

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

Dr. Alan Shippen

Createc

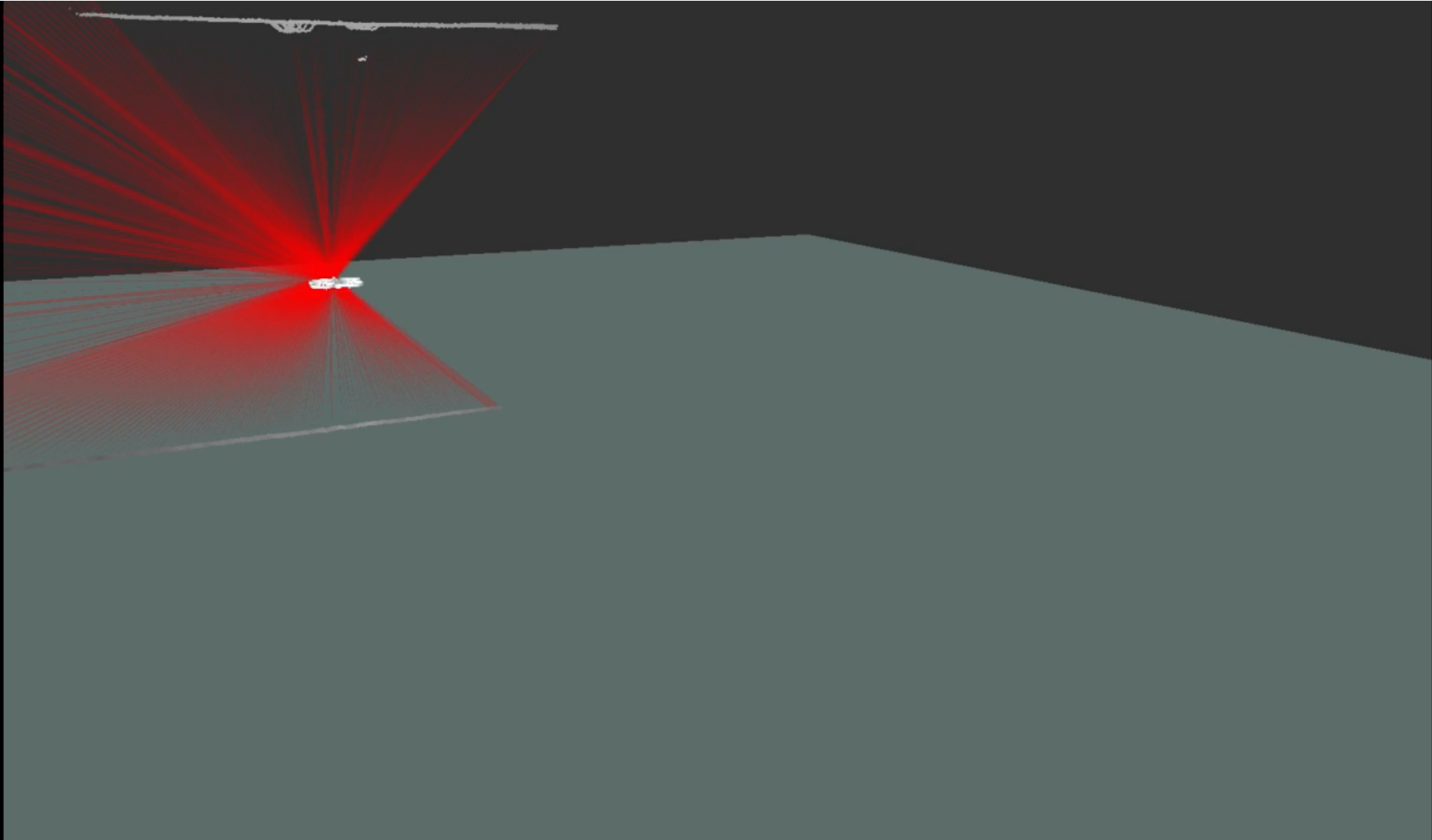
E-mail: [alan.shippen@createc.co.uk](mailto:alan.shippen@createc.co.uk)

