SLU

SCIENCE AND EDUCATION FOR SUSTAINABLE LIFE


Science and Education for Sustainable Life
SVEA
SLU
SVEA

Swedish Government mission:

- Joint project between authorities
- Concept study – August 2014
- Management study – February 2015
- Responsible for future management the Swedish maritime administration
- Decision by Swedish Government – April 2015, SLU owner and responsible for the procurement and project

THE GLOBAL GOALS
For Sustainable Development

SLU Swedish University of Agricultural Sciences

SMHI

Swedish Agency for Marine and Water Management

SWEDISH MARITIME ADMINISTRATION

Specification of requirement

- SLU-fish surveys, bottom and pelagic trawling, hydroacoustics, oceanography
- Low noise ICES crr 209
- SMHI-oceanography, advanced laboratories
- All year round in Skagerrak, Kattegat and the Baltic (North Sea, Norwegian Sea)
- Flexibility for research projects, aft deck, cranes winches and container labs etc.

Procurement:

- Procurement design (restricted procedure, qualification) – contract December 2015 - Skipsteknisk AS
- Technical specification and design –September 2016
- Procurement vessel (restricted procedure, qualification) – contract Armon shipyard, Vigo in Spain January 2017

Concept 2014

Time schedule:

- Delivery planned to May 2019
- Test period May – September 2019
- The vessel in full operation oktober 2019
- 1 year guarantee, May 2019 – May 2020.

Examples of tomorrow's benefits from SVEA

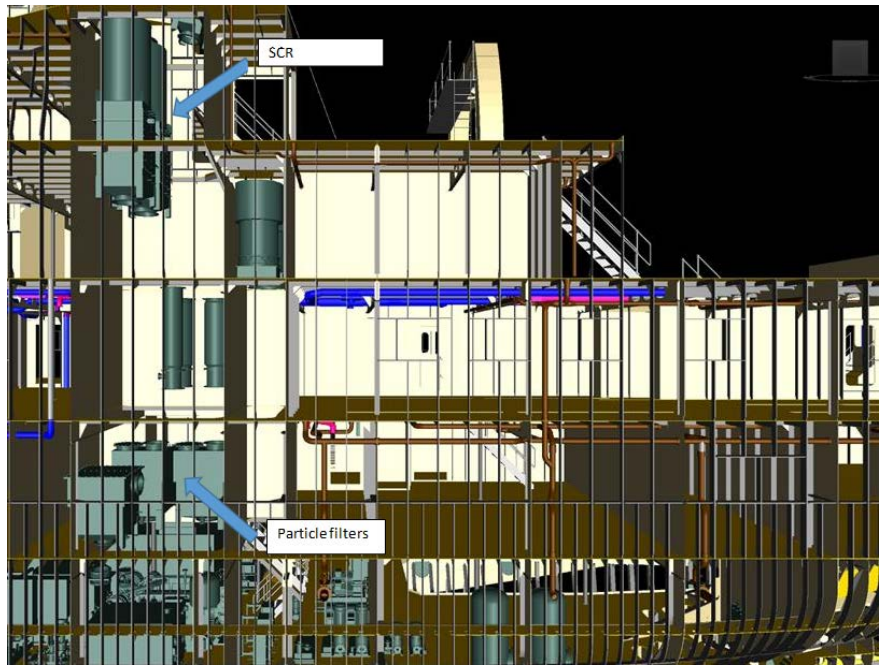
- Use of a multitude of measuring instruments producing huge amounts of data, for example ROTV, meteorological monitors, ferryboxes and so on
- Continuous video monitoring of the seabed
- High resolution profiling of oxygen, physical parameters and climate indicators
- Continuous surface measurements with ferryboxes modelling acidification
- High resolution monitoring of phytoplankton
- Capacity for using autonomous platforms like gliders, buoys, sub-surface rigs
- Monitoring current directions and current speed with ADCP

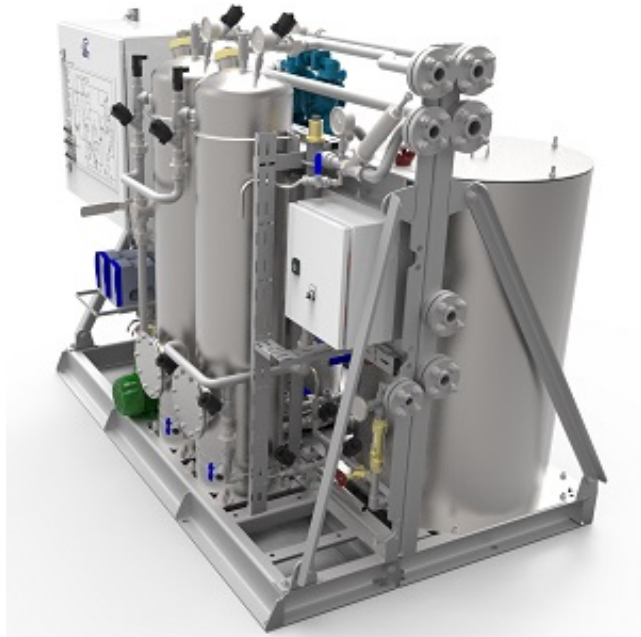
Also:

- Plenty of space for researchers on board
- Preparations for monitoring of climate, air, meteorology and so on
- Sea Truthing for evaluation od satellite data
- Accoustic oceanography

Built and run with the aim of a low environmental foot print

- The vessel will run on Hydrogenated vegetable oils (HVO) based on surplus materials from the paper industry
- SCR for cleaning exhaust gas from engines
- Latest technology in reduction of emissions including particle filtersin serie with SCR exhaust cleanings system (DEC Marine)
- Connection to shore based heating and electrical power at port
- Silicon based anti fouling of hull and seawater cooling systems
- Onboard sewage treatment plant (Marinefloc)



