

National Transportation Safety Board

Marine Accident Brief

Collision of Matachin Tow with US Coast Guard Cutter Thetis

Accident no.	DCA16PM041		
Vessel names	Matachin and Thetis		
Accident type	Collision		
Location	Las Cascadas Reach, Panama Canal, Panama 9°4'15" N, 79°40'30" W		
Date	June 2, 2016		
Time	About 0111 eastern standard time (coordinated universal time – 5 hours)		
Injuries	None		
Property damage	\$1.2 million est.		
Environmental damage	None reported		
Weather	Visibility 5 miles, winds north-northwest at 4 knots, calm water, air temperature 75°F, water temperature 86°F		
Waterway information	The Panama Canal is a 48-mile-long, man-made waterway that connects the Atlantic Ocean to the Pacific Ocean. The canal measures approximately 270 yards wide at the site of the collision.		

On June 2, 2016, about 0111 local time, the dump scow barge *123* being pushed by the Panama-flagged towing vessel *Matachin* collided with the US Coast Guard cutter *Thetis* in Las Cascadas Reach, Panama Canal. Although the *Matachin* and its tow were not damaged, the *Thetis* sustained an estimated \$1.2 million in damage to the hull and deck plate aft, as well as to various systems in the steering gear room. There were no injuries, nor was there any report of pollution.



US Coast Guard cutter *Thetis* arriving at the Guantanamo Bay Naval Base in Cuba. (Photo by Coast Guard)

*Unless otherwise noted, all miles in this report are nautical miles (1.15 statute miles).



Accident area, marked by a red triangle. (National Geospatial-Intelligence Agency chart 21602)

Accident Events

On May 19, 2016, the commanding officer of the *Thetis*—a 270-foot Famous-class medium endurance cutter—assumed responsibility of the vessel and its crew at a Coast Guard change-of-command ceremony held in the vessel's home port of Key West, Florida. The next day, the *Thetis* departed the port to perform a "shakedown cruise." During this voyage, functionality tests were performed on all systems on board, including a recently installed davit-launched small boat and the cutter's two main diesel engines, one of which had been recently overhauled. After returning to Key West on May 21 to address issues identified during that brief underway period, the *Thetis* departed a week later for patrol operations in, first, the Gulf of Mexico and, second, the eastern Pacific Ocean via the Panama Canal. On June 1, at 0900, the *Thetis* entered the territorial seas of Panama and, shortly thereafter, at 1042, anchored off Colón, Panama.



Towing vessel *Matachin* pushing ahead the dump scow barge 123 postaccident in the Panama Canal. (Photo by Panama Canal Authority)

The commanding officer and the navigational crew prepared for the transit through the canal by developing a voyage plan, performing a navigational brief, and completing a risk assessment using the agency's Green-Amber-Red (GAR) model. The GAR model indicated a moderate (amber) level of risk based on the complexity of the canal transit, traffic density, potential for reduced visibility in the canal caused by rain and darkness, and several watch rotations of the navigational crew that would occur during the voyage.

Following the GAR procedures, the commanding officer and crew developed mitigation strategies to address the risks they had identified. These strategies included improving communications between each of the watch positions and offsetting watch rotations to ensure continuity as the various watch positions changed out. The team also identified the services of a Panama pilot as a strategy to reduce the risks associated with traffic density and reduced visibility.

Under the rules and regulations of the Panama Canal Authority (ACP), pilots on board vessels assume control of the navigation; therefore, they do not serve in an advisory capacity as do compulsory state pilots in US waters. Vessel traffic is managed in the canal by the ACP's Marine Traffic Control Center (MTC), whose efforts contribute to the prevention of collisions in a manner similar to those of a Vessel Traffic Service in the United States. Although the center provides traffic advisories to pilots, its primary responsibilities are to minimize a vessel's average transit time and to optimize the use of canal facilities, including the lock systems at both ends of the canal.

