

# Profile of Jacobs in Nuclear Research

Nuclear Academics Meeting,  
5/9/2024


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Technical Director, Jacobs Technology, Consulting & Innovation

# Scope of Presentation

Overview of Jacobs Solutions / Amentum

Profile of Jacobs Nuclear Operations World-wide

Current & Prospective areas of technology development with universities



# Overview of Jacobs / Amentum split / merger

**Jacobs**

Challenging today.  
Reinventing tomorrow.

## Jacobs Solutions inc **split & merge**

# Jacobs

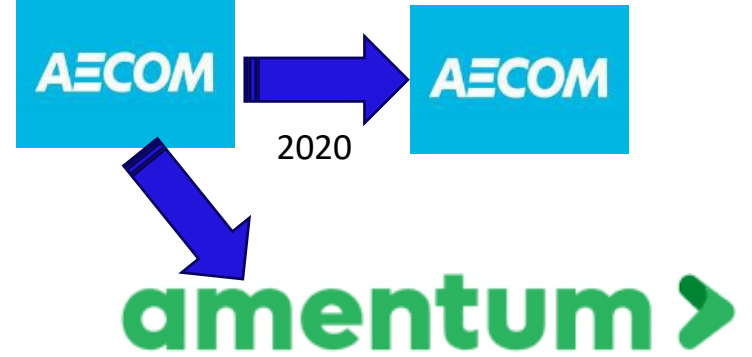
### People & Places Solutions\*

Revenue – \$10.5bn  
Staff – 42,000  
Margin ≈ 13%

### Critical Mission Solutions\*

Revenue – \$5.5bn  
Staff – 18,000  
Margin ≈ 8%

Revenue - \$16bn Staff – 60,000



Amentum  
Revenue – \$7.9bn  
Staff – 35,000  
Margin ≈ 8%

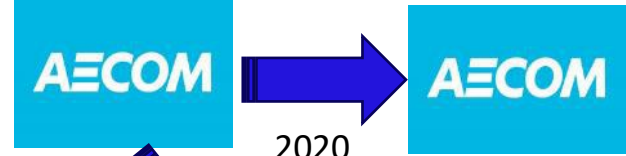
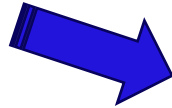
\* Also includes cyber businesses + PA

# Jacobs Solutions inc Split and Merge

# Jacobs

People & Places  
Solutions\*

Revenue – \$10.5bn  
Staff – 42,000  
Margin ≈ 13%



# amentum >

Critical Mission  
Solutions

Revenue – \$5.5bn  
Staff – 18,000  
Margin ≈ 8%

Amentum  
(Newco)

Revenue – \$7.9bn  
Staff – 35,000  
Margin ≈ 8%

Revenue - \$13.4bn Staff – 53,000

Jacobs and Jacobs shareholders will own up to 63% of Amentum  
All the nuclear businesses will operate in Amentum

\* Also includes cyber businesses + PA

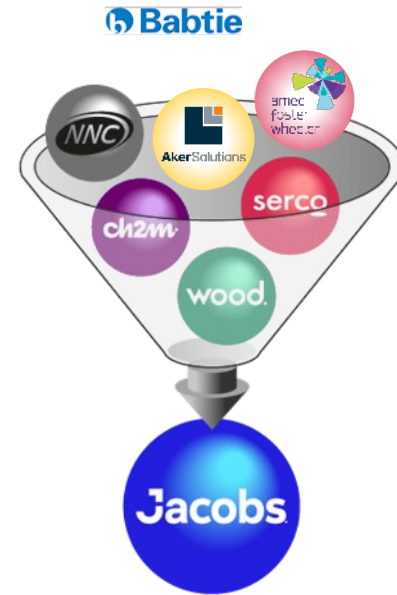
# Profile of Jacobs operations in nuclear sector world-wide

**Jacobs**

Challenging today.  
Reinventing tomorrow.

