

LAETP Floc Retrievals Project – Crawler Vehicle

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LAETP Floc Retrievals Project – Crawler Vehicle

The Project

The project is to provide the capability to retrieve the legacy waste (floc) from four Holding Tanks.

LAETP consist of 4-off Ø12m x 4m high carbon steel tanks located outside and set below ground level.

Built late 1950s to support original Sellafield fuel reprocessing activities.

Previously have been emptied using the original process equipment but has resulted in residual amounts of floc and supernate remaining within the tanks.

Deteriorating...



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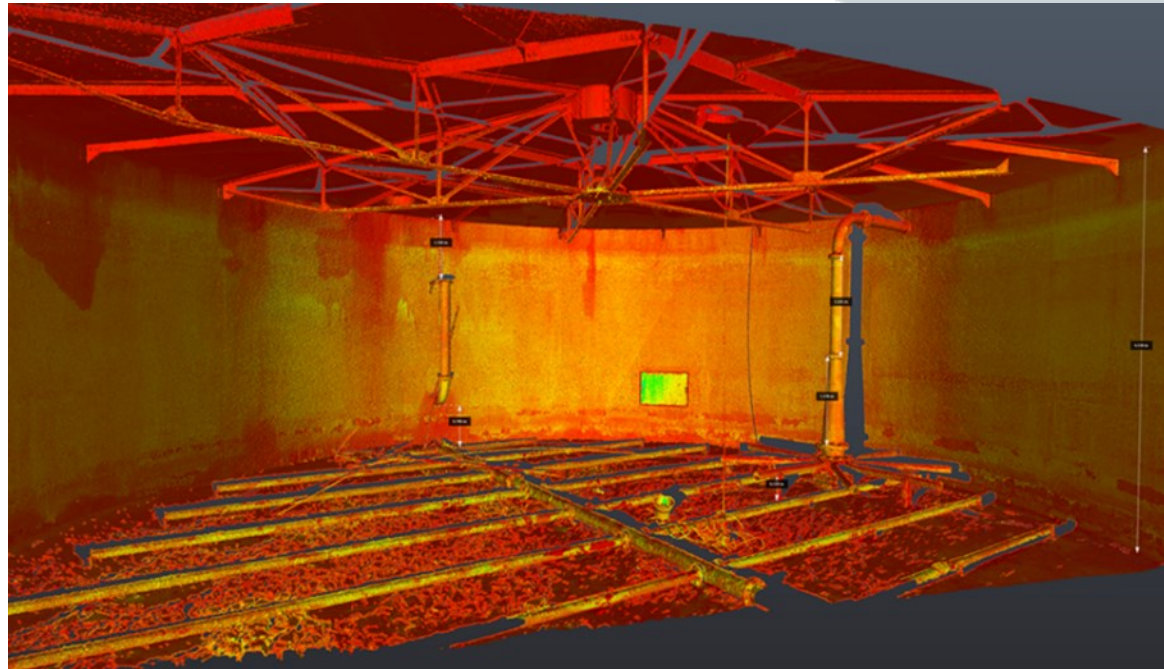
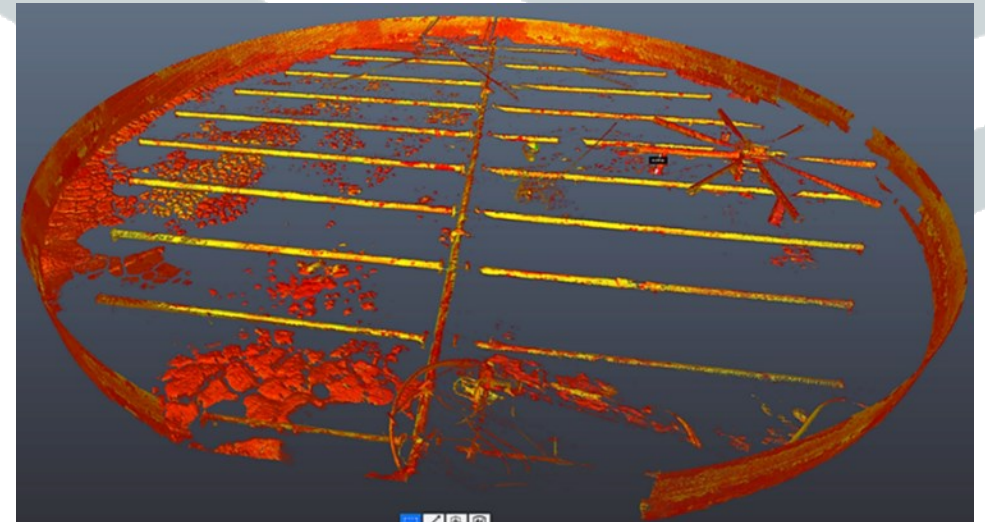
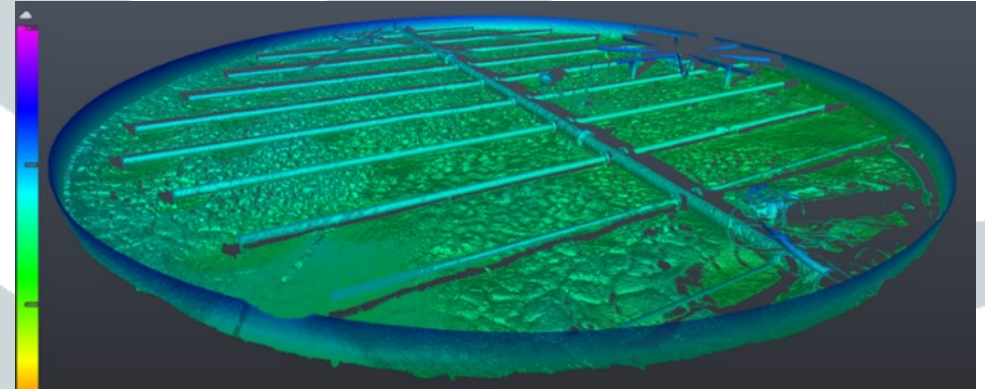
The Four Tanks



