



OGS

National Institute
of Oceanography
and Applied
Geophysics



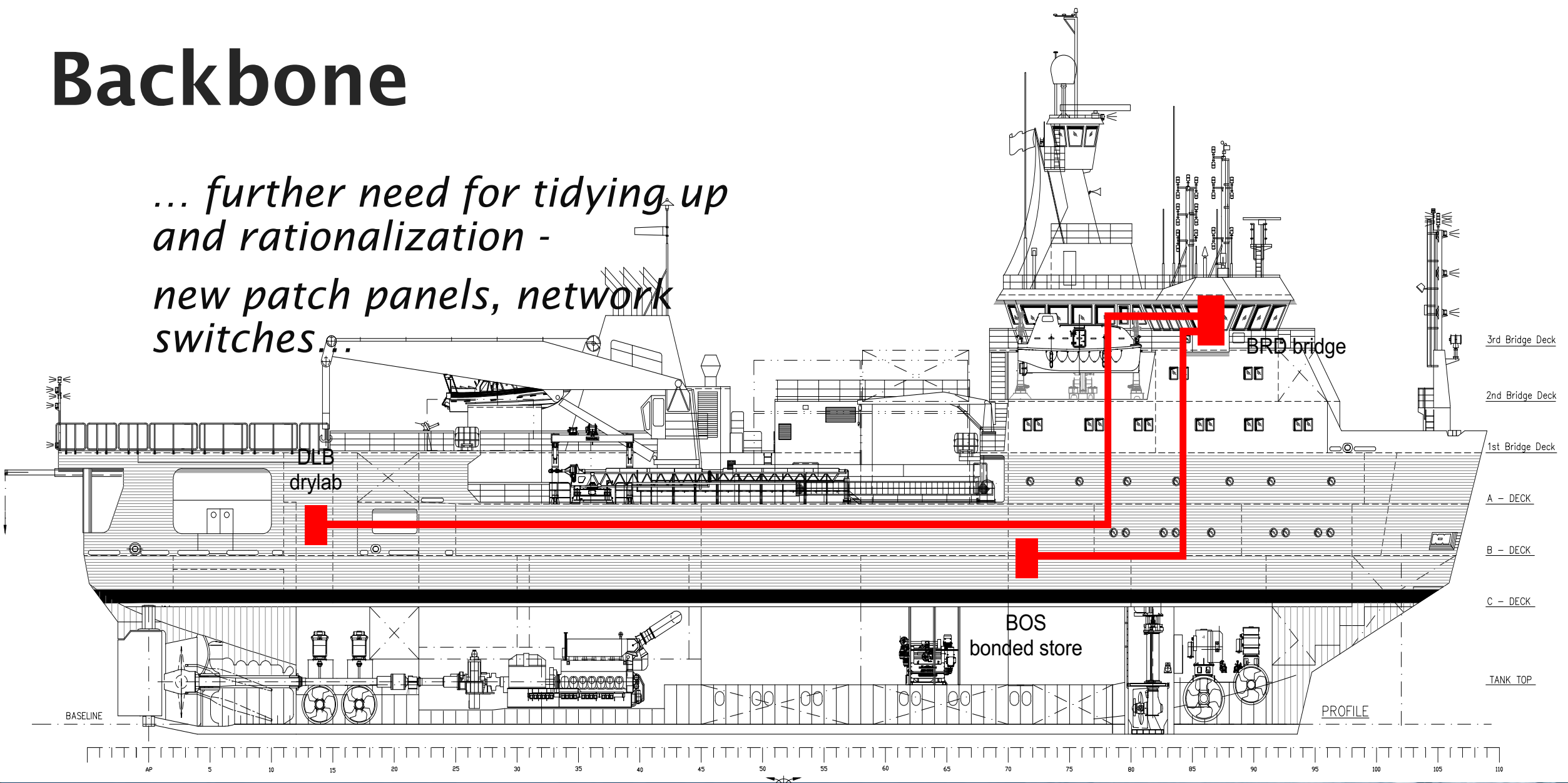
ICT upgrade for r/v Laura Bassi

Massimiliano Iurcev - OGS



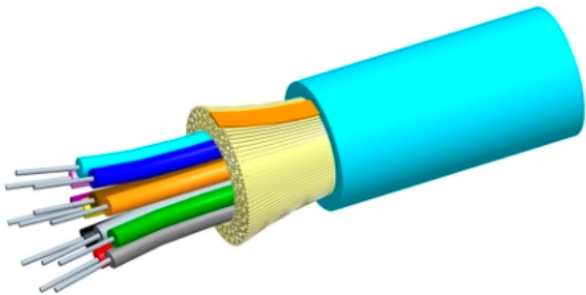
Backbone

*... 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

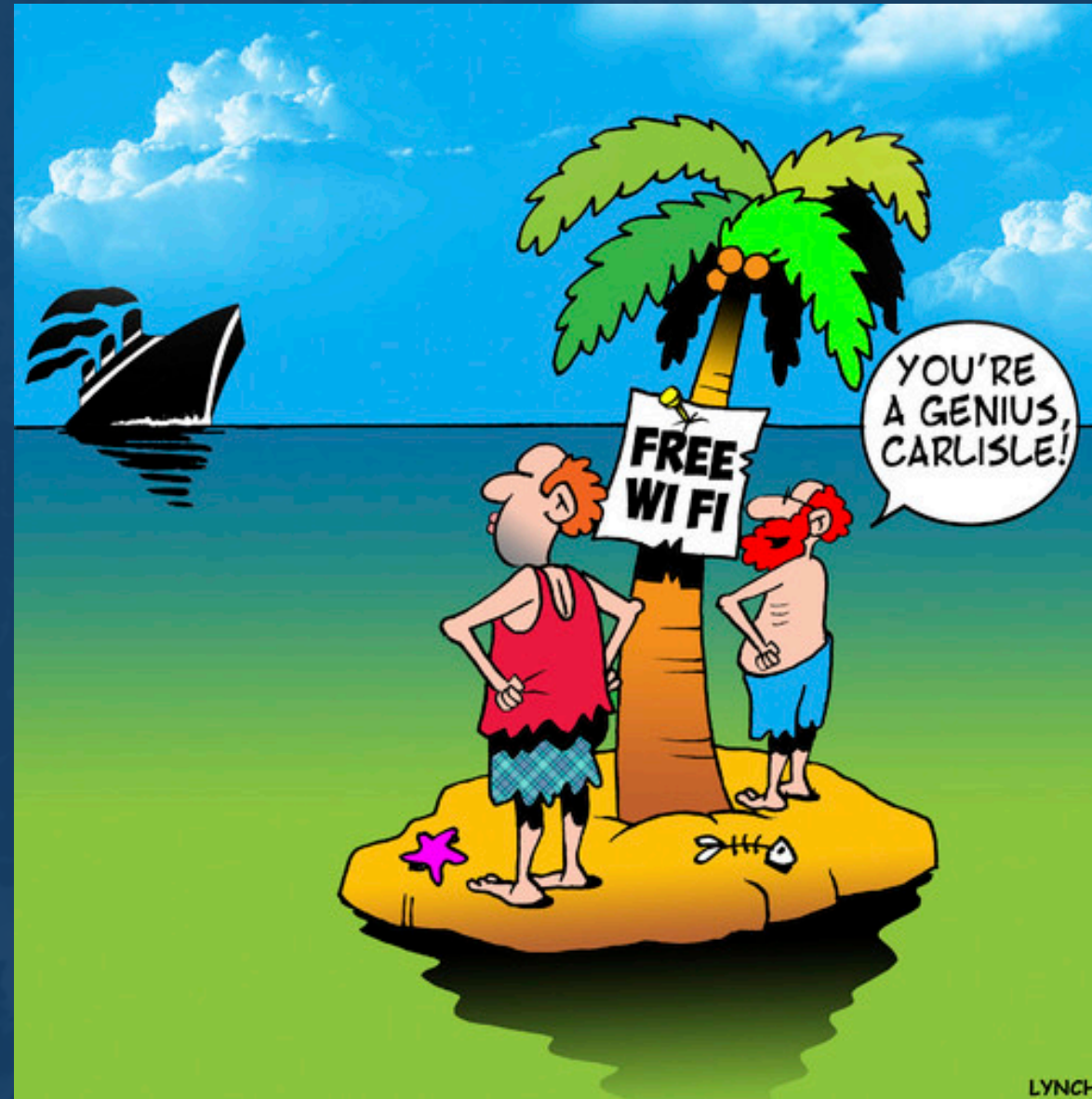
- Rack optimization and enhanced cooling system
- New Layer2 node (server room in bow area)
- New core-switch Aruba HPE 6300M (Layer3, router, DHCP server, high capacity)