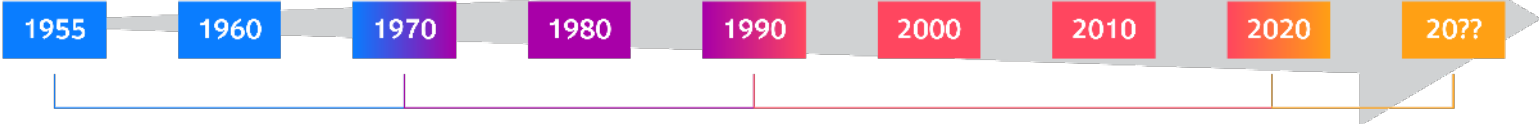
## Jacobs – World leaders in delivering nuclear programmes and projects

- From our **Reactor OEM** background – We understand the technology deeply
- **Technology Agnostic** – We work on all reactor types supporting current OEMs, Utilities and Governments (BWR, PWR, AMR, fusion)
- World leading in assuring **Programmes** – We deliver the world’s major infrastructure via bespoke models to suit client needs (including, maximising local resources and/or knowledge transfer)
- From our OEM background we are experts in a broad range of **Technologies**, enabling an assured delivery approach
- Focus on maximising **Societal Value** from our programmes of work to achieve regional aims
- Above all we are **Collaborative and Agile** in our approach



# Jacobs Nuclear

## Our Nuclear Pedigree History – Involved in Every Civil & Defence Nuclear Project in the UK

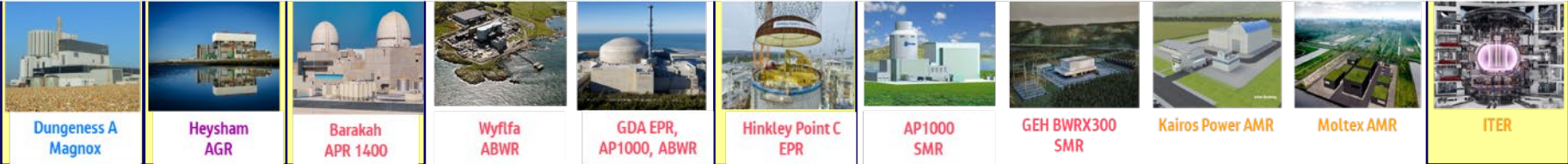


**Magnox Station Design & Construction**  
**Dreadnaught & Valiant Class Nuclear Submarine Programme**

**AGR Station Design & Construction**  
**Churchill, Swiftsure & Trafalgar Class Nuclear Submarine Programme**

**Growth in LWR Nuclear New Build & International Development**  
**Astute Class Nuclear Submarine Programme**

**Advanced Nuclear Technologies (ANT) SMRs / AMRs / MRRs / Fusion**  
**AUKUS SSN-A Class**





# Jacobs Service Offering to the Market

SECTOR		North America	United Kingdom	Western Europe	Middle East	Eastern Europe	APAC	Africa
	Decommissioning	✓	✓	✓		✓	✓	
	Nuclear New Build		✓		✓	✓		
	Existing Power Station Support		✓		✓			✓
	Defence	✓	✓				✓	

# JACOBS IN NUCLEAR

Nuclear Power



Decom EMEA



Decom NAN



Def & Sec EMEA




Def & Sec APAC





Technology  
Consulting  
Innovation





# Global Partner for Reactor Design and Operational Support


	United Kingdom
Rolls Royce	SMR Design & GDA Support
GE Hitachi	GDA Support
Westinghouse	Programme Delivery Historic GDA support
USNC	Reactor Design support
NNL (Govt)	HTGR Design support
M.O.D.	Reactor Use Case Analysis
M.O.D.	Independent Assurance (SDA)
Moltex	Reactor physics + materials
UKAEA	Chimera (Fusion Core Engineering) + materials
Framatome HPC	UK EPR & Programme Delivery EQ, Fracture qualification
Framatome SZC	ditto
EDF Energy	Operational support to AGR and PWR fleet

