Engineering and Imaging STAP

1. Welcome new scientist, new member, new organizer, new chair
2. Beam on Target / Commissioning update
3. Sample storage / Sample environment update
4. User office update
5. New proposals
6. See full talks: https://indico.ess.eu/event/4007/

Slides by Giovanna, Hanna & Fredrick

ESS must provide policies to receive and ship samples and equipment as well as how to integrate equipment into experiments such that discussions and planning with early users from academia and industry can happen in time for the first experiments or shortly thereafter. If academia or industry provides sample environments, mechanisms should exist to reward the investment, e.g. access to beam time.

Basics are clear, like another facility, however details are not yet finalized
SEE STAP invited Safety, RP, Quality to report and receive the feedback from STAP members

Will beam time be available for proprietary measurements by industry?

Not yet clear. One of the tasks of a new RCO group leader

ESS should provide support for such issues to the instrument teams and consider whether a safety culture that seems to fit the aerospace industry or a nuclear power plant better than a research institution is defendable to users who can take their experiments elsewhere

Noted

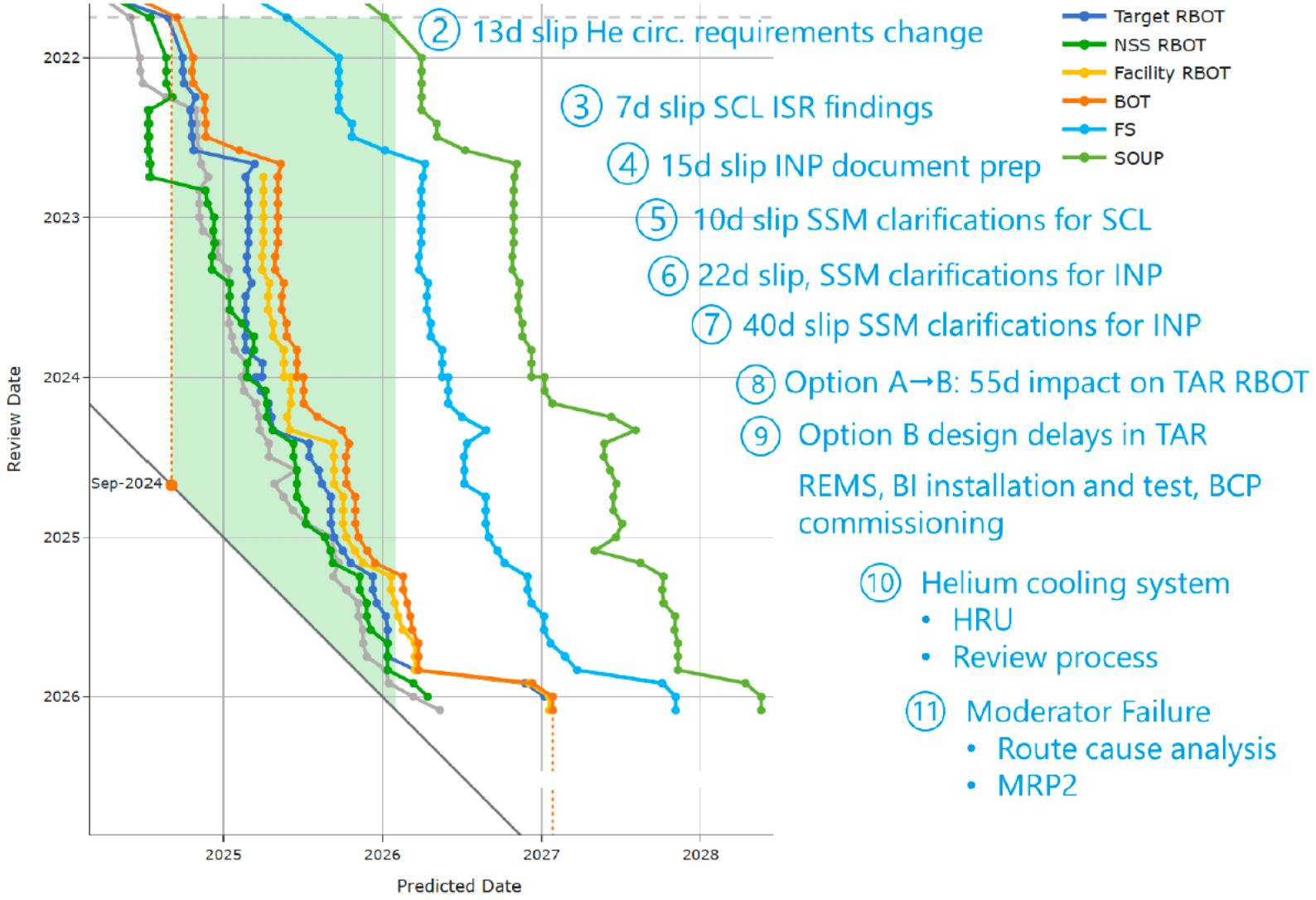
- For ODIN a tomography of a historical wood and gold artifact could be a typical use case. The STAP suggest to address these questions for the next STAP meeting and preform actual dry-runs of these cases:
  - How can valuable or hazardous samples be received, stored and released after beamtime?
  - How will the activated sample be handled after the experiment?
  - How can concerns about the sprinkler system becoming activated, potentially damaging the artifact?
  - Will alignment of samples, gratings, detectors etc. with a laser pose issues?
  - Both Robin and Stefanos have load frames available that could be operated on ODIN as user-provided sample environments except for the neutrons: How quickly can authorization of operation be achieved, EPICS integration be developed, repairs on activated components be accomplished, transfer to workshops or storage be done? Since these rigs are likely used at ODIN, any efforts invested into approvals and software developments will be investments in future operation.
  - The ODIN team has access to Digital Image Correlation systems to be used during an experiment. Can DMSC or ECDC staff provide a level of integration (correlating the standalone DIC data to the beamline data) that can make such an experiment a success?
  - Samples will often require masking with e.g. Cd and Gd2O3 paint: A practical dry-run should include these.

