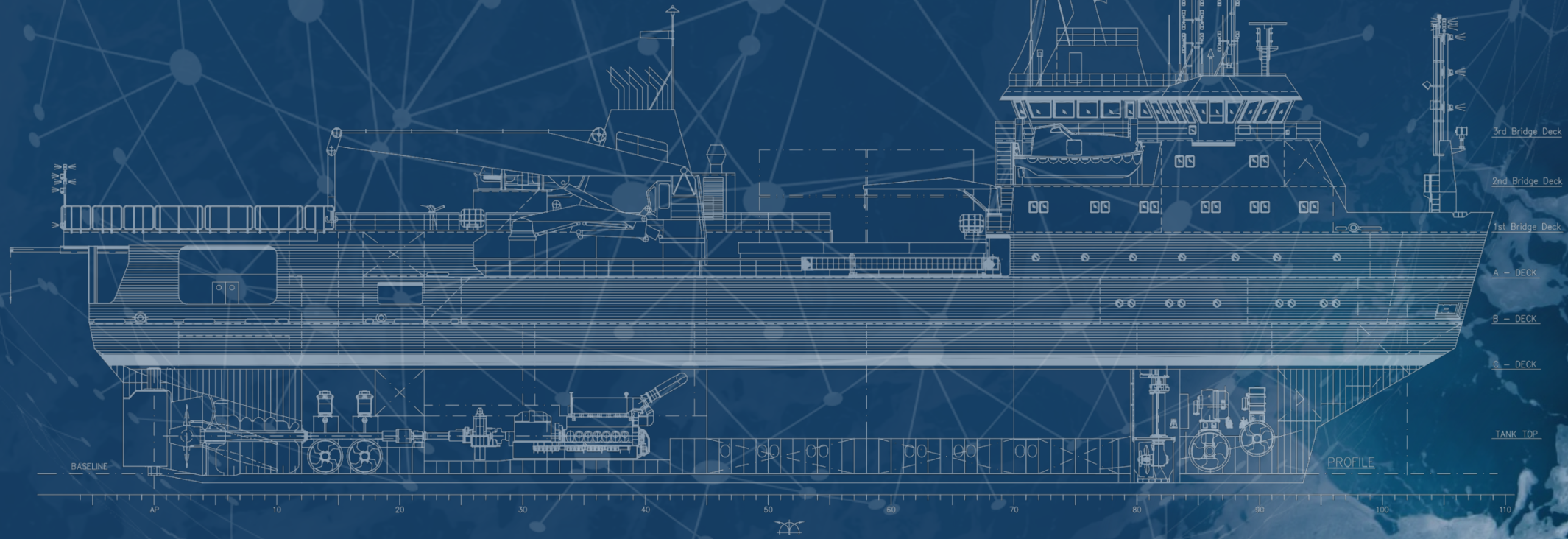
ICT upgrade for r/v Laura Bassi

Massimiliano Iurcev - OGS



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PROGRAMMA NAZIONALE DI RICERCHE IN ANTARTIDE

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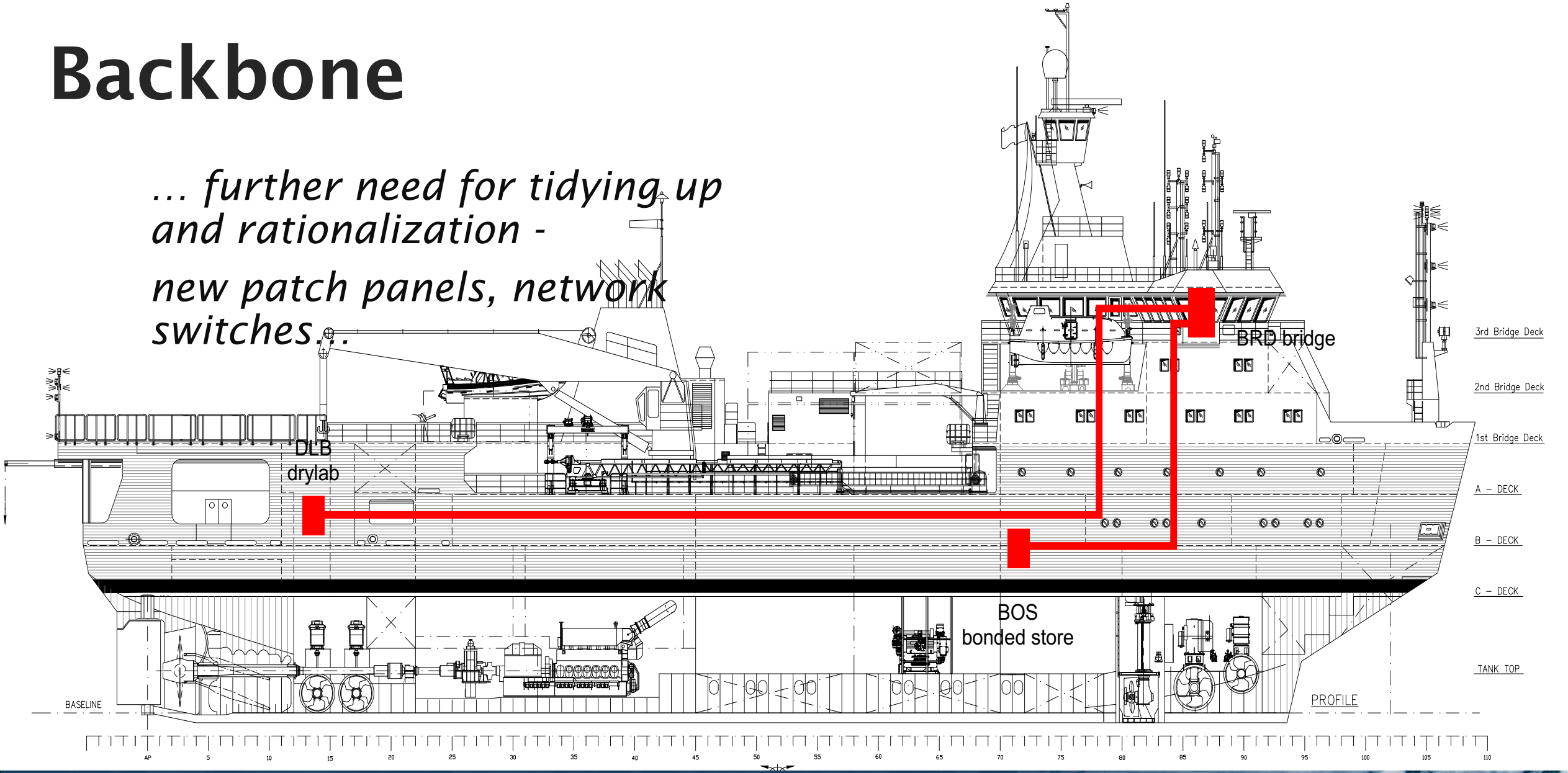
Backbone

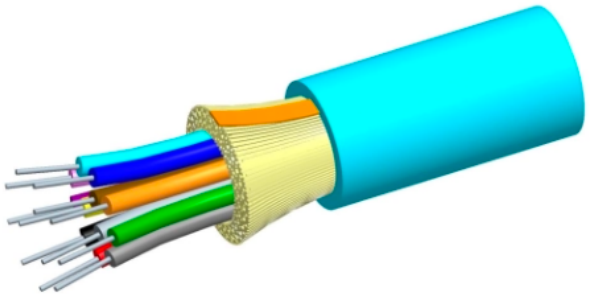
… further need for tidying up and rationalization -

new patch panels, network switches…



Fiber Optic Cable

CommScope



Indoor/outdoor Fiber Optic Cable, 12-fiber, office distribution, multimode, OM4, ULSZH, aqua. Provides Rodent Resistance.

- designed to offer flexibility, strength and compact construction for internal and interbuilding use
- non-metallic construction reinforced by E-glass yarns, which provide rodent resistance and higher tensile strength
- oversheathed with a ULSZH jacket meeting IEC fire performance requirements

Fiber Optic Cable

WHY? fiber optic cable is:

- *faster (up to 100Gbps)*
- *Longer (copper wire ethernet <100m)*
- *harder to tap, then more secure*
- *is thinner*
- *higher bandwidth*
- *more durable and…*
- is immune to EMI and RFI!

