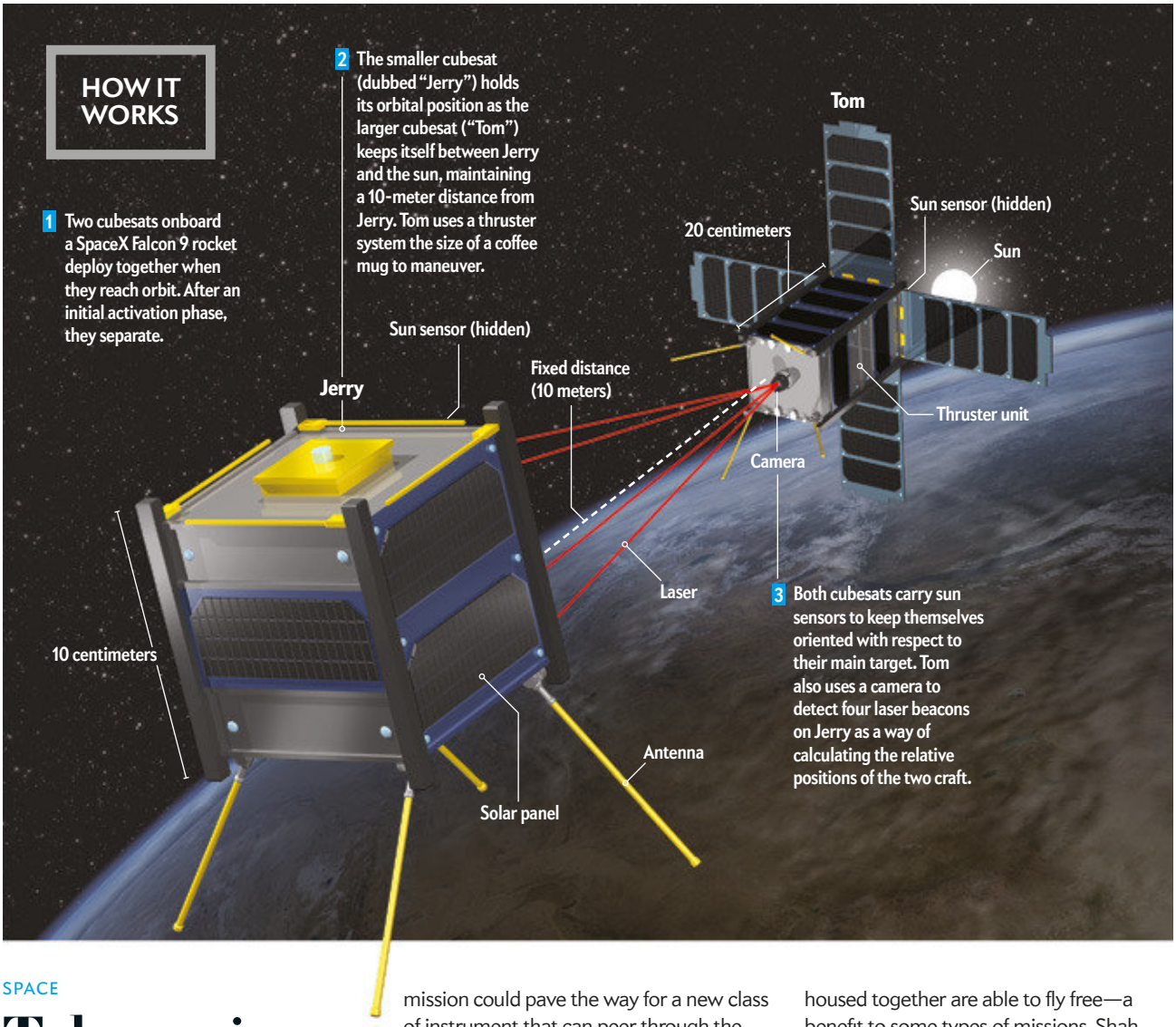

SPACE

Telescopic Tag Team

NASA works on building a gigantic space telescope from two miniature satellites

More than 400 years after Galileo handcrafted his first spyglass, NASA and South Korea's Yonsei University aim to create a "virtual" telescope in space by using two separate spacecraft. To test the concept, scientists have built two small satellites called cubesats that will practice lining up in orbit to construct a single telescope with a focal length as large as the distance between them. Scheduled for launch in early 2017, the roughly $1-million mission could pave the way for a new class of instrument that can peer through the sun's glare or at distant alien planets, without requiring a massive single scope.

The six-month mission—called "CubeSat Astronomy by NASA and Yonsei using Virtual telescope ALignment eXperiment" (CANYVAL-X)—will try out a technique for forming a telescope that would otherwise be much heavier to launch. The plan requires two spacecraft (together the size of a bread loaf) to orbit together in a straight line, always pointed at their target. "Flying two spacecraft in coordination, aligning them to a distant source and holding that configuration is a capability that has never been attempted," says Neerav Shah, an aerospace engineer at the NASA Goddard Space Flight Center.

Virtual telescopes could come in handy because components that would usually be housed together are able to fly free—a benefit to some types of missions, Shah explains. For example, an instrument on one satellite could block the glare of the sun or a distant star, making it possible for a camera on the other to image faint objects such as the sun's ghostly corona or exoplanets orbiting a star. Other telescopes designed to detect high-energy wavelengths, such as x-rays, need considerable distance between their mirrors and x-ray detectors and therefore must be built at large scales—an expensive venture in terms of construction and launch.

CANYVAL-X will not carry all the components necessary for a working scope but aims to demonstrate that the concept is possible. A $110-million European Space Agency mission called Proba-3 is slated to fly a fully functional virtual telescope pointed at the sun in 2019. —*Jeremy Hsu*

Illustration by Don Foley