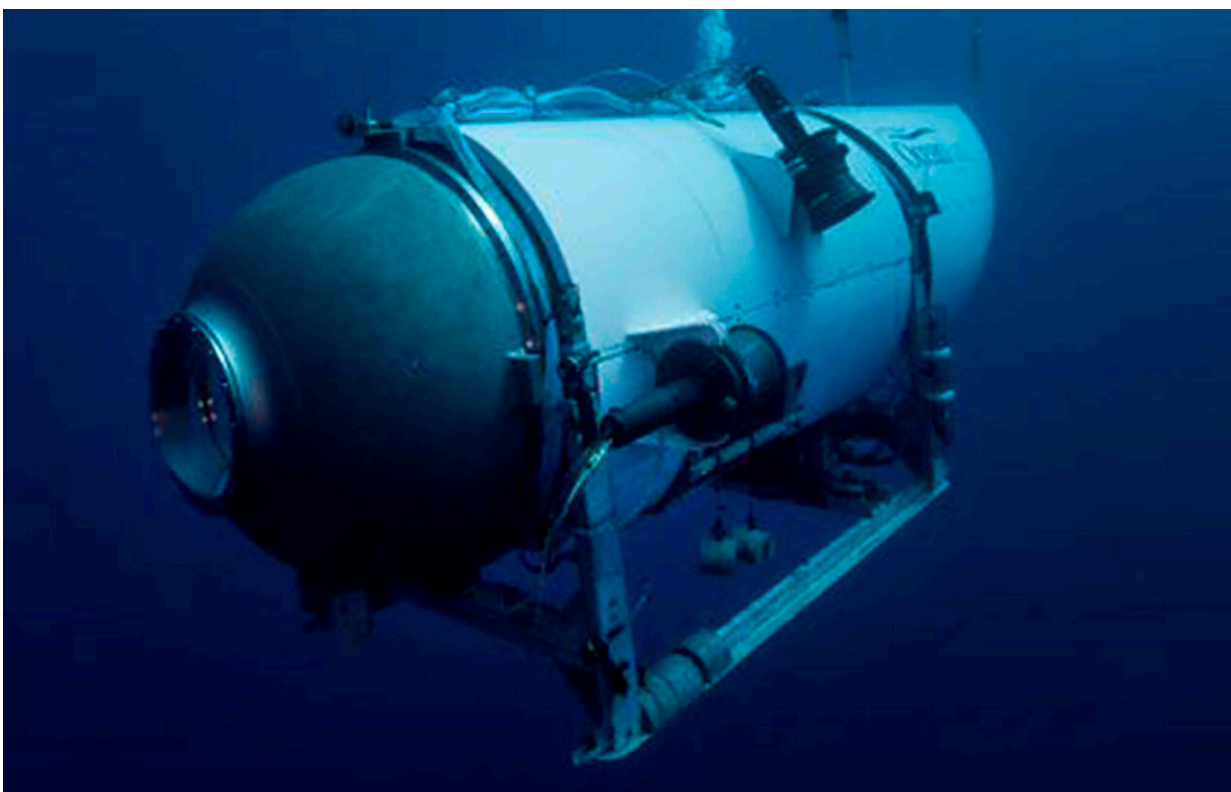


# Rescuers make a last desperate push as final hours of oxygen on the missing Titanic sub tick down

June 22 2023, by PATRICK WHITTLE and HOLLY RAMER

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This undated image provided by OceanGate Expeditions in June 2021 shows the company's Titan submersible. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night. Credit: OceanGate Expeditions via AP, File

The race against time to find a submersible that disappeared on its way to the Titanic wreckage site entered a new phase of desperation on Thursday morning as the final hours of oxygen possibly left on board the tiny vessel ticked off the clock.

Rescuers have rushed more ships and vessels to the site of the disappearance, hoping underwater sounds they detected for a second straight day might help narrow their search in the urgent, international mission. But the crew had only a four-day oxygen supply when the vessel, called the Titan, set off around 6 a.m. Sunday.

Even those who expressed optimism warned that many obstacles remain: from pinpointing the vessel's location, to reaching it with rescue equipment, to bringing it to the surface—assuming it's still intact. And all that has to happen before the passengers' oxygen supply runs out.