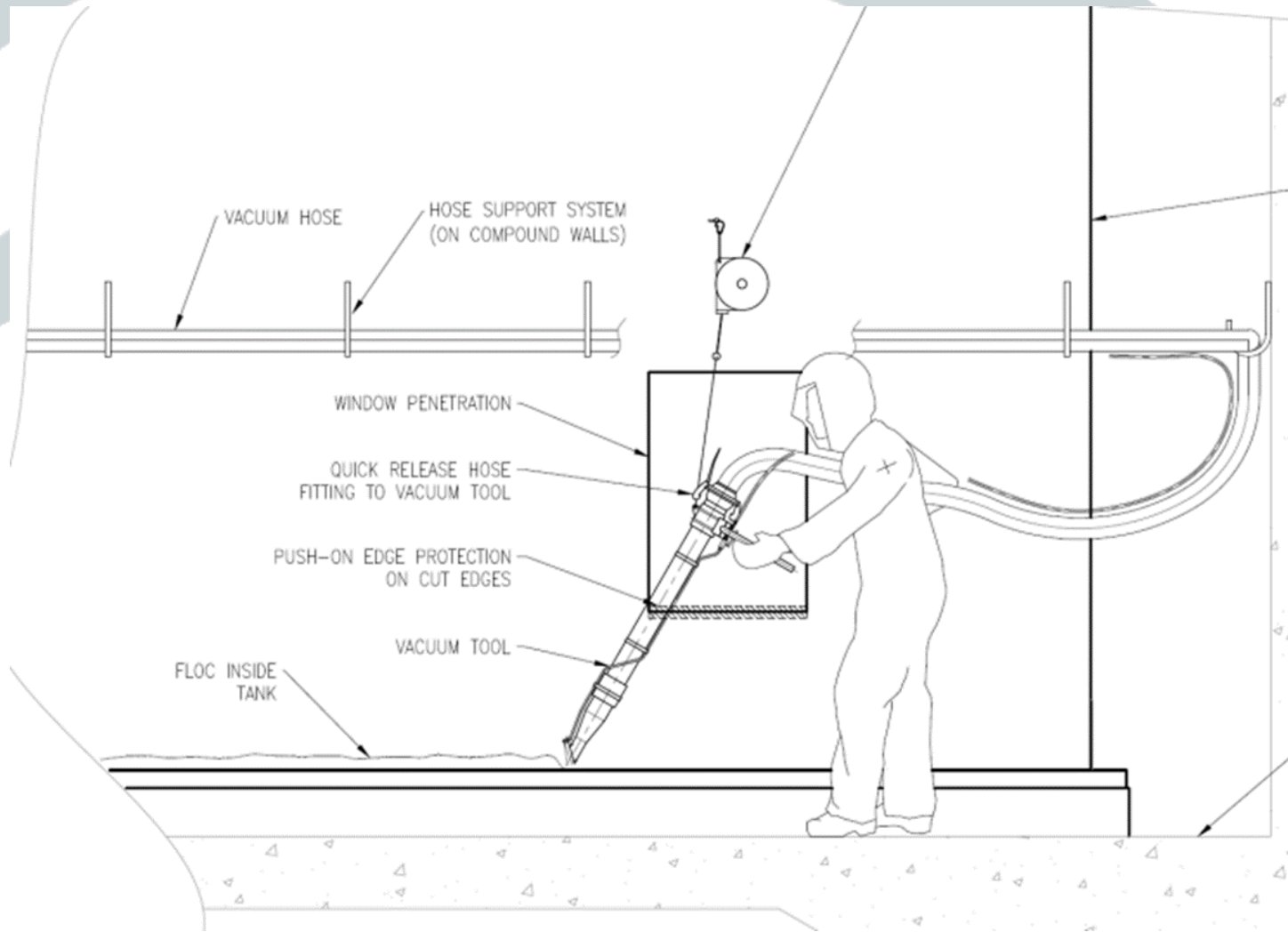
Two tanks contain relatively dry sludge. Two have a heel of supernate 300mm deep. The bulk sludge must be removed whilst the capacity to treat the floc remains.

