

TELEDYNE TECHNOLOGIES INC
Form 10-K
February 26, 2015
Table of Contents

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

FORM 10-K
(Mark One)

ANNUAL REPORT PURSUANT TO SECTION 13 OR SECTION 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 28, 2014

OR
 TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from _____ to _____
Commission file number 1-15295

TELEDYNE TECHNOLOGIES INCORPORATED
(Exact name of registrant as specified in its charter)

Delaware

25-1843385

(State or other jurisdiction of incorporation of organization)

(I.R.S. Employer Identification Number)

1049 Camino Dos Rios, Thousand Oaks, California

91360-2362

(Address of principal executive offices)

(Zip Code)

Registrant's telephone number, including area code: (805)-373-4545

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

Title of each class	Name of each exchange on which registered
Common Stock, par value \$.01 per share	New York Stock Exchange

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

None

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 or 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 website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T 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 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, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company

(Do not check if a smaller reporting company)

Indicate by check mark whether the 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 Common Stock held by non-affiliates on June 27, 2014, was \$3.4 billion, based on the closing price of a share of Common Stock on such date, which is the last business day of the registrant's most recently completed fiscal second quarter. Shares of Common Stock known by the registrant to be beneficially owned by the registrant's directors and the registrant's executive officers subject to Section 16 of the Securities Exchange Act of 1934 are not included in the computation. The registrant, however, has made no determination that such persons are "affiliates" within the meaning of Rule 12b-2 under the Securities Exchange Act of 1934.

At February 24, 2015, there were 35,266,140 shares of the registrant's Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Selected portions of the registrant's proxy statement for its 2015 Annual Meeting of Stockholders (the "2015 Proxy Statement") are incorporated by reference in Part III of this Report. Information required by paragraphs (d)(1)-(3) and (e)(5) of Item 407 of Regulation S-K shall not be deemed "soliciting material" or to be filed with the Commission as permitted by Item 407 of Regulation S-K.

Table of Contents

INDEX	Page Number
PART I	
<u>Item 1. Business</u>	<u>1</u>
Item 1A. Risk Factors	<u>13</u>
<u>Item 1B. Unresolved Staff Comments</u>	<u>25</u>
<u>Item 2. Properties</u>	<u>26</u>
<u>Item 3. Legal Proceedings</u>	<u>26</u>
<u>Item 4. Mine Safety Disclosures</u>	<u>26</u>
PART II	
<u>Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities</u>	<u>27</u>
<u>Item 6. Selected Financial Data</u>	<u>28</u>
<u>Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations</u>	<u>28</u>
<u>Item 7A. Quantitative and Qualitative Disclosure About Market Risk</u>	<u>56</u>
<u>Item 8. Financial Statements and Supplementary Data</u>	<u>56</u>
<u>Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure</u>	<u>56</u>
<u>Item 9A. Controls and Procedures</u>	<u>56</u>
<u>Item 9B. Other Information</u>	<u>56</u>
Part III	
<u>Item 10. Directors, Executive Officers and Corporate Governance</u>	<u>57</u>
<u>Item 11. Executive Compensation</u>	<u>57</u>
<u>Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters</u>	<u>57</u>
<u>Item 13. Certain Relationships and Related Transactions, and Director Independence</u>	<u>58</u>
<u>Item 14. Principal Accountant Fees and Services</u>	<u>58</u>

PART IV

<u>Item 15. Exhibits and Financial Statement Schedules</u>	<u>58</u>
<u>INDEX TO FINANCIAL STATEMENTS AND RELATED INFORMATION</u>	<u>59</u>
<u>SIGNATURES</u>	<u>101</u>
<u>EXHIBIT INDEX</u>	<u>103</u>

Explanatory Notes

In this Annual Report on Form 10-K, Teledyne Technologies Incorporated is sometimes referred to as the “Company” or “Teledyne”.

For a discussion of risk factors and uncertainties associated with Teledyne and any forward looking statements made by us, see the discussion beginning at page 13 of this Annual Report on Form 10-K.

