

Sensorteknologi for styring av trengeprosessen

Løst og fast om eksiterende teknologi – inspirasjon til debatt

Frank Reier Knudsen
SIMRAD



KONGSBERG

KONGSBERG Maritime Subsea



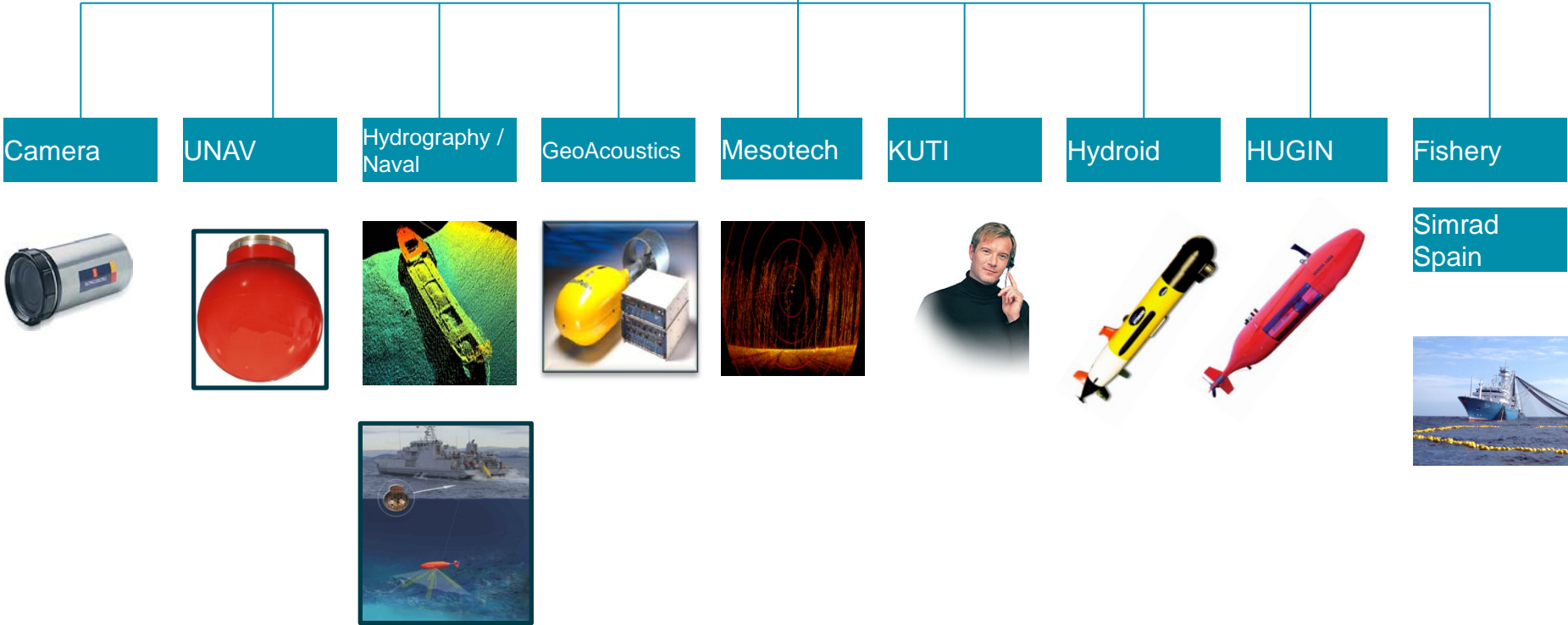
KONGSBERG



KONGSBERG Maritime Subsea Division

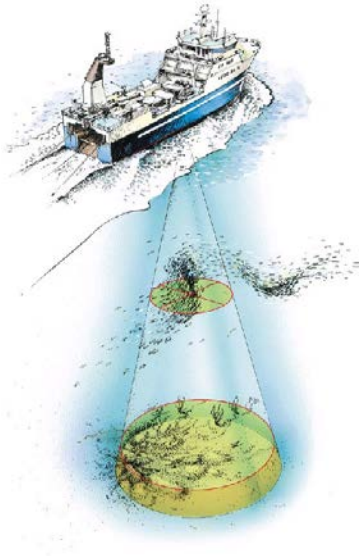


Kongsberg Maritime Subsea



KM SIMRAD fishery

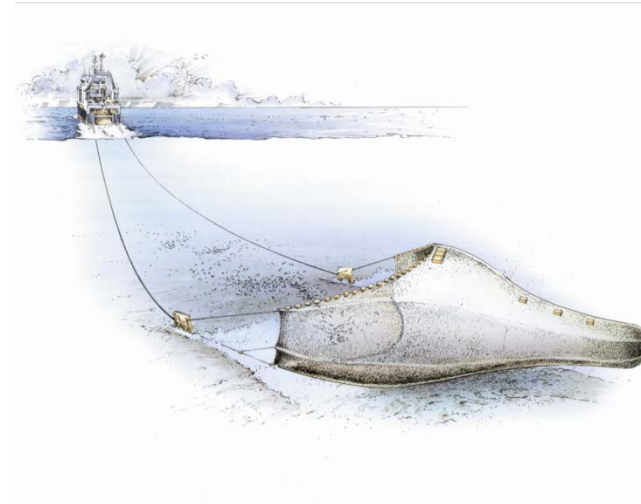
Echosounders



Sonar



Trawl instruments

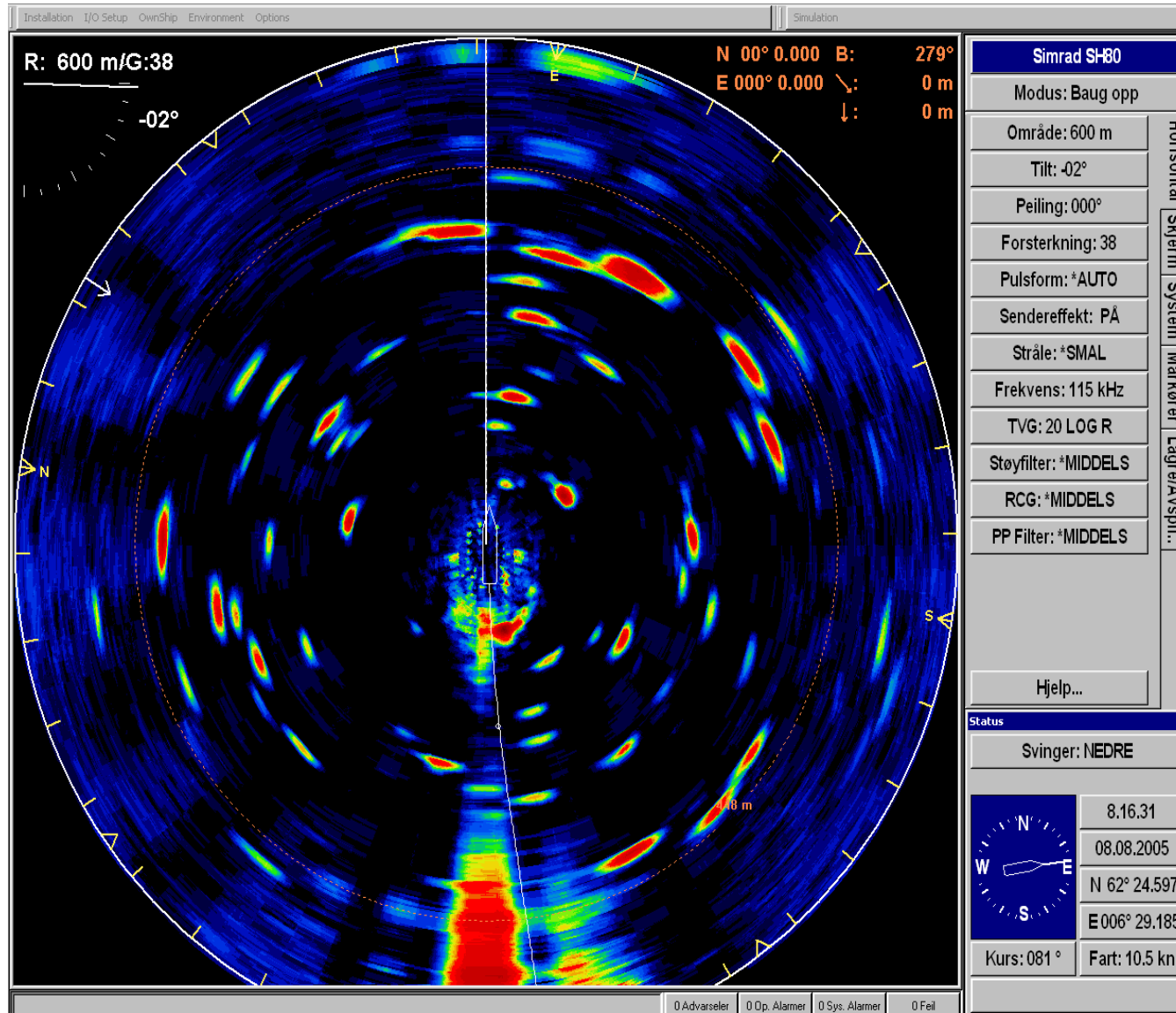


Established 1947

World leading manufacturer of acoustic instrumentation for fisheries and fisheries research