	U.S.A.
USNC	Reactor Design Support
NuScale	Licensing & Regulatory Support
Kairos	Structural Integrity Support
NuCube	Reactor Design Support
INL (Govt)	AMR/SMR collaboration

	France
Newcleo	Reactor Design Support
ITER	Tier 1 Programme Delivery / CMA
Naarea	Lab testing support

	Canada
CNL	Site operator
USNC	Reactor Prototype Construction

	Poland
PGE (Govt)	Advisory & Owners Engineer
SGE	Programme Delivery Partner
	Japan
JAEA	HTGR Partner to NNL

	Australia-UK-USA
AUKUS	Independent Assurance
AUKUS	Support to regulator

	Netherlands (*Developing)
MINEZEK	Owners Engineer to Government

	Czech Republic
MPO (Govt)	Owners Engineer to Govt.

# Jacobs – North America Nuclear



NAN

Revenue – >\$800M

Staff – 3,000

Margin ≈ 9%



## Hanford Plateau Remediation (PRC)

Characterisation of facilities and waste sites, retrieval of waste, environmental protection, regulatory compliance, D&D of nuclear facilities

## Paducah Gas Diffusion Plant (GDP) D&R

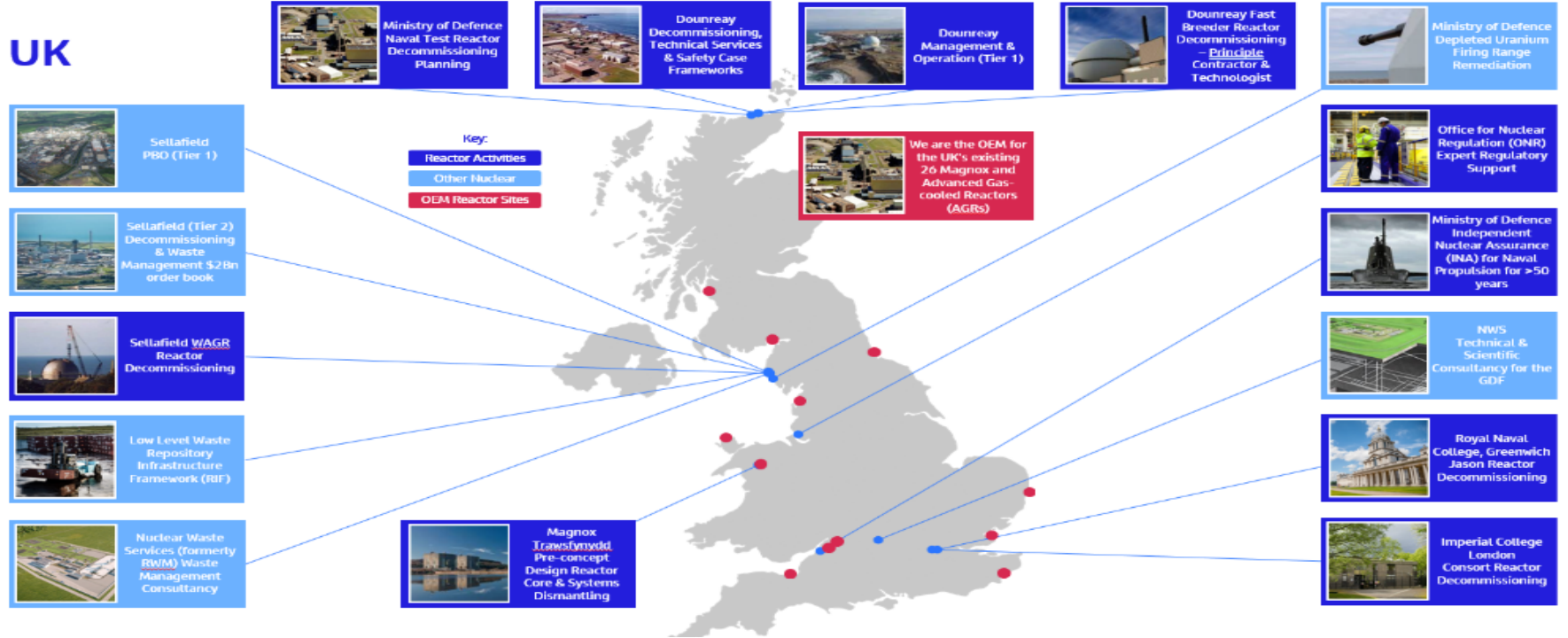
Management of over 650 structures, properties and buildings, deactivation and remediation, risk management, Tc-99 treatment

