FLC

MID-ATLANTIC & NORTHEAST REGIONAL MEETING

October 5 - 7, 2021

WELCOME TO THE 2021 FLC MIDWEST & SOUTHEAST JOINT REGIONAL MEETING

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SCHEDULE AT A GLANCE

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9:25 – 10:10 a.m.	**Panel Session 1:** *Using Social Media in Technology Transfer*	**Moderator:** David Lee, Combat Capabilities Development Command Armaments Center (CCDC AC) – Technology Transfer Specialist **Panelists:** • Daniel Lockney, National Aeronautics and Space Administration (NASA) – Technology Transfer Program Executive • Gregg Scharfstein, Lawrence Berkeley National Laboratory – Senior Technology Commercialization Associate • Laura Schoppe, Fuentek – President
10:20 – 11:05 a.m.	**Panel Session 2:** *Value Proposition in Marketing*	**Moderator:** Claudia Haywood, Frederick National Lab for Cancer Research (FNLCR) – Director, Intellectual Property & Strategic Agreements **Panelists**: • Matthieu Dumont, TechLink – Senior Licensing Manager • Michelle McQueen, Yale University – Communication Officer • Michael Salgaller, National Cancer Institute (NCI) – Invention Development Marketing Unit Supervisor
11:15 a.m. - Noon	**Panel Session 3:** *Speed Dating with Labs: 6 Labs You Should Know in the Mid-Atlantic & Northeast Regions*	**Moderator:** Joe DiRenzo, U.S. Coast Guard Research and Development Center **Mid-Atlantic Labs:** • George Korch, National Biodefense Analysis and Countermeasures Center (NBACC) – Lab Director • Chad Kusko, Advanced Technology Large Structural Systems Center (ATLSS) Engineering Research – Administrative Director • Joseph Teter, Naval Surface Warfare Center, Carderock Division – Director of Technology Transfer **Northeast Labs:** • James Mitchell, U.S. Geological Survey (USGS) – Technology Enterprise Specialist • Jim Poulos, U.S. Department of Agriculture (USDA) – Technology Transfer Coordinator • Christopher Smith, Transportation Security Lab (TSL) – Lab Director
Noon	**Closing Remarks**	Joe DiRenzo, U.S. Coast Guard Research and Development Center

WEDNESDAY, OCTOBER 6 ALL TIMES EDT

TIME	ACTIVITY	INFO
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9:10 – 9:55 a.m.	**Panel Session 1:** *Legal Best Practices: Data Rights*	**Moderator:** Claudia Haywood, Frederick National Lab for Cancer Research (FNLCR) – Director, Intellectual Property & Strategic Agreements **Panelists:** • Madelynne Farber, U.S. Department of Energy (DOE) – Senior Patent Licensing Attorney at Sandia National Laboratory • Azza Jayaprakash, Acquisition & Logistics Division of the DoD Office of General Counsel – Counsel and Lead for Law, Regulations, and Policy for DoD Intellectual Property Cadre and Associate General Counsel • Wayne Mackenzie, National Oceanic and Atmospheric Administration (NOAA) – Technology Transfer Program Manager • Quentin Vaughan, U.S. Department of Energy (DOE) – Assistant General Counsel at Lawrence Livermore National Laboratory
10:05 – 10:50 a.m.	**Panel Session 2:** *T2 Best Practices: Small Offices vs. Large Offices*	**Moderator:** David Lee, Combat Capabilities Development Command Armaments Center (CCDC AC) – Technology Transfer Specialist **Panelists**: • Laurie Bagley, Princeton Plasma Physics Laboratory (PPPL) – Head, Technology Transfer • Bert Macesker, U.S. Coast Guard Research and Development Center (CGRDC) – Executive Director • Thomas Stackhouse, National Cancer Institute (NCI) – Director • Alice Welch, U.S. Food and Drug Administration (FDA) – Director
11 – 11:50 a.m.	**Panel Session 3:** *Speed Dating with Labs: 6 Labs You Should Know in the Mid-Atlantic & Northeast Regions*	**Moderator:** Vladimir Popov, Frederick National Lab for Cancer Research – Director, Partnership Development Office **Mid-Atlantic Labs:** • Amanda Hess, Combat Capabilities Development Command Chemical Biological Center (CCDC CBC) – Business Manager, Strategic Initiatives Group • Thomas Moreland, Forest Service Research (FSR) – Tech Transfer Coordinator • Dan Wang, CIA Federal Labs – Director **Northeast Labs:** • Alice Hong, National Urban Security Technology Laboratory (NUSTL) – Director • Sheri Mennillo, U.S. Army Combat Capabilities Development Command Soldier Center – Technology Transfer Manger • Kenneth Wickiser, U.S. Military Academy - West Point – Associate Dean for Research
11:45 a.m. - Noon	**Closing Remarks**	Vladimir Popov, Frederick National Lab for Cancer Research – Director, Partnership Development Office

