Annex VII Detailed Description of Storm Eunice

1.1 Introduction

This Chapter provides a detailed description of the Storm Eunice and the events that instigated the request for this study. It forms one of the building blocks towards an initial qualitative analysis, and the basis for the consecutive quantitative method.

1.2 The Setting: Belgian Exclusive Economic Zone (EEZ) during Storm Eunice

In February 2022, the extratropical cyclone "Storm Eunice" traversed the North Sea. It was the first time since 2010 that a storm had caused such significant damage in Europe. Therefore, it can be characterized as an exceptional weather event. Note the connection between 'significant damage caused' and the definition of exceptional weather; we will elaborate more on this in the section dedicated to defining extreme weather.

During *Storm Eunice,* the Royal Meteorological Institute (KMI) classified the weather conditions on the Belgian coast as code orange, indicating wind speeds of up to 150 km/h[1]

In the Netherlands, the storm intensified further, prompting the Royal Netherlands Meteorological Institute (KNMI) to issue code red warnings along several coastal areas. Wind speeds temporarily reached force 11 on the *Wadden Sea.*

One notable consequence of these weather conditions was the cessation of pilotage services. Due to the severe winds and high waves, ships bound for the Flemish coastal ports, Vlissingen, Ghentor Antwerp could not be piloted.

[1] As per windspeeds measured by the VKI Lidar weather station positioned at Westhinder

