



Technology Benefiting Disaster Relief Has Roots in the SBIR Program and Technology Transfer Efforts

Collaboration helped achieve FCC certification, enabling inflatable antenna technology to aid relief efforts



Image courtesy of GATR Technologies

Officers with the Air Force Special Operations Command set up the inflatable antenna at Hurlburt Field in Eglin, Florida.

A technology with roots in the Small Business Innovation Research (SBIR) program is benefiting from an ongoing technology transfer relationship with NASA's Glenn Research Center and leading to faster on-the-ground communications support for disaster relief efforts and military operations. The inflatable antenna from the GATR Technologies® company can provide emergency Internet access, cell coverage, and phone lines over satellite networks via a compact package that can be deployed in less than an hour. Technology developed through a 1998 SBIR contract served as the basis for the technology, and the deployable antenna was further developed through a license agreement between GATR and the SBIR contract holder. Additional refinements, characterization, and tests on the technology were made possible by a 2006 Space Act Agreement (SAA) that tapped into Glenn's antenna expertise and test facilities and resulted in the first-ever Federal Communications Commission (FCC)-certified inflatable antenna. GATR is now able to deploy this technology as a critical support tool for first responders from Haiti to Afghanistan.

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SUCCESS



Image courtesy of GATR Technologies

GATR's inflatable antenna was deployed to assist with communications efforts following the January 2010 earthquake in Haiti.

Benefits of Technology Transfer

For the Partner:

- Enabled the company to characterize and test its inflatable antenna technology, leading to critical FCC certification and saving the company the time and expense of putting these testing capabilities together on its own
- Helped the company increase data rates, leading to improved performance

For NASA:

- Increased the technology readiness to a level necessary for potential inclusion in future NASA missions
- Strengthened an ongoing relationship with a growing start-up company

For Society:

- Provided necessary characterization, enabling the technology to provide rapid communications support to first responders in emergency situations
- Helped bring a technology to market that provides communications tools to disaster relief and military personnel, enabling them to work efficiently and effectively

About GATR Technologies

Incorporated in 2004, GATR Technologies (Huntsville, Alabama) manufactures inflatable satellite communications terminals ideal for first-in deployments, remote applications, and contingency scenarios where transportation and space are limited. The company's customers include military, broadcast, and public safety organizations. GATR Technologies specializes in design, integration, and implementation of large-scale, high-performance, portable telecommunications systems in support of end-to-end multimedia applications. The company also provides custom engineering services.

Technology Origins

In 1998 Glenn awarded an SBIR contract to SRS Technologies to address

"NASA is a unique agency. It's our mission to develop technology for the benefit of all mankind. From Hurricane Katrina to the earthquake in Haiti, the work that GATR is doing is just phenomenal, and we're glad that we've been able to help with that in some way."

—Robert Romanofsky, Antenna and Optical Systems Branch, Glenn Research Center

large aperture deployable reflectors for space power and communications applications. However, NASA's Space Communications and Navigation (SCaN) Program had a need for inflatable antenna technology—and researchers quickly realized that the base technology under the SBIR contract could serve

as the groundwork for the inflatable antenna's development. NASA sought to address the large mass and volume penalty that conventional large aperture antennas place on launch missions while meeting space communications requirements. With this new direction and more than \$1 million in additional SBIR Phase 3 funding, plans were made to develop the rigidized thin film and inflatable antennas and increase their technology readiness level (TRL). The result was the Large Inflatable Thin Film Antenna with Rigidized Support Structure, which combines thin film antenna technology, large lightweight rigidized space structures, and radio frequency (RF) technology. This work also verified that the technology could address NASA requirements for large aperture antennas for potential inclusion in future missions.

"The SBIR program was instrumental in helping us refine our concepts. We were able to make continual improvements through those contracts, which helped us get prototype systems into the hands of first responders."

—Paul Gierow, President, GATR Technologies



The inflatable antenna was used to assist with communications efforts in the search for a missing girl in San Diego, California.

