PHYSICAL OPTICS CORPORATION

Technology that makes a difference.®

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/// LEADERSHIP STATEMENT

Over the years, Physical Optics Corporation has come a long way – from a small enterprise with just three employees in 1985, to a leading supplier of integrated products, services and support to military forces, intelligence agencies and prime contractors worldwide. Throughout our history, our products have consistently responded to the needs of U.S. and allied military forces, touching the lives of our troops, and helping prepare our forces so that they are ready to respond.

/// MISSION

Physical Optics Corporation is a leading systems integrator of advanced technology serving the military, defense, security and commercial markets. We provide a unique combination of innovative research and development while consistently commercializing these products in next generation avionics systems, integrated wearable networks, surveillance systems, agile RF filters for electronic warfare, and smart industrial metrology solutions.

We meet or exceed our customers' expectations by providing quality products, on time, and in compliance with customer, regulatory, and authority requirements. We are committed to continual improvement of the Quality Management System through deployment of quality objectives which are measured, reported, and reviewed for continuing improvement.

IMAGE COURTESY | **U.S NAVY**

/// CORE COMPETENCIES

Project Management

Our Project Management Services provide the leadership required to plan, coordinate and oversee the execution of complex and diverse projects. Our dedicated PMI-certified project management professionals have the expertise required to initiate, plan, implement and manage large-scale, complex projects. From assessments and statements of work to monitoring and managing timelines, budgets and performance, our Project Management Services ensures efficient and cost-effective implementation.

Quality Management

Our Quality Management System (QMS) was expanded to comply with AS9110 as applied to the maintenance and repair of aircraft equipment, and is now certified to AS9110A. We also expanded the scope of our ISO-certification to include electronic systems. Our QMS was expanded to comply with AS9100, which applies specifically to the aerospace industry, and is now certified to AS9100C.

Manufacturing

We are customer-focused, investing in capabilities that allow us to provide better, faster and more flexible service. Our lean manufacturing facilities offer the latest automated equipment and process control techniques to ensure quality products meet your time-to-market demands.

Final Assembly

Your final product is completed using the KANBAN pull material handling process on continuous flow lines and labor techniques that include documented quality checks.

Integration Capabilities

Our integration capabilities include programming and testing of circuit cards, software configuration of the cards and system, safety (leakage & HiPot) testing, inventory consignment/management, configuration management and functional testing. Our strengths are in engineering and mechanical design.We offer COTS and custom build-to-order configuration and engineering services. We collaborate with you, our customer, to deliver prototypes and evaluation units to test various configurations in your specific application environment. We support a wide range of operating system types and operating environments. Our complete integration services deliver fully assembled solutions that are loaded with software, tested, and require literally no set up apart from connecting external assets. Our integration solutions can address particular vertical market requirements such as military and aerospace, industrial and other environmentally-challenged industries. Our strong engineering and technical capability make us the right choice for our customers who need to extend their integration and configuration capability.

End-Of-Life (EOL) – Life Cycle Management

We take a proactive approach to the rapidly changing lifecycle of COTS components. Our customers are provided with advanced notifications of EOL items as well as a preliminary replacement strategy to facilitate testing, long before components are no longer available. We work collaboratively with our suppliers to get accurate roadmaps and formulate design criteria for each system to ensure the longest shelf life possible. In the event a particular component must be used, we can maintain life-purchase stock to facilitate the progression of the program.

Earned Value Management System

We have an Earned Value Management Systems (EVMS) that is compliant with ANSI/EIA 748. Our key staff members have extensive experience in analyzing EVM data using EV predictive metrics to proactively manage large government programs with EVMS, contract work breakdown structures, integrated master schedules, and CSDR requirements.

Technology Transition

We have taken a multi-faceted approach to a technology transition strategy. POC will integrate a cross-functional transition integrated product team (TIPT) supported by customer user's and 3rd party Tier 1 platform integrators. This process will result in a smoother transition from development, through prototype demonstration, to an affordable, operationally suitable system for the end user needs. The main goal is to bring value to our customers.

/// PRODUCTS

AVIONICS SYSTEMS

We are a leader in advanced mission data loaders, data transfer systems, crash survivable flight recorders and high density mass storage systems that support new and legacy military and civil aircraft.

