



CAMPAIGN DEPLOYMENT REPORT (LEIXÕES – LOTE 2)

EOL-LO208-V02

03/07/2025



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REVISIONS:			
Revision:	Modification causes:	By:	Date:
01	Document Creation	Ignasi Andreu	03/07/2025
VERSION	Choose an item		Click for date.
VERSION	Choose an item		Click for date.

CONTENTS

1.	Introduction	5
2.	Overview.....	5
2.1.	Buoy Specifications	5
2.2.	As Laid Mooring.....	6
2.3.	Installation Locations.....	9
3.	Vessel.....	10
4.	Recovery Operation.....	11
4.1.	Personnel Onboard	11
4.2.	Weather forecast	12
4.3.	Procedure.....	12
5.	HSE	18
5.1.	Project risk assessment and method statement	18
5.2.	Vessel inductions and emergency drills	18
5.3.	HIRA meeting & Toolbox talk	18
5.4.	Incidents, accidents, and near misses	18
6.	Daily Progress Report	19
7.	Appendix 1: Site Acceptance Test (SAT).....	21

Figures

Figure 1: FLS200 E10 general arrangement.	5
Figure 2: Standard upper mooring lay out and auxiliary/recovery line connection distance.	6
Figure 3: Leixões site mooring layout.	7
Figure 4: Leixões site location on map.	9
Figure 5: Vessel selected for the operation and its specifications.	10
Figure 6: Vessel fore crane diagram.	11
Figure 7: 38mm chain spooled onto the main winch drum.	12
Figure 8: Deck arrangement (1/2).	13
Figure 9: Deck arrangement (2/2).	13
Figure 10: Scheme for the deployment of the 10-meter upper mooring chain.	14
Figure 11: Buoy deployed and being moved near the bow roller.	14
Figure 12: Midline floaters deployed.	15
Figure 13: Clump weight being lifted using the vessel crane.	16
Figure 14: Vessel sound showing the actual depth of the site.	17
Figure 15: FLS200 E10 deployed at Leixões site.	17
Figure 16: June 20, 2025 Daily Progress Report.	20
Figure 17: Site Acceptance Test Report (1/6).	22
Figure 18: Site Acceptance Test Report (2/6).	23
Figure 19: Site Acceptance Test Report (3/6).	24
Figure 20: Site Acceptance Test Report (4/6).	25
Figure 21: Site Acceptance Test Report (5/6).	26

Figure 22: Site Acceptance Test Report (6/6).....	27
Figure 23: FLS200 E10 AIS signal.....	28

Tables

Table 1: FLS200 E10 main dimensions.....	5
Table 2: Bill of material.....	8
Table 4: FLS200 Buoy Coordinates.....	9
Table 5: People involved in the offshore operations.....	11
Table 6: Weather conditions during the operations.....	12
Table 7: Hazard observations.....	18
Table 8: Site Acceptance Test details.....	21
Table 9: Instruments tested.....	21

1. Introduction

EOLOS Floating Solutions has successfully completed the deployment of its metocean buoy unit FLS200 E10 at the Leixões site for the LNEG wind and metocean measurement campaign.

This document provides a summary of the buoy commissioning at its installed location offshore during the 20th of June 2025.

All relevant information regarding the offshore operation is explained in this document.

2. Overview

This section describes the buoy and mooring characteristics and provides the coordinates where the buoy was deployed.

2.1. Buoy Specifications

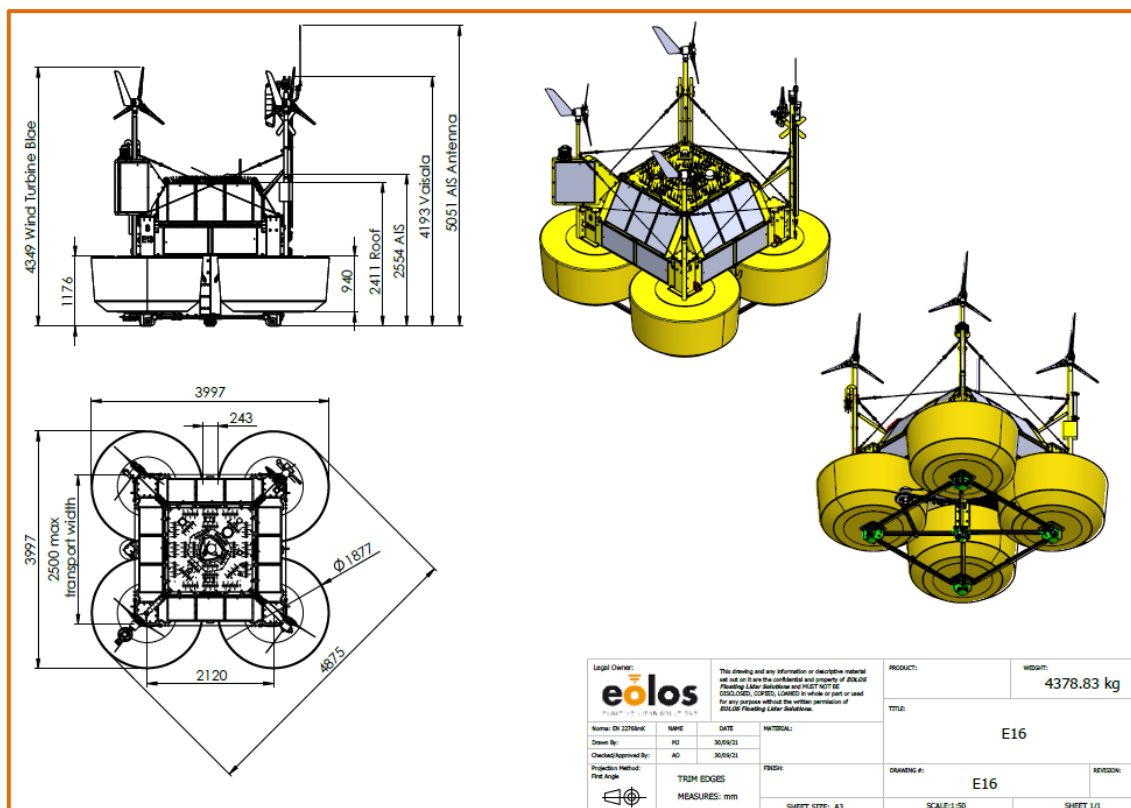


Figure 1: FLS200 E10 general arrangement.

EOLOS FLS200 buoy main dimensions (mm)		
A	External width with floaters	3997
B	Max. diagonal width (with floaters)	4878
C	Total height with masts (including wind generator)	5300
D	Total height without masts	2551
E	Height from floaters deck to the top of buoy cover	1250
F	The minimum distance between the floater deck and the wind generator	2150

Table 1: FLS200 E10 main dimensions.

2.2. As Laid Mooring

The EOLOS FLS200 E10 buoy at the Leixões site has a standard mooring assembly, common for all units, and a site-specific mooring design.