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The Tanks were inspected, to assess their condition and substantiate the structures until 2033. Laser scans were performed to assess the levels of solids and the exact location of the pipework, Ancillary items and non-sludge debris.



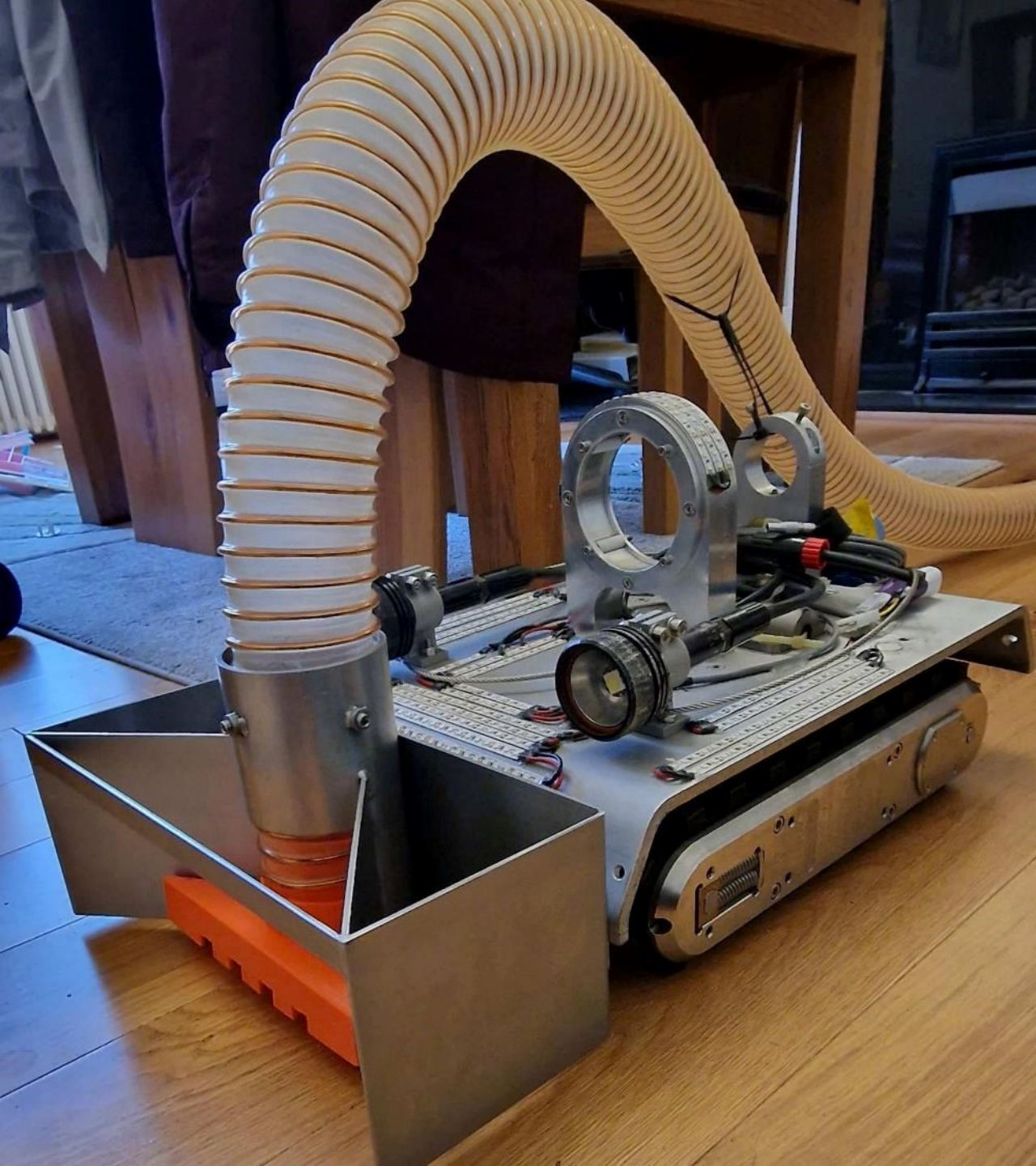
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The sludge retrievals project is being run by SL with partners, to develop a sludge extraction facility that temporarily holds and processes the solids before routing to downstream plants, where it can be removed using existing processes.