Table of Contents

PART I

Item 1. Business

Who We Are

Teledyne Technologies Incorporated provides enabling technologies for industrial growth markets. We have evolved from a company that was primarily focused on aerospace and defense to one that serves multiple markets that require advanced technology and high reliability. These markets include deepwater oil and gas exploration and production, oceanographic research, air and water quality environmental monitoring, electronics design and development, factory automation and medical imaging. Our products include monitoring and control instrumentation for marine and environmental applications, harsh environment interconnects, electronic test and measurement equipment, digital imaging sensors and cameras, aircraft information management systems, and defense electronic and satellite communication subsystems. We also supply engineered systems for defense, space, environmental and energy applications. We differentiate ourselves from many of our direct competitors by having a customer and company sponsored applied research center that augments our product development expertise.

Total sales in 2014 were \$2,394.0 million, compared with \$2,338.6 million in 2013 and \$2,127.3 million in 2012. Our aggregate segment operating profit and other segment income were \$338.4 million in 2014, \$277.9 million in 2013 and \$279.8 million in 2012. Approximately 75% of our total sales in 2014 were to commercial and international customers and the balance was to the U.S. Government, as a prime contractor or subcontractor. Approximately 58% of these U.S. Government sales were attributable to fixed-price type contracts and the balance to cost-plus-fee type contracts. Sales to international customers accounted for approximately 45% of total sales in 2014.

Our businesses are divided into four business segments: Instrumentation, Digital Imaging, Aerospace and Defense Electronics and Engineered Systems. The respective percentage contributions of our four business segments to our total sales in 2014, 2013 and 2012 are summarized in the following table:

Segment (a)	Percentage of Sales				
	2014		2013		2012
Instrumentation	47	%	44	%	38
Digital Imaging	17	%	18	%	20
Aerospace and Defense Electronics	25	%	26	%	28
Engineered Systems	11	%	12	%	14
Total	100	%	100	%	100

(a) Reflects a revised segment reporting structure adopted in 2013. All years presented reflect the new structure. See further discussion of our four segments in Note 13 to the Notes to Consolidated Financial Statements

Our principal executive offices are located at 1049 Camino Dos Rios, Thousand Oaks, California 91360-2362. Our telephone number is (805) 373-4545. We are a Delaware corporation that was spun-off as an independent company from Allegheny Teledyne Incorporated (now known as Allegheny Technologies Incorporated) on November 29, 1999.

Strategy

Our strategy continues to emphasize growth in our core markets of instrumentation, digital imaging, aerospace and defense electronics and engineered systems. Our core markets are characterized by high barriers to entry and include specialized products and services not likely to be commoditized. We intend to strengthen and expand our core businesses with targeted acquisitions and through product development. We continue to focus on balanced and disciplined capital deployment among capital expenditures, acquisitions and share repurchases. We aggressively pursue operational excellence to continually improve our margins and earnings. At Teledyne, operational excellence includes the rapid integration of the businesses we acquire. Using complementary technology across our businesses and internal research and development, we seek to create new products to grow our company and expand our addressable markets. We continue to evaluate our businesses to ensure that they are aligned with our strategy.

Table of Contents

Our Recent Acquisitions

Consistent with our strategy, during 2014, we made the following acquisitions and investments for a total \$195.8 million:

To broaden our marine instrumentation capabilities:

Bolt Technology Corporation (“Bolt”) - Bolt, headquartered in Norwalk, Connecticut, with additional operations in Houston, Texas and San Diego, California, supplies marine seismic energy sources and related equipment for offshore energy exploration and, through its SeaBotix business, designs and manufactures miniature underwater remotely operated vehicles (“Mini ROVs”).

Assets of The Oceanscience Group Ltd. (“Oceanscience”) - Oceanscience, headquartered in Carlsbad, California, develops oceanographic and hydrographic deployment equipment designed to save survey time and improve data quality.

Assets of Atlas Hydrographic GmbH (“Atlas”) - Atlas, based in Bremen, Germany, designs, manufactures, and integrates marine sonar systems for mid and deep water applications.

Investment in Ocean Aero, Inc. (“Ocean Aero”) - Ocean Aero, based in Poway, California, is designing an unmanned surface vehicle that will also have the ability to descend subsea.

To expand our environmental instrumentation product lines:

Photon Machines, Inc. (“Photon”) - Photon, headquartered in Bozeman, Montana, designs and manufactures laser-based sample introduction equipment for laboratory instrumentation.

