

ASTRONOMY EDUCATION

Telescopes for the People

The International Year of Astronomy (IYA) 2009 has come and gone, but Rick Fienberg is still catching his breath. As leader of the Galileoscope project, one of the most ambitious parts of the global IYA campaign, his work was supposed to be wrapped up by now. The original goal was to put telescopes in the hands of the millions of people attending IYA events. But then the global financial crisis hit. The scientists on Fienberg's team were forced to become instant entrepreneurs to keep the Galileoscope project alive. One "insane" year later, they've pulled it off. "It has had a truly global impact," says Pedro Russo, the coordinator of the IYA based in Garching, Germany.

The ultimate aim of the IYA was "to help the citizens of the world rediscover their place in the universe." What better way to do that than give them their own telescopes? Fienberg says that when he proposed the idea at an astronomy meeting 3 years ago, "it was immediately embraced." And as the long-time editor of *Sky & Telescope* magazine, Fienberg had all the right connections to make it happen. The plan was to use "start-up money from a major donation," he says, and then partner with "an existing commercial telescope manufacturer so we could take advantage of their distribution network."

The device had to be powerful enough for people to see what Galileo first saw 400 years ago—the lunar landscape, the rings of Saturn, the moons of Jupiter—but also cheap enough to distribute, says Fienberg, "especially in developing countries." He was joined by Stephen Pompea, an astronomer at the U.S. National Optical Astronomy Observatory in Tucson, Arizona, and Douglas Arion, an astronomer at Carthage College in Kenosha, Wisconsin.

Because seeing the innards of the telescope would be as important for education as viewing celestial objects, the instrument would be taken apart and put back together on a daily basis—and yet it must cost no more than \$30. (Charitable support would drive the price of the telescopes below \$10.) The solution was a plastic clamshell design with the lenses locked in place by internal slots. Engineering by their manufacturing partner, Thomas Smith, the owner of U.S. company Merit Models, proved crucial, says Arion, ensuring that "all the tolerances were met [and] the parts fit together well."

The final instrument was far more powerful than Galileo's telescope. Rather than a 20-fold magnified view of 10 arc minutes of sky—far narrower than the face of the moon—the Galileoscope was designed to magnify as many as 50 times and comfortably take in the full moon in a single view.



Stargazing. Middle school students peer through Galileoscopes at the Arizona state capital in March.

The lenses of the Galileoscope also correct for distortions called chromatic aberrations that Galileo's original telescope produced.

By late 2008, they had a prototype Galileoscope ready to go. And that's when the financial floor fell out from under them. In the wake of the financial crisis, says Fienberg, "the donation didn't materialize, and telescope manufacturers lost interest in working with us on a project that wasn't designed to make any real money." At that point, they might have thrown in the towel, but the Galileoscopes were already locked in as a "cornerstone project" of the IYA, says Fienberg. "So three of us formed our own new company, Galileoscope LLC."

The business faced a daunting challenge. "We had no cash, no capital, and with no profit to be made and no assets, no realistic way to

raise funds," says Arion. So the trio spent a significant amount of their own money to create the tooling to manufacture the Galileoscopes. They built a Web site that could handle orders, "and then we bootstrapped from there," using funds from orders to pay for inventory, says Arion. "That's the primary reason why the delivery schedule has been, shall we say, sporadic." Fienberg, Pompea, and Arion prefer not to disclose how much money they each "loaned" the Galileoscope project, but they hope "to get it back out" in the near future.

By the time the IYA launched in January 2009 with global fanfare, the Galileoscopes were far from ready. The first orders weren't met until July. Some of the gap was filled by parallel efforts in the United Kingdom and Japan, which distributed an existing telescope kit to schools in Asia and Africa.

After the summer, huge waves of Galileoscopes finally went out around the globe. Norway bought 15,000 of them. Brazil bought 20,000. By the end of last year, 140,000 Galileoscopes were delivered. Orders for another 40,000 will be fulfilled in the coming weeks, pushing the total to 180,000. "Pretty good considering the late start we got," says Fienberg. And because most of the telescopes went to "schools, planetariums, and science museums, they'll be used by dozens or hundreds of people each," he adds.

The Galileoscopes are already taking on a life of their own. "This spring, 15,000 telescopes will be distributed to teachers nationwide," says Pompea, with workshops organized through the National Earth Science Teachers Association. Meanwhile, Chi-kwan Chan, an astrophysicist at Harvard University, is preparing to take a Galileoscope across North America by bicycle. He'll be teaching astronomy, measuring light pollution, and sharing astronomical photographs on a live blog (www.bikexus.blogspot.com). "Yes, I am a geek," says Chan.

But the future of the Galileoscope project is uncertain. The hope is to keep producing the telescopes, "but we can't maintain the level of volunteer effort we've put in during the past year," says Fienberg, who is now director of outreach for the American Astronomical Society. The team is hunting for an organization or company willing to take over their labor of love. So far, no takers.

—JOHN BOHANNON

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gonzoscience.org
Introducing
villagers to
telescopes in Senegal.