WiFi

Is it THAT important?
or...

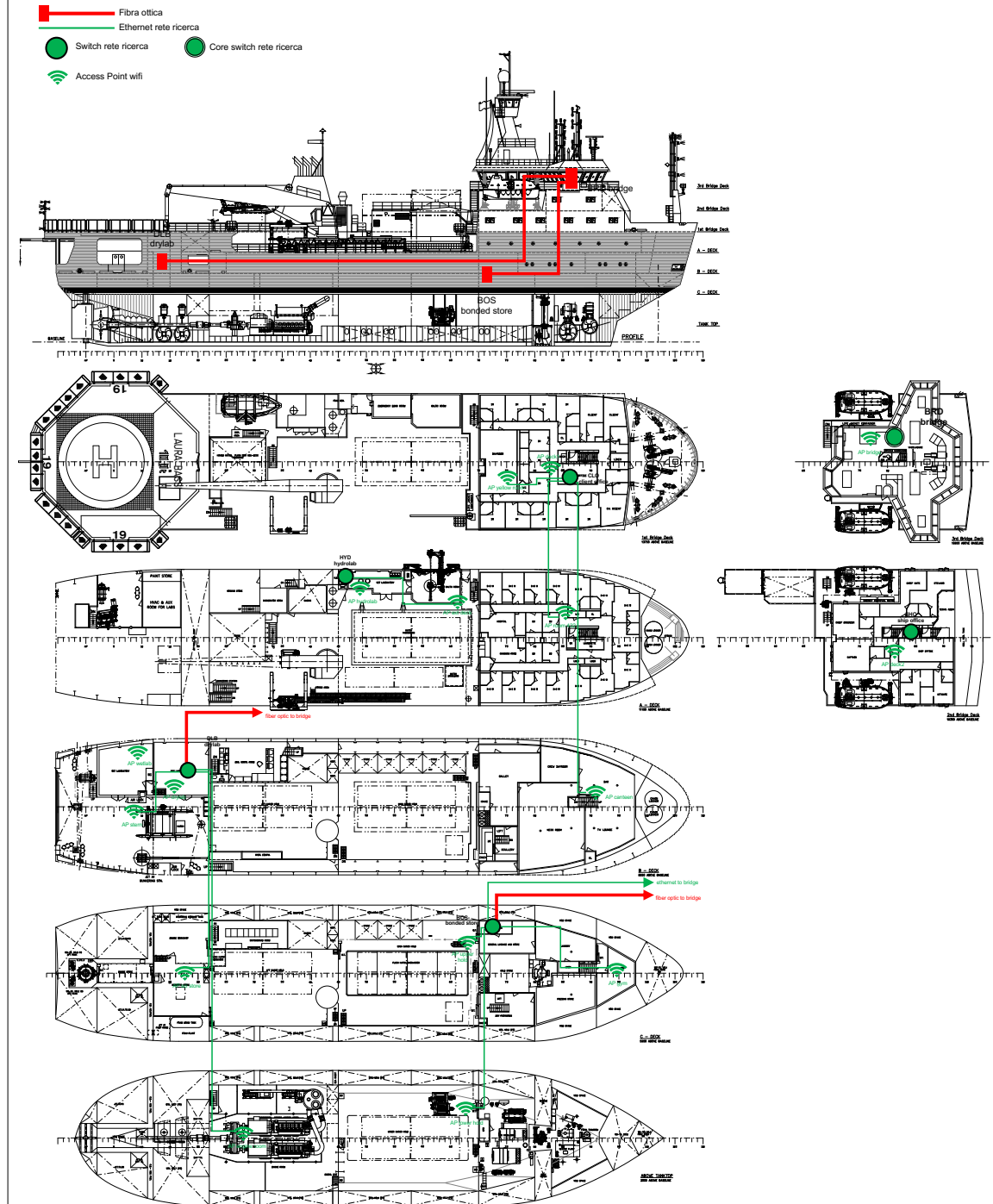
“how long would I last
without Instagram
reels?”



WiFi

Previous situation: 7 access points
New planning: 18 access points

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



WiFi



HPE Aruba APs

610 series “campus”

518 series “ruggedized”

560 series “outdoor”

WiFi

560 series “outdoor”

Operating:

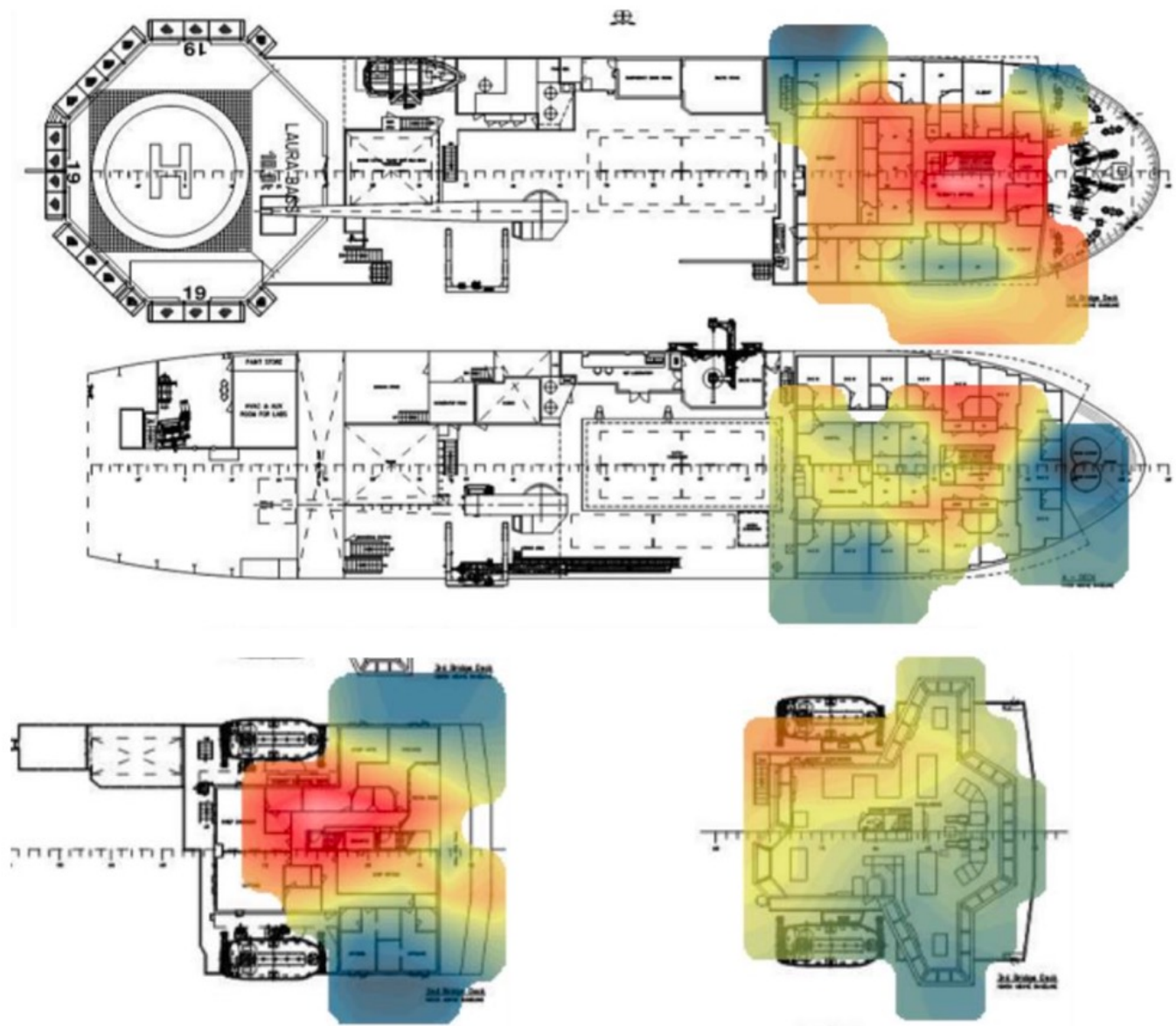
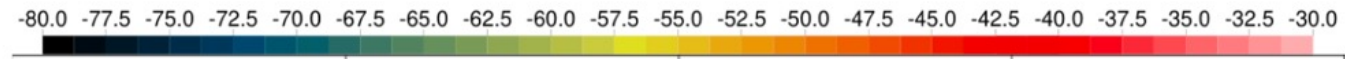
- Temperature: -40° C to +55° C (-40° F to +131° F) with full solar loading
- Humidity: 5% to 95% non-condensing internal
- Rated for operation in all weather conditions
- Water and Dust: IP66/67
- Salt Tolerance: Tested to ASTM B117-07A Salt Spray 200hrs
- Wind Survival: Up to 165 Mph
- Shock and Vibration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



WiFi

Signal quality tests
& optimization

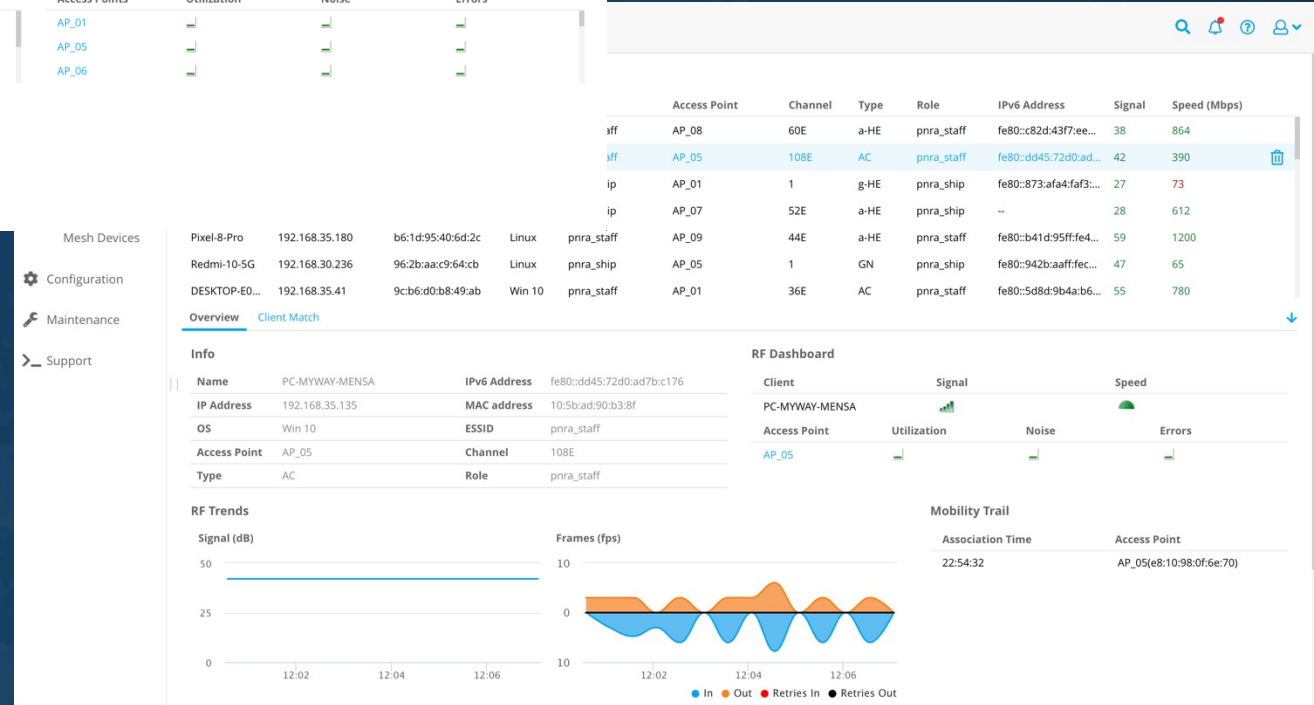
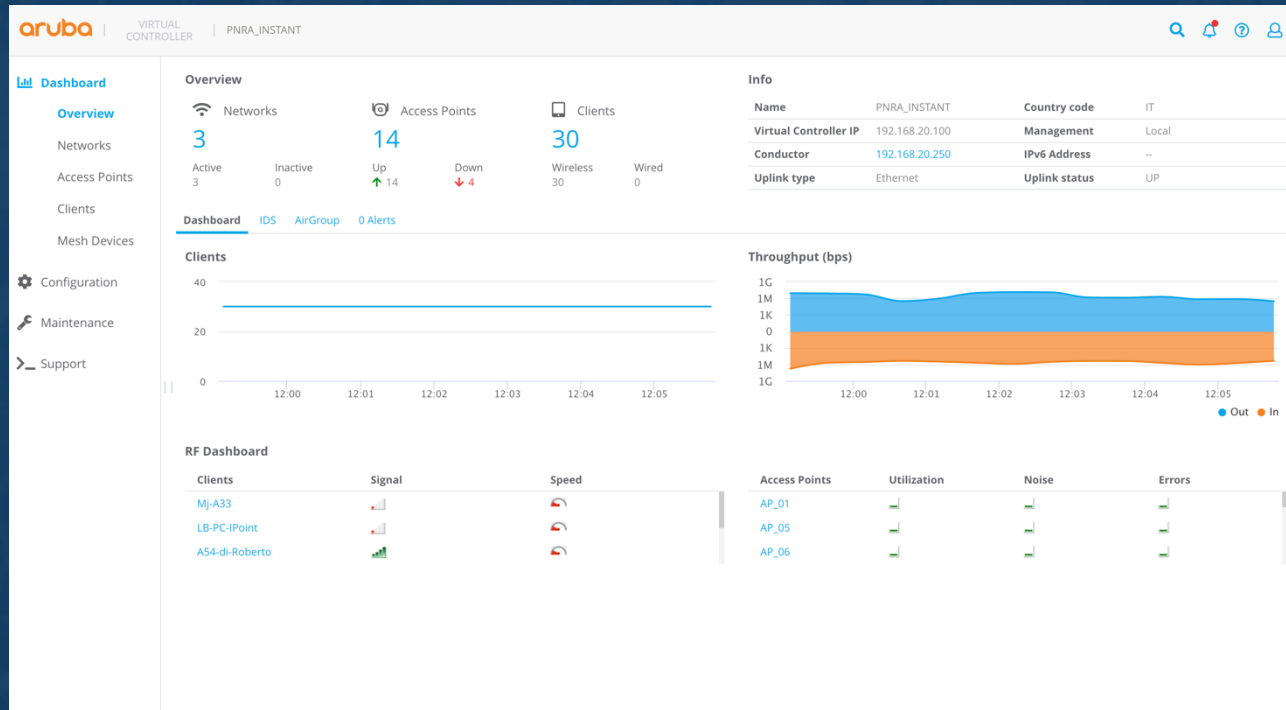
Heatmap: Signal



