

RISER: 3D Contamination Mapping with a Nuclear-Capable Drone

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Createc

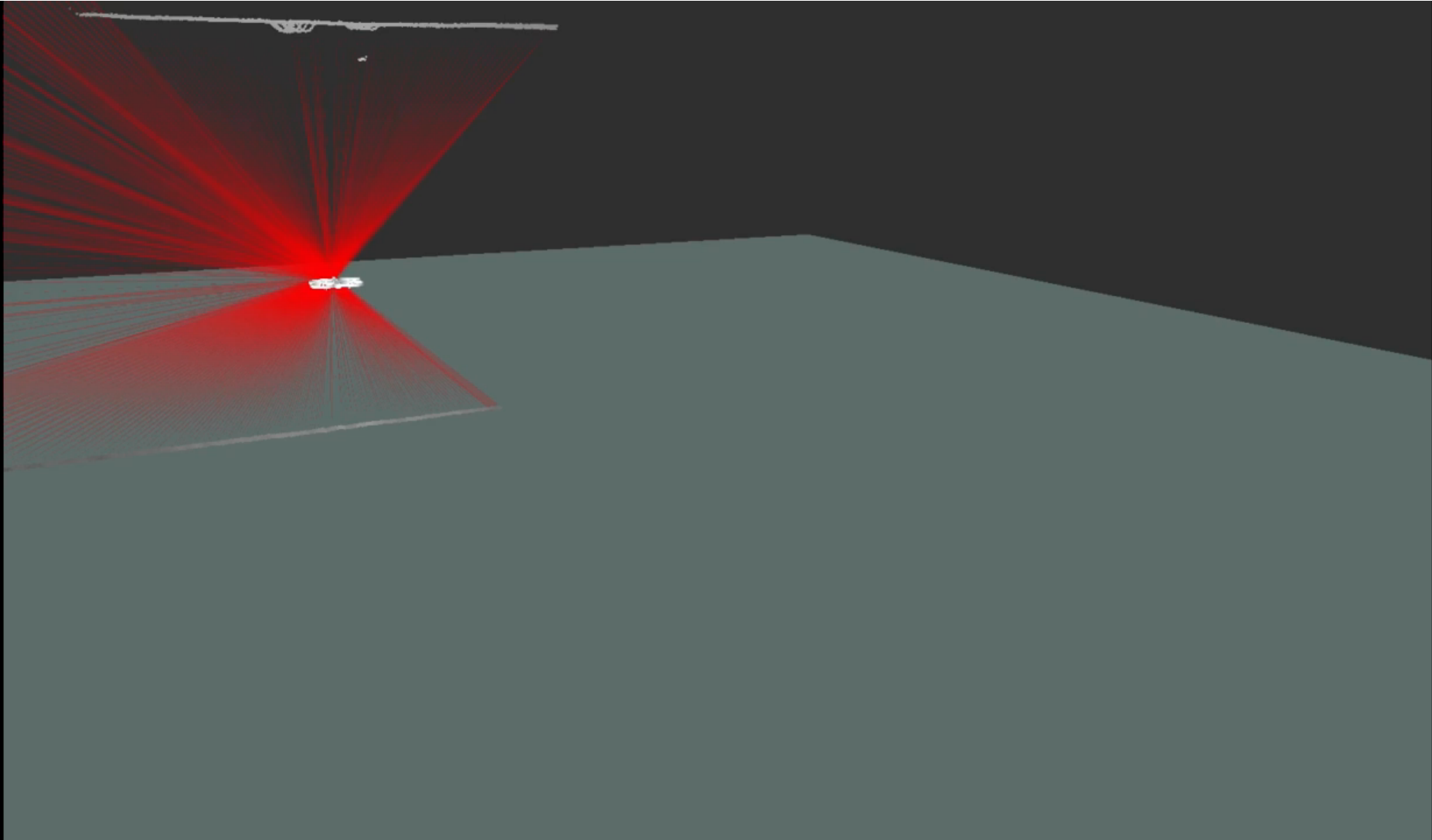
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When access is a real issue

- Fully Self-contained
- Contamination resistance
- >25 minutes flight time
- 4 kg mass
- Self lighting
- Remote operation
- Shrouded blades
- SNAP autopilot for safe autonomy