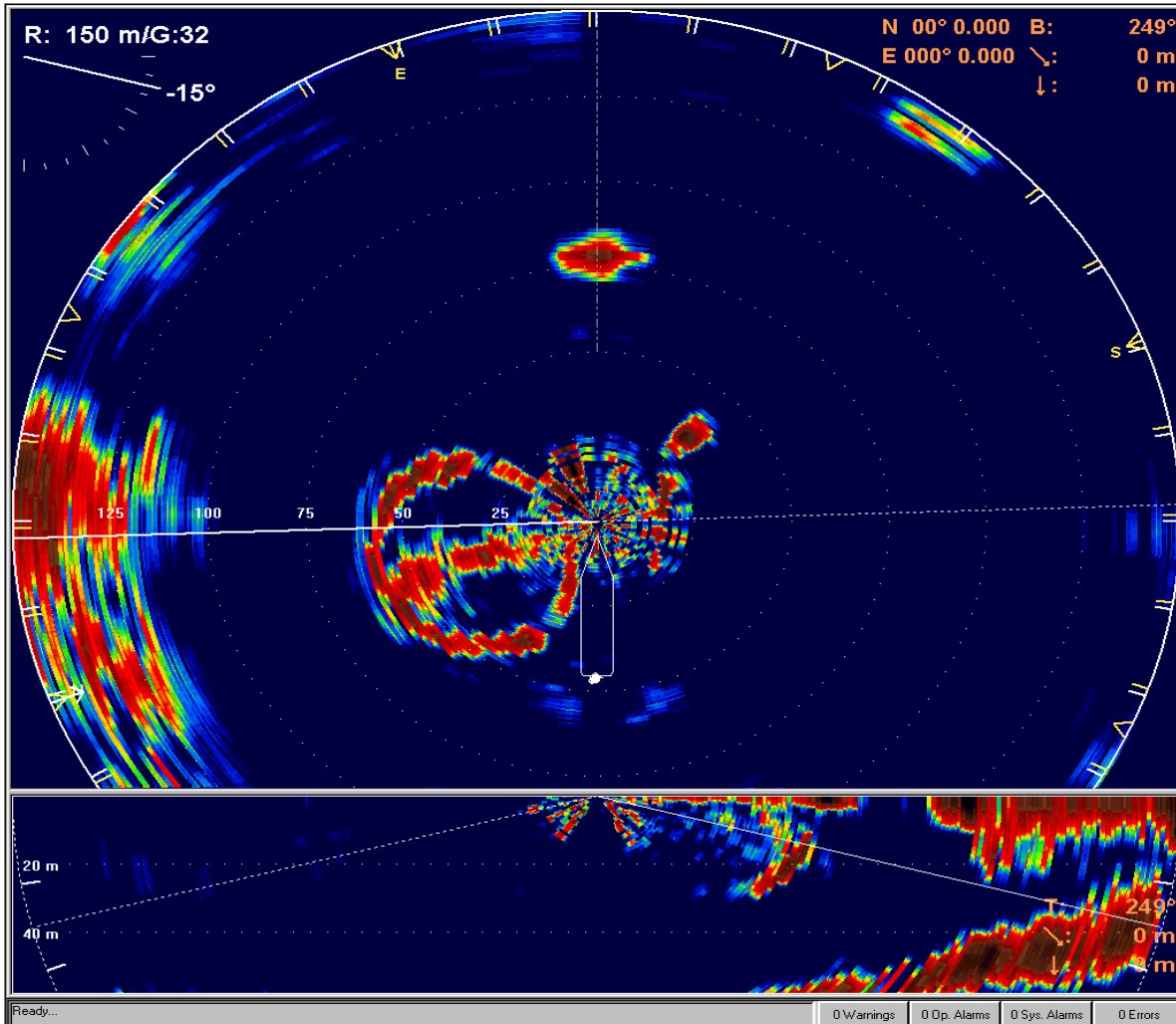
Sonar image of herring schools



Tuna in cage



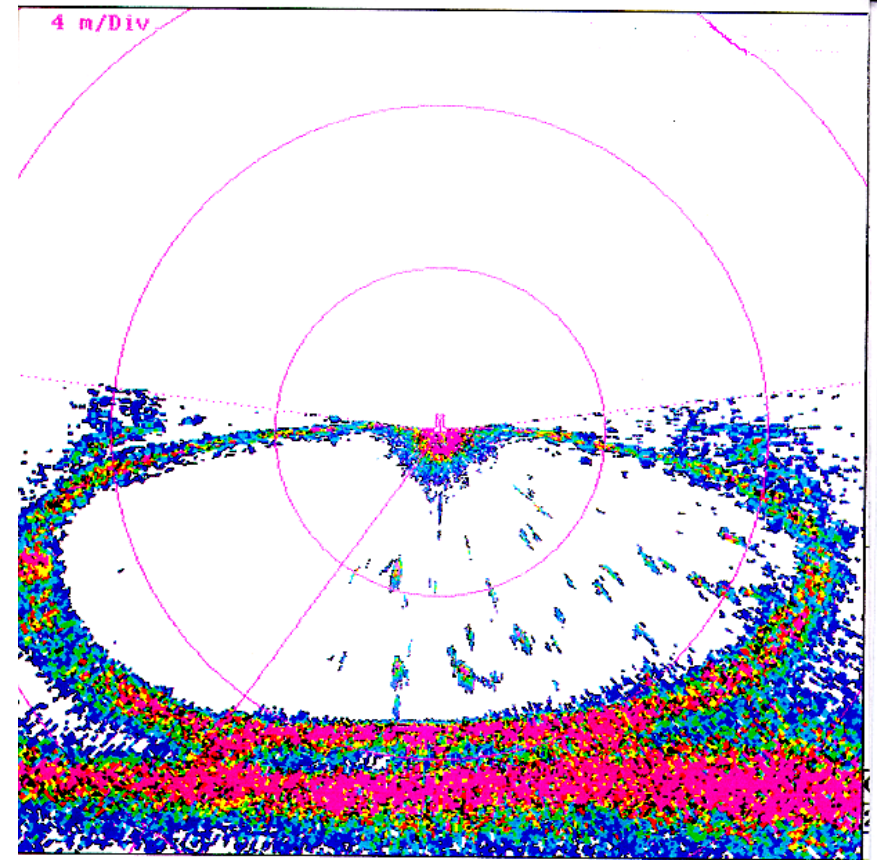
KONGSBERG



Catch monitoring



KONGSBERG

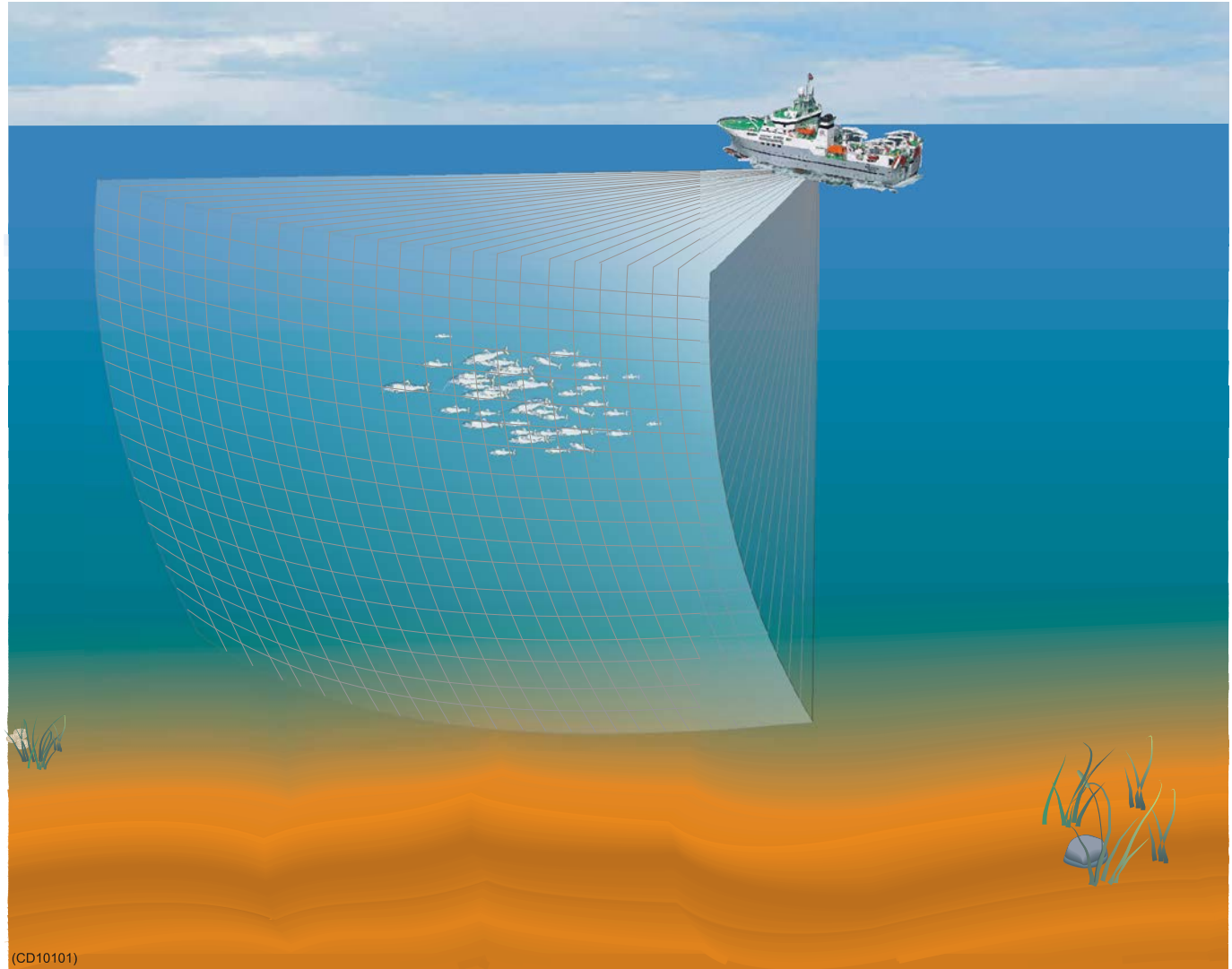


Multibeam sonar (MS70)



