



Royal Netherlands Institute for Sea Research

Fleet renewal & update on scientific equipment and handling

Presented by Lorendz Boom

Royal NIOZ is part of the institutes organisation of NWO, in cooperation with Utrecht University



Utrecht University



National Marine Facilities

NMF Office (~4 persons)

- Cruiseplanning
- Booking of flight tickets and hotels
- Ship related things (arranging maintenance/external companies, ordering spare parts etc)
- Data collection

NMF Support (~7 persons)

- Maintenance of national pool of scientific equipment
- Technical support during cruises on Pelagia or other research vessels
- Engineering (subframes, new coring equipment, labcontainers)
- Logistics to the ships and (un)loading
- Customs

NMF-Development (~7 persons)

- Engineering (new equipment)
- Electronics and small instruments
- Rarely on cruises
- Software/programming



Fleet renewal

‘Stern’, small fast vessel for coastal areas

- length 14.6m, width 4.2m
- speed 15 knts
- Age 43 years

‘Navicula’, small vessel for coastal areas

- length 26m, width 7m
- Speed 7 knts
- Age 39 years

‘Pelagia’, vessel for both coastal and open oceans

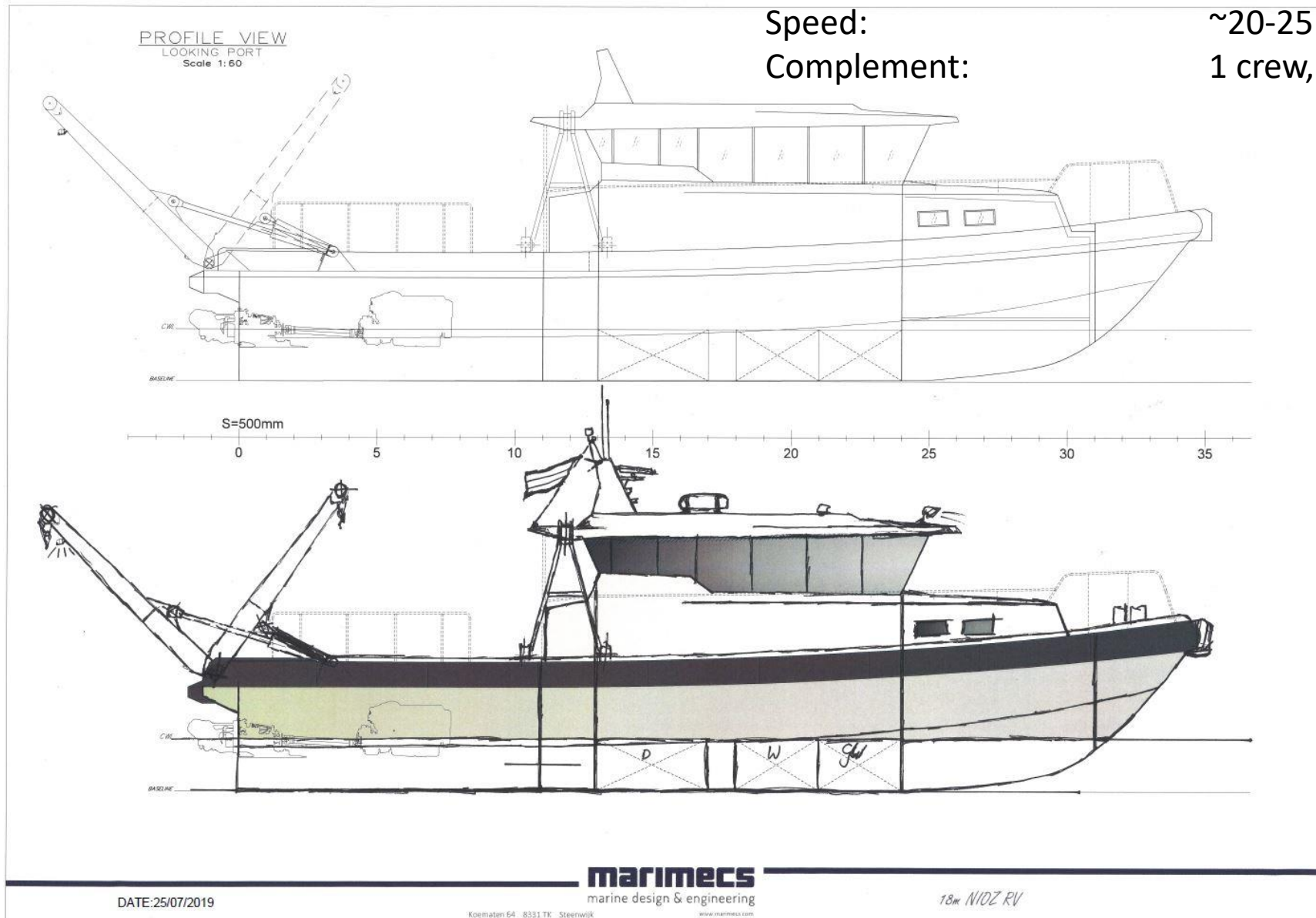
- Length 66m, width 12m
- Speed 10 knts
- Age 28 years





