
2002
Technology
Transfer/Commercialization
report
NASA
Goddard Space
Flight Center
a technology commercialization office publication

table of contents

Since its inception,

NASA's Goddard Space Flight Center

has pursued a commitment to technology transfer and commercialization. For every space technology developed, Goddard strives to identify new ways it can be used. Goddard then makes these technologies, its facilities, and its expertise available to U.S. companies, universities, and government agencies. These efforts are based in Goddard's Technology Commercialization Office (TCO). This report presents TCO's activities and accomplishments during calendar year 2002.

Who We Are

Technology transfer and commercialization are an important part of Goddard Space Flight Center's mission. They enable the national assets of Goddard's technology, facilities, and expertise to be used in developing new products and processes that benefit the United States. These benefits include enriching the lives of the citizenry, increasing the Nation's competitiveness in the global market, improving the balance of trade, and facilitating the transfer of technology with other federal government agencies. To ensure that these benefits are achieved, Goddard established the Technology Commercialization Office.

TCO helps Goddard achieve its technology transfer/commercialization goals by:

- Seeking out new Goddard technologies that might meet industry and national needs
- Inventorying these newly developed technologies
- Patenting Goddard-developed technologies
- Promoting Goddard technologies, facilities, and capabilities to potential partners
- Negotiating license agreements and partnerships with industry, academia, or government agencies
- Sharing successful transfer and commercialization efforts

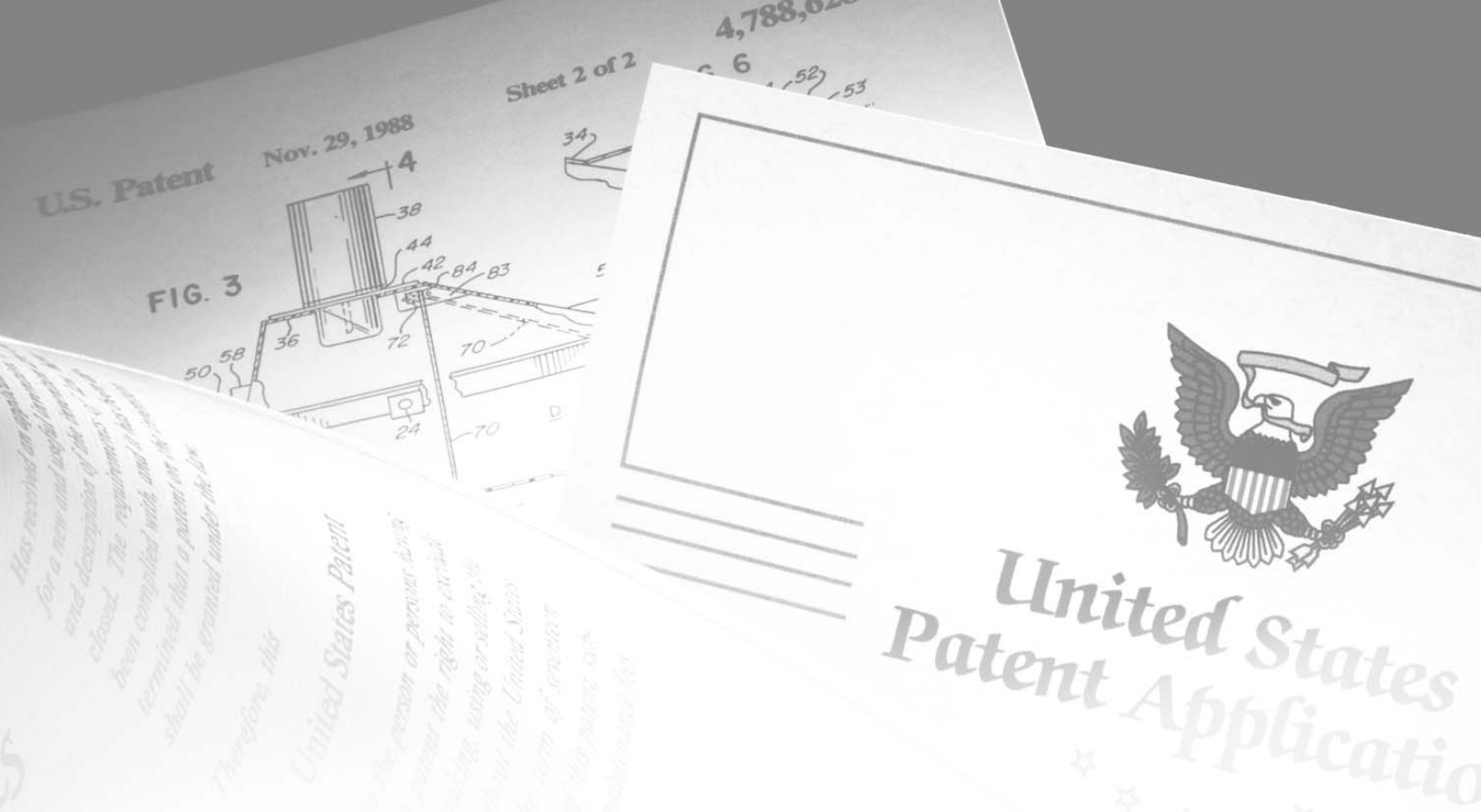
These key activities are performed by three teams that work together to facilitate technology transfer and commercialization.

Commercial Technology Staff

The commercial technology staff works with industry, academia, and other government agencies to transfer Goddard technologies and to help these organizations solve their technical problems within the six areas of Goddard's technology commercialization expertise:

- **Environmental systems**
- **Guidance, navigation, and control**
- **Information systems**
- **Optics**
- **Sensors and detectors**
- **Thermal and cryogenics**

The staff also negotiates licensing or partnership agreements.



