Havrommet

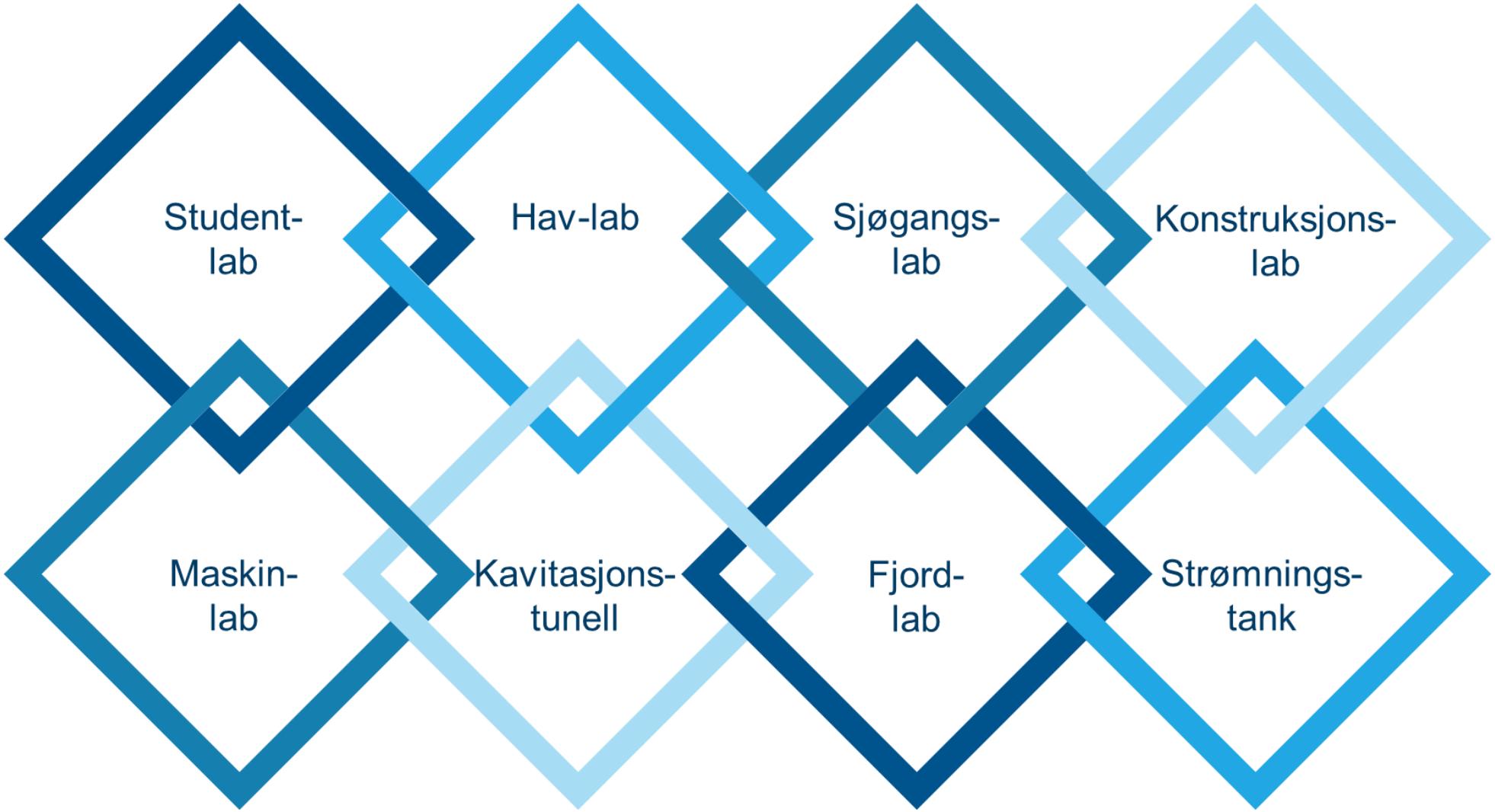
Ocean Space Centre

Møre Ocean lab
Det Digitale Havrom

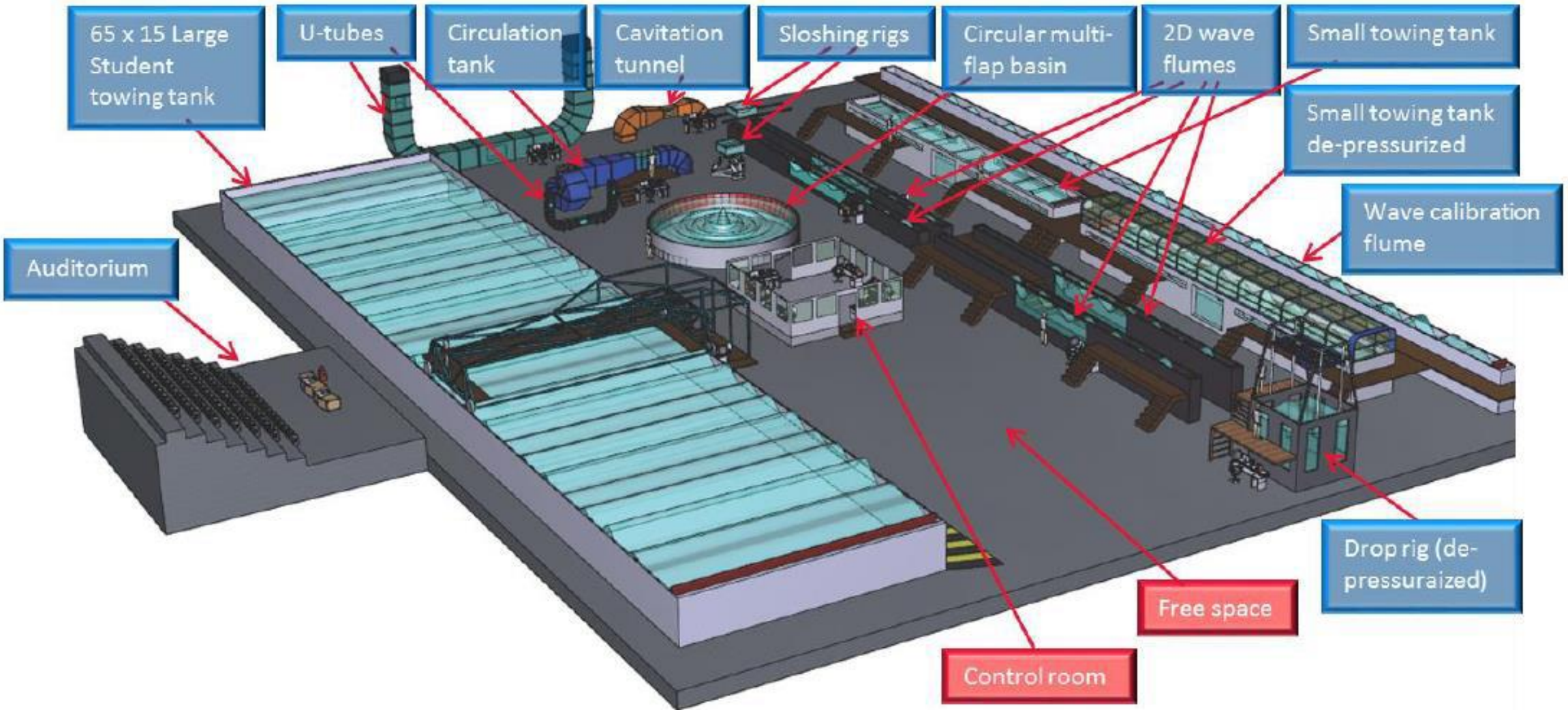
70 % av jordens overflate er hav

Ocean Space Centre

Ocean Space Centre



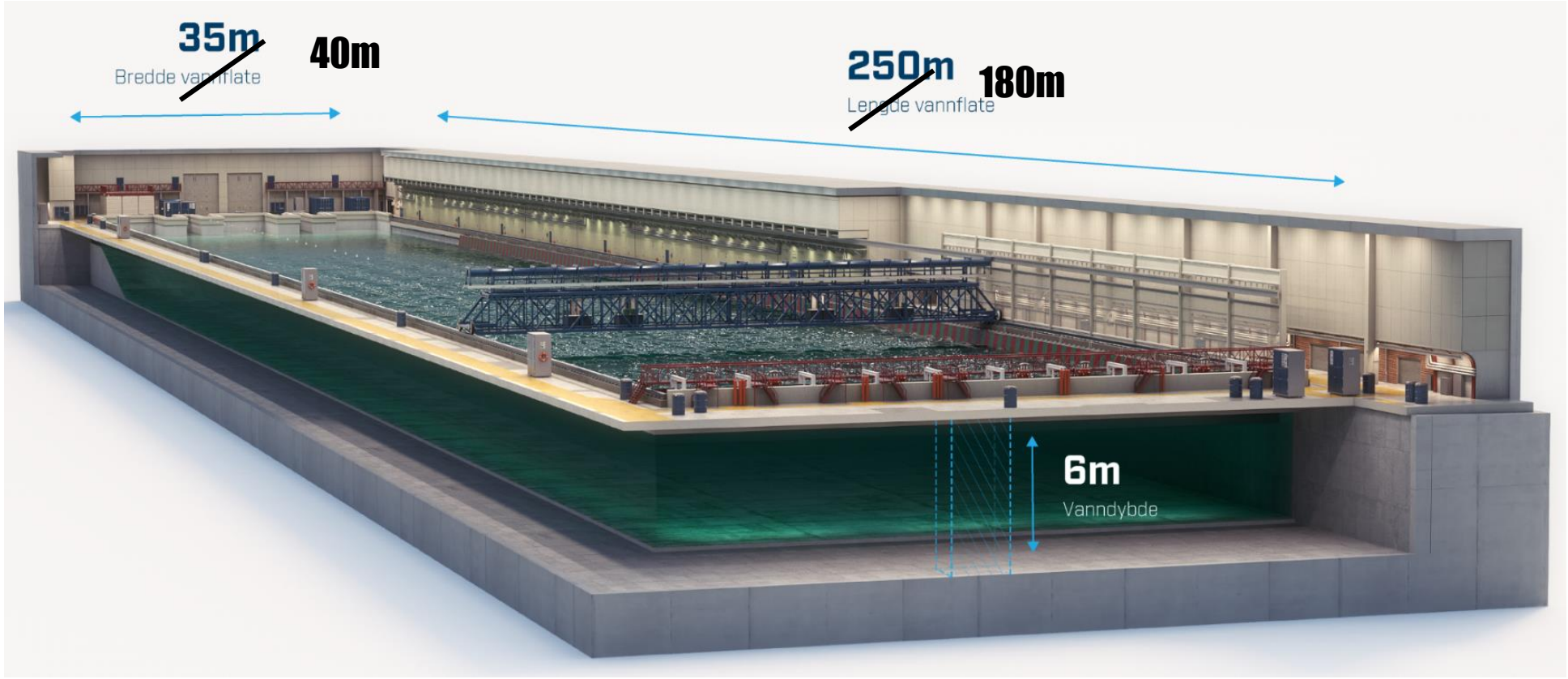
Student lab


65 x 15 Large Student towing tank
U-tubes
Circulation tank
Cavitation tunnel
Sloshing rigs
Circular multi-flap basin
2D wave flumes
Small towing tank
Small towing tank de-pressurized
Wave calibration flume
Auditorium
Drop rig (de-pressuraized)
Free space
Control room

