National Aeronautics and Space Administration

2010
Strategic Relationships Office's Innovative Partnerships Program
Accomplishments Summary
NASA's Langley Research Center




Meet Langley's IPP Team

Seated are Sebrenna Young, Eric Vitug, Monica Barnes, Marva Mabry, and Kate Kvaternik. Standing are John Franke, Sheri Beam, Tim Allen, Bob Yang, Kathy Dezern, Sandra Pretlow, and Beth Plentovich. Not pictured: Kimberly Graupner, Rheal Turcotte, and Moline Prak.

Contents

NASA's Langley Research Center is a global leader in cutting-edge research and technology. As part of the Strategic Relationships Office, Langley's Innovative Partnerships Program (IPP) provides the leadership, tools, and methods to grow partnerships around Langley's resources – its expertise, unique facilities, and novel technologies. We strive to jumpstart innovation that solves technical challenges, both inside and outside of NASA. Our partners include small and medium firms, large corporations and academia worldwide, and other federal agencies.

With an eye on the future, Langley is exploring new ways to transfer knowledge to our educator workforce. Our Center led a successful pilot effort to improve the teaching of science, technology, engineering, and mathematics (STEM) education in the United States by immersing a group of teachers in a research environment and exposing them to the resources and skills needed to develop innovative lessons for their classrooms. Efforts like these will inspire wonder in a new generation that can create a pipeline of young engineers, scientists, and mathematicians to serve future national needs

As our office continues to promote Langley technologies, expertise, and facilities for new applications and searches for new avenues, we would like to share some of our latest achievements, technologies, partnerships, events, community collaborations, and awards to illustrate the innovative spirit in our office, as well as across the Center. We are always interested in hearing from partners. Please feel free to contact us through The Technology Gateway.

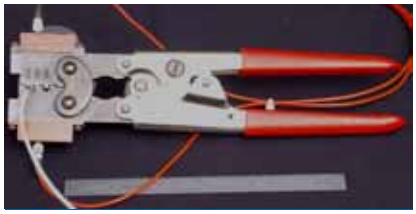
Beth Plentovich
Chief, Innovative Partnerships Program

Summer Program

NASA Langley Research Center successfully piloted the Simulation-Based Aerospace Engineering Teacher Professional Development program at Langley and Ames Research Centers. The photo shows the teachers and NASA program facilitators at the Langley facility.

Recognition and Licenses

Langley's technologies won national awards, and the following technologies have also been licensed by commercial companies.



2009 NASA Government Invention of the Year for "Ultrasonic Wire Crimp Inspection"

K. Elliott Cramer, Daniel F. Perey, and William T. Yost invented "Ultrasonic Wire Crimp Inspection." The invention is a handheld tool for checking wire crimp connections based on traditional ultrasonic nondestructive evaluation methods. The tool grasps the crimp joint and its transducers send an ultrasonic signal through the joint. If the return signal to the transducer is low, there is not enough contact at the crimp.

The technique can be applied to critical connections, like those on flight vehicles. The Aircraft Aging and Durability Project is using the technology to investigate failure of electrical wiring systems in commercial and military airplanes. And, it is currently being evaluated by the Federal Aviation Administration (FAA), Naval Air Systems Command (NAVAIR), and the Coast Guard.

Langley and Sonicrimp, LLC recently entered into a partially exclusive license agreement for Langley's wire crimping tool technology. Sonicrimp plans to market and sell the tool to measure the quality and durability of wire crimps for automated assembly operations in aerospace, military, automotive, and other high-reliability market niches.

NASA Langley Inventors Receive the 2009 Green Economic Alliance Green Innovation Award

The Hampton Roads Technology Council (HRTC) recognized two Langley researchers for their technology. Qamar Shams and Allan Zuckerwar received the HRTC "Green Economic Alliance Green Innovation Award" for their "Portable Infrasonic Detection System." The award honors the person(s) or a company that has created the most outstanding green innovation in Hampton Roads.

The technology has applications in emerging wind power technology, determining low frequency noise emanating from the wind turbines, and its impact on local weather phenomena. It also helps determine the possible health monitoring of turbine blades and how wind turbines interfere with military bases and Comprehensive Test Ban Treaty monitoring sites.