WiFi

Aruba Instant

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



CCTV

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



CCTV

- Bosch Remote portal

The screenshot displays the Bosch Remote Portal interface. At the top, the Bosch logo and 'Invented for life' tagline are visible. The user is logged in as 'NR Laura Bassi' with the name 'Massimiliano Iurcev' next to it. The 'Remote Portal' title is prominently displayed. Below the navigation bar, the 'Systems' section is active, showing a hierarchy for 'RV Laura Bassi TLC'. The hierarchy lists various camera locations: Aft CAM 4, Aft Side CAM 5, Bow CAM 2, Engine 1 CAM 10, Engine 2 CAM 11, Engine 3 CAM 12, Engine 4 CAM 13, Hold 2 CAM 6, LB Main Deck CAM 1, Lower Holder Aft CAM 20, Lower Holder Fore CAM 17, Port Side CAM 3, Scientific Store CAM 9, Scientific Trunk CAM 16, Stern Tube CAM 14, SwitchBoard CAM 8, ThermoTank CAM 15, Thruster CAM 18, Upper Hold Aft CAM 7, and Upper Hold Fore CAM 19. To the right, the 'RV Laura Bassi TLC' system is detailed as 'Unrestricted' with '20 Systems' and '40 Services'. It includes icons for Connectivity, Health, Services, and Updates. Below this, a 'Systems' table lists the available cameras:

Name	Type	ID	Connectivity	Health	Services
Aft CAM 4	FLEXIDOME micro 3100i - 2MP	00-07-5F-F1-0E-27	✓	✓	✓
Aft Side CAM 5	FLEXIDOME micro 3100i - 2MP	00-07-5F-F1-0E-1F	✓	✓	✓

The screenshot shows the live video feed from the 'FLEXIDOME micro 3100i - 2MP' camera. The interface includes a top navigation bar with 'Live' and 'Playback' tabs, and a right sidebar with 'Configuration', 'Dashboard', 'Links', 'Logout', and a help icon. The main video area shows a wide-angle view of the ship's deck, featuring various equipment, yellow barrels, and a yellow safety barrier. The text 'LB Aft Side CAM 5' is overlaid on the bottom left of the video feed. The Bosch logo is visible in the top right corner of the interface.

Weather station

Vaisala WXT536

- Wind speed/direction
- Pressure
- Temperature
- Rel. Humidity
- Rain and Hail
- Sensor heating
- Operating environment from -52° to $+60^{\circ}$



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!

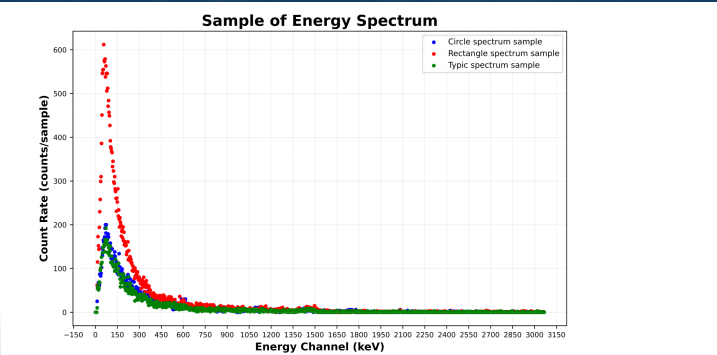


Fig. 3 Recorded gamma spectra variation

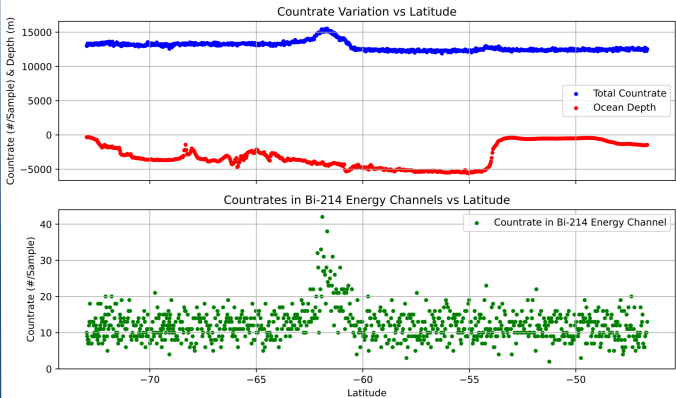


Fig. 4 Count rate and parameters variation

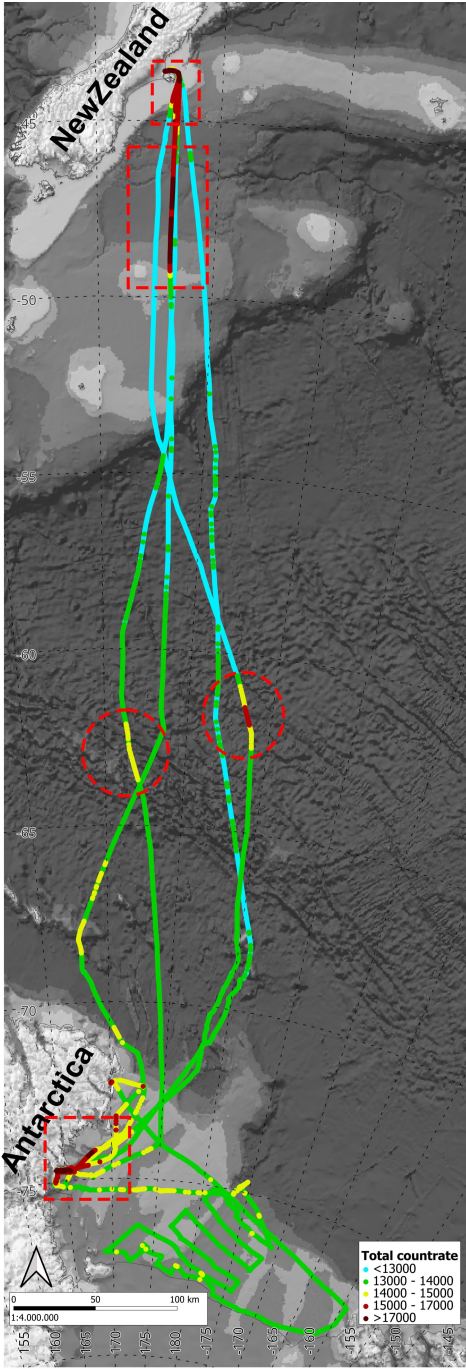
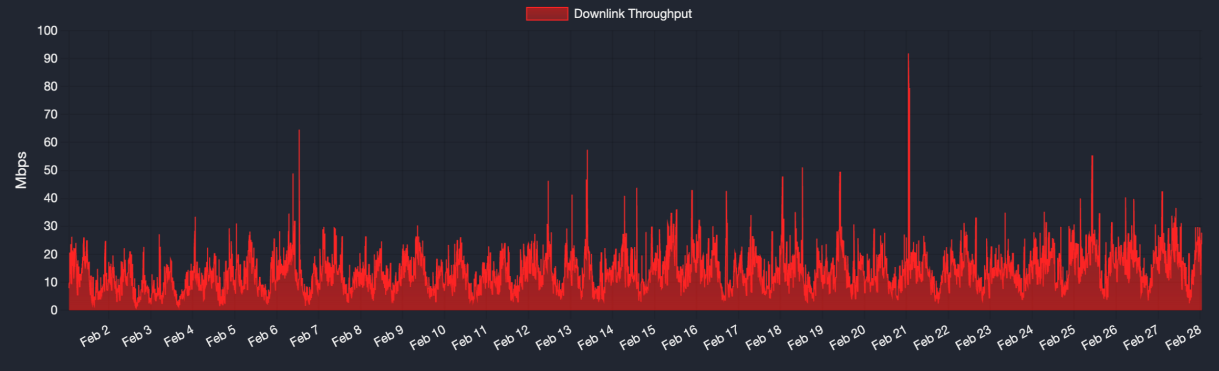


