



# SERVIR: Connecting Space to Village



**SERVIR program manager, Dan Irwin, shows students the capabilities available in the SERVIR lab.**

SERVIR is a joint venture between NASA and the U.S. Agency for International Development (USAID), which provides satellite-based Earth observation data and science applications to help developing nations in Central America, East Africa and the Himalayas improve their environmental decision making. SERVIR — an acronym meaning “to serve” in Spanish — provides this critical information to help countries assess environmental threats and respond to and assess damage from natural disasters.

## History

SERVIR originally began in 2004 as a collaborative effort among NASA, USAID, World Bank and the Central American Commission for Environment and Development (CCAD). The program, managed at NASA’s Marshall Space Flight Center in Huntsville, Ala., opened its first “hub” in Panama in 2005 to serve Central America and the Dominican Republic in cooperation with CATHALAC, the Water Center for the Humid Tropics of Latin America and the Caribbean. Additional hubs were opened in 2008 in Nairobi,

Kenya, serving all of East Africa, and in 2010 in Kathmandu, Nepal, serving the Kush-Himalaya region. These hubs are partnerships with the Regional Center for Mapping of Resources for Development in Nairobi, and the International Centre for Integrated Mountain Development in Kathmandu, respectively. Hubs also are planned for other developing regions of the world.

The SERVIR hubs consist of teams of scientific experts who develop satellite data into useful information for governments and non-governmental organizations in the host nations. The goal of the hubs is eventually to make them integral, self-sustaining parts of the national and regional information infrastructure. The SERVIR Coordination office at the Marshall Space Flight Center provides scientific expertise, computer applications and technologies to help the hubs advance their knowledge and capabilities. USAID’s expertise in international development and training/capacity building helps connect space to village.

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## SERVIR in Action

The program is designed to address societal benefit areas identified by the Group on Earth Observation (GEO), a voluntary partnership of governments and international organizations that provides a framework to develop new earth observation projects and coordinate their strategies and investments.

The GEO projects are organized into the following areas:

- Agriculture
- Biodiversity
- Climate
- Disasters
- Ecosystems
- Health
- Water
- Weather
- Energy

SERVIR has worked in most of these areas.

### Biodiversity

SERVIR-East Africa has partnered with zoologists across Africa who developed range maps of the continent's flora and fauna using ground- and satellite-based data. SERVIR is using these maps to better understand how climate change could impact the region's unique plants and animals.

### Climate

Working in concert with the government of Bhutan, SERVIR integrated precipitation data with future climate change models and the Coupled Routing and Excess Storage, or CREST, model to estimate how hydroelectric power generation in Bhutan's Wangchu Valley might be affected by future climate changes.

### Disasters

Through cooperation with a number of international initiatives, SERVIR harnesses both NASA satellite data and a wide variety of near-real-time, high-resolution satellite images that can help governments assess environmental and infrastructural damage due to extreme events such as hurricanes, earthquakes, floods and landslides.

### Ecosystems

The SERVIR-East Africa hub hosts workshops to help African governments better catalogue and map the continent's numerous and varied ecosystems. SERVIR-Mesoamerica produced a 30-year map of forest cover in Belize, showing deforestation over time. These types of efforts help nations conduct long-term environmental management.

### Water

The CREST model combined with precipitation data from NASA's Tropical Rainforest Measurement Mission identifies past, present, and future areas susceptible to flood-



**Flood monitoring is critical in developing nations.**  
(Image credit the Associated Press)

ing. SERVIR's partnership with the Kenya Meteorological Department is helping improve local flood forecasts and NASA's flooding models.

### Weather

SERVIR partners with the U.S. National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service to provide improved satellite data and computer-based weather forecasting models for Central America.

### Health and Air Quality

In addition to studying and improving air quality models in Central America, SERVIR has provided satellite data from the Terra and EO-1 satellites to monitor and track cyano-



**SERVIR-developed products appeared on the front page of Guatemala's largest newspaper.**



bacteria outbreaks. SERVIR helped track a cyanobacteria outbreak in Guatemala's Lake Atitlán, which grew, in part, due to pollutants in the water. The outbreak images, widely reported in Guatemala's largest newspaper, resulted in local changes to water treatment practices.

## Other SERVIR Activities

The USAID portion of SERVIR's mission is tied directly to advancing science and technological capabilities in the program's host nations through training with the eventual goal of making the program's work self-sustaining and encouraging "South-South" collaboration between the nations using the services.

## Geospatial One-Stop

While SERVIR's data and applications primarily have been Web-based from the beginning of the program, the coordination office at Marshall is overseeing a redesign and improvement of the SERVIRGlobal.net website to allow easier access to and uploading of new Earth observation and geospatial data. This "One-Stop" site also features "cloud-based" data storage to avoid data losses.

