



North Sea
Transition
Authority



CO₂ Transportation
and Storage
Taskforce



Carbon storage monitoring (MMV)

Technology Showcase

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Participants

Operators



Suppliers

Geophysical / Wells / Environmental / Data



R&D and public bodies



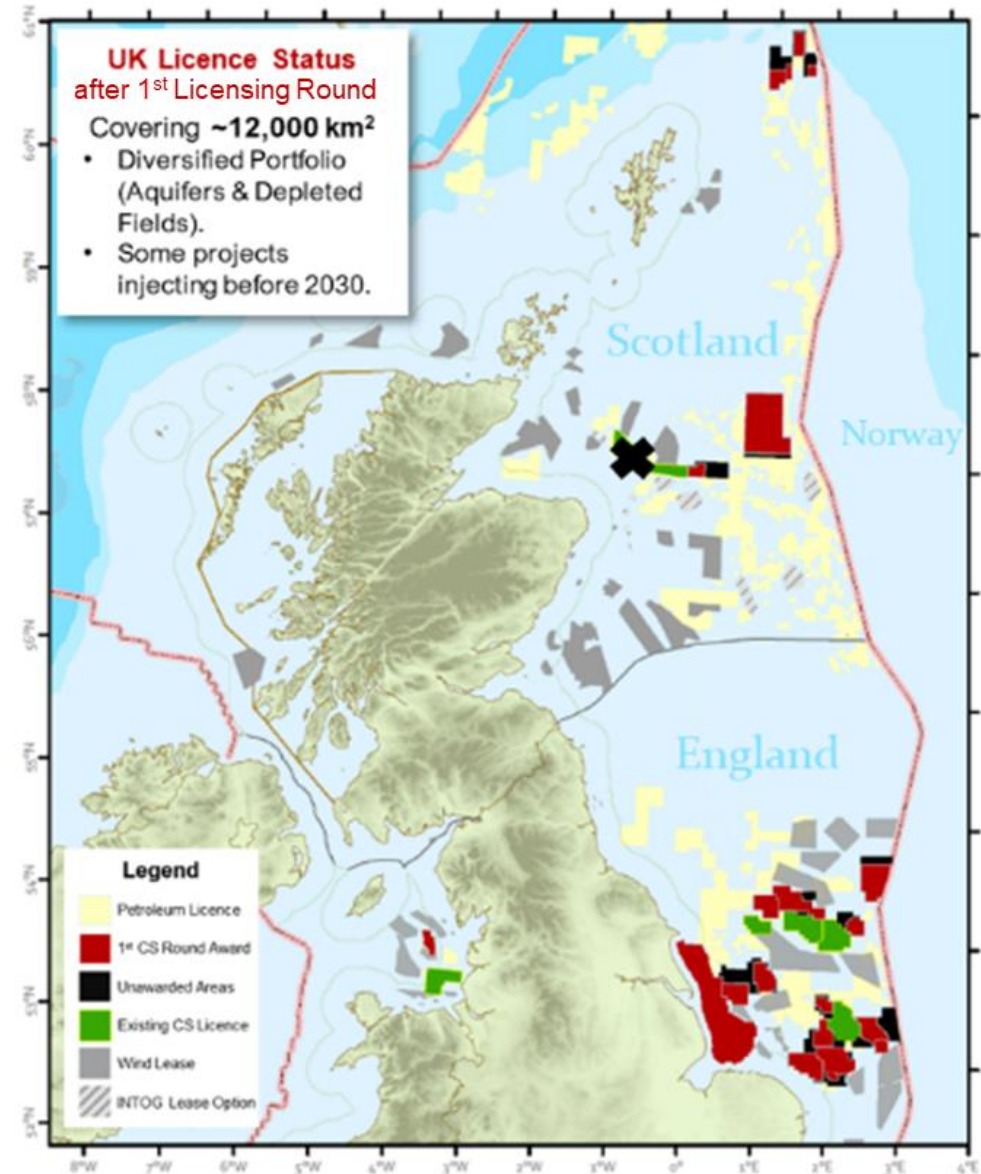
Organisers



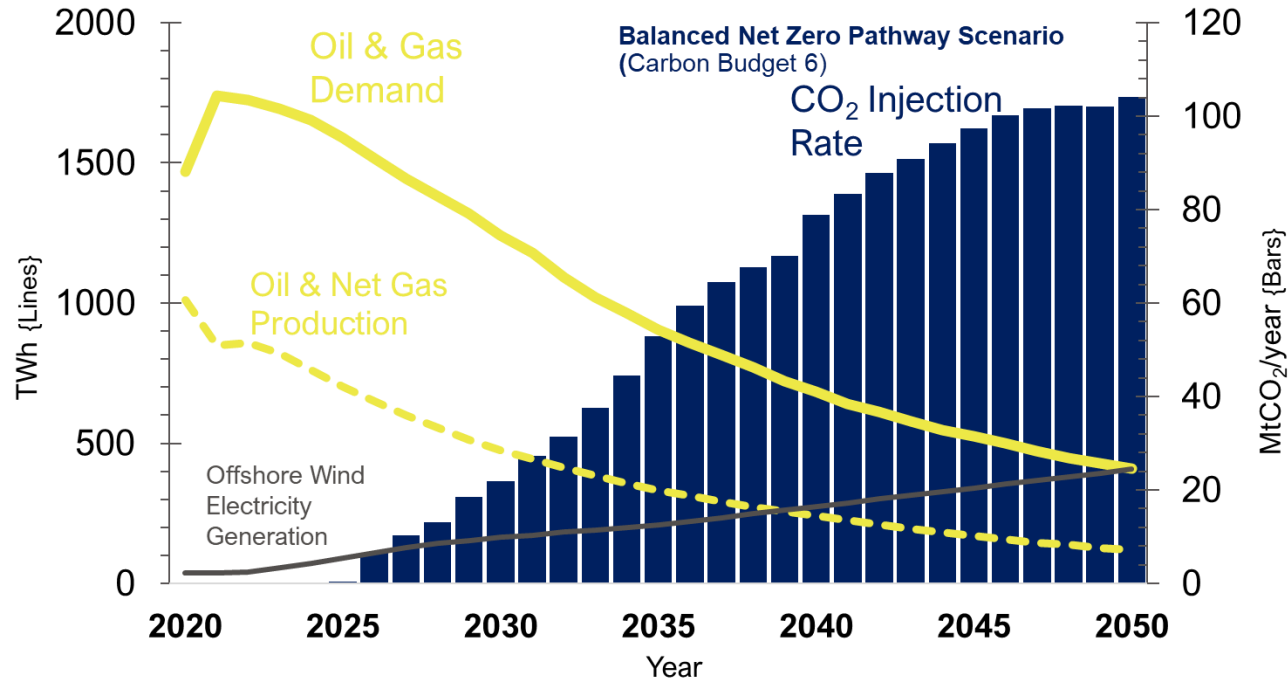
The NSTA

- UK Oil&Gas and Carbon Storage regulator
- After 1st CS Licensing Round (2023) **27 active licences** in the UKCS
- **4 storage permits** awarded to major developments underway; additional projects in the planning phase
- **2nd licensing round** underway: applications for >2m acres (8k km²)
- **MMV is a key focus of the regulator:** a core prerequisite to develop a store, with no prescriptive approach to the technologies to adopt

