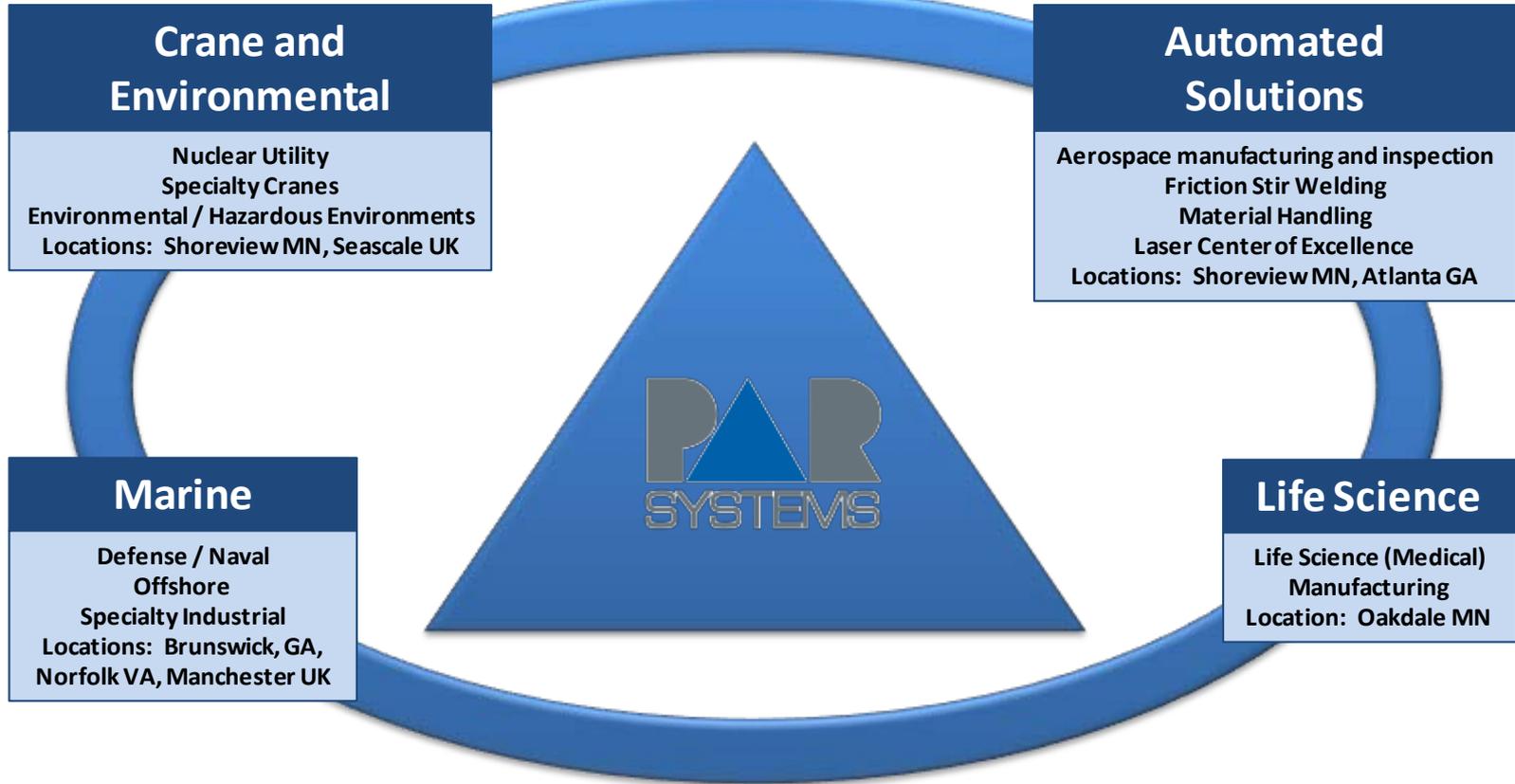




**Remote Handling, Critical Lift and Automation Solutions**

*Adding dramatic value for system customers and users*



*PaR successfully combines technical expertise from across its business units to develop integrated, flexible solutions for our clients across a broad range of end markets.*



# PaR Crane Solutions Profile



## Commercial Nuclear

Refueling Equipment  
Outage Critical Cranes  
SMR component design  
D&D systems

## Specialty Cranes

First of a kind  
Specialized lift  
Tensile Truss



## Environmental

D&D Systems  
Manipulators  
Telescoping  
Tooling

## Advanced Motion

Crane Solutions  
Anti Sway  
Crane Vision  
Safe Move  
Auto Move



*PaR's broad material handling portfolio and systems integration experience coupled with risk and project management experience have solved a wide range of difficult material handling problems.*



- Waste Treatment Plant (Hanford)
- Advanced Mixed Waste Treatment Facility (INL)
- Pit disassembly and conversion (Savannah River)
- Alpha Gamma hot cell decommissioning (ANL)
- Thorium uranium recycle facility replacement with new mast system (ORNL)



