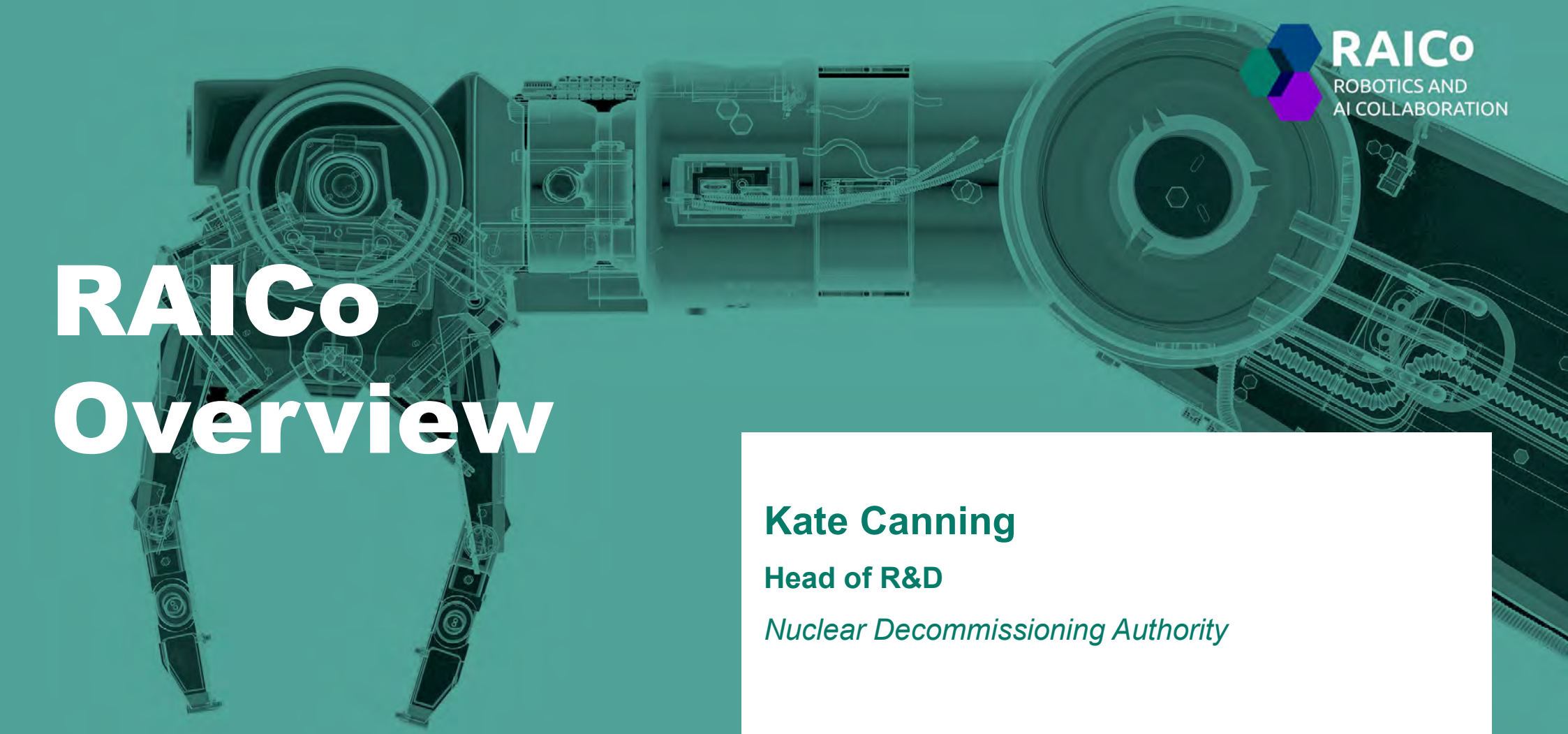
RAICo Supplier Event

Wednesday 5th July 2023



RAICo
ROBOTICS AND
AI COLLABORATION

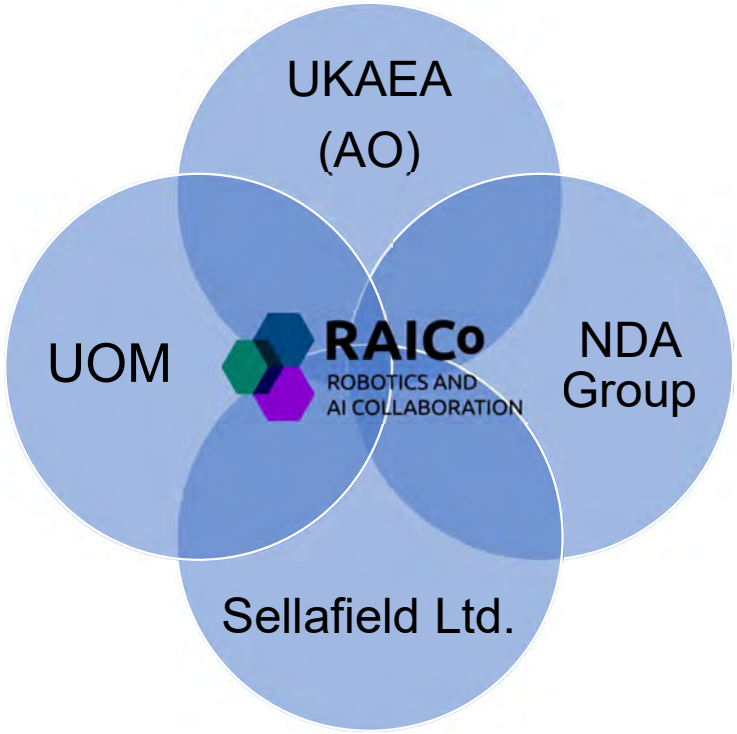
RAICo Overview

Kate Canning

Head of R&D

Nuclear Decommissioning Authority

RAICo overview



RAICO® IS AN END USER LED **R**OBOTICS AND **AI** **CO**LLABORATION.

RAICO BRINGS TOGETHER FISSION DECOMMISSIONING AND FUSION ENGINEERING FOR MUTUAL BENEFIT

OPERATIONALISATION OF 'THIS GEN' ROBOTICS INTO THE NUCLEAR SECTOR

DEVELOPING **REMOTELY OPERATED SOLUTIONS FOR DECOMMISSIONING**

DEVELOPING **INTELLIGENT CUSTOMER** AND **SUPPLY CHAIN** CAPABILITY AND CAPACITY

SOCIO-ECONOMIC IMPACT IN CUMBRIA

(**SUPPORTING LEVELLING UP**)

RAICo
ROBOTICS AND AI COLLABORATION

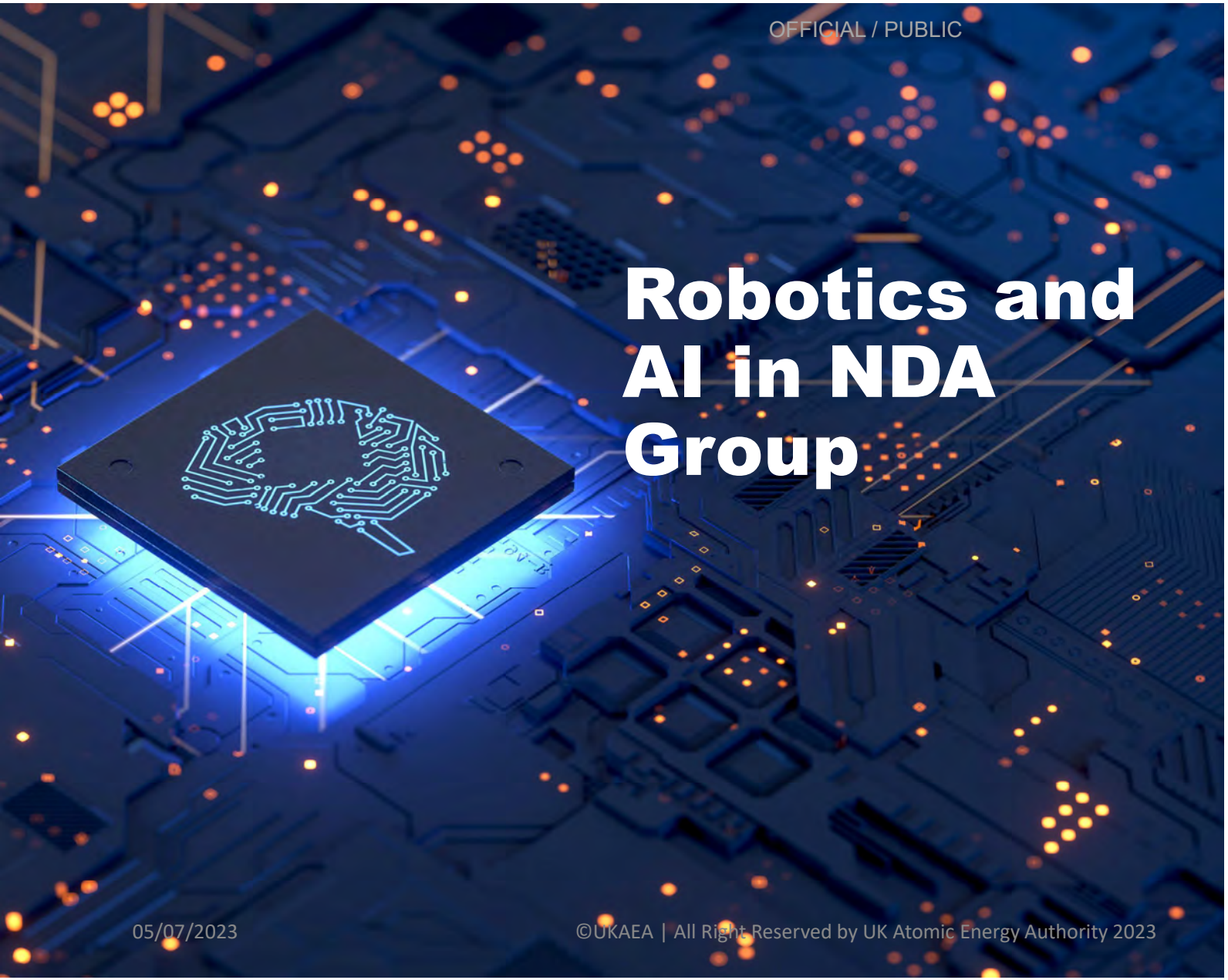
Partners:

The NDA

Kate Canning

Head of R&D

Nuclear Decommissioning Authority



Robotics and AI in NDA Group

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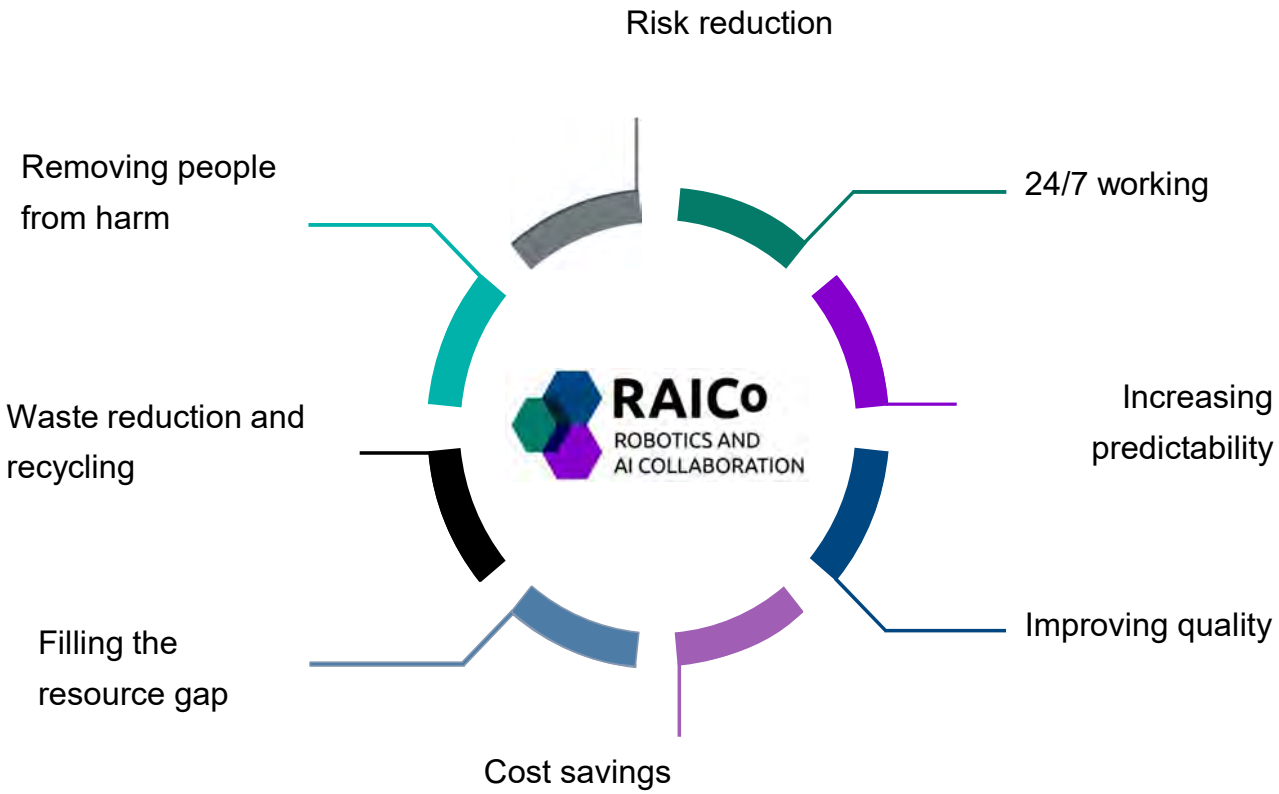
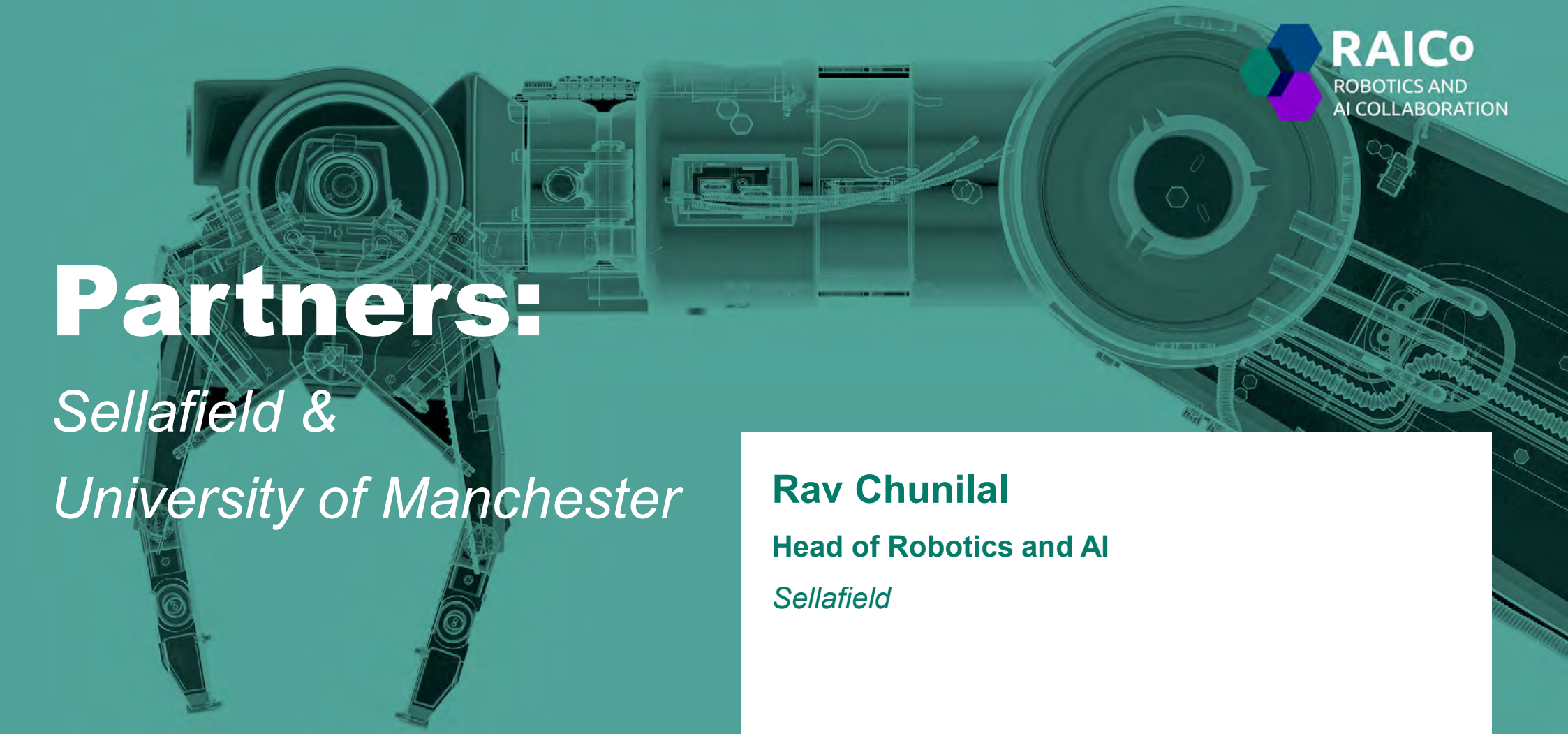
Ensure NDA Group effectively exploits RAI technology to significantly improve the existing technical baseline for decommissioning the UK's civil nuclear legacy.

