

Public Private Collaboration in Securing our Ports

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Passport Systems



PASSPORT
SYSTEMS INC

Project Overview

- Nuclear Radiological Imaging Platform (NRIP)
 - Advanced Technology Demonstration – TRL 8/9
 - Primary organization: Domestic Nuclear Detection Office (DNDO)
 - Detect fissionable and radioactive materials
 - Demonstrate in stream of commerce
- UK Home Office, DHS S&T, CBP
 - Detect (other) Contraband: explosives, drugs, weapons,
 - Manifest verification
- Massport
 - Providing site location at Port of Boston
 - Providing some funding and marketing assistance
- Commonwealth of Massachusetts – Housing and Urban Development
 - Providing funding to develop the technology and secure

SmartScan™ 3D Automated Cargo Inspection System

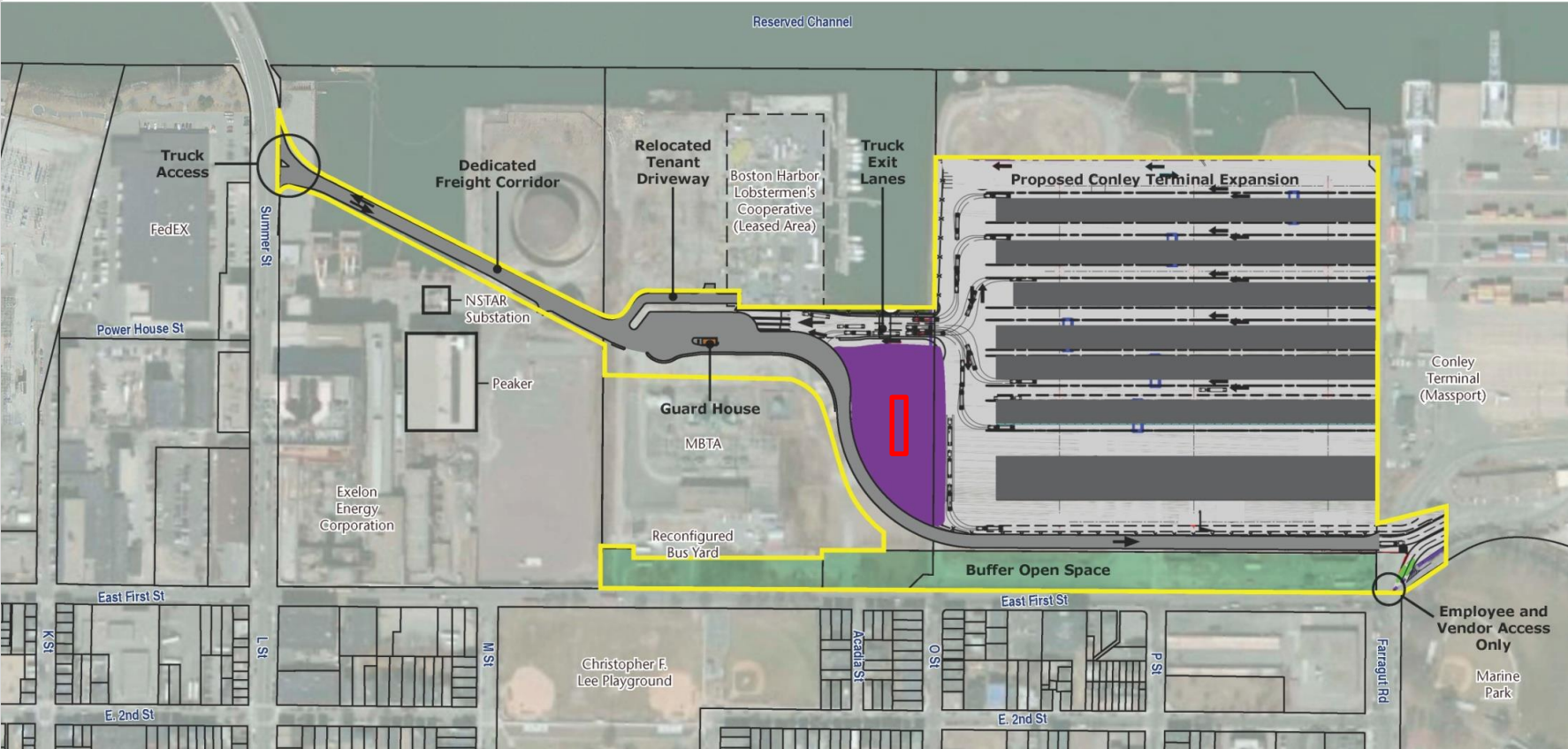


Conley Terminal Expansion

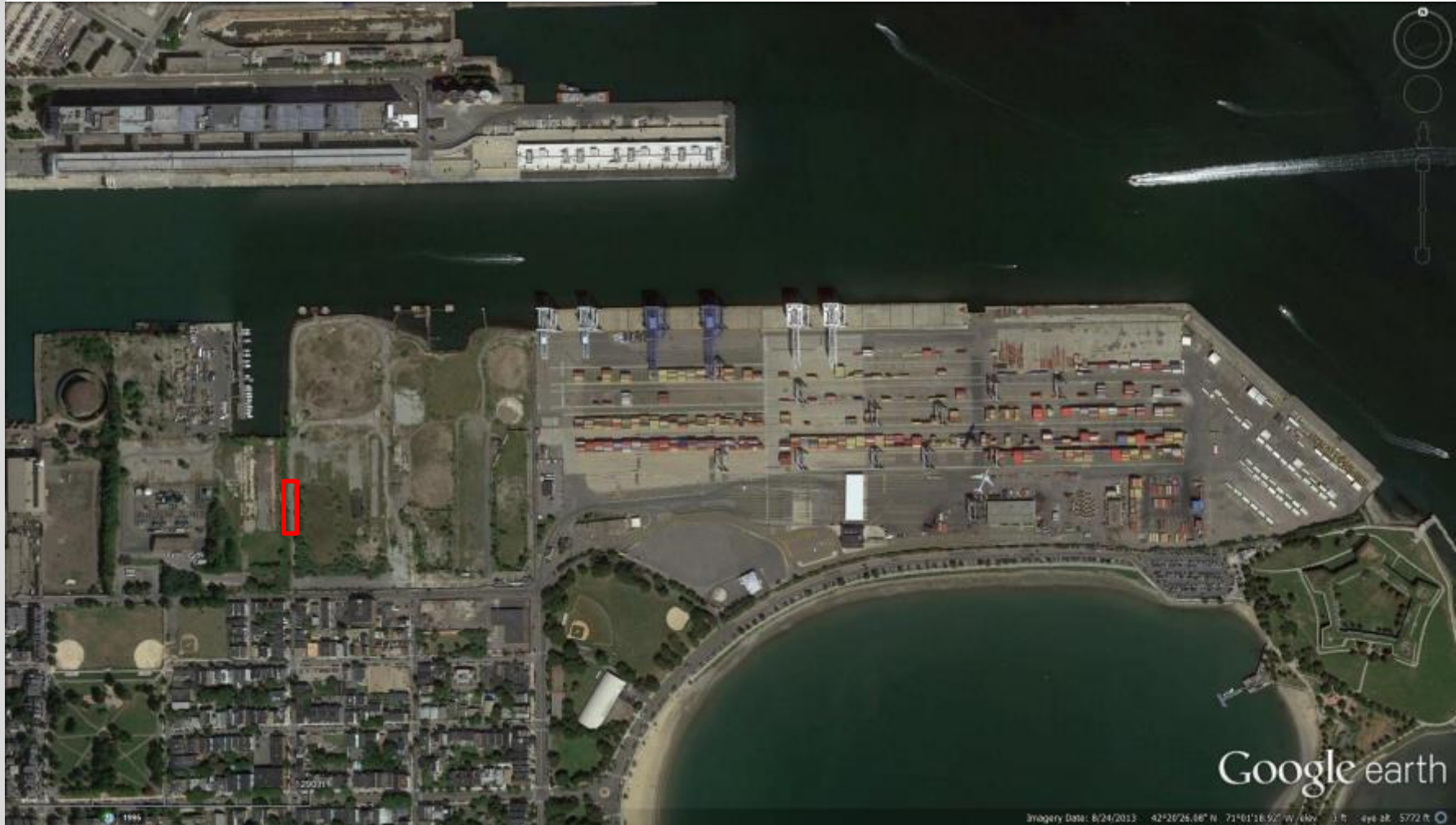
- Integrating 30-acre former Coastal Oil site for future expansion
- Constructing a new 2/3-mile dedicated truck haul road
 - Removes truck traffic from East First St.
- Construct 4.5 acre community open space
 - Visual and noise buffer