Basin I - Width=40m, Length=180m, Depth=6m

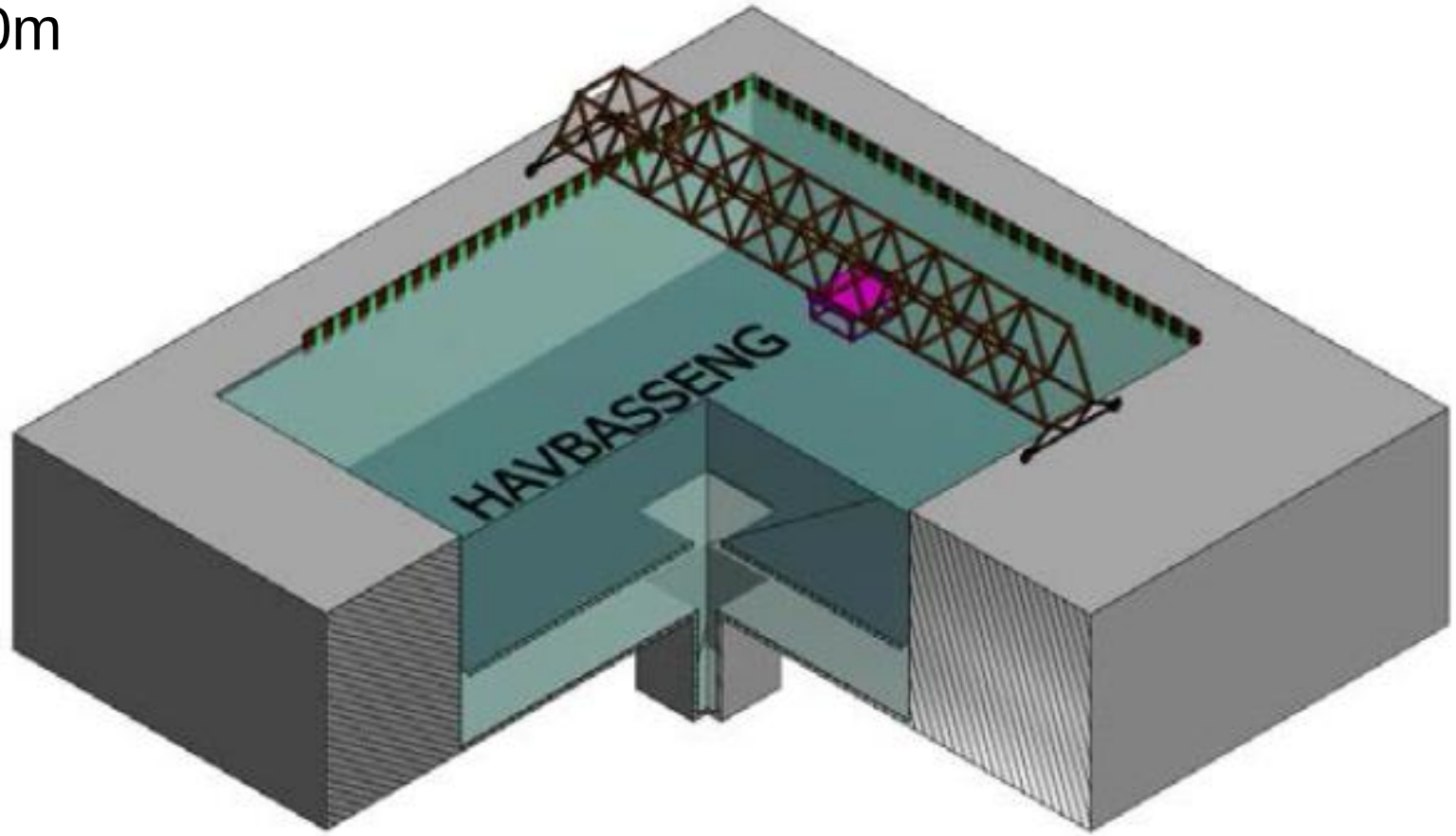
Testing of vessels and constructions under realistic wave and wind conditions – example: vessel energy consumption

Wave generators on both the long sides, and with variable depth

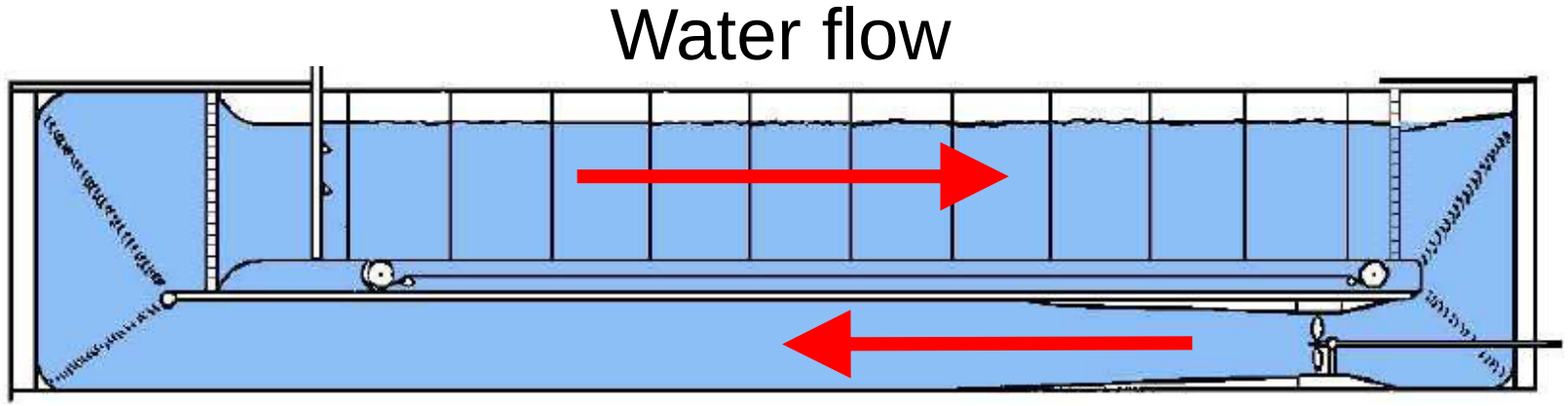


Basin II - Width=50m, Length=60m, Depth=20m

Testing of various constructions under realistic wave, current and wind conditions
Wave generators on two sides, and an advanced current generator
Centre hole: W/L=7.5m - D=10m