New 'Stern' Artist Impression

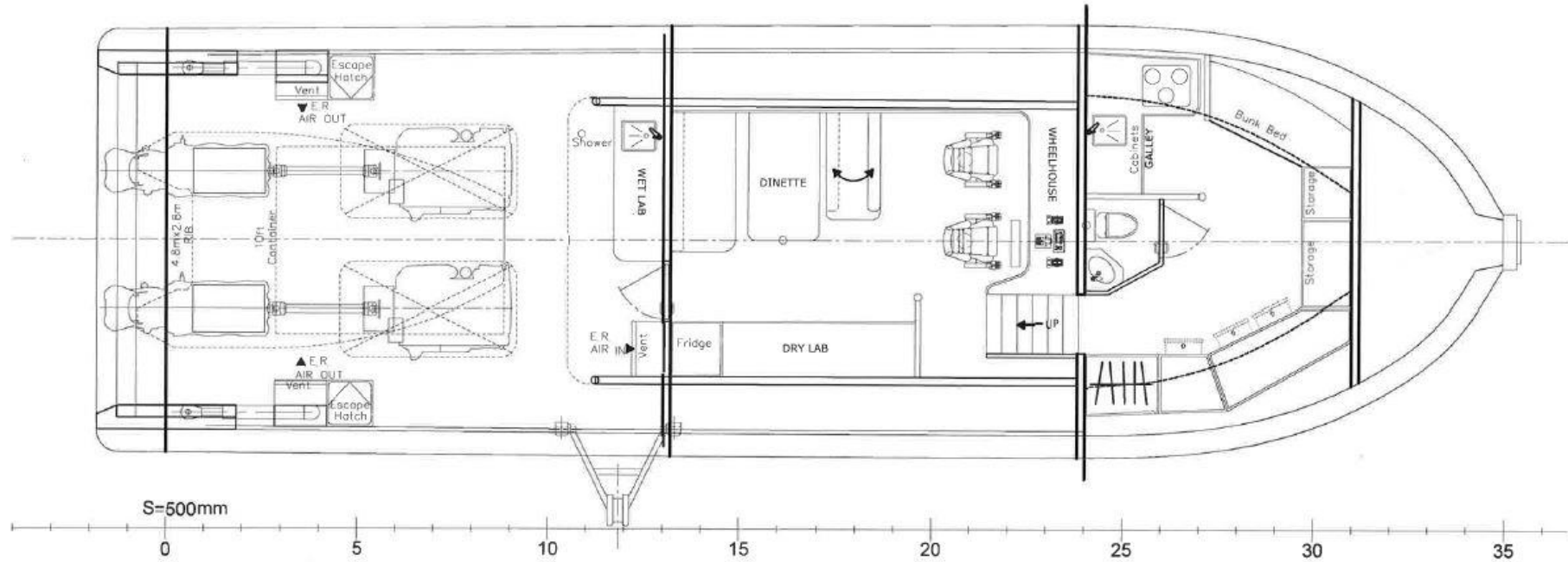
Length over all: 18.00 (m)
Breadth moulded: 7.50 (m)
Speed: ~20-25 (kn)
Complement: 1 crew, 6-8 scientist





PLAN VIEW
Looking DOWN
Scale 1:60

General Arrangement 'Stern'



