DHS SCIENCE AND TECHNOLOGY

S&T Overview

Homeland Security
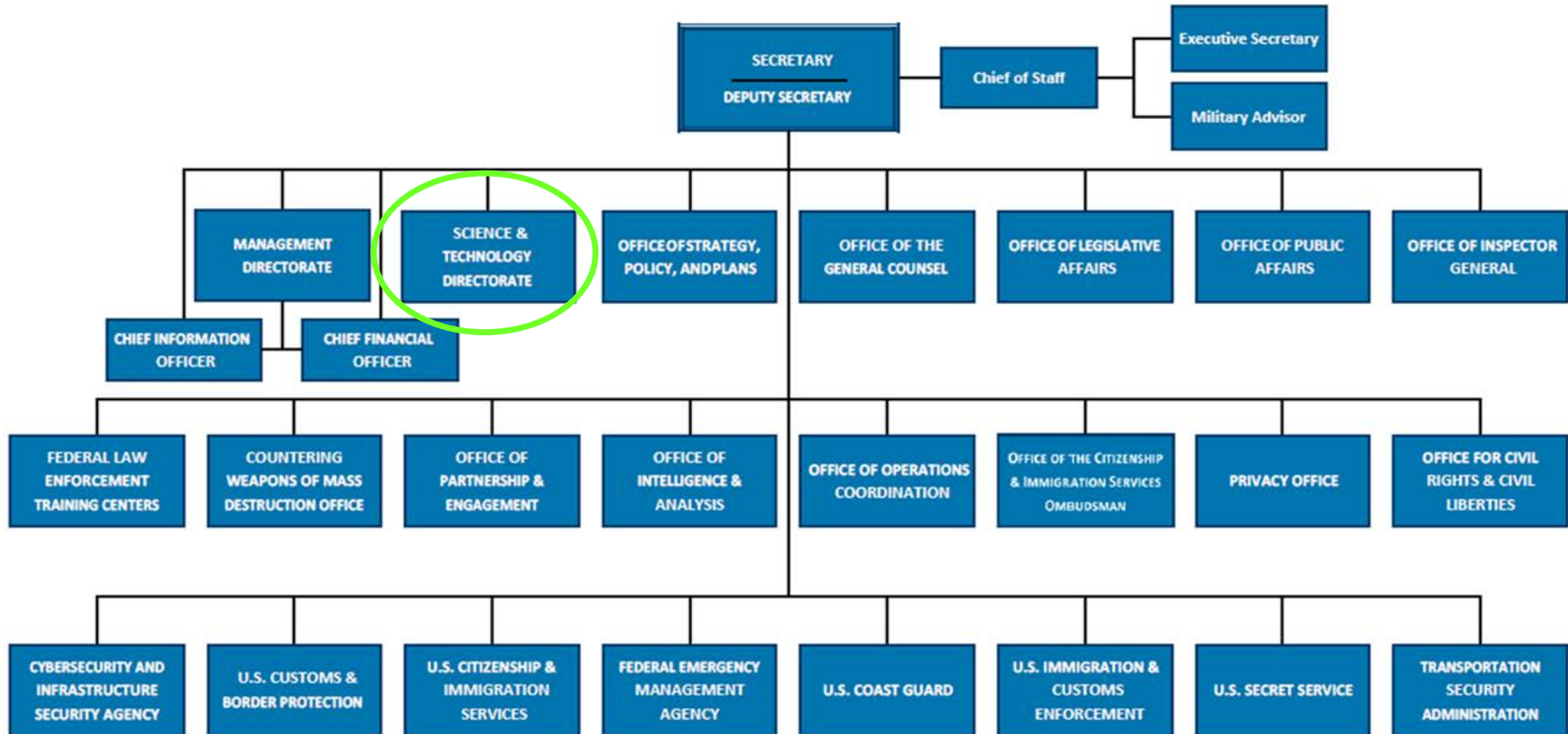
Science and Technology