Mapping and navigation



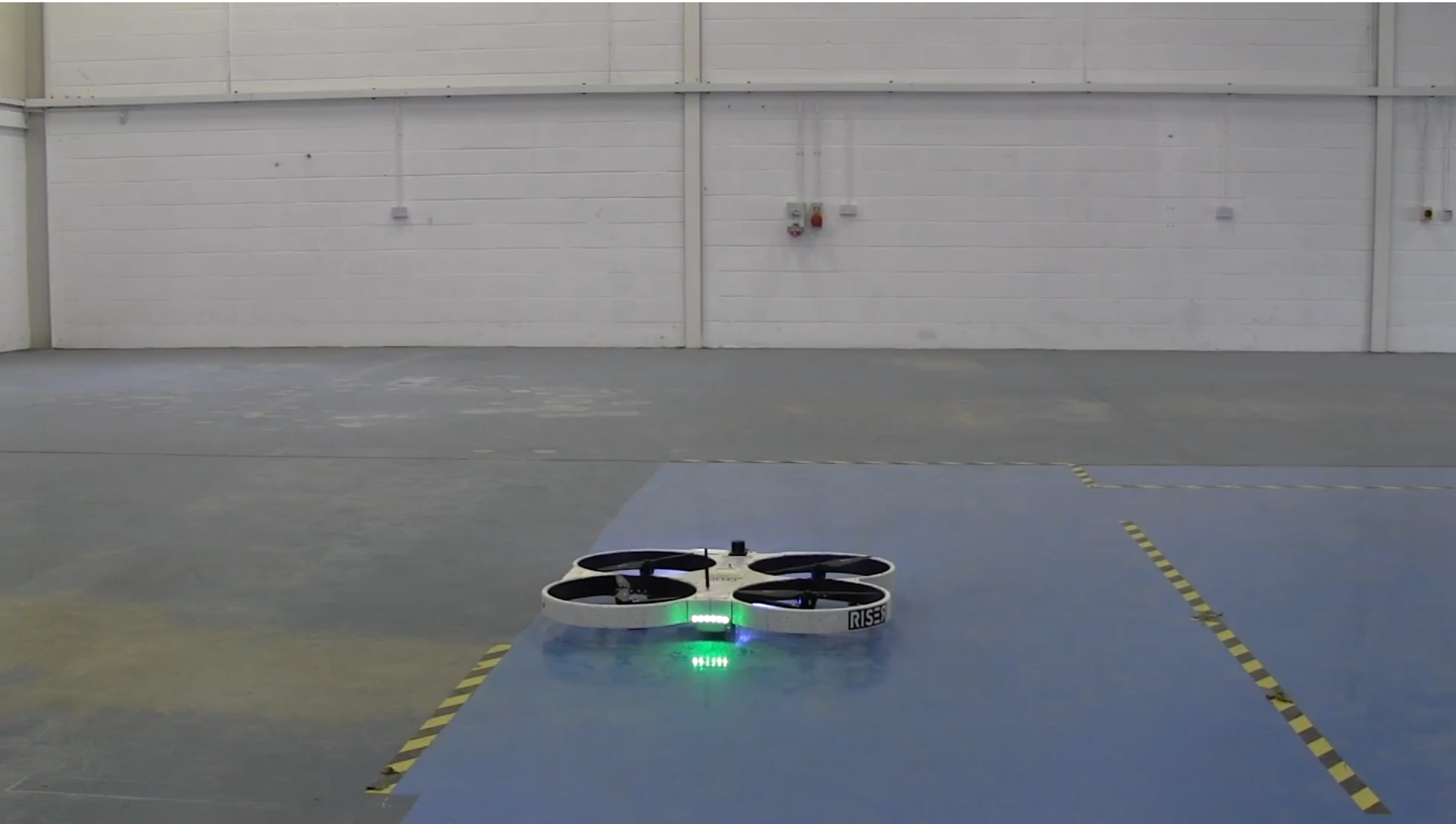
First flight at Sellafield (inside!)