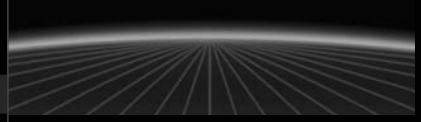
Outreach and Integration Staff

The outreach and integration staff markets Goddard-developed technologies that are available for transfer and commercialization and publicizes successful commercialization efforts. These outreach efforts are conducted using Technology Opportunity Sheets; *NASA Tech Briefs; Commerce Business Daily;* the Internet; press releases; articles in trade and news journals; and presentations at conferences, technology briefings, and trade shows. For more information on these efforts, see pages 22–25.

The staff also works to integrate Goddard researchers into the commercialization process. For more information on these efforts, see page 11 and pages 26–27.

Patent Counsel

Goddard's Office of Patent Counsel prepares patent applications and other patent-related documents, and it reviews Space Act, license, and nondisclosure agreements pertaining to patent and licensing matters. Patent counsel also helps determine the patent potential of new Goddard technologies and oversees intellectual property issues.

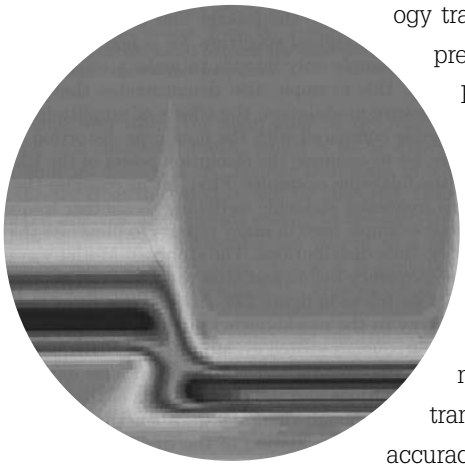


Technology opportunities and successes in 2002

The technologies that Goddard's scientific and technical staff develops to achieve space mission goals often offer benefits outside the aerospace industry. The technologies on the following pages have shown significant commercial potential, and some have already achieved commercial success.

Hilbert-Huang Transform

New algorithms for analyzing and monitoring physiological diagnostic data



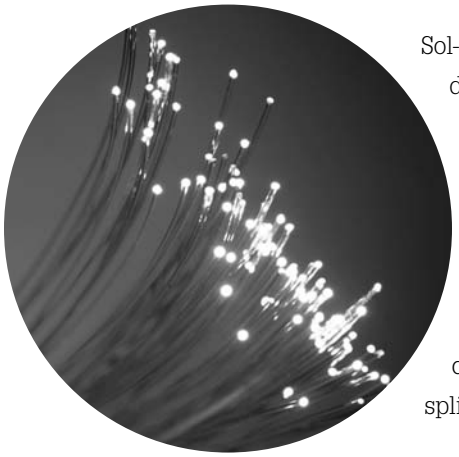
Winner of the Federal Laboratory Consortium (FLC) award for excellence in technology transfer, the Hilbert-Huang Transform (HHT) allows users to conduct more precise analyses of signal data than can be obtained from conventional Fourier-based methods. Designed specifically for processing nonlinear and nonstationary signals, HHT also can be used to analyze linear and stationary signals. This versatility enables the technology to be used in a variety of commercial applications.

This technique uses a process called empirical mode decomposition, which decomposes a complicated set of data into a finite, smaller number of functions called intrinsic mode functions. Compared to current transform methods and technologies, HHT offers increased quality and accuracy. HHT could be used in analyzing physiological non-linear or non-stationary data coming from the heart, brain, lungs, and nervous system.

This technology already is being used in underwater acoustic signal analysis, and several other commercial applications exist. HHT has been applied in the laboratory to medical conditions such as sleep apnea, epileptic seizures, blood pressure variation, and the effects of oxygen concentration on blood pressure. The use of this method resulted in new data not previously available to researchers. It provides more physical meaning than existing historical analysis tools and, as a result, enables medical researchers to better understand and characterize the phenomena. HHT could prove beneficial in diagnosing and/or monitoring patients at risk of aneurysm, Alzheimer's disease, Parkinson's disease, as well as many heart and lung conditions. Companies are encouraged to consider partnering with Goddard to commercialize the HHT technology.

New Sensors via Sol-Gel-Filled Fiber Optics

For monitoring biological systems, toxic materials, gases, radiation, and other conditions

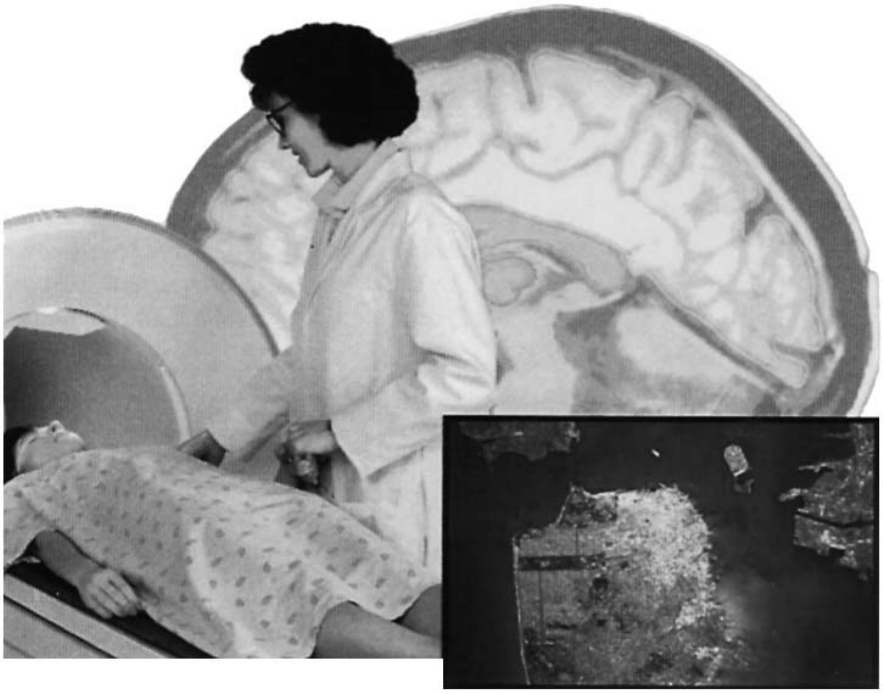


Sol-gel has been used for many years to coat optical fibers. One drawback, however, is that detection occurs outside the core of the fiber rather than inside. Goddard researchers have developed an innovative process for incorporating sol-gel into hollow core fiber optic waveguides. When the sol-gel is doped with chemiluminescent materials or fluorescent indicators, these waveguides can be used to monitor biological systems, toxic materials, hazardous and other gases, radiation, and other conditions.

