

Satellite launched to map the world's oceans, lakes, rivers

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A SpaceX rocket carrying the Surface Water and Ocean Topography satellite lifts off from Vandenberg Space Force Base in California, Friday, Dec. 16, 2022. Credit: Keegan Barber/NASA via AP

A U.S.-French satellite that will map almost all of the world's oceans,

lakes and rivers rocketed into orbit Friday.

The predawn launch aboard a SpaceX rocket from Vandenberg Space Force Base in California capped a highly successful year for NASA.

Nicknamed SWOT—short for Surface Water and Ocean Topography—the satellite is needed more than ever as climate change worsens droughts, flooding and coastal erosion, according to scientists. Cheers erupted at control centers in California and France as the spacecraft started its mission.

"It is a pivotal moment, and I'm very excited about it," said NASA program scientist Nadya Vinogradova-Shiffer. "We're going to see Earth's water like we've never before."

About the size of a SUV, the satellite will measure the height of water on more than 90% of Earth's surface, allowing scientists to track the flow and identify potential high-risk areas. It will also survey millions of lakes as well as 1.3 million miles (2.1 million kilometers) of rivers.

The satellite will shoot radar pulses at Earth, with the signals bouncing back to be received by a pair of antennas, one on each end of a 33-foot (10-meter) boom.



In this image made from video provided by NASA, a SpaceX rocket carrying the Surface Water and Ocean Topography satellite lifts off from Vandenberg Space Force Base in California, Friday, Dec. 16, 2022. Credit: NASA via AP

It should be able to make out currents and eddies less than 13 miles (21 kilometers) across, as well as areas of the ocean where water of varying temperatures merge.

NASA's current fleet of nearly 30 Earth-observing satellites cannot make out such slight features. And while these older satellites can map the extent of lakes and rivers, their measurements are not as detailed, said the University of North Carolina's Tamlin Pavelsky, who is part of the mission.

Perhaps most importantly, the satellite will reveal the location and speed of rising sea levels and the shift of coastlines, key to saving lives and

property. It will cover the globe between the Arctic and Antarctica at least once every three weeks, as it orbits more than 550 miles (890 kilometers) high. The mission is expected to last three years.



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Laurie Leshin, the director of NASA's Jet Propulsion Laboratory in Pasadena, California, noted that while the agency is known for its Mars rovers and space telescopes, "this is the planet we care most about."

"We've got a lot of eyes on Earth," with even more globe-surveying missions planned in the next few years, she added.

NASA and the French Space Agency collaborated on the \$1.2 billion SWOT project—some 20 years in the making—with Britain and Canada chipping in.

Already recycled, the first-stage booster returned to Vandenberg eight minutes after liftoff to fly again one day. When the double sonic booms sounded, "Everybody jumped out of their skin, and it was exhilarating. What a morning," said Taryn Tomlinson, an Earth science director at the Canadian Space Agency.

It's the latest milestone this year for NASA. Among the other highlights: [glamour shots of the universe](#) from the new Webb Space Telescope; [the Dart spacecraft's dead-on slam into an asteroid](#) in the first planetary defense test; and the [Orion capsule's recent return from the moon following a test flight](#).

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