



ROBOTICS AND AI IN NUCLEAR

Barry Lennox

7th September 2021



Summary



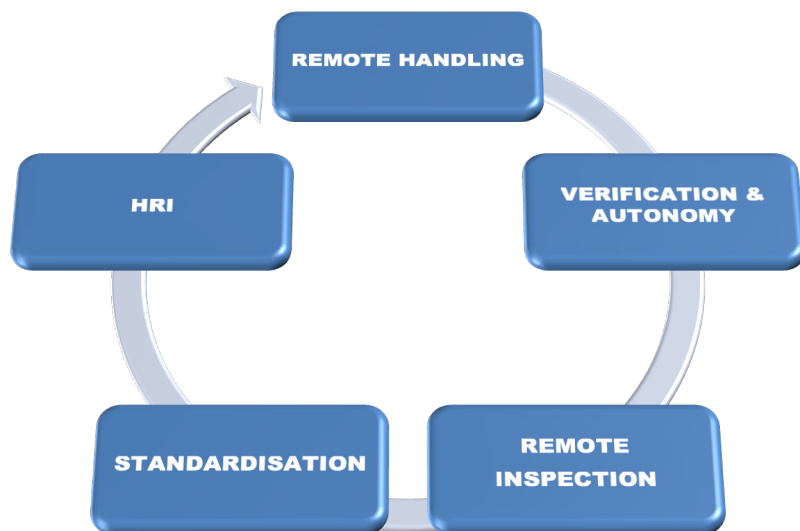
RAIN

- Established in Sept 2017
- 9 universities and UKAEA's RACE centre
- Funding of £12M from UKRI
- Overall programme >£50M
- >30 full-time researchers
- Vision is to:
 - Make robotics commonplace in the nuclear industry
 - Support development of an innovation pipeline
- **£2.5M of additional funding provided in April 2021 to extend programme by 12 months**
 - Continue development and demonstration work
 - Expand into other sectors





Working Groups



- Five working groups established
- Working groups:
 - Co-ordinate the research work within RAIN
 - Engage with end-users and supply chain
 - Identify challenges
 - Organise demonstrations
 - Co-ordinate active deployments, where possible.
 - Engage with researchers within other robotics hubs (ORCA, FAIR-Space and NCNR)

Demonstrations: JET, UKAEA

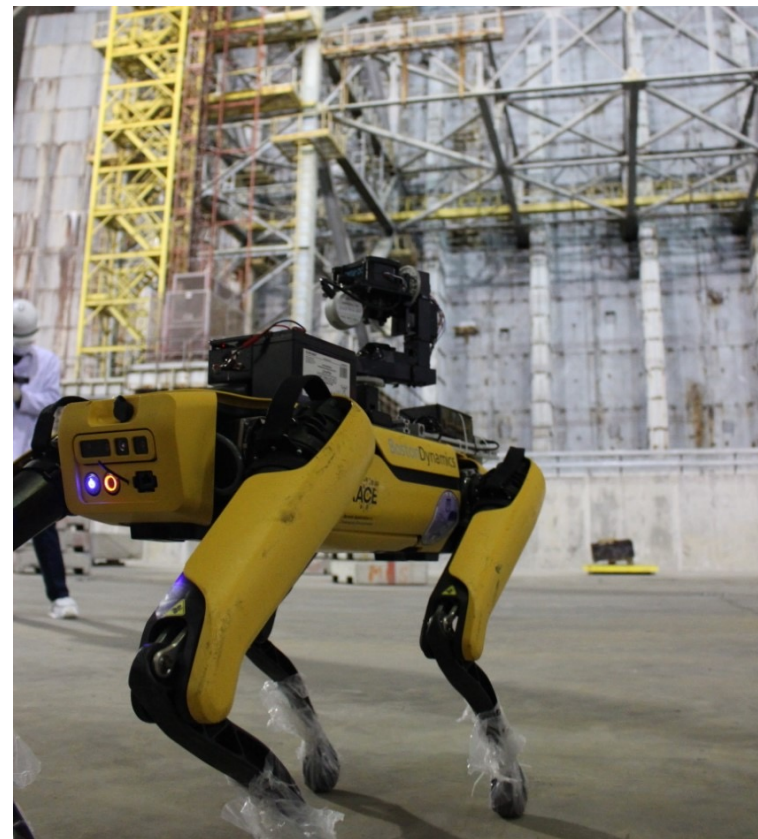
ORI's Husky with LU's radiation detectors was deployed into the JET Torus Hall to measure gamma intensity.

ORI and UoM now looking at high level planning for long-term deployment into UKAEA's drum store.



Demonstrations: Chernobyl

- Spot deployed with positioning and radiation modules attached in and around Chernobyl.
- Bristol are returning to Chernobyl over the summer
- Spot has been demonstrated to Sellafield and on-going discussions with many others, including space and other sectors.