The full area being searched was twice the size of the U.S. state of Connecticut in waters as deep as 13,200 feet (4,020 meters). Captain Jamie Frederick of the First Coast Guard District said authorities were still holding out hope of saving the five passengers onboard.

"This is a search-and-rescue mission, 100%," he said Wednesday.

The area of the North Atlantic where the Titan vanished Sunday is also prone to fog and stormy conditions, making it an extremely challenging environment to conduct a search-and-rescue mission, said Donald Murphy, an oceanographer who served as chief scientist of the Coast Guard's International Ice Patrol.



OceanGate CEO Stockton Rush emerges from the hatch atop the OceanGate submarine Cyclops 1 in the San Juan Islands, Wash., on Sept. 12, 2018. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night, June 18, 2023. Credit: Alan Berner/The Seattle Times via AP, File

Meanwhile, newly uncovered allegations suggest there had been significant warnings made about vessel safety during the submersible's development.

Frederick said while the sounds that have been detected offered a chance to narrow the search, their exact location and source hadn't yet been determined.

"We don't know what they are, to be frank," he said.

Retired Navy Capt. Carl Hartsfield, now the director of the Woods Hole Oceanographic Systems Laboratory, said the sounds have been described as "banging noises," but he warned that search crews "have to put the

whole picture together in context and they have to eliminate potential manmade sources other than the Titan."

The report was encouraging to some experts because submarine crews unable to communicate with the surface are taught to bang on their submersible's hull to be detected by sonar.



Submersible pilot Randy Holt, right, communicates with the support boat as he and Stockton Rush, left, CEO and Co-Founder of OceanGate, dive in the company's submersible, "Antipodes," about three miles off the coast of Fort Lauderdale, Fla., June 28, 2013. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night, June 18, 2023. Credit: AP Photo/Wilfredo Lee, File

The U.S. Navy said in a statement Wednesday that it was sending a specialized salvage system that's capable of hoisting "large, bulky and heavy undersea objects such as aircraft or small vessels."

The Titan weighs 20,000 pounds (9,071 kilograms). The U.S. Navy's Flyaway Deep Ocean Salvage System is designed to lift up to 60,000 pounds (27,216 kilograms), the Navy said on its website.

Lost aboard the vessel are pilot Stockton Rush, the CEO of the company leading the expedition. His passengers are a British adventurer, two members of a Pakistani business family and a Titanic expert. OceanGate Expeditions oversaw the mission.

Authorities reported the 22-foot (6.7-meter) carbon-fiber vessel overdue Sunday night, setting off the search in waters about 435 miles (700 kilometers) south of St. John's.



In this image released by Action Aviation, the submersible Titan is prepared for a dive into a remote area of the Atlantic Ocean on an expedition to the Titanic on Sunday, June 18, 2023. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night. Credit: Action Aviation via AP, File

Officials have said the vessel had a 96-hour oxygen supply. That would give rescuers a deadline of between 6 a.m. (1000 GMT) and 8 a.m. (1200 GMT) Thursday morning to find and raise the Titan before the breathable air inside is expected to run out—if the vessel hadn't suffered catastrophic damage before that.

Frank Owen, a submarine search-and-rescue expert, said the estimated oxygen supply is a useful "target" for searchers, but is only based on a

"nominal amount of consumption." Owen said the diver on board the Titan would likely be advising passengers to "do anything to reduce your metabolic levels so that you can actually extend this."

At least 46 people successfully traveled on OceanGate's submersible to the Titanic wreck site in 2021 and 2022, according to letters the company filed with a U.S. District Court in Norfolk, Virginia, that oversees matters involving the Titanic shipwreck.



The logo for an OceanGate Expeditions 2019 Titanic expedition is seen on a marine industrial warehouse office door in Everett, Wash., Tuesday, June 20, 2023. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night. Credit: AP Photo/Ed Komenda, File

One of the company's first customers characterized a dive he made to the site two years ago as a "kamikaze operation."

"Imagine a metal tube a few meters long with a sheet of metal for a floor. You can't stand. You can't kneel. Everyone is sitting close to or on top of each other," said Arthur Loibl, a retired businessman and adventurer from Germany. "You can't be claustrophobic."