17 July 2019

Jonathan McEntee
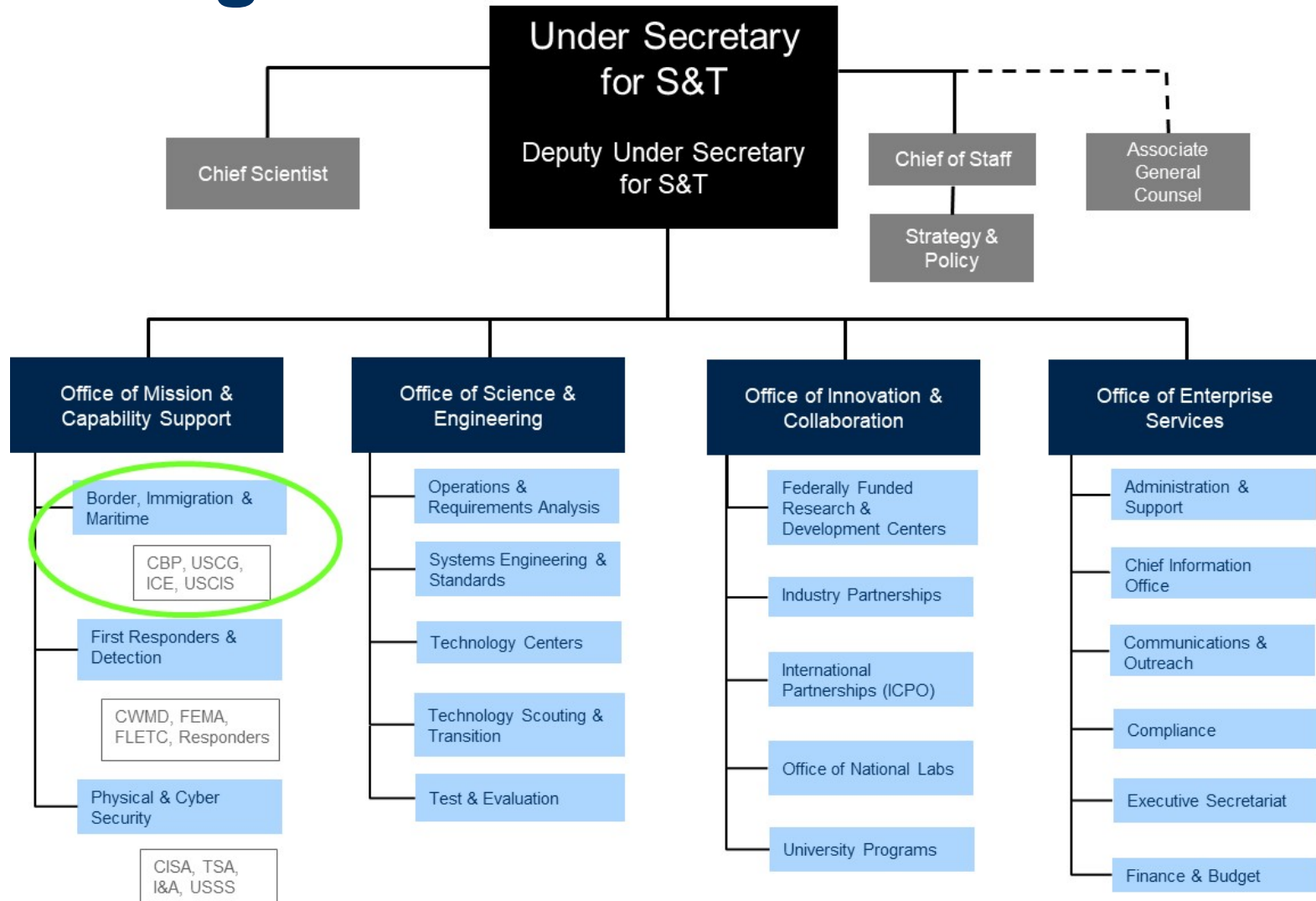
Borders, Immigration and Maritime Division

Science and Technology Directorate

DHS Organizational Chart

S&T Organizational Chart

Under Secretary for S&T / Deputy Under Secretary for S&T

- Chief Scientist
- Chief of Staff
  - Strategy & Policy
- Associate General Counsel

Office of Mission & Capability Support
- Border, Immigration & Maritime
  - CBP, USCG, ICE, USCIS
- First Responders & Detection
  - CWMD, FEMA, FLETC, Responders
- Physical & Cyber Security
  - CISA, TSA, I&A, USSS

Office of Science & Engineering
- Operations & Requirements Analysis
- Systems Engineering & Standards
- Technology Centers
- Technology Scouting & Transition
- Test & Evaluation

Office of Innovation & Collaboration
- Federally Funded Research & Development Centers
- Industry Partnerships
- International Partnerships (ICPO)
- Office of National Labs
- University Programs

