

# GAME CHANGERS

.technology

## CHALLENGE

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### Techniques and technologies for identifying unknown sharps in gloveboxes

Sellafield would like to explore technologies which would enable them to analyse the contents of gloveboxes, specifically allowing them to identify the presence of potentially unknown sharp objects.

Applications are invited for technological solutions to meet this challenge.

**The deadline for applications and poster presentations is 12:00 on Tuesday 26<sup>th</sup> June, 2018**

This scheme is funded and supported by





## Sellafeld's Gloveboxes

As part of Sellafeld's decommissioning programme, gloveboxes used historically for research, development, and fuel fabrication operations need to be dismantled.

- There are approximately 350 gloveboxes in total on the Sellafeld site.
- They are generally cuboid and vary in size from one to several cubic metres.
- Many designs exist, however, a glovebox can be thought of as a sealed, but ventilated, container generally comprising a steel frame and panels made from metal or polymers such as Perspex.
- Long PVC gloves are built into the panels such that operators can place their hands into them and work on hazardous materials inside the gloveboxes.
- Gloveboxes are held under a depression in an inert atmosphere.
- Access is via entry ports where containment has to be maintained.
- Manoeuvrability within a glovebox is difficult due to limited access and complex machinery which can be located within.

## The Glovebox Challenge

- Gloveboxes, and the facilities housing them, can be up to 60 years old.
- In some instances, the glovebox viewing windows have degraded over time and visibility can be poor.
- Glovebox lighting may be of a poor standard or disconnected altogether.
- The presence of radiation shielding (such as Jabroc) on the outside of some of the gloveboxes can further reduce visibility. This can make it difficult to determine the contents of the gloveboxes.

The contents of gloveboxes can include pipework, vessels, cabling, valves and furnaces which may have remained in place after operations.

**The gloveboxes may also contain unknown sharp objects which could represent a dismantling hazard.**

**These objects may be very simple in nature such as exposed wire, cropped cables or sharp pipework.**

## The Opportunity for Innovative Solutions

Sellafield would like to explore technologies which would enable them to analyse the contents of gloveboxes, specifically allowing them to identify the presence of potentially unknown sharp objects.

**The timeframe for adopting the technology is relatively short and it is anticipated that proposed technologies will need to be TRL5 or higher.**



*Above Left - Front of an older glovebox. Note the old gloves are 'posted' inside and blanking plugs fitted in their place.*



*Above Right - Some of the oldest gloveboxes at Sellafield. Note the almost opaque, aged Perspex windows.*

## Functional Requirements

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- Sellafield are seeking technologies which can be manoeuvred inside the gloveboxes.
- The technology needs to be small enough to access all areas of the glovebox and be manoeuvrable around glovebox contents such as pipes and vessels.
- Gloveboxes generally incorporate a 'posting port', usually 10" in diameter, and a number of other ports ranging in diameter from 6" to 20".
- It should be possible to post the sensor system into a glovebox via one of these standard ports.
- Sensors should be capable of providing real-time images or signals, with object recognition alerting users to the presence of potentially sharp objects.
- These sharp objects could be metallic (including magnetic and non-magnetic metals), glass, plastic, rubber or ceramic in nature.
- It should be noted that glovebox users will have limited dexterity and not all gloveboxes have power supplies.
- The technology itself must not have any sharp or snagging points.
- Radiation tolerance of the technology may be a consideration.
- Deployment and operation in a nuclear environment will be considered outside this challenge.

## Funding Available

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Applications are invited for technological solutions to meet this challenge.

This challenge may provide an excellent opportunity to transfer suitable technologies already employed in sectors outside the nuclear industry.

Sellafield are seeking technology which can be demonstrated in a standard laboratory/glovebox environment.

Funding of up to £10,000 is available for short feasibility studies to determine the suitability of proposed technologies. It is anticipated that further Proof of Concept funding may be available for technologies which demonstrate significant potential.

## Application Process

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Please visit [www.gamechangers.technology/challenges/gloveboxes](http://www.gamechangers.technology/challenges/gloveboxes) for more information about the application process and to download an application form.

**The deadline for applications and poster presentations is 12:00 on Tuesday 26<sup>th</sup> June, 2018.**

It is anticipated that successful applicants will be notified on Monday 2<sup>nd</sup> July.

It would be highly advantageous if successful applicants were able to work with a Sellafield Innovation team on location in Cumbria between Monday 9<sup>th</sup> and Friday 20<sup>th</sup> July.

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## Funding Available

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Proof of Concept funding is available through the Game Changers Innovation Programme for new technologies which may aid Sellafield in their decommissioning mission and which demonstrate commercial potential for the innovator.

Visit [www.gamechangers.technology](http://www.gamechangers.technology) to find out more about the Game Changers Innovation Programme, the application process and to download or complete an application form.

You can also request an application form by emailing us at:  
[apply@gamechangers.technology](mailto:apply@gamechangers.technology)



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