Available Information

Our Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q, any Current Reports on Form 8-K, and any amendments to these reports, are available on our website as soon as reasonably practicable after we electronically file such materials with, or furnish them to, the Securities and Exchange Commission (the “SEC”). The SEC also maintains a website that contains these reports and other information we file, including our proxy statements, at www.sec.gov. Any materials we file with the SEC may be viewed at the SEC’s Public Reference Room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, our Corporate Governance Guidelines, our Global Code of Ethical Business Conduct, our Codes of Ethics for Financial Executives, Directors and Service Providers and the Charters of the standing committees of our Board of Directors are available on our website. We intend to post any amendments to these policies, guidelines and charters on our website. Our website address is www.teledyne.com. This information on our website is available free-of-charge. Alternatively, if you would like a paper copy of any report we file with the SEC (without exhibits) or other document, please write to Melanie S. Cibik, Senior Vice President, General Counsel and Secretary, Teledyne Technologies Incorporated, 1049 Camino Dos Rios, Thousand Oaks, California 91360-2362, and a copy of such requested document will be provided to you, free-of-charge.

Our Business Segments

Our businesses are divided into four segments: Instrumentation, Digital Imaging, Aerospace and Defense Electronics, and Engineered Systems. Financial information about our business segments can be found in Note 13 to our Notes to Consolidated Financial Statements in this Annual Report on Form 10-K.

Instrumentation

Our Instrumentation segment provides monitoring and control instruments for marine, environmental, industrial and other applications, as well as electronic test and measurement equipment. We also provide power and communications connectivity devices for distributed instrumentation systems and sensor networks deployed in mission critical, harsh environments.

Table of Contents

Marine Instrumentation

We offer a variety of products designed for use in harsh underwater environments, instruments that measure currents and other physical properties in the water column, systems that create acoustic images of objects beneath the water's surface, including the bottom of a body of water, and sensors that determine the geologic structure below the bottom. We also design and manufacture vehicles that utilize and transport these sensors over and beneath the water's surface. We design and manufacture geophysical streamer cables, hydrophones, seismic energy sources and specialty products used in offshore hydrocarbon exploration to locate oil and gas reserves beneath the ocean floor. Through our 2014 acquisition of Bolt, we are now a leading supplier of marine seismic energy sources and replacement parts for offshore energy exploration. Our Acoustic Doppler Current profilers ("ADCPs") precisely measure currents at varying depths in oceans and rivers, and our Doppler Velocity Logs ("DVLs") are used for navigation by civilian and military surface ships, unmanned underwater vehicles and naval divers. In addition to our DVLs, which are acoustic navigation devices, we design and manufacture inertial sensing and navigation products, as well as subsea pipe and cable detection systems for offshore energy, oceanographic and military marine markets. With the 2013 acquisition of CDL Limited ("CDL"), we obtained additional subsea inertial sensing and navigation products, and our goal is to accelerate the development and deployment of real-time motion sensing and communication systems for our subsea oceanographic and oil and gas customers. With the 2014 acquisition of Oceanscience, we design and manufacture remotely-controlled and tethered instrumentation deployment vehicles used for current measurement, seafloor mapping and measurement of physical parameters such as salinity.

Additionally, we design and manufacture hydrographic survey instrumentation used in port surveys, dredging, pre- and post-installation of offshore energy infrastructure and other challenging underwater applications. Our multibeam sonar systems range from portable high-resolution systems used on autonomous underwater vehicles ("AUVs") to full ocean depth vessel-mounted oceanographic systems. We offer 3D imaging systems for use from aircraft, fixed platforms, surface vessels and subsurface vessels over a wide range of distances and water depths. Our multibeam sonar systems are used for creating highly accurate maps of underwater offshore constructions, wrecks or quay walls in harbors. In particular, the multibeam sonars are used to produce high quality maps of the seafloor. With advanced imaging capabilities, our sonars create images of hidden structures on the seafloor and are also used for detecting underwater mineral deposits, gas and oil seeps streaming from the seabed. Sonars are used to create real-time images of the environment in the oceans and enable precise navigation of AUVs, which are essentially advanced robots navigating through the oceans autonomously. Our products are being utilized in both commercial and defense applications where we provide systems for detecting mines in the water.