The MTC uses a Communications, Tracking, and Navigation (CTAN) system that relies on differential GPS-based locations, radar at both ends of the canal, and automatic identification

system (AIS) data to develop a traffic image. Along with other safety-critical information, this image is displayed in the MTC and on the pilot's laptop computer as an electronic map in real time. The MTC also prepares an operation schedule based on the number and characteristics of all vessels in transit or waiting to transit the canal. Staff continuously monitors vessel operations and conveys traffic information to each pilot to ensure close adherence to each vessel's schedule.

At 1800, the *Thetis* was ready to receive the first Panama Canal pilot (hereafter referred to as pilot no. 1) but learned that he had been delayed because of traffic. At 1934, pilot no. 1 boarded the vessel in the anchorage. About 10 minutes later, the cutter was under way, transiting via the Atlantic Entrance Range southbound toward the lock chambers known as the Gatun Locks. The *Thetis*'s navigational lighting was energized, with each light being visually verified as operational, the status of which was noted in the deck log.

To assist with his pilotage duties, pilot no. 1 used a CTAN AIS-capable portable pilot unit (PPU) that was connected to the *Thetis*'s AIS unit. The cutter's AIS unit was broadcasting in non-encrypted mode, thereby transmitting its information to all surrounding vessel traffic and the MTC.

The commanding officer established an anchor watch on the bow of the *Thetis*, in case the navigation team needed to release the anchors during the transit, as well as a special navigation watch on the bridge to maneuver in restricted waters. Under this special navigation watch, communication between watchstanders was limited to communication essential to the safe movement of the vessel and essential to the bridge team. The bridge team consisted of the following: a conning officer, a deck watch officer, a shipping officer, a navigation evaluator, a helmsman, a quartermaster of the watch, a dedicated lookout, a safety observer, the executive officer, and the commanding officer. Communications from the pilot were directed to the conning officer, who in turn conveyed the orders and directions to the helmsman.

In addition to the bridge team, the cutter also had personnel assigned to the stern to assist with line-handling functions; to the aft steering room to perform manual steering, if needed; and to a secure space on the vessel known as the combat information center (CIC). The personnel serving in the CIC maintained a picture of all threats to the vessel, using AIS data, surface search radar, and other sensors, and then disseminated that information to the shipping officer on the navigation bridge. The shipping officer, who managed the input from the CIC and the dedicated lookout, also used the bridge radar to track all reported and observed contacts, providing the navigation team the closest point of approach and other information related to the contact.

The shipping officer told investigators that the cutter did not have a specific policy on radar settings for navigation and that he preferred a greater visibility of radar echo return on the screen because, otherwise, he might unintentionally filter out a contact. Thus, when he assumed the watch that evening, he took the radar out of automatic tuning mode and attempted to adjust both the sensitivity time control, which adjusts the reflected radar echoes off the sea around the ship, and the fast time constant, which suppresses the reflected radar echoes from rain and consequentially can curb the return from legitimate contacts at close range. However, after trying unsuccessfully to manually adjust the settings to attain the screen display and image he preferred, the shipping officer returned the system setting to its automatic tuning mode. He also stated that the radar console was set to display the X-band radar, which he considered better for short-range contact detection.¹

¹ X-band frequency generates shorter electromagnetic wavelengths for improved short-range contact detection, compared to S band, which generates longer electromagnetic wavelengths for better long-range detection.

The vessel entered the Gatun Locks system at 2012, cleared the last lock at 2123, and then entered Gatun Lake to continue the transit southbound in the Panama Canal. At 0030 on June 2, the pilot boat approached the *Thetis*, where the second Panama Canal pilot (pilot no. 2), who had over 8 years of service, embarked the *Thetis* in an area of the canal near Gamboa, Panama. Pilot no. 2 was escorted by Coast Guard personnel to the vessel's navigation bridge, where he and pilot no. 1 performed a brief pilot-to-pilot information exchange. After the exchange, at 0035, pilot no. 1 boarded the pilot boat, which departed the *Thetis* at 0038.

Between 0030 and 0040, the master of the towing vessel *Matachin* assumed control of his vessel, which was pushing ahead the empty dump scow barge *123*. At the time, the vessel was heading southbound in a section of the Panama Canal known as San Pablo Reach, Gatun Lake, from a dumpsite at Buena Vista Reach, Gatun Lake. The vessel was en route to a canal expansion worksite near the new Pacific Ocean locks (also known as the Cocoli Locks).

