

NATIONAL TRANSPORTATION SAFETY BOARD OFFICE OF MARINE SAFETY WASHINGTON, D.C.

VESSEL TRAFFIC SERVICE GROUP CHAIRMAN'S FACTUAL REPORT

A. ACCIDENT INFORMATION

NTSB Accident No.: DCA15MM017

Accident Type:	Collision			
Location:	Houston Ship Channel, Upper Galveston Bay at buoys 89 & 90 in the vicinity of Morgan's Point. Lat 29-40.35N, Long 94-58.74W			
Vessel No. 1:	Liberian-registered bulk carrier Conti Peridot, IMO No. 9452634			
Owners, No. 1:	Conti Peridot Shipping Ltd.			
Vessel No. 2:	Danish-registered chemical tanker Carla Maersk, IMO No. 9171503			
Owners No. 2:	A.P. Moller – Maersk A/S			
Date:	March 9, 2015			
Time:	12:30:45 Central Davlight Time (CDT)			

B. VESSEL TRAFFIC SERVICE GROUP

Group Chairman: Larry D. Bowling, Senior Investigator NTSB Office of Marine Safety 490 L'Enfant Plaza East, S.W., Washington, DC 20594

> Mr. Les Ledet, Investigator USCG Investigations National Center of Expertise 1615 Poydras Street, Suite 1030 New Orleans, LA 70112

C. ACCIDENT SUMMARY

For a summary of the collision, refer to the Accident Summary Report in the docket for this investigation.

D. DETAILS OF THE GROUP'S INVESTIGATION

The Group convened on March 15, 2015, at Vessel Traffic Service (VTS) Sector Houston-Galveston to interview three individuals assigned to the VTS, and on watch at the time of the collision. The Group also examined multiple documents, logs, recordings and manuals which were deemed relevant to the incident being examined. Field Notes containing a summary of on-scene interviews and activities were generated by the Group Chairman, and distributed to the parties.

1. Interviews

The following individuals were interviewed.¹

- 1.1. Vessel Traffic Control Specialist, Petty Officer First Class, Jeremy Estes
- 1.2. Vessel Traffic Control Specialist, Mr. Monte Wilkes
- 1.3. Supervisory, Vessel Traffic Management Specialist, Mr. Alberto Hernandez

2. Vessel Traffic Service (VTS) Sector Houston-Galveston

VTS Houston-Galveston operates 24 hours a day, 7 days a week, and is equipped with the Ports and Waterways Safety System (PAWSS) which collects, processes, and disseminates information on the marine operating environment and vessel traffic. PAWSS receives vessel movement data from automatic identification system (AIS), three radars, 26 closed-circuit television (CCTV) cameras, and metrological and hydrological data collected by NOAA's Physical Oceanographic Real-Time System (PORTS). An AIS-based VTS reduces the need for voice interactions, enhances mariners' ability to navigate, improves their situational awareness, and assists them in the performance of their duties thus reducing the risk of collisions. Vessel Traffic Control Specialists (controllers) use Very High Frequency (VHF) radio to gather and disseminate vessel traffic information.² VTS provides mariners with information including position, identity, and intentions of vessels operating in the VTS area; meteorological information; status of aids to navigation; traffic congestion; and waterway restrictions. VTS also offers navigational assistance, at the request of the vessel operator, by providing information about the operator's own vessel, such as course and speed, position in the waterway relative to the channel axis, landmarks, and aids to navigation. PAWSS allows controllers to monitor vessel movements using a variety of methods including track correlation in which radar and/or AIS data from a single vessel is combined and communicated to the workstations. For each vessel being monitored, the controller can display a track vector, which is a line projected forward of the vessel which indicates its anticipated direction of travel for a specific time period, and/or a track history, which is a linear representation of the vessel's immediate past course over ground for a specified time period.

The information provided from a vessel to VTS is entered into an electronic form called a track data card, or TDC. The data card can be retrieved or displayed by VTS controllers as the vessel transits the coverage area. VTS controllers will routinely "read back" the data card

¹Refer to the accident docket for a redacted copy of each interview transcript.