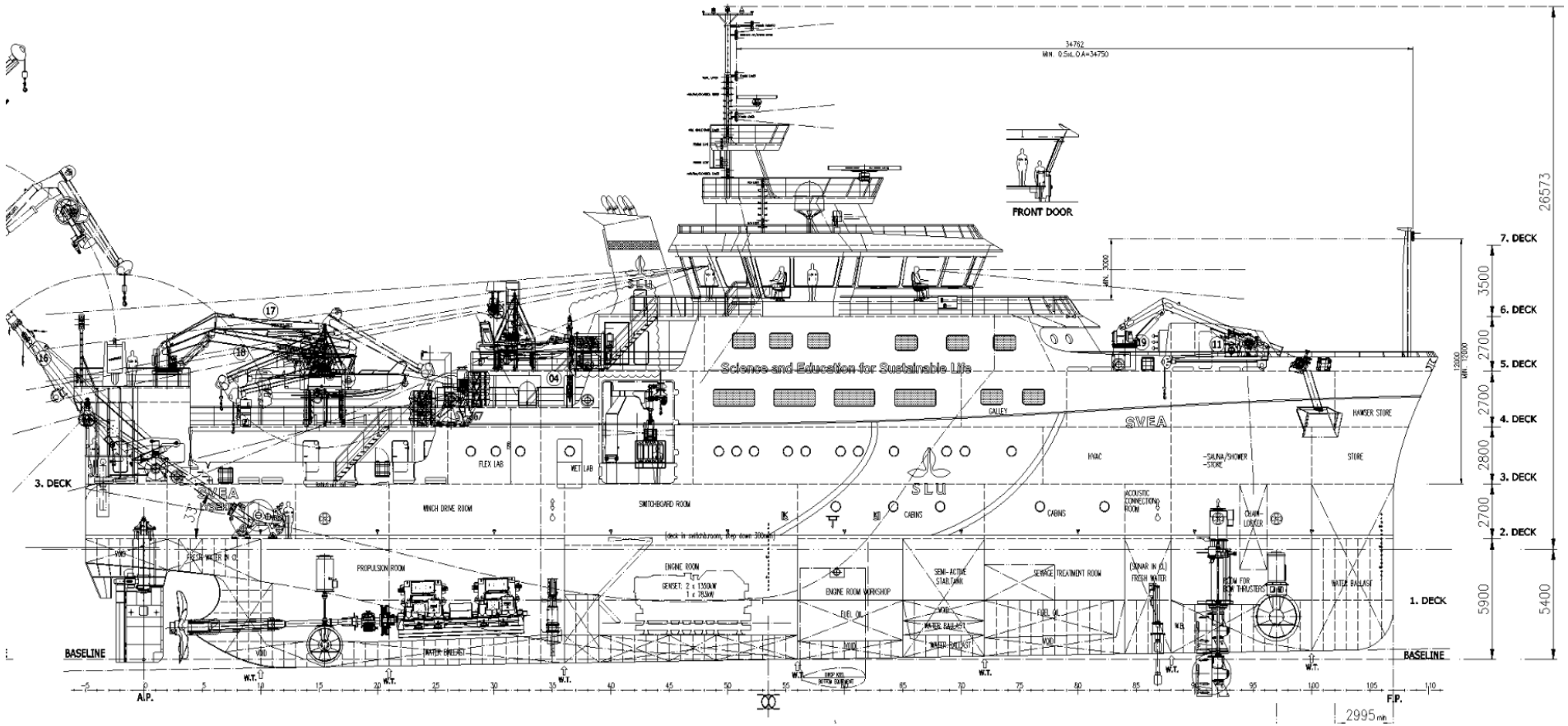


Length O.A. 69.5 m
Beam 15.8 m
Accomodation 28 single cabins
Crew 9-15
Scientists >13
Class: DNV 1A1, EO, ICE-1B,
Dynpos-auts, SPS, TMON, BWM-T,
Comf-C(2)V(2), CLEAN, NAUT-AW
Endurance 16 days