KONGSBERG

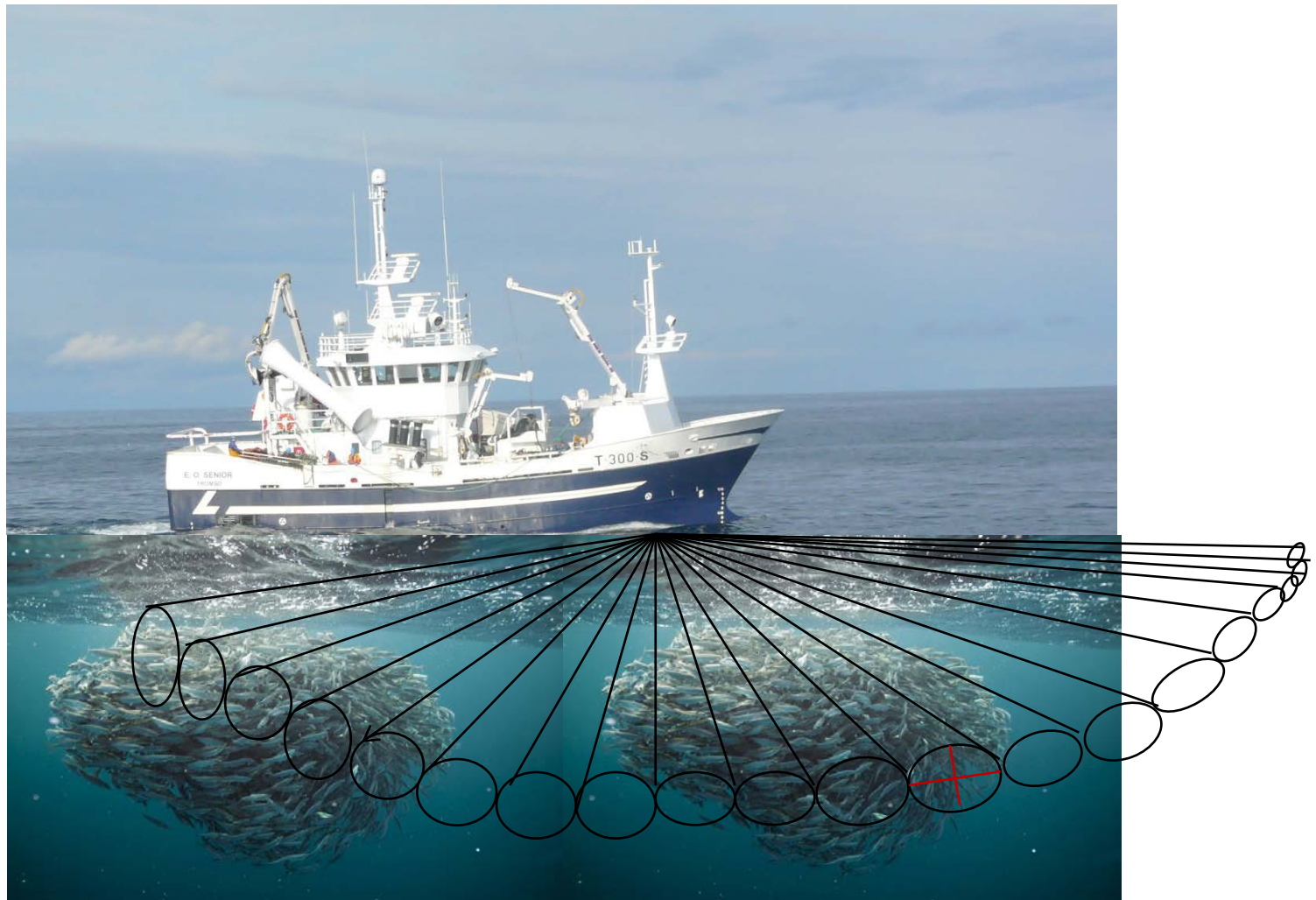
IMR
Norway



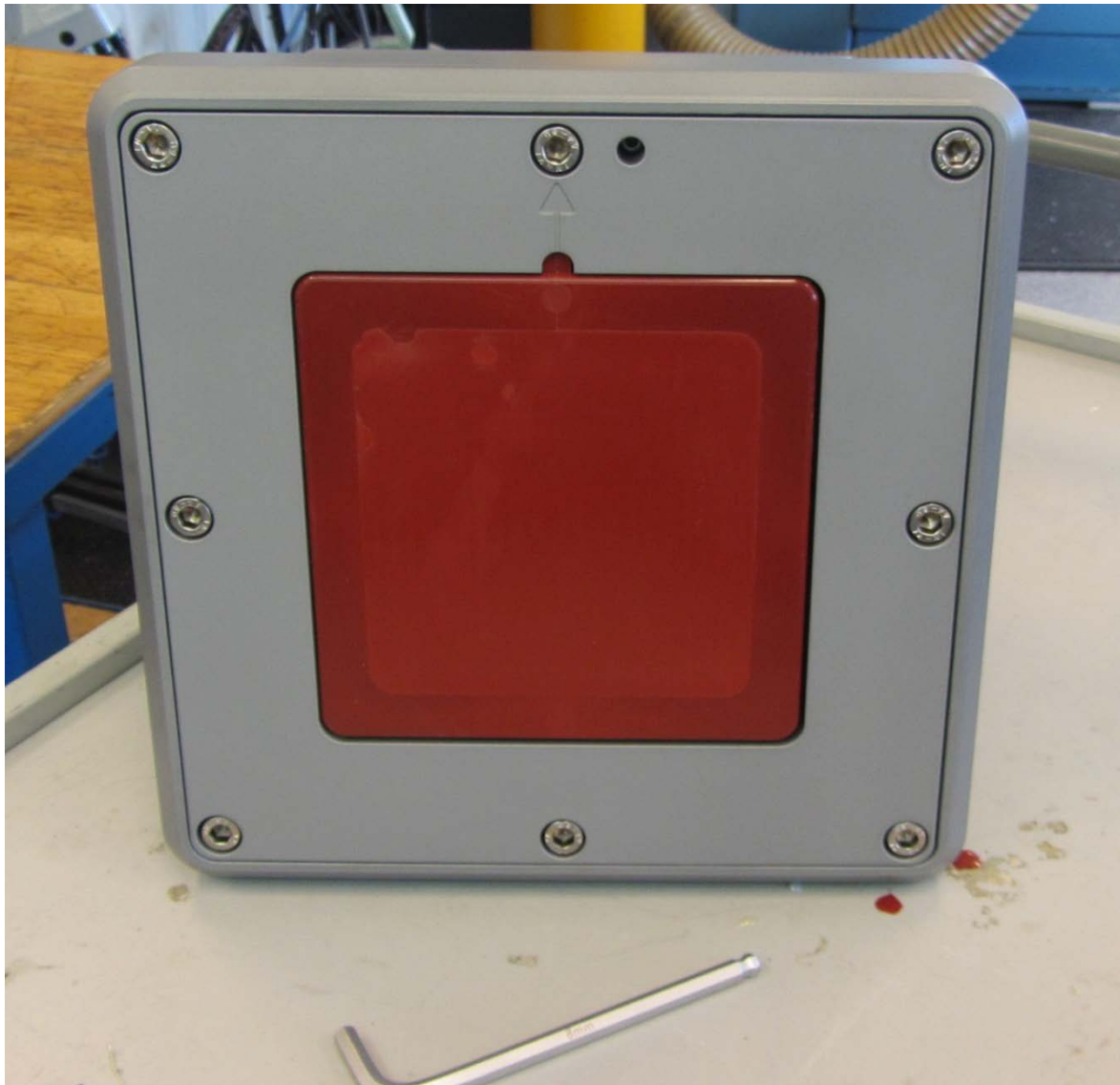
SN90 horizontal coverage sector



KONGSBERG



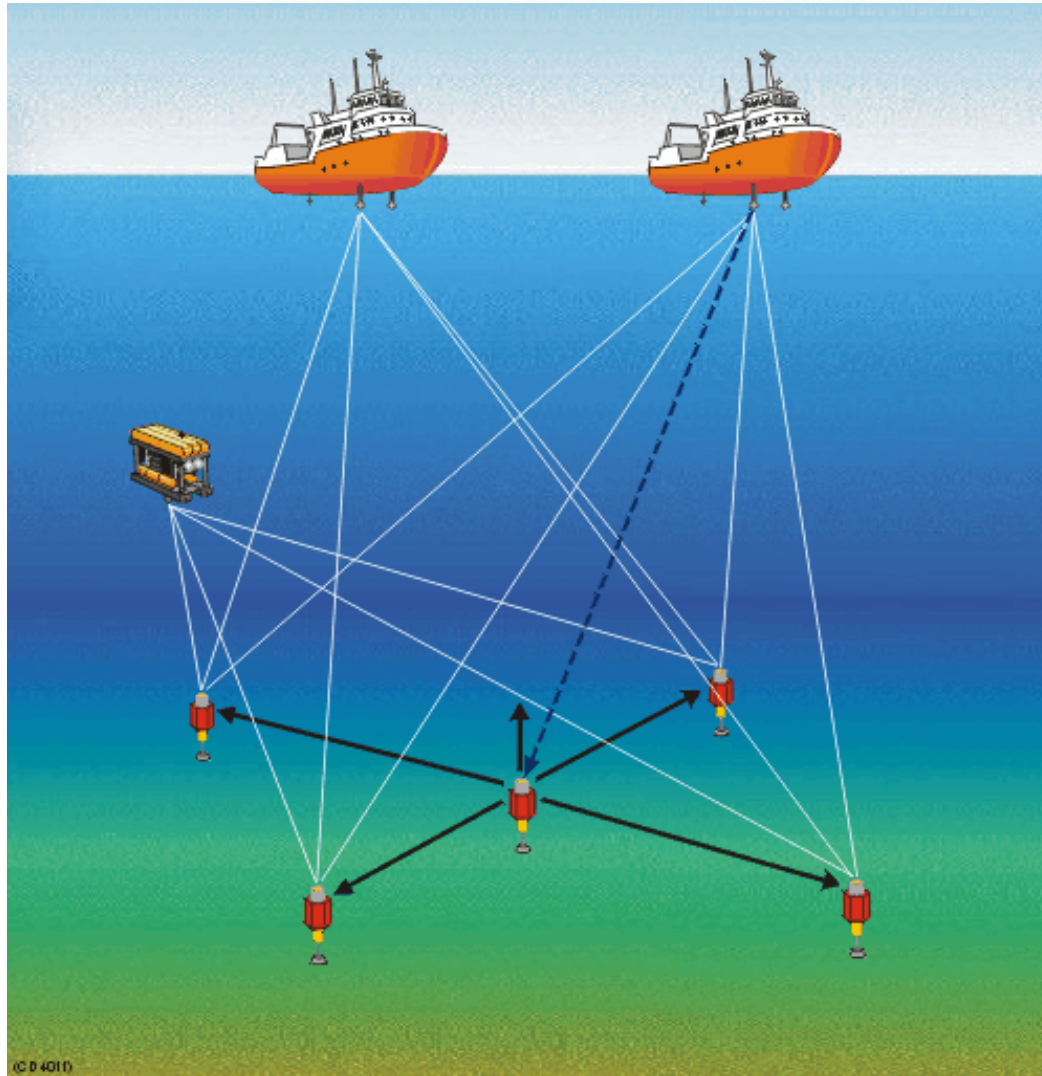
SN90 transducer



Underwater positioning



KONGSBERG



EK15 – a small low power echosounder

- Low power (1.2 W)
- Both 12V and AC
- Small
- Splash proof (IP66)
- Raw data storage
- Calibration
- Ethernet based
- Third party software support
- Up to 15 units simultaneously
- Simultaneous or sequential transmission
- 200 kHz operating frequency
- Standard transducer beam width 26°
- Other transducers are optional (9 and 5°)
- Wireless



