Development of Unrestricted Datasets and Requirements

Presented by Harry Martz, Steve Glenn
07/26/23

LLNL-PRES-XXXXXX
This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

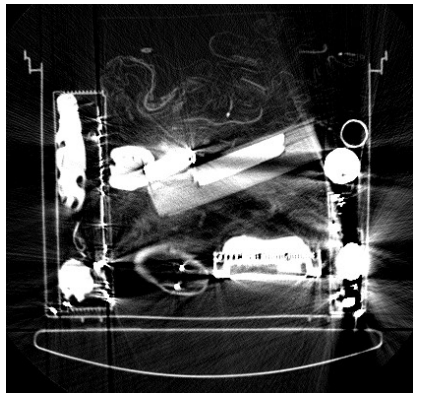
Lawrence Livermore National Laboratory

So What? Who Cares?

- **Space:** CBP needs better contraband interdiction
- **Problem:** Restricted NII datasets prevent a larger community from developing automated contraband detection algorithms for cargo. It is very difficult to get data for vendors and impossible to get data for third parties (other vendors, academia, national labs, etc.)
- **Solution:** Scan on other scanners (e.g., industrial radiography), use simulated scans; add objects of interest (OOIs) to existing scans; [for National Labs] use data from DHS Countering Weapons of Mass Destruction (CWMD).
- **Data Availability:** Depends on user: incumbent vendors, third parties, national labs
- **Results**: Better contraband interdiction
- **TRL**: 3. Algorithms need to be developed

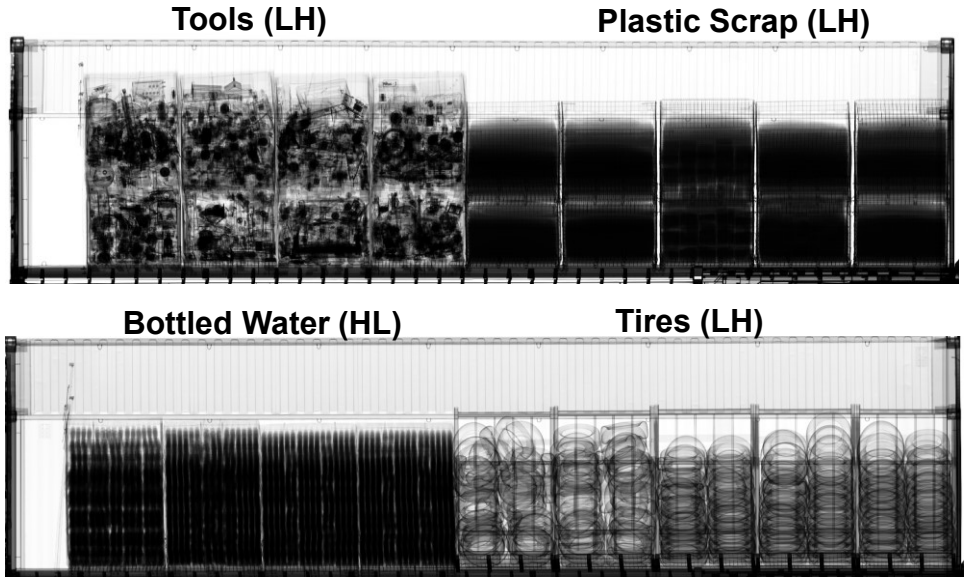
Unrestricted datasets would allow a larger community to develop algorithms for contraband detection in cargo

- Algorithm development requires data
- CBP does not release data for open algorithm development by third parties
- Possible solutions:
  - Acquire data as done for checked luggage but in land-sea containers with a generic imaging system
  - Acquire datasets with reduced-scale cargo and OOI
  - Add OOIs to existing scans
  - Use simulated scans
  - [For national labs] Use DHS CWMD test data, mainly rad/nuc test objects and is OUO or classified



COE TO-4 Unrestricted X-ray CT data acquired using a medical scanner for EDS algorithm development

NII Images of CWMD Cargo



ALERT's Unrestricted CT Data Sets

- For CT reconstruction and ATR
- Simulated bags scanned on medical CT Scanner
- Support available to use the datasets (code, documentation, subject matter experts)
- https://alert.northeastern.edu/transitioning-technology/alert-datasets/

Disclaimer
This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor Lawrence Livermore National Security, LLC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or Lawrence Livermore National Security, LLC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC, and shall not be used for advertising or product endorsement purposes.