Navtech

AD NAVIGATION

Navigation technology for the Modern Mariner

Specialists in Precise GPS Navigation

DC200 RTK

MGNSS L1/L2 RTK 1cm Receiver

2004

ADQ1

Wireless AIS Pilot Plug

2006

ADX DUO

100% Wireless 2 Pod PPU

2015

ADX XR2

100% Wireless 3 Pod PPU Dutch/Belgium Colab

2020

2002 2004 2006 2008 2012 2014 2016 2018 2020

2002

Founded

Sarpsborg Norway

2005

ADX PPU

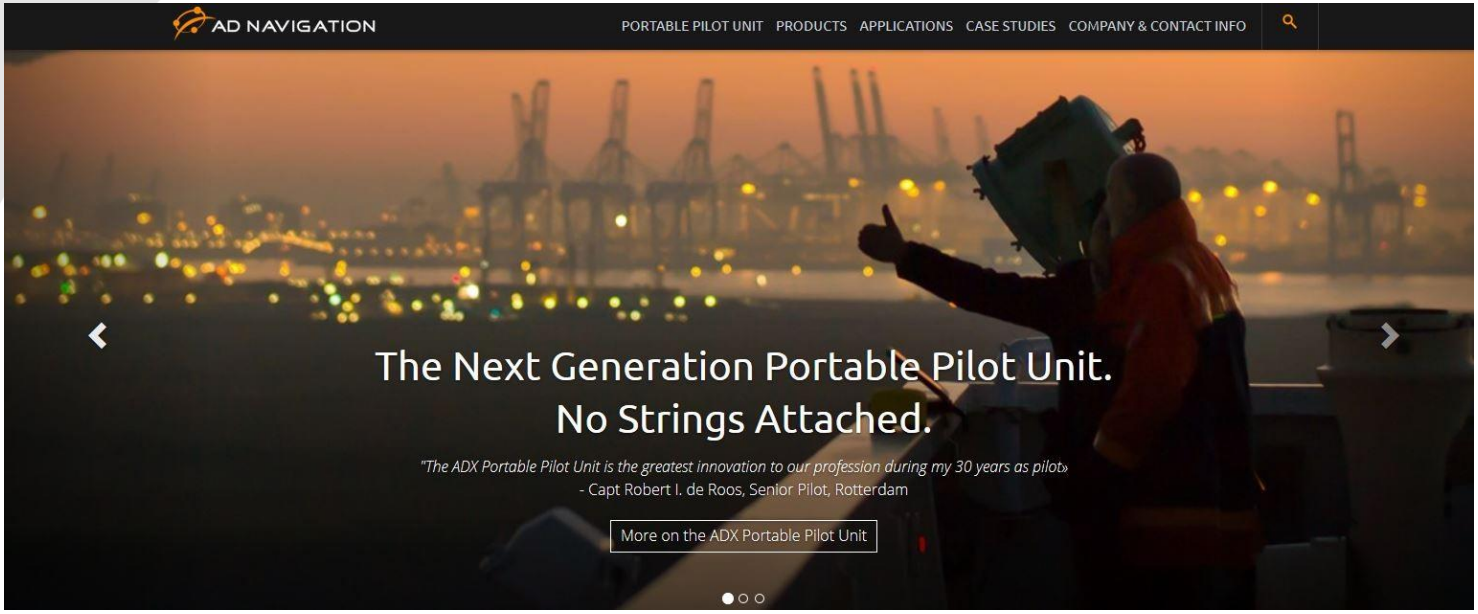
1st MGNSS L1/L2 RTK PPU

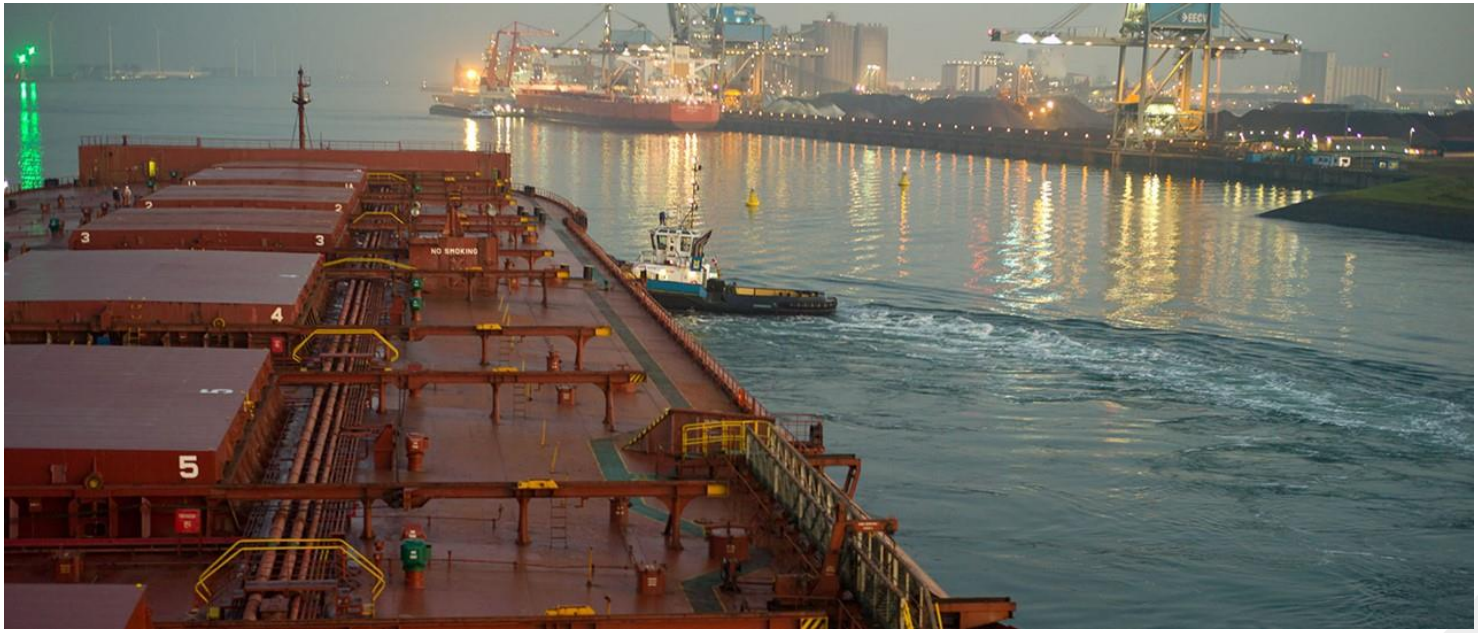
2011

ADX XR

100% wireless lightweight PPU Dutch/Belgium Colab

AD NAVIGATION


AD NAVIGATION
PORTABLE PILOT UNIT
PRODUCTS
APPLICATIONS
CASE STUDIES
COMPANY & CONTACT INFO
The Next Generation Portable Pilot Unit.
No Strings Attached.
"The ADX Portable Pilot Unit is the greatest innovation to our profession during my 30 years as pilot»
- Capt Robert I. de Roos, Senior Pilot, Rotterdam
More on the ADX Portable Pilot Unit


NO SMOKING

Loodswezen

Nederlands Loodswezen – 460+ Pilots
Busiest port in Europe
11th busiest in the world - > 14,350,000 TEU 2020

PORT OF LONDON AUTHORITY

MJA MARSEILLE-FOS

Jacobsen Pilot Service
2nd busiest seaport in the United States

PORT OF VENICE
WHERE THE EARTH REVOLVES AROUND THE SEA

PILBARA PORTS AUTHORITY

TasPorts

PORT OTAGO

NORTH QUEENSLAND BULK PORTS CORPORATION

POSEIDON SEA PILOTS

NAPIER PORT
Te Herenga Waka o Ahuriri

KYSTVERKET

EXCELERATE ENERGY

Comments

Most relevant

Capt. Grant Livingstone FNI • 1st
Pilot Ports of Long Beach and Los Angeles
4d

AD. Navigation XR 2 is the best PPU system in the world today. We pair with SeaIQ software. Amazing. Accurate. Simple. The best part? Remarkable support from AD Nav. Thanks to our Rotterdam pilot colleagues for introducing us to AD Nav. We owe you one!

Like • 4 | Reply • 2 replies

Show 1 more reply

Capt. Grant Livingstone FNI • 1st
Pilot Ports of Long Beach and Los Angeles
3d

I stand corrected for the record; recommendation came from mark Hayden then LPA Capt Flanagan. Thanks Capt Cail also for huge investment of time brains and energy!

Like • 2 | Reply

Neil Doyle (Captain) • 1st
Marine Pilot at Auriga Pilots
4d

We have been using the XR2s with SEAiq at Amrun in NE Australia and are very happy with accuracy and portability of the units.