Oak Ridge National Lab, Turf-G



Waste Treatment  
Plant



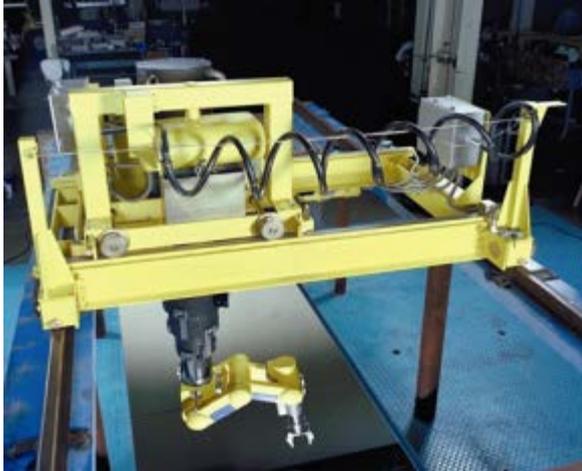
Advanced Mixed Waste  
Treatment Facility



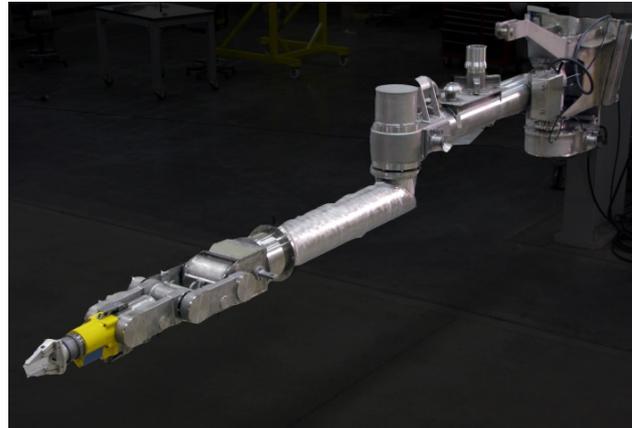
Defense Waste Processing  
Facility

Over 45 various equipment since 1966, such as power manipulators, in cell cranes, hoists, robotic arms, etc

- JAEA            Oarai and Tokai: JMTR, RFEF, FMF, NUCEF  
                    Manipulators, Waste treatment, Spent fuel treatment
- JNFL            Reprocessing plant fuel cutting, vitrification  
                    Power manipulators and mast for AA and KA facilities
- TEPCO/GE    Fukushima 1, 2 and 6 Fuel handling machines  
                    Fukushima 4 Shroud cutting water jet tool and mast
- JAPC/GE      Tsuruga 1 and Tokai 2 Fuel handling machines
- Kansai Electric   Takahama waste treatment facility manipulators



