

FIG
2018
ISTANBUL



**Presented at the FIG Congress 2018,
May 6-11, 2018 in Istanbul, Turkey**

6-11 May 2018

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XVI FIG Congress 2018



**EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:
ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES**

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siNafa – Safety Navigation for Shipping

- Dirk Kowalewski
- Frank Heinen

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Overview

Project Partner and Funding

Motivation

Two different vessels

Routes and results

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Project Partner and Funding

Project costs 1.6 Mio. Euro



Founder and Leader



other Project Partner



Project executing organization and funding



Bundesministerium für Wirtschaft und Energie

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Motivation and Rules 6 DOF System



- navXperience develop the hardware and calculate the positions of the three antennas
- TU Berlin calculate the motion and acceleration for present and for the future
- Precise GNSS System for surveying vessels
- Calculate the acceleration at every point for passenger vessels
- Measure the liability of container vessels in the life time
- Calculate a horizontal helicopter platform



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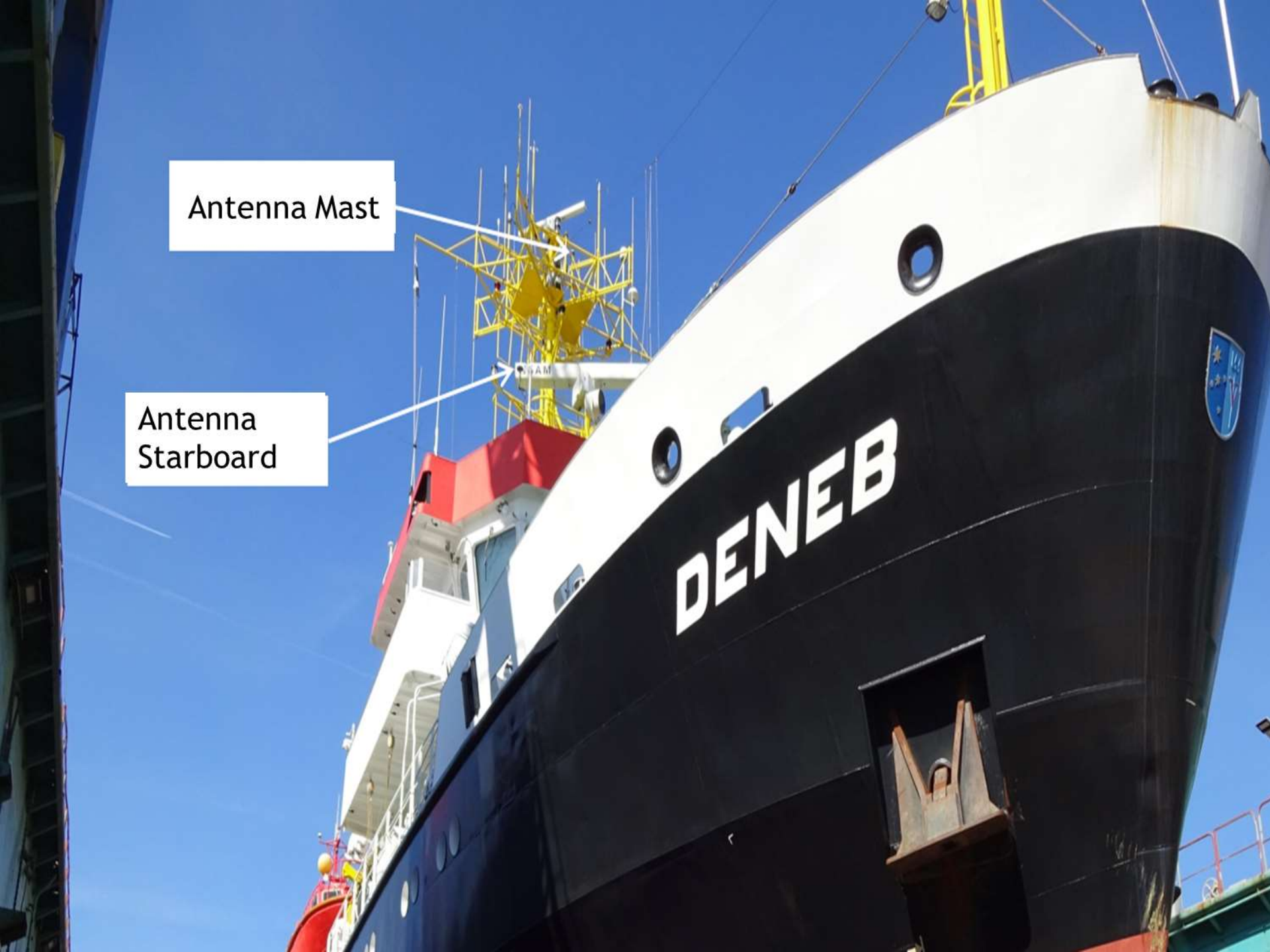
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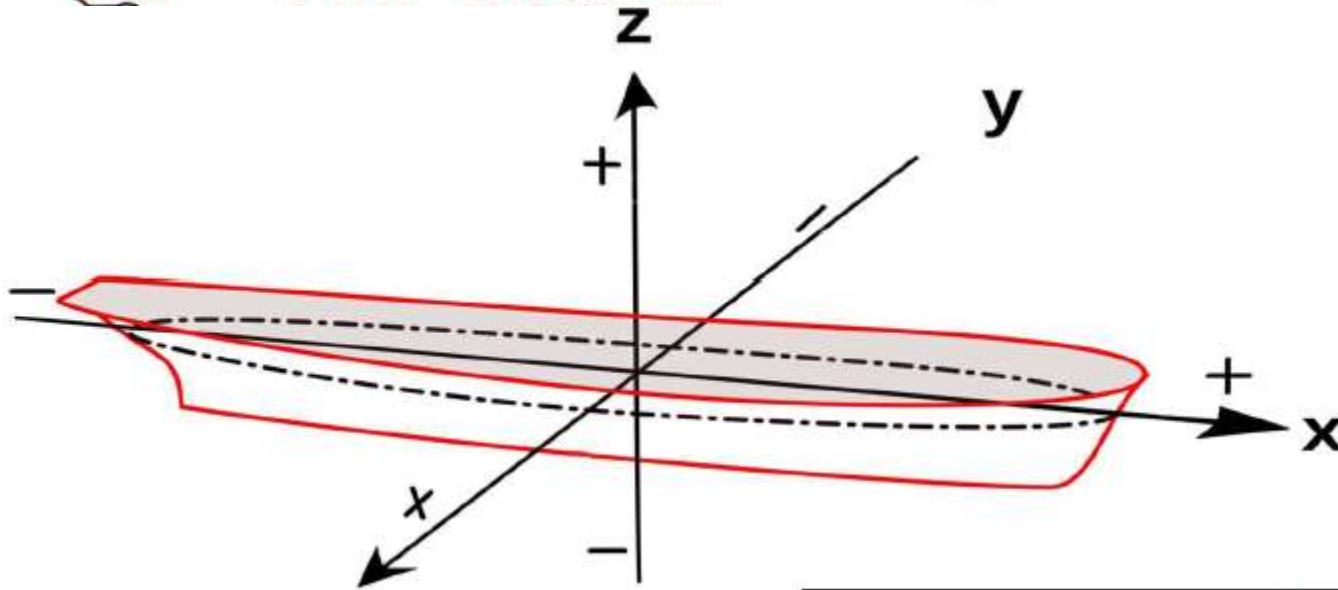