Goddard's researchers have developed a method to ensure that the sol-gel's emitted chemiluminescence or fluorescence is transmitted directly to the detector via a fusion-spliced communications fiber. Advantages of this technology include:

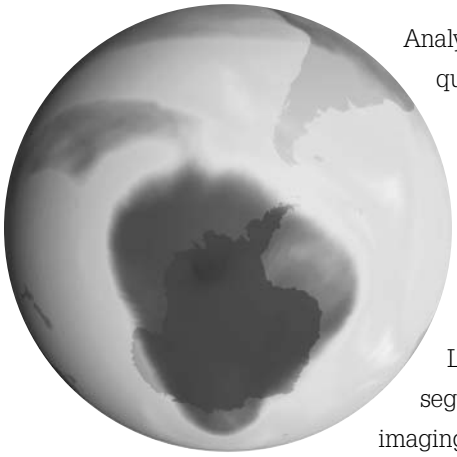
- ***Simple manufacturing:*** Goddard's is a low cost, straightforward method of customizing fiber optic waveguides.
- ***Near-room-temperature processing:*** Near-ambient processing allows thermally sensitive materials to be incorporated into the sol-gel matrix and retains the fiber's inherent reliability.
- ***Highly sensitive and fast:*** The sensing process occurs within the sol-gel inside the fiber optic waveguide.
- ***Versatile:*** Many sol-gel-filled fiber optic units can be bundled into custom applications.

Researchers are currently working on sensors for monitoring an alkaline phosphatase reaction using chemiluminescence. Goddard is pursuing patent protection for this technology and invites companies to consider partnering with Goddard to commercialize it.



Hierarchical Segmentation Software

For more accurate and reliable image analysis



Analysis of images from satellites and medical devices can achieve better quality and resolution using a Goddard-developed program called hierarchical segmentation software. This new technology is designed to analyze single-band, multispectral, or hyperspectral imagery data with a resolution of up to 8000 x 8000 pixels. Boundaries between regions within an image are maintained at full resolution, reducing distortion and resulting in a more accurate and reliable analysis of the image.

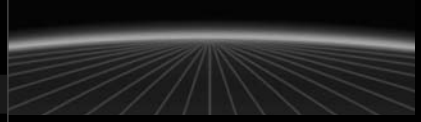
Licensed in November 2002, by Bartron Imaging, LLC, the hierarchical segmentation software has applications in both remote sensing and medical imaging analysis. These applications include:

- Remote sensing to monitor agricultural crops
- Identification of buildings and roadways as well as traffic congestion
- Identification of population densities and areas with the greatest expansion
- Improved scan analyses for CAT scans, MRIs, and ultrasound medical equipment

Companies can license this advanced image analysis software, developed at Goddard. For more information about the **hierarchical segmentation software**, please visit our Web site at:

http://techtransfer.gsfc.nasa.gov

http://techtransfer.gsfc.nasa.gov



Activities in 2002

The Technology Commercialization Office's mission is to introduce Goddard technologies, capabilities, and facilities into the commercial, academic, and government communities.

To achieve this mission, TCO undertakes many activities:

- Encouraging researcher involvement in the technology commercialization process
- Inventorying new technologies developed at Goddard
- Patenting Goddard technologies
- Promoting available technologies and facilities
- Establishing new agreements with industry, academia, and other government agencies
- Seeking and bestowing awards for Goddard technologies

Encouraging Researcher Involvement

Technology transfer and commercialization would not be possible without the participation of Goddard's scientific and technical staff. Throughout the year, the Technology Commercialization Office encourages researcher participation. For example, TCO hosts an annual program to highlight civil servants who report new technologies or provide outstanding contributions to technology transfer and commercialization (see page 12). Events such as this and other TCO efforts encourage civil servant researchers to disclose their new technologies (see pages 16-20) and to participate in commercialization efforts.

The following civil servant researchers participated in the technology transfer and commercialization process in 2002:

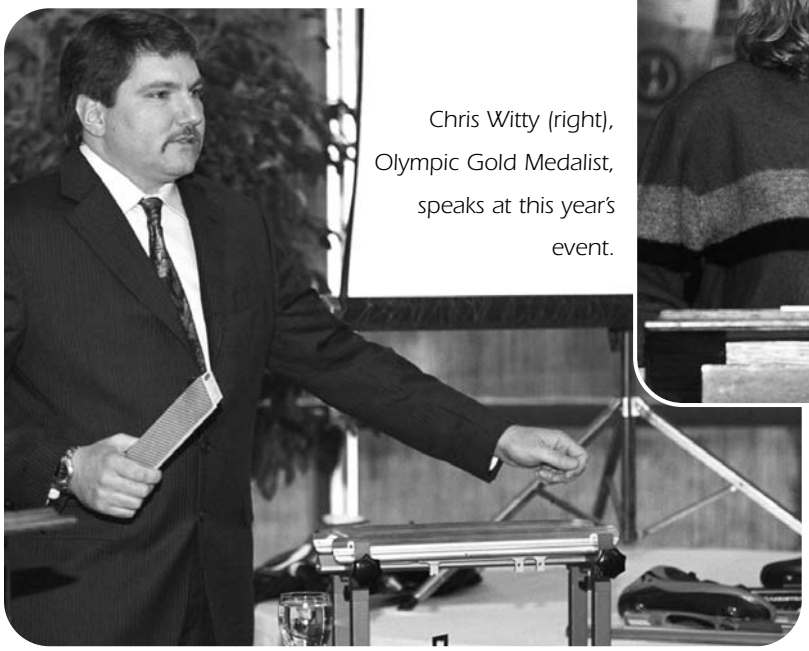
Richard Barclay
John Bristow
Paul Bryant
Michael Choi
Michael Comberiate
Steven Curtis
Mitchell Davis
John Degnan
David Folta
Steven Graham
Cheryl Gramling
Matthew Greenhouse
Jason Hair