Since 2007, the ACP had been working to complete the Panama Canal expansion project. Near completion at the time of the accident, the canal project consisted of adding new locks at each end of the canal to accommodate larger vessels, widening and deepening existing navigational channels, and creating a new channel to connect the Pacific Ocean locks and Culebra Cut. The *Matachin* and barge *123* were performing tasks in support of this project at the time of the accident.

Around 0055, the *Thetis* reached an area known as Las Cascadas Reach. The vessel was scheduled by the MTC to arrive at the Pedro Miguel Locks at 0220 and then pass through in a tandem lockage with another vessel, an Antigua and Barbuda-flagged cargo ship named the *Independent Aim*. To accommodate this anticipated arrival time, pilot no. 2 had ordered the *Thetis*'s forward speed to be reduced to 4–4.5 knots so that the vessel would not arrive at the locks before 0200. The *Thetis* had traveled through a section of the waterway that required the vessel to transit on a course over ground of approximately 128 degrees and now entered a section that required transiting on a course over ground of approximately 144 degrees.

Sometime between 0105 and 0106, the commanding officer identified the *Matachin* as an AIS contact among many other AIS contacts in the area. Because the *Matachin* was not visible by eye from the cutter at the time, the commanding officer focused on the vessel activity forward of the *Thetis*.

At 0110, while the *Thetis* was approximately 1,600 yards off the stern of the *Independent Aim*, the executive officer stepped onto the port bridge wing and visually observed the port and starboard navigation lights on what was later identified as the *Matachin* and barge 123. The tow was approaching from the port stern at a speed that the executive officer visually determined was much faster than that of the *Thetis*'s. Upon returning to the navigation bridge, he asked the pilot, "Is this guy overtaking us?" According to the executive officer, the pilot responded not verbally but with a look of surprise. The executive officer then asked, "Are you talking to this guy?" Once again, the pilot gave no verbal response; instead, he followed the executive officer and the commanding officer quickly out onto the port bridge wing.

The lookout, who was stationed just above the navigation bridge, had not seen the towing vessel and the barge. The line handlers assigned to the stern were in the galley on break. Investigators later learned that the crewmembers assigned to the CIC also had not identified the

approaching contact, even though the AIS transmission of the towing vessel was captured by the *Thetis*'s SeaWatch system.²

At that time, the executive officer determined that the distance between the two vessels had reduced to the point where collision was imminent. From the port bridge wing, the pilot ordered "full speed ahead," and the executive officer also attempted to call out a rudder command of "right standard rudder" in an attempt to move the *Thetis* out of harm's way. However, about 0111, the starboard bow of barge *123* struck the port stern of the *Thetis*.

The general alarm, which the commanding officer ordered to be sounded just prior to the collision, was activated almost immediately after the contact between the vessels. The crew began the initial damage assessment; accounted for all crewmembers, including the petty officer who was stationed in the aft steering room; and determined that the vessel was not taking on water. Portions of the hull plating and other material dislocated by the contact had been pushed into the area of the *Thetis*'s steering system, thereby limiting the functionality of the steering rams and rudders. Using the port and starboard propulsion systems, in conjunction with two assist tugboats ordered by the pilot, the *Thetis* made its way to the nearby Cucaracha tie-up station on the east side of Gaillard Cut, where further damage assessments were completed. Later, the vessel was shifted to dock no. 6 at the Panama Ports Company in Balboa, Panama, to await the arrival of NTSB and Coast Guard investigators. Neither the *Matachin* nor barge *123* was damaged.

Although they were not able to interview the Panamanian mariners involved in this accident, investigators were given access to the investigative hearing convened by the ACP Board of Inspectors on June 4, 2016, and were later provided with a copy of the board's final report along with all evidence collected. In the hearing, the master of the *Matachin*, who had 16 years of service as master of towboats without incident, said he had assumed the watch between 0030 and 0040. The vessel's radar was operational, but the master had shut off the system because he had clear forward visibility. The *Matachin* was outfitted with a CTAN AIS unit, which was turned on and operational at the time of the accident.