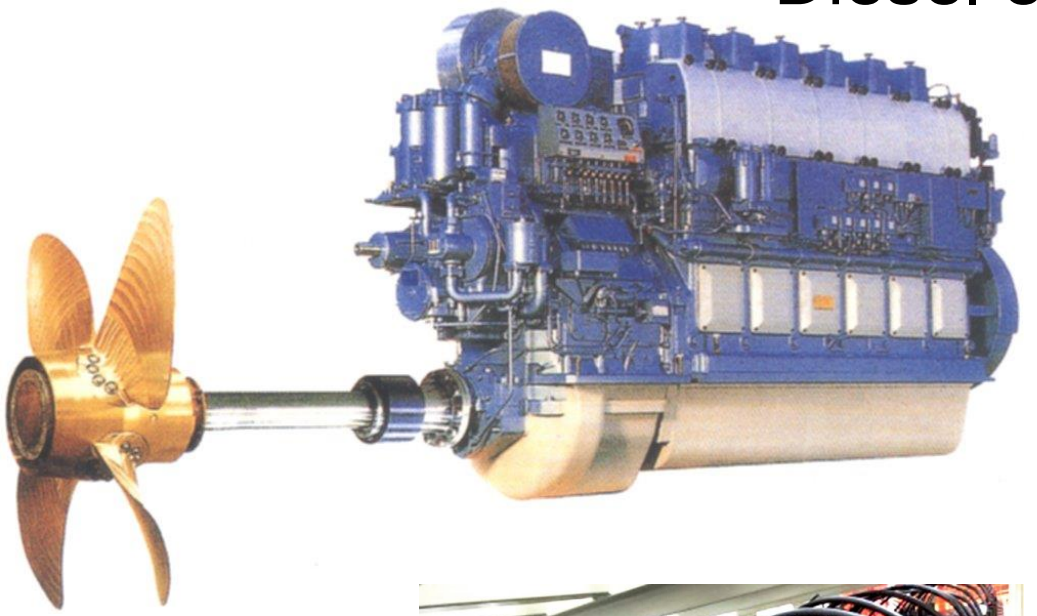


Flume tank

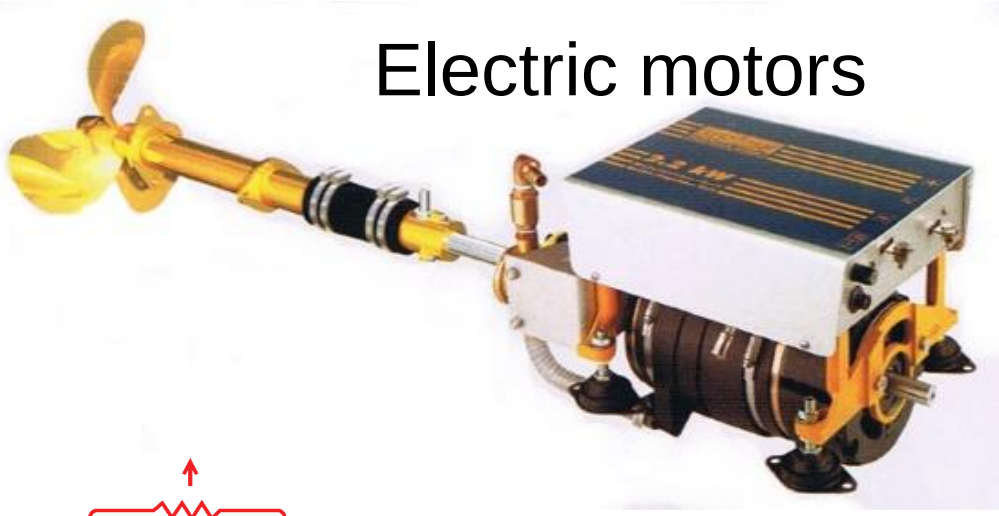


Engine lab

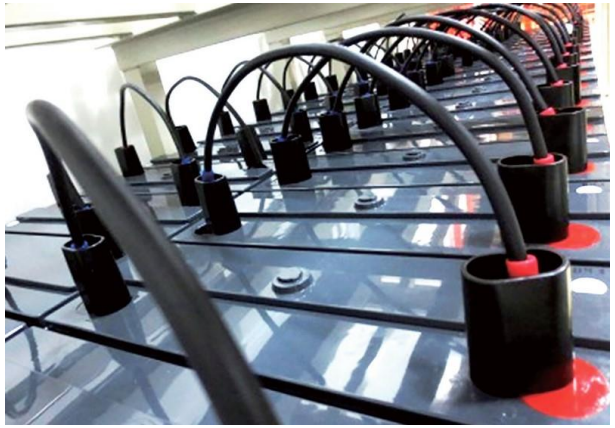
Diesel engines

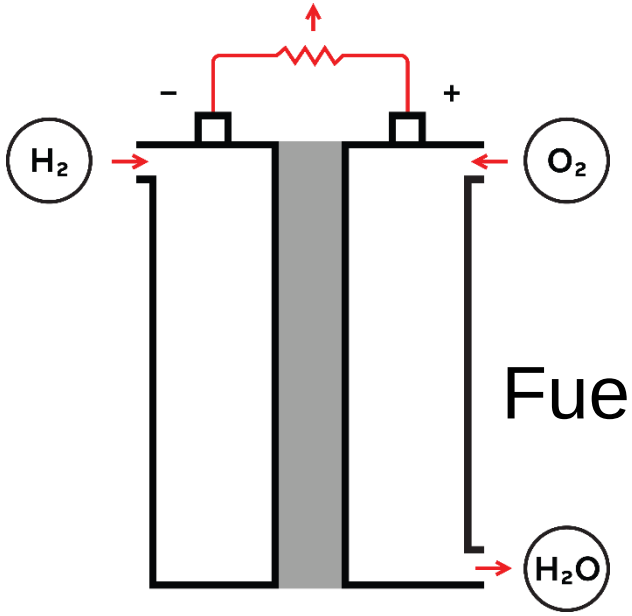


Electric motors



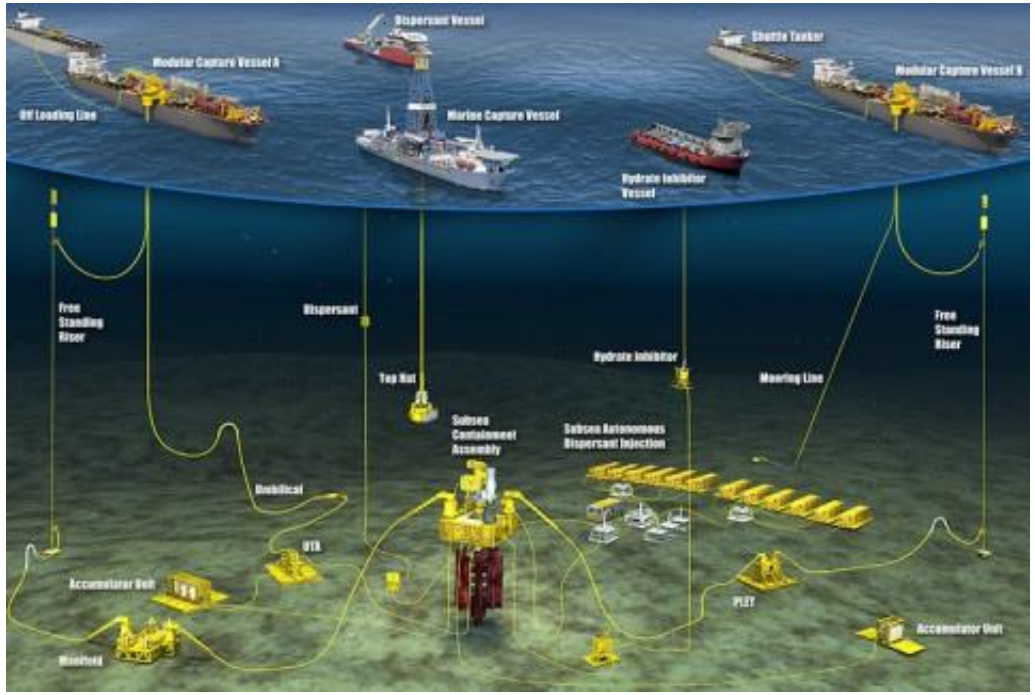
Battery and charging technologies





Fuel cells

Construction test lab



Oil & gas risers

Pipelines

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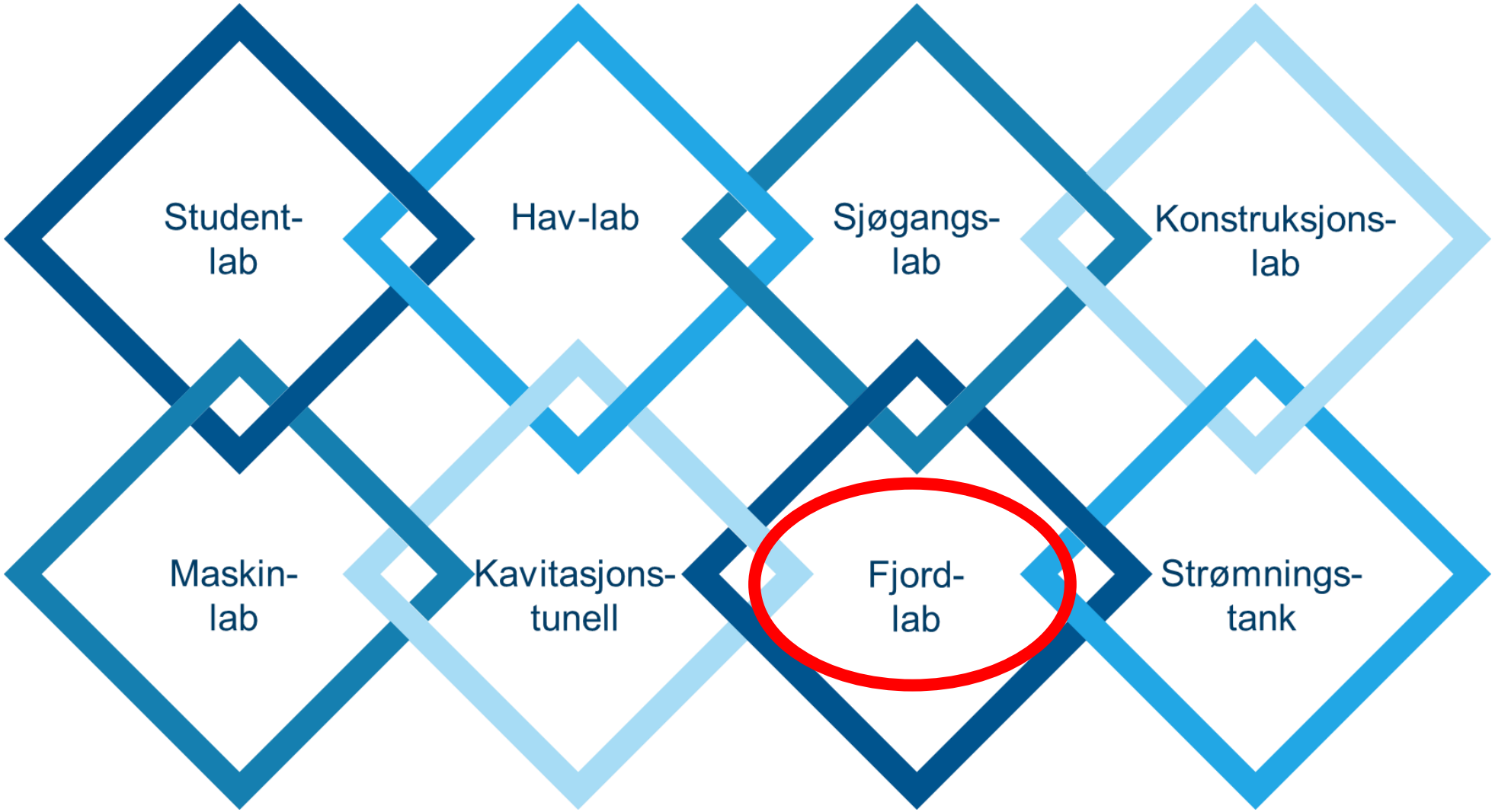
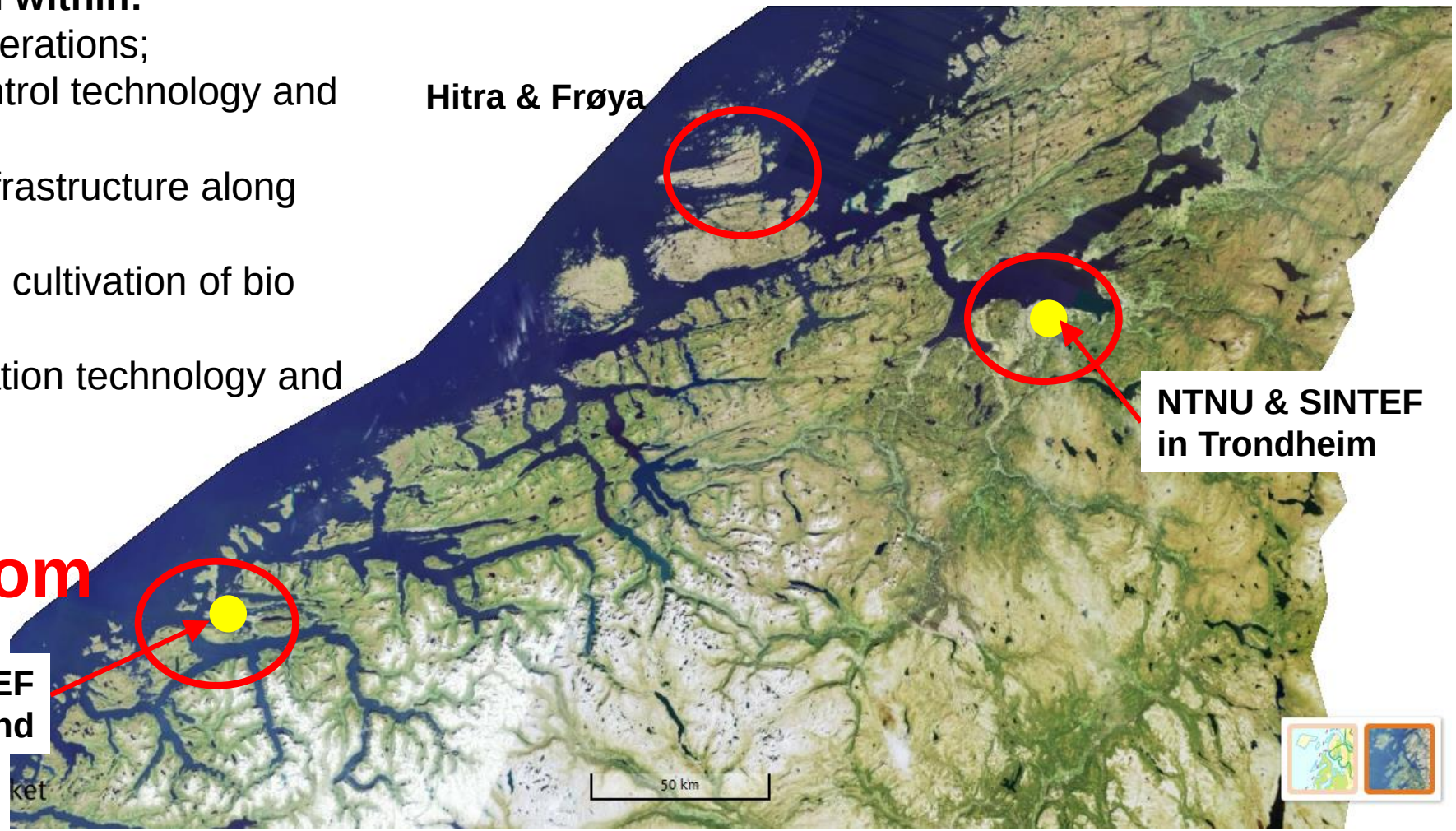


