

# LaserSnake2 - An Innovative Approach to Nuclear Decommissioning

- Collaborative R&D project integrating robotic delivery systems and laser cutting for nuclear decommissioning
- In-situ and ex-situ decommissioning processes
- Develop safe, cost efficient solutions for high-hazard confined spaces



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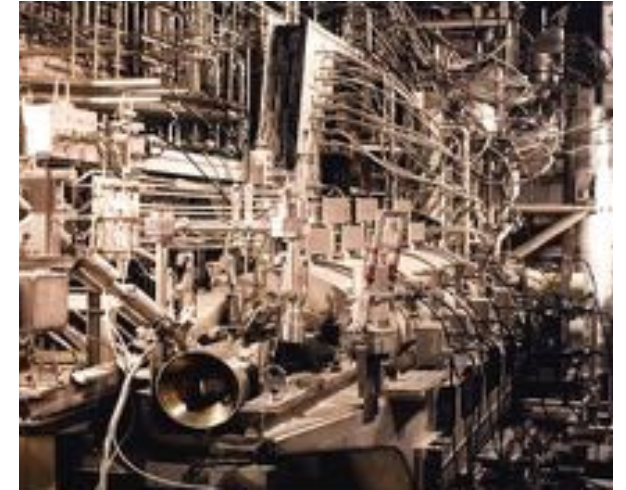
# *An Innovative Approach to Nuclear Decommissioning*

## **The challenge**

- Decommissioning of complex and hazardous environments
- Industry-wide aim to minimise personal dose uptake
- A need for remote solutions to safely conduct decommissioning

## **Use-case:**

Size reduction of dissolver vessel in FGRP in Sellafield



## *An Innovative Approach to Nuclear Decommissioning*

### **Active Decommissioning Campaign: Dissolver Vessel**

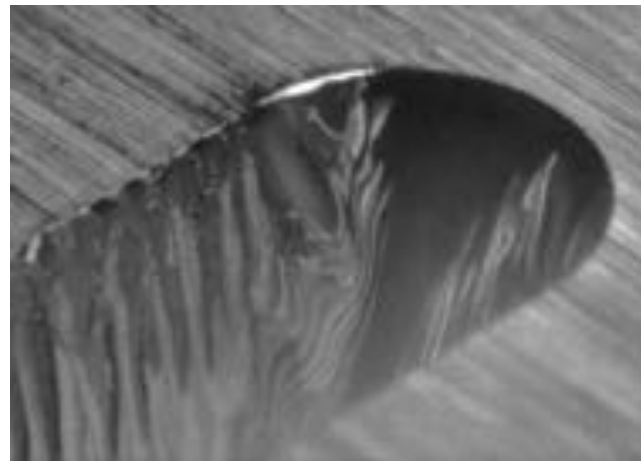
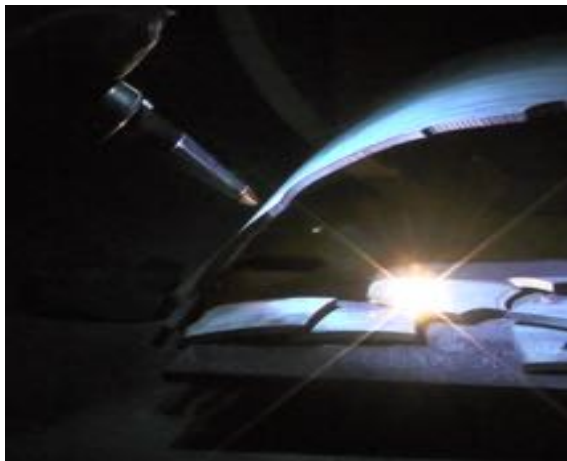
- Mass: 5 tonnes
- Diameter: 1.3 m
- Dual Walled
  - Inner Shell: 32 mm thick
  - Outer Shell: 12 mm thick
  - Separated by 40 mm air gap
- Already size reduced into three sections
- Located in a 3 m x 4 m concrete walled cell
- Cell categorised as C3/R4 – Man accessible in PVC suit with respirator
- Contact dose on vessel 12 mSv/hr



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## Why laser cutting?

- Traditional methods: Reciprocating saws or grinders
  - Complicated to re-engineer hand-held tools into remote systems
  - Slow and time-consuming
- Laser cutting head integrated with robotic system
- Already being implemented in other industrial sectors



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### **Why snake-arm robots?**

- Highly flexible robots ideal for working in confined and hazardous spaces
- Arm can traverse complex environments using a control mode called ‘nose-following’



# *An Innovative Approach to Nuclear Decommissioning*

## LaserSnake2

- Modular arm system, up to 4.5m long
- 10kW Laser process head
- High definition inspection cameras
- High powered environment lighting



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## Conclusions

- Significant benefits to using advanced remote systems for size reduction
  - Reduced dose uptake
  - Cost savings – less secondary waste
  - Reduce duration of work
  - Less plant modification required
  - Fewer interventions for maintenance and lower fume
  - Excellent tolerance to standoff compared with other techniques
  - Deployable with 1/3 of the labour resource
  - Safe operation throughout