The master of the *Matachin*, who was serving as the only lookout on the vessel, stated that the chief engineer was also on the bridge talking with him at the time of the collision and that neither of them was aware of the presence of the *Thetis* until after contact was made. Also, the master of the *Matachin* said that prior to the collision he had the vessel's throttle at full-ahead speed and that while the vessel was transiting at 10.5–11 knots he did not see the stern light of the *Thetis* illuminated. However, video of the accident captured by an MTC camera confirmed the cutter's stern light was operational and energized at the time of the collision. After he felt the contact, the master energized the *Matachin*'s spotlight, which illuminated the stern of the *Thetis*.

Pilot no. 2, who also provided testimony during the hearing, stated that the MTC had not informed him that the *Matachin* was proceeding southbound in Gaillard Cut astern of the *Thetis*. He also said that the ship's crew properly executed all of his commands.

² The Coast Guard's SeaWatch system synthesizes navigation, tactical, communication, and optical surveillance information into one situational awareness picture.

Panama Canal



1042, June 1

Colón

Shortly after entering the territorial seas of Panama, the Thetis anchors.

1934

Pilot no. 1 boards the Thetis. Ten minutes later, the vessel is under way, heading southbound via the Atlantic Entrance Range toward the Gatun Locks.

2012, June 1

Gatun Locks

The Thetis enters the locks system, clears the last lock at 2123, and then enters Gatun Lake to continue the transit southbound in the canal.

0030-0040, June 2

San Pablo Reach

The master of the Matachin, which is pushing ahead the dump scow barge 123, assumes control of his vessel.



3

Gamboa

Pilot no. 2 embarks the Thetis to relieve pilot no. 1. Five minutes later, the first pilot departs the vessel.

0105-0106, June 2 5

Las Cascadas Reach

The commanding officer on the Thetis identifies the Matachin as one of many contacts on the vessel's automatic identification system.

About 0111

The starboard bow of the dump scow barge 123 contacts the port stern of the Thetis.



Damaged stern of the *Thetis*, which was moored postaccident at the Cucaracha tie-up station in the Panama Canal. (Photo by Panama Canal Authority)

As part of their efforts, investigators interviewed crewmembers assigned to the *Thetis* who were on watch at the time of the collision; surveyed the vessel and the barge for damage; with the assistance of the ACP, performed an assessment of the waterway where the accident occurred; and boarded the *Matachin*, which was under way.

Also, on the *Thetis*, investigators examined the lookout station, starboard side, on the 03 deck that was directly above the cutter's navigational bridge. At that dedicated lookout station, the watchstander could use a permanently mounted binocular system to aid in identifying contacts and a sound-powered phone to report all contacts to the bridge team.

Visibility of the water's surface from the lookout station was partially obstructed between 180 and 245 degrees of relative bearing by the *Thetis*'s mast, exhaust stacks, helicopter hangar, and other equipment. In addition, the cable that connected the headset of the sound-powered phone to the pedestal-mounted service connection lacked sufficient length to allow the lookout to walk over to the port side where obstructions to the visibility would have been eliminated. The lookout stated to investigators, "You can't really see behind you at all. The main thing is to keep your eyes forward and make sure . . . we don't hit anything and no contacts are coming directly at us." The relative bearing of barge *123* before the collision was between 185 and 195 degrees. Immediately after the collision, the lookout indicated that he saw a white light, which he thought was possibly the top of the mast of the *Matachin*.



Looking aft, view from the 03 deck starboard where the assigned lookout was stationed.

Neither of the two pilots nor any of the navigational crewmembers on the *Thetis* identified any concerns related to the functionality of the bridge navigation equipment, nor did the master of the *Matachin* regarding his vessel. In addition, the engineering, steering, and other vital systems on both ships were determined to have been operational and in good order. Furthermore, pilot no. 1 did not report a problem with the PPU used on the *Thetis*.

Investigators examined the work/rest histories for the Coast Guard personnel involved: there were no indications of crew fatigue. The navigation team members of the *Thetis* submitted samples for chemical testing: all were determined to be negative. However, alcohol testing was not conducted.