Antenna Mast

Antenna
Starboard

DENEBO





Punktnummer	X in m	Y in m	Z in m
GNSS - Antenne	4.358	-1.099	22.100
Fächerlot Mitte	3.028	-1.921	-4.129
NavXperience port	12.980	-3.287	11.976
NavXperience starboard	12.892	3.645	11.945
Sidescan Stempel	4.554	-1.000	-4.077
Kongsberg Combi			
Arbeitsdeck starboard	-23.888	5.038	3.015
Arbeitsdeck port	-23.902	-5.001	3.052
Arbeitsdeck work	-18.083	5.493	3.011



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Basle Express



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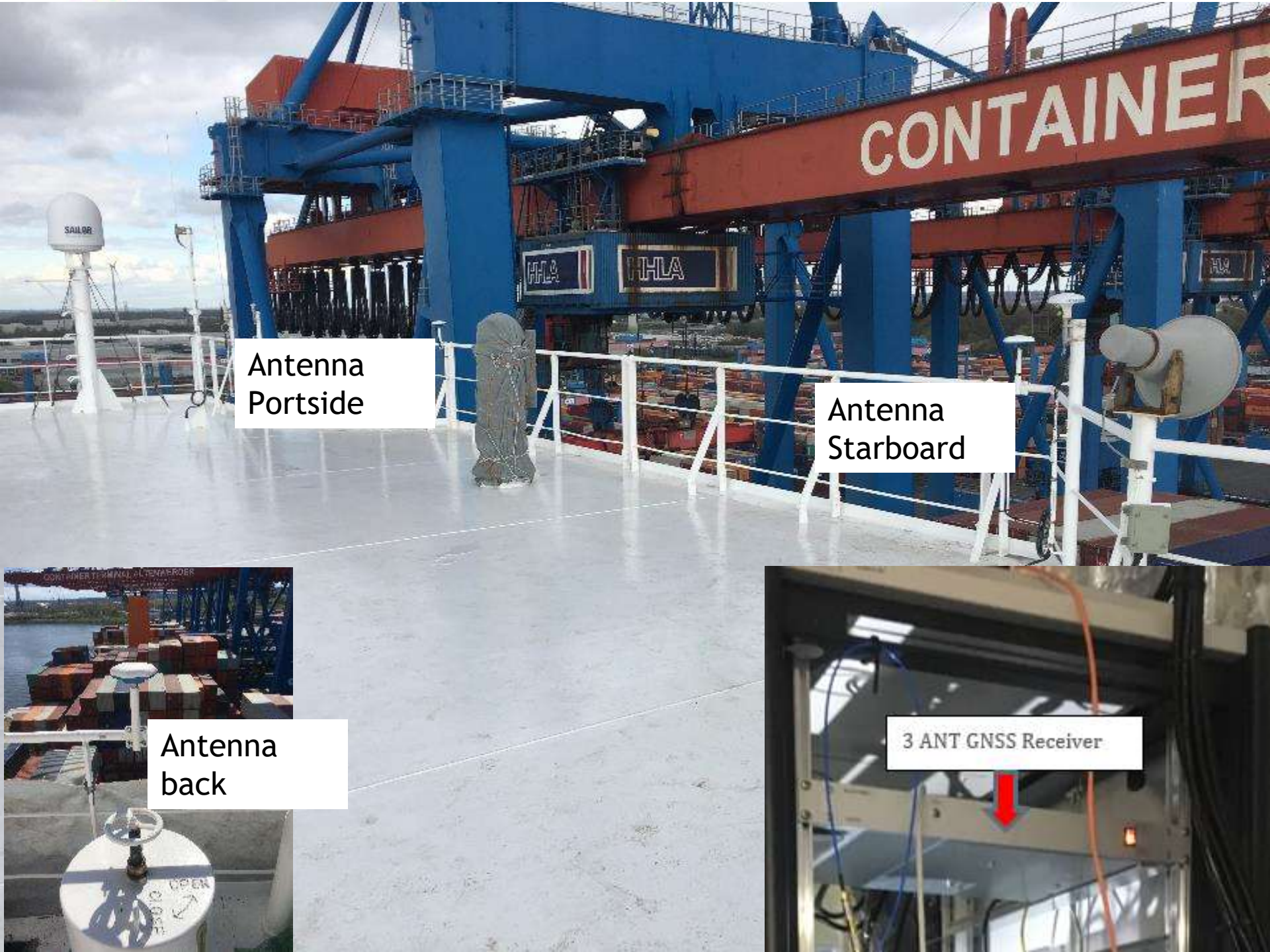