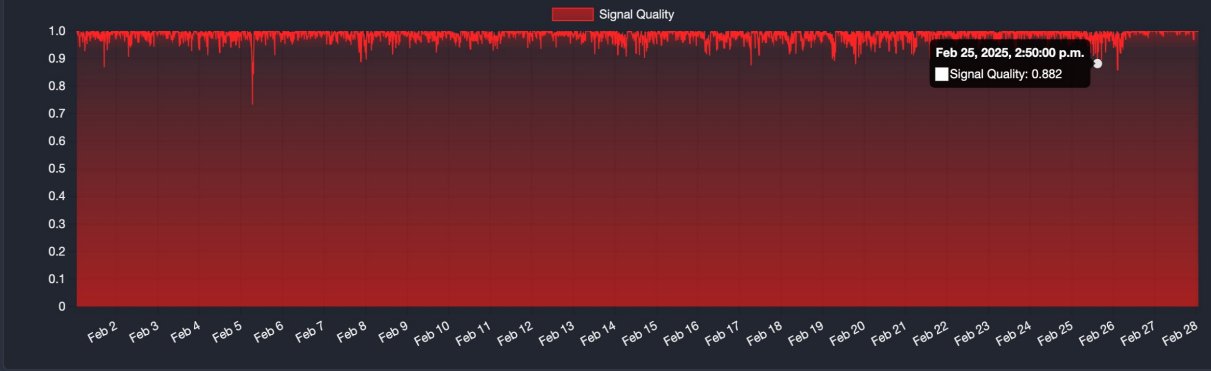
Fig. 2 Vessel routes and anomalies location