IMAGE COURTESY | **U.S NAVY**

DAU – DATA ACQUISITION UNIT

The DAU provides the core processing, I/O, and internal memory storage to support Video/Audio/Data recording, Mission Data Loading, Wireless, and Terrain Awareness and Warning System functionality. The Data Acquisition Unit is adaptive and will meet most avionics recording requirements. This lightweight (17.2 lb) DAU combines multiple recording functions into one small footprint (6"x10"x7"). Key functions include: Digital Video Recorder (2Ch), Digital Voice Recorder (4Ch), Airborne Data Recorder, Mission Data Loader, integrated TAWS (3.2B), Sensor Data and Wireless Sensors with 32Hz sampling rate, 24 analog channels, and 16 discrete channels. Communication interface includes dual MIL-1553, RS422 and RS232. Internal memory is 128GB and is expandable to mission requirements. Both Gigabit Ethernet and USB maintenance access support the Fast Data Download Requirements of MFOQA / FDM. Information security includes FIPS 140-2.

CP – CONTROL PANEL

Meeting both MIL-STD and ED-112 Standards, the Control Panel (CP) contains an 8GB Crash Survivable Memory Unit (CSMU), and 32GB USB RMU (Removable Memory Unit). The CP contains a display and menu driven user interface. This CP will accept mission data and enables fast post flight extraction.

DDS – DIGITAL DATA SET

The Digital Data Set (DDS), AN\AYH-5(V) has been adopted as the US Navy standard DDS for the T-45A/C Goshawk Flight Trainer aircraft. The DDS consolidates the Airborne Video Cassette Recorder (AVCR), Mission Data Loader (MDL) AN/ASQ-215, and Airborne Data Recorder (ADR)/Signal Data Computer (SDC)/Advanced Signal Data computer into a single unit. The US Navy PMA-209 Terrain Awareness Warning System software is fully integrated in the DDS and it also complies with MFOQA download requirements. It contains a Data Acquisition Unit (DAU), a cockpit-mounted intelligent Control Panel (CP) with ED-112 Certified Crash Survivable Memory Unit (CSMU), and a hand-carried non-volatile solid-state data storage device known as the Removable Memory Unit (RMU). The DAU provides the core processing, I/O, and internal memory storage to support Video/Audio/Data recording, Mission Data Loading, Wireless, and Terrain Awareness and Warning System functionality. The CP manages and controls the data exchange between the RMUs and other avionics subsystems via the aircraft's Ethernet, RS422, and MIL-STD-1553 multiplex databus. The RMU serves as the transportable storage medium for both pre- and post-mission information exchange between ground station computers and the airborne system.

FAERITO® DVRS – DIGITAL VIDEO RECORDING SUITE

DDS - DIGITAL DATA SET

MFD
MULTI FUNCTION COCKPIT DISPLAY

DTS – DATA TRANSFER SYSTEM

ADTS – ADVANCED DATA TRANSFER SYSTEM

FAERITO – DIGITAL VIDEO / AUDIO / DATA FLIGHT RECORDER
The FAERITO line of digital flight recorders provide over 30 hours of synchronous Digital Video/Audio/ Data recording. This unique "All-In-One" digital flight recorder meets DO-160 environmental standards. FAERITO is packaged into a single compact housing measuring 4.5"x5"x8" and weighs less than 9 lbs.

FAERITO® DVRS – DIGITAL VIDEO RECORDING SUITE
The Digital Video Recording Suite consists of a FAERITO digital flight data recorder (TSO-C176) that contains a 32GB (ED-112) Crash Survivable Memory Unit (CSMU). The DVRS can be multiplexed to accommodate 4 cameras and will record over 30 hours of video per channel at a video data rate of 1Mbps.

DTU – DATA TRANSFER UNIT
The DTU is a data transfer system specifically designed to address the needs of the F/A-18E/F and EA-18G platforms. DTU is a form and fit replacement for the current MU-1135A Digital Memory Device (DMD), plus adds NSA Type 1 encryption for mission data and FIPS-140 encryption for maintenance data.

DTS – DATA TRANSFER SYSTEM
The DTS is an In-Flight Data Loading & Digital Recorder. The primary function is to upload mission and map data, record in-flight avionics data, and record maintenance data during ground and flight operation for post flight information exchange.

ADTS – ADVANCED DATA TRANSFER SYSTEM
The ADTS is a data/video/audio loader and recorder with NSA Type 1 Encryption for Rotary and Fixed Wing platforms. The primary function is to upload mission and map data, record in-flight avionics data, and record maintenance data during ground and flight operation for post flight information exchange.

