

Bob Ballard and James Cameron on what we can learn from Titan

 nationalgeographic.com/science/article/exclusive-titan-exploration-james-cameron-bob-ballard

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The two people on this planet who have spent the most time exploring and documenting *Titanic* are National Geographic Explorers at Large James Cameron and Bob Ballard. In an exclusive interview held immediately after news came in that the remains of submersible *Titan* were found on the seafloor, the legendary deep-sea explorers shared their immediate reactions with National Geographic.

“If you're an explorer... there's this idea that there's a certain level of risk that's acceptable. I actually don't believe that,” says Cameron. “I think you can engineer against risk. I think you can minimize the risk down to the few things that you can't anticipate.”



Titan near the ocean's surface prior to descending on a journey to the seafloor. The carbon fiber-composite and titanium vessel was an engineering outlier compared to the steel or titanium submersibles most scientists use.

Photograph By OceanGate Expeditions

On *Titan* and risk

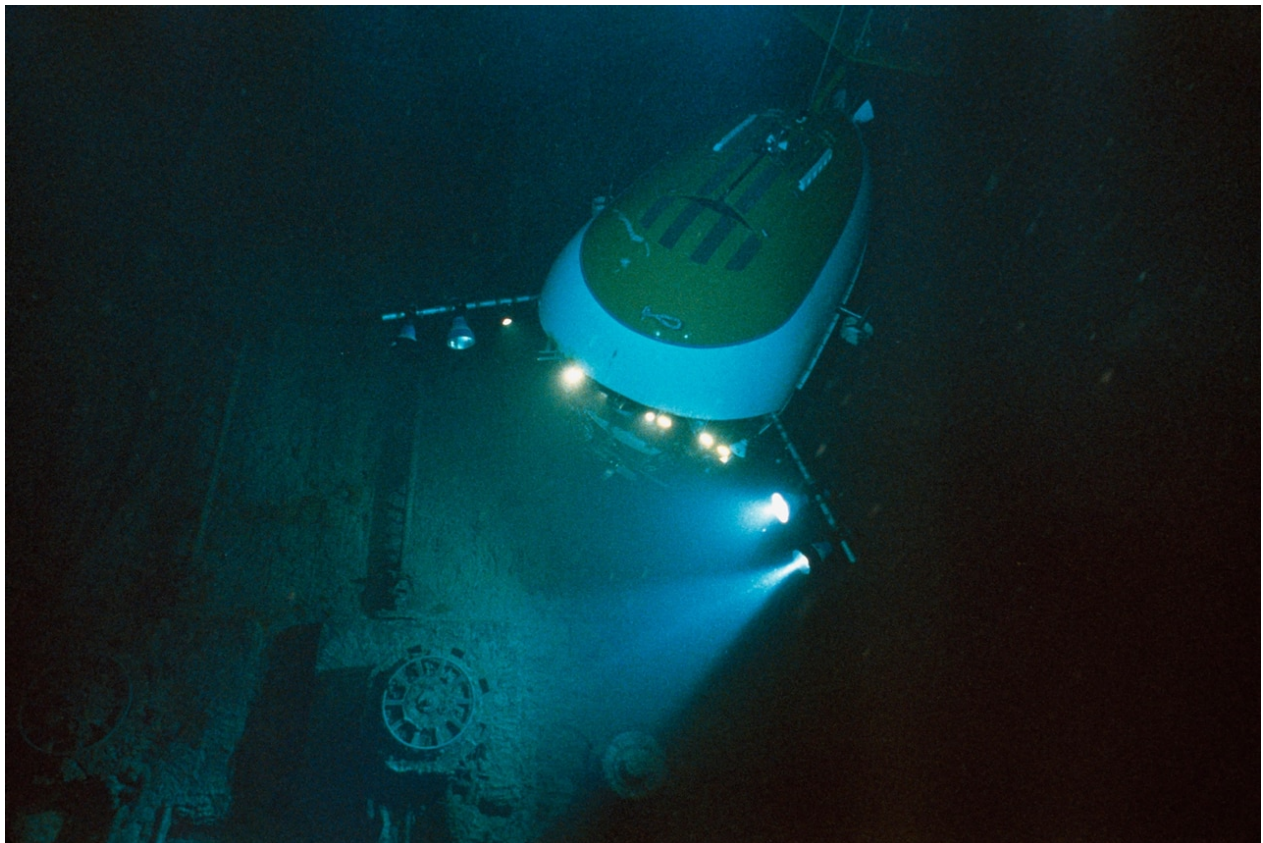
Both explorers agreed that the *Titan* tragedy was a failure of engineering and regulation. They stressed that the underwater vehicles they use for scientific exploration are products of meticulous testing supported with risk-management backups such as support vehicles that can come to the rescue should anything go wrong.