THURSDAY, OCTOBER 7 ALL TIMES EDT

TIME	ACTIVITY	INFO
9 – 9:25 a.m.	**Welcome Day 3**	Welcome by FLC Regional Coordinators
9:35 – 10:35 a.m.	**Keynote Speaker:** *Lessons Learned from using T2 to Fight the Pandemic*	**Moderator:** David Lee, Combat Capabilities Development Command Armaments Center (CCDC AC) – Technology Transfer Specialist **Speaker:** Robert Charles, U.S. Army Medical Research and Development Command (USAMRDC) – Chief, Medical Research Law
10:45 – 11:15 a.m.	**Panel Session 1:** *New Ideas and Getting Connected*	**Moderator:** Laurie Bagley, Princeton Plasma Physics Laboratory (PPPL) – Head, Technology Transfer **Panelists**: • Vladimir Popov, Frederick National Lab for Cancer Research: Federal Lab Education Accelerator (FLEX) • Katherine Segreti, FLC: FLC Systems
11:25 a.m. – 12:20 p.m.	**Panel Session 2:** *Mid-Atlantic & Northeast Regional Awards Ceremony & Concluding Remarks*	**Mid-Atlantic Deputy Regional Coordinator:** Claudia Haywood, Frederick National Lab for Cancer Research **Deputy Regional Coordinator:** Joe DiRenzo, U.S. Coast Guard Research and Development Center

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Commercialization in Vietnam positions ARS vaccine to help control African swine fever pandemic

USDA Agricultural Research Service, Plum Island Animal Disease Center

A vaccine developed by the U.S. Department of Agriculture's Agricultural Research Service (USDA ARS) and commercialized in Vietnam is now uniquely positioned to help control the deadly African swine fever pandemic in Southeast Asia and prevent it from spreading to the U.S.

African swine fever (ASF) is a devastating, highly contagious viral disease of domestic and wild pigs with mortality rates approaching 100%. At first localized to sub-Saharan Africa, since 2007 ASF has spread to Europe and Southeast Asia, creating a pandemic that killed half the world's pig population in 2019.

A new wave of ASF outbreaks in 2021 is again threatening food security and raising pork prices to historical highs worldwide. The potential introduction of ASF in the U.S.—the world's third largest swine producer after Europe and China—is a serious concern for the nation's pork industry.

Researchers across the globe have tried unsuccessfully in the last 50 years to develop a safe and efficacious ASF vaccine. Starting in 2008, scientists at the ARS Plum Island Animal Disease Center began a long, arduous genetic engineering process that ultimately led to the creation of an effective ASF vaccine, which was patented in 2019.

Realizing that preventing an ASF outbreak in the U.S. would require controlling the disease in endemic regions (where it already existed), the ARS researchers felt it was important to transfer the technology to a commercial partner in an ASF-endemic country. A visit to Vietnam in February 2020—despite the COVID-19 pandemic—initiated discussions between ARS and the National Veterinary Joint Stock Company (NAVETCO). One of the biggest veterinary pharmaceutical companies in Vietnam, NAVETCO also had valuable experience conducting the clinical trials needed for approval from that country's regulatory authorities.

ARS scientists worked with NAVETCO to create a vaccine development plan and to help the company

Photo credit: AdobeStock

navigate the USDA technology transfer process. The ARS Office of Technology Transfer issued NAVETCO a Patent & Biological Material License Agreement on August 7, 2020, and signed a collaborative Material Transfer Research Agreement less than three weeks later.

In September 2020, materials were shipped to NAVETCO—no small feat during a pandemic. The company produced the first batches of the vaccine, conducted the necessary clinical studies, and submitted the results to Vietnamese regulatory authorities in February 2021, just five months after receiving the shipment. It is the first time that a commercial ASF vaccine will be used to control and prevent the spread of ASF in an endemic country.

Since ASF has now spread to 15 countries in Asia, it may take some time before ASF is fully controlled, but the availability of a commercial vaccine is a key step toward preventing it from spreading to the U.S. It also offers for the first time the potential to control the disease at its source, which is a critical component of the U.S National Strategy for Countering Biological Threats.