Connectivity

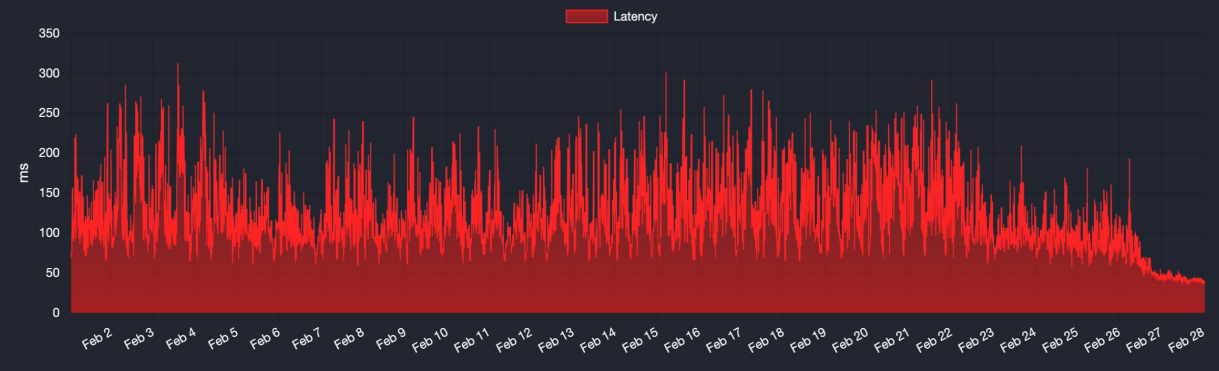
Downlink Throughput



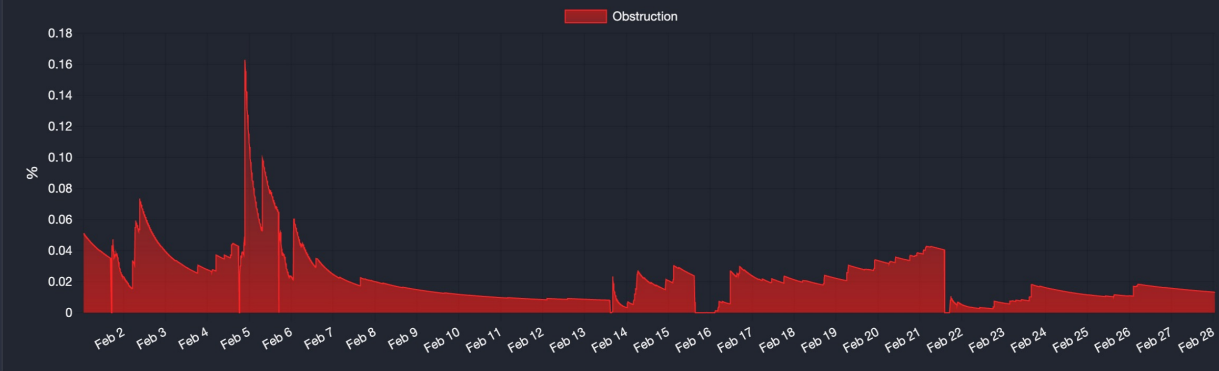
Signal Quality



Latency



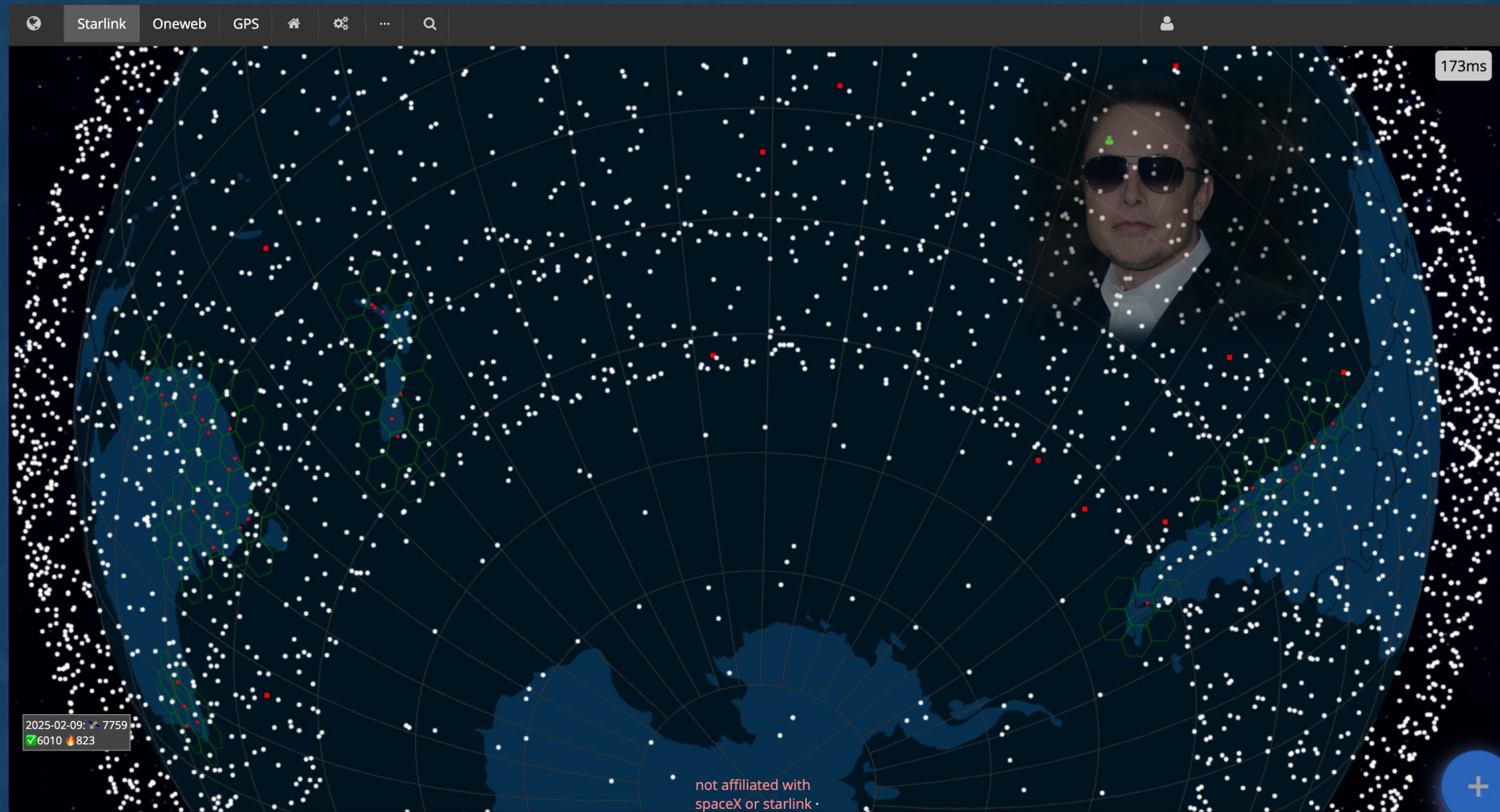
Obstruction



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

Connectivity


any Starlink
competitors
???



Intranet

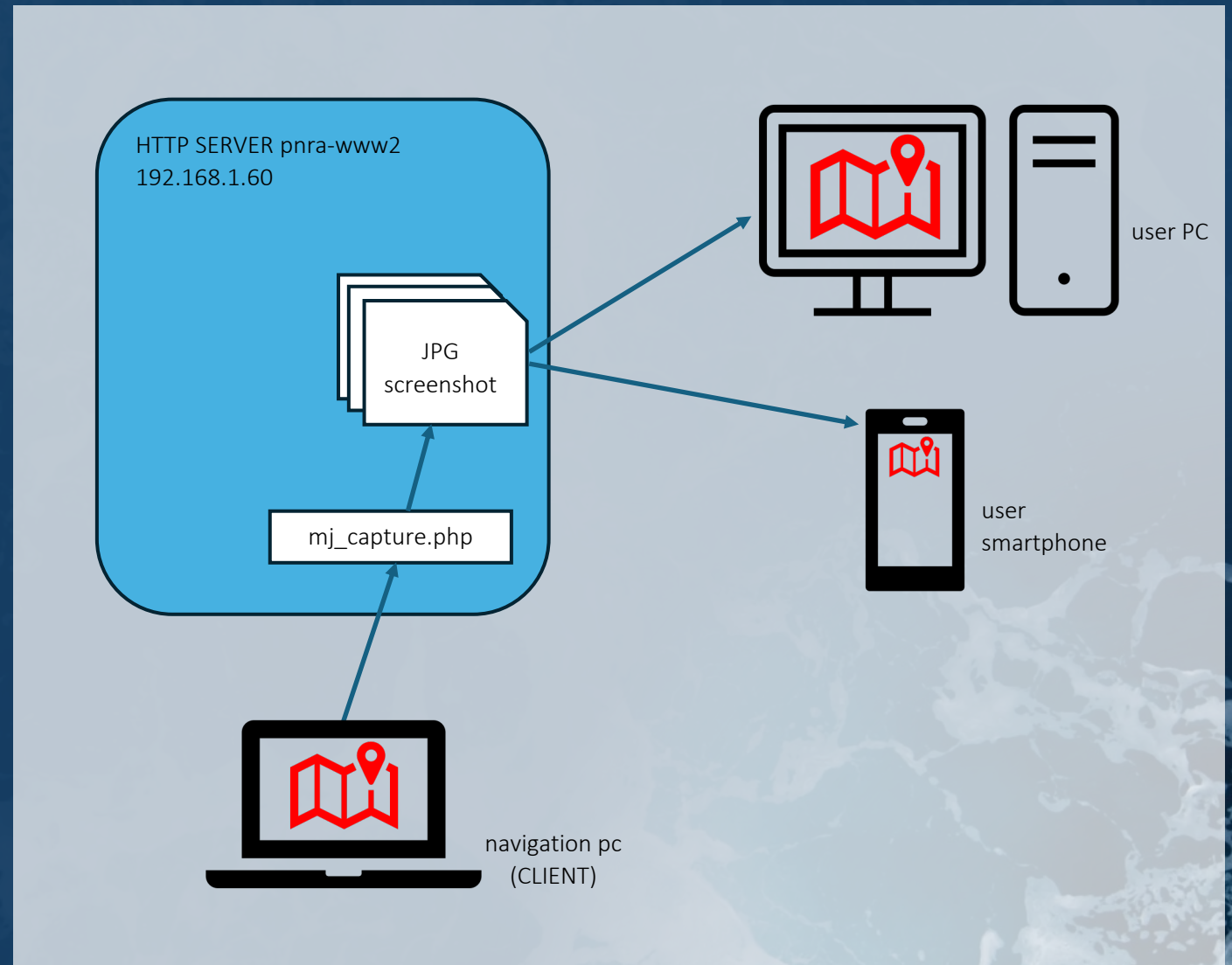
- Navigation
- Weather
- Waypoint
- ETA
-
- Screen sharing
- Documents

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°

 OGS N/R Laura Bassi	
Temperature	21.9°C
Wind speed	23.2 kts
Wind direction	45°
NAV	CTD
Latitude	014°00.341'N
Longitude	024°22.307'W
Heading	20.87°
Speed	13.4kts
Pressure	1011 hPa
Rel.Humidity	77%
Sci.personnel	Crew list
Cabin plan	Meal times

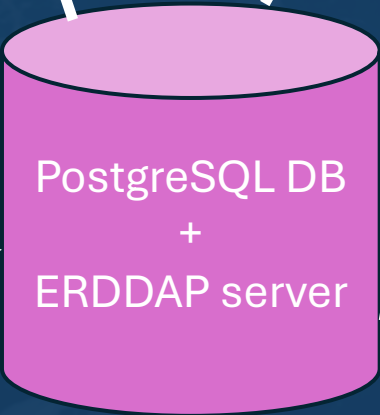
Intranet


Screen sharing system
“*mj_capture*”
Python + PHP + Javascript





WWW

OGC services
(WMS, WFS...)



