

# Profile of Jacobs in Nuclear Research

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# Scope of Presentation

Overview of Jacobs

Selection of major nuclear projects and market presence

Key areas of research and technology development

## About Jacobs – Group (Jacobs, Wood Nuclear, CH2M Hill)

54,000  
talented  
people

Executive  
Team  
Diversity of  
75%

£13Bn  
Revenue

1700+  
mental  
health  
champions

175  
apprentices  
anually

800  
graduates  
annually

Mission Critical  
Solutions

Resilient  
Environments

Thriving Cities

Operational  
Advancement

Scientific  
Discovery

Advanced  
Manufacturing

## Service and Capabilities Relevant to Nuclear Sector

Portfolio, Project and Programme management	Cyber, Digital & Security	Safety case and licensing	Operations and Maintenance	Technical solutions
EPC projects	Intelligent Asset Management	Design & Engineering	Software services	Infrastructure
Nuclear physics	Construction Management	Environmental & Planning	Remote inspection & engineering	Enterprise resilience
Radioactive waste modelling and assessment	Site services	Human factors	Independent regulatory support (civil and defence)	Construction
Environmental services	Independent validation services	Chemistry and material laboratory and assessment capability	Commissioning	Advanced technology systems

## Key positions – Nuclear 1

### **Strategic lifetime partner**

to EDF Energy (and their  
largest UK provider of R&D)

Playing a key role  
**in every UK civil  
reactor new build  
project**

### **On site at the world's most challenging decommissioning sites**

Fukushima, Sellafield,  
Chernobyl, Hanford.

Supporting  
**global nuclear  
new build**

Barakah, Hanhikivi

Integrating the construction  
of ITER,  
**the worlds largest  
fusion reactor**

## Key positions – Nuclear 2

### **Programme Delivery Partner**

providing agile project  
management and delivery  
to DE&S and SDA (MOD)

### **Provision of professional services**

to the  
Australian Department of  
defence since 1997

### **50 years of support to the UK's continuous at sea deterrent programme**

HMNB Clyde, HMNB  
Devonport, Rolls-Royce,  
Barrow in Furness, AWE

### **"GOCO" manager**

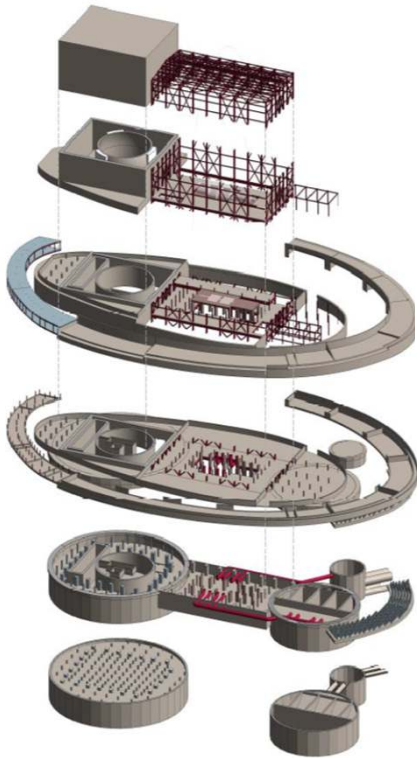
of Canadian Nuclear Labs  
through CNEA  
with SNC and Fluor

### **24.5% shareholding in AWE plc**

with Serco and Lockheed  
Martin

COMMERCIAL IN CONFIDENCE

## UK Small Modular Reactor (SMR) – consortium members



**Jacobs**

**an**  
assystem

**ATKINS**

Member of the SNC-Lavalin Group

**ARUP**

 **bam**  
nuttall



NUCLEAR AMRC



NATIONAL NUCLEAR  
LABORATORY

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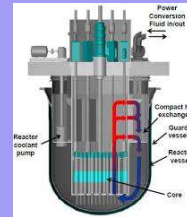
# Jacobs Profile in UK-delivered AMR Support



He-cooled 4MWe FR  
( 10MWt 750 °C)

Process heat, transportable,  
remote op., water desal.

Towards detail design  
Structural integrity calcs  
Some materials tests  
Reactor physics calcs



Pb-cooled 400MWe FR  
(500, up to 700-800 °C)

Process heat, transportable,  
remote op., water desal.