DATE:25/07/2019

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18m NIOZ RV

Page 1
Plan Stern B



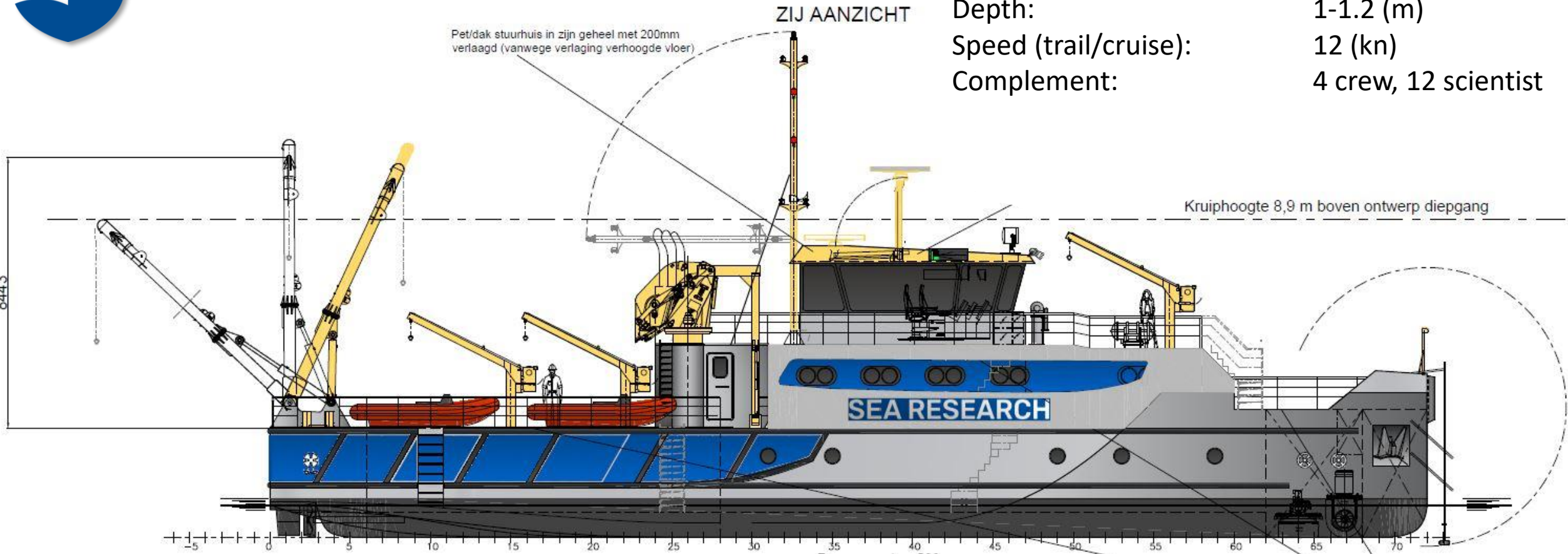
New 'Navicula' Artist Impression





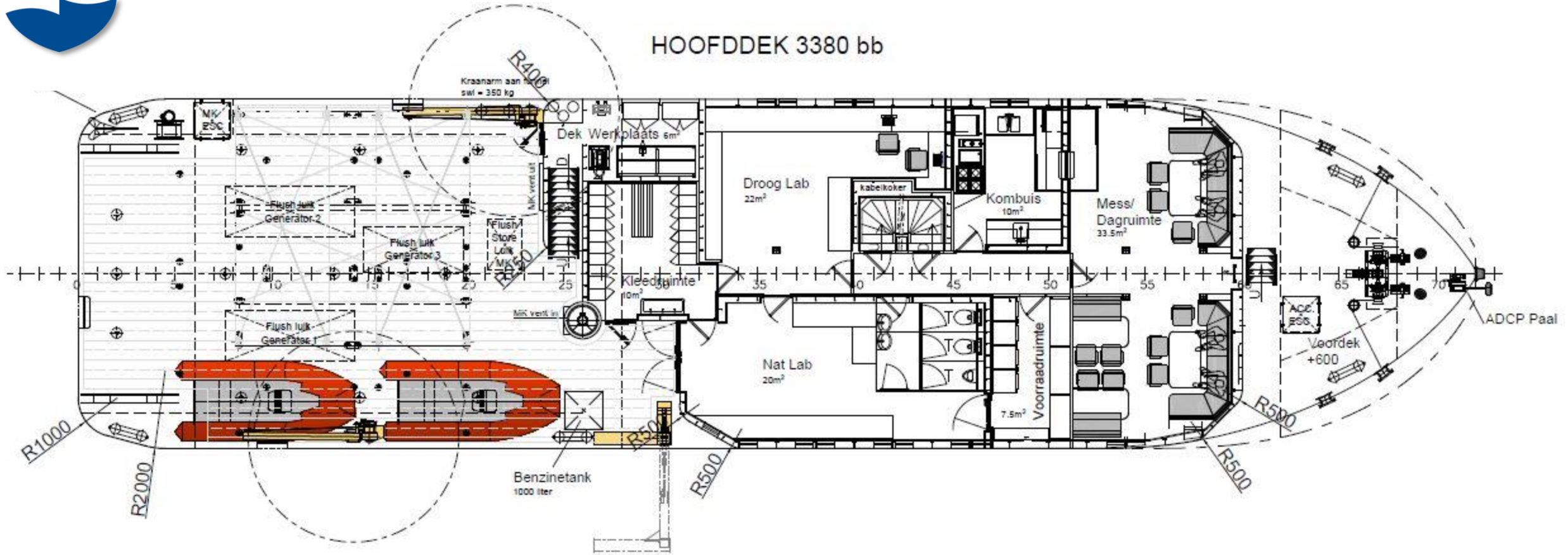
New 'Navicula' at this moment

Length over all:	36.00 (m)
Breadth moulded:	9.00 (m)
Depth:	1-1.2 (m)
Speed (trail/cruise):	12 (kn)
Complement:	4 crew, 12 scientist



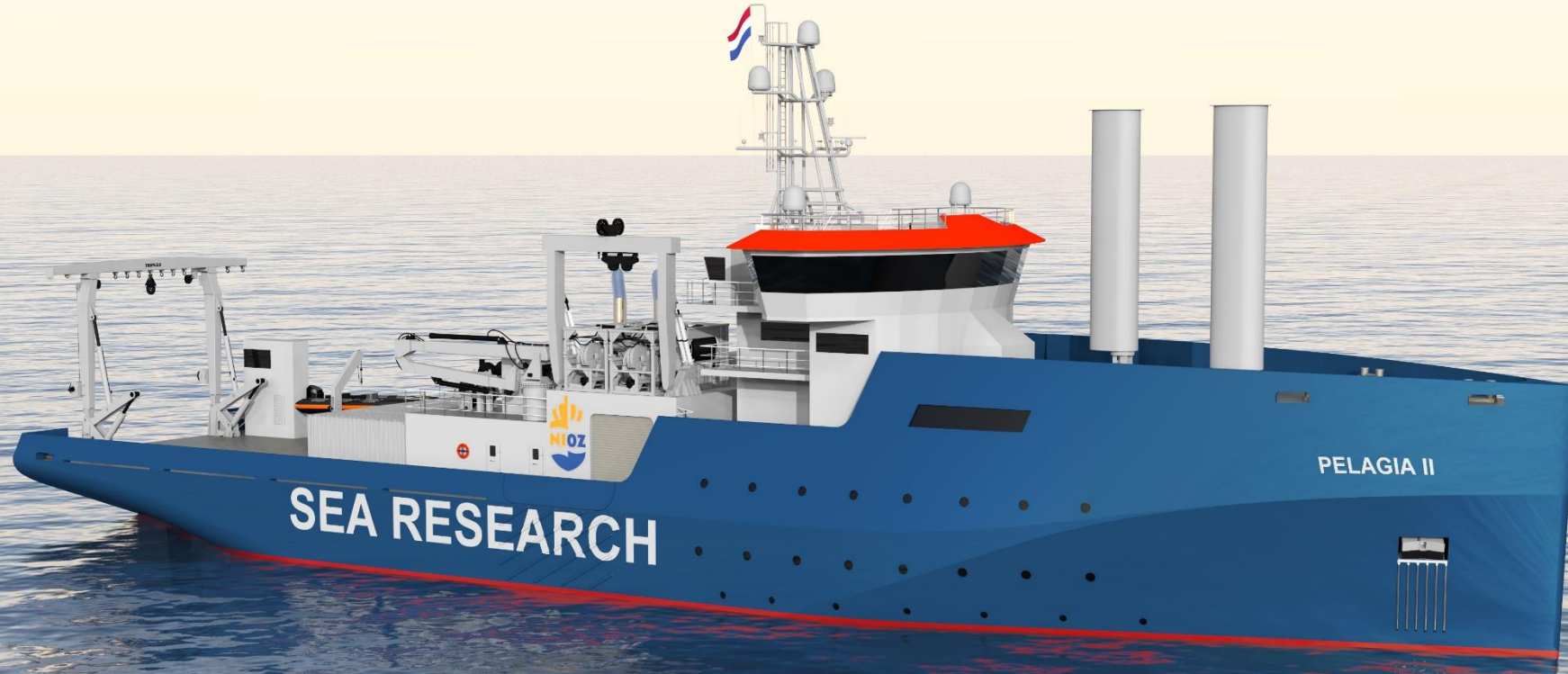


General Arrangement D-deck





New 'Pelagia' Artist Impression





Advantages of the new Pelagia

- Bigger -> longer period at sea with more people onboard
- Capable handling all the OFEG equipment like ROV, AUV, MEBO, ROCKDRILL etc
- Drop keel
- Piston cores up to 30m
- Room for 12 laboratory containers
- Multidisciplinary research