## West Valley Decommissioning Project (WVDP)

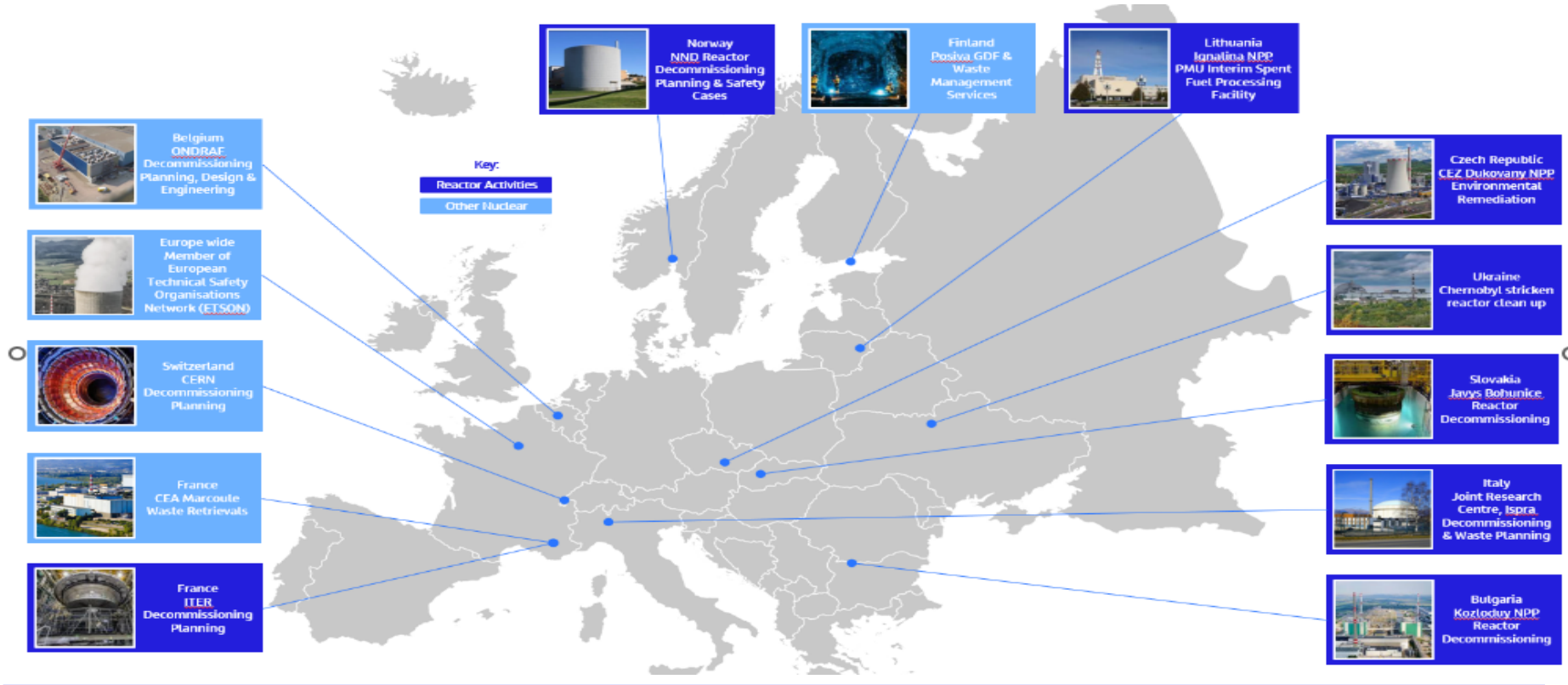
First phase site decommissioning, demolition of processing and vit plant, relocation of vitrified HLW, mgt of underground tank farm.