The Panama Canal Authority did not require the master of the *Matachin* to be tested for alcohol or other drugs, nor did it review his work/rest history.

Analysis

The navigation of any vessel is a dynamic process in which an individual, or a navigation team, performs multiple tasks or functions using all available resources with the intent of ensuring the safe and efficient movement of the vessel. This process becomes more challenging during periods when visibility is impacted by darkness and in waters where traffic is frequently dense and vessels operate in close proximity to each other, such as in the Panama Canal. In this particular accident, both vessels were equipped with technologically advanced navigational equipment, each

manned by well-trained, experienced, and competent mariners. Thus, it is reasonable to infer that the master of the *Matachin* and the pilot and navigation team on the *Thetis* all had the skills, capabilities, and necessary tools to identify the risk of collision that was developing between the two vessels early enough to take appropriate action. Because the vital systems and navigational equipment on each vessel were confirmed to be fully operational, the causal factors that led to this accident can only be attributed to the human element.

The Matachin

According to a statement by the master of the *Matachin* to the ACP Board of Inspectors, he was not aware of the presence of the *Thetis* until he illuminated the stern of the vessel with the towing vessel's spotlight just after the barge had struck the cutter's stern. Had the master been properly monitoring radio communications or the CTAN AIS unit, which was displaying the *Thetis*'s AIS transmission, at least one of those two electronic bridge resources would have alerted him to the presence of the cutter. Likewise, had he energized the radar, that tool would have provided him with an indication that a contact of some type was in the canal ahead of his vessel, thereby prompting him to take action in order to avoid the collision.

On the night of the accident, the visibility was reported as being good by all individuals involved, and the *Thetis*'s stern and other navigational lights were illuminated. Although it is possible that the cutter's stern light was misperceived by the master of the *Matachin* as one of the many bank lights positioned along the edges of the canal, it is more probable that the master simply did not observe the light—which would have been visible from several nautical miles away—because he did not maintain a vigilant lookout by sight. Also, considering the fact that the vessel's chief engineer was on the bridge talking with him at the time of the collision, it is likely that the master was distracted from his navigational duties and lost situational awareness.

The Thetis

Although the burden of navigational control of the *Thetis* while transiting the Panama Canal fell solely on the pilot, the officers and the crewmembers of the cutter were expected to maintain responsibility for their respective watch positions. However, neither the pilot nor the navigation team members identified, or even recognized, the risk of collision presented by the approaching tow until seconds before impact. The watchstanders in the cutter's CIC did not identify the *Matachin*'s AIS transmission or its radar return, and the lookout did not visually observe the navigational lights of the vessel and barge approaching from the stern. Given the array of navigational and situational awareness tools available to them, the CIC team should have identified any vessel approaching the *Thetis* from the stern, or from any other direction, and conveyed its presence to the shipping officer, even in a congested waterway like the Panama Canal. The commanding officer, on the other hand, detected the *Matachin* on the AIS approximately 5 minutes prior to the collision, but he did not alert the pilot or the bridge team.

The *Thetis*'s dedicated lookout on the starboard side of the 03 deck was in the best position to have visually detected the approaching *Matachin*; he had the greatest height of eye. Had he been capable of seeing these contacts, he could have used that vantage point to monitor the position of the towing vessel and barge and, at a minimum, keep the navigation team informed about its progress.

From the lookout's position on the starboard side, his ability to visually observe the towing vessel and barge approaching from a relative bearing of between 185 and 195 degrees was obstructed by the *Thetis*'s mast, exhaust stacks, helicopter hangar, and other equipment. In

addition, the cable that connected the headset of the sound-powered phone to the service connection did not have enough length to allow the lookout to make his way over to the port side of the 03 deck, which would have enabled him to effectively scan all 360 degrees of the water's surface. Because the crewmembers on the stern were serving as line handlers and had not been assigned the responsibility of being aft lookouts, they had entered the ship's galley for a work break. Therefore, the risk of collision presented by the approaching *Matachin* and barge went undetected visually and thereby unreported to the navigation team, until the executive officer noticed its approach just prior to the collision.