Result

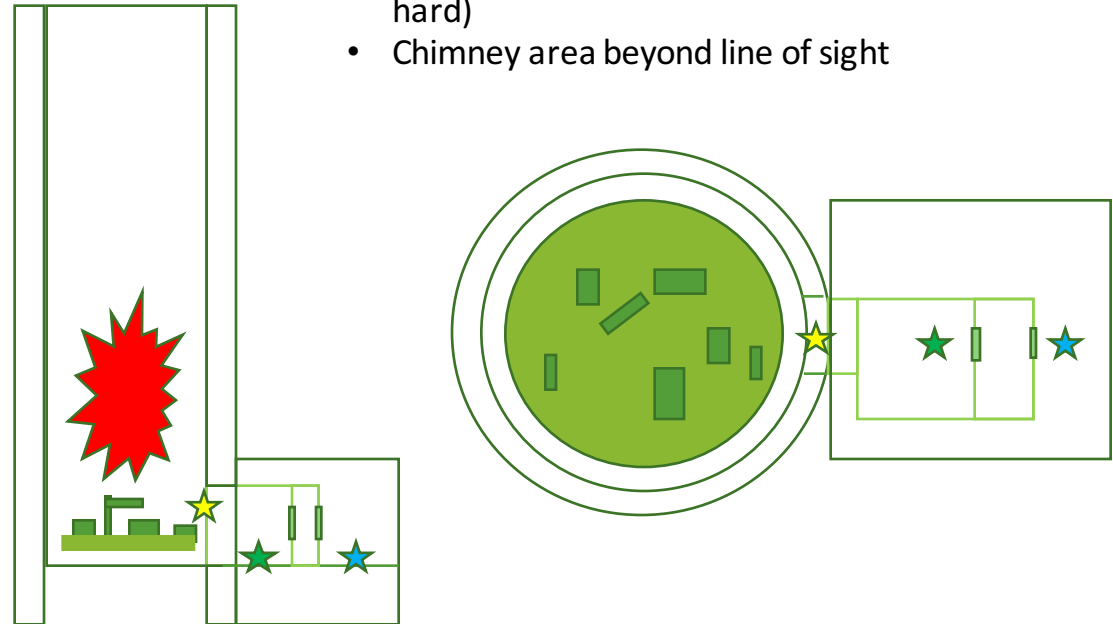











Full Autonomy – no-communication
required for stability



Target Area: Base of Windscale Chimney

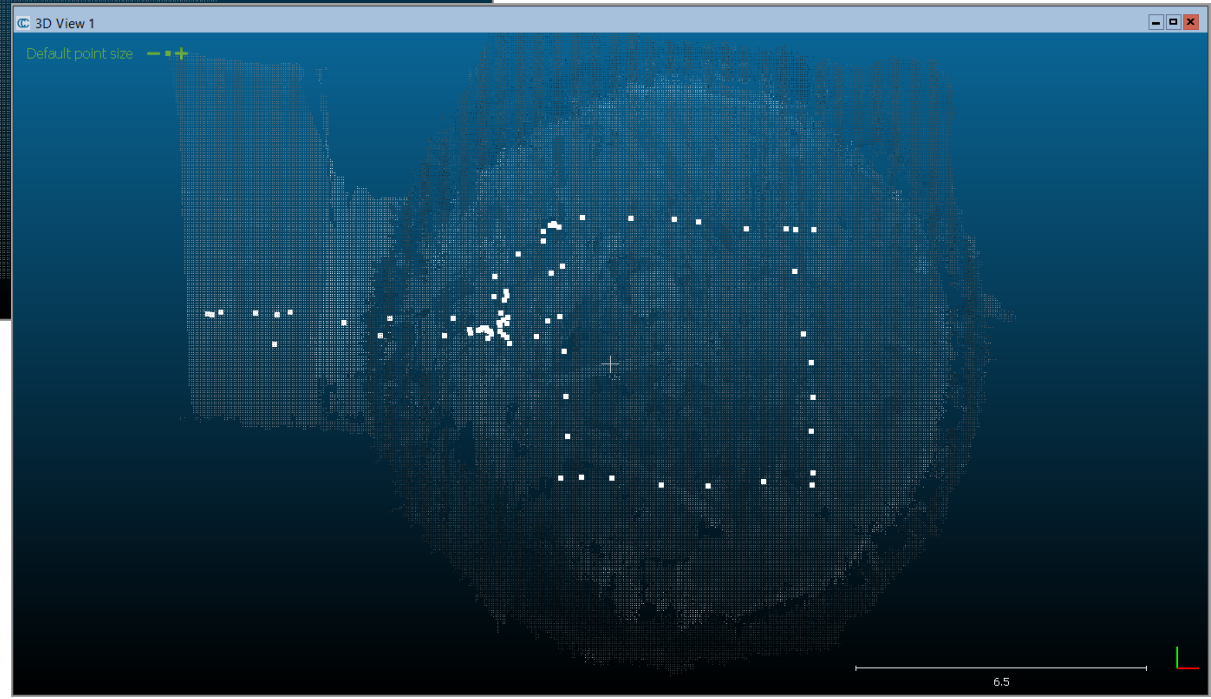
- 3 flights in total
- Access via small aperture (1mx2m)
- flight in this area by computer view, not visual (too hard)
- Chimney area beyond line of sight