We provide a broad range of end-to-end undersea interconnect solutions to the offshore oil and gas, naval defense, oceanographic and telecom markets. We manufacture subsea, wet-mateable electrical and fiber-optic interconnect systems and subsea pressure vessel penetrators and connector systems with glass-to-metal seals. Our water-proof and splash-proof neoprene and glass reinforced epoxy connectors and cable assemblies are used in underwater equipment and submerged monitoring systems. Bolt, acquired in 2014, added high-reliability underwater cables and connectors, as well as related electronic controllers, monitoring systems and other auxiliary equipment. We also manufacture subsea and topside pipeline corrosion and erosion monitoring detectors as well as flow integrity monitoring solutions for the oil and gas industry. These flow assurance sensors and equipment rely on our wet-mateable interconnect systems and our sensor feed-through systems. Our Teledyne Oil & Gas group and Teledyne Scientific Company continue to work collaboratively to improve the reliability of materials exposed to ultra deep-sea conditions.

We offer a variety of marine instrumentation products used by the U.S. Navy and in energy exploration, oceanographic research and port and harbor security services. Our products include acoustic modems for networked underwater communication and sidescan and sub-bottom profiling sonar systems. Using our acoustic technology, we also provide quality control and package integrity systems under the Taptone® brand to the food and beverage, personal care and pharmaceutical industries.

We manufacture complete autonomous underwater vehicle systems. Our marine gliders use a silent buoyancy engine for propulsion that takes advantage of changes in buoyancy in conjunction with wings and tail steering to convert vertical motion to horizontal displacement, thereby propelling the system on a programmed route with very low power consumption. Glider applications range from oceanographic research to military persistent surveillance systems as

part of a mobile underwater sensing and communication network. The modular design of our battery-powered, man-portable Gavia™ AUV allows for rapid sensor bay reconfiguration and battery replacement capability. Our Slocum gliders, as well as our ADCPs, are being used as part of the National Science Foundation's Ocean Observatories Initiative to collect physical, chemical, geological and biological data from the ocean and the seafloor on coastal, regional and global scales. Through the SeaBotix business, we design and manufacture Mini ROVs used in maritime security, search and rescue, aquaculture, and scientific research applications.

3

Table of Contents

Environmental Instrumentation

We offer a wide range of products used for environmental monitoring, instruments that enable measurement and monitoring of key air environmental parameters as well as gas purity and content for industrial and manufacturing applications, sensors for the measurement and monitoring of the physical and chemical properties of untreated water, and laboratory systems that improve sample acquisition, handling, and preparation for analysis.

Our instrumentation monitors trace levels of gases such as sulfur dioxide, carbon monoxide, carbon dioxide, oxides of nitrogen and ozone in order to measure the quality of the air we breathe. Our instrumentation also monitors particulate air pollution, and we supply environmental monitoring systems for the detection, measurement and automated reporting of air pollutants from industrial stack emissions. We serve the process control and monitoring needs of industrial plants with instruments that include gas analyzers, vacuum and flow measurement devices and torque measurement sensors. We were a pioneer in the development of precision trace oxygen analyzers, and we now manufacture a wide range of process gas and liquid analysis products for the measurement of process contaminants, hydrocarbons, combustibles, oil-in-water, moisture, pH and many other parameters. Our instrumentation is also used to detect a variety of water quality parameters. Our sampler products include portable, refrigerated and specialty samplers used in hazardous location applications. Flow meters include ultrasonic, submerged probe, bubbler and area velocity models. Laser technology is now part of our flow capabilities. Our custom analyzer systems provide turn-key solutions to complex process monitoring and/or control applications found in petrochemical and refinery facilities. Our broad line of instruments for precise measurement and control of vacuum and gas flow are used in varied applications such as semiconductor manufacturing, refrigeration, metallurgy and food processing.

We provide laboratory instrumentation that complements our process or field environmental instrumentation. We manufacture laboratory instrumentation that automates the preparation and concentration of organic samples for the analysis of trace levels of volatile organic compounds by a gas chromatograph and mass spectrometer. We also provide laboratory instrumentation for the detection of total organic carbon and total nitrogen in water and wastewater samples. In addition, we provide inductively coupled plasma laboratory spectrometers, atomic absorption spectrometers, mercury analyzers and calibration standards. With the 2013 acquisition of assets of CETAC Technologies (“CETAC”), we enhanced our laboratory automation and robotics capabilities as well as our elemental and chemical analysis systems. Our 2014 acquisition of Photon complements our CETAC business by adding laser-ablation components to CETAC’s sample introduction systems. Our advanced elemental analysis products are used by environmental and quality control laboratories to detect trace levels of inorganic contaminants in water, foods, soils and other environmental and geological samples. Our high precision, high pressure syringe pumps measure process extraction rates of fluids ranging from liquefied gases to viscous tars. Plus, we manufacture liquid chromatography instruments and accessories for the purification of organic compounds. Our liquid chromatography customers include pharmaceutical laboratories involved in drug discovery and development.

