July 28, 2025 MIR-25-31

Fire aboard Yacht *Flagship*

On April 28, 2024, at 1031 local time, a fire started on board the uncrewed yacht *Flagship* while it was docked at an enclosed bay of a shipyard on the Miami River in Miami, Florida (see figure 1 and figure 2).[1] Shoreside firefighters moved the vessel to a nearby sea wall, where they extinguished the fire. The vessel eventually sank at the sea wall. There were no injuries, and no pollution was reported. The *Flagship* was declared a total loss, valued at $5 million.[2]

Figure 1. The *Flagship* before the fire, on unknown date. (Source: Flagship Marine LLC)

[1] In this report, all times are eastern daylight time, and all miles are statute miles.

[2] Visit ntsb.gov to find additional information in the public docket for this NTSB investigation (case no. DCA24FM035). Use the CAROL Query to search investigations.

Casualty Summary

Casualty type	Fire/Explosion
Location	RMK Merrill Stevens Shipyard, Miami River, Miami, Florida 25°46.39 N, 080°12.67′ W
Date	April 28, 2024
Time	1031 eastern daylight time (coordinated universal time –4 hrs)
Persons on board	0
Injuries	None
Property damage	$5 million est.
Environmental damage	None
Weather	Visibility 10 mi, clear, winds west 20 mph, air temperature 79°F, water temperature 80°F
Waterway information	River; depth 12 ft at casualty site

Figure 2. Area where the *Flagship* caught fire, as indicated by a circled *X*. (Background source: Google Maps)

1 Factual Information

1.1 Background

Owned by Flagship Marine, LLC, the 82-foot-long, aluminum-hull catamaran yacht *Flagship* was built in Yalova, Turkey, by VisionF Yatcilik A.S. The first vessel of its class (VisionF 82), the *Flagship* was outfitted with solar panels, charging systems, and lithium-ion batteries that could power a portion of the yacht's electrical load for up to 20 hours without the vessel's generator. Conventional diesel engines in each hull, driving a propeller, provided vessel propulsion. Construction of the vessel was completed in September 2023, and the yacht was built in accordance with CE Certification.[3]

The vessel had three 48-volt lithium-ion battery banks and one 24-volt lithium-ion battery bank—each monitored by a separate battery management system (BMS), a computer system designed to ensure efficient and safe operation of the electrical battery system (see figure 3). A BMS is critical to the safety and overall performance of lithium-ion batteries. The four BMSs aboard the *Flagship* managed the voltage, current, and temperature of each battery cell, as well as the charging and discharging. The BMSs were designed to start charging each of the battery banks when the charge level fell below 94% and would continue to charge until the charge level reached 100%. The battery banks could be charged from the vessel's generator, shore power connection, or the solar panels located on the flying bridge.[4]

[3]CE Certification refers to European Union regulations that required manufacturers to affix a "CE marking" on products. The CE marking indicates that a product has been assessed by the manufacturer and deemed to meet European Union safety, health, and environmental protection requirements.

[4] The vessel's shore power electrical system was designed to operate on the nominal European standard—single phase, 230 volts, 50 hertz. The vessel's electrical system did not have a step-up transformer (120-volt, two-phase US standard to 230-volt, single-phase European standard), or a 60- to 50-hertz frequency converter installed on board.

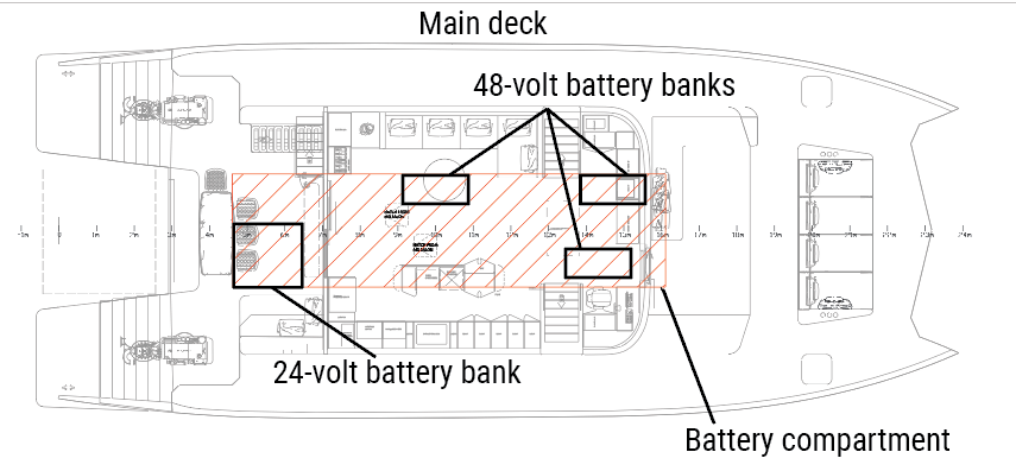

Figure 3. Diagram of the main deck of the *Flagship* showing the approximate locations of the 24-volt and 48-volt lithium-ion battery banks. (Background source: RMK Merrill Stevens)