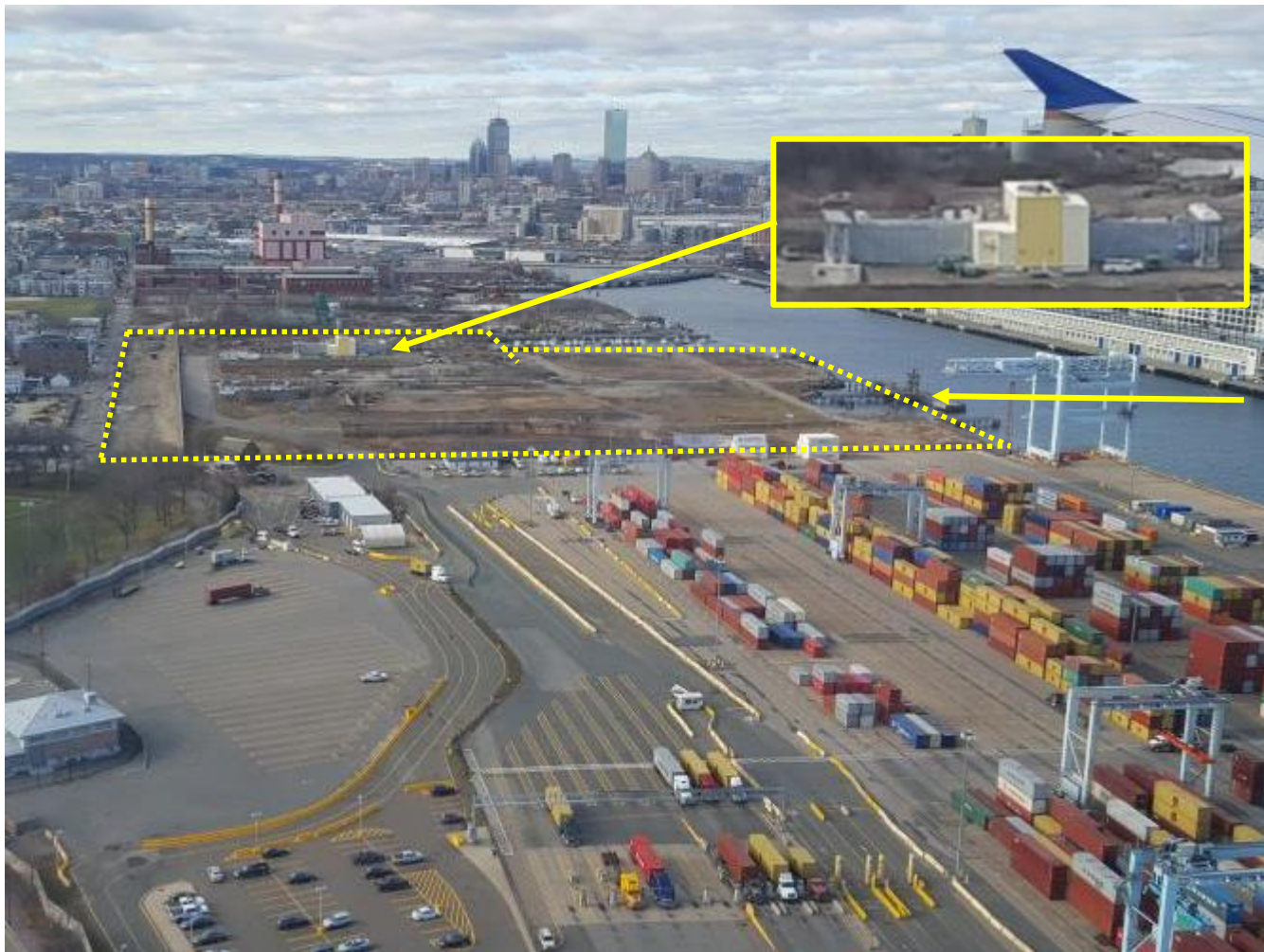
Conley Terminal Expansion



Port of Boston



Conley Port Expansion



NRIP
Facility

Port
Expansion

Conley Container Terminal – Artist Rendition



Conley Container Terminal – July 2016



Passport Systems Massport Facility Timeline

- State Permitting – September 2014
- Shovel in the ground – April 2015
- Completion of Construction – June 2016
- Passport Integration and Testing – April – December 2016

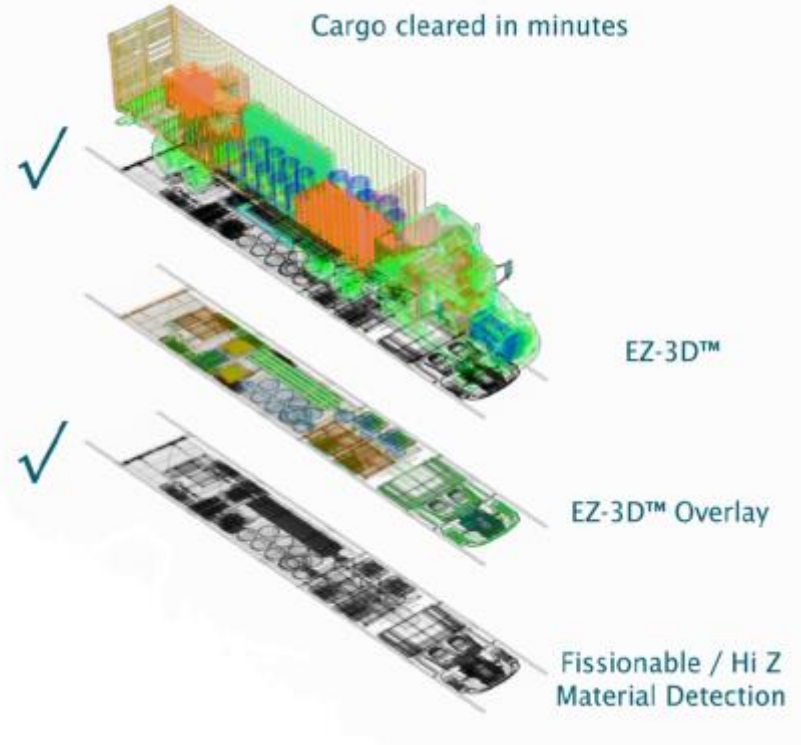
- DHS Testing – Q1 & Q2 2017
- May 2017 – Available for CBP inspections

Passport Systems Overview

- Private U.S. company addressing security
 - Passport's technology allows prompt, thorough, and precise cargo screening
 - Identifies cargo by what it is made of - not by how it 'looks'
 - Passive, scalable, bi-directional sensor network for wide area surveillance
- Passport's strong intellectual property originates from MIT
 - Passport patents on core detection technologies, HW and applications
 - Unique automated threat detection algorithms
- \$85+ million invested in Passport to date
 - Major funding from U.S. Department of Homeland Security (\$50M)
- Passport products
 - SmartScan™ Land/Sea Cargo Scanner
 - Networked Sensor Systems SmartShield™ Radiation Detection System
- Experienced management team with proven track record