NDA Group and RAICo





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Partners:

Sellafield &

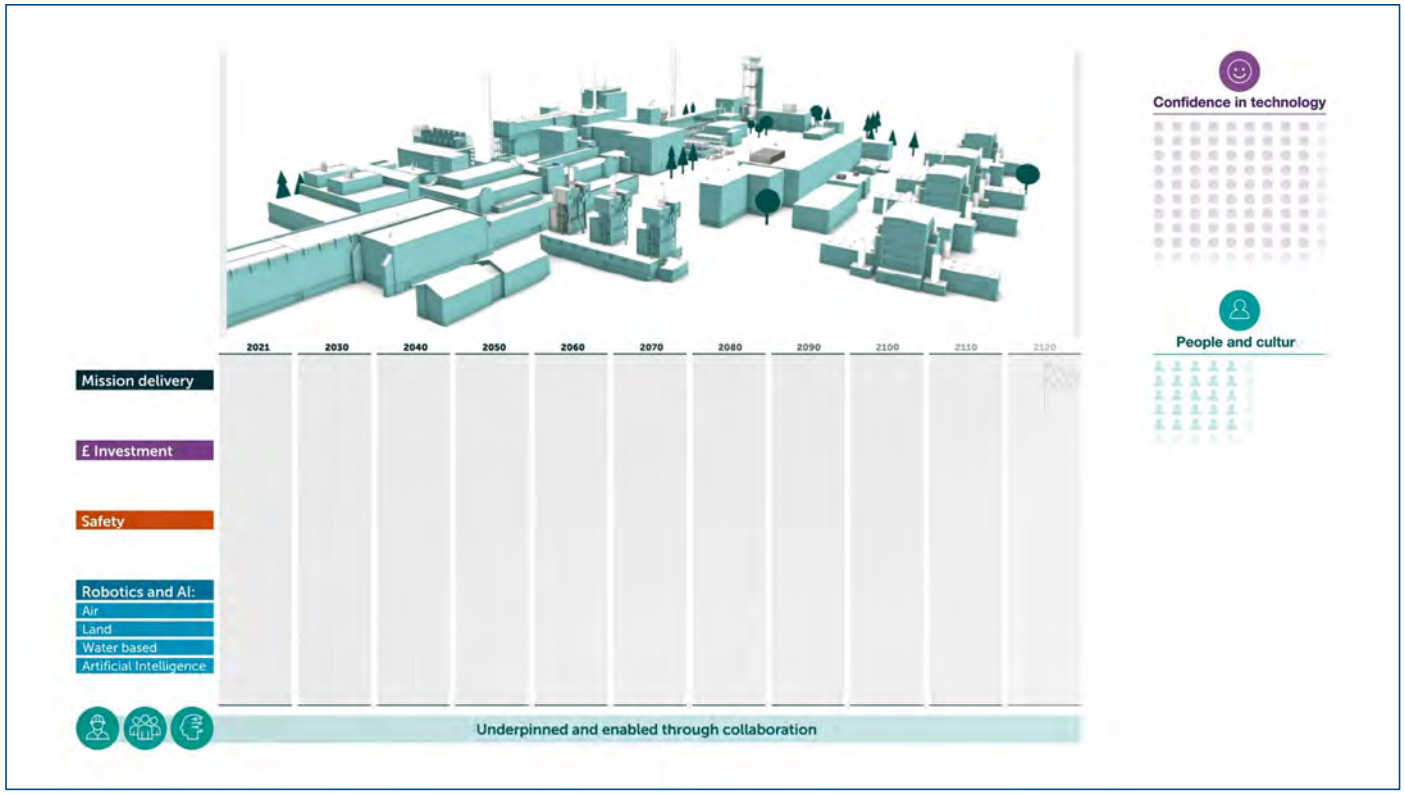
University of Manchester

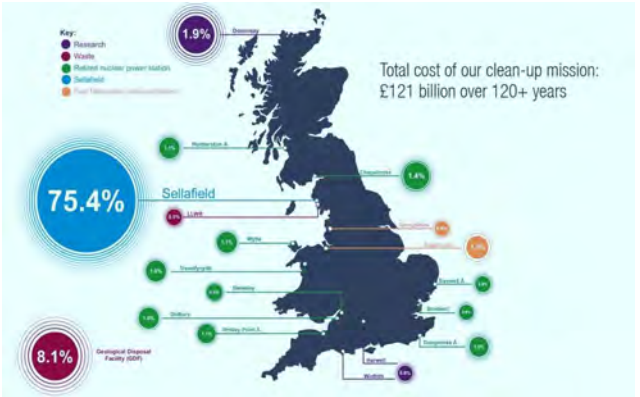
Rav Chunilal

Head of Robotics and AI

Sellafield

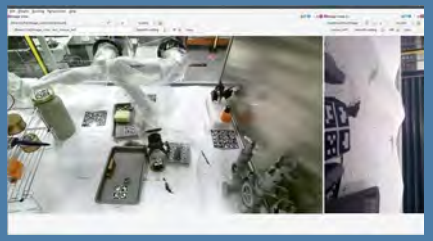
NDA Group and RAICo

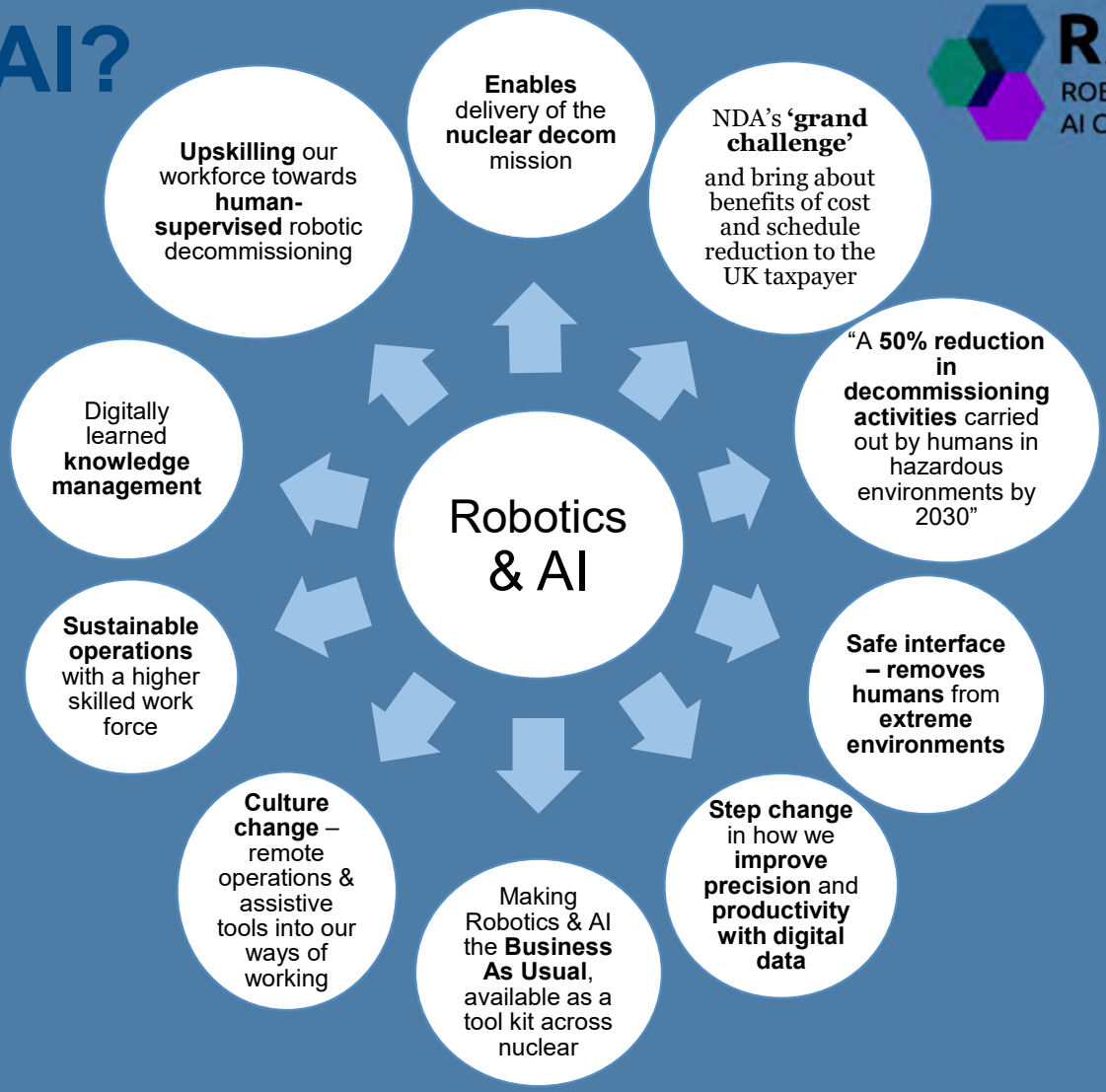




Address NDA's 'grand challenge' "A 50% reduction in decommissioning activities carried out by humans in hazardous environments by 2030" and bring about **benefits of cost and schedule reduction** to the UK taxpayer.

Why Robotics & AI?





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UOM: ACADEMIC LANDSCAPE

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UKRI has invested significantly in academic robotics research

From Sensing to Collaboration

RNE
AIMS
Agri FoRwArdS
FARSCOPE
EDINBURGH CENTRE FOR ROBOTICS

RAIN

NCNR
National Centre for Nuclear Robotics

FAIR-SPACE

ORCA HUB
Offshore Robotics for Certification of Assets
Remote Safety and Integrity

4 Hubs established with £46M to support the translation of academic research into industry.

UoM: REMOTE INSPECTION

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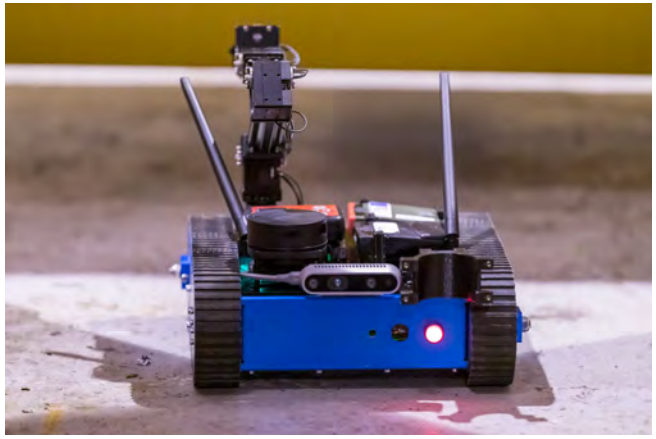
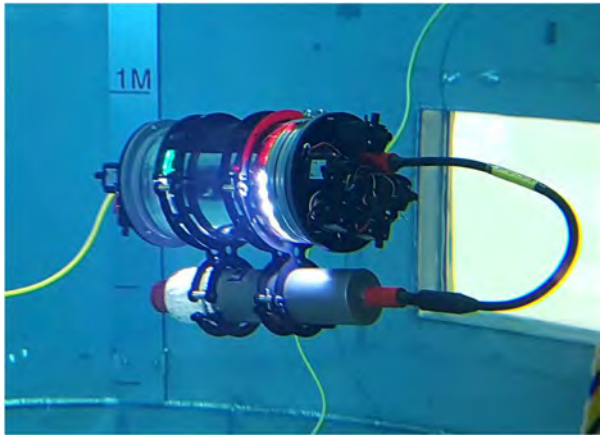


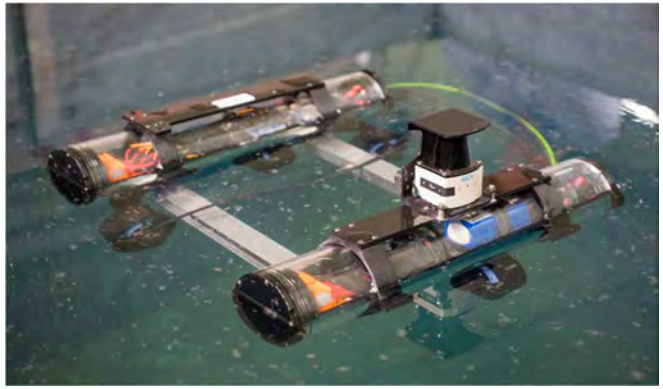

UoM: ACTIVE DEMONSTRATIONS

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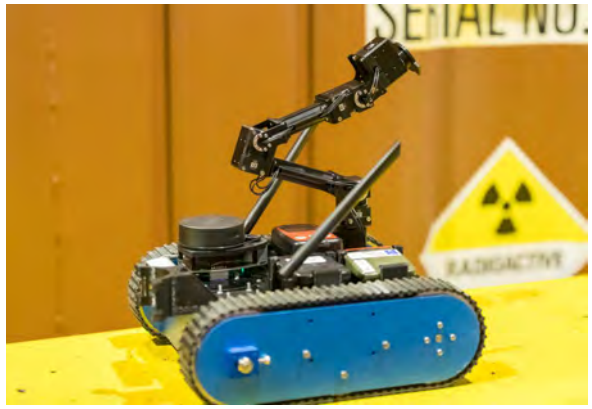
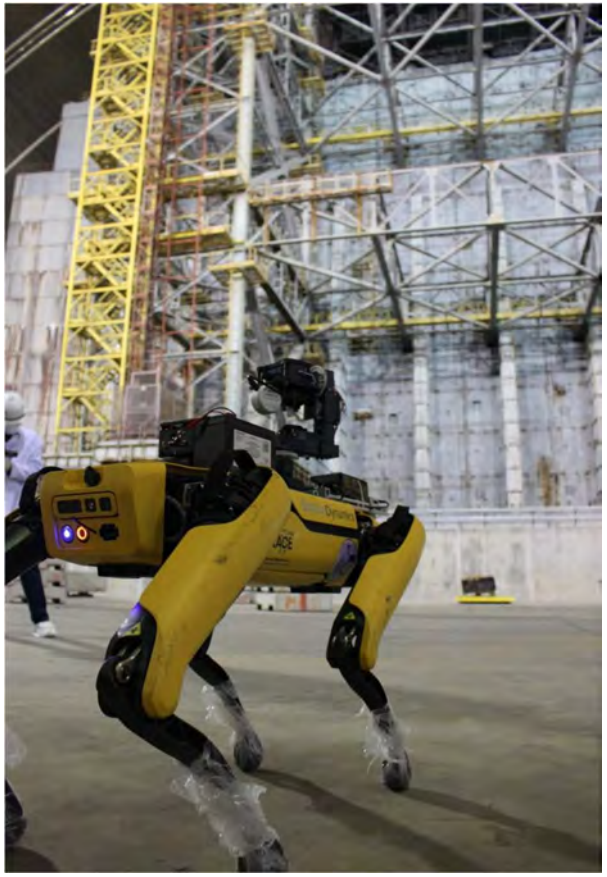


Dounreay

JET Reactor



Chernobyl

Jozef-Stefan Reactor, Slovenia

Sellafield

RAICo
ROBOTICS AND AI COLLABORATION

Partners:

UKAEA

Rob Buckingham

Executive Director

UKAEA

UKAEA and RAICo

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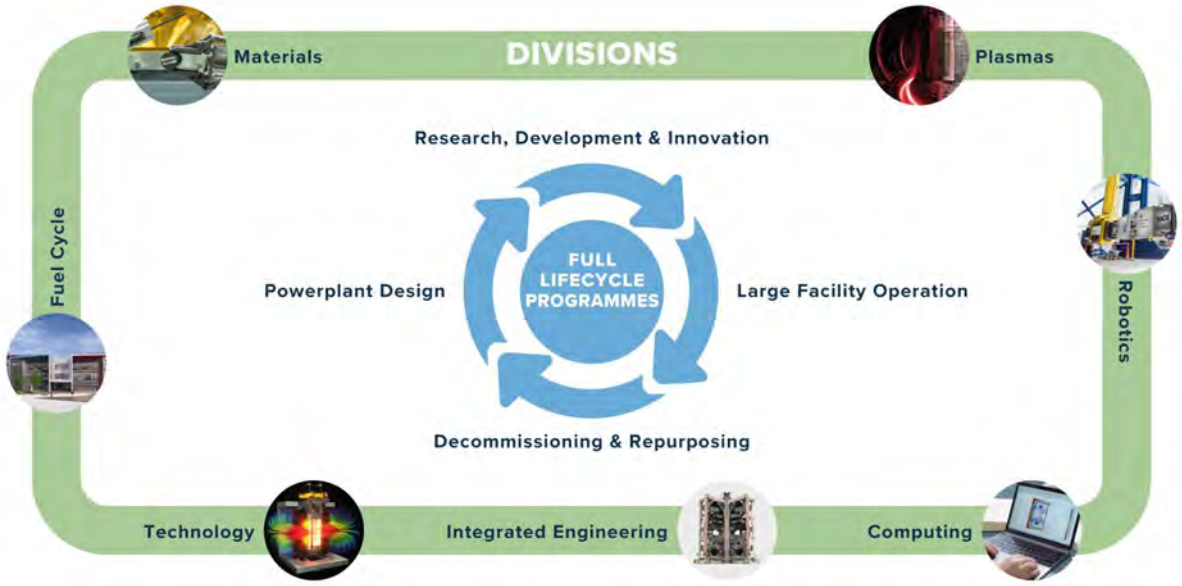
UKAEA's mission is to lead the delivery of sustainable fusion energy and maximise the scientific and economic benefit.

Solve problems, enable product, drive prosperity, create place, develop people.



