

# High-Energy X-Ray Dense Air Cargo Scanner

*This work was funded under Department of Homeland Security  
Science and Technology Directorate contract 70RSAT20KPM000110.*

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July 26, 2023

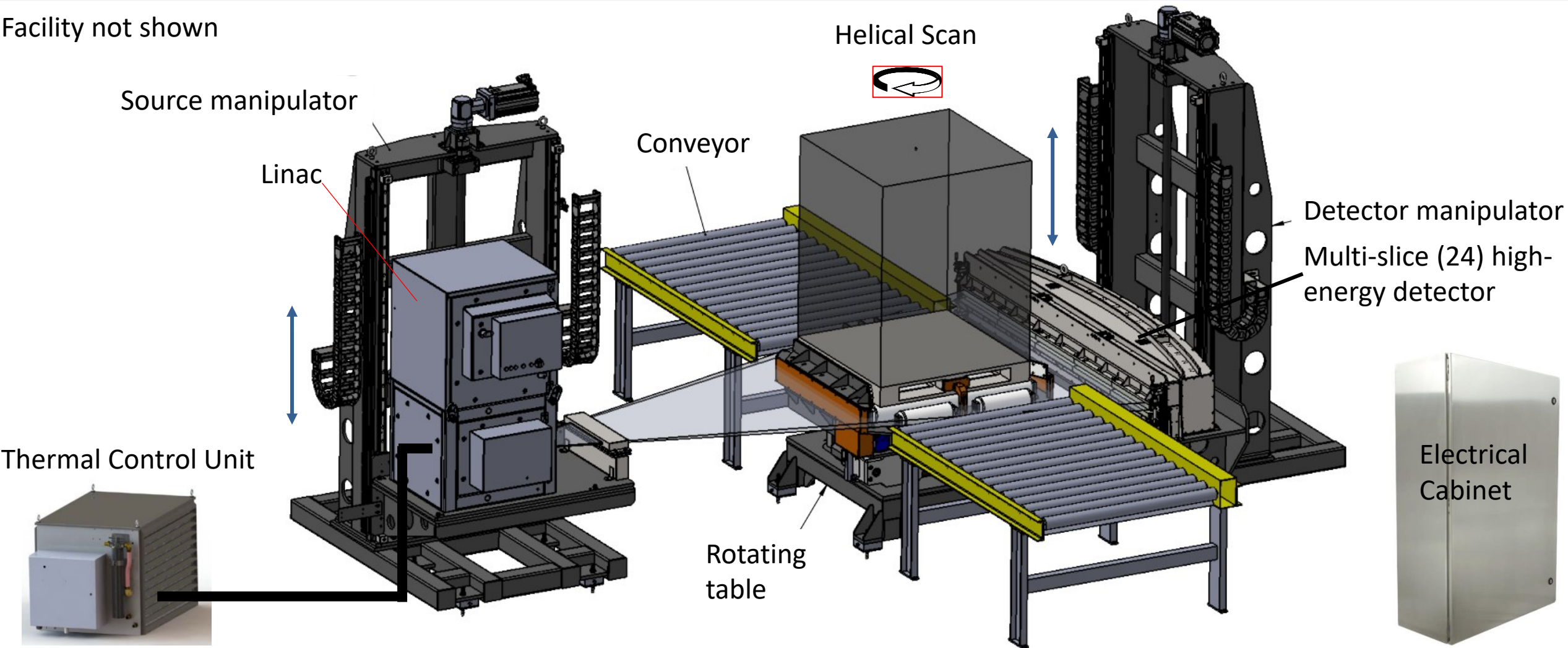


# So What? Who Cares?

- **Space:** CBP detection of illicit materials at multiple POEs using large multiple conveyances
- **Problem:** CBP may require better detection of illicit materials compared to present methods such as projection X-ray
- **Solution:** designed high-energy CT scanner for TSA air cargo application. Scanner applicable to large conveyances for CBP such as skids
- **Results:** understand trade-space for CT scanners: energy, resolution, throughput, cost, ConOps
- **TRL:** 4. Precursor demonstrated performance at 1 container/hour