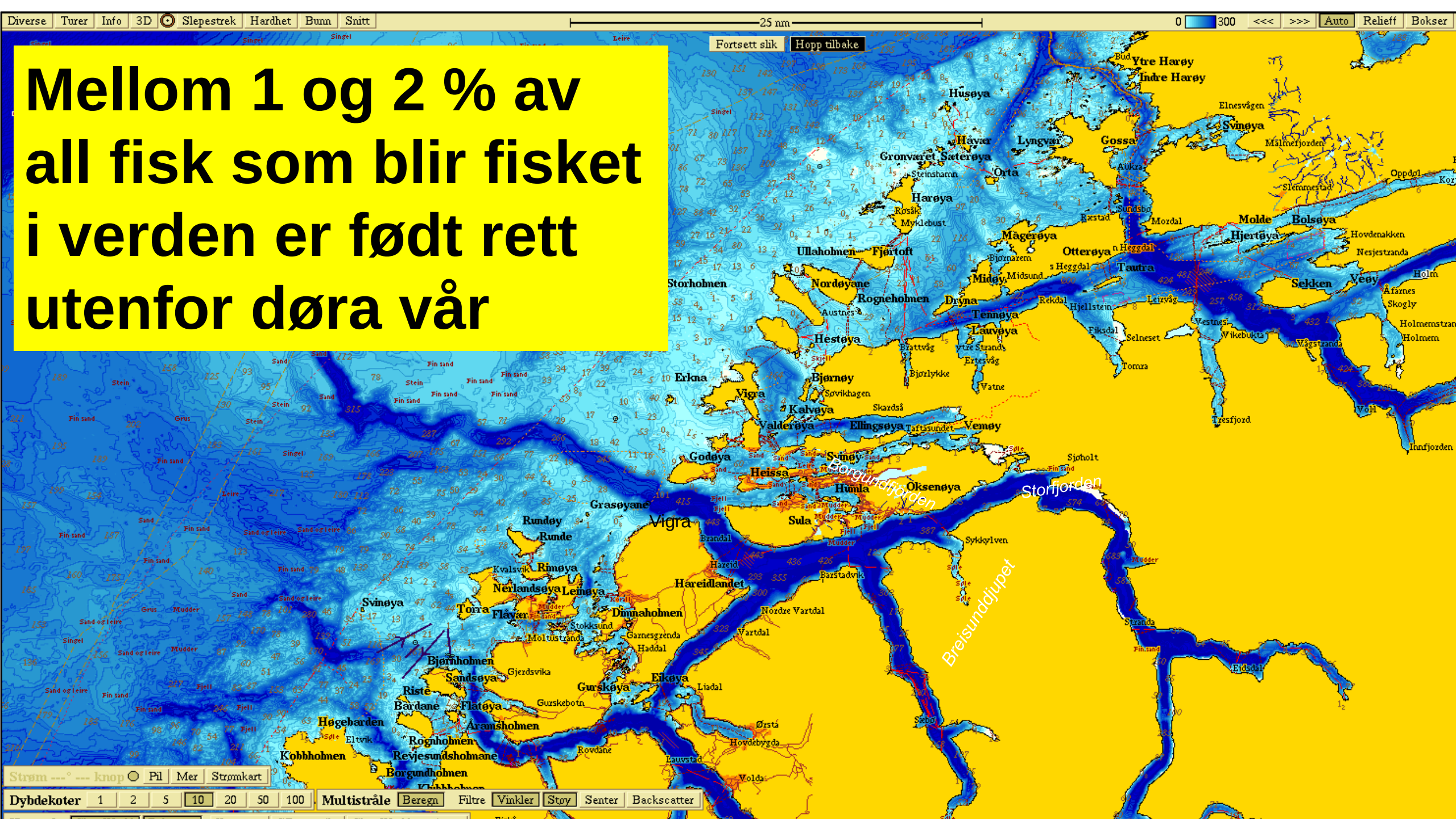
Fjordlab

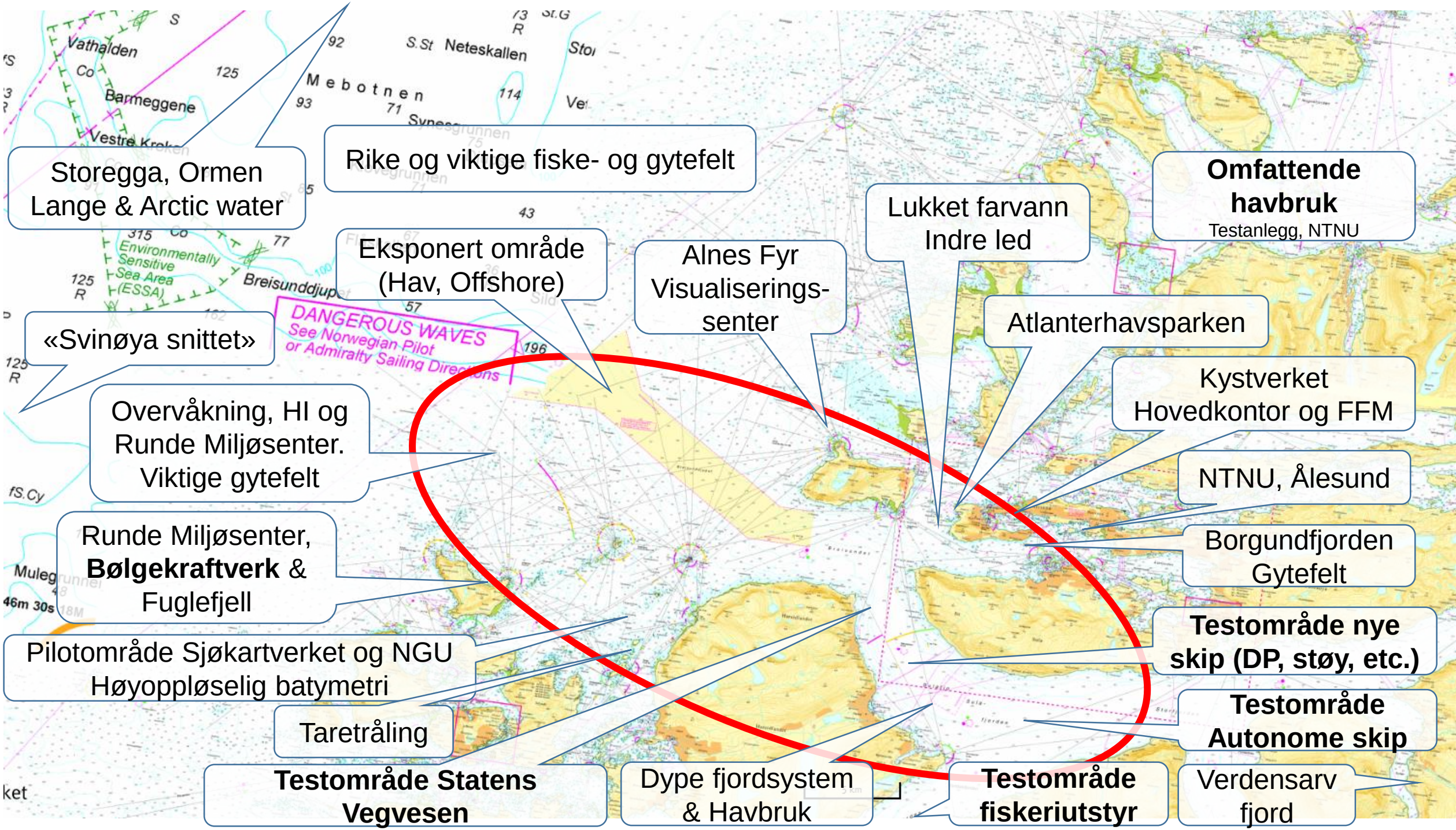
Fjordlab Ålesund is an arena for the full-scale testing, design and innovation within:

- maritime technologies and operations;
- navigation and ship traffic control technology and methods;
- the impact of the ocean on infrastructure along the coast;
- technology for harvesting and cultivation of bio resources;
- environmental ocean observation technology and methods.

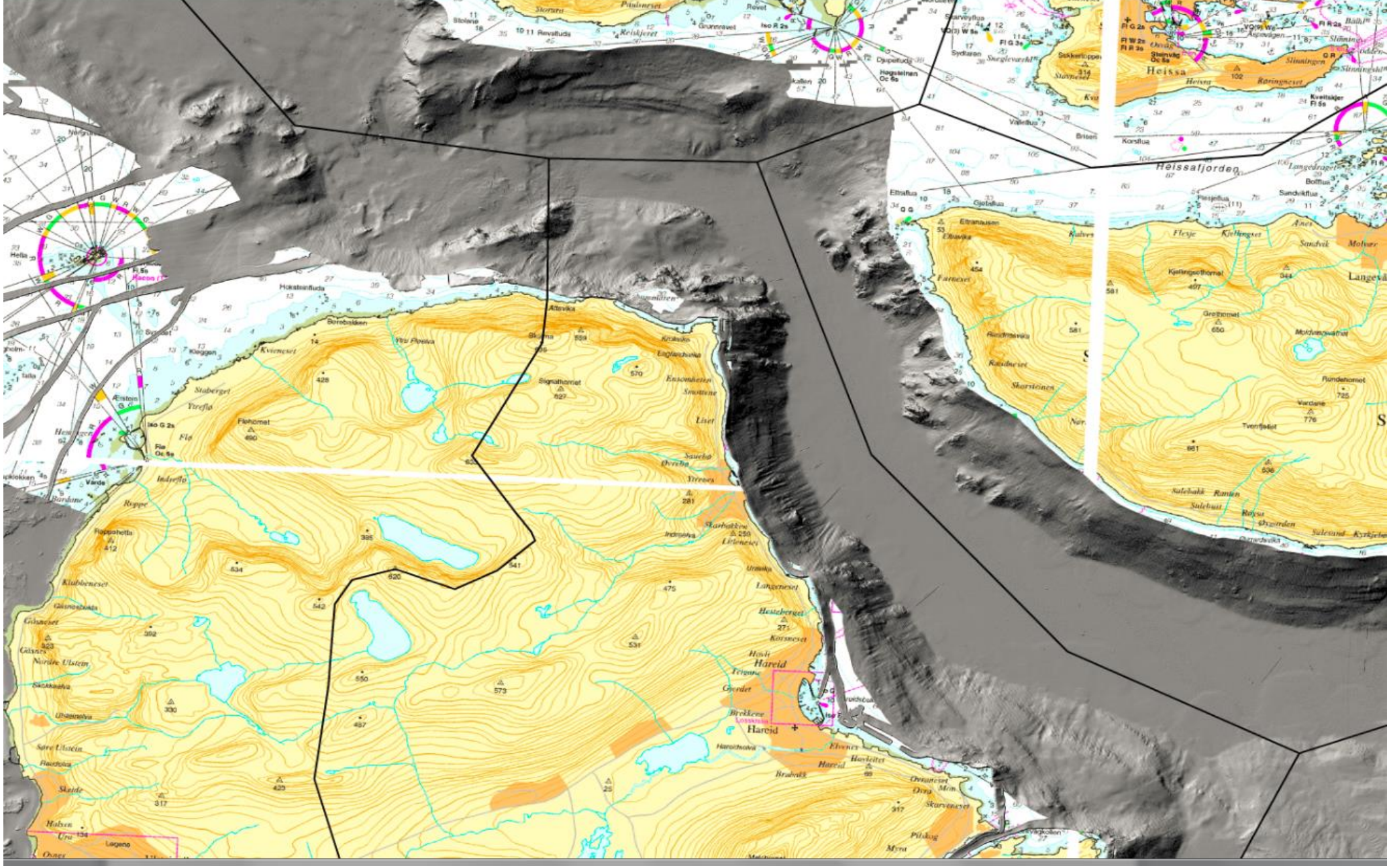
Det Digitale Havrom




Diverse
Turer
Info
3D
Slepestrek
Hardhet
Bunn
Snitt
25 nm
0
300
<<<
>>>
Auto
Relieff
Bokser
Fortsett slik
Hopp tilbake
Mellom 1 og 2 % av all fisk som blir fisket i verden er født rett utenfor døra vår
Ytre Harøy
Indre Harøy
Husøya
Elnesvågen
Svinøya
Målmefjorden
Håvær
Lyngvær
Gossa
Gronværet
Sæterøya
Steinshamn
Orta
Oppdøl
Slemmestad
Harøya
Rosåk
Myklebust
Sundsbo
Kræstad
Mordal
Molde
Bolsøya
Hjertøya
Hovdenakken
Nesjestranda
Mågerøya
Ullaholmen
Fjørtoft
Bjornarem
Otterøya
Heggdal
Tautra
Midsund
Midøy
Storholmen
Nordøyane
Rognskjæret
Rognaholmen
Dryna
Rekdal
Hjellstein
Leirvåg
Sekken
Veøy
Holm
Åfarnes
Skogly
Holmemstran
Holmem
Austnes
Tennøya
Lauvøya
Fiksdal
Selneset
Vestnes
Vikebukta
Vågstranda
Hestøya
Brattvåg
ytre Strandv
Ertesvåg
Tomra
Erkna
Bjørnøy
Bjørlykke
Vatne
Vigra
Søvikhagen
Kalvøya
Skardså
Valderøya
Ellingsøya
Taftasundet
Vemøy
Tresfjord
Innfjorden
Godøya
Sandy
Heissa
Humla
Oksenøya
Sjøholt
Borgundfjorden
Storfjorden
Grasøyane
Vigra
Sula
Rundøy
Runde
Brandal
Sykkylven
Kvalsvik
Rimøya
Hareid
Barstadvik
Nerlandsøya
Leinøya
Hareidlandet
Svinøya
Torra
Flåvær
Dimnaholmen
Nordre Vartdal
Stokksund
Vartdal
Garnesgrenda
Haddal
Bjørnhohmen
Gjerdsvika
Sandsøya
Eikøya
Liadal
Gurskøya
Riste
Bardane
Flatøya
Gurskebotn
Høgebarden
Aramsholmen
Eltvik
Rognholmen
Ørstå
Hovdebygda
Rovdane
Kobbholmen
Revjesundsholmane
Lauvstad
Borgundholmen
Volda
Breisunddjupet
Sæbø
Stranda
Eidsdal
Strøm ---° --- knop
Pil
Mer
Strømkart
Dybdekoter
1
2
5
10
20
50
100
Multistråle
Beregn
Filtre
Vinkler
Støy
Senter
Backscatter