UKCS carbon storage licences after 1st Round

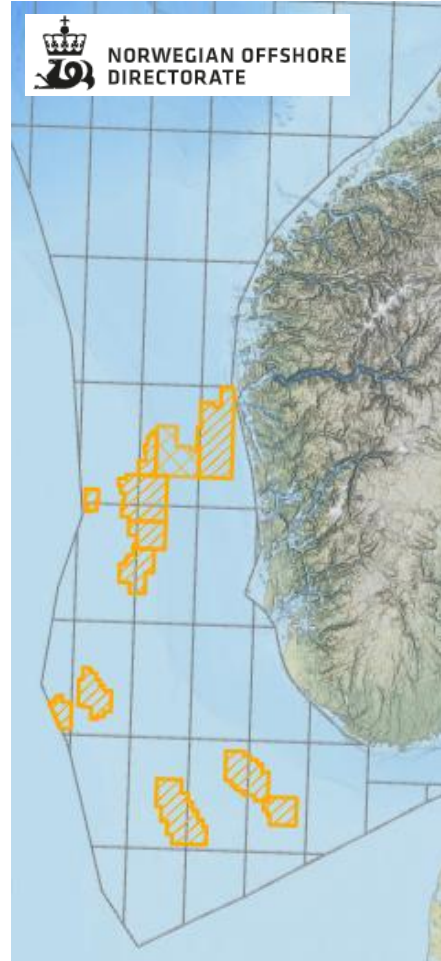
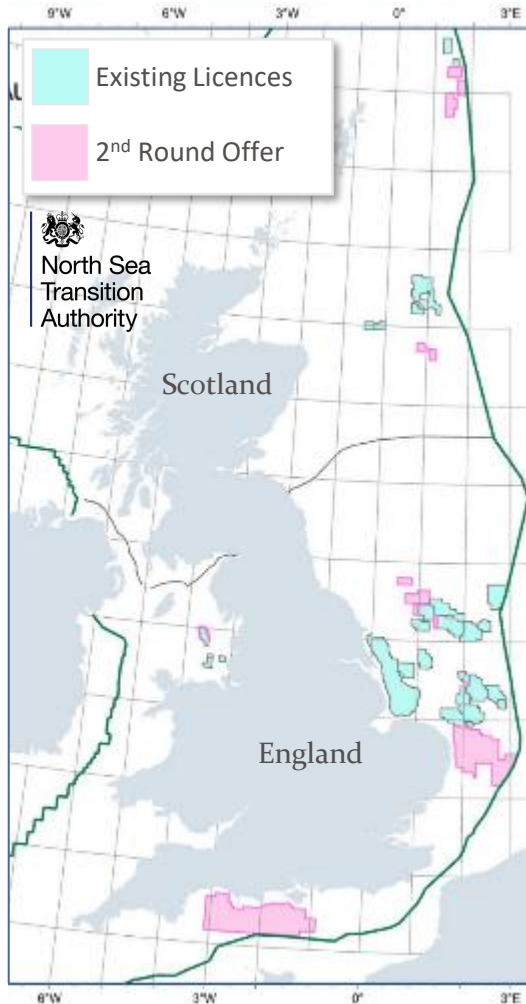