All fusion powerplants will require intervention (refuelling, inspection, maintenance, upgrade)... not by people

“Robotics” is device defining and mission critical

UKAEA and RAICo

Robotics, Repurposing, Decommissioning Division

RAICo ROBOTICS AND AI COLLABORATION

UKAEA Goals (5Ps)	Enabling Research	RACE	RAICo	JDR
Problem	"Top 10 Research Challenges"	ESS ACF, STORM, RH-Core, IRTF, ITER HCC, WPRM	First uses of robotics and AI across NDA and at UKAEA	Fusion end of life (esp. de-tritiation, waste processing)
Product	Viable innovation pipeline for architecture, tools and processes to enable economic remote operations in fusion and beyond			
Prosperity	Essential R&D	Fusion: device defining HMG robotics	NDA, TEPCO, UKAEA: "Safer, Faster, Cheaper"	
Place	B1	B1, Lund, ITER	RAICo1 Whitehaven	Culham Campus
People	Capability and capacity to deliver fusion powerplants, working with the supply chain			
People (2027)	50+	400+	100+	200+
People (collaborations)	Academia (globally)	ITER, EUROfusion, TEPCO (LongOps)	NDA Group, UoManchester	UKAEA Divisions H3AT, MRF, STEP, IED

ENABLING RESEARCH

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Key challenges for robotics in fusion & beyond

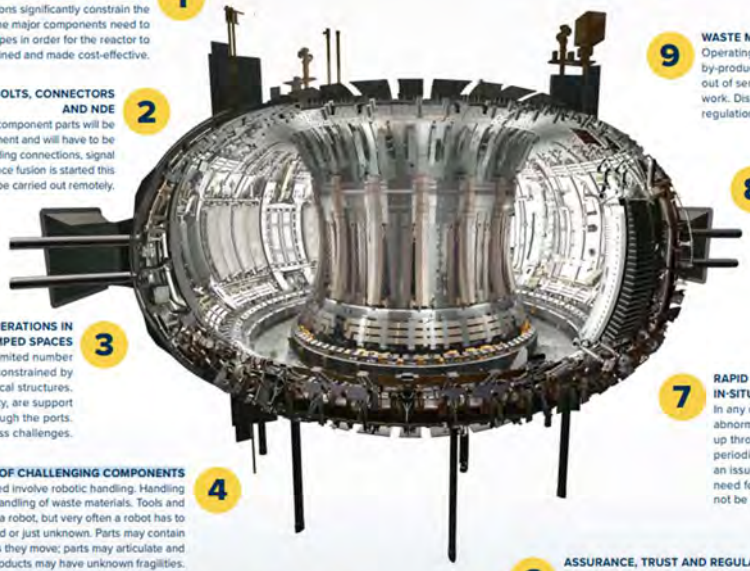
1 ARCHITECTURE OPTIMISATION INCLUDING DESIGN FOR REMOTE MAINTENANCE
The physics of fusion reactions significantly constrain the architectural design of the reactor. The major components need to have specific sizes, positions and shapes in order for the reactor to work. However it must also be maintained and made cost-effective.

2 SERVICE JOINING INCLUDING PIPES, BOLTS, CONNECTORS AND NDE
Over the lifetime of a reactor many component parts will be degraded by the extreme environment and will have to be replaced: pipes, flange bolts, earth bonding connections, signal connectors, seals and many more items. Once fusion is started this regular maintenance work will have to be carried out remotely.

3 SLENDER MECHANISMS AND OPERATIONS IN CONFINED, CRAMPED SPACES
Access into the fusion chamber is via a limited number of access ports with dimensions constrained by toroidal field magnets and other critical structures. Outside the vessel, in close proximity, are support systems that access the chamber through the ports. This results in significant access challenges.

4 HANDLING OF CHALLENGING COMPONENTS
All of the remote maintenance tasks needed involve robotic handling. Handling of components, handling of tools or handling of waste materials. Tools and parts can be designed to be handled by a robot, but very often a robot has to handle parts that are irregular, awkward or just unknown. Parts may contain liquids which alter their centre of gravity as they move; parts may articulate and move unpredictably, and waste products may have unknown fragilities.

5 ENVIRONMENTAL COMPATIBILITY INCLUDING RADIATION, VACUUM, MAGNETIC FIELDS
The operating environment in which robots must carry out maintenance and inspection tasks is extreme: neutron fluences, high levels of gamma radiation, powerful magnetic fields, vacuum conditions, high temperatures, and thermal cycles.



6 ASSURANCE, TRUST AND REGULATION
In addressing these challenges the physical and digital systems that are deployed to make fusion possible must be trustworthy. Not just trustworthy when they are built but trustworthy after decades of operation.

7 RAPID RESPONSE INCLUDING INSPECTION AND IN-SITU REPAIR
In any complex system there will be operational abnormalities. These abnormal events will be picked up through long-term and short-term monitoring and by periodic inspections, most often conducted remotely. When an issue is identified a decision must be made about the need for rapid and immediate intervention where there will not be an opportunity to transition to full shutdown.

8 MAINTENANCE PRODUCTIVITY
Future fusion power plants will need to be productive enough to ensure sufficient return on investment by providing reliable, sustained electricity generation. This in turn relies on the high availability of the reactor and its support systems.

9 WASTE MANAGEMENT
Operating a fusion power plant creates waste either as by-products of the fusion process or by parts being taken out of service and refurbished or by decontamination work. Disposal must be done safely and in compliance with regulations around the management of hazardous materials.

10 THROUGH-LIFE COST REDUCTION FOR LONG-LIVED FACILITIES
Lifetime cost is a critical factor in the success of fusion-based electricity generation. Over its lifetime, a fusion plant will have a high potential for loss of efficiency and the chance that sub-optimal operations will drive up operating costs. These effects may be compounded over long lifespans where changing teams, technology obsolescence, and altered operational requirements create unforeseen efficiency losses.

20 **Robotics challenges for fusion** - United Kingdom Atomic Energy Authority

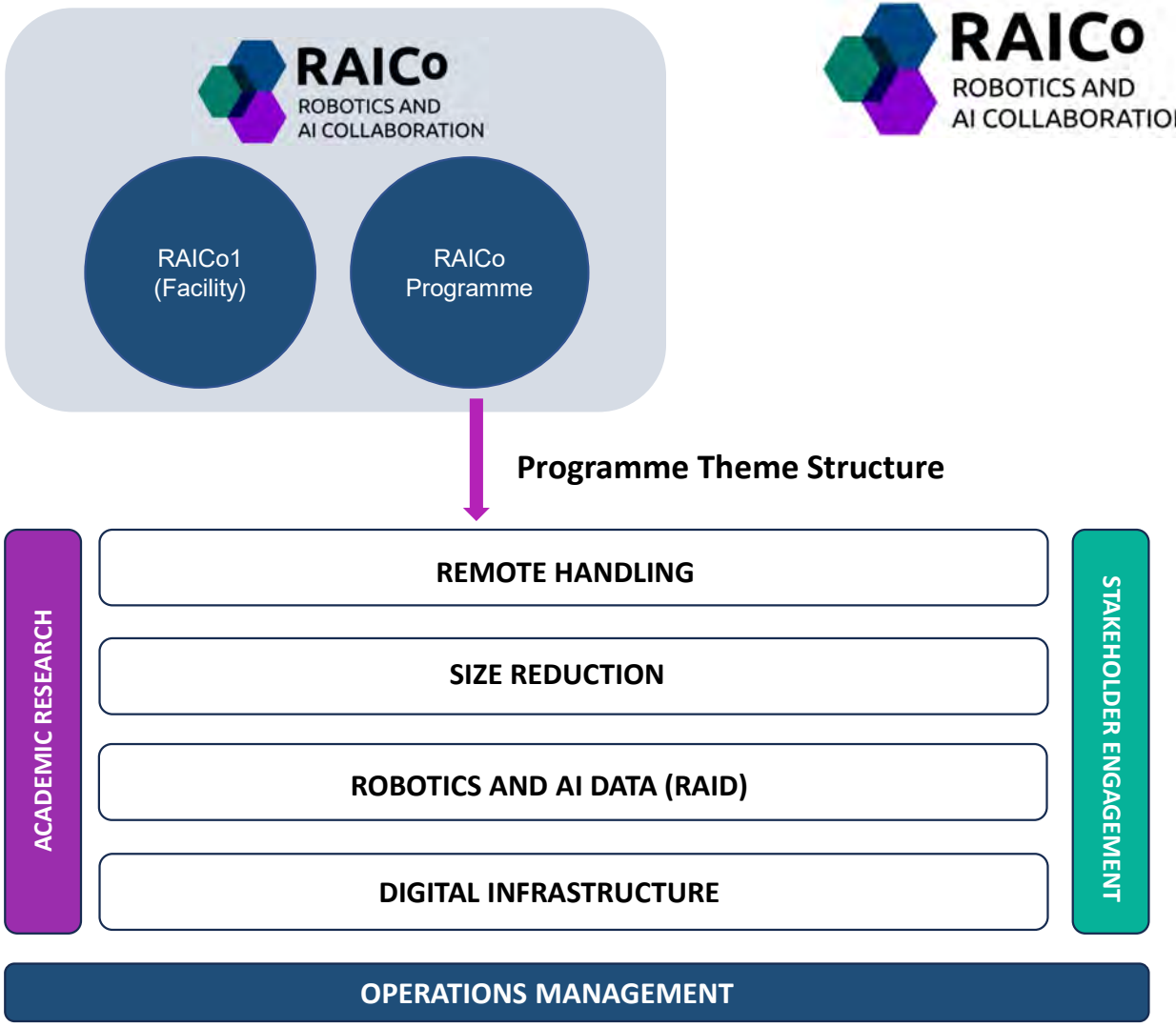
United Kingdom Atomic Energy Authority - **Robotics challenges for fusion** 21

RAICo Programme

- **Initial 3-year programme:**

  April 22 to March 25.

- **Targeting 50% of the budget to be placed with the supply chain.**



RAICo projects have applications across fission decom and fusion engineering

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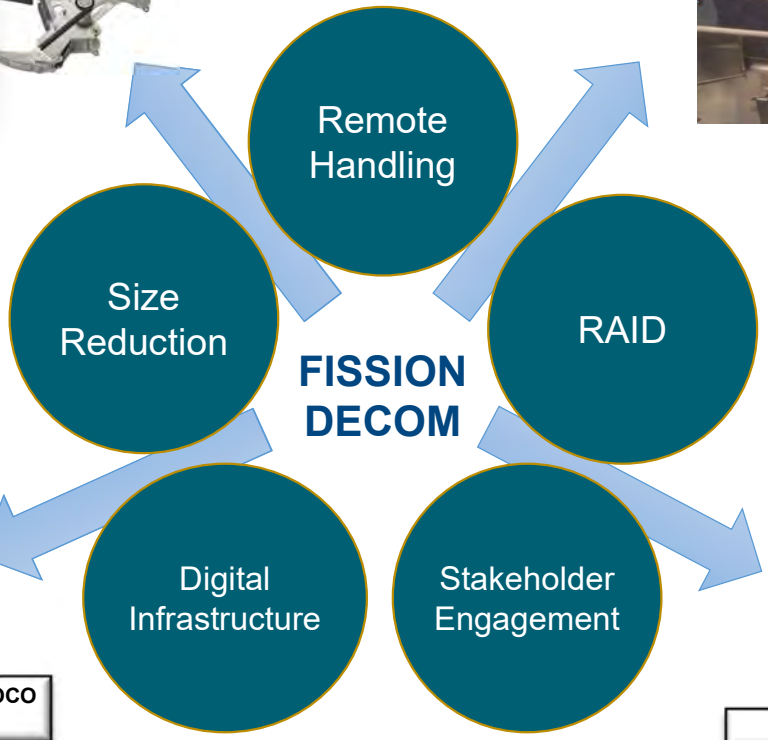

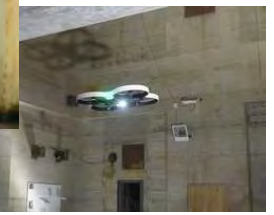

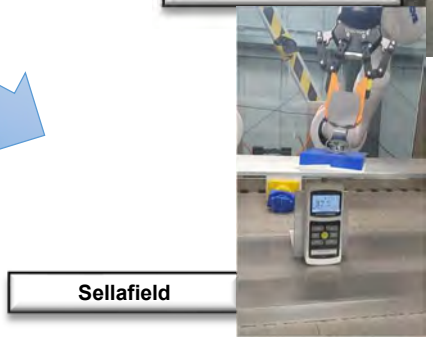

RAICo projects have applications across fission decom and fusion engineering

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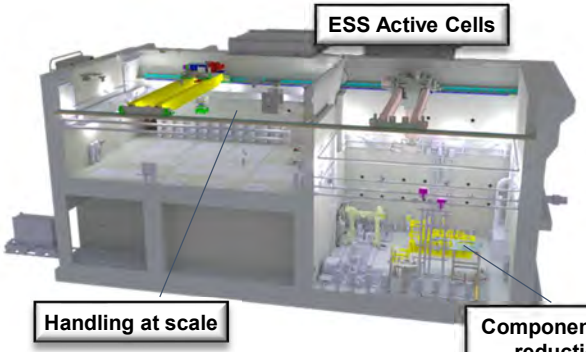

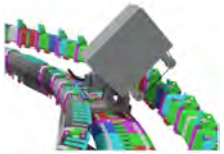

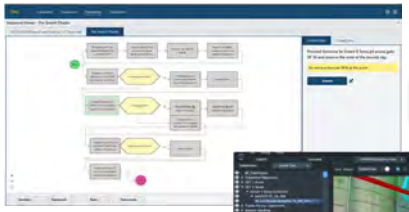

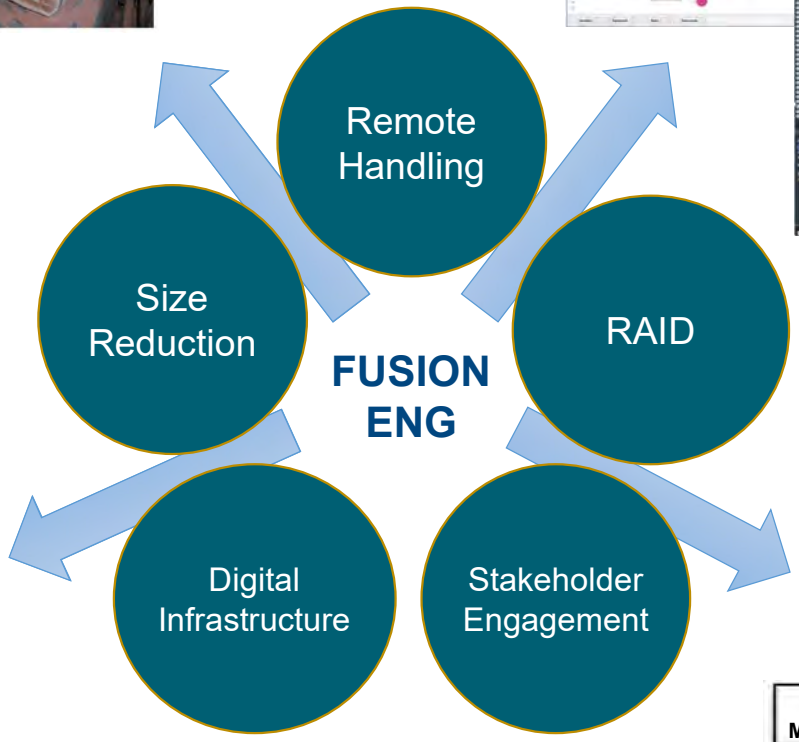

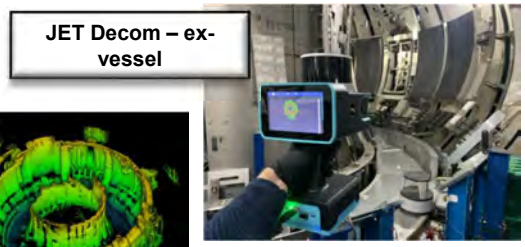

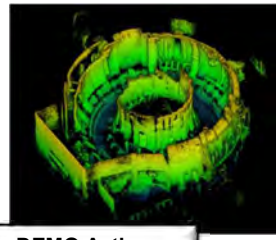

FOR MORE INFORMATION

Speak to us this afternoon

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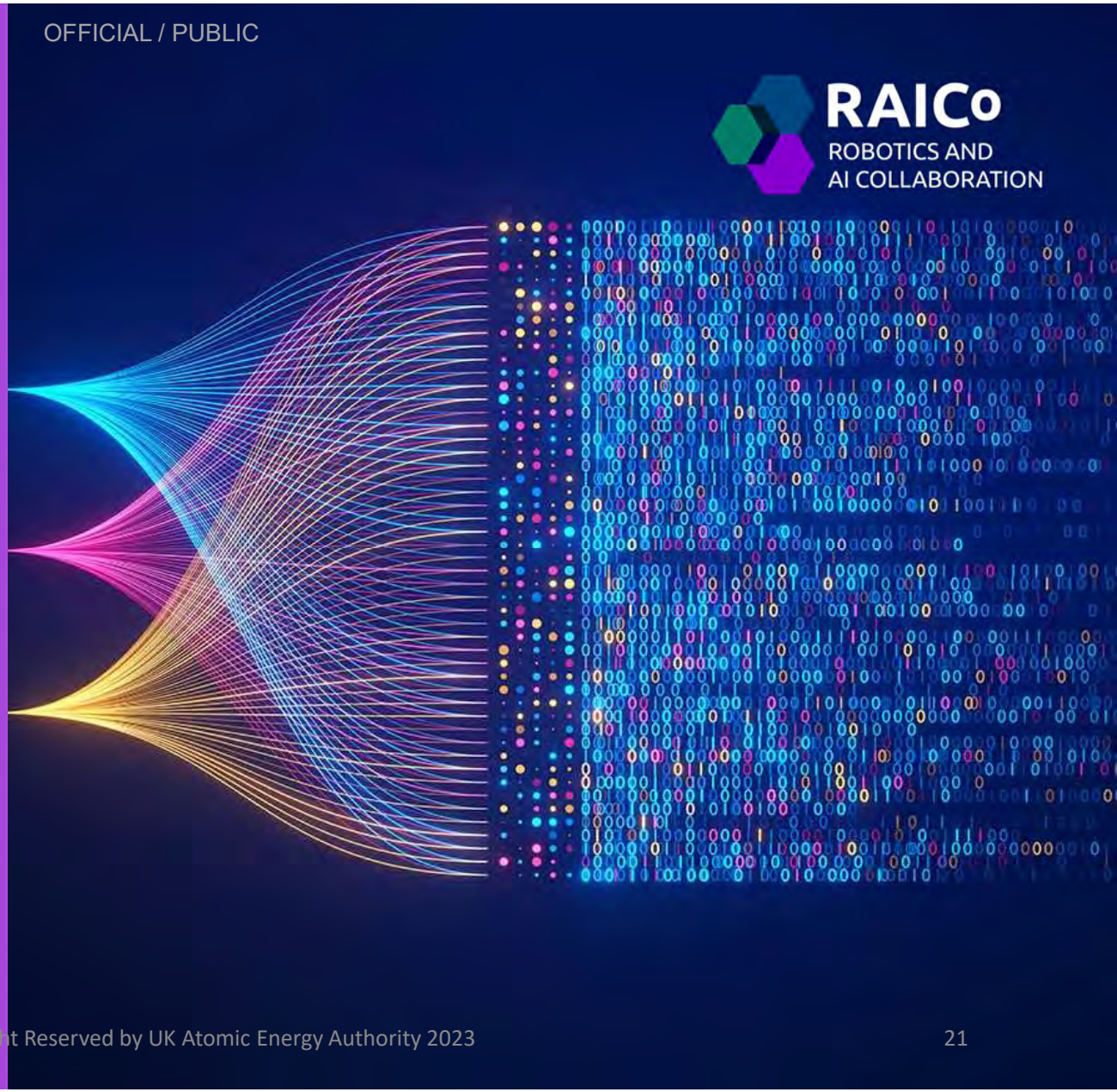
ravindra.b.chunilal@sellafieldsites.com
barry.lennox@manchester.ac.uk



RAICo
ROBOTICS AND AI COLLABORATION

Procurement

Phil Perkins

Strategic Procurement Business Partner

RAICo Procurements will be managed by UKAEA Procurement Team on behalf of our partners. Here is the information on our routes to market, form of contract and position on IP.