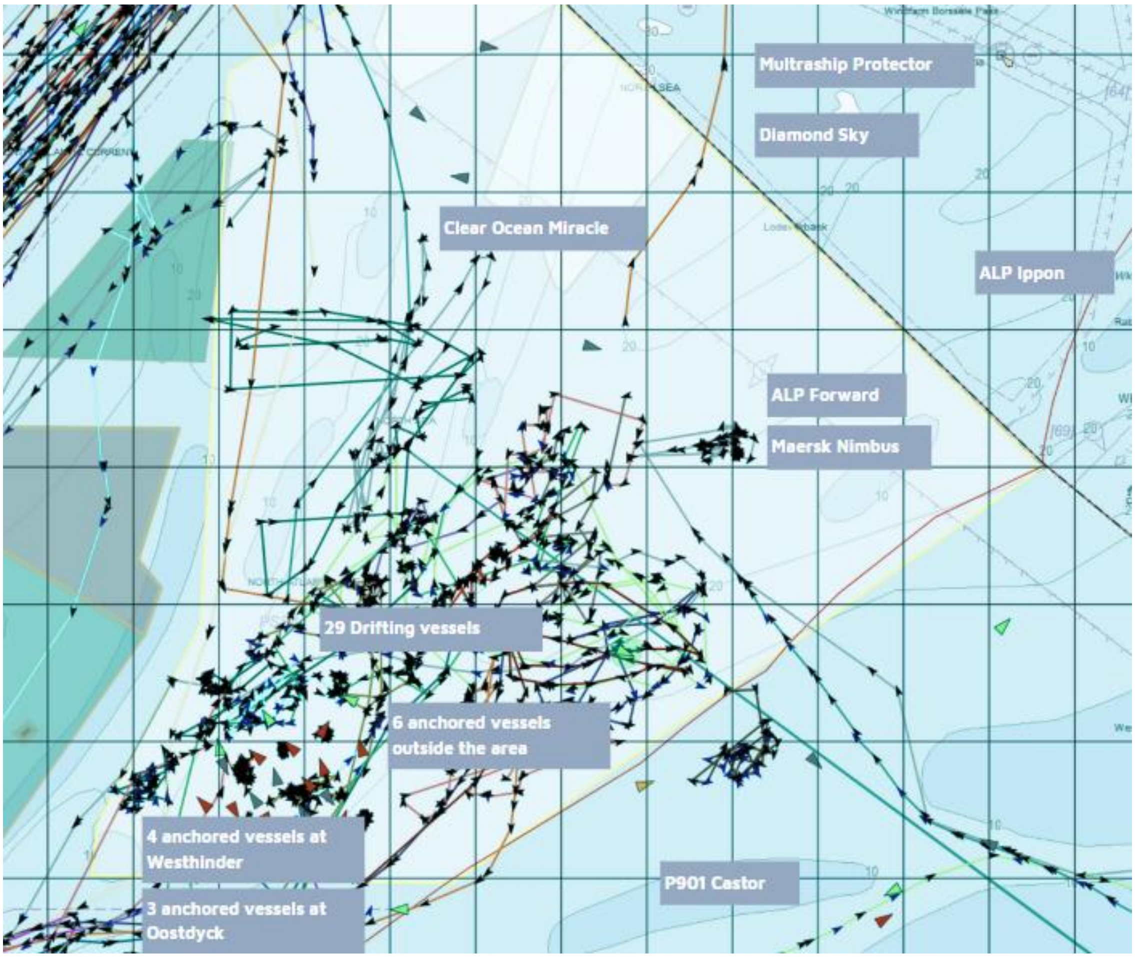

Figure 1 The event of Storm Eunice, general overview of the Maritime Domain

During the event of the Maersk Nimbus 215 vessels sailed through the Belgian EEZ. This highlights the importance of the navigational impact the Belgian EEZ has on marine traffic with her anchorages, drifting areas, traffic separation scheme (TSS) and approach to the Belgian and Dutch ports.

The anchorages Oostdyck and Westhinder were both in use, with 7 vessels utilizing the designated areas. Through self-regulating safety precautions, the distance between anchored vessels increases during storms, contributing vessels to anchor outside of the anchorages. During the event, we counted 6 vessels anchored outside of the Westhinder Anchorage in the vicinity of the 29 drifting vessels.

The P901 Castor was the Coastal Patrol Vessel on guard for the Belgian Navy. During the event, it was tasked to approach the Maersk Nimbus, but due to the extreme weather, the captain declared the situation unsafe to leave the Port of Zeebrugge.

In Dutch waters, North of the Borsele wind parks, the Multraship Protector was out at sea, guarding the zone between the TSS and the wind park. Two other seagoing towage vessels were on standby in Dutch ports: the ALP Forward and the ALP Ippon. The ALP Forward was tasked to approach the Maersk Nimbus, awaiting further instructions and an assignment. The ALP Ippon was not tasked to support the Maersk Nimbus as it was contracted to support vessels in Dutch waters.

1.3 The event of the Maersk Nimbus

This assessment is aimed at understanding the near miss? of the Maersk Nimbus and how the chain of events during Storm Eunice led to an incident. The replay and analysis of the route information gathered from the passed AIS and radar tracks cast light on multiple factors that could have been detected, and were action could have been taken to potentially avoid the incident.