New 'Pelagia' side- and stern view

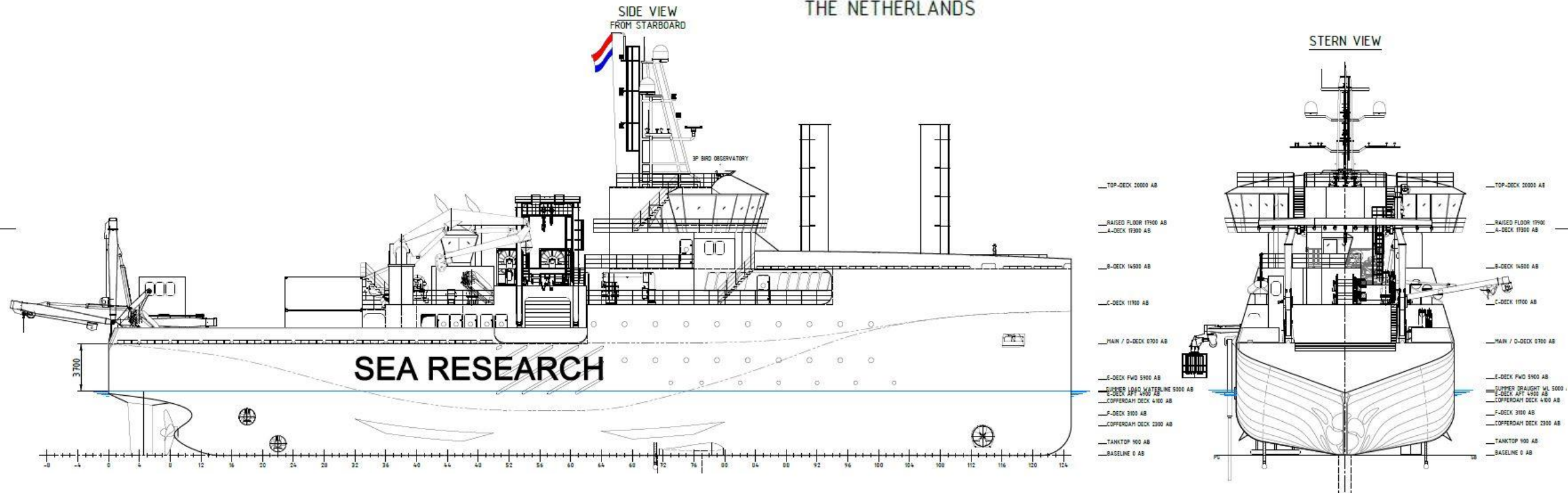
Length over all: 75.00 (m)
Breadth moulded: 17.00 (m)
Speed (trail/cruise): 12/9 (kn)
Complement: 12 crew, 34 scientist

CLASS:

BUREAU VERITAS: CLASS I • •HULL • •MACH, RESEARCH VESSEL,
UNRESTRICTED NAVIGATION • •AUT-UMS • •DYNAPOS AM/AT R,
ICE CLASS 1C, SP49, CLEANSHIP

FLAG:

THE NETHERLANDS





Winches

Side winches:

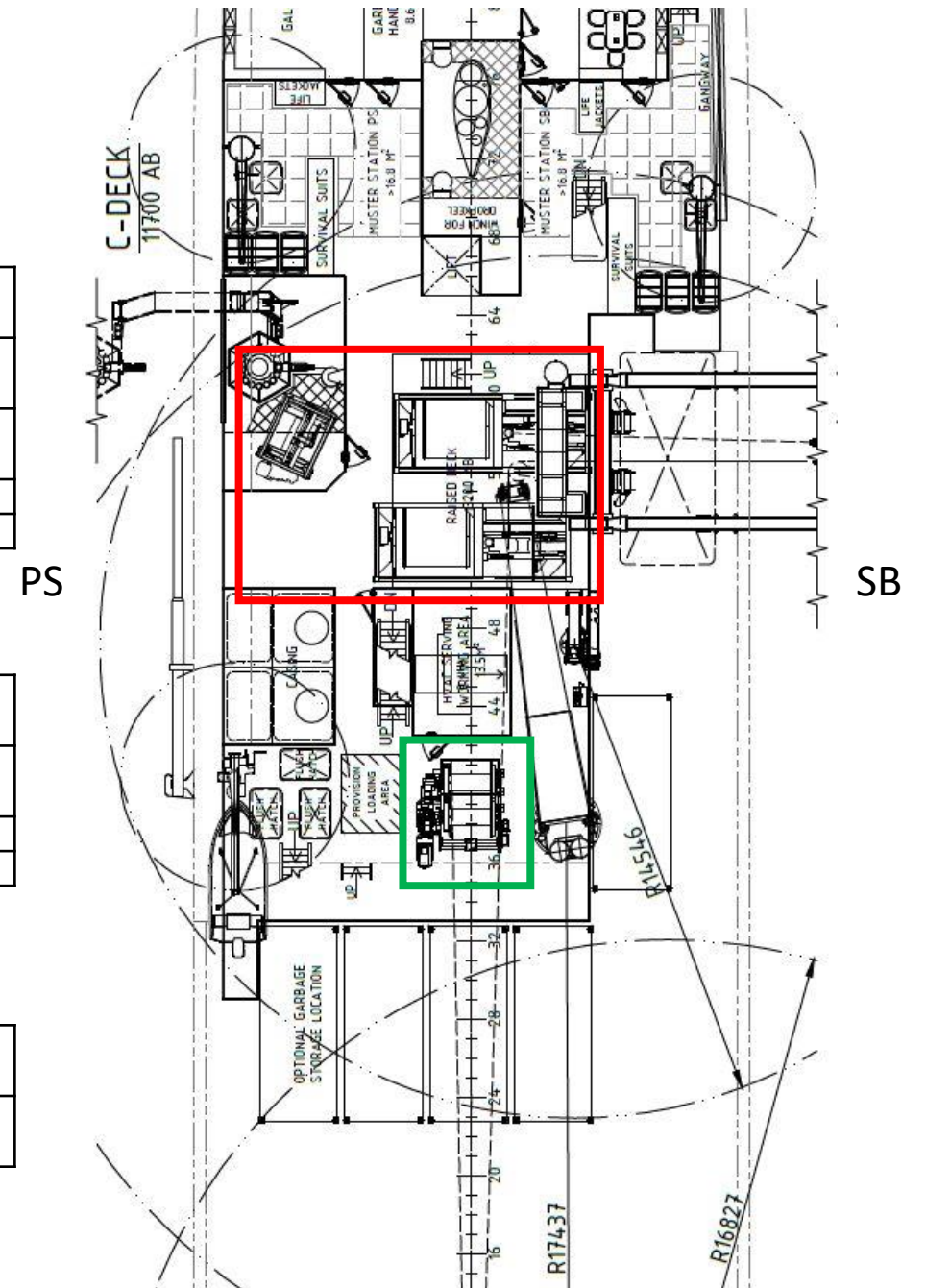
CTD winch	Cable length: 8000m Diameter 11,4mm Steel wire with copper conductors and coax
Deep sea coring winch	Cable length: 8000m Diameter 28mm Synthetic rope (Dyneema?)
Clean Optic Fiber winch	Cable length: 10.000m Diameter 20mm Synthetic rope with fiber optics and copper conductors
2 Auxillary winches	1 on each side of the side frame
Hydrographical winch	Placed next to side frame in direction bow