Langley signed a nonexclusive license agreement with PCB Piezotronics for the technology. Shams and Zuckerwar originally designed and developed the technology to detect Clear Air Turbulence for Aviation Safety and other NASA exploration programs.

Shams and Zuckerwar furthered the development of the technology through a Langley Innovation Seed Fund Award to develop sensors and algorithms that enhanced their system for use in earthquake detection, prediction of environmental and weather conditions, and general purpose sound pressure testing.

Bringing NASA Technologies Back to Earth

While our inventors are creating new technology solutions for NASA's missions, they are also developing many technologies that bring value to the commercial marketplace.

For access to the full articles, please visit NASA *Spinoff* magazine.

Tail Rotor Airfoils Stabilize Helicopters,Reduce Noise

Founded by former Ames Research Center engineer Jim Van Horn, Van Horn Aviation (VHA) of Tempe, Arizona built upon a Langley Research Center airfoil design to create a high performance aftermarket tail rotor for the popular Bell 206 helicopter. Compared to current blades, the new highly durable rotor has twice the lifetime, reduces noise by 40 percent, and displays enhanced performance at high altitudes. These improvements benefit helicopter performance for law enforcement, military training, wildfire and pipeline patrols, and emergency medical services.

Winglets Save Billions of Dollars in Fuel Costs

The upturned ends now featured on many airplane wings are saving airlines billions of dollars in fuel costs. Called winglets, the drag-reducing technology was advanced by Langley engineer Richard Whitcomb and through flight tests conducted at Dryden Flight Research Center. Seattle-based Aviation Partners Boeing manufactures Blended Winglets, a unique design featured on Boeing aircraft around the world. These winglets have saved more than 2 billion gallons of jet fuel to date, representing a cost savings of more than $4 billion and a reduction of almost 21.5 million tons in carbon dioxide emissions.

Personal Aircraft Point to Future of Transportation

Duluth, Minnesota-based Cirrus Design Corporation is one of the world's leading manufacturers of general aviation aircraft. Partnerships with Langley provided the company with cost-effective composite airframe manufacturing methods, while crashworthiness testing at the Center increased the safety of its airplanes. Other NASA-derived technologies on Cirrus SR20 and SR22 aircraft include synthetic vision systems that help pilots navigate and full-plane parachutes that have saved the lives of more than 30 Cirrus pilots and passengers to date. Today, the SR22 is the world's top-selling Federal Aviation Administration (FAA)-certified single-engine airplane.

Rocket-Powered Parachutes Rescue Entire Planes

Small Business Innovation Research (SBIR) contracts with Langley helped BRS Aerospace of Saint Paul, Minnesota to develop technology that has saved over 250 lives to date. The company's whole aircraft parachute systems deploy in less than one second thanks to solid rocket motors and are capable of arresting the descent of a small aircraft, lowering it safely to the ground. BRS has sold more than 30,000 systems worldwide, and the technology is now standard equipment on many of the world's top-selling aircraft. Parachutes for larger airplanes are in the works.

Terahertz Tools Advance Imaging for Security, Quality Control

Picometrix, a wholly owned subsidiary of Advanced Photonix Inc. (API) of Ann Arbor, Michigan, invented the world's first commercial terahertz system. The company improved the portability and capabilities of their systems through SBIR agreements with Langley to provide terahertz imaging capabilities for inspecting the space shuttle external tanks and orbiters. Now API's systems make use of the unique imaging capacity of terahertz radiation on manufacturing floors, for thickness measurements of coatings, pharmaceutical tablet production, and even art conservation.

Compact, Robust Chips Integrate Optical Functions

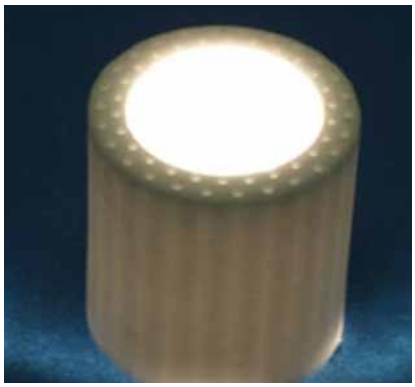
Located in Bozeman, Montana, AdvR Inc. has been an active partner in NASA's SBIR and Small Business Technology Transfer (STTR) programs. Langley Research Center engineers partnered with AdvR through the SBIR program to develop new, compact, lightweight electro-optic components for remote sensing systems. While the primary customer for this technology will be NASA, AdvR foresees additional uses for its NASA-derived circuit chip in the fields of academic and industrial research—anywhere that compact, low-cost, stabilized single-frequency lasers are needed.

