

## Improved Use of Satellites for Risk Management

### Description

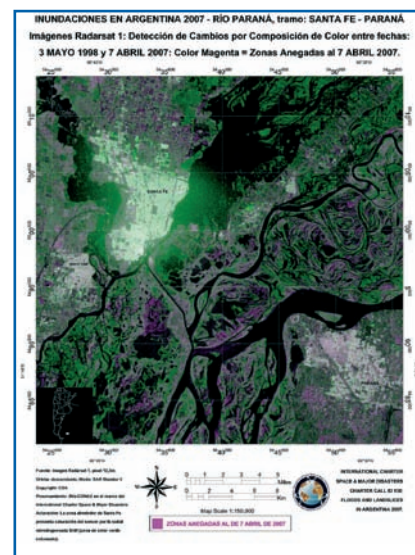
Canada has taken a leadership role in the definition of global requirements for satellite observations in support of risk management. The Canadian Space Agency leads Task DI-06-09, which will compile the first comprehensive set of global user requirements for every phase of disaster management, and identify gaps in sustained observations for mitigation, warning, respond to and recovery from disasters.



*Hurricane Isabelle from space, courtesy of NASA*

Weather satellites have for many years made well-recognized contributions to disaster warning and prevention, particularly hydrological disasters. More recently, other Earth observation satellites are being brought to bear to improve the management of a broader range of natural disasters. This can be achieved through better assessment of risk before events take place, by providing accurate warnings of where disasters will occur, by assessing the situation of critical infrastructure after an event or supporting the recovery process long after the disaster is over. Dozens of Earth observation satellites orbit the world collecting imagery in the visible, near infrared and even microwave spectrum. The images provide information about the effects of hazards derived from low and high resolution data. These data can be integrated into disaster warning systems to improve their accuracy, or may be used to generate maps that assist responders in determining the most affected areas and the status of infrastructure. GEO Members aim to improve access to these unique data sets for disaster managers and ensure that critical observations are sustained over the long-term. In the context of GEO, Member States are also examining how to ensure operational integration of data into disaster management systems, and how to develop capacity for improved use of satellite imagery.

Following the UNISPACE III conference in July 1999, the European and French space agencies (ESA and CNES) initiated the International Charter "Space and Major Disasters" (the Charter), whose membership now includes the Canadian Space Agency and 8 other leading space organizations. The Charter provides a unified system of space data acquisition and delivery to emergency authorities affected by natural or man-made disasters. This system has been activated over 150 times, with more than 30 calls in 2007 alone. In parallel, a number of regional initiatives have been undertaken to better coordinate access to satellite data, including the GMES programme in Europe, Sentinel-Asia's 18 nation operational system and SERVIR, a Mesoamerican visualization and monitoring portal. UNOOSA has worked with UN Members States to define a United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN SPIDER), which was approved by the UN General Assembly in 2006. Building on the lessons learned from these systems and extensive consultations by CEOS and IGOS-P over the past decade, DI-06-09 aims to compile comprehensive user requirements and establish a virtual constellation of satellite assets to address them.



*Flooding near Santa Fe, Argentina. Comparison of archived and near-real time RADARSAT-1 imagery (courtesy INA/CONAE)*

## Added Value

Through GEO, it is hoped that successful systems can be taken one step further. For example, the GEO Secretariat is formulating a request to the Board of the Charter to extend to all Member States the right to directly activate the Charter and access data archives. In parallel, space agencies in the context of CEOS and DI-06-09 are currently discussing how to address needs for data during other phases of the disaster cycle: mitigation, warning and recovery. In order to do this effectively, GEO Members are working on compiling the first comprehensive requirements for satellite data for all disasters on a global basis. This work will build on extensive user requirements analysis in each of the disaster communities involved, as well as technical analyses undertaken by CEOS, the IGOS Partnership, the European Union and others over the course of the last decade. From this analysis, priority observations will be identified and better coordinated, and mechanisms for broader data access will be established. GEO work under DI-06-09 has been closely coordinated with UN SPIDER activities. In June 2007, representatives from GEO members met at UNOOSA headquarters to discuss the data needs of risk managers and to begin planning the regular acquisition of a baseline data set. These acquisitions will support global disaster mitigation activities and facilitate the generation of damage maps after events.

## Relevance to GEO

Satellites offer unique observations of the world's catastrophes useful for every aspect of risk management, from mitigation through response and recovery. Satellites offer the largest potential for improving current practices in support of one of GEO's core societal benefit areas: the reduction of loss of life and property through improved disaster management. Coordinating and facilitating access for GEO Member States and participating organizations to these unique data sets and products will enable national and regional bodies to better prepare and respond to disasters. Work in this area has been coordinated under the User Interface Committee, in close consultation with the Architecture and Data Committee and the Committee on Earth Observation Satellites, within Task DI-06-09.

## Participants

Australia/Geoscience Australia, Austria/Z-GIS, Canada/CSA (lead), Chile/Foreign Ministry, European Space Agency, France/CNES, Germany/DLR, India/NRSA/ISRO, Indonesia/National Institute of Aeronautics and Space, Japan/Ministry for Education, Science and Technology, Korea/Aerospace Research Institute, Italy/ASI and Protezione civile, Nigeria/NCRS/NASRDA, Spain/INTA, Romania/National Meteorological Administration, Russia/EMERCOM, Saudi Arabia/KACST, Syria/GORS, Thailand/GISTDA, US/NOAA and USGS, UK/BNSC, Ukraine/NSAU, CEOS, GEO Secretariat, IGOS-Geohazards, GTOS/FAO, UNITAR/UNOSAT, UNOOSA and UN/SPIDER, World Meteorological Organization.

## Current status and Next Steps

In the context of DI-06-09, user communities are working with satellite data providers to provide the first comprehensive statement of global requirements for Earth observations to support disaster management. These requirements are compiled taking advantage of regional initiatives, such as GMES, Sentinel-Asia, and SERVIR. Given that requirements aim to address a broad range of natural disasters at every phase of the disaster management cycle, the compilation of these requirements has been demanding. This work includes defining global baseline data sets that meet the basic needs of disaster management communities for forecasts, warnings and recovery. Eventually, GEO Members intend to create a virtual constellation of satellites that together can address all phases of disaster management. The initial system architecture is based on existing systems put together to collectively address needs. Future system architecture requirements will address critical gaps identified in the current system of systems. Both users and satellite designers and operators will meet again in fall 2007 to validate initial requirements and to establish a timeline for creating a system that marries existing, planned and future assets together in one operational service.