Office of Enterprise Services
- Administration & Support
- Chief Information Office
- Communications & Outreach
- Compliance
- Executive Secretariat
- Finance & Budget

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Other S&T Services

- Tech Centers (Modeling & Simulation, Data Analytics, Biometrics, etc.)
- Tech Scouting/Market Research
- International Partnerships (Canada; opportunities with 12 countries and the EU)
- DHS Office of National Labs
- University Programs Centers of Excellence (ADAC, MSC)
- Border Security Technology Consortium (BSTC)
- Silicon Valley Innovation Program (SVIP)
- Prize Competitions (e.g., Detection of People in the Water)
- Small Business Innovative Research (SBIR) (e.g., Cell Phone Location Finder)
- Department of Energy (DOE) Labs
- Homeland Security Systems Engineering and Development Institute (Mitre)
- Homeland Security Operational Analysis Center (Rand)
- SAFETY Act

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Borders, Immigration and Maritime Security
Mission Space

Key Operating Partners:

 U.S. Customs and Border Protection

 U.S. Coast Guard

 U.S. Immigration and Customs Enforcement

 U.S. Citizenship and Immigration Services

Operational Settings: People/Cargo/Conveyances
- At the Ports of Entry (POE)
- Areas between POEs

Domains:
- Air
- Ground
- Underground
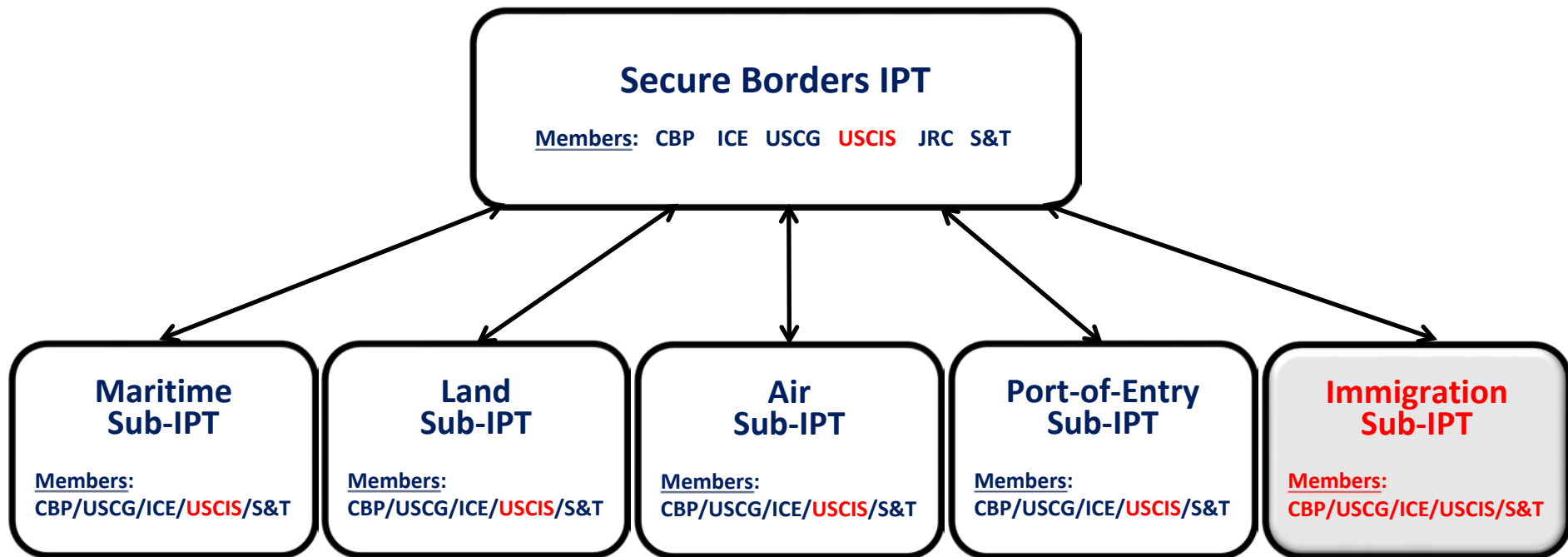- Water
- Underwater

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Our Overall Investment Strategy
Focus on Operations, Innovation and Partnerships

- Getting mature and more rapidly deployable solutions to DHS Operating Components

- Technologies must show positive impact on operations and return on investment for our customers. Priority given to life-cycle cost savings and increased efficiency

- Collaborating/cost sharing with other components, agencies and international partners to reduce R&D cost and time to delivery