ROUTES TO MARKET

Low value materials & services <£20K	<£20k, not under direct Procurement Management, typically subject to three quotes.
Supplies and Services >£20K	Frameworks - Crown Commercial Services, LUPC, or UKAEA (Project Delivery Services, Embedded Engineering Resource, Engineering Design Services)
	Dynamic Purchasing System - We are engaging with our partner organisations on a Robotics & AI DPS for RAICo requirements
	Competitive Process (> £20K and < PCR Threshold) - Contract Finder Open Competition. We may utilize Reserved Contracts to restrict to SMEs and or Specific locations where justified and to meet specific RAICo objectives.
	Competitive Process (> PCR Threshold) - Regulated Process (Open, Restricted, Negotiated – as appropriate to requirement). These may include Social Value criteria to support RAICo levelling up objectives.
	Direct Award (where justified) - Negotiated Procedure Without Competition
R&D Pre- Commercial	Pre-commercial procurement process - Utilising either UKRI SBRI, DASA, Digital Catapult or UKAEA platforms

CONTRACT FORM

Procurement of standard of the shelf items UKAEA Standard PO Terms (based on NEC4 Supply Contract)

More Complex procurement of Goods

NEC4 Supply Contract

Procurement of Professional Services

NEC4 Professional Services Contract

INTELLECTUAL PROPERTY

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Professional Service Contracts:

Foreground IP (FIP) arising from contract:

- Vests with Supplier
- Licence granted to Client, including rights to sub-license

Supplier Background IP (BIP)

- Limited licence granted to Client that is required for use of FIP

Client BIP

- Licence granted to Supplier in order to provide the service

INTELLECTUAL PROPERTY

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Supply Contracts:

Foreground IP (FIP) arising from contract:

- Normally vests with Client, any exceptions will be dealt with on a case-by-case basis.

Supplier Background IP (BIP)

- No transfer of ownership
- Licence granted to Client that is required for use of FIP

Client BIP

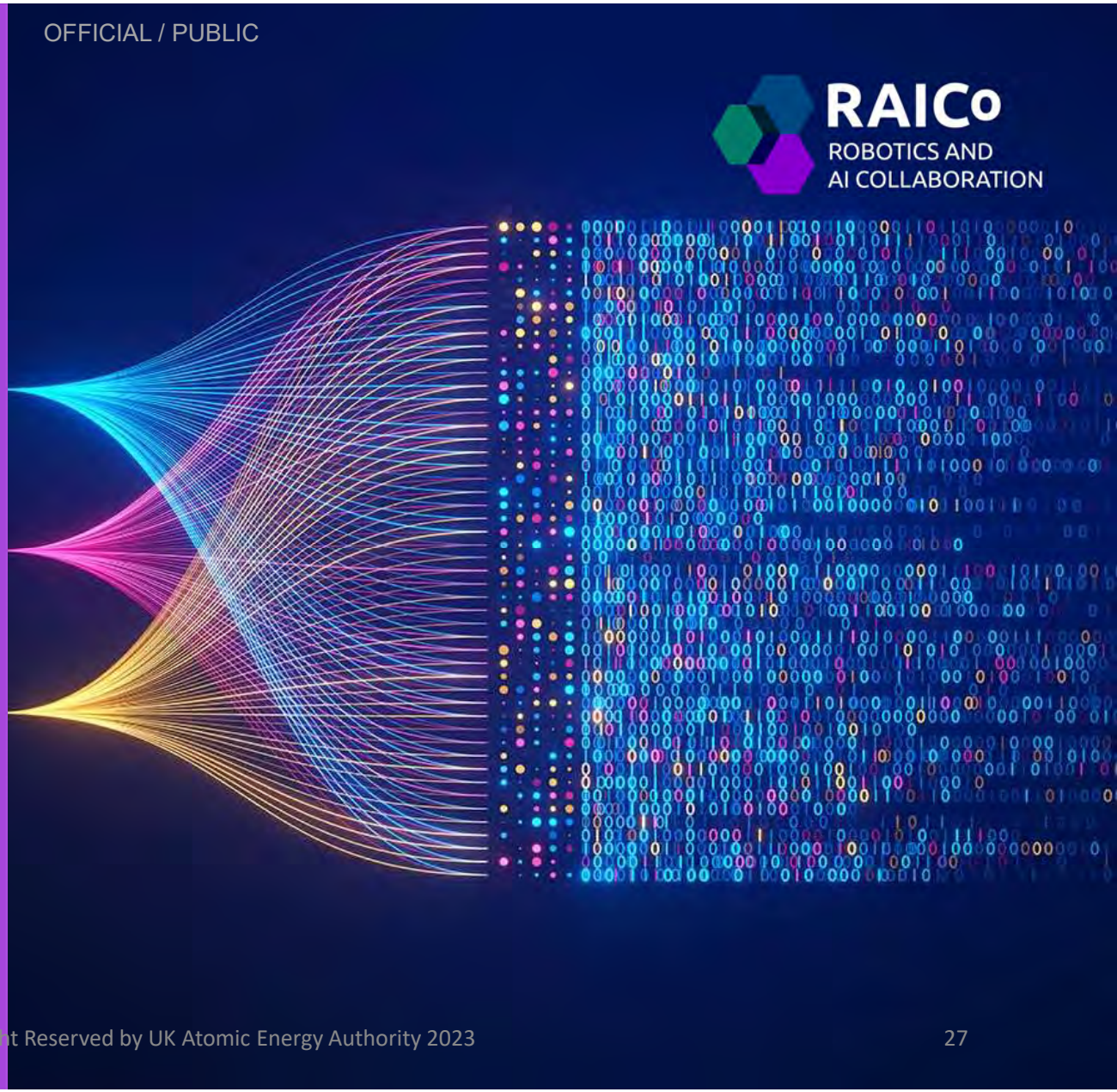
- No transfer of ownership
- Licence granted to Supplier in order to provide the service

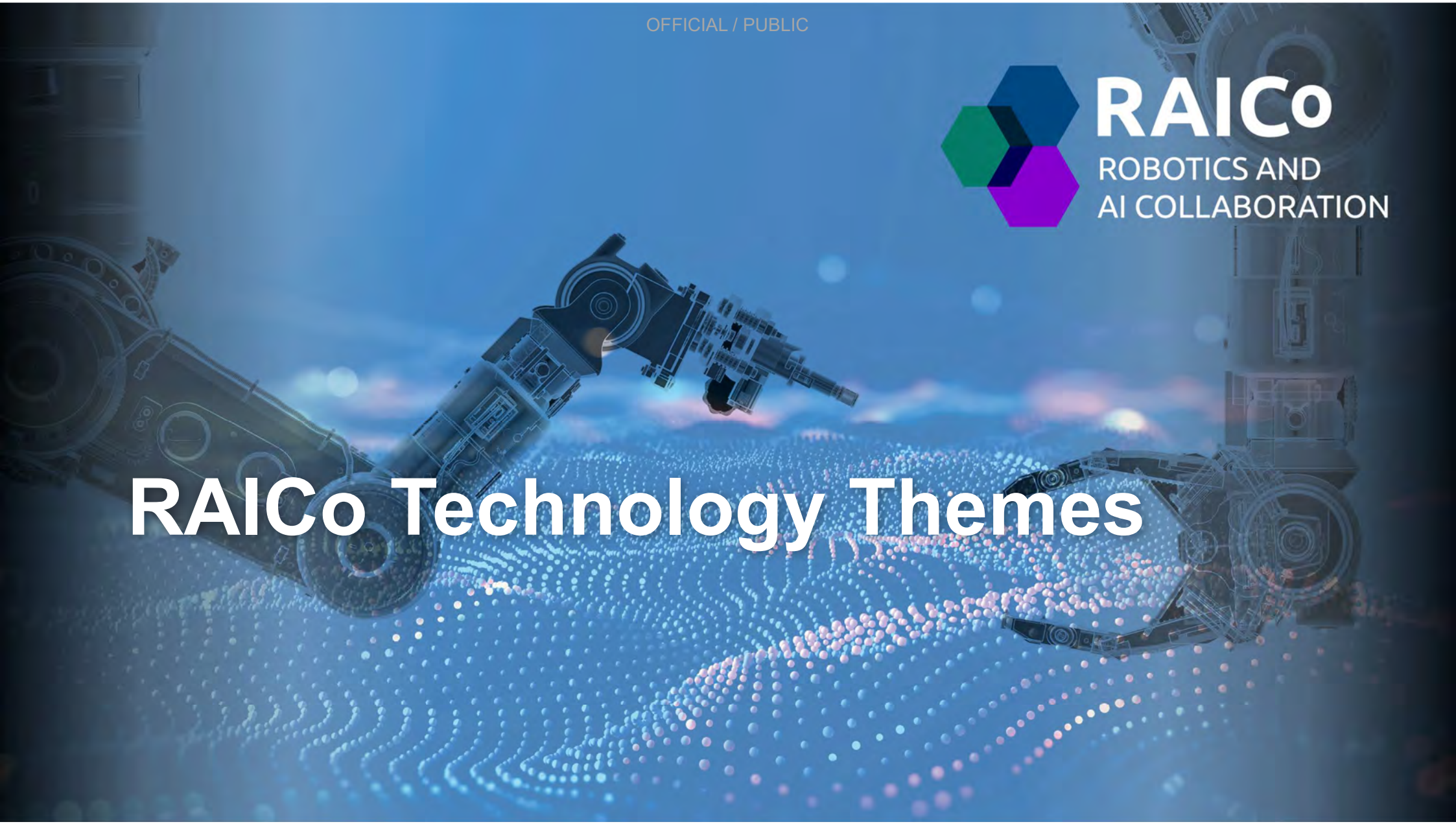
FOR MORE INFORMATION

Visit our Procurement & Supply Chain Booth

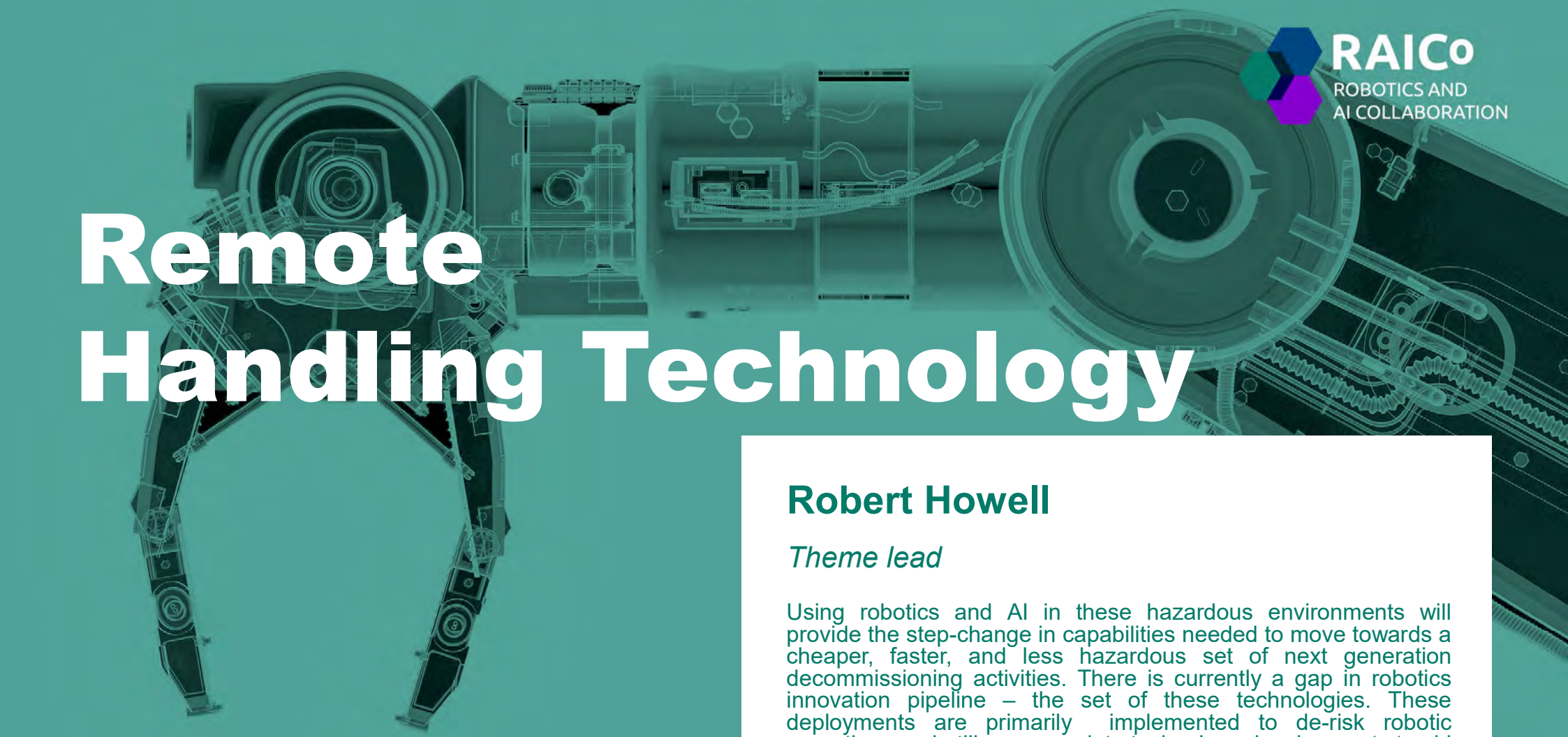
Look up UKAEA's Procurement Webpage

Contact: phil.perkins@ukaea.uk





RAICo Technology Themes



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Remote Handling Technology

Robert Howell

Theme lead

Using robotics and AI in these hazardous environments will provide the step-change in capabilities needed to move towards a cheaper, faster, and less hazardous set of next generation decommissioning activities. There is currently a gap in robotics innovation pipeline – the set of these technologies. These deployments are primarily implemented to de-risk robotic operations and utilise appropriate technology developments to aid the trials phase.