## Partnerships

As a joint venture between NASA and USAID, SERVIR relies on those agencies for expertise in scientific research and international development. Partnerships within the U.S. government include:

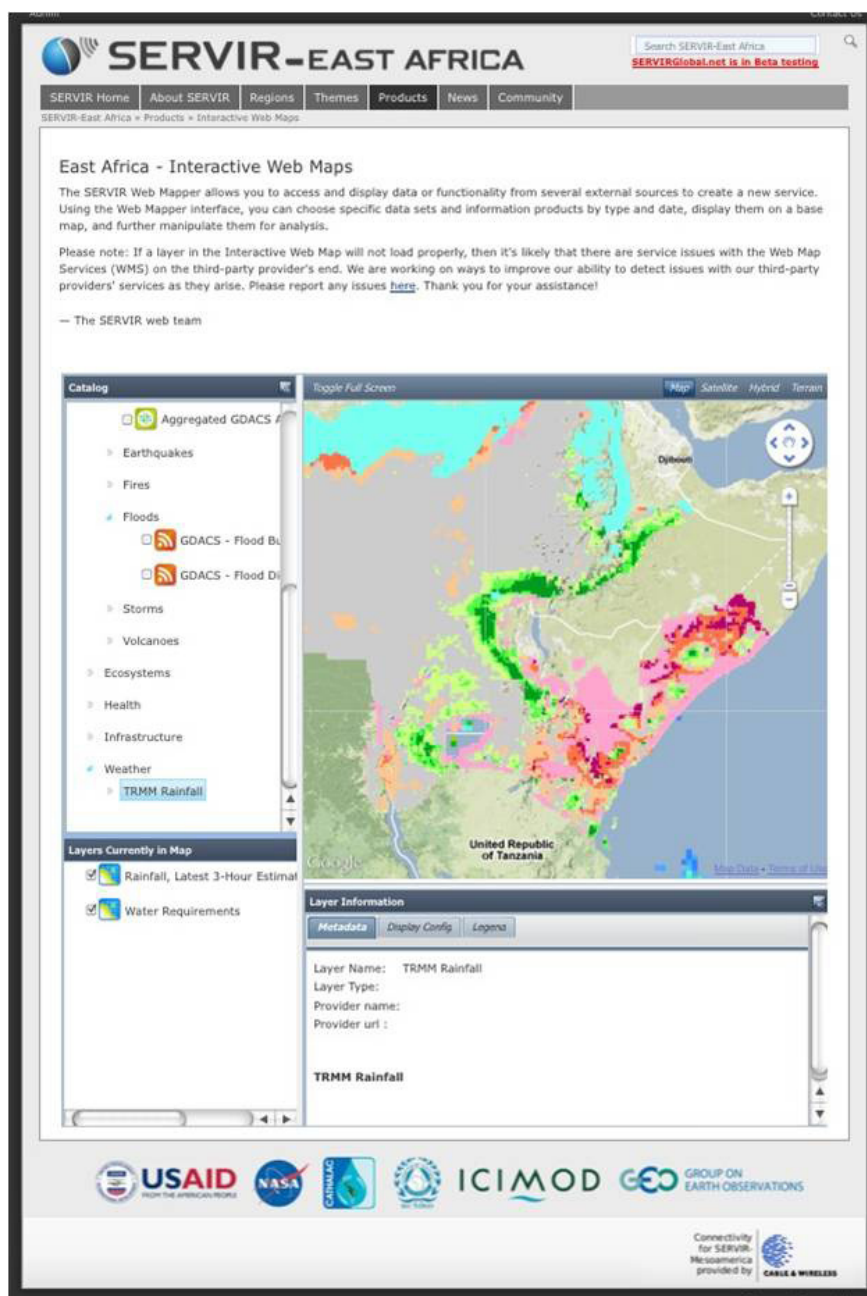
- NOAA
- Environmental Protection Agency
- US Forestry Service
- US Geological Survey

Because SERVIR's long-term goal is to ensure its host nations will one day be self-sustaining, the program works closely with governments and other international organizations to establish local capacity.

In addition to 38 national governments, SERVIR works with other entities to perform its mission, including the Kenya Meteorological Department and the United Nations Platform for Space-Based Information for Disaster Management and Emergency Response.

## Future Work

To further advance SERVIR's commitment to operate "from space to village," NASA and USAID signed a joint



**SERVIR improved "one-stop" site will increase access to important space-based environmental information.**

Memorandum of Understanding April 25, 2011. This agreement will expand their joint efforts to overcome international development challenges such as food security, climate change, and energy and environmental management.

In addition to increasing the number of hubs worldwide, SERVIR is continuing to expand the number of sources and uses of Earth observation data in its host nations. The program issued a Research Opportunities in Space and Earth Sciences, or ROSES, solicitation - a call to establish an applied sciences team that can develop new applications for Earth observations and work with the scientists work-

ing at the Marshall Space Flight Center and at the hubs. The SERVIR Applied Sciences Team will develop new earth science applications and leverage the program's existing networks and systems.

To provide additional observations during disasters and humanitarian crises, the SERVIR team and engineers at Marshall have developed a pathfinder camera system for the International Space Station. This system, the ISS-SERVIR Environmental Research and Visualization System (ISERV) was delivered to the Space Vehicle Mockup Facility at NASA's Johnson Space Center in Houston prior to its launch to the International Space Station, currently scheduled for late June 2012. Operations are targeted to begin in November 2012.

For additional information, visit:

**[www.servirglobal.net](http://www.servirglobal.net)**

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