

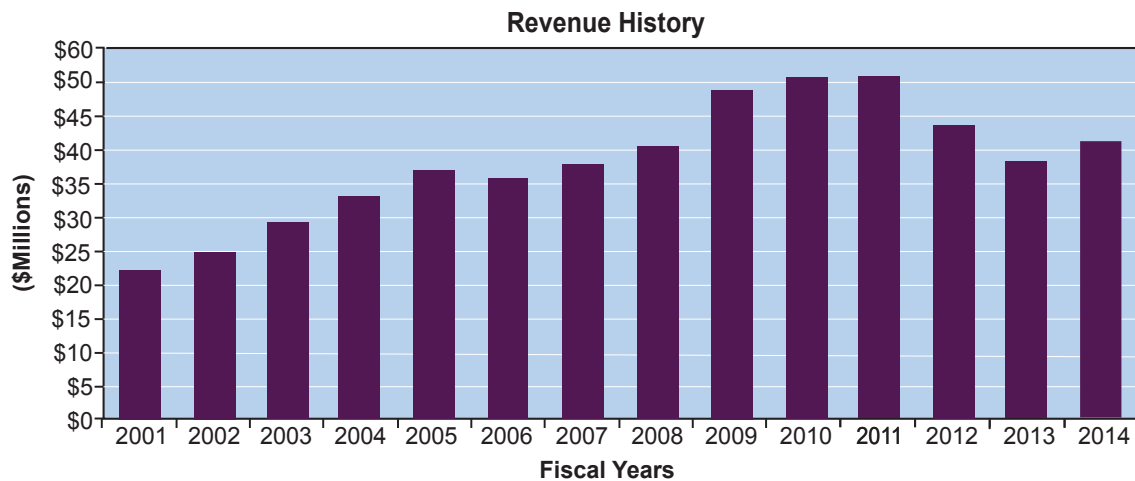
**Physical
Sciences Inc.**



The bridge between vision and reality.

PSI Heritage and Accomplishments

Physical Sciences Inc. (PSI) was founded in 1973. Its heritage is the Avco Everett Research Laboratory, now a division of Textron Corp. PSI is now a 100% employee owned company with over 180 employees that has diversified from an R&D organization to a broadly based technology development and commercialization organization.



1973

First company research contract from the Air Force Office of Scientific Research

1979

First Miniature Homing Vehicle Lethality Testing

1983

PSI Systems Division organized to develop commercial software products

1987

PSI Participates in Major Re-entry Flight Tests

1993

PSI Environment Instruments founded; later renamed Spectrum Diagnostix, Inc.

1993

First BRD-based tunable diode laser sensor measurements; start of TDL research

1997

SAMMES flight modules designed for space shuttle

2001

Revenues exceed \$20M; PSI research group organized into four enterprises

2001

Hundredth Tunable Diode Laser spectrometer delivered

2005

AIRIS Open Range Flight Test

2005

Remote Methane Leak Detector (RMLD™) wins R&D 100 Award for best new product

2007

PSI developed Fuel Contamination Sensor passes First Article Test (FAT) with Navy

2008

Sales of RMLD (via license) exceed 500 units, Ophthalmic instrumentation sales (via license) exceed 2000 units.

2011

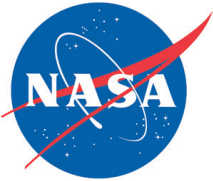
Shipment of over 60 fuel contamination sensors for U.S. Navy Carriers & Destroyers

2013

First multi-unit shipments of PSI's InstantEye sUAS

Corporate Goal

PSI bridges the gap between applied research and systems integration in the development and deployment of technology for our government and commercial customers.



Leadership Statement

PSI has an international reputation for technical excellence and innovation. We have successfully developed and transitioned advanced technologies to support the missions of the Department of Defense, NASA, and many commercial partners. We are dedicated to the application of scientific and engineering innovation to solve technological problems. We perform product development to manufacturing prototype and ultimately transition it to the military and commercial market sectors through manufacturing or licensing.