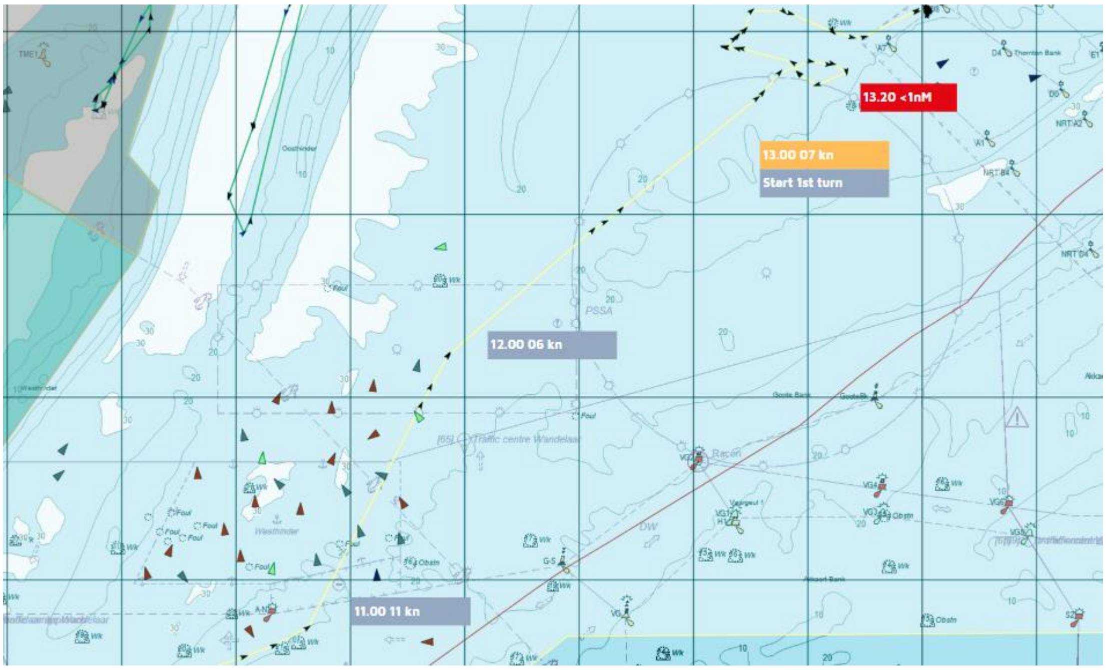

Figure 2 The prequel to the incident of Maersk Nimbus – Arrival within Belgian EEZ

Figure 2 above shows the filtered track of the Maersk Nimbus to highlight the details of the route, including the various alterations in speed, course, and navigation modes. The Maersk Nimbus made its entry into the Belgian Exclusive Economic Zone (EEZ) at 10:00 on February 18, 2022.

As the vessel bypassed the Westhinder Anchorage at an unusually high speed of more than 6 knots, it raised concerns regarding the clarity of its intentions, thereby posing a potential higher risk scenario.

Figure 3 sheds light on the intricate nature of vessel traffic during extreme weather conditions. This specific area operates without active monitoring by Vessel Traffic Service, and while it falls under the jurisdiction of the Belgian Maritime Rescue Coordination Center (MRCC), they do not perform 24/7 Vessel Traffic Monitoring.

The vessels in the area drift in unstructured patterns, solely governed by the judgement of the officer on watch and the captain onboard the vessels themselves. They are tasked with steering the vessel safely through a chaotic cluster of waiting vessels. Notably, there are no regulations limiting the number of vessels allowed to drift in this region. In this scenario, the Maersk Nimbus opted for a direct crossing of the drift area at a consistent speed of 6 knots. It is worth noticing that the vessel maintained this course until it approached a distance of 1 nautical mile from the outer safety barrier of the windfarms, at which point it initiated a turn in an attempt to seek new open waters amidst a densely populated drifting area