Randy Harbaugh
Richard Harman
Roger Hart
Norden Huang
Stanley Hunter
David Israel
Mindy Jacobson
Tracee Jamison
Murzy Jhabvala
Hollis Jones
Andrew Jones
Karen Keadle-Calvert
Al Kogut

John Kolasinski
Jonathan Kuhn
Michael Lee
Douglas Leviton
Mary Li
Shian-Jiann Lin
James Lohr
Donald Lokerson
Richard Luquette
Matthew McGill
Nargess Memarsadeghi
Armando Morell

David Mott
Sharon Orsborne
James Ryan
Vibart Scott
Ken Segal
Rajeev Sharma
James Tilton
John Vranish
Evan Webb
Edward Wollack
Terri Wood
Pen-Shu Yeh

Chris Witty (right), Olympic Gold Medalist, speaks at this year's event.



Jim Lyons (left) demonstrates the speedskate polishing technology developed for the 2002 Olympic Games.

Spotlight:

10th Annual New Technology Reporting Awards Program

On April 5, 2002, the TCO held the 10th annual New Technology Reporting (NTR) awards program. The NTR commemorates the efforts of all of the inventors at Goddard who reported their technologies to the TCO in 2001–2002.

This year's program, held at the Newton White Mansion in Mitchellville, MD, proved to be one of the more exciting NTR events in recent years. Chris Witty, Olympic Gold Medallist in the 1000-meter Long Track Speedskating event; her coach, Finn Halvorsen; and Jim Lyons, former NASA Goddard Technician, spoke about Goddard's role in the 2002 Olympic Games.

Finn Halvorsen spoke about the super-polishing technique that Jim Lyons created and the "unassisted glide test" that proved this new technique offered a 10%–15% improvement, helping the United States win an amazing 11 medals in speedskating (see Striking Gold with NASA Technology Transfer, page 24).

Jim Lyons, formerly of the Optics Branch in the Instrument Technology Center (Code 551), encouraged all Goddard scientists to disclose their technologies. He stressed the importance of the role TCO played in helping both the U.S. Speedskating Team and his company, The Competitive Edge, work together to meet the skaters' needs for the 2002 Winter Olympics.

Al Diaz (right), GSFC Director, presents the Kerley Award to Doug Leviton (left) at this year's NTR awards program.

The James Kerley Award

Another highlight of the NTR program was the ceremony awarding Doug Leviton the 2001–2002 James Kerley Award in recognition of his commitment to the technology transfer and commercialization program throughout the year.

Named after the late James Kerley, a Goddard scientist who championed technology transfer and commercialization, the Kerley Award is presented annually to recognize a Goddard researcher's commitment to new technology reporting and the technology transfer process. The recipients have reported outstanding technology spin-off opportunities, participated in outreach activities, contributed articles to ***NASA Tech Briefs*** magazine, displayed innovative approaches to outreach and technology reporting, and worked closely with the Technology Commercialization Office to further its goals and mission.

Diana Cox, Lead Patent Counsel, also presented Patent Awards to 18 Goddard inventors for patents issued in 2001 (see page 21).

spotlight:

Commercial Technology Development Program

The Commercial Technology Development Program encourages and stimulates Goddard's development of advanced technology that has the potential for successful transfer to private industry. It allows Goddard to maintain its technological edge in research and development, while also promoting the transfer of these cutting-edge technologies to the private sector. The new products and processes that benefit from the Commercial Technology Development Program represent the achievement of the TCO goal.

The technologies chosen must have significant commercial potential, as well as applications for a Goddard mission. They are chosen based on the technology's:

- Market potential
- Maturity
- Commercial readiness level
- Intellectual property rights generated for the government
- Anticipated societal impact
- Partnership potential
- Project schedule and resources

In 2002, eleven Goddard innovators received CTD Program funding that enabled further development of technologies in fields ranging from fiber optics to magnetic refrigeration. These civil servants must now follow an aggressive development schedule that involves both TCO managers and private industry. The 2002 innovators include:

innovator	***title***
Semion Kizhner	*Hilbert-Huang Transform Data Processing System*
Harry Shaw	*A Demonstration Module for Integrated Fiber-Optic Sol-gel Sensors*
Jeffrey Didion	*Prototype Electrohydrodynamic Micro-Scale Pump*
James Tilton	*Improving the Commercialization Potential of Hierarchical Segmentation Software*
John Vranish	*Gear-Bearing for Industrial Applications*
Dr. Russell Carpenter	*Attitude Determination Using GPS*
Matthew McGill	*Demonstration of Atmospheric Wind Measurements Using Holographic Detection Technology*
David N. Whiteman	*Laser Power Stabilization Feedback System*
John Bolton	*Instrument Geolocation and Pointing Stabilization System*
Michael Hinchey	*Converting Specification to Code: The Enabling Technology*
Dr. Peter Shirron	*Compact, Low Cost Continuous Magnetic Refrigerator*

Inventorying new technologies

A primary way that Goddard researchers participate in the technology transfer process is by identifying, documenting, and reporting their new technologies to the Technology Commercialization Office. TCO then maintains an inventory of these reported technologies. Pages 17–20 list all of the technologies reported in 2002, categorized according to Goddard's areas of technical expertise. For more information about these technologies, please contact the TCO (see page 28).