During the 2.5-hour descent and ascent, the lights were turned off to conserve energy, he said, with the only illumination coming from a fluorescent glow stick.

The dive was repeatedly delayed to fix a problem with the battery and the balancing weights. In total, the voyage took 10.5 hours.

OceanGate has been criticized for the use of a simple commercially available video game controller to steer the Titan. But the company has said that many of the vessel's parts are off-the-shelf because they have proved to be dependable.





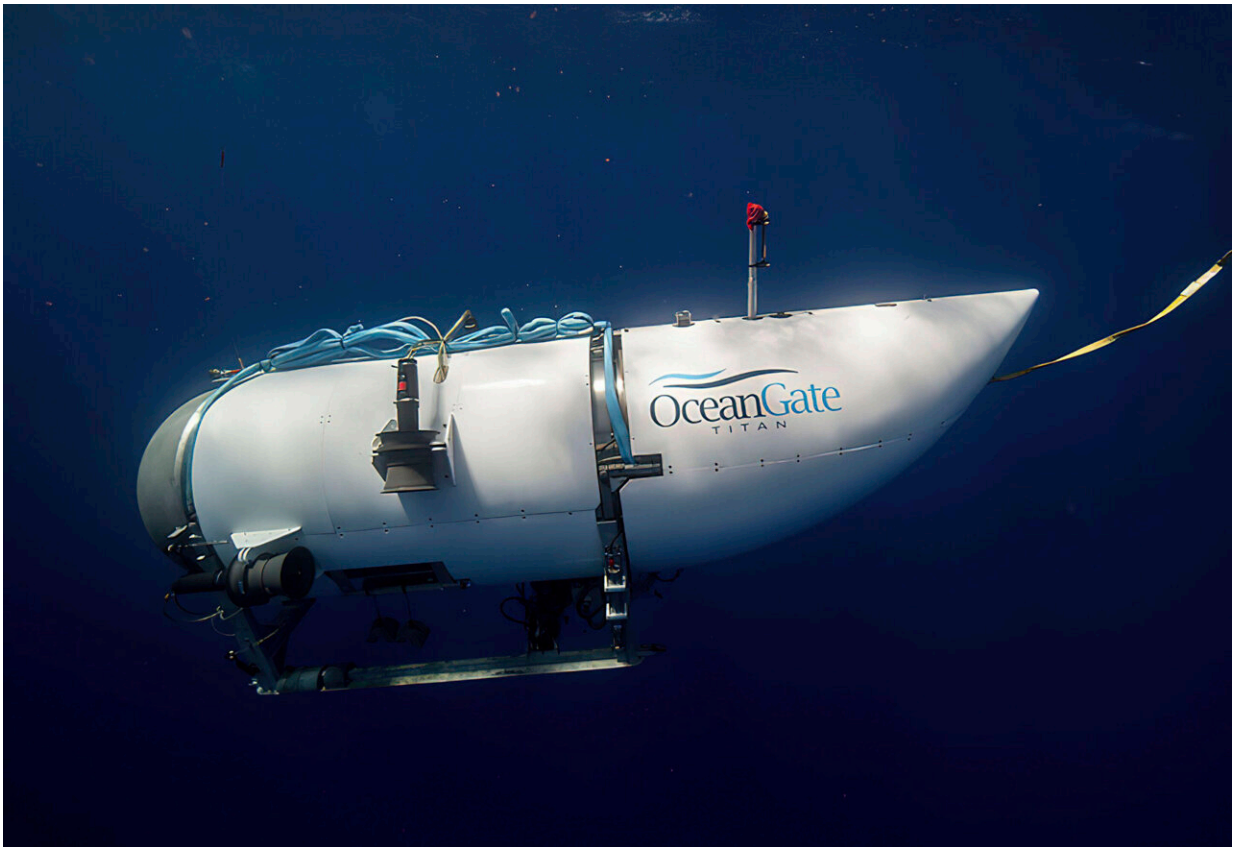
This 2004 photo provided by the Institute for Exploration, Center for Archaeological Oceanography/University of Rhode Island/NOAA Office of Ocean Exploration, shows the remains of a coat and boots in the mud on the sea bed near the Titanic's stern. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night, June 18, 2023. Credit: Institute for Exploration, Center for Archaeological Oceanography/University of Rhode Island/NOAA Office of Ocean Exploration, File

"It's meant for a 16-year-old to throw it around" and is "super durable," Rush told the CBC in an interview last year while he demonstrated by throwing the controller around the Titan's tiny cabin. He said a couple of spares are kept on board "just in case."