Test and Measurement Instrumentation

Since our August 2012 acquisition of LeCroy Corporation (“LeCroy”), we develop, manufacture, sell and license high-performance oscilloscopes and high speed protocol analyzers for various computer communication links. We also provide related test and measurement equipment, probes, accessories and application solutions. To a lesser extent, we provide extended warranty contracts, maintenance contracts and repairs and calibrations on our instruments after their warranties expire.

Our oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems, validate electronic designs and improve time to market. We offer eight families of real-time oscilloscopes, which address different needs: HDO4000/HDO6000, our 12-bit, high definition oscilloscopes; LabMaster 10 Zi-A; WaveMaster, our industry leading high-end oscilloscope family; WavePro, which is targeted at the mid-to high-range performance sector; WaveRunner, designed for the general purpose and bench-top sector; WaveSurfer designed for users in the lower bandwidth bench-top sector of the market; WaveJet, designed for value-oriented users in the economy sector of the market; and WaveAce, our entry-level oscilloscope products. In addition to our real-time oscilloscopes, we have the WaveExpert family of sampling oscilloscopes and modules. In 2014, we released the world’s first 100GHz real-time scope, aimed at applications such as high speed optical communications, and we extended our line of 12 bit oscilloscopes to include an eight channel product with specialized

capabilities for analyzing power and efficiency of motors and the associated drive circuitry. In collaboration with Teledyne Scientific Company, we also completed the design of a next generation indium phosphide (“InP”) chip. The integrated circuit represents the first device in an expansive chip set planned for future generations of high speed oscilloscopes.

Our protocol analyzers are used by designers and engineers to reliably and accurately monitor communications traffic and diagnose operational problems in a variety of communications devices to ensure that they comply with industry standards.

Table of Contents

Our test and measurement products are sold into a broad range of industry sectors, including computer, semiconductor, consumer electronics, data storage, automotive, industrial, military, aerospace and telecommunications. We believe designers in all of these industry sectors are developing products which rely on increasingly complex electronic signals to provide the features and performance their customers require.

Digital Imaging

Our Digital Imaging segment includes high performance sensors, cameras and systems, within the visible, infrared, ultraviolet and X-ray spectra for use in industrial, government and medical applications, as well as micro electro-mechanical systems (“MEMS”). It also includes our sponsored and centralized research laboratories benefiting government programs and businesses.

We design, develop and manufacture image capture products, primarily consisting of high performance image sensors and digital cameras for use in industrial, scientific, medical and professional applications. We also design, develop and manufacture image processing products, primarily consisting of hardware and software for image processing in industrial and medical applications. We continue to develop high-resolution, low dose X-ray sensors for medical, dental and industrial applications. Our high performance image sensors utilize both charge coupled device (“CCD”) and complementary metal-oxide semiconductor (“CMOS”) technology. In particular, our CMOS image sensing technology is used in our large flat panel detectors for X-ray imaging and in some of our sensors used for industrial machine vision applications. Our image processing software allows original equipment manufacturers (“OEMs”) and systems integrators to develop vision applications using our image acquisition and processing hardware. Our smart camera products are user-friendly, cost-effective vision appliances for task-specific factory floor applications such as gauging, high-precision alignment, inspection, assembly verification and machine guidance. Unlike our OEM imaging products, this category of cameras is designed to be quickly deployed by technicians on the factory floor.

Additionally, we produce and provide manufacturing services for MEMS and high voltage CMOS devices and complete integrated circuit (“IC”) products. The majority of our semiconductor manufacturing capacity is consumed by external customers with the remaining capacity applied towards supplying unique CCD and microbolometer fabrication services for our internal image sensor requirements.

Our Digital Imaging segment also provides Light Detection and Ranging (“LIDAR”) systems for airborne terrestrial mapping, mobile mapping, bathymetry and laser-based 3D imaging applications through our majority-owned subsidiary, Optech. These imaging and mapping systems are used by commercial and government customers serving energy, natural resources and infrastructure applications.

