets increased $3,331,000 due to business combinations discussed in *Note (2) - "Acquisitions."* Under ASC 606, unbilled receivables constitute contract assets. There were no material impairment losses recognized on contract assets during the fiscal year ended 2019. On large long-term contracts, and for contracts with international customers that do not do business with us regularly, payment terms typically require advanced payments and deposits. Under ASC 606, payments received from customers in excess of revenue recognized to-date results in a contract liability. These contract liabilities are not considered to represent a significant financing component of the contract because we believe these cash advances and deposits are generally used to meet working capital demands which can be higher in the earlier stages of a contract. Also, advanced payments and deposits provide us with some measure of assurance that the customer will perform on its obligations under the contract. Under the typical payment terms for our contracts accounted for at a point in time, costs are accumulated in inventory until the time of billing, which generally coincides with revenue recognition. Contract liabilities increased $5,411,000 due to business combinations discussed in *Note (2) - "Acquisitions."* Of the total contract liabilities at August 1, 2018, $33,139,000 was recognized as revenue during fiscal 2019.

We recognize the incremental costs to obtain or fulfill a contract as an expense when incurred if the amortization period of the asset is one year or less. Incremental costs to obtain or fulfill contracts with an amortization period greater than one year were not material.

As commissions payable to our internal sales and marketing employees or contractors are contingent upon multiple factors, such commissions are not considered direct costs to obtain or fulfill a contract with a customer and are expensed as incurred in selling, general and administrative expenses on our Consolidated Statements of Operations. As for commissions payable to third-party sales representatives related to large long-term contracts, we do consider these types of commissions both direct and incremental costs to obtain and fulfill such contracts. Therefore, such types of commissions are included in total estimated costs at completion for such contracts and expensed over time through cost of sales on our Consolidated Statements of Operations.

Remaining performance obligations represent the transaction price of firm orders for which work has not been performed as of the end of a fiscal period. Remaining performance obligations, which we refer to as backlog, exclude unexercised contract options and potential orders under indefinite delivery / indefinite quantity ("IDIQ") contracts. As of July 31, 2019, the aggregate amount of the transaction price allocated to remaining performance obligations was $682,954,000 (which represents the amount of our consolidated backlog). We expect that a significant portion of our remaining performance obligations at July 31, 2019 will be completed and recognized as revenue during the next twelve-month period. During fiscal 2019, revenue recognized from performance obligations satisfied, or partially satisfied, in previous periods (for example due to changes in the transaction price) was not material.

(e) Cash and Cash Equivalents

Our cash equivalents are short-term, highly liquid investments that are both readily convertible to known amounts of cash and have insignificant risk of change in value as a result of changes in interest rates. Our cash and cash equivalents, as of July 31, 2019 and 2018, amounted to $45,576,000 and $43,484,000, respectively, and primarily consist of bank deposits and money market deposit accounts insured by the Federal Deposit Insurance Corporation. Cash equivalents are carried at cost, which approximates fair value.

(f) Inventories

Our inventories are stated at the lower of cost and net realizable value, the latter of which is defined as the estimated selling price in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation. Our inventories are reduced to their estimated net realizable value by a charge to cost of sales in the period such excess costs are determined. Our inventories are principally recorded using either average or standard costing methods.

Work-in-process (including our contracts-in-progress) and finished goods inventory reflect all accumulated production costs, which are comprised of direct production costs and overhead, and is reduced by amounts recorded in cost of sales as the related revenue is recognized. Indirect costs relating to long-term contracts, which include expenses such as general and administrative, are charged to expense as incurred and are not included in our cost of sales or work-in-process (including our contracts-in-progress) and finished goods inventory.

(g) Long-Lived Assets

Our machinery and equipment, which are recorded at cost, are depreciated or amortized over their estimated useful lives (three to eight years) under the straight-line method. Capitalized values of properties and leasehold improvements under leases are amortized over the life of the lease or the estimated life of the asset, whichever is less.

Goodwill represents the excess cost of a business acquisition over the fair value of the net assets acquired. In accordance with FASB ASC 350 "*Intangibles - Goodwill and Other*" goodwill is not amortized. We periodically, at least on an annual basis in the first quarter of each fiscal year, review goodwill, considering factors such as projected cash flows and revenue and earnings multiples, to determine whether the carrying value of the goodwill is impaired. If we fail the quantitative assessment of goodwill impairment ("quantitative assessment"), we would be required to recognize an impairment loss equal to the amount that a reporting unit's carrying value exceeded its fair value; however, any loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. We define our reporting units to be the same as our operating segments.

We performed our annual goodwill impairment assessment for fiscal 2020 on August 1, 2019 (the first day of our fiscal 2020). See *Note (14) - "Goodwill"* for more information. Unless there are future indicators that the fair value of a reporting unit is more likely than not less than its carrying value, such as a significant adverse change in our future financial performance, our next impairment assessment for goodwill will be performed and completed in the first quarter of fiscal 2021. Any impairment charges that we may record in the future could be material to our results of operations and financial condition.

We assess the recoverability of the carrying value of our other long-lived assets, including identifiable intangible assets with finite useful lives, whenever events or changes in circumstances indicate that the carrying amount of the assets may not be recoverable. We evaluate the recoverability of such assets based upon the expectations of undiscounted cash flows from such assets. If the sum of the expected future undiscounted cash flows were less than the carrying amount of the asset, a loss would be recognized for the difference between the fair value and the carrying amount.

(h) Research and Development Costs

We charge research and development costs to operations as incurred, except in those cases in which such costs are reimbursable under customer funded contracts. In fiscal 2019, 2018 and 2017, we were reimbursed by customers for such activities in the amount of $14,679,000, $16,924,000 and $27,050,000, respectively. These amounts are not reflected in the reported research and development expenses in each of the respective periods but are included in net sales with the related costs included in cost of sales in each of the respective periods.

(i) Income Taxes

Income taxes are accounted for under the asset and liability method. Deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax bases and operating loss and tax credit carryforwards. Deferred tax assets and liabilities are measured using the enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to be recovered or settled. The effect on deferred tax assets and liabilities of a change in tax rates is recognized in income in the period that includes the enactment date.

We determine the uncertain tax positions taken or expected to be taken in income tax returns in accordance with the provisions of FASB ASC 740-10-25 "*Income Taxes,*" which prescribes a two-step evaluation process for tax positions. The first step is recognition based on a determination of whether it is more-likely-than-not that a tax position will be sustained upon examination, including resolution of any related appeals or litigation processes, based on the technical merits of the position. The second step is to measure a tax position that meets the more-likely-than-not threshold. The tax position is measured as the largest amount of benefit that is greater than 50% likely of being realized upon ultimate settlement. If a tax position does not meet the more-likely-than-not recognition threshold, the benefit of that position is not recognized in the financial statements. Our policy is to recognize potential interest and penalties related to uncertain tax positions in income tax expense.

(j) Earnings Per Share

Our basic earnings per share ("EPS") is computed based on the weighted average number of common shares (including vested but unissued stock units, share units, performance shares and restricted stock units ("RSUs")), outstanding during each respective period. Our diluted EPS reflects the dilution from potential common stock issuable pursuant to the exercise of equity-classified stock-based awards, if dilutive, outstanding during each respective period. Pursuant to FASB ASC 260 "*Earnings Per Share,*" equity-classified stock-based awards that are subject to performance conditions are not considered in our diluted EPS calculations until the respective performance conditions have been satisfied. When calculating our diluted earnings per share, we consider the amount an employee must pay upon assumed exercise of stock-based awards and the amount of stock-based compensation cost attributed to future services and not yet recognized. As a result of our adoption of ASU No. 2016-09 on August 1, 2017 (the start of our first quarter of fiscal 2018), the amount of excess tax benefits assuming exercise of in-the-money stock-based awards is no longer included in the calculation of diluted earnings per share on a prospective basis and the denominator for our diluted calculation could increase in the future as compared to prior calculations. See *Note (11)* - "*Stock-Based Compensation*" for more information on the impact of adopting ASU No. 2016-09.

There were no repurchases of our common stock during the fiscal years ended July 31, 2019, 2018 and 2017. See *Note (16)* - "*Stockholders' Equity*" for more information.

Weighted average stock options, RSUs and restricted stock outstanding of 1,347,000, 1,739,000 and 1,986,000 shares for fiscal 2019, 2018 and 2017, respectively, were not included in our diluted EPS calculation because their effect would have been anti-dilutive.

Our EPS calculations exclude 243,000, 258,000 and 228,000 weighted average performance shares outstanding for fiscal 2019, 2018 and 2017, respectively, as the performance conditions have not yet been satisfied. However, net income (the numerator) for EPS calculations for each respective period, is reduced by the compensation expense related to these awards.

The following table reconciles the numerators and denominators used in the basic and diluted EPS calculations:

	Fiscal Years Ended July 31,		
	2019	2018	2017
Numerator:			
Net income for basic calculation	$ 25,041,000	29,769,000	15,827,000
Numerator for diluted calculation	$ 25,041,000	29,769,000	15,827,000
Denominator:			
Denominator for basic calculation	24,124,000	23,825,000	23,433,000
Effect of dilutive securities:			
Stock-based awards	178,000	215,000	56,000
Denominator for diluted calculation	24,302,000	24,040,000	23,489,000

(k) Fair Value Measurements and Financial Instruments

Using the fair value hierarchy described in FASB ASC 820 "*Fair Value Measurements and Disclosures,*" we valued our cash and cash equivalents using Level 1 inputs that were based on quoted market prices.

We believe that the carrying amounts of our other current financial assets (such as accounts receivable) and other current liabilities (including accounts payable, accrued expenses and the current portion of our favorable AT&T warranty settlement) approximate their fair values due to their short-term maturities. We believe the fair value of our current portion of capital lease and other obligations, which currently has a blended interest rate of approximately 7.0%, would not be materially different than its carrying value as of July 31, 2019.

The fair value of our Credit Facility that we entered into on October 31, 2018 approximates its carrying amount due to its variable interest rate and pricing grid that is dependent upon our leverage ratio as of the end of each fiscal quarter.

The fair value of the non-current portion of our favorable AT&T warranty settlement would not be materially different than its carrying value as of July 31, 2019, given our belief that the present value of such liability reflects market participants' assumptions for a similar junior, unsecured debt instrument. See *Note (6) - "Accrued Expenses and Other Current Liabilities"* for further discussion of the favorable AT&T warranty settlement.

As of July 31, 2019 and 2018, other than the financial instruments discussed above, we had no other significant assets or liabilities included in our Consolidated Balance Sheets recorded at fair value, as such term is defined by FASB ASC 820.

(l) Use of Estimates

The preparation of consolidated financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions that affect the reported amount of assets and liabilities, and disclosure of contingent assets and liabilities, at the date of the consolidated financial statements and the reported amounts of net sales and expenses during the reported period. We make significant estimates in many areas of our accounting, including but not limited to the following: long-term contracts, stock-based compensation, intangible assets and liabilities including goodwill, provision for excess and obsolete inventory, allowance for doubtful accounts, warranty obligations and income taxes. Actual results may differ from those estimates.

(m) Comprehensive Income

In accordance with FASB ASC 220 "*Comprehensive Income*," we report all changes in equity during a period, except those resulting from investment by owners and distribution to owners, for the period in which they are recognized. Comprehensive income is the total of net income and all other non-owner changes in equity (or other comprehensive income) such as unrealized gains/losses on securities classified as available-for-sale, foreign currency translation adjustments and minimum pension liability adjustments. Comprehensive income was the same as our net income in fiscal 2019, 2018 and 2017.

(n) Reclassifications

Certain reclassifications have been made to previously reported consolidated financial statements to conform to the fiscal 2019 presentation.

(o) Adoption of Accounting Standards and Updates

We are required to prepare our consolidated financial statements in accordance with the Financial Accounting Standards Board ("FASB") Accounting Standards Codification ("ASC") which is the source for all authoritative U.S. generally accepted accounting principles, which are commonly referred to as "GAAP." The FASB ASC is subject to updates by the FASB, which are known as Accounting Standards Updates ("ASUs"). During fiscal 2019, we adopted:

- FASB ASU No. 2014-09 "Revenue from Contracts with Customers (Topic 606)." See *Note (1)(d) - "Revenue Recognition"* for further information.

- FASB ASU No. 2016-16 "Intra-Entity Transfers of Assets Other Than Inventory," which eliminates a prior exception and now requires an entity to recognize the income tax consequences of an intra-entity transfer of an asset other than inventory (for example, intellectual property and property, plant and equipment) when the transfer occurs. We adopted this ASU on August 1, 2018. There was no material impact to our consolidated financial statements (including any cumulative effect adjustment) and related disclosures upon such adoption.

- FASB ASU No. 2019-07, issued in June 2019, which amends various SEC guidance pursuant to the issuance of recent SEC Final Rule Release No. 33-10532, 33-10231, and 33-10442. This ASU clarifies or improves the disclosure and presentation requirements of a variety of Codification Topics by aligning them with the SEC's regulations, eliminating redundancies, and making the Codification easier to apply. There was no material impact to our consolidated financial statements and related disclosures upon such adoption.

(2) Acquisitions

Solacom Technologies Inc.

On February 28, 2019, we completed our acquisition of Solacom Technologies Inc. ("Solacom"), pursuant to the Arrangement Agreement, dated as of January 7, 2019, by and among Solacom, Comtech and Solar Acquisition Corp., a Canadian corporation and a direct, wholly-owned subsidiary of Comtech. Solacom is a leading provider of Next Generation 911 ("NG-911") solutions for public safety agencies. The acquisition of Solacom was a significant step in our strategy of enhancing our public safety and location technologies.

The acquisition has an aggregate purchase price for accounting purposes of $32,934,000, of which $27,328,000 was settled in cash and $5,606,000 was settled with the issuance of 208,669 shares of Comtech's common stock at a volume weighted average stock price of $26.86. The fair value of consideration transferred in connection with this acquisition was $31,489,000, which was net of $1,445,000 of cash acquired. The cash portion of the purchase price was funded principally through borrowings under our Credit Facility.

We are accounting for the acquisition of Solacom under the acquisition method of accounting in accordance with FASB ASC 805, "Business Combinations" ("ASC 805"). The purchase price was allocated to the assets acquired and liabilities assumed, based on their preliminary fair value as of February 28, 2019, pursuant to the business combination accounting rules. Acquisition plan expenses were not included as a component of consideration transferred and were expensed in the period incurred. Our Consolidated Statement of Operations for fiscal 2019 includes a nominal amount of revenue and contribution from Solacom. Pro forma financial information is not disclosed, as the acquisition is not material.

The following table summarizes the preliminary fair value of the assets acquired and liabilities assumed in connection with the Solacom acquisition:

	Preliminary Purchase Price Allocation [1]	Measurement Period Adjustments	Purchase Price Allocation (as adjusted)	
Settled in cash	$ 27,328,000	—	$ 27,328,000	
Settled in common stock issued by Comtech	5,606,000	—	5,606,000	
Aggregate purchase price at fair value	$ 32,934,000	—	$ 32,934,000	
Allocation of aggregate purchase price:				
Cash and cash equivalents	$ 1,445,000	—	$ 1,445,000	
Current assets	9,425,000	471,000	9,896,000	
Property, plant and equipment	777,000	—	777,000	
Deferred tax assets, non-current	5,374,000	(315,000)	5,059,000	
Accrued warranty obligations	(1,431,000)	—	(1,431,000)	
Current liabilities	(4,477,000)	—	(4,477,000)	
Contract liabilities, non-current	(1,604,000)	—	(1,604,000)	
Net tangible assets at preliminary fair value	$ 9,509,000	156,000	$ 9,665,000	
Identifiable intangibles, deferred taxes and goodwill:				Estimated Useful Lives
Technology	$ 6,779,000	—	$ 6,779,000	10 years
Customer relationships	7,007,000	—	7,007,000	20 years
Trade name	1,828,000	—	1,828,000	20 years
Deferred tax liabilities	(4,153,000)	—	(4,153,000)	
Goodwill	11,964,000	(156,000)	11,808,000	Indefinite
Allocation of aggregate purchase price	$ 32,934,000	—	$ 32,934,000	

[1] As initially reported in the Company's Quarterly Report on Form 10-Q for the three and nine months ended April 30, 2019.