THE GLOBAL GOALS
For Sustainable Development

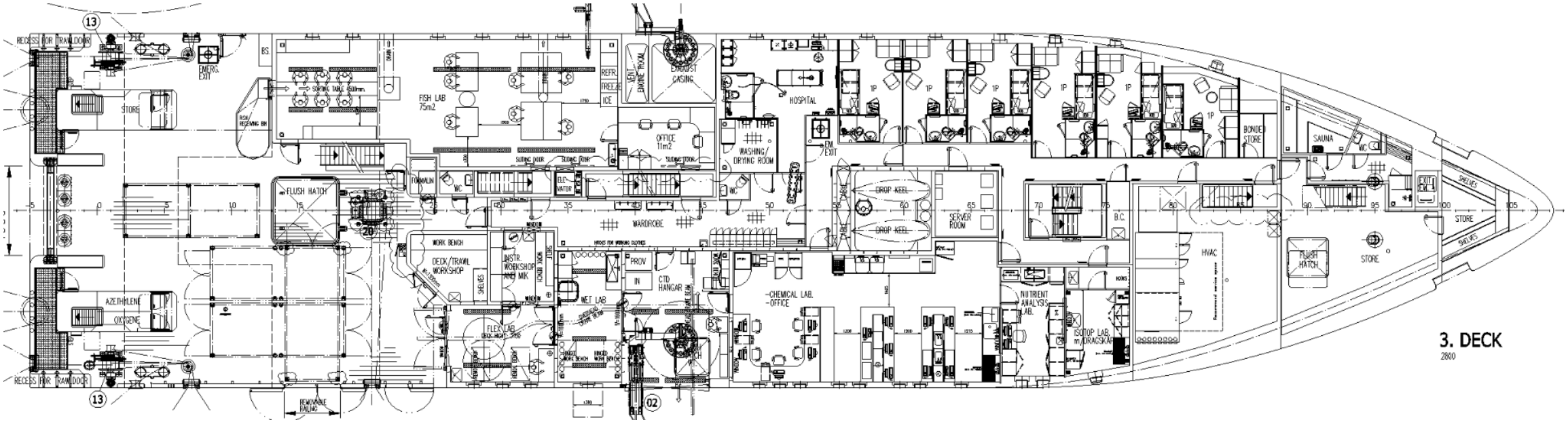
14 LIFE BELOW WATER

SVEA



General arrangement

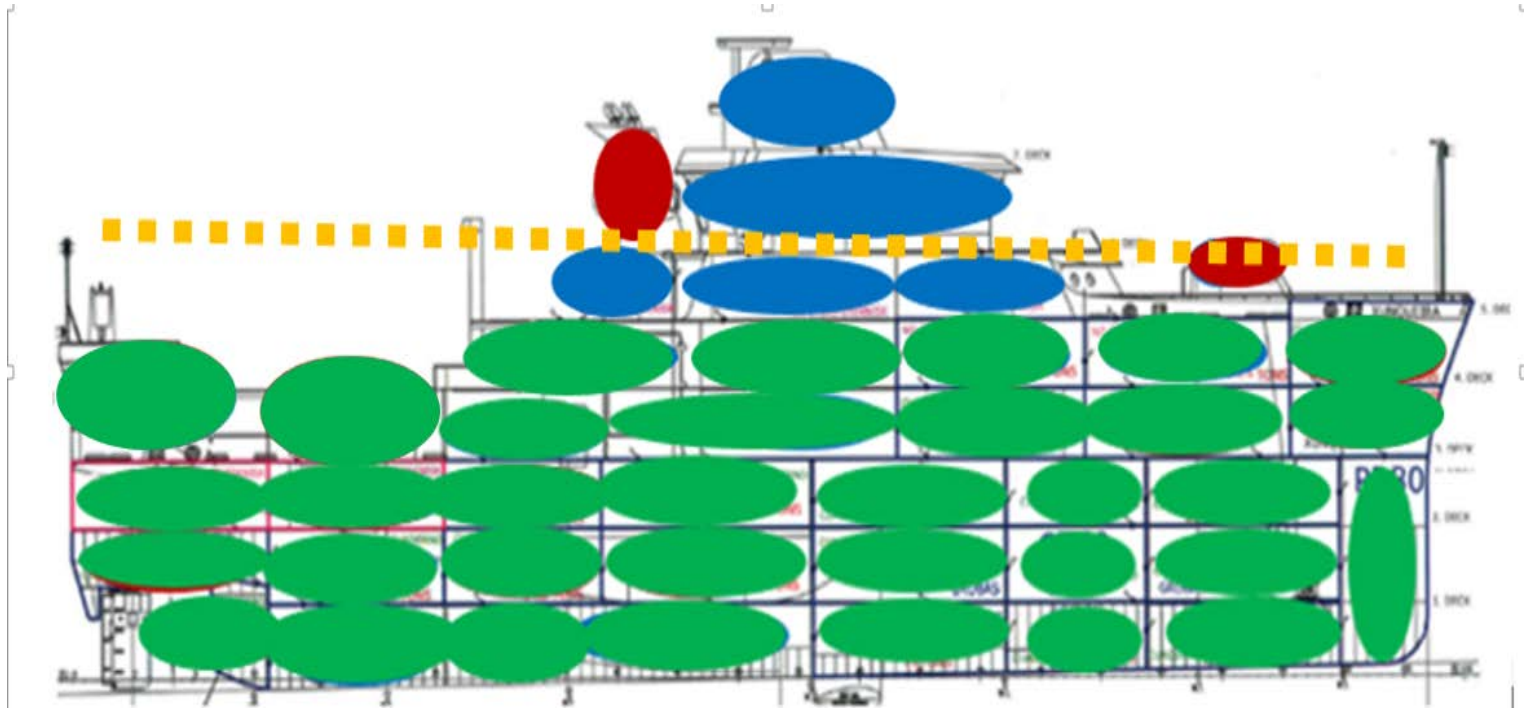
SVEA


RECESS FOR TRAWLDOOR
EMERG. EXIT
STORE
FISH LAB 75m2
FLUSH HATCH
FORMALIN
WC
OFFICE 11m2
WASHING/ DRYING ROOM
HOSPITAL
EM EXIT
1P
BONDED STORE
SAUNA
WARDROBE
DROP KEEL
SERVER ROOM
B.C.
HVAC
WORK BENCH
DECK/TRAWL WORKSHOP
INSTR. WORKSHOP AND MK
SHELVES
PROV
IN
CTD HANGAR
WET LAB
FLEC LAB
-CHEMICAL LAB. -OFFICE
NUTRIENT ANALYSIS LAB.
ISOTOP LAB. m/DRAGSKAR
AZETHYLENE
OXYGENE
REMOVABLE RAILING
3. DECK
2800

Deck 3

SVEA

Green= assembled sections, assembled together into the hull
Blue= sections where the welding has started but not is fully finalized
Red= sections ready and waiting for assembling into the hull



Section assembling on Svea

Site office

Project meeting at SLU site office which is manned during the whole building process.

Armon Shipyard

Welding hall at the shipyard where Svea is being built right now.

Armon Shipyard

Here sections are being assembled to the hull. The bow on its way in place.

Armon Shipyard

Fore ship mounted up to 7,6 m height from the keel. At full height up to the railing it will be 15 meters.

Armon Shipyard

Section ET40, part of the switchboard room, during turning before assembling into the hull.

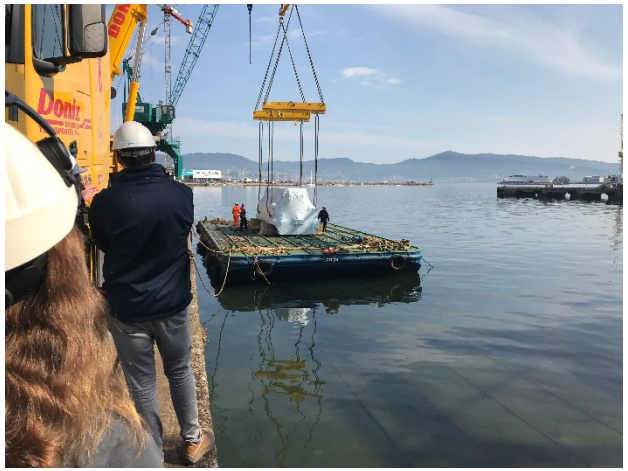
Armon Shipyard

Aft ship and you can see part of the bed for the machine for electrical propulsion engines.

Armon Shipyard

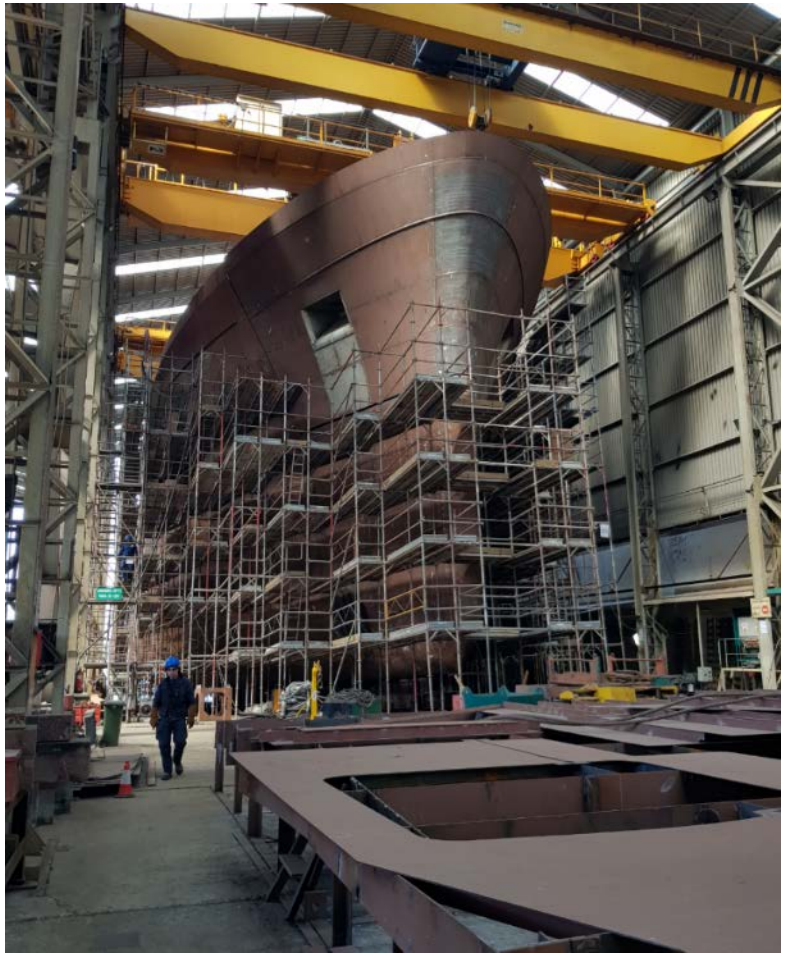
Here is the aft ship seen from the machinery space.