Storegga, Ormen Lange & Arctic water
Rike og viktige fiske- og gytefelt
Eksponert område (Hav, Offshore)
Alnes Fyr Visualiserings-senter
Lukket farvann Indre led
Omfattende havbruk
Testanlegg, NTNU
«Svinøya snittet»
Atlanterhavsparken
Overvåkning, HI og Runde Miljøsenter. Viktige gytefelt
Kystverket Hovedkontor og FFM
NTNU, Ålesund
Runde Miljøsenter, **Bølgekraftverk** & Fuglefjell
Borgundfjorden Gytefelt
Pilotområde Sjøkartverket og NGU Høyoppløselig batymetri
Testområde nye skip (DP, støy, etc.)
Taretråling
Testområde Autonome skip
Testområde Statens Vegvesen
Dype fjordsystem & Havbruk
Testområde fiskeriutstyr
Verdensarv fjord

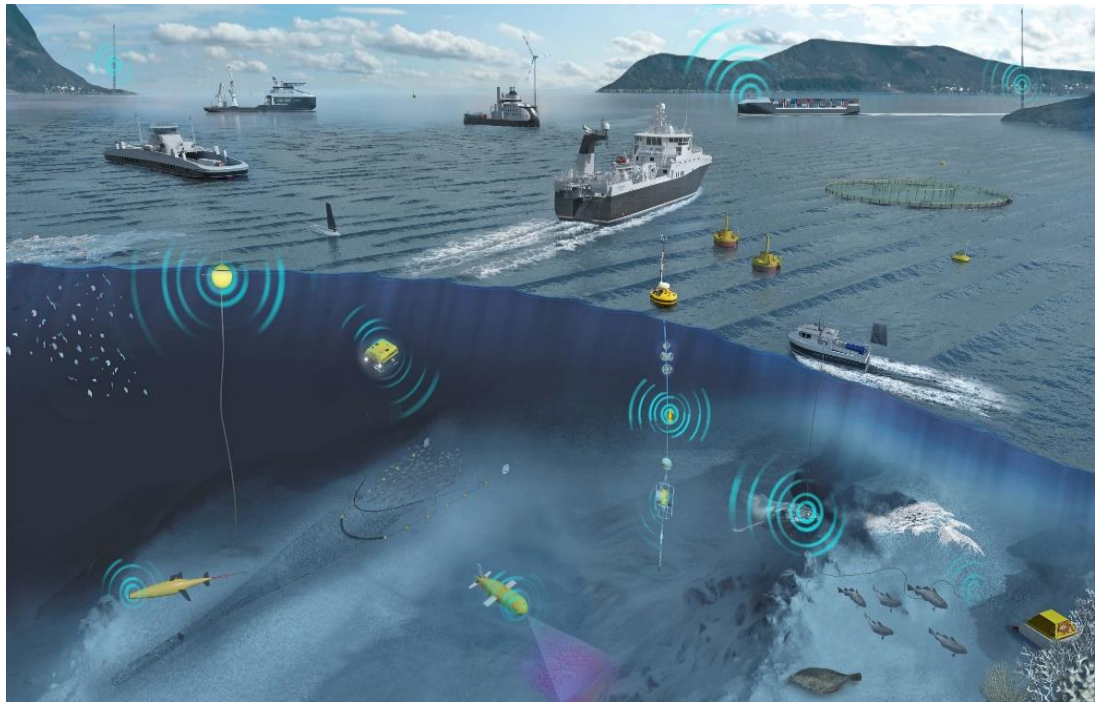
Marine grunnkart



Møre Ocean Lab

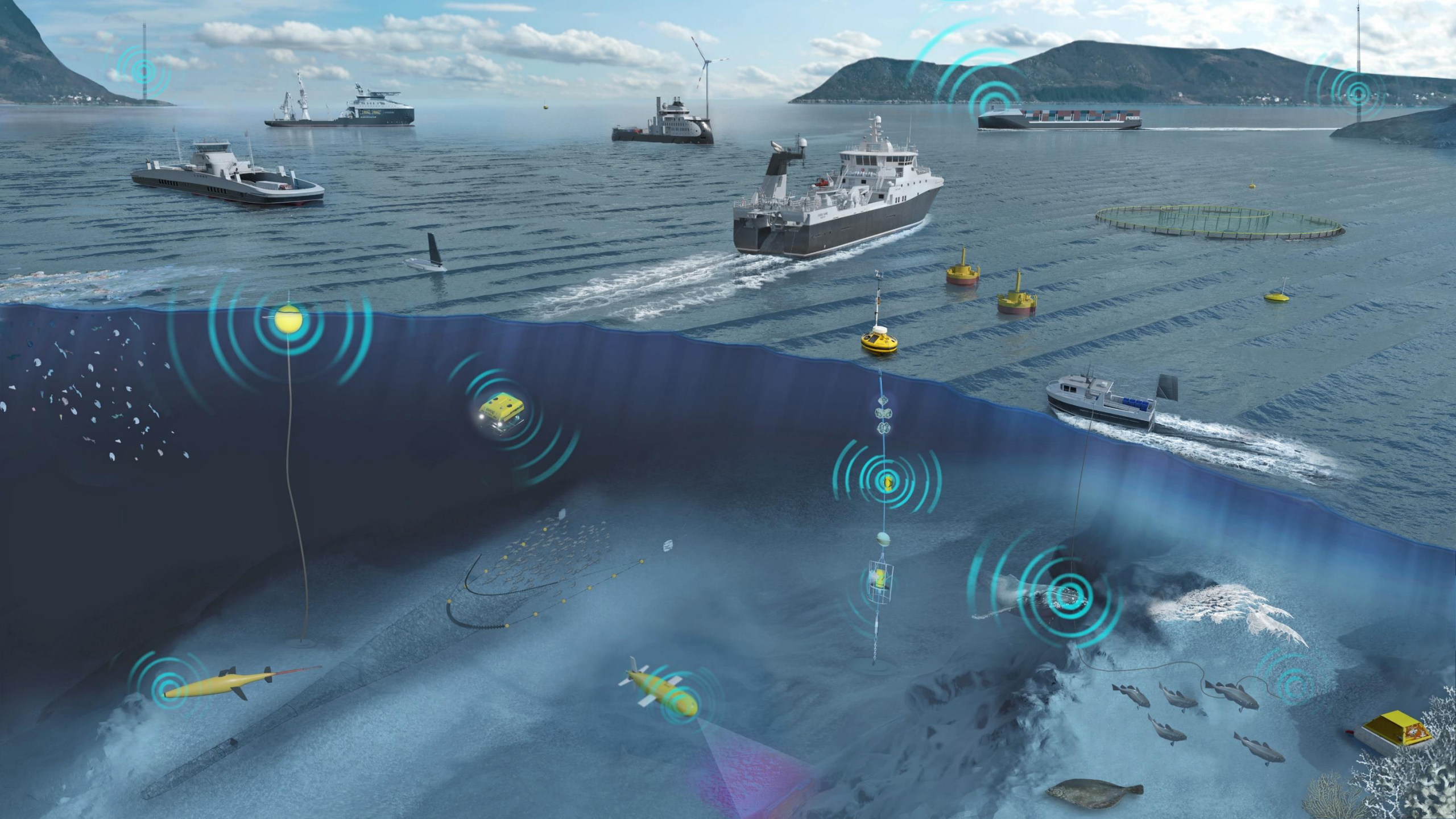
Application areas for testing

- Maritime technology & op.
- Navigation and ship traffic
- Impact on infrastructure
- Technology for “harvesting and cultivation of bio res.
- Ocean observation technologies and methods



Infrastructure

- Wind
- Current
- Waves
- Tide
- Sea level
- Environmental
- Hydrophones
- Metrology



Møre Ocean lab/ Det Digitale Havrom

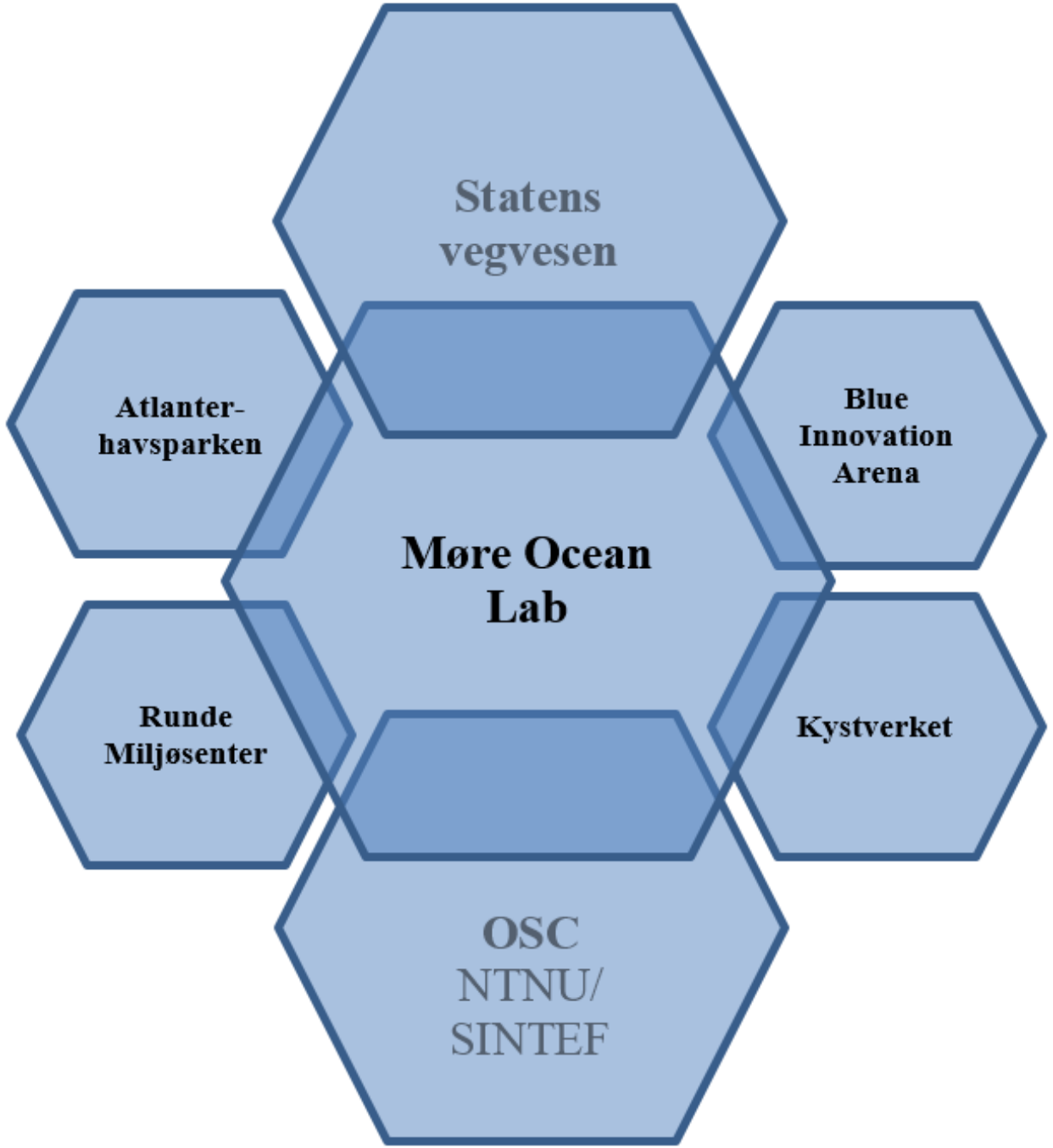
Møre Ocean lab/ Det Digitale Havrom

- Wind tower
- Buoy
- ADCP
- Radar, waves
- Radar, traffic
- AUV navigation
- FerryBox, environmental monitoring
- Hydrophone
- Metrological station