² Very High Frequency (VHF) radio operates between 156 and 162.05 Megahertz (MHz). Marine VHF radio sets are installed on most seagoing, commercial craft and used for ship to shore, and ship to ship communication.

information to the vessel, primarily to verify that VTS has accurately captured the vessel's intentions, and also to re-broadcast the vessel's intentions using their powerful VTS VHF radio transmission capabilities. In addition, VTS controllers will provide the vessel operator with advisories, marine event information, potential hazards, or other hindrances to the vessel's safe transit. Communications from shore to ship, and ship to shore, are made using the English language and commonly accepted, standard marine communication phrases.

The position report is required on a vessel's entry into VTS-controlled waters, at designated points within the VTS area, and as directed by VTS operators. A sailing plan deviation or amplification report is required when a vessel intends to deviate from previously reported intentions (a change in route or bridge span intentions, for example), or when needed to provide additional information to VTS. The final report is required on a vessel's arrival at its destination or when leaving the VTS area, and it must include the vessel's name and position. Although VTS regulations afford certain exemptions for vessels on published routes or vessels that operate within a small nautical area, vessel participation in the Vessel Movement Reporting System (VMRS) is mandatory for all power-driven vessels of 40 meters or more, all towing vessels of 8 meters or more, and all passenger vessels carrying 50 or more passengers.

When a vessel reports passing a mandatory reporting point, the controller is expected to deliver advisories which detail anticipated traffic that will be encountered before the vessel's next anticipated communication with the VTS, aid to navigation discrepancies, any hazards to navigation which may exist, and details on any VTS measures that may be in place. At a minimum, the controller shall report all meeting situations expected to occur before the next reporting point; all crossing situations expected to occur before the next reporting point; and all crossing situations expected to occur before the next reporting point.³

The section of the waterway where the accident occurred was in the monitoring area of VTS Houston-Galveston. The VTS is co-located with Coast Guard Sector Houston-Galveston at Ellington Field in Houston, Texas, about 17 miles from the accident site. There are about 70 miles of navigable waters in the Vessel Traffic Service Area (VTSA), 55 miles of which is the Houston Ship Channel. At the time of the accident, VTS Houston-Galveston divided the VTSA into two areas: Sector I & II (southern) and Sector III (northern). Certain vessels transiting the waterway are required to check in with VTS before entering the VTSA and at designated reporting points in the waterway.⁴

Within the VTS Houston-Galveston center, the following positions or stations are continuously manned: Watch Supervisor; Assistant Watch Supervisor; radio guard desk for vessels to check-in/out of the VTSA on VHF channel 5A; Sectors I & II station, the southernmost sectors from Baytown extending out to the Galveston Bay Entrance Channel which guards VHF channel 12; and Sector III station, the northernmost sector from Baytown to Buffalo Bayou which guards VHF channel 11. The controllers assigned those specific positions use a

³ Internal Operating Procedures, Traffic Advisory pg 4-24.

⁴ VTS utilizes a regulatory Vessel Movement Reporting System (VMRS) to monitor and manage vessel movements. Per regulations governing VTS operations in the United States, VTS waterway users must provide an initial sailing plan report, position reports upon arrival at designated areas of the waterway, sailing plan deviation/amplification reports if the planned transit is changed, and a final report upon arrival at the destination. VTS Houston-Galveston has multiple mandatory reporting points identified in its operating area. See 33 CFR Part 161.

hard wired headset to monitor those three VHF channels, as appropriate. There is no single radio watch or controller specifically assigned to guard VHF channel 13, which is the commonly used channel for ship to ship, or ship to shore communications, rather, that channel is broadcast using speakers for the entire watch in the VTC to monitor, with the VTS controllers expected to guard that frequency for the purpose of gathering information on VTS user activity.



Figure 1. Vessel Traffic Center Houston-Galveston Watch Floor showing the locations of the four controllers. Inset shows the Sector I & II VTS controller at the watch station. Note: At the time of this accident, VTS Houston-Galveston designated the southern area as Sector I & II; and the northern area as Sector III.