PSI's 130 person technical staff is organized around technology centers that focus on Lasers, Sensor Technologies, Materials, Simulation and Modeling, and Space Hardware. The following sections describe each of these areas.

Technical Areas of Expertise

Lasers

Laser development and application has been a central component of PSI's core technology since its founding in 1973. From the vacuum-ultraviolet to the far-infrared; from ultra-sensitive atomic measurements to directed energy - PSI understands how to make lasers work for any application in any environment.



Materials

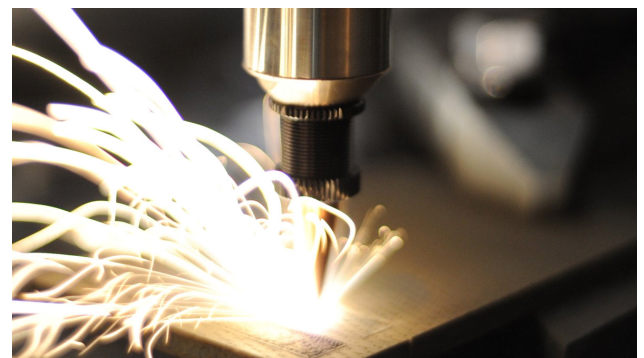
Material advancements reshape technologies across a wide range of disciplines. PSI's materials development and manufacturing capabilities result in high performance systems, particularly for high temperature applications. Our understanding of materials behavior under high heat fluxes has enabled us to develop a new class of ceramic matrix composites that can survive for 10 minutes duration at 4850°F in supersonic, highly oxidative environments with no erosion.



Laser Machining

Another example of PSI's materials expertise is its high speed laser machining center. Aircraft engine and exhaust washed structures require highly efficient ceramic matrix composite (CMC) designs to minimize weight and withstand severe environmental conditions. It is time consuming and expensive to fabricate these components, as they require significant post-fabrication machining to precise dimensions. A high-speed machining process is needed to eliminate many of the major cost and risk impediments for transitioning these materials to aircraft production.

PSI is addressing this need by developing a highly innovative high speed laser machining center. The PSI laser machine center is demonstrating machining of CMC components at 25 times the speed and 1/10 the cost of the original baseline machining techniques. These improvements enable production of CMC aircraft components at greatly reduced time and cost. Our technology is currently being qualified in the manufacturing line for a specific Navy platform.



Simulation and Modeling

PSI supports the DoD in the areas of test prediction and design, as well as post-test data analysis. Under the U.S. Navy Aegis Ballistic Missile Defense effort, PSI provides test and evaluation support concentrating on pre-shot predictions and post-test analysis. PSI is part of PD 452's weapon system effectiveness team and supports the flight test program; the most recent being Aegis Ballistic Missile Defense Flight Test FTM-04-02.



This successful intercept test involved a target warhead separated from its booster rocket.

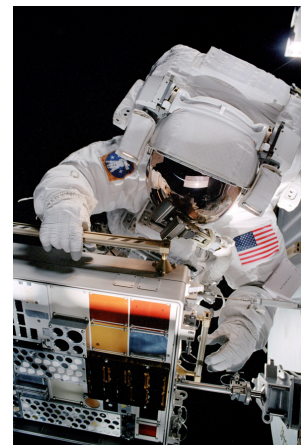
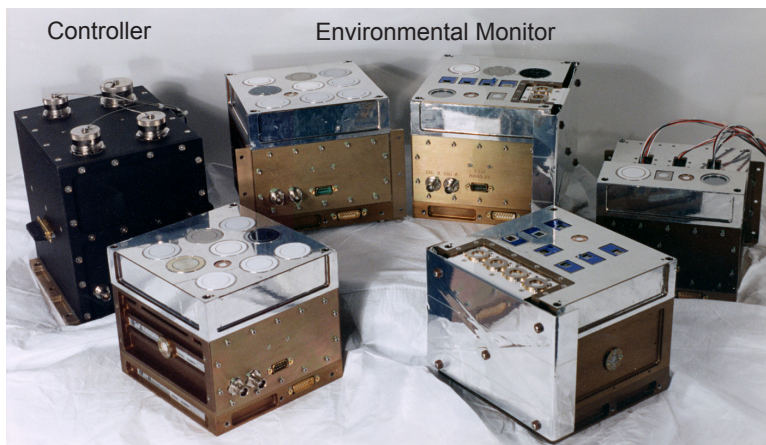
Sensor and Imaging Technology