Armon Shipyard



Engines transported by barge and lifted onboard

Armon Shipyard



Here also the fore ship is in place.

Armon Shipyard

Sound insulation is mounted with thin top plate in cabin area deck 2.

Armon Shipyard

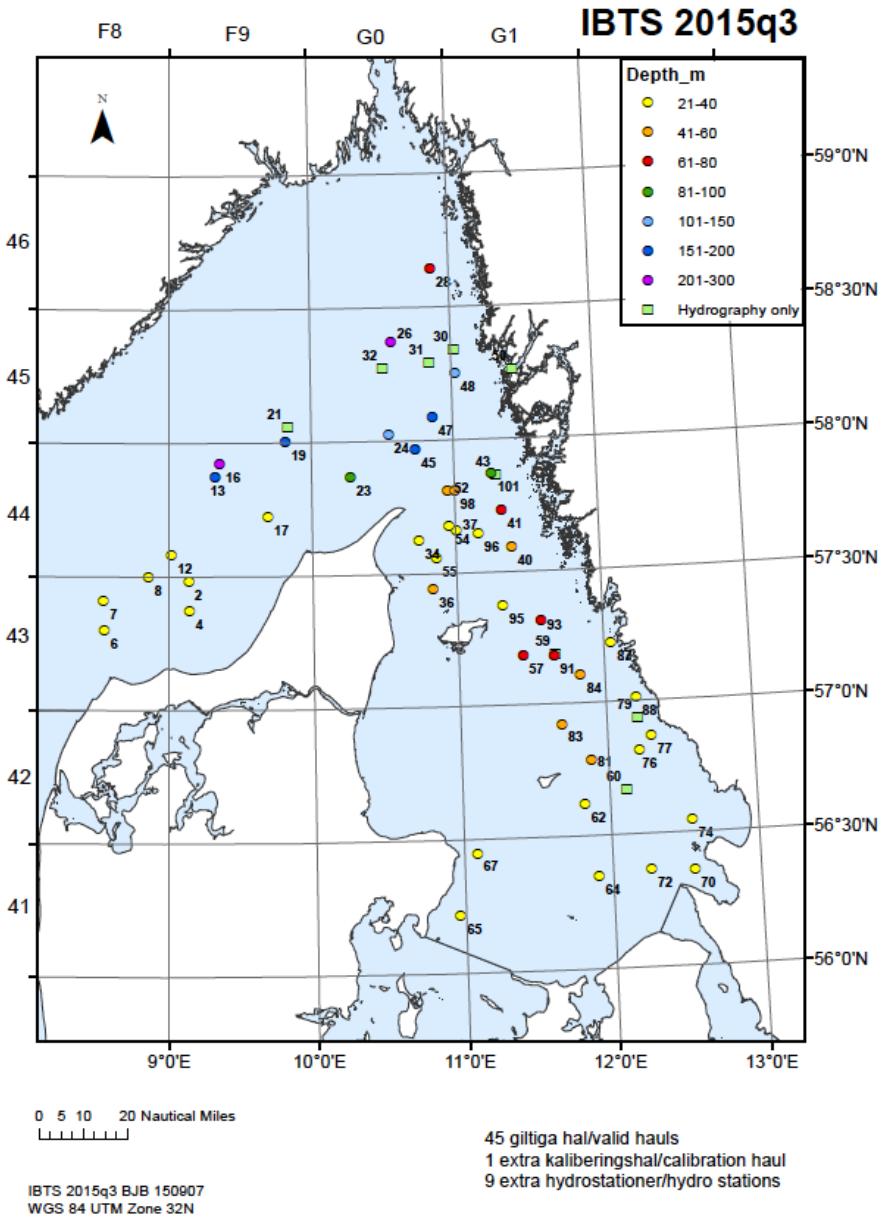
The shipyard has built up a mock-up of the stations on bridge to be able to design this as good as possible together with crew and scientists.

SVEA

Photo taken at the time of the official keel laying.