Figure 5. Location of sensors

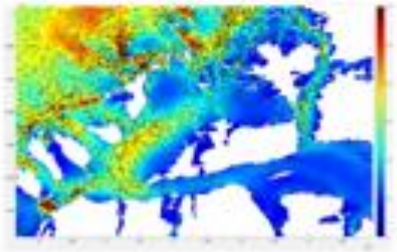
Møre Ocean Lab

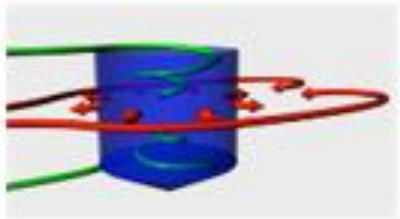
- et samarbeid



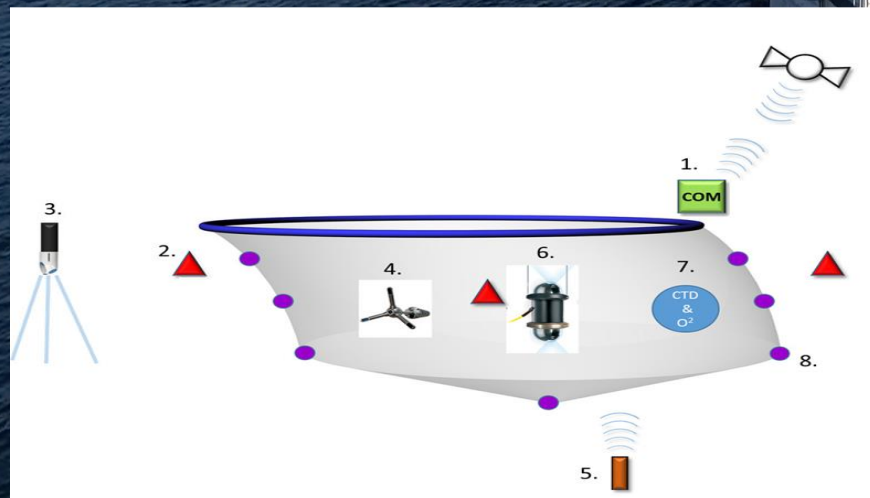
Møre Ocean lab/
Det Digitale Havrom

Numerical and
conceptual models



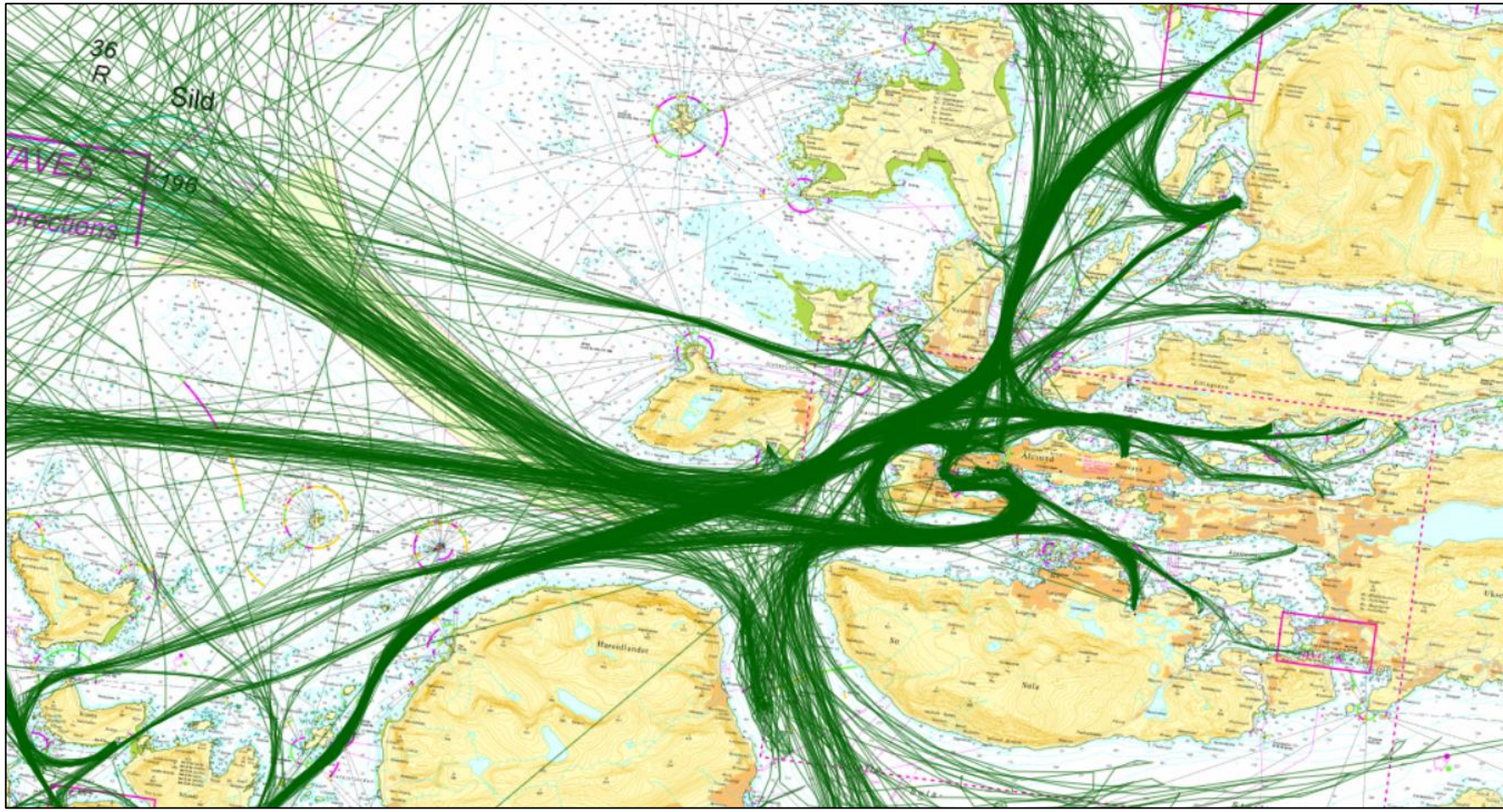


R&D-lisence for salmonids
780 tonns of standing fish biomass at commercial farm sites



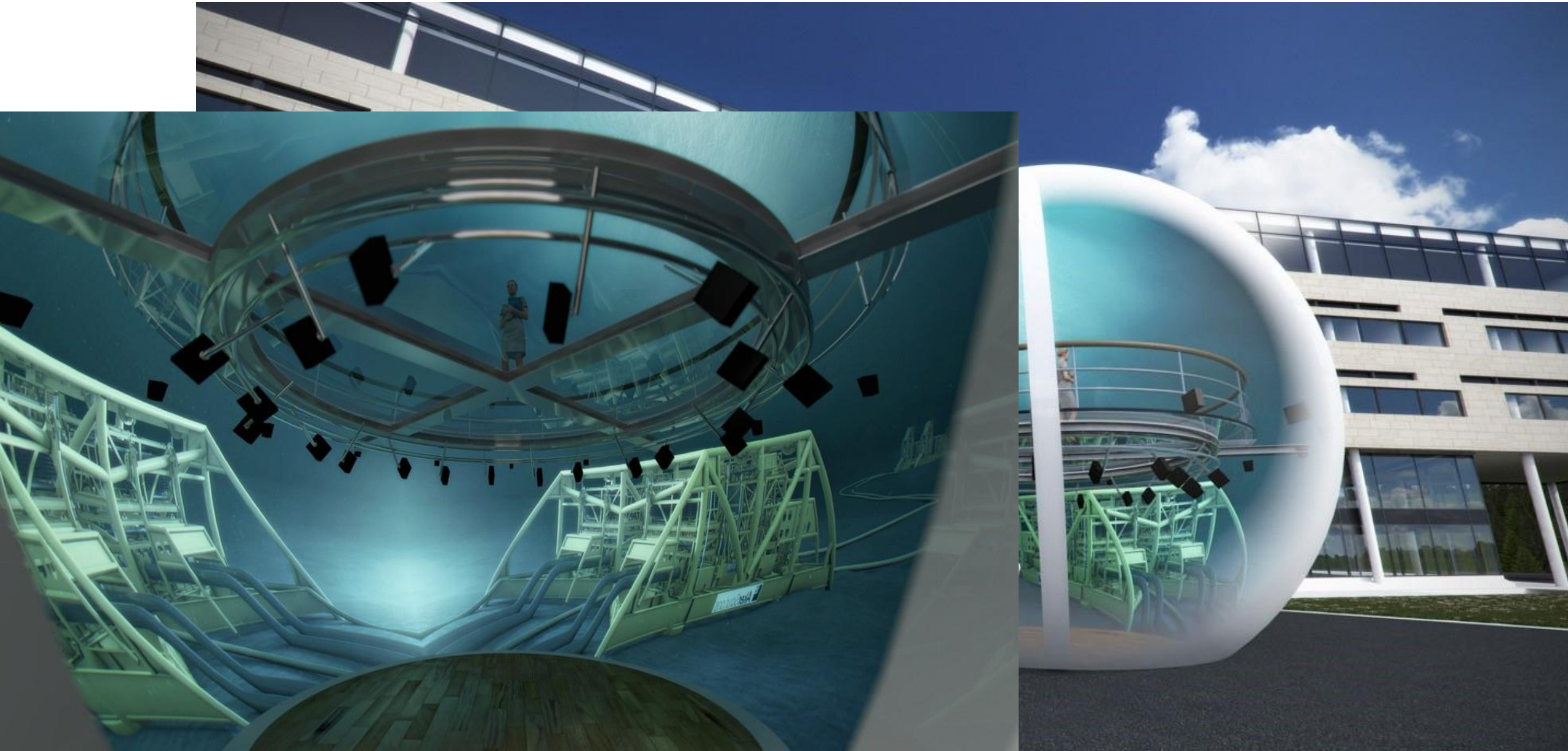
1. PC/communication
   - Connection to all sensors
   - Streaming of live data
   - Remote control/steering of equipment
   - **Allows manipulation of all equipment and live streaming of all data**
2. Telemetry system
   - Allows exact information about 3-D position of fish and/or equipment
   - Allows positioning of equipment
   - Allows deduction of 3-D profiles of sensor-data
   - Can be used on AUV/ROV/swimming robots
3. Current profiler
   - Current profiling outside of net cages
4. Current meter
   - Flow and/or turbulence measurements inside or outside of net cages (also with fish inside)
5. Echo sounder
   - Allows estimation of biomass distribution in fish cages
6. Camera system
   - Controlled remotely (live) in depth and horizontal position
7. CTD & oxygen sondes
8. Net deformation and volume
9. Visualization and simulation
   - All data is continously streamed onto servers and can be used for live or offline visualization and simulations
   - Simulation environments, including 180° simulation room can be used for visualization

