

CLIMATE CHANGE

Big prize for methane probe

US green group wins millions to launch satellite.

BY JEFF TOLLEFSON

An environmental group in the United States has been awarded tens of millions of dollars to develop a satellite to help track emissions of the greenhouse gas methane from oil and gas facilities around the world.

If the Environmental Defense Fund (EDF) succeeds in launching its probe, it could be the first environmental organization to send its own satellite into space. Its work is being funded through the Audacious Project, a joint effort of the non-profit group TED and philanthropic organizations such as the Bill & Melinda Gates Foundation.

The EDF, based in New York City, aims to launch 'MethaneSAT' as early as 2020, with the help of scientific partners at Harvard University and the Harvard-Smithsonian Center for Astrophysics in Cambridge, Massachusetts. The group says that the probe will make the most-precise measurements yet of methane from space, and its data will be freely available.

The oil and gas industry emits around 76 million tonnes of methane globally each year, according to the International Energy Agency in Paris. That's enough to power about 285 million US homes. The EDF's goal is to monitor emissions from roughly 50 sites that account for around 80% of the world's oil and gas production. But the satellite could also be used to estimate emissions from landfills and agriculture. "We need good solid data so that we really can support global action on climate change, and we've got to do it fast," says Steven Hamburg, the EDF's chief scientist.

The most-detailed measurements of atmospheric methane concentrations available come from the European Space Agency's Sentinel-5P spacecraft, which was launched in October 2017. It provides global coverage at a resolution of nearly 50 square kilometres.

The EDF team is designing MethaneSAT to provide measurements at a resolution of 1 square kilometre, with global coverage at least once a week. That information can then be plugged into atmospheric models to calculate cumulative emissions across larger areas, says Steve Wofsy, an atmospheric scientist at Harvard who is working on the project.

"EDF has a very good team, and I have no doubt that it can be done," says Charles Elachi, who formerly headed NASA's Jet Propulsion Laboratory in Pasadena, California. "The challenge is how much it's going to cost." ■



The tick *Haemaphysalis longicornis* transmits an emerging, potentially fatal virus to people.

increase between 2016 and 2017.

All three countries have implemented measures aimed at educating local physicians and citizens in endemic areas about the risks of tick bites. Those infected now fare much better. In China, only around 3% of people infected died in 2016, and in Japan the number fell to 8%. In South Korea, the figure dropped from 47% in 2013 to 20% in 2017. Scientists credit the reduced fatality to earlier recognition and better general treatment — although no cure exists — and to the likelihood that wider surveillance has led physicians to recognize mild as well as severe cases.

The SFTS virus is not expected to evolve into a rapidly transmitted disease like Ebola. And infections are generally limited to people, such as farmers or hunters, who come into contact with the animals that carry *Haemaphysalis longicornis*, the tick that harbours the virus.

But many say that the virus's toll and potential threat have been under-appreciated. Those infected have a better prognosis, but the virus still kills a higher percentage than any other infectious disease in South Korea, says Keun-Hwa Lee, a microbiologist at Jeju National University in South Korea. And the higher number of infections means that the disease claims more than 100 lives globally each year.

Many animals, including goats, cattle, sheep and deer, expose humans to the ticks, and are often infected without showing symptoms. Current control efforts that focus on known endemic areas could fail, says Bao Chang-jun, a biostatistician at Jiangsu Provincial Center for Disease Control and Prevention in Nanjing. The course of the

epidemic "may change with human activities and climate change", says Bao. "It's necessary to conduct research on potential risk areas."

Two reports from Japanese health officials last year caused particular alarm. One stated that a woman had been infected through a cat bite, and the other that a man had been infected by his dog. "To the warnings of previous years, we have to add the risk of touching sick domestic animals," says Kazunori Oishi, director of the Infectious Disease Surveillance Center in Tokyo.

CLINICAL TRIAL

Last month, Japan began a clinical trial of an influenza drug, favipiravir, that was used to treat Ebola during the 2014 outbreak in West Africa. The drug is effective on viruses with a certain molecular structure that Ebola and SFTS share, says Saijo.

Although the number of cases has risen sharply, scientists can't say whether the increase is due to heightened surveillance and awareness, a real growth in the number of ticks and the animals that carry them, or an increase in risk as humans encroach on areas where the disease is endemic. Shigeru Morikawa, director of the department of veterinary science at Japan's National Institute of Infectious Diseases, says that some researchers suspect the number of ticks has increased because fewer people hunt wild animals in Japan now, and this has allowed deer and boar populations to surge.

Researchers say they have many questions about the virus and how it spreads, but they suspect that the chances to study the disease will go up soon, as warm weather returns and people flock to the outdoors, where they can come into contact with the ticks. "There will be more cases," says Hideki Hasegawa, a pathologist at the National Institute of Infectious Diseases. "The season is just beginning." ■

"It is our responsibility to come up with an effective treatment."