# 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



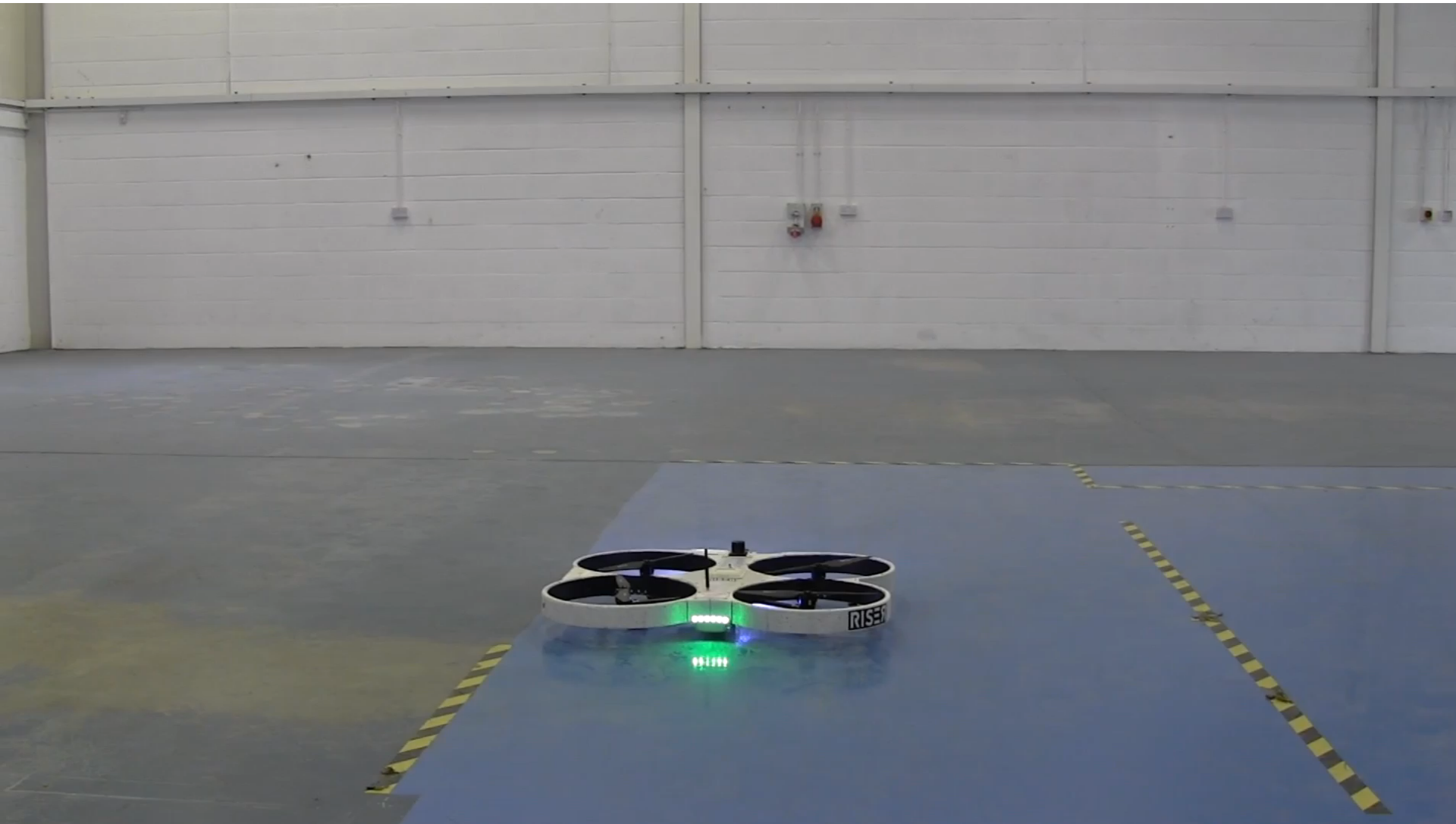
# First flight at Sellafield (inside!)



