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Headline: NASA space lasers to reveal new depths of planet's ice loss

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The NASA logo is displayed at the agency's booth during CES 2018 at the Las Vegas Convention Center on January 11, 2018 in Las Vegas, Nevada.

TAMPA, United States — NASA is poised to launch Saturday its most advanced space laser ever, ICESat-2, a $1 billion dollar mission to reveal the depths of the Earth's melting ice as the climate warms.

The half-ton satellite, about the size of a smart-car, is scheduled to blast off atop a Delta II rocket on September 15 from Vandenberg Air Force Base in California.

The 40-minute launch window opens at 5:46 am local time (1246 GMT).

The mission is "exceptionally important for science," Richard Slonaker, ICESat-2 program executive at NASA, told reporters ahead of the launch.

That's because it has been nearly a decade since NASA had a tool in orbit to measure ice sheet surface elevation across the globe.

The preceding mission, ICESat, launched in 2003 and ended in 2009. From it, scientists learned that sea ice was thinning, and ice cover was disappearing from coastal areas in Greenland and Antarctica.

In the intervening nine years, an aircraft mission, called Operation IceBridge, has flown over the Arctic and Antarctic, "taking height measurements and documenting the changing ice," NASA said.

But an update is urgently needed.

Humanity's constant reliance on fossil fuels for energy means planet-warming greenhouse gases are continuing to mount.

Global average temperatures are climbing year after year, with four of the hottest years in modern times all taking place from 2014-2017.

Ice cover is shrinking in the Arctic and Greenland, adding to sea level rise that threatens hundreds of millions of people along the coastlines.

ICESat-2 should help scientists understand just how much melting the ice sheets are contributing to sea level rise.

"We are going to be able to look at specifically how the ice is changing just over the course of a single year," said Tom Wagner, cryosphere program scientist at NASA.

Adding this precise level of data to that collected in prior years should boost scientists' understanding of climate change and improve forecasts of sea level rise, he said.

Advanced lasers

ICESat-2 is equipped with a pair of lasers — one is on board as a back-up — that are far more advanced than the kind aboard the preceding ICESat mission.

Though powerful, the laser will not be hot enough to melt ice from its vantage point some 300 miles (500 kilometers) above the Earth, NASA said.

The new laser will fire 10,000 times in one second, compared to the original ICESat which fired 40 times a second. The result is a far higher degree of detail, akin to taking 130 images of a single football field, compared to one shot of each goal post.

Measurements will be taken every 2.3 feet (0.7 meters)along the satellite's path.

"The mission will gather enough data to estimate the annual elevation change in the Greenland and Antarctic ice sheets even if it's as slight as four millimeters – the width of a No. 2 pencil," NASA said in a statement.

Importantly, the laser will measure the slope and height of the ice, not just the area it covers.

"One of the things that we are trying to do is, one, characterize the change that is taking place within the ice, and this is going to greatly improve our understanding of that, especially over areas where we don't know how well it is changing right now," Wagner said, mentioning the deep interior of Antarctica as one such area of mystery.

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The mission is meant to last three years but has enough fuel to continue for 10, if mission managers decide to extend its life. /ee