PSI's expertise in optical science and technology covers a wide range of activities from basic research to commercial products. PSI's Adaptive Infrared Imaging System (AIRIS) addresses a significant need in remote chemical/biochemical (CB) detection. Most significantly, it has the capability to detect smaller scale (10 m) chemical releases at ranges to 5 km that may occur as a result of single terrorist or small group activity.



Space Hardware

PSI has extensive expertise in spacecraft systems design, systems analysis, modeling, system diagnostics, and orbital monitoring. PSI has flown more than 20 instruments and experiments since 1991 on satellites, shuttles and the space station. PSI has three space environment sensors currently in orbit, with three more scheduled for delivery, and several more in development.



Products

The natural evolution of Physical Sciences' R&D effort encourages the transition of the technology to support the missions of the Department of Defense, NASA, and many commercial partners. Following are examples of some recent PSI developed technologies now undergoing insertion into DoD missions and commercial applications.

InstantEye sUAS

PSI has developed InstantEye, an affordable, innovative small unmanned autonomous system (sUAS), which will become a vital surveillance tool for soldiers, civilian police forces, and border control. The vehicle can be easily stowed and deployed on-the-fly for examining roof tops, looking around corners, identifying IEDs or clearing mountain caves. Its quad-rotor design provides a nimble, hovering platform—ideal for carrying its two high-resolution cameras and combating windy/gusty environments. InstantEye's greatest advantage is its reflexive autopilot and sensors, which allow for autonomous hovering around a GPS point while combating winds and gusts. The vehicle returns real-time video and location information to its small ground controller. InstantEye has forward and downward facing cameras. The downward pointing camera is ideal for overhead surveillance and tracking of objects. The forward facing camera is used to inspect doorways, investigate difficult to reach areas, and maneuvering within cluttered environments. PSI delivered its first multi-unit orders to customers in 2013.

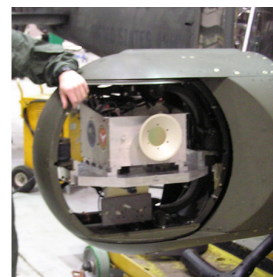


Adaptive Infrared Imaging Spectrometer (AIRIS)

AIRIS is PSI's patented (U.S. Patent 5,461,477) multispectral infrared imaging technology. AIRIS operation from an airborne platform was first demonstrated in 2002 in collaboration with

U.S. Army SBCCOM and the U.S. Army Redstone Technical Test Center.

The sensor was integrated into a gyro-stabilized, gimballed instrumentation pod on a

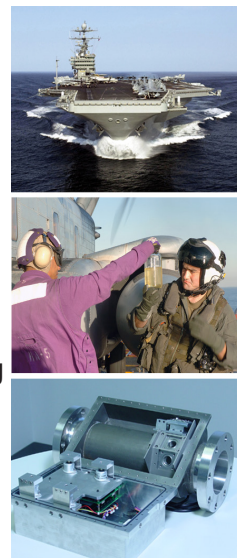


UH-1 helicopter and used to monitor releases of chemical and biological agent simulants. Under DTRA JSTO sponsorship, the technology was transitioned to TRL 7 maturity and is being evaluated by the Joint Program Executive Office for Chemical and Biological Defense.

PSI can deliver AIRIS units for general use or customized for specific applications.