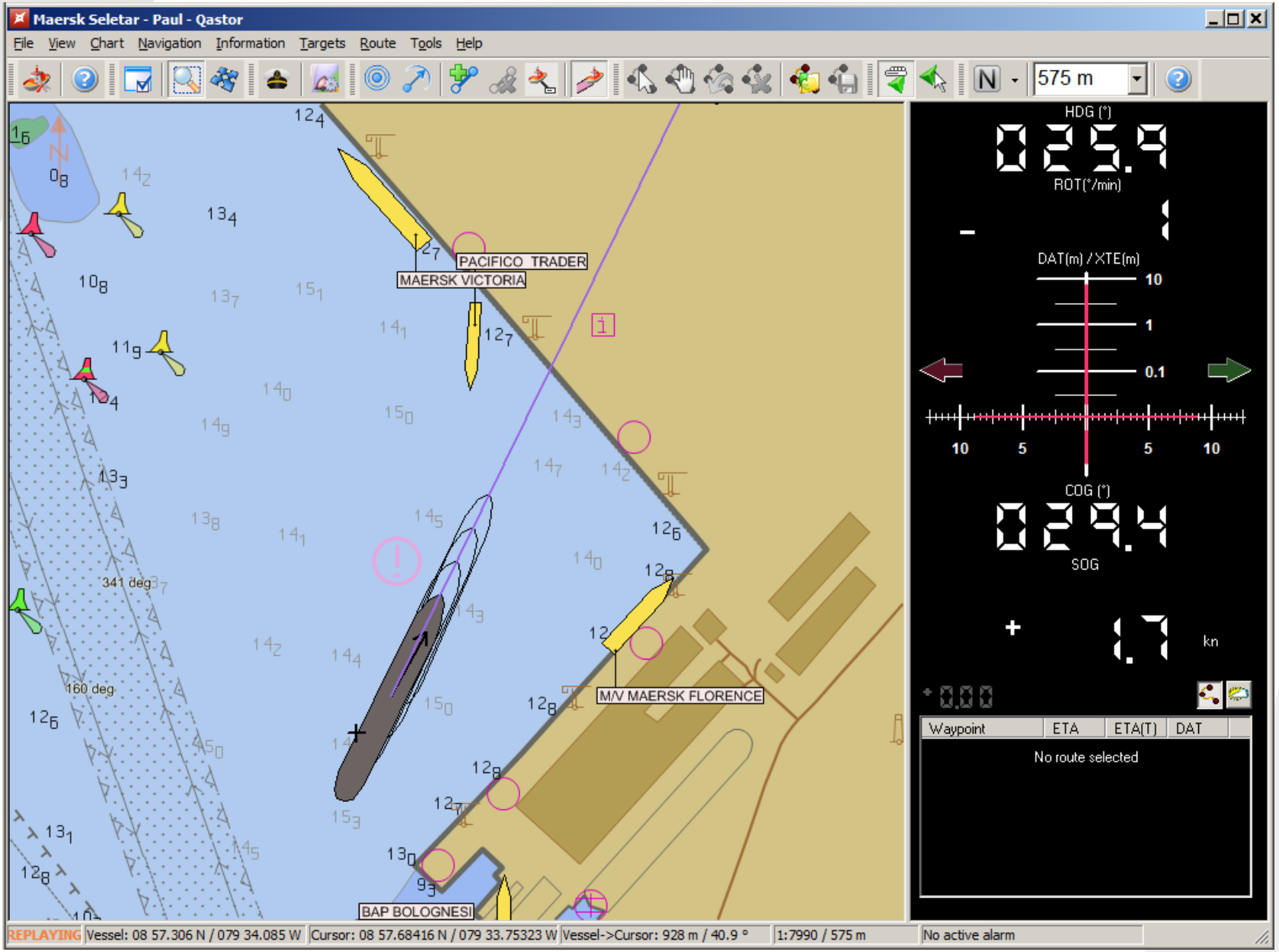
Like • 4 | Reply • 1 reply

AD NAVIGATION

ADQ-2 IS THE ULTIMATE TOOL FOR WIRELESS CONNECTION TO A PROFESSIONAL PILOT'S ECS USING AN AIS PILOT PLUG. ADQ-2 PROVIDES INDEPENDENT RATE OF TURN AND UTILIZES INDUSTRY STANDARD BLUETOOTH (CLASS 1) AND WLAN 802.11B/G FOR THE CONNECTION. THIS MAKES THE INTERFACE TO ANY MAJOR PILOTING SOFTWARE SIMPLE REGARDLESS OPERATING SYSTEM OF THE COMPUTER.

ADQ-2

AIS PILOT PLUG CONNECTOR WITH INDEPENDENT RATE OF TURN




MAERSK
SEALAND
MAERSK VICTORIA
DOUGLAS
PACIFICO TRADER
HYUNDAI


2° 292° 288° 9.2 359
XTD Bow/Stern
Waypoint
BTW DTW TTG
285° 1.11 07:13
True NM Minutes
ETA NLC
23:17 11/21 288°
True
Back Own-Ship Advance
Waypoint (Monitor)
TSC22
ETA:00:48 11/22
DTG TTG
15.1 01:38
NM Hours
GPS Diagnostics
FIX:NA GST:NA
HDOP:NA
Satellites (0)
Alarms
WPT ARRIVAL (1m)
CAT I (EXTRA) Inactive (8m)
Source
CAT ROT(AIS)
AIS: GPS, COG, SOG
CAT ROT: HDG, ROT
Trelleborg
Device Firmware Battery
2.6° 288.3° 288.0° 9.3 397
ROT HDG COG SOG XTD
Stbd °/m True True Knots R Stbd
Back Own-Ship Advance
Waypoint (Monitor)
N ER13
ETA:01:24 11/22
DTG TTG
20.7 02:14
NM Hours
Source
ADN XR2(AIS + Ext GPS)
ADN XR2: GPS, COG, SOG, ROT
Corrected: HDG
GPS Diagnostics
FIX:DGPS GST:28
UTC:04:10:41 VAR:NA
HDOP:0.5
ALT (MSL) GSP HAE (WGS84)
44.54 -118.47 -73.94
Feet Feet Feet
Satellites (0)
AD Navigation XR2
Mode POS HDG
DGPS RTK Fix
ADN XR2 Diagnostics
HDG Baseline Pitch
GNSS 62.40ft 0.58°
SAT POS HDG
RMS 28 28
Mode 1.25ft 0.33ft
DGPS RTK Fix
Single Single
Heading Offset -90°
bENCs Enabled
Soundings 6.0/100ft
Course Vector
CAPE HENRY
VIGILPT 6
NEWPORT NEWS
2° 292° 288°
2.6° 288.3° 288.0
ROT HDG COG
Stbd °/m True True

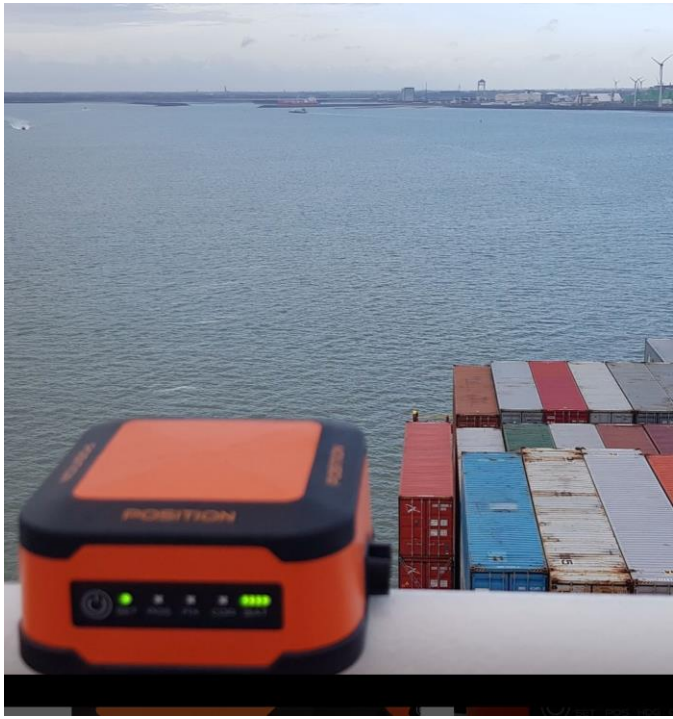
PPU Class C: Ship Dependent Navigation Systems

These systems only augment and refine the ship's gyro feed to give independent rate of turn. Position, speed and heading are derived from the ship via the transmitted AIS signal or the pilot plug and display on professional PPU software. They are only suitable for general navigation pilotage and should not be relied upon for narrow channel or berthing operations.

CAUTION - this technology is NOT recommended by AMPI for port pilotage, pilotage in confined waters or in situations where high accuracy position information has been assessed as a requirement. This method relies on the ship's AIS equipment and is subject to

1. position latency
2. lack of differential corrections
3. offset errors


Getac


POSITION


Intellian
EVER GIVEN

XR2 Systems

Possible operational modes

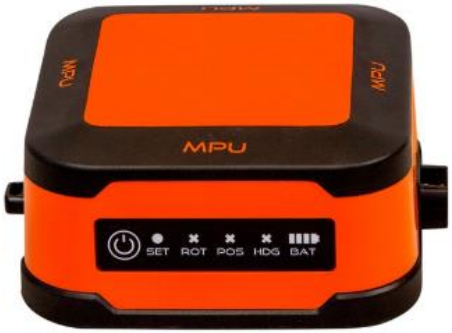
Single Mode – Situational Awareness

Dual Mode – Enhanced Situational Awareness

Triple Mode – Fully Independent

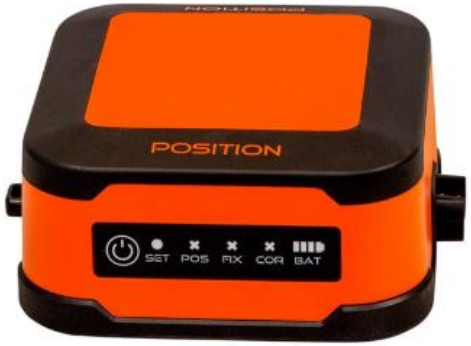
XR2 Systems

System Content



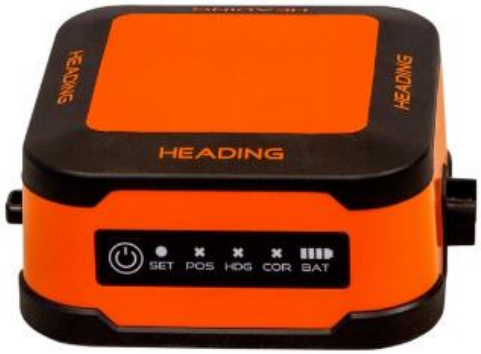
MPU Pod

*CPU with charger
*High end mems gyro
*UHF Radio
*WLAN chipset
*4G modem
*Pilot plug interface
*UHF/WLAN/4G antennas
*Li-Ion Batteries



POSITION Pod

*CPU with charger
*Geodetic grade GNSS
*UHF radio
*High end GNSS antenna
*UHF antenna
*Li-Ion Batteries



