Magallanes | ATIR

Deerness Anchorage

Navigational Risk Assessment Addendum

February 2020

Purpose

This document is provided as an addendum to and should be read in conjunction with the document 'NRA Addendum for Ocean_2G Project' that was produced by Marico Marine. It describes the key project-specific navigational risks to be addressed in relation to proposed temporary mooring of ATIR at Deerness anchorage, Orkney Islands, together with proposed mitigation for reduction/elimination of these risks.

This document has been prepared to support a marine licence application for the Magallanes ATIR. For further information regarding the project, please refer to the Project Information Summary.

Document History

Revision	Date	Description	Originated by	Reviewed by	Approved by
1.0	26/02/20	Originate	EMEC (DL)		

Disclaimer

Insert as necessary.

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1 Introduction

It is the intention of Magallanes to test their ATIR device at the European Energy Centre (EMEC) Fall of Warness test site, Eday, Orkney islands, Scotland. The testing period is expected to last at least twelve months, enabling Magallanes to assess the platform behaviour in a real open sea environment throughout the seasons of a complete annual cycle. During this testing programme, there will be a requirement to deploy at a temporary mooring location for the purpose of installing and removing rotor blades. The EMEC Shapinsay Sound scale test site has already been covered by the 'NRA addendum for Ocean_2G Project' document, thus this document will specifically relate to the Deerness anchorage.

This assessment has been produced as an addendum to the 'NRA addendum for Ocean_2G Project' document. This document identifies and assesses any project-specific navigational risks and discusses the proposed risk control measures to be implemented in order to reduce the risk associated with the project.

2 Project overview

Further information regarding the project is available in the Project Information Summary.

2.1 Asset information

The full-scale prototype to be tested at EMEC can be broken down into the upper block, vertical block, and lower block.

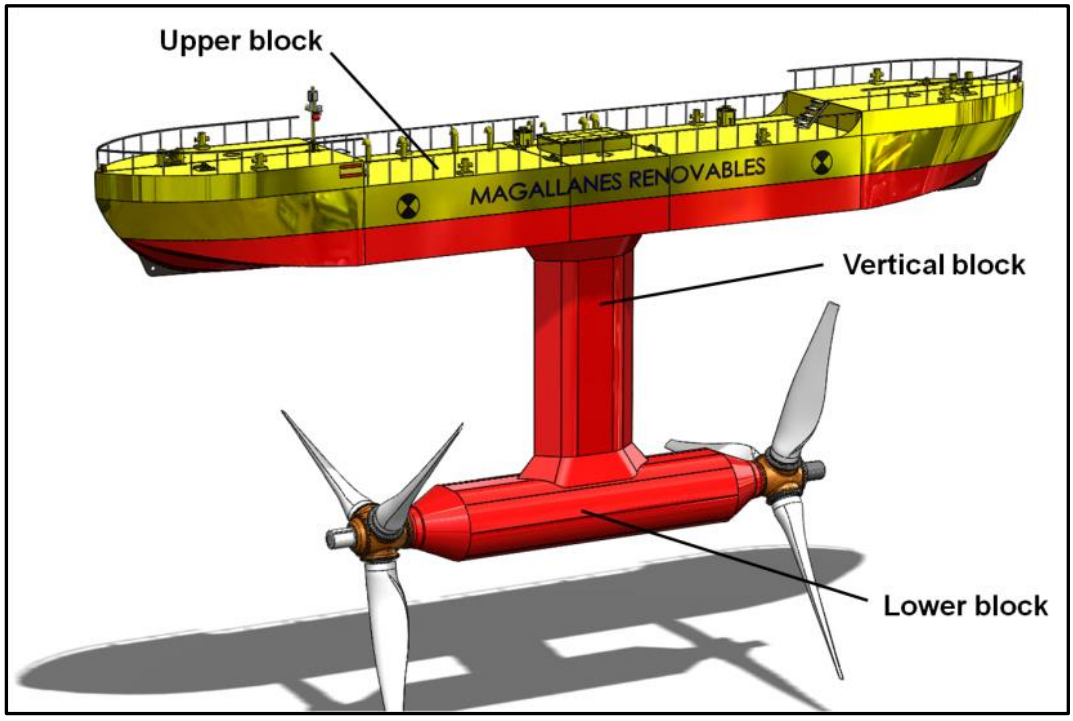

Figure 1. Scheme of blocks distribution

The device is planned to be temporarily moored at Deerness anchorage in March 2020 to remove blades before transportation to a dry harbour for emergency repairs. The device will then be towed back to the Deerness anchorage in July 2020 to re-install the blades before

being moored at Fall of Warness test site. The table below (Table 1) details the proposed timeline.