NIH partnership results in key FDA Orphan Drug Designation for rare respiratory disease therapy

National Cancer Institute

A partnership between the National Institutes of Health (NIH) and Precigen Inc., a biopharmaceutical company, has led to a milestone regulatory designation that could significantly decrease treatment costs and improve quality of life for patients living with an incurable respiratory disease.

In March 2021, the Food and Drug Administration (FDA) granted an Orphan Drug Designation for PRGN-2012, an investigational therapeutic vaccine being developed to treat recurrent respiratory papillomatosis (RRP). It is the first human regulatory designation for this investigational agent, which was developed by the National Cancer Institute (NCI) in collaboration with the National Institute on Deafness and Other Communication Disorders (NIDCD) and Precigen.

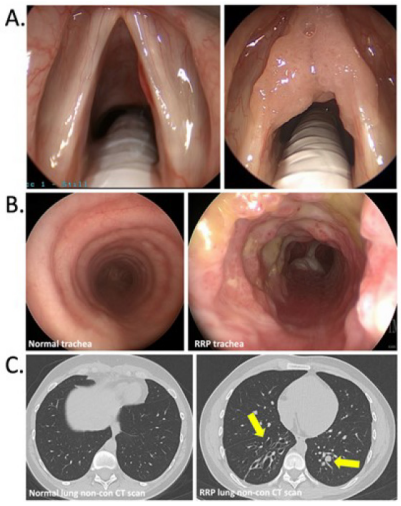
The partnership brings together Precigen's PRGN-2012 vaccine and platform technologies and NCI's expertise in research, design, and execution of preclinical and clinical studies to develop a treatment for RRP.

RRP is a rare, difficult-to-treat, and sometimes fatal disease caused by human papillomavirus (HPV) infection. Approximately 1,500 new cases of RRP are diagnosed each year in the United States.

The disease causes benign tumors (papillomas) to grow in the air passages leading from the nose and mouth to the lungs (respiratory tract), which can affect a patient's ability to talk and breathe easily. In rare cases (1% to 3%), RRP can transform into invasive cancer (invasive squamous cell carcinoma).

There is no cure for RRP, and the current standard of care is repeated surgeries to remove the papillomas. Unfortunately, papillomas often recur after surgical removal, which necessitates repeated surgeries that expose patients to clinical risks and emotional distress.

In October 2017, NCI executed a confidential disclosure agreement (CDA) with Intrexon Corporation (which subsequently became Precigen) to discuss a possible collaboration to study Precigen's investigational therapies. PRGN-2012 uses Precigen's "gorilla adenovector technology," a proprietary gene therapy delivery technology that is part of the company's AdenoVerse™ platform.



Left: *A: normal (left) and diseased (right) true vocal folds. B: normal (left) and diseased (right) trachea. C: axial cuts of computed tomography scan showing normal (left) and diseased (right) lungs, yellow arrows point to mixed cystic and solid papillomatous lesions.*

In February 2018, the NCI Technology Transfer Center executed a cooperative research and development agreement (CRADA), which allowed NCI to evaluate Precigen's proprietary vaccine platform for the treatment of cancer. In December 2020, the CRADA was amended to expand the scope of the research.

Preclinical studies, conducted by researchers from NCI and NIDCD, showed robust immune responses to the vaccine in human patient samples and animal models. The Orphan Drug Designation was based on these data; a clinical trial in patients with RRP began in March 2021 and is ongoing.

The Orphan Drug Designation is given to drugs and biologics intended for the safe and effective treatment, diagnosis or prevention of diseases/disorders that affect fewer than 200,000 people in the U.S. at the time of the designation. Although the designation does not necessarily mean the treatment will be approved by the FDA or reach patients faster, it provides important incentives that help to expedite and reduce the cost of drug development, approval, and commercialization.

DEVCOM CBC and Pendar take handheld chemical threat detection technology to the next level

U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC)

The individuals whose job involves keeping others safe from chemical threats now have some extra protection of their own, as the result of a partnership between the U.S. Army Combat Capabilities Development Command (DEVCOM) Chemical Biological Center (CBC) and chemical analysis company Pendar Technologies.

The Pendar X10 is a handheld Raman spectrometer that detects and identifies explosives, hazardous materials, chemical warfare agents, and narcotics with new levels of safety, accuracy, and speed. Raman spectroscopy is a chemical analysis technique in which scattered light is used to measure the vibrational patterns of molecules within a sample.

Close contact can inadvertently expose an investigator who touches or inhales a toxic substance, which is a limitation of most handheld devices that require being within a few inches of the sample. The Pendar X10 identifies substances from "standoff" distances up to 3 feet, and can "see" through transparent materials, such as a clear plastic bag or a window.