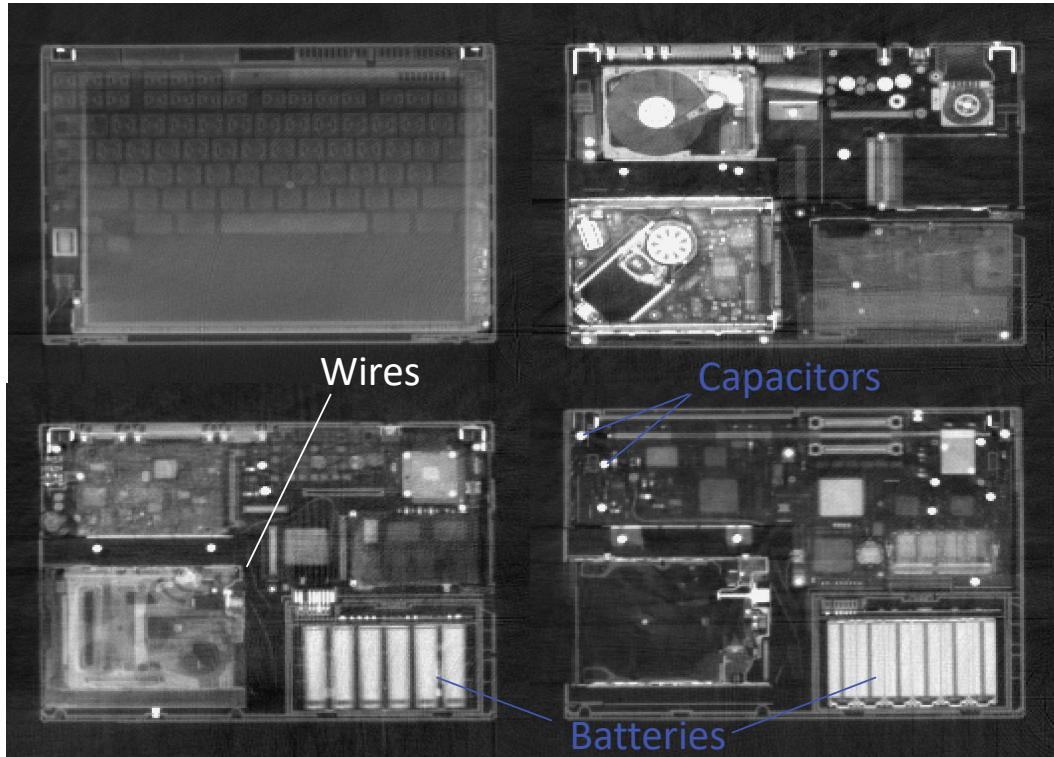
# CT System Design

Facility not shown



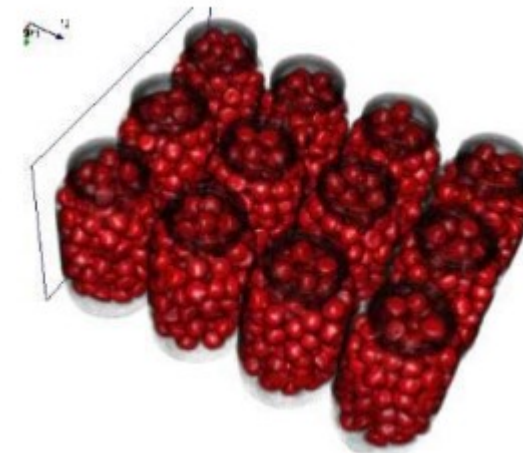
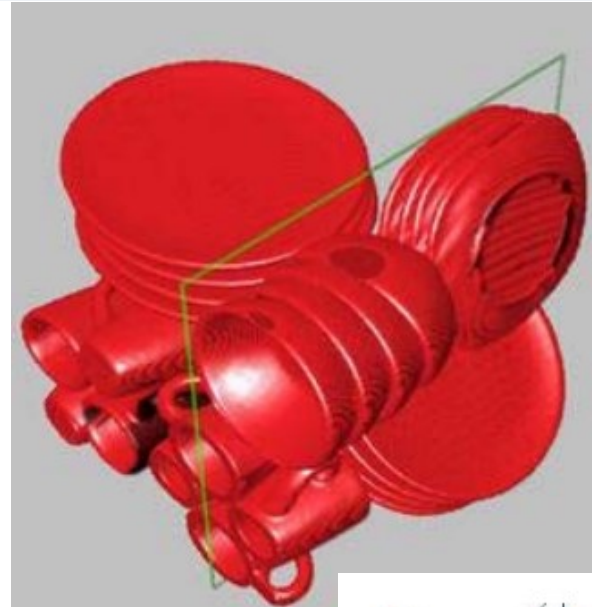
\*Scanner of Palletized Air Cargo