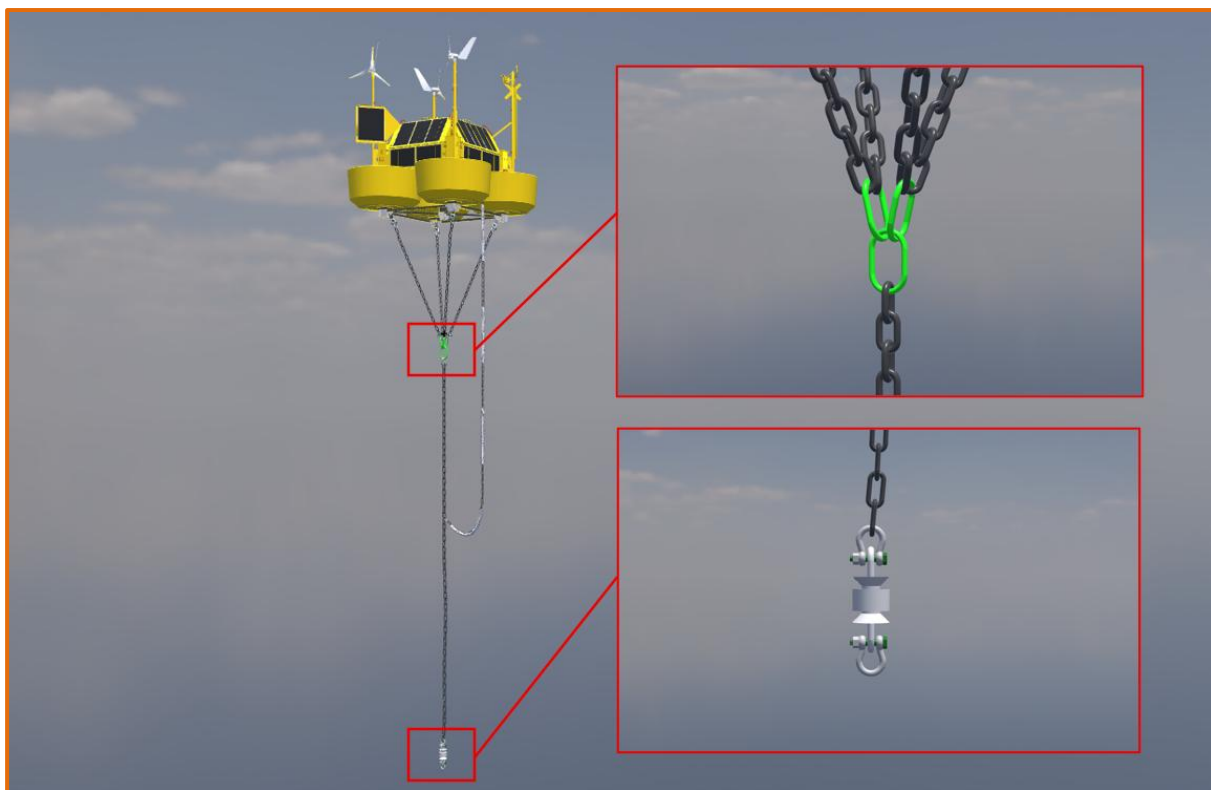


Figure 2: Standard upper mooring lay out and auxiliary/recovery line connection distance.

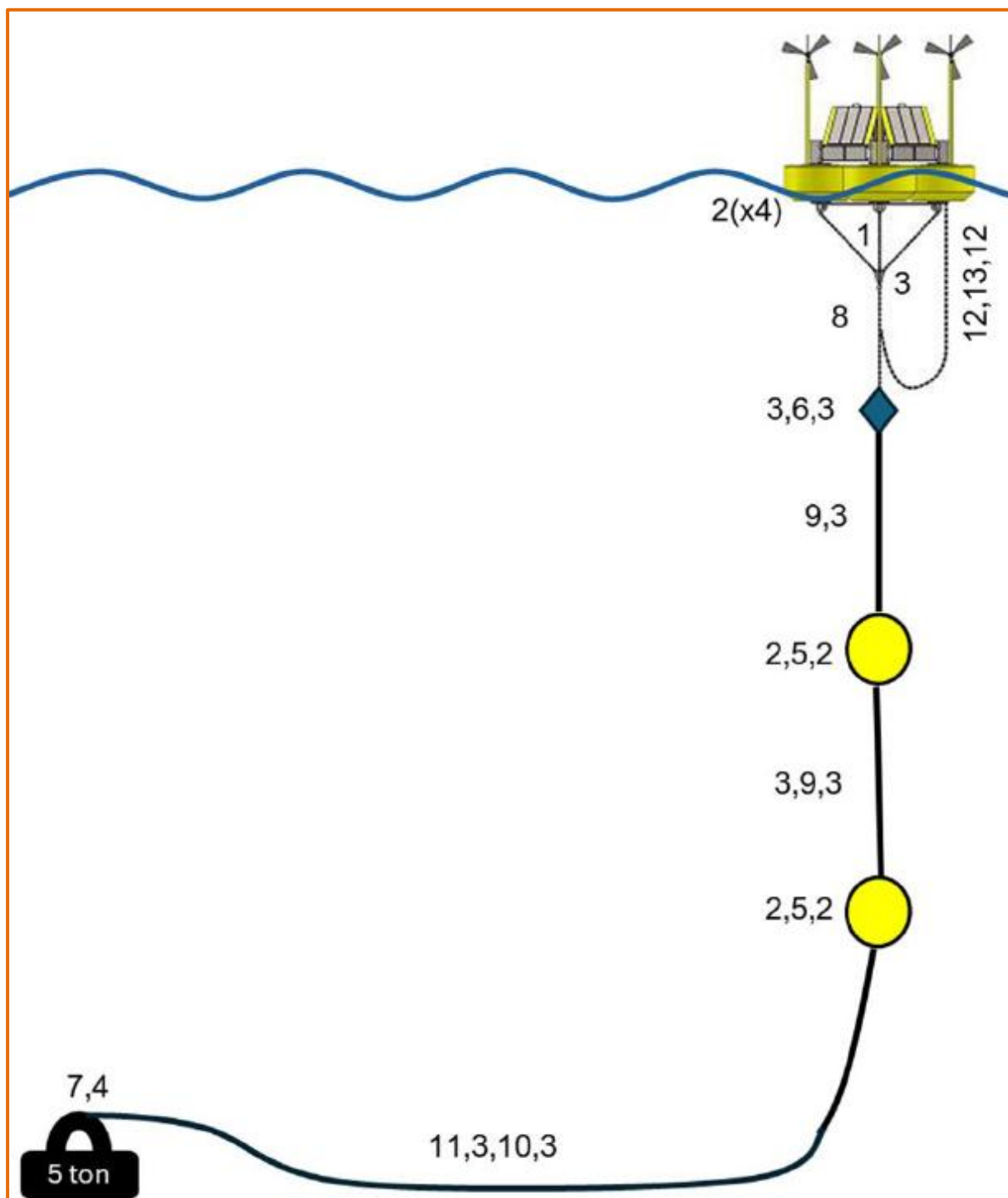


Figure 3: Leixões site mooring layout.