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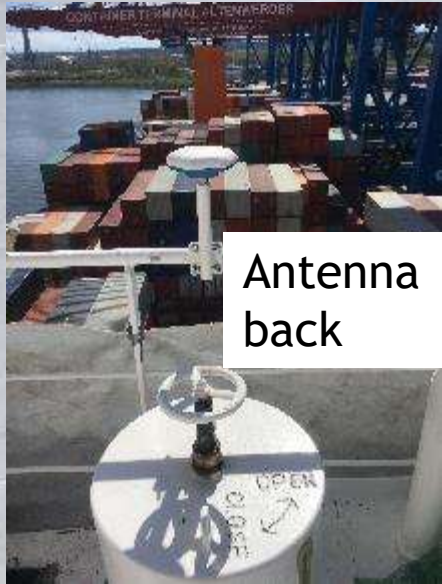
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Antenna Portside

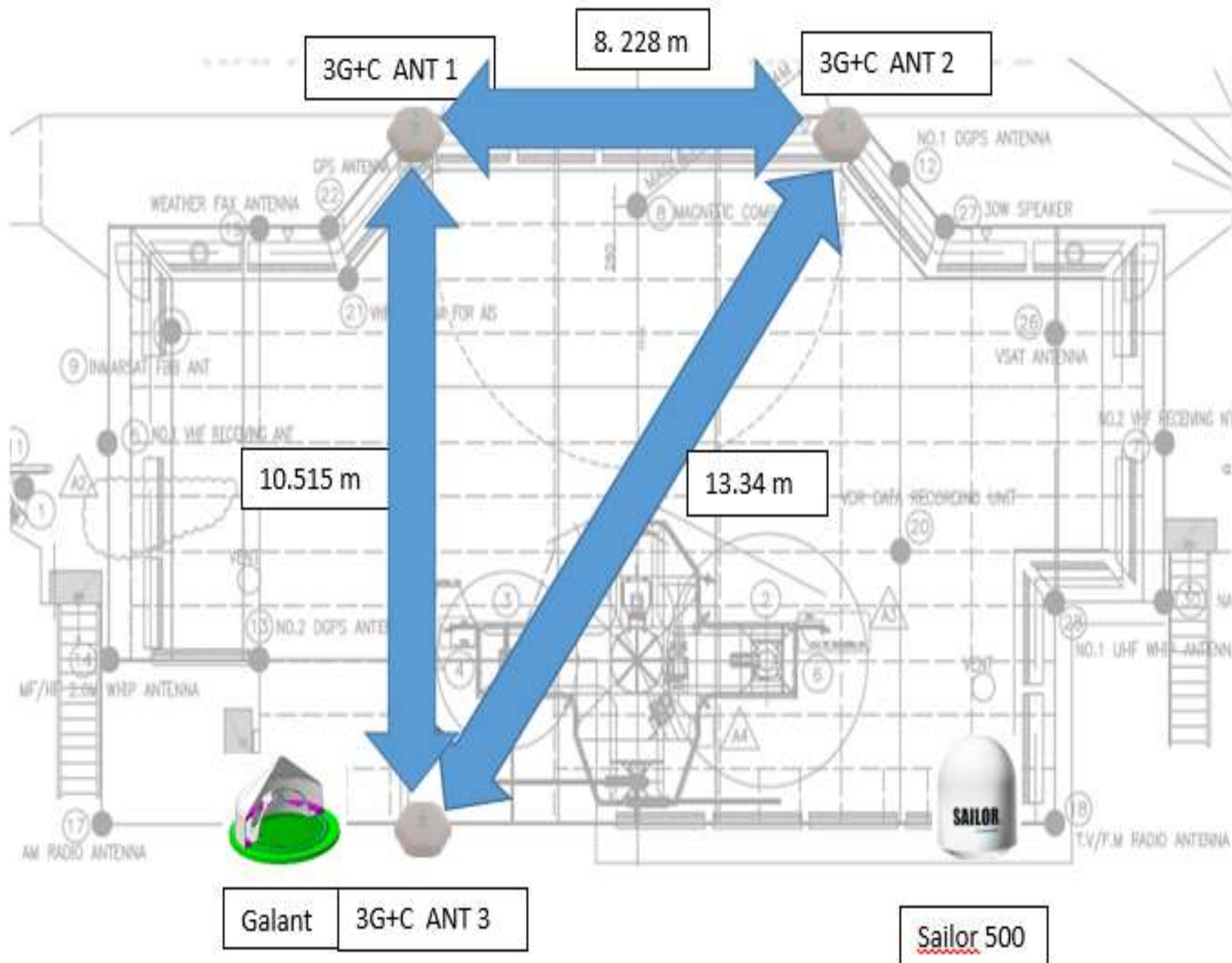
Antenna Starboard



Antenna back

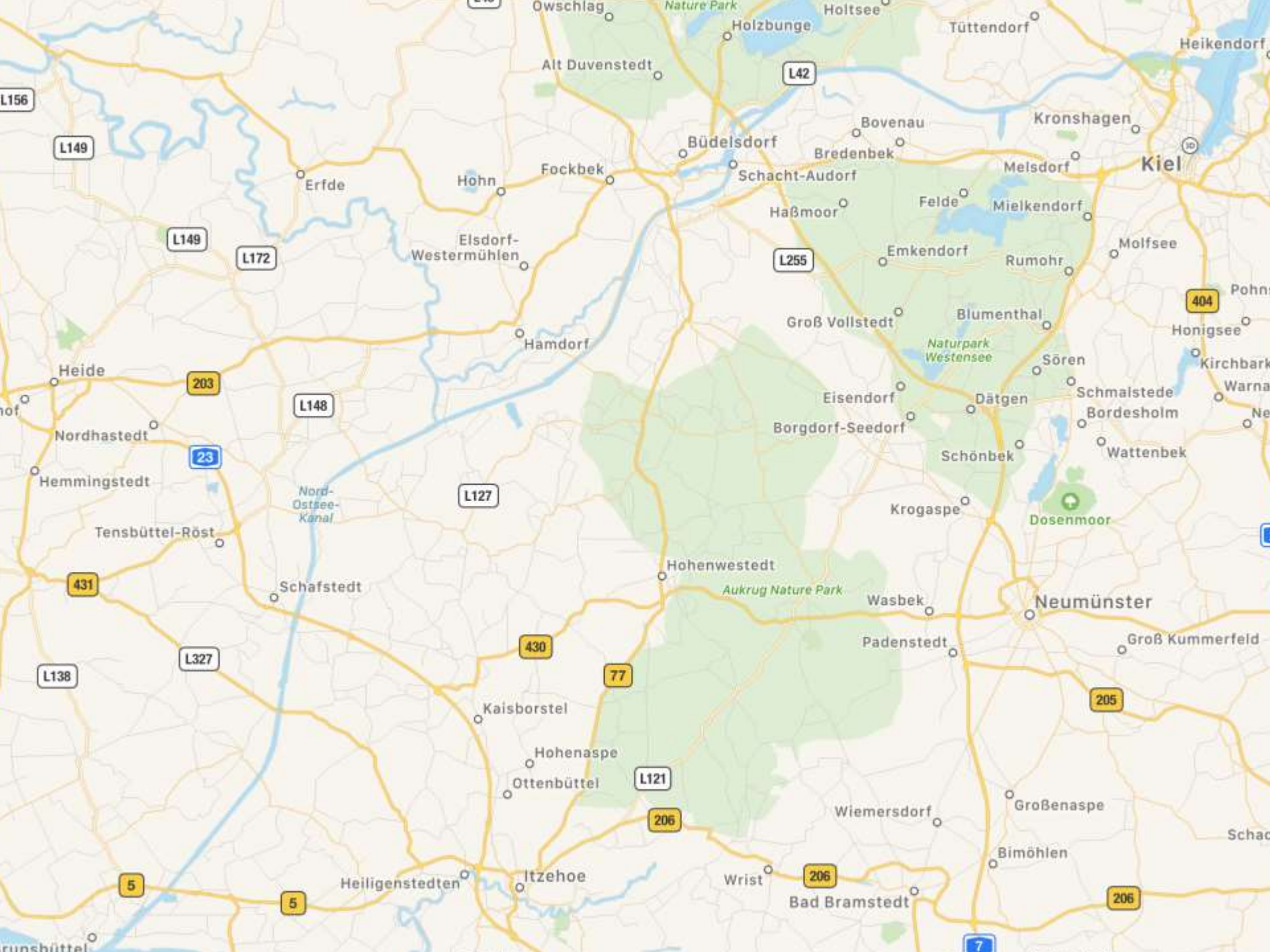


3 ANT GNSS Receiver



Results

- navXperience synchronized 3 OSR (open source receiver) on one main board and get a higher accuracy for the moving baselines and the positioning
- The accuracy of the angle and positioning is in the specification. 0.05 for the angles and 3 cm in delta altitude
- Next steps are test drive with Dneb (surveying vessel) at 22th of May 2018 compare with an IMU
- The project ends in May 2018



