



ROBOTICS & ARTIFICIAL
INTELLIGENCE

Future Nuclear Opportunities

Verification and Regulatory Issues for Remote Robotic Inspection
Workshop

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Why Robotics?

Four Ds: Dirty, Dark, Dangerous, Dull

Address Extreme Environments 

- Remove Operators from Risk
- Reduce Dose Uptake
- Automated Processes

NDA Strategic Objective for RAI

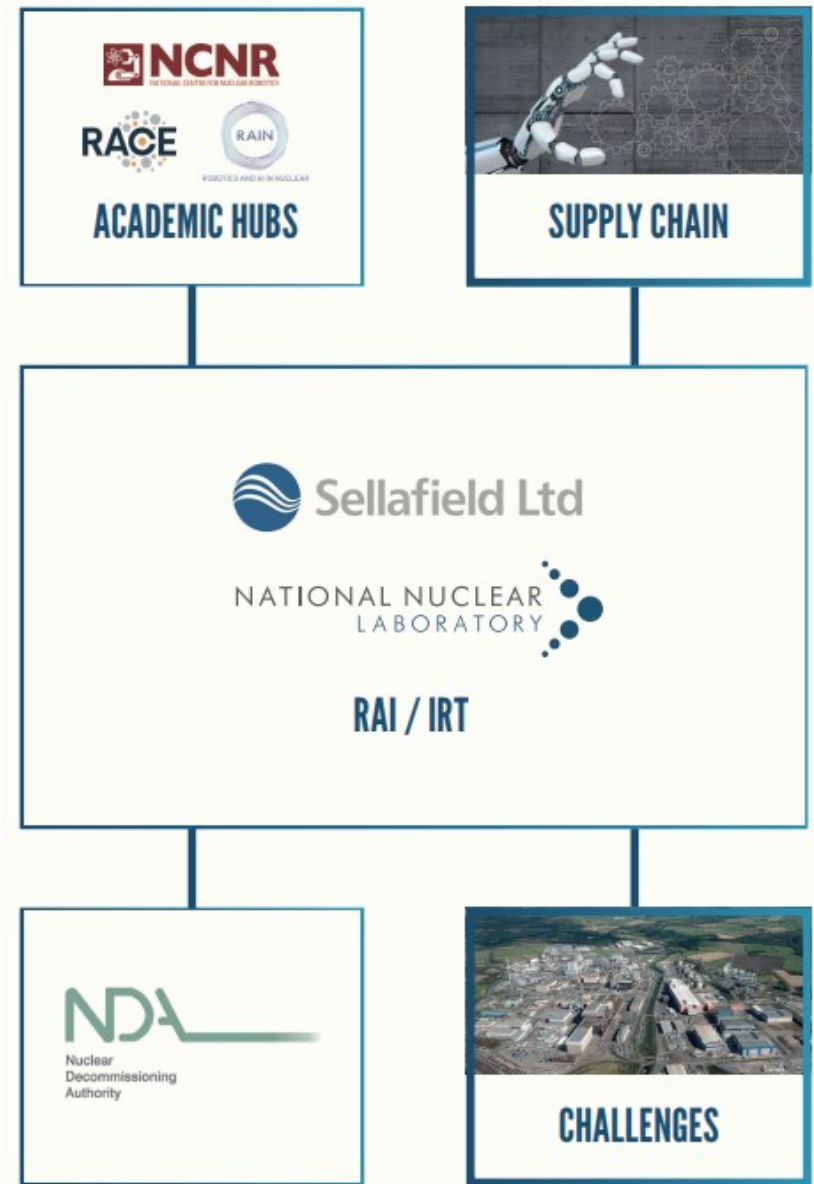
“Ensure that NDA and its estate effectively exploit RAI technology to significantly improve the existing technical baseline for decommissioning the UK’s civil nuclear legacy (e.g. faster, cheaper, safer, less environmental impact).”