Fuel Contamination Monitor

PSI has developed a laser-based in-line sensor to monitor contamination (sediment and free water) in JP5 aviation fuel aboard Navy aircraft carriers and diesel fuel on surface ships. PSI's innovative monitoring system is currently being procured for new carrier construction, retrofits of existing carriers, and new surface ships. Over 60 systems have been shipped for this application. PSI's Aviation Fuel Contamination Monitoring System utilizes laser scattering technology to measure the quantities of free water and sediment in the fuel as it flows through a pipe. This innovation will effectively reduce work load by up to 3200 hours per month, translating to an annual savings of nearly \$1 million per carrier. In addition to alleviating the military of tedious fuel sampling processes, this technology has applications to non-military fuel sampling by commercial airports, fuel storage sites, and power plants. Over 50 commercial systems have been sold by our partner, Velcon Filters.



Laser Machining Systems

PSI's multi-axis laser machining systems enable cost effective manufacture of complex ceramic composite components. Performance benefits afforded by ceramic composites will make them an essential element of next generation propulsion system designs, but the hard brittle nature of these materials makes them exceedingly costly to machine using current practices. PSI's laser machining solution is a versatile tool that reduces ceramic composite machining costs and can be easily integrated onto the production floor. Development of the technology has been sponsored by the US Navy since 2006. PSI delivered its first production machine for a ceramic composite component production line in 2011.



5-axis PSI Laser Machine Center

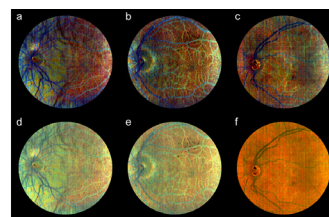
Remote Methane Leak Detector (RMLD)

The RMLD is an eye safe, invisible laser-based natural gas sensor used to locate leaks in natural gas transmission and distribution pipelines. The RMLD was developed by PSI with support from the U.S. Environmental Protection Agency, U.S. Department of Energy, and a consortium of natural gas utilities. PSI has licensed the RMLD to Heath Consultants Inc., a leading provider of leak detection services to the natural gas distribution and transmission industry, providing the right to manufacture and distribute it for locating leaks in natural gas transmission and distribution pipelines. PSI and Heath Consultants received a 2005 R&D 100 award for the development of the RMLD. Over 2500 sensors have been sold.



