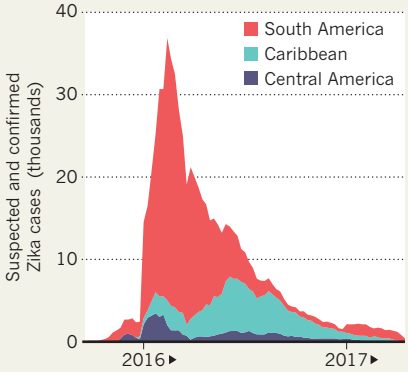
numbers of Zika cases, says Anthony Fauci, director of the NIH's National Institute of Allergy and Infectious Diseases (NIAID). "That's good for the population — if making it more difficult to get reasonable data for the study," he says. The low level of cases will also affect field trials of experimental vaccines, he adds. One such trial, the NIH VRC 705 phase II trial, began in March and aims to enrol at least 2,490 volunteers in 7 countries in the Americas.

But Fauci says that capturing enough data in an outbreak, where numbers of cases fluctuate from place to place and over time, and, at times, dry up altogether, is always an issue. "That's just a risk you accept," he says. "Sometimes a study that you think would take two years, winds up taking four or five years. But ultimately we hope that we can get some meaningful data."

Epidemiologists say that they are unsure why the number of cases of the mosquito-borne disease has declined so steeply, and whether it will spike again in some region in South America or elsewhere. Often, the disease causes no symptoms, so most cases go undetected; it's possible that the rapid spread of the disease in the Americas has meant it has burnt itself out because enough people have become immune to the virus.

DECLINE AND FALL

New cases of Zika are estimated to have peaked last year and have dropped sharply.



SOURCE: PAHO/WHO

Large-scale trials inevitably take time to organize. But delays incurred in obtaining ethical and other approvals in the trials' host countries have slowed the process further, as have a lack of clear rules for matters such as the shipping and ownership of samples.

It's unlikely that Zika infection will disappear completely, however, says Fauci. "One doesn't know what is going to happen with the Zika situation and whether or not there will be flare-ups in one country more than another," he says. Spreading trial sites across different countries helps, he notes. "We try to build into the system enough flexibility, where you can assign slots depending on where the outbreak activity is."

Researchers are still hopeful that despite lower than expected disease activity, the trials could produce useful results. Learning from other disease outbreaks such as Ebola, the main research agencies and groups involved in combating Zika last year agreed on common methodologies and designs for the latest studies. This means that the raw data from ZIP and the ZIKAlliance's study, as well as from other cohort studies, can be pooled to increase the sample size.

"It's the first time that we have achieved such a degree of harmonization of research protocols at an international level," de Lamballerie says. ■

EARTH OBSERVATIONS

Commercial space sensors go high-tech

Firms seek to develop sophisticated science instruments to match government offerings.

BY GABRIEL POPKIN

Never have so many private eyes looked down at Earth. In the past decade, about a dozen companies have formed to launch Earth-observing satellites. Few have sought to compete with sophisticated government-built instruments, but that is changing.

Private firms have begun to develop satellite radar systems and other advanced technologies in a bid to court scientists and other users, even as the US government is threatening to pare back its stable of satellites. Later this year, for example, the Finnish firm Iceye plans to launch a prototype radar instrument — the first step, the company says, towards a constellation of 20 such probes. Until recently, commercial firms had shied away from pursuing radar satellites because they require heavy instruments and consume a lot of power.

For some scientists, the growing variety of commercial data is enabling previously impossible research projects. But others fear that increasing reliance on private satellite observations could short-change science over time, by making data more costly or creating other barriers to access. "If you go the commercial way, you're going to shrink the user base and you're going to shrink the amount of knowledge you gain from it," says Matthew Hansen, a geographer at the University of Maryland in College Park who uses some private data.

Remote-sensing companies typically sell their data to the government and to businesses such as private weather forecasters and agricultural firms. They have tended to focus on collecting data in just a few wavelength bands, to provide sharper and more frequent images than government spacecraft can. But various trends — the falling costs of components, the development of small satellites such as CubeSats and improved engineering and manufacturing processes — have allowed firms to pursue more-complex technologies.

Several firms are looking to develop satellites equipped with radar, which can gather data at night and through cloud cover — situations

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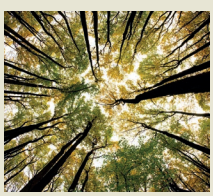

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KAREN BLEIER/AFP/GETTY

in which instruments relying on visible light falter. Iceye's planned constellation of probes should be able to image a given location many times a day, whereas existing radar-equipped satellites, such as the European Space Agency's Sentinel-1, return to a given spot only every few days. Other companies with radar projects in development include XpressSAR of Arlington, Virginia, and Urthecast of Vancouver, Canada.

Some firms are beginning to explore hyperspectral imaging, which spans a wide range of wavelengths, allowing the detection of specific chemicals. In 2016, Satellogic of Buenos Aires launched two 35-kilogram satellites equipped with custom-designed cameras and light filters. Last month, the company became the first commercial supplier of hyperspectral data. Satellogic's goal is to fly about 300 satellites, together capable of imaging any location on Earth.

And it has already begun to appeal to scientists. The company announced in January that it would give researchers free access to its 30-metre-resolution hyperspectral data. These span optical and near-infrared wavelengths and can help track water pollution and oil spills, and monitor the health of forests and crops. "We are receiving contacts from scientists all over the world," says Satellogic chief executive Emiliano Kargieman.

But most commercial data must be purchased, and some scientists say the cost can limit their usefulness. Unless companies commit to making data archives available to all who need such information, they will freeze out many cash-strapped junior researchers and people in developing countries, Hansen says. And commercial data simply aren't good enough for many types of study, despite the technical advances. No commercial satellite matches the consistency and stability of the data collected by the US government's Landsat probes, which have monitored Earth since 1972.

Government-funded missions also remain unparalleled in enabling scientists to push frontiers in basic research that may not have immediate applications, says Lorraine Remer, an atmospheric scientist at the University of Maryland in Baltimore. Remer is deputy project scientist for NASA's planned PACE satellite, and says that she does not know of any instrument aboard a commercial satellite that could produce hyperspectral data to rival those possible with the NASA mission. PACE's ocean-colour imager will enable researchers to identify specific types of aerosol particle in the air, and plankton types in the ocean.

And governments typically provide the raw data that are used to create images, not just the images themselves, adds Andreas Kääb, a geoscientist at the University of Oslo who uses satellite data to study glacier movement. With commercial providers, "once you ask for raw data, you quickly run into problems", he says.

But commercial data may become more enticing if government support for Earth monitoring recedes. In the United States, President Donald Trump has proposed axing three NASA missions in 2018 — including PACE — and scaling back a fourth.

"We're looking at an unpredictable future for Earth-science funding in the US," Kargieman says. "If we have a capability among the private sector to step in and provide the data that will allow scientists to continue to do research, I think we should do so." ■

CORRECTIONS

The News story 'How Trump's science cuts could hurt his supporters' (*Nature* **545,** 273–274; 2017) misstated the number of advanced manufacturing institutes funded by the US government — there are 14, not 9. The graphic also gave the funding amounts in US$ instead of millions of US$. The News Feature 'The electric cure' (*Nature* **545,** 20–22; 2017) erroneously stated that Kevin Tracey initiated the first trial for vagus nerve stimulation in humans. In fact, the trial was started by SetPoint Medical. And Paul-Peter Tak, who ran the trial, first joined GlaxoSmithKline in 2011, not 2016.