ETMR – ENGINE TREND MONITORING RECORDER
The ETMR unit is housed in an aluminum chassis qualified to DO-160F environmental requirements and can be mounted in any orientation.. The unit is configured with all connectors on the front panel for ease of access to power, electrical interfaces and either USB or Ethernet interfaces for data retrieval. The unit supports performance and maintenance analysis and provides storage for >10,000 hours of flight information.

MFD – MULTI FUNCTION COCKPIT DISPLAY
POC's Multifunction Display (MFD) provides full-color graphics rendering, operator controls, and high resolution display for rugged military applications (ground or airborne). The Liquid Crystal Display (LCD) features anti-reflective, electro-magnetic interference shielding treatments and a selectable LED backlight that provides operation for day and night. Multiple configurable soft keys can be used to display information to the user in numerous ways to work with current and future platforms.

SEE OUR WEBSITE FOR A LIST OF OUR CERTIFICATIONS

SENSOR SYSTEMS

We play a major role in force protection by providing cutting-edge, compact, ultra broadband tunable notch and band pass filters for radio communications, wireless data systems, CREW systems, and jammers. Applications include dismounted, fixed site, land vehicle, shipboard, and airborne platforms.

IMAGE COURTESY | **U.S NAVY**

MWS – MICRO WEATHER SENSOR

The Micro Weather Sensor is a robust and lightweight unattended weather sensor with an imaging capability and a modular design for optional enhancements. It is capable of reporting local weather parameters, and transmitting them via a secure satellite link, Line of Sight, or local wireless communications. The Micro Weather Sensor is battery powered with solar augmentation, enabling it to operate for more than 90 days and provide persistent and continuous sensing.

HIGH POWERED TUNABLE AGILE RF FILTERS

POC's family of Agile RF Filters can be synchronized to frequency-hopping radios, Data or SIGINT Systems and dynamically create notches in the full output energy of most jammers, thus removing harmful interference from communication Data or SIGINT frequencies. It can provide over 100 dB of in-band attenuation, with minimal reflected power (VSWR <1.4), and low out-of-ground insertion loss (<1.0 dB), while passing over 1kW of power to the emitter. It is capable of creating frequency tuned notches of dynamically configurable widths and depths. Agile RF Filter performance has been validated in U.S. Navy and U.S. Army EW labs.

EMERGING TECHNOLOGIES

Modular, Adaptive Personal Power Strip (MAPPS)

Our low-profile and lightweight architecture can easily integrate into a combatant-worn vest. It is designed to distribute power from a battery or military vehicle. MAPPS interconnectivity utilizes an intelligent SNAPNET® connector that includes electronics for device recognition, power regulation, and power monitoring.

Sense and Avoid Insect Eye/Neuromorphic Sensor System (SAVIEN and SAPIEN)

Our insect vision-based sensors are small size, low weight, and have the capability to allow Unmanned Aircraft Systems (UAS) to sense the presence of aircraft, report their location, and identify those on a collision course. They can be used for military and commercial platforms, law enforcement and homeland security as well as for aerial photography, police surveillance, firefighting, rescue operation, traffic control, and collision avoidance for the blind, robots, automobiles and trucks.

GROUND SYSTEMS

We provide military, law enforcement and first responders with integrated wearable electronic solutions that significantly reduce weight while adding intelligent data connectivity and personal power management with plug and play compatibility.

WEARNET® – WEARABLE PERSONAL AREA NETWORK

WEARNET is a fully integrated solution that adds capability and reduces weight, while adding intelligent connectivity and personal power management with plug-and-play compatibility.

WEARNET® – WEARABLE PERSONAL AREA NETWORK

WiSIC – PHYSIOLOGICAL MONITORING SENSORS AND FLEXIBLE DISPLAY TECHNOLOGY

POC's WiSIC is the starting point for an integrated platform that enables next-generation physiological monitoring. This device monitors temperature, heart rate, respiration rate and ECG data and can be integrated into a Transportation Telemedicine system. The device enables the persistent monitoring of the medical status of a large group of triage patients, through the use of a wireless interface and can also be used for en route patient care for vitals monitoring. The ultra-low power electrophoretic display enables at-a-glance evaluation of the patient, while the flexible photovoltaic extends the operational lifetime of the device. The flexible packaging allows the device to conform to the shape of the patient.

ADVANCED SYSTEMS

We provide long-range multi-sensor systems, hyper spectral detection and electro-magnetic detection systems that provide real-time ability to detect, recognize, identify and geo-locate distant targets.