Other systems take minutes to identify fluorescent materials, such as colored explosives, narcotics, and degraded chemicals. In comparison, the Pendar X10 takes 10 to 20 seconds with many chemicals identified even more quickly.

Some chemicals ignite or explode when they get too hot, posing a safety hazard when using a detection system that focuses a laser on one small spot. The Pendar X10 instead moves the laser across a larger sample area, preventing any single point from reaching the ignition threshold.

While Pendar developed the spectrometer device itself, DEVCOM CBC vastly expanded and customized the digital chemical threat library powering Pendar devices to include data for hundreds of chemicals of interest to the Department of Defense and the Department of Homeland Security.

DEVCOM CBC leveraged the Raman technology and expanded chemical threat library for a Portable Chemical Fingerprint Identification System (PCFIS), a device that is positioned over objects to identify trace chemicals. The PCFIS, more compact and affordable than stationary lab spectroscopic microscopes, is perfectly suited for fieldwork and mobile labs.

Above: The Pendar X10 owes its exceptional functionality to a CRADA between Pendar and DEVCOM CBC. The Pendar X10 reads and identifies a variety of hazardous threats.

DEVCOM and Pendar entered into a cooperative research and development agreement (CRADA) in July 2017 for the enhanced chemical threat library. In December 2019, the original CRADA was expanded to include a partnership with the Chemical Analysis and Physical Properties Branch at DEVCOM CBC to test infrared aerosol and gas sensors developed under a U.S. Army Small Business Innovation Research (SBIR) Phase II contract.

While the immediate impact of the technology is evident for military components, this dual-use technology also benefits the general public through its use in law enforcement, customs and border control, emergency response, and screening of travelers and postal mail. It could also be leveraged for purely commercial purposes, such as analyzing plastic components for recycling applications, identifying minerals in soil, and determining pigments for art conservation.

Collaboration and crowdsourcing propel HD-AIT airport screening technology to commercialization

Department of Homeland Security, **Science & Technology Directorate** and **Transportation Security Administration**
Department of Energy, **Pacific Northwest National Laboratory** and **Sandia National Laboratories**
National Aeronautics and Space Administration, **Center of Excellence for Collaboration and Innovation**

The next generation of airport security screening is now being commercialized, thanks to an innovative collaboration that involved three federal agencies, an industry partner, and a $1.5-million crowdsourcing competition.

In March 2021, Liberty Defense Holdings Ltd. of Atlanta, Georgia, licensed the High Definition-Advanced Imaging Technology (HD-AIT) platform—including an on-person screening system and a shoe scanner—that was jointly developed by the Department of Homeland Security (DHS) and the Department of Energy (DOE).

Liberty Defense intends to manufacture the platform in a way that seamlessly upgrades the HD-AIT platform, to not disrupt the current airport security footprint.

Development of the HD-AIT and shoe scanner was initiated in 2011 by the Screening at Speed Program within the DHS Science and Technology Directorate (S&T). This program develops and improves aviation security solutions in alignment with Transportation Security Administration (TSA) goals and requirements, and forges partnerships that enable the commercialization, transition, and deployment of those solutions.

Spurred by TSA's evolving security needs, Screening at Speed partnered with DOE's Pacific Northwest National Laboratory (PNNL) to fund and develop technology that would improve on-person screening and shoe scanning processes for the 2.5 million travelers who pass through TSA checkpoints each day. The PNNL team, which developed the original holographic millimeter wave system currently used at airports worldwide, funded the preliminary research and development of the new HD-AIT screening system.

The HD-AIT system provides higher resolution images, improves detection, reduces false alarms, and is built on a flexible, open architecture that aids rapid updates while enabling third party participation. The shoe scanner system is built on the same technology but is specifically configured to scan upward through a passenger's shoes. Both systems will reduce the need for people screened at airports and large public events to remove outerwear and shoes, which will make screening more accurate and more efficient while remaining aligned with TSA requirements.

Development of the new screening system was a collaborative process that included:

- Hardware and software maturation by PNNL
- Development of open-software standards for third-party algorithm integration by Sandia National Labs
- Algorithms crowdsourced through a $1.5-million prize competition, which was funded by TSA and Screening at Speed and administered by the National Aeronautics and Space Administration's Center of Excellence for Collaborative Innovation
- Prototype testing and evaluation by the DHS S&T Transportation Security Laboratory

In January 2021 TSA, DOE, and S&T collaborated to create a licensing agreement framework that was implemented by Battelle Memorial Institute, which manages PNNL and other DOE labs, for the license with Liberty Defense. The milestone-driven agreement grants exclusivity for three years and requires that licensees build systems compliant with government-owned detection algorithms.