# Result

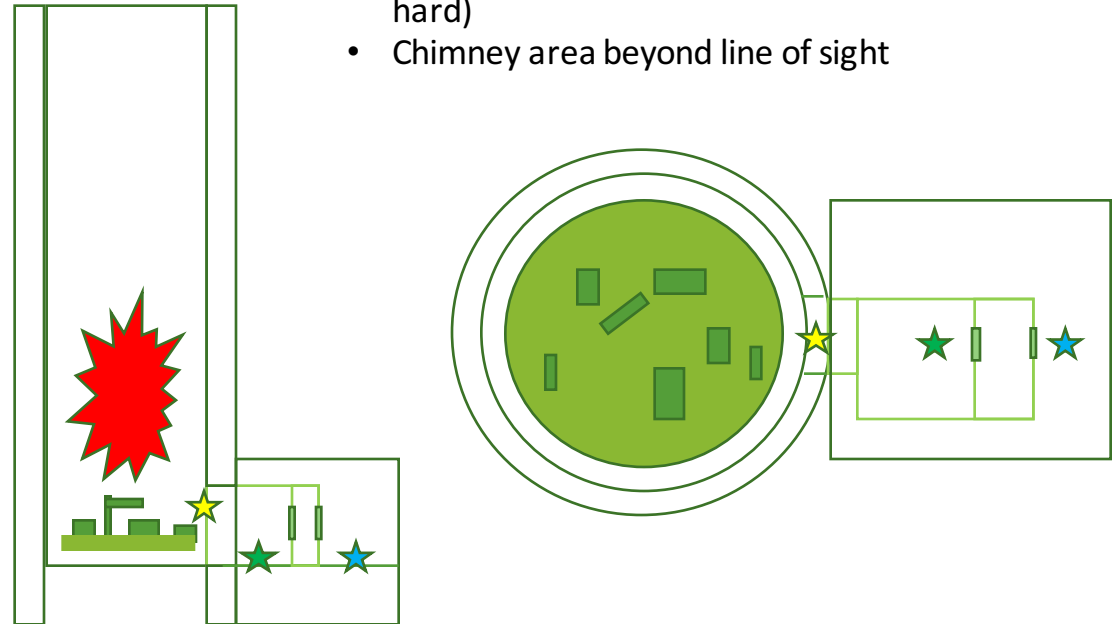











Full Autonomy – no-communication  
required for stability



# 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

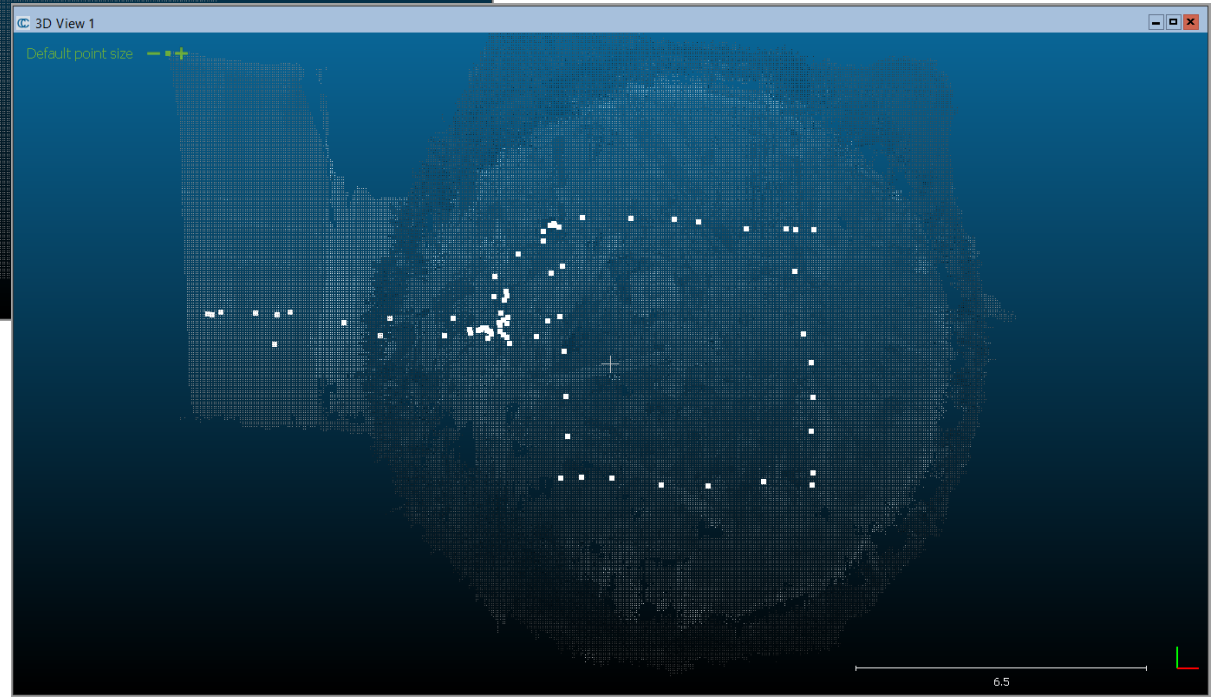


 Permanent Structure	 Window	 Narrow space (1-1.5m)	 Zero visibility area	 Ground control station
 Platform	 Tent enclosure	 Take off point	 Obstacles	