Finding a New Use

Innovators working on inflatable antenna technology realized their ideas also could be applied to first-response communications applications. In 2004, GATR Technologies was formed, and joined forces with SRS Technologies. Their efforts resulted in the “Ground-Based Inflatable Antenna,” which was exclusively licensed to GATR in 2006. The company worked to refine development of its “GATR Antenna System” and find suitable markets for it, with its sights on FCC certification. With this goal in mind, GATR partnered with Glenn in 2006 with the first of two SAAs, enabling the company to leverage NASA’s SCaN Program and conduct in-depth testing of the antenna using Glenn’s facilities and expertise. The 2006 SAA enabled characterization of GATR’s 2.4-meter inflatable antenna and fine-tuning of the antenna surface through surface metrology. This testing resulted in GATR’s goal of FCC certification and made the antenna the first-ever FCC-certified product of its kind.

Prototypes of the ground-based antenna were used by GATR to assist with communications needs in Biloxi, Mississippi following Hurricane Katrina. In 2008, the GATR Antenna System helped support the Federal Emergency Management Agency’s (FEMA’s) efforts during Hurricane Ike. The technology also has been used to help law enforcement

with missing person rescue missions, and has provided communications support to the U.S. Navy and the U.S. Air Force. Outside the U.S. the antenna has been deployed in Afghanistan, South Africa, South America, Haiti, and Korea. And back at NASA, GATR’s antenna is among other large aperture antennas being considered for NASA’s next-generation Space Communication Architecture. One future NASA mission that may utilize the antenna is a possible lunar ground station.

Most recently, the company has deployed a system at a United Nations search and rescue site in Port-au-Prince, Haiti, in response to the earthquake there, and a second unit at a special operations unit at the Port-au-Prince Airfield. Two additional units have been deployed at a makeshift hospital in the Dominican Republic. The antennas are providing Internet access to first responders and doctors through a coordinated effort with Cisco Systems® Inc. and satellite provider Intelsat General Corporation.

GATR was able to provide very swift communications assistance to Haiti because the inflatable antenna could be flown in two boxes on a private jet, and quickly set up in about an hour, as opposed to other antennas that require longer set-up time and significantly more cargo space.

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“We have two systems in Haiti providing support to first responders. It’s giving them Internet access and helping with search and rescue using text, chat, and the Google Maps™ mapping service to help pinpoint the location of houses where people are known to be missing. We’ll also be providing Internet access to about 100 doctors to connect them with other health workers to help their efforts.”

—Paul Gierow, President, GATR Technologies

“The tools NASA provided showed us the changes that we needed to make and the improvements that were necessary to meet FCC requirements—which can often be a barrier to entry from a business perspective. But with NASA’s facilities we were able to make the necessary changes and get FCC certification, which has been critical to moving forward. Without that certification, we wouldn’t be able to send signals, and so we wouldn’t be able to support first responders in these emergency situations.”

—Paul Gierow, President,
GATR Technologies

The Transfer Process

Glenn's Technology Transfer and Partnership Office, part of NASA's Innovative Partnerships Program (IPP), helped coordinate the 2006 SAA among technical contacts with the SCan Program, personnel at GATR, and facilities personnel at Glenn. The partnership that resulted from the SAA enabled GATR to leverage Glenn's facilities and expertise for further in-depth testing of the ground-based inflatable antenna system, leading to FCC certification.

"NASA's charter reflects our desire to help companies both large and small. We've got to step up to the plate—especially in this economy—to help companies that have so much potential to benefit humanitarian efforts."

—Robert Romanofsky,
Antenna and Optical
Systems Branch
Glenn Research Center



The inflatable antenna technology was shipped via private plane to Port-au-Prince, Haiti and deployed in about an hour. GATR's David Hoffman, Customer Support Specialist, is shown here with the antenna.

Looking Ahead

Moving forward, GATR Technologies is pursuing a longer-term relationship with Glenn for future testing and evaluation of emerging antenna products and miniaturization of RF devices. The company will be working with Glenn on development and characterization of a 5-meter version of the inflatable antenna in the spring of 2010, as part of a second SAA signed in 2009.

"One day, hopefully, everything we've learned will be a benefit to NASA and they can spin it back in."

—Paul Gierow, President, GATR Technologies

For More Information

If you would like additional information about NASA's technology transfer opportunities, please contact:

Technology Transfer and Partnership Office
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