NASA's Arctic Laser Helps Satellites Stay on Track

A new station in Svalbard uses laser light to help check satellites that watch Earth.



A snowy Arctic observatory sends a laser beam into the sky toward a satellite.

NASA has turned on a new **laser** tracking system in Svalbard, Norway, a group of islands far inside the Arctic. According to NASA Earth Observatory, the system officially began work on Oct. 12 at the Ny-Ålesund **Geodetic** Observatory. Geodetic means it helps measure Earth's shape and position very carefully.

The machine does something that sounds like science fiction. It fires quick pulses of laser light at satellites. A laser is a narrow beam of light. Some satellites carry special mirrors. The light bounces back. Scientists measure the trip time. That tells them where the satellite is.

This matters because satellites help make many maps work. They also help weather watchers, ice researchers, and navigation systems such as GPS. GPS is the system that helps a phone or car find its place. If a satellite's location is a little wrong, its measurements can be a little wrong too.

The new system is faster and more careful than older ones. NASA says its lasers can fire thousands of pulses each second. Older systems fired only tens of pulses each second. Its sensors can also notice a single **photon**, which is a tiny bit of light. That means it does not need much light to return from a satellite.

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Svalbard is a useful place for this work. It is far north, near the top of the world. Many Earth-watching satellites travel over the poles again and again. These are called polar-orbiting satellites, because their path goes near the North and South Poles. From Maryland, NASA might see one of them only a few times a day. From Svalbard, the station can see some of them almost every **orbit**, NASA said.

One satellite that could benefit is ICESat-2. It measures the height of ice. In a place where ice is changing, careful measurements matter. The Svalbard laser can help check that the satellite is measuring from the right place.

Being there would not feel like a busy space center. It would feel quiet, cold, and remote. The observatory sits near a bird sanctuary. During some seasons, people must stay away to protect nesting birds. So the station must be able to work from far away.

NASA is also building two more newer laser stations in Maryland and Texas. The Svalbard station is the first of this new kind to begin working. It is one small building, but it helps make the whole planet's measuring system steadier.

Written from reporting by NASA.

THINK IT THROUGH

1. **Is it worth putting a high-tech station in a remote Arctic place? Why or why not?**

> **A strong answer:** A strong answer weighs the value of better satellite data against distance, weather, cost, and protecting wildlife.

2. **Why might a tiny measuring mistake matter when scientists study ice or make maps?**

> **A strong answer:** A strong answer explains how small errors can grow important when people compare places, times, or changes.

3. **If NASA could build only one more station, what information should it use to choose the location?**

> **A strong answer:** A strong answer considers satellite paths, gaps in the current network, local conditions, and effects on people or nature.