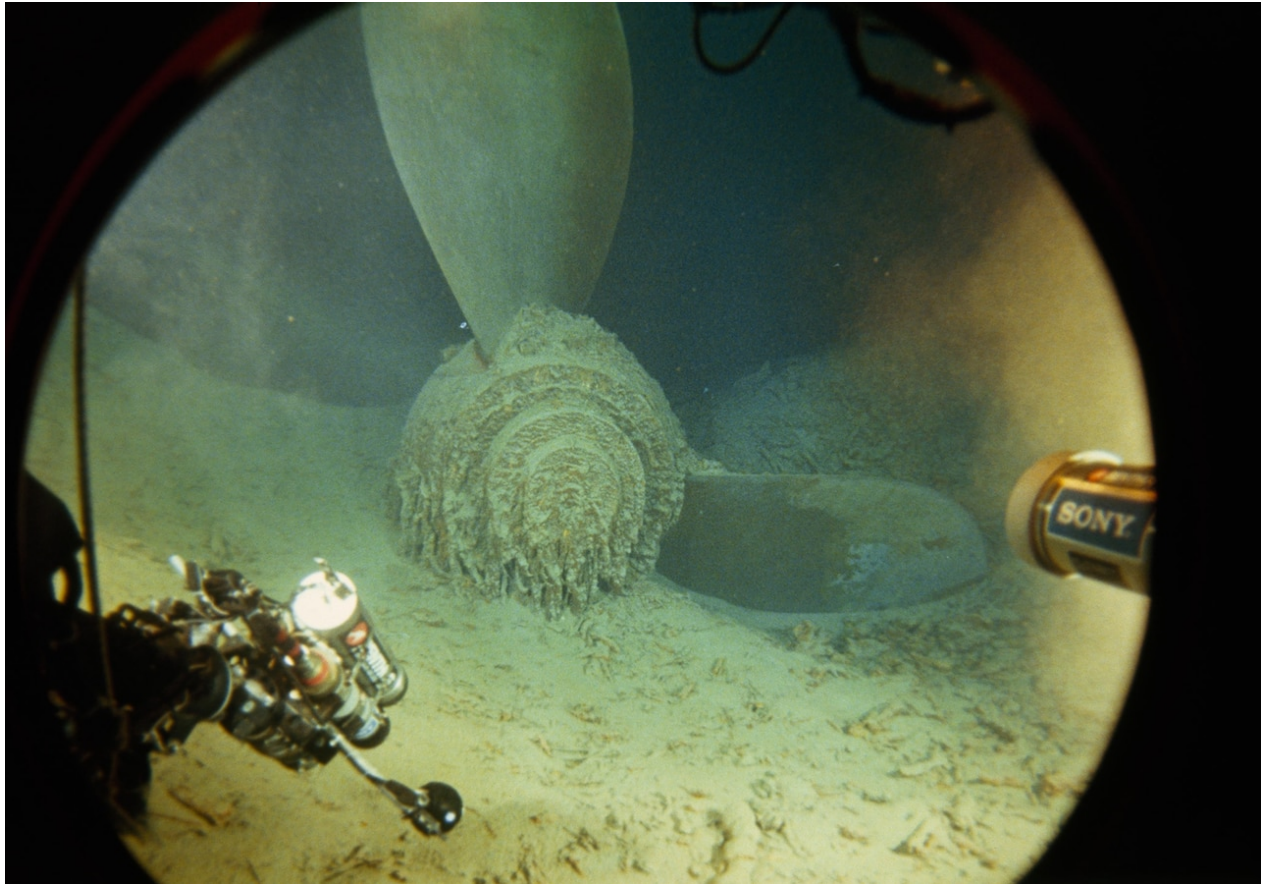
“I would submit that if you're going to take passengers into the deep ocean, certainly to the depths of *Titanic*, you must have another vehicle on board, even if it's a remotely operated vehicle, to assist in an entanglement,” says Cameron.