1.2 Event Sequence

1.2.1 Pre-casualty Events

Before their installation on the *Flagship* during vessel construction, the 24- and 48-volt batteries for the *Flagship* were able to maintain a charge. There were no issues with the installation of the 48-volt lithium-ion battery systems. However, when the 24-volt system was installed, its BMS could not manage the charging of battery cells. The cause of the problem with the charging of the 24-volt lithium-ion battery system was not identified or resolved during vessel construction. During the vessel's sea trials, a temporary battery bank of 24-volt batteries with a portable charger was placed on board to meet the vessel's electrical demands.

Following the sea trials, the vessel owner directed the vessel to be shipped to the US so that it would arrive in time to be shown at the Fort Lauderdale International Boat Show. In September 2023, the vessel was shipped from Turkey to the US, without the temporary battery bank that had been used during sea trials. It arrived in Miami in October. Because the main engine's computer had multiple error codes when it was started, preventing the main engine from being operated, the *Flagship* was towed to Fort Lauderdale, Florida, for the International Boat Show, which ran from October 25 to 29.

A couple months after the boat show, on December 11 and 13, a survey of the vessel was conducted. The survey report noted that the BMSs for the three 48-volt battery banks were not fully functional and that the associated batteries were 100% discharged.

The vessel remained in Fort Lauderdale until January 19, 2024, when it was towed to the RMK Merrill Stevens Shipyard in Miami to address outstanding issues, including water leaks from the flying bridge, and to prepare for the Palm Beach International Boat Show. After the *Flagship*'s arrival at the shipyard, three 48-volt, 60-hertz portable battery chargers were purchased and placed on board the vessel to maintain the charge of the three 48-volt lithium-ion battery banks. However, the charging speed was slow; during the initial charging of one of the 48-volt battery banks using one of the portable chargers, which started on February 1, it took 5 days for the battery voltage to increase from 34 volts to 39 volts. Vessel personnel determined that the BMSs were preventing the batteries from being charged from a portable charger (the thermal bar/contactor on each BMS was not remaining closed). In response, the vessel manufacturer, shipyard personnel, an electrician, and the vessel owner's representative developed a new procedure to increase the charging speed of the lithium-ion batteries by bypassing the BMS of each battery bank. To bypass each BMS, an electrical wire was attached to allow power to travel from one side of the terminal to the other side (see figure 4).

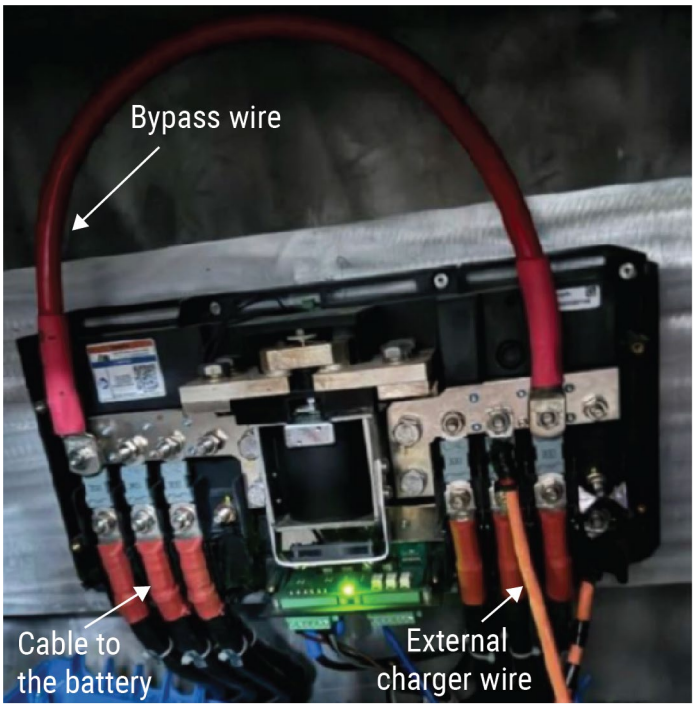

Figure 4. The installed bypass wire and the wire from the external charger on one of the 48-volt battery management systems on board the *Flagship*. (Background source: RMK Merrill Stevens)

The BMS for the 24-volt battery system, which provided power to the vessel's fuel pump and internal lights, was bypassed on March 13 and charged by a portable charger that had arrived with the vessel from Turkey.