# Jacobs Decommissioning in UK

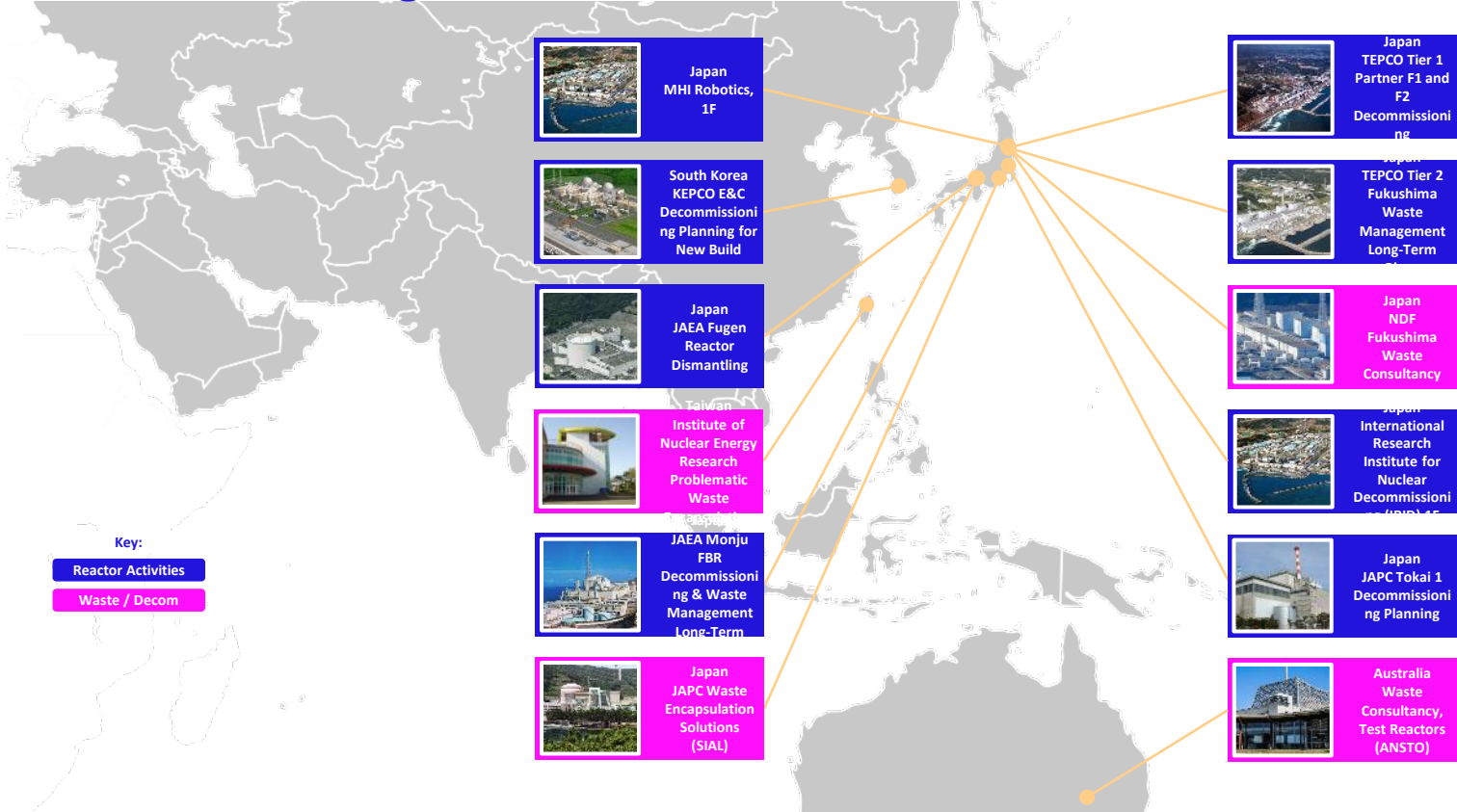
UK



# Jacobs Decommissioning in Continental Europe



# Jacobs Decommissioning in Far East and Australia



# Jacobs in Defence and Security



**HMNB Clyde,  
Faslane**



**Devonport**



**Barrow**



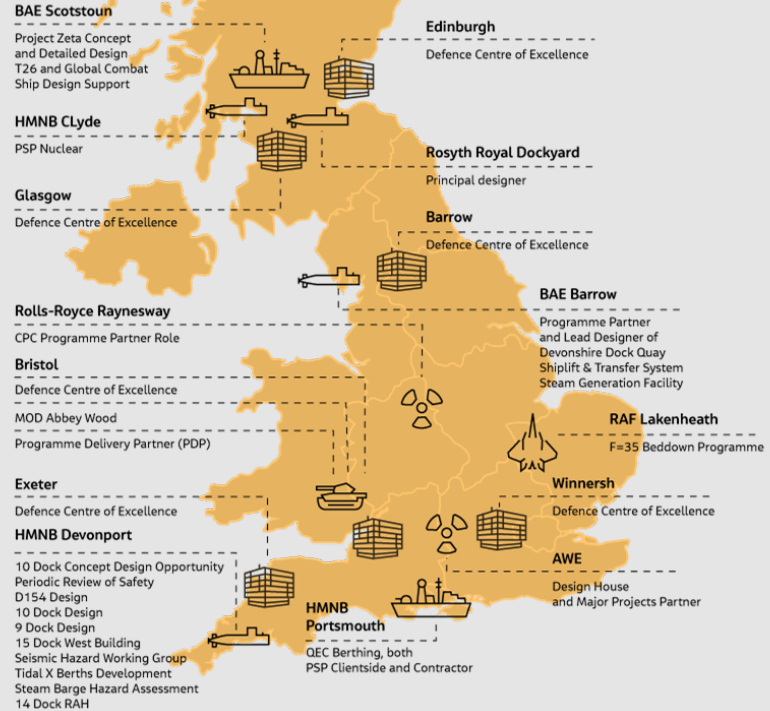
**DIO and USVF  
estate**



**AWE**



**Queen Elizabeth Class  
Aircraft Carrier Berths**



**SUPPORTING LOCAL DEFENCE CLIENTS AND PROGRAMMES**

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## TC&I - Birchwood Science & Engineering Laboratories / R&D Hub



**12,000 Sq/M**  
UK's Largest  
specialist nuclear test  
facilities, laboratories  
and rig halls.



**+700  
Specialists**  
Over 700  
Engineers,  
Scientists &  
Subject Matter  
Specialists on one  
site.



**+10,000  
Reach Back**  
Into over 10,000  
U.K. based  
engineering  
specialists and  
scientists



**Nuclear**  
+55 Years experience  
working with both  
civil and defence  
nuclear sectors

**Specialist  
Consulting &  
Laboratory  
Solutions**



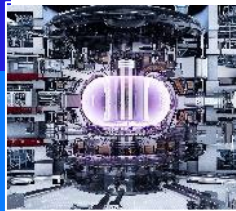
**Engineering  
Development  
&  
Independent  
Validation**



**Material  
Science &  
Structural  
Integrity**



**Independent  
Assurance,  
Technical  
Advice &  
Regulation**



**Nuclear &  
Fusion**  
GW Scale, Small  
Modular Reactors  
(SMR) and  
Advanced Modular  
Reactors (AMR)



**Energy  
Transition**  
Design, engineering  
& prototyping of  
Hydrogen, Tidal,  
Solar and Wind



**Space**  
Material Science,  
Robotics, Orbital  
Nuclear  
Technologies, Lunar  
Based Power



**Defence**  
Specialist support  
of UK Nuclear  
Deterrent and  
Nuclear  
Submarine Fleet  
for +50 Years

**Chemistry | Robotics | Failure Investigations | High Temperature Testing | NDT, Equipment Qualification | Safety Case | Physical Twins | Equipment Qualifications | Prototyping, Technical Oversight | Independent Assurance | Advanced Research and Development**