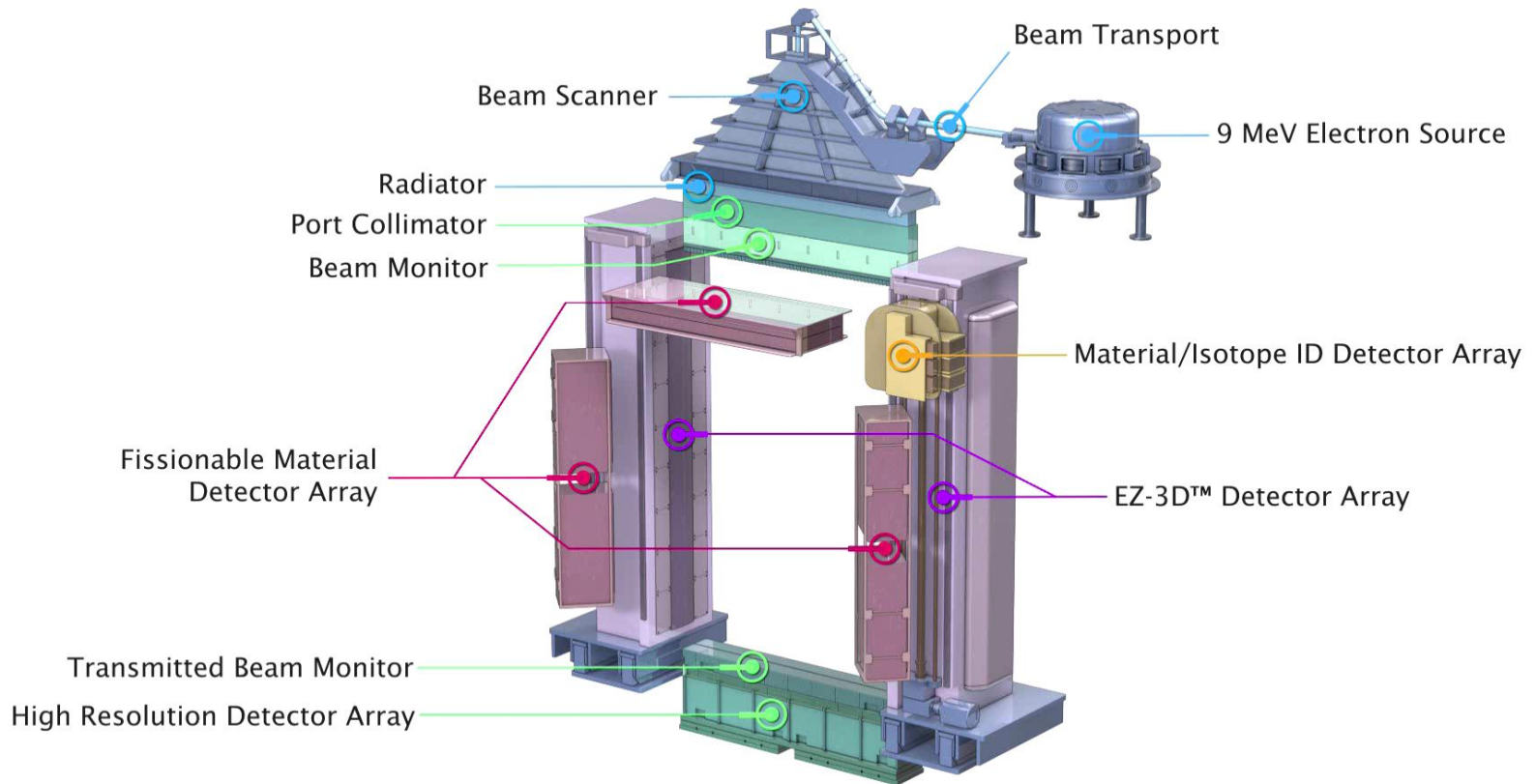
Full Capability Scanner

During the Primary Scan, EZ-3D™ generates a series of slices that reconstructs the contents of the cargo in 3D