The acquired identifiable intangible assets are being amortized on a straight-line basis, which we believe approximates the pattern in which the assets are utilized over their estimated useful lives. The fair value of customer relationships and backlog was estimated primarily based on the value of the discounted cash flows that the related intangible asset could be expected to generate in the future. The fair value of technology and trade name was estimated based on the discounted capitalization of royalty expense saved because we now own the assets. Among the factors contributing to the recognition of goodwill, as a component of the purchase price allocation, were synergies in products and technologies and the addition of a skilled, assembled workforce. This goodwill has been assigned to our Commercial Solutions segment based on specific identification and is generally not deductible for income tax purposes.

The allocation of the aggregate purchase price shown in the above table was based upon a valuation and estimates and assumptions that are subject to change within the purchase price allocation period (generally one year from the acquisition date). The primary areas of the purchase price allocation not yet finalized include a final assessment of income taxes and residual goodwill.

GD NG-911 Business

On April 29, 2019, we completed the acquisition of a state and local government NG-911 business pursuant to the Asset Purchase Agreement, dated as of April 29, 2019, by and among General Dynamics Information Technology, Inc., Comtech and Comtech NextGen LLC, a Delaware limited liability company and indirect, wholly-owned subsidiary of Comtech. The acquisition of this NG-911 business from GD (the "GD NG-911 business") has a preliminary cash purchase price of $10,000,000 (which is subject to a working capital adjustment). In connection with this acquisition, we also announced an award of a five-year contract to develop, implement and operate a NG-911 emergency communications system for a Northeastern state. Immediately after our announcement of this acquisition, we hired approximately sixty GD NG-911 employees and completed the integration of this business into our Commercial Solutions segment's public safety and location technologies product line. The acquisition, contract award and hiring of talented employees are expected to strengthen Comtech's position in the growing NG-911 solutions market.

We are accounting for the acquisition of this business under the acquisition method of accounting in accordance with FASB ASC 805. The purchase price, which is subject to a pending closing date balance sheet adjustment process under the purchase agreement, was allocated to the assets acquired and liabilities assumed, based on their preliminary fair value as of April 29, 2019, pursuant to the business combination accounting rules. Acquisition plan expenses were not included as a component of consideration transferred and were expensed in the period incurred. Our Consolidated Statements of Operatons for fiscal 2019 include a nominal amount of revenue and contribution from the GD NG-911 business. Pro forma financial information is not disclosed, as the acquisition is not material.

The following table summarizes the preliminary fair value of the assets acquired and liabilities assumed in connection with the acquisition of the GD NG-911 business:

	Preliminary Purchase Price Allocation [1]	Measurement Period Adjustments	Purchase Price Allocation (as adjusted)	
Aggregate purchase price at fair value	$ 10,000,000	—	$ 10,000,000	
Allocation of aggregate purchase price:				
Current assets	$ 5,790,000	(1,330,000)	$ 4,460,000	
Property, plant and equipment	646,000	—	646,000	
Deferred tax assets, non-current	3,292,000	134,000	3,426,000	
Accrued warranty obligations	(5,000,000)	—	(5,000,000)	
Current liabilities	(3,960,000)	798,000	(3,162,000)	
Net tangible assets at preliminary fair value	$ 768,000	(398,000)	$ 370,000	
Identifiable intangibles, deferred taxes and goodwill:				Estimated Useful Lives
Customer relationships	$ 20,300,000	$ —	$ 20,300,000	10 years
Technology	3,500,000	—	3,500,000	15 years
Other liabilities	(21,700,000)	—	(21,700,000)	
Deferred tax liabilities	(518,000)	—	(518,000)	
Goodwill	7,650,000	398,000	8,048,000	Indefinite
Allocation of aggregate purchase price	$ 10,000,000	—	$ 10,000,000	

[1] As initially reported in the Company's Quarterly Report on Form 10-Q for the three and nine months ended April 30, 2019.

The acquired identifiable intangible assets are being amortized on a straight-line basis, which we believe approximates the pattern in which the assets are utilized over their estimated useful lives. The fair value of customer relationships was estimated based on the value of the discounted cash flows that the related intangible asset could be expected to generate in the future. The fair value of technology was estimated based on the discounted capitalization of royalty expense saved because we now own the assets. The preliminary fair value of other liabilities was based on the difference in discounted cash flows related to remaining performance obligations under a certain acquired contract as compared to current market terms for similar arrangements that a market participant would expect. Other liabilities will be credited against cost of sales over the remaining performance of the contract, which was 5.25 years as of the acquisition date.

Among the factors contributing to the recognition of goodwill, as a component of the purchase price allocation, were synergies in solution offerings and the addition of a skilled, assembled workforce. We currently estimate that approximately $7,300,000 of goodwill resulting from the acquisition will be tax deductible. This goodwill has been assigned to our Commercial Solutions segment based on specific identification.

We are currently finalizing a working capital adjustment, pursuant to the terms of the purchase agreement. In August 2019, the seller proposed and requested an approximate $2,900,000 upward adjustment to the preliminary purchase price. We do not agree with their proposed adjustment and believe that we are entitled to a reduction of approximately $890,000 to the preliminary purchase price. We expect to reach an amicable resolution.

The allocation of the preliminary purchase price shown in the above table was based on a valuation and estimates and assumptions that are subject to change within the purchase price allocation period (generally one year from the acquisition date). The primary areas of the purchase price allocation not yet finalized include the purchase price (due to a pending closing date balance sheet adjustment process under the purchase agreement), a final assessment of accrued warranty obligations, income taxes and residual goodwill.

(3) Accounts Receivable

Accounts receivable consist of the following at July 31, 2019 and 2018:

	2019	2018
Receivables from commercial and international customers	$ 85,556,000	83,411,000
Unbilled receivables from commercial and international customers	20,469,000	19,731,000
Receivables from the U.S. government and its agencies	38,856,000	26,251,000
Unbilled receivables from the U.S government and its agencies	2,018,000	19,807,000
Total accounts receivable	146,899,000	149,200,000
Less allowance for doubtful accounts	1,867,000	1,761,000
Accounts receivable, net	$ 145,032,000	147,439,000

Unbilled receivables as of July 31, 2019 relate to contracts-in-progress for which revenue has been recognized, but for which we have not yet earned the right to bill the customer for work performed to-date. Under ASC 606, which we adopted on August 1, 2018 (see *Note (1)(d) - "Revenue Recognition"*), unbilled receivables constitute contract assets. Management estimates that substantially all amounts not yet billed at July 31, 2019 will be billed and collected within one year.

As of July 31, 2019, except for the U.S. government (and its agencies), which represented 27.8% of total accounts receivable, there were no other customers which accounted for greater than 10.0% of total accounts receivable. As of July 31, 2018, the U.S. government (and its agencies) and Verizon represented 30.9% and 10.1%, respectively, of total accounts receivable.

(4) Inventories

Inventories consist of the following at July 31, 2019 and 2018:

	2019	2018
Raw materials and components	$ 53,959,000	53,649,000
Work-in-process and finished goods	40,576,000	38,854,000
Total inventories	94,535,000	92,503,000
Less reserve for excess and obsolete inventories	19,696,000	17,427,000
Inventories, net	$ 74,839,000	75,076,000

As of July 31, 2019 and 2018, the amount of inventory directly related to long-term contracts (including contracts-in-progress) was $4,053,000 and $1,249,000, respectively, and the amount of inventory related to contracts from third-party commercial customers who outsource their manufacturing to us was $1,513,000 and $1,310,000, respectively.

(5) Property, Plant and Equipment

Property, plant and equipment consist of the following at July 31, 2019 and 2018:

	2019	2018
Machinery and equipment	$ 159,882,000	154,556,000
Leasehold improvements	14,265,000	13,807,000
	174,147,000	168,363,000
Less accumulated depreciation and amortization	146,121,000	139,376,000
Property, plant and equipment, net	$ 28,026,000	28,987,000

Depreciation and amortization expense on property, plant and equipment amounted to $11,927,000, $13,655,000 and $14,354,000 for the fiscal years ended July 31, 2019, 2018 and 2017, respectively.

(6) Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities consist of the following at July 31, 2019 and 2018:

	2019	2018
Accrued wages and benefits	$ 23,295,000	23,936,000
Accrued contract costs	15,007,000	10,016,000
Accrued warranty obligations	15,968,000	11,738,000
Accrued legal costs	2,835,000	6,179,000
Accrued commissions and royalties	5,114,000	4,654,000
Other	16,365,000	8,511,000
Accrued expenses and other current liabilities	$ 78,584,000	65,034,000

On August 1, 2018, in connection with our adoption of ASC 606, $2,079,000 of accrued expenses and other current liabilities were reclassified to contract liabilities on our Consolidated Balance Sheet. Of this total amount, $1,679,000 and $400,000, respectively, was reclassified from the "accrued warranty obligations" and "other" categories presented in the above table to contract liabilities, as they represented deferred revenue related to service-type warranty performance obligations. See *Note (1)(d) - "Revenue Recognition"* for further discussion of our adoption of ASC 606. Accrued expenses and other current liabilities as of July 31, 2019 includes the amounts from our acquisitions of Solacom and the GD NG-911 business, as discussed in *Note (2) "Acquisitions."*

Accrued wages and benefits as of July 31, 2019 and 2018 include $1,787,000 and $2,963,000, respectively, of accrued remittance of employees' statutory tax withholdings related to the net settlement of fully-vested share units, as discussed in more detail in *Note (11)* - "*Stock-Based Compensation.*"

Accrued contract costs represent direct and indirect costs on contracts as well as estimates of amounts owed for invoices not yet received from vendors or reflected in accounts payable.

Accrued legal costs as of July 31, 2018 included $3,372,000 related to estimated costs associated with a certain TeleCommunication Systems, Inc. ("TCS") intellectual property matter. During the fiscal year ended July 31, 2019, this matter was resolved in our favor. As a result, we reduced such accrued legal costs and recorded a $3,204,000 benefit in the Consolidated Statement of Operations. See *Note (13)(b)* - "*Commitments and Contingencies - Legal Proceedings and Other Matters*" for additional information.

Other accrued expenses as of July 31, 2019 include $568,000 for the current portion of facility exit costs related to the closure of a manufacturing facility, as discussed in more detail in *Note (7) - "Cost Reduction Actions."*

Accrued warranty obligations as of July 31, 2019 relate to estimated liabilities for assurance type warranty coverage that we provide to our customers. We generally provide warranty coverage for some of our products for a period of at least one year from the date of delivery. We record a liability for estimated warranty expense based on historical claims, product failure rates, a consideration of contractual obligations, future costs to resolve software issues and other factors. Some of our product warranties are provided under long-term contracts, the costs of which are incorporated into our estimates of total contract costs.

Changes in our accrued warranty obligations during the fiscal years ended July 31, 2019 and 2018 were as follows:

	2019	2018
Balance at beginning of year	$ 11,738,000	17,617,000
Reclass to contract liabilities as of August 1, 2018	(1,679,000)	—
Provision for warranty obligations	3,902,000	5,055,000
Additions (in connection with acquisitions)	6,431,000	—
Charges incurred	(6,151,000)	(8,244,000)
Warranty settlement and reclass (see below)	1,727,000	(2,690,000)
Balance at end of year	$ 15,968,000	11,738,000

Our current accrued warranty obligations at July 31, 2019 and 2018 include $3,999,000 and $4,650,000, respectively, of warranty obligations for a small product line that we refer to as the TCS 911 call handling software solution. This solution was licensed to customers prior to our acquisition of TCS. During the fiscal year ended July 31, 2018, we entered into a full and final warranty settlement with AT&T, the largest customer/distributor of this product line, pursuant to which we issued thirty-six credits to AT&T of $153,000 which AT&T can apply on a monthly basis to purchases of solutions from us, beginning October 2017 through September 2020. As of July 31, 2019, the total present value of these monthly credits is $2,029,000, of which $1,727,000 is included in our current accrued warranty obligations and $302,000 is reflected in other liabilities (non-current) on our Consolidated Balance Sheet. In connection with this favorable settlement, during the fiscal year ended July 31, 2018, we recorded a benefit to cost of sales of $660,000.

In connection with our acquisition of Solacom and the GD NG-911 business, during the fiscal year ended July 31, 2019, we assumed warranty obligations related to certain contracts acquired. See *Note (2) - "Acquisitions"* for further information pertaining to these acquisitions.

(7) Cost Reduction Actions

During the three months ended October 31, 2018, we took steps to improve our future operating results and successfully consolidated our Government Solutions segment’s manufacturing facility located in Tampa, Florida with another facility that we maintain in Orlando, Florida. In doing so, we accrued $1,373,000 of facility exit costs, which were recorded in selling, general and administrative expenses in our Consolidated Statements of Operations.

During the fiscal year ended 2019, we made cash payments of $805,000 related to such facility exit cost accrual. As of July 31, 2019, the remaining estimated facility exit costs amounted to $568,000, which is included in accrued expenses on our Consolidated Balance Sheet. To-date, we have incurred an immaterial amount of severance and retention costs related to our Florida facilities consolidation.

During the second quarter of fiscal 2019, we began an evaluation and repositioning of our public safety and location technologies solutions in order to focus on providing higher margin solution offerings. This evaluation and repositioning continued throughout the remainder of fiscal 2019 and is ongoing. To date, we have ceased offering certain solutions, have worked with customers to wind-down certain legacy contracts and have not renewed certain contracts. In connection with this ongoing repositioning, we recorded $6,351,000 of estimated contract settlement costs in our Commercial Solutions segment during the fiscal year ended July 31, 2019.

(8) Credit Facility

On October 31, 2018, we entered into a First Amended and Restated Credit Agreement (the "Credit Facility") with a syndicate of lenders, replacing our prior Credit Agreement dated as of February 23, 2016 (as amended by that certain First Amendment, dated as of June 6, 2017 (the "Prior Credit Facility")). In connection with the establishment of our new Credit Facility, during the three months ended October 31, 2018, we wrote-off $3,217,000 of deferred financing costs primarily related to the Term Loan Facility portion of our Prior Credit Facility and capitalized deferred financing costs of $1,813,000 related to the new Credit Facility.

The Credit Facility provides a senior secured loan facility of up to $550,000,000 consisting of: (i) a revolving loan facility ("Revolving Loan Facility") with a borrowing limit of $300,000,000; (ii) an accordion feature allowing us to borrow up to an additional $250,000,000; (iii) a $35,000,000 letter of credit sublimit; and (iv) a swingline loan credit sublimit of $25,000,000.

The Credit Facility matures on October 31, 2023 (the "Revolving Maturity Date"). If we issue new unsecured debt in excess of $5,000,000 with a maturity date that is less than 91 days from October 31, 2023, the Revolving Maturity Date would automatically accelerate so that it would be 91 days earlier than the maturity date of the new unsecured debt.

The proceeds of the new Credit Facility were used, in part, to repay in full the outstanding borrowings under the Prior Credit Facility, and additional proceeds of the Credit Facility are expected to be used by us for working capital and other general corporate purposes. As of July 31, 2019, the amount outstanding under our Credit Facility was $165,000,000 which is reflected in the non-current portion of long-term debt on our Consolidated Balance Sheet. At July 31, 2019, we had $2,686,000 of standby letters of credit outstanding under our Credit Facility related to guarantees of future performance on certain customer contracts and no outstanding commercial letters of credit. Since October 31, 2018, we had outstanding balances under the new Credit Facility ranging from $150,000,000 to $184,000,000.

As of July 31, 2019, total net deferred financing costs related to the Credit Facility were $3,128,000 and are being amortized over the term of our Credit Facility through October 31, 2023.

Interest expense, including amortization of deferred financing costs, recorded during the fiscal years ended July 31, 2019, 2018 and 2017 was $8,859,000, $9,614,000 and $11,106,000, respectively. The amount for the most recent fiscal year relates to both our Prior Credit Facility and new Credit Facility; whereas, the amount in the prior fiscal years relates to our Prior Credit Facility. Our blended interest rate approximated 5.25%, 5.40% and 4.90% for fiscal 2019, 2018 and 2017, respectively.