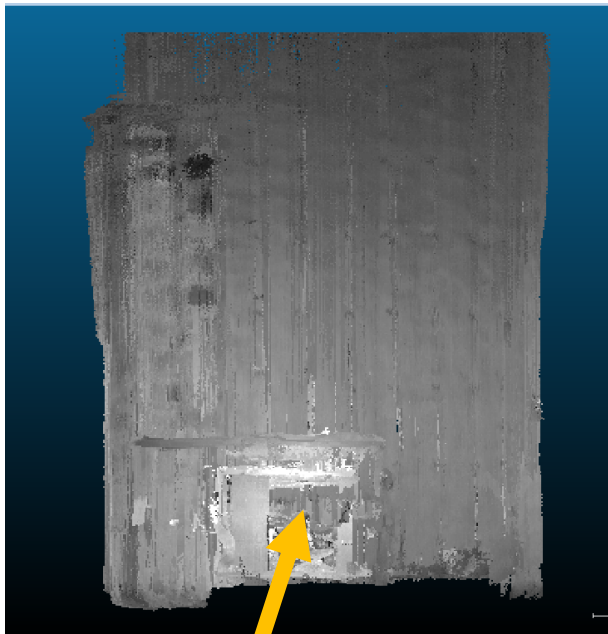


# Raw Input – Flight Path



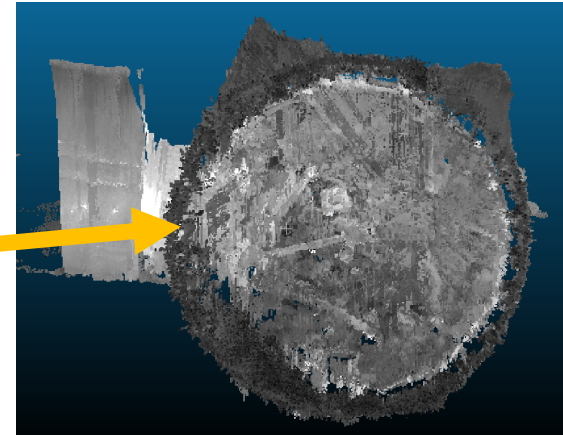
# Results (edited for security reasons)

Elevation – lidar data



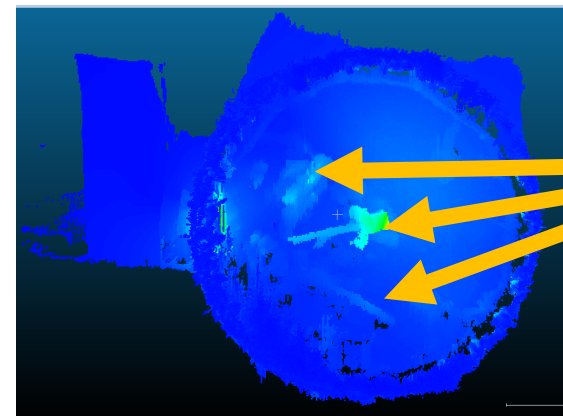
Narrow entrance (~1m(h) x 2m(w))