Below: Agency employees and their roles

AGENCY/*TEAM*	EMPLOYEE(S)	ROLE(S)
DHS Science & Technology Directorate		
Screening at Speed	John Fortune	Program Manager, Program Strategy
Transportation Security Laboratory	Barry Masters, Peter Kenny, Chondrea Richard	Test and Evaluation
Office of General Counsel	Nathan Grebasch	Intellectual Property Management
Tech Scouting and Transition	Lesley Blancas	Technology Transition
DHS Transportation Security Administration		
Acquisition Program Management	Michael Chandarlis, Bill Garrett	Acquisition Planning
Requirements and Capability Analysis	Daniel Williams, David Farcht, James Lambeth, Frank Cartwright	Operational, Detection, and Functional Requirements
Department of Energy, Pacific Northwest National Lab		
Millimeter Wave Team	David Sheen, Mark Jones	Hardware Design
Technology Commercialization Team	Kannan Krishnaswami	Marketing and Communications Commercialization
Department of Energy, Sandia National Labs		
Open Threat Assessment Platform Program	Andrew Cox, Austin Silva, Edward Jimenez	Open Architecture Software Development
National Aeronautics and Space Administration		
Center of Excellence in Collaborative Innovation	Steven Rader	Algorithm Challenge Administration and Management

DR. SUNA GULAY FRENCH: From TTAP training to commercialization of innovative cancer treatments

National Cancer Institute

Dr. Suna Gulay French

Just two years after joining the Technology Transfer Ambassador Program (TTAP) at the National Cancer Institute (NCI), Suna Gulay French, PhD, is already an accomplished NCI technology transfer (T2) professional and a testament to the success of this training program and the NCI T2 fellowship.

Gulay French has managed diverse portfolios under NCI's Center for Cancer Research (CCR) and Division of Cancer Control and Population Sciences (DCCPS), and she has assisted with multiple collaborative agreements to facilitate research and clinical trials on rare cancers and public health crises such as COVID-19 and HIV. Her work on biological materials licenses and patent licenses has supported the use of NCI cell lines in drug evaluation and the development of T cell receptor technologies into novel cancer immunotherapies.

In early 2019, as a postdoctoral fellow at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), Gulay French was accepted into TTAP, a yearlong hybrid T2 training program focused on invention analysis, commercialization and entrepreneurship. In this role, she assisted technology transfer managers within the NCI Technology Transfer Center (TTC) by reviewing specific NCI inventions for patent application, marketing and portfolio management purposes.

This experience led to a fellowship position at TTC in late 2019, which provided immense growth opportunities and introduced her to many esteemed mentors. She managed a diverse docket—two NCI laboratories within the CCR and the DCCPS—usually shared by two T2 fellows. During this time, she also started mentoring incoming TTAP trainees.

Seven months into her fellowship, Gulay French was hired as a full-time TTC employee, with a docket that includes the NCI CCR Surgical Oncology Program and the Laboratory of Cellular and Molecular Biology. She drafts and negotiates clinical research agreements—such as human material transfer agreements, human data transfer agreements and collaborative research and development agreements (CRADAs)—that enable collaborations for rare endocrine and gastrointestinal cancers.

> Gulay French is now working on an exclusive license for TP5, a small peptide therapeutic that can be used to treat many types of cancerous tumors.

One NCI invention managed by Gulay French is a small peptide therapeutic, TP5, that can be used to treat many types of cancerous tumors, including colorectal carcinoma and glioblastoma in the brain. Gulay French's marketing of this technology started when she was a TTAP ambassador and has continued throughout her work with NCI.

As a T2 fellow and full-time employee, she worked on slide decks explaining the TP5 technology for multiple events, including the 2020 NCI Technology Showcase. She also connected inventors with TTC's competitive Invention Development Program (IDP), under which TP5 has received funding and other assistance for preclinical development. Gulay French is now working on an exclusive license for this technology.

Meanwhile, she has continued her involvement with TTAP. As a volunteer TTAP lead, Gulay French coordinates interactions with the Johns Hopkins (JHU) Carey Business School Discovery-to-Market (D2M) MBA course; D2M students select inventions from the TTC's NCI and client institute dockets and analyze these inventions, providing TTC with additional valuable patenting and licensing information.