Monitoring

SLU operation areas



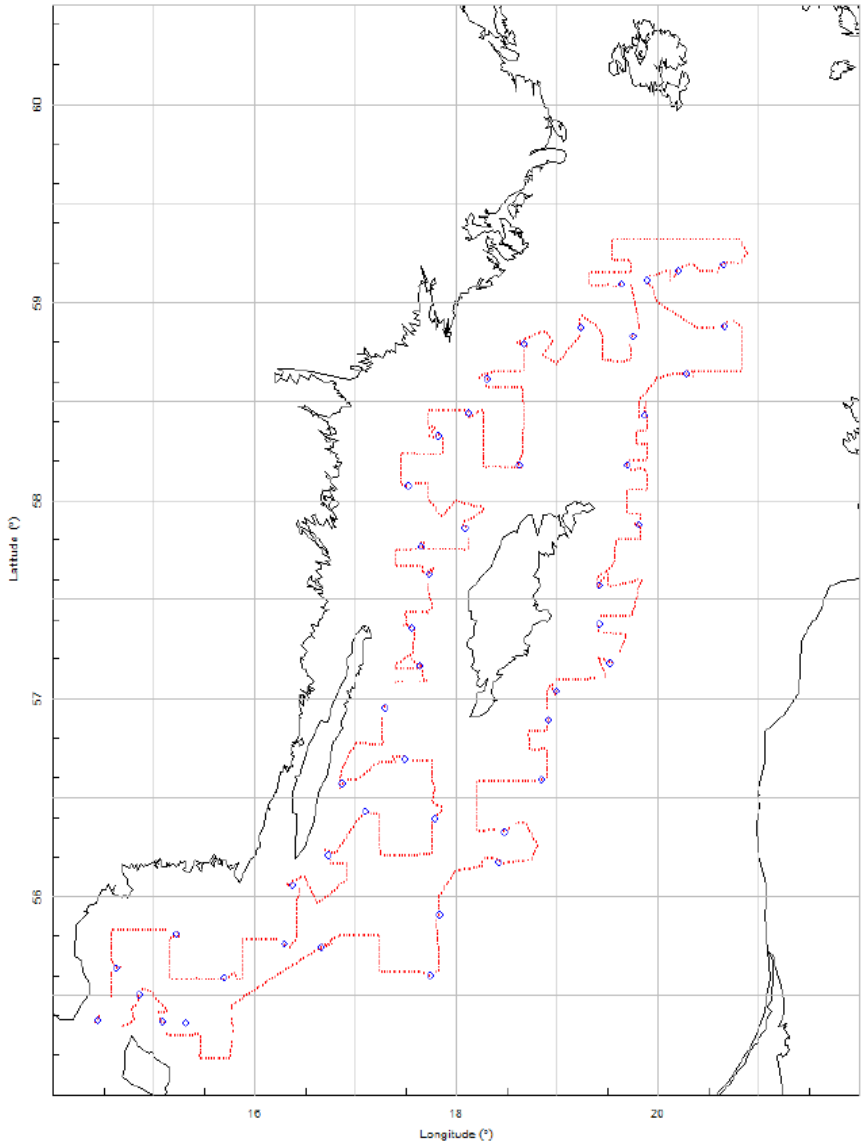
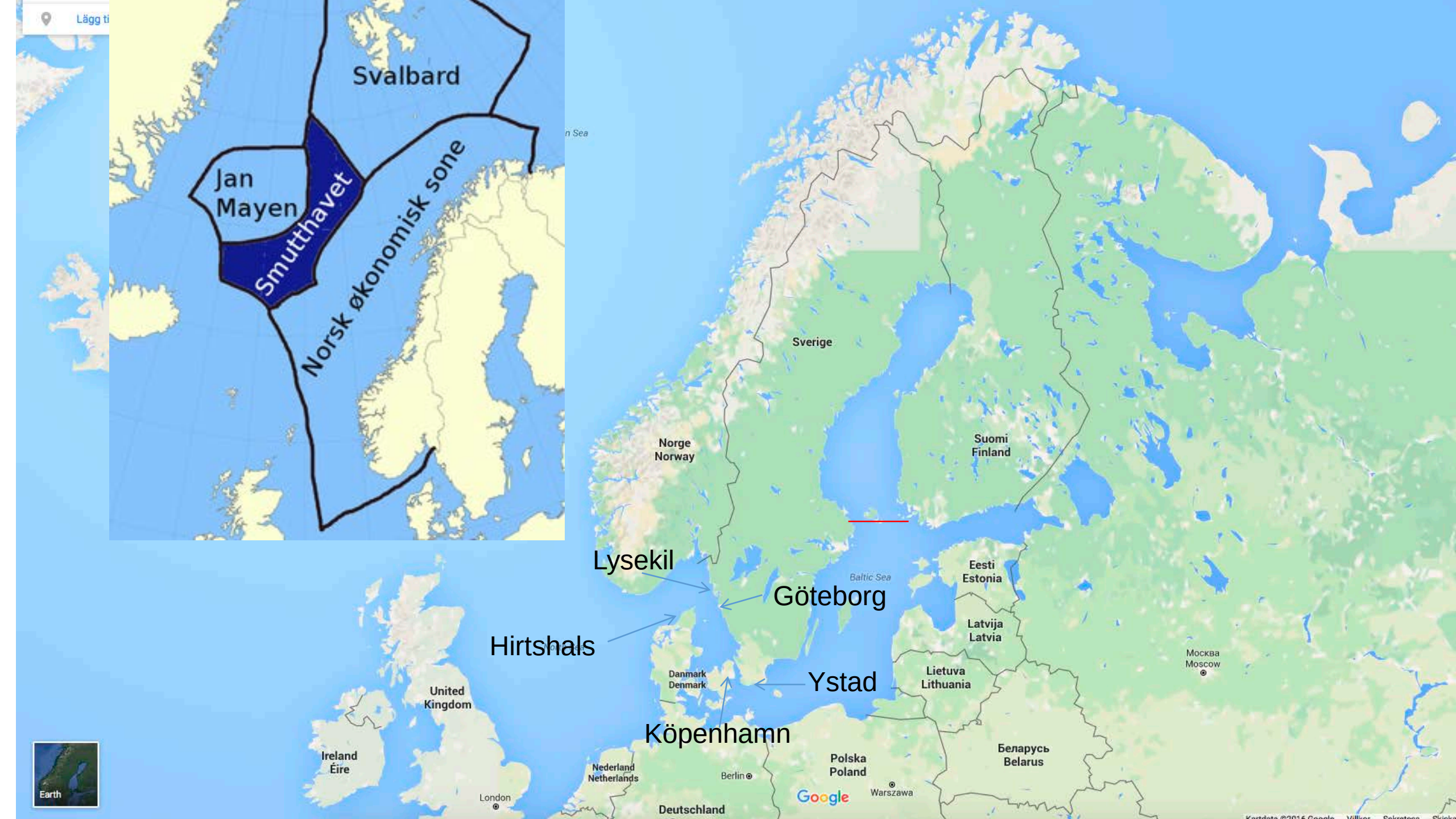
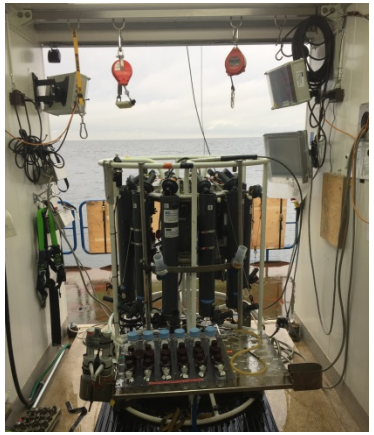
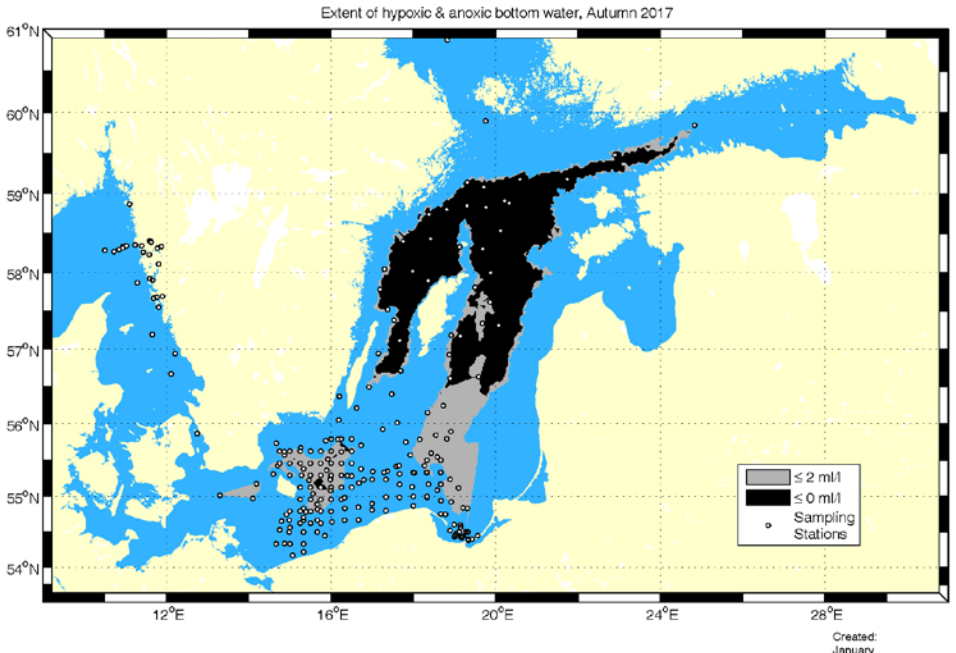