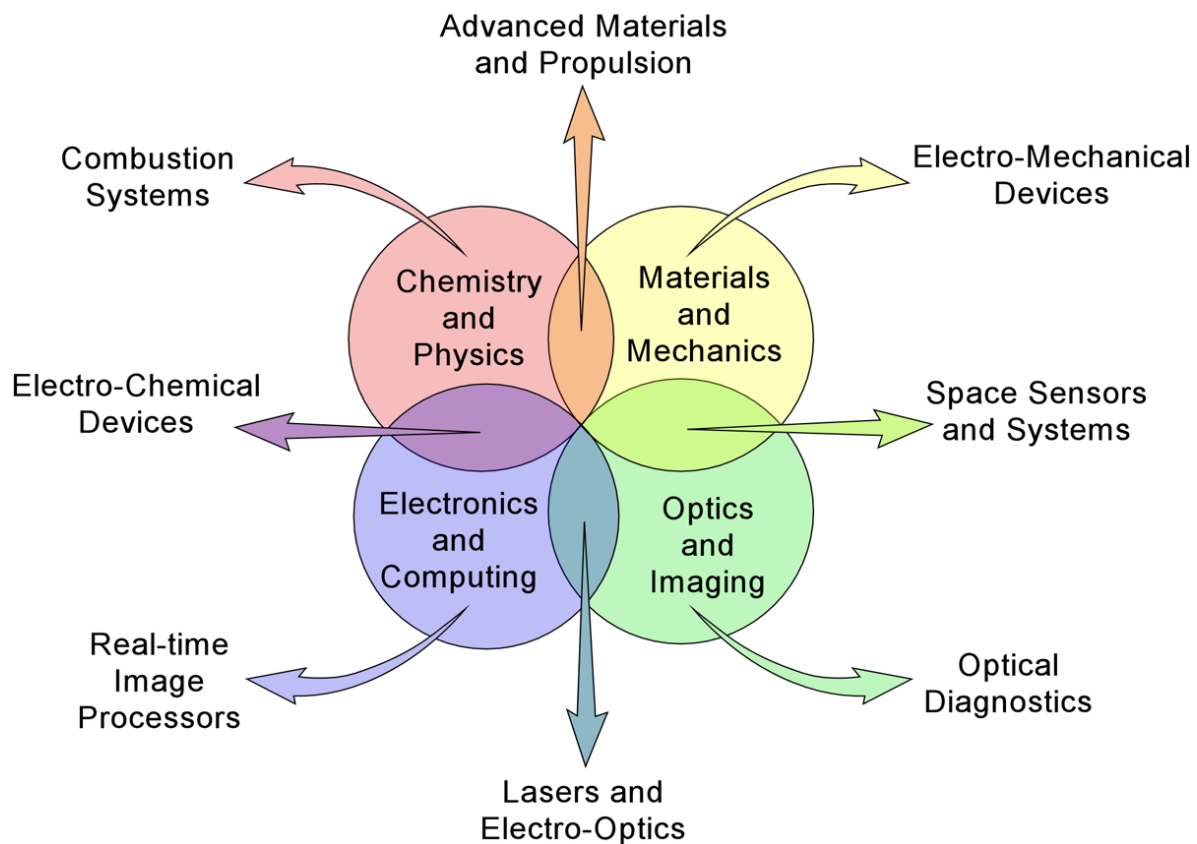
Ophthalmic Instrumentation

PSI has developed a range of revolutionary ophthalmic instruments based on optical coherence tomography and laser line scanning. These instruments are sold directly to vision researchers trying to understand the cellular basis of eye diseases as well as to clinicians via our licensed partners. Applications include diabetic retinopathy, macular degeneration, and the study of degenerative eye diseases in children and the aged. Our licensed partners have sold over 10,000 instruments incorporating PSI's technology



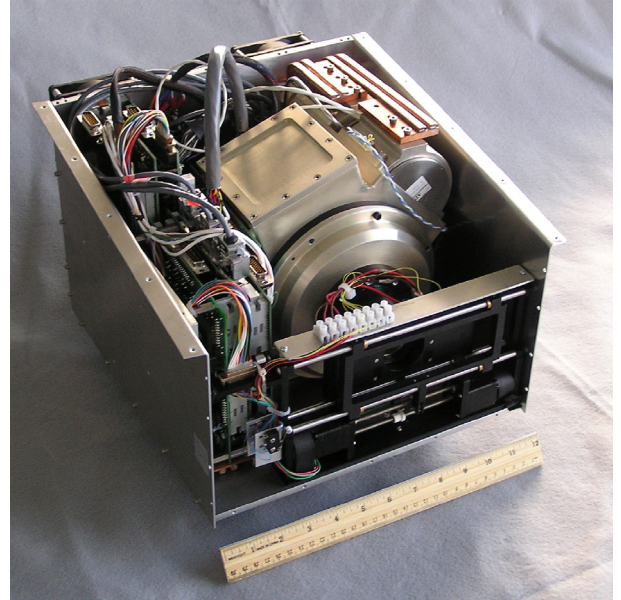
Core Competencies

PSI has a highly interdisciplinary staff with advanced degrees in chemistry, biology, physics, applied physics, electrical engineering, aeronautical engineering, mechanical engineering, and materials science. We are structured to enable cross-disciplinary collaboration between our scientists and engineers and to manufacture solutions to our customers' technical problems.