Sea cage monitoring – Ewos Innovation

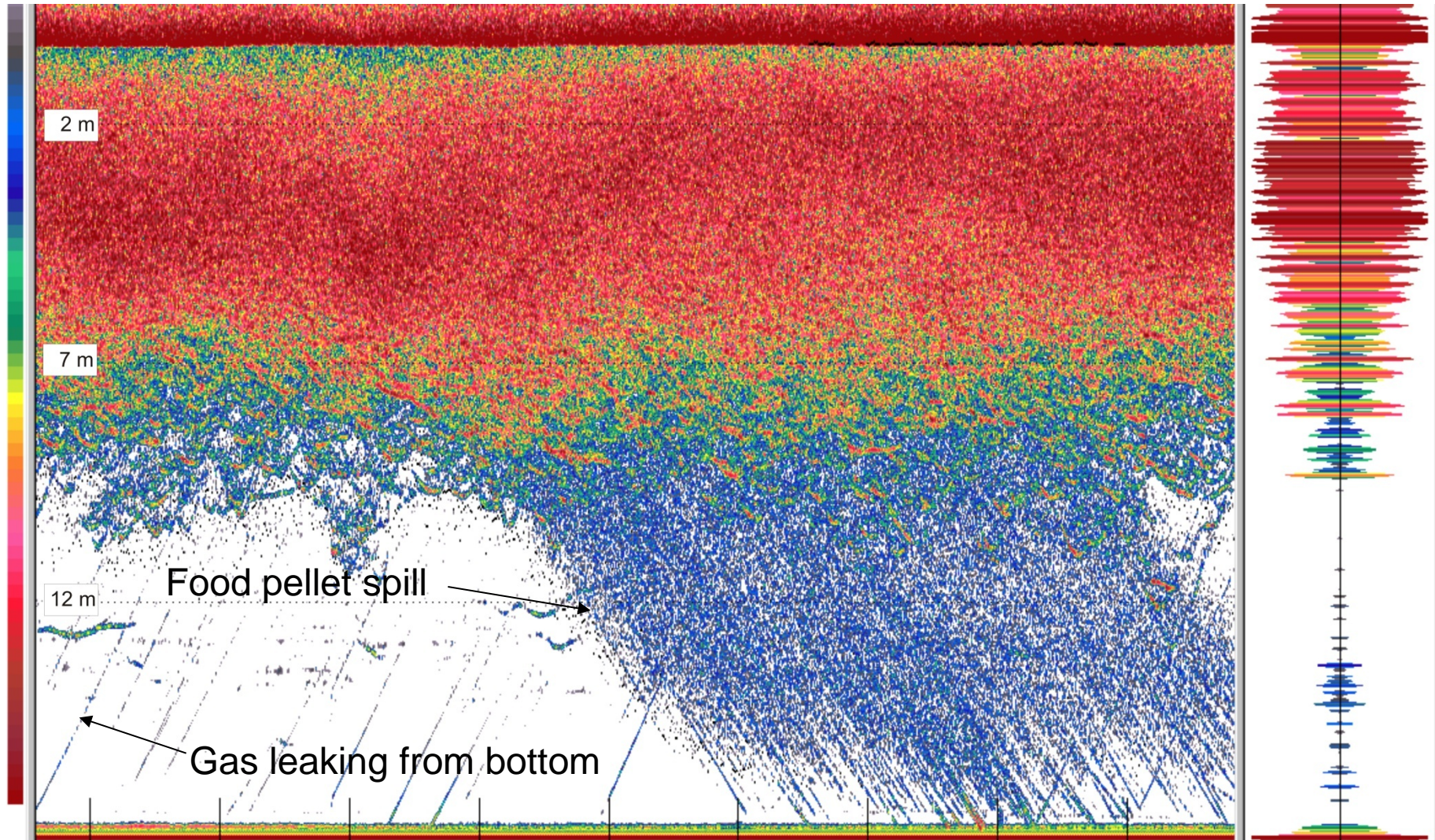


KONGSBERG





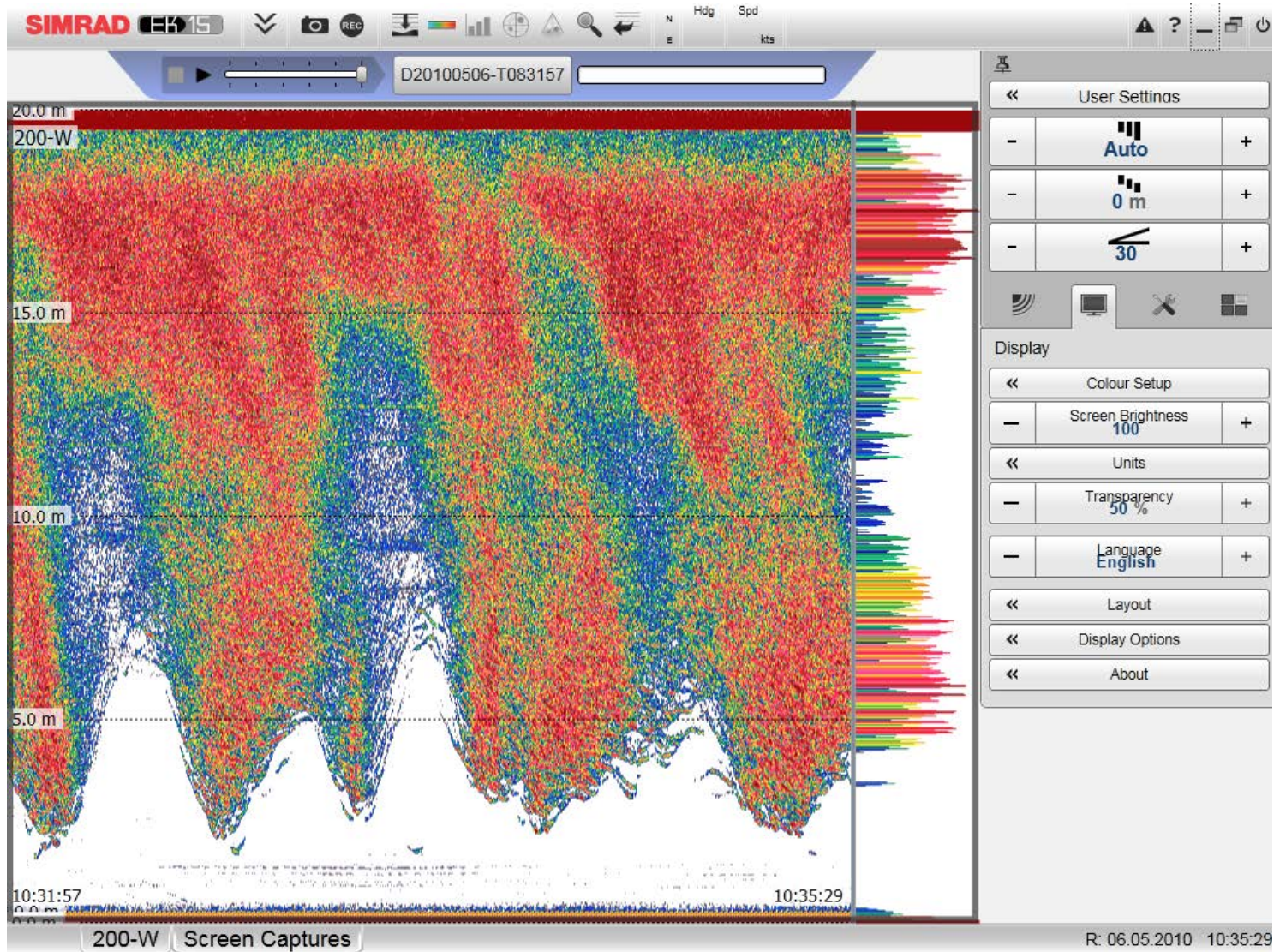
Echogram from cage



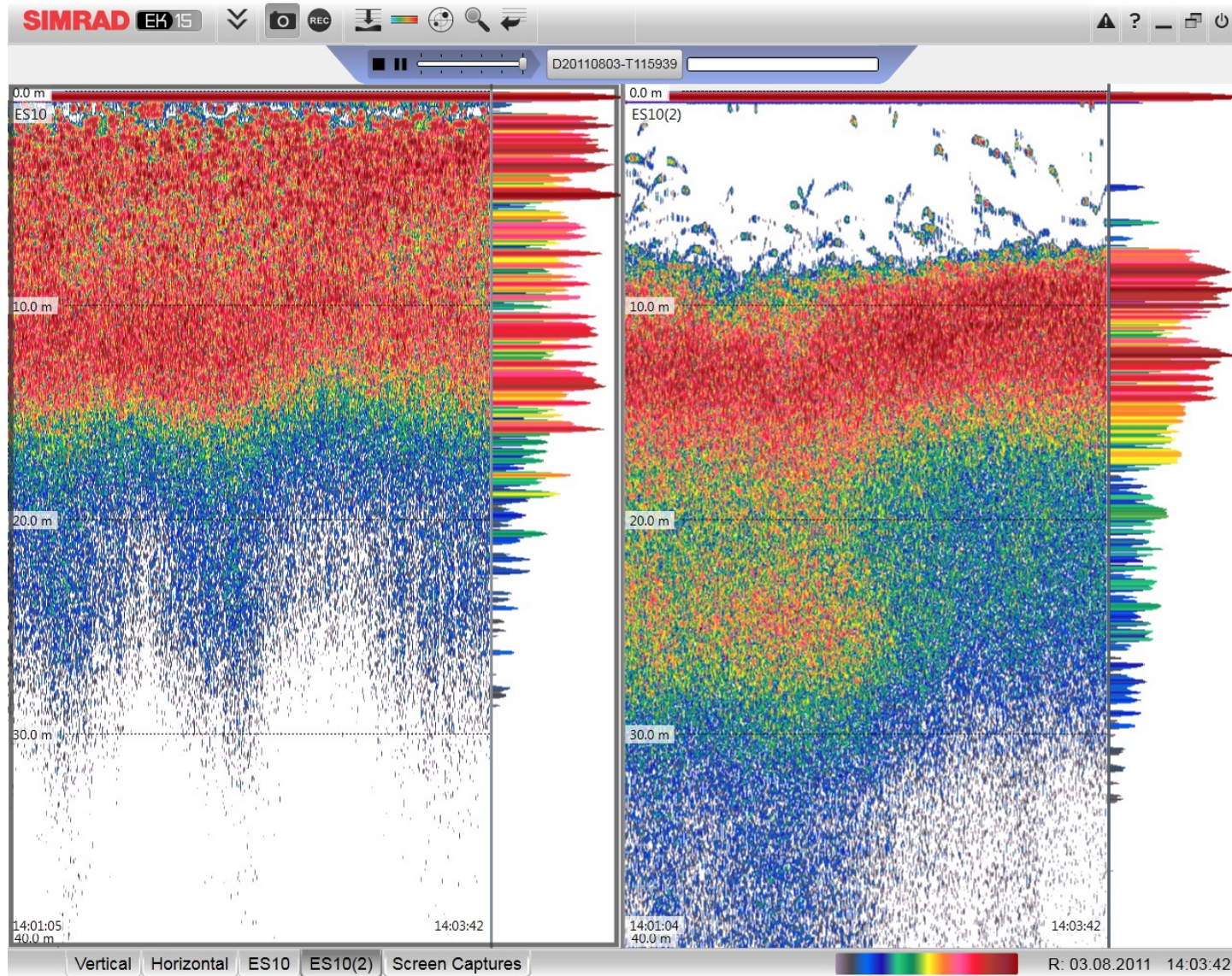
Echogram from cage



KONGSBERG



Echogram from cage



Trengning i not, slipping og dødelighet

Maria Tenningen, Havforskningsinstituttet

Siste tillate tidspunkt for slipping av makrell er når 7/8 av nota er halt inn. Imidlertid; fangststørrelse, form og volum på nota betyr vel så mye for fiskens overlevelse.



