



# Berkeley Nuclear Data Cloud: Web-based data service to empower radiological detection

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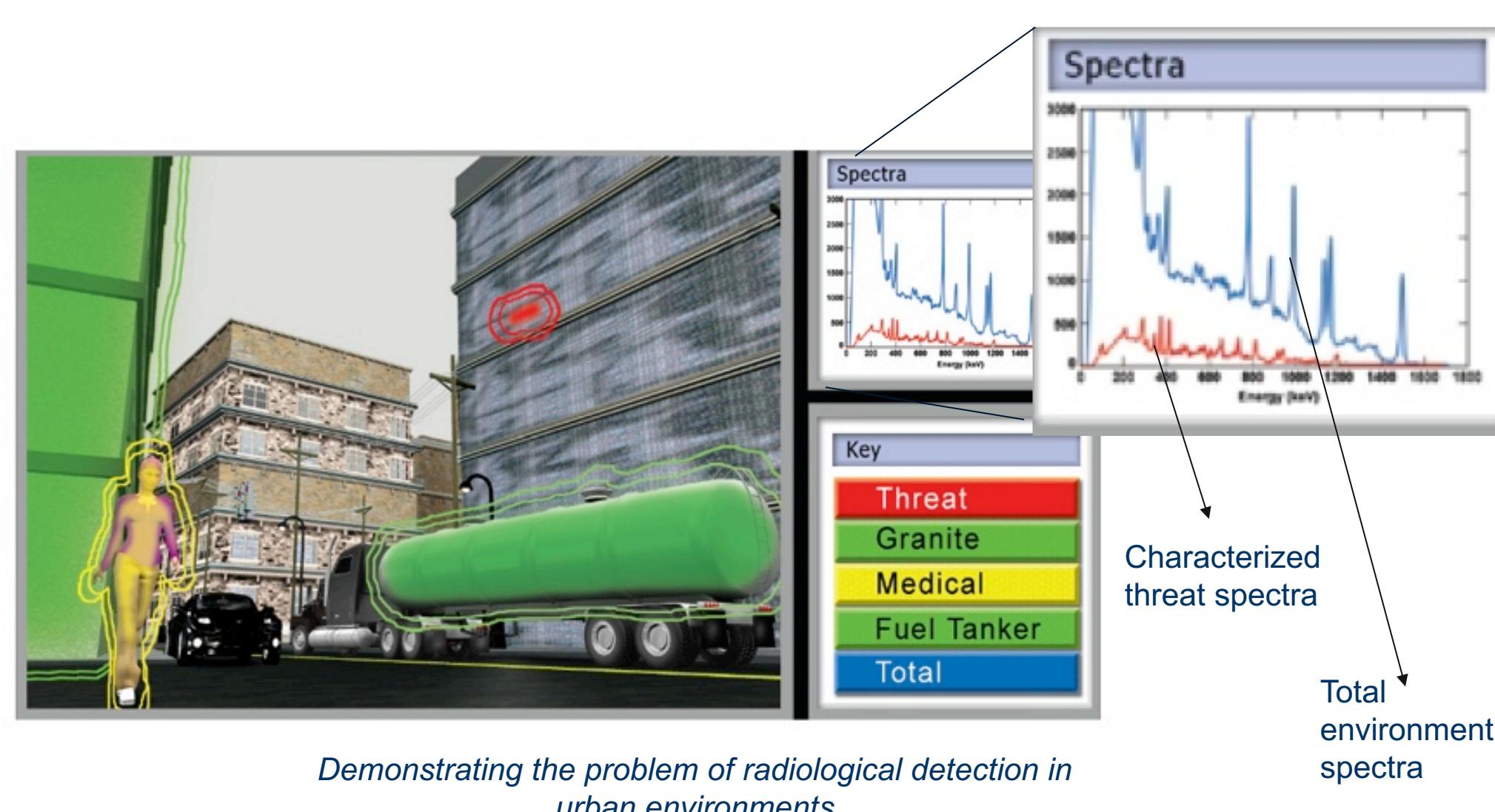


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## Problem Statement

- Capability to detect/localize radiological sources is a key nuclear security concern.
- Many detection algorithms operating in urban areas (e.g: cities) can benefit from taking background radiation data into account.
- Several science teams need radiological data yet each team reinvents the wheel for data lifecycle management.
- Primary aim of the Berkeley Nuclear Data Cloud (BDC) is to collect, label and disseminate this data.



## Key Challenges

- Terabytes of data.
- Over 20+ sensors (data sources).
- Provenance.
- Sharing data analysis results.
- Custom visualizations.



## Results

What datasets are here: Workspace capability enables search and organization

Dataset browser: allows analysts to visualize datasets on a map to retrace the flight path or download a subset of data for local analysis.

Visualizing datasets: Histogram visualization for an ARES helicopter "run" - the color spectrum corresponds to variations in altitude and allows further filtering of data.