Bridging the Gap to Commercialization

PSI maintains a pilot assembly facility to bridge the gap between building instrument prototypes in a laboratory environment and doing large lot runs in infrastructure intensive production lines. This provides the capability to build production quality devices in a controlled manufacturing environment. In this facility, PSI scientists and engineers work closely with manufacturing engineers and technicians to develop and document assembly and test procedures, as well as create and verify Bills of Materials and quality control procedures for products that will be built in small quantities. This 1000 sq. ft. flexible space is equipped with assembly benches and appropriate tools, a clean room section, a stock and inventory area, and documentation controls. A Manufacturing Resource Planning (MRP) system is also being implemented. The facility is managed by a full-time manufacturing operations engineer who is supported by part-time assemblers, a part-time quality engineer, and the PSI engineering team.



Markets/Customers

PSI's customer list includes many of the top government sponsors and commercial organizations.

Examples are shown below



Facilities

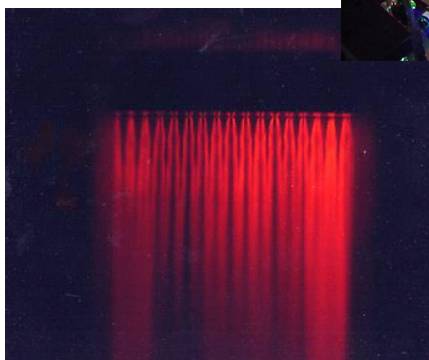
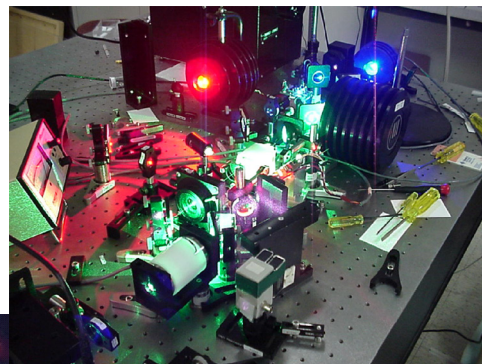
Physical Sciences Inc. occupies approximately 65,000 square feet of office and laboratory space at its Andover, MA location, of which over 25,000 square feet is dedicated to state-of-the-art experimental laboratories and assembly areas. Additional operations of PSI and its wholly-owned subsidiaries, Q-Peak, Inc., Research Support Instruments, and Faraday Technology, Inc., are conducted in Bedford, MA; Lanham, MD; Princeton, NJ; Pleasanton, CA; and Englewood, OH. Administrative, computational, and experimental facilities are designed to be fully responsive to contractual requirements and supportive of sensor design and testing, systems analysis, modeling, and experimental research efforts, as well as prototype product and process development.



Several laboratories have been developed to provide basic capabilities in high temperature physics, radical and excited state chemistry, propulsion technology, material response to pulsed and CW laser radiation, optical systems, combustor simulation, material fabrication, spacecraft orbital environments, combustion and emission control, biochemistry, and electrochemistry. Computer-assisted data acquisition and control systems in these laboratories allow a high degree of productivity and flexibility.

Specific examples of study areas for which fully equipped laboratories are available include:

- Chemical Kinetics and Synthesis
- Diode Laser Applications
- Flow Diagnostics
- Laser Interactions
- Fiber Optics
- Material Sciences
- High Energy Microwaves
- Space Environment Simulations
- Electrochemistry
- Plasma Physics
- Biochemistry



Address and Contact Information

Andover Headquarters

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810
Telephone: (978) 689-0003
Facsimile: (978) 689-3232

California Operations

Physical Sciences Inc.
6652 Owens Drive
Pleasanton, CA 94588
Telephone: (925) 743-1110
Facsimile: (925) 460-0110



Research Support Instruments, Inc.

4325-B Forbes Boulevard
Lanham, MD 20706
Telephone: (301) 306-0010
Facsimile: (301) 306-0295

Q-Peak, Inc.

135 South Road
Bedford, MA 01730
Telephone: (781) 275-9535
Facsimile: (781) 275-9726



Faraday Technology, Inc.

315 Huls Drive
Englewood, OH 45315
Telephone: (937) 836-7749
Facsimile: (937) 836-9498