Extend test facility in HTF  
to performance materials  
corrosion test in HT Pb



Molten stable salt reactor  
150MW modular

Reduced cost, waste Pu,  
heat store -> load follow

Support flow tests in  
molten salt in MCLR facility  
at Warrington



# CHIMERA (MODULE TEST FACILITY)

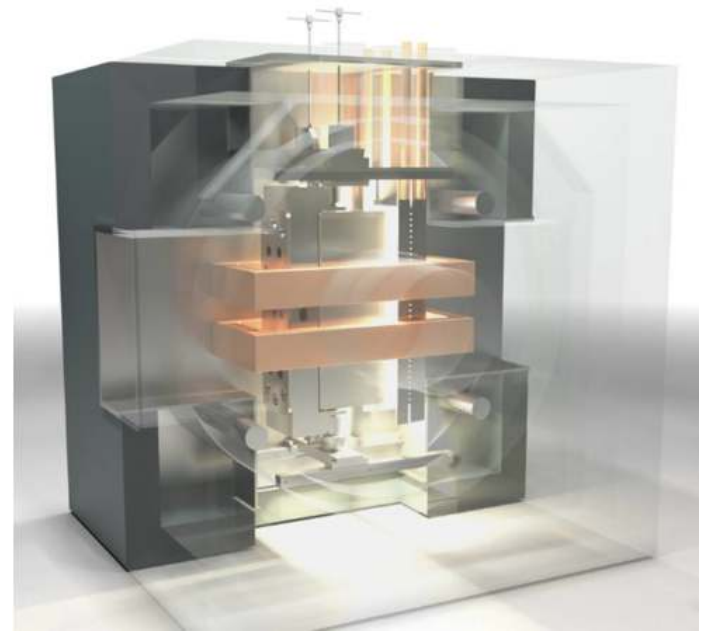
(Combined Heating and Magnetic Research Apparatus)

Jacobs performing detailed design and construction of new UKAEA facility to be located at Advanced Manufacturing Research Park Rotherham

£14.3M contract

Will enable component tests under fusion-relevant conditions

High temperature, heat flux, vacuum, magnetic field (static and dynamic)



## Integrated Innovation for Nuclear Decommissioning (IIND)

- Research competition initiated to identify new ways to decommission radioactively contaminated process cells.
  - Desire to bring new innovation to decommissioning challenges.
  - Innovative funding by InnovateUK, NDA and BEIS.
  - Competition was run over 3 years in three stages:
    - Initial proposals – 35 consortia proposed ideas.
    - 15 consortia were awarded feasibility studies (Phase 1 £50k).
    - 5 feasibility studies were awarded £1.5m each to develop and showcase ideas in an inactive demonstration of their ideas (Phase 2).
    - 2 consortia chosen to take solutions forward for Active Demonstrator Phase – Jacobs and Barron led consortia (Phase 3).
  - As competitions winner's we will now work with Sellafield to develop our technologies and demonstrate them in a real decommissioning environment.
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# The End to End Solution

- Safer – Faster – Cheaper Decommissioning



## The Partners

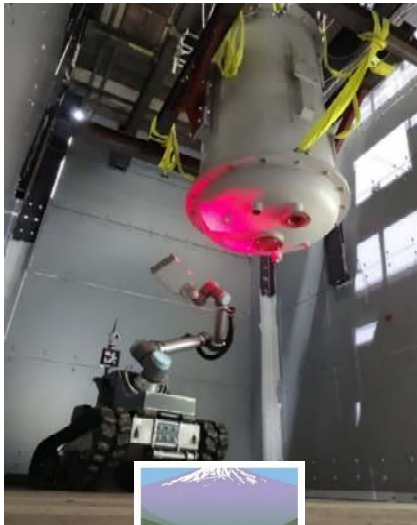
- A group of partners brought promising technologies and ideas.
- Developed a clear understanding of what our partners wanted to achieve from the project.
- Selected partners who could support their developments from outside the nuclear sector.
- Agility in our partnering because one size does not fit all.



