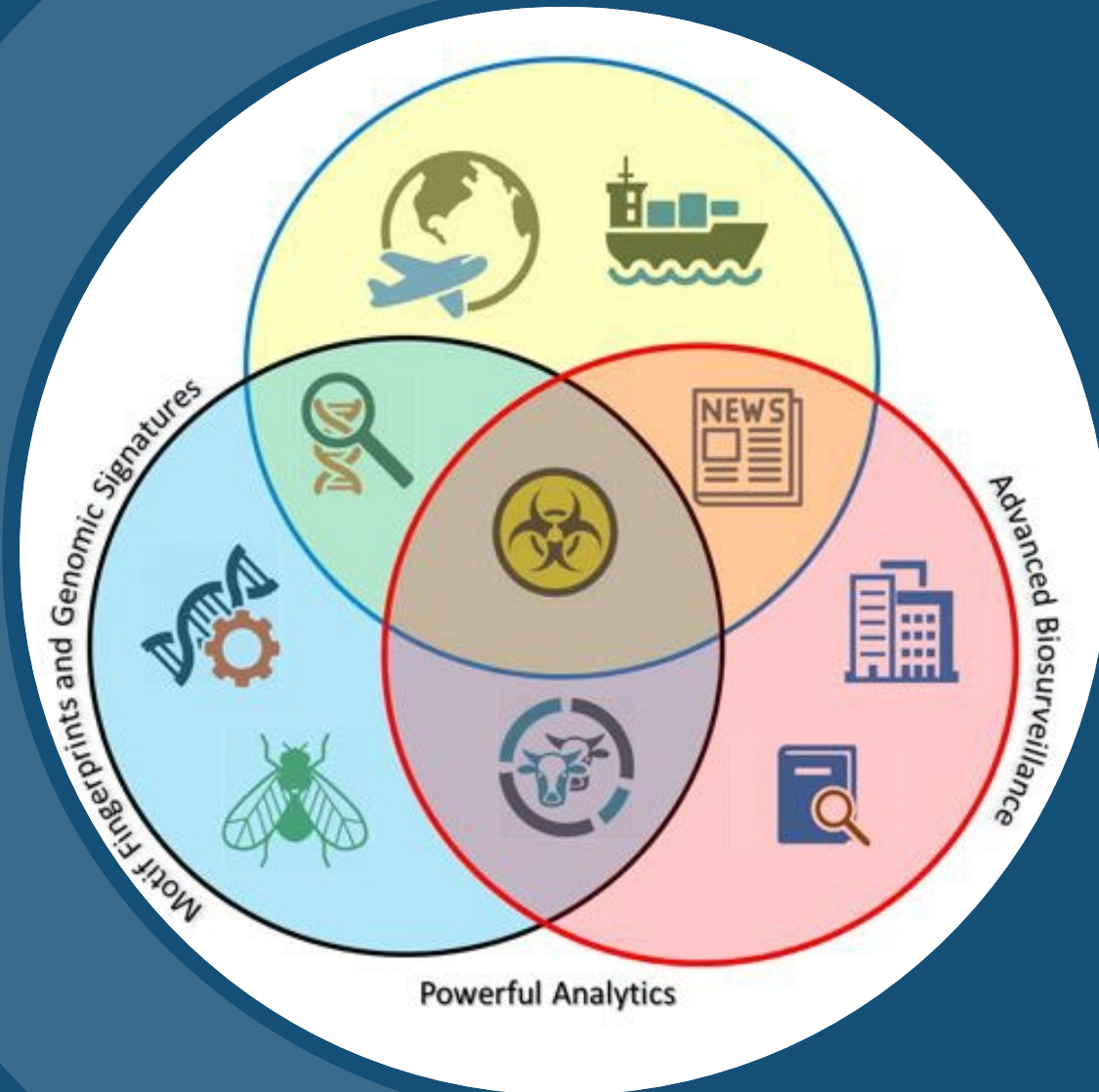




U.S. Customs and
Border Protection



PRECOGNITION OF INBOUND BIOLOGICAL THREATS

Romelito L. Lapitan
CBP-ADEPT-05 Workshop
July 25, 2023

Gaps and Capability Requirements

- **Mission: Biothreat Exclusion and Mitigation of Biothreat Risks at the Border**

- **Products of Concern:** *Naturally emerging and synthesized biological agents, vectors, and biotechnology products of agriculture and public health significance*
- **Conveyances:** *Traveler checked and carry-on items, Commercial cargo, Express Consignment, and International Mail packages*
- **Venues:** *International Mail, Air, Sea, and Land Border Ports of Entry*