AIMS AND OBJECTIVES:

- Enhance end-user experience in nuclear decommissioning teleoperation context
- Raise Technology Readiness Level (TRL) of handling concepts or technologies
- Enable adaptable and extensible teleoperation capabilities
- Incorporate matured technologies into products for specific use cases
- Promote technology transfer and knowledge dissemination

ROADMAP TECHNOLOGIES

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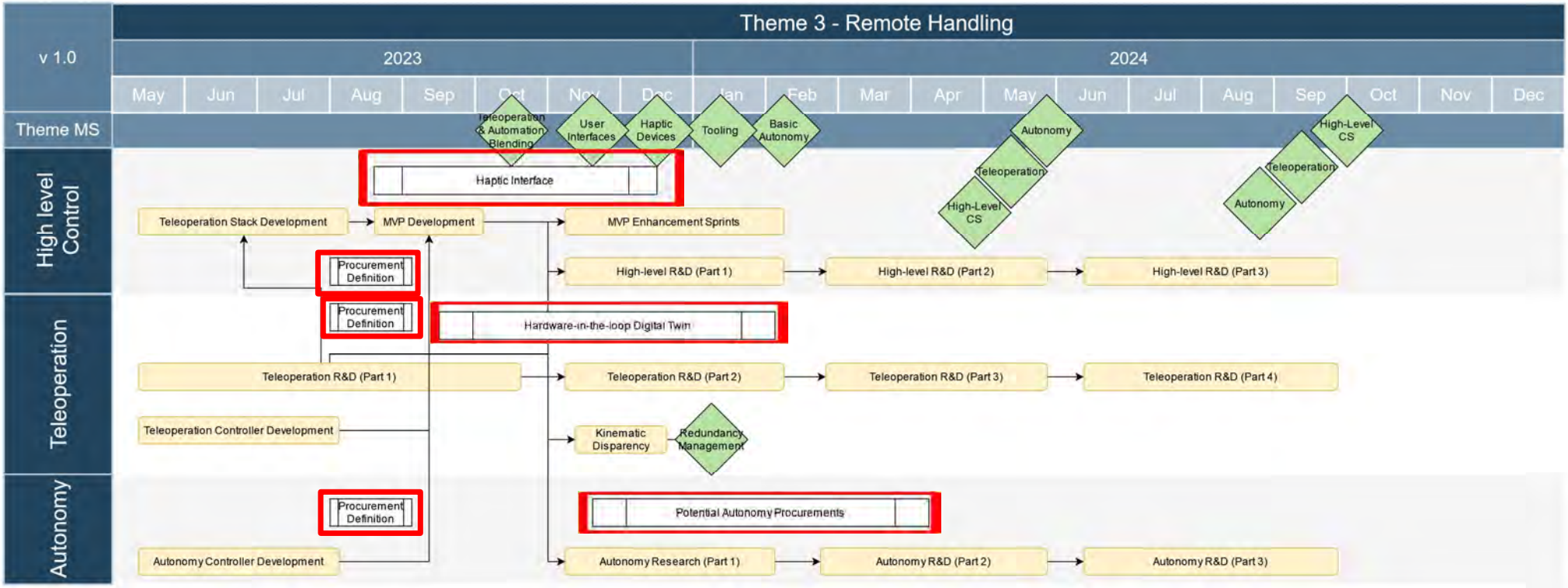

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Haptic Interface:

Product & Design Services

- Development of a haptic manipulation interface
- Interoperable between different local manipulator systems
- Force-feedback rendering and consideration of ergonomics

HIL Digital Twin Digital Twin:

Product & Design Services

- Hardware in the loop-based teleoperation with digital twin simulation
- Haptic Rendering and Computer Assistive Technologies (CAT)
- Enabling extendible and flexible teleoperation systems

Autonomy Products:

Software and Hardware Products

- Perception Systems - sensors, cameras, and depth perception technologies.
- Robot Automation and Guidance Solutions
- Manipulation, Grasping, and Collaborative Robotics Products

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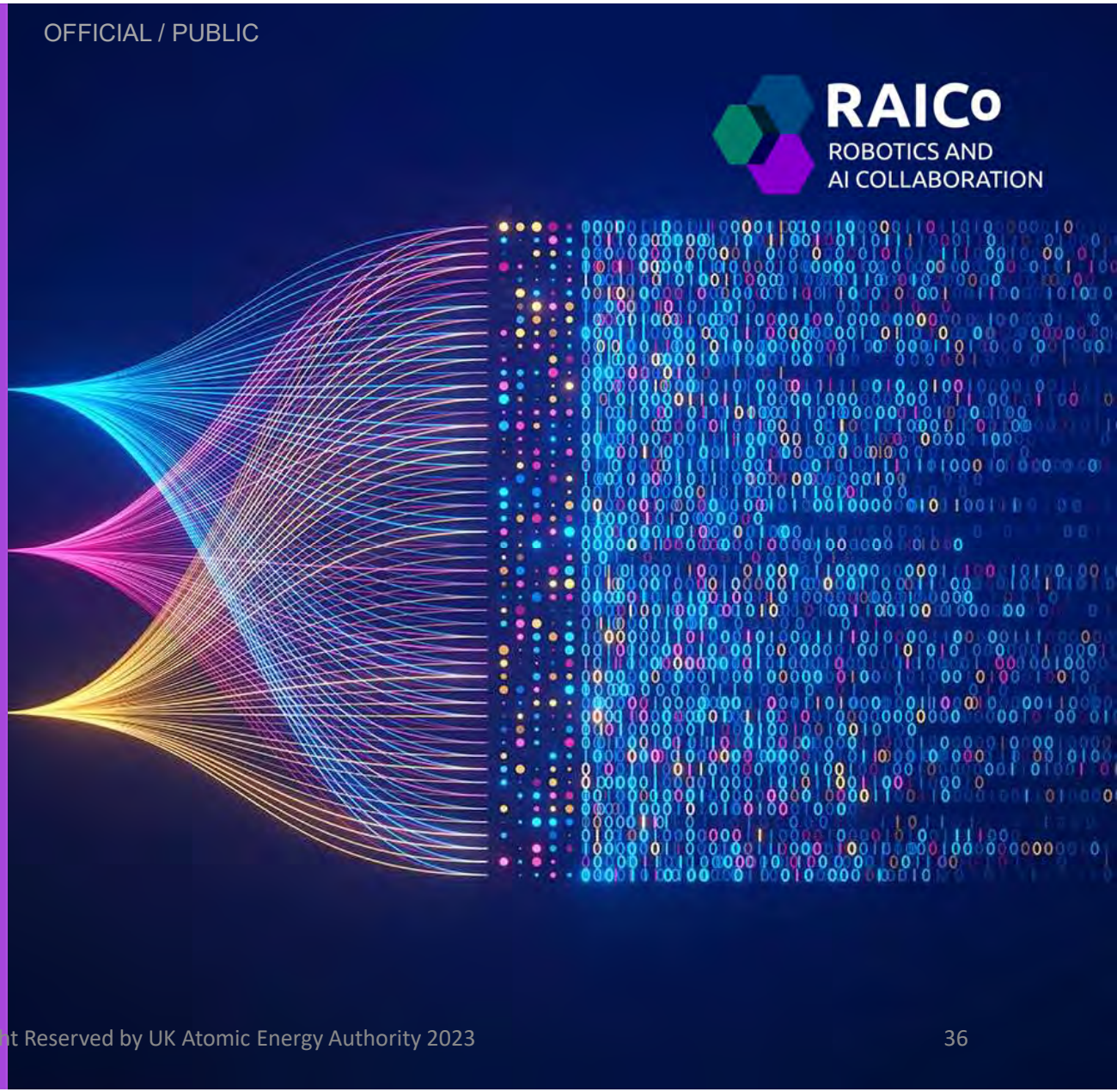
PROCUREMENT SUMMARY

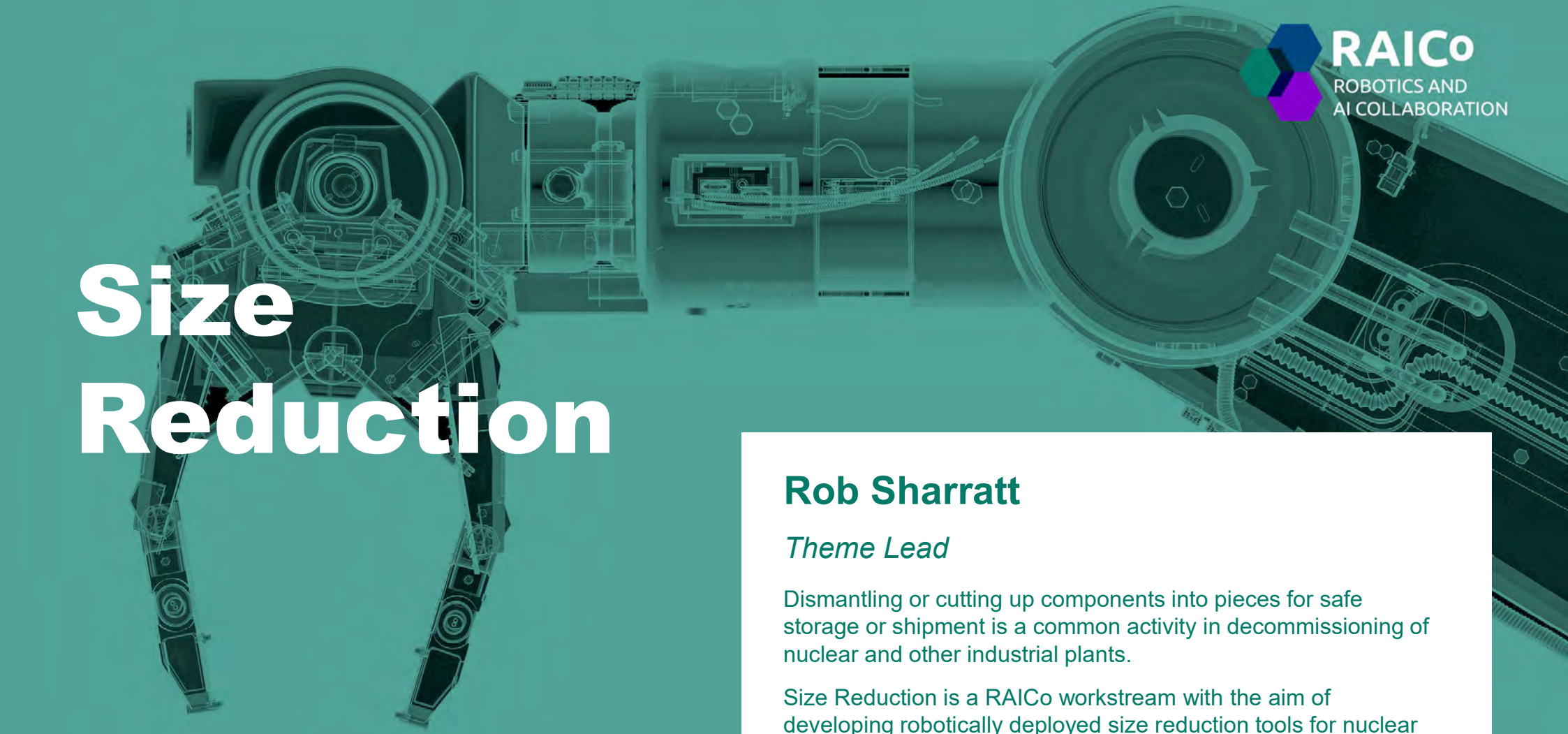
Procurement Title	RFQ Issue Date	Planned Contract Start Date*	Estimated Contract Length	Estimated Value Banding	Procurement Route
11.38 - Haptic Interface - Design & Supply	10/2023	12/2023	~12 months	£30k to <£80k	Contracts Finder Competition
11.39 - Hardware in the loop digital twin – Design & Supply	10/2023	12/2023	~12 months	£30k to <£80k	Contracts Finder Competition
11.40 - Autonomy products – Design & Supply (Potential)	10/2023	12/2023	~12 months	£30k to <£80k	Contracts Finder Competition

FOR MORE INFORMATION

Speak to me this afternoon

Contact: Robert.Howell@ukaea.uk





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Size Reduction

Rob Sharratt

Theme Lead

Dismantling or cutting up components into pieces for safe storage or shipment is a common activity in decommissioning of nuclear and other industrial plants.

Size Reduction is a RAICo workstream with the aim of developing robotically deployed size reduction tools for nuclear decommissioning applications (both Fission and Fusion).

INTRODUCTION

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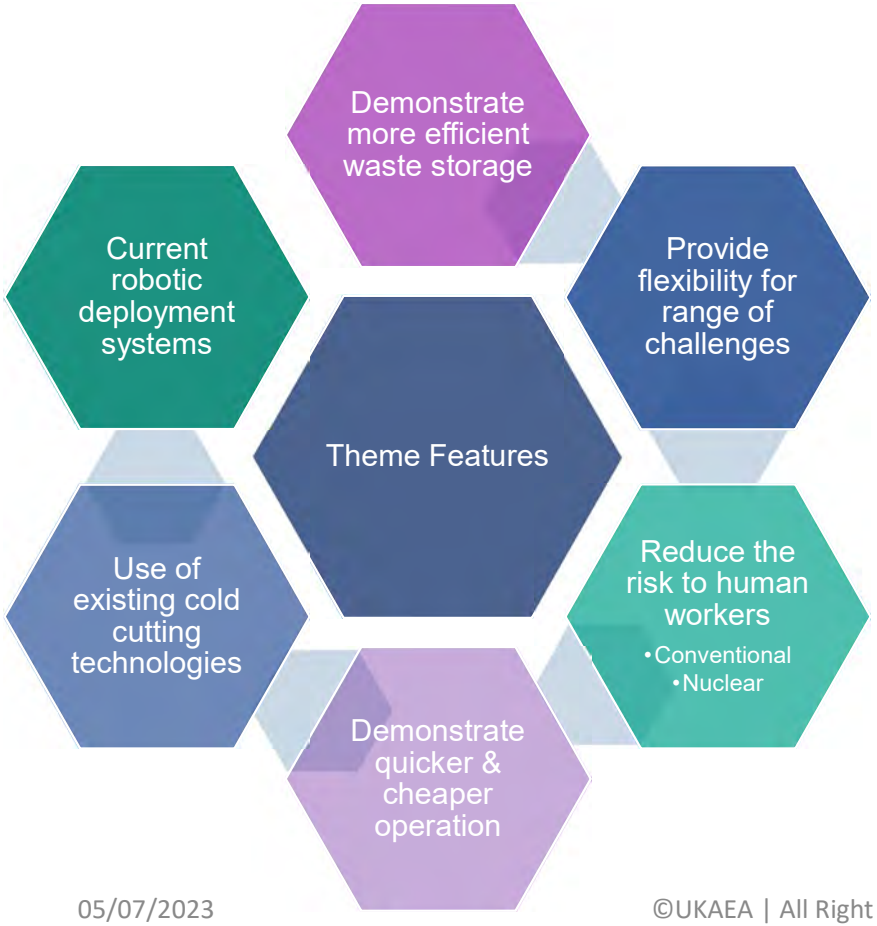
ROBOTICS AND AI COLLABORATION



SIZE REDUCTION IS A KEY RAICO WORKSTREAM

Applying and demonstrating size reduction tools with robotic deployment systems

For nuclear decommissioning applications (both Fission and Fusion)

AIMS AND OBJECTIVES

RAICo
ROBOTICS AND AI COLLABORATION

1. Demonstrate the application of robotic and AI systems combined with existing size reduction technologies

2. Develop the Next Generation Through Wall Manipulator and demonstrate the operational benefits

Applying and Demonstrating "Ready to Go" Solutions

PRIORITY TOPICS

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1. Size Reduction using Quadruped Robots
2. Laser Cut Path Planning / Operator Assistance
3. Size Reduction in Gloveboxes using small robots
4. Size Reduction using Through Wall Manipulator (TWM) in Hot Cells
5. Laser Ablation (internal and external)

PROCUREMENT PLAN

RAICo
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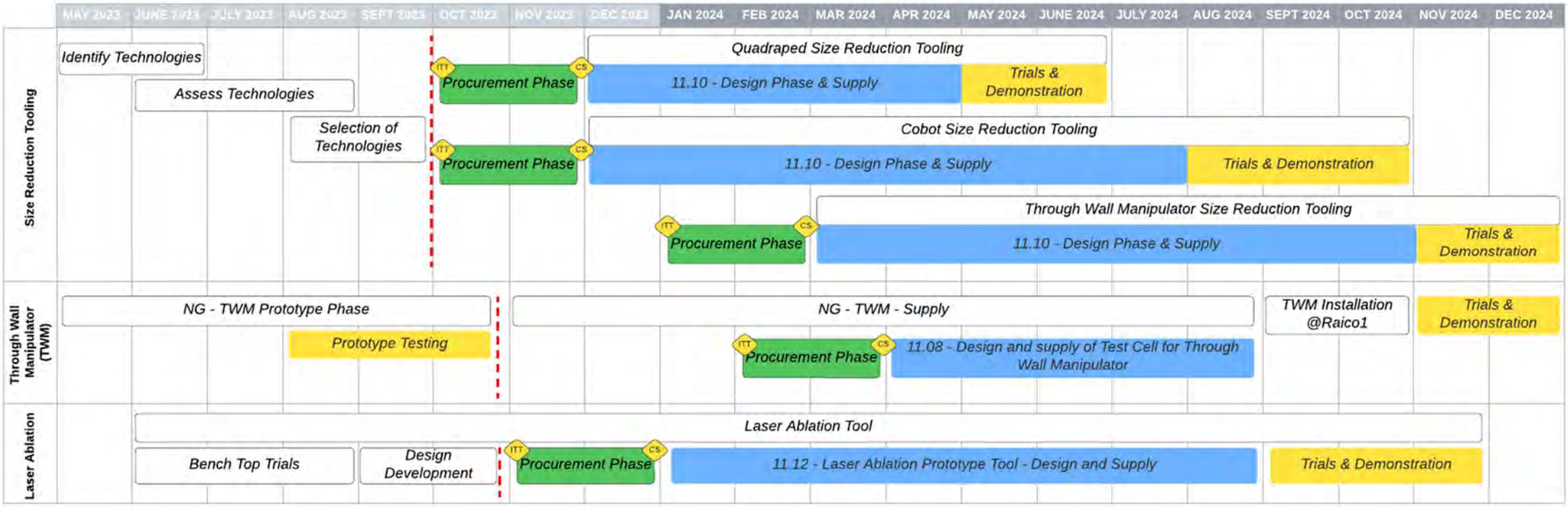
Internal Technology Development and Assessment

Hold Point

Supplier Design and Supply Packages

Non-active Trials and Demonstrations



*Dates are the earliest possible dates and are subject to change

11.28 DESIGN & SUPPLY:

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WÄLISCHMILLER HWM
Quality for Safety.