Skipstrafikk i et vegkryss på RV1



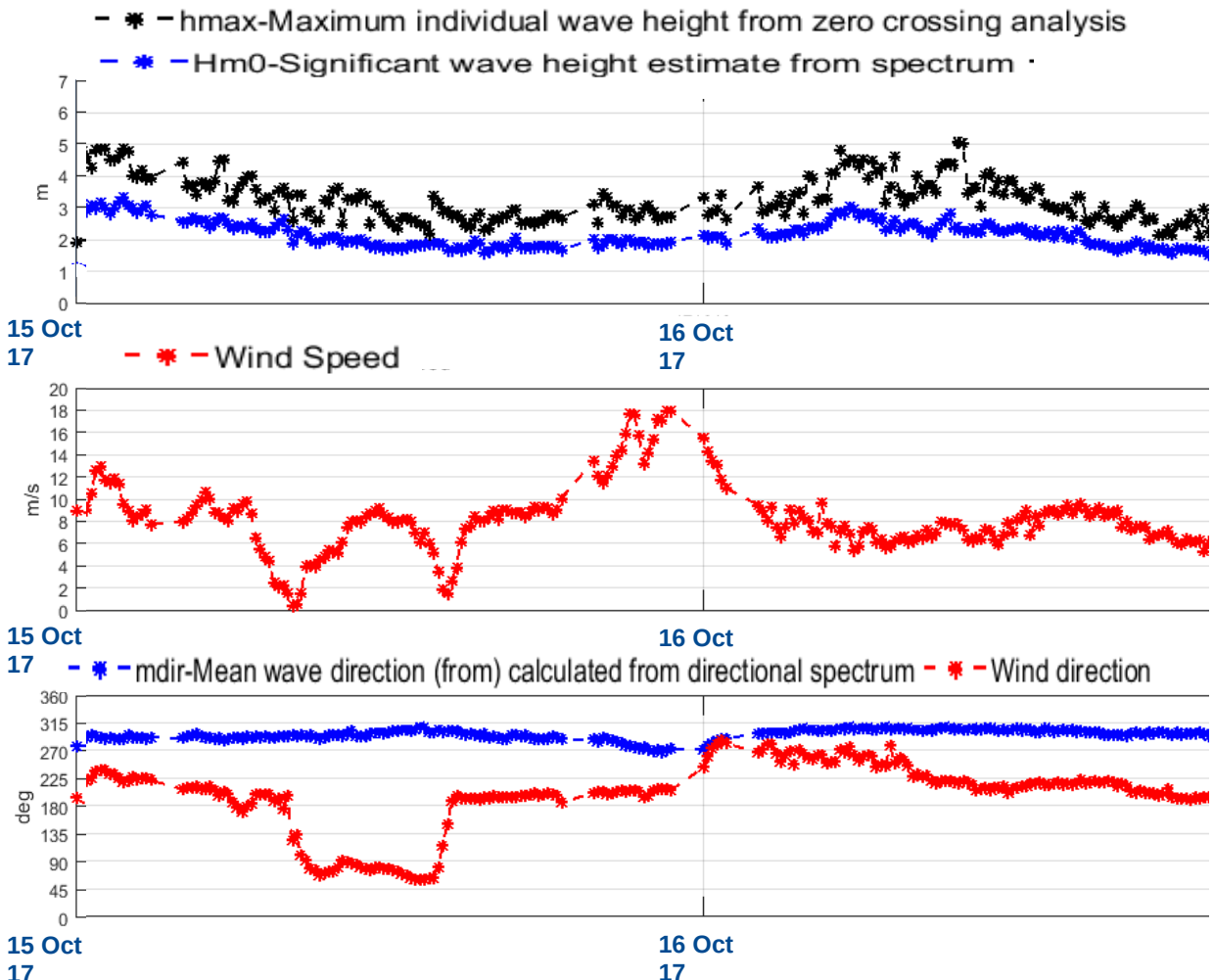
Illustrasjon av trafikk av fiskefartøy i løpet av februar 2017

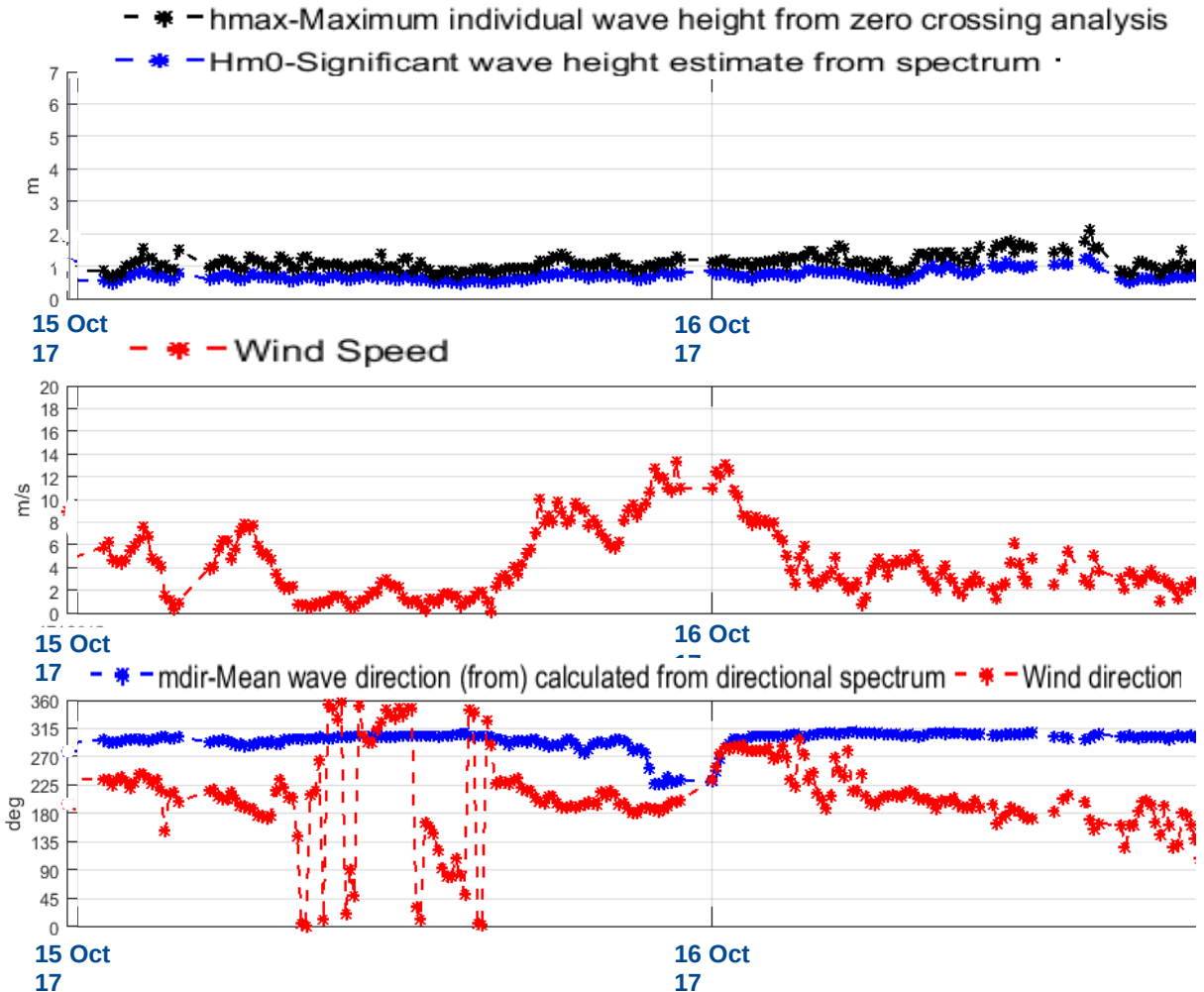
Med data inn i våre simuleringssentre



Er allerede i gang …

- Ulstein
- Havyard
- Rolls Rolls Marine





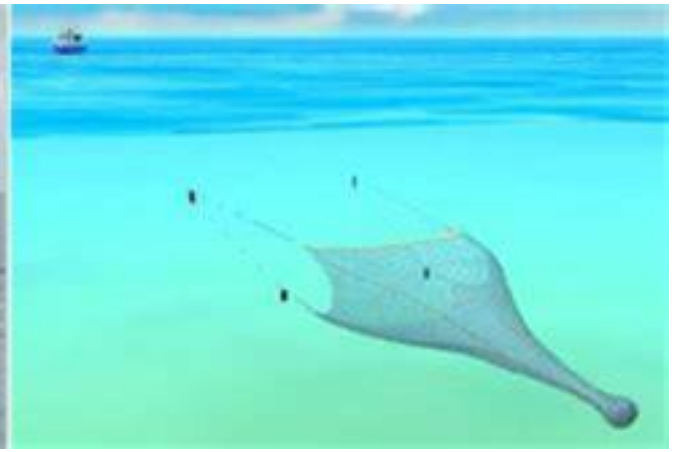
Applications, research

- **Wave energy farms**

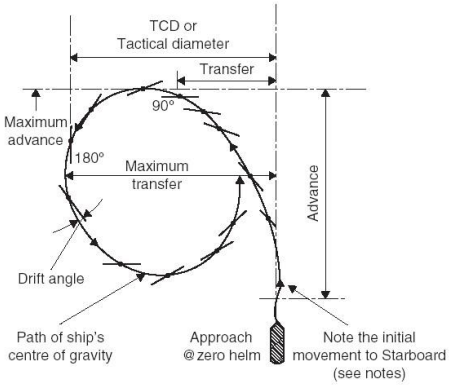
- **Aquaculture**

Applications, research

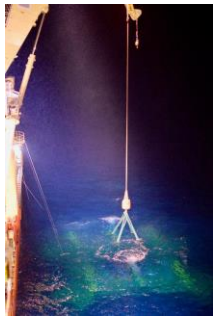
- **Testing of new fishing gear and methods**



- **Testing of ship maneuvering characteristics, operation monitoring, and new hybrid propulsion systems**

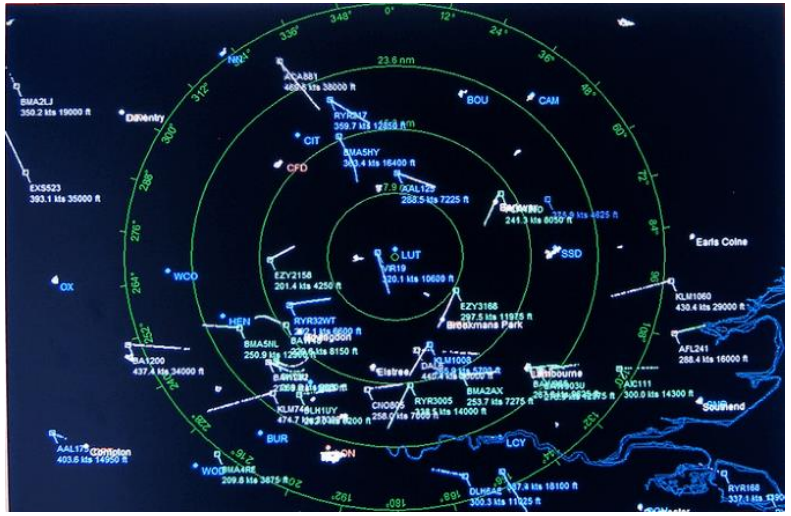


- **Testing of ship equipment such as cranes, winches, ROVs, AUVs and subsea installation equipment**