- Partnership with industry, national laboratories, and academia is viewed as best/preferred path to transition new technology and to guide their investments

  - Commercialize tech at earlier stage via venture capitalists

  - Performance Standards vs. government-developed prototypes

  - Private service data vs. government-owned data

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Secure Borders Sub-IPT Structure

Secure Borders IPT

Members: CBP   ICE   USCG   USCIS   JRC   S&T

Maritime Sub-IPT

Members:
CBP/USCG/ICE/USCIS/S&T

Land Sub-IPT

Members:
CBP/USCG/ICE/USCIS/S&T

Air Sub-IPT

Members:
CBP/USCG/ICE/USCIS/S&T

Port-of-Entry Sub-IPT

Members:
CBP/USCG/ICE/USCIS/S&T

Immigration Sub-IPT

Members:
CBP/USCG/ICE/USCIS/S&T

FY19 Secure Border IPT Strategic Priorities (1-14)

In priority order – edits to existing priorities and new priorities highlighted

Sub-IPT					Component				Strategic R&D Priority
Air	Land	Maritime	POE	Immigration	CBP	ICE	USCG	USCIS	
	X				X				Enhance the detection, identification, classification, and tracking of illicit activity in remote areas of the U.S. land border not using airborne sensors
X		X			X		X		Enhance situational awareness on maritime borders
	X	X	X	X	X	X	X	X	Enhance the utilization of biometric collection to expedite and improve people screening
X	X	X	X	X	X	X	X	X	Enable law enforcement investigations by enhancing the ability to share, query, and analyze law enforcement information/data (e.g. Human Trafficking, Alien Processing, Immigration Data, Geolocation)
X	X	X			X		X		Enhance the detection, identification, classification, and tracking of illicit land and maritime activity using airborne sensors
X	X	X	X		X	X	X	X	Enable information sharing by enhancing the capability to integrate disperate border security sensor and intelligence sources, perform data analytics, and share the resulting actionable intelligence with HSE partners
	X	X	X		X	X	X	X	Enhance the capability to detect the transport of contraband, bulk currency, and other threats in inbound and outbound cargo, passengers, automobiles, mail, and express consignment by improving the performance of Imaging (NII) Systems
X		X			X		X		Enhance persistent maritime surveillance capabilities in port and coastal environments
	X	X	X	X	X	X	X		Enhance Narcotics Detection including Opioids/Fentanyl
X	X	X	X		X	X	X		Enhance law enforcement telecommunication capabilities
X	X	X	X		X	X	X		Enhance reliable mobile capabilities and improved remote access for frontline operators
X		X			X	X			Enhance presence in the maritime domain
X	X				X	X			Improve the detection, identification, classification and tracking of low altitude airborne threats
	X			X	X	X			Enhance capabilities to detect, surveil and remediate cross-border tunnels

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Preliminary Results

In priority order – edits to existing priorities and new priorities highlighted

Air	Land	Maritime	POE	Immigration	CBP	ICE	USCG	USCIS	Strategic R&D Priority
			■		■		■		Enhance the capability to collect cargo data and perform data analytics to target illegal cargo while expediting the delivery of legitimate cargo
			■		■			■	Implement technologies and process improvements to enhance traveler inspection operations (non-biometric)
■		■			■		■		Improve dark vessel detection, tracking and interdiction capabilities
■	■		■		■	■			Enhance the capability to counter nefarious UAS
	■	■	■	■	■	■			Enhance DNA Collection and Forensics
■	■	■			■	■			Enhance the reliability of C5I Enterprise Systems
	■	■			■				Crisis Control
		■					■		Enhance resilience of the Marine Transportation System
■					■		■		Enhance surveillance and communications capabilities in remote maritime environments (e.g. the Arctic)
			■		■	■			Build operational capacity and capability to pre-empt, detect, characterize, and visualize known and unknown cross-border biological threats to American agriculture and public health that are moving through the global supply chain
	■	■			■	■			Enhance the safety and effectiveness of DHS component officers/agents by providing them improved tools and personal protection equipment
	■			■	■				Enhance tunnel investigation and forensics capabilities
■							■		Enhance Search and Rescue Operations
■					■				Improve the detection and tracking of medium and high altitude airborne threats (<40K ft)
							■		Enhance Iceberg Detection
			■	■	■	■			Enhance intellectual property protection related to the exportation of U.S. goods
			■		■		■		Enhance ability to leverage emerging Blockchain technology