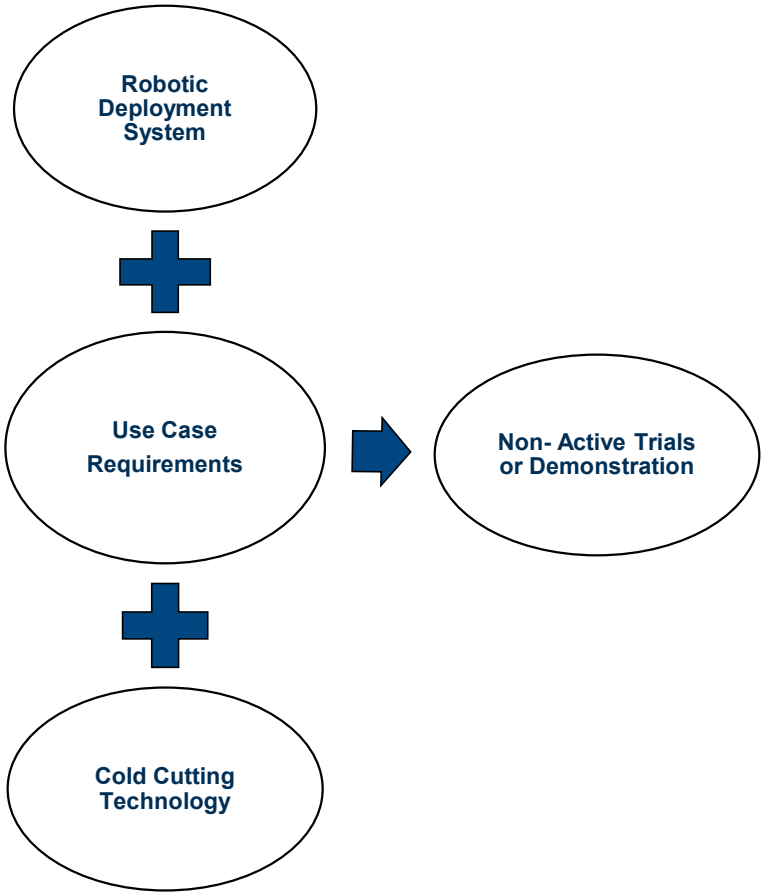
Design and Supply of Test Cell for Through Wall Manipulator

A new through wall manipulator is to be delivered to RAICo1 in 2024

A flagship test cell to safely install, operate, test and demonstrate both the manipulator itself and associated size reduction tooling is required within the RAICo1 work hall prior to its arrival

- Contract to design and supply test cell equipment and operator station to the issued requirement specification and interfaces
- Installation of test cell in conjunction with RAICo Technicians
- Test Cell – Estimated to be complete: July/Aug 2024

11.29 DESIGN & SUPPLY:



Robot Deployable Cold Cutting Prototypes

The following contracts are envisaged:

- Design and Supply of a Prototype, Quadruped Deployed, Cold Cutting Tool
- Design and Supply of an In Glovebox, Cobot Deployed, Cold Cutting Tool
- Design and Supply of a TWM Deployed Cold Cutting Tool

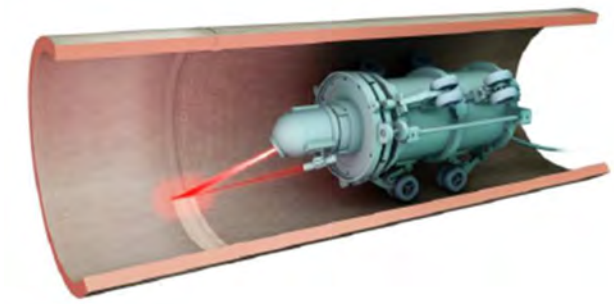
Note: *Multiple contracts may be launched.*
Number of contracts and size of contract will vary depending on scope and budget available

For each of the contracts the following will be specified in the ITT:

- The specific cold cutting technology (Diamond Wire, Circular Saw etc…)
- The deployment system to be used (Quadruped, Cobot, TWM)
- The use case requirements (e.g. what is being cut and where)

Non-Active Trials performed asap through 2024 – March to December

11.30 DESIGN & SUPPLY:



Complete removal of rust layer

Laser Ablation Prototype Tool

RAICo have a concept design for an in-bore pipe laser ablation tool

A prototype is to be designed to undertake initial non-active trials in RAICo facility.

- Design and supply of a prototype in-bore laser ablation tool and test rig

  - Optics Concept Design Package
  - High Power Laser Test Results
  - Drive System Test Results
  - Requirements Specification
  - Use Case and Test Specification

Contract Launch Jan 2024

Non-Active Trials – ASAP estimated start August 2024

Capabilities Required

- Laser Optics Design
- Mechatronics
- System Packaging
- Pneumatics and Turbine Design

PROCUREMENT SUMMARY

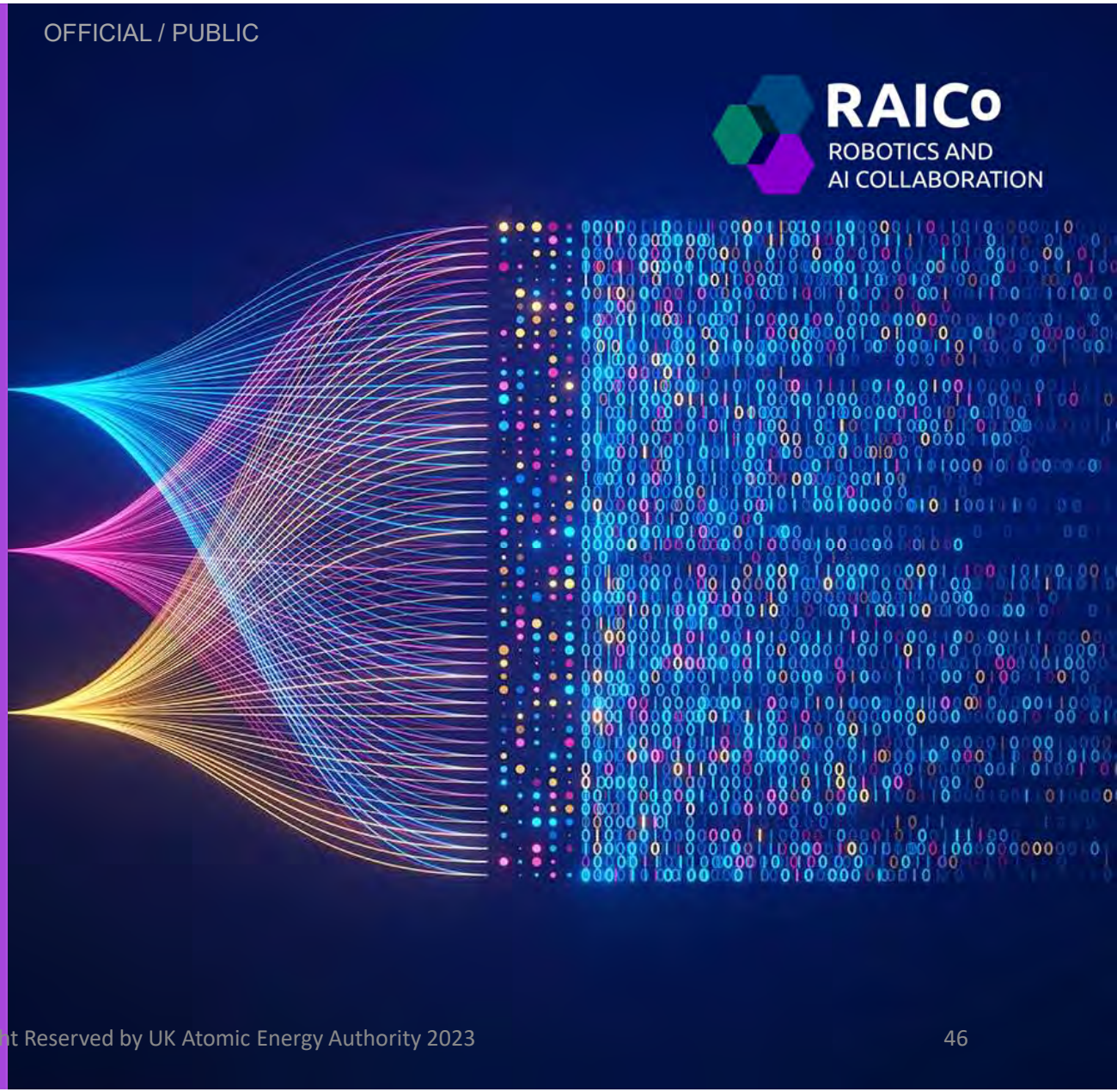
Procurement Title	RFQ Issue Date	Planned Contract Start Date*	Estimated Contract Length	Estimated Value Banding	Procurement Route
11.28 - Design and supply of Test Cell for Through Wall Manipulator	01/02/2024	01/04/2024	<1 year	£100k to <£500k	Contracts Finder Competition
11.29 - Robot Deployable Cold Cutting Prototypes - Design and Supply	Between 01/10/2023 to 01/01/2024	Between 01/12/2023 to 01/03/2024	1-2 years	£500k to <£1M	Find a Tender Service
11.30 - Laser Ablation Prototype Tool - Design and Supply	01/11/2023	01/01/2024	1-2 years	£100k to <£500k	Find a Tender Service

**Dates are the earliest possible dates and are subject to change*

FOR MORE INFORMATION

Speak to me this afternoon

Contact: Rob.Sharratt@ukaea.uk



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Robotics and AI Data: RAID

Salvador Pacheco-Gutierrez

Theme Lead

The goal is to create an enhanced suite of tools for merging legacy data with data collected by robot/sensor from fusion and fission decommissioning site locations.

Using robotics and AI in hazardous nuclear decommissioning environments will provide the step-change in capabilities needed to move towards a cheaper, faster, and less hazardous set of next generation decommissioning activities.

INTRODUCTION

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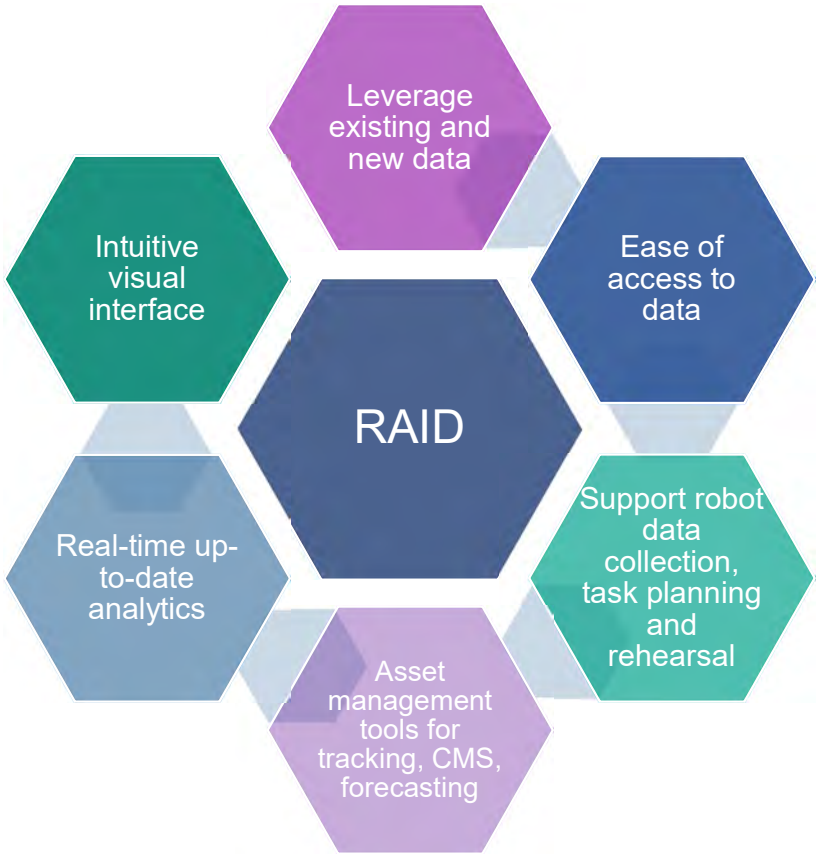

Data is crucial during the planning and execution of decommissioning activities. Having the right information at the right time can save time, money and more importantly, lives

Robotics and AI Data (RAID) Theme focuses on:

Applying BIM technologies to centralise data and support the planning, tracking and management of the nuclear decommissioning process

Robot-assisted data collection from hazardous locations including remote health physics data

Developing an intuitive and interactive data visualisation tool

AIMS AND OBJECTIVES

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OBJECTIVES

To demonstrate the capabilities and potential of BIM for nuclear decommissioning planning

To develop visualisation and inspection tools for nuclear decommissioning data

To deploy sensor-enhanced robotic platforms (e.g. quadrupeds, drones) for data collection to evaluate, plan and forecast decommissioning scenarios

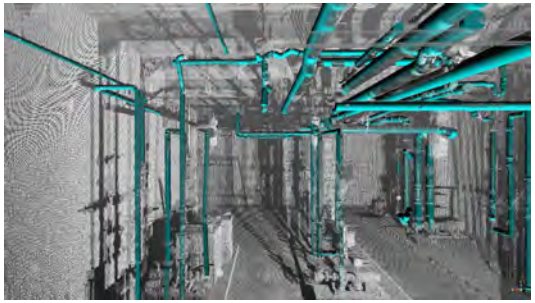
To support remote health physics data collection using robotic systems

Prepare the foundational data systems for next gen AI for decommissioning

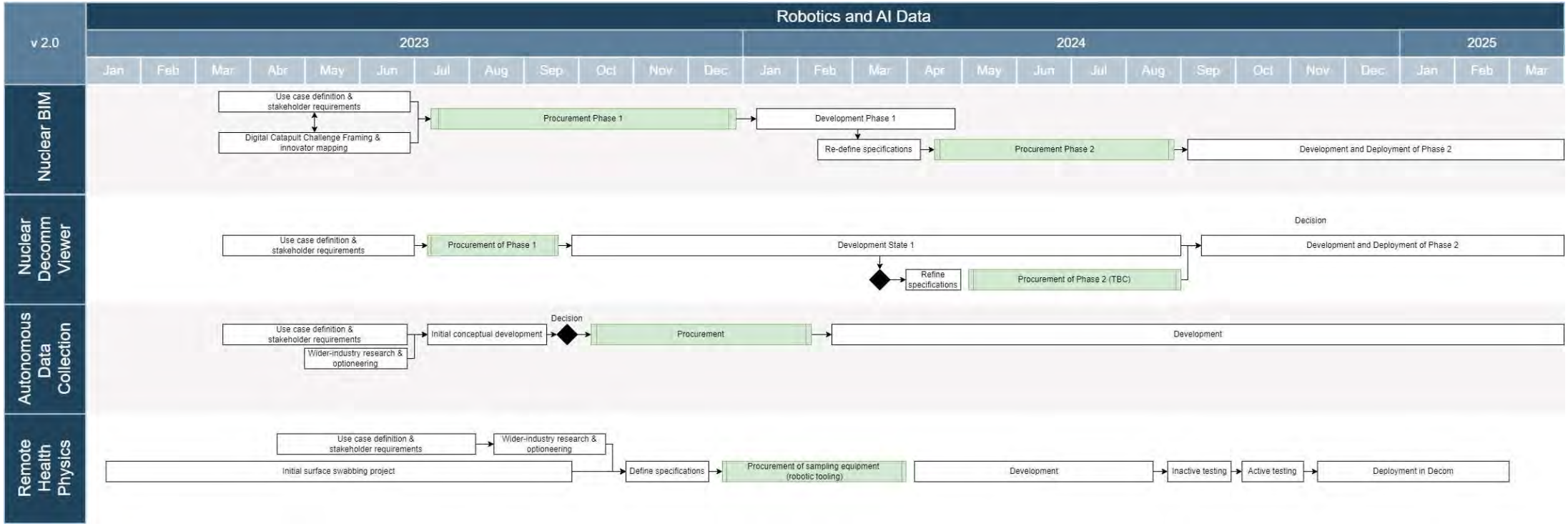
AIMS

To create an enhanced suite of digital tools for leveraging existing data and newly collected data using robots

To support decommissioning activities by supporting planning and decision-making, and to leverage the potential of AI in nuclear decommissioning applications



ROADMAP:

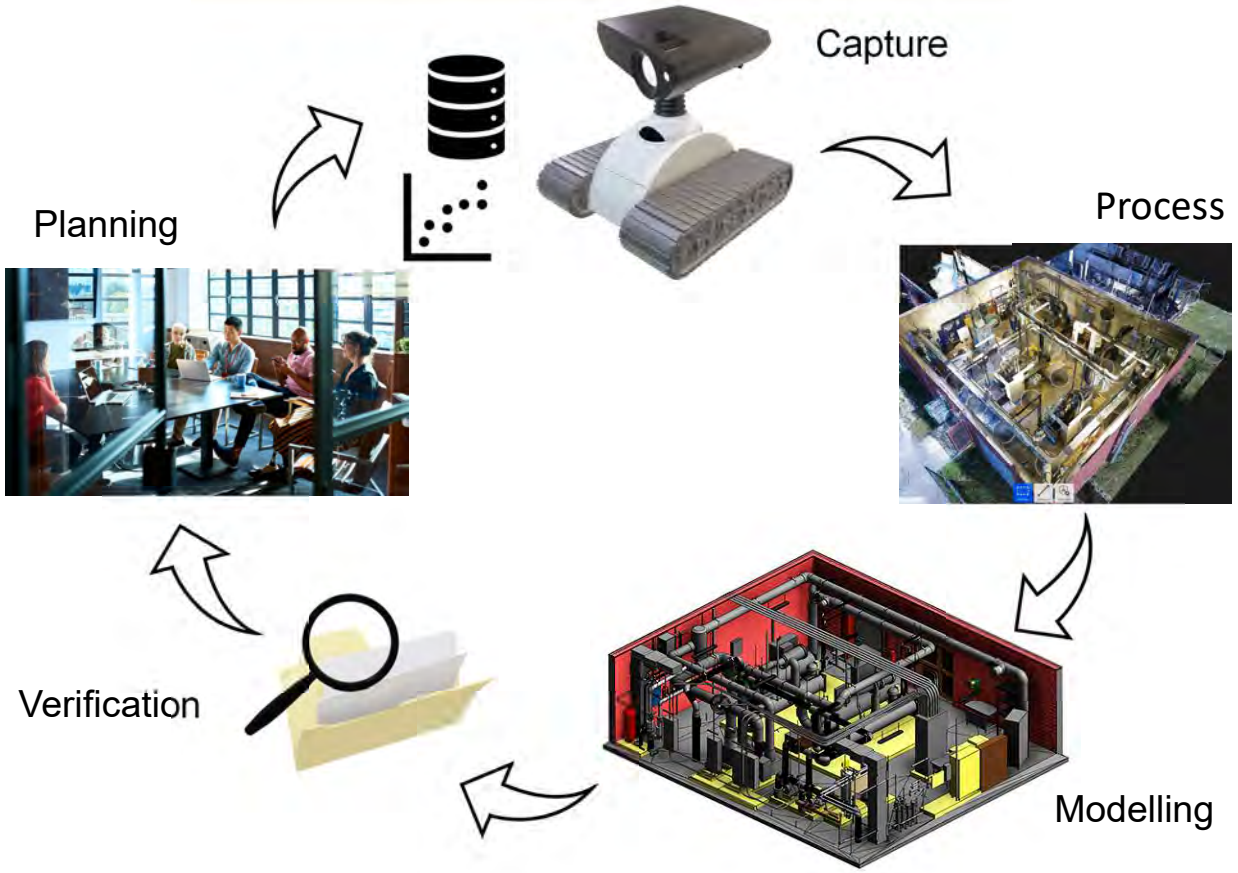


PROCUREMENT SUMMARY

Procurement Title	RFQ Issue Date	Planned Contract Start Date*	Estimated Contract Length	Estimated Value Banding	Procurement Route
11.32 - Nuclear BIM (Phase 1)**	Jul/Aug 2023	Oct 2023	3 months	£50k to <£100k	Digital Catapult – Future Scope Decommissioning Data Challenge
11.33 - Nuclear decommissioning data viewer (Phase 1)**	Jul/Aug 2023	Sep/Oct 2023	4~6 months (possible extension)	£100k to <£200k	Find a Tender Service
11.31 - Autonomous data collection	Oct/Nov 2023	Jan 2024	1 year	£150k to <£200k	Find a Tender Service
11.34 - Remote health physics	Jan/Feb 2024	Apr 2024	9 months	£100k to <£200k	Find a Tender Service

**Dates are the earliest possible dates and are subject to change*
*** Potential extension to Phase 2 depending on outcome of Phase 1*

NUCLEAR BIM (Phase 1) :



Development and demonstration of a nuclear BIM suitable for supporting nuclear fusion and fission decommissioning:

- Importing existing CAD
- Connecting related textual records, maintenance logs, and capture data from inspection robots and sensors.
- Ability to include radiological and contamination data

NUCLEAR DECOMMISSIONING DATA VIEWER:

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VR-enabled decommissioning site

To develop an intuitive visualisation interface to collected data (e.g., data stored in a BIM), allowing

- Multiple types of user access,
- 3D modelling visualisation and
- Inspection while easily interacting with the data (e.g. overlaying radiological data, annotating features of interest, adding metadata, etc).
- This shall include VR/AR representations of the 3D data for off-line exploration purposes.
- Data analytics related to trends, patterns and potential risks
- Dashboards to analyse and visualise the potentially large amount of information generated throughout the decommissioning process.