Borrowings under the Credit Facility shall be either: (i) Alternate Base Rate borrowings, which bear interest from the applicable borrowing date at a rate per annum equal to (x) the greatest of (a) the Prime Rate (as defined) in effect on such day, (b) the Federal Funds Effective Rate (as defined) in effect on such day plus 1/2 of 1.00% per annum and (c) the Adjusted LIBO Rate (as defined) on such day (or, if such day is not a business day, the immediately preceding business day) plus 1.00% per annum, plus (y) the Applicable Rate (as defined), or (ii) Eurodollar borrowings, which bear interest from the applicable borrowing date at a rate per annum equal to (x) the Adjusted LIBO Rate for such interest period plus (y) the Applicable Rate. Determination of the Applicable Rate is based on a pricing grid that is dependent upon our Secured Leverage Ratio (as defined) as of the end of each fiscal quarter for which consolidated financial statements have been most recently delivered.

The Credit Facility contains customary representations, warranties and affirmative covenants. The Credit Facility also contains customary negative covenants, subject to negotiated exceptions, including but not limited to: (i) liens, (ii) investments, (iii) indebtedness, (iv) significant corporate changes, including mergers and acquisitions, (v) dispositions, (vi) restricted payments, including stockholder dividends, and (vii) certain other restrictive agreements. The Credit Facility also contains certain financial covenants and customary events of default (subject to grace periods, as appropriate), such as payment defaults, cross-defaults to other material indebtedness, bankruptcy and insolvency, the occurrence of a defined change in control and the failure to observe the negative covenants and other covenants related to the operation of our business. In addition, under certain circumstances, we may be required to enter into amendments to the Credit Facility in connection with any further syndication of the Credit Facility.

The Credit Facility provides for, among other things: (i) no scheduled payments of principal until maturity; (ii) a maximum Secured Leverage Ratio of 3.75x trailing twelve months ("TTM") Adjusted Earnings Before Interest, Taxes, Depreciation and Amortization ("Adjusted EBITDA") and a Maximum Total Leverage Ratio of 4.50x TTM Adjusted EBITDA, each with no step downs; and (iii) a Minimum Interest Expense Coverage Ratio of 3.25x TTM Adjusted EBITDA.

As of July 31, 2019, our Secured Leverage Ratio was 1.74x TTM Adjusted EBITDA compared to the maximum allowable Secured Leverage Ratio of 3.75x TTM Adjusted EBITDA. Our Interest Expense Coverage Ratio as of July 31, 2019 was 12.05x TTM Adjusted EBITDA compared to the Minimum Interest Expense Coverage Ratio of 3.25x TTM Adjusted EBITDA. Given our expected future business performance, we anticipate maintaining compliance with the terms and financial covenants in our Credit Facility for the foreseeable future.

The obligations under the Credit Facility are guaranteed by certain of our domestic subsidiaries (the "Guarantors"). As collateral security under the Credit Facility and the guarantees thereof, we and the Guarantors have granted to the administrative agent, for the benefit of the lenders, a lien on, and first priority security interest in, substantially all of our tangible and intangible assets.

On December 6, 2018, we entered into the first amendment to the Credit Facility. The purpose of the amendment is to provide for a mechanism to replace the LIBO Rate for Eurodollar borrowings with an alternative benchmark interest rate, should the LIBO Rate generally become unavailable in the future on an other-than-temporary basis.

The Prior Credit Facility was a $400,000,000 secured credit facility and comprised of a senior secured term loan A facility of $250,000,000 (the "Term Loan Facility") and a secured revolving loan facility of up to $150,000,000, including a $25,000,000 letter of credit sublimit (the "Revolving Loan Facility"). The proceeds of the Prior Credit Facility were primarily used to finance our acquisition of TCS, including the repayment of certain existing indebtedness of TCS. During the three months ended October 31, 2018, we had outstanding balances under the Revolving Loan Facility, ranging from $34,904,000 to $63,804,000.

As of July 31, 2018, the net amount outstanding under the Prior Credit Facility was as follows:

		2018
Term Loan Facility	$	120,121,000
Less unamortized deferred financing costs related to Term Loan Facility		3,427,000
Term Loan Facility, net		116,694,000
Revolving Loan Facility		48,604,000
Amount outstanding under Secured Credit Facility, net		165,298,000
Less current portion of long-term debt		17,211,000
Non-current portion of long-term debt	$	148,087,000

Capitalized terms used but not defined herein have the meanings set forth for such terms in the Credit Facility and the Prior Credit Facility, which have been documented and filed with the SEC.

(9) Capital Lease and Other Obligations

We lease certain equipment under capital leases. As of July 31, 2019 and 2018, the net book value of the leased assets which collateralize the capital lease and other obligations was $864,000 and $2,547,000, respectively, and consisted primarily of machinery and equipment. Depreciation of leased assets is included in depreciation expense.

As of July 31, 2019, our capital lease and other obligations reflect a blended interest rate of approximately 7.00%. Our capital leases generally contain provisions whereby we can purchase the equipment at the end of the lease for a one dollar buyout.

Future minimum payments under capital lease and other obligations consisted of the following at July 31, 2019:

Fiscal 2020	$	789,000
Total minimum lease payments		789,000
Less: amounts representing interest		32,000
Present value of net minimum lease payments		757,000
Current portion of capital lease and other obligations		757,000
Non-current portion of capital lease and other obligations	$	—

(10) Income Taxes

On December 22, 2017, H.R.1, also known as the Tax Cuts and Jobs Act ("Tax Reform"), was enacted in the U.S. Tax Reform significantly lowered the amount of our current and future income tax expense primarily due to the reduction in the U.S. statutory income tax rate from 35.0% to 21.0%. This provision went into effect on January 1, 2018 and required us to remeasure our deferred tax assets and liabilities. In connection with Tax Reform, during fiscal 2018, we recorded a net discrete tax benefit of $11,792,000, primarily related to the remeasurement of deferred tax liabilities associated with non-deductible amortization related to intangible assets. This remeasurement was recorded pursuant to ASC 740 *"Income Taxes"* and SEC Staff Accounting Bulletin ("SAB") 118, using estimates based on reasonable and supportable assumptions and available information as of such reporting date. In the event the Internal Revenue Service ("IRS") issues clarifying or interpretive guidance related to Tax Reform, it may result in a change to our estimated income tax. In fiscal 2019 and beyond, Tax Reform will result in the loss of our ability to take the domestic production activities deduction, which has been repealed, and is also likely to result in lower tax deductions for certain executive compensation expenses.

For fiscal 2019, we were subject to a U.S. statutory income tax rate of 21.0%. For fiscal 2018, we were subject to a 35.0% statutory income tax rate with respect to the period August 1, 2017 through December 31, 2017 and a 21.0% statutory income tax rate with respect to the period January 1, 2018 through July 31, 2018, or a blended U.S. statutory income tax rate for fiscal 2018 of approximately 27.0%. As such, our effective tax rate for accounting purposes in fiscal 2018, excluding discrete items, was 27.0%.

Income before provision for (benefit from) income taxes consists of the following:

	Fiscal Years Ended July 31, 2019	2018	2017
U.S.	$ 28,813,000	22,243,000	23,732,000
Foreign	97,000	2,383,000	1,749,000
	$ 28,910,000	24,626,000	25,481,000

The provision for (benefit from) income taxes included in the accompanying Consolidated Statements of Operations consists of the following:

	Fiscal Years Ended July 31, 2019	2018	2017
Federal – current	$ (2,190,000)	367,000	(441,000)
Federal – deferred	4,782,000	(7,499,000)	8,399,000
State and local – current	1,715,000	440,000	608,000
State and local – deferred	(321,000)	1,115,000	659,000
Foreign – current	62,000	429,000	413,000
Foreign – deferred	(179,000)	5,000	16,000
Provision for (benefit from) income taxes	$ 3,869,000	(5,143,000)	9,654,000

The provision for (benefit from) income taxes differed from the amounts computed by applying the U.S. Federal income tax rate as a result of the following:

	Fiscal Years Ended July 31, 2019		2018		2017	
	Amount	Rate	Amount	Rate	Amount	Rate
Computed "expected" tax expense	$ 6,071,000	21.0%	6,615,000	27.0 %	8,919,000	35.0%
Increase (reduction) in income taxes resulting from:						
State and local income taxes, net of federal benefit	967,000	3.3	1,193,000	4.8	1,257,000	4.9
Stock-based compensation	(44,000)	(0.1)	(1,112,000)	(4.5)	78,000	0.3
Research and experimentation credits	(1,129,000)	(3.9)	(678,000)	(2.8)	(919,000)	(3.6)
Foreign-derived intangible income deduction	(632,000)	(2.2)	—	—	—	—
Nondeductible transaction costs	394,000	1.4	—	—	—	—
Nondeductible executive compensation	330,000	1.1	(22,000)	(0.1)	88,000	0.3
Audit settlements	(2,081,000)	(7.2)	—	—	—	—
Tax Reform remeasurement of deferred taxes	—	—	(11,317,000)	(46.0)	—	—
Foreign income taxes	5,000	—	(221,000)	(0.9)	(151,000)	(0.6)
Other, net	(12,000)	—	399,000	1.5	382,000	1.6
Provision for (benefit from) income taxes	$ 3,869,000	13.4%	(5,143,000)	(21.0)%	9,654,000	37.9%

The tax effects of temporary differences that give rise to significant portions of the deferred tax assets and liabilities at July 31, 2019 and 2018 are presented below:

	2019	2018
Deferred tax assets:		
Inventory and warranty reserves	$ 7,318,000	5,089,000
Compensation and commissions	3,548,000	3,511,000
Contract liabilities	5,331,000	—
Federal, state and foreign research and experimentation credits	18,183,000	18,816,000
Federal alternative minimum tax credit	1,800,000	3,243,000
Stock-based compensation	5,817,000	5,092,000
Acquisition-related contingent liabilities	1,250,000	2,477,000
Federal, state and foreign net operating losses	6,248,000	7,349,000
Other	7,651,000	4,672,000
Less: valuation allowance	(12,568,000)	(11,854,000)
Total deferred tax assets	44,578,000	38,395,000
Deferred tax liabilities:		
Plant and equipment	(1,362,000)	(1,155,000)
Intangibles	(54,612,000)	(48,167,000)
Total deferred tax liabilities	(55,974,000)	(49,322,000)
Net deferred tax liabilities	$ (11,396,000)	(10,927,000)

At July 31, 2019, our net deferred tax liability of $11,396,000 includes $1,085,000 of foreign net deferred tax assets that were recorded as other assets, net in our Consolidated Balance Sheets. At July 31, 2018, the entire $10,927,000 of net deferred tax liabilities were recorded as deferred tax liability, net in our Consolidated Balance Sheets.

We provide for income taxes under the provisions of FASB ASC 740 *"Income Taxes."* FASB ASC 740 requires an asset and liability based approach in accounting for income taxes. In assessing the realizability of deferred tax assets, management considers whether it is more likely than not that some portion or all of them will not be realized. If management determines that it is more likely than not that some or all of its deferred tax assets will not be realized, a valuation allowance will be recorded against such deferred tax assets.

At July 31, 2019, we had federal alternative minimum tax credit carryforwards of $1,800,000, which are available to offset future federal income taxes. We have federal research and experimentation credits of $8,725,000 that will begin to expire in 2027. The timing and manner in which we may utilize tax credits in future tax years will be limited by the amounts and timing of future taxable income and by the application of the ownership change rules under Section 383 of the Internal Revenue Code.

We have state net operating loss carryforwards available of $3,808,000 which expire through 2038, utilization of which will be limited by the amounts and timing of future taxable income and by the application of the ownership change rules under Section 382 of the Internal Revenue Code. We believe that it is more likely than not that the benefit from certain state net operating loss carryforwards will not be realized. In recognition of this risk, we have provided a valuation allowance of $3,746,000 on the deferred tax assets relating to these state net operating loss carryforwards. We have state research and experimentation credit carryforwards of $7,032,000 expiring through 2038. We believe that it is more likely than not that the benefit from certain state research and experimentation credits will not be realized. In recognition of this risk, we have provided a valuation allowance of $6,820,000 on the deferred tax assets relating to these state credits.

At July 31, 2019, we had foreign deferred tax assets relating to net operating loss carryforwards of $2,440,000. These losses were generated by Solacom prior to being acquired by Comtech and will begin to expire in 2023. We believe that it is more likely than not that a portion of these net operating loss carryforwards may not be realized. In recognition of this risk, we have provided a valuation allowance of $656,000 on the deferred tax assets relating to these net operating loss carryforwards. We have foreign deferred tax assets relating to research and experimentation credits of $2,426,000 that will begin to expire in 2019. We believe that it is more likely than not that the benefit from certain foreign research and experimentation credits may not be realized. In recognition of this risk, we have provided a valuation allowance of $539,000 on the deferred tax assets relating to foreign research and experimentation credits. At July 31, 2018, our foreign deferred tax assets relating to research and experimentation credits have been offset by a valuation allowance as they may not be utilized in a future period. Our foreign earnings and profits are insignificant and, as such, we have not recorded any deferred tax liability on unremitted foreign earnings.

We must generate $197,600,000 of taxable income in the future to fully utilize our net deferred tax assets as of July 31, 2019. Management believes it is more likely than not that the results of future operations will generate sufficient taxable income to realize the net deferred tax assets.

At July 31, 2019 and 2018, total unrecognized tax benefits were $7,215,000 and $9,339,000, respectively, including interest of $12,000 and $202,000, respectively. At July 31, 2019 and 2018, $325,000 and 2,572,000, respectively, of our unrecognized tax benefits were recorded as non-current income taxes payable on our Consolidated Balance Sheets. The remaining unrecognized tax benefits of $6,890,000 and $6,767,000 at July 31, 2019 and 2018, respectively, were presented as an offset to the associated non-current deferred tax assets on our Consolidated Balance Sheets. Of the total unrecognized tax benefits, $6,670,000 and $8,563,000 at July 31, 2019 and 2018, respectively, net of the reversal of the federal benefit recognized as a deferred tax asset relating to state reserves, would favorably impact our effective tax rate, if recognized. Unrecognized tax benefits result from income tax positions taken or expected to be taken on our income tax returns for which a tax benefit has not been recorded in our consolidated financial statements. We do not expect that there will be any significant changes to our total unrecognized tax benefits within the next twelve months.

Our policy is to recognize potential interest and penalties relating to uncertain tax positions in income tax expense. The following table summarizes the activity related to our unrecognized tax benefits for fiscal years 2019, 2018 and 2017 (excluding interest):

	2019	2018	2017
Balance at beginning of period	$ 9,137,000	8,586,000	9,108,000
Increase related to current period	893,000	645,000	587,000
Increase related to prior periods	17,000	49,000	86,000
Expiration of statute of limitations	(394,000)	(81,000)	(404,000)
Decrease related to prior periods	(2,450,000)	(62,000)	(791,000)
Balance at end of period	$ 7,203,000	9,137,000	8,586,000

Our federal income tax returns for fiscal 2017 and 2018 are subject to potential future IRS audit. None of our state income tax returns prior to fiscal 2015 are subject to audit. TCS's federal income tax returns for tax year 2015 and the tax period from January 1, 2016 to February 23, 2016, the date we acquired TCS, are subject to potential future IRS audit. None of TCS's state income tax returns prior to calendar year 2014 are subject to audit. Future tax assessments or settlements could have a material adverse effect on our consolidated results of operations and financial condition.

(11) Stock-Based Compensation

Overview

We issue stock-based awards to certain of our employees and our Board of Directors pursuant to our 2000 Stock Incentive Plan, as amended, (the "Plan") and our 2001 Employee Stock Purchase Plan (the "ESPP") and recognize related stock-based compensation in our consolidated financial statements. The Plan provides for the granting to employees and consultants of Comtech (including prospective employees and consultants): (i) incentive and non-qualified stock options, (ii) restricted stock units ("RSUs"), (iii) RSUs with performance measures (which we refer to as "performance shares"), (iv) restricted stock, (v) stock units (reserved for issuance to non-employee directors) and share units (reserved for issuance to employees) (collectively, "share units") and (vi) stock appreciation rights ("SARs"), among other types of awards. Our non-employee directors are eligible to receive non-discretionary grants of stock-based awards, subject to certain limitations.