RAI at Sellafield

Purpose is to **manage** and **co-ordinate** R&D support to guide the business in challenging and exploring efficient ways to **support Sellafield and wider NDA Mission.**

‘Work allocation process’ is used to ensure work is placed:

- With the best athletes
- Where we need to develop skills and capability
- Those who have the appropriate facilities
- Where we see innovation
- With those who can ensure the RAI is deployed



Barriers to deployment



Creating that interface between the extreme environment and the operator



Delivering a step change in what we do at Sellafield



Making Robotics & AI the new **Business As Usual**, available as a robotics tool kit at Sellafield



Supporting our culture change for incorporating robotics deployments into our ways of working

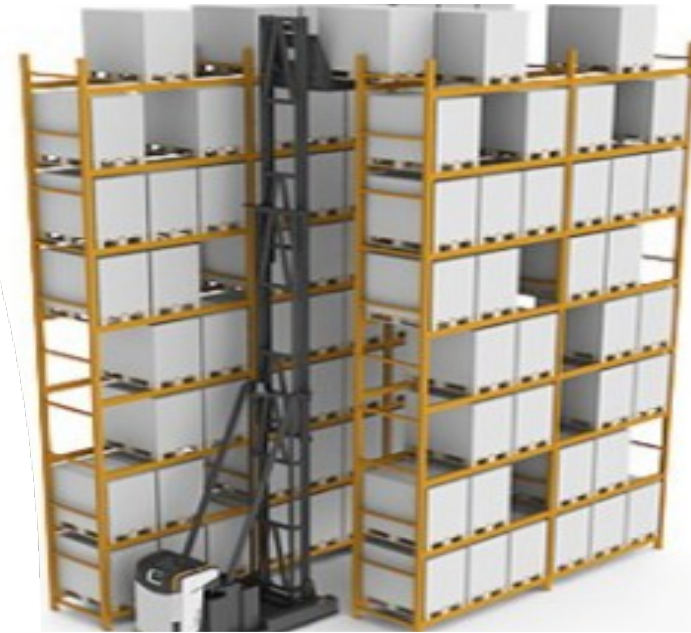


Upskilling our workforce towards **human-supervised** robotic decommissioning

Future RAI Scope

Automated Stores

- From 2025 onwards packages will be transferred from a legacy facility into a new long term storage.
- Risk/Hazard reduction
- Automation
 - to enable no operator entries into stores
 - for stores management
 - Semi Automation for store transfer

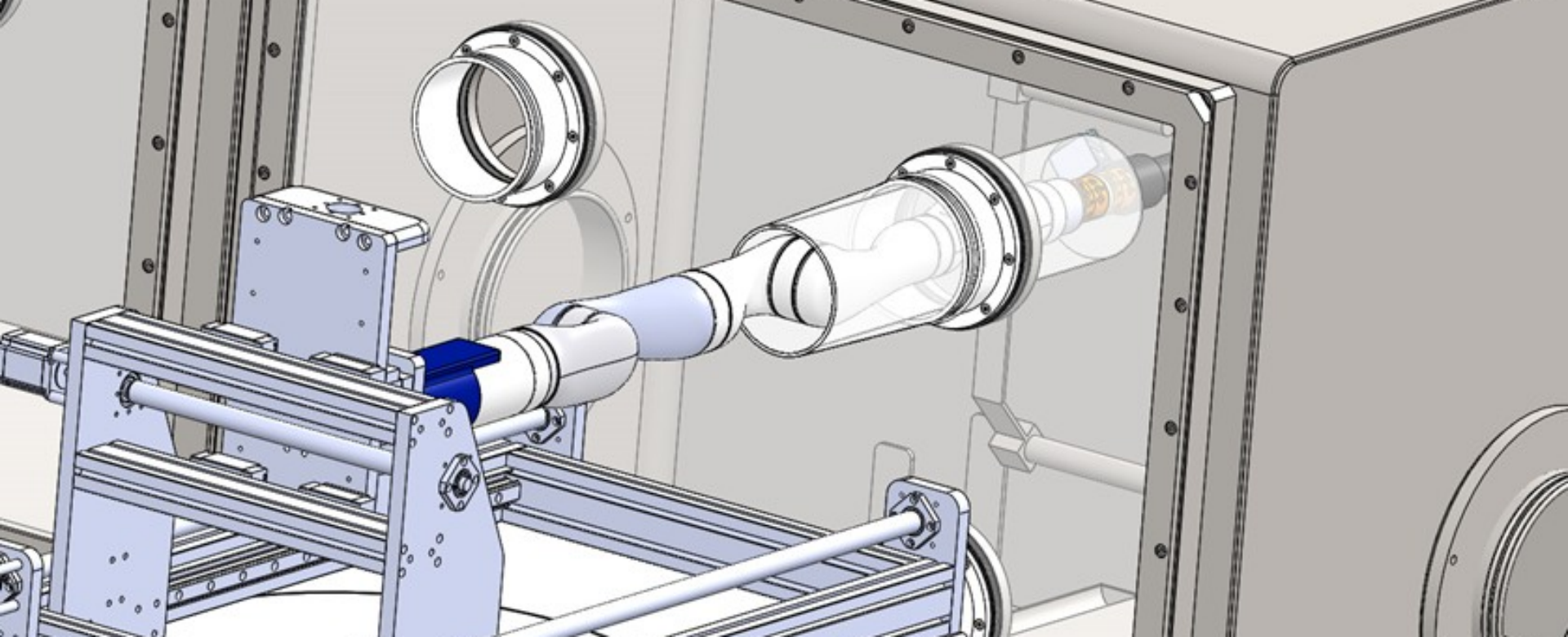




Future RAI Scope

Risk Reduction of Glove Box Operations (RROBO)