Ongoing (impacted by recruitments)

- For BEER:
  - a furnace experiment could be simulated in which a vanadium can with activated powder fails.
  - What procedures are in place to decontaminate the furnace?
  - If activated heating elements fail, can they be replaced?
  - What are the procedures to transfer radioactive components into sample environment areas for maintenance?
  - How will radiation protection identify the most activated regions/components?
  - Are procedures to deal with contamination in place?
  - Are hazards identified in experimental safety reviews?

Ongoing (see next slides)

Project Update (February data)



1. (TAR electrical design)
2. 13d slip He circ. requirements change
3. 7d slip SCL ISR findings
4. 15d slip INP document prep
5. 10d slip SSM clarifications for SCL
6. 22d slip, SSM clarifications for INP
7. 40d slip SSM clarifications for INP
8. Option A→B: 55d impact on TAR RBOT
9. Option B design delays in TAR

   REMS, BI installation and test, BCP commissioning
10. Helium cooling system
    - HRU
    - Review process
11. Moderator Failure
    - Route cause analysis
    - MRP2

Key dates

Beam on Dump: ✓

SAR5: 30th June 2026

SRR5: 8th September 2026

Facility RBOT: 19th January 2027 following MRP2 Assembly and testing

Beam on Target: 27th January 2027

Date held from last month, driven by delivery date of MRP2, 15th October 2026

Current ambition: "launching a credible user programme"

Start of user operation beginning of 2028 with 7 to 10 instruments
Very large number of activities going on in the science directorate!

No more tranches!
One of the challenges: simultaneous cold commissioning of instruments (ex. BEER & MAGiC)

Process selection validated by SAC

Step 1: STAP Reviews (April 2026)

• STAPs review proposals based on four criteria (Impact, Feasibility, Capacity and Capability, Uniqueness).

Step 2a: Neutron Instrument Review (July 2026)

• An Instrument Review Committee is established to review neutron scattering and transmission proposals only (fundamental and particle physics proposal are reviewed through a separate parallel process).