ERIC MCGILL: Technology transfer contributions at Goddard that go above and beyond

National Aeronautics and Space Administration, Goddard Space Flight Center

Eric McGill

Though the 18 commercial licenses Eric McGill executed in the last year unquestionably contributed to new levels of technology transfer success at the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center, his creativity and team-building skills proved just as valuable.

As a Senior Technology Manager, McGill used self-developed direct marketing techniques that yielded more licenses in the past fiscal year alone than any previous year. Those licenses—many of which involved small businesses—were both numerous and varied, spanning a wide range of industries such as small satellite technology, avionics, cybersecurity, climate analytics, fitness and wellness, and artificial intelligence.

McGill's in-depth knowledge, his skill in building relationships with industry and his professionalism have been invaluable for NASA's technology transfer program. Known for his team-based mentality, he readily shared knowledge, provided mentoring, and took on additional tasks for the greater good of the organization.

McGill also developed innovative and creative approaches to technology transfer. One of those approaches involved targeting the professional athlete community, where teamwork can be an effective driver of success.

One of the first athletes McGill worked with was retired National Football League (NFL) player Obafemi Ayanbadejo. In 2018, Ayanbadejo licensed a patented NASA technology and integrated it into HealthReel, a new personal health and wellness app. The NASA technology, developed at Goddard, calculates a "corrected" body mass index (BMI) that is more accurate than conventional BMI measures.

To better target entrepreneurial, business-minded professional athletes with the drive and ambition to jump-start new companies, McGill created Commercialization Training Camp—a program that educates current and retired athletes about technology transfer and the commercialization of NASA technologies. Space Act agreements with the NFL Players Association, the National Basketball Players Association, and the National Basketball Retired Players Association helped facilitate coordination between NASA and prospective Training Camp attendees.

> One of McGill's creative approaches to technology transfer involved creating a Commercialization Training Camp for current and former professional athletes.

"With a start-up, you can get that same kind of competitive team-building experience as you get in sports," Ayanbadejo said during a presentation at the 2019 Training Camp. "I understand how difficult it is to transition out of the game and into the real world. I hope to inspire the attendees of this workshop to become as passionate about tech as they are about athletics."

The program, now in its third year, has led to the formation of three start-ups and the licensing of three NASA technologies. In addition, given its success, the Training Camp concept spearheaded by McGill has been adopted by other NASA centers.

DENNIS ANDRUCYK: Facilitating success by viewing his laboratory through a technology transfer lens

National Aeronautics and Space Administration, Goddard Space Flight Center

Dennis Andrucyk

Since becoming director of the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center in 2019, Dennis Andrucyk has steadfastly supported the center's technology transfer efforts on multiple levels—from small-business partnerships to high-profile collaborative strategies for new commercial markets.

"Tech transfer only ever works if it's incentivized from the top down, and that's exactly what Dennis has done," said Kerry Leonard, Deputy Chief of Goddard's Strategic Partnerships Office (SPO). "He's great at seeing Goddard through a tech transfer lens. His proactivity has definitely helped our office generate some success stories over the past few years."

The office relies on the participation and collaboration of several groups across Goddard to complete technology transfer objectives, and with Andrucyk's support, this participation has increased across multiple sectors. By ensuring better accountability and transparency across divisions, Andrucyk directly improved communications and functionality, familiarizing himself with technologies, licenses and metrics for quality and quantity.

Additionally, Andrucyk has cultivated an environment supportive of the Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) program. When NASA leadership visited Goddard in early 2020, center management, scientists, engineers, and program participants were encouraged to speak about their experiences and give facility tours to the visitors at the event.

"Events like these help Goddard's SBIR/STTR program participants and program leadership meet and put faces to email addresses," said Joe Famiglietti, Goddard SBIR/STTR lead. "Without support from upper management, the program would not be able to ask Goddard employees to take time out of the workday for these events."

> "Tech transfer only ever works if it's incentivized from the top down, and that's exactly what Dennis has done."
>
> – Kerry Leonard, Deputy Chief of Goddard's Strategic Partnerships Office (SPO)

One specific example of Andrucyk's support for technology transfer is his direct involvement in licensing software for the NASA Autonomous Flight Termination Unit (NAFTU), a system that can independently determine if an unmanned rocket is off course and terminate the flight by self-destructing. NAFTU eliminates the need for ground personnel, transmitters, telemetry receivers, and radars historically used for the same purpose.

Originally developed at NASA's Kennedy Space Center, the program's development and certification activities transferred to Goddard's Wallops Flight Facility in 2020. From that moment onward, Andrucyk supported efforts across Goddard to validate and certify the software package.