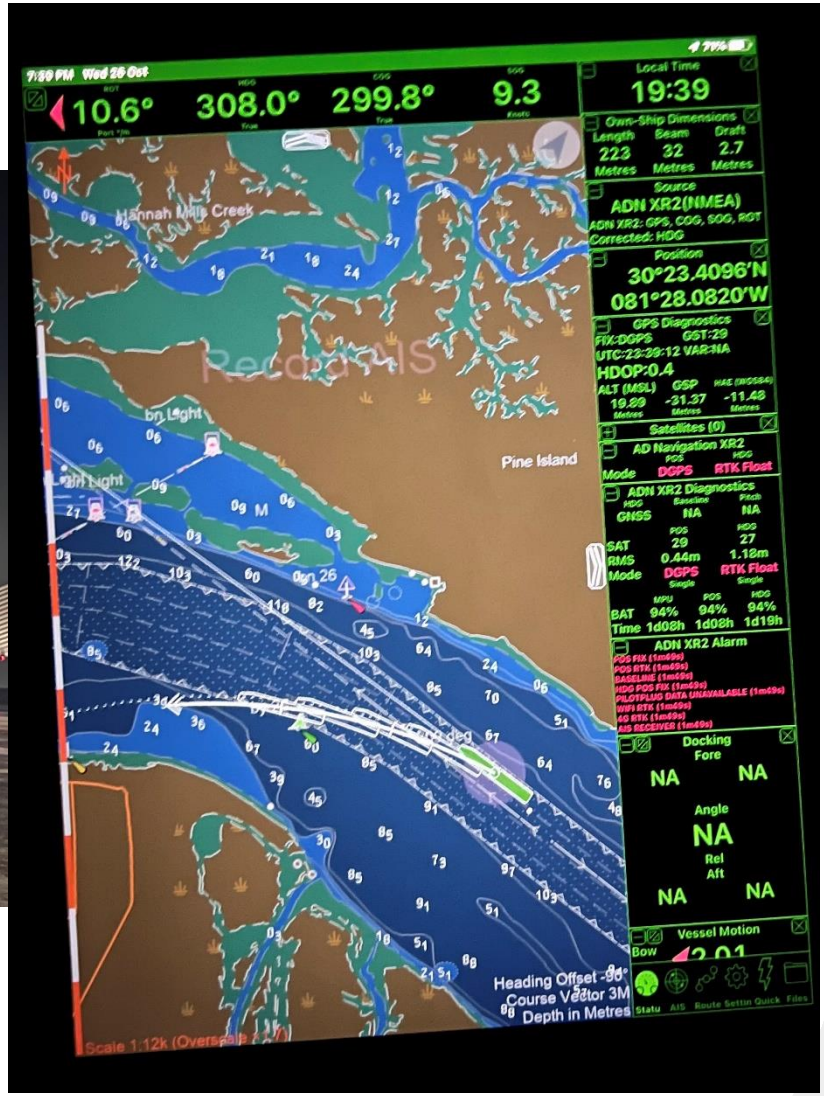
HEADING Pod

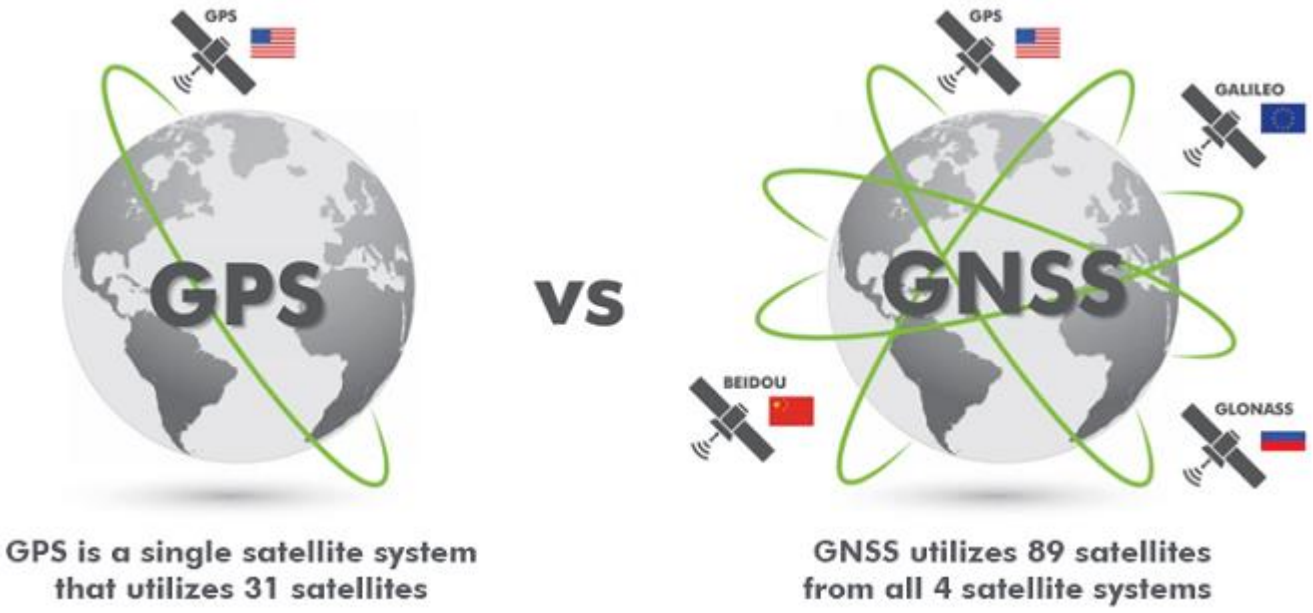
*CPU with charger
*Geodetic grade GNSS
*UHF radio
*High end GNSS antenna
*UHF antenna
*Li-Ion Batteries

AD Navigation XR2

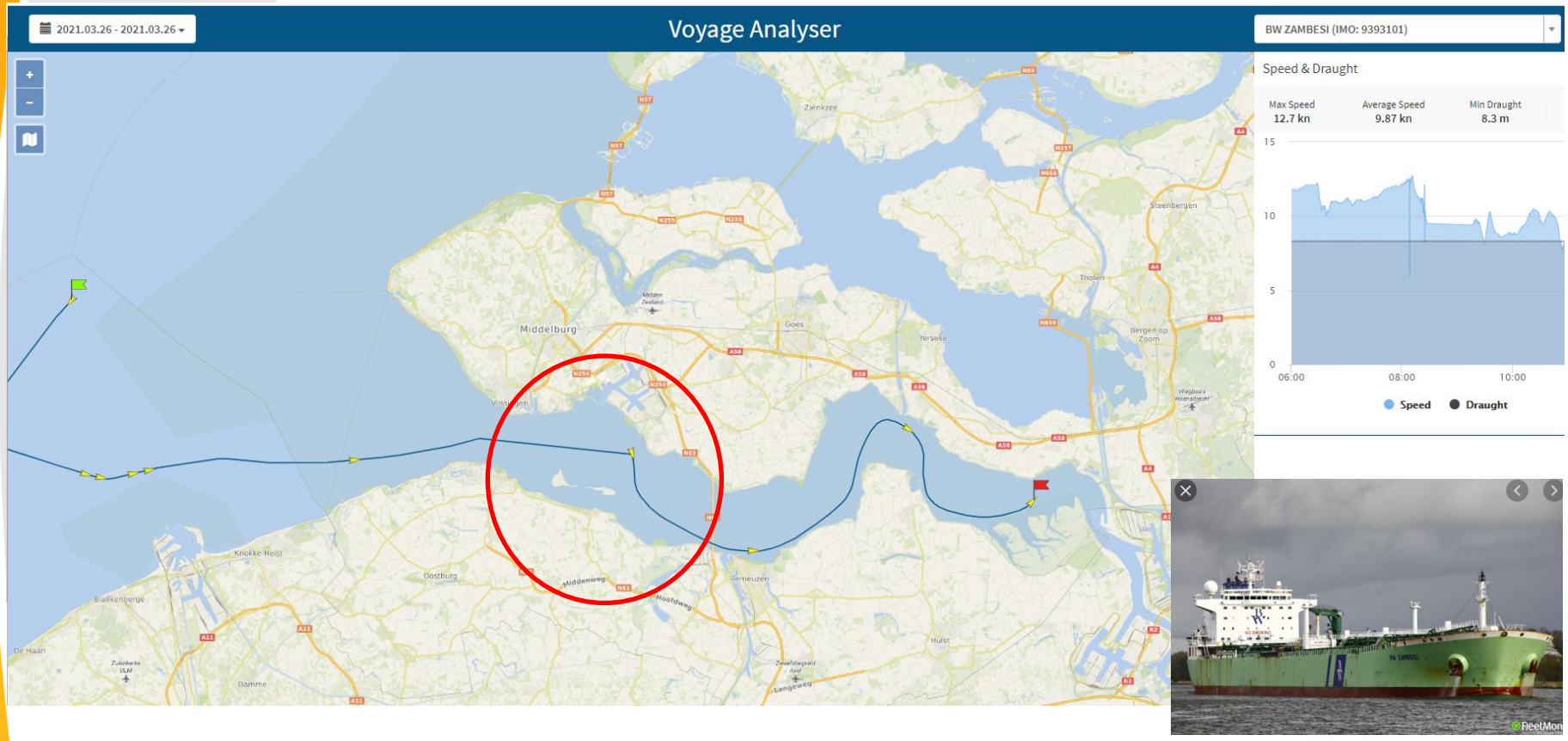
- Robust UHF communication between sensors
- WiFi Link – MPU to Pilot Display

Ultra Precise - GNSS Heading


10.6°
308.0°
299.8°
9.3
Local Time
19:39
Own-Ship Dimensions
Length 223 Metres
Beam 32 Metres
Draft 2.7 Metres
Source
ADN XR2(NMEA)
ADN XR2: GPS, COG, SOG, ROT
Corrected: HDG
Position
30°23.4096'N
081°28.0820'W
GPS Diagnostics
FIX:DGPS
HDOP:0.4
ALT (MSL) 19.89 Metres
GSP -31.37 Metres
Satellites (0)
AD Navigation XR2
Mode DGPS RTK Float
ADN XR2 Diagnostics
GNSS NA
SAT 29
RMS 0.44m
Mode DGPS
BAT 94%
Time 1d08h
ADN XR2 Alarm
Docking
Fore
NA
Angle
NA
Rel
Aft
Vessel Motion
Bow
Hannah Mills Creek
Pine Island
Heading Offset -90°
Course Vector 3M
Depth in Metres



XR2 receives data (PVT) from Multiple GNSS Systems (Constellations)
And Multiple Frequencies – into both Heading and Position Pods



- Jamming incident Holland March 26, 2021
- 75% of all ships lost GNSS position
- XR2 provided consistent positioning during attack

Jam Fest Andoya - September 2022

Jam Fest Andoya - September 2022

Key findings listed:

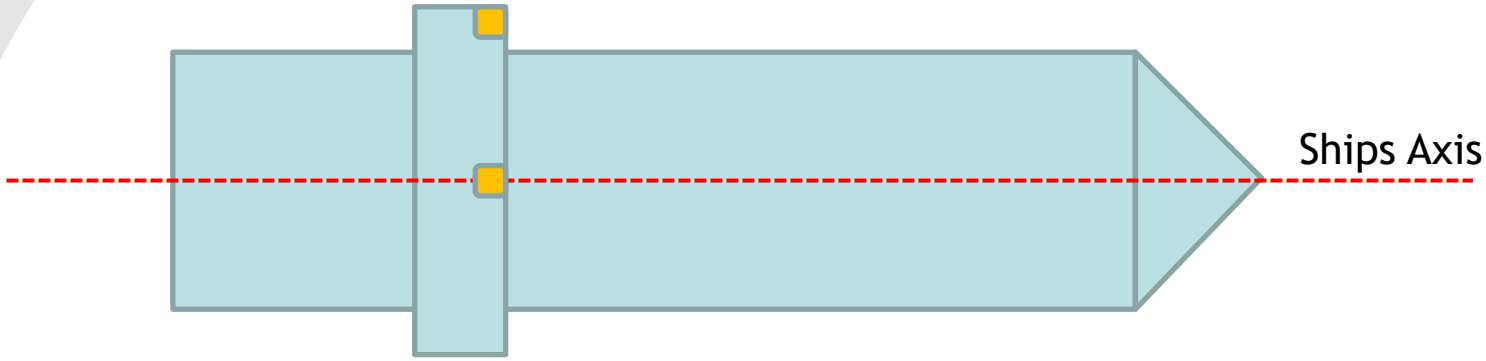
- The XR 2 was most resistant because it is a multi-constellation receiver and has a wide frequency range.
- RTK was vulnerable when 3 out of 10 frequency band were jammed and when 4 were jammed, RTK disappeared.
- Heading from XR2 was vulnerable as phase measurements are used and is easier to manipulate due to convergence challenge.
- The XR2 also coped best during spoofing, but so did the iPad that had SIM card 4G coverage and could utilize A-GNSS.
- It was very useful to get an alarm that pointed out the inconsistency between internal (built-in GNSS iPad) and external PPU (SeaIQ).
- Shielding against jamming did not have a positive effect with this setup (cake box or tin box), resulting in fewer received signals or multipath (multi-directional interference) that degraded the sensor instead of shielding it from jamming.
- In the case of weak jamming signals, the HDOP value and decreasing signal-to-noise ratio are the first indicators of a possible interference.
- PRN jamming is more effective than CW jamming.
- Alarms are not adapted to warn about received interference.

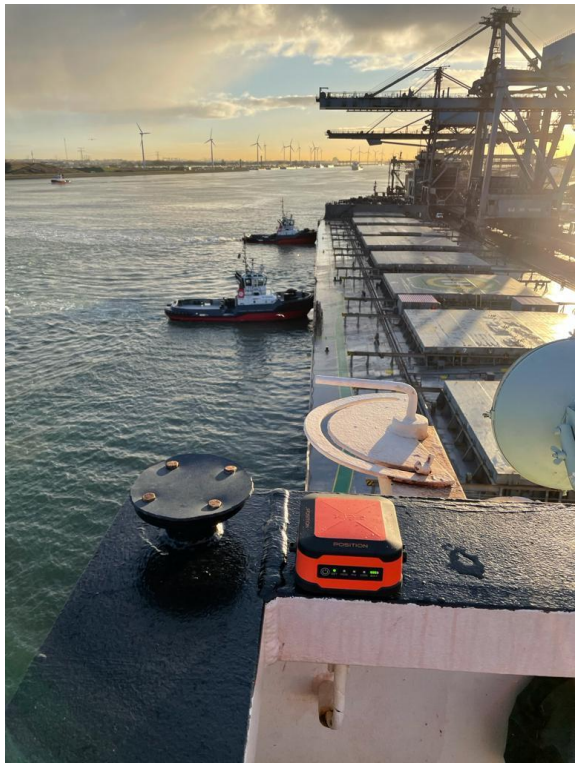
How robust is the Norwegian pilot's navigational equipment?

S. Nyhamn, G. Pettersen1 and O.S. Hareide1,2
1The Norwegian Coastal Administration, Pilot service
2Department of Ocean Operations and Civil Engineering