**OGS**
N/R Laura Bassi

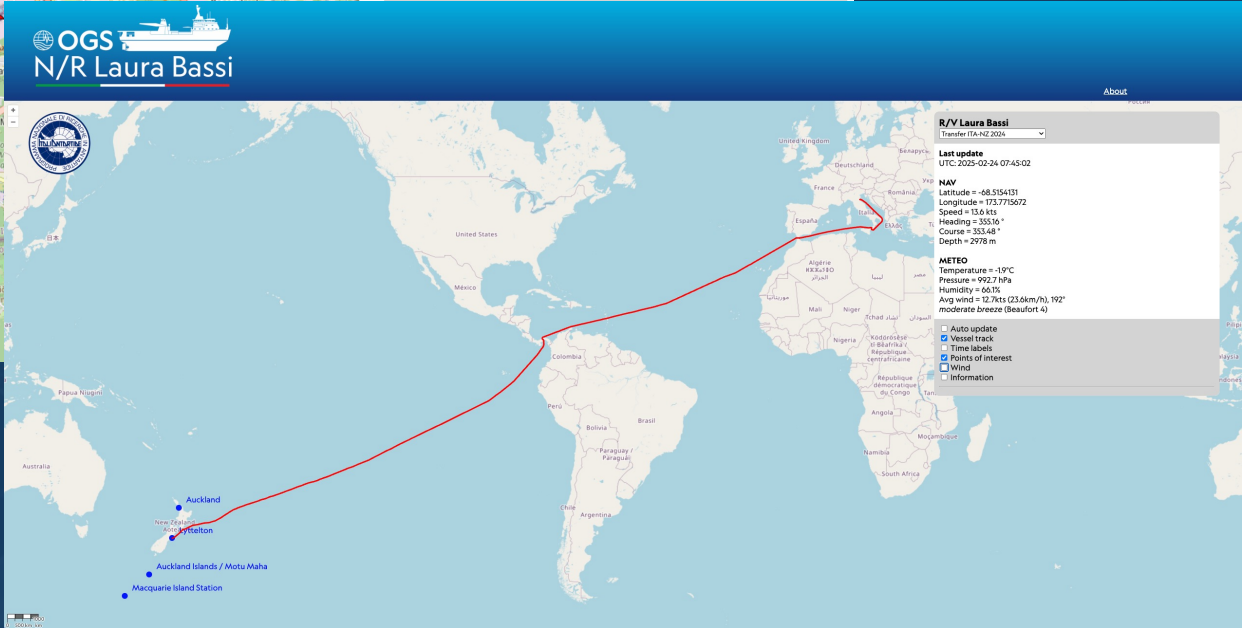


Last update (UTC): 11/10/2024 10:17:02
38 seconds ago

Navigation

SeaPath GPS

Last update (UTC): 11/10/2024 10:17:02



Information + Dissemination + FAIR database + ERDDAP server

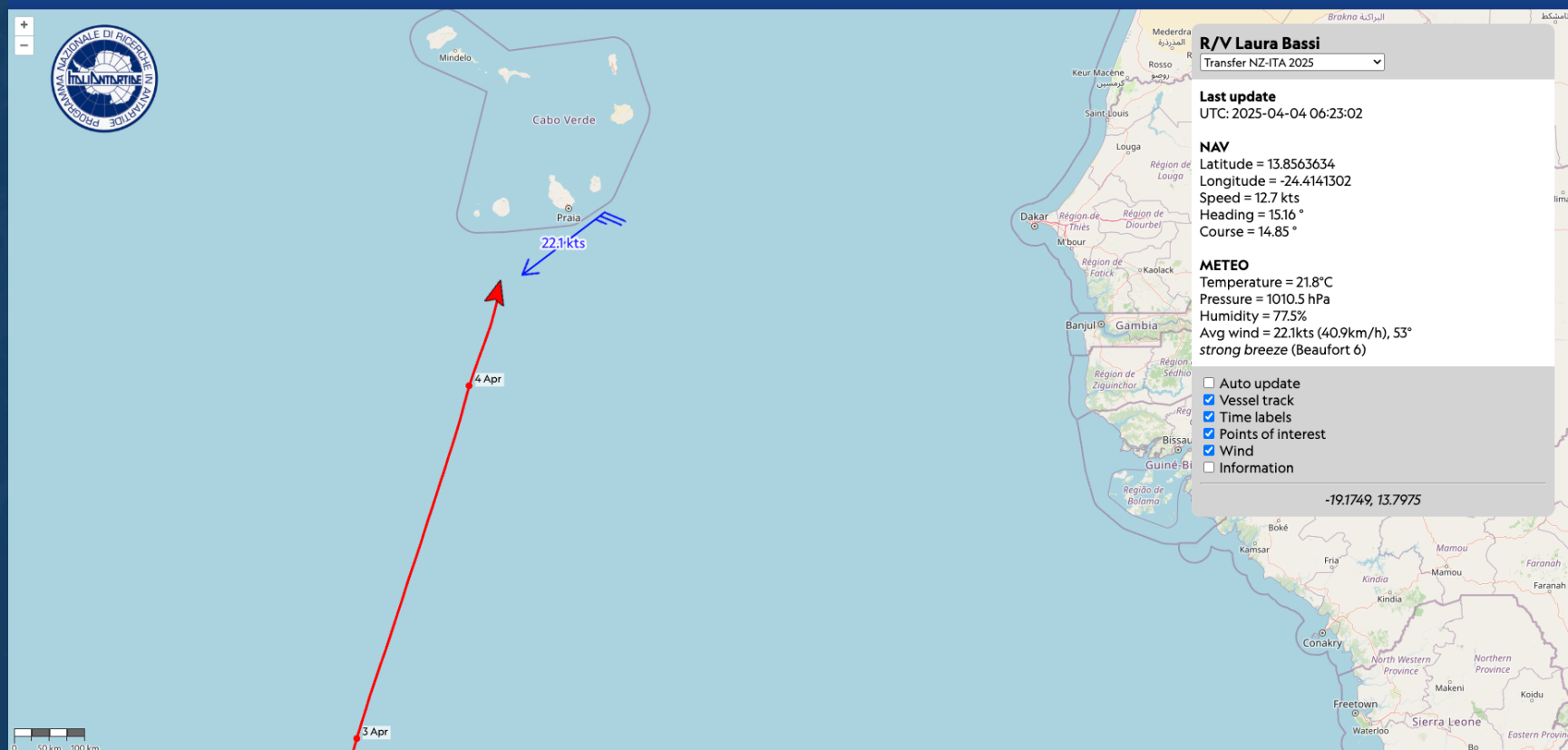
“Towards a digital ship paradigm”