Client		LNEG		
Document ref		EOL-ML-LO2		
REVISION		0		
CREATED BY		17/12/2024	WATER DEPTH 94 m	
SITE		LO2	E10	
Item	Qty	Equipment	SWL [kN]	Length [m]
		FLS200 Standard Mooring Assembly		
		EOLOS FLS200		
1	1	26mm, 4-Leg chain to 1-Chain Assambly	150	4
2	8	12t SWL Safety bow shackle	118	0,2
		MOORING BRIDLE		
3	8	13.5T Safety bow shackle	135	0,2
4	1	25T Safety bow shackle	245	0,3
5	2	230kg Net Buoyancy Midline Buoy	215	1,3
6	1	38mm SWIVEL ASSEMBLY (SWL 20.5t)	201	0,3
7	1	STEEL CLUMP WEIGHT 5,0 t		
8	1	28mm stabilizing chain	175	10
9	2	28mm G2 STUDLESS CHAIN	175	40
10	1	32mm G2 STUDLESS CHAIN	234	150
11	1	38mm G2 STUDLESS CHAIN	336	150
		AUXILIAR RECOVERY LINE		
13	2	6.5T Safety bow shackle	63	0,1
14	1	16 mm G2 STUDLESS CHAIN	132	10
Designed by:		A. Herrera		
Approved by:				
Date:				

Table 2: Bill of material

2.3. Installation Locations

The **EOLOS FLS200 E10** was installed at the following coordinates.

FLS200 Unit	LAT:	LONG:	Depth (m)
FLS200 E10 Leixões (Lote 2) Project Coordinates	41° 03' 17.613" N	09° 13' 42.809" W	94,1
	41° 03.294' N	09° 13.714' W	
	41.054892° N	09.2285581° W	
FLS200 E10 Leixões (Lote 2) Final Coordinates	41° 03' 17.70" N	09° 13' 42.84" W	154,0
	41° 03.295' N	09° 13.714' W	
	41.054916° N	09.228566' W	

Table 3: FLS200 Buoy Coordinates

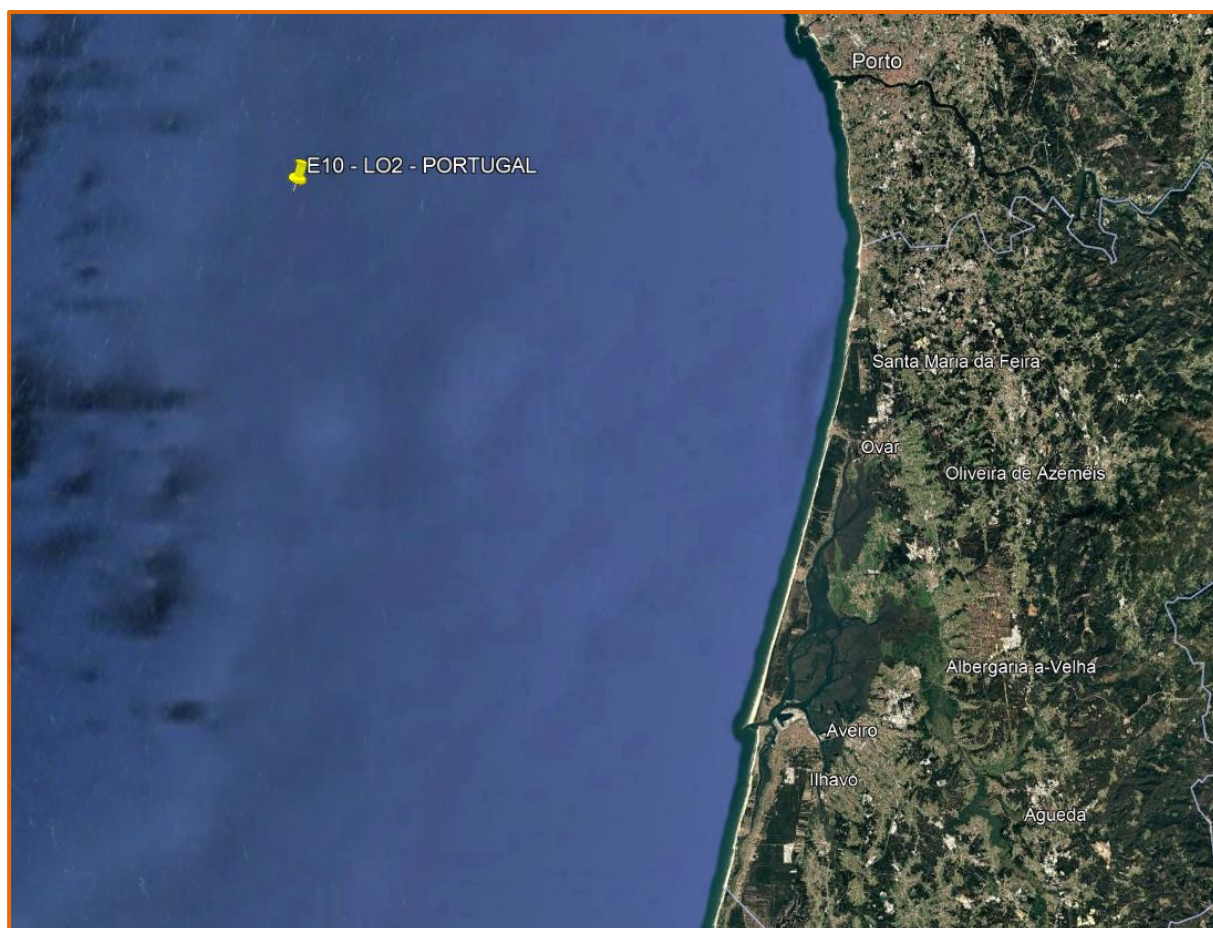


Figure 4: Leixões site location on map.

3. Vessel

Name: MV Jif Mairi

JIF Mairi

Multi-Purpose Vessel

JULY 2 2024





MAIN SPECIFICATIONS

General

Type of vessel:	Multi-Purpose Vessel
Classification:	BV 1 HULL • MACH Special Service multi purpose vessel Unrestricted navigation • AUT-UMS MCA Workboat Category 2
IMO:	9923918
Callsign:	MISZ7
MMSI:	232033759
Flag:	UK
Tonnage (UMS):	99.33

Dimensions

Length O.A.:	23.60 m
Beam O.A.:	9.04 m
Draught aft (range):	2.10 m – 2.40 m
Clear deck area:	120 m ²
Deck loading:	6 t/m ²

Tank Capacities

Fuel oil:	56 m ³
Fresh water:	59 m ³
Black/grey water:	1 m ³
Dirty oil:	1 m ³

Performances

Bollard Pull ahead:	14.10 t
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Figure 5: Vessel selected for the operation and its specifications.