The sludge will be removed by vacuum through flexible hoses. It was intended for the process to be fully manual, i.e. using people in air-fed suits with handheld vacuum tools.

New legislation has reduced the allowable eye dose by a factor of 10 within one of the tanks, so the project now requires an alternative method of floc retrievals to reduce accumulated dose to the operators.



Previous Trials

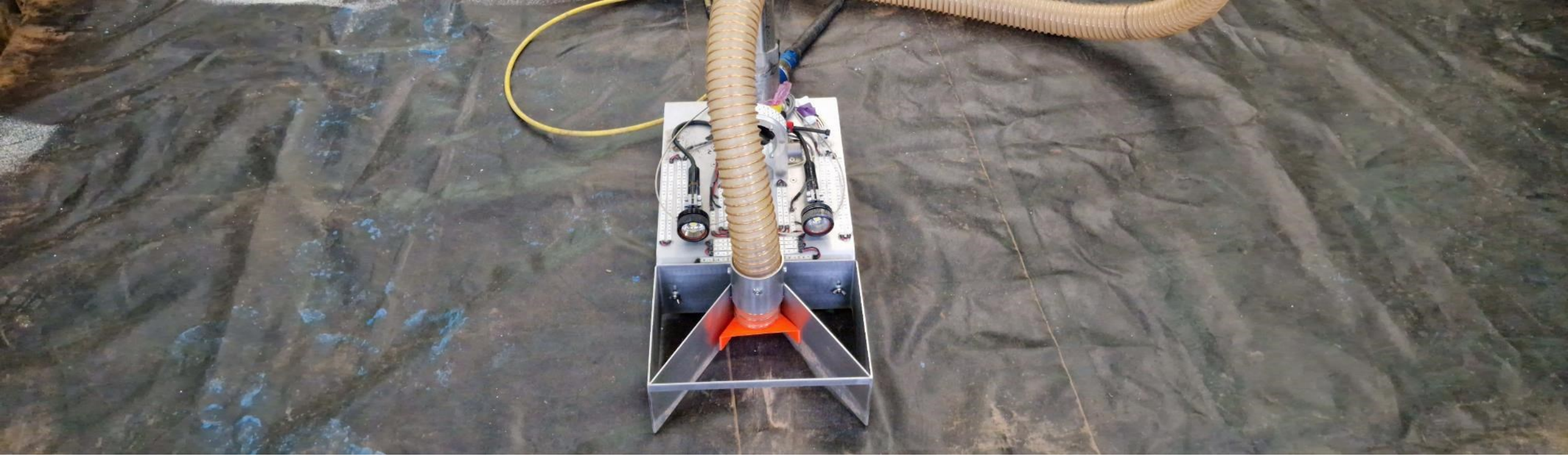
Early Crawler

SL was looking for design and build of a crawler vehicle.

This vehicle had to be able to:

- Use a water jet tool to disturb and wet the floc.
- Vacuum floc into a secondary holding tank.

Trials conducted that proved the concept would work.



Design of the LAETP Crawler

Optimisation of the Crawler

The new design for the LAETP Crawler had to be robust, quickly developed, and ready for trials by the Summer of 2024 to allow feedback to the design in time for operation on site.

Design of the LAETP Crawler

Design Philosophy



Maintenance will be performed through 4 pairs of gloves, and air-fed suits with limited visibility.



The operators must find the tool of value, and it must result in fewer entrances into the tank.