- **Problems needing solutions**

- *Precognition and characterization of known and unknown emerging biothreats (“reducing the haystack”)*
- *Determination of contamination along the food and agriculture supply chain (“risk scoring”)*
- *Enhancement of non-intrusive detection*
- *Resource optimization i.e., increased targeting efficacy and port inspection efficiency*
- *Reduction of agriculture inspection times at ports of entry*
- *Better training of existing and new generations of border workforce on all aspects of agro/biodefense posture*

- **Methods for people with solutions to work with you**

- *BAA/Whitepaper submissions*

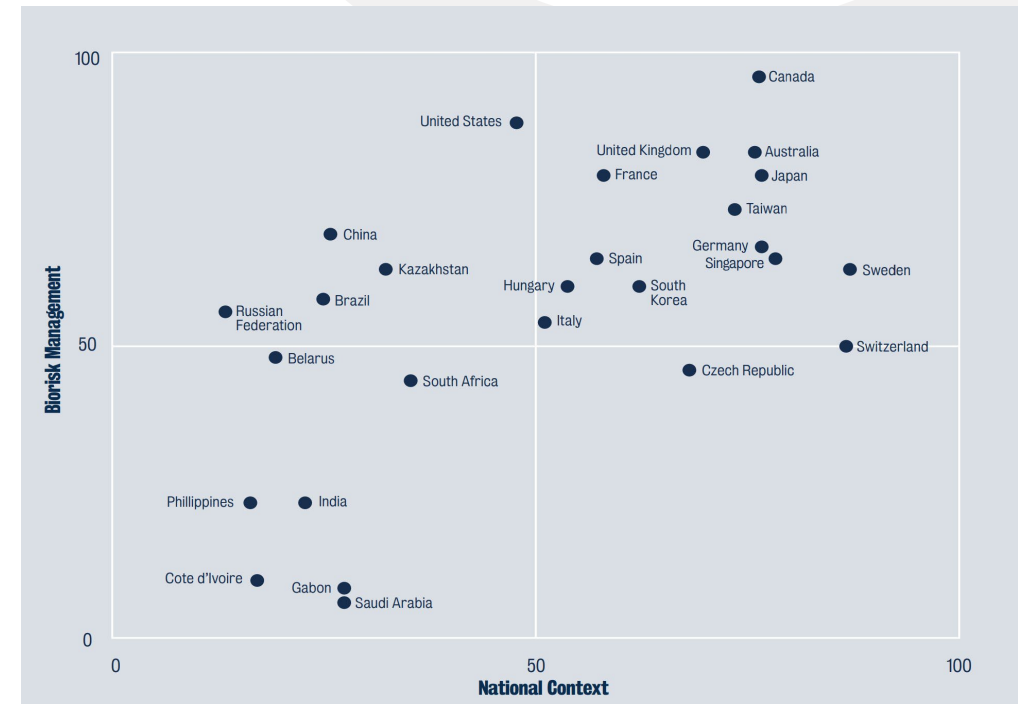


Challenges

- **Increasing Volume of Trade and Travel**
 - Time is of the essence during inspection
- **Global rise in number of:**
 - High containment biological laboratories; and,
 - Gain-of-function research on high-consequence pathogens lacking transparency, biosafety, and biosecurity oversight
- **Changing global biothreat landscape and increase emergence of *known* and *unknown* diseases**
- **Risk contextualization and operational visualization using millions of complex, disparate data from heterogeneous open sources is beyond human cognitive abilities.**

On a Typical Day in FY 2022, CBP Processed:

- 868,867 passengers (30%) and pedestrians (63%)
- 226,589 incoming privately owned vehicles
- 91,605 truck, rail, and sea containers
- 107,000 entries of merchandise at our air, land, and sea ports of entry



Credit: Global Biolabs Report 2023 (2023).



LAYERS OF SCREENING

- Advanced screening of trade entries
- Document review
- Non-intrusive inspection
- Physical inspection
- Canine



Convergent Solution to Multidimensional Cross-Border Biothreat Defense: Operational Visualization