Applications, research

- **Testing of autonomous ships**

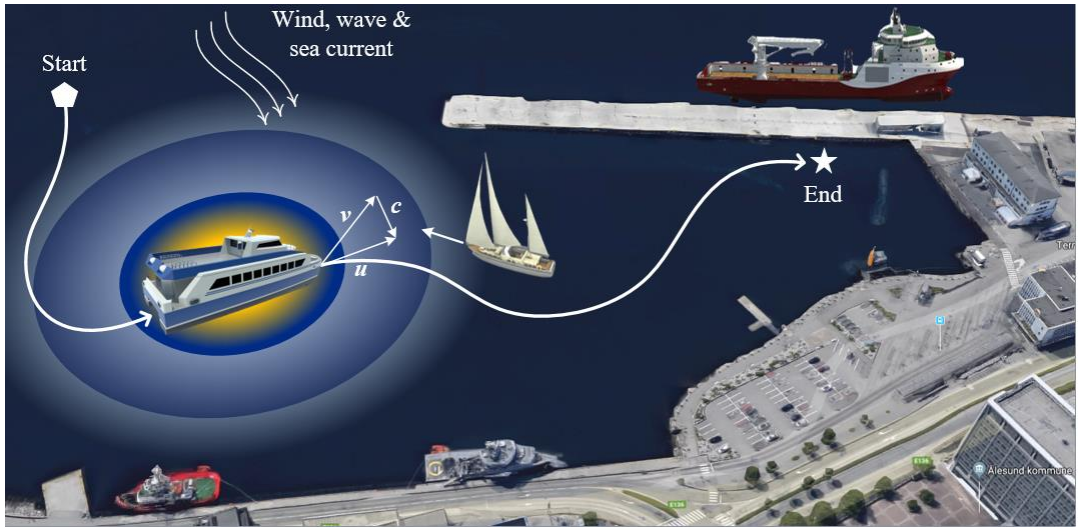


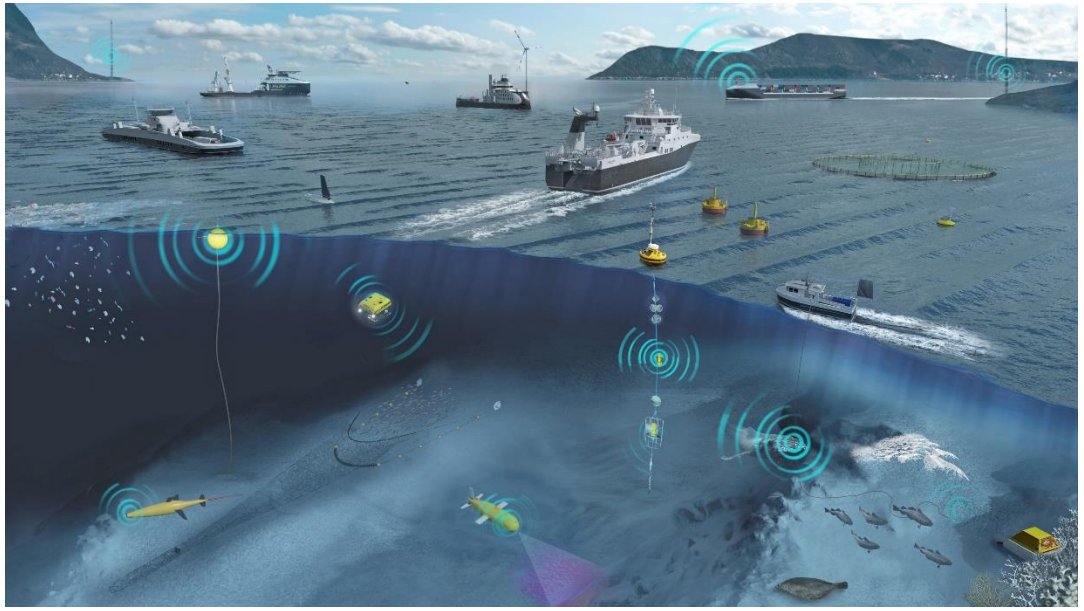
- **Testing AUVs**

- **Realistic simulations of accidents/crisis handling and testing of life saving equipment**

Applications, research

- **Testing of automatic berthing system or berthing support systems**
- **Testing of equipment that will withstand large water depths and the Arctic climate**
- **Testing of technology and sensor systems used to instrument the ocean space**





Applications, research

- **Testing of solutions for floating bridges and tunnels**

- **Testing of loads on coastal infrastructure**

- **Testing of systems for navigation and marking of shallow waters etc.**

Applications, research

- **Development of innovative operations and training**

- **Testing and development of ship monitoring and identification systems**

- **Trialling of the future shipping company organization with autonomous- or remote operated ships**

MOVE
SFI Marine Operations

Senter for forskningsdrevet innovasjon

Crane cabin on ship

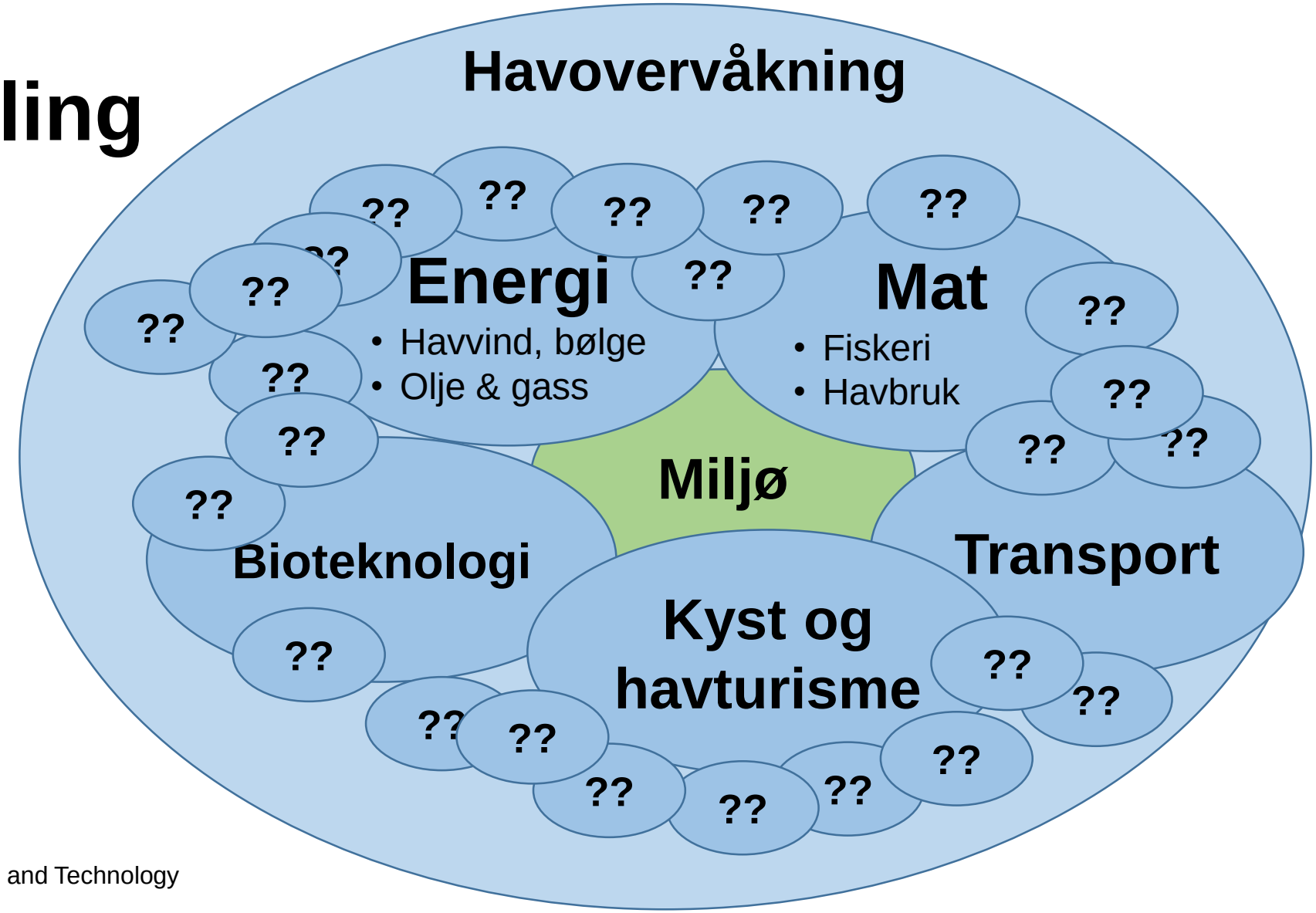
Crane cabin in control center

Applications, education

- Oceanography
- Nautics
- Marine cybernetics
- Ship technology and design
- Energy technology
- Design of coastal infrastructure

Et laboratorium for

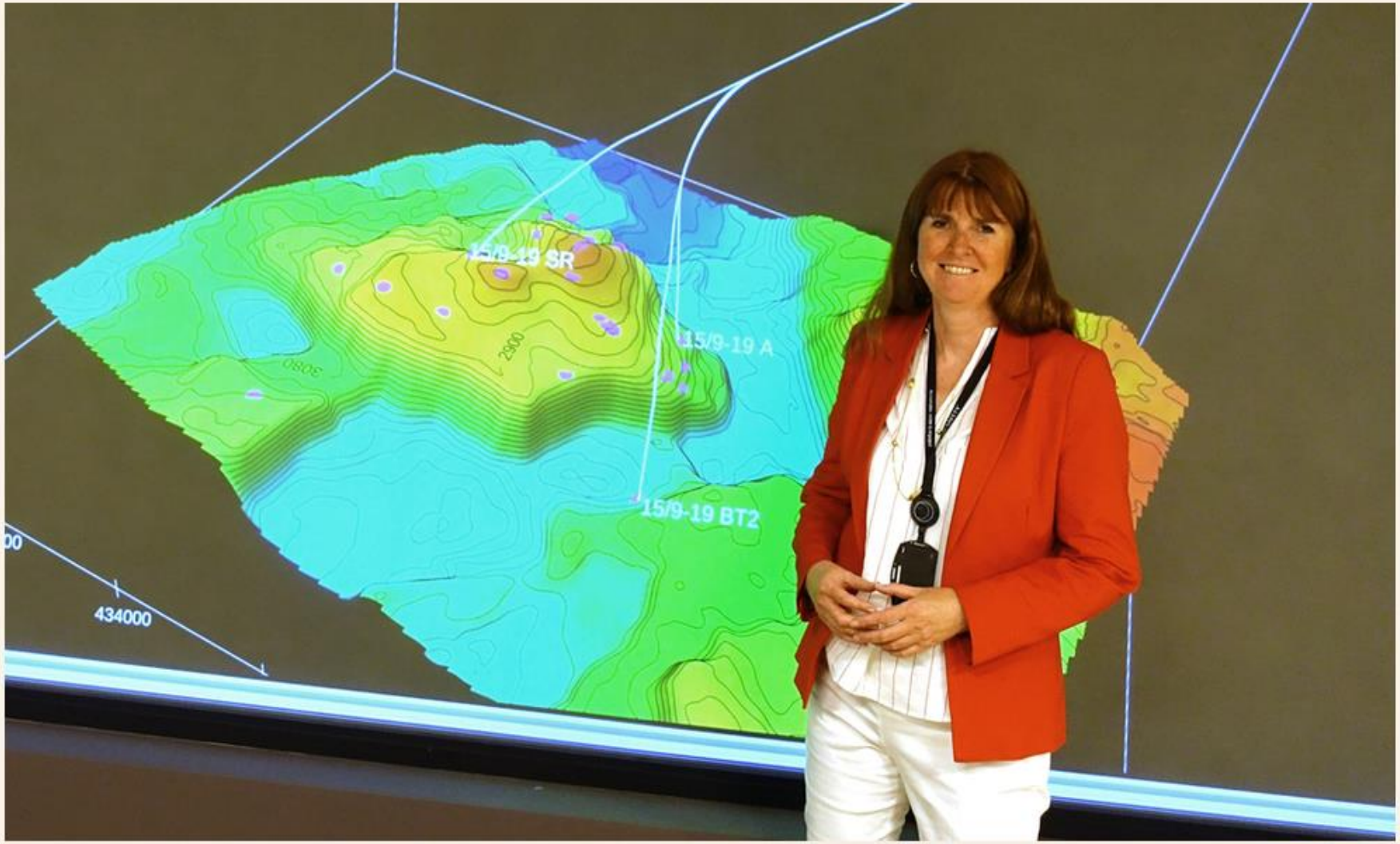
- **Næringsutvikling**
- **Undervisning**
- **Forskning**



Hvorfor er fullskala testlabber så viktige i dag?

Vil dele data med alle

Equinor har bestemt seg for å dele alle data fra hele Volve-feltets levetid med offentligheten, i håp om nye ideer og innovasjon.



FRIGIR DATA: Konserndirektør Jannicke Nilsson i Equinor foran en grafisk fremstilling av Volve-feltet. Equinor offentliggjør nå 40.000 filer med data som er samlet inn gjennom feltets levetid, i hop om at realistiske data kan spore til nye ideer og innovasjon. **FOTO:** KJETIL MALKENES HOVLAND, E24