On August 1, 2017 (the start of our first quarter of fiscal 2018), we adopted ASU No. 2016-09, which amended several aspects of the accounting for and reporting of our share-based payment transactions, including:

Excess tax benefits and shortfalls - ASU No. 2016-09 requires that all tax effects related to our share-based awards be recognized in the Consolidated Statement of Operations. ASU No. 2016-09 also removed the prior requirement to delay recognition of excess tax benefits until it reduces current taxes payable; instead, we are now required to recognize excess tax benefits as discrete items in the interim period in which they occur, subject to normal valuation allowance considerations. As ASU No. 2016-09 eliminated the concept of accumulated hypothetical tax benefits, excess tax benefits and shortfalls are no longer recognized in stockholders' equity. As a result, ASU No. 2016-09 is expected to result in future volatility of our income tax expense (as the future tax effects of share-based awards will be dependent on the price of our common stock at the time of settlement). Additionally, on a prospective basis, excess income tax benefits from the settlement of share-based awards are presented as a cash inflow from operating activities in our Consolidated Statement of Cash Flows.

Diluted earnings per share - Prior to the adoption of ASU No. 2016-09, in addition to considering the amount an employee must pay upon assumed exercise of stock-based awards and the amount of stock-based compensation cost attributed to future services and not yet recognized, when calculating our diluted earnings per share, the assumed proceeds also included the amount of excess tax benefits, if any, that would have been credited to additional paid-in capital assuming exercise of in-the-money stock-based awards. Effective with our adoption of ASU No. 2016-09, excess tax benefits are to be excluded from the calculation on a prospective basis. As a result, the denominator for our diluted calculations could increase in the future as compared to prior calculations.

Forfeitures - As permitted by ASU No. 2016-09, we elected to continue to estimate forfeitures of share-based awards.

Statutory Tax Withholding Requirements - ASU No. 2016-09 now allows us, when net settling share-based awards, to withhold an amount up to the employees' maximum individual tax rate in the relevant jurisdiction, without resulting in liability classification of the award. To qualify, we must have at least some withholding obligation. This aspect of adopting ASU No. 2016-09 did not have any material impact on us. However, with respect to cash payments that we make to taxing authorities on behalf of employees for such shares withheld, on a retrospective basis, we are required to present such payments as a cash outflow from financing activities in our Consolidated Statements of Cash Flows (as opposed to operating activities).

As of July 31, 2019, the aggregate number of shares of common stock which may be issued, pursuant to the Plan, may not exceed 10,362,500. Stock options granted may not have a term exceeding ten years or, in the case of an incentive stock award granted to a stockholder who owns stock representing more than 10.0% of the voting power, no more than five years. We expect to settle all outstanding awards under the Plan and employee purchases under the ESPP with the issuance of new shares of our common stock.

As of July 31, 2019, we had granted stock-based awards pursuant to the Plan representing the right to purchase and/or acquire an aggregate of 8,546,187 shares (net of 3,989,425 expired and canceled awards), of which an aggregate of 6,035,956 have been exercised or settled.

As of July 31, 2019, the following stock-based awards, by award type, were outstanding:

	July 31, 2019
Stock options	1,555,555
Performance shares	261,336
RSUs and restricted stock	432,550
Share units	260,790
Total	2,510,231

Our ESPP provides for the issuance of up to 1,050,000 shares of our common stock. Our ESPP is intended to provide our eligible employees the opportunity to acquire our common stock at 85% of fair market value at the date of issuance. Through July 31, 2019, we have cumulatively issued 787,051 shares of our common stock to participating employees in connection with our ESPP.

Stock-based compensation for awards issued is reflected in the following line items in our Consolidated Statements of Operations:

	Fiscal Years Ended July 31,		
	2019	2018	2017
Cost of sales	$ 1,047,000	758,000	760,000
Selling, general and administrative expenses	9,336,000	6,866,000	7,071,000
Research and development expenses	1,044,000	945,000	675,000
Stock-based compensation expense before income tax benefit	11,427,000	8,569,000	8,506,000
Estimated income tax benefit	(2,553,000)	(2,005,000)	(3,065,000)
Net stock-based compensation expense	$ 8,874,000	6,564,000	5,441,000

Stock-based compensation for equity-classified awards is measured at the date of grant, based on an estimate of the fair value of the award and is generally expensed over the vesting period of the award. At July 31, 2019, unrecognized stock-based compensation of $7,714,000, net of estimated forfeitures of $869,000, is expected to be recognized over a weighted average period of 2.8 years. Total stock-based compensation capitalized and included in ending inventory at both July 31, 2019 and 2018 was $48,000. There are no liability-classified stock-based awards outstanding as of July 31, 2019 or 2018.

Stock-based compensation expense, by award type, is summarized as follows:

	Fiscal Years Ended July 31,		
	2019	2018	2017
Stock options	$ 739,000	1,089,000	1,400,000
Performance shares	1,554,000	1,013,000	1,607,000
RSUs and restricted stock	2,149,000	1,458,000	829,000
ESPP	215,000	205,000	162,000
Share units	6,770,000	4,804,000	4,508,000
Stock-based compensation expense before income tax benefit	11,427,000	8,569,000	8,506,000
Estimated income tax benefit	(2,553,000)	(2,005,000)	(3,065,000)
Net stock-based compensation expense	$ 8,874,000	6,564,000	5,441,000

ESPP stock-based compensation expense primarily relates to the 15% discount offered to participants in the ESPP. During the fiscal years ended July 31, 2019 and 2018, we recorded benefits of $130,000 and $62,000, respectively, which primarily represents the recoupment of certain share units.

The estimated income tax benefit as shown in the above table was computed using income tax rates expected to apply when the awards are settled. Such deferred tax asset was recorded net as part of our non-current deferred tax liability on our Consolidated Balance Sheet as of July 31, 2019 and 2018. The actual income tax benefit recognized for tax reporting is based on the fair market value of our common stock at the time of settlement and can significantly differ from the estimated income tax benefit recorded for financial reporting.

Stock Options

The following table summarizes the Plan's activity:

	Awards (in Shares)	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at July 31, 2016	2,256,679	$ 28.87		
Expired/canceled	(400,804)	30.15		
Outstanding at July 31, 2017	1,855,875	28.60		
Expired/canceled	(72,190)	27.58		
Exercised	(114,710)	27.44		
Outstanding at July 31, 2018	1,668,975	28.72		
Expired/canceled	(32,490)	30.11		
Exercised	(80,930)	28.18		
Outstanding at July 31, 2019	1,555,555	$ 28.72	3.54	$ 2,512,000
Exercisable at July 31, 2019	1,389,895	$ 28.73	3.26	$ 2,186,000
Vested and expected to vest at July 31, 2019	1,538,930	$ 28.75	3.51	$ 2,460,000

Stock options outstanding as of July 31, 2019 have exercise prices ranging from $20.90 - $33.94, representing the fair market value of our common stock on the date of grant, a contractual term of five or ten years and a vesting period of three or five years. The total intrinsic value relating to stock options exercised during the fiscal years ended July 31, 2019 and 2018 was $576,000 and $469,000, respectively. There were no stock options exercised during the fiscal year ended 2017.

During fiscal 2019 and 2018, at the election of certain holders of vested stock options, 72,830 and 101,610 stock options, respectively, were net settled upon exercise. As a result, 9,345 and 8,706 net shares of our common stock were issued during the fiscal years ended July 31, 2019 and 2018, respectively, after reduction of shares retained to satisfy the exercise price and minimum statutory tax withholding requirements.

Performance Shares, RSUs, Restricted Stock and Share Unit Awards

The following table summarizes the Plan's activity relating to performance shares, RSUs, restricted stock and share units:

	Awards (in Shares)	Weighted Average Grant Date Fair Value	Aggregate Intrinsic Value
Outstanding at July 31, 2016	217,213	$ 28.32	
Granted	705,241	14.31	
Settled	(61,462)	26.63	
Forfeited	(30,795)	17.13	
Outstanding at July 31, 2017	830,197	16.95	
Granted	473,005	22.45	
Settled	(354,822)	17.66	
Canceled/Forfeited	(129,942)	17.26	
Outstanding at July 31, 2018	818,438	19.78	
Granted	442,363	29.76	
Settled	(275,619)	26.05	
Canceled/Forfeited	(30,506)	25.52	
Outstanding at July 31, 2019	954,676	$ 22.40	$ 28,411,000
Vested at July 31, 2019	321,702	$ 25.82	$ 9,574,000
Vested and expected to vest at July 31, 2019	914,082	$ 22.55	$ 27,203,000

The total intrinsic value relating to fully-vested awards settled during the fiscal years ended July 31, 2019, 2018 and 2017 was $8,772,000, $10,473,000 and $1,039,000 respectively.

The performance shares granted to employees since fiscal 2014 principally vest over a three-year performance period, if pre-established performance goals are attained, or as specified pursuant to the Plan and related agreements. As of July 31, 2019, the number of outstanding performance shares included in the above table, and the related compensation expense prior to consideration of estimated pre-vesting forfeitures, assume achievement of the pre-established goals at a target level.

RSUs and restricted stock granted to non-employee directors have a vesting period of three years and are convertible into shares of our common stock generally at the time of termination, on a one-for-one basis for no cash consideration, or earlier under certain circumstances. RSUs granted to employees have a vesting period of five years and are convertible into shares of our common stock generally at the time of vesting, on a one-for-one basis for no cash consideration.

Share units granted prior to July 31, 2017 were vested when issued and are convertible into shares of our common stock, generally at the time of termination, on a one-for-one basis for no cash consideration, or earlier under certain circumstances. Share units granted on or after July 31, 2017 were granted to certain employees in lieu of non-equity incentive compensation and are convertible into shares of our common stock on the one-year anniversary of the respective grant date.

On July 31, 2019, 257,608 fully vested share units were granted to certain employees in lieu of fiscal 2019 non-equity incentive compensation. Also, on July 31, 2019, 146,410 fully vested share units (previously granted in lieu of fiscal 2018 non-equity incentive compensation) were settled by delivery of 90,928 shares of our common stock after reduction of share units retained to satisfy employees' statutory tax withholding requirements. Cumulatively, through July 31, 2019, 421,966 share units granted have been settled.

The fair value of performance shares, RSUs, restricted stock and share units is determined using the closing market price of our common stock on the date of grant, less the present value of any estimated future dividend equivalents such awards are not entitled to receive and an applicable estimated discount for any post-vesting transfer restrictions. RSUs, performance shares and restricted stock granted since fiscal 2013 are entitled to dividend equivalents unless forfeited before vesting occurs. Share units granted since fiscal 2014 are entitled to dividend equivalents while the underlying shares are unissued.

Dividend equivalents are subject to forfeiture, similar to the terms of the underlying stock-based awards, and are payable in cash generally at the time of settlement of the underlying award. During fiscal 2019, 2018 and 2017, we accrued $327,000, $300,000 and $273,000, respectively, of dividend equivalents (net of forfeitures) and paid out $263,000, $141,000 and $176,000, respectively. Accrued dividend equivalents were recorded as a reduction to retained earnings. As of July 31, 2019 and 2018, accrued dividend equivalents were $777,000 and $713,000, respectively.

With respect to the actual settlement of stock-based awards for income tax reporting, during the fiscal years ended July 31, 2019 and 2018 we recorded income tax benefits of $479,000 and $1,193,000, respectively, which primarily represent the net excess income tax benefits upon settlement of stock-based awards during each of the respective periods. During fiscal 2017, net income tax shortfalls from similar items totaled $670,000 and, pursuant to prior GAAP, were recorded as a reduction to additional paid-in capital.

Subsequent Events

In the first quarter of fiscal 2020, our Board of Directors authorized the issuance of stock-based awards with a total unrecognized compensation expense, net of estimated forfeitures, of approximately $5,632,000.

(12) Segment Information

Reportable operating segments are determined based on Comtech's management approach. The management approach, as defined by FASB ASC 280 *"Segment Reporting"* is based on the way that the CODM organizes the segments within an enterprise for making decisions about resources to be allocated and assessing their performance. Our CODM, for purposes of FASB ASC 280, is our Chief Executive Officer and President.

Our Commercial Solutions segment offers satellite ground station technologies (such as modems and amplifiers) and public safety and location technologies (such as 911 call routing and mapping solutions) to commercial customers and smaller government customers, such as state and local governments. This segment also serves certain large government customers (including the U.S. government) that have requirements for off-the-shelf commercial equipment.

Our Government Solutions segment provides mission-critical technologies (such as tactical satellite-based networks and ongoing support for complicated communications networks) and high-performance transmission technologies (such as troposcatter systems and solid-state, high-power amplifiers) to large government end-users (including those of foreign countries), large international customers and domestic prime contractors.

Our CODM primarily uses a metric that we refer to as Adjusted EBITDA to measure an operating segment's performance and to make decisions about resources to be allocated. Our Adjusted EBITDA metric for the Commercial Solutions and Government Solutions segments do not consider any allocation of indirect expenses, or any of the following: income taxes, interest (income) and other, write-off of deferred financing costs, interest expense, amortization of stock-based compensation, amortization of intangible assets, depreciation expense, estimated contract settlement costs, settlement of intellectual property litigation, acquisition plan expenses, facility exit costs or strategic alternatives analysis expenses and other expenses that relate to our Unallocated segment. These items, while periodically affecting our results, may vary significantly from period to period and may have a disproportionate effect in a given period, thereby affecting the comparability of results. Any amounts shown in the Adjusted EBITDA calculation for our Commercial Solutions and Government Solutions segments are directly attributable to those segments. Our Adjusted EBITDA is also used by our management in assessing the Company's operating results. Although closely aligned, the Company's definition of Adjusted EBITDA is different than the Consolidated EBITDA (as such term is defined in our Credit Facility) utilized for financial covenant calculations and also may differ from the definition of EBITDA or Adjusted EBITDA used by other companies and, therefore, may not be comparable to similarly titled measures used by other companies.