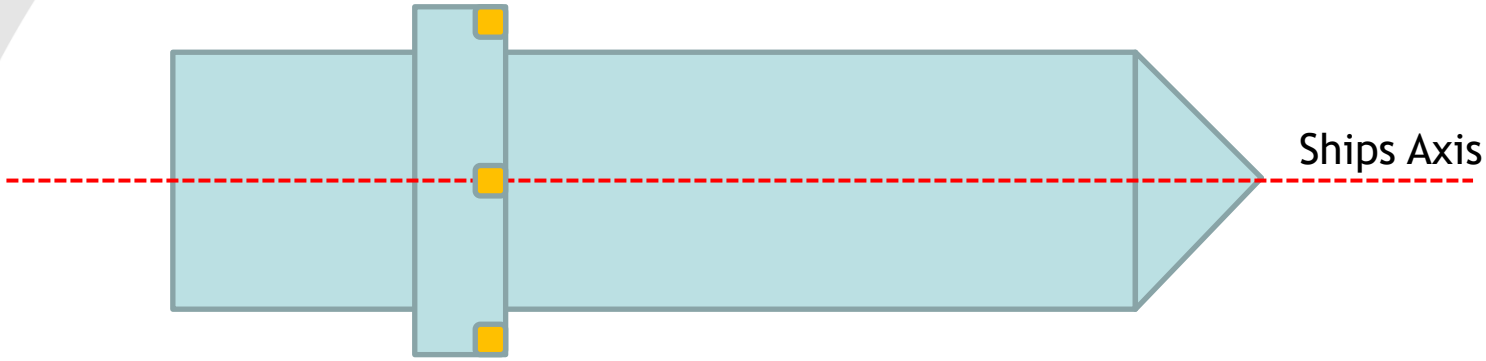
Ultra Precise - GNSS Heading

Ultra Precise - GNSS Heading

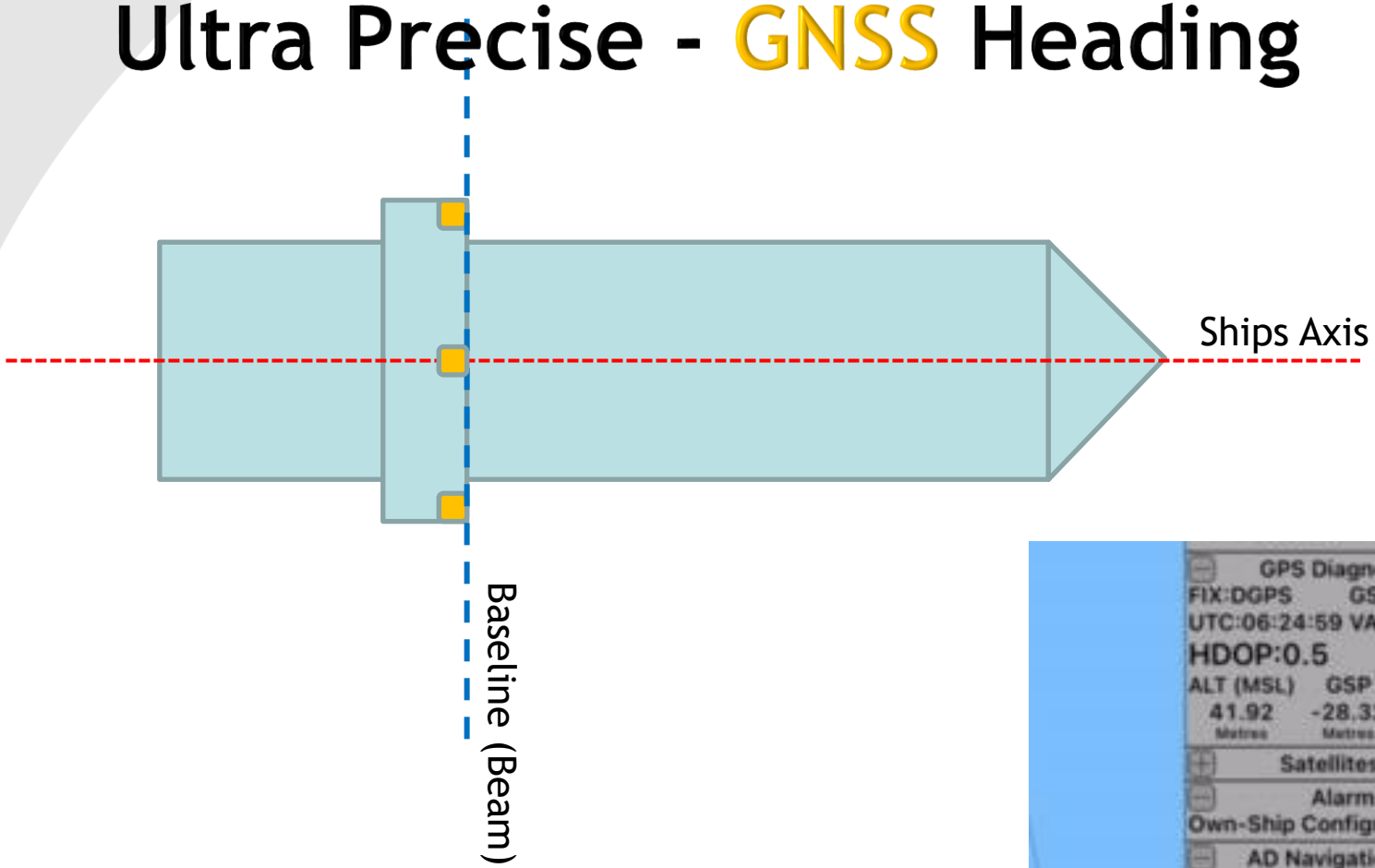


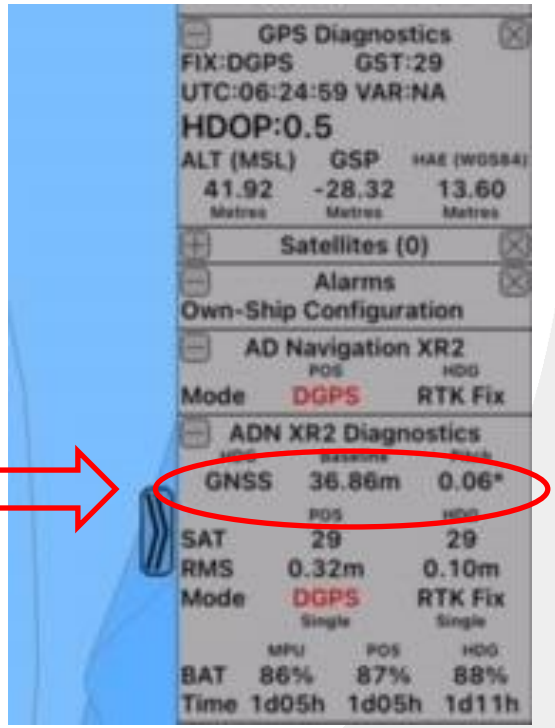


Ultra Precise - GNSS Heading

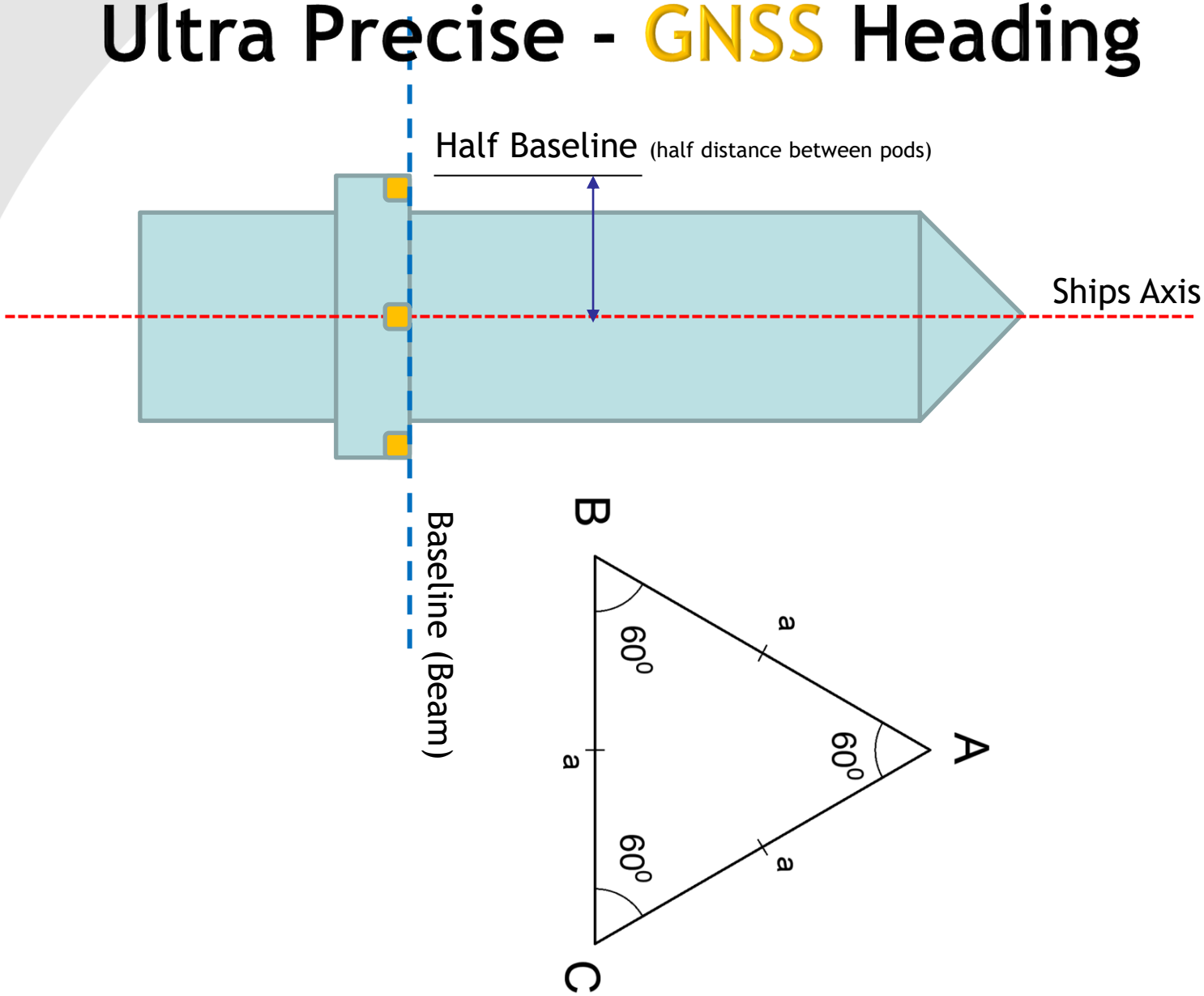


Ultra Precise - GNSS Heading

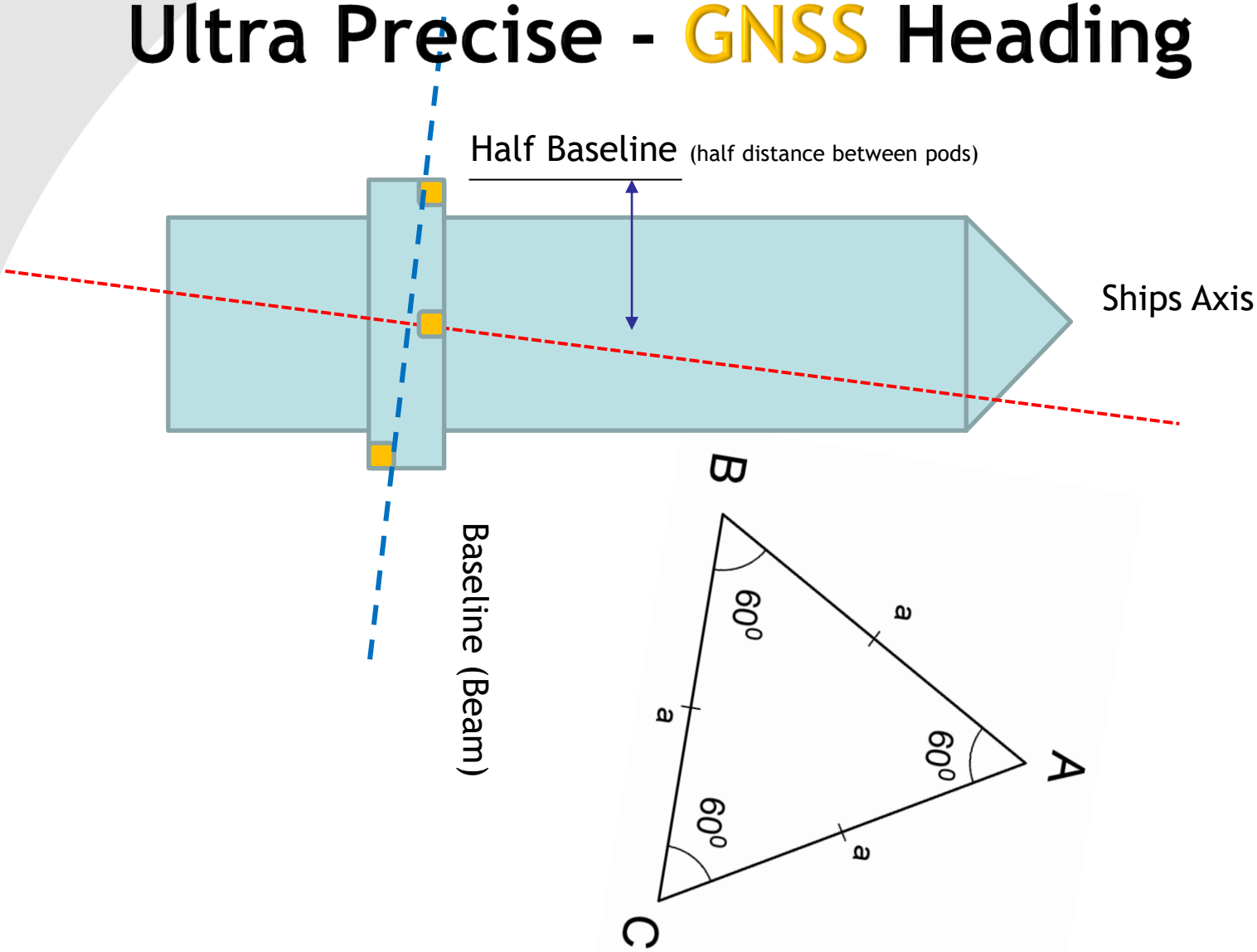




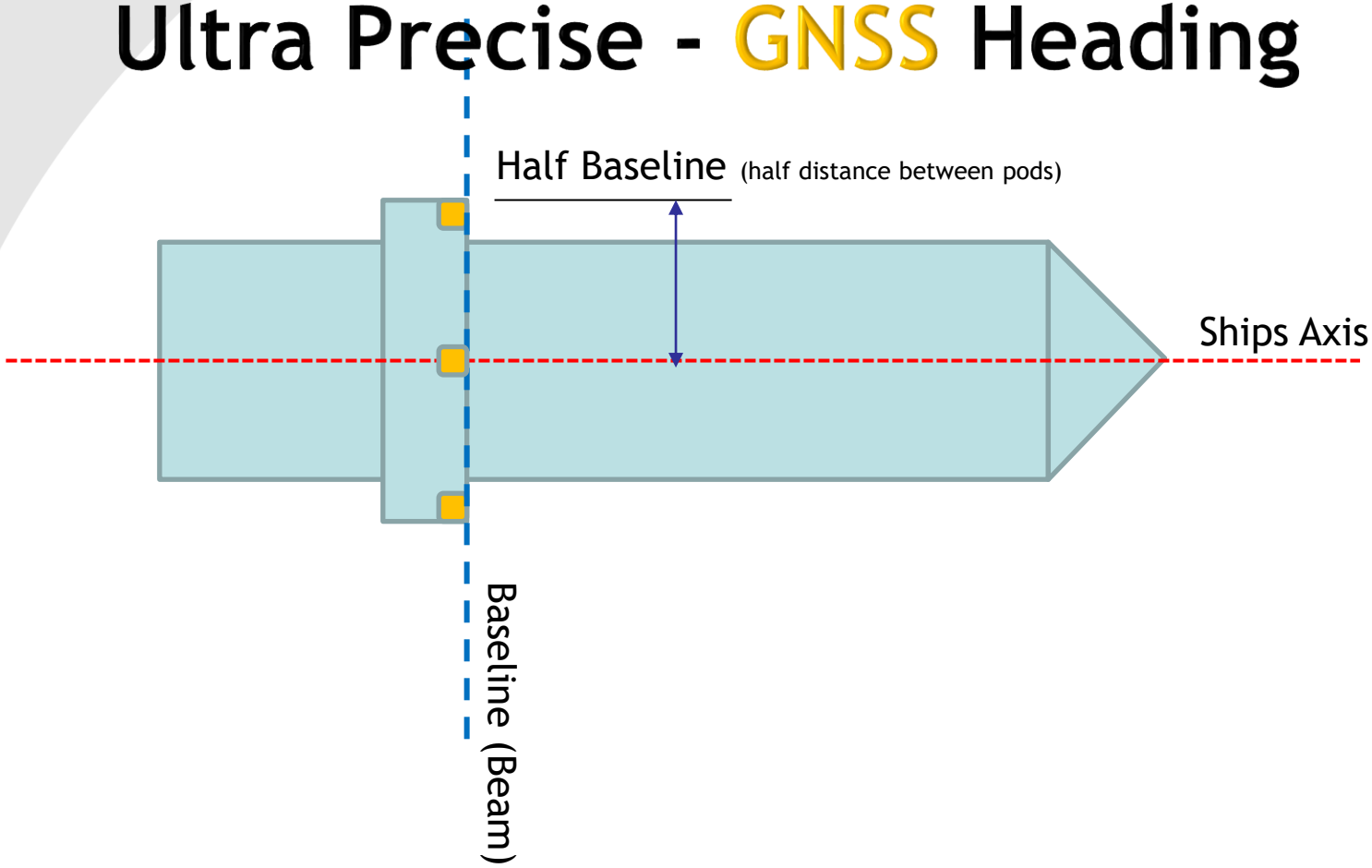
Ultra Precise - GNSS Heading



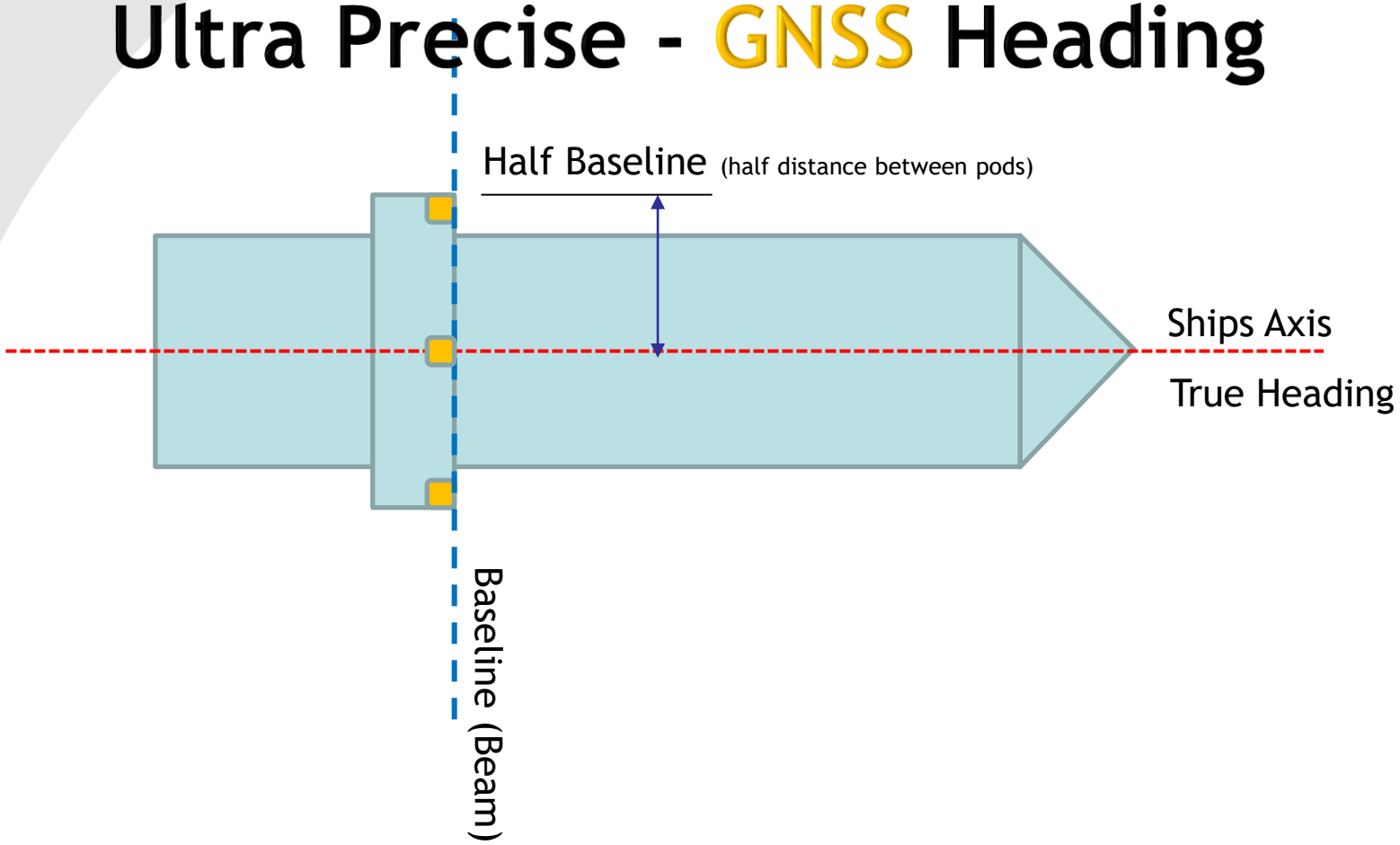
Ultra Precise - GNSS Heading



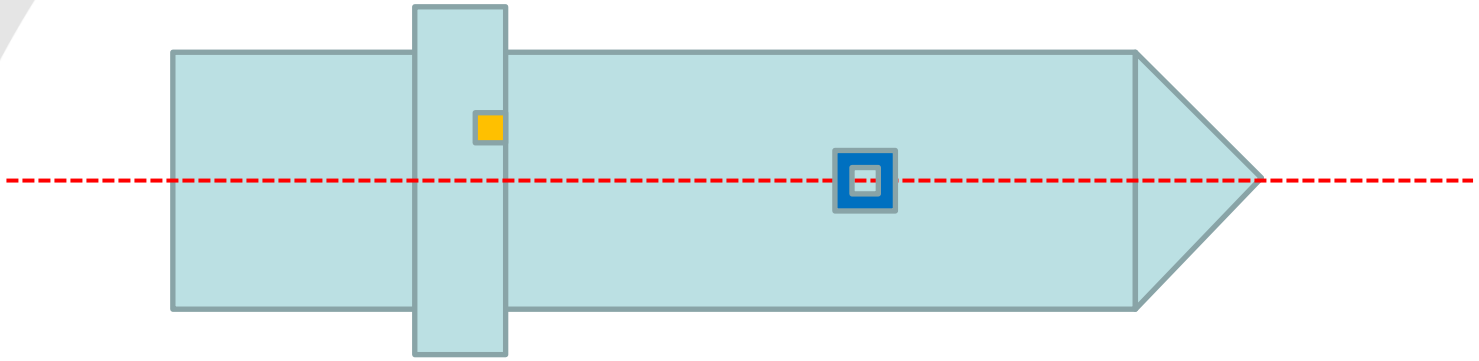
Ultra Precise - GNSS Heading

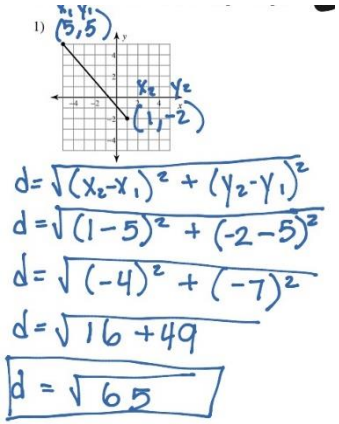


Ultra Precise - GNSS Heading



Ultra Precise - GNSS Heading

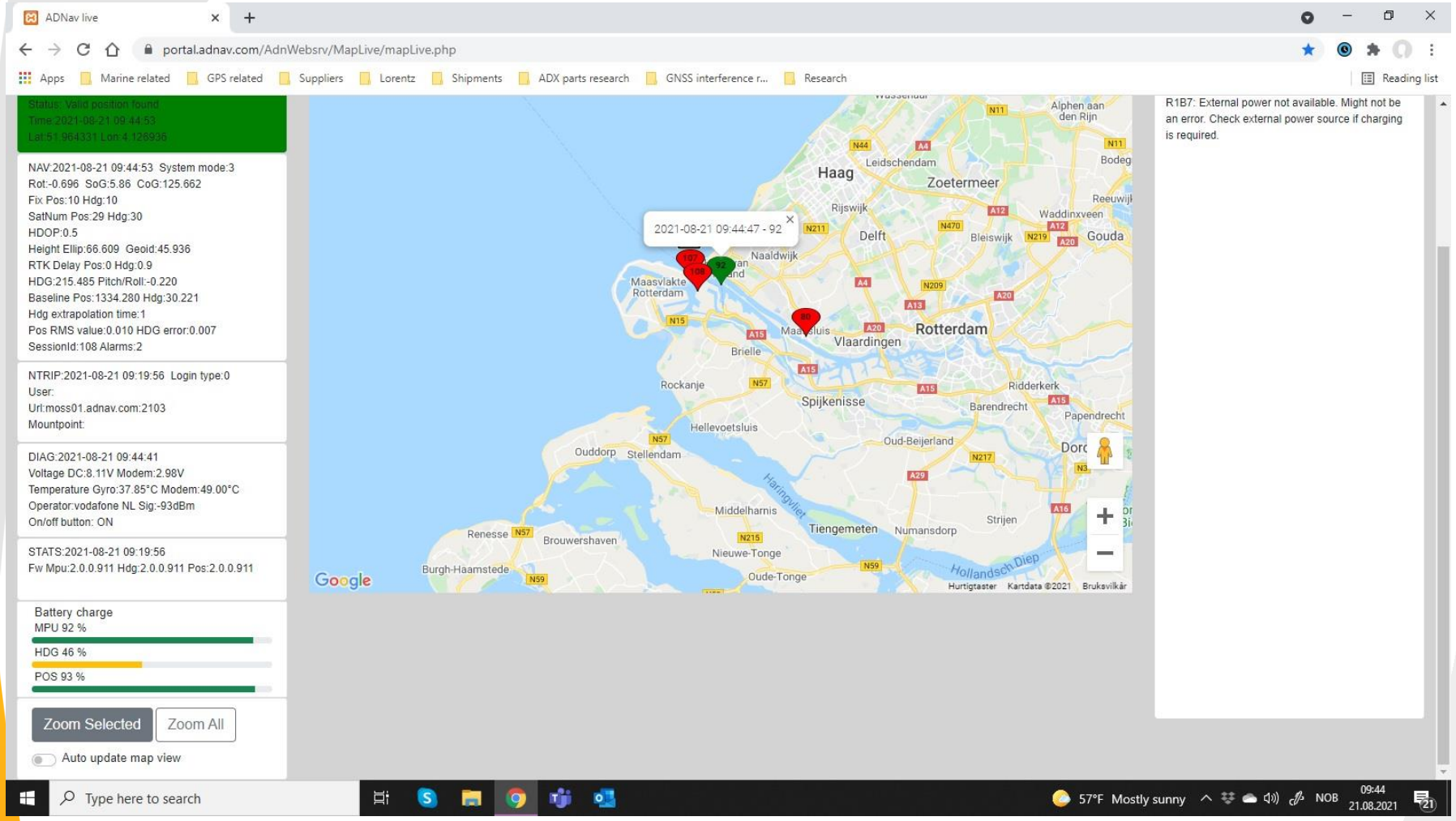


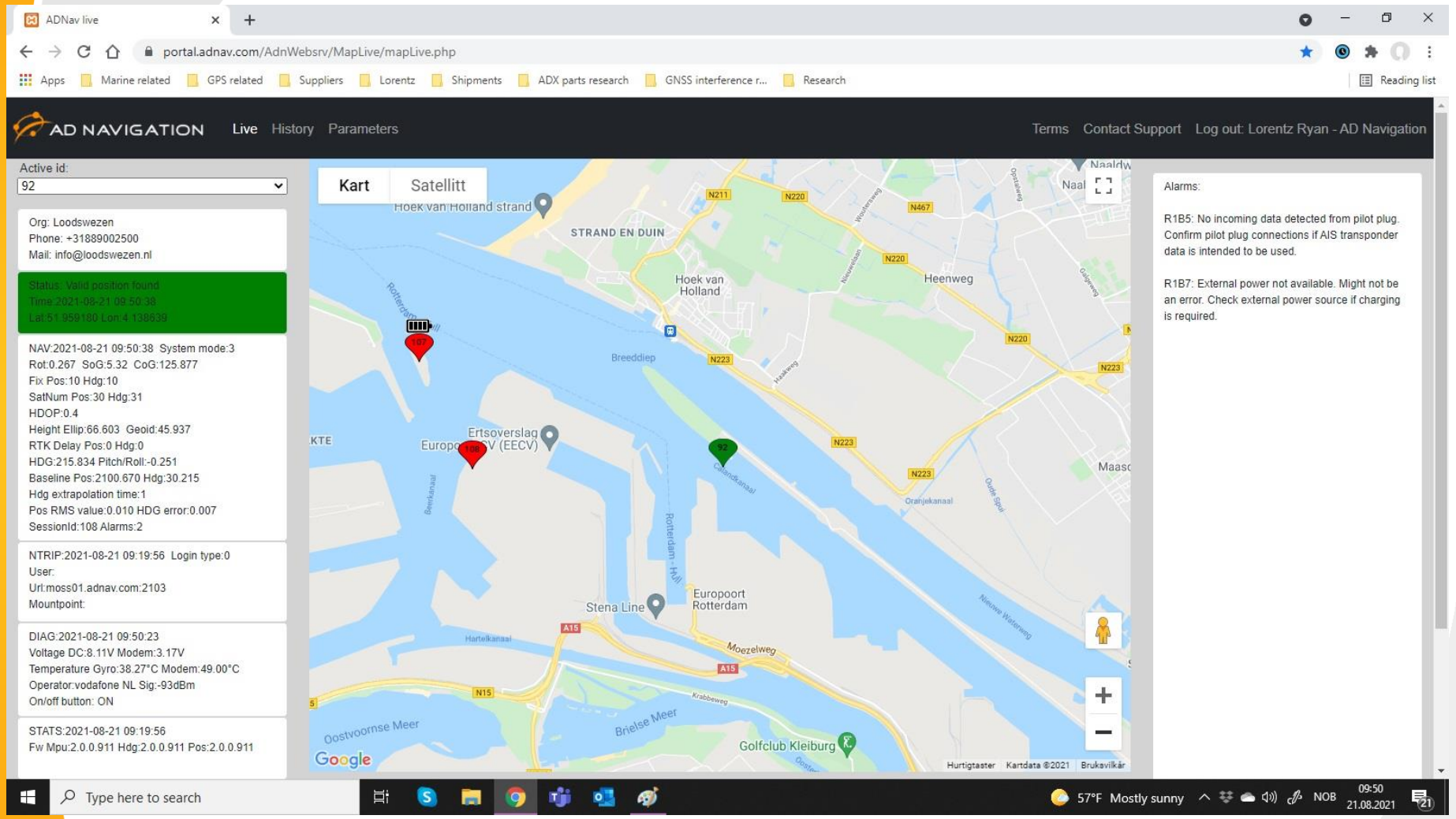


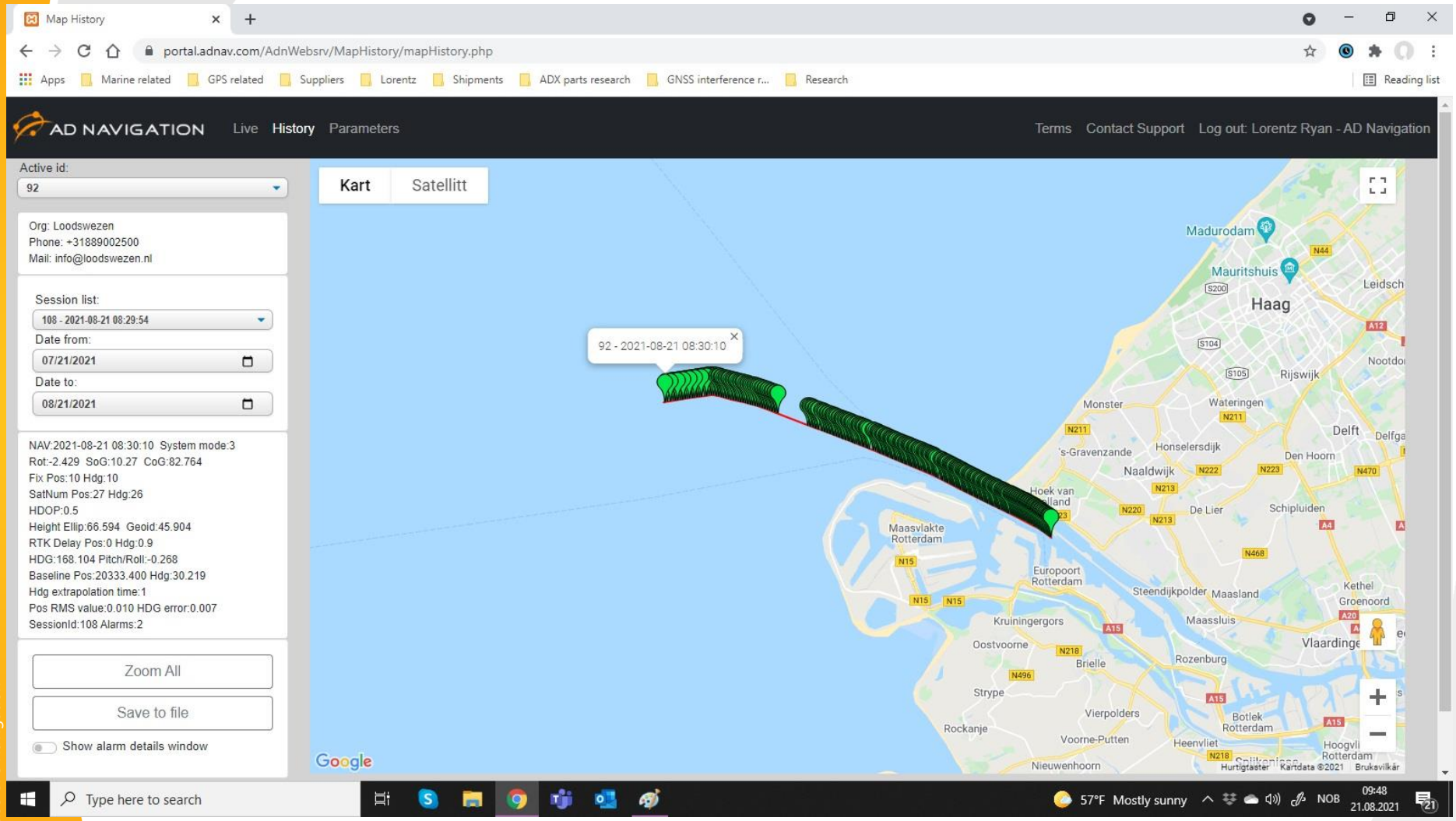

MARMARAS NAVIGATION


HMM


-06:20
-27
24
-56
N/A


ADNav live
portal.adnav.com/AdnWebsrv/MapLive/mapLive.php
Apps
Marine related
GPS related
Suppliers
Lorentz
Shipments
ADX parts research
GNSS interference r...
Research
Reading list
Status: Valid position found
Time:2021-08-21 09:44:53
Lat:51.964331 Lon:4.126936
NAV:2021-08-21 09:44:53 System mode:3
Rot:-0.696 SoG:5.86 CoG:125.662
Fix Pos:10 Hdg:10
SatNum Pos:29 Hdg:30
HDOP:0.5
Height Ellip:66.609 Geoid:45.936
RTK Delay Pos:0 Hdg:0.9
HDG:215.485 Pitch/Roll:-0.220
Baseline Pos:1334.280 Hdg:30.221
Hdg extrapolation time:1