DATA COLLECTION

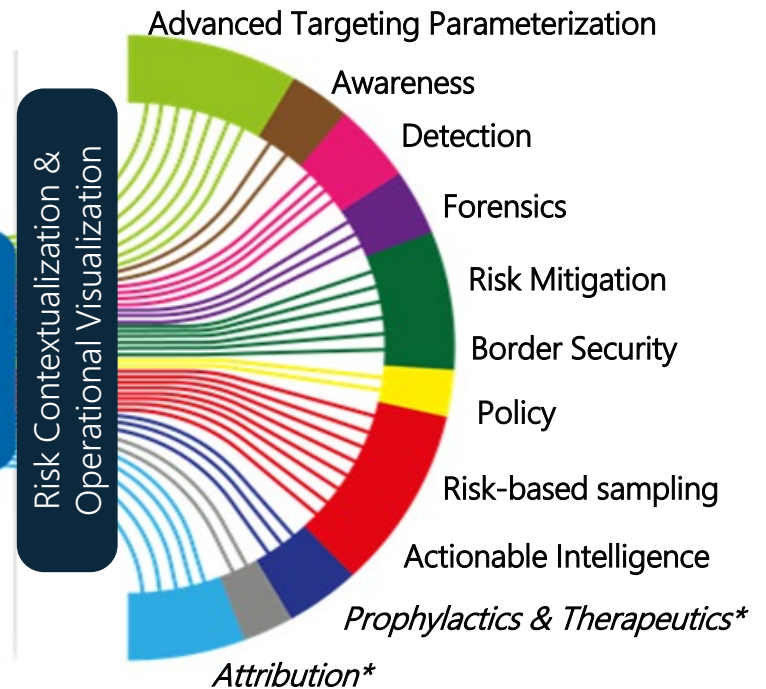
- International Trade
- Researchers & Institutions
- International PAX crossing
- Airline and Vessel Trackers
- Digital Genomic Biosurveillance
- Pest and Disease Monitoring
- Official Disease Reporting
- Country Capability Matrix
- Biophysical & Environmental Data



THREAT CHARACTERIZATION & RISK ANALYTICS

Motif fingerprinting
Big Data Analytics (AI)
Risk Scoring

MISSION & DETERRENCE



DATA, DATA, DATA

- Collecting Data
- Disambiguation
- Standardization
- Inter-operability
- Integration
- Robust Data Analytics (AI)
- Data Sharing



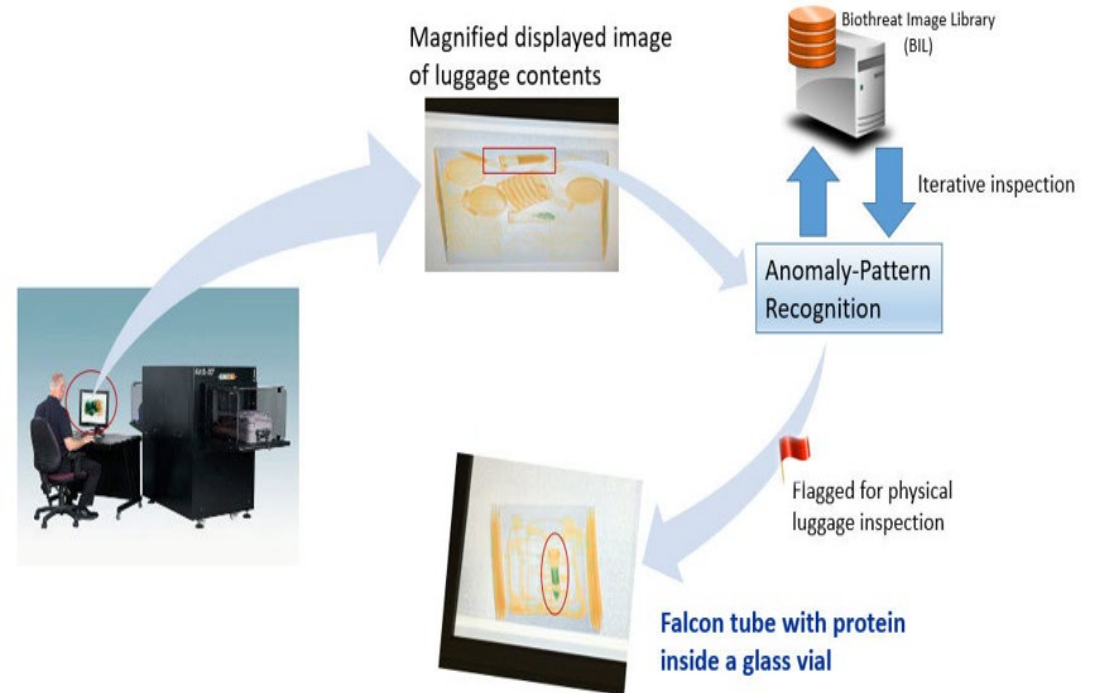
PASSENGER BAGGAGE NON-INTRUSIVE INSPECTION

Challenges:

- Low resolution of DV x-ray equipment
- Difficulty in detecting biologicals
- Proprietary ownership of vendors

Potential Solution:

- Automated Threat Recognition Algorithm
- Biothreat Image Library
- Network connectivity of x-ray equipment





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THANK YOU !

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