Sensors and Detectors

Microfluidic Ion Analyzer

Deposition and Delineation of Thick Metal Layers onto Nonplanar Substrates for Use in Microelectronic Circuits

Improved CdZnTe Crystal Growth for Gamma Ray Detection Applications

Integral Sensor Device

MEMS Fabry-Perot Tunable Filter for Near-Infrared Imagery

Micromachined, Arrayable Hot-wire Anemometers and Fabrication Process for Such

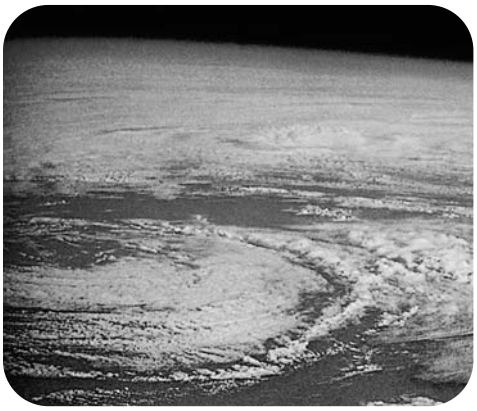
Micromachined Energy Discriminator

Quantum Well Electron Gain Structures for Improved Infrared Detector Read Noise Performance

Sol-gel Approach to LiN_bO_3 (Lithium Niobate) Fiber Modulator for Acoustooptic and Electrooptic Applications

UV Laser Micro-machining of Pixelized Micro-Well Detectors

Environmental Systems



A High-Definition Hyperspectral Imaging System

Conceptual Design of a 3D Imaging Lidar for High-Resolution Mapping of the Surface Topography of Moons or Planets from Space

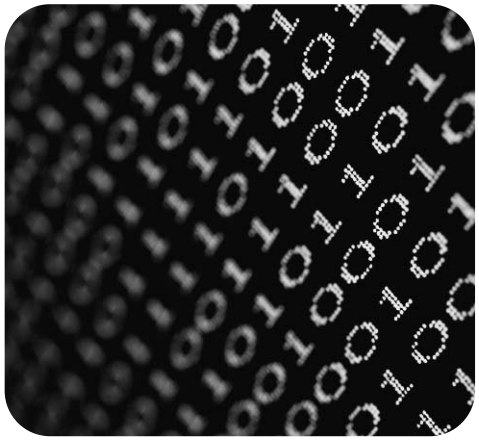
Finite-Volume Dynamical Core

In Situ Lidar for Cloud and Aerosol Radiation Science

Investigation of Helioseismic Waves and Magnetic Variations Associated with Solar Flares

Method to Image Surfaces Based on Monte Carlo Sampling

Information Systems



3D Terrain Renderer Using Compressed Source Data with Multi-scale, Region-of-interest Flow Mechanism (Unique Software Program)

A Hardware Lookup Engine that Uses No Processor, Simultaneously Supports Multiple Users Without Arbitration and Has a Known Maximum Latency

AutoCon-f-Autonomous Maneuver Control Flight Software

Automated Mission Planning and Scheduling System (AMPS) [Version 2]

Electronic Patch Panel (EPP) Software

Electronic Patch Panel (EPP) Card (and more generally, the Multi-function Digital Data Board)

Employee Contract Management System (ECMS)

Evolvable Neural Software System

Hatch-High Accuracy Atmospheric Correction for Hyperspectral Data

High Speed Information Exchange Between Spacecraft Subsystems

Low-Power, Radiation Tolerant Spaceborne Gigabit Ethernet

Method and Apparatus for Accurate, Digital Monitoring of a Receiver Frequency via Telemetry Without the Need for Calibartion of Analog Components

Mission Operation Planning and Scheduling System (MOPSS) [version 13.3]

Mixed Signal Asic Chip for a Pixel Detector

Normalized Amplitude Hilbert Transform (NAHT): A New Algorithm for Computing Instantaneous Frequency

Paramesh: Parallel Adaptive Mesh Refinement Library

Pass-Thru Logic Array Reduction and Synthesis

Reusable Java Library and Science Planning Tools

Silicon-Oxide-Insulated Silicon Shadow Masks

Simulation Software for a High Performance Data Compression Technique

The New Cloud Absorption Radiometer (CAR) Software

The Time-of-Flight System on a Chip (TOF Chip)

Time Frequency Analysis Based on Extema Sifting

TIMED Assessment Plotting System

TIMED Telemetry Definition System

Guidance, Navigation, and Control

- A Distributed Guidance and Control System for Satellite Constellations
- A Method for Using GPS and Crosslink Signals to Correct Ionospheric Errors in Space Navigation Solutions
- A New Algorithm for Satellite Attitude Determination (Rotating Satellites)
- Altimeter Noise, EMB, and Associated Software
- Friction Clamp Restraint Mechanism for Springback Reflectors
- General Maneuver Program (GMAN) Release 2001.01
- Goddard Trajectory Determination System (GTDS) Release 2001.01
- High-Torque Circular Electrical Connector Tool, EVA Crew Aids and Tools
- MEMS Torque Motor on a Chip (TOC-Microvalve)
- Method for Establishing Heliocentric Spacecraft Formations Using Gravity Assist From a Natural Satellite
- Method for Maintaining Attitude/Minimizing Attitude Transient During Gyro Traid Switch
- Multi-cell Battery Reconditioning for Spacecraft and Other Applications
- Point and Hold Positioning Hexapod
- Self-Deploying Foam Antenna Structures
- User-Involved Star Identification and Attitude Estimation
- Weak Signal and Anti-Jam GPS Receiver Using Full Correlation Grid