Network

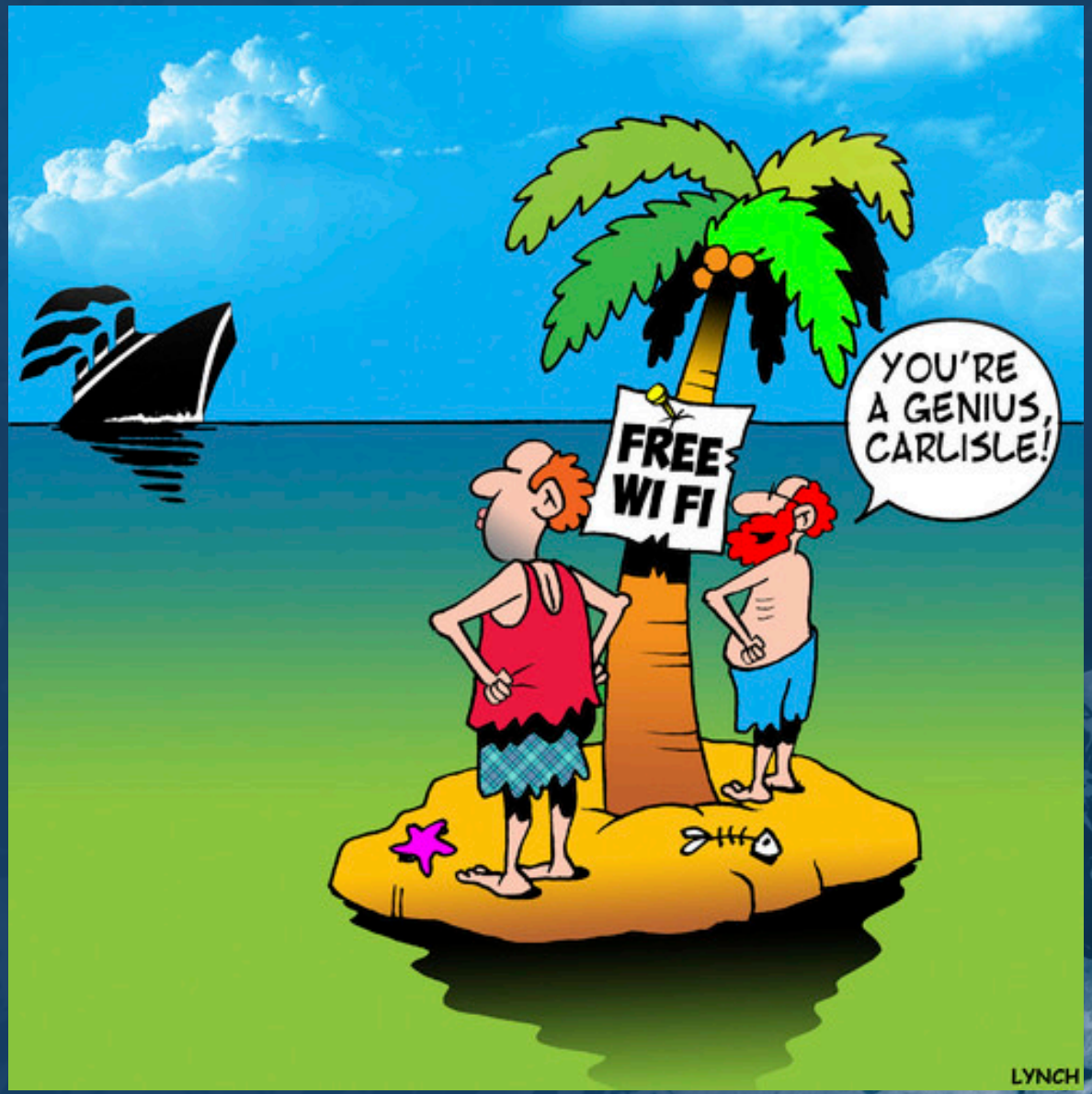
- Rack optimization and enhanced cooling system
- New Layer2 node
  (server room in bow area)
- New core-switch Aruba HPE 6300M
  (Layer3, router, DHCP server, high capacity)

WiFi

Is it THAT important?

or…

“how long would I last without Instagram reels?”

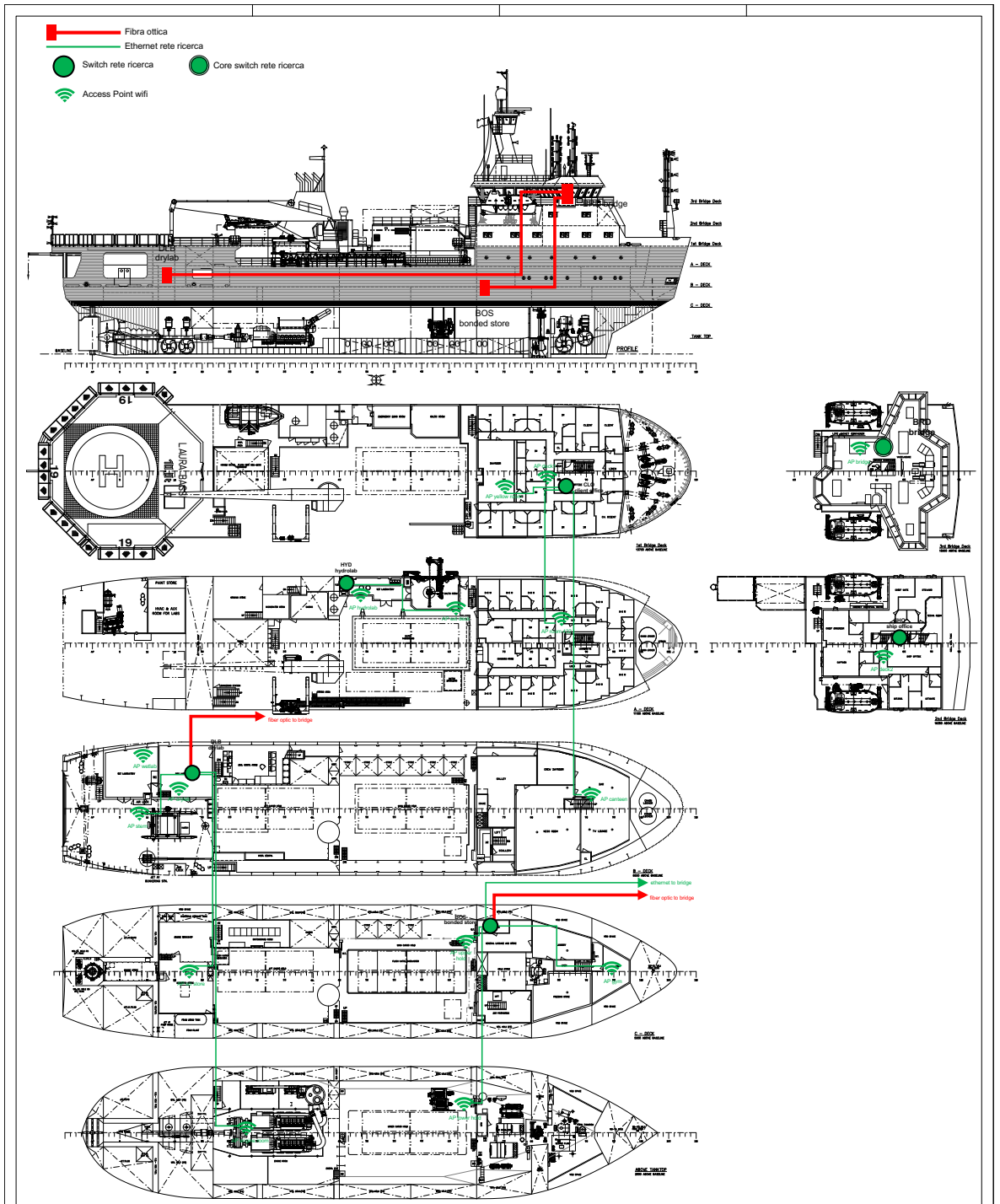


WiFi

Previous situation: 7 access points

New planning: 18 access points

- Harsh environmental specs
- Seamless coverage
- HW/SW robustness



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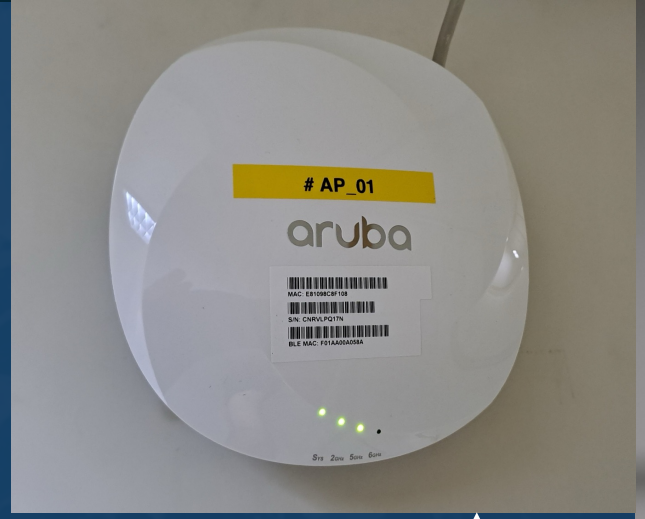
WiFi



HPE Aruba APs

610 series “campus”

518 series “ruggedized”

560 series “outdoor”

WiFi

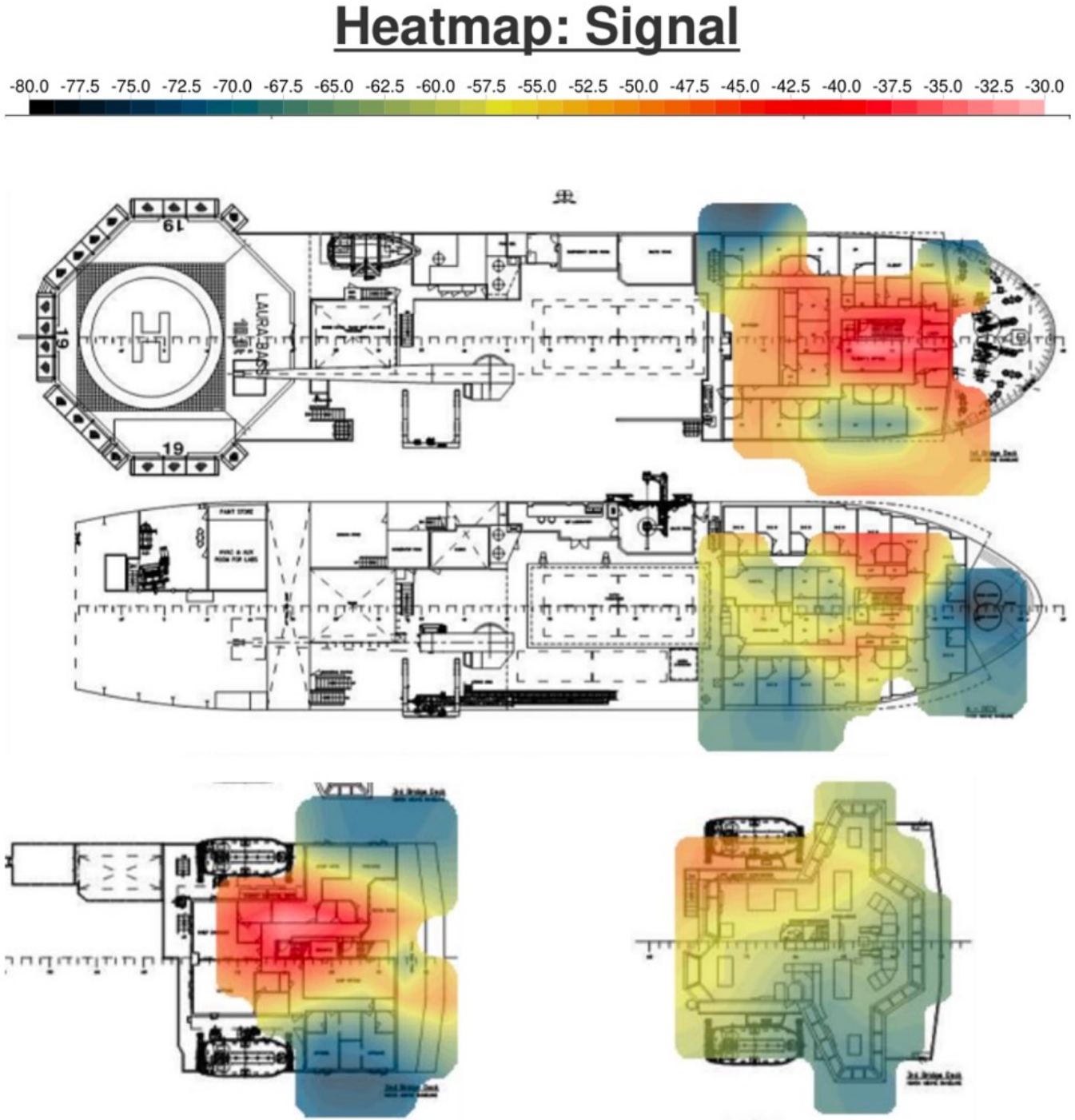
560 series “outdoor”