3. VTS Law and Regulation

It is from The Ports and Waterways Safety Act of 1972 (PWSA), Title 33 United States Code (USC) §1221 (33 Code of Federal Regulations (CFR), Part161) that the Coast Guard draws its authority to construct, maintain and operate VTS systems. The purpose of the act was to establish good order and predictability on US waterways by implementing fundamental waterways management practices. Using the PWSA as the authority and the San Francisco Harbor Advisory Radar as the operational model, the Coast Guard began to establish VTS systems in critical, congested ports. The Houston/Galveston Vessel Traffic Service (VTS) was

established in 1975 to improve maritime safety and efficiency in the Houston-Galveston-Texas City port complex, the largest petrochemical port in the United States. These operations were curtailed in 1988 due to budgetary restraints and brought back on-line after the Exxon Valdez oil spill, when the Coast Guard was mandated by the Oil Pollution Act of 1990 to make participation mandatory at existing and future VTS.

The Bridge to Bridge Radiotelephone Act, Title 33 USC §1201 (33 CFR § 26) requires the use of the vessel bridge-to-bridge radiotelephone. Each person who is required to maintain a listening watch under the Act shall, when necessary, transmit and confirm, on the designated frequency, the intentions of his vessel and any other information necessary for the safe navigation of vessels. The radiotelephone required by this Act is for the exclusive use of the master or person in charge of the vessel, or the person designated by the master or person in charge to pilot or direct the movement of the vessel, who shall maintain a listening watch on the designated frequency. Nothing in the act relieves any mariner from the obligation of complying with the rules of the road and the applicable pilot rules. In general, mariners are required to use VHF channel 13 where the inland navigation rules apply, within the line of demarcation and use VHF channel 16 where international navigation rules apply, outside the line of demarcation.

4. Active Vessel Traffic Management and Control Concept

VTS services to mariners are primarily advisory, but VTS controllers have the authority to issue outcome-based directions, such as directing a vessel to proceed to anchorage and leaving the details of execution such as course to be steered and speed to the master or pilot of the vessel. As outlined in both the Coast Guard National Standard Operating Procedures Manual (VTS SOP), and the Sector Houston-Galveston VTS Internal Operating Procedures (IOP), a VTS actively manages vessel traffic in a prescribed manner to instill good order and predictability using four levels of control.⁵ These control levels, from the lowest and most common, to the highest level of control are Monitor, Inform, Recommend, and Direct. At the Monitor level, VTS controllers use the sensors and VHF radio to track vessel movement in the waterway and to identify potential risks which may be developing. At the Inform level, a VTS controller will disseminate navigational information which is intended to enhance the safe movement of the vessels in the system and efficient coordination of shipping and port activities. At the Recommend level, the VTS operator, based on data from the VTS system that may not be available on board a vessel, may offer Recommendations, navigational suggestions or alternatives for consideration by the vessel's master or pilot. In this instance, the decision whether or not to take a specific action remains with the master or the pilot. At the Direct level of control, a VTS operator who has determined that a certain vessel action is necessary to enhance navigation, vessel safety and/or protect the environment may issue a VTS Directive that a ship's master or pilot take a specific action(s) to mitigate the risk. A Directive from VTS may include imposing vessel operating requirements, but does not include specific vessel operational orders such as helm or rudder commands. In times of restricted visibility, the above referenced guidance and 33 CFR 161.11(b) stipulates that VTS may "control, supervise, or otherwise

⁵ Commandant Instruction M16630.3, *Vessel Traffic Services National Standard Operating Procedures Manual*, Management Activities section, pages 2-2 to 2-3, dated August 18, 2009, and *Internal Operating Procedures*, Mission page 3-2, US Coast Guard Sector Houston-Galveston Vessel Traffic Service Branch, Change-5 (VTSHGINST 3120.1B) dated April 2, 2012.

manage traffic, by specifying times of entry, movement or departure to, from, or within a VTS area."