- Primary containment of hazardous materials.
- Main access is through glove ports to perform tasks.
- Sellafield site has over 300 gloveboxes. Variation in size, age, design, purpose, condition and materials.
- As plants end operation, gloveboxes require POCO and decommissioning.



Risk Reduction of Glove Box Operations (RROBO)

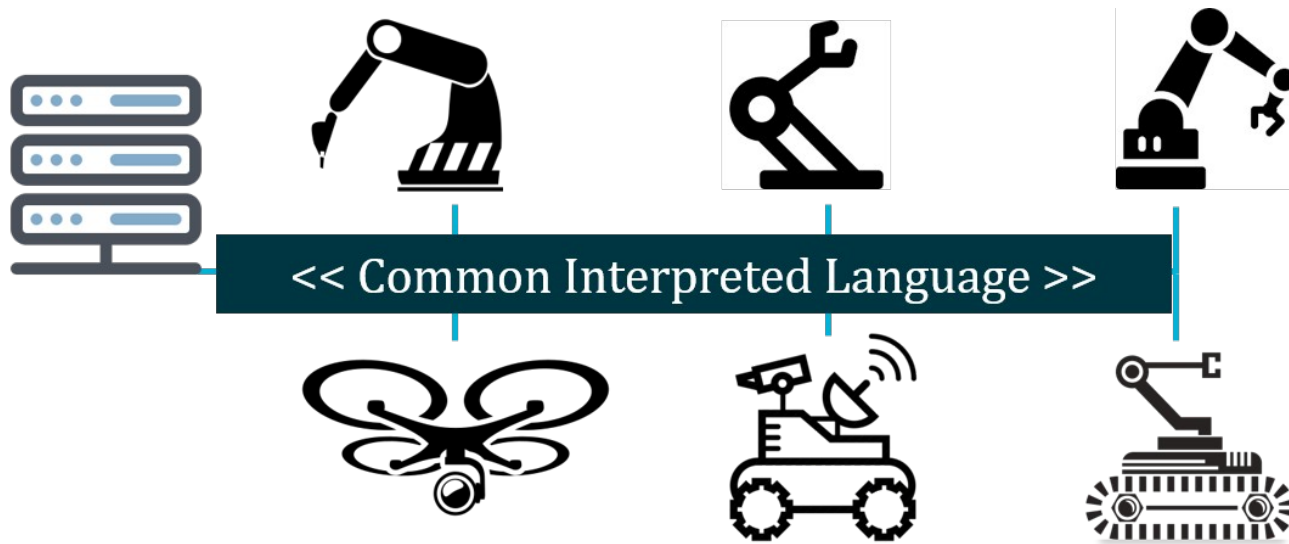
Focus on Post Operational Clean Out (POCO), to define the required tasks

- The recovery of loose nuclear material,
- Removal of unrestrained equipment through glove/posting ports,
- Size reduction and removal of installed equipment through glove/posting ports,
- Decontamination, radiological survey and characterisation of the remaining glovebox shell

Future RAI Scope

Standardised Robotics

- Standardised hardware
 - Off the shelf tool kit for equipment and functions that is accompanied by a generic (previously approved safety case),
- Standardised system software architecture
 - Ensures effective communication across the board (regardless of base language)
 - Plug and Play operation through robust application program interface
- Allows for accelerated deployment though confidence in infrastructure & capability



Future RAI Scope

Working with our regulator

- Put together a working group of key people at SL and ONR
- Develop generic safety case and PMP for robotics
- Removal of blockers/barriers – removing unnecessary bureaucracy to allow work to proceed at pace



To Summarise...



**Issues: culture, plant buy-in,
new way of working.**

**Work to accelerate this: - Safety
Case (Generic), Standardised
Robotics and RAI/ONR engagement**

- Accelerated deployment though confidence and testing,
- Capability of tools within our box increased with accompanied safety and operations instructions. – taking credit from pervious testing / deployments,
- Capable operational robotic solutions accepted with AI integration - (AI – levels)