Thermal and Cryogenics

Conflict-Free Radiation Tolerant Storage Cell

Figure-Controlled Membrane Mirror

Improved Method of Fabricating Honeycomb Panels with Many Co-cured Tapped Holes

Linear Magnetostrictive Actuator

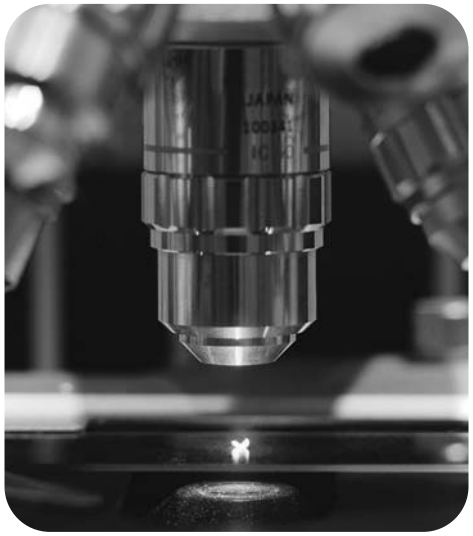
Method and Apparatus for Collection of Lunar Dust Particles

Musical Pitch Method for Measuring the Tension in Arimid Fiber Cord Such as Kevlar

Neutral Axis Spring Concept for Providing Torque Margin to Composite Thin Wall Integral Boom Hinges

Toolless Assembly Design for Composite Corrugated Feedhorns

Optics



Anti-Terrorism Bomb Eliminator

Charge Dissipative Electrical Cable

Double-Stranded DNA Microarrays and Methods for Detecting Interactions Between Protein and DNA

Improved Optical, Absolute, Linear and Rotary Position Encoders Using Vertically Compressible Imaging

Micro-Mirror Array Illumination Source for Optical Microscopes

Process for Producing High Quality Optically Polished Surfaces on Bare Aluminum Substrates

Solar Spectroradiometric Telescope and Absolute Calibration Method

Spherical Mirror Grazing Incidence Optics

Tunable Single Frequency CW IR Laser Source

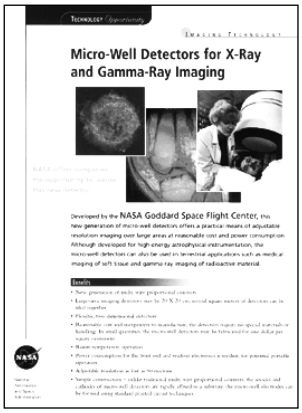
Patenting Goddard Technologies

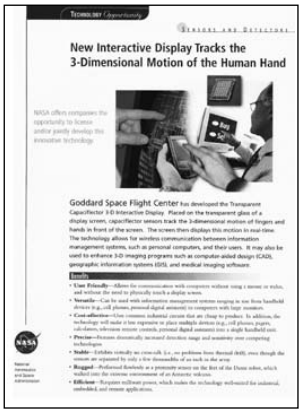
A key activity of the TCO's Office of Patent Counsel team is protecting Goddard inventions. Because filing for and maintaining a patent can be costly, counsel carefully evaluate new technologies to ensure that filing for a patent is appropriate. During 2002, the Patent Counsel team filed ten provisional patent applications, and ten nonprovisional patent applications.

While patents protect inventions for 20 years from the date on which the nonprovisional application is filed, provisional patent applications provide a means to establish an early effective filing date. Provisional patent applications have only a twelve-month pendency, however, and a non-provisional patent application must be filed within this time period to further protect the invention. Provisional patent applications are useful for protecting patent rights while decisions are made about whether to file for full patent protection.

In addition to the patent application filings, seven Goddard technologies received patents in 2002:

U.S. patent no.	*technology name*
6,381,559	Empirical Mode Decomposition Apparatus, Method, and Article of Manufacture for Analyzing Biological Signals and Performing Curve Fitting
6,420,691	Charge-Coupled Device for Low Background Observations
6,445,861	Sol-gel Processing to Form Doped Sol-gel Monoliths Inside Hollow Core Optical Fiber and Sol-gel Hollow Core Devices Made Thereby
6,359,357	Combination Radial and Thrust Magnetic Bearing
6,343,245	Microaltimeter
6,350,176	High Quality Optically Polished Aluminum Mirror and Process for Producing
6,479,808	Method and System for Collecting Data from Multiple Fields of View





Promoting Goddard Technologies

The Technology Commercialization Office promotes Goddard's innovative technologies and unique facilities through publications and conferences, briefings, and trade shows with industry.

Technology Opportunity Sheets

Each of these one-page announcements succinctly summarizes a Goddard-developed technology, focusing on its potential commercial applications and benefits. In 2002, the Technology Commercialization Office prepared these sheets on six Goddard technologies and distributed them through targeted mailings, at trade shows, and via TCO's Web site. *http://techtransfer.gsfc.nasa.gov*

- ***Hierarchical Segmentation Software:*** Achieving finer resolution and better quality images from satellite and medical devices
- ***Micro-Well Detectors for X-Ray and Gamma-Ray Imaging:*** Providing a practical means of adjustable resolution imaging over large areas with lower costs and lower power consumption
- ***Gear Bearings:*** Combining gear and bearing functions to reduce weight, number of parts, size, and cost, while increasing gearset capacity
- ***Multifrequency-Scanning Capaciflector:*** Combining fast material identification with proximity measurement
- ***New Interactive Display Tracks the 3-Dimensional Motion of the Human Hand:*** Allowing for wireless, touchless communication between information management systems and their users
- ***Flexible Wedge:*** Enabling efficient and effective brake/clutch configurations for many applications

Reprinted with permission from *NASA Tech Briefs*, Volume #26, Nos. 2,4,7, & 10.