Operating:

- Temperature: -40° C to +55° C (-40° F to +131° F) with full solar loading
- Humidity: 5% to 95% non-condensing internal
- Rated for operation in all weather conditions
- Water and Dust: IP66/67
- Salt Tolerance: Tested to ASTM B117-07A Salt Spray 200hrs
- Wind Survival: Up to 165 Mph
- Shock and Vibration ETSI 300-19-2-4

WiFi

Signal quality tests
& optimization



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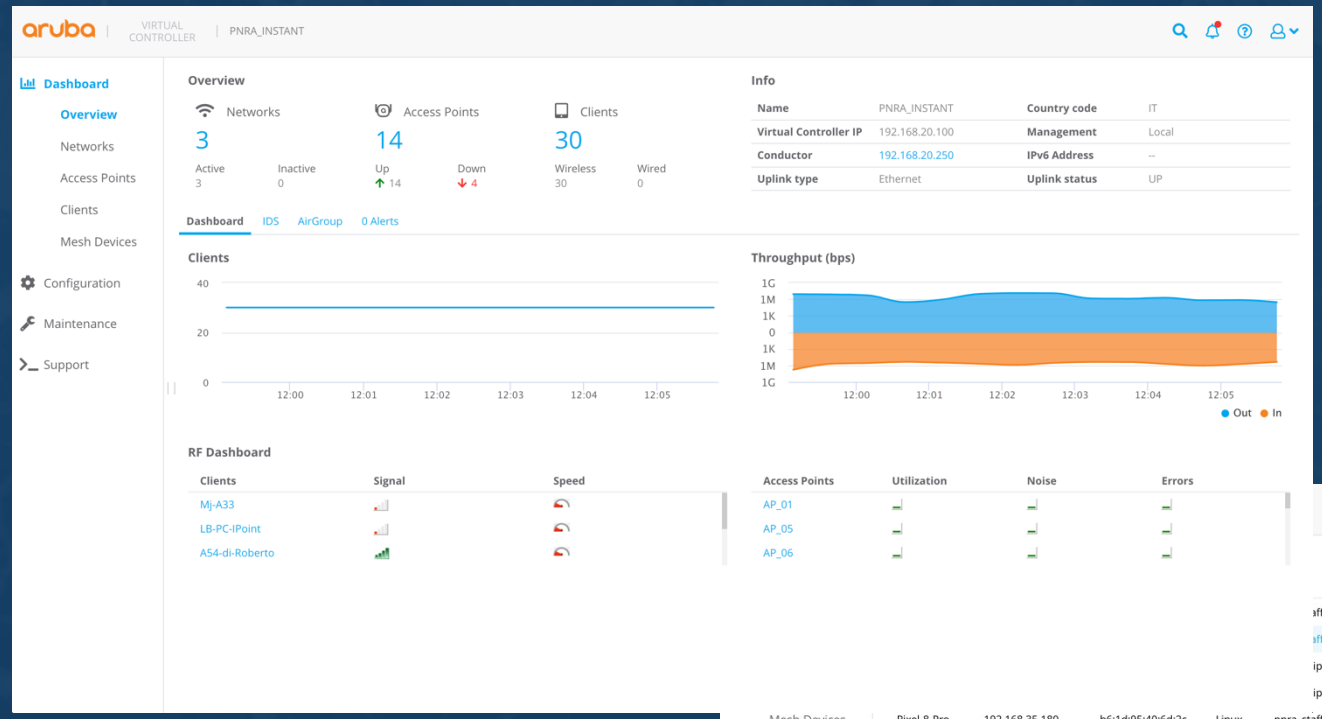
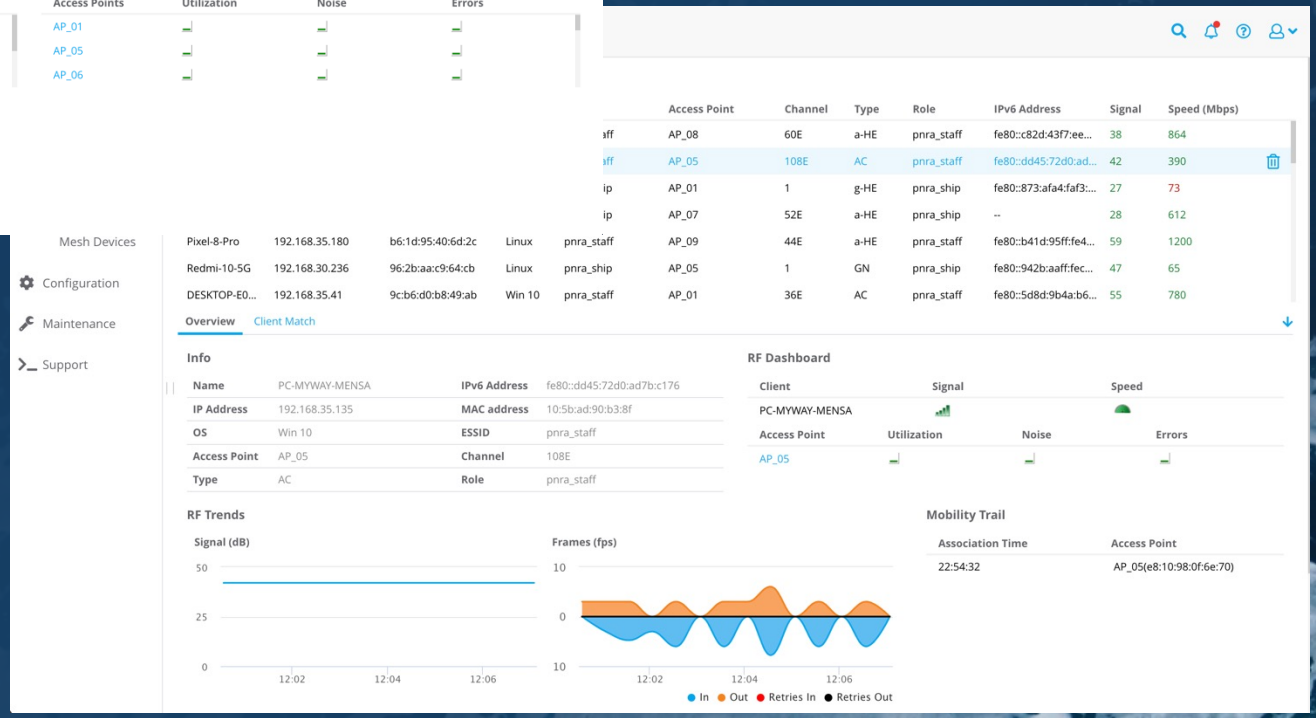
WiFi





Aruba Instant

- Easy deployment
- Robust, distributed peer network
- Advanced config and monitoring

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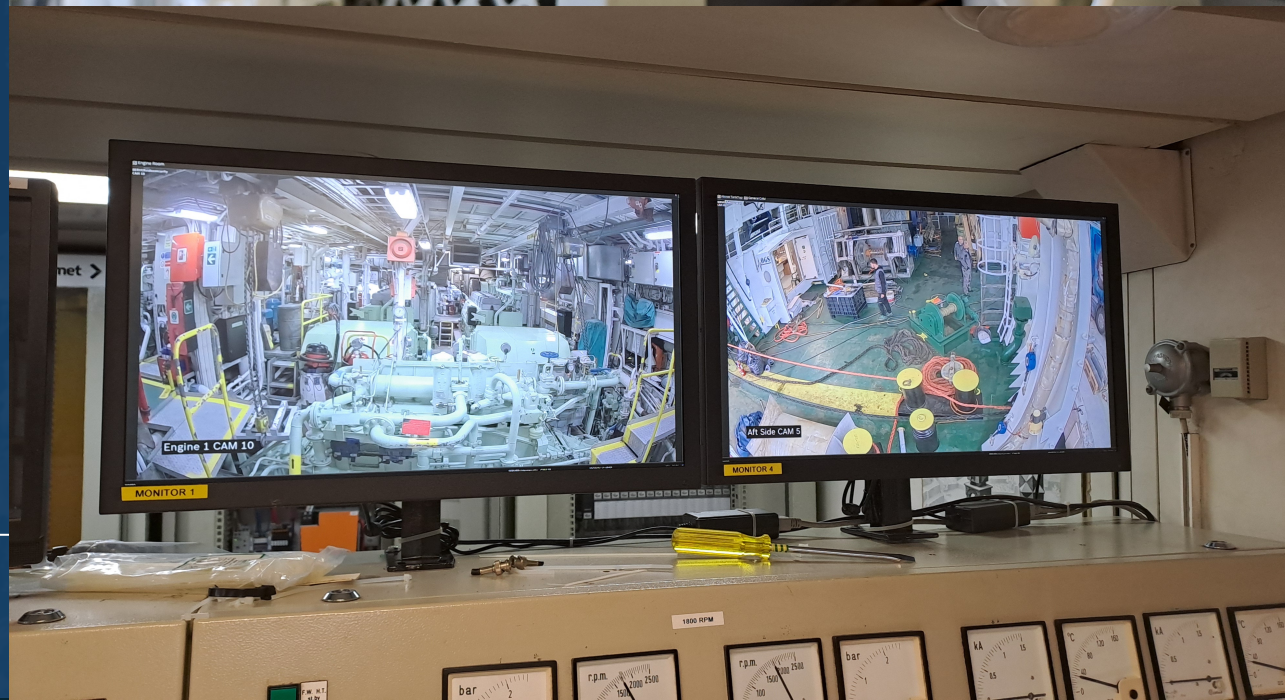
CCTV