Plan – lidar data



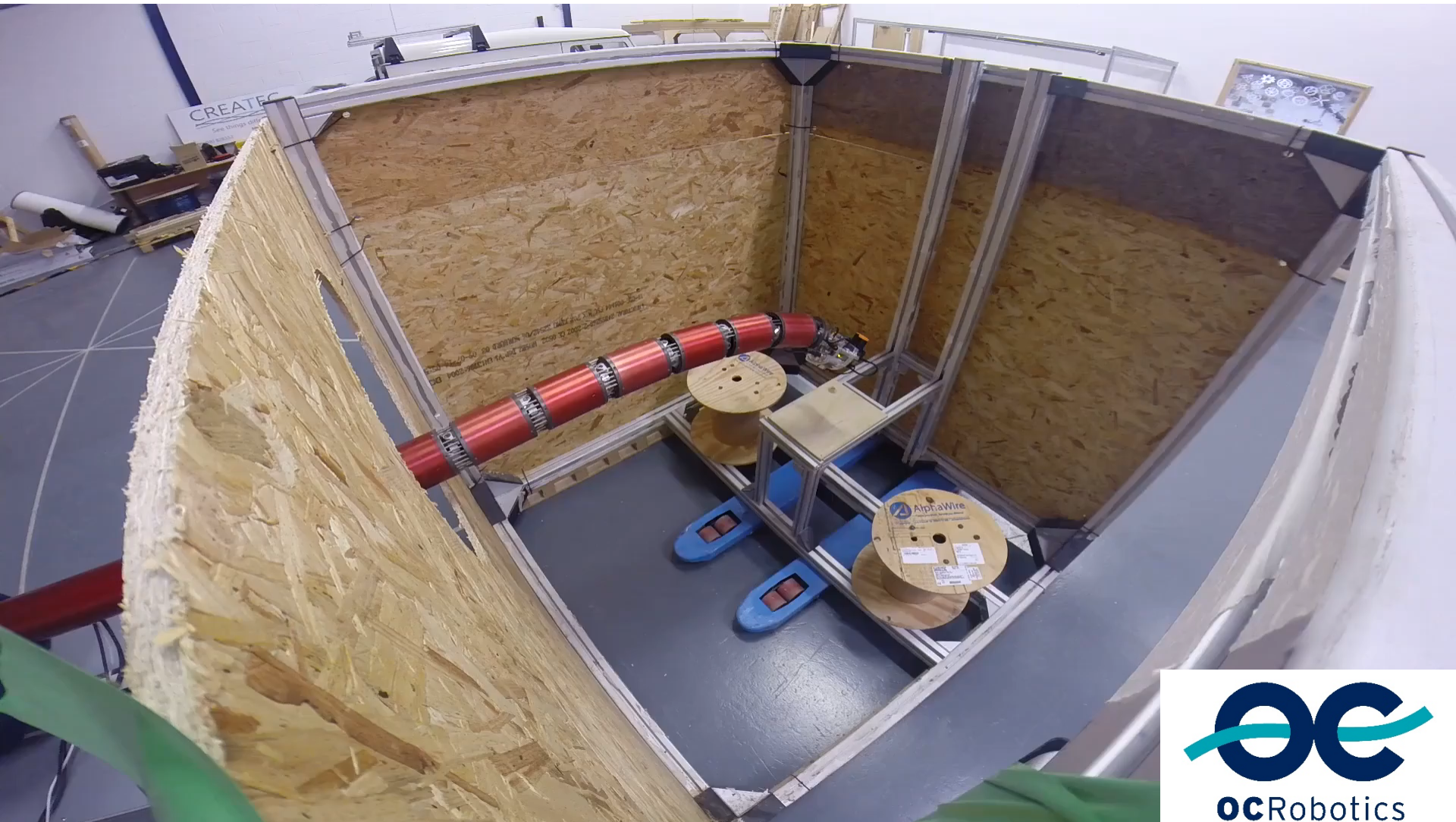
Narrow entrance (~1m(h) x 2(w))