Table 1. Indicative timetable of key events in testing programme

Activity	Location	Approximate duration	Approximate timescale
Platform delivery to Orkney	Orkney		10/07/2020
Platform installation at scale site	Deerness Anchorage	10 days	01/07-2020 – 10/07/2020
Blade installation	Deerness Anchorage	10 days	10/07/2020 – 20/07/2020
Anchors and mooring installation	Fall of Warness	15 days	15/06/2020 – 30/06/2020
Platform installation	Fall of Warness	10 days	21/07/2020 – 31/07/2020
Cable connection	Fall of Warness	5 days	26/07/2020 – 31/07/2020
Power performance test	Fall of Warness	18 months	01/08/2020 – 30/12/2021
Cable disconnection	Fall of Warness	5 days	01/01/2022 – 05/01/2022
Removal of platform	Fall of Warness	10 days	05/01/2022 – 15/01/2022
Decommissioning of anchors	Fall of Warness	15 days	15/01/2022 – 30/01/2022

2.2 Schedule and test plan

The scheduled temporary mooring of the ATIR device at Deerness anchorage is planned for March 2020 for the outward journey to be repaired and July 2020 for the inward journey to re-install at Fall of Warness.

Table 2. Operational activities and anticipated frequency of vessel movements

Activity	Anticipated frequency of vessel movements
Platform installation	
Preparation and installation of moorings at Fall of Warness	5-10 day trips
Assembly of blades at Deerness anchorage	8-10 day trips
Towing the platform from Deerness anchorage to Fall of Warness	1 day preparation 1 day towing operation (2 x vessels)
Installation of the platform (including attachment to the mooring and subsea cable connection)	8-10 day trips (possibly over 2 x neap periods)
Surveillance/maintenance	
Surveillance on site	Visits at regular intervals. 2 trips per month (1 day trip). During the first month of platform operation, visits might be more frequent.

Maintenance on site	Visits at regular intervals. 1 trip per month (1 day trip). During the first month of platform operation, visits might be more frequent.
Towing the platform for maintenance in calmer waters	2-3 day trips
Redeployment of platform at Fall of Warness after maintenance in calmer waters	4-6 day trips
Platform decommissioning	
Decommissioning of the platform (including unmooring and subsea cable disconnection)	8-10 day trips (possibly over 2 x neap periods)
Towing the platform from Fall of Warness to Deerness Anchorage	1 day trip
Disassembly of blades	6-8 day trips
Decommissioning of moorings at Fall of Warness	5-10 day trips

2.3 Deployment location

The proposed location of temporary deployment at Deerness anchorage is shown in the figure below (Figure 2).