We provide research and engineering capabilities primarily in the areas of electronics, materials, optical systems, and information science to military, aerospace and industrial customers, as well as to various businesses throughout Teledyne. We receive funding from the Defense Advanced Research Products Agency (“DARPA”), the Intelligence Advanced Projects Research Activity (“IARPA”), and various other U.S. Department of Defense funding agencies, and we collaborate with researchers at universities and national laboratories to stay at the forefront of emerging technologies. We have developed high speed electronics, MEMS sensors and actuators, advanced functional and structural materials, liquid-crystal based optical devices, and image processing algorithms.

We produce advanced focal plane arrays, sensors, and subsystems that cover a broad spectrum of frequencies from X-ray wavelengths to 18 micron long-wave infrared wavelengths. We develop imaging process algorithms and manufacture compact mid-wave and short-wave infrared camera systems. We are a leader in the development and production of large format focal plane array sensors for both military and space science markets.

We deliver advanced imaging solutions to the U.S. Department of Defense, NASA, prime system integrators, foreign space agencies and commercial customers. Our sensor technologies are on the Hubble Space Telescope and weather satellites, are orbiting the moon and Mars, are on the way to Pluto and asteroid missions, and can be found at major ground-based telescopes. In the U.S. defense arena, our sensors are integrated into several major systems for space surveillance, persistent surveillance, chemical detection and target identification, among others. We have developed various sensors, subassemblies and cameras for air- and ground-based applications. We have developed infrared cameras and hyperspectral sensors for unmanned aerial vehicles. We also design and manufacture advanced military laser protection eyewear. Finally, we develop low-noise, high performance cameras for use in laboratory instruments.

Table of Contents

Aerospace and Defense Electronics

Our Aerospace and Defense Electronics segment provides sophisticated electronic components and subsystems and communications products, including defense electronics, harsh environment interconnects, data acquisition and communications equipment for aircraft, and components and subsystems for wireless and satellite communications, as well as general aviation batteries.

Over the years, principally through focused acquisitions, we have expanded our microwave components and subsystems business with a goal of providing more highly integrated microwave subsystems and solutions to our customers. Historically, we designed and manufactured helix traveling wave tubes, commonly called TWTs, used to provide broadband power amplification of microwave signals. Military applications include radar, electronic warfare and satellite communication. We make TWTs for commercial applications as well, such as electromagnetic compatibility test equipment and satellite communication terminals. More recently, we have designed and delivered high power solid state TWT replacement amplifiers and complete amplifiers that incorporate a TWT and a power supply.

We design and manufacture solid state radio frequency (“RF”) and microwave components and subassemblies used in a wide variety of applications. As components which form the building blocks for electronic systems, we produce amplifiers, voltage-controlled oscillators, YIGs, BAWs, low noise amplifiers (“LNAs”), microwave mixers, and detectors using LDMOS, GaAs, GaN, InP, and SiC technologies. These components form the basis for our line of solid state power amplifiers, RF converters, and modems which are used in systems that provide communications links between ground stations, mobile units, UAVs, and orbiting satellites. Such products are also used in mobile telephone, TV broadcast and commercial data communications networks. In addition, some of our products are modified to design and manufacture higher level subsystems including: UAV, mobile, and fixed location radar transmitters and receivers; test and measurement systems; and Instantaneous Frequency Measurement (“IFM”)-based systems and subsystems. The latter includes integrated frequency locked sources and set-on receiver jammers used for the U.S. Navy and Air Force training.

We supply a variety of connectors and cable assemblies, including specialized high voltage connectors and subassemblies and coax microwave cable and connectors, for defense, aerospace and industrial applications. We also provide custom, high-reliability bulk wire and cable assemblies to a number of marine, environmental and industrial markets. Additionally, we produce pilot helmet mounted display components and subsystems for the Joint Helmet Mounted Cueing System (“JHMCS”) used in the F-15, F-16 and F-18 aircrafts. The JHMCS system is a multi-role system designed to enhance pilot situational awareness and provides visual control of aircraft targeting systems and sensors. We manufacture microprocessor-controlled aircraft ejection seat sequencers and related support elements to military aircraft programs. We continue to pursue the development of electronic safe and arm devices for use in