UK-RFD infrastructure and tooling preparation

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on behalf of Crab Cavity collaboration
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Contents

• Current infrastructure capability at Daresbury Laboratory

• Planned development of infrastructure specifically for the RFD Cryomodule assembly.

• Procurement currently underway

• Future work
- Current infrastructure capability at Daresbury Laboratory

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Daresbury Lab Engineering Technology Centre (ETC), systems integration building
ETC Floor Plan

- 30 Tonne Crane coverage
- General (RFD) Assembly Area
- Large Systems Assembly Area
- Survey
- Magnet Test
- ISO 4,5 Cleanroom
- CMM
- Electrical Lab.
- Meeting Room
- Reception
- Vacuum Laboratory
- Ovens
- UHV Cleaning
- Precision Machining Centre

Dimensions:
- 23 m
- 21 m
- 15 m
- 30 m
- 40 m
- 92 m
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Engineering Technology Centre 3D Layout

General Assembly area
Approx. 100m²

Cleanroom Assembly Area
ISO 4 interior
Cavity String Travel Path

- Tool shelves to be removed (Red)
- Required travel path of string (Grey)
- RFD General Assembly and storage

Survey and Alignment Area

Magnet Test Lab

Alignment to take place in clean room

Cleanroom Assembly

Engineering Technology Centre – Plan View
ETC ISO 4 Cleanroom
Cavity String lifter selection

Option 1
Fully actuated Custom lifter

Option 2
Modified commercial car lifter

Option 3
Use overhead crane and guidance frame

4 x Servo Motor

O/H Crane

Fixed pin positions on each column used to lock carriage
General Assembly Area – String Lifter

Car lifter Cost ≈ £5,000 - £10,000

Installation and Ancillary Components ≈ £20,000 – £30,000

Total cost ≈ £25,000 - £40,000

Significantly cheaper than option 1
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Cavity String Mobile Frame (Trolley)

Cavity String Option 1

Cavity String Option 2

Cavity String Option 3

Now on order
Cavity String Mobile (Trolley) - Travel Path

- Green route is for shorter trolley.
- Reduced turning area required, easier transport offers less risk of damage.
- A shorter trolley allows more working space around the string on the assembly frame.
Cavity String Mobile Frame

- 3.5 – 4.5 m Mobile Cleanroom Assembly Frame

- Contract Placed with ESE Engineering Aug ’18

- Cost: £40k

- Expected Feb ‘19
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Upcoming challenges

- Open discussions for planning and strategy for the RFD assembly procedure at Daresbury, both inside the cleanroom, and the general assembly.
- Take on board the lessons learnt from the DQW assembly sequence, but not to use it as a template – substantial design and infrastructure changes will necessitate a fresh strategy and approach to the assembly procedures.
- Therefore a lot of new documentation required!!
Summary

So far;

• Facility development at Daresbury has begun.
• Identified and reserved assembly area onsite.
• Placed order for RFD cleanroom assembly frame – under manufacture

Next Steps;

• Finalise design of augmented car lifter, and begin procurement. (immediate action)
• Begin the creation of an assembly sequence for the RFD. (ongoing action)
Thank you for your attention, Questions?