Maritime Administration's Safety Corner

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The Maritime Administrator

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Hurricane season is not over yet and we are seeing more and more activity. Hurricane Season runs until November 30th in the Atlantic Ocean. Continue to monitor the National Hurricane Center's website (National Hurricane Center (noaa.gov)) for storm activity.

As temperatures begin to drop, now is the time to start preparing for winter weather. Stock up on the necessary supplies such as shovels, deicing materials and clothing like winter gloves and hats, before you need them. Review procedures for winterizing water lines, such as the fire main and eye wash stations before you encounter freezing temperatures. Talk to coworkers about the importance of notifying supervisors if they feel they have been exposed to the cold for too long. Have a plan in place if a coworker feels they have been exposed to freezing temperatures for an extended period of time.

Preparation goes a long way toward preventing accidents and injuries.

Stay Safe!

Preventing GPS Signal Interference

The Global Positioning System (GPS) is heavily relied on in marine navigation. Unfortunately, interference specifically jamming and spoofing of the GPS signal around the world has become prevalent. Jamming occurs when the weak GPS signal is disrupted by a stronger broadcast, effectively blocking the GPS signal to the vessel. Spoofing involves manipulating the signal, so that the vessel appears to be in a position other than the actual location. While spoofing requires more sophisticated equipment and is less common worldwide, it can be more dangerous to the vessel and may have lasting impacts on GPS receivers.

The Maritime Administration (MARAD) has teamed up with the Department of Transportation (DOT), the Volpe Center, and Zeta Associates to test equipment designed to prevent jamming and spoofing. Real world testing was done on a MARAD vessel in the Mediterranean followed by extensive testing at a military facility. The results indicate that anti-jam antennas with more elements had greater success in preventing the GPS signal from being interfered with. However, as the number of elements increases, connections to existing equipment and power sources tend to be more complicated. Some of these potential antenna solutions fall under the ITAR (International Traffic in Arms Regulations) restrictions and cannot currently be purchased in the United States. DOT is working with the State Department to change the language in the ITAR restriction to allow these antennas to be purchased in the United States.

Vessel operators should be aware of an impending report which will describe the technology and testing results, enabling them to better determine which option is better for their situation. A notice will be sent when available for review.