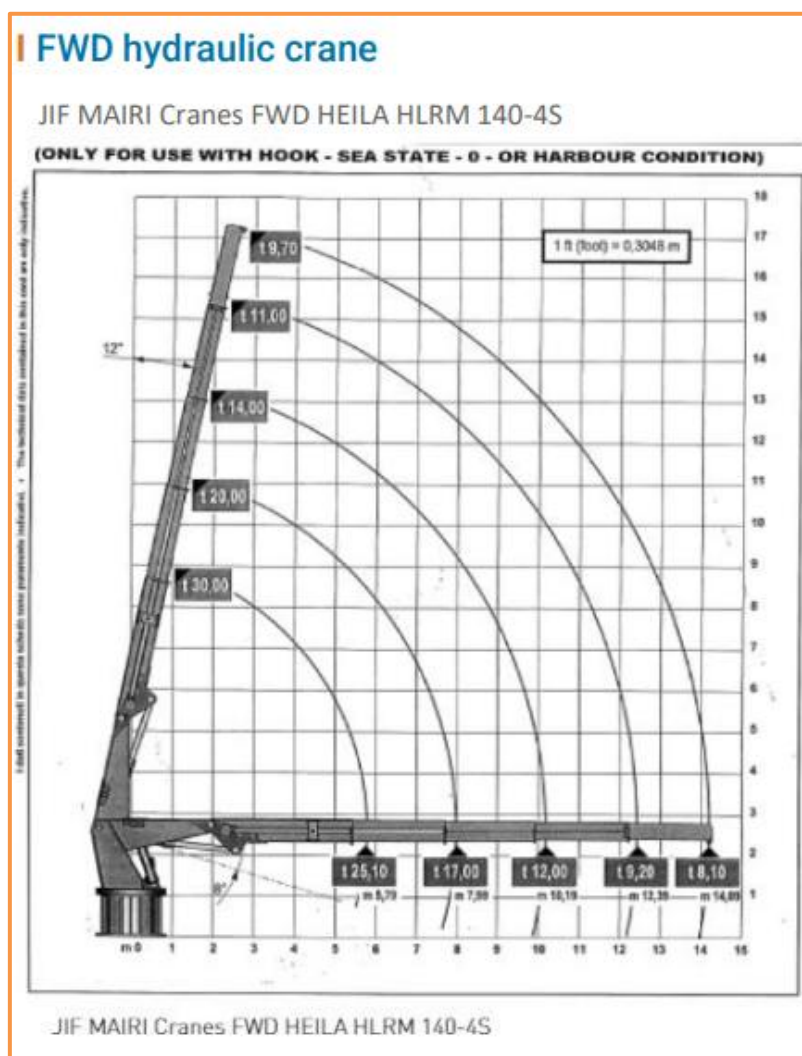


Figure 6: Vessel fore crane diagram.

4. Recovery Operation

4.1. Personnel Onboard

Name	Position	Company	Location
Ignasi Andreu.	Party Chief	EOLOS	Offshore
Mateo Garcia	Field Engineer	EOLOS	Offshore
	Captain	Jifmar	Offshore
	Crane Operator	Jifmar	Offshore
	Chief Engineer	Jifmar	Offshore
	Deck Hand	Jifmar	Onshore

Table 4: People involved in the offshore operations.

4.2. Weather forecast

The maximum forecasted weather conditions were:

Hs (m)	Hmax (m)	Wind speed (m/s)
0.6	0.9	10

Table 5: Weather conditions during the operations.

4.3. Procedure

On the morning of June 20, the EOLOS personnel mobilized in Aveiro together with the port stevedores transferred the FLS200 E10 and its associated mooring system from the storage area to the quayside where the MV Jif Mairi was berthed.

Using the vessel's forward crane, two chain lengths -150 meters each, of 32mm and 38mm diameter- were loaded on board. The 32mm chain was flaked out on the port side near the roller, while the 38mm chain was partially spooled onto the winch. Approximately 90 meters of the 38mm chain were wound onto the drum, with the remaining 60 meters stowed on the starboard side.



Figure 7: 38mm chain spooled onto the main winch drum.

Following the chain loading, the 5-ton cast iron sinker was brought on board, secured between the towing pins, and connected to the 38mm chain spooled on the winch. The midline floaters, along with two 40-meter segments of 38mm studless chain, were loaded. The chains were flaked out on the starboard side near the roller, and the floaters were positioned forward of the chain.

Additionally, the 10-meter upper mooring chain was loaded and routed aft of the forward crane. Finally, the FLS200 E10 was loaded and stowed near the starboard-side opening. All shackles were connected and welded, and the buoy, chains and floaters were securely lashed for transit.



Figure 8: Deck arrangement (1/2).

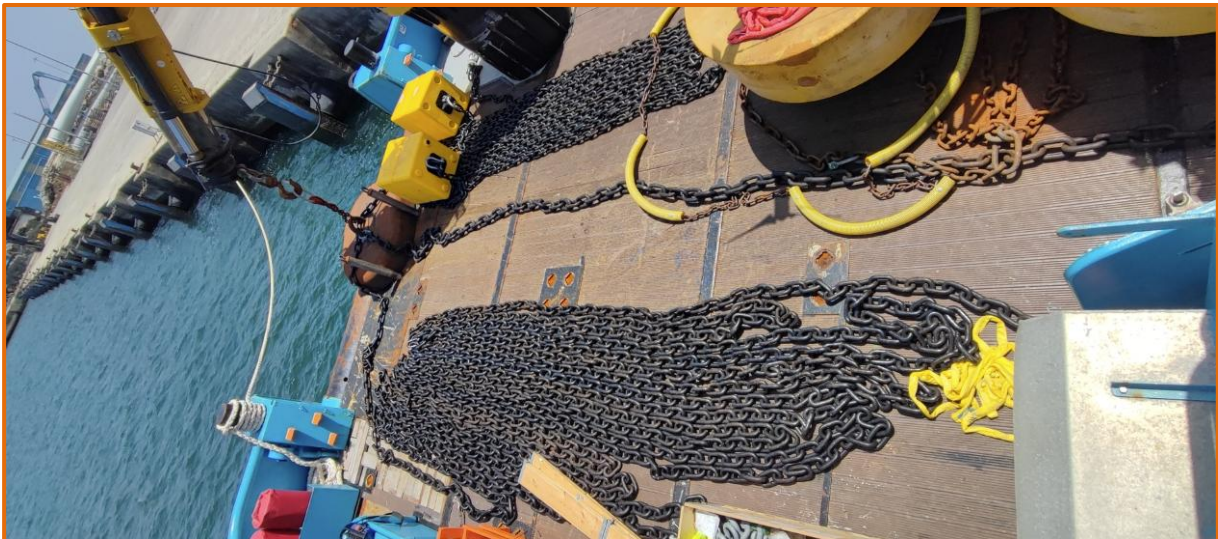


Figure 9: Deck arrangement (2/2).

At 14:00 (UTC), after notifying the Aveiro port pilots, the MV Jif Mairi departed for the Leixões site, arriving approximately at 19:30 (UTC). A Toolbox Talk was conducted on the bridge with the EOLOS team and all the crewmembers, where the sea conditions were assessed and the deployment methodology described on the RAMS was reviewed.

The operation started at 20:05. First the FLS200 was connected to the crane using the Quick Release, next the swivel was secured on deck and the upper mooring chain thrown overboard on the starboard side.