- Bosch, provided by E-Nav
- Arteco VMS server
- 3 clients
- Fiber optic backbone, dedicated LAN
- 20 cutting edge cameras for extreme environment



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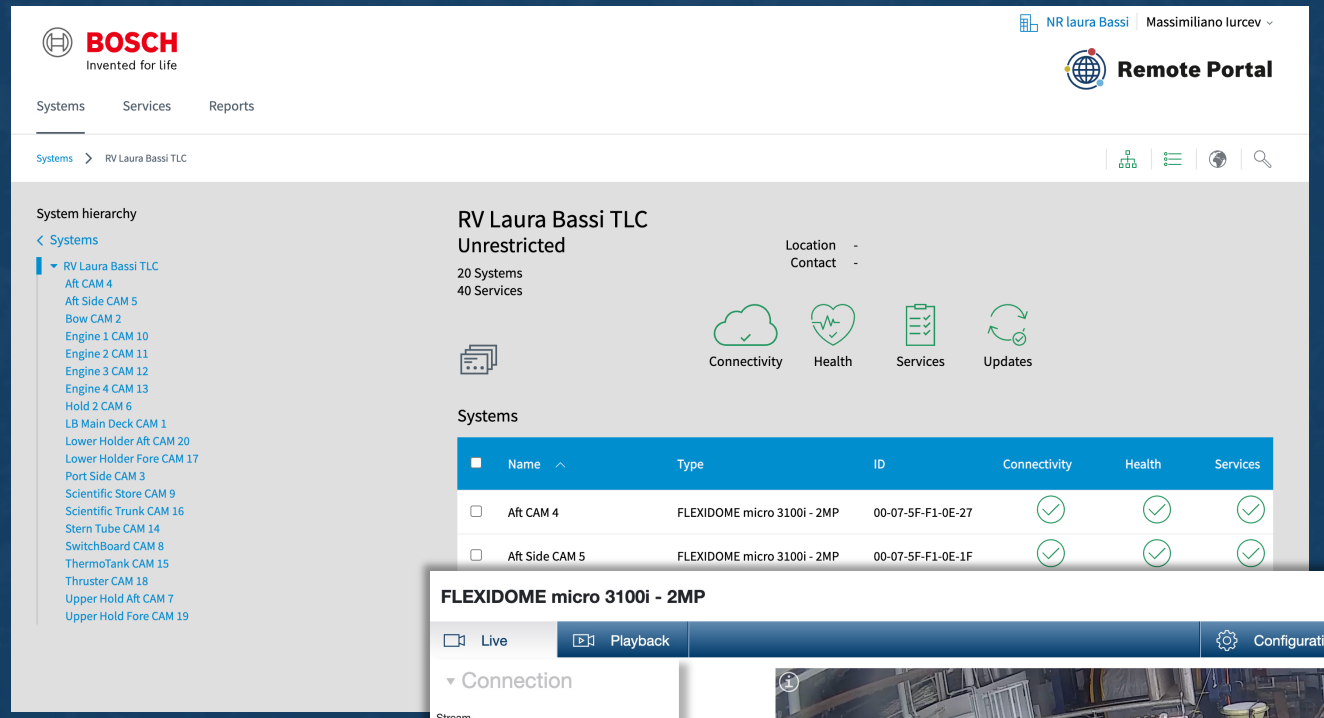
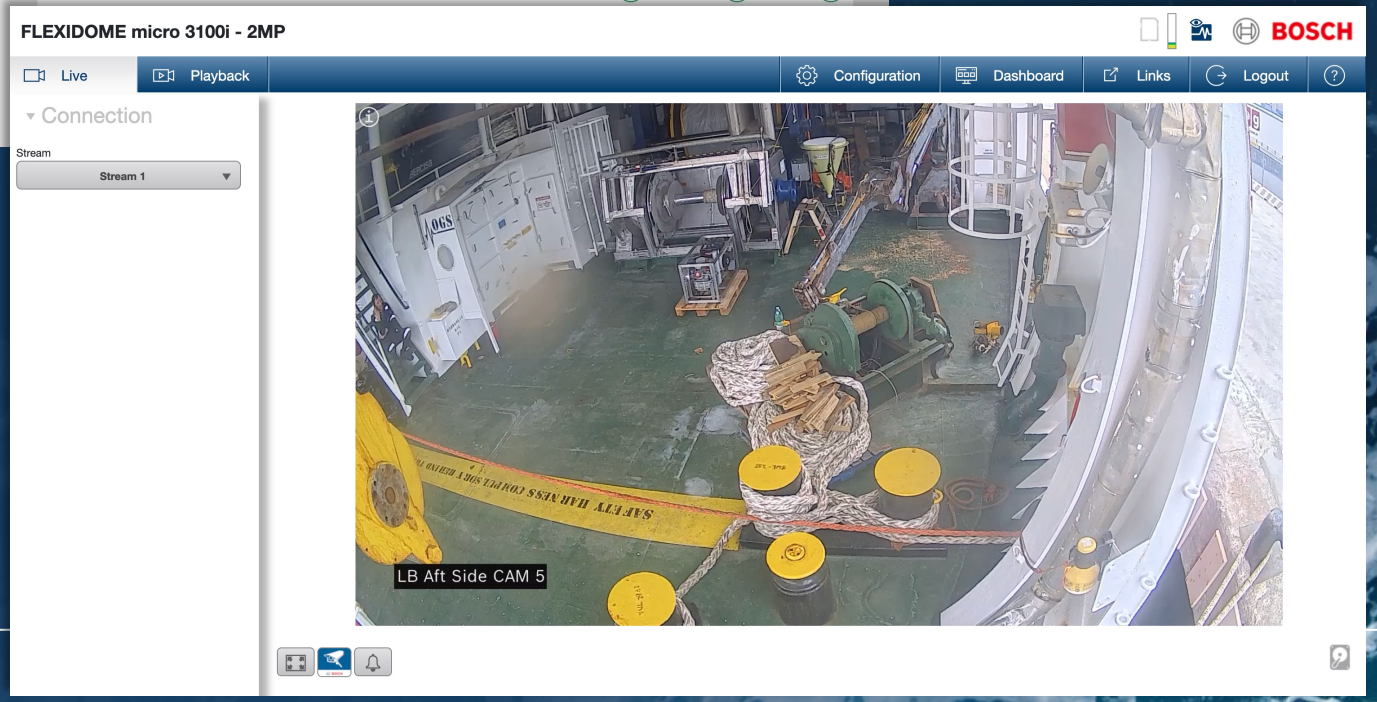
CCTV

- Bosch
  Remote portal





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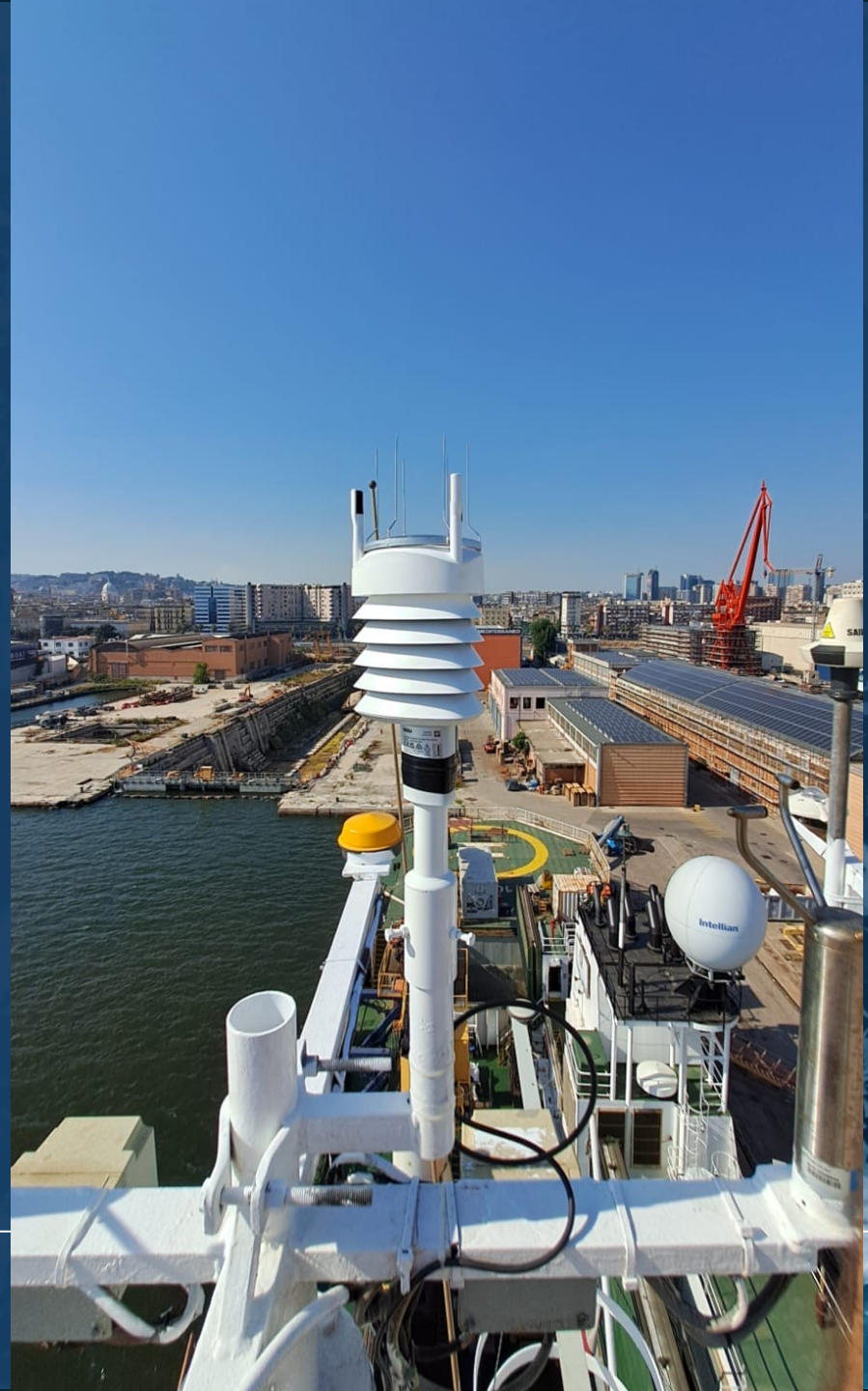
Weather station