L156

L149

L149

L172

L148

L127

L138

L327

5

5

L42

L255

430

77

L121

206

206

205

206

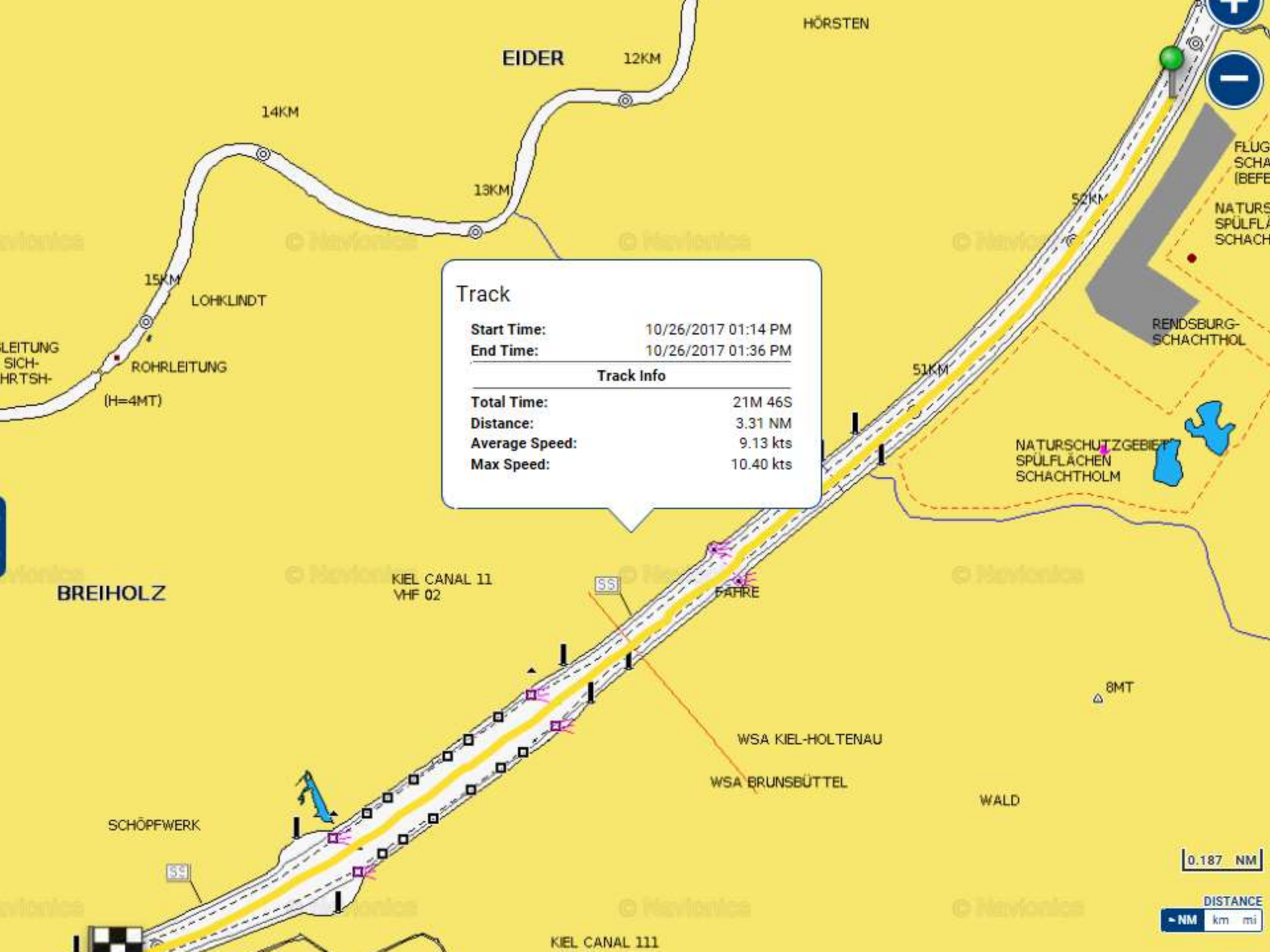
404

203

23

431

7



Track

Start Time: 10/26/2017 01:14 PM
End Time: 10/26/2017 01:36 PM

Track Info

Total Time: 21M 46S
Distance: 3.31 NM
Average Speed: 9.13 kts
Max Speed: 10.40 kts