•The committee applies four equally weighted criteria to assess the proposals:

1. Impact (scientific/industrial/societal)
2. Technical feasibility
3. Capacity and capability
4. Uniqueness and alignment with ESS source characteristics

Committee membership *(tbc☺*:

- 4 SAC representatives
- 4 experts from the community
- Chairperson

Process selection validated by SAC

Step 2b: Fundamental *Nuclear* and Particle Physics Review (July 2026)

•A review process has already started by the STAP which SAC considers appropriate.

Step 3: ESS Management Assessment (Sep 2026)

•Combines prioritised lists from Instrument Review Committee and fundamental and particle physics reviews.
•Adds factors such as readiness and maturity, timeliness, risks, human resource needs, financial implications, implementation schedule, and strategic alignment.
•Produces revised priority list (with 1st and 2nd positions clearly defined).

Step 4: SAC and STAP Ratification (Oct 2026)

•ESS shares final list with SAC (and STAPs) for ratification.

Step 5: ESS Council Submission (Dec 2026)

•ESS management submits ratified proposal to Council.

Initial STAPs' evaluations (April meetings)

Specific feedback on each proposal in the following areas:

- Impact – *Potential for scientific, industrial, and societal impact*
- Feasibility – *Is the instrument feasible in technological terms? How much new*

technology needs to be developed?

- Capacity and Capability – *Does the instrument provide new capabilities and/or additional capacity to the ESS suite? How does it fit in the European instrumentation*

landscape? What is the potential user base?

- Uniqueness – *will the instrument provide new or unique capabilities that are needed by the European science community? Does the instrument make good use of the long-pulse?*

And..

Relative importance of new instruments against completion of scope of the existing instruments based on the list of completion scope in the table overleaf.

Advice on whether any of the new proposals could be combined or whether they could be executed as upgrades to existing instruments

Comment on the two new instrument ideas presented

- General comment: The STAP recommends to ESS to request comments on the potential user base from the proposers ("number of imaging instruments is growing at other facilities", "demand from industry for paid-for residual stress or SAN measurements has increased" to gauge the utilization/weigh the impact early on.
- Imaging beamline MAGNI: Why not as short as possible to provide as much flux as possible? Suggest to present ODIN and MAGNI more side-by-side, current slides make it a bit unclear what is different besides the shorter flightpath (how different are flux, divergence, FOV – twice? Ten times?). 50 micrometer resolution is not that great? Typo? Quantify the "faster and better than ILL" claim?
- Multi-port beamline IDUN: Good idea, use neutrons otherwise lost, problem could be staffing and still high cost if bunkers, tens of meters of beam guide are needed? Good for training, proof-of-principle experiments, increase of throughout etc. Make clear that flux on sample for each beamline is not less since neutrons are used that are otherwise lost. Case would be stronger if cost for the shared components (in-bunker) vs. the rest of the beamline (100 m beam guides, detector system, hutch) could be estimated – is an IDUN beamline can be offered at 25% of the cost with 80% of the flux of a dedicated single beamline, i.e. "almost four for the price of one" it is more interesting than if the finances turn out to be "almost 2 for the price of one" or so.

We need more feedback to align with other STAPs

New instrument proposals for DID

HUGIN & MUNIN: Single crystal diffraction
(ESS, PSI, ESS Bilbao, ISIS, Edinburgh University)

BRAGI : Total scattering diffractometer
(PSI, ESS, TUM, ISIS, Duisburg-Essen University, Uppsala University)

MAGNI : Microscopy, Advanced and Grating Neutron Imaging
(PSI, DTU, ESS)

SLEIPNIR: A high-capacity instrument cluster for ESS
(DTU, ESS)

IDUN - Industrial & utilitarian neutron instruments
(DTI, ESS)

Sample storage / Sample environment update

Scientific Support Division
Hanna Wacklin-Knecht

Support Laboratories
Ryan Oliver (9/3)

Katrin Michel
Nicholas Weisend
Ghazaleh Roostai (PL)