Stern winches:

CTD winch stern (sleeplier)	Cable length: 8000m Diameter 11,4mm Steel wire with copper conductors and coax
Fish winch (heklier)	Cable length: 8000m Diameter 15-20mm Synthetic rope (dyneema?)
Empty winch	
2 Auxillary winches	1 on each side of the A-frame

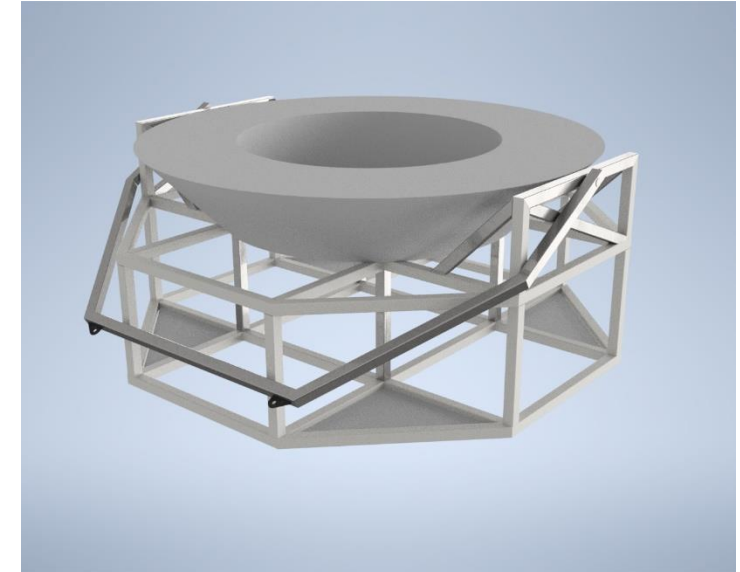
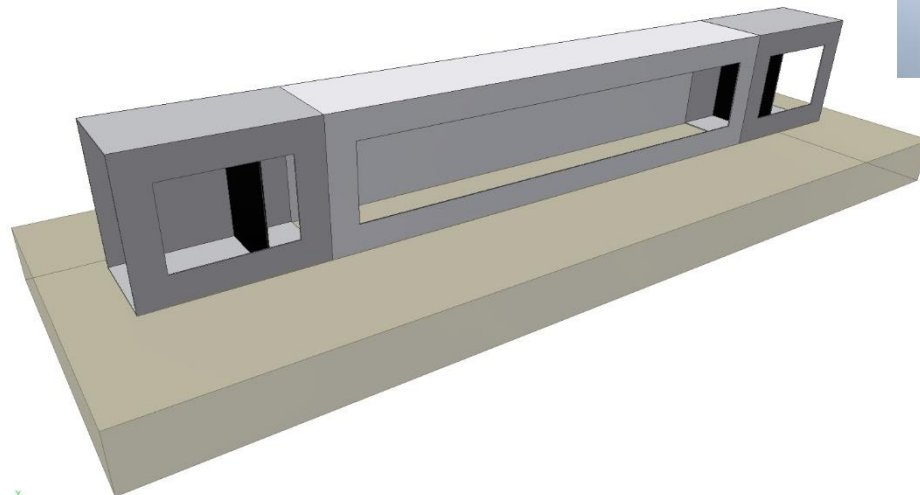
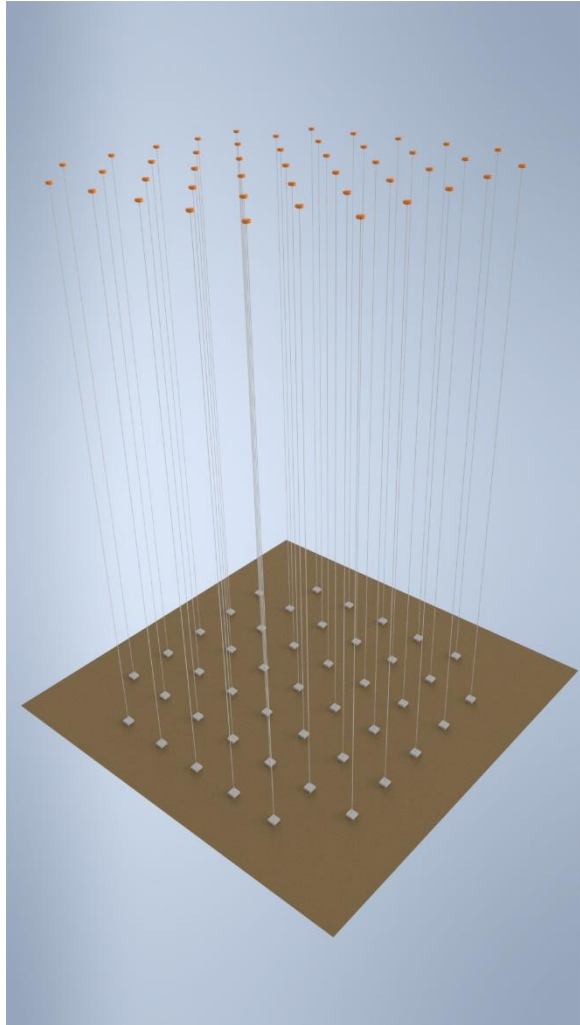
Other winches:

Piston-coring winch	Used for lifting the cradle out of the water, placed at stern. Max cable length 100m Diameter 10mm steel wire
USBL pole winch	Used for lifting USBL pole on side of the vessel in and out of the water. Max cable length 25m 10mm steel wire



Improvements in handling moorings & ongoing NIOZ projects:

- KM3Net 2.0
- NOSE lab
- Flexisub





Changes in handling equipment

Mooring cable: from 9x7 steel wire with plastic cover to 'Dyneema'

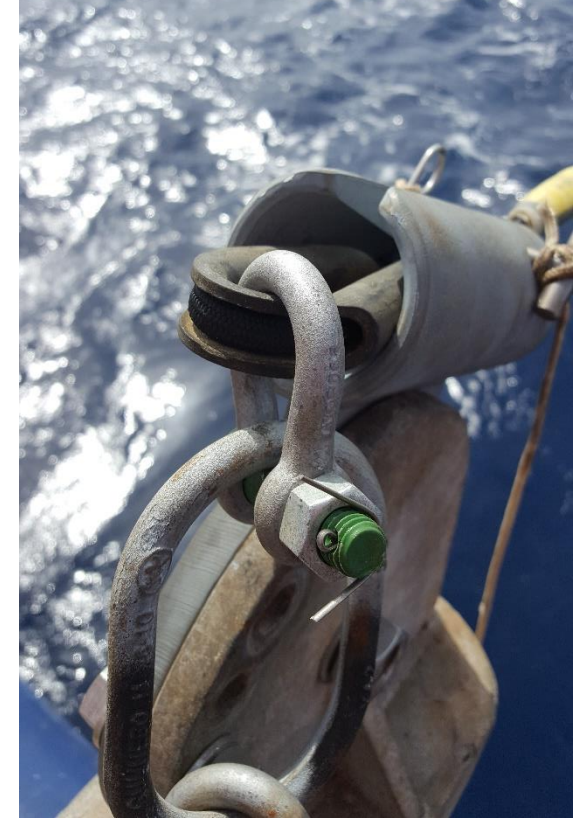
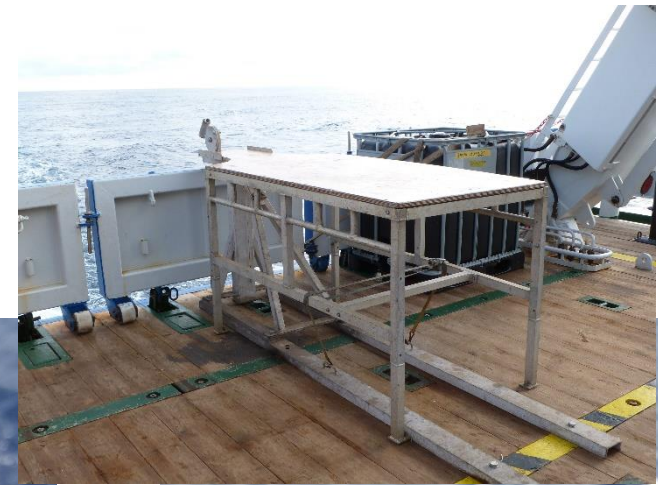
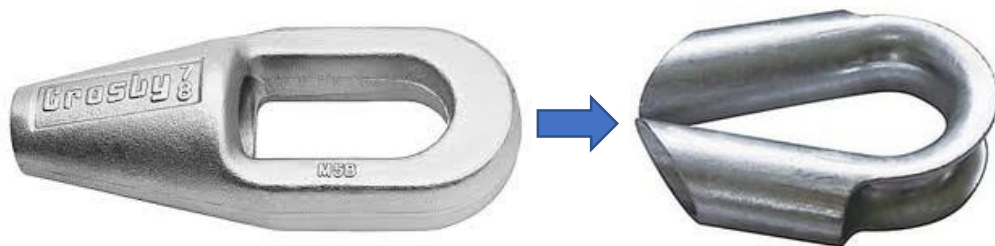
Why Dyneema?

Pro

- Cheaper (reusable)
- Stronger (big sediment traps)
- Easier to work with
- Recycling

Con

- Less easy to terminate
- How to use our 'stopper'?