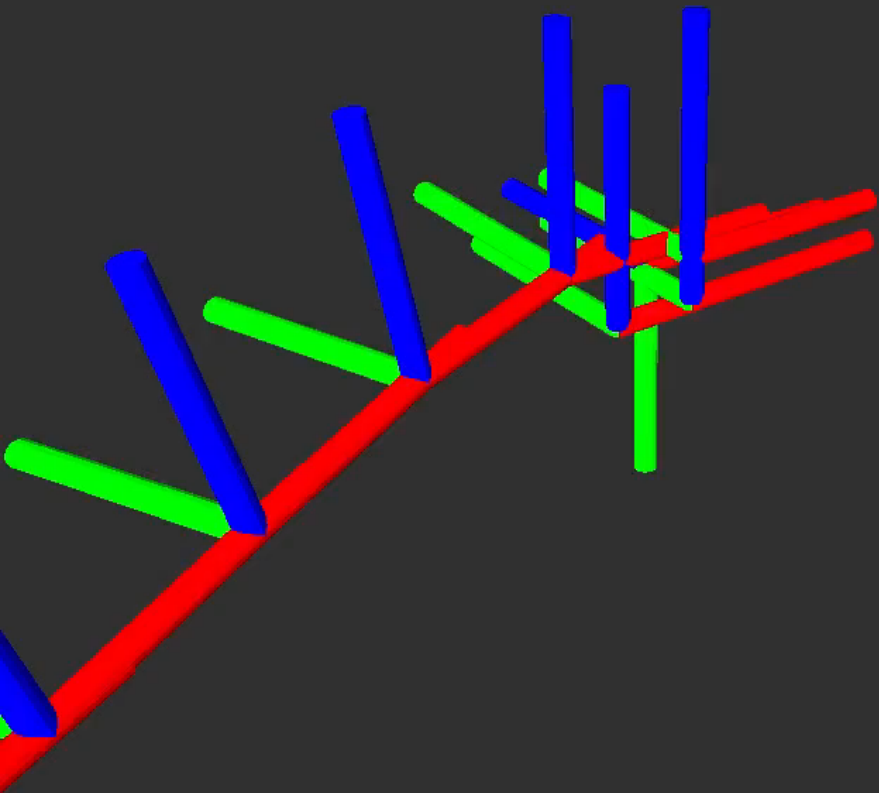
Plan – rad data



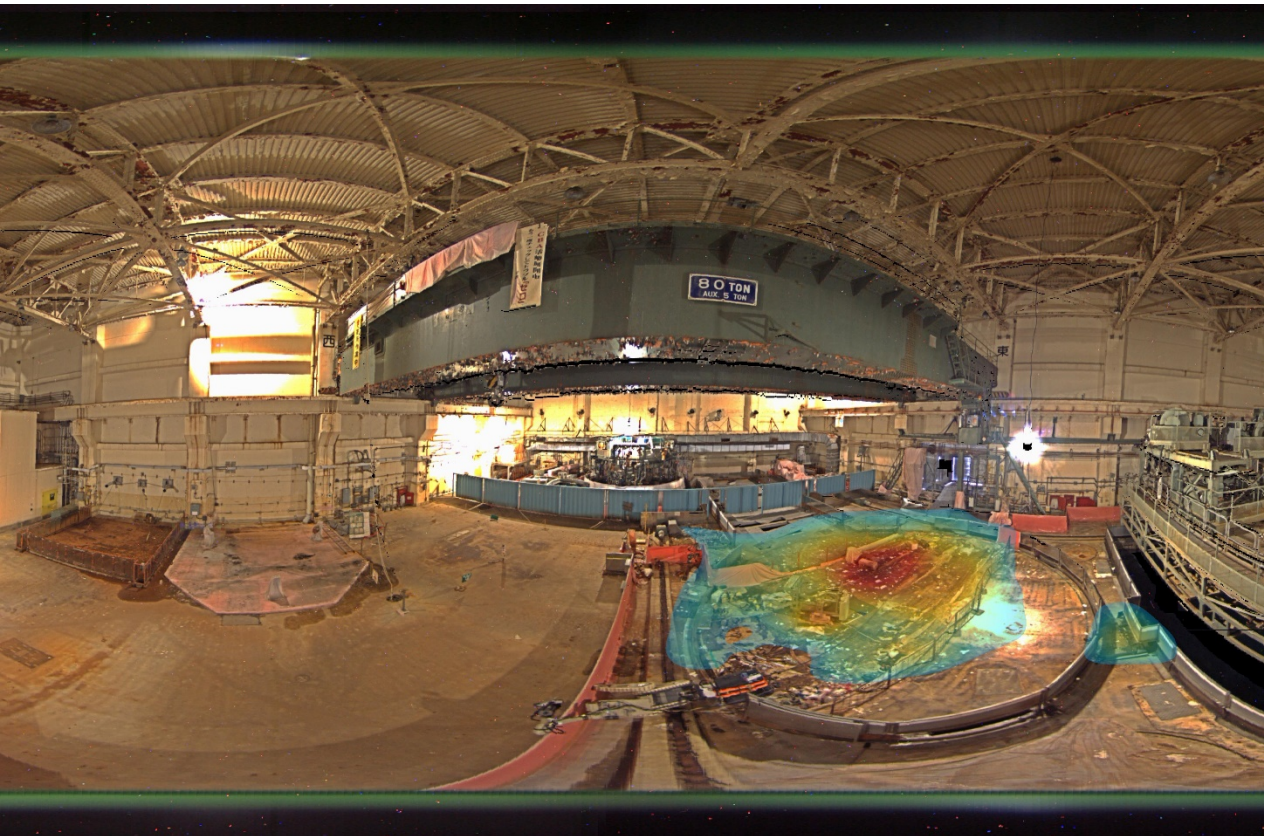
Obstacles

# 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