### Technology, Consulting & Innovation

#### Business & Delivery Units



#### **S.C.L.S.** Specialist Consulting & Laboratory Solutions

- Reactor Design Services
- Reactor Physics
- Chemistry Consultancy
- Radiochemistry
- AMR Test Rig Development
- Radiation Protection
- Failure Investigations
- Graphite Consultancy
- Safety Case Support
- Equipment Qualification



#### **E.D.** Engineering Development

- Specialist Test Rigs
- Robotics
- Remote Handling
- Technology Integration
- Package Building
- Novel Engineering
- Life Extension
- Physical Twin Simulation
- Validation & Verification



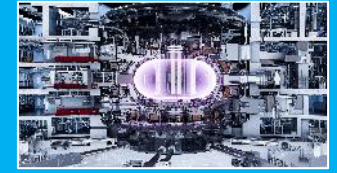
#### **M.S.S.I.** Material Science & Structural Integrity

- Low & High Temperature Testing (NNUF HTF)
- Corrosion Test Rigs
- Materials Qualification
- Advanced NDT services
- Structural Integrity assessment
- SI Methods Development
- Finite Element Analysis
- Specialist Modelling & Analysis
- Inspection Validation Centre



#### **A.T & R.** Assurance, Technology & Regulation

- Independence Assurance
- Codes & Standards
- Regulatory Assurance
- Technology Development
- Technology Evaluation
- Technical Oversight
- GDA Application Support
- Regulator Support

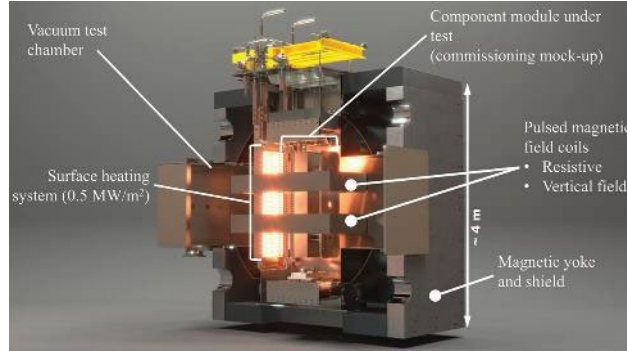


#### **FUSION** Fusion Technology Development & Research

- Fusion Reactor Design
- Fusion Reactor Physics
- Advanced fabrication dev.
- High Temp Materials Testing
- Tritium Plant Design
- Remote Solutions & Robotics
- Programme Delivery
- Specialist Test Rigs/Facilities
- Demonstration Projects

# Examples of High Profile Projects (NA, UK, Europe)

Management and Operation of Chalk River site for AECL



Momentum SNC with KEPCO and Assystem CMA of ITER



Design and Build of FTF  
“CHIMERA” for UKAEA

# Jacobs University Research Links

**Jacobs**

Challenging today.  
Reinventing tomorrow.

# NNUF High Temperature Facility (HTF) for Materials Testing



## CONNECTED UNIVERSITIES

Manchester

Bangor

(N)AMRC/Sheffield

## TECHNICAL DEFINITION / SCOPE

As part of NNUF, HTF is an open access lab that is able to support materials structural integrity testing in a variety of generation IV reactor coolants.