The VTS Houston-Galveston IOP Concept of VTS Traffic Management expands upon the concept and states the controllers should use a "safety-in-depth" management approach.⁶ The IOP explains "this approach is based on the assumption that competent (licensed) mariners are following established procedures (rules-of-the-road) while operating properly equipped and maintained vessels in properly marked channels unless there are specific reasons to believe otherwise...Unlike other navigational aids, VTS has the ability to assess the safety of waterway situations; to call attention to particular hazards; to recommend mariner take or avoid certain action; and to direct vessels to perform or not perform certain maneuvers or movements...in almost every instance, sharing and highlighting information will sufficiently provide for safety because mariners will make prudent decisions about the navigation of their vessels. However, when the VTS detects a situation in which danger is imminent or a mariner has made an unsafe decision, the Watch Supervisor shall implement appropriate traffic management measures to mitigate immediate danger."

5. Periods of Reduced Visibility - Fog Conditions I and II

According to Sector Houston-Galveston IOP, the VTS will endeavor to limit the risk of collision in periods of reduced visibility such as periods of fog, by performing the following three functions noted. The first was to make special efforts to deliver navigational safety information to its users when fog is predicted, or present within the VTSA. The second was to use appropriate VTS control measures when vessel movements in reduced visibility appeared unsafe to the Watch Supervisor. And the third was to augment watch personnel in the VTS in a manner to ensure positive tracking of all vessels participating in the traffic system.

That same guidance outlined two special conditions which were to be set within the VTSA during periods of reduced visibility. The first condition, *Fog Condition II*, was to be "set any time reduced visibility was reported within the VTSA due to fog." In this condition, the role of the VTS was to obtain and share reduced visibility and traffic information. The second special condition, *Fog Condition I*, was to be "set any time reduced visibility causes a ship to anchor, or a towboat to push in, or the pilots suspend boardings." In this condition, the role of the VTS is expanded "to include evaluation of all meeting and overtaking situations of all stopped vessels, giving due consideration to the fact that at least one professional mariner has decided that it is not safe to proceed". Both conditions authorized the watch supervisor to direct any vessel to discontinue its transit when the circumstances of the transit lead to the watch supervisor to believe the transit was unsafe. Neither of the two special fog conditions outlined in this guidance required the controller assigned to the area with low visibility, to modify or adjust radar range, re-scaling chart areas, or use the track vectors or track history functions of PAWSS to optimize the traffic image in the impacted area.

Since the beginning of 2015, and up until this accident, the VTS Channel Closure log, a log used to record suspension of pilot boardings, indicated that temporary closures of the entire

⁶ *Internal Operating Procedures*, Mission page 1-7, US Coast Guard Sector Houston-Galveston Vessel Traffic Service Branch, Change-5 (VTSHGINST 3120.1B) dated April 2, 2012.

VTSA or portions of the VTSA due to fog occurred on at least four different days in the month of January, and three days in February of 2015. For the month of March, this log indicated there had been temporary closures of the entire VTSA, or portions of the VTSA due to fog in the morning preceding the accident, and as well as on the 1st, 2nd, 3rd, and 4th of the month. The table below shows the total number of hours that fog or heavy weather resulted in a channel closure in VTS Houston-Galveston area of responsibility from 2009 through 2014.

	2009	2010	2011	2012	2013	2014
Fog	210.65	265	351.5	389.55	319.96	384.1
Heavy Weather	89.5	104.5	36.8	28.1	33.1	20

Table 1. Summary of total channel closure hours within the VTS Houston-Galveston area of responsibility caused by either fog, or heavy weather. Source: VTS Houston-Galveston State of the Waterway 2015 presentation.

6. Vessel Traffic Service (VTS) Sector Houston-Galveston on March 9, 2015

According to the VTS Houston-Galveston watch log, around 0700 on the morning of the accident, the VTS was manned with a watch supervisor, assistant watch supervisor, 4 active duty VTS controllers, and 2 civilian VTS controllers. There were approximately 45 vessels in the system. Of the watch standers on duty, the watch supervisor has the highest level of authority and had the overall responsibility for the watch.