Cameras Reveal Elements in the Short Wave Infrared

Goodrich ISR Systems Inc. of Princeton, New Jersey received SBIR contracts from the Jet Propulsion Laboratory, Marshall Space Flight Center, Kennedy Space Center, Goddard Space Flight Center, Ames Research Center, Stennis Space Center, and Langley Research Center to assist in advancing and refining indium gallium arsenide (InGaAs) imaging technology. Used on the Lunar Crater Observation and Sensing Satellite (LCROSS) mission in 2009 for imaging the short wave infrared (SWIR) wavelengths, the technology has dozens of applications in the military, security and surveillance, machine vision, the medical field, spectroscopy, semiconductor inspection, instrumentation, thermography, and telecommunications.

Small Business Innovation Research (SBIR)

An opportunity for small, high technology companies and research institutions to participate in government-sponsored research and development

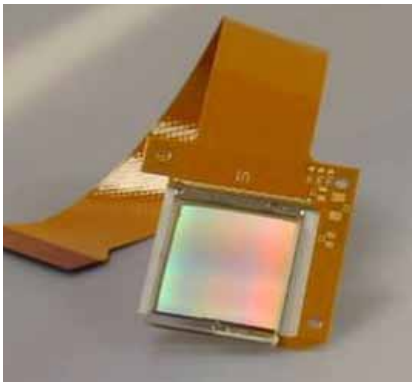


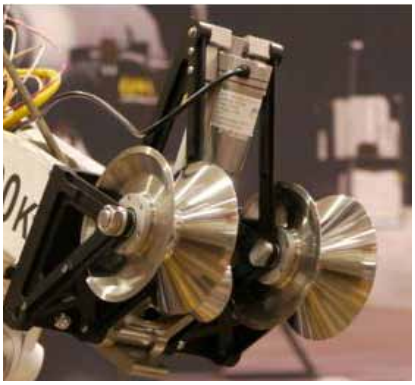
Ceramic Stereolithography Accelerates Prototyping

Technology Assessment & Transfer, Inc. (TA&T) leveraged an award from Langley Research Center, through NASA's SBIR program, to develop a process for creating complex ceramic parts without any tooling. The resulting process significantly reduces the time required to prototype and produce technical ceramic components (from as many as eight weeks to just seven days or less) and extends the rapid prototyping and manufacturing advantages of stereolithography to technical ceramic components, offering complex shapes, fine features, good accuracy and surface finish, and properties similar to conventionally processed ceramics.

Boulder Nonlinear Systems Advances Beam Steering Technology

Boulder Nonlinear Systems created the Linear Series, Spatial Light Modulator with funds from a NASA Langley SBIR contract. Using a combination of high-speed, liquid crystal phase modulators and high-voltage, very large scale integration silicon backplanes, the firm developed a high-speed, high-resolution, fully programmable, nonmechanical optical phased array beam steerer. This optical phased array helped overcome the physical concerns of large, mechanical gimble steering systems and the low resolution and speed of early glass slide arrays. Current Boulder Nonlinear's projects include multi-spot beam steering and wide beam steering systems.