Realizing that this game-changing technology required a copyright and promised to have profound implications for commercial markets as well as government entities, Andrucyk was instrumental in making the software available. Subsequently, eight companies have signed copyright licenses for the technology so far, with continued industry interest in NAFTU's unique capabilities.

MIT Lincoln Laboratory

Industry partnership expands applications for MIT-LL's video surveillance analytics technology

MIT Lincoln Laboratory

Technology from MIT Lincoln Laboratory that makes it significantly easier and faster for investigators to review surveillance video—originally developed for public transportation security—will soon be available for commercial use, after being licensed by software start-up Doradus Labs.

As part of the laboratory's work with the Department of Homeland Security, MIT-LL researchers developed the Forensic Video Exploitation and Analysis (FOVEA) tool to speed up the process of reviewing and analyzing security footage from subways and rail systems in the aftermath of an attack or during an event of interest.

Doradus Labs, which licensed the FOVEA technology in 2019 and 2021, is a software development and technical support company focused on machine learning, including machine learning for video surveillance.

The first envisioned commercial application of the FOVEA technology is for monitoring casino activity, as part of efforts to prevent future events like the 2017 mass shooting in Las Vegas that killed 60 people. In that case, the perpetrator managed to stockpile five suitcases of automatic-type firearms in his casino hotel room without being detected.

Inefficiency is a major challenge when forensic analysts are trying to confirm a security threat based on surveillance video from most large-scale, closed-circuit systems. Commercially available video analytics can require extensive work by video surveillance operators, especially when confirming an apparent threat requires searching through large amounts of archived video.

Unlike existing commercial solutions, FOVEA's capabilities can be integrated into existing surveillance systems, so video data do not need to be exported or otherwise curated before being analyzed. FOVEA also can be processed on any desktop or laptop computer, with no need to purchase proprietary server equipment or transmit data to a cloud service. This feature is important for adhering to government or corporate privacy policies.

The system's new analytic capabilities, made possible with machine learning, include:

- Video Summarization, which creates a very short visual summary of a long stretch of video for quicker review
- Jump Back, which automatically rewinds to the point in a video when an object of interest first appeared
- Multi-Camera Navigation and Path Reconstruction, which tracks a person or vehicle across multiple camera views and allows users to assemble a composite video.

Above: FOVEA's benefits were confirmed after it was deployed in two mass transit facilities.

These features result in shorter investigation times, improved ability to react to in-progress events, and a more robust security presence. Investigations that usually take days can be performed in hours, and review tasks that usually take hours can be performed in minutes.

The MIT-LL team confirmed these benefits after deploying a FOVEA prototype in two mass transit facilities and integrating the software into their video management systems. Then the team began to focus on commercialization.

MIT-LL identified Doradus as a potential licensee through the National Science Foundation's Innovation Corps (I-Corps) program. An initial nondisclosure agreement was followed by a trial license, which allowed the company's engineers to familiarize themselves with the software and the underlying source code. The trial phase led to a commercial license agreement, which was amended after MIT-LL updated FOVEA with additional functionality.

MIT Lincoln Laboratory

Success of MIT-LL's cloud server security technology now includes endorsement from tech giant IBM

MIT Lincoln Laboratory

In just six years, a cloud security technology developed at MIT Lincoln Laboratory has evolved from an internal project to a key player in maintaining the security of IBM's thousands of cloud servers.

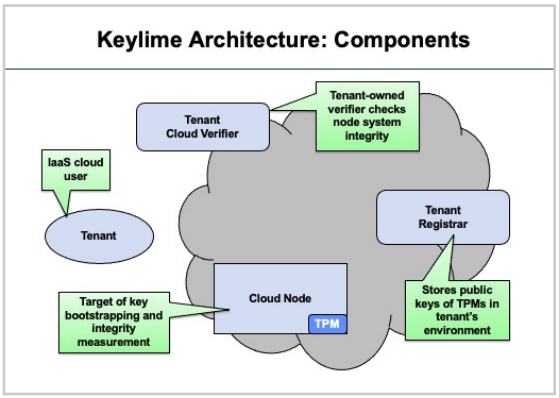
Keylime is a free, open-source security software architecture designed to help government and industry users with sensitive data protect their cloud and Internet of Things (IoT) devices. The system allows users to securely bootstrap secrets (securely upload cryptographic keys, passwords, and certificates) into the cloud without divulging them to a cloud provider and to continuously verify trust in their cloud computing resources without relying on a provider to do it for them.

In July 2021, IBM announced that it would be rapidly rolling out Keylime based technology to its entire cloud fleet to meet the security needs of its customers in financial services and other enterprise areas. This will leverage work done to expand the scalability and resilience of Keylime for managing large quantities of data, allowing Keylime to be applied across a cloud data center.