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Navigation Near Miss

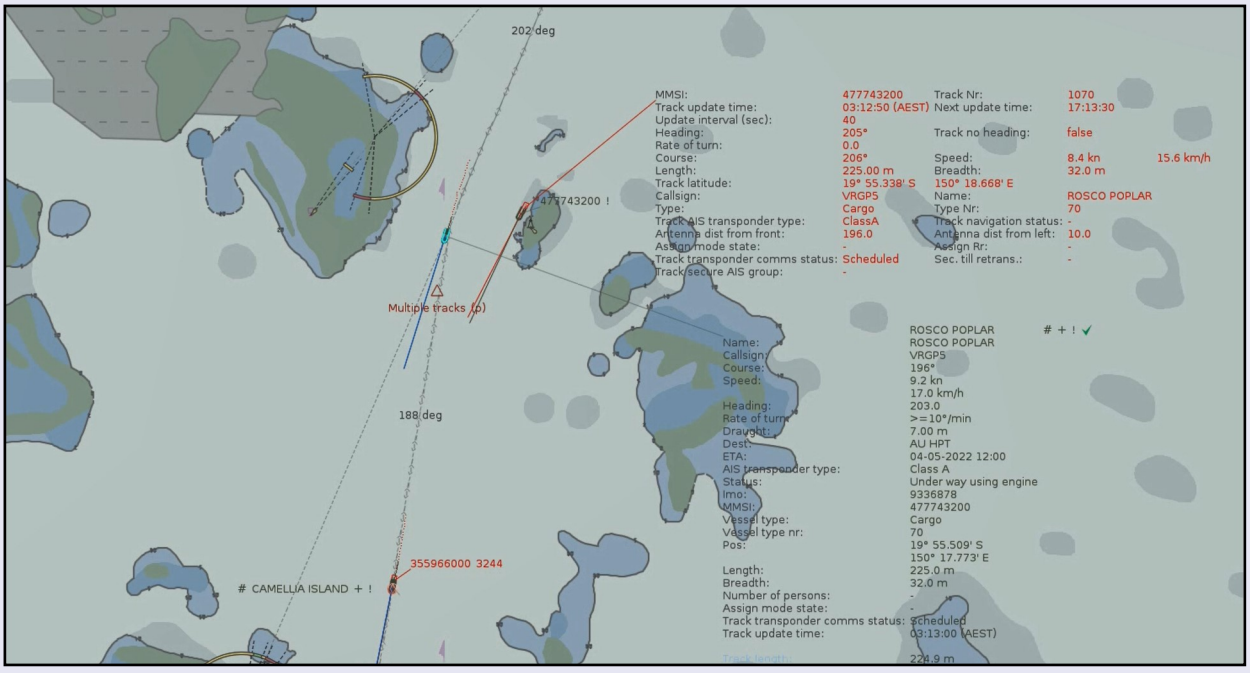
The Australian Transport Safety Bureau (ATSB) released a report on a near miss incident (Near grounding of Rosco Poplar, off Bond Reef, Hydrographers Passage, Queensland, on 4 May 2022 | ATSB). One of the findings was an over-reliance on GPS, but communication was also a significant issue. The Master alerted the second mate to discrepancies between the ship's heading displayed on the radar and ECDIS units; however, he never alerted the pilot. Below is part of the Executive Summary of the report.

The ATSB found that during the early stages of the pilotage, one of the ship's three GPS units began outputting incorrect positional data, likely due to an antenna malfunction. Because the bridge navigational equipment, including the electronic chart display and information system (ECDIS) and automatic identification system (AIS), was receiving a single position input from the same GPS unit, the ship's position was incorrectly displayed on all these systems. However, no alarms were triggered from the failure, as the GPS unit incorrectly indicated that position accuracy was within acceptable limits.

The investigation found that the pilot and bridge team solely relied on GPS positioning to monitor the ship's progress and did not maintain a proper lookout through use of radar and visual observations. As a result, they failed to identify that the position reported on the ECDIS units was incorrect and that the ship had deviated significantly from the planned track.

It was also identified that the pilot had not correctly configured their portable pilot unit (PPU) to be independent of the ship's position sensors. This resulted in the PPU displaying the same incorrect position as the ship's ECDIS units.

Additionally, ineffective pilotage and bridge resource management (BRM) contributed to the occurrence. An inadequate master-pilot information exchange failed to establish individual roles and responsibilities for watchkeeping and communication, while the second mate was assigned tasks that distracted them from their duties of monitoring the passage plan and maintaining a proper lookout. Consequently, the pilot and bridge team's situational awareness progressively declined in the absence of adequate communication and a shared mental model of the pilotage.



The picture above from the Australian Maritime Safety Authority shows the difference between the actual position of the vessel (in red) and where the pilot and crew thought they were (in blue).

Fatigue Related Accident

The National Transportation Safety Board (NTSB) recently released a report on a towing vessel incident which occurred on the Mississippi River. The pilot operating the vessel at the time of the incident, fell asleep. Below is part of the NTSB's report.

The pilot of the towing vessel was experiencing the effects of fatigue during his watch on September 12, 2023, while navigating the Lower Mississippi River (Pilot is a term used aboard towing vessels on inland waterways to refer to a person, other than the captain, who navigates the vessel). NTSB investigators concluded the pilot had less than two hours of continuous sleep before taking the watch, and likely received less than five hours of sleep combined over the two days before striking the pier.