AUTONOMOUS DATA COLLECTION:

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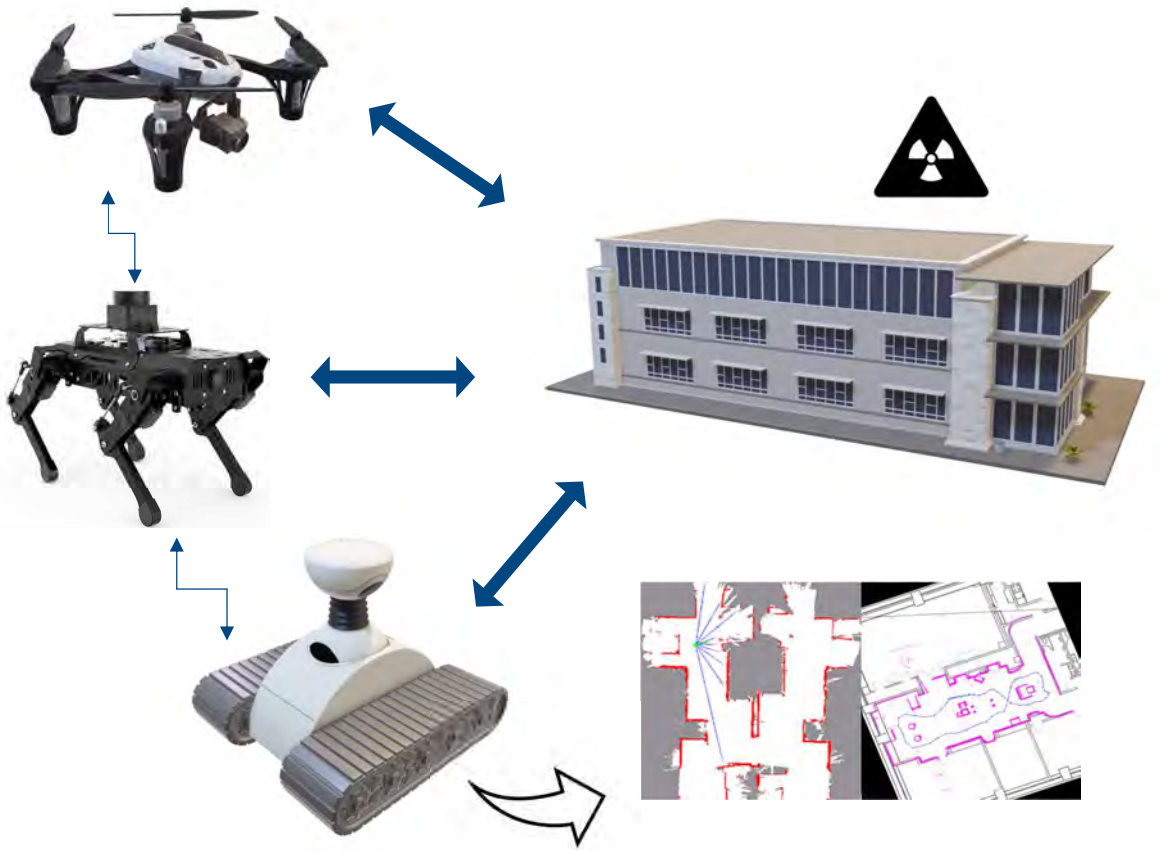


Deployment of robotic platforms (quadrupeds, drones, ROVs, etc) for:

- Routinely and autonomously exploring and inspecting large complex regions
- Novel sensing devices capable of capturing geometrical, physical and radiological data suitable for the BIM
- Mapping, semi-autonomous navigation, sample retrieval

REMOTE HEALTH PHYSICS:

KUKA Glovebox – Remote Handling demonstration

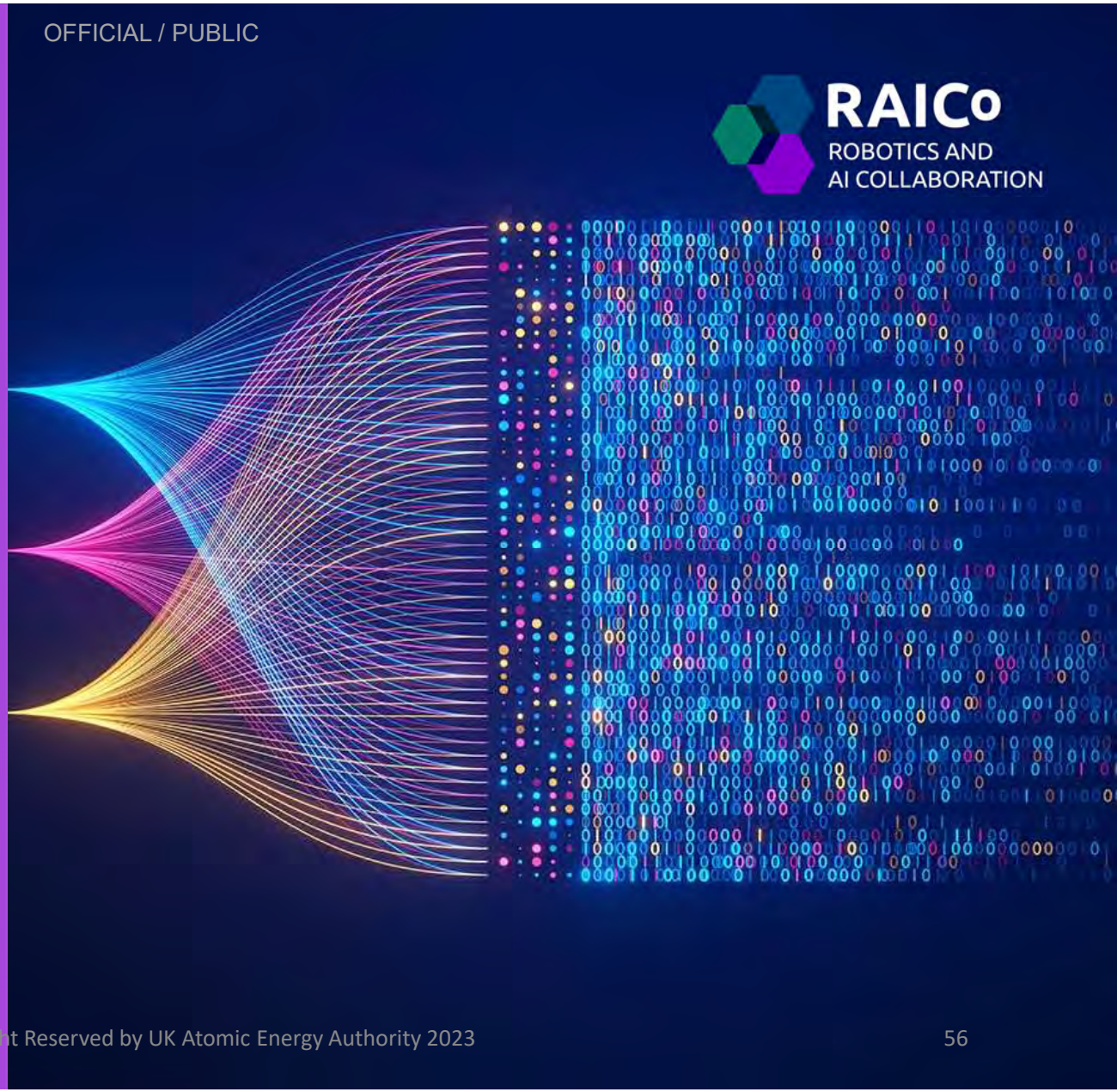
This project focuses on the development and in-field testing of remote health physics techniques, tooling and deployment of robots:

- Improve safety of workers during decommissioning operations
- Deploy remote platforms to complete some of the monitoring tasks remotely

FOR MORE INFORMATION

Speak to me this afternoon

Contact:
Salvador.Pacheco-Gutierrez@ukaea.uk



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Digital Infrastructure

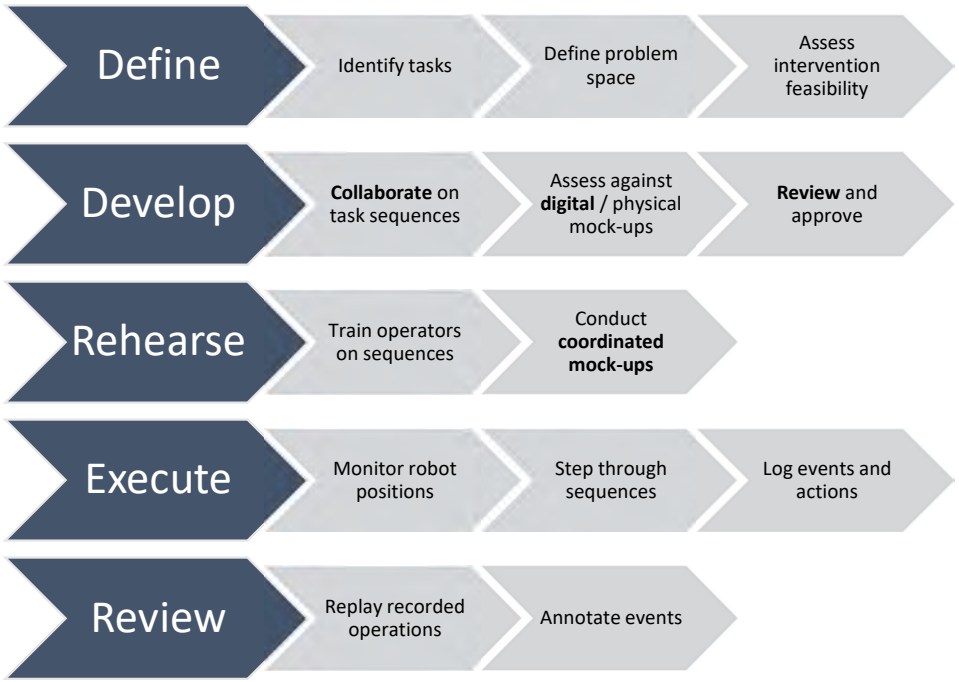
Ronan Kelly

Theme Lead

The goal of this theme is to demonstrate the application of modern **digital tools** to support remote operators of handling and size reduction equipment. We require these tools to provide a common thread throughout the lifecycle of an operations, from concept design, planning, and training through to rehearsal and execution – hence *infrastructure*.

INTRODUCTION:

- Digital tools to support decision making and execution throughout the Ops lifecycle
  - Continuity of data
  - Transferability of tools between contexts
- In practice this means generic tools for:
  - Structured planning
  - Asset tracking
  - Visualisation
  - Simulation
  - Reporting



AIMS AND OBJECTIVES

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AIM

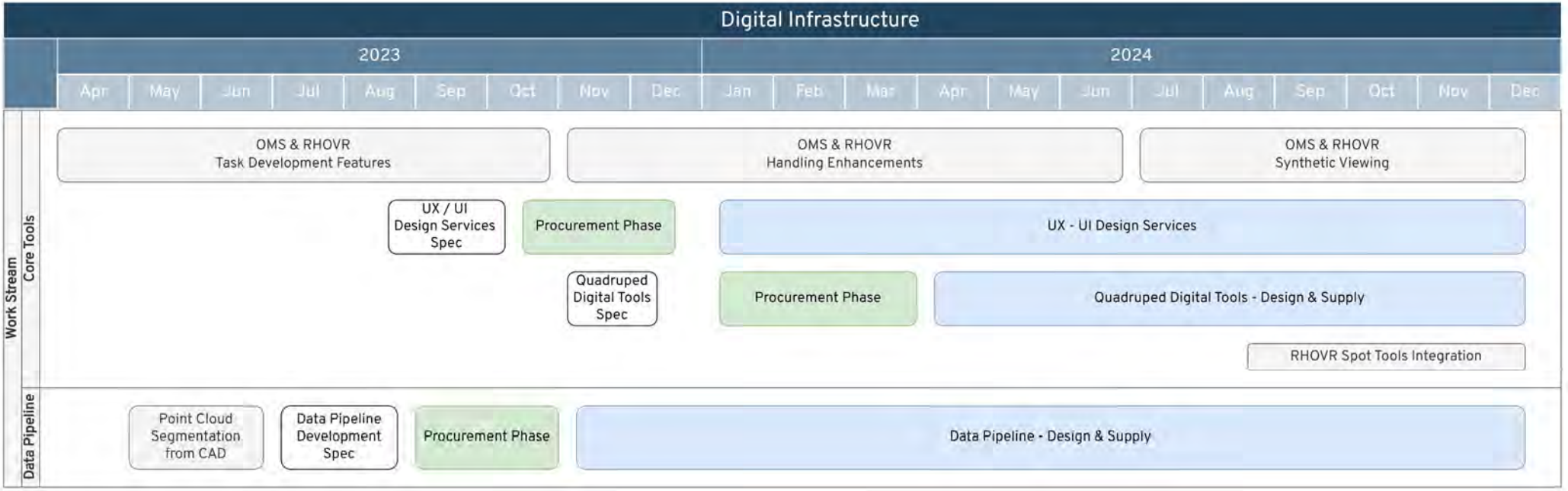
Deploy digital tools to support R&D and deployment across RAICo use cases

OBJECTIVES

Support RAICO deployments

- Robotic glovebox – high usability UX / UI
- Quadrupeds – digital tools to support training and operation
- JET Decommissioning – asset tracking
- NDA Decommissioning - TBD

ROADMAP:



UX / UI:

Context

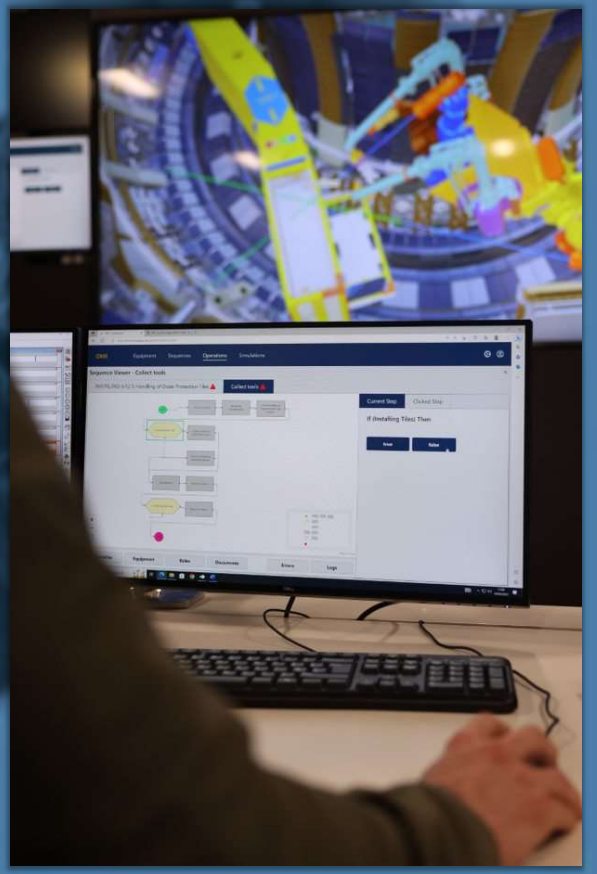
Aim: pivot existing DI systems (RHOVR & OMS) to increase accessibility and support broader use cases

Scope

Design services for reworking existing software UX

- Participation in user workshops
- Agile delivery of UI designs for new features

Excluded: implementation of design



QUADRUPED DIGITAL TOOLS:

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CONTEXT

Quadruped robots being deployed for inspection, size reduction, clean up

SCOPE

Digital tools to support remote operators with:

- Training
- Planning
- Operations

DATA PIPELINE:

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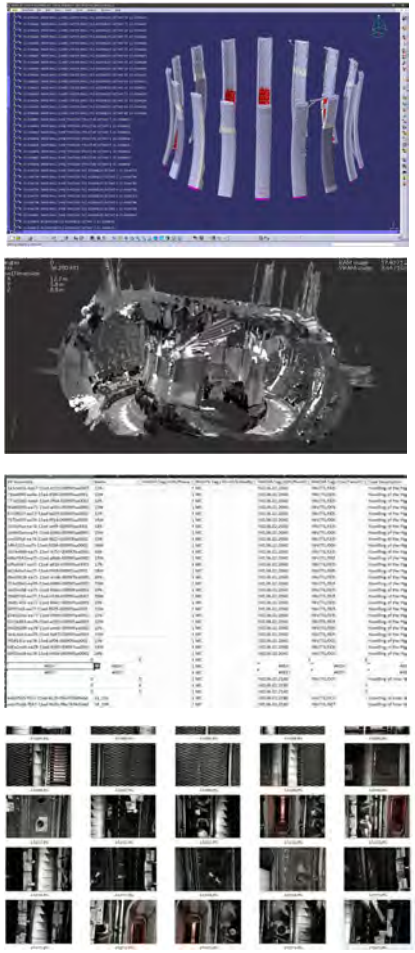
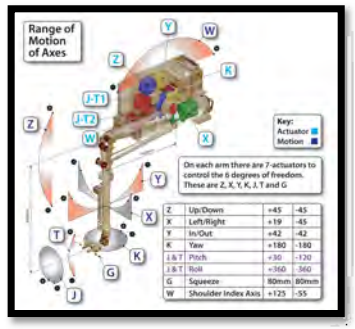
Inputs

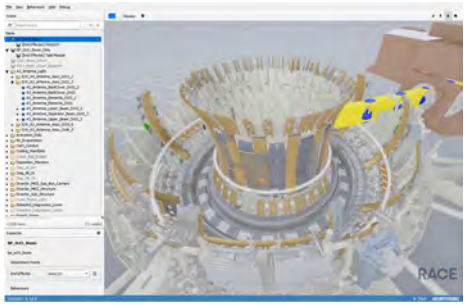
- CAD data
- Point Cloud Data
- Documentation and knowledge
- Physical material



Data Pipeline

- Collate data sets
- Convert to mesh
- Setup hierarchy
- Setup functionality
- Optimise meshes
- Apply materials
- Convert file formats





Outputs

- Digital media
- Interactive 3D models
- Digital Simulations
- Datasets for ML

PROCUREMENT SUMMARY

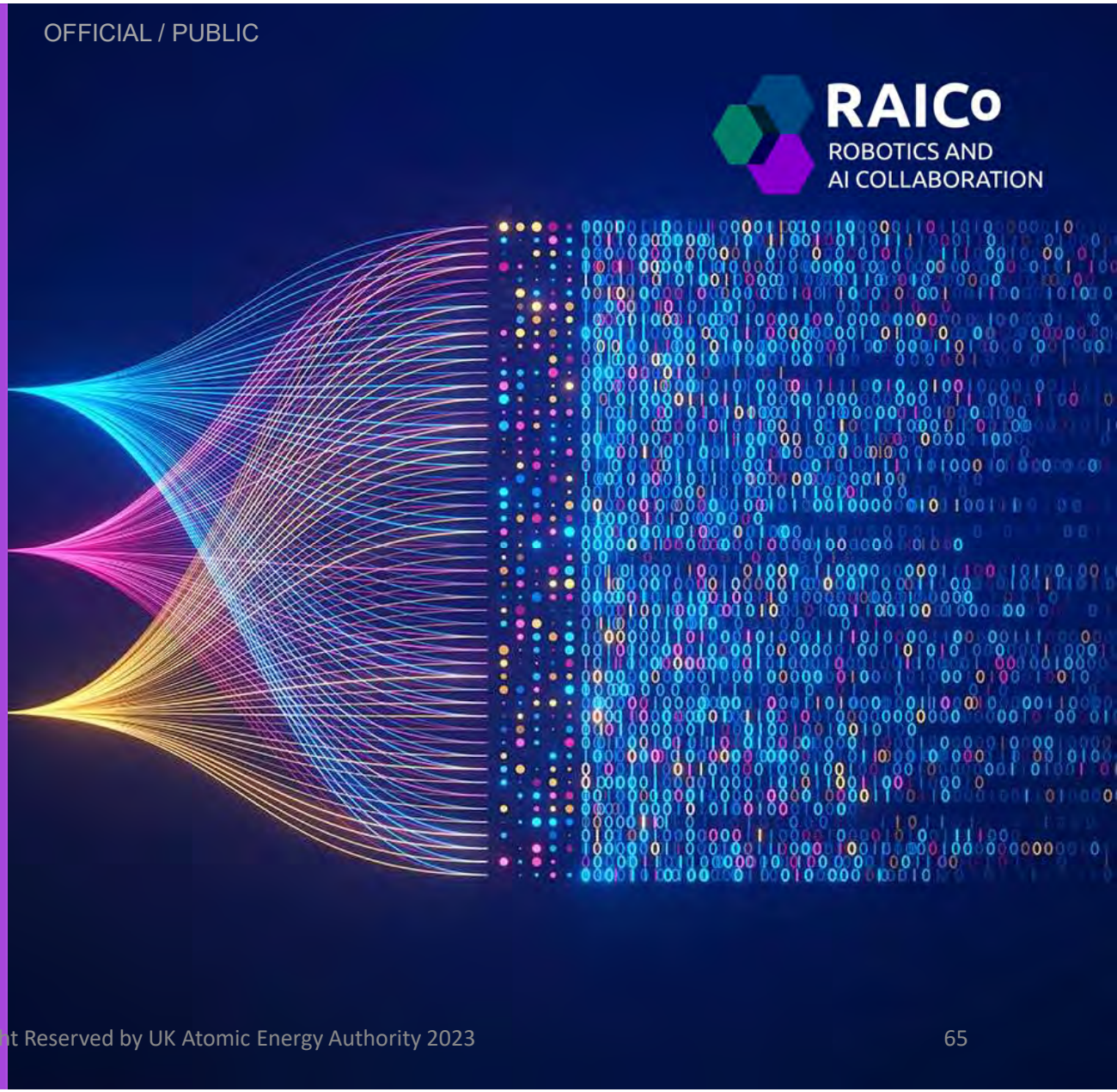
Procurement Title	RFQ Issue Date	Planned Contract Start Date*	Estimated Contract Length	Estimated Value Banding	Procurement Route
11.37 - UX / UI - Design Services	10/2023	01/2024	1 year	£100k to <£200k	Competitive Process
11.36 - Quadruped Digital Tools – Design & Supply	11/2024	05/2024	~6 months	£100k to <£300k	Competitive Process
11.35 - Data Pipeline – Design & Supply	09/2023	11/2023	~1 year	£100k to <£300k	Competitive Process

**Dates are the earliest possible dates and are subject to change*

FOR MORE INFORMATION

Speak to me this afternoon

Contact: Ronan.Kelly@ukaea.uk



RAICo
ROBOTICS AND AI COLLABORATION

Remote Handling Deployments

Lipika Naidu

Deployments Lead

Lipika Naidu

Deployments Lead

The RAICo Programme has an objective to demonstrate a **series of deployments** to incorporate and showcase the development and growth of technologies across all themes. The primary deployment streams being robotic gloveboxes, quadruped deployments and automated cells. These deployments are mainly implemented to **de-risk robotic operations** for specific use-case while utilising appropriate technology developments to aid the trials phase and optimise user experience.

AIMS AND OBJECTIVES:

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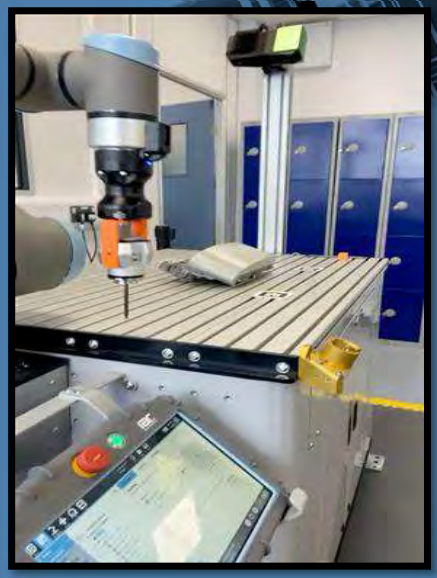
- To de-risk robotics operations.
- To de-risk AI integrated solutions.
- To provide a testbed for various technology theme developments.
- To reduce human intervention in hazardous areas.
- To implement Industry capability and improve collaboration.
- To maximise impact in Post Operational Clean Out (POCO) in NDA group facilities.



ROADMAP:

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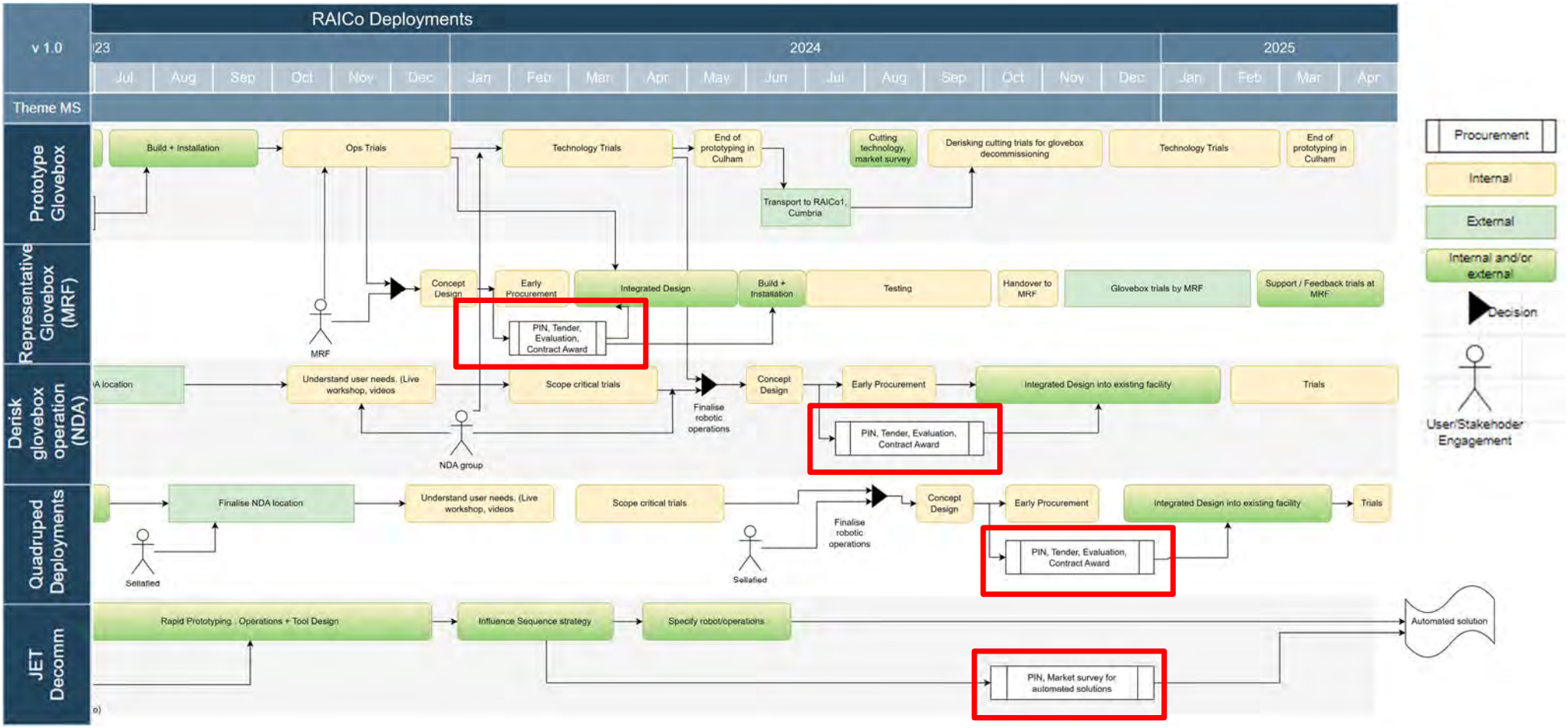

PROJECTS AND PROCUREMENT NEEDS:

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Glovebox

Integration and commissioning services.

- Mechanical, EC&I, Safety and/or Software.
- From concept design to final delivery.
- UKCA marking and technical file generation.
- Potential for all streams of deployment.

PROJECTS AND PROCUREMENT NEEDS:

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Quadruped Deployments:

Interface design & manufacture.

- Tool-changers.
- Grasping interfaces.
- Portability.

Rad hard testing

- Test critical components.
- Identity solutions in maintaining containment.
- Potential across all deployment streams e.g.UR10e, Cameras etc

PROJECTS AND PROCUREMENT NEEDS:

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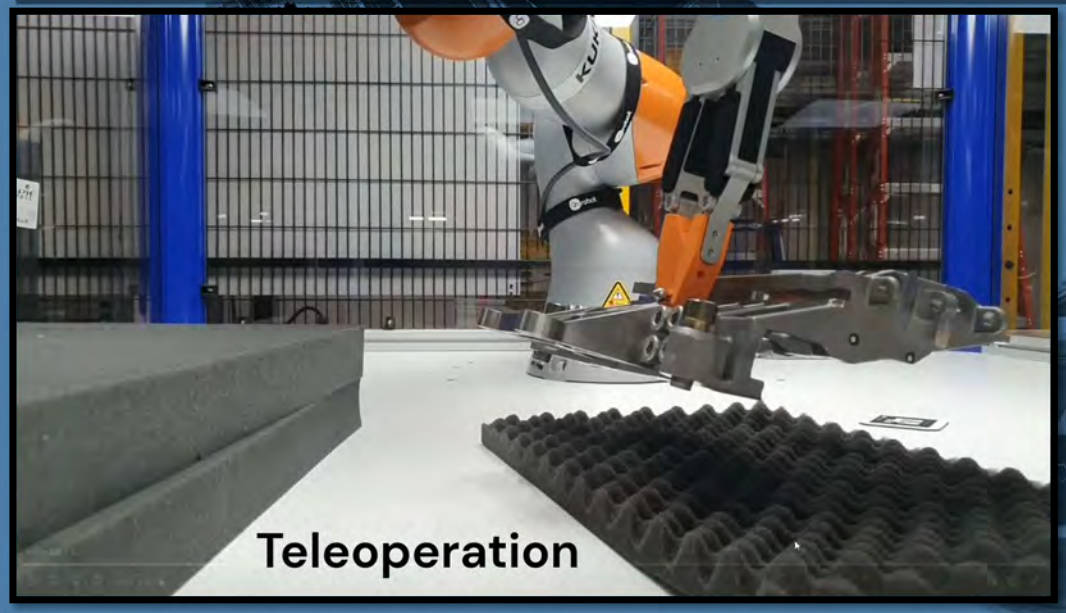
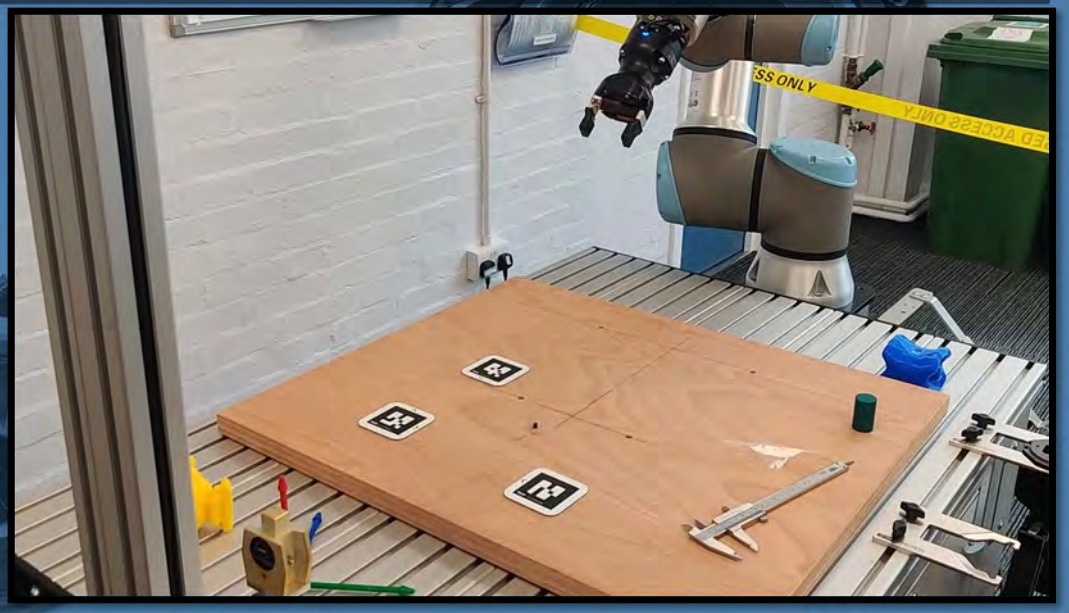
Automated solutions : JDP tile disassembly/MRF small object picking

- Automatic grasp identification
- Sort & segregate
- Pick & place.





PROCUREMENT SUMMARY

RAICo
ROBOTICS AND AI COLLABORATION

Procurement Title	RFQ Issue Date	Planned Contract Start Date*	Estimated Contract Length	Estimated Value Banding	Procurement Route
11.26 - Design, build and supply of Representative Glove Box No.2	10/2023	12/2023	~12 months	£80k to <£150k	Contracts Finder Competition
11.41 - Radiation Hardness component testing (Potential)	07/2024	09/2024	~6 months	£30k to <£80k	Contracts Finder Competition
11.42 - Interface design & manufacture (Potential)	09/2024	11/2024	~6 months	£30k to <£80k	Contracts Finder Competition
11.43 - Automated solutions (Potential)	09/2024	11/2024	~6 months	£30k to <£80k	Contracts Finder Competition

FOR MORE INFORMATION

Speak to me this afternoon

Contact: Lipika.Naidu@ukaea.uk