The submersible had seven backup systems to return to the surface, including sandbags and lead pipes that drop off and an inflatable balloon.

Jeff Karson, a professor emeritus of earth and environmental sciences at Syracuse University, said the temperature is just above freezing, and the vessel is too deep for human divers to get to it. The best chance to reach the submersible could be to use a remotely operated robot on a fiber optic cable, he said.

"I am sure it is horrible down there," Karson said. "It is like being in a snow cave and hypothermia is a real danger."



This photo provided by OceanGate Expeditions shows a submersible vessel named Titan used to visit the wreckage site of the Titanic. In a race against the clock on the high seas, an expanding international armada of ships and airplanes searched Tuesday, June 20, 2023, for the submersible that vanished in the North Atlantic while taking five people down to the wreck of the Titanic. Credit:

## OceanGate Expeditions via AP

Documents show that OceanGate had been warned there might be catastrophic safety problems posed by the way the experimental vessel was developed.

David Lochridge, OceanGate's director of marine operations, said in a 2018 lawsuit that the company's testing and certification was insufficient and would "subject passengers to potential extreme danger in an experimental submersible."

The company insisted that Lochridge was "not an engineer and was not hired or asked to perform engineering services on the Titan." The firm also says the vessel under development was a prototype, not the now-missing Titan.

The Marine Technology Society, which describes itself as "a professional group of ocean engineers, technologists, policy-makers, and educators," also expressed concern that year in a letter to Rush, OceanGate's chief executive. The society said it was critical that the company submit its prototype to tests overseen by an expert third party before launching in order to safeguard passengers. The New York Times first reported on those documents.



U.S. Coast Guard Capt. Jamie Frederick, right, faces reporters as Royal Navy Lt Cdr Rich Kantharia, left, looks on during a news conference, Wednesday, June 21, 2023, at Coast Guard Base Boston, in Boston. The U.S. Coast Guard says sounds and banging noises have been heard from the search area for Titanic submersible. Credit: AP Photo/Steven Senne



The U.S. Coast Guard Cutter Warren Deyampert is docked as a member of the Coast Guard walks past, Tuesday, June 20, 2023, at Coast Guard Base Boston, in Boston. Rescuers are racing against time to find the missing submersible carrying five people, who were reported overdue Sunday night, June 18, 2023. Credit: AP Photo/Steven Senne, File



U.S. Coast Guard Capt. Jamie Frederick, left, faces reporters as Carl Hartsfield, director and senior program manager Oceanographic Systems Laboratory, center, and Paul Hankins, U.S. Navy civilian contractor, supervisor of salvage, right, look on during a news conference, Wednesday, June 21, 2023, at Coast Guard Base Boston, in Boston. The U.S. Coast Guard says sounds and banging noises have been heard from the search area for Titanic submersible. Credit: AP Photo/Steven Senne



U.S. Coast Guard Capt. Jamie Frederick, center at microphone, faces reporters during a news conference, Wednesday, June 21, 2023, at Coast Guard Base Boston, in Boston. The U.S. Coast Guard says sounds and banging noises have been heard from the search area for Titanic submersible. Credit: AP Photo/Steven Senne

The passengers lost on the Titan are British adventurer Hamish Harding; Pakistani nationals Shahzada Dawood and his son Suleman, whose eponymous firm invests across the country; and French explorer and Titanic expert Paul-Henry Nargeolet.

Retired Navy Vice Admiral Robert Murrett, who is now deputy director of the Institute for Security Policy and Law at Syracuse University, said the disappearance underscores the dangers associated with operating in

deep water and the recreational exploration of the sea and space.

"I think some people believe that because modern technology is so good, that you can do things like this and not have accidents, but that's just not the case," he said.

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