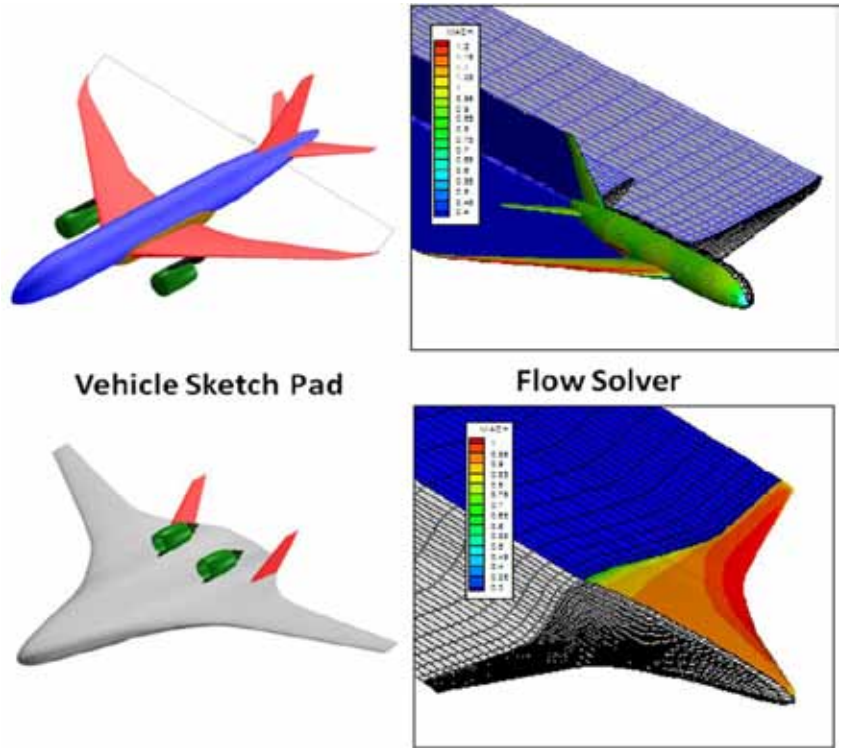


NASA Langley and Honeybee Robotics Working on New Technologies

Members of a team at Langley built a robotic system called the Lunar Surface Manipulation System (LSMS). The tools on the end of the LSMS crane could be changed manually on site, but the Langley group wanted to be able to operate the LSMS remotely. They knew they would need a piece of hardware called a Robotic Tool Changer on the end of the crane to perform the remote operations, and contacted Honeybee Robotics. The Langley team was aware of Honeybee's accomplishments, as Honeybee has worked with NASA for some time on robotic devices, often partnering with NASA through the SBIR Program. Honeybee developed the Robotic Tool Changer for the LSMS under a Phase III SBIR.

Phoenix Integration's ModelCenter Used to Develop Next Generation Air Vehicles

Phoenix Integration is reaching a large portion of the aerospace community, including engineers at NASA centers, federal agencies, and the private sector, through an SBIR-funded enhancement of the PHX ModelCenter software. The software creates a robust, physics-based design and analysis framework to be used early in the design process for the next generation of air vehicles. It works in conjunction with other NASA software and has resulted in lower costs and reduced product development time because it is easy to use and effective in the early stages of design.



Intelligent Light to Develop Aero-acoustic Data Isolation from CFD Simulations

With funding from a Langley SBIR contract, Intelligent Light recently developed the Rotorcraft Computational Aero-Acoustics Post-processing System (RCAAPS). The first-in-class RCAAPS software allows engineers to expedite the exploration of large computational fluid dynamics (CFD) data sets and quickly identify and select the relevant aero-acoustic and turbulence data required to understand the noise produced by a virtual rotorcraft. Development of RCAAPS created additional technologies capable of processing and reading data and executing solver code faster than previously; these technologies have been incorporated into Intelligent Light's popular FieldView software.

NASA Langley's TecFusion Forum

Langley Research Center's TecFusion Forum gives small companies the opportunity to present, and discuss their technologies, to large businesses in a wide variety of fields. The program is successful because the partnerships that are facilitated by TecFusion events transition technologies developed in support of Federal Government needs to new commercial products, spurring economic development through the creation of jobs. To date, 17 large businesses have developed partnerships with NASA-funded small businesses through TecFusion Forums. In addition, 21 SBIR companies have developed new commercial products since participating. During NASA's 2010 fiscal year, approximately 12 TecFusion events were held.

Technology Collaboration

with other NASA Centers

Langley and Johnson Team on EBF^3 Technology to Support Future Space Exploration

Researchers from Langley and Johnson Space Center (JSC) have continued to team on a novel fabrication technology, electron-beam freeform fabrication (EBF^3), a layer-additive process that uses an electron beam and a solid wire feedstock to fabricate metallic structures. The process is well suited to in-space use to manufacture parts, tools, and spare parts. Originally developed for the Aeronautics Research Mission Directorate (ARMD) to improve structural weight and performance for future aircraft, the technology is being leveraged by other mission directorates for use in space exploration programs.