Pos RMS value:0.010 HDG error:0.007
SessionId:108 Alarms:2
NTRIP:2021-08-21 09:19:56 Login type:0
User:
Url:moss01.adnav.com:2103
Mountpoint:
DIAG:2021-08-21 09:44:41
Voltage DC:8.11V Modem:2.98V
Temperature Gyro:37.85°C Modem:49.00°C
Operator:vodafone NL Sig:-93dBm
On/off button: ON
STATS:2021-08-21 09:19:56
Fw Mpu:2.0.0.911 Hdg:2.0.0.911 Pos:2.0.0.911
Battery charge
MPU 92 %
HDG 46 %
POS 93 %
Zoom Selected
Zoom All
Auto update map view
2021-08-21 09:44:47 - 92
Haag
Zoetermeer
Delft
Rijswijk
Naaldwijk
Maasvlakte
Rotterdam
Vlaardingen
Rotterdam
Brielle
Rockanje
Spijkenisse
Hellevoetsluis
Ouddorp
Stellendam
Oud-Beijerland
Barendrecht
Ridderkerk
Papendrecht
Middelharnis
Tiengemeten
Numansdorp
Strijen
Renesse
Brouwershaven
Nieuwe-Tonge
Oude-Tonge
Burgh-Haamstede
Haringvliet
Hollandsch Diep
Google
Hurtigtaster
Kartdata ©2021
Bruksvilkår
R1B7: External power not available. Might not be an error. Check external power source if charging is required.
Type here to search
57°F Mostly sunny
NOB
09:44
21.08.2021


ADNav live
portal.adnav.com/AdnWebsrv/MapLive/mapLive.php
Apps
Marine related
GPS related
Suppliers
Lorentz
Shipments
ADX parts research
GNSS interference r...
Research
Reading list
AD NAVIGATION
Live
History
Parameters
Terms
Contact Support
Log out: Lorentz Ryan - AD Navigation
Active id:
92
Org: Loodswezen
Phone: +31889002500
Mail: info@loodswezen.nl
Status: Valid position found