Vaisala WXT536

- Wind speed/direction
- Pressure
- Temperature
- Rel. Humidity
- Rain and Hail
- Sensor heating
- Operating environment from -52º to +60º



Radiometer

RS-250 Radiation solution

Gamma-ray spectrometry system, commonly utilized for radionuclide identification and quantification.
The detector geometry consists of a thallium-doped sodium iodide (NaI(Tl)) scintillation crystal with dimensions of 3 × 3 inches, coupled to a photomultiplier tube (PMT).
It detects aerosol-borne radionuclides, although cosmogenic and other environmental isotopes are also observed.

Radiometer

A lot of interesting data collected in the Southern Ocean!

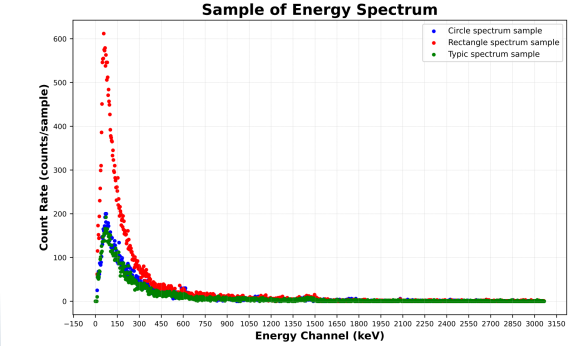