0.187 NM

DISTANCE
 - NM km mi



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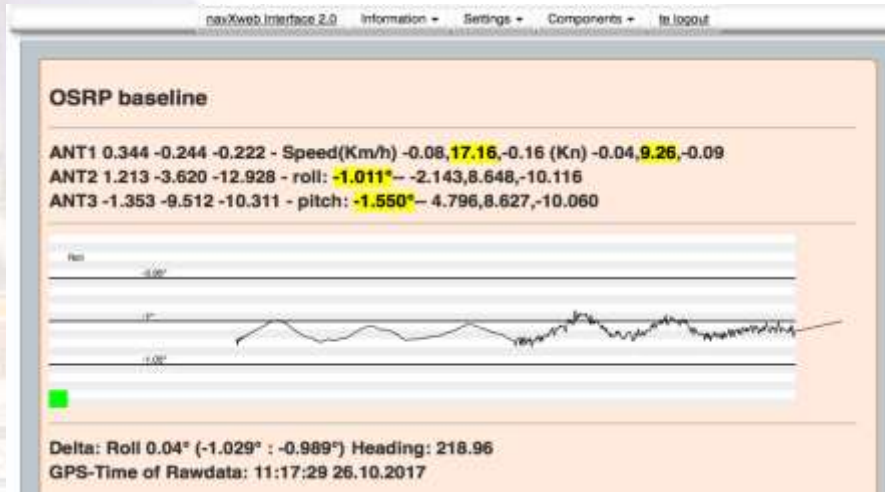
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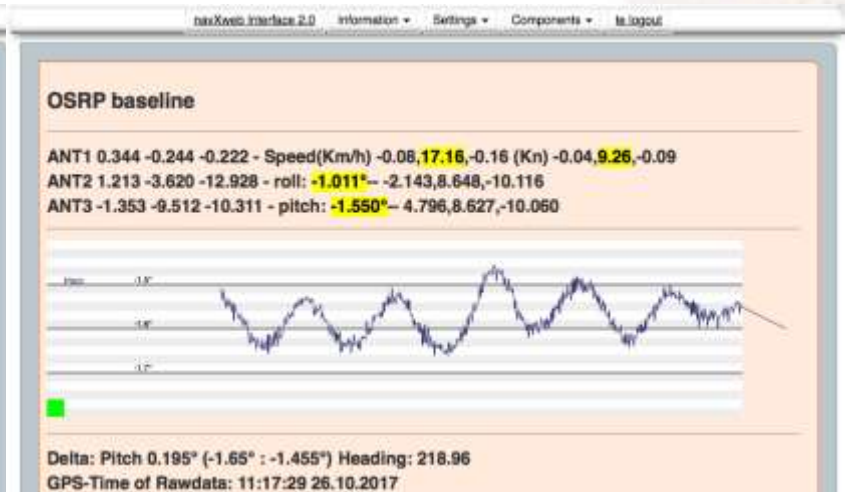
In the Channel

Roll



Scale 0.05°

Pitch



Scale 0.1°

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Measurement System (1)

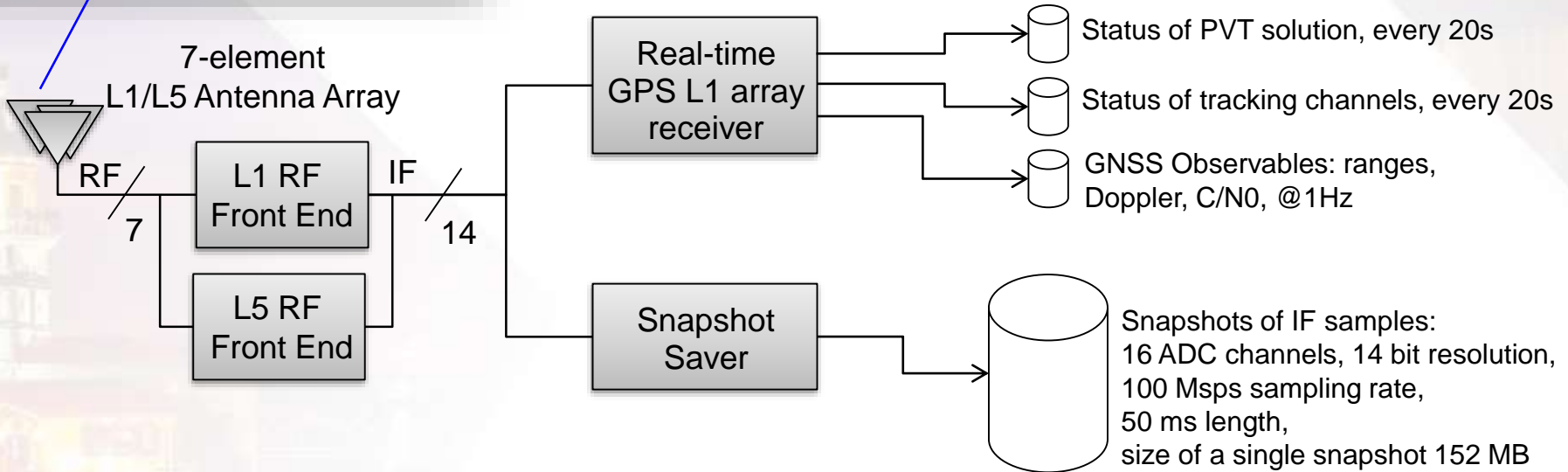


Source: vesselfinder.com

~45 m

The carrier is a container ship of the Post-Panamax class:

- length 366 m
- width 48 m

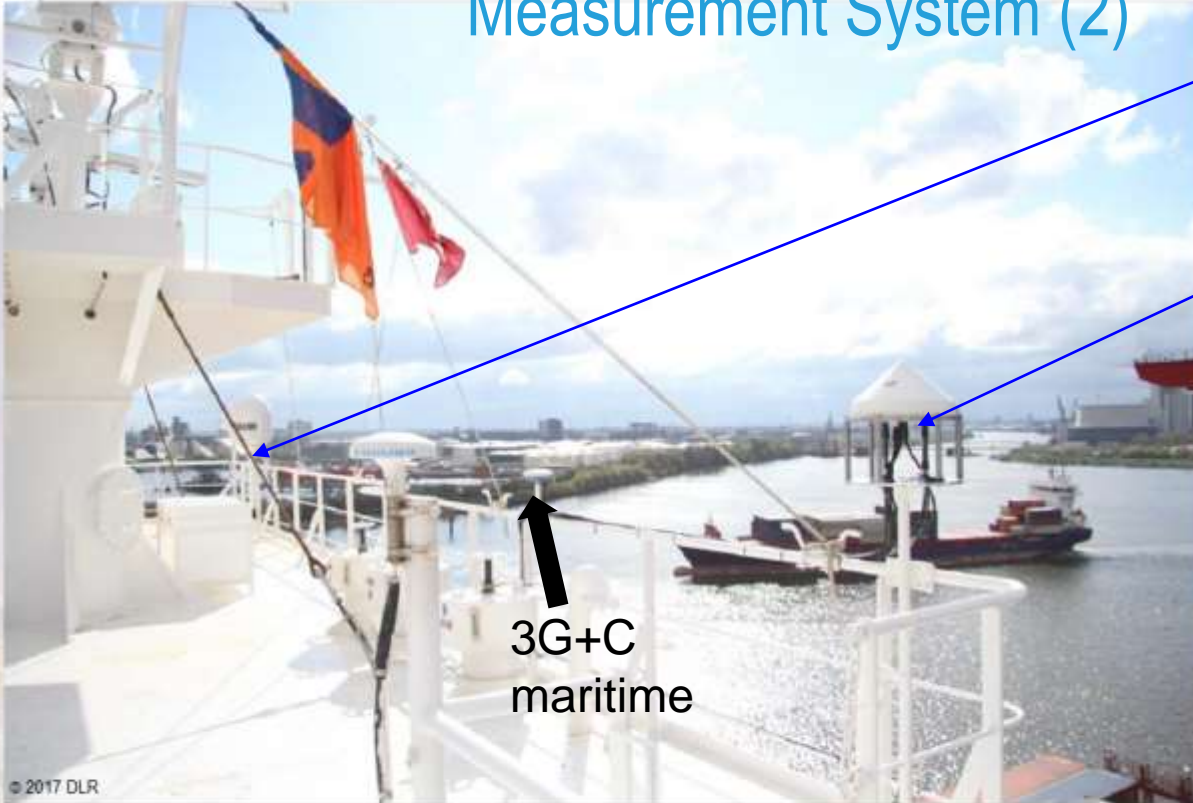


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Measurement System (2)



Antenna of a satellite communication terminal (Inmarsat)

DLR array antenna

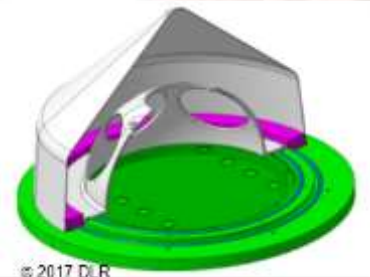


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Route of the container ship during the measurement run



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Results for safety shipping

- The DLR find a lot of Jamming event
- Most of them are only for a short time
- One strong event, but no influence for the navigation equipment or the 3 Ant- GNSS Receiver from navXperience

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Raytheon

Anschütz

Motivation and Role from Raytheon Anschütz

- Bridge integration of the whole System
- Combine the new Gyro 30 MF with the measurements from navXperience and the DLR
- Testing onboard the Basle Express

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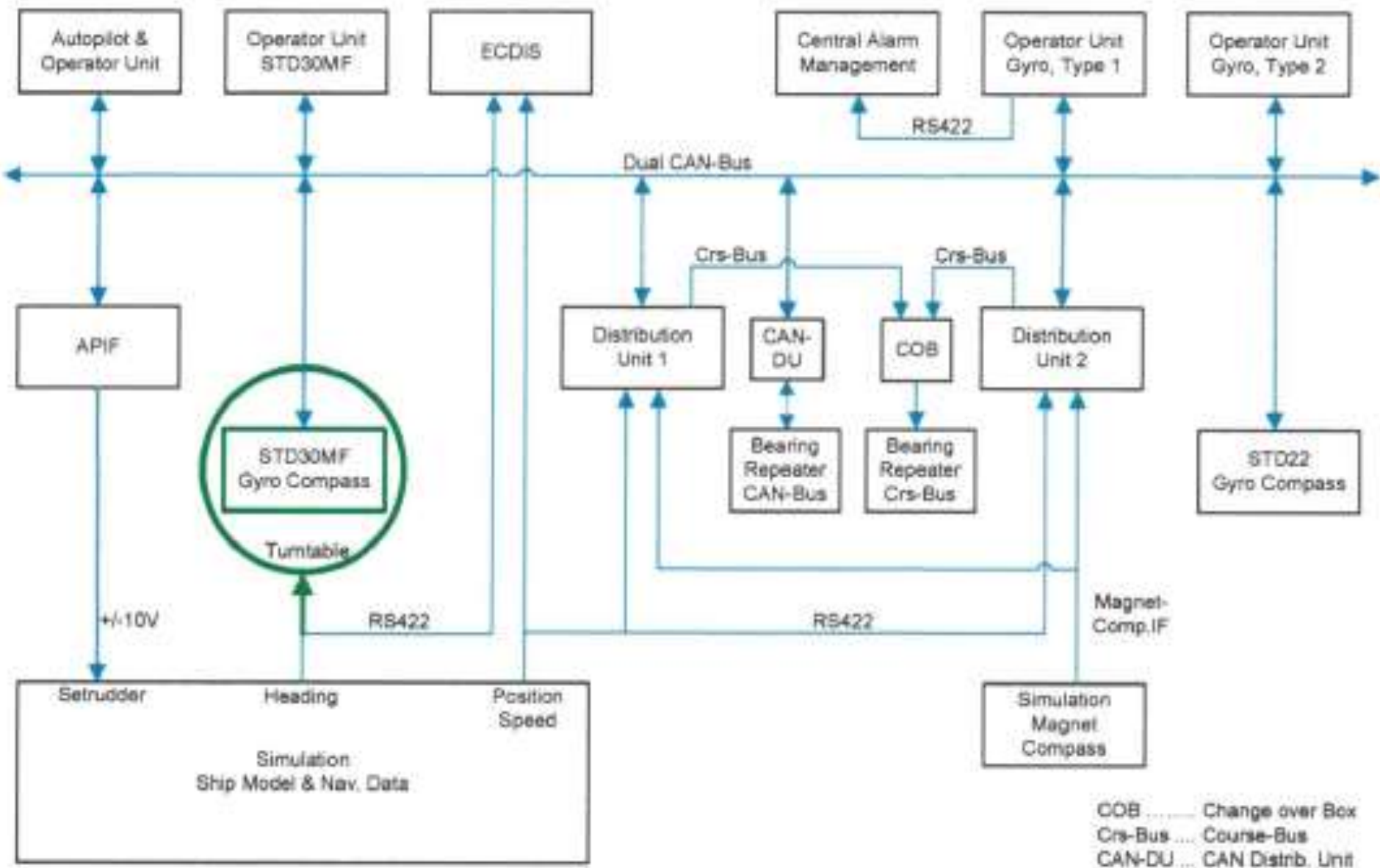