Figure 2: cruise track(red), positions of trawl hauls (blue) and survey grid (ICES squares)(grey)


Svalbard
Jan Mayen
Smutthavet
Norsk økonomisk sone
Lysekil
Göteborg
Hirtshals
Ystad
Köpenhamn
Sverige
Norge
Norway
Suomi
Finland
Eesti
Estonia
Latvija
Latvia
Lietuva
Lithuania
Danmark
Denmark
United
Kingdom
Ireland
Éire
Nederland
Netherlands
Berlin
London
Polska
Poland
Warszawa
Беларусь
Belarus
Deutschland
Москва
Moscow
Baltic Sea
Google
Earth

Marine monitoring of the seas surrounding Sweden

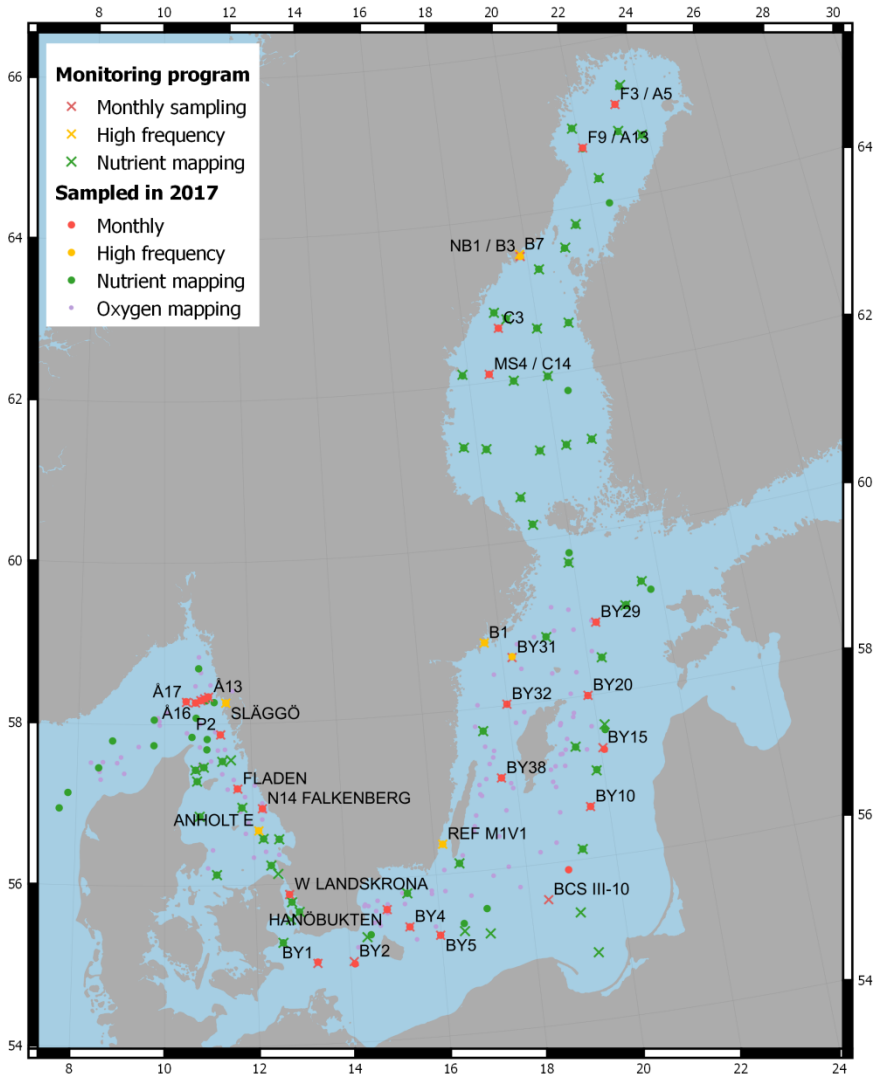




Water Chemistry, Physic Oceanography & Marine Biology

- Eutrophication
- Anoxia & Hypoxia
- Algal blooms
- Marine acidification
- Climate
- Fishery's Oceanography
- RT monitoring (Buoys etc)
- Data assimilation
- Waves and currents
- Marine research

Swedish monitoring programme



Havs och Vatten myndigheten

- Monthly cruises
  ~7 days
  5-6 SMHI crew (+guests)

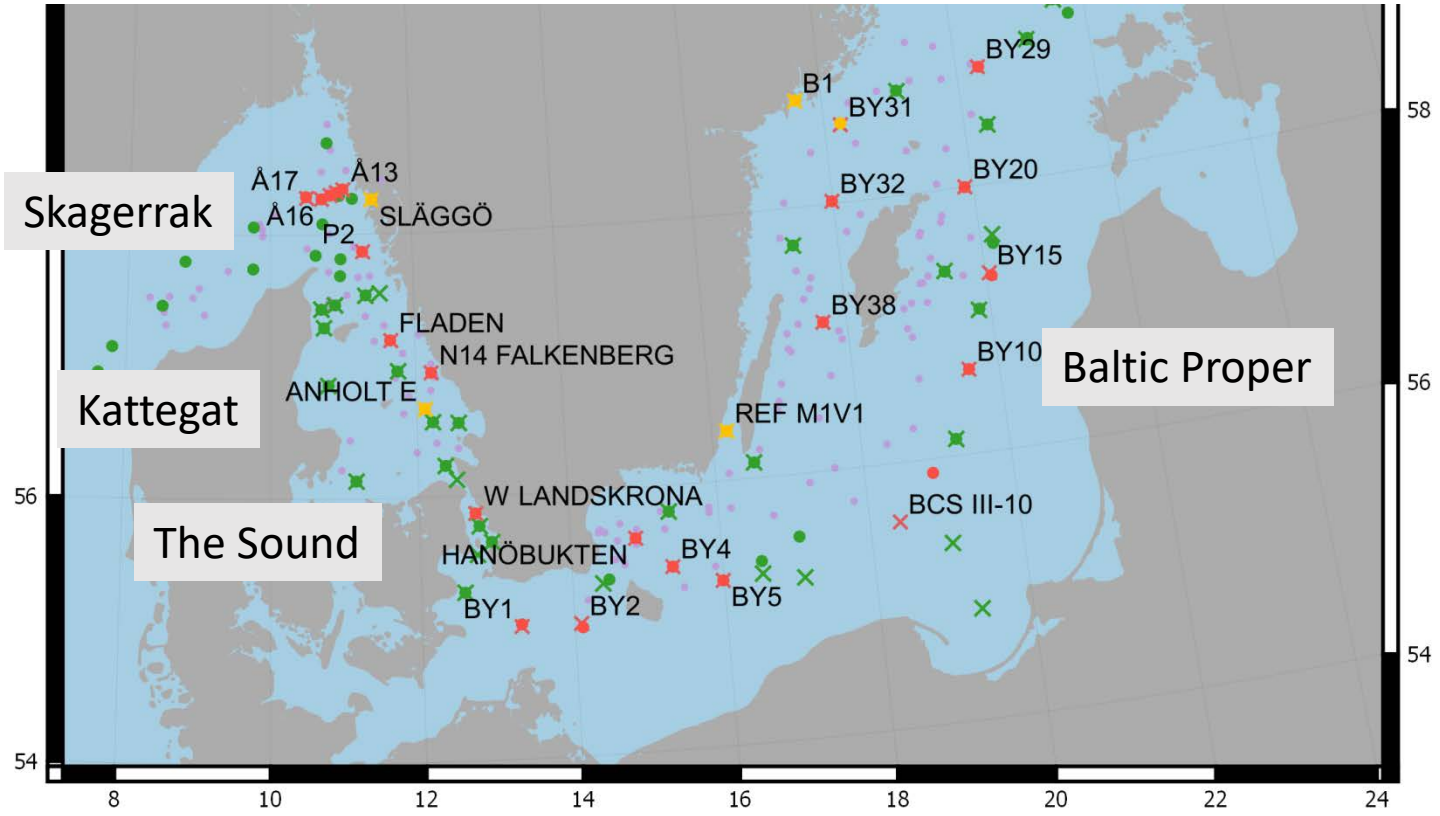
- Stations:
  25 Regular stations, 12 visits/year
  7 High frequency stations, 24 visits/year
  >80 mapping stations. 1-2 visits/year