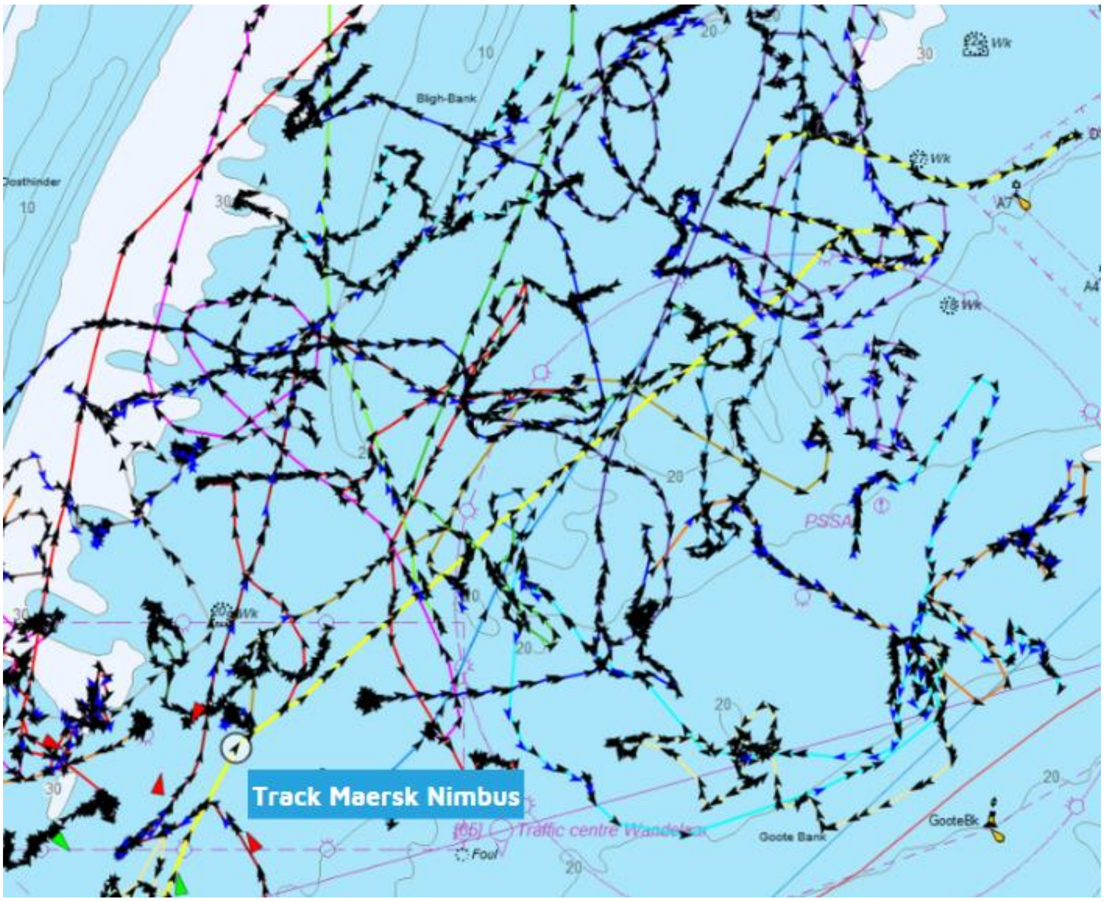

Figure 3 The Vessel Traffic Movements during Storm Eunice

Another observation that can be made is that the Maersk Nimbus is the only vessel sailing for a longer period of time in a straight line on a possible collision course with the wind farms. This would also be an unmistakable anomaly that would trigger operators and digital systems early in the process of a collision to intervene with the vessel's intentions.