Operating segment information, along with a reconciliation of segment net income (loss) and consolidated net income to Adjusted EBITDA is presented in the tables below:

	Fiscal Year Ended July 31, 2019			
	Commercial Solutions	Government Solutions	Unallocated	Total
Net sales	$ 357,293,000	314,504,000	—	$ 671,797,000
Operating income (loss)	$ 36,053,000	28,997,000	(23,643,000)	$ 41,407,000
Net income (loss)	$ 35,888,000	29,029,000	(39,876,000)	$ 25,041,000
Provision for income taxes	19,000	—	3,850,000	3,869,000
Interest (income) and other	75,000	(41,000)	1,000	35,000
Write-off of deferred financing costs	—	—	3,217,000	3,217,000
Interest expense	71,000	9,000	9,165,000	9,245,000
Amortization of stock-based compensation	—	—	11,427,000	11,427,000
Amortization of intangibles	14,944,000	3,376,000	—	18,320,000
Depreciation	9,265,000	1,891,000	771,000	11,927,000
Estimated contract settlement costs	6,351,000	—	—	6,351,000
Settlement of intellectual property litigation	—	—	(3,204,000)	(3,204,000)
Acquisition plan expenses	—	—	5,871,000	5,871,000
Facility exit costs	—	1,373,000	—	1,373,000
Adjusted EBITDA	$ 66,613,000	35,637,000	(8,778,000)	$ 93,472,000
Purchases of property, plant and equipment	$ 6,293,000	1,902,000	590,000	$ 8,785,000
Long-lived assets acquired in connection with acquisitions	$ 60,693,000	—	—	$ 60,693,000
Total assets at July 31, 2019	$ 662,580,000	186,438,000	38,693,000	$ 887,711,000

	Fiscal Year Ended July 31, 2018			
	Commercial Solutions	Government Solutions	Unallocated	Total
Net sales	$ 345,076,000	225,513,000	—	$ 570,589,000
Operating income (loss)	$ 40,837,000	10,950,000	(16,712,000)	$ 35,075,000
Net income (loss)	$ 40,297,000	10,835,000	(21,363,000)	$ 29,769,000
Provision for (benefit from) income taxes	270,000	—	(5,413,000)	(5,143,000)
Interest (income) and other	151,000	112,000	(9,000)	254,000
Interest expense	119,000	3,000	10,073,000	10,195,000
Amortization of stock-based compensation	—	—	8,569,000	8,569,000
Amortization of intangibles	17,699,000	3,376,000	—	21,075,000
Depreciation	9,479,000	3,088,000	1,088,000	13,655,000
Adjusted EBITDA	$ 68,015,000	17,414,000	(7,055,000)	$ 78,374,000
Purchases of property, plant and equipment	$ 7,151,000	901,000	590,000	$ 8,642,000
Total assets at July 31, 2018	$ 610,166,000	195,924,000	39,067,000	$ 845,157,000

	Fiscal Year Ended July 31, 2017			
	Commercial Solutions	Government Solutions	Unallocated	Total
Net sales	$ 330,867,000	219,501,000	—	$ 550,368,000
Operating income (loss)	$ 33,234,000	9,393,000	(5,585,000)	$ 37,042,000
Net income (loss)	$ 32,871,000	9,421,000	(26,465,000)	$ 15,827,000
Provision for income taxes	258,000	—	9,396,000	9,654,000
Interest (income) and other	(108,000)	(34,000)	74,000	(68,000)
Interest expense	213,000	6,000	11,410,000	11,629,000
Amortization of stock-based compensation	—	—	8,506,000	8,506,000
Amortization of intangibles	17,698,000	5,125,000	—	22,823,000
Depreciation	9,938,000	2,938,000	1,478,000	14,354,000
Settlement of intellectual property litigation	—	—	(12,020,000)	(12,020,000)
Adjusted EBITDA	$ 60,870,000	17,456,000	(7,621,000)	$ 70,705,000
Purchases of property, plant and equipment	$ 7,007,000	1,046,000	97,000	$ 8,150,000
Total assets at July 31, 2017	$ 606,436,000	185,234,000	40,393,000	$ 832,063,000

Unallocated expenses result from corporate expenses such as executive compensation, accounting, legal and other regulatory compliance related costs and also includes all of our amortization of stock-based compensation. During fiscal 2019, unallocated expenses also include $5,871,000 of acquisition plan expenses. In addition, offsetting unallocated expenses in fiscal 2019 is a $3,204,000 benefit resulting from a favorable ruling of the U.S. Court of Appeals for the Federal Circuit related to a legacy TCS intellectual property matter. See *Note (13)*(b)- *"Commitments and Contingencies - Legal Proceedings and Other Matters"* for further information. Unallocated expenses reflect favorable adjustments to operating income related to: (i) warranty and sales and use tax settlements in fiscal 2018; and (ii) settlement of certain legacy TCS intellectual property matters in fiscal 2017.

Interest expense in the tables above relate to our Prior Credit Facility and new Credit Facility, and includes the amortization of deferred financing costs. In addition, during fiscal 2019, we recorded a $3,217,000 loss from the write-off of deferred financing costs primarily related to the Term Loan Facility portion of our Prior Credit Facility. See *Note (8)* - "*Credit Facility*" for further discussion. There were no comparable losses recorded in fiscal 2018 and 2017.

Intersegment sales in fiscal 2019, 2018 and 2017 by the Commercial Solutions segment to the Government Solutions segment were $17,371,000, $9,630,000 and $12,492,000, respectively. There were nominal sales by the Government Solutions segment to the Commercial Solutions segment for these fiscal periods. All intersegment sales are eliminated in consolidation and are excluded from the tables above.

Unallocated assets at July 31, 2019 consist principally of cash and cash equivalents, income taxes receivable, corporate property, plant and equipment and deferred financing costs. Substantially all of our long-lived assets are located in the U.S.

(13) Commitments and Contingencies

(a) Operating Leases

At July 31, 2019, future minimum lease payments, net of subleases, under non-cancelable operating lease agreements are as follows:

Fiscal Year:		
2020	$	11,812,000
2021		8,723,000
2022		7,343,000
2023		5,776,000
2024		3,430,000
Thereafter		7,130,000
Total	$	44,214,000

Lease expense charged to operations was $11,953,000, $12,733,000 and $13,270,000 in fiscal 2019, 2018 and 2017, respectively.

We lease our Melville, New York production facility from a partnership controlled by our President, CEO and Chairman. Lease payments made in fiscal 2019 were $636,000. The current lease provides for our use of the premises as they exist through December 2021 with an option for an additional 10 years. The annual rent of the facility for calendar year 2020 is $657,000 and is subject to customary adjustments. We have a right of first refusal in the event of a sale of the facility.

(b) Legal Proceedings and Other Matters

Legacy TCS Intellectual Property Matter - Vehicle IP
In December 2009, Vehicle IP, LLC ("Vehicle IP") filed a patent infringement lawsuit in the U.S. District Court for the District of Delaware (the "District Court"), seeking monetary damages, fees and expenses and other relief from, among others, our customer Verizon Wireless ("Verizon") based on the VZ Navigator product. TCS defended Verizon against Vehicle IP. In January 2019, we received a ruling from the U.S. Court of Appeals for the Federal Circuit upholding the District Court's claim construction in our favor. Consequently, we and Vehicle IP filed a joint stipulation requesting a judgment of non-infringement, which judgment was entered on March 5, 2019. As a result of the Federal Circuit Court's decision, this matter is now closed and during the second quarter of fiscal 2019, we reduced our accrued legal costs related to this matter and recorded a $3,204,000 benefit in the Consolidated Statement of Operations. See *Note (6)* - "*Accrued Expenses and Other Current Liabilities*" for additional information.

Legacy TCS 911 Call Handling Software Matter
A customer that purchased a TCS 911 call handling software solution in December 2014 (which was more than one year prior to our acquisition of TCS) (the "TCS Legacy Customer") informed us in fiscal 2019 that it experienced several network outages and that it would seek indemnification for any claims made against it as a result of such outages.

In connection with these outages, the TCS Legacy Customer informed us that it believed certain communication failover redundancies promised to it by former senior management of TCS were never completed and had originally demanded that we refund to it all amounts previously paid to us under the contract, which through July 31, 2019 exceeded $14,000,000. In response to such claim, we engaged legal counsel to review the claims made by our customer.

Settlement conversations were had with this customer for several months and a mutual agreement was not reached. In September 2019, this customer filed a lawsuit in the Sixth Judicial Circuit Court of the State of South Dakota and has accused us of committing fraud because, among other things, we failed to provide them with certain redundancy. We believe that TCS has complied with its contractual requirements and that the customer is not entitled to any such reimbursement. Our contract to provide services to this customer expires in December 2019 and the amount of annual revenue we generate from this customer is immaterial.

We vigorously contest that we violated any contractual obligations, much less committed fraud, and have submitted notification to our insurance carriers of the lawsuit for review and consideration of coverage for potential liability that may arise from this lawsuit. We are also reviewing with counsel our multiple counter claims against this TCS Legacy Customer.

We also filed a lawsuit in March 2019 against a former employee and her new employer arising from such former employee's violation of her obligation to TCS of confidentiality, non-competition and non-solicitation of customers, including the TCS Legacy Customer. The former employee has responded with her own lawsuit against us.

The ultimate resolution of these matters could vary and have a material adverse effect on our consolidated results of operations, financial position or cash flows in future periods.

Other Matters
In October 2014, we disclosed to the U.S. Department of the Treasury, Office of Foreign Assets Control ("OFAC") that we learned during a self-assessment of our export transactions that a shipment of modems sent to a Canadian customer by Comtech EF Data Corp. was incorporated into a communication system, the ultimate end user of which was the Sudan Civil Aviation Authority. The sales value of this equipment was approximately $288,000. At the time of shipment, OFAC regulations prohibited U.S. persons from doing business directly or indirectly with Sudan. In late 2015, OFAC issued an administrative subpoena seeking information about the disclosed transaction. We responded to the subpoena, including alerting OFAC to Comtech’s repair of three modems for a customer in Lebanon who may have rerouted the modems from Lebanon to Sudan without the required U.S. licensing authorization. In September 2018, Comtech agreed to enter into a Tolling Agreement with OFAC, which extends the statute of limitations in this matter through December 31, 2019. The Tolling Agreement was shortly followed by a second administrative subpoena seeking additional information about the disclosed transaction. In December 2018, Comtech responded to a second administrative subpoena from OFAC, answering the questions it posed and providing all the documents it sought. U.S. sanctions with respect to Sudan were revoked in 2017. Consistent with the revocation of the Sudan Sanction Regulations ("SSR"), shipments to the Sudan Civil Aviation Authority by U.S. persons are now permissible. We are not able to predict whether OFAC will take any enforcement action against us in light of the revocation of the SSR. If OFAC determines that we have violated U.S. trade sanctions, civil and criminal penalties could apply, and we may suffer reputational harm. Even though we take precautions to avoid engaging in transactions that may violate U.S. trade sanctions, those measures may not be effective in every instance.

In May 2018, we were informed by the Office of Export Enforcement ("OEE") of the Department of Commerce ("DoC") that it was forwarding to the DoC's Office of Chief Counsel, the results of its audit of international shipments by Comtech Xicom Technology, Inc. for further review and possible determination of an administrative penalty. We fully cooperated with the OEE in their audit and, based on our self-assessment of the approximately 7,800 individual transactions audited, have determined that six (6) transactions may not have been fully in compliance with the Export Administration Regulations ("EAR"). These six (6) items, for which export licenses were not obtained, were either spares or repaired power amplifier subassembly components valued at less than $100,000 (in aggregate) and were shipped to Brazil, Italy, Russia, Thailand and the United Arab Emirates. The EAR provides an exception to the requirement to obtain an export license for the replacement of a defective or damaged component. During our self-assessment, we determined that we inadvertently did not obtain export licenses for the spares or evidence of the return or destruction of the defective or damaged components necessary to authorize our use of the export license exception for the replacements. Since discovering this issue, we have implemented additional controls and procedures and have increased awareness of these specific export requirements throughout the Company to help avoid similar occurrences in the future. Administrative penalties under the EAR can range from a warning letter to a denial of export privileges. A civil monetary penalty not to exceed the amount set forth in the Export Administration Act ("EAA") may be imposed for each violation, and in the event that any provision of the EAR is continued by any other authority, the maximum monetary civil penalty for each violation shall be that provided by such other authority. Administrative penalties under the EAR are currently determined pursuant to the International Emergency Economic Powers Act ("IEEPA"), which can reach the greater of twice the amount of the transaction that is the basis of the violation or approximately $300,000 per violation. We have not recorded an accrual related to a possible administrative penalty and continue to work cooperatively with the OEE.

In the ordinary course of business, we include indemnification provisions in certain of our customer contracts to indemnify, hold harmless and reimburse such customers for certain losses, including but not limited to losses related to third-party claims of intellectual property infringement arising from the customer's use of our products or services. We may also, from time to time, receive indemnification requests from customers related to third-party claims that 911 calls were improperly routed during an emergency. We evaluate such claims as and when they arise. We do not always agree with customers that they are entitled to indemnification and in such cases reject their claims. Despite maintaining that we have properly carried out our duties, we may seek coverage under our various insurance policies; however, we cannot be sure that we will be able to maintain or obtain insurance coverage at acceptable costs or in sufficient amounts or that our insurer will not disclaim coverage as to such claims. Accordingly, pending or future claims asserted against us by a party that we agree to indemnify could result in legal costs and damages that could have a material adverse effect on our consolidated results of operations and financial condition.

There are certain other pending and threatened legal actions which arise in the normal course of business. Although the ultimate outcome of litigation is difficult to accurately predict, we believe that the outcome of these other pending and threatened actions will not have a material adverse effect on our consolidated financial condition or results of operations.

(c) Employment Change of Control and Indemnification Agreements

We have an employment agreement with our CEO and President. The employment agreement generally provides for an annual salary and bonus award. We have also entered into change of control agreements with certain of our executive officers and certain key employees. All of these agreements may require payments by us, in certain circumstances, including, but not limited to, a change in control of our Company.

(14) Goodwill

The following table represents goodwill by reportable operating segment, including the changes in the net carrying value of goodwill during the fiscal year ended July 31, 2019:

	Commercial Solutions	Government Solutions	Total
Balance as of July 31, 2018	$ 231,440,000	59,193,000	$ 290,633,000
Addition resulting from Solacom acquisition	11,808,000	—	11,808,000
Addition resulting from the GD NG-911 acquisition	8,048,000	—	8,048,000
Balance as of July 31, 2019	$ 251,296,000	59,193,000	$ 310,489,000

As discussed further in *Note (2)* -"*Acquisitions*," the goodwill resulting from the acquisitions of Solacom and the GD NG-911 business was based upon valuation and estimates and assumptions that are subject to change within the purchase price allocation period (generally one year from the acquisition date).

In accordance with FASB ASC 350 "*Intangibles - Goodwill and Other,*" we perform a goodwill impairment analysis at least annually (in the first quarter of each fiscal year), unless indicators of impairment exist in interim periods. If we fail the quantitative assessment of goodwill impairment ("quantitative assessment"), we would be required to recognize an impairment loss equal to the amount that a reporting unit's carrying value exceeded its fair value; however, any loss recognized should not exceed the total amount of goodwill allocated to that reporting unit.

On August 1, 2019 (the first day of our fiscal 2020), we performed our annual quantitative assessment using market participant assumptions to determine if the fair value of each of our reporting units with goodwill exceeded its carrying value. In making this assessment, we considered, among other things, expectations of projected net sales and cash flows, assumptions impacting the weighted average cost of capital, trends in trading multiples of comparable companies, changes in our stock price and changes in the carrying values of our reporting units with goodwill. We also considered overall business conditions.

In performing the quantitative assessment, we estimated the fair value of each of our reporting units using a combination of the income and market approaches. The income approach, also known as the discounted cash flow ("DCF") method, utilizes the present value of cash flows to estimate fair value. The future cash flows for our reporting units were projected based on our estimates, at that time, of future revenues, operating income and other factors (such as working capital and capital expenditures). For purposes of conducting our impairment analysis, we assumed revenue growth rates and cash flow projections that are below our actual long-term expectations. The discount rates used in our DCF method were based on a weighted-average cost of capital ("WACC") determined from relevant market comparisons, adjusted upward for specific reporting unit risks (primarily the uncertainty of achieving projected operating cash flows). A terminal value growth rate was applied to the final year of the projected period, which reflects our estimate of stable, perpetual growth. We then calculated a present value of the respective cash flows for each reporting unit to arrive at an estimate of fair value under the income approach. Under the market approach, we estimated a fair value based on comparable companies' market multiples of revenues and earnings before interest, taxes, depreciation and amortization and factored in a control premium. Finally, we compared our estimates of fair values to our August 1, 2019 total public market capitalization and assessed implied control premiums based on our common stock price of $29.54 as of August 1, 2019.

Based on our quantitative evaluation, we determined that our Commercial Solutions and Government Solutions reporting units had estimated fair values in excess of their carrying values of at least 29.0% and 122.2%, respectively, and concluded that our goodwill was not impaired and that neither of our two reporting units was at risk of failing the quantitative assessment. It is possible that, during fiscal 2020 or beyond, business conditions (both in the U.S. and internationally) could deteriorate from the current state, our current or prospective customers could materially postpone, reduce or even forgo purchases of our products and services to a greater extent than we currently anticipate, or our common stock price could decline. A significant decline in our customers' spending that is greater than we anticipate or a shift in funding priorities may also have a negative effect on future orders, sales, income and cash flows and we might be required to perform a quantitative assessment during fiscal 2020 or beyond. If assumed net sales and cash flow projections are not achieved in future periods or our common stock price significantly declines from current levels, our Commercial Solutions and Government Solutions reporting units could be at risk of failing the quantitative assessment and goodwill assigned to the respective reporting units could be impaired.

