

# New ET detection method leads to quest for world's largest telescope

May 30 2013

---

Until recently, one of the ultimate mysteries of the universe—how many civilizations may exist on planets orbiting other stars in the Milky Way Galaxy—relied on the possibility of detecting intelligent beings by radio signals. Now a team of astronomers, engineers, and physicists from the University of Hawaii, the University of Freiburg, and elsewhere has proposed a new and powerful technique to search for intelligent life.

The revolutionary method is described by four of the team's astronomers in the June 2013 issue of *Astronomy Magazine*, the world's largest magazine on the subject, with a print and web readership of half a million each month. The story, "How to Find ET with Infrared Light," was written by Jeff R. Kuhn of the University of Hawaii's Institute for Astronomy, Svetlana V. Berdyugina of the University of Freiburg and the Kiepenheuer Institute for [Solar Physics](#) in Germany, David Halliday of Dynamic Structures, Ltd., in British Columbia, and Caisey Harlinton of the Searchlight Observatory Network in The Grange, Norwich, England.

Rather than looking for [radio waves](#), the team suggests searching for the heat signatures of nearby planets, which requires a giant [telescope](#) that could detect [infrared radiation](#) directly from an exoplanet, thus revealing the presence of a civilization.

"The energy footprint of life and civilization appears as infrared [heat radiation](#)," says Kuhn, the project's lead scientist. "A convenient way to describe the strength of this signal is in terms of total stellar power that

is incident on the host planet." The technique arises from the fact that a civilization produces power that adds to the heat on a planet, beyond the heat received from its [host star](#). A large enough telescope, idealized for infrared detection, could survey planets orbiting stars within 60 light-years of the Sun to see whether or not they host civilizations.

## The Colossus Telescope

The quest for direct infrared detection of extraterrestrial civilizations, along with many other research possibilities, has led the team to the funding and building of a [giant telescope](#). Currently planned large infrared telescopes, the Giant Magellan Telescope, the Thirty Meter Telescope, and the European Extremely Large Telescope, would not be large enough.

Instead, a telescope (dubbed Colossus) with a primary mirror about 250 feet (77 meters) in diameter could find hundreds of Earth-sized or larger planets in habitable zones, and perhaps dozens of [extraterrestrial civilizations](#), by using a sensitive coronagraph—and the technology to build such an instrument exists.

The international team thus seeks funding to build a 77-m telescope, which would be constructed from revolutionary thin-mirror slumping and polishing technologies developed by the Innovative Optics team. The telescope would consist of approximately sixty 8-m mirror segments, and would operate at a high-altitude site.

Colossus's field of view would be optimized for star-like sources. It would be the world's best high-resolution infrared telescope and would excel at the study of stellar surfaces, black holes, and quasars, objects that appear smaller than 1 arcsecond on the sky.

The organization behind the technologies that make Colossus-style

telescopes possible is Innovative [Optics Ltd.](#) (IO). IO operates its research and development at the University of Hawaii's Institute for Astronomy in Maui, and at the National University of Mexico in Ensenada, Mexico. IO also has developmental operations at the Vancouver, B.C., Canada location of Dynamic Structures Ltd.

For decades, [Dynamic Structures Ltd.](#) has been the leader in both design and construction of the world's largest telescopes and telescope enclosures. These include the Canada-France-Hawaii Telescope and enclosure, Hawaii; the Sir Isaac Newton Telescope and enclosure, La Palma, Canary Islands; the Sir William Herschel Telescope and enclosure, La Palma, Canary Islands; both W. M. Keck Observatories, Phase 1 and 2, Mauna Kea, Hawaii; the Owens Valley Radio Observatory and support structures, California; the Gemini 8-meter Telescope Projects in both Hawaii and Chile; and the Atacama Cosmology Telescope in Chile.

Dynamic Structures Ltd. has also been retained by the Thirty Meter Telescope Corporation (TMT) to provide a solution for the TMT enclosure. This has just been completed, resulting in the "Calotte" design. This design allows for significantly reducing the mass and size of the telescope's enclosure compared with conventional carousel and dome-type structures.

[Dynamic Structures](#) Ltd. is an investment partner in IO and lends its engineering, fabrication and support infrastructure to IO for a joint effort in creating a revolution in astronomical capabilities.

With manageable fabrication timescales, both optical and mechanical, and cost-effective pricing, IO technologies will enable the realization of telescopes of unprecedented size and capability.

**More information:** [PDF](#)

Provided by Astronomy Magazine

Citation: New ET detection method leads to quest for world's largest telescope (2013, May 30)  
retrieved 23 June 2024 from <https://phys.org/news/2013-05-method-quest-world-largest-telescope.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.