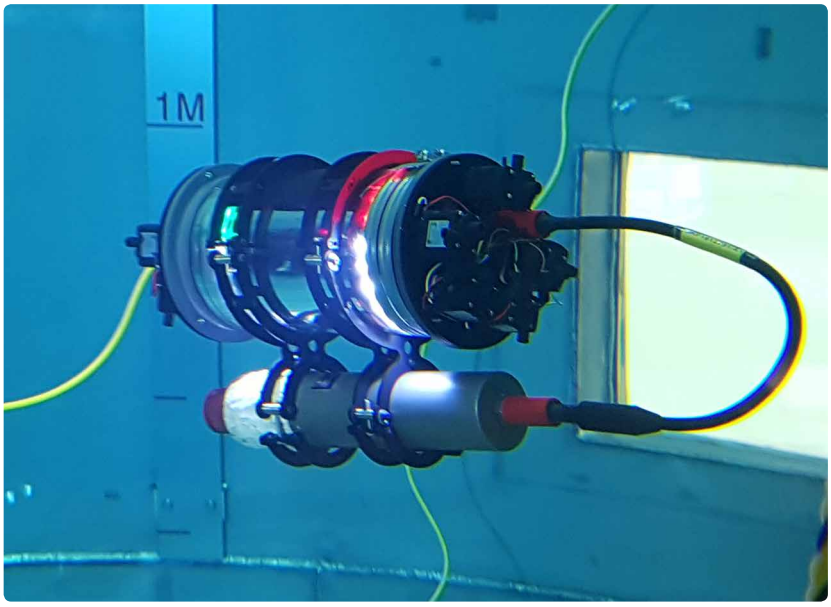
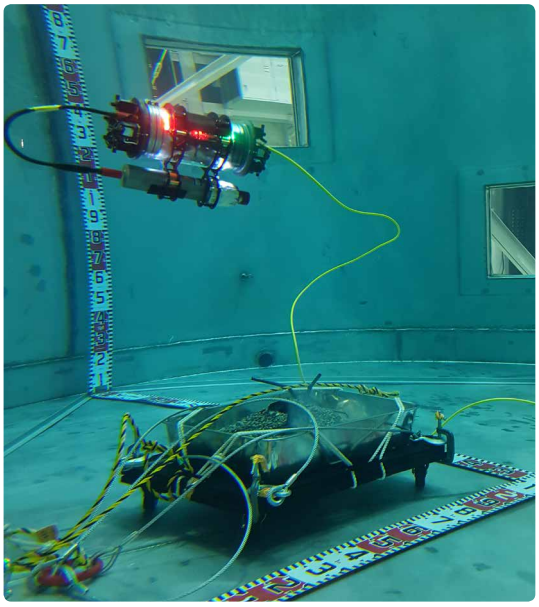
AVEXIS™

Underwater exploration,
inspection and characterisation.





The AVEXIS™ at a test facility in Fukushima Daiichi. A sonar device was attached to the underside of the AVEXIS™ to map the vessle, including the location and outline of the mock debris.

TRL 1-2 basic research → TRL 2-3 research to feasibilty → TRL 3-5 technology development → **TRL 5-6 technology demonstration** → TRL 6-8 system/ subsystem development → TRL 8-9 system test, launch and operations

The AVEXIS™ is a small underwater vehicle designed to survey and monitor challenging aquatic environments. It has been developed in particular for use in the legacy ponds and silos of the nuclear industry.

- The AVEXIS™ has a waterproof cylindrical body for housing all electronics, camera, lighting and communications.
- The AVEXIS™ can carry a 1.5kg sensor payload, e.g. gamma and neutron detectors.
- There are 5 thrusters, or pumps, on each end of the AVEXIS™, allowing excellent manoeuvrability forwards, backwards, left and right.
- Explorations and characterisation of many diverse and unknown environments is possible.

APPLICATIONS

The AVEXIS™ is a small underwater tethered Remotely Operated Vehicle (ROV) designed to fit through a 6 inch port, move through water, and characterise the space it is in.

The AVEXIS™ has been deployed in silos at Sellafield, and a test facility at Fukushima Daiichi.

The AVEXIS™ has been tested within an active TRIGA reactor at the Jožef Stefan Institute in Slovenia.

The AVEXIS™ can be used for exploration and characterisation of nuclear, and other industrial, underwater environments.

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AVEXIS™

TECHNICAL SPECIFICATION

Parameter	Value (units)
External dimensions	300mm x 150mm or 350mm x 120mm (other variants are available)
Weight	3kg, approximately 1-1.5kg of which is ballast.
Payload weight	1-1.5kg, replacing the additional ballast. The design can be adjusted to some degree to reflect payload requirements.
Communication interface	Umbilical power and Ethernet.
On-board computing?	Single-board computer (SBC) and flight controller.
Operation mode	Tele-operated
Battery/run-time	Battery powered: 2 hours, indefinite if tethered. Battery reduces payload space.
Tether/tether management	Tether length 25m – 300m, kept on a reel. Tether ranges from 4mm (2-core) to 7.6mm (8-core) in diameter. Neutrally buoyant in freshwater, slightly positively buoyant in seawater, working strength 35kgf, breaking strength 155kgf, minimum working bend diameter 25mm (2-core) to 75mm (8-core), Kevlar fibre reinforced, bright yellow polyurethane foam coating.
Drive system	Version 1, pumps. Version 2, thrusters.
Built in sensors	Depth sensor, temperature sensor, IMU, lighting, camera, current measurement

COMMERCIAL OPPORTUNITIES

Offering

- Technology demonstration on your site, or an inactive demonstration at short notice at a University of Manchester facility.
- Partnering opportunity to commercialise the technology.
- In the near future, a CE marked, built to order commercial product.

Needs

- Demonstrations to key stakeholders.
- Collaboration opportunity for CE marking support, deployments in relevant environments, or developing regulatory paperwork for commercial deployments on a nuclear site.
- Technology demonstrations to non-nuclear industries such as water wells or dockyards for ship hull inspection.

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