Fig. 3 Recorded gamma spectra variation

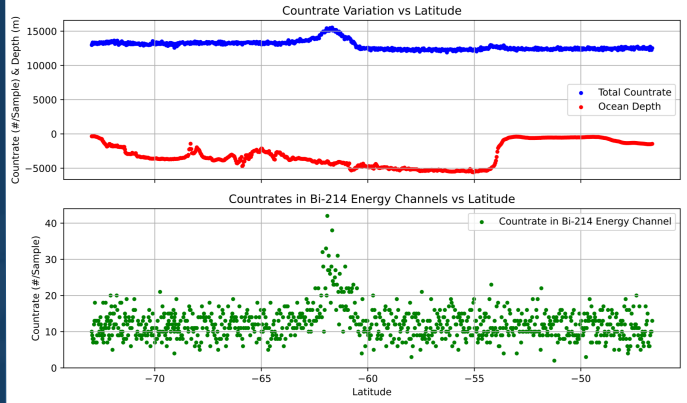


Fig. 4 Count rate and parameters variation

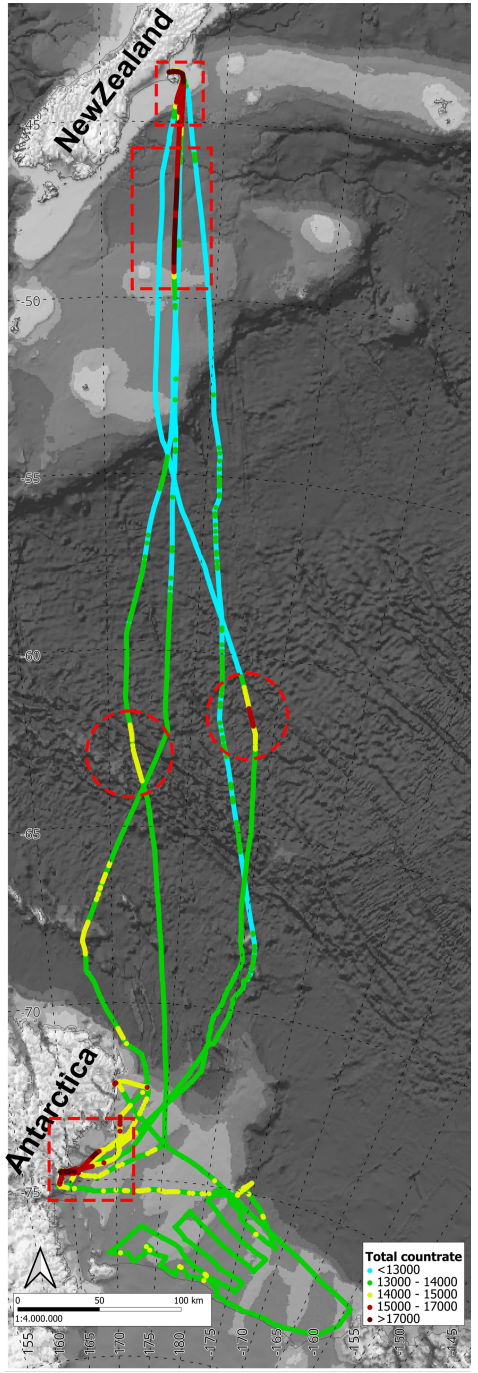


Fig. 2 Vessel routes and anomalies location

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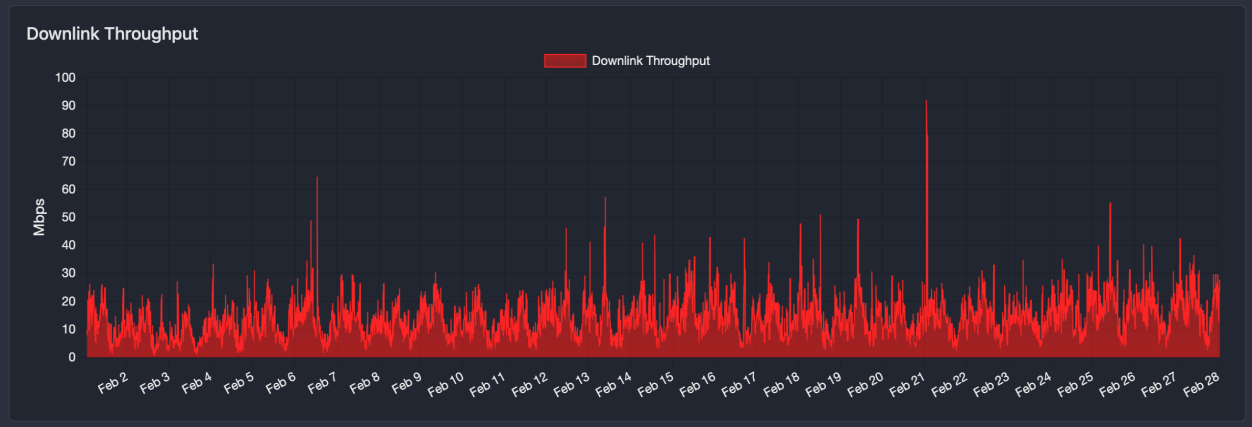
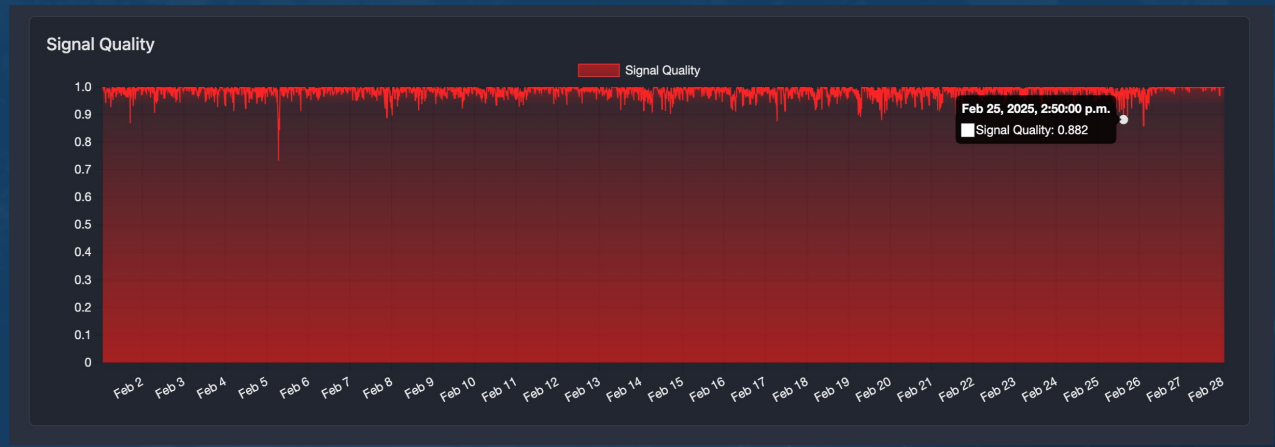
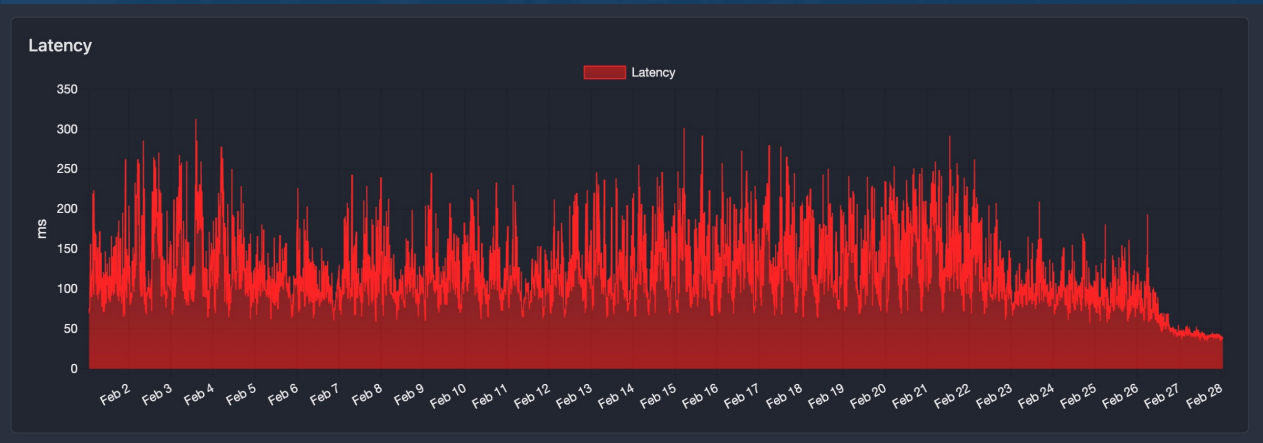
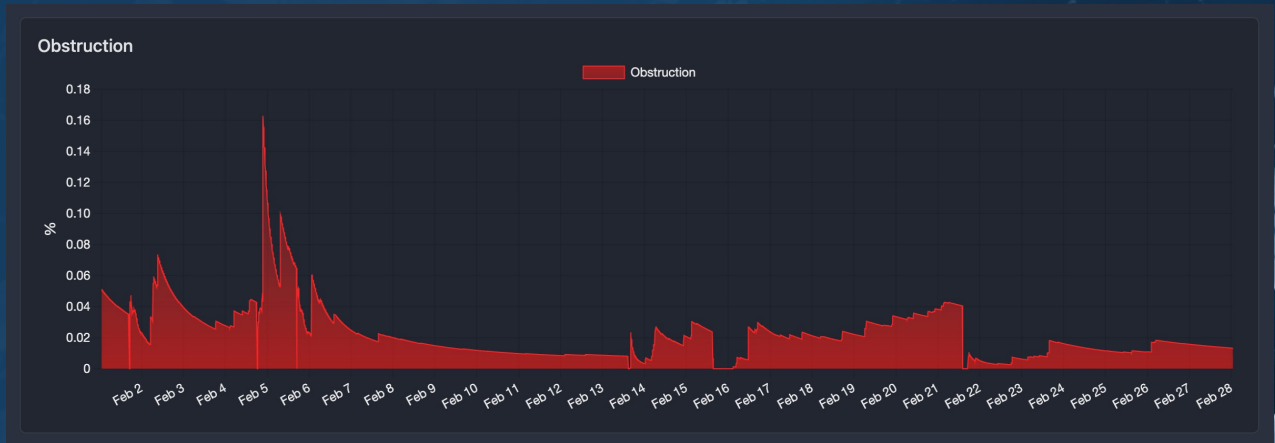
Connectivity









Starlink: 2 maritime connection + 1 spare system
Backup: VSAT Ku + Iridium + LTE

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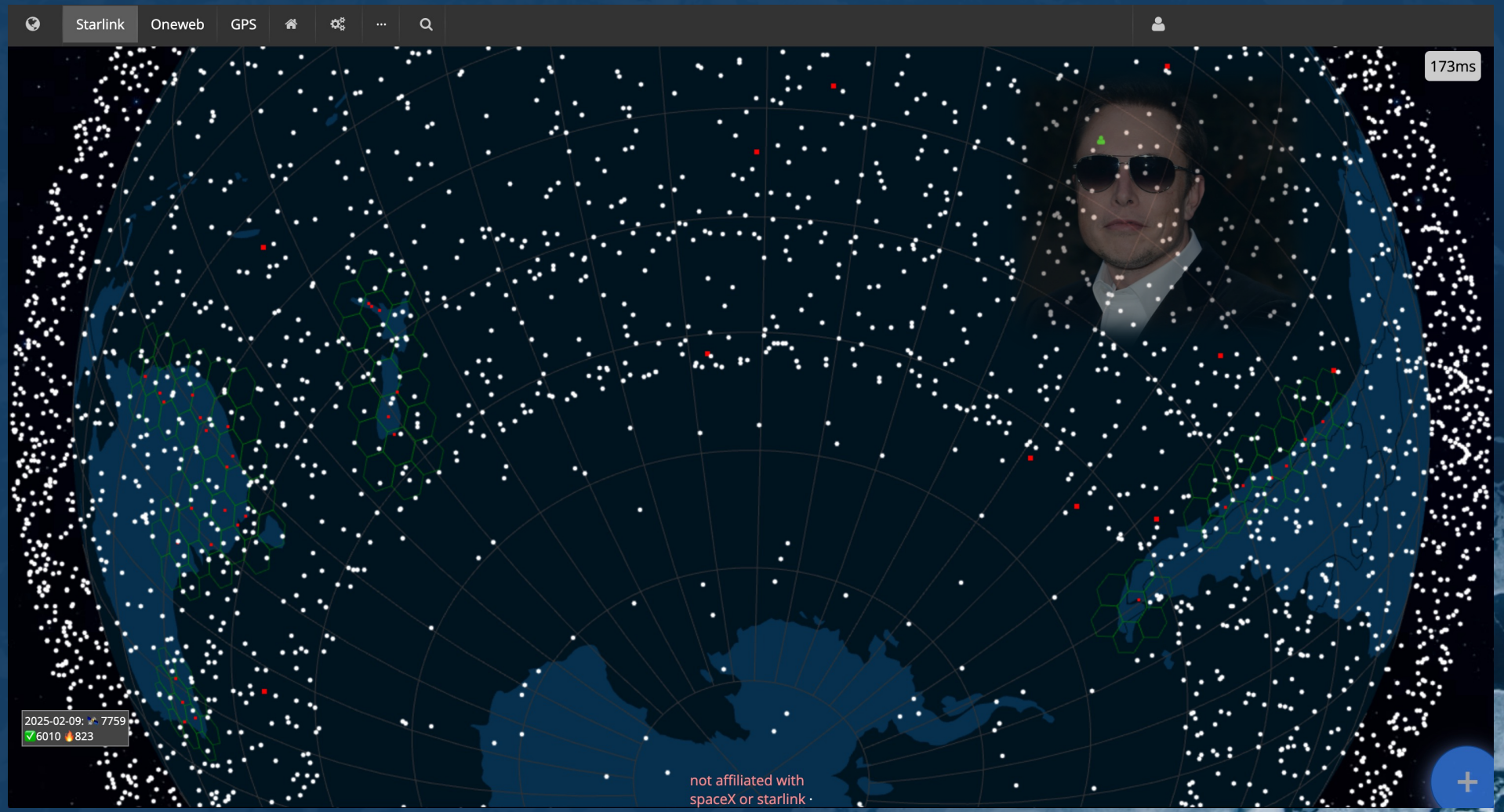
Connectivity

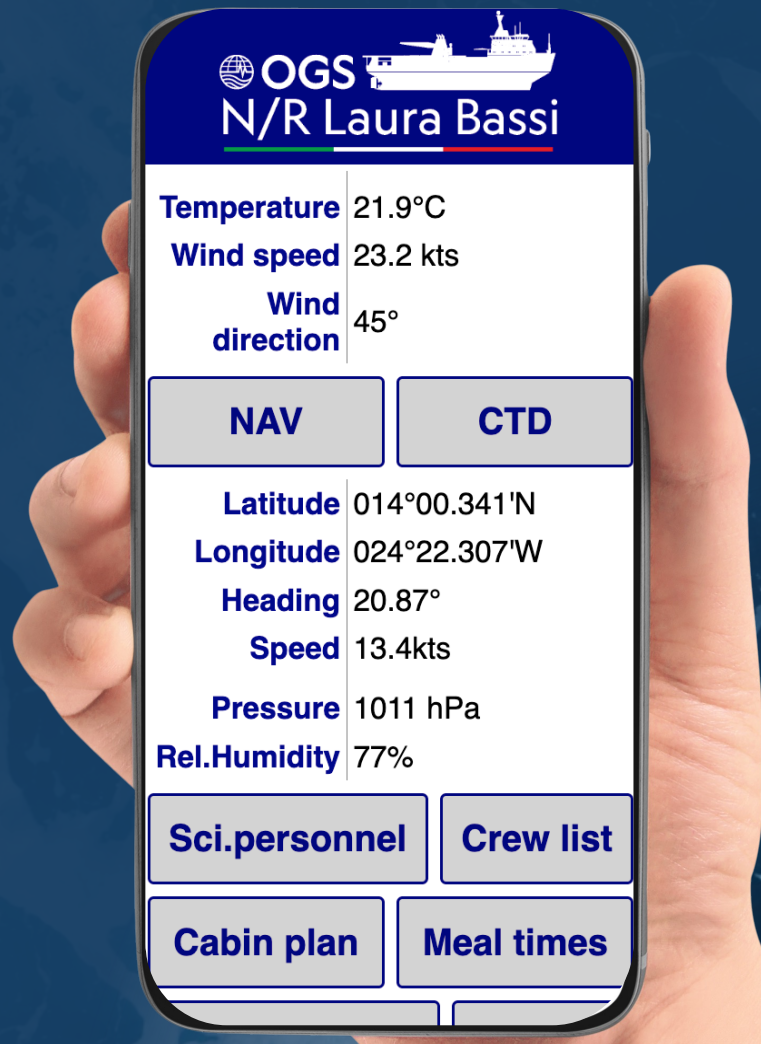
any Starlink competitors ???