UKCS energy transition



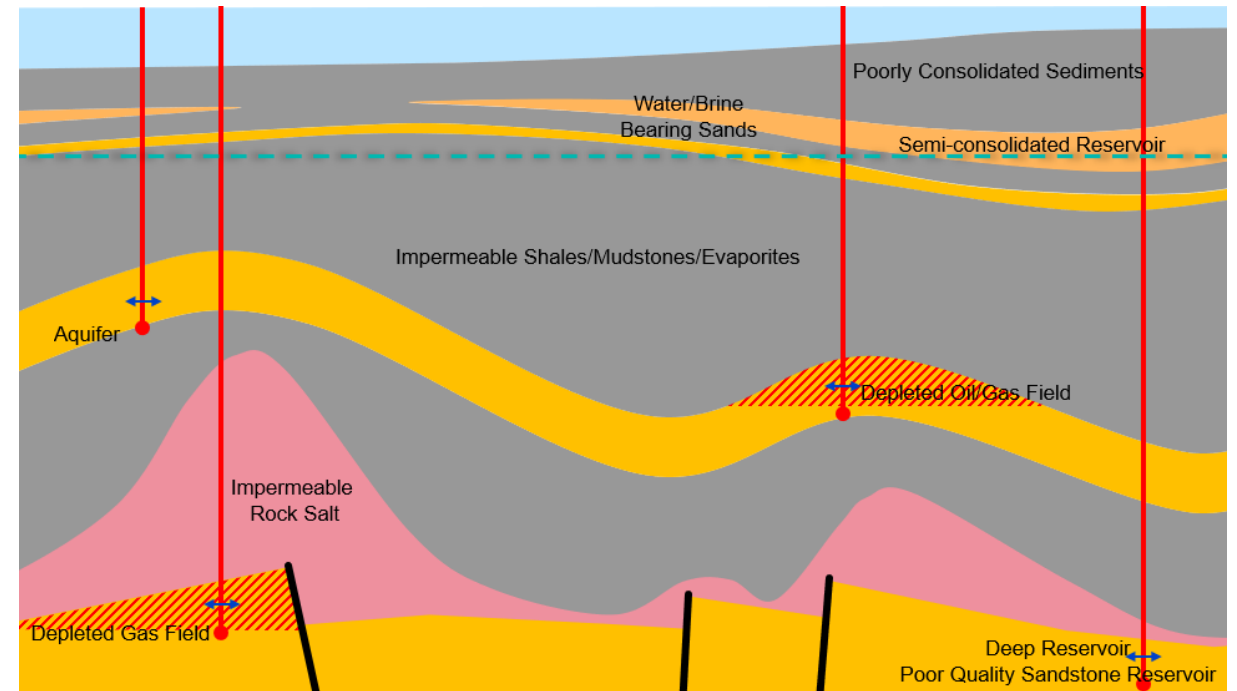
Carbon storage monitoring scope

North Sea carbon storage



Subsurface and surface features drive monitoring requirements

- **Saline aquifers** versus **depleted gas fields**
- Hydraulic unit **pressure communication**
- **Development concept** (subsea, platform or ship transport)
- **Water depths, seabed and metocean** conditions
- **Co-location, maritime traffic, proximity** to onshore communities



Technology opportunities in monitoring



Objectives of MMV technologies

- Improve **sensitivity** and **accuracy**
 - Monitor in **real time**
 - With smaller **footprints** and lower **costs**
 - Deal with large and complex **data**
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- **Operator** and **supplier collaboration** is critical throughout the project phases
 - **Testing** and **field trials** are very important – operational team’s experience will be key
 - **Sharing** of information and learnings across industry – today’s event, for instance

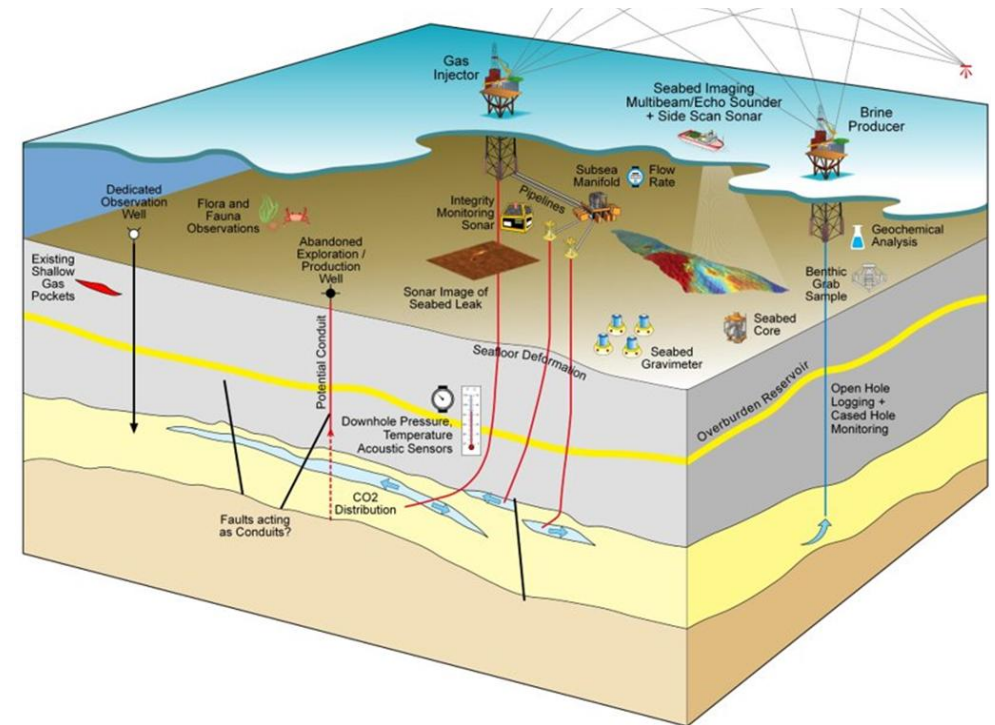
As complete as possible **technology portfolio**