Vacancy: RML Scientist – interviews held

Sample Environment

Alex Holmes
Oleksiy Zhadorosko
Damian Paliwoda
Lauritz Saxtrup
Andreas Hagelberg
Niklas Ekström
Alice Corani
Harald Schneider
Oskar Summerton (technician)

Vacancies:
Group Leader – interviews held
2 SE technicians
SE engineer HT/gas

Deuteration

Jia-Fei Poon
Oleksandr Kovalenko
Naomi Elstone (AMBER PD)

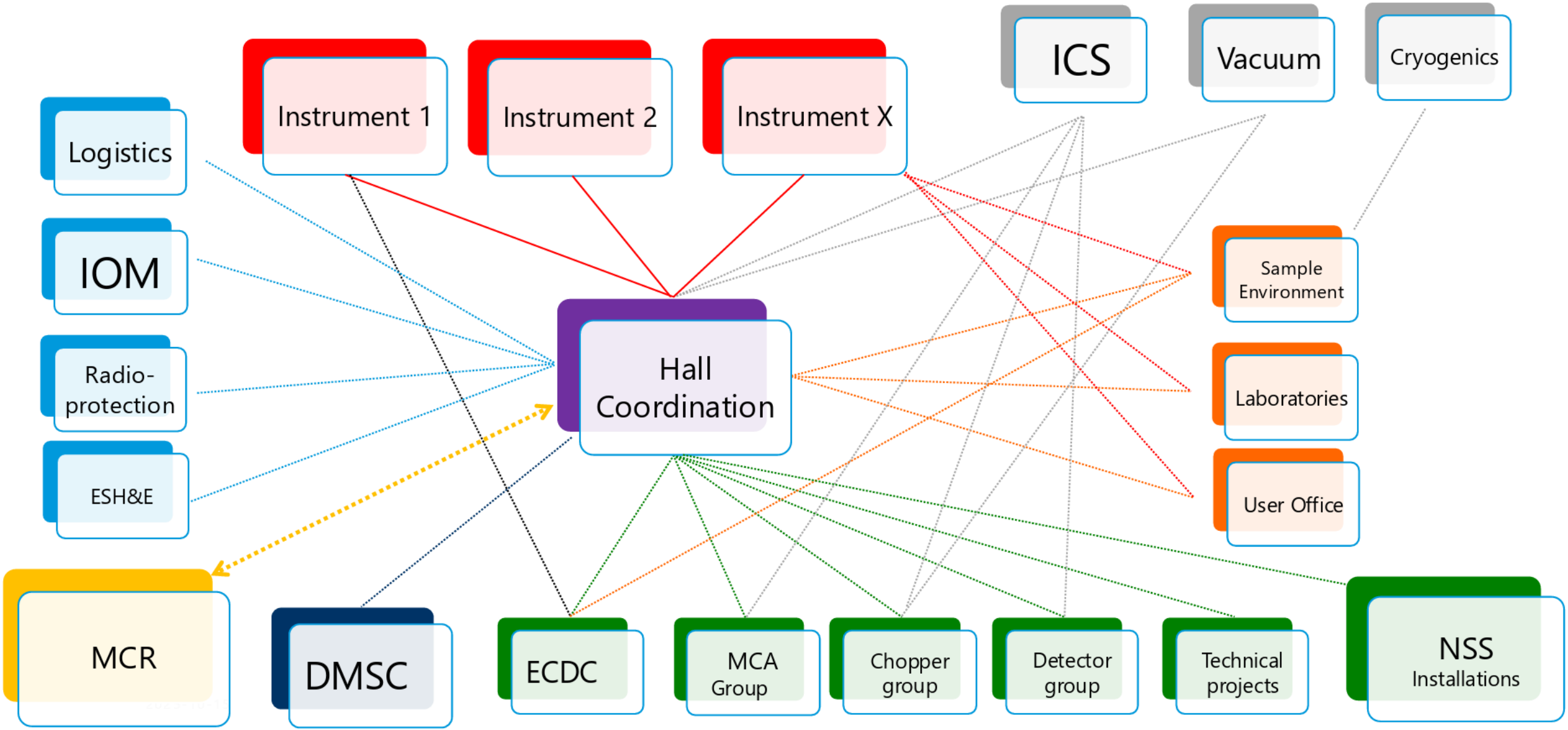
Vacancies:
Group Leader
Biodeuteration Scientist
Postdoc – nanodisc deuteration/SEC-SANS