- Mapping surveys:
  Kattegat: Winter pool of nutrients
  Skagerrak: Winter pool of nutrients (IBTS)
  Baltic Proper: Winter pool of nutrients
  Gulf of Bothnia: Winter pool of nutrients
  Baltic Proper: Oxygen survey (BIAS)
  Kattegat: Oxygen survey (IBTS)

- Co-operation: National, SYKE, FMI, IOPAN, IOW, DTU

National marine monitoring performed by SMHI. Approximately one survey/month. Duration: 5-7 days

- Skagerrak: 7 stations
- Kattegat and the strait: 4 stations
- Baltic Proper: 14 stations



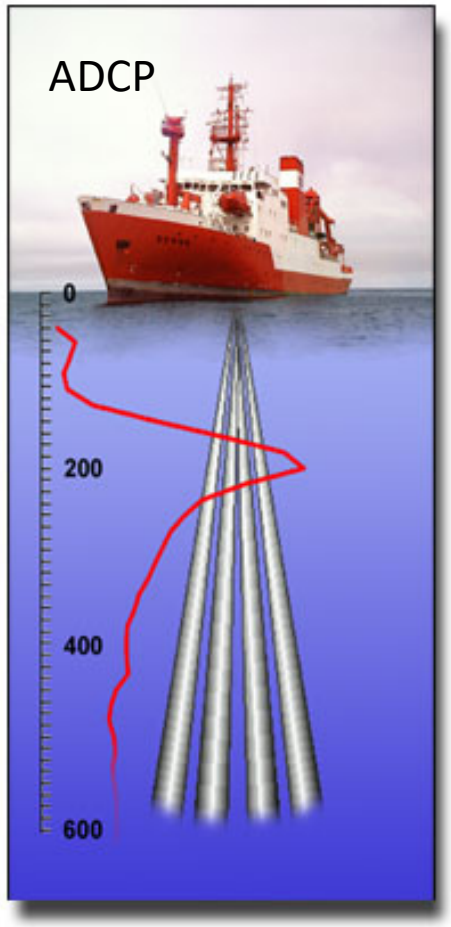
Equipment

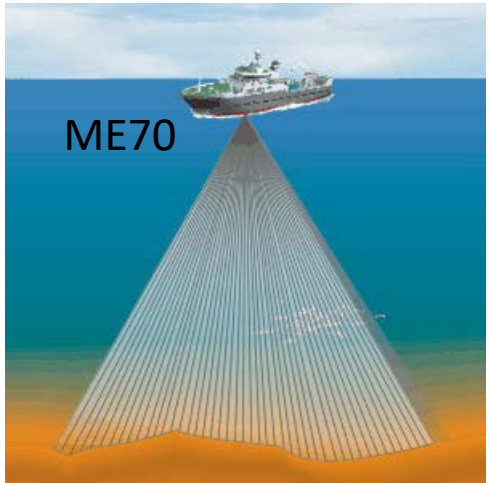
SVEA Oceanograhpic equipment

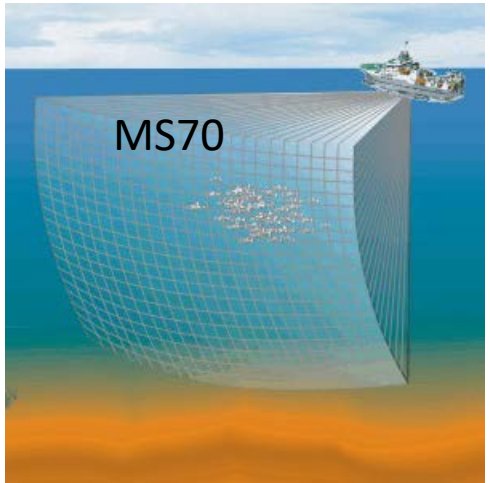
- Three oceanographic winches with telemetric system with fiber optics
  - CTD-winch/davit: 24 bottle CTD-rosette with uv-video in HD
  - Multipurpose-winsch/A-frame: Aft ROTV, uv-video, deployments, CTD-rosett
  - Fore-winch: Fore ROTV for fishery acoustics
- Wetlab with external platform for nets, hose, bottom sampling,
- Modern and flexible labs och workshops
- ADCP - 150 & 600 kHz
- Imaging flow cytobot - automatic plankton recorder
- Moving vessel profiler - CTD/SVP
- Weather station and instruments for satellite sea truthing
- A-frames, cranes and winches for handling; buoys, vehicles, bottom rigs, trawls.
- Under water reference system for ROVs
- Water flow through system
  - Ferrybox with pH & pCO2
  - Sampling of marine litter & pollutants

Scientific equipment

- Two drop keels for hydroacoustics (multibeam sonar, multibeam echosounder, wideband multifrequency echo sounder system, low and high frequency fish finding sonars, current profilers ADCP (150 and 600 kHz) - Simrad
- Towed fish (ROTV) for hydroacoustics (wideband multifrequency echo sounder system)
- Towed ROTV undulating for hydrography (MacArtney)