1. Geophysical

3. Geochemical

2. In-Well

4. Marine



Your input – priority topics for today

Technology maturity

Deployable technologies

Case studies

Field trials & deployments

Technology selection

Monitoring strategies

Focusing of MMV plans to containment risks

Cost-effective, scalable solutions (e.g. passive and induced seismicity)

Geophysical

Sparse seismic - nodes, DAS fibre, spot seismic

Continuous monitoring: seal, plume & fluid migration

MMV of depleted gas fields

Practical challenges in shallow waters

Wells

PT gauge options (wired/wireless, etc)

Fibre optic: practical applications, well and seabed

Cased hole logging (PNS, PNX)

Surface leak detection & volumetric estimation

Data

Large data transmission, processing and storage

Data analytics (AI) for enhanced seismic event detection and location

Data management platforms: data handling, analytics and workflows, visualisation and dissemination, cost efficiency

Environmental

Survey robotics, low cost & low impact

Seabed sampling

Environmental sensors/analysers: seabed, water column

Landers, AUVs for continuous surveillance

Today's agenda

Plenary programme

08:30	Arrival and coffees
08:40	P&J Live - Safety brief
08:45	NSTA - Welcome & Agenda

09:00 - 10:00 Plenary session P1: Monitoring plans & technology selection

09:00	Spirit - Monitoring requirements and technology screening
09:15	Snam - Snam monitoring plan
09:30	SLB - Innovating for Impact: Delivering Scalable CCS Technologies
09:45	Oxford University & NSTA - UKCS Microseismic JIP

10:00 - 11:00 Showcase session S1 - Geophysical *(coffee will be served)*

11:00 - 12:00 Plenary session P2: Well & reservoir monitoring

11:00	Weatherford - Discrete Fibre Optic P/T Monitoring in a CO2 Injection Well
11:15	Silixa - From Field Lessons to the Future of CCUS Monitoring with DFOS
11:30	BakerHughes - Integrated CCS Characterization, Geomechanics, Model-Driven Monitoring
11:45	Equinor - From conformance to appraisal – turning measurement into evidence

12:00 - 13:30 - Showcase session S2 - Well & reservoir *(lunch will be served)*

13:30 - 14:30 Plenary session P3 - Environmental

13:30	NOC Innovation - CCS lessons from Ocean Research
13:45	Reach Subsea - Efficient Offshore CCS Monitoring with Gravity & Remote Operations
14:00	Aquaterra Energy - 'Shallow Borehole Array' MMV solution
14:15	Sentinel & TracerCo - Passive detectors & Chemical fingerprinting

14:30 - 15:30 Showcase session S3 - Environmental *(coffee will be served)*

15:30 - 16:00 - Discussion panel & Closing

15:30	CS MMV Showcase Steering Committee - Reflections from the day and Q&A
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16:00 End

Showcase sessions

During the three Showcase sessions, 15 minute presentations as per the agenda below, will run in parallel.

We will ask presenters to give their talk twice during the hour.

Showcase sessions (1 to 1.5 hours) will give ample time also for Q&A and engagement of all the other exhibitors.

10:00 - 11:00 Showcase session S1 - Geophysical *(coffee will be served)*

A	TGS - Scaling CCS with Certainty: Global Subsurface Data and Digital Monitoring Solutions
B	Spotlight - Critical window: Early injection focused seismic defines storage site future
C	TensorGEO - Integrated Passive Microseismic for Continuous CO ₂ Storage Assurance
D	Guralp - Offshore Seismic Monitoring Solutions for Carbon Storage
E	K.U.M. & Nanometrics - Offshore microseismic monitoring

12:00 - 13:30 - Showcase session S2 - Well & reservoir *(lunch will be served)*

A	Viridien - Conxise CS - Targeted Ultra Sparse Full Wavefield Monitoring
B	Quintessa - Risk-driven MMV plans
C	TGT - Diagnostics for well surveys in carbon storage monitoring
D	Carbon Guardian - C44 Monitoring Platform – Integrated monitoring for secure CCS
E	Imenco - Seabed monitoring instrumentation