Intranet

- Navigation
- Weather
- Waypoint
- ETA
- ….
- Screen sharing
- Documents

Waypoint	WUNDERBAR
ETA	23:16
Time To Go	4 days 15:28
Distance	1497 Nm (2772461 m)
Temperature	-1.9°C
Wind speed	10.3 kts
Wind direction	188°

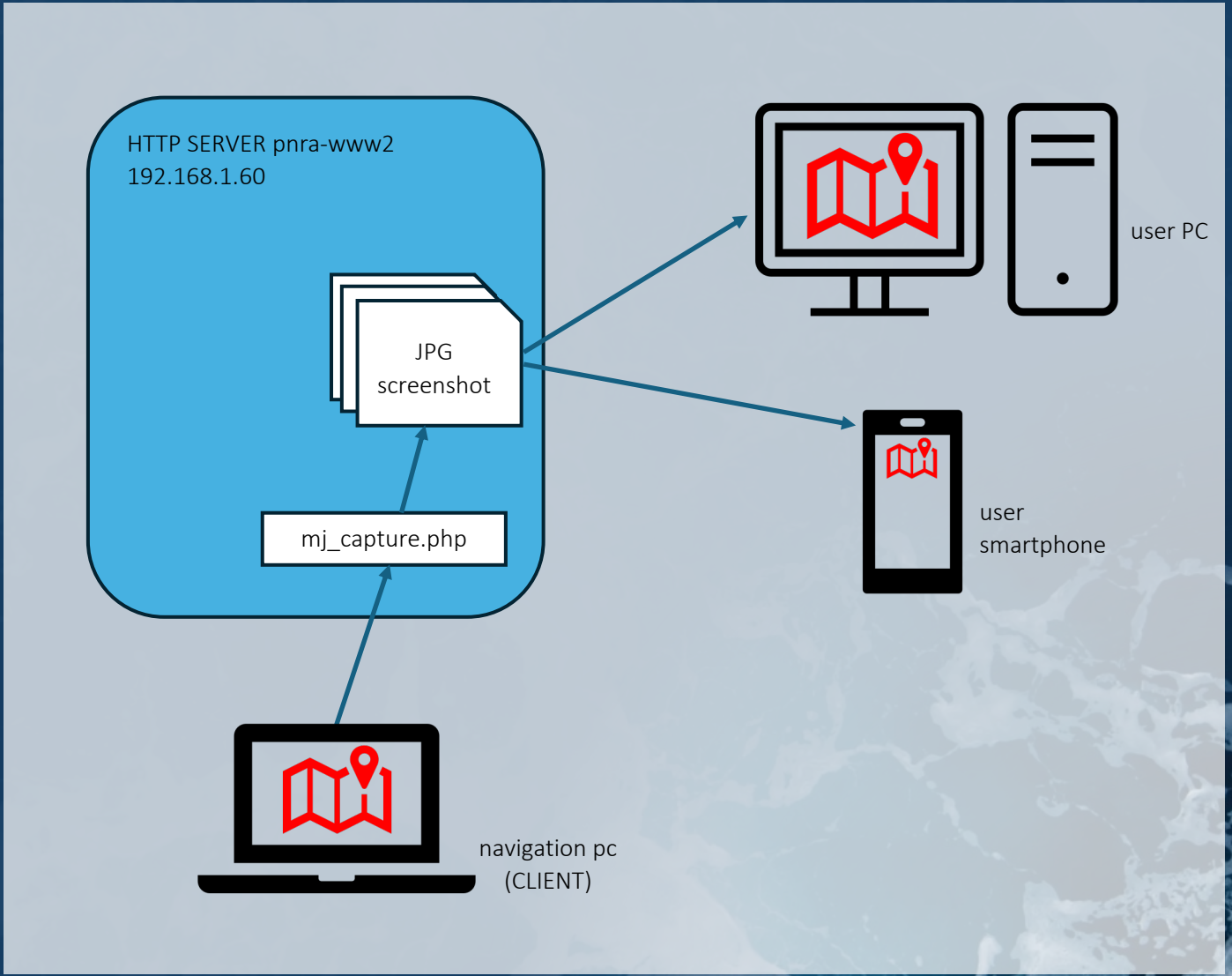


Intranet

Screen sharing system

"*mj_capture*"

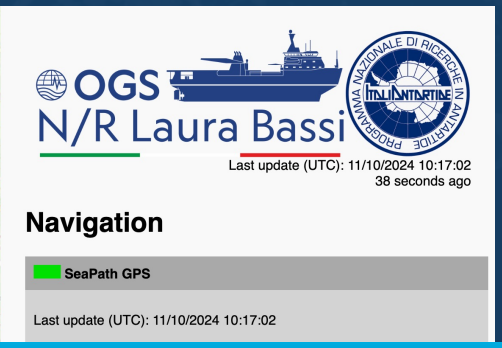
Python + PHP + Javascript

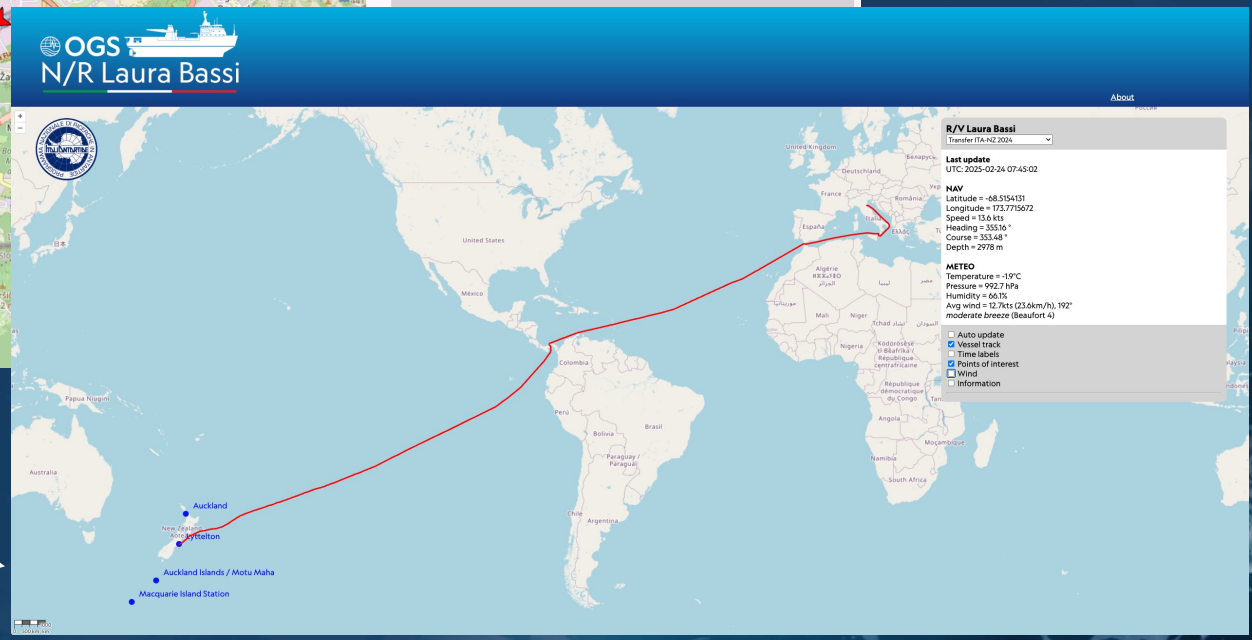


WWW

OGC services
(WMS, WFS...)

PostgreSQL DB
+
ERDDAP server





Information + Dissemination + FAIR database + ERDDAP server

"Towards a digital ship paradigm"