Time:2021-08-21 09:50:38
Lat:51.959180 Lon:4.138639
NAV:2021-08-21 09:50:38 System mode:3
Rot:0.267 SoG:5.32 CoG:125.877
Fix Pos:10 Hdg:10
SatNum Pos:30 Hdg:31
HDOP:0.4
Height Ellip:66.603 Geoid:45.937
RTK Delay Pos:0 Hdg:0
HDG:215.834 Pitch/Roll:-0.251
Baseline Pos:2100.670 Hdg:30.215
Hdg extrapolation time:1
Pos RMS value:0.010 HDG error:0.007
SessionId:108 Alarms:2
NTRIP:2021-08-21 09:19:56 Login type:0
User:
Url:moss01.adnav.com:2103
Mountpoint:
DIAG:2021-08-21 09:50:23
Voltage DC:8.11V Modem:3.17V
Temperature Gyro:38.27°C Modem:49.00°C
Operator:vodafone NL Sig:-93dBm
On/off button: ON
STATS:2021-08-21 09:19:56
Fw Mpu:2.0.0.911 Hdg:2.0.0.911 Pos:2.0.0.911
Kart
Satellitt
Hoek van Holland strand
STRAND EN DUIN
Hoek van Holland
Heenweg
Breeddiep
Ertsoverslag
Stena Line
Europoort Rotterdam
Moezelweg
Oostvoornse Meer
Brielse Meer
Golfclub Kleiburg
Google
Alarms:
R1B5: No incoming data detected from pilot plug. Confirm pilot plug connections if AIS transponder data is intended to be used.
R1B7: External power not available. Might not be an error. Check external power source if charging is required.
Type here to search
57°F Mostly sunny
NOB
09:50
21.08.2021


Map History
portal.adnav.com/AdnWebsrv/MapHistory/mapHistory.php
Apps
Marine related
GPS related
Suppliers
Lorentz
Shipments
ADX parts research
GNSS interference r...
Research
Reading list