The physical location assigned to the dedicated lookout, as well as the tools provided to that individual, should allow the watchstander to scan the surface of the water in a full 360-degree view to make a full appraisal of the risk of collision. In this case, there was a significant portion of the vessel's aft port quarter that could not be monitored by the lookout, and there was no assignment of a secondary, dedicated lookout aft to monitor the area. As such, the special navigation team missed another opportunity to detect the *Matachin* tow approaching from the stern in a timely manner where action could have been taken. The crew on the *Thetis* did not maintain a sufficient and proper lookout necessary to identify the risk of collision presented by the approaching towing vessel and barge.



View looking forward from the starboard control station on the navigation bridge of the Matachin.

Coast Guard Actions Postaccident

Since the accident, the Coast Guard cutter *Thetis* has implemented the following changes: First, the shipping officer's responsibilities, as outlined in the onboard guidance, were amended to require that an individual be qualified as deck watch officer, preferably as an *underway* deck watch officer, before assuming the role of shipping officer. Second, an additional dedicated lookout position was added to the aft area of the *Thetis* for long transits in restricted waters. Third, a radar-tuning policy was established that prohibits both the SeaWatch and the radar systems from being offset from the automatic tuning mode when transiting in restricted waters, in order to ensure the optimal traffic image.

Probable Cause

The National Transportation Safety Board determines that the probable cause of the collision between the *Matachin* tow and the US Coast Guard cutter *Thetis* was the failure of the master of the *Matachin* to maintain a proper lookout and use radar to detect the vessel traffic ahead to avoid a collision. Contributing to the collision was the failure of the pilot and the navigational crew on board the *Thetis* to maintain a proper lookout.

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

ROBERT L. SUMWALT III Acting Chairman CHRISTOPHER A. HART Member

EARL F. WEENER Member

T. BELLA DINH-ZARR Member

Adopted: June 28, 2017

Vessel Particulars

Vessels	Thetis	Matachin	123
Owner/operator	US Coast Guard	Panama Canal Authority	Panama Canal Authority
Port of registry	Key West, Florida	Panama	Panama
Flag	United States	Republic of Panama	Republic of Panama
Туре	Coast Guard cutter	Towing vessel	Dump scow barge
Year built	1986	2012	2012
Official/IMO number	924318	9658202	6007456 (ACP ship identification number)
Construction	Steel	Steel	Steel
Length	270 ft (82 m)	93.5 ft (28.5 m)	213.3 ft (62.4 m)
Draft	14.5 ft (4.4 m)	12.5 ft (3.8 m)	14 ft (4.3 m)
Beam/width	32 ft (12 m)	40.6 ft (12.4 m)	49.2 ft (15 m)
Gross and/or ITC tonnage	1,800 long tons	489 gross tons	1,077 gross tons
Engine power; manufacturer	7,300 hp (6,712 kW); diesel; (2) Fairbanks Morse ALCO V-18 diesels @ 3,650 hp each	5,260 hp (3,922 kW); diesel; (2) General Electric 12V228 diesels @ 2,630 hp each	N/A
Persons on board	90	7	N/A

NTSB investigators worked closely with our counterparts from Coast Guard Investigations National Center of Expertise (New Orleans) and Coast Guard First District throughout this investigation.

For more details about this accident, visit <u>www.ntsb.gov</u> and search for NTSB accident ID DCA16PM041.

The NTSB has authority to investigate and establish the probable cause of any major marine casualty or any marine casualty involving both public and nonpublic vessels under Title 49 of the *United States Code*, Section 1131(b)(1). This report is based on factual information either gathered by NTSB investigators or provided by the Coast Guard from its informal investigation of the accident.

The NTSB does not assign fault or blame for a marine casualty; rather, as specified by NTSB regulation, "[NTSB] investigations are fact-finding proceedings with no formal issues and no adverse parties . . . and are not conducted for the purpose of determining the rights or liabilities of any person." Title 49 of the *Code of Federal Regulations*, Section 831.4.

Assignment of fault or legal liability is not relevant to the NTSB's statutory mission to improve transportation safety by conducting investigations and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report. Title 49 of the *United States Code*, Section 1154(b).