On the Sector I & II watch desk, the VTS area in which the accident occurred, an active duty controller had assumed responsibility for that portion of the waterway around 1030, from a civilian controller and he began a 2 hour shift on that station.⁷ When asked by investigators about his preferred display settings, the controller indicated that did not like to use track history function on the PAWSS display, a function which displays a vessel's course over ground on the screen, and stated that setting "just clutters up the screen". He did use the track vector function, a function which displays a vessel's heading and anticipated immediate future direction of travel, and set that a range of 2 to 3 minutes out.

Between 1100 and 11:30, the fog was beginning to impact the area, and per internal VTS e-mail notifications, the Houston Pilots suspended boardings of inbound vessels due to fog at 1120, and the Galveston-Texas City Pilots suspended boardings of inbound vessels due to fog shortly thereafter at 1135. These closures were also recorded in the VTS Channel Closure Log which indicated that both pilot groups had suspended boardings for ships that were destined for the HSC, Galveston, and Texas City. As a result, the watch supervisor contacted the Director, VTS, regarding potential actions he intended to take, primarily the consideration of broadcasting a fog advisory. At approximately that same time, the Assistant Watch Supervisor took a call

⁷ This VTS Traffic Control Specialist was also interviewed by the NTSB during the investigation of the Collision between Bulk Carrier *Summer Wind* and the Miss Susan Tow, Houston Ship Channel, Lower Galveston Bay, Texas, on March 22, 2014. See Marine Accident Report NTSB/MAR-15/01.

from a local representative of the National Weather Service regarding the deteriorating local fog conditions in the HSC and Galveston Bay. It was determined by the watch supervisor that a dense fog advisory would be issued, and broadcast over the radios to the mariners in order to inform the mariners of the deteriorating conditions and locations of the heaviest fog. This direction was passed down to the respective VTS controllers who began including this information in the radio broadcast. The VTS controllers on Sector III, and Sector I & II, also performed a "roll call", which was an attempt to specifically raise each vessel within their respective watch areas via the guarded VHF channel to alert each vessel of the reduced visibility.

At 1126, the pilot on the inbound *Conti Peridot* reported his progress to VTS controller on Sectors I & II using VHF Channel 12 as the vessel passed the designated reporting point known as "Red Fish Bar", near HSC lighted markers #53A and #54A. During that interaction, the pilot and the VTS controller exchanged information on the reduced visibility in the VTSA, and the pilot noted visibility at his location as being an estimated at "2 miles" and indicated the fog was "closing in pretty quickly." The pilot also requested, and received a report of all outbound vessel traffic at that time, and briefly discussed the pilots closing the bar down due to fog south of his position. There were roughly 44 vessels in the VTS system at 1130. Investigators reviewed VHF recordings from the VTS and could not identify any direct discussion captured on either VHF radio channels 11 or 12, between VTS, and the pilot on the outbound *Carla Maersk* regarding the reduced visibility, or the dense fog advisory. There also was no indication of such communication captured from review of the VDR microphones on the *Carla Maersk*.

The watch supervisor did not formally set either Fog Condition I or Fog Condition II in the VTS, which were to be set within the VTSA during periods of reduced visibility as outlined in the VTS Sector Houston-Galveston IOP. When the watch supervisor was asked if either fog condition had been set in the VTS prior to the accident he stated that "there is no fog condition I or II notice given in the watch room. Nobody, myself included, is using ... fog condition I or II". He further stated that since there was "a report of fog in the HSC...by definition of this event, a fog condition II exists." And although neither of those two fog conditions had been declared or set, the watch supervisor felt the overall intent of these written directives had been met. He stated, "Mind you again, this is paper and it's very important for us to have some standards and some metrics by which to measure what we do in the room. You don't want to throw out, you know, this system here, but by vernacular, the watch sup issuing the broadcast and letting partners know vis-à-vis the radio, the radio -- and the radio, because those are your customers that it impacts. Now phone calls are well and good and do take place, but the meat and the potatoes of who we need to inform is the customers on the radio." The watch supervisor also did not augment either the Sector III, or the VTS Sector I & II watch desk with additional personnel to ensure positive tracking of vessels as outlined in the Sector Houston-Galveston IOP.