# Jacobs



## Characterisation Technologies



Gamma imaging

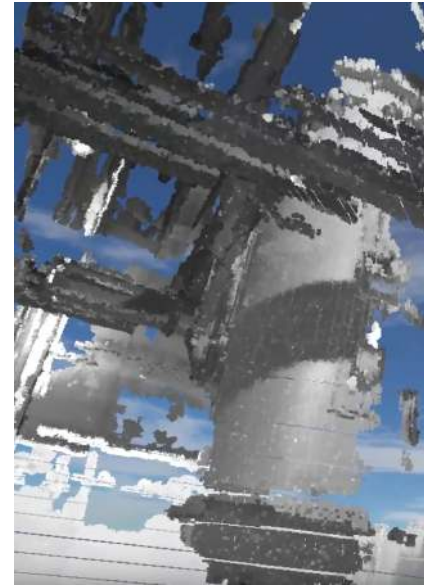
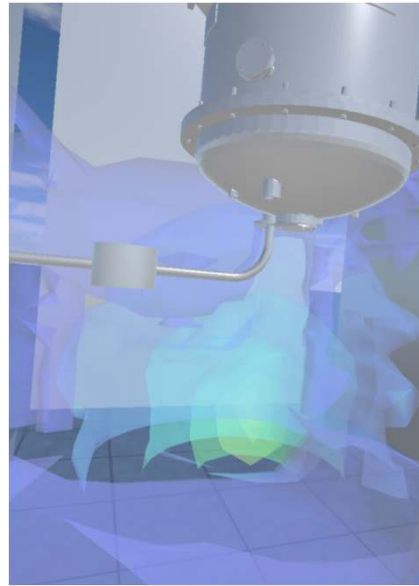


Stereoscopic vision



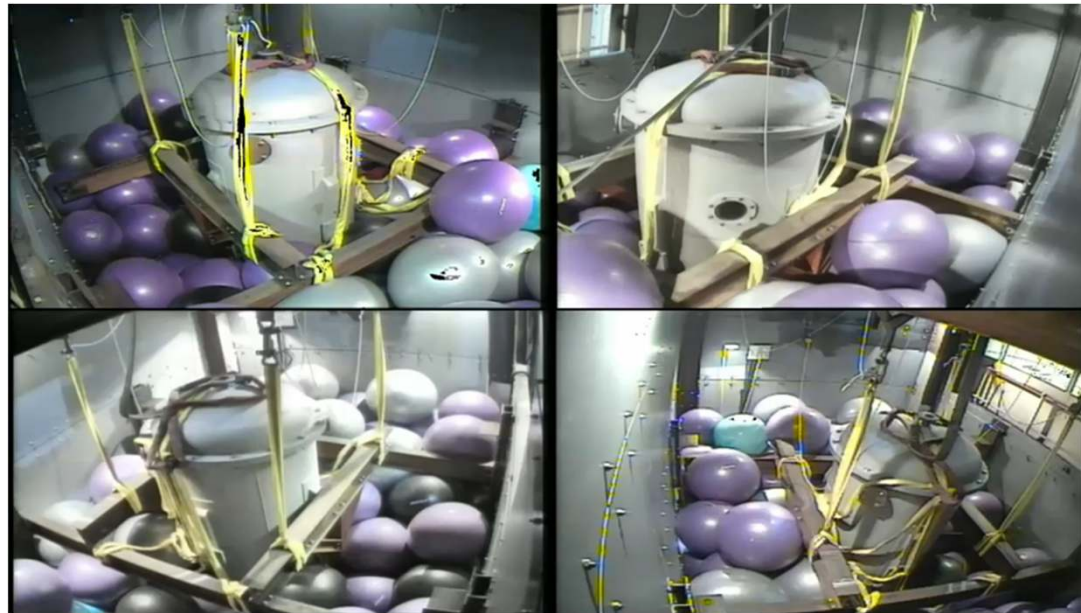
Raman imaging

## VR and Planning





## Release and Lowering of Waste



**Jacobs**

## Laser Cutting



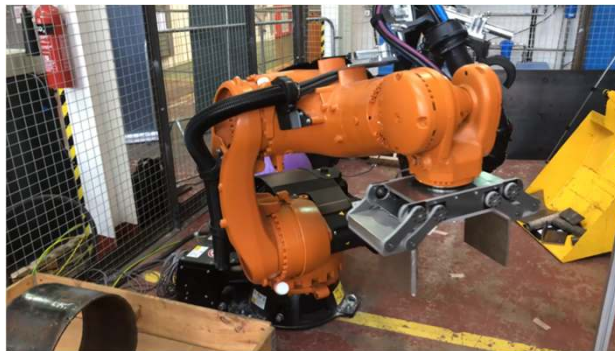


## Robotics and Remote Handling

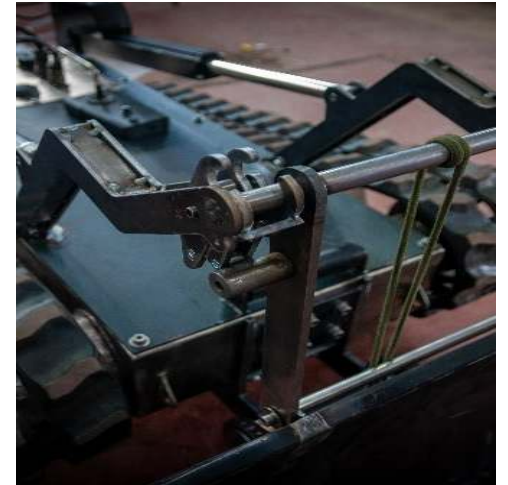


Remotely Operated Vehicle

**DCE** DIGITAL  
CONCEPTS  
ENGINEERING LTD.



University of  
**Salford**  
MANCHESTER



**Jacobs**  
Adaptive Gripper

# Jacobs Key Technologies With University Support Links - 1

## Materials Science and Structural Integrity

- Advanced microscopy
- Structural integrity methods development
- Access to specialised test facilities (active)