This full configuration identifies anomalies and resolves potential threats

Scanner Core Technologies



SmartScan 3D™ Automated Cargo Inspection System

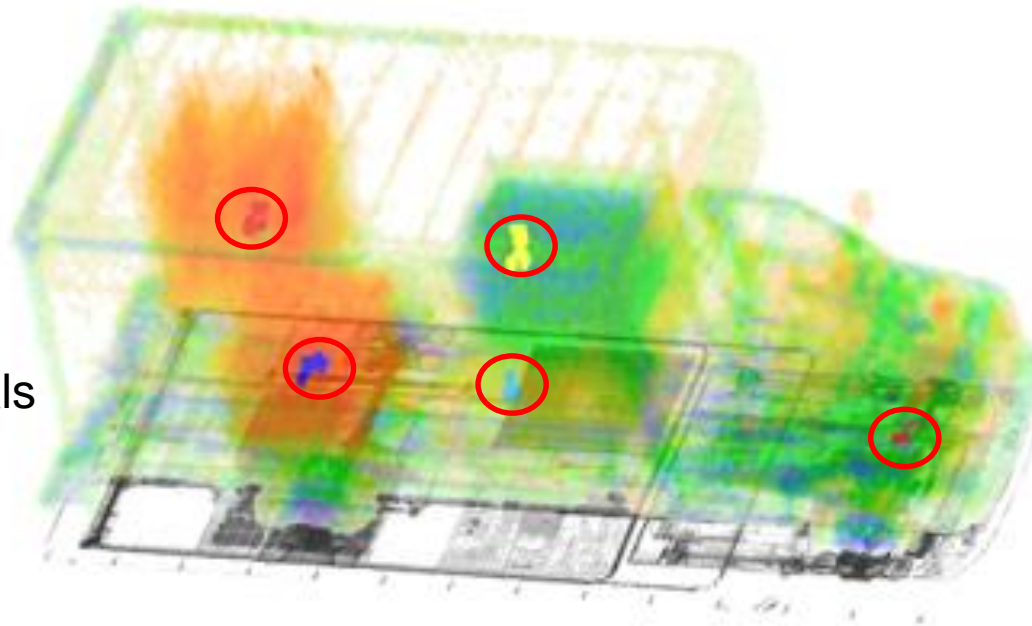
EZ-3D Volumetric Data of Density and Effective Z

Color Scale = Zeff Range

Transparency = Density

Cargos

- Organic
- Inorganic
- Metals
- Dense Metals



Targets

- Tobacco
- C4 Explosive
- Cocaine
- High - Z

- Cargo is scanned slice-by-slice and reconstructed in 3D
- The voxels are aggregated into regions-of-interest
- These ROI's are analyzed for targeted materials