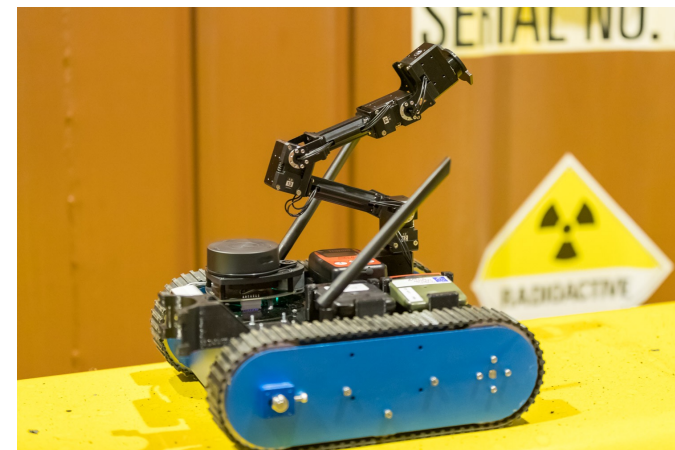
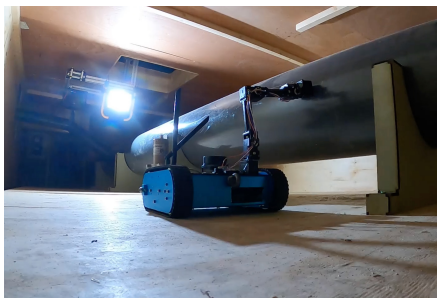




Demonstrations: Dounreay

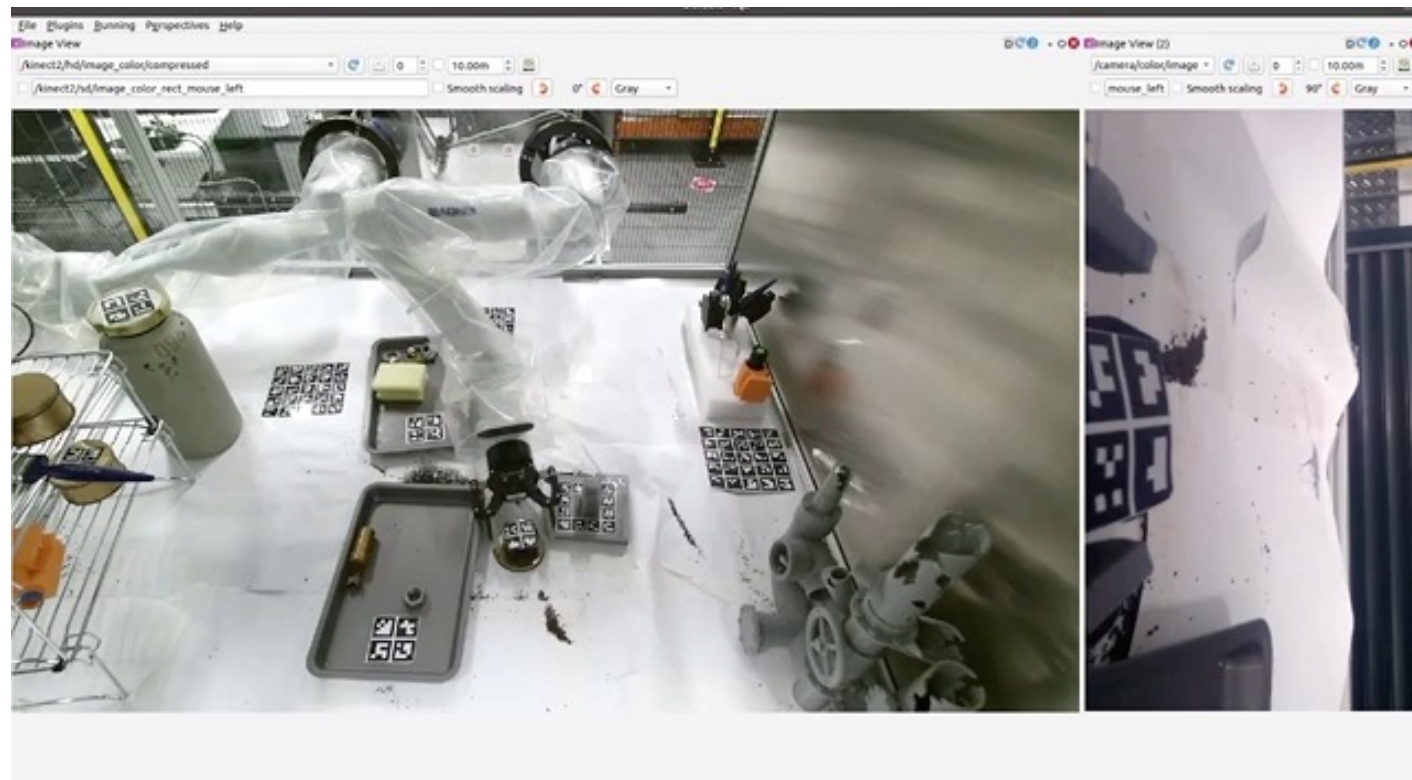


- Inspection of a contaminated drain to take place w/c Sept 13th.
- Trial will collect swabs, measure radiation dose and capture video images.
- Several other robotics projects being discussed.



Glovebox: RrOBO

- Strong links now established to SL's RrOBO programme.
- RAIN is several years ahead of RrOBO and able to steer this programme.
- RAIN work to be located at Culham and Cumbria.





Verification & Autonomy

- White paper published
 - Jointly authored with RAIN & ONR
 - A unique collaboration and industry-influencing document
- Covers key principles
 - Prerequisite concepts
 - Safety-Critical Robotic Systems
 - Human-Controlled Robotic Systems
 - Autonomous Robotic Systems





Industry Engagement: Sellafield



- With funding from Sellafield Ltd: UoM, UKAEA, Sellafield and NNL are establishing RAICo One in Whitehaven.
- RAICo One is a robotics collaboration laboratory that has resulted from RAIN
- Opens Oct 2021 (or maybe November)
- Initial projects include: RrOBO, LongOps and CARMA.
- Funding being sought for a purpose built robotics facility and programme in Cumbria.
- Find out more. 9th Sept, 9:30am.
 - <https://zoom.us/j/93155257426>





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