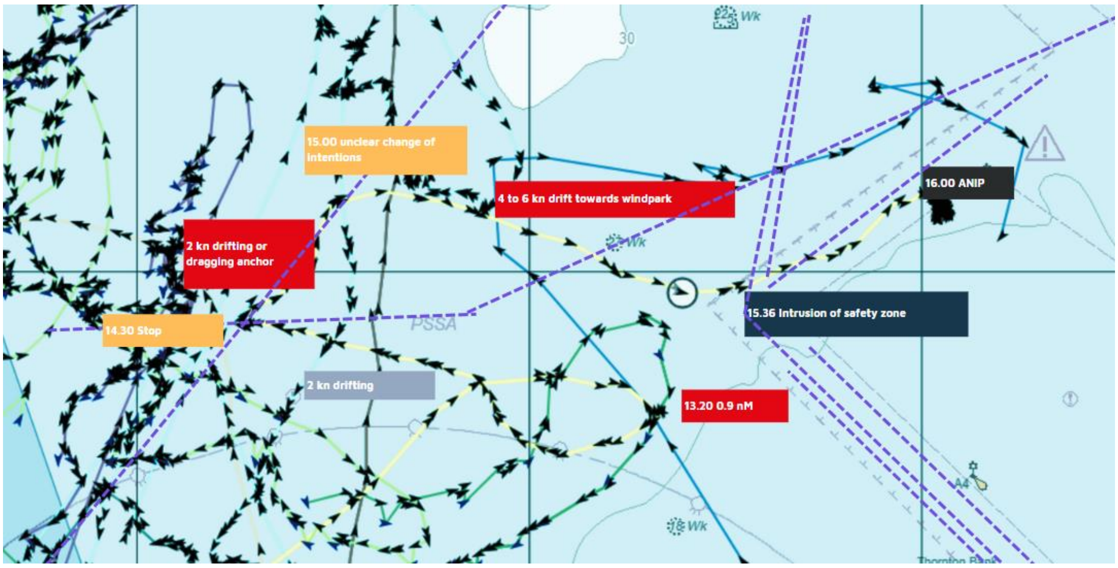

Figure 4 The prequel to the incident of Maersk Nimbus – Approach to Wind Parks

The first signs of possible allisions with the wind farms occur at 13:00 when the Maersk Nimbus makes its first turn within a distance of less than 1 nautical mile from the C-Power windfarms. This lack of response at this point from monitoring services supports the implicit dangers of not having active-screen monitoring or other warning systems in place. The monitoring that does happen, by the offshore wind companies themselves is primarily focused on intrusions from a maritime security perspective.

At 14:20, the Maersk Nimbus came to a complete stop. The logbook entries of the vessel were not gathered as evidence, but the complete stop was a highly likely indication of an intention to anchor. When we analyze the area, we notice two important subsea cable connections crossing the area. During the investigation, it was unclear if this danger was recognized by any service. Still, the event of a complete stop in an area where damage from anchoring is substantial would be an event to add a higher level of risk behavior to the Maersk Nimbus.

In the next 40 minutes, we observe the normal pattern of a vessel dragging an anchor with a low holding power. The vessel maintains a speed over ground of 2 knots. There is no information on the logbook entries during this time of the event, and we observe the same information as a maritime operations control would display to an operator ("Vessel Traffic Services Data and Information Management R1014 Portrayal of VTS Information," n.d.).

At 15:00, the course and speed of the Maersk Nimbus changes drastically from a northeasterly direction at 2 knots to a southeasterly direction of 4 to 6 knots. This alteration is remarkable and leads to the intrusion of the safety barrier at 15:36, which leads to the activation of the Algemeen Nood- en Interventieplan voor de Noordzee (ANIP) at 16:00.

Note that because no comprehensive report documenting the incident was created at the time or immediate aftermath of the event there are many information gaps. One of those gaps is records of the vessel's logbook, which could have given important insights into the thought process onboard.

1.4 Another Protagonist: Diamond Sky

The Diamond Sky was the second vessel during Storm Eunice that made an intrusion into the safety barrier of the wind parks within the Belgian EEZ. The incident has a parallel timeline to the incident of the Maersk Nimbus. This highlights the complexity and chance of multiple high-risk vessel traffic movements in the same period of time during extreme weather events.