In any event, we are required to perform the next annual goodwill impairment analysis on August 1, 2020 (the start of our fiscal 2021). If our assumptions and related estimates change in the future, or if we change our reporting unit structure or other events and circumstances change (e.g., a sustained decrease in the price of our common stock (considered on both absolute terms and relative to peers)), we may be required to record impairment charges when we perform these tests, or in other future periods. Any impairment charges that we may record in the future could be material to our results of operations and financial condition.

(15) Intangible Assets

Intangible assets with finite lives as of July 31, 2019 and 2018 are as follows:

	July 31, 2019			
	Weighted Average Amortization Period	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Customer relationships	20.5	$ 276,834,000	66,484,000	$ 210,350,000
Technologies	12.7	92,649,000	59,522,000	33,127,000
Trademarks and other	16.7	31,026,000	12,613,000	18,413,000
Total		$ 400,509,000	138,619,000	$ 261,890,000

	July 31, 2018			
	Weighted Average Amortization Period	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
Customer relationships	21.0	$ 249,831,000	55,350,000	$ 194,481,000
Technologies	12.8	82,370,000	54,386,000	27,984,000
Trademarks and other	16.4	28,894,000	10,563,000	18,331,000
Total		$ 361,095,000	120,299,000	$ 240,796,000

The weighted average amortization period in the above table excludes fully amortized intangible assets.

Amortization expense for the fiscal years ended July 31, 2019, 2018 and 2017 was $18,320,000, $21,075,000 and $22,823,000, respectively.

As further discussed in *Note (2)* -"*Acquisitions*," intangible assets as of July 31, 2019 include recently acquired intangibles resulting from the acquisitions of Solacom and the GD NG-911 business.

The estimated amortization expense consists of the following for the fiscal years ending July 31:

2020	$ 20,700,000
2021	19,563,000
2022	18,322,000
2023	18,322,000
2024	17,631,000

We review net intangible assets with finite lives for impairment when an event occurs indicating the potential for impairment. No such event has occurred during the fiscal year ended July 31, 2019. We believe that the carrying values of our net intangible assets were recoverable as of July 31, 2019. Any impairment charges that we may record in the future could be material to our results of operations and financial condition.

(16) Stockholders' Equity

Sale of Common Stock

In December 2018, we filed a $400,000,000 shelf registration with the SEC for the sale of various types of securities, including debt. The shelf registration was declared effective by the SEC as of December 14, 2018. To-date, we have not issued any securities related to our $400,000,000 shelf registration.

Stock Repurchase Program

As of July 31, 2019 and September 24, 2019, we were authorized to repurchase up to an additional $8,664,000 of our common stock, pursuant to our current $100,000,000 stock repurchase program. Our stock repurchase program has no time restrictions and repurchases may be made in open-market or privately negotiated transactions and may be made pursuant to SEC Rule 10b5-1 trading plans. There were no repurchases made during the fiscal years ended July 31, 2019 or 2018.

Dividends

Since September 2010, we have paid quarterly dividends pursuant to an annual targeted dividend amount that was established by our Board of Directors. On September 26, 2018, December 6, 2018, March 6, 2019 and June 5, 2019, our Board of Directors declared a dividend of $0.10 per common share, which were paid on November 16, 2018, February 15, 2019, May 17, 2019 and August 16, 2019, respectively. On September 24, 2019, our Board of Directors declared a dividend of $0.10 per common share, payable on November 15, 2019 to stockholders of record at the close of business on October 16, 2019.

Future dividends remain subject to compliance with financial covenants under our Credit Facility as well as Board approval.

(17) Unaudited Quarterly Financial Data

The following is a summary of unaudited quarterly operating results:

Fiscal 2019	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	
Net sales	$ 160,844,000	164,133,000	170,448,000	176,372,000	$ 671,797,000	
Gross profit	57,769,000	61,245,000	64,416,000	64,010,000	247,440,000	
Net income	3,468,000	7,826,000	7,612,000	6,135,000	25,041,000	
Diluted income per share	0.14	0.32	0.31	0.25	1.03	*

Fiscal 2018	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	
Net sales	$ 121,569,000	133,731,000	147,854,000	167,435,000	$ 570,589,000	
Gross profit	47,716,000	50,801,000	62,436,000	62,988,000	223,941,000	
Net (loss) income	(1,660,000)	15,761,000	8,210,000	7,458,000	29,769,000	
Diluted (loss) income per share	(0.07)	0.66	0.34	0.31	1.24	*

Fiscal 2017	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total	
Net sales	$ 135,786,000	139,028,000	127,792,000	147,762,000	$ 550,368,000	
Gross profit	52,108,000	53,204,000	52,461,000	60,412,000	218,185,000	
Net (loss) income	(2,489,000)	6,585,000	4,417,000	7,314,000	15,827,000	
Diluted (loss) income per share	(0.11)	0.28	0.19	0.31	0.67	*

* The per share information is computed independently for each quarter and the full year based on the respective weighted average number of common shares outstanding. Therefore, income per share information for the full fiscal year may not equal the total of the quarters within the year.

Schedule II

COMTECH TELECOMMUNICATIONS CORP.
AND SUBSIDIARIES

Valuation and Qualifying Accounts and Reserves

Fiscal Years Ended July 31, 2019, 2018 and 2017

Column A	Column B	Column C Additions				Column D		Column E
Description	Balance at beginning of period	Charged to cost and expenses		Charged to other accounts - describe		Transfers (deductions) - describe		Balance at end of period
Allowance for doubtful accounts receivable:								
Year ended July 31,								
2019	$ 1,761,000	1,136,000	(A)	—		(1,030,000)	(B)	$ 1,867,000
2018	1,300,000	573,000	(A)	—		(112,000)	(B)	1,761,000
2017	1,029,000	497,000	(A)	—		(226,000)	(B)	1,300,000
Inventory reserves:								
Year ended July 31,								
2019	$ 17,427,000	6,015,000	(C)	—		(3,746,000)	(D)	$ 19,696,000
2018	16,019,000	5,628,000	(C)	—		(4,220,000)	(D)	17,427,000
2017	16,198,000	2,900,000	(C)	—		(3,079,000)	(D)	16,019,000
Valuation allowance for deferred tax assets:								
Year ended July 31,								
2019	$ 11,854,000	58,000	(E)	656,000	(F)	—		$ 12,568,000
2018	8,633,000	3,221,000	(E)	—		—		11,854,000
2017	9,624,000	324,000	(E)	121,000	(F)	(1,436,000)	(F)	8,633,000

(A) Provision for doubtful accounts.
(B) Write-off of uncollectible receivables.
(C) Provision for excess and obsolete inventory.
(D) Write-off of inventory.
(E) Change in valuation allowance.
(F) Acquisition related valuation allowance charged to (deducted from) goodwill.

Exhibit 10(f)(2)

LONG TERM PERFORMANCE SHARE AWARD AGREEMENT PURSUANT TO THE COMTECH TELECOMMUNICATIONS CORP. 2000 STOCK INCENTIVE PLAN

THIS LONG TERM PERFORMANCE SHARE AWARD AGREEMENT (this "Agreement"), made effective as of [GRANT DATE], by and between Comtech Telecommunications Corp. (the "Company") and [PARTICIPANT NAME] (the "Participant").

WHEREAS, the Board of Directors of the Company (the "Board") adopted, and the stockholders of the Company approved, the Comtech Telecommunications Corp. 2000 Stock Incentive Plan (Amended and Restated Effective [DATE]) (as amended and/or restated from time to time, the "Plan");

WHEREAS, pursuant to Section 3.3 of the Plan, the Committee appointed by the Company's Board of Directors to administer the Plan (the "Committee") has adopted the Guidelines for Deferrable Long Term Performance Shares Granted under the Plan, as amended and in effect at the date hereof (the "Guidelines");

WHEREAS, the Company, through the Committee under the Plan, wishes to grant to the Participant a Performance Share Award under Article IX of the Plan that, following the achievement of the specified levels of performance, as set forth on the document titled "Performance Goals and Corresponding Earned Shares" attached hereto as Appendix A (the "Performance Goals"), and, subject to the Participant's continuing service with the Company or an Affiliate through the Final Certification Date (as defined below), may provide for the issuance of a number of shares of the Company's Common Stock corresponding to the level of achievement of the Performance Goals (subject to accelerated earning, vesting and payment of such shares as specifically provided herein);

WHEREAS, the Performance Goals are intended to constitute "Performance Goals," as set forth under the Plan; and

WHEREAS, such shares of Common Stock, when issued to the Participant, shall be subject to the terms of this Agreement.

NOW, THEREFORE, the Company and the Participant agree as follows

1. **Grant of Performance Share Award.** Subject to the restrictions, terms and conditions of the Plan, the Guidelines and this Agreement, on [GRANT DATE] (the "Grant Date") the Company awarded and granted to the Participant an award under Article IX of the Plan with the designated target number of [TARGET PERFORMANCE SHARES] Performance Shares (the "Target Performance Shares"), and providing to the Participant a conditional right to earn the Target Performance Shares, or a number of Performance Shares for each Applicable Performance Period (as defined below) ranging from 70% (at each applicable Threshold Performance level) to 200% (at each applicable Maximum Performance level) of the Target Performance Shares, by achievement of the designated levels of performance of each performance criteria as specified in the Performance Goals attached hereto as Appendix A, the earning of which would entitle the Participant to receive for each Performance Share earned, in accordance with Section 2 below, one share of Common Stock, subject to the provisions of Sections 3 and 4 below (the "Performance Share Award"). The Performance Shares granted under the Performance Share Award are Deferrable Performance Shares under the Guidelines, and the payment of shares of Common Stock

following vesting of Earned Shares (as defined below) in accordance with the terms and conditions of this Agreement may be deferred by the Participant in accordance with Section 4.2 of the Guidelines. If the Participant desires to defer the payment of Earned Shares, the Participant must complete an election form prescribed by the Committee and deliver it to the Company no later than six months before the end of the Applicable Performance Period (as defined in Section 2) or, if earlier, the date the number of Performance Shares to be earned has become readily ascertainable within the meaning of Treasury Regulation Section 1.409A-2(a)(8).

2. **Certification Date.** Subject to the Participant's not incurring a Termination of Employment prior to the Final Certification Date (except as otherwise specifically set forth in this Agreement), upon the Committee determining and certifying the achievement of the Applicable Performance Goals on each of the applicable Annual Certification Dates with respect to the performance period beginning on [FULL PERFORMANCE PERIOD] (the "Full Three-Year Performance Period"), the performance period commencing on [FIRST APPLICABLE PERFORMANCE PERIOD], or the performance period beginning on [SECOND APPLICABLE PERFORMANCE PERIOD] (each an "Applicable Performance Period"), the Participant shall have the right to receive one share of Common Stock for each Performance Share earned based on the level of attainment of the applicable Performance Goals for the Applicable Performance Period in accordance with Appendix A ("Earned Shares") during the Applicable Performance Period, subject to the Participant remaining employed through the applicable Annual Certification Date, except as otherwise provided in Section 3. The Committee shall certify the level of achievement of each of the Performance Goals no later than seventy-five (75) days following the end of the Applicable Performance Period (the date of each such certification the "Annual Certification Date", and the date of the Annual Certification Date following the Full Three-Year Performance Period, the "Final Certification Date"), at which time a number of Earned Shares calculated in accordance with this Section 2 and Appendix A hereto shall become earned. All Performance Shares that do not become Earned Shares following the Committee's certification on the Final Certification Date under the terms hereof shall be forfeited on such Final Certification Date.

3. **Death or Disability/Change in Control before the Final Certification Date; Effect of Terminations of Employment.**

3.1. Death**, Disability and Termination of Employment.**

(i) In the event of the Participant's death or Disability prior to the Final Certification Date and prior to forfeiture of the Performance Shares, the Performance Goals for the Full Three-Year Performance Period shall be deemed to be satisfied at a level equal to the greater of the designated Target Performance level or the Projected Performance Level (as defined in Appendix A) as of the date of such death or Disability, and the resulting number of Earned Shares less Earned Shares earned for a prior completed Applicable Performance Period (if any), together with the number of Earned Shares earned for any previously completed Applicable Performance Period shall become fully vested and shall (subject to Plan Section 17.13) be distributed to the Participant or his or her beneficiary within sixty (60) days following the end of the fiscal quarter in which the Participant's death or Disability occurs. The term "Disability" shall have the meaning as set forth in Plan Section 2.14 treating the Performance Shares as being subject to Code Section 409A, provided that a "Disability" shall be deemed to have occurred only if it qualifies as a disability within the meaning of Treasury Regulation Section 1.409A-1(e)(1).

(ii) In the event of the Participant's Termination of Employment without Cause (and other than due to death or Disability) on a date that is both prior to the Final Certification Date and prior to a 409A Change in Control occurring, the Participant shall earn for each Applicable Performance Period not completed on the date of the Termination of Employment a number of Earned Shares (which shall not be less than zero) in an amount equal to: (I) the product of (x) the number of Performance Shares the Participant would have earned based on the projected achievement of each of the Performance Goals for the Applicable Performance Period which shall be calculated utilizing the actual achievement of the applicable portion of the Performance Goals and assuming the same level of performance through the end of the Applicable Performance Period, measured on the last day of the fiscal quarter in which the Termination of Employment occurs, times (y) a fraction, the numerator of which is the number of days during the Applicable Performance Period in which the Participant was employed, and the denominator of which is the number of days in the Applicable Performance Period; less (II) any Earned Shares earned for any prior Applicable Performance Periods. The resulting number of Earned Shares (if any) plus the Earned Shares previously earned for previously completed Applicable Performance Periods (if any), shall become fully vested and shall (subject to Plan Section 17.13) be distributed to the Participant in accordance with Section 4 hereof, subject to Participant's timely execution and non-revocation of a release agreement prior to the Final Certification Date in a form required by the Company.

(iii) In the event of a Termination of Employment due to the Participant's resignation for any or no reason on a date that is both prior to the Final Certification Date and prior to a 409A Change in Control occurring, the following provisions shall apply:

(a) If on the Grant Date, the Participant has ten or more years of qualifying service with the Company (as determined by the Committee in its sole discretion) (a "Qualifying Long-Term Employee"), any Earned Shares earned with respect to any previously-completed Applicable Performance Period shall be forfeited and disregarded, and the Participant shall earn for the Full Three-Year Performance Period a number of Earned Shares (which shall not be less than zero) in an amount equal to the product of (x) the number of Performance Shares the Participant would have earned based on the actual achievement of each of the Performance Goals for the Full Three-Year Performance Period if the Participant remained employed by the Company through the Final Certification Date, times (y) a fraction, the numerator of which is the number of days during the Full Three-Year Performance Period that the Participant was employed by the Company, and the denominator of which is 1,095. The resulting number of Earned Shares (if any) shall become fully vested and shall (subject to Plan Section 17.13) be distributed to the Participant in accordance with Section 4 hereof, subject to Participant's timely execution and non-revocation of a release agreement prior to the Final Certification Date in a form required by the Company.

(b) If on the Grant Date, the Participant is not a Qualifying Long-Term Employee, all Performance Shares, including any Earned Shares, shall be forfeited on the date of such Termination of Employment for no consideration.

(iv) In the event of a Termination of Employment for Cause, all Performance Shares, including any Earned Shares, shall be forfeited on the date of such Termination of Employment for Cause for no consideration.