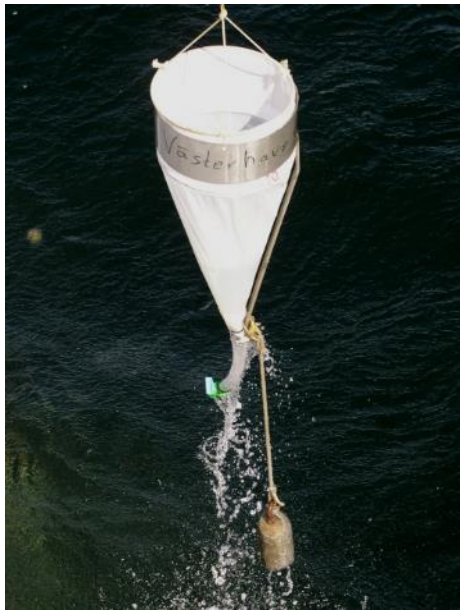


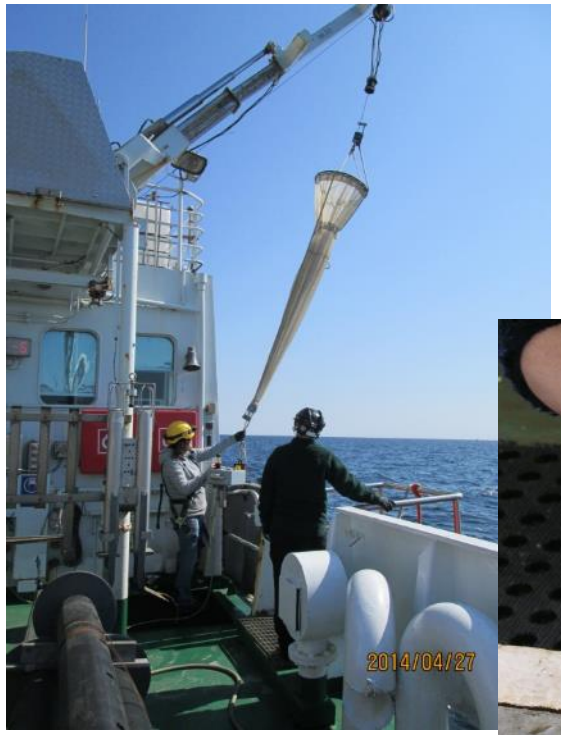


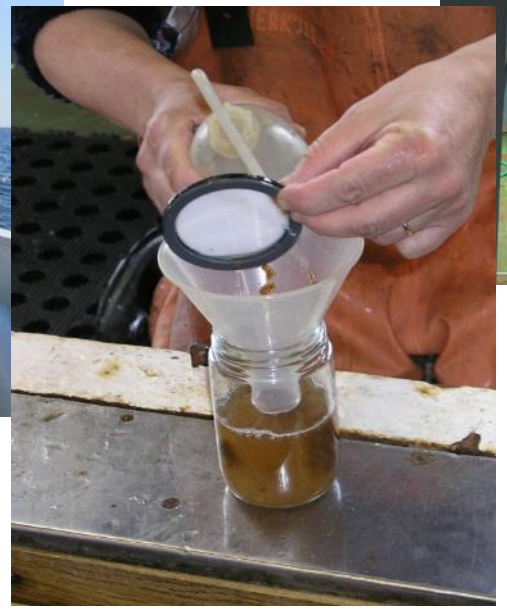
Environmental monitoring of the seas around Sweden

- Chemistry, physics and biology
- Eutrophication
- Lack of oxygene
- Algal bloom
- Data to models
- Fishery hydrographic
- Bottom and pelagic trawling surveys

Sampling of plant-, zoo plankton and jellyfish. Measuring of sight depth.



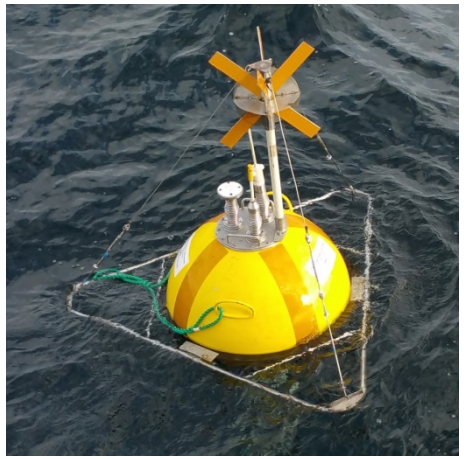


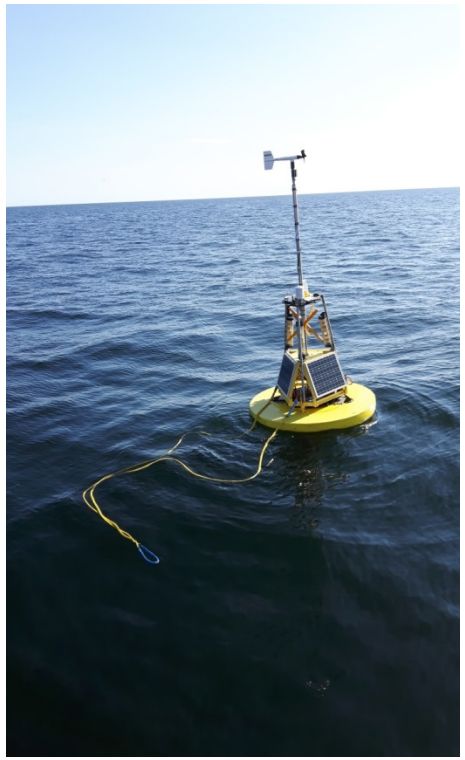


Buoys, ferrybox and fixed platforms

- 2 offshore ocean buoys
- 2 coastal buoys
- 4 Wave buoys
- Ferrybox; Svea & Tavastland
- Bottom rigs

  CTD(DO) & currents





DTU – SLU

- Close collaboration on the DCF fish surveys IBTS, BITS, ASH and UWTV - *Nephrops*

On the RV Dana and the RV Havfisken

Research ships

- U/F Argos 1974-2011
- R/V Franklin
- Coast Guard, KBV001 och KBV002
- R/V Aranda (SYKE-Finland)
- M/S Meri och M/S Aura (Finland)
- New R/V Aranda (July?)
- R/V Svea (2019)


SLU
Science and Education for Sustainable Life
ST-367
SLU
VESSEL NAME
HOMEPORT

De nya möjligheterna med Svea

- Möjlighet att sätta en stor mängd nya instrument som producerar stora datamängder på CTD-rosett, ROTV, väderstation och ferrybox etc.
- Filma botten med droppkamera eller släde för habitatkartering
- Mycket tätare profiler: Syrekartering, Fys-data (NRT) till modeller, klimat
- Kontinuerliga ytvattenmätningar med ferrybox: Klimat, Fys-kem-bio, marin försurning
- Större kapacitet att samla in data om växtplanktonsamhället
- Större kapacitet att drifta autonoma plattformar: flöten, bojar, gliders, undervattensriggar för högupplöst datainsamling i tid och rum. Både realtid och loggad data.
- Mäta strömriktning och hastighet under expedition med skrovmonterad ADCP
- Mycket större kapacitet för gästforskare att följa med och göra sina mätningar parallellt med miljöövervakningen
- Mycket bra meteorologiska mätningar under expedition
- Sea truthing för evaluering av sattelitdata
- Akustisk oceanografi