Known as Manufacturing Key Equipment Replacements (MAKER), the collaborative project will focus on building a demonstration system that will integrate technologies from the two centers and from industry partners to adapt the current efforts for space-based hardware application. The proven core technology has the ability to operate in reduced-gravity environments. In addition, a smaller, more robust EBF^3 version will be suitable in Earth-based applications for remote locations such as naval vessels, army depots, Antarctica outposts, and oil rigs.

This photo shows teachers and NASA program facilitators at the Ames Research Center facility (Photo courtesy of ARC). To view the teachers and NASA program facilitators at the Langley facility, see page 2.

Langley and Ames Research Center Pilot a STEM-focused Teacher Professional Development Program

Because of its commitment to help build an educator workforce skilled in teaching innovative engineering, design, and simulation-based engineering, Langley partnered with RTI International to design and pilot a new program. The Simulation-Based Aerospace Engineering Teacher Professional Development program immersed teachers in a research environment and exposed them to the resources and skills needed to develop modeling and simulation-based lessons for their classrooms. Sixteen middle and high school science, technology, engineering, and mathematics (STEM) teachers attended program workshops at Ames Research Center (ARC) and at Langley from July 19 to July 30. By using their experiences in the NASA environments, the teachers were able to develop creative hands-on simulation-based aerospace engineering lessons to use in their own classrooms.

Langley and Ames Researchers Collaborate on the Axial Curved Element Beam

Researchers from Langley and ARC collaborated in the development of the Axial Curved Element (ACE), a novel beam design that has exceptional axial strength-to-weight properties. An ARC researcher developed the concept for the strong but very lightweight beam. Metal parts and carbon rods were fabricated at ARC and then shipped to Langley where composite sandwich panel fabrication and final assembly took place. The assembled product was then sent back to ARC for testing of the structure. Several case studies have revealed that ACE replacement in various types of truss structures will allow for significant reduction of weight and cost to structures.

The ACE beam has the potential for implementation in many key NASA areas such as lunar infrastructure, Constellation elements like Altair, and the Ares V payload adaptor and lighter-than-air vehicles like next generation dirigibles. In addition, civil applications may include lightweight, rapidly constructed and deconstructed bridges and ultra tall skyscrapers.

Langley Collaborated with the Europa Jupiter System Mission Program

Langley's Small Business Innovation Research (SBIR) program collaborated with the Europa Jupiter System Mission (EJSM) program by helping to identify topics relevant to the EJSM Mission that would be included in the upcoming NASA SBIR and Small Business Technology Transfer (STTR) solicitations. The SBIR program used the occasion of the upcoming 4th EJSM Instrument Workshop, to be held at NASA's Jet Propulsion Laboratory, as an opportunity to communicate the new focus areas and topics before the workshop took place. They provided notification of the workshop to the general public and to small businesses with technologies or capabilities that could address the instrument community's radiation challenges for space exploration. In addition, Langley helped organizations within the instrument research community to connect with small businesses looking for development partners to pursue future Announcements of Opportunities. One-third of the proposals submitted after the workshop came from companies that were notified by Langley.

Langley's Cutting-edge Technologies

Solutions to advance America's technology future

One of our primary goals is to find licensees and partners to further develop Langley's cutting-edge technologies. The technologies featured on the following pages offer innovative technological solutions to today's challenges.

A Synthetic Quadrature Phase Detector/Demodulator for Fourier Transform Spectrometers

An improved Brault algorithm for FTS using heterodyne techniques

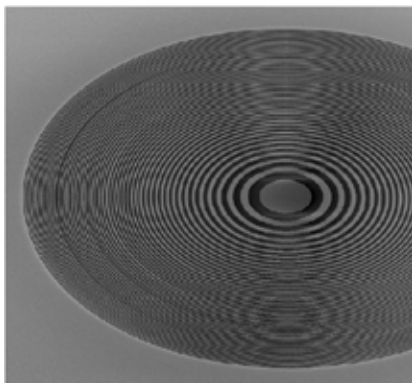
Langley has developed a method to velocity correct Fourier transform spectrometer (FTS) data using a heterodyne technique. In this system both spectral and laser fringe signals are recorded using a acquisition module that samples evenly in time. This technique uses FM demodulation to determine velocity and position from the laser fringe signal. From this, the spectral data may be resampled evenly in space using the demodulated laser fringe signal. Because the spectral data is recorded evenly in time, filtering may be applied to eliminate ghosting, as in the Brault algorithm, yet the hardware required is simpler because an event counter is not needed. At the same time, the correction is more precise because it is done at every sample point, not at every fringe crossing. This software relaxes sample positioning requirements and can facilitate a lower-cost FTS instrument.