Source inject interface allows analysts to simulate a nuclear source for a part of a helicopter "run" in ARES

## BDC Deployments

GRDC Gamma-Ray Data Cloud

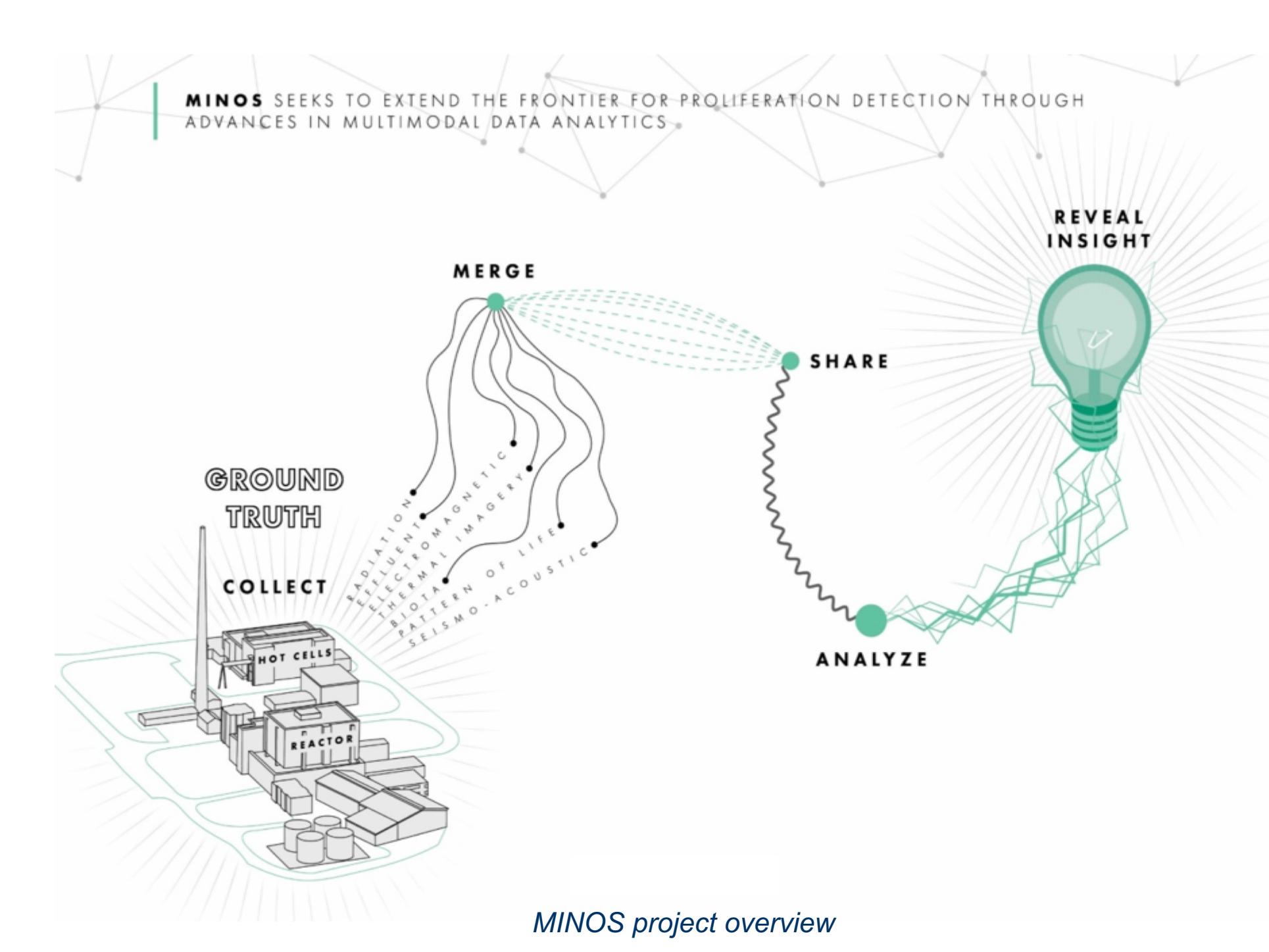
BDC

ARES Domestic Nuclear Detection Office

CMSDS

## Impact and Expanding BDC

- 11 publications made possible by this work.
- Approx. 200 users stretched across the different deployments of the BDC deployments.
- CMSDS: Consequence Management and Search Data Service:
  - Canned workflow capability.
  - New Fukushima survey data.
  - Azure deployment.
- MINOS: Multiple Informatics for Nuclear Operation Scenarios:
  - Supporting multiple data formats (not just HDF5).
  - Automated ingest.
  - Hierarchical data management.
  - 10 publications scheduled for this summer.



## Future Work

- Improving metadata support and usability.
- Introducing new custom visualization capabilities.