Hall Coordinators
Dana McKenzie (1/1)

Vacancies:
7 Hall Coordinators

Hall Coordination

Overview of stakeholders and interfaces



Storage of active samples

Proposal for RP

Update – preliminary process and RP guidelines

ESS staff (IOE/IS or RP depending on activity level) is responsible for user samples at ESS

Before removing a sample from sample position, its activity must be checked every time:

- Experiment Risk Assessment ERA will contain who should do this (user, LC, HC, RP)
- Depending on the result, the sample can be stored at:

1. Instruments

- Each instrument will have active sample storage cupboard(s) appropriate for their samples.
- RP provides advice and instructions on storage solutions and shielding of stored samples to <3 µSv/h
- RP checks samples prior to removal from storage and gives instructions for transport if required.

2. RML

- For handing samples with contamination hazard or exceeding 25µSv/h
- 4 fumehoods + 2 gloveboxes (wet/dry)
- 90 min. fire cabinets
- Access only during normal hours/weekdays
- Trained users supervised by RML scientist

2. Sample storage room

- Storage of active samples that can be shielded to <3 µSv/h
- Storage for active samples requiring fridge/freezer/inert atmosphere
- Waste hood for emptying sample containers
- Managed/supervised by RML scientist
- Access for trained ESS staff

Sample Management and Tracking

Update

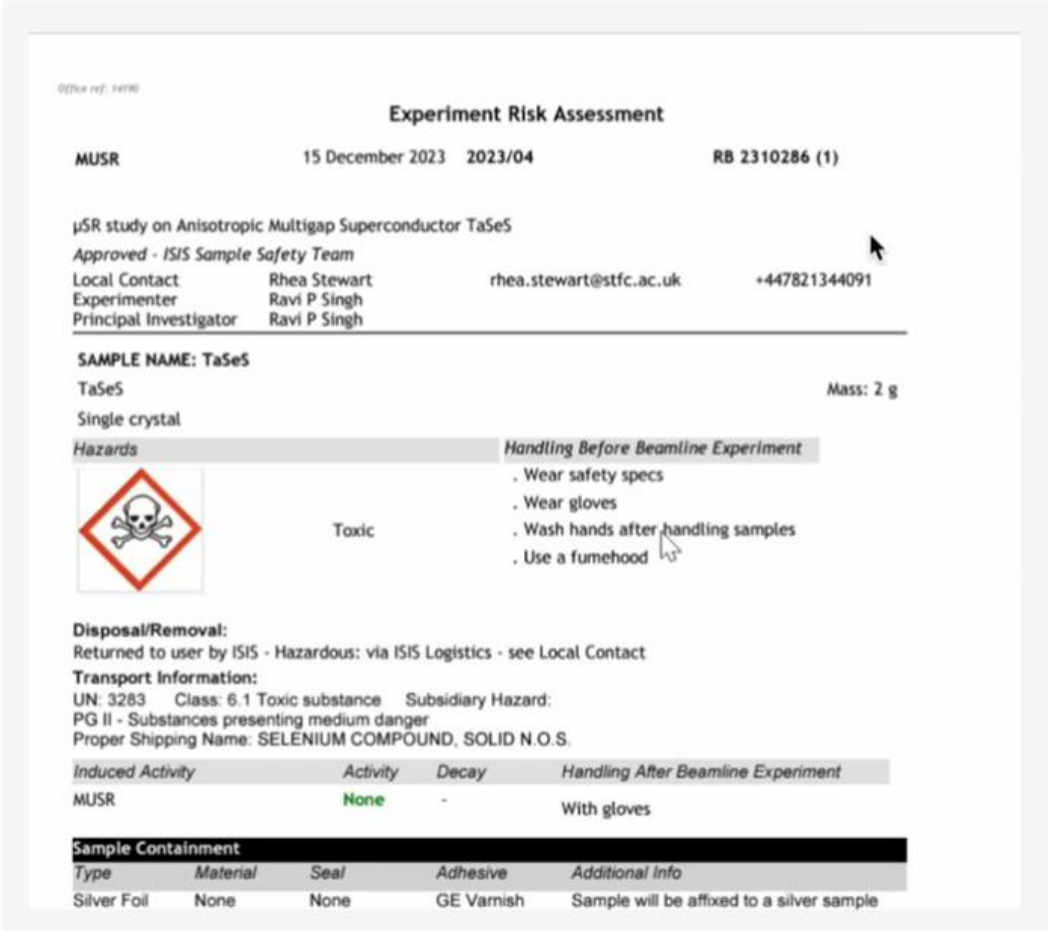
- All samples will be barcoded with labels produced by the User Office software from user proposal
- Samples shipped to ESS will be registered and delivered by Logistics to recipient (user laboratory or IOE) for barcoding/storage.
- Samples brought to ESS by user will be taken by the user/IOE to the support laboratories (day time), or Hall Coordination office (out-of-hours) for barcoding.
- Samples will be registered in/out of storage and supervised/controlled areas after appropriate RP checks
- IOE is responsible for arranging RP checks as well as sample return shipping

