

INNOVATION AT WORK

Connecting Visionaries in Radiation Safety, Science and Industry

Conrad Orlando Resort, FL – July 28th – August 1st



Shaping the Future: Innovations in Non-Destructive Assay Techniques

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Mirion Connect | Annual Users' Conference 2025
Orlando, Florida



AGENDA

- Introductions & Overview
- Innovation Highlights
- Innovation in Action Results from the PGDP
- Closing comments



NDA Systems Roadmap & Innovation Highlights

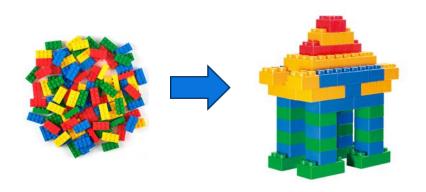




MEASUREMENT SYSTEMS & SERVICES

Engineered Solutions:

We utilize building blocks from other Business Lines, integrate and modify them, and create & deliver a turnkey solution



Generally, five main categories of "products" or solutions:

- ➤ NDA Characterization Systems
- ➤ Criticality Systems (CAAS)
- ➤ Monitoring Systems (In-Line, Stack, etc.)
- > D&D Solutions

> Measurement Services offering high level

expertise





NON-DESTRUCTIVE ASSAY (NDA) SYSTEMS

USING GAMMA RAYS

- Gross gamma counting
- LRGS (Nal, Plastic scintillator)
- MRGS (CZT)
- HRGS (HPGe)



USING NEUTRONS

- Total neutron counting
- Passive neutron counting (Pu)
- Active neutron techniques (U or Pu)
 - Active well
 - Cf-Shuffler
 - DDA





ROADMAP PROCESS OVERVIEW

- Product Drivers
- Innovation highlights





PRODUCT ROADMAP DRIVERS

- Market trends
- Customer needs
- Product evolution



Market trends

Longer-

Term

- Customer roadmaps
- Technology/Innovation



MARKET & INNOVATION TRENDS

CUSTOMER NEEDS

Improved Safety and Security

Reduced exposure to workers, compliance with modern security requirements

Improved Accuracy in Characterization

Better waste classification for cost-effective waste management.

Modernization & Training Efficiency

Upgrades (operating systems, software, hardware) helps safety and security and lowers training costs.

TECHNOLOGY / INNOVATION

Automation

Robotics, AI, 3-D object recognition

Modern software infrastructure

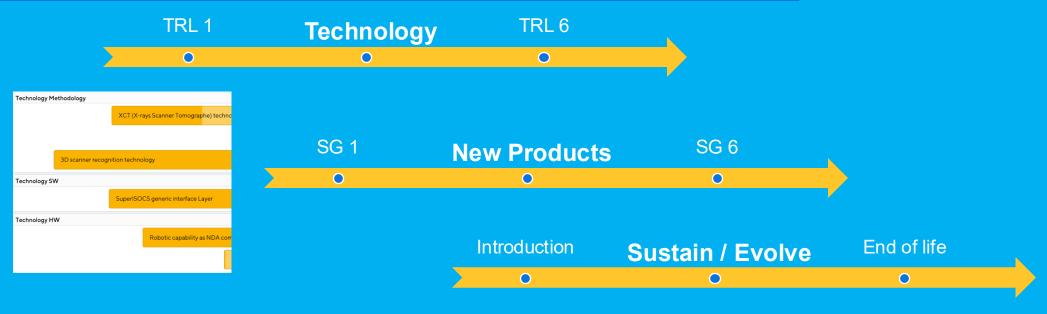
Security enhancements, Cloud usage,

architecture





NDA SYSTEMS ROADMAP MIX



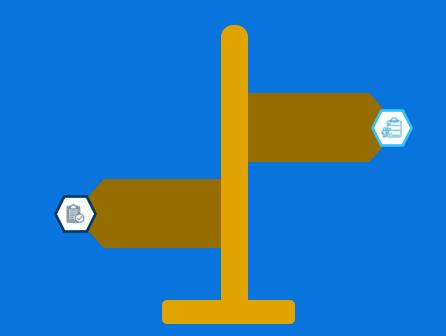


Objective is to have:

- Healthy mix of projects
- Different stages of maturity
- Frequent review/update

NDA SYSTEMS ROADMAP THEMES

- Higher Accuracy
- Faster Throughput
- Software Management
- Neutron Measurement





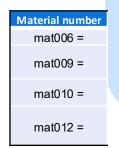
XCT / NDA - TGS ENHANCEMENT

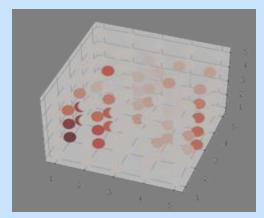
BENEFITS

- Extend density range of TGS technique (more challenging waste)
- Shorten measurement times
- Eliminate transmission source (site overhead & cost reduction)

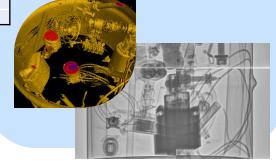
- XCT scans can be 'voxelized' with density and materials information
- By matching the XCT output voxels to the TGS voxels we can use XCT data for the TGS analysis

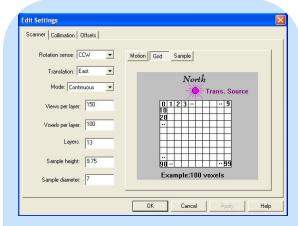
Voxe	Material	Av. density
25	mat007	0.1998
26	mat009	4.6694
27	mat010	1.5189
28	mat011	0.2007
29	mat012	0.2121
30	mat013	0.2008
31	mat014	3.4089
32	mat015	1.6478
33	mat006	0.2
34	mat016	0.4066
35	mat017	0.3316
36	mat018	1.0139
37	mat019	1.0484
38	mat006	0.2
39	mat006	0.2
40	mat020	0.4629



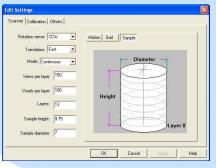


XCT





TGS



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SuperISOCS utility

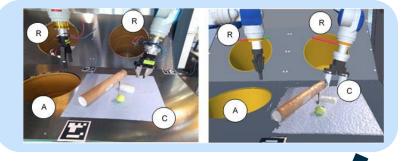
FARO



BENEFITS

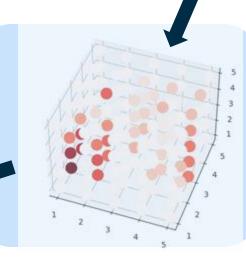
- Improves accuracy over standard calibration assumptions.
- Enables ISOCS use for complex geometries: modalities like Sort & Seg and D&D

 A utility that can create a system calibration using 3D data from various modalities: XCT, Laser scanning, CAD









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Tech./Sustaining – Neutron Measurement Portfolio

New technology for neutron counters



Shift Register & List Mode device for the future

Replacement **Pre-amplifiers**







Portable, battery powered neutron counter

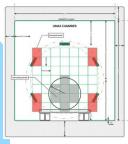




Hardware /
Electronics
modernization

Analysis
Techniques &
Software









AI TECHNIQUES FOR NON-DESTRUCTIVE ASSAY

Neural Radiance Fields

- Encodes a 3D representation inside a neural network – training the network refines the reconstruction
- High-accuracy 3D tomographic image reconstruction from view data

$$(x,y,z,\theta,\phi) \to \square \square \to (RGB\sigma)$$

$$F_{\Theta}$$

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NEURAL RADIANCE FIELDS



Thank you