Tunable Damper

Design allows for smaller components with less mass and more damping effectiveness.

The design is for a tuned damper, like those used in skyscrapers, tall smokestacks, helicopters, and other structures subject to vibration. This particular damper was developed for use in NASA Langley wind tunnel tests of launch vehicles that are subjected to high winds during rollout to the launch pad. The design helps modify the dynamic response to vortex shedding. This tuned damper concept is applicable to any vibrating structure requiring increased damping.

This unique design has a slider mass having a greater range of motion than is found in conventional devices, which allows the dissipation of 4 to 9 times the amount of energy for the same size and mass.



Micro Spectrometer for Parallel Light

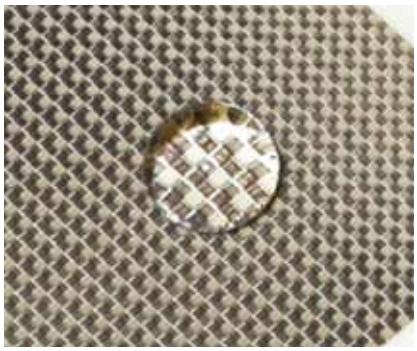
Fresnel micro-spectrometer

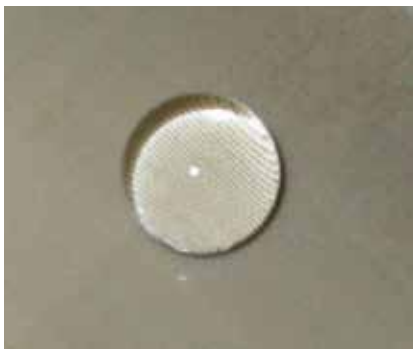
The spectroscope was first invented by Joseph von Fraunhofer in 1814, who measured the spectra of the Sun and the Sirius star, which marked the founding of stellar spectroscopy. Most spectrometers still use Fraunhofer diffraction, but a new NASA Langley micro-spectrometer uses Fresnel diffraction. With a gradient circular grating of 750-micrometer diameter, Fresnel diffraction becomes valid at a short distance. The fundamental difference enables the ultimate miniaturization of a spectrometer smaller than the critical optical dimension. A spectral resolution of 23nm was achieved, and the volume of the optical path between the grating and the detector was only 1mm^3, which is 100x smaller than today's commercial spectrometer.

Reconfigurable Peripheral Component Interconnect Local Bus Controller and Target Design

Multi-purpose PCI design

The invention is a design for a peripheral component interconnect (PCI) local bus controller and target in a PC/104-Plus form-factor. The design uses a flash-based field programmable gate array (FPGA) to provide immediate functionality from power-on to avoid delay after power is applied. It can be reprogrammed from connectors directly on the board, and is able to both receive and drive the clock for system and local peripherals, allowing it to function as either a PCI bus host controller or PCI target device interface. Fully compliant with the PC/104-Plus specification, the design has associated schematics and Gerber files in a vendor-ready state. The design was developed to support ongoing research in fault-tolerant computing systems. Other potential applications for the PC/104-Plus modules include high-speed data acquisition, video acquisition, surveillance remote systems, video servers, communication gateway routers, embedded servers, and intelligent transportation systems.