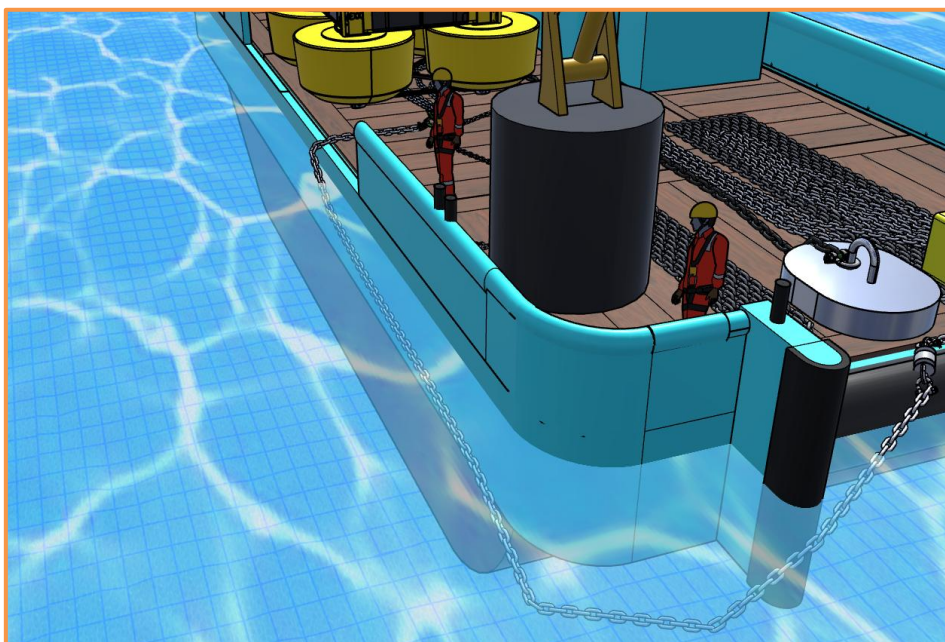


Figure 10: Scheme for the deployment of the 10-meter upper mooring chain.

The FLS200 E10 was lifted and lowered onto the water surface through the starboard-side opening. Once afloat, the crew activated the quick release mechanism and removed the slings from the buoy. The taglines were detached, and the skipper maneuvered the vessel to position the buoy near the bow roller.



Figure 11: Buoy deployed and being moved near the bow roller.

As the vessel slowly moved away from the buoy, the securing point on the bow was released, triggering a free fall of the first 40 meters of 28 mm chain. This segment dragged the first midline floater, the second 40-meter segment of 28 mm chain, and the second floater into the water. A pre-installed securing point below the second floater arrested the fall of the chain.



Figure 12: Midline floaters deployed.

The operation continued with the deployment of the clump weight. The crane was attached to the 38 mm chain near the anchor and lifted it to the water surface. The winch was then heaved in, transferring tension from the crane to the winch and allowing safe disconnection of the crane. With the crane detached, the 38 mm chain spooled on the winch was gradually paid out until only the last meters remained near the roller.



Figure 13: Clump weight being lifted using the vessel crane.

At this point, both the crane and the tugger winch were connected to the 38 mm chain to act as temporary securing points. This setup allowed the winch to be disconnected from the deployed chain. The remaining 38 mm chain, previously stowed on the starboard side, was then spooled onto the winch drum and connected to the other segment near the stern roller. Heaving in on the winch released the tension from the crane and tugger winch, which were subsequently disconnected. The remaining 38 mm chain was then paid out.

To manage the final section of the chain, the crane was used to stop the last few meters, facilitating disconnection from the main winch. The chain was then connected to the 32 mm chain that had been previously flaked out on the port side.

Once the shackle between the 38 mm and 32 mm chains was connected and welded, the quick release mechanism was rigged to the main winch wire. Two 6-meter-long slings (SWL 3t) were connected to the mooring line onboard: one at the connection between the 32 mm and 38 mm chains, and the other below the securing point beneath the second midline floater.

After passing the safety pin of the quick release, the captain heaved in the main winch wire, transferring tension to the quick release and allowing all remaining securing points to be safely disconnected. However, it was then discovered that the actual water depth at the site was 154 meters—considerably deeper than the 94 meters for which the mooring system was originally designed. Following an on-site assessment with the EOLOS operations team, it was decided to proceed with buoy deployment while a corrective plan was prepared ashore to add additional chain. This modification was carried out two days later during a follow-up visit to the buoy.

See document EOL-LO209-V01-OPS-Corrective Maintenance Report (20250622).



Figure 14: Vessel sound showing the actual depth of the site.

To finalize the deployment, the crew cleared the deck and moved to the vessel bridge, from where the quick release was activated. Upon release, the 150 meters of 32 mm chain free-fell into the water, completing the deployment of the FLS200 E10 buoy at the Leixões site. At 21:04 UTC, the EOLOS engineer onboard *Jif Mairi* confirmed the successful completion of the Site Acceptance Test (SAT), and the vessel began its return voyage to the Port of Aveiro.



Figure 15: FLS200 E10 deployed at Leixões site.

5. HSE

A summary of HSE performance during the project preparation, commissioning, mobilization, and installation phases of the project is detailed below.

5.1. Project risk assessment and method statement

The RAMS document *EOL-LO204-V02-OPS-RAMS for Campaign Deployment* details the health, safety, and environmental risks, and recovery methodologies, associated with the deployment of the FLS200 E10.

5.2. Vessel inductions and emergency drills

A vessel induction was given by the vessel chief officer for the EOLOS personnel as they joined the MV Jif Mairi on the 19th of June 2025.

5.3. HIRA meeting & Toolbox talk

A HIRA meeting and Toolbox Talks were carried out with all bridge and back deck personnel before all operations. The TBTs included:

- A review of the deployment methodology for the FLS buoy as per the project RAMS document.
- Review safety on the back deck with regards to moving chains, rope, and bights on deck.
- EOLOS Party Chief and Captain overseeing back deck operations from the bridge, with constant VHF communications.

5.4. Incidents, accidents, and near misses

The following situation occurred during the deployment of the FLS buoy.

Hazard Observations		
Incident / Near Miss / Accident	Description	Lesson Learnt
1. Incident – Incorrect depth	Before releasing the last section of mooring, it was detected that the actual site depth was considerably different from the depth initially informed to EOLOS. The buoy was deployed anyway, and a corrective action to solve this issue arranged.	Check actual site depth before starting the operations.

Table 6: Hazard observations.

6. Daily Progress Report

- 20th of June 2025: Deck preparation at Aveiro port and deployment at the Leixões site.