Fatigue, creep, creep fatigue, fracture, general corrosion

## AREAS OF FUTURE INTEREST

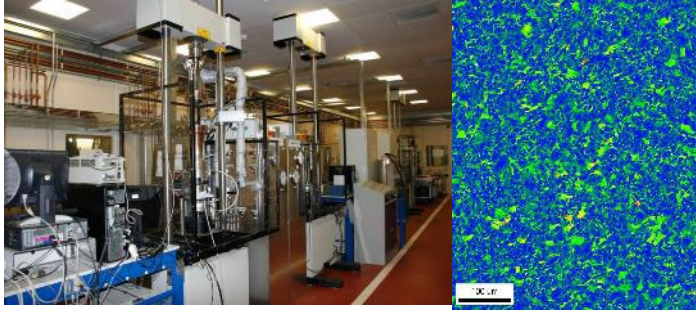
Qualification of new materials

Qualification of novel fabrications (c.f. STEP DFFM framework)

Qualification of material performance in high temperature / alternative coolants

Improved failure testing methods

# High Temperature Water Testing of Materials



## CONNECTED UNIVERSITIES

Manchester

Oxford

Bangor

## TECHNICAL DEFINITION / SCOPE

Stress corrosion cracking, environmental fatigue,  
Fuel cladding breakaway oxidation

## AREAS OF FUTURE INTEREST

Improved mechanistic understanding of the above degradation phenomena  
Advanced post-test microscopy of specimens  
Use of specialised test rigs to support programmes

# Robotics and Remote Operations



## CONNECTED UNIVERSITIES

Manchester  
Bristol  
Nottingham

## TECHNICAL DEFINITION / SCOPE

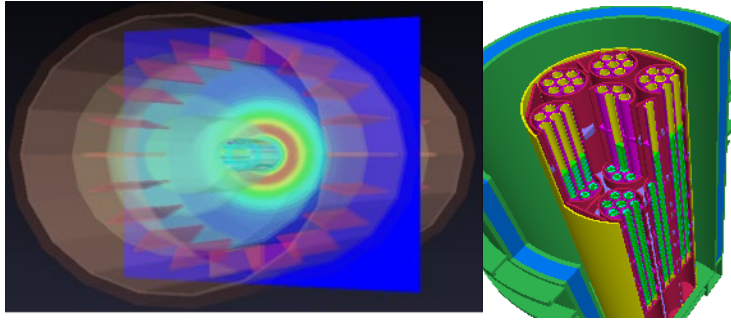
Integration of robotic systems to perform operations in dirty, dangerous, dear or delicate environments. Focus on Autonomy. Focus beyond the nuclear sector.

## AREAS OF FUTURE INTEREST

Regulatory support for autonomy.

Novel instrumentation to incorporate into advanced robotic systems

# ANSWERS™ REACTOR PHYSICS SIMULATION



## CONNECTED UNIVERSITIES

Warwick  
Cambridge  
Imperial

## TECHNICAL DEFINITION / SCOPE

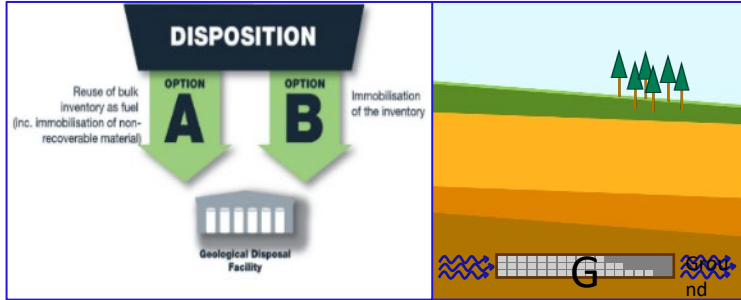
A suite of reactor physics modelling tools comprising WIMS+MONK (reactor physics) MCBEND (shielding and dosimetry), TRAFIC (fast reactor fuel), PANTHER (whole core simulation)

## AREAS OF FUTURE INTEREST

Use of advanced analytical methods to improve (Monte Carlo) code performance, advances in uncertainty quantification, adaption to HPC/GPU.



# Nuclear Decommissioning / Waste Disposal & Storage



## CONNECTED UNIVERSITIES

Sheffield  
Bristol  
Cambridge

## TECHNICAL DEFINITION / SCOPE

Corrosion experimental and modelling studies related to GDF  
Support to management of active lab at Sheffield

## AREAS OF FUTURE INTEREST

Development of GDR-related experimental methods, data generation, advances in mechanistic understanding  
Scale-up methods

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