EZ-3D Volumetric Data of Density and Effective Z





Color Scale = Zeff Range

Transparency = Density

Cargos

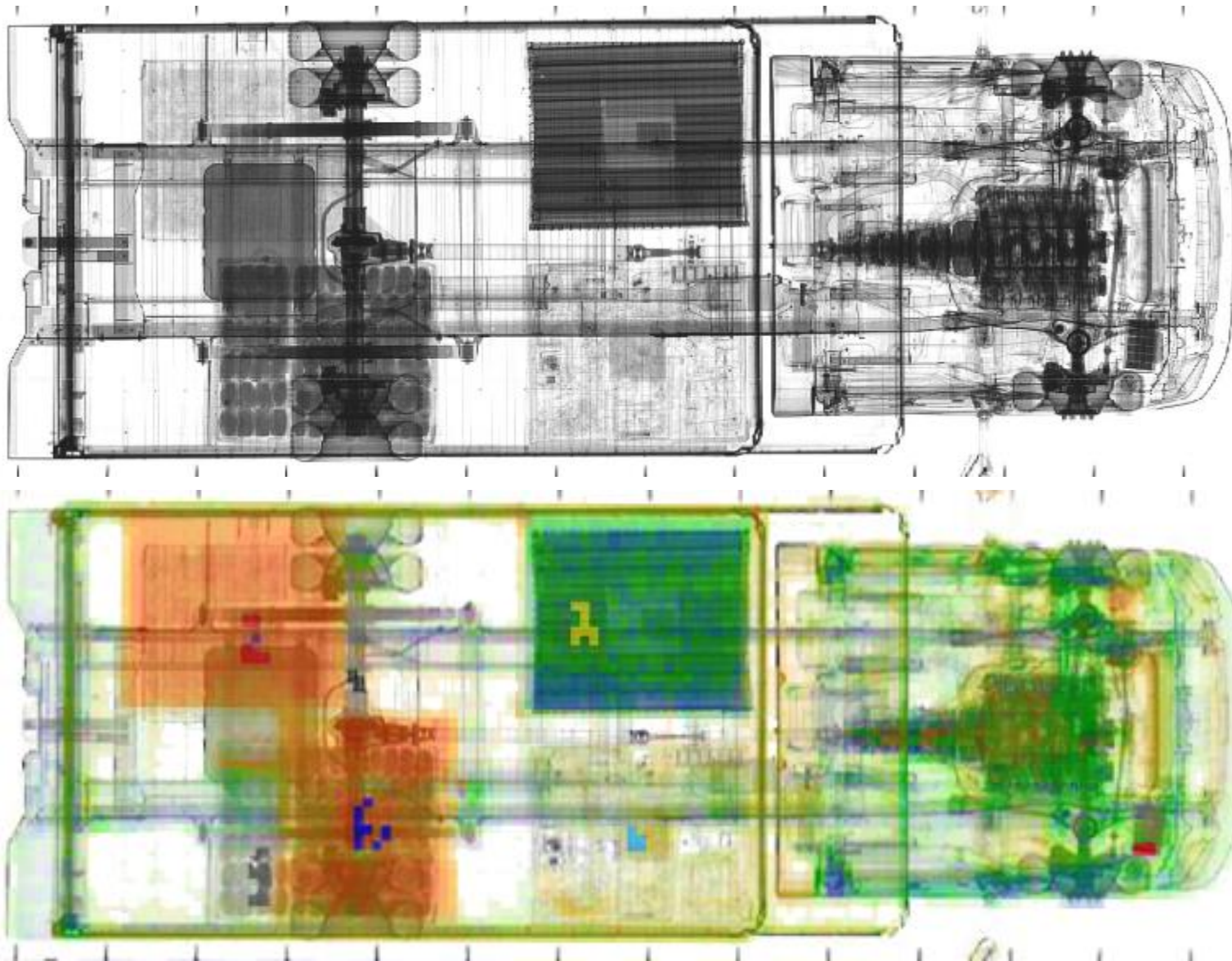
-  Organic
-  Inorganic
-  Metals
-  Dense Metals

Targets

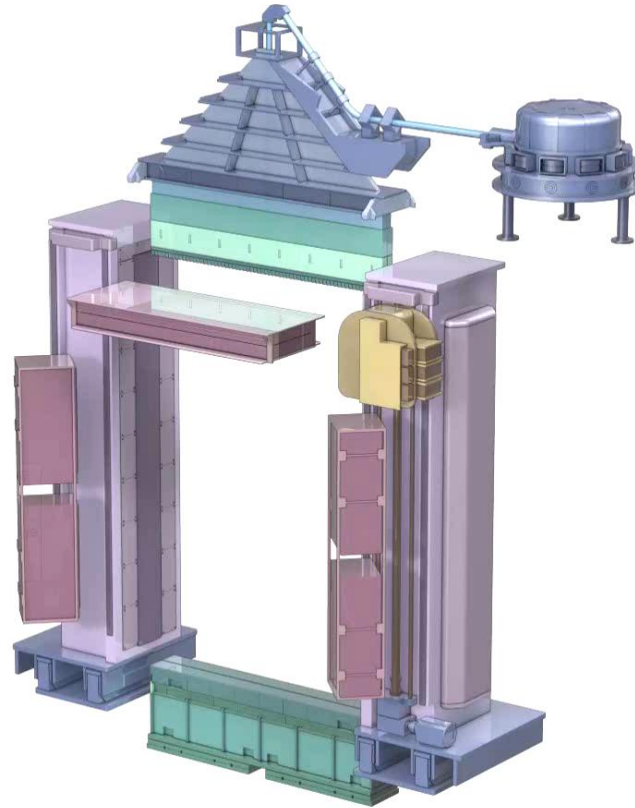
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HR Transmission with EZ-3D™ Overlay