AD NAVIGATION
Live
History
Parameters
Terms
Contact Support
Log out: Lorentz Ryan - AD Navigation
Active id:
92
Org: Loodswezen
Phone: +31889002500
Mail: info@loodswezen.nl
Session list:
108 - 2021-08-21 08:29:54
Date from:
07/21/2021
Date to:
08/21/2021
NAV:2021-08-21 08:30:10 System mode:3
Rot:-2.429 SoG:10.27 CoG:82.764
Fix Pos:10 Hdg:10
SatNum Pos:27 Hdg:26
HDOP:0.5
Height Ellip:66.594 Geoid:45.904
RTK Delay Pos:0 Hdg:0.9
HDG:168.104 Pitch/Roll:-0.268
Baseline Pos:20333.400 Hdg:30.219
Hdg extrapolation time:1
Pos RMS value:0.010 HDG error:0.007
SessionId:108 Alarms:2
Zoom All
Save to file
Show alarm details window
Kart
Satellitt
92 - 2021-08-21 08:30:10
Madurodam
Mauritshuis
Haag
Leidsch
Rijswijk
Wateringen
Monster
's-Gravenzande
Honselersdijk
Naaldwijk
Delft
Den Hoorn
Schipluiden
De Lier
Maasvlakte Rotterdam
Europoort Rotterdam
Steendijkpolder
Maasland
Maassluis
Kethel
Groenoord
Vlaardinge
Kruiningergors
Oostvoorne
Brielle
Rozenburg
Strype
Vierpolders
Rockanje
Voorne-Putten
Botlek Rotterdam
Heenvliet
Nieuwenhoorn
Google
Type here to search
57°F Mostly sunny
NOB
09:48
21.08.2021

XR2 - Pilot Software

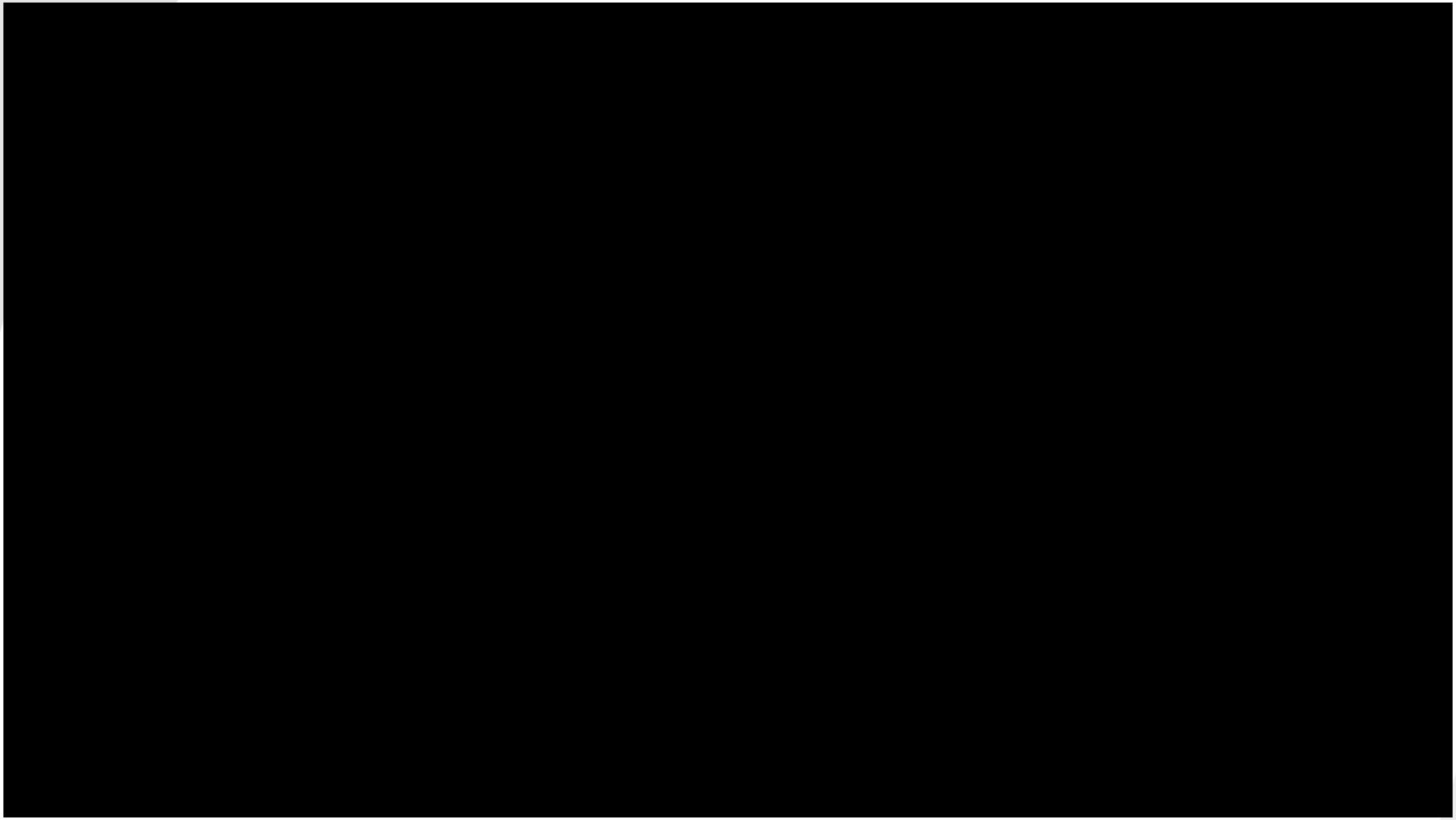
ORCA PILOT G2

XR2 output:

- Standard NMEA0183
- Proprietary heartbeat sentences for system diagnostics

Qastor.

compatible with all
Multi-Platform Pilot Software



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