Around 1215, the Sector I & II controller interacted with the *Miss Tammy*, an uninspected towing vessel that indicated it was coming from Cedar Bayou, a waterway which is just west of Morgans Point, and headed to Bayport, a transit would have required the Miss Tammy to enter the HSC at Morgans Point, then run in a southerly direction down to Bayport, TX. During that conversation, the controller informed the vessel that he was getting "negative reports on the weather", and further indicated it was "shut out", and that he was watching an outbound vessel "disappear into the fog". When interviewed by investigators, he indicated the term "shut out" was used to describe the weather phenomena in which a fog rolls into an area

and severely reduces visibility. At 1221, the Sector I & II controller interacted with at least two uninspected towing vessels, the UTV *San Miguel* and the UTV *Nathan Golding* regarding those pushing into the banks of the Gulf Intracoastal Waterway (GIWW) near Bolivar Roads to wait out the fog. He next hailed the UTV *Reedemer* at 1223 which was underway from a dock in the Port of Texas City, and transiting towards Bolivar Roads, to provide the vessel with a traffic advisory and updated visibility report. During that advisory and update, the controller stated, "there is just no traffic moving due to the fog."

At 1225 the pilot on the inbound *Conti Peridot* proposed a "one bell", or port to port passing arrangement with outbound *Carla Maersk* over VHF radio 13, and this passing arrangement was accepted by the pilot on the *Carla Maersk*. The controller on Sector I & II stated to investigators that he did not hear this communication.

Between the approximate times of 1225 and 1227, the active duty controller on Sector I & II was relieved by another civilian controller who assumed responsibility for that position for the 12:30 through 14:30. During his watch period on Sector I & II, the active duty controller did not issue any formal VTS *Recommendations*, or *Directives* to either a specific vessel or group of vessel(s) for any reason.

At the time of the collision, the civilian controller on Sector I & II was providing a traffic advisory to the UTV *Miss Tammy* on VHF channel 12 and did not hear the verbal exchanges between the pilots on *Conti Peridot* or *Carla Maersk* on VHF channel 13, just prior to the collision. This controller was made aware of the collision afterwards by the UTV *Miss Tammy* who radioed in to provide the controller with his revised sailing plan. The VTS dense fog advisory for the HSC and Galveston Bay was still in effect and being broadcast at time of the accident.

Preceding the accident, the watch supervisor stated he was physically sitting down at his desk and monitoring the various traffic scenarios, but "concern was more so down at the Bolivar Roads intersection because that was where the report of the heaviest of fog was given." He learned of the collision when he overhead communications on VHF channel 13 in which a vessel stated that it had anchored due to a collision.

The watch supervisor stated to investigators that he did not recall seeing the vessels, or the meeting situation develop on his monitors, prior to the accident. He also did not hear the discussions between the pilots on VHF channel 13, just prior to the vessels making contact. He first became aware of the collision when he overheard some radio traffic on VHF channel 13 that a vessel "was anchoring in the channel due to collision, words to that effect." Shortly after the collision, the watch supervisor ordered the controllers to begin broadcasting information throughout the VTSA that a collision had occurred in the vicinity of Morgans Point, and urged all vessels to take caution.

At 1240, the watch supervisor ordered the VTS controllers to issue a VTS *Directive* to all vessels in the VTSA over VHF radio and e-mail which prohibited further movement between the HSC lighted marker #86 and Morgans Point. Specifically, that directive stated, "VTS Houston-Galveston directs no vessel movements on the HSC from HSC light 86 to Morgan's Point High Lines; due to a vessel collision." The watch supervisor had not authorized the

issuance of, or issued any other VTS *Recommendations* or *Directives* earlier on his watch on March 9, 2015, to either a specific vessel or group of vessel(s) for any reason.

End of Report

Larry D. Bowling Vessel Traffic Service Group Chairman