 Permanent Structure	 Window	 Narrow space (1-1.5m)	 Zero visibility area	 Ground control station
 Platform	 Tent enclosure	 Take off point	 Obstacles	

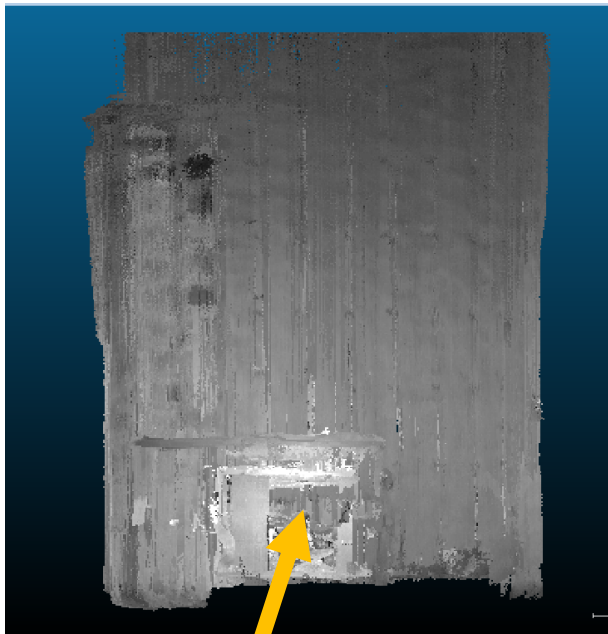


Raw Input – Flight Path



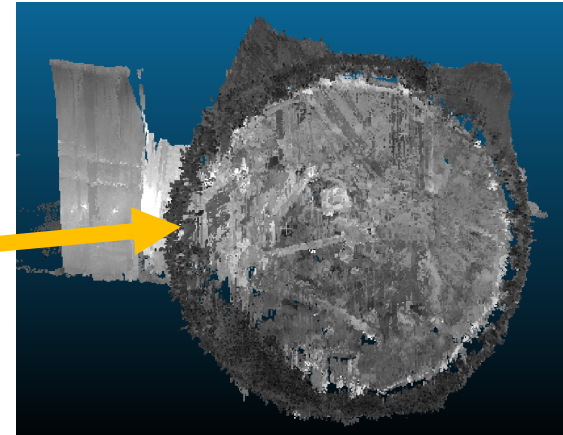
Results (edited for security reasons)

Elevation – lidar data



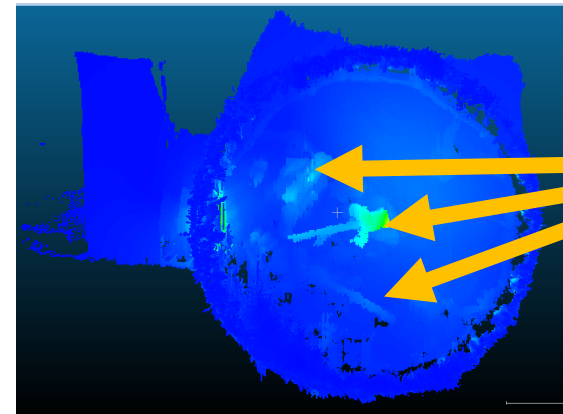
Narrow entrance (~1m(h) x 2m(w))