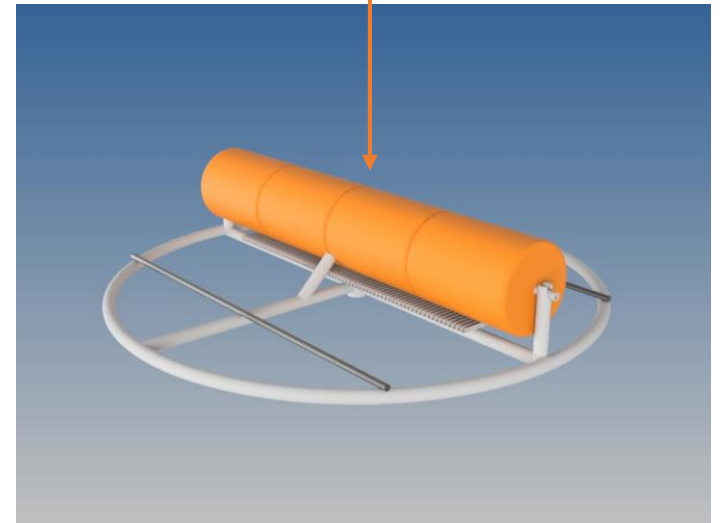
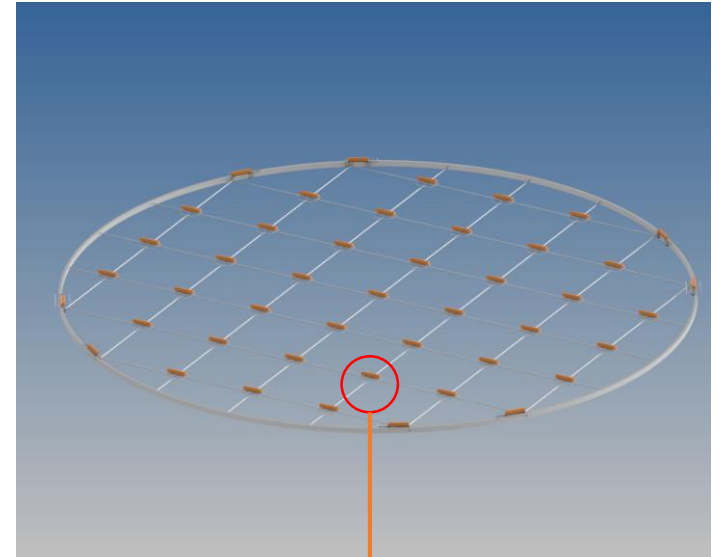
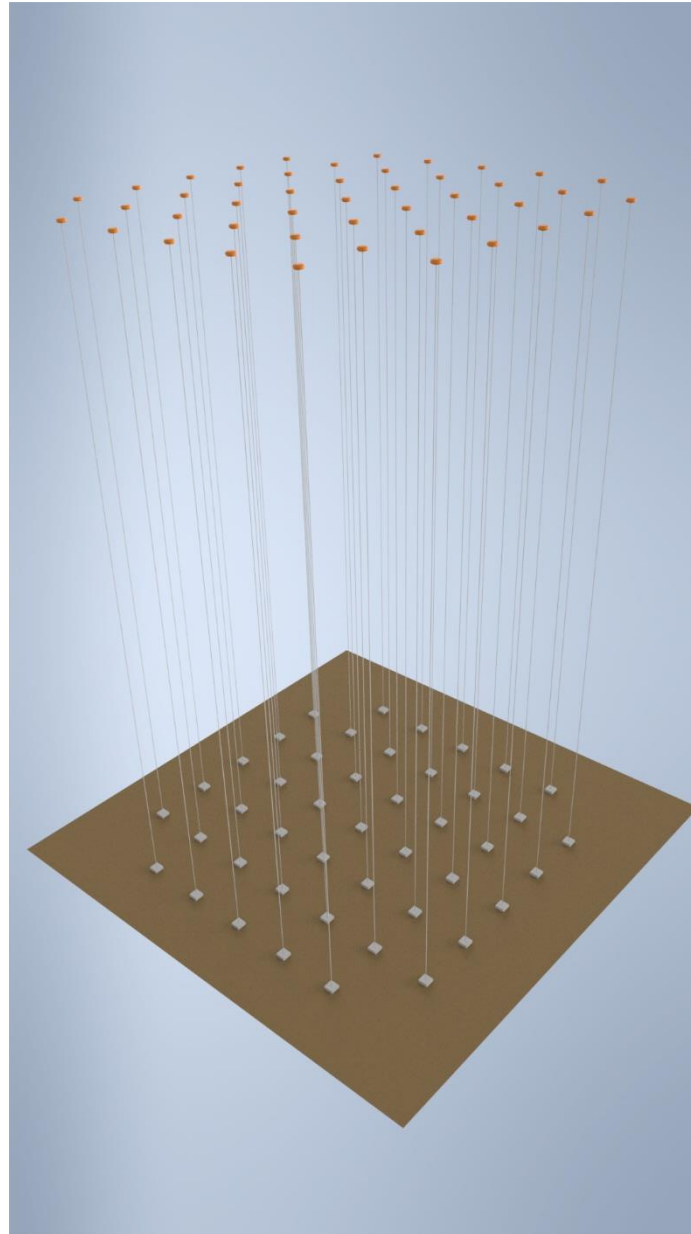
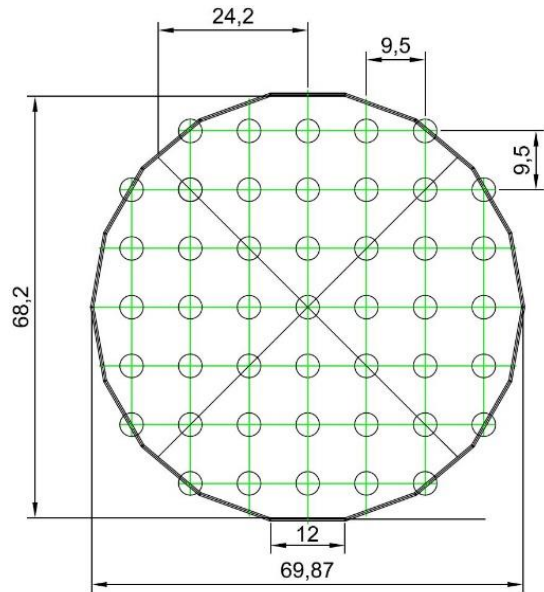


KM3-Net 2

- 2800 thermistor sensors
- 45 lines of 120m
- No acoustic releases
- 2500m water depth

Big questions

- How to deploy?
- How to recover?