WWW

institutional website
laurabassi.ogs.it

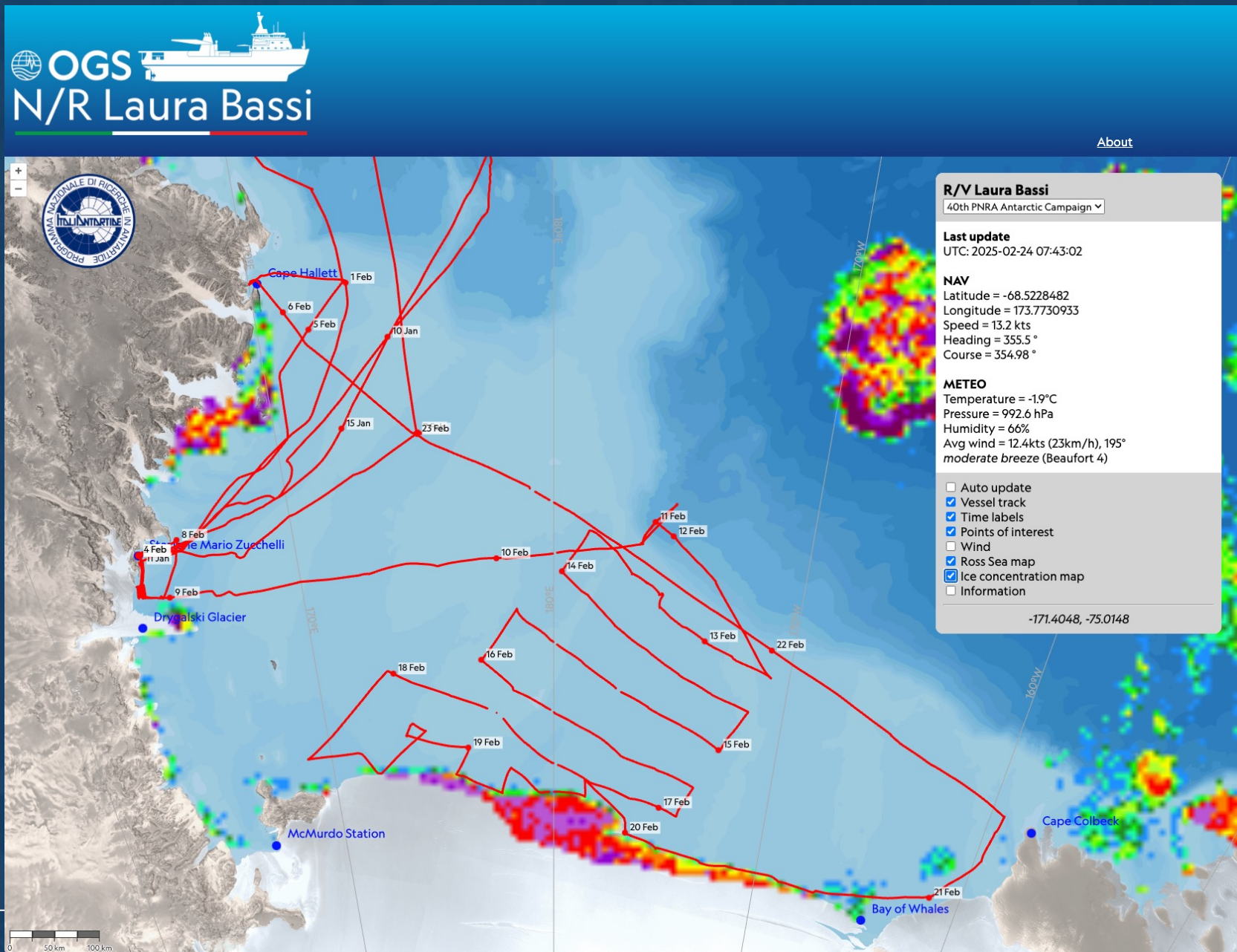
- Realtime position
- Ship track,
- Campaign archive
- Meteo data
- Wind arrow
- Auto update

OGS
N/R Laura Bassi



WWW

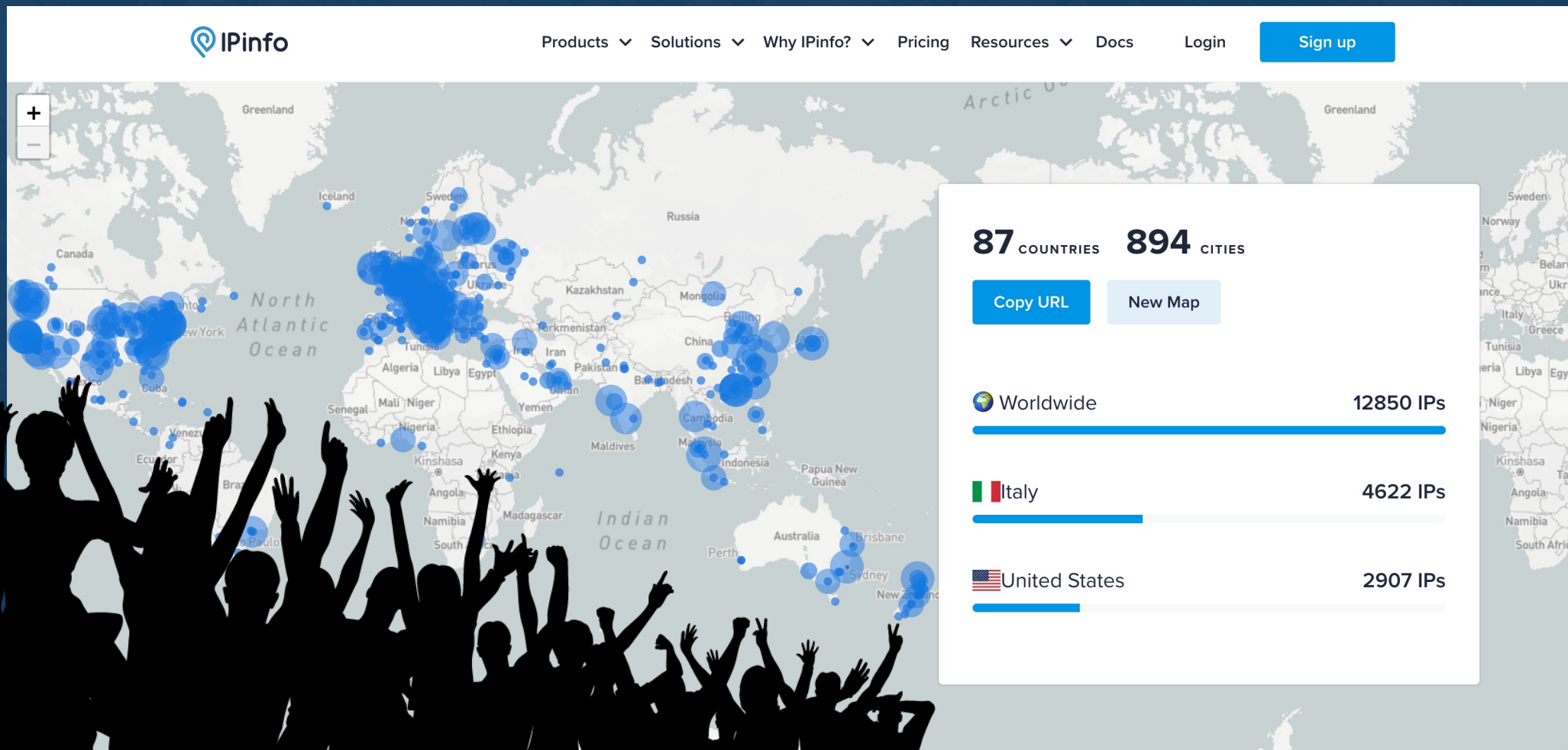
- Ice coverage maps
- Vectorial and raster maps for Antarctica
- Web Mercator and polar stereographic projections



WWW



...many visitors! 😊



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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Massimiliano Iurcev
miurcev@ogs.it

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Thank You!