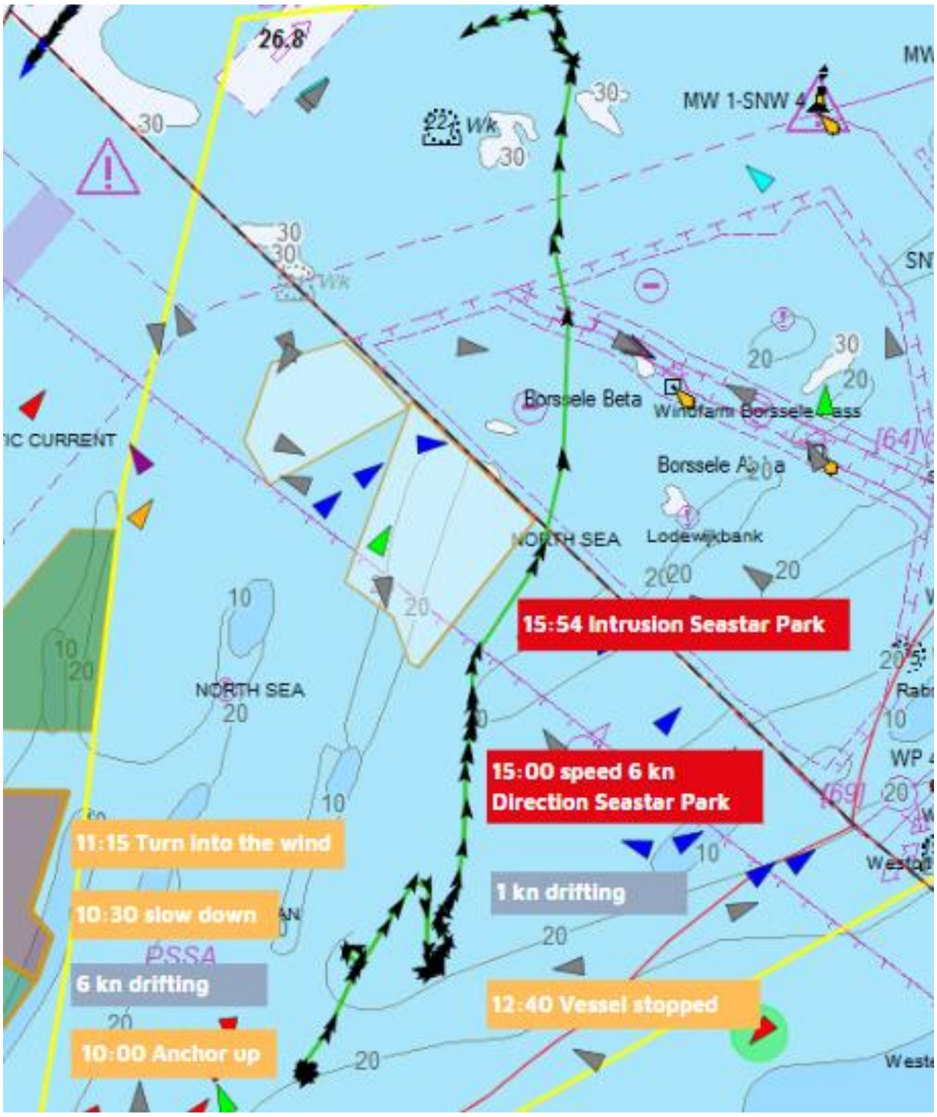

Figure 5 The incident of the Diamond Sky

The image above illustrates how the Diamond Sky lifts her anchor at 10:00 on the 18th of February and leaves the anchorage at a speed of six knots. The wind coming from behind lets the vessel speed up. Presumably, the first 180-degree turn is a reaction to slow down and stay in control of the vessel's speed. This assumption is based on the traffic image based on AIS replay, because no logbook entries were gathered as evidence.

The Diamond Sky makes a second attempt to stay in control and turns into the wind at 11:15. It drifts slowly until coming to a full stop at 12:40. Presumably, a second attempt to anchor the vessel was executed successfully. During the next two hours, the Diamond Sky drags or drifts with full control of the vessel at a speed of less than 1 knot and often comes to a complete halt. The movement of the vessel is at this moment of a slightly higher risk because the dragging of the vessel is in the direction of the wind parks and submarine cable corridors.

The situation changes dramatically at 15:00 when the course and speed of the Diamond Sky alter enough to become a danger to offshore infrastructure and the surrounding vessel traffic movements. The vessel speeds up to 6 knots with a course heading straight for the Seastar wind park. One hour before the intrusion of the safety zone at 15:54, the intentions of the vessel were clearly visible on a Vessel Traffic Monitoring and Information System (VTMIS).

When analyzing the course plotted through the zone with wind parks, the Diamond Sky chose to go through the Seastar wind park and not to make use of the 5-cable-wide corridor between the Seastar and Noblewind wind parks, decreasing the risk of a potential allision.