Laser Ablative Surface Patterning Method

Modification of surface energy

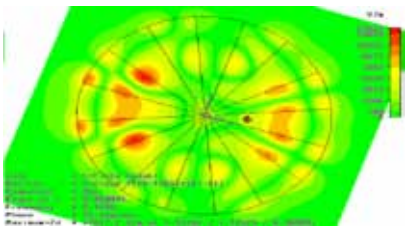
Langley researchers have developed a laser ablative surface patterning method to impart precise dimensional surface features onto a variety of materials. A laser is used to create micron-scale patterns on a material surface, and surface feature dimensional ranges that impact the material's wetting properties are identified. Materials that are initially hydrophilic or hydrophobic become significantly more hydrophilic or hydrophobic. These properties can be fine-tuned for specific applications.

Enhancing surface hydrophilicity promotes adhesive interactions; applications for these surfaces include adhesive bonding of polymeric, composite, and metallic materials, and generation of sacrificial surfaces. The benefits of a hydrophobic surface include a decrease in friction; abhesion, or anti-adhesion; and an increase in self-cleaning properties. Some applications for the improved hydrophobicity include resistance to particle accumulation, control of airflow over aerodynamic surfaces, and control of fluid flow in microfluidic channels.

Compared to other material surface modifications, the laser ablative surface patterning method is fast, automated, and scalable; requires no chemicals; and can be adapted for a variety of materials.

Fractal Dielectric Microstrip Antenna

Using patterned substrate material geometries



NASA Langley has developed a novel method to create tailorable dielectric materials by depositing metal nanoparticles onto carbon nanotubes using a solvent-free method. The dielectric material can be used to create patterned substrate materials, which have been characterized as exhibiting optimal electrical properties. The tailorable substrate material has a unique combination of high dielectric constants with low-loss properties. By creating fractal substrate geometries of the dielectric material, this NASA technology has the potential to create low-mass, ultra-thin microstrip antennas with enhanced performance. Strong computational data supports this claim. NASA is currently seeking collaborators to fund and further develop the technology into a prototype.

Showcasing Langley Innovations

in Professional Communities

Mindshift Technology Briefing

NASA Langley Research Center hosted the Mindshift Technology Briefing at RTI International in Research Triangle Park, North Carolina, a hub for software companies, on September 22, 2010. Alan Pope and Chad Stephen introduced Mindshift, a new type of controller system, to the video gaming community. Mindshift has been constructed to allow modulation of player inputs to a video game or simulation from a user interface device based on the player's psychophysiological state. Attending companies had the opportunity to learn about the Langley-developed Mindshift technology through featured presentations, demonstrations, hands-on testing of the technology, and one-on-one sessions with the inventor. Approximately 80 people from 17 organizations attended the technology briefing.

MODSIM WORLD Conference & Expo

MODSIM World Conference & Expo

Langley IPP team members participated in the 2009 MODSIM World Conference & Expo held at the Virginia Beach Convention Center last October. MODSIM is a unique multi-disciplinary conference for the exchange of modeling and simulation knowledge, research, and technology across industry, government, and academia. The Team contacted two of its Small Business Innovation Research partners, who agreed to demonstrate their modeling and simulation technologies during the Expo. Employees from TechnoSoft, Inc. of Cincinnati, Ohio and Collier Research Corporation in Newport News, Virginia demonstrated technologies currently used in NASA projects and programs.

The upcoming MODSIM World Conference & Expo will be held October 13–15, 2010, at the Hampton Roads Convention Center in Hampton, Virginia. This year's theme is "21st Century Decision-Making: The Art of Modeling & Simulation."

SansEC Wireless Sensor Measurement System Technology Meeting

The SansEC Wireless Sensor Measurement System Technology Meeting took place on Monday, September 13, 2010, at the Center. Stanley Woodard introduced and educated the public about the award-winning SansEC [sans Electrical Connections] sensor technology, a new framework for designing, powering, interrogating, and manufacturing wireless passive electrical sensors. Attending businesses had the opportunity to learn about SansEC through a technical presentation, demos, lab tours, and one-on-one sessions with the inventor.

Southeastern Virginia Biomedical Technology Partnership

Langley co-sponsored the Southeastern Virginia Biomedical Technology Partnership Forum on June 15, 2010. The forum highlighted biomedical technologies emerging from federal research laboratories, academia, and the private sector that are available for licensing, partnership development, and other forms of collaboration. IPP members helped organize the event and selected Langley staff to speak on relevant topics. Approximately 90 people attended the event.