Cargo SmartScan™ System Operation



SmartScan 3D™ Automated Cargo Inspection System

Backup

Passport Scanner Technologies

Beam

9 MeV Bremsstrahlung
CW Photons

Measured Particle

Photons: Effective-Z (EZ-3D™)

Nuclear Resonance Fluorescence (NRF)

Neutrons: Photofission (prompt)

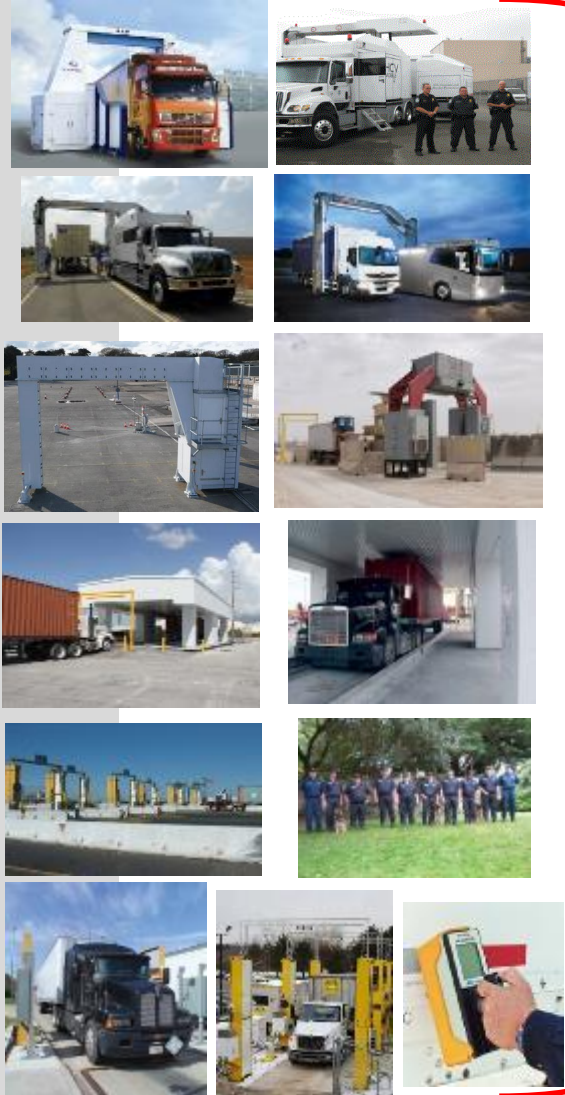
Scan	Algorithm	Input	Functionality / Output
Initial	EZ-3D™ Reconstruction	Medium-resolution energy spectrum	3-D density and Effective-Z map Anomaly identification/3D location
Initial	Transmission X-ray	Medium/High spatial resolution transmission image	Anomaly 2D location & density Shape/edge recognition
Initial	Portal Networked Detection System	Medium-resolution passive spectrum	Identification and localization of radioactive sources
Initial & Prolonged	Photofission	Digitized pulses from liquid organic scintillator	Identifies presence of fissionable material
Prolonged	NRF 3D	High-resolution energy spectrum	Complete isotopic composition in the region-of-interest
	Anomaly Classification	Output of NRF 3D, PNPf, EZ-3D™ and transmission algorithms	Performs data fusion, classifies anomaly as threat or innocuous, predicts detect/clear time

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Cargo SmartScan™ Inspection Process

Current Inspection Methods



Unresolved
Suspect
Items

Cargo SmartScan™ Inspection

Passive

Spectral Radiation Detection with Localization

Primary Scan

Hi-Z and Fissile Material Detection

EZ-3D – Zeff and Density Measurements

Transmission Radiograph

Data Fusion and Analysis



Image Analyst – Anomaly Detection



Secondary Scan

Resonance Fluorescence

Isotropic/Elemental Measurements

of EZ-3D Regions of Interest and

Passive Radioactive Materials ID



Suspect Item / Devanning Protocol



Passport Cargo Screener Location