Keylime achieves its cloud security by leveraging a piece of hardware called a TPM (Trusted Platform Module), an industry-standard hardware security chip. A TPM generates a hash, a short string of numbers representing a much larger amount of data, that changes significantly if data are even slightly tampered with. Keylime can detect and react to this tampering in under a second.

Before Keylime, TPMs were incompatible with cloud technology, slowing down systems and forcing engineers to change software to accommodate the module. Keylime gets around these problems by serving as a piece of intermediary software that allows users to leverage the security benefits of the TPM without having to make their software compatible with it.

Keylime started as an internal project funded through MIT Lincoln Laboratory's Technology Office in 2015. Through the Massachusetts Open Cloud initiative, the



Above: The Keylime system allows users to securely bootstrap secrets (securely upload cryptographic keys, passwords, and certificates) into the cloud without divulging them to a cloud provider.

Keylime team began discussions with RedHat, one of the world's largest open-source software companies, to expand the technology's commercial reach.

With the help of RedHat and the Department of Homeland Security Science & Technology Directorate's Transition to Practice Program, the Keylime team developed an open-source distribution strategy that would facilitate updates to public and government systems. RedHat also helped Keylime to transition in 2019 into the Cloud Native Computing Foundation as a sandbox technology with more than 30 open-source developers contributing to it from around the world.

The Keylime community continues to attract members with diverse skill sets, experiences, and application interests. Through this diverse and growing community, Keylime is now:

- Available to be downloaded and installed from Fedora, a digital asset management content repository
- Being prepared for integration into the RedHat Enterprise Linux (RHEL) operating system as a trusted cloud integrity management security system
- Being re-implemented in the Rust operating system language for improved performance and safety.

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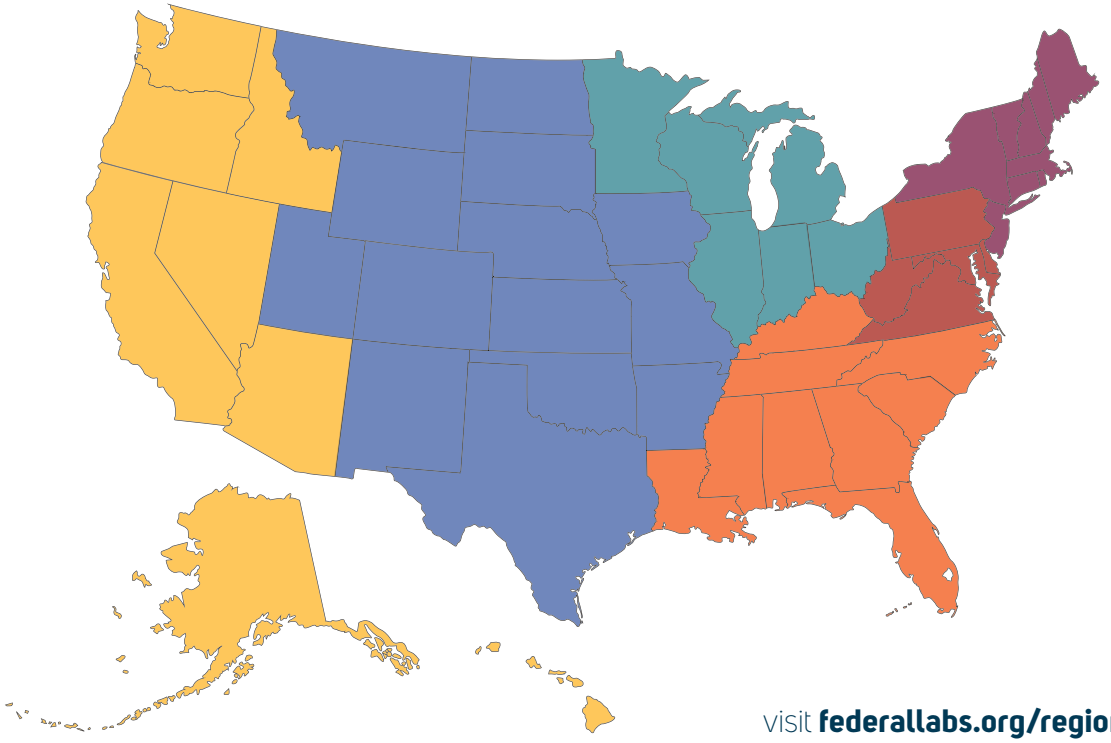

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