3.2. **409A Change in Control.** In the event of a 409A Change in Control prior to the Final

Certification Date, the Performance Goal for the Full Three-Year Performance Period shall be deemed to be satisfied at a level equal to the greater of the designated Target Performance level or the Projected Performance Level (as defined in Appendix A) as of the date of such 409A Change in Control, and the resulting number of earned Performance Shares, less any previously earned Earned Shares, shall be deemed to be Earned Shares and shall become fully vested as of the 409A Change in Control (including in the case of a Participant whose employment terminated between the time of the 409A Change in Control and the Assumption Deadline (as defined below)) and all vested Earned Shares shall (subject to Plan Section 17.13 and any limitations under Section 409A of the Code) be distributed to the Participant within sixty (60) days following the end of the fiscal quarter in which the 409A Change in Control occurs, provided, that, notwithstanding the foregoing, if the Committee reasonably determines in good faith but subject to and only in accordance with Section 409A of the Code, prior to the Assumption Deadline, that any Performance Shares that are not Earned Shares shall be honored or assumed, or new awards substituted therefor (each such honored, assumed or substituted Performance Share hereinafter called an "Alternative Performance Share"), by Participant's employer (or the parent or a subsidiary of such employer) by the Assumption Deadline, then no acceleration of earning or vesting shall occur with respect to the Performance Shares solely due to such event, provided that, such Alternative Performance Shares must meet the following criteria:

(i) Each Alternative Performance Share must be based on stock that is traded on an established securities market, or that will be so traded within 30 days after the 409A Change in Control, or provide for a cash payment not less than the cash value of the Performance Share based on the highest consideration per share received by a holder of Common Stock in the transaction or series of transactions that gave rise to the 409A Change in Control;

(ii) The Alternative Performance Shares must provide such Participant with rights, terms, conditions and entitlements substantially equivalent to or better than the rights, terms, conditions and entitlements applicable under the Performance Shares, including, but not limited to, an identical or better vesting schedule than applied prior to the 409A Change in Control;

(iii) The Alternative Performance Share must have economic value substantially equivalent to the value of each Performance Share (such equivalent values to be determined as of the time of the 409A Change in Control);

(iv) In furtherance of clause (ii) above, the performance goal applicable to the Alternative Performance Shares (the "Alternative Performance Goal") and the corresponding level at which Alternative Performance Shares shall be earned must be determined by the Committee to be not less probable of being achieved than the Performance Goal immediately prior to the 409A Change in Control (assuming the 409A Change in Control had not occurred and assuming that the Company had incurred no expense in connection with the 409A Change in Control);

(v) The Alternate Performance Shares must be structured in a manner intended to comply with Section 409A of the Code to avoid any adverse tax consequences thereunder, to the extent applicable;

(vi) The Alternative Performance Shares shall provide that, in the event that, within two years following the 409A Change in Control and prior to the Final Certification Date, either the Participant has a Termination of Employment by his or her employer other than for Cause (with the result that immediately thereafter the Participant is not employed by such employer or its parent or other affiliates or that the Alternative Performance Shares otherwise would be forfeited under their terms but for this provision), or if the Participant would be paid a CIC Payment under Section 3(b)(i) of the Company's Change-in-Control Agreement upon a Termination of Employment by the Participant for "Good Reason" (however designated), or under any other agreement with the employer or its parent or other affiliates and Participant effects a Termination of Employment for such Good Reason, then the Alternative Performance Goal for the Full Three-Year Performance Period shall be deemed to be satisfied at the Maximum Performance level as of the date of such Termination of Employment, and the resulting number of earned Alternative Performance Shares less any Performance Shares previously earned for a completed Applicable Performance Period, which together with Earned Shares previously earned for previously completed Applicable Performance Periods (if any) shall be the resulting Earned Shares (or awarded cash), shall become fully vested (to the extent not vested prior thereto) and shall be distributed to the Participant within five business days thereafter.

(vii) Any changes after the 409A Change in Control to the businesses the performance of which is measured under the Alternative Performance Goal, including but not limited to asset sales or dispositions, reorganizations, restructurings, acquisitions, or discontinuations of operations, that will or could have an adverse effect on the performance criteria under the Alternative Performance Goal during the Full Three-Year Performance Period shall be accompanied by adjustments to the Alternative Performance Goal so that such changes do not reduce the probability of the Performance Goal being achieved at the level that would have been obtained in the absence of such changes.

For purposes of this Section 3.2, the "Assumption Deadline" shall be the date of the 409A Change in Control if the Company had at least 20 days' advance notice that the 409A Change in Control was anticipated to occur, and otherwise the Assumption Deadline shall be the date ten business days after the 409A Change in Control.

The provisions of this Agreement supersede Plan Section 14.1(a).

4. **Vesting and Distribution of Earned Shares.** Subject to Section 3, Earned Shares shall vest and be distributed to the Participant on the Final Certification Date; provided, that, in the event the Participant has made a valid deferral election in accordance with Section 4.2 of the Guidelines the vested Earned Shares shall be distributed to the Participant in accordance with such deferral election and the Guidelines (a "Deferral Election").

Except as otherwise provided herein, there shall be no proportionate or partial vesting in the periods prior to the Final Certification Date and all vesting shall occur only on the Final Certification Date.

5. **Dividend Equivalents.** In the event that the Company declares and pays ordinary cash dividends on its outstanding Common Stock the record date for which is on or after the Grant Date and on or before the date of distribution of Earned Shares (including during any period of deferral at the election of the Participant), the Participant shall be credited, as of the dividend payment date, for each Performance Share that is potentially earnable under this Agreement, a cash amount equivalent to the cash amount paid at that date on one share of Common Stock, under Section 9.2(d) of the Plan. Such credited cash amount of dividend equivalents shall be earned and vested if and only if the related Performance Share becomes earned and vested (i.e., it is forfeitable to the same extent as the related Performance Share). No interest will be credited on accrued dividend equivalents. Dividend equivalents will be distributable at such time as the Earned Shares resulting from the earning and vesting of the Performance Shares to which the dividend equivalents relate

are distributed; provided, however, that the Company may withhold cash dividend equivalents to satisfy then applicable tax withholding obligations relating to Earned Shares (to minimize the number of Earned Shares being withheld to satisfy tax obligations) under Section 12.

6. **Detrimental Activity.** In the event the Participant engages in Detrimental Activity prior to, or during the one year period following the earlier of the Participant's Termination of Employment or the Final Certification Date, the Committee may direct (at any time within one year thereafter) that all Performance Shares shall be immediately forfeited to the Company and that the Participant shall pay over to the Company an amount equal to the gain realized at the time of vesting and distribution of any Earned Shares.

7. **Restrictions on Transfer.** The Participant shall not sell, negotiate, transfer, pledge, hypothecate, assign, encumber, anticipate or otherwise dispose of the Performance Share Award or Performance Shares, and such Performance Share Award and Performance Shares shall not be subject to attachment or garnishment by creditors of Participant or Participant's beneficiaries (if any), except as specifically permitted by the Plan and this Agreement, and only to the extent permitted under Code Section 409A. Any attempted Transfer in violation of this Agreement and the Plan shall be void and of no effect.

8. **Issuance Restrictions.** The Company is not obligated to issue any securities if, in the opinion of counsel for the Company, the issuance of such Common Stock shall constitute a violation by the Participant or the Company of any provisions of any law or of any regulations of any governmental authority or any national securities exchange.

9. **Securities Representations.** The shares of Common Stock will be issued to the Participant and this Agreement is being made by the Company in reliance upon the following express representations and warranties of the Participant. The Participant acknowledges, represents and warrants that:

9.1. The Participant has been advised that the Participant may be an "affiliate" within the meaning of Rule 144 under the Securities Act and in this connection the Company is relying in part on the Participant's representations set forth in this section;

9.2. The Common Stock must be held indefinitely by the Participant unless (i) an exemption from the registration requirements of the Securities Act is available for the resale of such Common Stock or (ii) the Company files an additional registration statement (or a "re-offer prospectus") with regard to the resale of such Common Stock and the Company is under no obligation to continue in effect a Form S-8 Registration Statement or to otherwise register the resale of the Common Stock (or to file a "re-offer prospectus");

9.3. The exemption from registration under Rule 144 will not be available under current law unless (i) a public trading market then exists for the Common Stock, (ii) adequate information concerning the Company is then available to the public, and (iii) other terms and conditions of Rule 144 or any exemption therefrom are complied with and that any sale of the Common Stock may be made only in limited amounts in accordance with such terms and conditions.

10. **Not an Employment Agreement.** Neither the execution of this Agreement nor the issuance of the Performance Share Award or the Common Stock hereunder constitute an agreement by the Company to employ or to continue to employ the Participant during the entire, or any portion of, the term of this Agreement, including but not limited to any period during which any shares of Common Stock are outstanding.

11. **Power of Attorney.** The Company, its successors and assigns, is hereby appointed the attorney-in-fact, with full power of substitution, of the Participant for the purpose of carrying out the provisions of this Agreement and taking any action and executing any instruments which such attorney-in-fact may deem necessary or advisable to accomplish the purposes hereof, which appointment as attorney-in-fact is irrevocable and coupled with an interest. The Company, as attorney-in-fact for the Participant, may in the name and stead of the Participant, make and execute all conveyances, assignments and transfers of Common Stock and property provided for herein, and the Participant hereby ratifies and confirms that which the Company, as said attorney-in-fact, shall do by virtue hereof. Nevertheless, the Participant shall, if so requested by the Company, execute and deliver to the Company all such instruments as may, in the judgment of the Company, be advisable for this purpose.

12. **Withholding.** The Participant acknowledges that the Participant is solely responsible for all applicable foreign, federal, state, and local taxes with respect to the Performance Share Award and the payments thereunder; provided, however, that at any time the Company is required or permitted to withhold any such taxes (including, without limitation, any employment taxes), the Participant shall pay, or make arrangements to pay, in a manner satisfactory to the Company, an amount equal to the amount of all applicable federal, state and local or foreign taxes that the Company is required or permitted to withhold at any time, including, if then permitted by the Company, by electing to reduce the number of shares of Common Stock otherwise then deliverable to the Participant under this Agreement. Unless the Participant has informed the Company of the Participant's intent to make alternate arrangements to satisfy the Participant's withholding obligations satisfactory to the Company within either sixty (60) days in advance of the applicable tax date or at a time when the participant is not otherwise precluded from trading Common Stock under the Company's insider trading policies (unless otherwise determined by the Company) and relevant amounts are actually paid, the Company or one of its Affiliates shall have the automatic right to withhold such taxes from any amounts payable to the Participant (including salary, wages and other compensation), including, but not limited to, the right to withhold shares of Common Stock otherwise deliverable to the Participant under this Agreement. The Company will withhold taxes (e.g., federal, state and local taxes, including payroll taxes) in an amount at least equal to the statutory minimum taxes required to be withheld; provided, however, at the Participant's advance election the participant may request the Company withhold additional amounts up to the Participant's maximum individual tax rate in each relevant jurisdiction applicable to the Participant at such time of withholding, so long as the withholdings do not result in this Performance Share Award being classified as a liability-based award in accordance with applicable accounting standards.

13. **Miscellaneous.**

13.1. This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective heirs, personal legal representatives, successors, trustees, administrators, distributees, devisees and legatees. The Company may assign to, and require, any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company or any affiliate by which the Participant is employed to expressly assume and agree in writing to perform this Agreement. Notwithstanding the foregoing, the Participant may not assign this Agreement other than with respect to shares of Common Stock Transferred in compliance with the terms hereof.

13.2. This award of the Performance Share Award and the issuance of Common Stock thereunder shall not affect in any way the right or power of the Board or stockholders of the Company to make or authorize an adjustment, recapitalization or other change in the capital structure or the business of the Company, any merger or consolidation of the Company or subsidiaries, any issue of bonds, debentures, preferred or prior preference stock ahead of or affecting the Common Stock, the dissolution or liquidation of the Company, any sale or transfer of all or part of its assets or business or any other corporate act or proceeding. Performance Shares and Earned Shares shall be subject to adjustment in accordance with Section 4.2(b) of the Plan, including during any period in which payment of the Award is deferred at the election of Participant. For clarity, ordinary dividends on Common Stock will not trigger adjustments to Performance Shares and Earned Shares, and any adjustments to Performance Shares and Earned Shares shall take into account dividend equivalents credited thereon under Section 5.

13.3. The Participant agrees that the award of the Performance Share Award under this Agreement and the issuance of Common Stock thereunder is special incentive compensation and that the Performance Share Award (even if treated as compensation for tax purposes) will not be taken into account as "salary" or "compensation" or "bonus" in determining the amount of any payment under any pension, retirement or profit-sharing plan of the Company or any life insurance, disability or other benefit plan of the Company.

13.4. No modification or waiver of any of the provisions of this Agreement shall be effective unless in writing and signed by the party against whom it is sought to be enforced.

13.5. The failure of any party hereto at any time to require performance by another party of any provision of this Agreement shall not affect the right of such party to require performance of that provision, and any waiver by any party of any breach of any provision of this Agreement shall not be construed as a waiver of any continuing or succeeding breach of such provision, a waiver of the provision itself, or a waiver of any right under this Agreement.

13.6. The headings of the sections of this Agreement have been inserted for convenience of reference only and shall in no way restrict or modify any of the terms or provisions hereof.

13.7. All notices, consents, requests, approvals, instructions and other communications provided for herein shall be in writing and validly given or made when delivered, or on the second succeeding business day after being mailed by registered or certified mail, whichever is earlier, to the persons entitled or required to receive the same, at the addresses set forth at the heading of this Agreement or to such other address as either party may designate by like notice. Notices to the Company shall be addressed to the Compensation Committee of the Board.

13.8. This Agreement shall be construed, interpreted and governed and the legal relationships of the parties determined in accordance with the internal laws of the State of Delaware without reference to rules relating to conflicts of law.

13.9. The right to receive each payment of Earned Shares shall be treated as a separate award for purposes of Section 409A of the Code.

14. **Rights as a Stockholder.** The Participant shall have no rights as a stockholder with respect to any shares of Common Stock covered by the Performance Share Award unless and until the Participant has become the holder of record of the shares of Common Stock.

15. **Provisions of Plan Control.** This Agreement is subject to all the terms, conditions and provisions of the Plan, including, without limitation, Section 17.13 of the Plan (Section 409A of the Code), the amendment provisions thereof, and to such rules, regulations and interpretations relating to the Plan as may be adopted by the Committee and as may be in effect from time to

time. The Plan is incorporated herein by reference. A copy of the Plan has been delivered to the Participant. If and to the extent that this Agreement conflicts or is inconsistent with the terms, conditions and provisions of the Plan, unless this Agreement expressly provides otherwise, the Plan shall control, and this Agreement shall be deemed to be modified accordingly. Unless otherwise indicated, any capitalized term used but not defined herein shall have the meaning ascribed to such term in the Plan. This Agreement contains the entire understanding of the parties with respect to the subject matter hereof (other than any other documents expressly contemplated herein or in the Plan) and supersedes any prior agreements between the Company and the Participant.

16. **Agreement and Grant Not Effective Unless Accepted.** By signing below the Participant agrees (i) to enter into this Agreement, and (ii) to the terms and conditions of the Agreement. Until the Participant signs below and the Agreement is countersigned by the Company, this Performance Share Award shall not be effective and, if the Participant does not sign below and return to the Company within 14 days from the date the Agreement is made available to the Participant, this Performance Share Award shall be null and void.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date and year first above written.

COMTECH TELECOMMUNICATIONS CORP.

____
Employee's Signature
Social Security No. __________

By: ______________________________
Authorized Officer

Home Address: ____________________
Street

____
City State Zip Code

APPENDIX A

LONG TERM PERFORMANCE SHARE AWARD AGREEMENT
Performance Goal and Corresponding Earned Shares
Under the Comtech Telecommunications Corp.
2000 Stock Incentive Plan, as Amended and Restated [DATE]

Fiscal [YEAR - YEAR] Performance Period

The Participant shall earn Performance Shares in accordance with the provisions set forth below, with any earned Performance Shares constituting Earned Shares under the Participant's Long Term Performance Share Award Agreement of which this Appendix is a part (the "Performance Share Agreement"). Capitalized terms in this Appendix shall have the meanings as defined in the Performance Share Agreement.

[PERFORMANCE GOALS]

Exhibit 10(g)(3)

[GRANT NUMBER]

RESTRICTED STOCK AWARD AGREEMENT
PURSUANT TO THE
COMTECH TELECOMMUNICATIONS CORP.
2000 STOCK INCENTIVE PLAN

Dear [Director Name]:

Preliminary Statement

As a non-employee director of Comtech Telecommunications Corp. (the "Company"), and pursuant to your election made in accordance with Section 13.6(a) of The Comtech Telecommunications Corp. 2000 Stock Incentive Plan, as amended (the "Plan"), you were automatically granted on [Date] (the "Grant Date"), pursuant to the terms of the Plan and this Restricted Stock Award Agreement (this "Agreement"), the number of shares of Restricted Stock set forth below.

