



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 Chandaris, 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