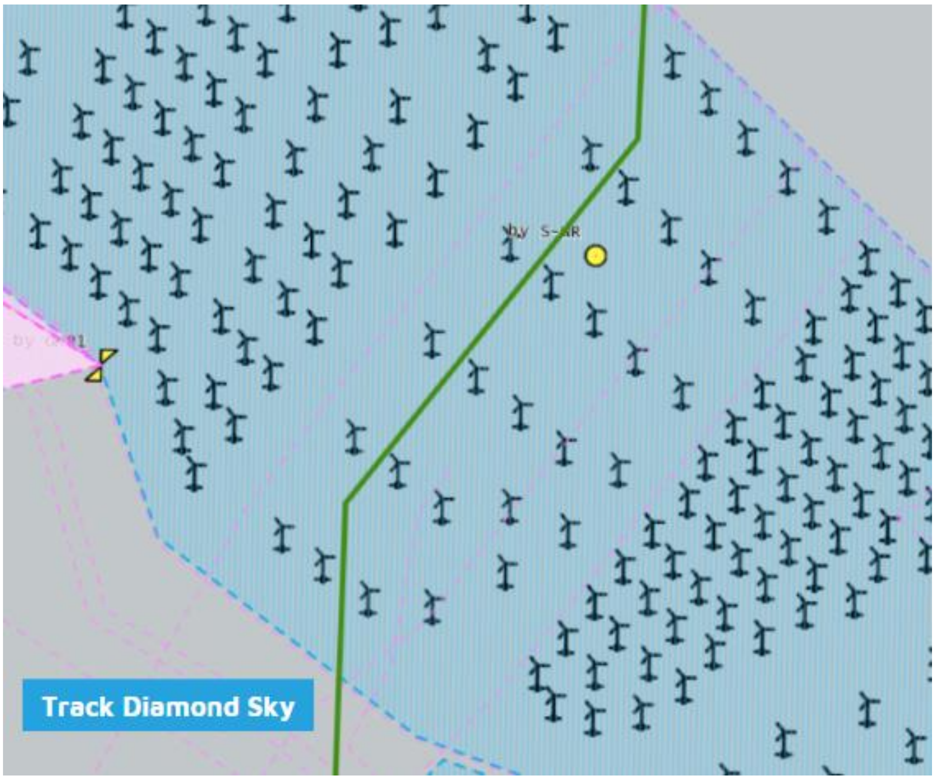

Figure 6 Intrusion to the Seastar Wind Park

1.5 The Activation of the General Emergency Plan (ANIP)

The General Emergency Plan, called ANIP was activated when the Maersk Nimbus entered the wind parks at approximately 15:36. This was closely followed by the Diamond Sky, which also intruded into the Seastar wind park at around 15:54. The two vessels took different approaches to manage their situations. The Maersk Nimbus attempted to deploy both anchors to regain control, whereas the Diamond Sky chose to navigate through the wind park while maintaining control.

The Maersk Nimbus's incident occurred in a region with numerous subsea energy cables, posing a significant risk of collision with wind turbines. The vessel's anchors were dropped, bringing it within 50 meters of a wind turbine.

1.6 Was the Maersk Nimbus a Unique Case?

During the six-day passage of Storm Eunice, two incident cases were reported. Firstly, the Maersk Nimbus, an IMO type 3 tanker (referring to the dangerous cargo), triggered the emergency ANIP procedures. Secondly, a bulk carrier, the Diamond Sky, which, based on our research, did not undergo any incident investigation, nor was there a full report on its intrusion into the Seastar wind park area. It is worth noting that near-miss reporting and sharing of such reports is rare to nonexistent.

For our research, it is important to delve deeper into other cases that posed a higher risk during an extreme weather event. As an indicator, we have analyzed the timeframe of the Maersk Nimbus incident, from 10:00 until 16:00 on the 18th of February. During this timeframe, we implemented an additional 1.87 nautical miles[2] monitoring zone on top of the already existing 500-meter safety zone surrounding the wind parks. This allowed us to gain a better understanding of the number of vessels struggling to find open space for drifting and had no other option than turning within close proximity to the wind parks.

[2] 1,87 nautical miles is an general used standard in onboard operational instructions for keeping a safe distance to obstructions depending on the navigational environment.

The research, based on AIS (Automatic Identification System) data, showed that a total of 7 vessels came within 1.87 nautical miles of the wind parks while conducting course alterations in preparation for the next leg of their drifting patterns. Remarkably, vessels carrying dangerous cargo, such as LPG and type 3 tankers, also chose to approach the wind parks closely.