Society for the Advancement of Material and Process Engineering

NASA exhibited and organized a technology briefing and poster session at the 2010 Society for the Advancement of Material and Process Engineering in Seattle, Washington, held May 17–20, 2010. The exhibit booth attracted several hundred visitors, and approximately 70 people attended presentations by Glenn Research Center and Langley on partnering and licensing opportunities with NASA. During the event, attendees spoke directly with NASA researchers, and over 40 companies met with the Innovative Partnerships Program (IPP) staff to discuss potential collaborations.

Showcasing Langley Innovations

in the Community

Monthly "Tour de NASA" at Langley Facilities and Laboratories

The Innovative Partnerships Program (IPP) strives to create internal partnerships. Langley's "Tour de NASA" helps educate members of the Center's workforce about the unique capabilities of some of our world-renowned and one-of-a-kind facilities. The series of monthly tours increases employee knowledge about our facilities and capabilities and fosters collaboration among members in the Langley community, including government, industry, and academia. IPP Team members are among the 300-plus Langley employees who have participated in the series, which featured 14 facilities this past year.

TedxNASA

On November 20, 2009, Langley tried something new by collaborating with the well-known nonprofit Technology, Entertainment, and Design Event series known as "TED." The Center hosted the first-ever TEDxNASA, where innovative and inspiring thinkers from across the world shared their "talks of a lifetime" in 18-minute and shorter presentations. The lobby of the Ferguson Center also had interesting and creative exhibits with hands-on activities for the attendees. The sold-out event at Christopher Newport University's Ferguson Center for the Arts in Newport News, Virginia centered around the theme "Space to Create" and featured renowned author Mitch Albom, astronaut Leland Melvin, guitar virtuoso Mike Rayburn, and many others, including scientists, artists, engineers, and inventors. In addition to the live audience, more than 75,000 people were able to view the event on-line. Because of its huge success, Langley is holding its next TEDxNASA event on November 4, 2010, in the same location. This year's theme is "What Matters Next," and the event will once again be livestreamed.

Food 4 Thought – The Lunchtime Series

Our innovative lunchtime series, "Food 4 Thought" provides fresh perspectives on a variety of topics presented by employees throughout the Center. The IPP team designed the series as creative conduit for personal expression and networking. Attendance has averaged between 20 and 25 participants, with the highest attendance being almost 200 total for the "Planning Your Cruise Vacation Like a Pro" series. Some of the topics presented in the "Food 4 Thought" lunchtime series included:

- The Savvy Motorist Tips & Auto Enthusiast Car Show – Jesse Cook
- Planning Your Cruise Vacation Like a Pro (presented 3 times) – Donna Speller Turner
- Body Refresh: Strength Training & Work Exercise Basics – Judy Heinrich
- Tapping into Your Creativity – Tim Allen
- South Indian Classical Music (The Veena Instrument) – Kamala Krishnamurthy
- The Five Love Languages (Communication Tips) – Monica Barnes
- Español Exploded...an Insider's Guide to Spain, Mexico, Peru & Argentina – Sheri Beam
- Outclass the Competition – Cheryl Cleghorn

The lunchtime networking will continue, with the next three topics planned through December 2010:

- Renewable Energy at Home: Things You Can Do to Preserve the Carbon Footprint – Ruth Amundsen
- It's a Swap Party!!! Celebrate National Recycle Week – Priscilla Warsley Riley
- Outclass the Competition–Dining Like a Diplomat – Cheryl Cleghorn

Awards and Metrics

NASA's Inventions & Contributions Board (ICB) Awards

Over 125 Langley inventors received a total of $139,900 in awards from NASA's ICB for FY10. NASA's ICB selects and distributes financial awards for technologies that have enhanced the nation's space program and our quality of life.

ICB Awards

Patent Application Awards — $49,000

Software Release Awards — $24,000

Tech Brief Awards — $17,150

Board Action Awards — $49,750

FY10 Metrics

New Technology Reports (NTRs) — 118

Patents

Non-provisional applications — 18
Provisional applications — 33
Patents issued — 19

License Agreements

Signed agreements — 2 agreements for 3 technologies
Ongoing negotiations — 3
Royalty income — $516,024
Space Act Agreements — 99
Software Usage Agreements — 521

For More Information

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National Aeronautics and Space Administration

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