		Daily Progress report 20/06/2025		Code:	LO2
				Date:	22/06/2025
				Version:	01

Project	LO2		Date	20/06/2025
Coordinates	41° 03' 17.613" N	9° 13' 42.809" W	Vessel	Jif Mairi
Activity	Campaign Deployment		Country	Portugal

Health and Safety (HSE)	
Vessel inspection	Yes
Vessel induction	Yes
RAMS review	Yes
Toolbox talk	Yes
Management of Change	No

Incidences	
1	Actual depth of the site 60 meters more than what was informed by the client.
2	
3	
4	

Personnel		
Name	Position	Role
Mateo G.	Field Engineer	Oversee FLS200 and assist as required
Ignasi A.	Party Chief	Supervise FLS200 deployment

Weather conditions			
Weather	Sun	Max wind (m/s)	10
Visibility	Good	Max waves (m)	0.6

Operational details	
Asset S/N	E10
As laid coordinates	41° 03' 17.70" N / 9° 13' 42.84" W
As laid new coordinates	N/A
Arrival (UTC)	18:30
Departure (UTC)	22:05
Server Actions (START TIME)	
Server Actions (END TIME)	

Narrative			
Time (Local)	Time (UTC)	Day (UTC)	Description
08:30	07:30	20/06/2025	Loading of chains, midline floaters and FLS200 E10 started
13:20	12:20	20/06/2025	Loading completed
15:00	14:00	20/06/2025	Jif Mairi departure from Aveiro port

		Daily Progress report 20/06/2025		Code:	LO2
				Date:	22/06/2025
				Version:	01

19:30	18:30	20/06/2025	Arrival at the Leixoes (LO2) site
20:05	19:05	20/06/2025	FLS200 E10 lifted on the water
20:10	19:10	20/06/2025	Midline floaters released
20:57	19:57	20/06/2025	Depth detected to be 154 meters instead of 94m
21:25	20:25	20/06/2025	Lower mooring released. FLS200 deployed
22:04	21:04	20/06/2025	SAT completed
22:05	22:05	20/06/2025	Navigation to Aveiro port started.

Service visit details and outcomes	
Work completed	
- Loading of chain, midline floaters and FLS200 E10 onboard Jif Mairi. - Navigation to Leixoes (Lote 2) site. - Deployment of FLS200 at the Leixoes site.	
Proposed work for the next 24 hours	
- Navigation to Aveiro Port. - Loading of FLS200 E15 and associated mooring system. - Navigation to Figueira da Foz (Lote 3) site. - Deployment of FLS200 E15 at the Figueira da Foz site.	
Reference documentation	
EOL-LO204-V02-OPS-RAMS for Campaign Deployment	
Comments (Challenges and issues)	
Actual depth of the site 154 meters instead of 94 meters.	

Author	
Name: Ignasi Andreu Font	Signature: 

Figure 16: June 20, 2025 Daily Progress Report.

7. Appendix 1: Site Acceptance Test (SAT)

Site Acceptance Test – Certificate

Project:	Leixões (Lote 2)
Client:	Laboratoria Nacional de Energia i Geologia (LNEG)
FLS200:	E10
Supplier:	EOLOS Floating Lidar Solutions
Inspection place:	Leixões site
Inspection Date:	20/06/2025

Table 7: Site Acceptance Test details.

Testing

Item Tested	Yes/No/NA	Comments
LiDAR	Yes	Capturing data at correct heights
ADCP	Yes	Capturing data at correct depth
Wave	Yes	Capturing data
Weather Station (Airmar)	Yes	Capturing data
Weather Station (Vaisala)	Yes	Capturing data
Compass (Roof)	Yes	Heading: 22.14°
Compass (Mast)	Yes	Heading: 18.86°
Fuel Cell	Yes	No errors
Wind turbine (East)	Yes	Producing energy
Wind turbine (East)	Yes	Producing energy
Wind turbine (East)	Yes	Producing energy
Solar Panels	Yes	Producing energy
AIS	Yes	Communicating
Navigation Light	Yes	Flashing
4G Neptulink	Yes	No 4G signal
Satellite Iridium (Roof)	Yes	Communicating
Satellite Iridium (Mast)	Yes	Communicating

Table 8: Instruments tested.



SAT

(Site Acceptance Test)

Test Information

Buoy ID:	E10	Date:	2025-06-20
Project:	LO2	Time:	20:43:00 UTC
Personnel Responsible:	Mateo Garcia	Location:	LO2 Site
Operation Code:			

Project		Clump weight	
Latitude:	41° 3.29358' N	Latitude:	41° 3.295' N
Longitude:	9° 13.71348' W	Longitude:	9° 13.714' W

* Test performed in water in open sky

LiDAR

2025-06-20 20:41:00 UTC

Serial number: 920

Light Detection and Ranging



Figure 17: Site Acceptance Test Report (1/6).



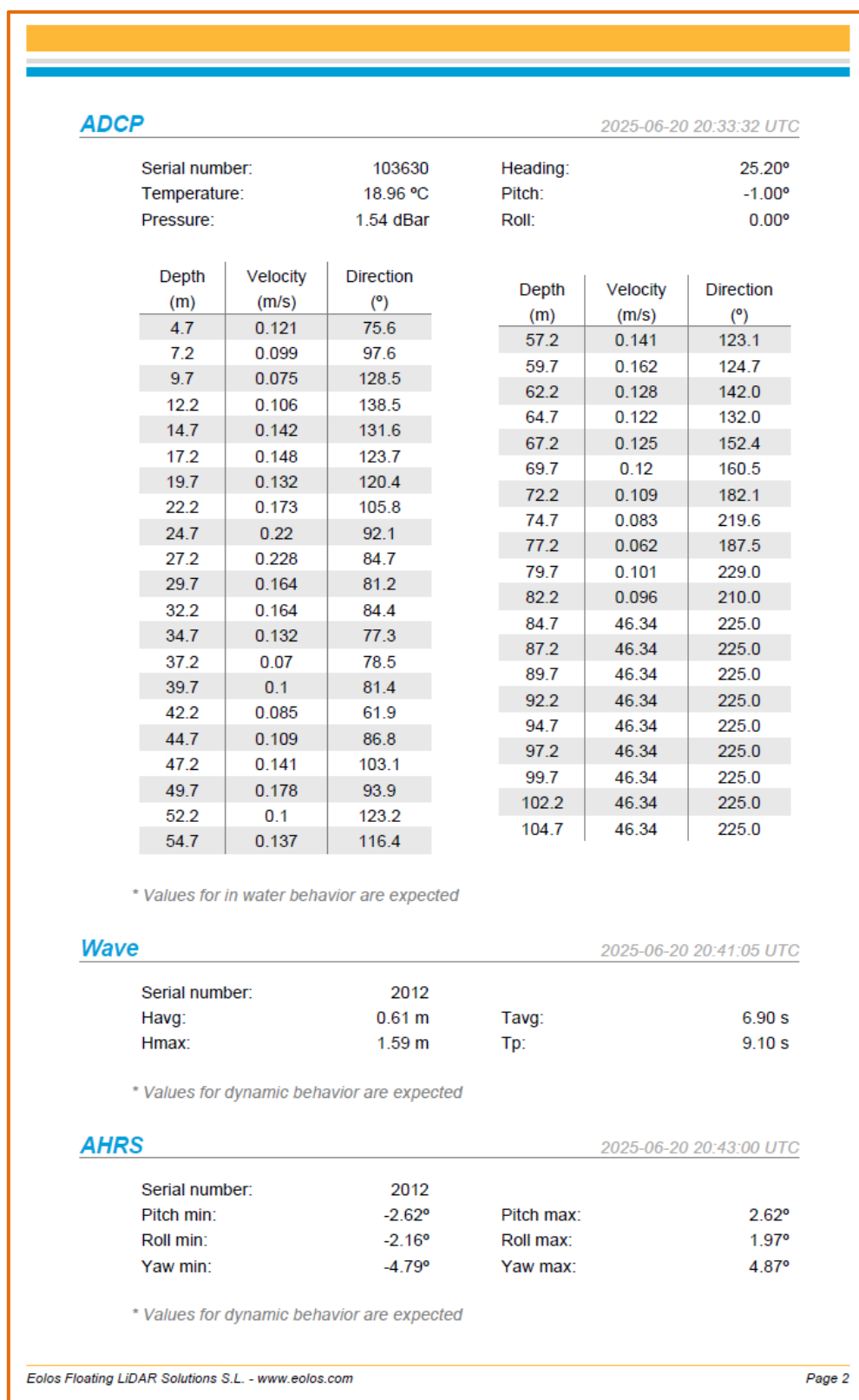


Figure 18: Site Acceptance Test Report (2/6).