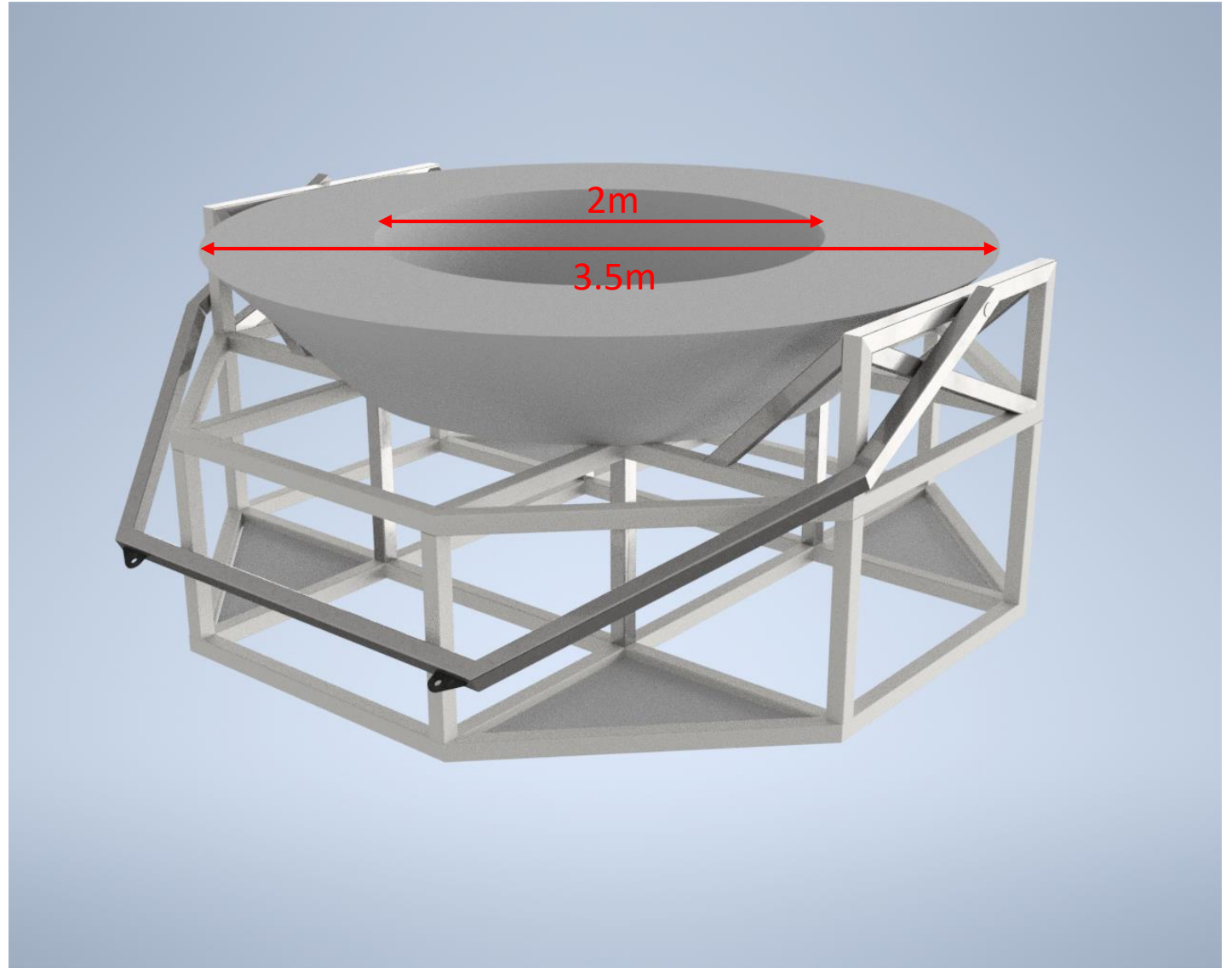
NOSE-lab (North Sea experimental lab)

North Sea experimental lab to facilitate large scale, long term manipulative field research.

Growing interest in understanding the factors driving biological development in marine protected areas and on- and near off-shore constructions such as wind farms.

Requirements:

- Diameter circular box 2m
- Depth circular box 0.5m
- Flat surface around box 0.5m
- Distance from seabed to box 1m
- At seabed for ~6 months
- Easy to recover





Flexi-Sub

Designing a field flume capable of generating an oscillatory motion that mimics the near bed motion of shallow water waves

L_{flume}	6m
L_s	1.3m
$L_{measurement}$	2m
$W_{paddle} * h_{paddle}$	0.4*0.6m
u_{max}	2m/s

Table 2, Flume dimensions used in the initial power calculation.

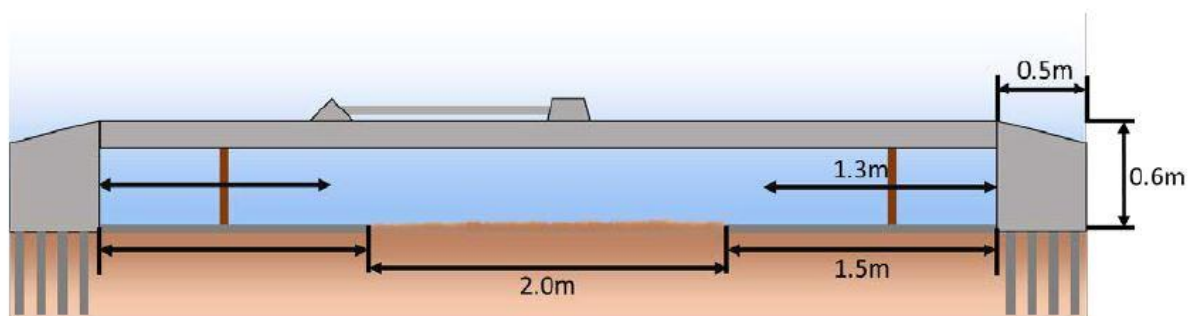
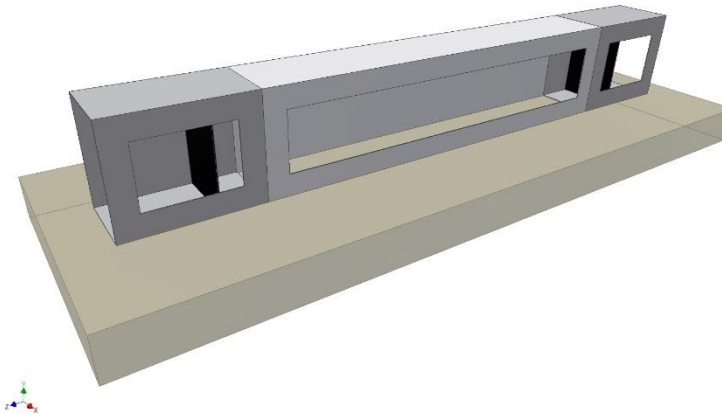


Figure 6, rough scaled sketch of field flume design.

Small test models





Any questions??