During sea trials on March 15, tests confirmed that the *Flagship*'s propulsion system was operational. On March 17, the vessel departed the shipyard and motored to a boat show in Palm Beach, Florida. The *Flagship* returned to the shipyard on March 24; the issues with the 24-volt and 48-volt battery systems were not addressed, and the portable battery chargers connected to shore power were still charging the batteries.

On April 2, the vessel's shore power cable was connected to a 220-volt, 60-hertz outlet at the shipyard to supply power to the vessel's electrical system, which then powered the portable chargers used to charge the 48-volt battery systems (bypassing the BMSs). The battery system was configured so that the 24-volt system was charged through the 48-volt battery system.

Shipyard personnel were given verbal instructions on how to charge the batteries with a portable battery charger; they were also told to monitor the charging with the electric control system display located in the aft port quarter of the salon. Shipyard personnel charged the batteries on several occasions, but there was no set schedule to ensure the batteries maintained their charge. In addition, none of the battery systems could maintain a charge, and they were continuously being drained by an unidentified stray current. In some cases, after there was no battery charging during the weekend, the shipyard workers found that the voltage level indicated on the display of the batteries was 0%.

1.2.2 Casualty Events

On April 26, while the *Flagship* was moored port side to the pier within the shipyard facility, two shipyard employees worked on sealing the supports for the solar panels located above the pilothouse to prevent rainwater from dripping down into the cabin. About 1600, the two employees finished work and departed the facility. While on board the vessel, they did not notice anything concerning.

On April 28, the shipyard security cameras recorded an explosion at 1031 on board the *Flagship,* originating from the hatch that led to the 24-volt battery bank (it was a Sunday, so no workers were present) (see figure 5). Following the explosion, smoke was visible, followed by fire. Shortly thereafter, the fire grew rapidly, engulfing the vessel. The shipyard's sprinkler system activated to protect the facility and other vessels from the flames.

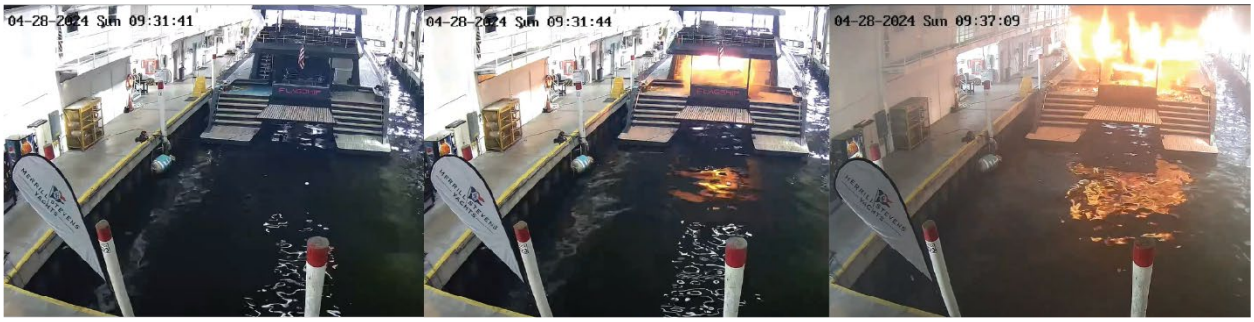

Figure 5. *Left to right*: Video still images from the shipyard's internal security camera showing (1) the *Flagship* moored within the facility before the fire (2) an explosion from the aft area of the vessel at 1031 (3) progression of the fire within the vessel. The times in the upper left of each video still are 1 hour behind the actual time because the shipyard clocks were not set for daylight savings time. (Source: RMK Merrill Stevens)

A security guard who was on duty at the shipyard entrance heard popping noises from the enclosed dock area and saw smoke coming from the facility. She went to investigate, discovered the fire, called 911, and then notified the facility manager. Firefighters from the City of Miami Fire Rescue arrived at 1050 and started to extinguish the fire. Additional firefighters later arrived to assist. During the response, firefighters moved the vessel from the dock facility to an exterior sea wall, where they extinguished the fire. The vessel sank at the sea wall. The firefighters departed at 1545.

1.3 Additional Information

The vessel was salvaged and made available for examination at a boatyard on July 29. Investigators from the Coast Guard and the NTSB discovered substantial fire damage throughout the vessel, including significant smoke and thermal damage. The most extensive damage to the aluminum deck and hull structure was found in the area around and above the location of the 24-volt lithium-ion battery bank, where the explosion was seen on the security video camera footage (see figure 6). In addition, investigators found the remains of a portable battery charger on the port side of the battery bank and the remains of an electrical bypass wire on the 24-volt BMS within the same compartment. A review of the data from the three BMSs for the 48-volt battery banks, which survived the fire, showed that, before the fire, the batteries were charged on April 26 but were not charged on April 27 and 28. At 1030 on April 28, the BMS data started to show warnings for broken fuses and batteries no longer connected to the system, which coincided with the time of the explosion and fire.