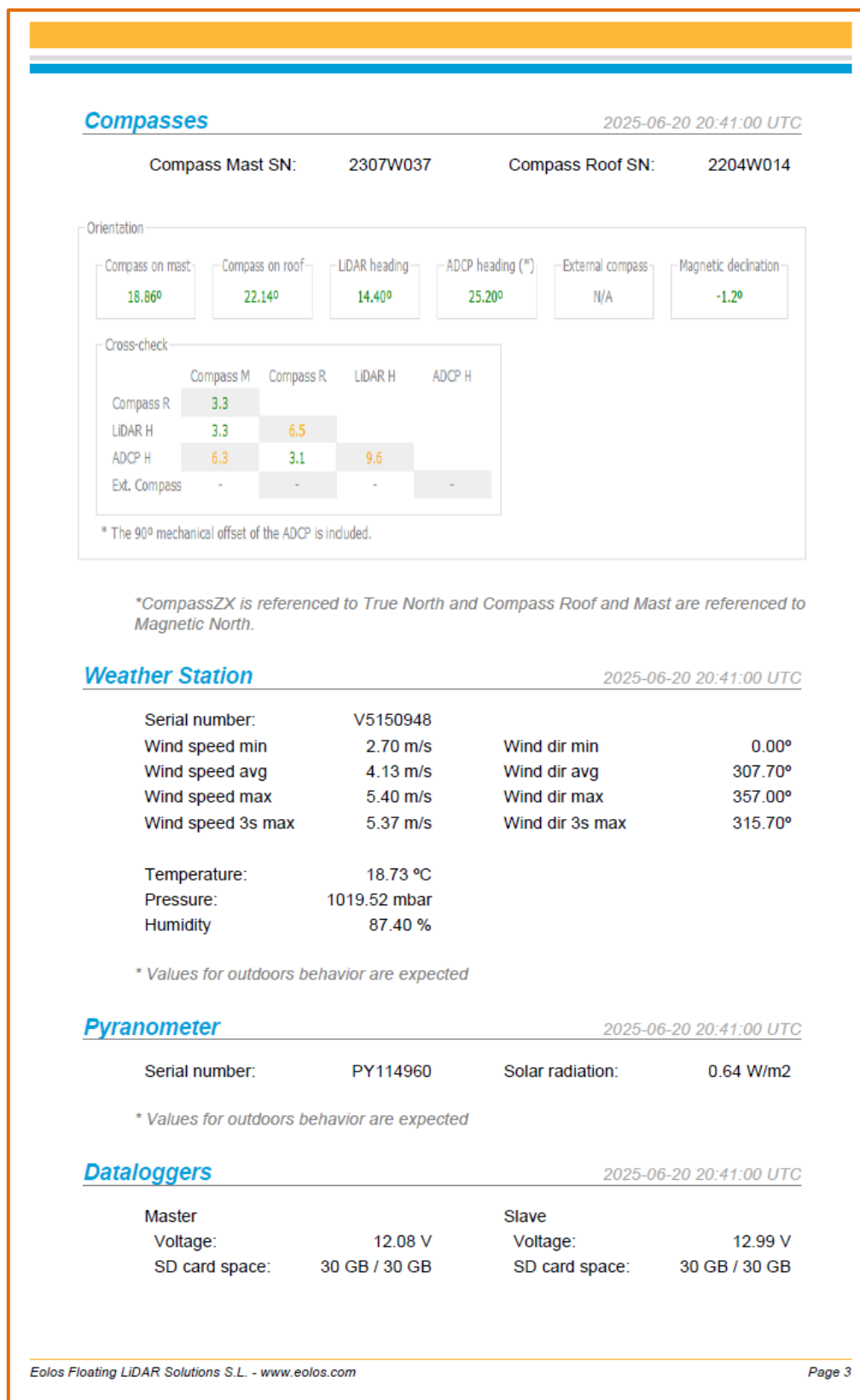


Figure 19: Site Acceptance Test Report (3/6).