One of the main problems in Norwegian purse seine fisheries is mortality related to slipping



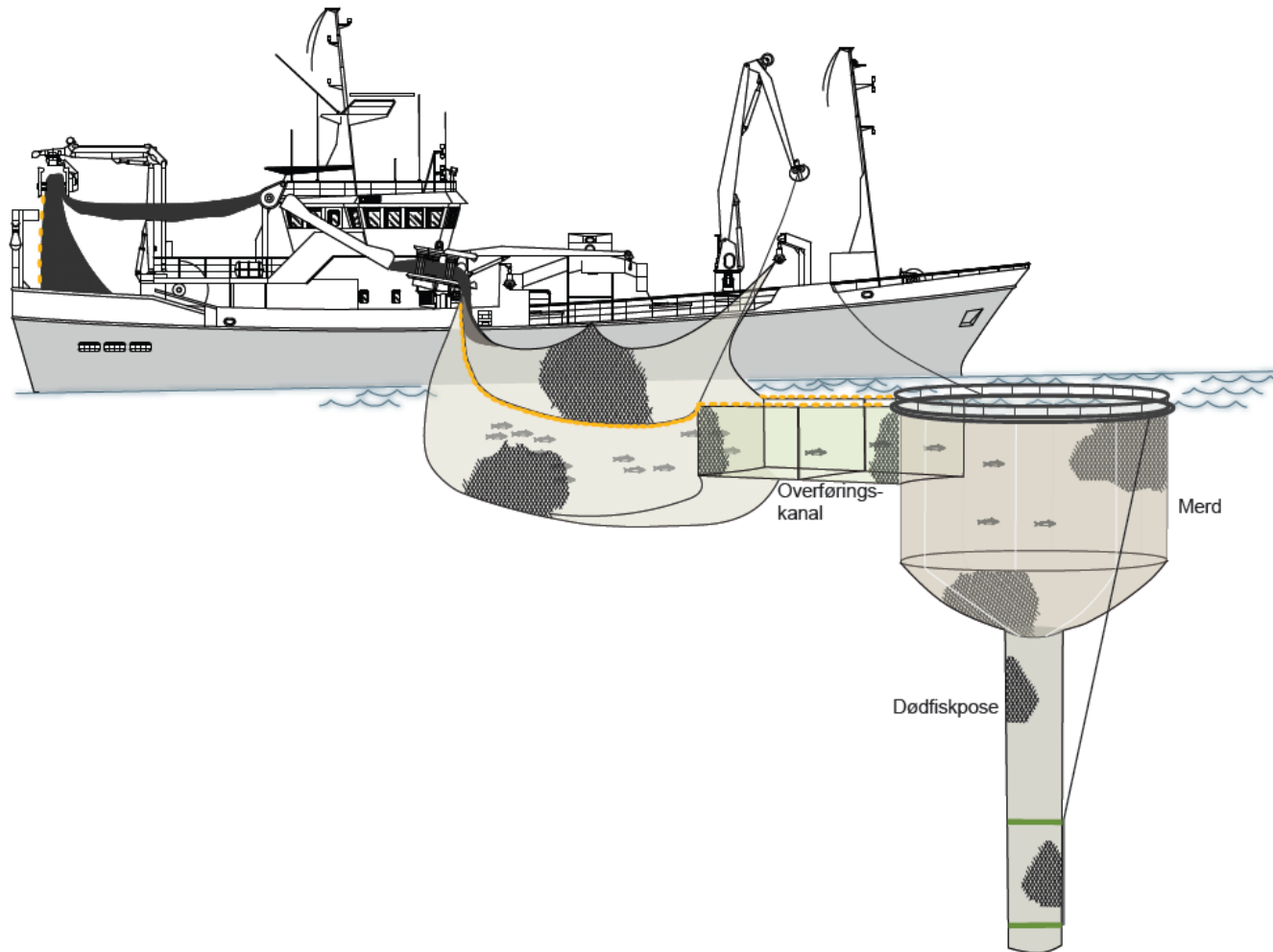
Reasons for slipping: too large catches or unwanted size, quality or species

Illegal to slip dead or dying fish, but how can this be defined?

In addition to being a waste and causing unaccounted mortality it is controversial because discarding is illegal in Norway

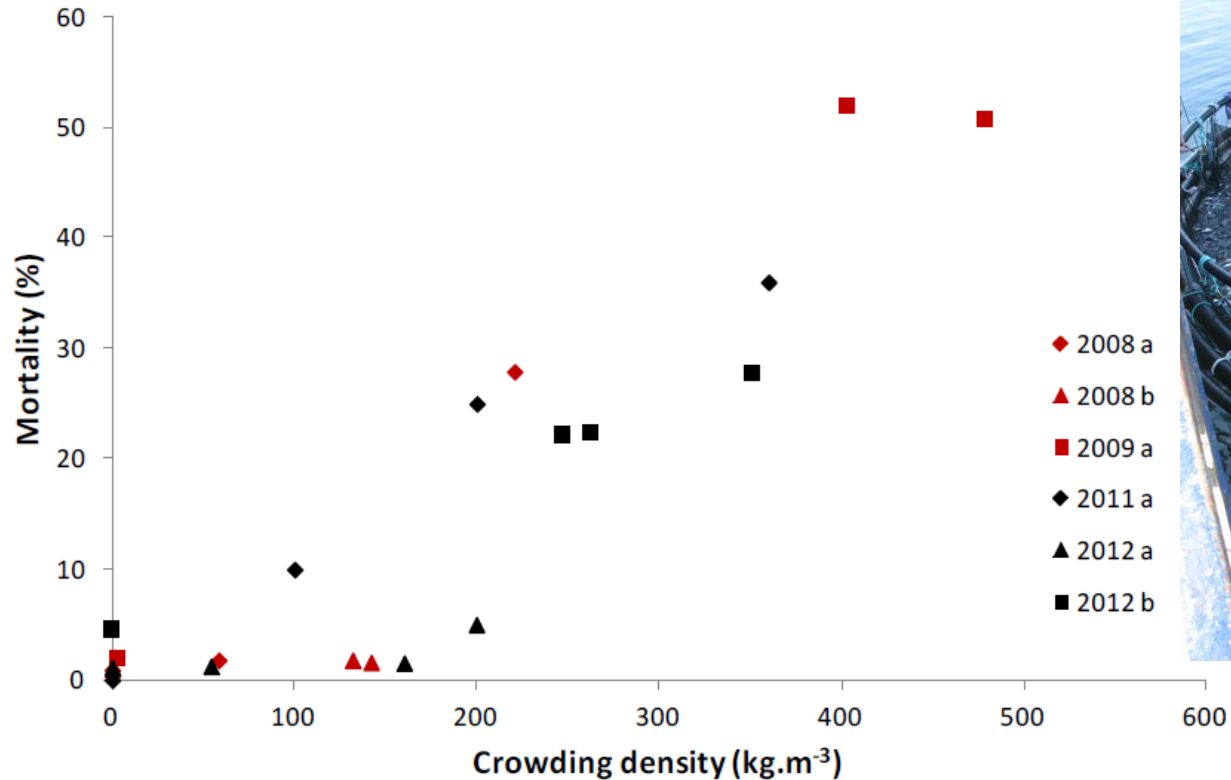
→ If slipping is allowed we have to make sure the fish survive!