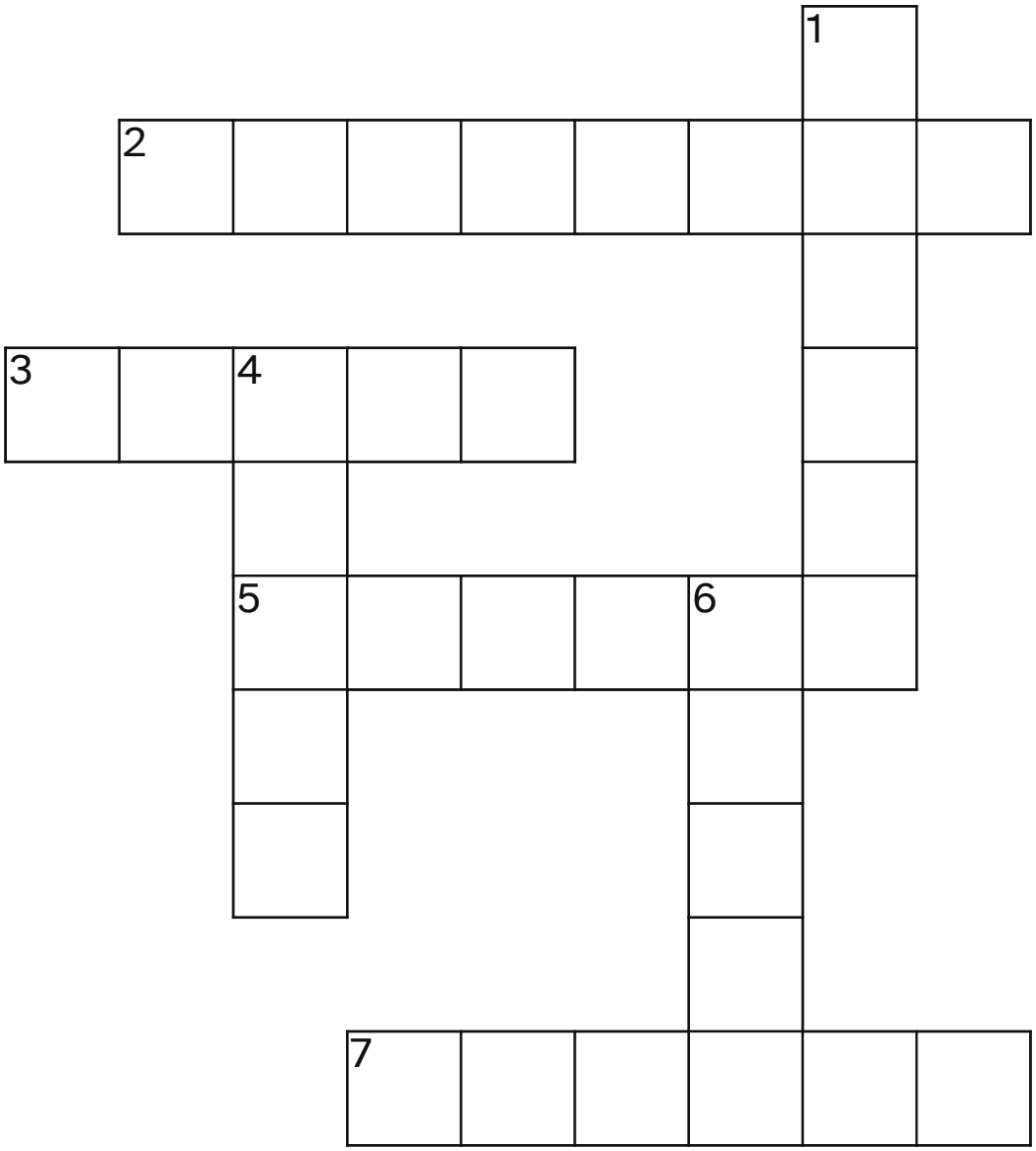
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D W I R N P U L S E
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GEODETIC LASER MIRROR ORBIT PHOTON PULSE SENSOR

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ACROSS

2 About carefully finding Earth’s shape and location

3 Quick short burst of light or power

5 Device that notices things such as light

7 Tiny bit of light

DOWN

1 Shiny surface that bounces light back

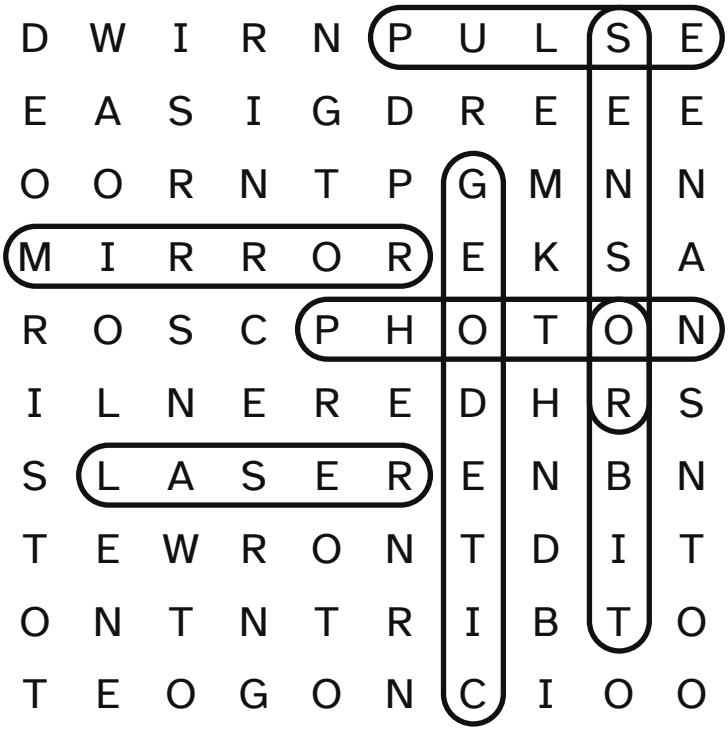
4 Powerful narrow light beam used to send messages