# Tomographic Images



Four CT Slices of laptop in LD3  
Invision/GE MVCT

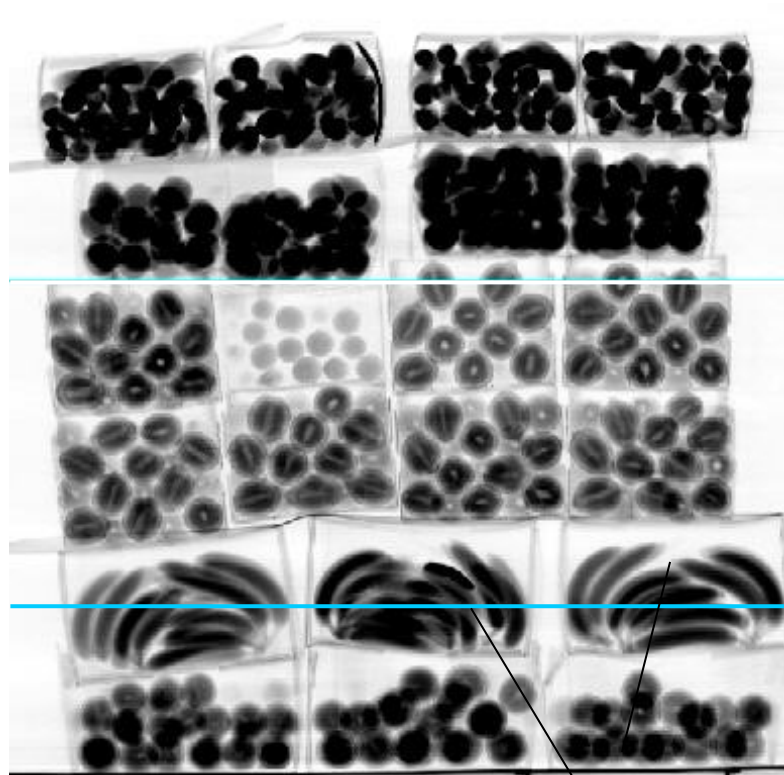
2008 IEEE International Conference on Technologies for  
Homeland Security, 2008



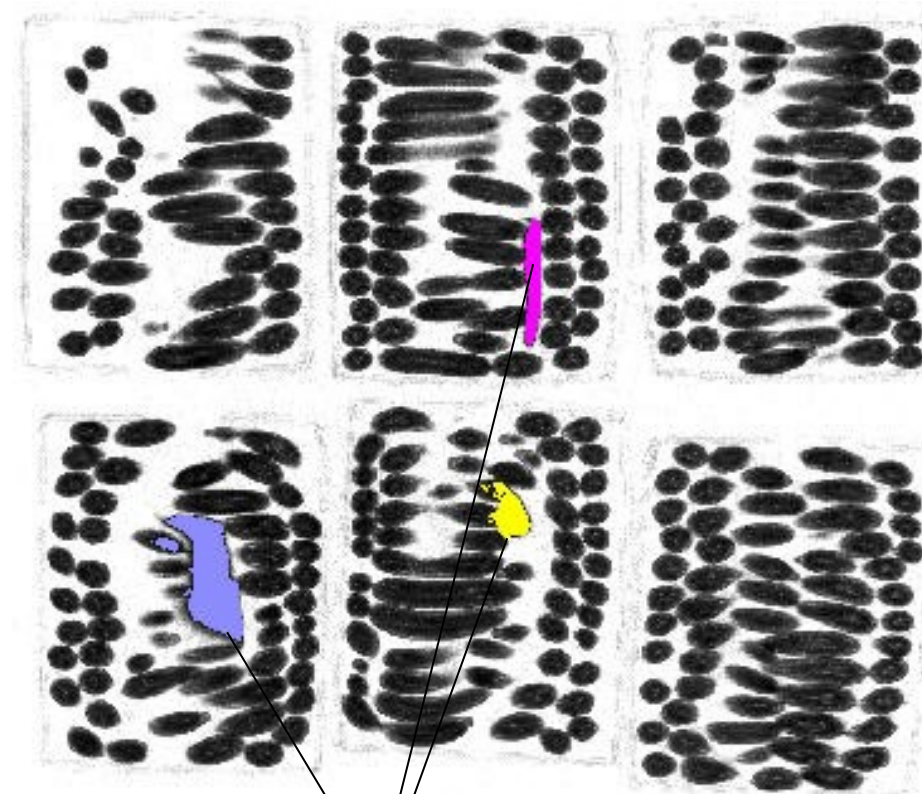
Morpho Single  
Pallet Air Cargo  
Scanner  
ADSA 10

# Fruits and Vegetable Cargo in LD3 Container

Radiography



CT Slice



InVision/GE MVCT System  
Collected with linear detector array  
1 LD3 container/hour

CT slice position

Automatically detected explosives

# TSA CT Scanner and Usefulness for CBP Applications

- CT TSA scanner was designed to inspect dense air cargo skids for aviation threats, with high PD, low PFA, small footprint, and acceptable cost of ownership. Waiting for funds to fabricate prototype and demonstrate technology (spring 2025).
- **Specifications:**
  - 3D images suitable for visual inspection, operator assist or automatic detection with higher detection performance than projection X-ray. Most suitable for AI.
  - Resolution: similar to EDS
  - Energy: 3 MV x-rays for high penetration of dense cargo at reasonable cost. Configurable
  - Throughput: 20 skids/hour; can be increased if necessary
  - Cost: higher than EDS and lower than sea/land X-ray scanners
  - ConOps: air cargo skids, alarming sea/land cargo can be broken into skids for individual inspection (instead of manual inspection)



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