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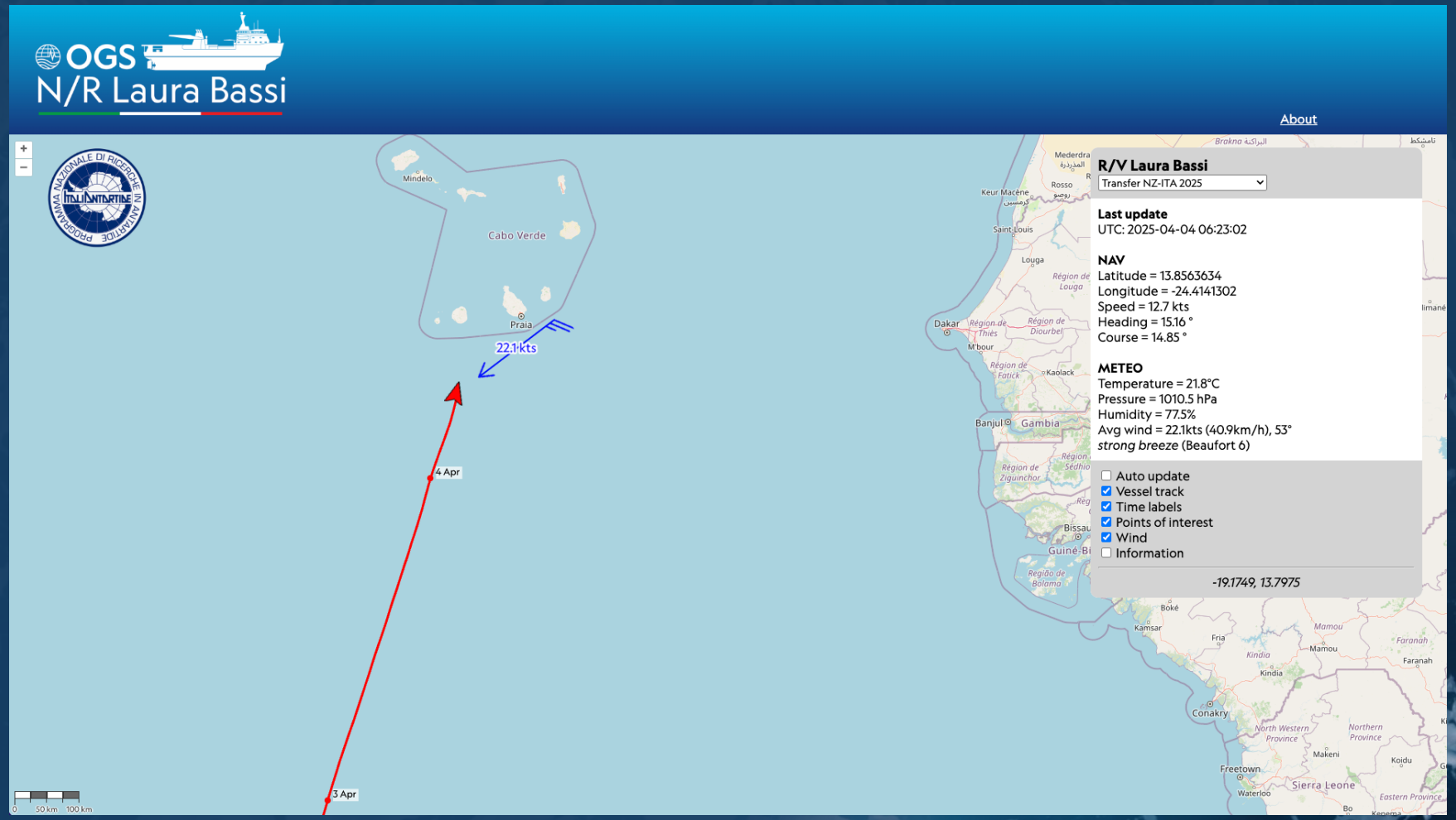
WWW

institutional website
laurabassi.ogs.it

- Realtime position
- Ship track,
- Campaign archive
- Meteo data
- Wind arrow
- Auto update



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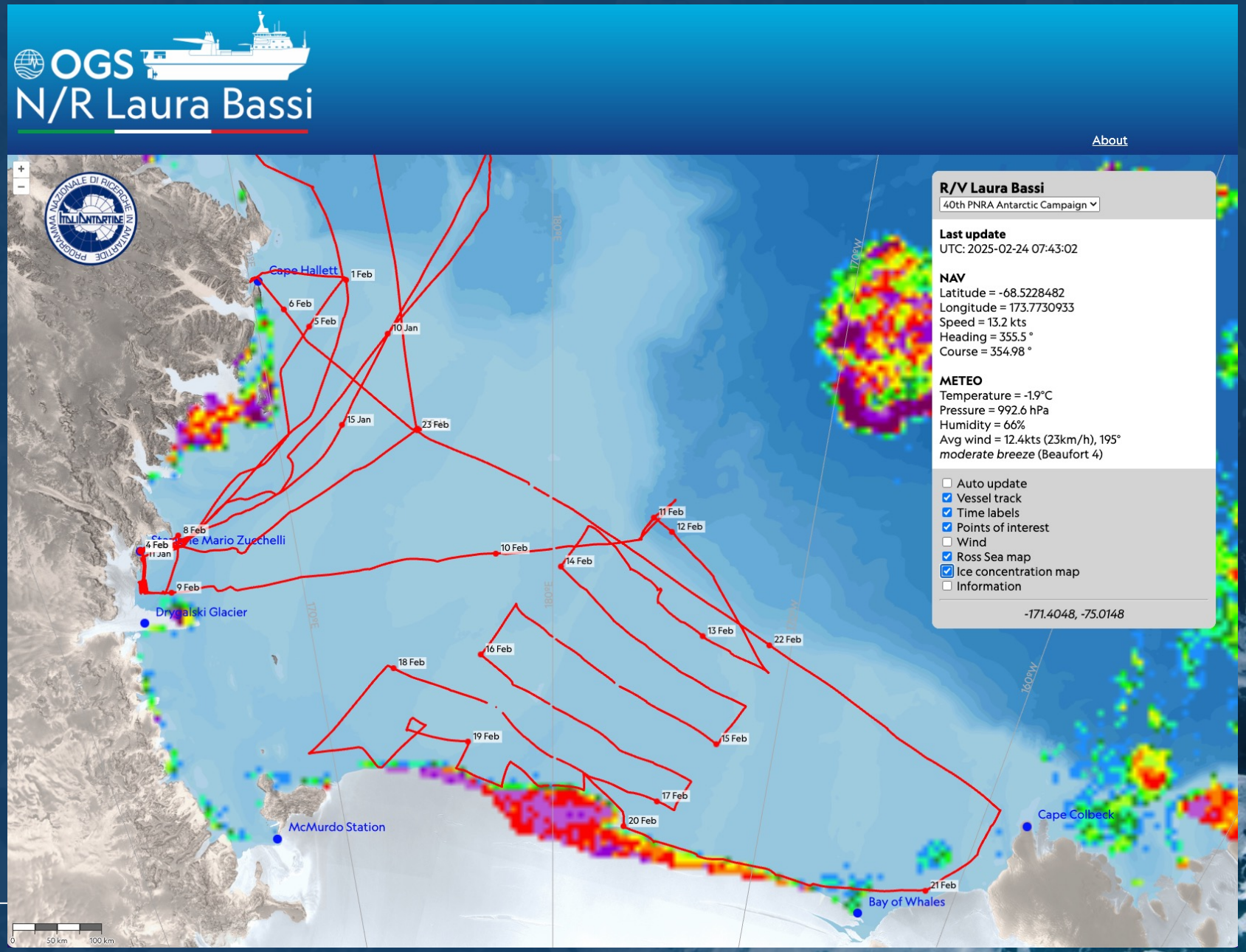
WWW

- Ice coverage maps
- Vectorial and raster maps for Antarctica
- Web Mercator and polar stereographic projections



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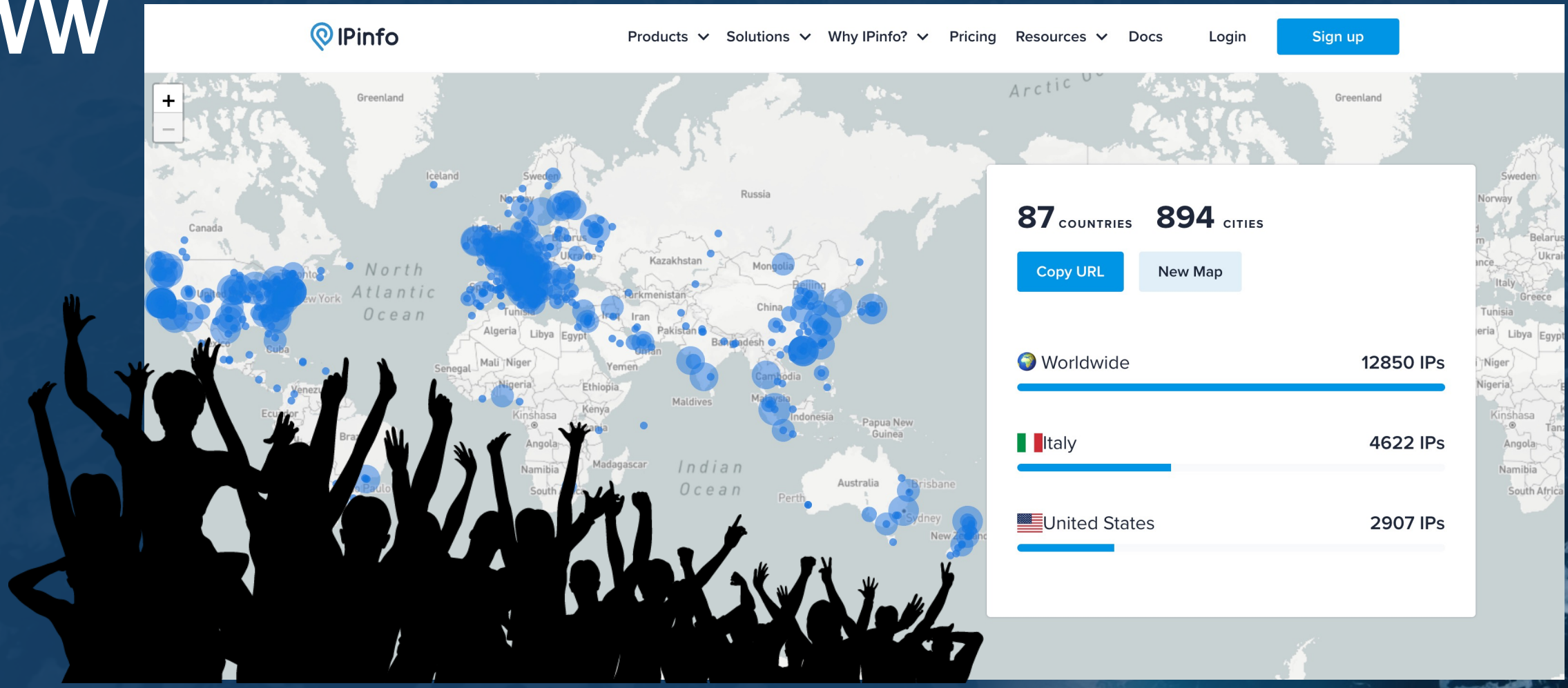
WWW



...many visitors! ☺

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Next steps

- New cameras for the baltic room
- Improvement of CCTV response time and continuity
- Better integration of the scientific network with Valmet control system and Kongsberg navigation and DP systems
- New scientific instruments with real-time / underway capabilities
- Higher levels of cybersecurity
- New backup solutions for general connectivity
- Improved web solutions for science dissemination, remote acquisition and technical management.

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Thank You!