14:30 - 15:30 Showcase session S3 - Environmental *(coffee will be served)*

A	Fugro - Marine Seismic Solutions for CCS MMV
B	QuadGeo - Seafloor uplift and gravity monitoring
C	Sonardyne - Better, More Frequent and Lower Cost Monitoring with "On Demand" OBN
D	Resman - Verifiable CO ₂ Storage: Tracers for High-Integrity MMV and Leak Detection

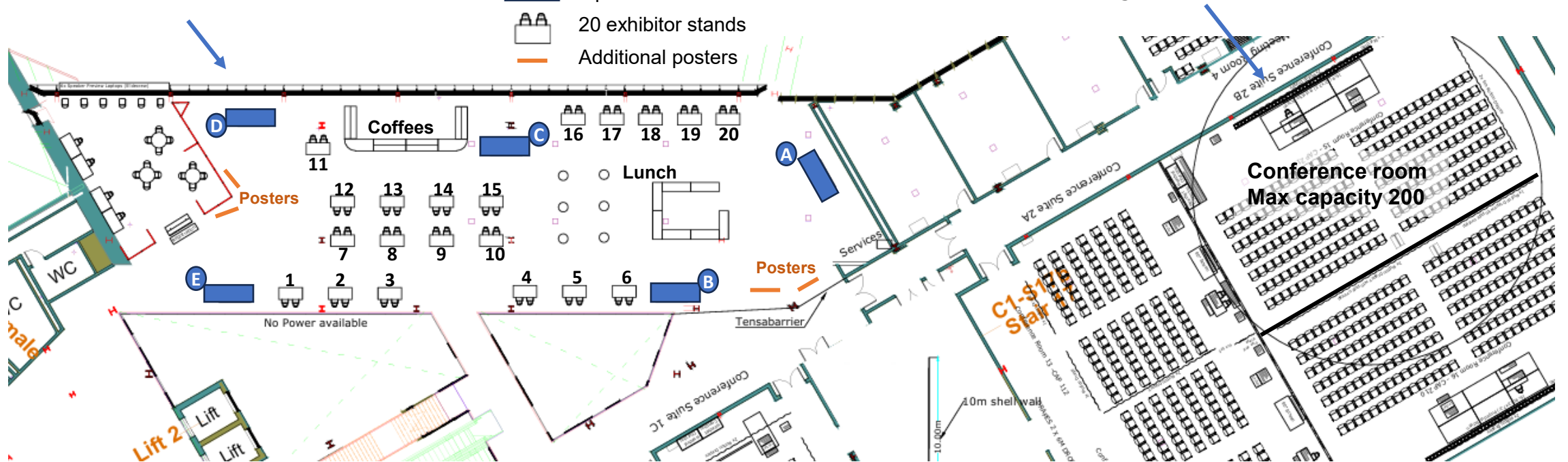
MMV Technology Showcase

- Three plenary sessions in Room 15 (this room) starting at 0900,
- Plenary presentations of 15 minutes each, with no Q&A. Please submit questions using Slido
- Breakout 'Showcase sessions'. Attendees move to the atrium on the same level 1, where 5 presentation screens, 20 exhibitor stands and 5 extra posters are located
- 'Showcase' presenters will have the screen for the entire hour and will repeat their presentations twice, taking questions from the floor. This will allow more attendees to listen

Showcase breakout sessions

-  5 presentation screens
-  20 exhibitor stands
-  Additional posters

Plenary sessions (Room 15)