(Inside the Titanic wreck's lucrative tourism industry.)

Ballard points out the unique dangers of exploring shipwrecks, noting that they pose unexpected hazards such as the possibility of becoming entangled in fishing nets and cables. “Hydrothermal vents? You know what you're up against. I'm most nervous when I've dove on a wreck,” he says.

Cameron agrees. “Shipwrecks are dangerous. There is an element of risk. You can't stop exploration, but you can't treat it like it's just to drive to the office either.”





Left: Explorer at Large and film director James Cameron relied on this Russian Mir titanium submersible while filming his 1997 blockbuster *Titanic*.

Photograph By EMORY KRISTOF, Nat Geo Image collection

Right: A view of the *Titanic*'s propeller from the Mir.

Photograph By EMORY KRISTOF, Nat Geo Image Collection

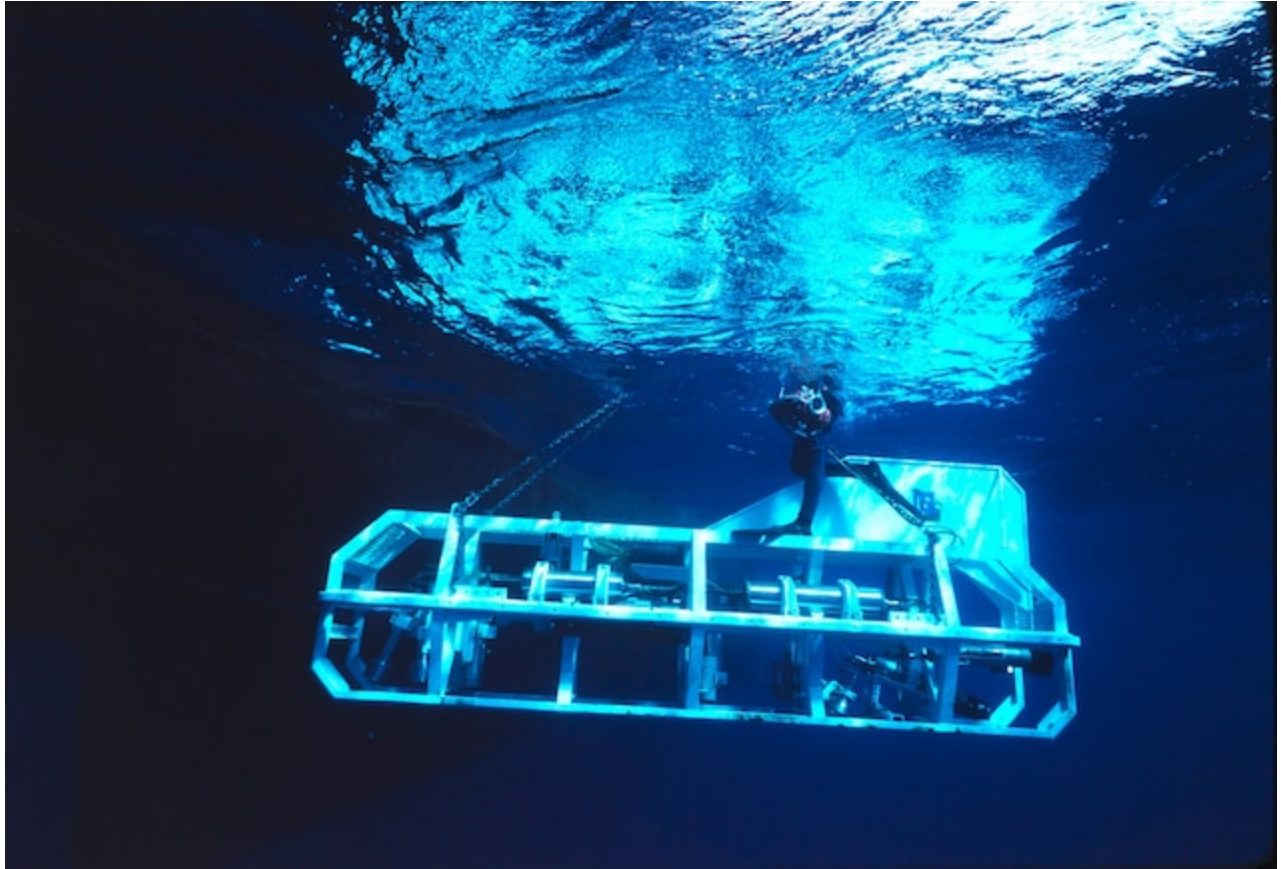
On regulation

Unlike steel or titanium vessels, OceanGate's *Titan* carbon-fiber composite and titanium craft submersible was an engineering outlier. Compounding issues is the fact that OceanGate CEO Stockton Rush chose to forgo the traditional certification expected by the industry.

"It's okay to move fast and break things as long as the thing you're breaking is not a submersible," notes Cameron, "but when you're at *Titanic* depth, that doesn't work out too well."

(He found the *Titanic* but for Robert Ballard the search never ends.)

"I'll stick with titanium personally," says Ballard. "I'll stick with the [submersibles] that Jim [Cameron] is building and titanium hulls ... after numerous testing with no one in it."



Central to the effort to locate *Titanic* in 1985 was *Argo*, the underwater search vehicle pictured here as it begins a descent to the *Titanic* site. Its hollow steel frame supports video cameras, side-scan sonar, a computerized timing system, and a host of other electronic gear.

Photograph By EMORY KRISTOF, Nat Geo Image Collection

On robots

The question that sparked a “violent agreement” between the legendary explorers is whether there is still a place for human scientific exploration of extreme ocean depths, or whether we now have the technology to do so without risking human life.

Ballard praised the developments in robotic exploration—in the form of remotely operated vehicles and autonomous underwater vehicles—which offer unlimited exploration time, unbounded by human constraints. “When I went back to *Titanic* in 2004, I literally was on *Titanic* for three days,” he notes.

“You’re talking about being on it through the video monitor of a vehicle that’s two and a half miles below you,” Cameron counters. “I still like seeing it with my own eyes.”

(James Cameron on what it’s like to “ghost-walk” the *Titanic*.)