The terms of the grant are as follows:

1. **Grant of Restricted Stock**. Subject in all respects to the Plan and the terms and conditions set forth herein and therein, on the Grant Date you were automatically granted [#] shares of Restricted Stock (the "Award"). To the extent required by law, you shall pay to the Company the par value ($0.10) for each share of Restricted Stock awarded to you simultaneously with the execution of this Agreement.

2. **Vesting**. This Award shall vest in installments over a five (5) year period, commencing on the Grant Date, at the rate of 20% effective on each of the first, second, third, fourth and fifth anniversaries of the Grant Date; provided that you have not incurred a Termination of Directorship (as defined below) prior to the applicable vesting date. Notwithstanding the foregoing, the Award shall become fully vested prior to your Termination of Directorship upon (i) your death or (ii) a Change in Control. Each anniversary date that a share of Restricted Stock becomes vested shall be referred to herein as the "Vesting Date".

There shall be no proportionate or partial vesting in the periods prior to each Vesting Date and all vesting shall occur only on the appropriate Vesting Date.

3. **Dividends**. Any dividends which would have been paid on shares of Restricted Stock but for the restrictions thereon prior to the Vesting Date shall be credited to a dividend book entry account on your behalf (any such credited amount, a "Dividend Equivalent"). Any cash Dividend Equivalents shall not be deemed to be reinvested in shares of Common Stock and will be held uninvested and without interest. Your right to receive any Dividend Equivalents with respect to cash dividends shall vest only if and when the related Restricted Stock vests, and an amount equal to such cash dividends shall be paid to you in cash on the applicable Vesting Date on which the Restricted Stock vests. Your right to receive any Dividend Equivalents with respect to dividends other than cash dividends shall vest only if and when the related Restricted Stock vests, and on the applicable Vesting Date you will be paid an

amount in cash equal to the Fair Market Value of the property underlying such dividend as of the applicable Vesting Date. Prior to the payment thereof, any Dividend Equivalents will be encompassed within the term "Award" with respect to the relevant shares of Restricted Stock.

4. **Termination**. Except as otherwise provided in Section 2 hereof, any shares of Restricted Stock (including any Dividend Equivalents credited thereupon) that are not vested upon your Termination of Directorship shall, upon such Termination of Directorship, terminate and be forfeited in their entirety as of the date of such Termination of Directorship. For the purposes of this Agreement, "Termination of Directorship" means that you have ceased to be a director of the Company; provided, that in the event that you become an Eligible Employee or a Consultant upon your ceasing to be a director, a Termination of Directorship shall not be deemed to occur until such time as such you are no longer an Eligible Employee or Consultant.

5. **Restriction on Transfer**. Unless otherwise approved by the Committee, the Award is not transferable other than by will or by the laws of descent and distribution. In addition, unless otherwise approved in writing by the Committee, the Award shall not be assigned, negotiated, pledged or hypothecated in any way (whether by operation of law or otherwise), and the Award shall not be subject to execution, attachment or similar process. Upon any attempt to transfer, assign, negotiate, pledge or hypothecate all or part of the Award or in the event of any levy upon the Award by reason of any execution, attachment or similar process contrary to the provisions hereof not otherwise approved in writing by the Committee, the Award shall immediately become null and void. In addition, you shall not be permitted to Transfer the shares of Restricted Stock (including any Dividend Equivalents credited thereupon) awarded to you prior to vesting.

6. **Legend**. You shall be issued your shares of Restricted Stock as book entries by the transfer agent, as evidencing ownership of shares of Restricted Stock. Any such book entry shares shall be registered in your name, and shall bear an appropriate legend referring to the terms, conditions, and restrictions applicable to such Award, substantially in the following form:

> "The anticipation, alienation, attachment, sale, transfer, assignment, pledge, encumbrance or charge of the shares of stock represented hereby are subject to the terms and conditions (including forfeiture) of The Comtech Telecommunications Corp. 2000 Stock Incentive Plan (the "Plan") and a Restricted Stock Award Agreement (the "Agreement") entered into between the registered owner and the Company dated [Date]. Copies of such Plan and Agreement are on file at the principal office of the Company."

7. **Rights as a Stockholder**. You shall have, with respect to your shares of Restricted Stock, all of the rights of a holder of shares of Common Stock of the Company including, without limitation, the right to vote such shares and, subject to and conditioned upon the full vesting of shares of Restricted Stock, the right to tender such shares; provided, however, that except as expressly provided herein, you shall not have the right to receive any dividends with respect to your shares of Restricted Stock unless and until your shares of Restricted Stock vest and all Dividend Equivalents shall be paid in cash. If and when your shares of Restricted Stock vest, the certificates for such shares shall be delivered to you. All legends shall be removed from said certificates at the time of delivery to you except as otherwise required by applicable law.

8. **Provisions of Plan Control**. This grant is subject to all the terms, conditions and provisions of the Plan, including, without limitation, the amendment provisions of the Plan, and to such rules, regulations and interpretations relating to the Plan as may be adopted by the Board of Directors of the Company and as may be in effect from time to time. Any capitalized term used but not defined herein shall have the meaning ascribed to such term in the Plan. The Plan is incorporated herein by reference. If and to the extent that this grant conflicts or is inconsistent with the terms, conditions and provisions of the Plan, the Plan shall control, and this grant shall be deemed to be modified accordingly.

9. **Notices**. Any notice or communication given hereunder shall be in writing and shall be deemed to have been duly given when delivered in person, or by United States mail, to the appropriate party at the address set forth below (or such other address as the party shall from time to time specify):

If to the Company, to:

Comtech Telecommunications Corp.
68 South Service Road, Suite 230
Melville, NY 11747
Attention: Secretary

If to you, to the address indicated after your signature at the end of this Agreement.

10. **Securities Representations**. The grant of the Award and the issuance of shares of Restricted Stock pursuant hereto shall be subject to, and in compliance with, all applicable requirements of federal, state or foreign securities law. No shares of Restricted Stock may be issued hereunder if the issuance of such shares would constitute a violation of any applicable federal, state or foreign securities laws or other law or regulations or the requirements of any stock exchange or market system upon which such shares may then be listed. As a condition to the grant of the Award, the Company may require you to satisfy any qualifications that may be necessary or appropriate, to evidence compliance with any applicable law or regulation.

The shares of Restricted Stock are being issued to you and this Agreement is being made by the Company in reliance upon the following express representations and warranties. By accepting this Award, you acknowledge, represent and warrant that:

(a) you have been advised that you may be an "affiliate" within the meaning of Rule 144 under the Securities Act of 1933, as amended (the "Act") and in this connection the Company is relying in part on your representations set forth in this section.

(b) if you are deemed to be an affiliate within the meaning of Rule 144 of the Act, the shares issued to you must be held indefinitely unless an exemption from any applicable resale restrictions is available or the Company files an additional registration statement (or a "re-offer prospectus") with regard to such shares and the Company is under no obligation to register the shares (or to file a "re-offer prospectus").

(c) if you are deemed to be an affiliate within the meaning of Rule 144 of the Act, you understand that the exemption from registration under Rule 144 will not be available unless (i) a public trading market then exists for the shares, (ii) adequate information concerning the Company is then available to the public, and (iii) other terms and conditions of Rule 144 or any exemption therefrom are complied with; and that any sales of the shares may be made only in limited amounts in accordance with such terms and conditions.

11. **Power of Attorney**. The Company, its successors and assigns, is hereby appointed the attorney-in-fact, with full power of substitution, of you for the purpose of carrying out the provisions of this Agreement and taking any action and executing any instruments which such attorney-in-fact may deem necessary or advisable to accomplish the purposes hereof, which appointment as attorney-in-fact is irrevocable and coupled with an interest. The Company, as attorney-in-fact for you, may in your name and stead, make and execute all conveyances, assignments and transfers of Common Stock and property provided for herein, and you hereby ratify and confirm that which the Company, as said attorney-in-fact, shall do by virtue hereof. Nevertheless, you shall, if so requested by the Company, execute and deliver to the Company all such instruments as may, in the judgment of the Company, be advisable for this purpose.

12. **Detrimental Activity**. In the event you engage in Detrimental Activity prior to, or during the one year period following your Termination of Directorship, the Board may direct (at any time within one year thereafter) that all shares of Common Stock delivered to you pursuant to this Agreement shall be immediately forfeited to the Company and you shall pay over to the Company an amount equal to the gain realized at the time of vesting of any the shares of Restricted Stock.

13. **Right to Terminate Directorship**. Neither the Plan nor the grant of the Award hereunder shall impose any obligations on the Company and/or the stockholders of the Company to retain you as a director, nor shall it impose any obligation on your part to remain as a director of the Company.

14. **Miscellaneous**.

(a) This Agreement shall inure to the benefit of and be binding upon the parties hereto and their respective heirs, personal legal representatives, successors, trustees, administrators, distributees, devisees and legatees. The Company may assign to, and require, any successor (whether direct or indirect, by purchase, merger, consolidation or otherwise) to all or substantially all of the business and/or assets of the Company or any affiliate to which you are rendering services to expressly assume and agree in writing to perform this Agreement. Notwithstanding the foregoing, you may not assign this Agreement other than with respect to shares of Common Stock Transferred in compliance with the terms hereof.

(b) This Award shall not affect in any way the right or power of the Board or stockholders of the Company to make or authorize an adjustment, recapitalization or other change in the capital structure or the business of the Company, any merger or consolidation of the Company or subsidiaries, any issue of bonds, debentures, preferred or prior preference stock ahead of or affecting the Common Stock, the dissolution or liquidation of the Company, any sale or transfer of all or part of its assets or business or any other corporate act or proceeding. The shares of Restricted Stock granted hereunder shall be subject to adjustment in accordance with Section 4.2(b) of the Plan.

(c) No modification or waiver of any of the provisions of this Agreement shall be effective unless in writing and signed by the party against whom it is sought to be enforced.

(d) The failure of any party hereto at any time to require performance by another party of any provision of this Agreement shall not affect the right of such party to require performance of that provision, and any waiver by any party of any breach of any provision of this Agreement shall not be construed as a waiver of any continuing or succeeding breach of such provision, a waiver of the provision itself, or a waiver of any right under this Agreement.

(e) The headings of the sections of this Agreement have been inserted for convenience of reference only and shall in no way restrict or modify any of the terms or provisions hereof.

(f) This Agreement shall be construed, interpreted and governed and the legal relationships of the parties determined in accordance with the internal laws of the State of Delaware without reference to rules relating to conflicts of law.

15. **Agreement and Grant Not Effective Unless Accepted**. By selecting the "Accept" button below you agree (i) to enter into this Agreement electronically, and (ii) to the terms and conditions of the Agreement. Until you select the "Accept" button below and accept the corresponding Irrevocable Stock Power (the "Power"), this Award shall not be effective and if you do not select the "Accept" button and accept the corresponding Power within 14 days from the date the Agreement is made available to you electronically this Award shall be null and void.

IRREVOCABLE STOCK POWER

KNOW ALL MEN BY THESE PRESENTS, that [Director Name] (the "Transferor"), for value received, has assigned and transferred, and by these presents does assign and transfer unto Comtech Telecommunications Corp., a Delaware corporation, (the "Company") [#] shares of the common stock, par value $0.10 per share, of the Company standing in the Transferor's name on the books of the Company, and does hereby constitute and appoint the Secretary of the Company, his true and lawful attorney, irrevocable for him and in his name and stead, to assign, transfer and set over said stock, and for that purpose, to make and execute all necessary acts of assignment and transfer, and one or more persons to substitute with like full power, hereby ratifying and confirming all that his said attorney, or the substitute or substitutes, shall lawfully do by virtue hereof.

By selecting the "Accept" button below you, [Director Name], agree (i) to execute this Irrevocable Stock Power (the "Power") electronically, and (ii) to the terms and conditions of the Power. Until you select the "Accept" button below, this Power shall not be effective and if you do not select the "Accept" button and accept the corresponding Restricted Stock Award within 14 days from the date the Power is made available to you electronically this Power shall be null and void.

Exhibit 21

Subsidiaries of Comtech Telecommunications Corp.*

Subsidiaries	Jurisdiction of Incorporation
Comtech AeroAstro, Inc.	Delaware
Comtech EF Data Corp.	Delaware
Comtech EF Data Pte. Ltd.	Singapore
Comtech Mobile Datacom Corporation	Delaware
Comtech PST Corp.	New York
Comtech Systems, Inc.	Delaware
Comtech Xicom Technology, Inc.	California
Beijing Comtech EF Data Equipment Repair Service, Co., Ltd. (a subsidiary of Comtech EF Data Corp.)	China
Memotec Inc. (a subsidiary of Comtech EF Data Corp.)	Canada
Xicom Technology Europe, Ltd. (a subsidiary of Comtech Xicom Technology, Inc.)	United Kingdom
TeleCommunication Systems, Inc.	Maryland
NextGen Communications, Inc. (a subsidiary of TeleCommunication Systems, Inc.)	Maryland
microDATA LLC (a subsidiary of TeleCommunication Systems, Inc.)	Maryland
microDATA GIS, Inc. (a subsidiary of microDATA LLC)	Vermont
Comtech Solacom Technologies, Inc.	Canada
Solacom Technologies (US), Inc. (a subsidiary of Comtech Solacom Technologies, Inc.)	Delaware
Comtech NextGen LLC (a subsidiary of TeleCommunications Systems, Inc.)	Delaware

* Pursuant to Item 601(b)(21)(ii) of Regulation SK, the names of other subsidiaries of Comtech are omitted because, considered in the aggregate, they would not constitute a significant subsidiary as of the end of the year covered by this report.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Deloitte.

We consent to the incorporation by reference in Registration Statements on Form S-8 (Nos. 333-125625, 333-143548, 333-166754, 333-51708 and 333-228690) and Registration Statement No. 333-228691 on Form S-3 of our reports dated September 24, 2019, relating to the consolidated financial statements and financial statement schedule of Comtech Telecommunications Corp., and the effectiveness of Comtech Telecommunications Corp.'s internal control over financial reporting, appearing in this Annual Report on Form 10-K of Comtech Telecommunications Corp. for the year ended July 31, 2019.

/s/ DELOITTE & TOUCHE LLP

Jericho, New York
September 24, 2019

Exhibit 31.1

**CERTIFICATION PURSUANT TO
18 U.S.C. ss.1350,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Fred Kornberg, certify that:

1. I have reviewed this annual report on Form 10-K of Comtech Telecommunications Corp.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: September 24, 2019

/s/ Fred Kornberg

Fred Kornberg
Chairman of the Board
Chief Executive Officer and President

Exhibit 31.2

CERTIFICATION PURSUANT TO
18 U.S.C. ss.1350,
AS ADOPTED PURSUANT TO
SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Michael A. Bondi, certify that:

1. I have reviewed this annual report on Form 10-K of Comtech Telecommunications Corp.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

    a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

    b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

    c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

    d. Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

    a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

    b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: September 24, 2019

/s/ Michael A. Bondi

Michael A. Bondi
Chief Financial Officer

Exhibit 32.1

CERTIFICATION PURSUANT TO

SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the annual report of Comtech Telecommunications Corp. (the “Company”) on Form 10-K for the fiscal year ended July 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the “Report”), I, Fred Kornberg, President and Chief Executive Officer of the Company, certify that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: September 24, 2019

/s/ Fred Kornberg

Fred Kornberg
Chairman of the Board
Chief Executive Officer and President

Exhibit 32.2

CERTIFICATION PURSUANT TO

SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the annual report of Comtech Telecommunications Corp. (the "Company") on Form 10-K for the fiscal year ended July 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I, Michael A. Bondi, Chief Financial Officer of the Company, certify that:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: September 24, 2019

/s/ Michael A. Bondi

Michael A. Bondi
Chief Financial Officer