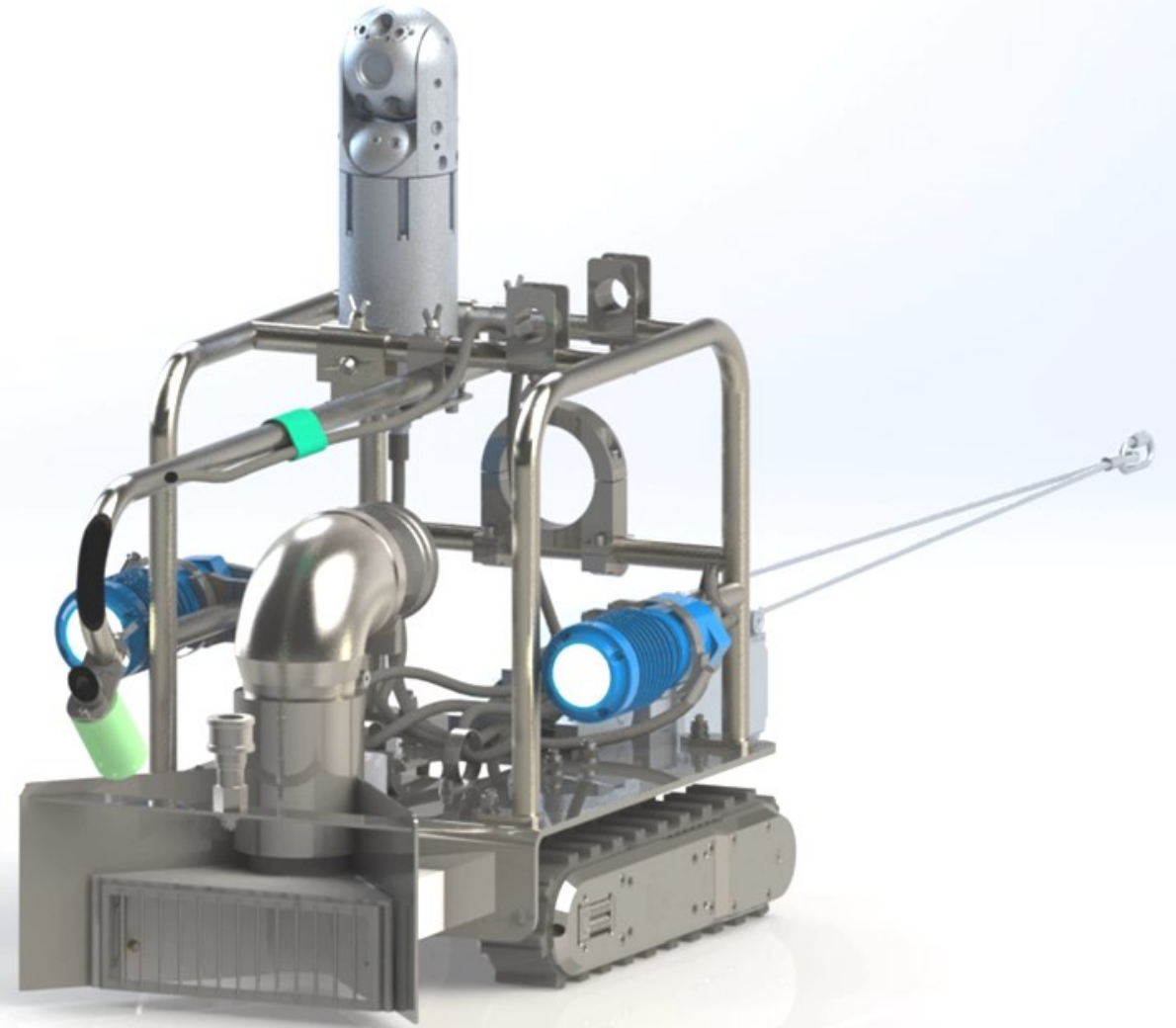


Has to be ready in time for deployment in the LAETP tanks.

Design of the LAETP Crawler

Design Elements

- Reconfigurable component mounting locations for trials;
- Actuated scoop;
- COTS components;
- No less than M5 bolts throughout
- IP66+ rated components;
- Lifting handles;



Trials at the Cleator Moor Centre of Excellence



Testing the crawler with different nozzle sizes and scoop sizes let us empirically optimize those details of the scoop.



Testing maintenance of the crawler in air-fed suits ensures that the operators can recommend changes to the design long before it is implemented on site.



The mock tank (in its Tank 4 configuration) allowed us to test the crawler for use in tanks with more obstructions.



Easy to use, intuitive and reducing our dose uptake

- SL operators said about the crawler

Conclusion

Next Steps

- Continued minor design changes to optimize for tank and operator use
- Plans for cable and hose management
- Deployment on site