Sharing space resources

Agnieszka Lukaszczyk outlines how nations and organisations are working together to make Earth observation information more readily available – and in the right format – for disaster preparedness and management

FOR SOME TIME SPACE HAS BEEN reserved only for wealthy, developed countries such as the United States, Soviet Union/Russia and, to some extent, Europe. In recent years, the number of space-faring states has increased rapidly to 39. Not only is the developed world participating in space activities, but many developing countries such as Mexico, Malaysia, Nigeria, South Africa and more, continue to develop space programmes. In fact, many developing states have their own satellites in space, while countries like China, India, and Brazil not only operate satellites, but already have working launch capabilities.

Space programmes and other related technologies are now becoming part of the national strategies and policies of many emerging space states, which are striving to strengthen their international status, security, and economic benefits.

It is important to note that the increasing number of space actors includes the private sector. Communication, Earth observation, geospatial information and other space applications affect modern life all over the globe, as well as provide relevant information to governments and various institutions in areas such as: Climate monitoring; disaster/crisis management; food security; water management; Earth observation; and telemedicine.

A country does not need to own space assets to take advantage of space technology. In a natural disaster or man-made crisis, satellite imagery has become a common tool for preparedness, mitigation and response, yet it still has not been used to its full capacity facing various political, economic and logistical obstacles.

Over time, access to spatial data has become easier and cheaper, particularly in crisis or disaster situations. Space agencies and private companies are often willing to provide free or very cheap data to those in need. However, in a crisis situation where data access by an average first responder is a critical first step, the nature of the need may not match data availability. For example, an average first responder would not know how to go about obtaining a high resolution image of an emergency area. Nevertheless, it is important to note that data is becoming more and more available, together with powerful related tools such as the Positioning, Navigation and Timing (PNT) and the Geographic Information System (GIS), all of which can greatly assist with crisis and disaster management.

More specifically, the space community has begun building various institutional frameworks to provide better space solutions to those in need before, during and after natural disasters and man-made crises. For

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instance, the International Charter for Space and Major Disasters aims to provide a co-ordinated system of space data acquisition and delivery, through authorised users, to those affected by natural or man-made disasters. Each member agency has committed resources to support the provisions of the charter and thus is helping to mitigate the effects of disasters on human life and property. Member agencies include: European Space Agency (Europe); Centre National d'Etudes Spaciales (CNES – France); Spotimage; National Space Organisation (NSPO - Taiwan); Canadian Space Agency (CSA); Indian Space Research Organisation; National Oceanic and Atmospheric Administration (USA); National Commission on Space Activities (CONAE – Argentina); Japan Aerospace Exploration Agency (JAXA); United States Geological Survey (USGS); and Digital Globe.

UN-SPIDER is another international framework. This one, however, focuses solely on natural disasters. In 2006, the United Nations General Assembly agreed to establish the United Nations Platform for Space-based Information for Disaster Management and Emergency Response – UN-SPIDER as a new United Nations programme, with the following mission statement: "To ensure that all countries and international and regional organisations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle." There have been several initiatives in recent years that have contributed to making space technologies available for humanitarian aid and emergency response. UN-SPIDER focuses on the need to ensure access to, and use of, such solutions during all phases of the disaster, including the risk reduction phase, which can contribute significantly to a decrease in loss of lives and property.

The UN-SPIDER programme serves as a gateway to space information for disaster management support, while also serving as a bridge to connect the disaster management and space communities. Additionally, it facilitates capacity-building and institutional strengthening, especially for developing countries. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities.

Wildfires starting in Greece on August 23, 2007: The image was acquired by Envisat's Medium Resolution Imaging Spectrometer (MERIS) optical instrument, while working in Full Resolution mode to provide a spatial resolution of 300 metres. Access to spatial data has become easier and cheaper, particularly in crisis and disaster situations

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Envisat acquired this image with its Medium Resolution Imaging Spectrometer (MERIS) on April 29; it shows oil spilling into the Gulf of Mexico.

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The European Union (EU) and the ESA have joined forces to establish the Global Monitoring for Environment and Security (GMES), which is now one of the EU's flagship programmes. This aims to establish a highly advanced European capacity for Earth observation. In addition, it has developed Europe's capability to supply independent and permanent access to reliable and timely information on the status of Earth's environment at all scales – from global to regional to local communities. In particular, it supports the critical decisions that are necessary during natural disasters and man-made crises. GMES is currently in a pre-operational phase and should be fully operational by 2014.

There are other initiatives that aim to assist with crisis and disaster management, yet challenges remain, primarily institutional, as there is uncoordinated use of the collected data. Often during a disaster, the first responders are firefighters, police, nurses, humanitarian NGOs, etc; not space experts. They need quality data and they need it fast – most importantly they need to be able to use it.

Still, today, there is a huge gap between what is available and what is actually being used. First responders often do not know what to ask for, where to get the relevant data, and how to read it once they get it. There are no standard formats, co-ordinated platforms, or dedicated places they can go to where one can easily get what is needed. The processes to get information from space entities are often complex and bureaucratic, and no-one has time for this during an emergency. The consequences are that first responders often get low resolution data, or multiple images of the same thing, while what is really needed is either not coming through or is sent in such a format that an end-user cannot interpret it.

Communication

One of the main challenges is that the space sector and those who use spatial data do not really communicate with each other. Thus, there is lack of understanding of end-users' needs and capabilities. Capacity building and training are essential so that first responders can really benefit from what space has to offer. Fancy data will not make a difference if no-one knows how to use it.

Another challenge is a lack of co-ordination among the space community itself. There are a lot of useful initiatives and programmes, but they appear to be working alone instead of working together towards a common goal such as assisting in crisis management. Each space entity works with different standards, formats, rules, requirements and specifications, making co-ordination very difficult. It is not difficult to obtain some sort of data; the challenge is to obtain the right data that could be useful to the end-user.

There will always be challenges and issues. The important thing to remember is that space is becoming a very important tool in disaster management all over the world and, with time, when some of the abovementioned challenges are slowly overcome, space will be able to play a bigger role. The technology is improving each year, and more high quality data is becoming available. The challenges are not on the technological level, but on the political/institutional level. Once we all learn how to 'play well together and share', space technology will be even more beneficial for humanity. CRJ

Author

Agnieszka Lukaszczyk *is European Program Manager at the Secure World Foundation*