"A sleep deficit of as little as two hours can result in acute sleep loss and associated performance decrements, including decreased attention, slower reaction time, reduced vigilance, poor decision-making, and an inability to stay awake," investigators found. Fatigue is often a factor in marine casualties investigated by the NTSB. "Fatigue affects all aspects of human performance, including decision-making, alertness, and reaction time, all of which affect a mariner's ability to safely navigate a vessel," investigators said. "Mariners should understand the performance effects of sleep loss and recognize the dangers of working on board a vessel while fatigued."

At the time of the casualty, the pilot had been assigned to the towing vessel for three months and was 14 days into a 28-day rotation—the pilot's typical hitch rotation. During this hitch, the pilot maintained the same watch schedule (0000–1200) and typically received five hours of sleep during each 12-hour off-watch period. When at home between hitches, the pilot stated that he also typically received five hours of sleep each night. Following the casualty, the pilot completed a work/rest report detailing his hours of sleep and awake time in the four days before the casualty. On September 8, he slept seven hours, and, on September 9, he slept five hours. He reported sleeping from 1800 to 2100 (three hours) on September 10 and from 1700 to 2000 (three hours) on September 11 (the day before the casualty). When asked about his sleep in the 24 hours before the casualty, the pilot noted personal stressors that affected his sleep quality and duration. The pilot stated that he did not feel tired or fatigued when assuming the watch at 0000 on September 12.

The towing vessel wheelhouse was equipped with a pilothouse alerter system, or watch alarm, that activated when either the vessel's steering pumps were on, or the engines were in gear. The system monitored movement in the wheelhouse using motion detectors and monitored rudder input. If there was no motion in the wheelhouse or rudder input detected for two minutes, an audible and visual alarm activated in the wheelhouse, requiring the on-watch crewmember in the wheelhouse to acknowledge the alarm. Once acknowledged the two-minute interval would reset. If the alarm was not acknowledged, subsequent alarms would activate in crew spaces. The intervals could not be changed, nor could the system be disabled by wheelhouse personnel. The pilot stated that the watch alarm activated and woke him up just before the vessel contacted the pier. The pilot recalled "hearing the dead man alarm, opening my eyes, and there was the dock."

Does your company have a plan for addressing fatigue? When was the last time the plan was evaluated? Can a "Stop work order" occur if someone feels fatigued? NTSB reports can be found at Investigation Report (ntsb.gov) .

Maritime Safety Meetings

- September 30– October 4, 2024: **IMO Marine Environmental Protection Committee** in London, U.K. (PROG-132-Preliminary-Rev.1 - Preliminary Programme Of Meetings For 2024 (Secretariat) final.pdf (imo.org))
- November 12-15, 2024: **International Workboat Show** in New Orleans, LA (International WorkBoat Show | Conference and Expo for Commercial Vessels)
- November, 12-13, 2024: **Waterborne Transport Group** meeting in New Orleans, LA (Waterborne Transports Group - National Safety Council (nsc.org))
- Dec 2-6, 2024: **IMO Maritime Safety Committee** in London U.K. (PROG-132-Preliminary-Rev.1 - Preliminary Programme Of Meetings For 2024 (Secretariat) final.pdf (imo.org))
- December 11-12, 2024: **ASTM F25 Committee on Ships and Marine Technology** in Orlando FL (ASTM International)
- January 27-30 2025: **Passenger Vessel Association (PVA) Annual Convention** in Savannah, GA (Meetings and Events Calendar | Passenger Vessel Association)
- February 18-20, 2025: **American Waterways Operators Safety Meeting** in Nashville, TN (The American Waterways Operators |)

Safety Tip:

Safety Management Systems are a way to ensure important steps are followed to avoid accidents. However, they do not always prevent every potential accident. Procedures and checklist need to be updated occasionally and the people who know best how they should be updated are the mariners who use them. If you think a change or an addition could prevent a future accident, notify your safety office of your recommended change. Safety Management System's work best when the end users fully participate.

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