NASA Tech Briefs

This monthly publication helps NASA achieve its technology transfer goals by reporting new, commercially significant NASA technologies. Subscribers to *NASA Tech Briefs*—industry engineers, managers, and scientists—thus learn about opportunities to license, transfer, and/or commercialize NASA technologies or to partner with NASA on joint research. Goddard's Technology Commercialization Office wrote four articles for *NASA Tech Briefs* in 2002:

- ***KPP — A Preprocessor for VHDL*** (GSC-14380): A computer program that enables faster coding and greater use of designs. (February 2002)
- ***Testing Grazing-Incidence Mirrors at Nearly Normal Incidence*** (GSC-14365): A system that enables adequate testing in visible light, without the need for a vacuum system. (March 2002)
- ***Magnetically Suspended Optical Chopper Wheel*** (GSC-14323): Magnetic bearings that offer long life at high speed, without lubrication or wear problems. (April 2002)
- ***Mechanisms for Reliable One-Time Deployment of Panels*** (GSC-13931): Mechanisms that overcome the disadvantages of both pyrotechnic and thermal release mechanisms. (July 2002)

NASA Tech Briefs is available on the Internet at:

http://www.nasatech.com

Success Story:

Striking Gold with NASA Technology Transfer

Jerry Search (SCSSA, copyright 2001); used with permission
SCSSA Copyright © 2001

In October 2002, *NASA Tech Briefs* featured a story, "Striking Gold," highlighting Goddard's assistance to the U.S. Speedskating Team at the 2002 Olympic Games in Salt Lake City, Utah. Using a polishing technology developed at Goddard for the Hubble Space Telescope, the team won 11 medals and broke a world speedskating record.

In 1998, Darryl Mitchell, of the TCO, met with the U.S. Olympic Committee offering help in transferring NASA technologies that had potential applications in various Olympic sports. As a result of that meeting, Mitchell began working with Finn Halvorsen, long-track program director for the U.S. Speedskating Team; Joe Famiglietti, of Goddard's TCO; and Jim Lyons, a former NASA Goddard optics engineer.

By modifying a polishing technology used to make the optics for NASA's Hubble Space Telescope and other science observatories, Lyons was able to develop a new polishing tool for use when sharpening the skating blade. The goal was to make the blade glide with the least amount of friction possible while still maintaining a sharp edge that could grip the ice.

Only three weeks before the Olympic games began, they finally hit on the perfect design. Tests proved the specially sharpened speedskates improved skate glide 10% to 15% over conventionally sharpened skates. As a result, the U.S. Speedskating Team won a total of 11 medals at the 2002 Olympic Games. Chris Witty used the new technology to break the world record for the 1,000-meter race and win the gold medal.

Jim Lyons has since started Competitive Edge Company to continue the development of the polishing technology. His company is the latest in a series of startup ventures benefiting from NASA's technology transfer program.

A 10-minute video and brochure about this highly successful transfer of technology were produced to further communicate the goals and successes of Goddard's TCO to the public and other entities.

Publications sharing Goddard's successes:

- "Microlasers Developed for Altimetry," an article about Goddard's ***photon-counting microaltimeter,*** was published in *Photonics Spectra* magazine in August of 2002.
- "The start of a new movement," an article about Goddard's new ***gear bearings***, written by Paul Sharke, Associate Editor of *Mechanical Engineering* magazine, was published in August of 2002.
- "Technology and the Future of O&P," an article featuring Goddard's ***compliant cable mechanisms***, written by Rachel Kelley, was published in *O&P World* in the Fall 2002 issue.

Conferences, Briefings, and Trade Shows with Industry

The Technology Commercialization Office also disseminates information about its inventions, their potential commercial applications, and opportunities for R&D partnerships by hosting and participating in conferences, briefings, and trade shows with industry. At these events, Goddard staff give presentations, demonstrate technologies, distribute literature, and offer one-on-one counseling to industry about partnership and commercialization opportunities at Goddard. These events enable Goddard's TCO to successfully reach many small, medium, and large companies; academic institutions; other government agencies; and trade and professional organizations.

Education

- Patriots Technology Summer Camps Program
  July 16, 2002; Clinton, MD

Engineering and Manufacturing

- National Design and Engineering Show
  March 18–21, 2002; Chicago, IL

Medicine

- SPIE International Symposium on Medical Imaging
  February 23–28, 2002; San Diego, CA

Sensors

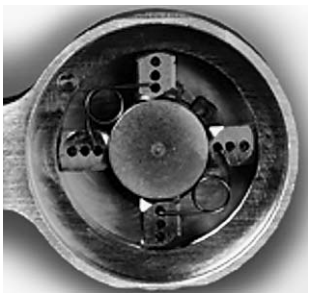
- Sensors Symposium
  July 29–31, 2002; Baltimore, MD
- Sensors Expo & Conference
  September 23–26, 2002; Boston, MA

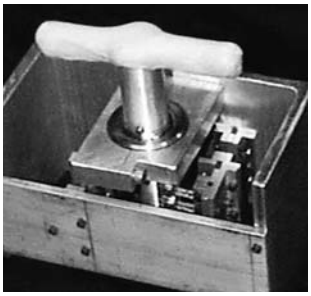
Small Business and Economic Development

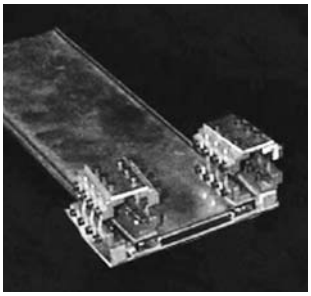
- Goddard's Annual Small and Small Disadvantaged Business Conference
  July 25, 2002; Greenbelt, MD
- 11th Annual NASA Technology & Business Conference
  August 13-14, 2002; Providence, RI

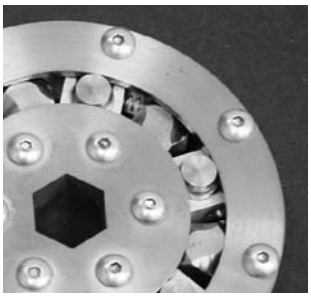
Technology Expos and Conferences

- NASA First Contact: Communicating in the 21st Century
  March 27–28, 2002; Phoenix, AZ
- 2nd Annual University of Maryland Business and Technology Mixer
  May 20, 2002; Adelphi, MD
- Goddard Motion Control Workshop
  June 18, 2002; Hartford, CT
- NBC4 Digital Edge Expo
  September 7–8, 2002; Washington, DC
- World's Best Technologies 2002
  September 24–27, 2002; Pittsburgh, PA
- Prince George's County (Maryland) Chamber of Commerce Showcase 2002
  October 3, 2002; Landover, MD
- Microaltimeter Workshop 2002
  December 3, 2002; NASA Goddard Space Flight Center, Greenbelt, MD
- Maryland Technology Showcase
  December 4–5, 2002; Baltimore, MD









spotlight:

Prototyping Licensing Opportunity

The Technology Commercialization Office at Goddard is continually looking for new and better ways to accomplish the TCO mission. The innovative spirit fostered by the TCO goes beyond the technologies it seeks to transfer. Improvements to the TCO's services for its customers are constantly being made. One such innovation is the Prototyping Licensing Opportunity.