User office update

- Capture and validate safety-critical experiment information

- Users provide detailed:
  - samples
  - sample environments
  - experiment design

- Reviewed for safety before experiment
- Developed by SIMS group, with process requirements from:
  - Instrument Scientists
  - Safety



Experiment Risk Assessment

MUSR 15 December 2023 **2023/04** **RB 2310286 (1)**

µSR study on Anisotropic Multigap Superconductor TaSeS

Approved - ISIS Sample Safety Team

Local Contact	Rhea Stewart	rhea.stewart@stfc.ac.uk	+447821344091
Experimenter	Ravi P Singh		
Principal Investigator	Ravi P Singh		

SAMPLE NAME: TaSeS

TaSeS Mass: 2 g

Single crystal

Hazards	*Handling Before Beamline Experiment*
Toxic	. Wear safety specs . Wear gloves . Wash hands after handling samples . Use a fumehood

Disposal/Removal:
Returned to user by ISIS - Hazardous: via ISIS Logistics - see Local Contact

Transport Information:
UN: 3283 Class: 6.1 Toxic substance Subsidiary Hazard:
PG II - Substances presenting medium danger
Proper Shipping Name: SELENIUM COMPOUND, SOLID N.O.S.

Induced Activity	*Activity*	*Decay*	*Handling After Beamline Experiment*
MUSR	None	-	With gloves

Sample Containment

Type	*Material*	*Seal*	*Adhesive*	*Additional Info*
Silver Foil	None	None	GE Varnish	Sample will be affixed to a silver sample

- Aligned with UOS collaboration (ERA adoption)

Summary

- Recruitment for ODIN completed, for TBL in the final stage (safety clearance)
- Overall good progress with the instrument projects, but some issues remain
- First three instruments (TBL, ODIN, DREAM) went through TG5/iSRR meeting
- No major roadblocks: those instruments will be ready for hot commissioning
- Readiness for hot commissioning is not the same as readiness for user operations
- There are technical and operational tasks remaining for the instrument teams, even after TG5/SAR
- Post TG5 instruments challenge: engineering resources from partners reassigned, NSS moved resources to the next instruments, but some of the tasks require engineering support
- Robustness of the data visualization & reduction tools have to be improved
- More stability and endurance tests unveil new issues even after passing TG5
- I have not addressed all the issues raised by the STAP, work is still ongoing

Issues raised during SAR/iSRR meeting (ODIN):

A combination of tasks to pass SAR/iSRR and to be ready for user operations