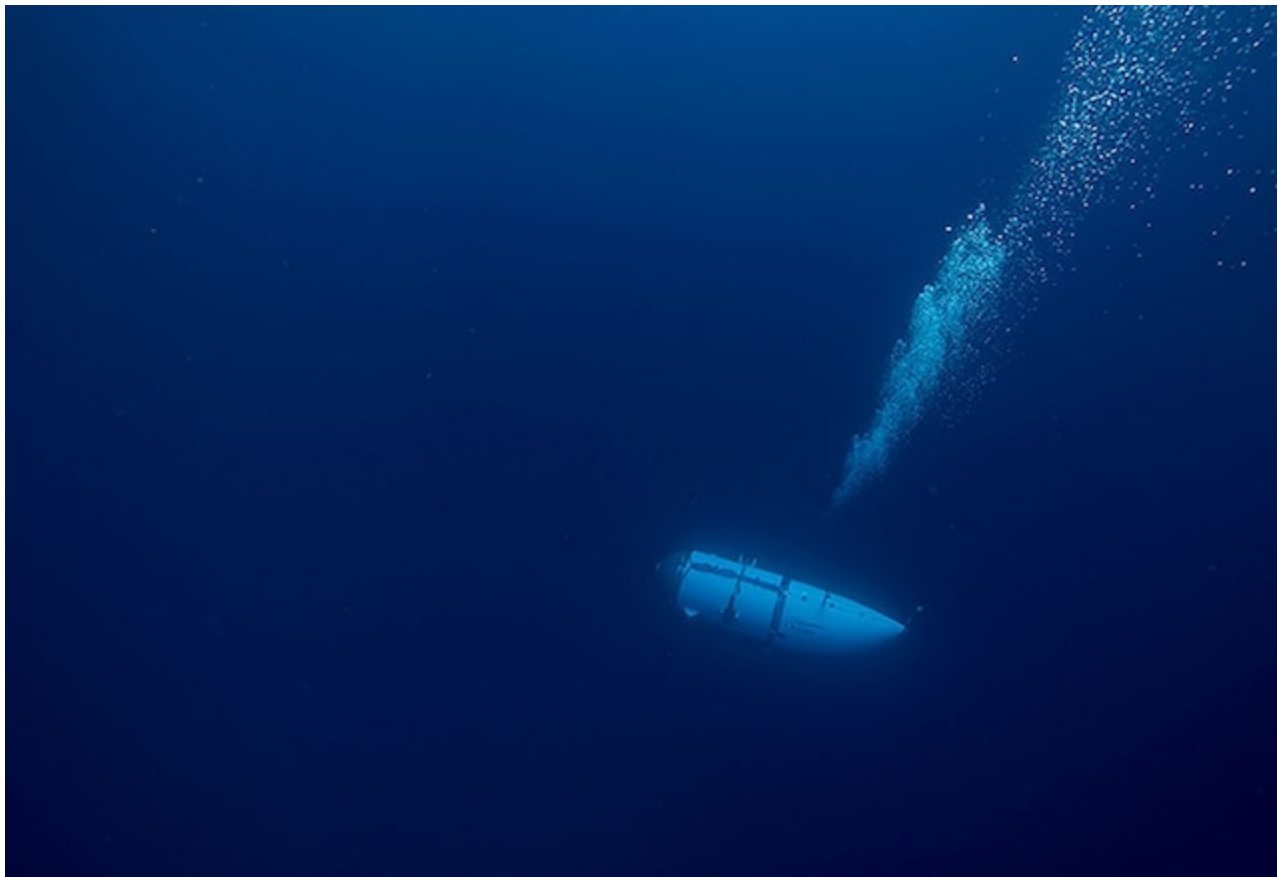
“I actually believe the value of a human bearing witness,” the director of the 1997 blockbuster *Titanic* adds, saying his logic is not technical or scientific, but rather poetic and emotional.

On reflection for future exploration

Both National Geographic Explorers emphasize that the *Titan* incident is an outlier and does not reflect the careful consideration that scientists build into their research efforts.

“What is the lesson of *Titanic*?” Cameron asks. “Heed the warnings. Do not let greed and arrogance supersede your best judgment. I mean, the captain of *Titanic* was highly seasoned, highly respected, and yet he didn't heed the warnings and he steamed full speed into an ice field on a moonless night. And 1,500 lives were forfeited as a result. That's the lesson.”

Ballard agrees. “If you don't study history, you're doomed to repeat it.”



Titan commences its descent to 4,000 meters. OceanGate CEO Stockton Rush chose to forgo the traditional certification expected by the industry when launching the submersible.

Photograph By OceanGate Expeditions