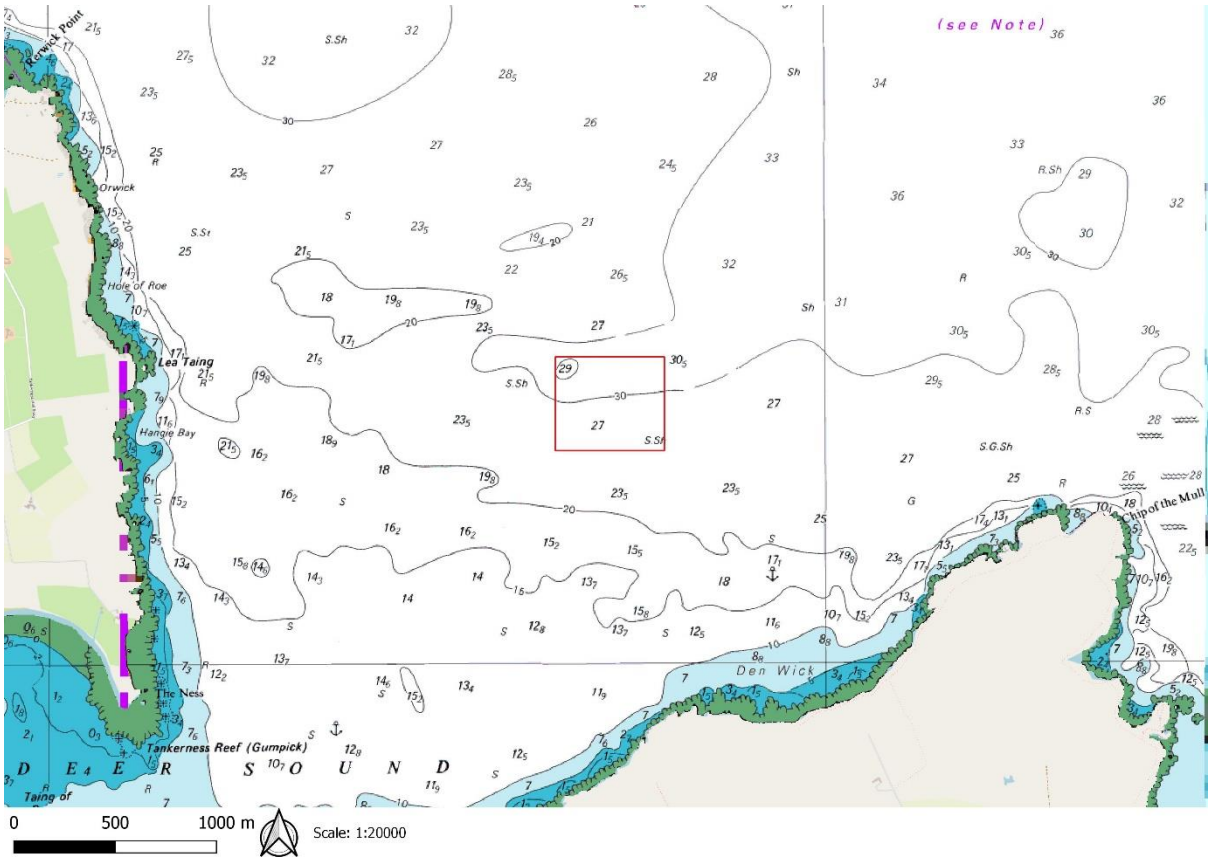

Figure 2. Proposed lease area for temporary deployment at Deerness anchorage

Anchorage	Latitude (WGS84)	Longitude (WGS84)
Proposed temporary deployment boundary	58º 58.813'N 58º 58.564'N 58º 58.564'N 58º 58.813'N	02º 45.388'W 02º 45.388'W 02º 44.829'W 02º 44.829'W

3 Key navigational themes

The following navigational themes have been considered during the assessment.

3.1 Vessel routing

The Shapinsay Sound test site is in close proximity to one shipping route. Commercial vessels currently transiting the site will be aware of the anchorage presence as it is marked on United Kingdom Hydrographic Charts. Also, a notice to mariners has been issued by Orkney Harbours Authority.

3.2 Contact / allision risk

The notice to mariners and use of appropriate marking and lighting to alert other mariners to the device should mitigate the risk of contact. The anchorage is charted on the United Kingdom Hydrographic Office charts.

3.3 Effects of tide / tidal streams and weather

The reason for the site selection for temporary mooring was primarily due to the benign environmental conditions such as wind, wave action, and tidal regimes. This is emphasised by the fact this site has been designated as an anchorage. In addition, the device has been designed for the extreme conditions present at the EMEC Fall of Warness test site.

3.4 Under keel clearance

The radius of the blades is 9.5 metres and the apex of the swept area is 4.4 metres below the surface. Given the width of the surface platform (6 metres), there are 6.5 metres of swept area either side of the platform.

For a navigating vessel to collide with the blades, the vessel must be within 7 metres of the device and drawing at least 7 metres. It is therefore far more likely that the vessel would collide with the platform than damage the blades, and small vessels would be incapable of contacting the blades.

The mooring arrangements are chain and, given the depth of water, will not compromise Under Keel Clearance (UKC) including when considering scouring.

3.5 Collision risk and visual navigation

The device is less than five metres high and will therefore ensure that most vessels will be visible over the top when navigating in the area. The exception may be small craft such as open top RIBs or pleasure craft as well as maintenance vessels working on the device. Prudent mariners will provide sufficient clearance from the device when navigating and this will further reduce the chance of a hidden vessel emerging in a collision scenario.

As the turbines are subsurface, there would be minimal noise generated and so it would not interfere with sound signals used by vessels or aids to navigation.

3.6 Communication, radar and positioning system

The ATIR platform is 45m LOA and has a breadth of 6m, with structures extending to 5 metres above sea level. It therefore presents a significant cross section which should be easily identifiable by marine radars. Given that no generating infrastructure exists above the surface, there is no anticipated impact upon communications, radar and positioning systems.

3.7 Moorings

A single point mooring will be installed at Deerness anchorage prior to the planned disconnection at Fall of Warness. The mooring will be marked by a site surface buoy when not in use. Further details can be found in the 'Device removal offsite' document.