## Radioactive Waste Management

- R&D on waste forms
- Modelling to support GDF
- Waste containment corrosion

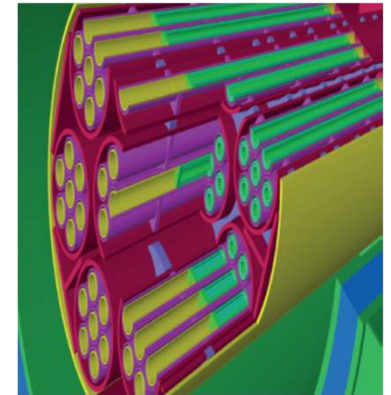
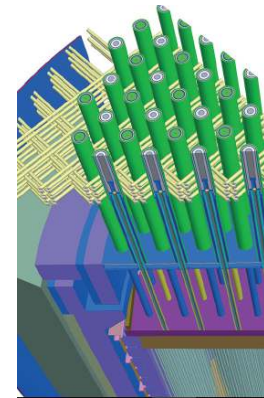


## Jacobs Key Technologies With University Support Links - 2

### The ANSWERS<sup>R</sup> software service

- Modelling development
- Code coupling
- Thermal hydraulics and SI links

WIMS, PANTHER,  
MCBEND, IDE,  
RANKERN, FISPIN,  
CRITEXUK, MONK



### Remote Operations

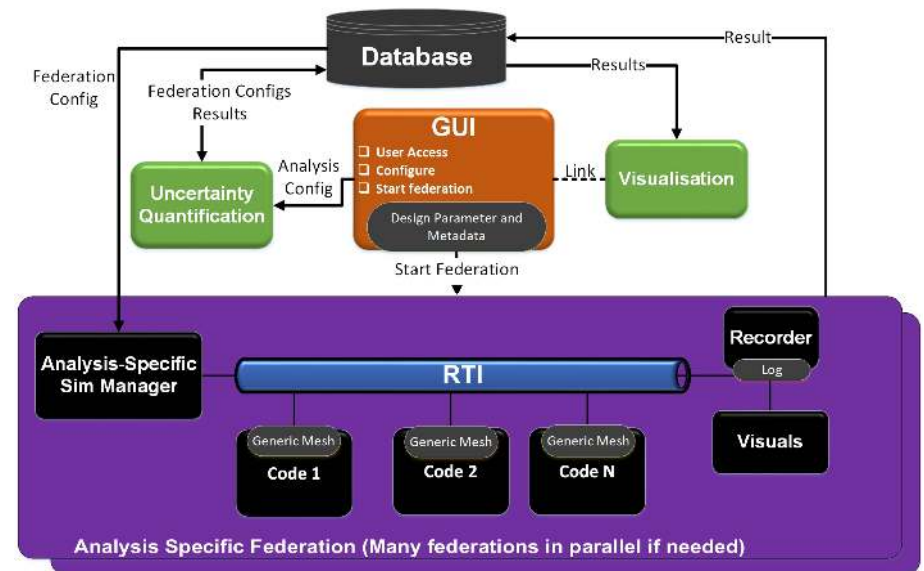
- Advanced Robotics
- Instrumentation
- Digital integration



## Jacobs Key Technologies With University Support Links - 3

# Digitalisation

- Development of digital twins capability (NVEC)
- Use of advanced instrumentation to support Internet of Things approaches
- Development of codes to support model representation of operational plant



## Areas of Jacobs Focus for Universities in Nuclear Sector

- Keen to be a commercialisation conduit for new technologies
  - Hardware for deployment in challenging plant context
  - Developments in improved assessment tools
- Recognise that new publicly-funded facilities raise new opportunities and challenges though open-access model (NNUF, SHRI)...a cultural change.
  - Use of High Temperature Facility by third parties
  - Access to NNUF capabilities for Jacobs projects
- Importance of letters of support from industry that show
  - Genuine engagement with important issues in the nuclear sector
  - Provide access to industry subject matter experts