One peculiar event concerns the vessel Seyma, which decided to leave the drifting area after assessing the crowded waters. The vessel's track enters the Belgian EEZ via the Northhinder TSS in a southerly direction. In the approach to the drifting area, the vessel makes a U-turn, which can be interpreted as an indication of an experienced crew making a negative risk assessment when entering the crowded waters.

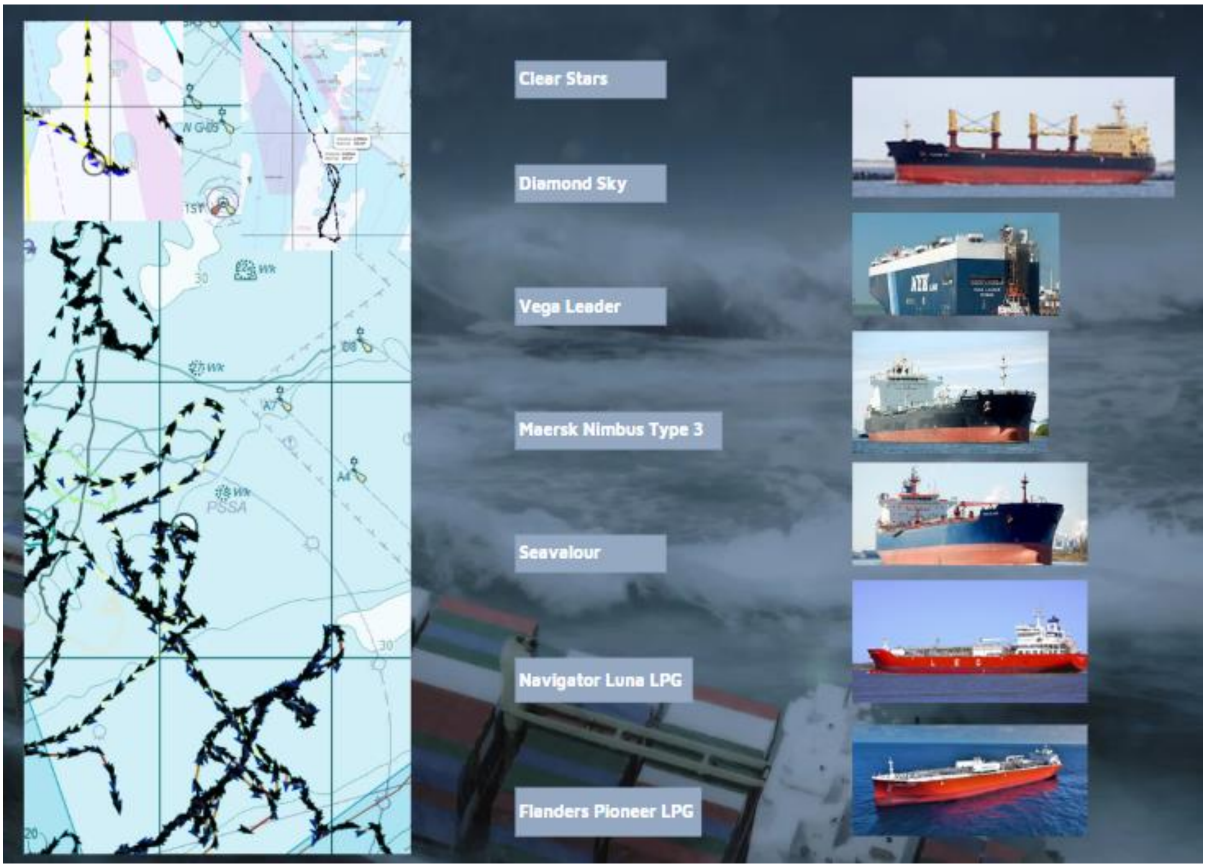

Figure 7 High risk cases during the incident of the Maersk Nimbus