The explosive growth of the Internet, coupled with the proliferation of easily accessible telecommunications technology, has accelerated the pace of doing business to levels never before dreamed. Goddard's Prototyping Licensing Opportunity streamlines TCO's interface with potential licensees of NASA patents in order to keep pace with the commercial sector's need for swift interactions. Through the Prototyping Licensing Opportunity, NASA licenses key technologies in its patent portfolio to small engineering firms, who then provide application-specific prototyping services to companies interested in licensing a technology from NASA for incorporation into a commercial product line.

The prototype licensing arrangement is beneficial for all parties involved for several reasons. The prototype licensee is able to expand its company knowledge base and is exposed to new customers and contacts that would not have been available previously—all at minimal or no cost to the licensee. The manufacturer benefits from the availability of a quick and easily accessible source for developing an application-specific prototype for their assessment prior to entering into a licensing agreement. Benefits to NASA include: reduced paperwork, an expedited licensing process, better allocation of personnel resources, creation of new developers for technologies needed in future NASA missions, and a better understanding of the value of its intellectual property.

Thus far, four companies have chosen to apply for prototyping licenses from NASA. As a result, eight prototyping licenses have been signed, covering three NASA technology portfolios. Discussions have been initiated between various prototyping licensees and representatives from one of the major automotive manufacturers, an international manufacturer of medical diagnostic equipment, and a major manufacturer of power hand tools.

The TCO seeks partnership opportunities with prototyping companies that would provide product development services to potential NASA customers interested in licensing NASA technology. The goal of this business-to-business initiative is to allow both NASA and engineering firms to reach a wider market segment. Companies interested in participating are encouraged to contact Goddard's TCO.

Establishing New Agreements

All of these efforts by the Technology Commercialization Office lead to the signing of various agreements. License agreements allow an outside organization to use a Goddard technology, often while paying a licensing fee and/or a royalty. Space Act Agreements are established to jointly develop Goddard technologies while sharing costs. During 2002, TCO established 8 license agreements that included prototype licenses for 4 Goddard technologies:

Technology	***Licenses***	
3-D Roller Locking Sprag	Turnkey Design Services	Blue Island, IL
3-D Sprag Ratcheting Tool (prototype)	Honeybee Robotics	New York, NY
3-D Sprag Ratcheting Tool (prototype)	Turnkey Design Services	Blue Island, IL
Capaciflector Patents (prototype)	Custom Engineering & Designs, Inc. (CEDI)	Boonton, NJ
Compliant Cable Walker	Enduro Wheelchair	East Hartford, CT
Gear Bearings (prototype)	Custom Engineering & Designs, Inc. (CEDI)	Boonton, NJ
Gear Bearings (prototype)	Honeybee Robotics	New York, NY
Gear Bearings (prototype)	Turnkey Design Services	Blue Island, IL
Hierarchical Segmentation Software	Bartron Imaging, LLC	New Haven, CT

Technology	***Space Act or other agreements***	
Hilbert-Huang Transform	Hirotaka Nakasone in support of the FBI	Quantico, VA
Hilbert-Huang Transform	John I. Salisbury (individual)	Chepchet, RI
Hilbert-Huang Transform	University of Wisconsin	Madison, WI
Hilbert-Huang Transform	University of Delaware	Newark, DE
Hilbert-Huang Transform	Harvard Medical School	Boston, MA
Microaltimeter	Earthdata Technologies, LLC	Myersville, MD
Microelectrode Array System	Ernest Gallo Clinic and Research Center University of California San Francisco	Emeryville, CA

Seeking and Bestowing Awards

Awards provide an excellent medium for promoting Goddard technologies to the public and potential partners and for encouraging researcher participation in reporting their new discoveries. The Technology Commercialization Office submits Goddard inventions for awards bestowed by outside organizations such as the Federal Laboratory Consortium for Technology Transfer (FLC), U.S. Space Technology, and *R&D Magazine*. NASA also has annual awards to recognize innovations. The TCO identifies promising technologies and submits them for these awards.

AutoCon — Runner-up Winners for the 2002 NASA Software of the Year Award

John Bristow (left) and Dave Folta (right).

AutoCon — Autonomous Maneuver Control Flight Software by John Bristow and Dave Folta of Goddard Space Flight Center; and Al Hawkins, Greg Dell, and Keith Chapman of A.I. Solutions, Inc., was one of three runner-up winners for the 2002 NASA Software Invention of the Year Award.

This annual, international competition honors NASA developed software that has significantly helped American industry maintain its world-class technology status.

How to Reach Goddard's Technology Commercialization Office

The staff of the Technology Commercialization Office welcomes calls and emails from industry, academia, government, and the general public interested in learning more about Goddard technologies and partnership opportunities.

Inquiries

For information about the Technology Commercialization Office or information on Goddard inventions, contact:

(301) 286-5810

email:
techtransfer@tco.gsfc.nasa.gov

Internet Addresses

Goddard's Technology Commercialization Office
http://techtransfer.gsfc.nasa.gov

NASA's Goddard Space Flight Center
http://www.gsfc.nasa.gov

NASA's Commercial Technology Network
http://nctn.hq.nasa.gov

2002 report

NASA Goddard Space Flight Center

Technology Commercialization Office

Greenbelt, MD 20771

301.286.5810 ▪ fax: 301.286.0301

email: techtransfer@tco.gsfc.nasa.gov ▪ http://techtransfer.gsfc.nasa.gov