3.8 Station keeping

The device has AIS capabilities, therefore if moorings failed and the device became loose the relevant personnel would be notified immediately.

3.9 Fishing activity

Fishermen would generally be expected to take precautions in order to avoid any underwater assets that may be present at the anchorage, especially while a vessel was onsite.

3.10 Recreational activity

The presence of an anchorage on UKHO Charts and the notice to mariners should be sufficient information for any recreational activities.

3.11 Search and rescue

The device will not alter the capability of search and rescue operations in the area or interfere with neither RNLI nor helicopter operations.

3.12 Cumulative and in-combination

There is no other developments within the area, thus no anticipated cumulative or in-combination effects are expected.

4 Risk controls

4.1 Project-specific risk controls

Please review the project-specific risk controls outlined in the following table and delete/amend as required in order to accurately represent the controls that will be implemented as part of this project.

The following table provides a description of the risk controls that will be implemented during the project.

Table 3. Project-specific risk controls

ID	Project-specific risk control	Description
1.	AIS	Use of AtoN AIS (or virtual AIS if permitted) fitted to all surface piercing devices to improve visibility to passing vessels. AIS should be Category 3 with at least 97% up time and use Message 21, or as directed by the Northern Lighthouse Board (NLB).
2.	Heightened monitoring in adverse metocean conditions	During gale force winds, periodic monitoring of the devices is recommended to ensure excessive forces are not acting on the moorings which might cause a breakout.

ID	Project-specific risk control	Description
3.	Remote shut down including feathering of blades	Devices to be fitted with ability to shut down in an emergency, such as feathering any blades or braking to allow access or prevent contact with a vessel.
4.	GPS alert system for asset moving	Remote monitoring of device to detect any major movements that might indicate a breakout for immediate response. Implement GPS excursion monitoring.
5.	Marking and Lighting	Assets to be lit to the requirements of NLB and marked in line with IALA guidance, IALA Recommendation O-139 (2013)[1]. The following is typically requested by the NLB: • Yellow day marking/painting; • Flashing yellow special mark light (Category 1) (larger devices may require 2 lights at each end which are synchronised; light ranges should be at least 3 nautical miles); • Day top mark (if deemed necessary); • AIS AtoN (mandatory for floating devices at EMEC). Appropriate statutory sanctions must be in place to exhibit, alter or discontinue lighting.
6.	Tow risk assessment and passage plan	As required under Orkney Harbours Pilotage Directions 4(3)[2], prior to conducting a towing operation, a risk assessment and passage plan for the move should be conducted. The plan should account for the size of the tow, manoeuvrability restrictions, tow arrangements and metocean conditions.
7.	Guard vessels	During major construction or maintenance activities, a guard vessel may be considered to assist in protecting the devices from contacts with passing vessel traffic. Due to the low density of traffic, this is not considered necessary except for extraordinary circumstances. If guard vessels are to be used onsite, it is important that such vessels employed to guard the site follow appropriate guidelines, with clear instructions on when to intervene in a potential incident.

[1] All surface piercing structures should be marked as:
- Individual wave and tidal energy devices within a site that extend above the surface are painted yellow above the waterline;
- If marked, the individual devices should have flashing yellow lights. The flash character of such lights must be sufficiently different from those displaying on the boundary lights with a nominal range of not less than 2 nautical miles; and
- A single wave or tidal energy structure standing alone may be marked as either an isolated danger mark or a special mark.

It is also recommended that:
- Radar reflectors, retro-reflecting material, Racons and / or AIS transponders should be considered where the level of traffic and degree of risk requires it;
- The lit Aid to Navigation (AtoN) must be visible to the mariner from all relevant directions in the horizontal plane, by day and night;
- Any floating AtoNs should be located outside the moorings of the floating structures; and
- AtoNs should comply with IALA Recommendations and have an appropriate availability, normally not less than 99% (IALA Category 2).

[2] Orkney Islands Council Competent Harbour Authority (2016) The Orkney Pilotage Direction 1988 (as amended 2007, 2010 and 2016).

5 Summary and conclusion

The ‘NRA Addendum for Ocean_2G Project’ document has been utilised to inform the development of this document for the temporary mooring of the Magallanes ATIR device at Deerness anchorage. This has allowed device specific navigational risks to be extracted and considered against navigational risks that may be present at the Deerness anchorage.

Therefore, in summary, the NRA has concluded that the temporary deployment of the Magallanes ATIR device is low risk with suitable risk controls identified and in place. This conclusion is emphasised by the previous experience of transportation and deployment associated with this device within Orkney waters.