Survival experiments on mackerel and herring crowded in the purse seine (Field experiments)



Results from the herring crowding experiments

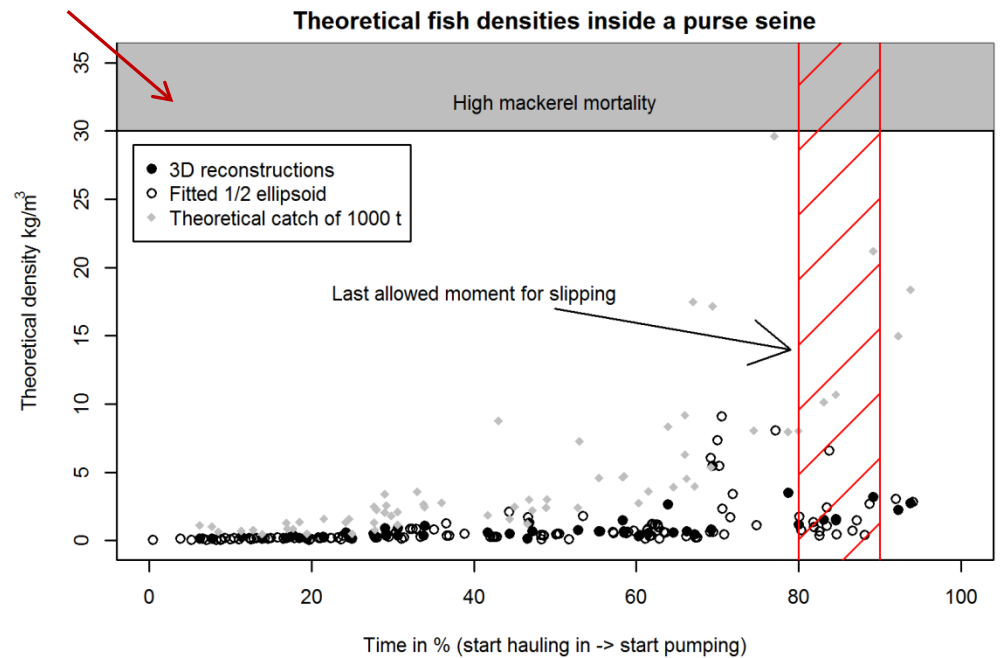
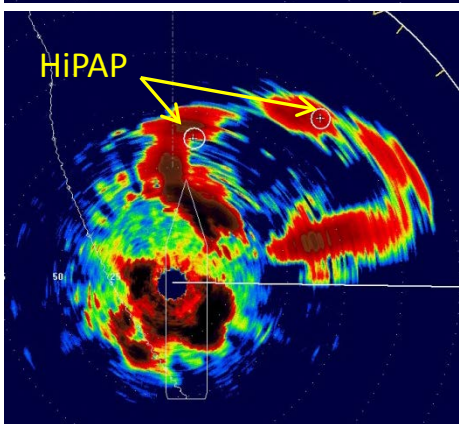
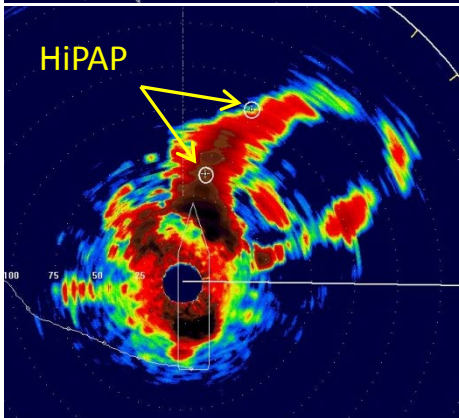
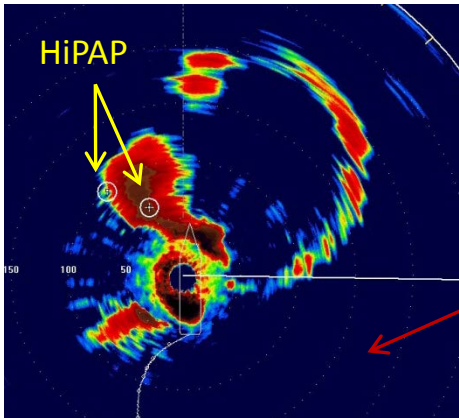
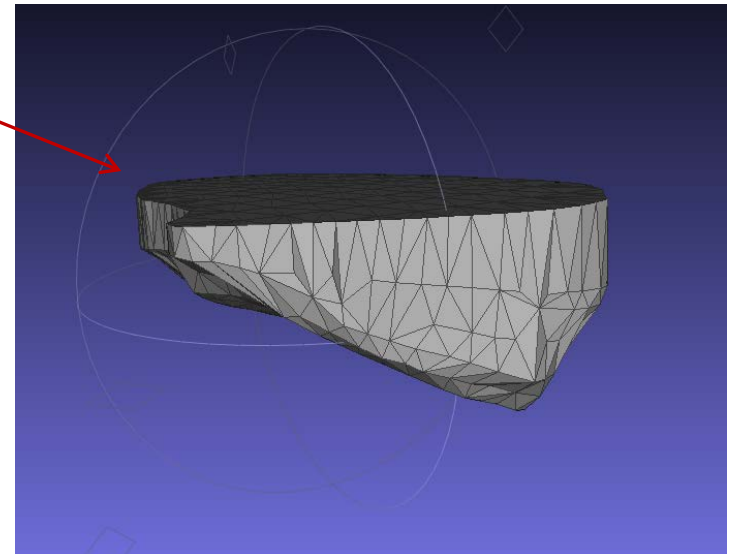
(10 minute crowding phase and mortality after a 4-5 days monitoring period)



Low mortality up to densities of about 150 kg m^{-3}

Rough 3D reconstructions of the net

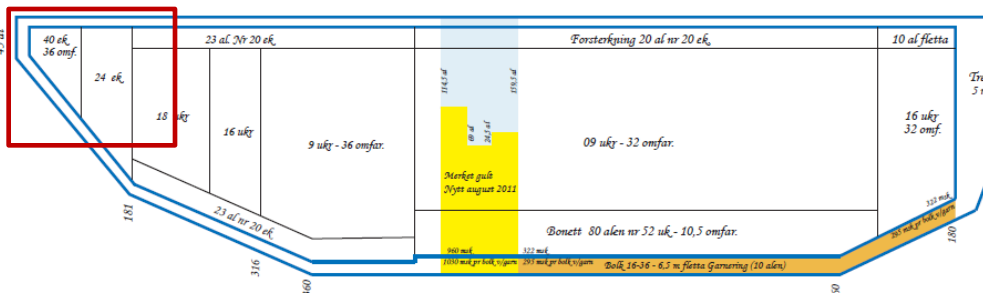
- 3D reconstructions based on horizontal sonar slices of the net
- Compare how well the sonar data correspond to the HiPAP positions (uncertainty)
- Theoretical fish densities → Catch / Available volume



Using HiPAP for net monitoring

- HiPAP – provides 3d positions of the transponders about every 1 sec
- May provide data where sonar data is not usable
- Up to 6 transponders mounted on the last 150 meters net

Challenge to use the transponders in the purse seine while fishing



Takk for oppmerksomheten!

kongsberg.com



KONSGBERG