SURVEYS 180 – PANORAMIC ULTRA-HIGH RESOLUTION VIDEO SURVEILLANCE

SURVEYS 180 is a complete high performance surveillance system for distances up to 10 km. As an "unblinking eye" it records and displays 180° wide field of view, with unprecedented resolution (0.3 Giga pixel). The SURVEYS 180 employs instantaneous digital e-zoom (no latency) with no moving parts. Using simple mouse operations, users can define multiple regions of interest (ROI), zoom in/out and remotely configure sensor parameters. All events (i.e. vehicle identification) are recorded in a searchable database along with the full resolution imagery, enabling forensic analysis with all of the same controls/features as the real-time interface.

iPEECS – INTEGRATED PERSISTENT ENERGY CONCENTRIC COVERT SURVEILLANCE SYSTEM

The iPEECS system offers covert surveillance capability to effectively monitor and track suspicious activity. The system consists of an all-weather, camouflaged standalone box mountable on objects such as trees, poles, or building structures. It provides persistent 200-m range day/night video surveillance with license plate reading capability with results logged to a searchable database. Solar-powered operation enables it to operate continuously for weeks. Remote operation and monitoring via commercial cellular networks and/or a separate 5-mile RF link provide capability to remotely control the system and access surveillance information in real time.

MENTIS – REMOTE INTERFACE UNIT

MENTIS enables interoperability between subsystems by providing a standardized interface that transparently adapts to unique connectorizations, and provides real-time translation between diverse data formats. With MENTIS, analog and digital inputs are internally rerouted using an embedded switching fabric, and the signals are transformed into outputs that re passed to the platform's onboard computer for logging and/or analysis, eliminating the need to rewire input connectors for different payloads. The onboard processing provides translations between various input signal types in a package as small as 1" x 1" x ½".

ADVANCED METROLOGY INSTRUMENTATION

IMAGE COURTESY | **U.S NAVY**

INTELLIMIC™ – "SMART" MICROMETER

Intellimic™ is an intelligent precision wireless micrometer designed for advanced materials, coatings, and location tracking. Intellimic offers improvements in production efficiency, without damaging the material surfaces. Thicknesses are measured and wirelessly transmitted and stored for easy reference.

AHDAT – HOT DOT APPLICATOR TOOL

The Automated Hot Dot Applicator Tool will dramatically improve production by pneumatically stamping the fastener hole, then filling with thermoplastic polyurethane, then skiving the surface to a smooth finish.

PHAST – SKIVING TOOL

PHAST is a Pneumatic Height Adjustable Skiving Tool fitted with a custom cutting head and vacuum line. PHAST will quickly and easily remove fastener fill paste and gap fill material. This tool is designed for advanced aerospace materials and will maintain surface integrity and significantly reduce labor time while improving production.

ILSAS – LIQUID SHIM APPLICATION SYSTEM

ILSAS is an Interpolated Liquid Shim Application System that will lay down a precise and measured bead consistently. The applied liquid material will be precisely measured and transmitted wirelessly back to the work station. ILSAS is easy to use, eliminates masking, saves material cost and reduces labor related to finish work on aircraft surfaces.

LACR – REPAIR OF AIRCRAFT CANOPY COATINGS

POC's Laser Assisted Coating Repair (LACR) performs flight-line service repair of the coatings typically found on canopies and fixtures for aircraft such as the B-2, F-22, and F-35. A low power (< 50mJ), compact laser is used to transfer virgin ITO or gold (and other substances) instantly to the repair areas. The LACR accommodates curved canopy surfaces and irregular scratch shapes, and can repair concave and convex surfaces with a 3" radius of curvature or greater.

/// MARKETS AND CUSTOMERS

Our products and technologies reach worldwide markets as a result of our in-house manufacturing, vendor supply network, six spin-off companies, and two ventures, combined with a number of licensing agreements.

FEDERAL CUSTOMERS

- The U.S. Department of Defense
  - Army
  - Navy
  - Air Force
  - Marine Corps
  - Special Operations Command
  - Office of the Secretary of Defense
  - DARPA
- Department of Homeland Security
- National Institutes of Health
- National Aeronautics and Space Administration
- National Science Foundation
- National Institutes of Science and Technology
- Technical Support Working Group
- Joint Improvised Explosive Device Defeat Organization
- Department of Energy

We also collaborate with a number of primes, universities, institutions and national laboratories such as Wright Patterson Air Force Base, Eglin Air Force Base, Sandia National Laboratories, and Brookhaven National Laboratories.