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Preliminary Results

Port of Entry Security
What We Are Trying To Do

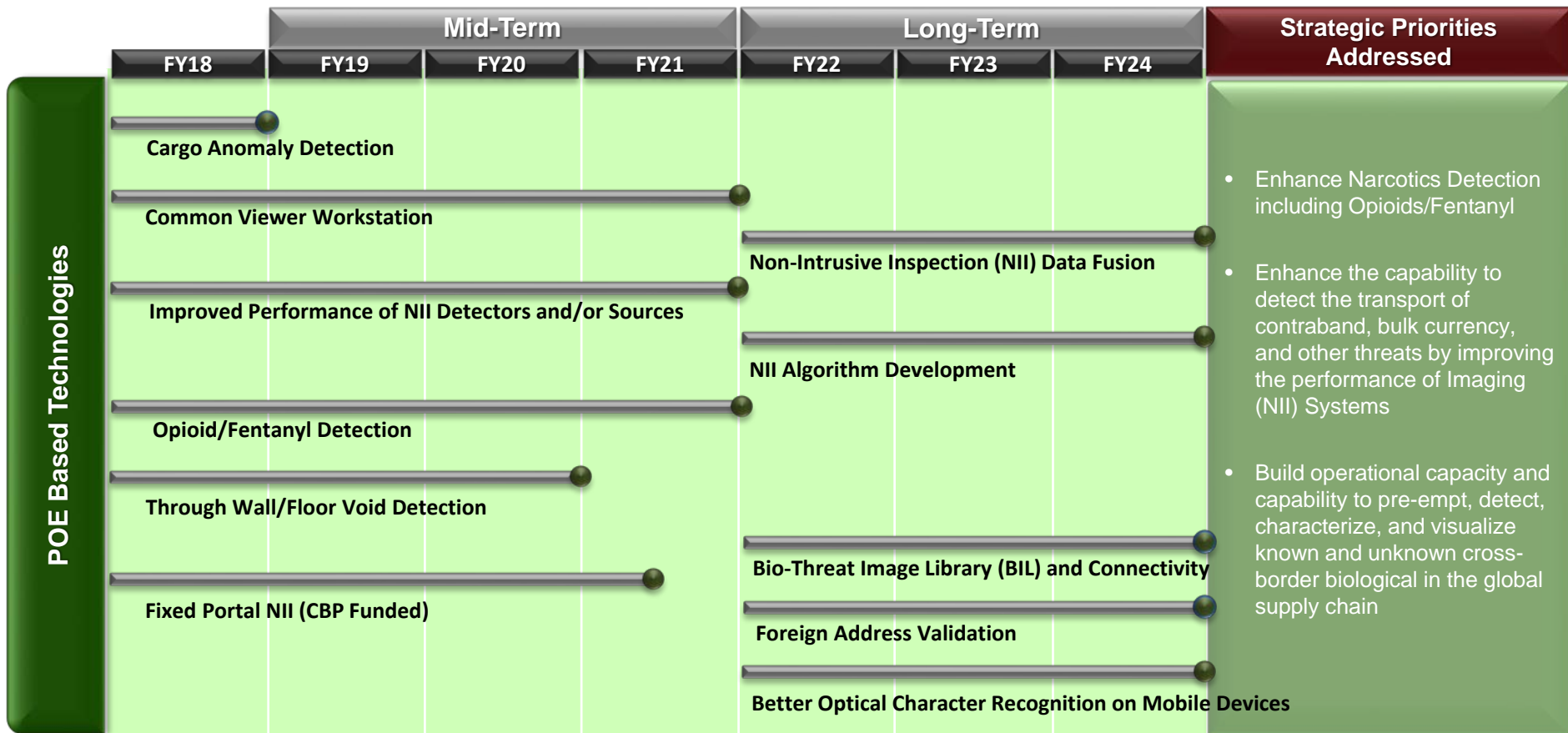**"Big" Goal: Improve rate and capability of CBP POE detection systems.**

- **Environment:** Processed through 328 Ports of Entry annually:
  - 25+ million containers
  - CBP processed 390 million travelers, 119 million at air ports of entry
  - 74+ million POVs pass across the southern border annually
  - Nine major International Mail Facilities arriving from more than 180+ countries, as well as 25 established express consignment carrier (ECC)
- **Threat:**
  - Drugs, contraband, potential pathway for WMD, customs violations
- **Current Operational Issues:**
  - Lack of reliable technology and data cause many "good" containers to be inappropriately designated as "High Risk"
    - Need to scan a higher volume of containers
  - Aging fleet of cargo scanning equipment with high maintenance costs
  - CBP OFO manpower expected to remain flat in out-years
  - Increasing traffic volume with no forecasted increase in manpower