Manipulator Systems



Manipulator Arms



Programmable Manipulator



Tensile Truss

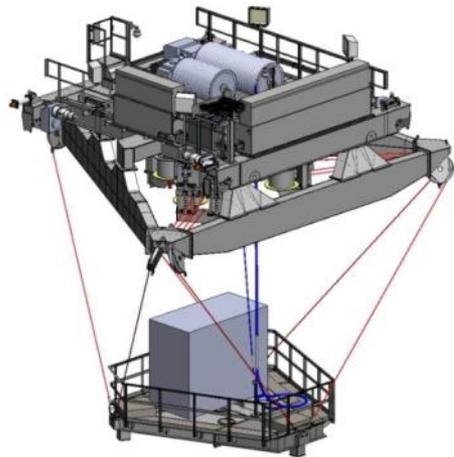


Wet Size Reduction



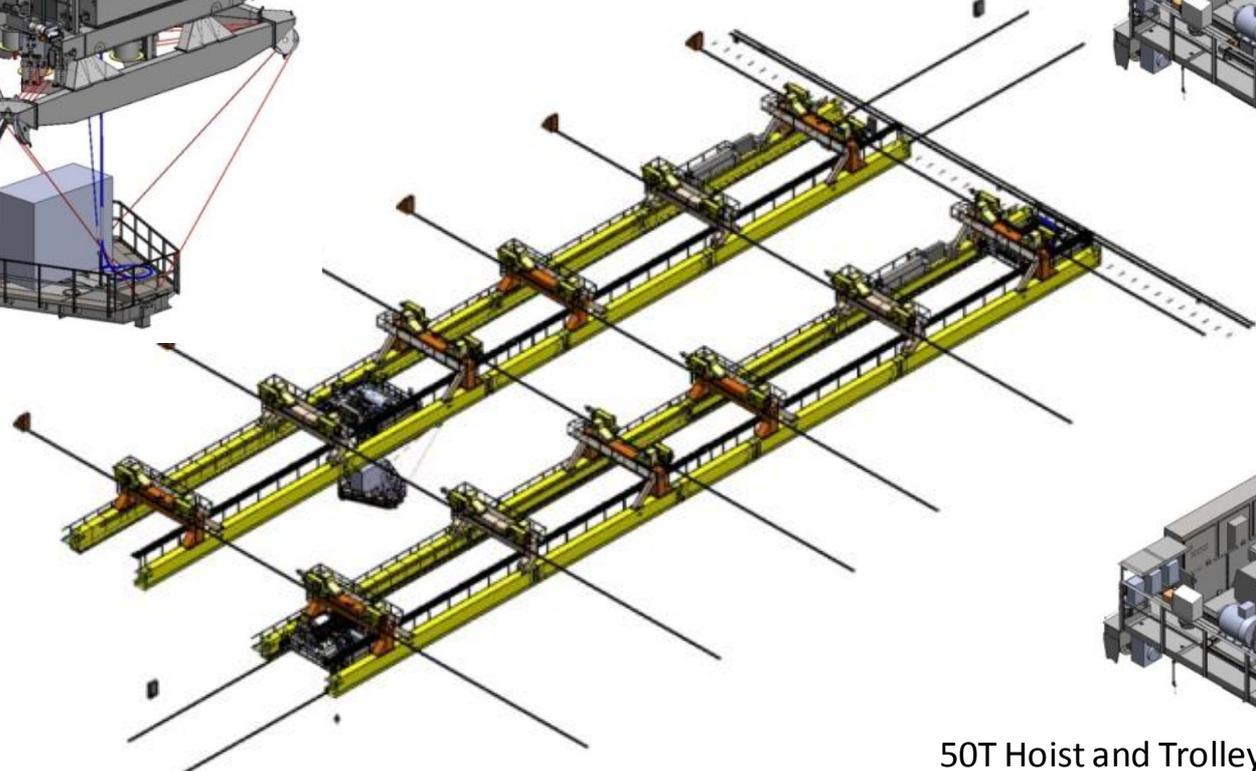
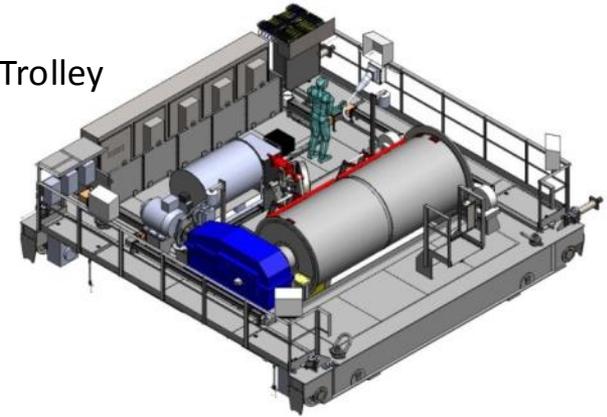
Mobile Manipulator for Hot Cell Maintenance

# Chernobyl – Main Crane System



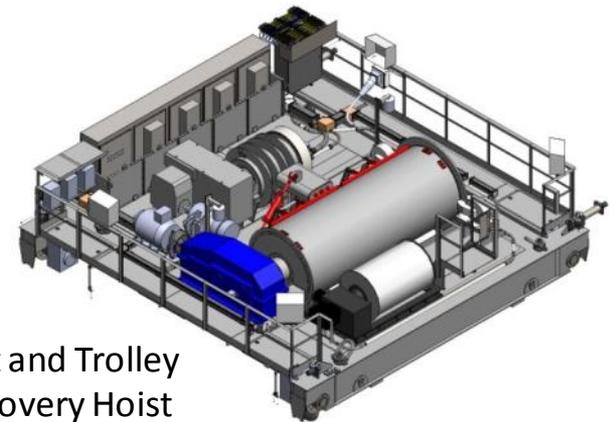
Tensile Truss  
~70m Reach

50T Hoist and Trolley



(2) 96m Bridges  
(6) Runway Beams

50T Hoist and Trolley  
With Recovery Hoist





## Spent fuel and debris retrieval system for Unit 3

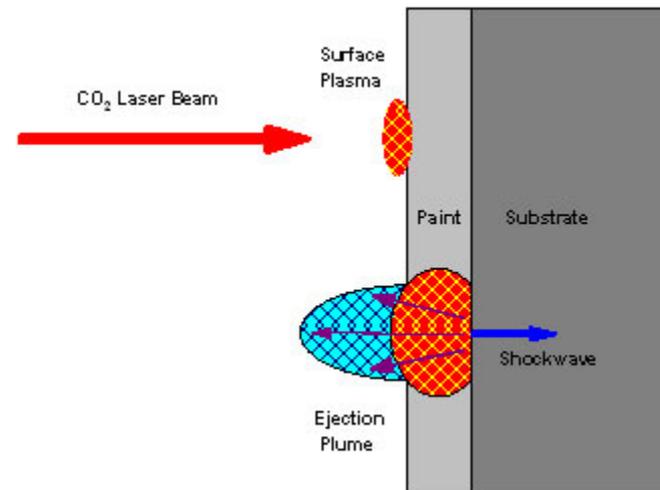
- Tensile Truss system to deploy stable platform and manipulators
- Standard refueling mast and hoists
- Remote control operation, supported by numerous cameras and lights



- Developed for Paint stripping and mold cleaning with use of high power TE CO2 laser
- No secondary waste – Suitable for decontamination
- High laser energy absorption by paint/polymer/rubber material (up to 92%, highest among various lasers) due to its wavelength(10.6  $\mu\text{m}$ )



- High pulse energy(2-5J at 300-500Hz)
  - Concrete scabbling is possible
- Large beam size
- Long life with solid state switching





**Thank you for attention  
and listening**