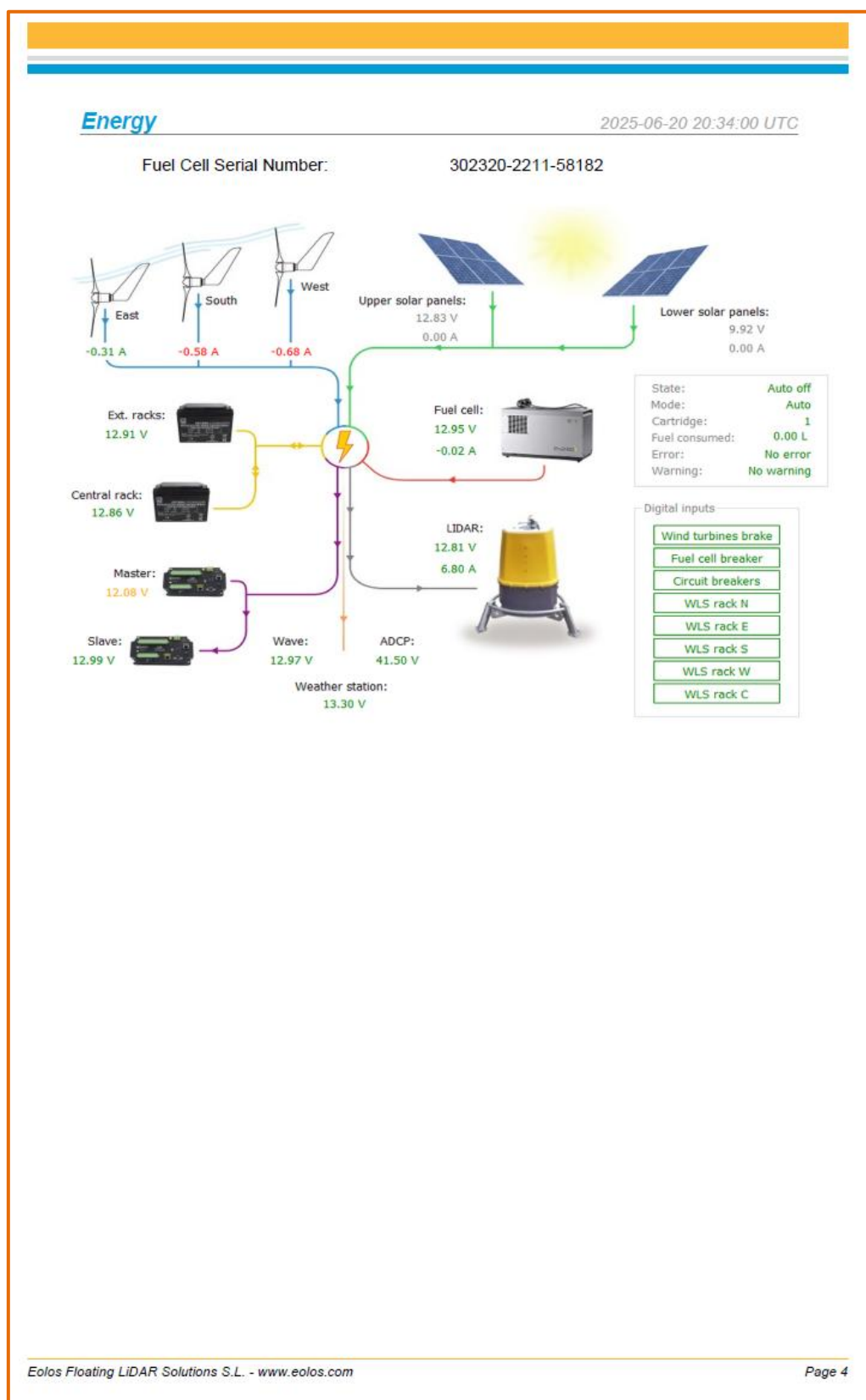


Figure 20: Site Acceptance Test Report (4/6).

GPS
2025-06-20 20:40:00 UTC

Serial number: 6JN004106

Status: Valid position

Position (DMM)

GPS coordinates:

Latitude: 41° 3.281' N

Longitude: 9° 13.6937' W

Project coordinates:

Latitude: 41° 3.29358' N

Longitude: 9° 13.71348' W

Clump Weight coordinates:

Latitude: 41° 3.295' N

Longitude: 9° 13.714' W

LiDAR coordinates:

Latitude: 41° 3.3' N

Longitude: 9° 13.68' W

AIS coordinates:

Latitude: 41° 3.282' N

Longitude: 9° 13.6953' W

Cross-check

	GPS	LiDAR	AIS	Project
LiDAR	40.1 m			
AIS	2.9 m	39.6 m		
Project	36.2 m	48.3 m	33.3 m	
Clump Weight	38.4 m	48.4 m	35.5 m	2.7 m

Checks
(Pending: ! Not Ok: X Ok: ✓)

Device functioning	Status
Lantern flashes when dark	✓
AIS emits signal	✓
Camera remote access	✓
LiDAR window is clean	✓
Clocks are synchronized	✓
GPS data crosschecked with external GPS	✓

Communications	Status
Wi-Fi	✓
4G antenna	✓
Iridium on mast	✓
Iridium on roof	✓

Trackers	Status
SmartOne NW reporting position	✓
SmartOne SE reporting position	✓
SmartOne W reporting position	✓
IDP reporting position	N/A
IDP Daily email configured	N/A
IDP Drift alarm email configured	N/A

Others	Status
Wind turbines brake ON/OFF remotely	✓
Wi-Fi module ON/OFF remotely	✓

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Page 5

Figure 21: Site Acceptance Test Report (5/6).

Comments

No comments.



Mateo García
Field Engineer

Figure 22: Site Acceptance Test Report (6/6).

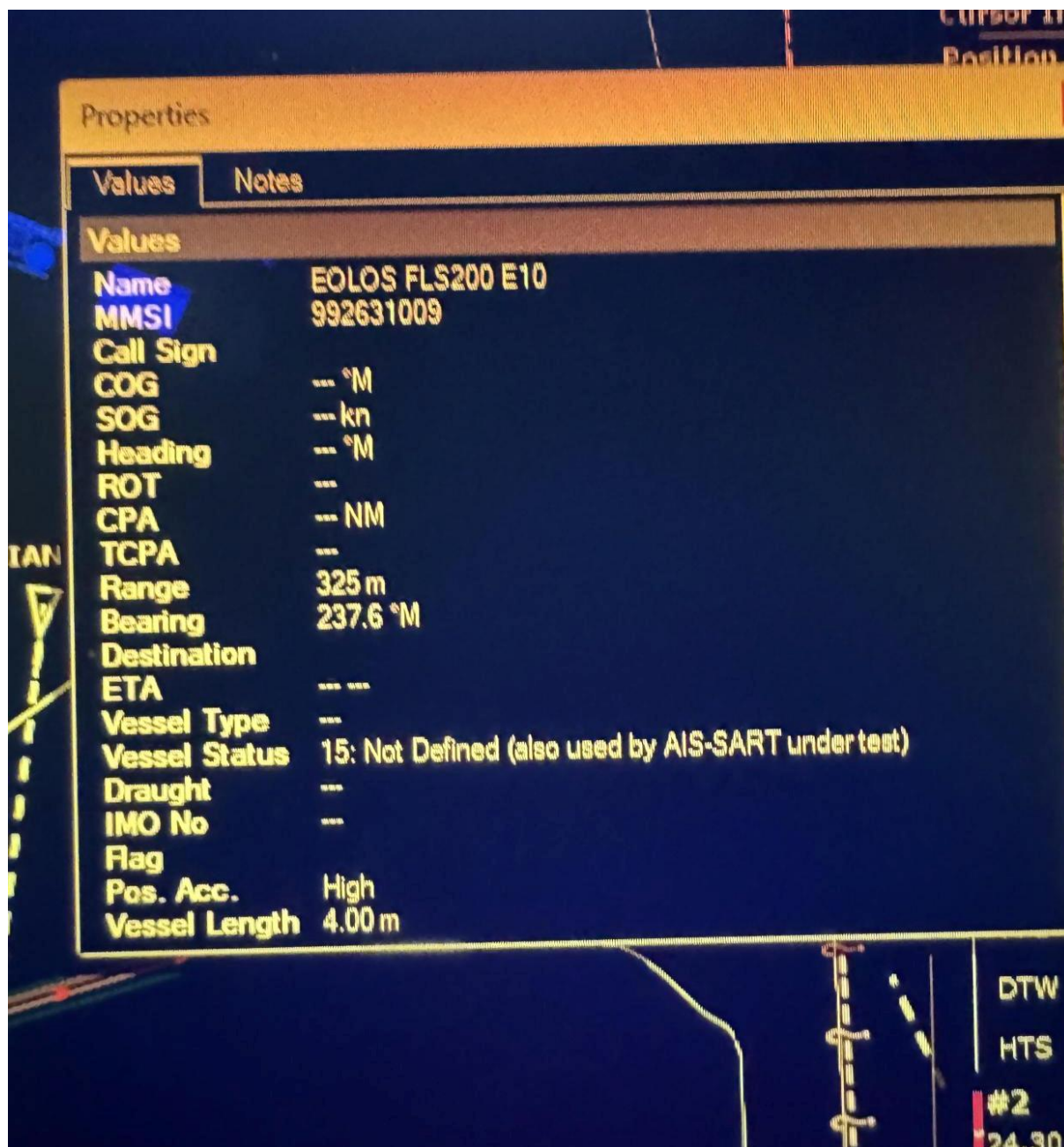


Figure 23: FLS200 E10 AIS signal.