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Port of Entry Sub-IPT R&D Plan
(pending budget and further guidance)

Updated 6-25-2019

POE Based Technologies	Mid-Term				Long-Term			Strategic Priorities Addressed
	FY18	FY19	FY20	FY21	FY22	FY23	FY24	

POE Based Technologies

- Cargo Anomaly Detection
- Common Viewer Workstation
- Improved Performance of NII Detectors and/or Sources
- Opioid/Fentanyl Detection
- Through Wall/Floor Void Detection
- Fixed Portal NII (CBP Funded)
- Non-Intrusive Inspection (NII) Data Fusion
- NII Algorithm Development
- Bio-Threat Image Library (BIL) and Connectivity
- Foreign Address Validation
- Better Optical Character Recognition on Mobile Devices

Strategic Priorities Addressed

- Enhance Narcotics Detection including Opioids/Fentanyl

- Enhance the capability to detect the transport of contraband, bulk currency, and other threats by improving the performance of Imaging (NII) Systems

- Build operational capacity and capability to pre-empt, detect, characterize, and visualize known and unknown cross-border biological in the global supply chain

Port of Entry Sub-IPT R&D Plan
(pending budget and further guidance)

Updated 6-25-2019

	Mid-Term				Long-Term			Strategic Priorities Addressed
	FY18	FY19	FY20	FY21	FY22	FY23	FY24	

POE Forensics & Investigations

- Pollen Forensics
- Igloo Analytics
- Enabling Law Enforcement Investigations
- Covert Cargo Tracking
- Border Security Forensics
- Labor Sourcing and Goods Tracking

Strategic Priorities Addressed:
- Enhance the capability to collect cargo data and perform data analytics to target illegal cargo while expediting the delivery of legitimate cargo
- Enable law enforcement investigations by enhancing the ability to share, query, and analyze law enforcement information/data
- Enhance intellectual property protection related to the exportation of U.S. goods

People Screening

- Modified Egress
- Pre-Clearance Technology
- Counting & Measuring
- Incorporating Facial Recognition
- Biometric Collection Technology Refresh
- Flexible Facilitation
- Seamless Biometric Identification Integration
- Frictionless Facilitation

Strategic Priorities Addressed:
- Enhance the utilization of biometric collection to expedite and improve people screening
- Implement technologies and process improvements to enhance traveler inspection operations (non-biometric)
- Enhance DNA Collection and Forensics

12

FY18 – FY19 Accomplishments

- Delivered a medium energy gamma ray system to Douglas, AZ POE

- Delivered a NII Common Viewer System to Savannah, GA POE

- Delivered a traffic model study to CBP for Brownsville, TX POE, Laredo, TX POE, and Buffalo, NY POE

- Awarded contracts for and conducted site surveys for Nogales, AZ, Otay Mesa, CA, Laredo, TX, and Buffalo, NY POE

- Conducted University Conference at Northeastern ADEPT

- Held Biometric Technology Rally in March at S&T's Maryland Test Facility, to test 11 innovative face and face/iris recognition systems.

- CBP's Office of Field Operations announced that the medium energy mobile NII scanner system, developed by DHS S&T, was instrumental to a 400 kg bulk marijuana seizure.

Doing Business with S&T

S&T seeks to engage innovators and a wide variety of performers to develop science and technology solutions that address real-world threats and hazards.

- **Silicon Valley Innovation Program** – engages technology innovators and investors to solve pressing homeland security challenges

- **S&T's Long Range Broad Agency Announcements** - open invitation to scientific and technical communities to fund pioneering R&D projects

- **S&T's Small Business Innovation Research Program** - awards funds to small businesses to quickly commercialize and deliver operational prototypes

- **Prize Competitions** - incentivizes non-traditional performers to propose innovative solutions

- **SAFETY Act** – offers important legal liability protections for providers of Qualified Anti-Terrorism Technologies

- **Transition to Practice Program** – helps federal laboratories and research centers transition promising solutions for commercialization

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Engage With Us!

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DIVERSE PERSPECTIVES + SHARED GOALS = POWERFUL SOLUTIONS