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Raytheon
Anschütz

Test equipment
on the Basle Express



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Thank you very much for your attention

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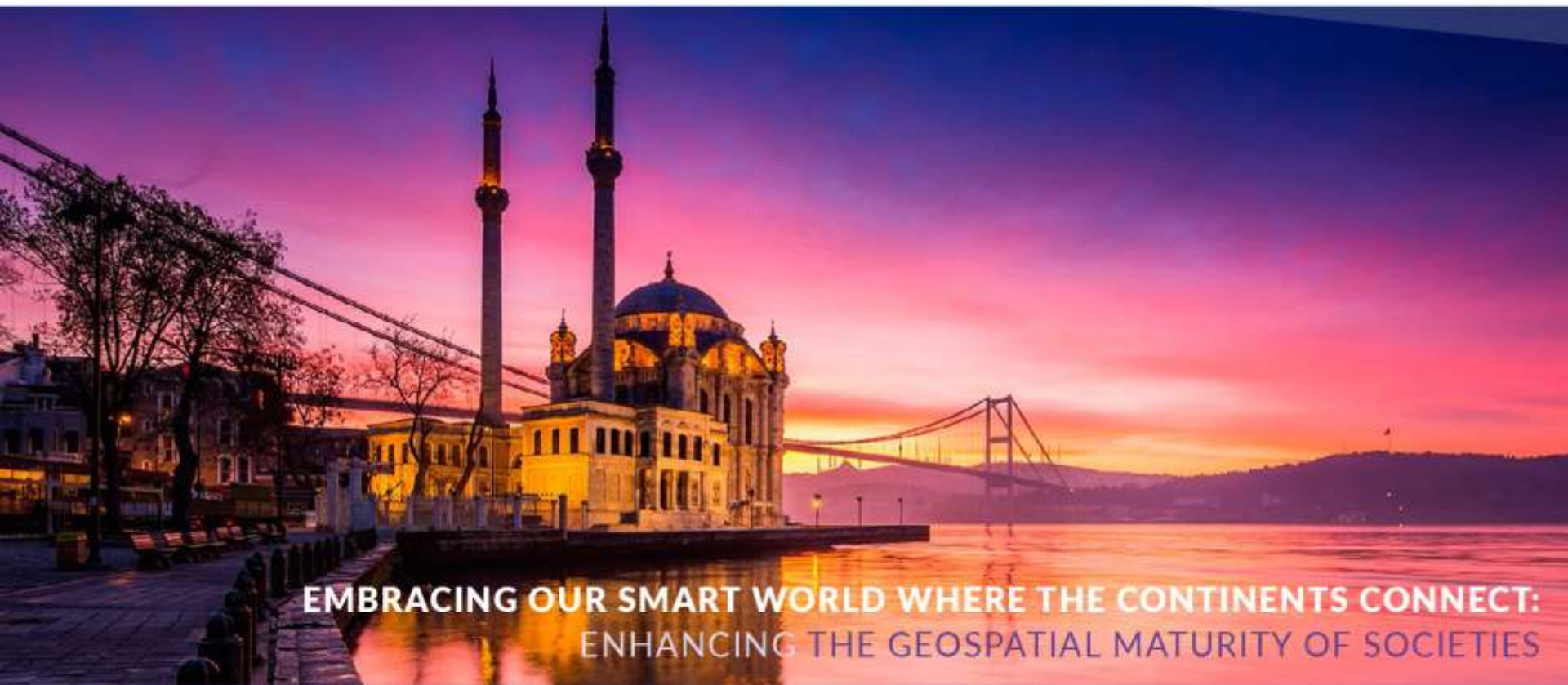




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