Plan – lidar data



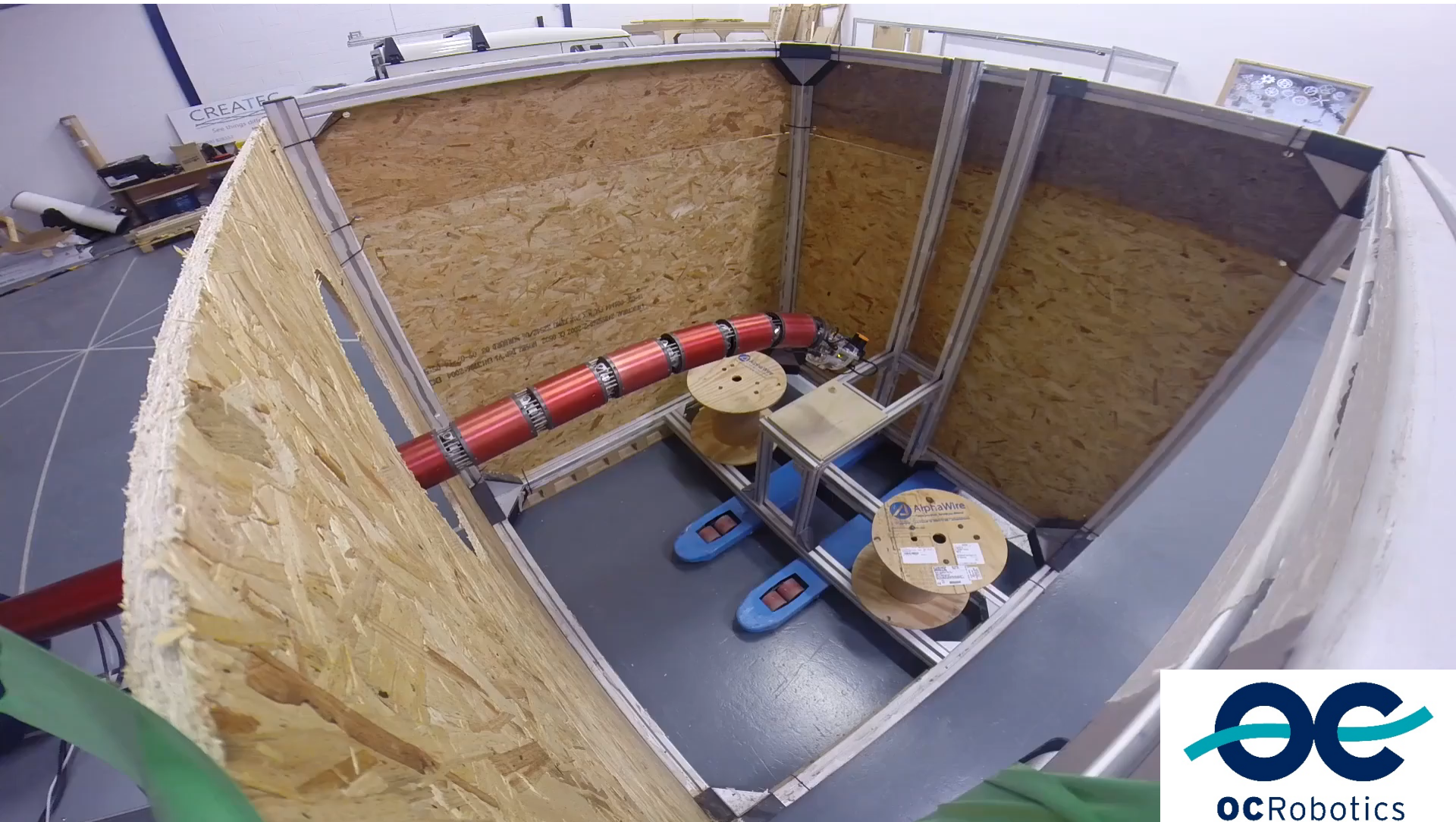
Narrow entrance (~1m(h) x 2(w))