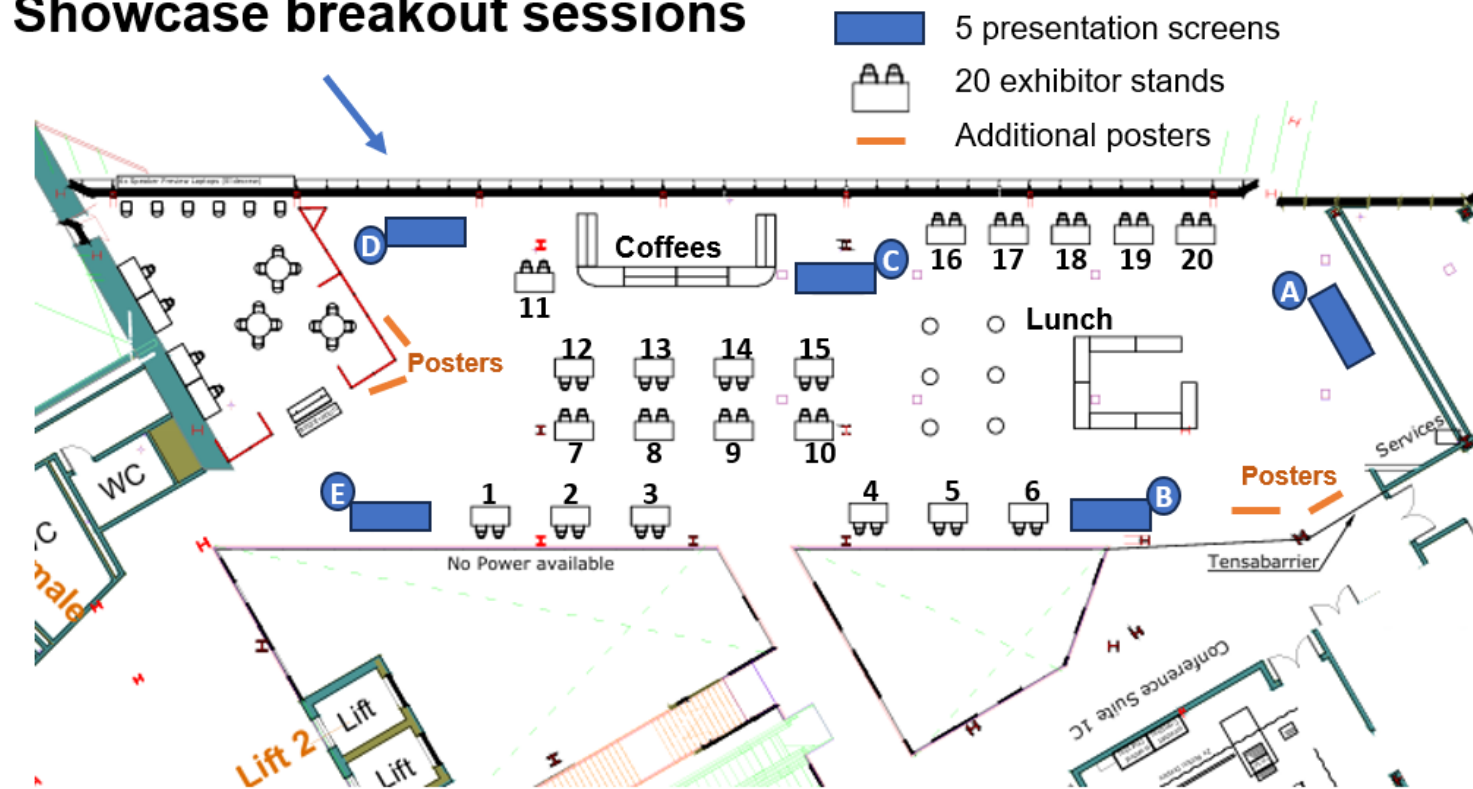


Exhibitors' stands



Stand	Company	Presentation P: Plenary S: Showcase
1	Aquaterra Energy	P3
2	BakerHughes	P2
3	K.U.M. & Nanometrics	S1
4	Fugro	S3
5	Guralp	S1
6	TGT	S2
7	NOC Innovation	P3
8	QuadGeo	S3
9	Quintessa	S2
10	Reach Subsea	P3
11	Sentinel & Tracerco	P3
12	Silixa	P2
13	SLB & Resman	P1 & S3
14	SMG Gravity	
15	Sonardyne	S3
16	Spotlight	S1
17	TensorGEO	S1
18	TGS	S1
19	Viridien	S2
20	Weatherford	P2

Showcase breakout sessions



Posters	
Carbon Guardian	S2
Imenco Future Technologies	S3
Storra	
NSTA	
Cambridge Biomagnetics	