6 Path traveled around a planet or other space object

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— answer key

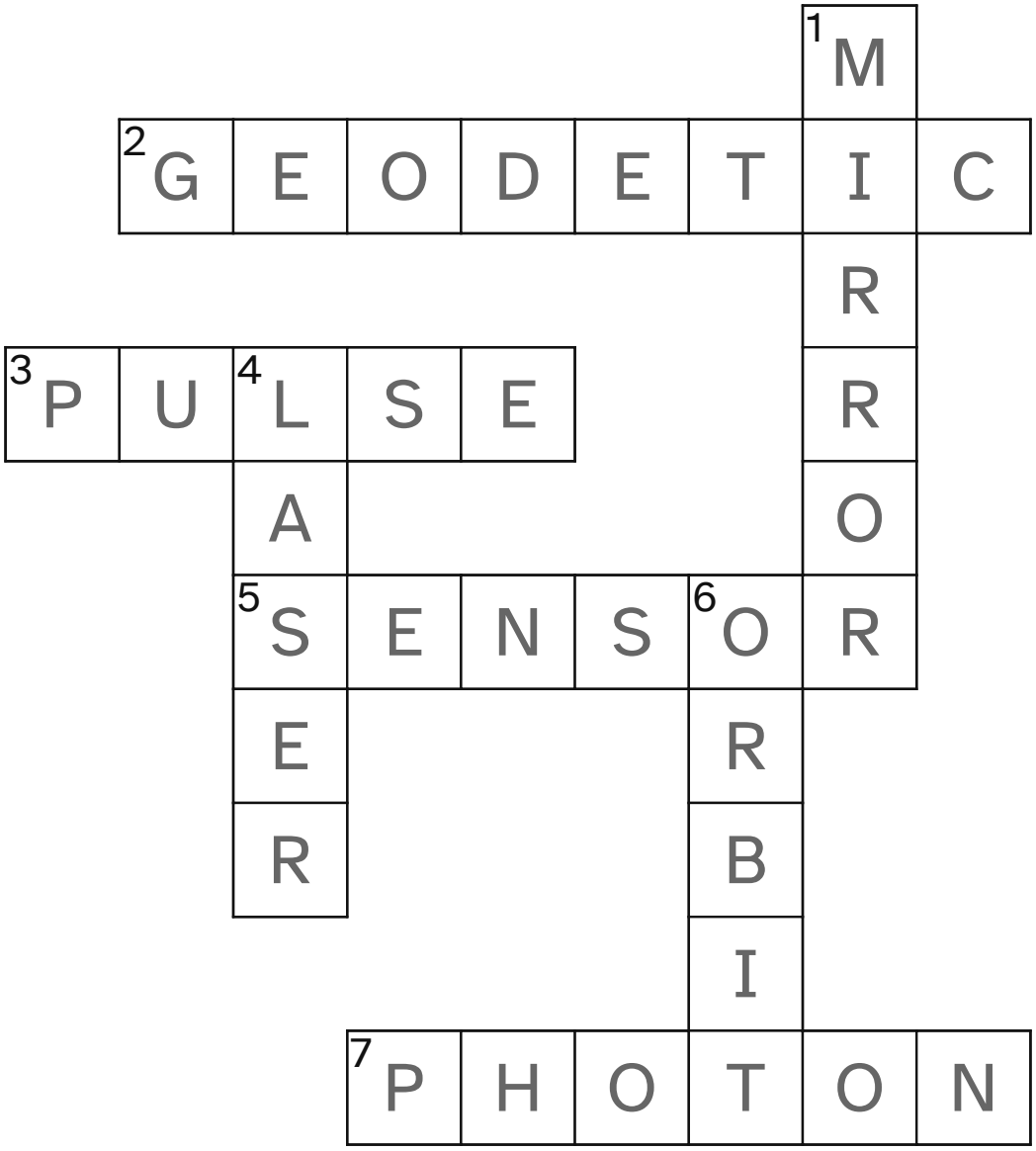


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Where this came from

This article was written for 3andB from the reporting below. It is not a reprint — the wording is ours and the facts are theirs.

NASA

"Laser Focus at the Top of the World"

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https://science.nasa.gov/earth/earth-observatory/laser-focus-at-the-top-of-the-world/

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