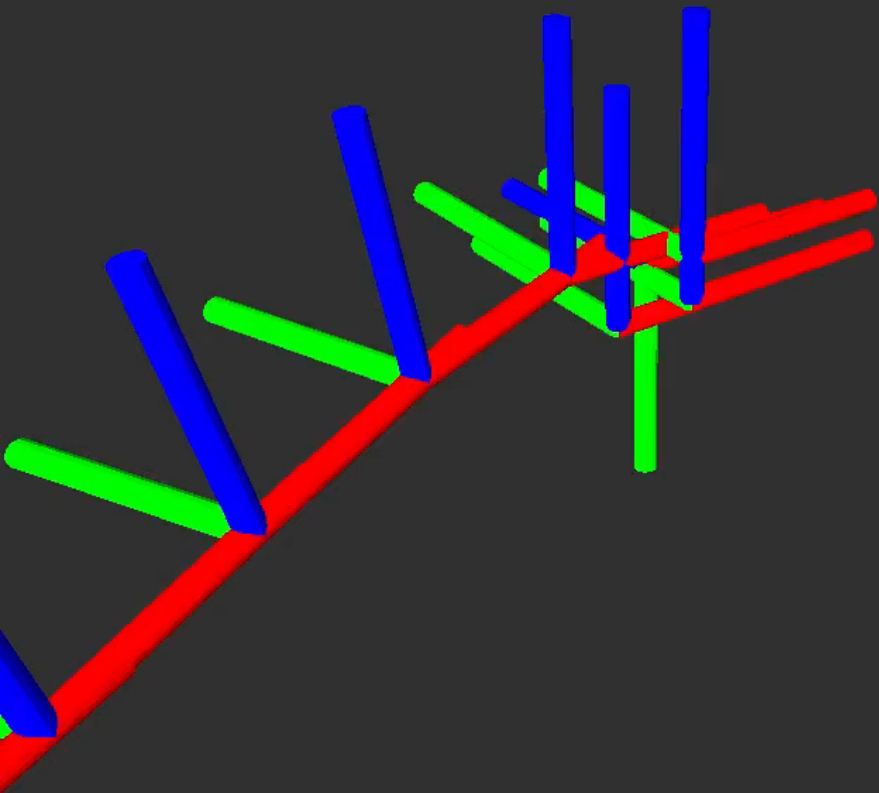
Plan – rad data



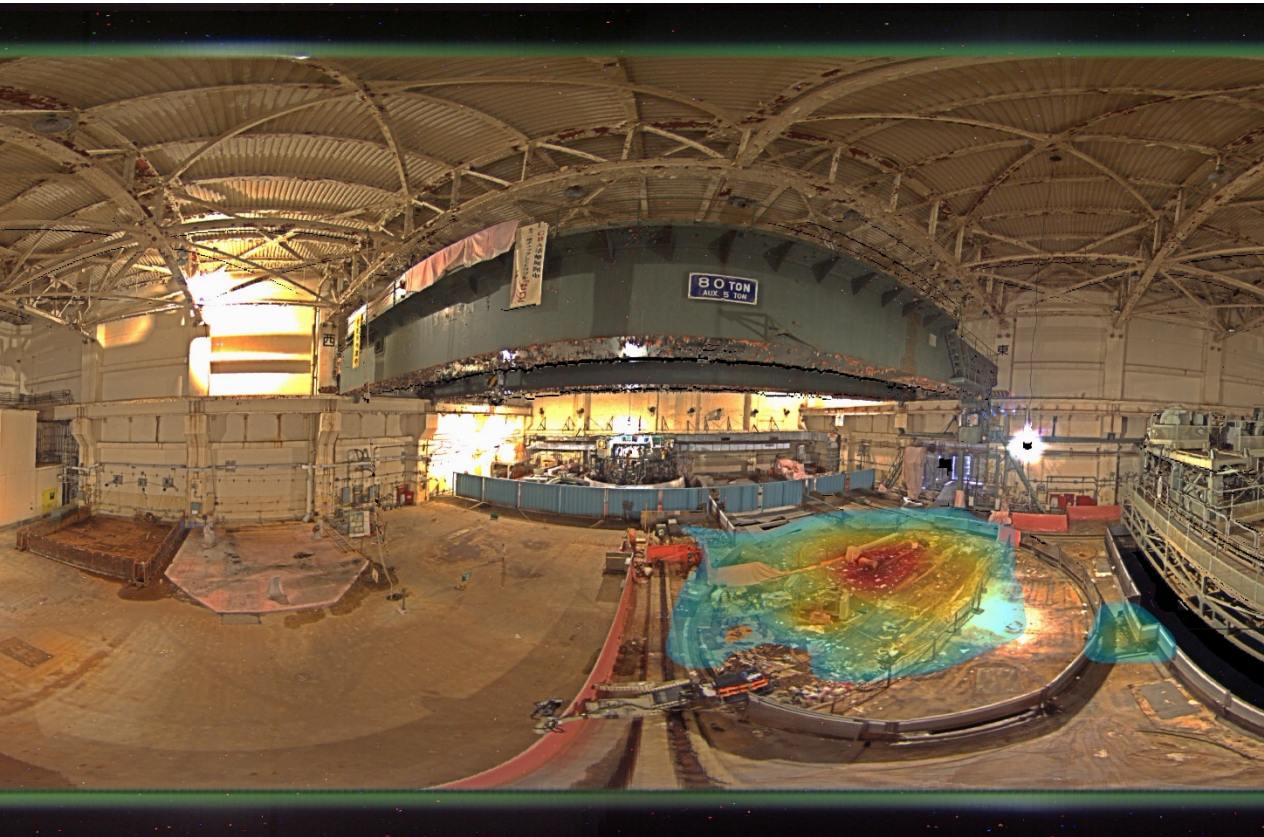
Obstacles

Other Implementation - SeeSnake





N-Visage Gamma Camera



Summary

- Introduced RISER
- Activity can be mapped in 3D in the field
- Accuracy sufficient for activities such as waste category and volume estimation
- Access is generally not an issue even in the most unfriendly environments