Figure 6. The 24-volt lithium-ion battery bank (circled), after the fire.

Shipyard personnel told investigators that the 24-volt and 48-volt batteries were not being charged when the workday ended on Friday, April 26, or during the weekend. They did not document or recall when they were last charged. Shipyard personnel informed investigators that both chargers were disconnected before the fire. The vessel's shore power cable was connected to an outlet designated to provide electricity while the vessel was docked. In addition, a vessel's representative told investigators that the electrical systems on the vessel were not being powered by the 24-volt and 48-volt battery systems.

2 Analysis

The yacht *Flagship* was docked with no personnel on board at a shipyard on the Miami River in Miami when an explosion and fire occurred. Shoreside firefighters moved the vessel to a nearby sea wall, where they extinguished the fire. The vessel eventually sank at the sea wall.

The video from the security camera at the shipyard showed an explosion at 1031 that originated from the hatch for the space below the floor where the 24-volt lithium-ion battery bank was located. The explosion expanded from the hatch and into the interior of the vessel. Following the explosion, smoke and fire were visible on the *Flagship*, and the fire continued to grow, eventually engulfing the entire vessel. Investigators later identified extensive damage to the aluminum deck and hull

structure in the area around and above the location of the 24-volt lithium-ion battery bank. Based on the security video and the location of the most extensive fire damage, a lithium-ion battery cell within the 24-volt battery bank was most likely the initiating source of the explosion and fire.

Since the vessel's arrival in the US, the BMSs for the battery banks of the 24-volt system and the three 48-volt battery systems were inoperable; they did not safely monitor and maintain the charge level of the batteries. This problem with the BMSs was not immediately resolved. In the interim, the vessel manufacturer, shipyard personnel, an electrician, and the vessel owner's representative developed a new procedure to increase the charging speed of the lithium-ion batteries by bypassing the BMS of each battery bank. A wire was attached to bypass each BMS so the batteries could be manually charged at a faster pace by an external charger. As a result, the charge level within the vessel battery banks was not automatically maintained by the BMSs, and, due to an unidentified electrical drain within the vessel, the batteries became fully discharged (0% charge) on several occasions for extended periods. In addition, routinely charging the batteries using a portable battery charger could have resulted in overcharging, since the external battery charger was not connected to and monitored by a BMS and the battery charge level was instead monitored by personnel at the shipyard. Therefore, the practice of externally charging the lithium-ion batteries without resolving the BMS issues resulted in fluctuations in the level of charge on the battery bank.

Extensive fluctuation in the level of charge within the batteries may have caused one of the cells to become unstable, eventually resulting in thermal runaway. A thermal runaway occurs when a battery cell overheats and combusts; it is a chemical reaction that can occur to any type of battery cell if it is damaged, shorted, overheated, defective, deep discharged, or overcharged. The heat produced from a thermal runaway of a lithium-ion battery cell can exceed 1,100°F, which can easily cause the adjoining cells of the same battery bank to ignite, as well as cause significant damage to aluminum structures. Lithium-ion battery cell explosions are typically caused by a thermal runaway. Therefore, the explosion on the *Flagship* was likely the result of one of the cells of the 24-volt battery bank undergoing a thermal runaway.

3 Conclusions

3.1 Probable Cause

The National Transportation Safety Board determines that the probable cause of the fire on the yacht *Flagship* was the thermal runaway and explosion of the 24-volt lithium-ion battery bank due to the inoperable battery management systems, resulting in the practice of manually charging the lithium-ion batteries with a portable battery charger, which compromised the safe monitoring of the vessel's lithium-ion battery systems.

Vessel Particulars

Vessel	*Flagship*
Type	Yacht/Boat (Yacht)
Owner/Operator	Flagship Marine, LLC (Private)
Flag	United States
Port of registry	Fort Lauderdale, Florida
Year built	2023
Official number	134835 (US)
IMO number	N/A
Classification society	N/A
Length (overall)	82.0 ft (24.9 m)
Breadth (max.)	32.5 ft (9.9 m)
Draft (casualty)	10.5 ft (3.2 m)
Tonnage	N/A
Engine power; manufacturer	2 x 800 hp (596 kW); Volvo Penta diesel engines

NTSB investigators worked closely with our counterparts from **Coast Guard Sector Miami** throughout this investigation.