COMMERCIAL CUSTOMERS

- Sikorsky
- Boeing
- Raytheon
- U.S. Forest Service
- L-3 Communications
- Rockwell Collins
- Lockheed Martin
- Aero Contractors

IMAGE COURTESY | **U.S NAVY**

/// COMPANY PROFILE

Founded in 1985, Physical Optics Corporation (POC) is a highly innovative small business, women-owned company, and is located in Torrance, CA with five buildings that occupy over 100,000 square feet. POC houses some of the most highly advanced and unique research laboratories, as well as engineering, prototyping, development, testing and production facilities. The company complies with all applicable ITAR provisions. Our production and quality programs are certified to ISO 9001:2000, AS9100C, AS9110A and managed under CMMI – ML3. The company has launched six (6) spin-off companies and holds over 135 issued patents worldwide, covering over 40 technologies. With more than $350 million in commercial and government sales, POC has been fielded in at least 71 DoD and DoE installations. Financially, POC has been profitable every year since its founding, and is planning for its next wave of growth. POC is managed by an experienced executive and management team, and is audited by DCCA and DCMA, along with certified independent financial audits. In addition to its strong financial management, the company has no long-term debt, holds a significant cash reserve, and is prepared for fluctuating market conditions.

MANAGEMENT TEAM

POC has had a seasoned management team in place for many years led by **Dr. Joanna Jannson**, President, Chairman, CEO and co-founder of Physical Optics Corp. Dr. Jannson has over 30 years of technical and business experience in high-technology environments. Since POC's inception in 1985, she has provided the company with successful strategies for expansion that included launching several spin-off companies and joint ventures in the areas of millimeter wave optics, remote lighting, biochemical sensing, fiber optic communications and displays.

Dr. Tomasz Jannson, Senior Vice President, Chief Technology Officer, is an expert in physical optics, diffraction, phase conjugation, coherence, and optical information processing.. When he co-founded Physical Optics Corporation in 1985, he became a leading force in orienting the company toward applications and product-oriented photonic technologies.

Dr. Gajendra Savant, Chief Operating Officer, joined POC in 1986 and has been instrumental in the company's technology development and business growth. Dr. Savant has been COO since 1996 and leads 6 technical divisions, including Avionics Products, and Manufacturing. He actively directs the transition of technology to volume production.

Mr. Gordon Drew, Chief Financial Officer and Sr. Vice President of Finance and Administration, has more than 35 years of management experience in technology research, manufacturing, and marketing companies. At Physical Optics, he has been instrumental in the planning, creation and building subsidiary operations focused on specific proprietary technologies.

Mr. Rick Shie, Chief Strategic Officer and Senior Vice President, is responsible for POC corporate strategy and business development. As a senior manager of POC, he makes critical contributions to the company's government, military and defense, and commercial expansions, largely by transitioning products from research and development into the military, defense, and commercial marketplace.

Dr. Kevin Walter, Chief Administrative Officer and Senior Vice President Operations, has 20+ years of management experience in high-tech industry and was a primary contributor responsible for establishing the manufacturing capability and for obtaining POC's AS9100 and CMMI certifications. Dr. Walter directs many functions including Contracts, Compliance, Recruiting, Security, Quality, and Proposals and Publications.

Dr. Andrew Kostrzewski, Senior Vice President, Strategic Technologies, and Chief Engineer, has over 25 years of experience in compression, signal processing, communications, authentication, and optoelectronic hardware development. In his role as Chief Engineer, Dr. Kostrzewski directs the development of strategically important technologies at POC.

/// OUR CORE ADVANTAGES

Physical Optics Corporation offers our customers technologies and products based on a deep understanding of physical principles of optics that can be applied to solve our customer needs and provide them with a competitive advantage.

INTELLECTUAL PROPERTY

Physical Optics has developed more than 100 products and holds over 135 patents covering 40+ technologies in the areas of applied technology, electro-optics systems, information technologies, photonic systems, avionics systems, and products and engineering.

WORLD-RENOWNED EXPERTS

With a staff of highly talented employees, from scientists, engineers, and production personnel to contract management, corporate marketing and business development teams, of whom many hold Ph.D. degrees, POC is positioned to develop and deliver solutions and "technology that make a difference®" to our customers.

/// CONTACT

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