



## Guidance and Training for Using Remote Sensing Data from Satellites

### Introduction

The role of the ITU is to provide the radio spectrum needed to remotely observe disaster areas and to communicate that data to the ground. Other organizations are responsible for training personnel to use the data, for processing and analyzing those data, and for forwarding the results to users who need them. The organizations which fill the roles between the ITU and the user in the field are described below.

### Overview

Figure 1 illustrates the overall flow of data and the responsibilities associated therein. The ITU provides interference-free radio spectrum, but has no part in the day-to-day acquisition, processing, analyzing, and transmission of the data needed in the field.

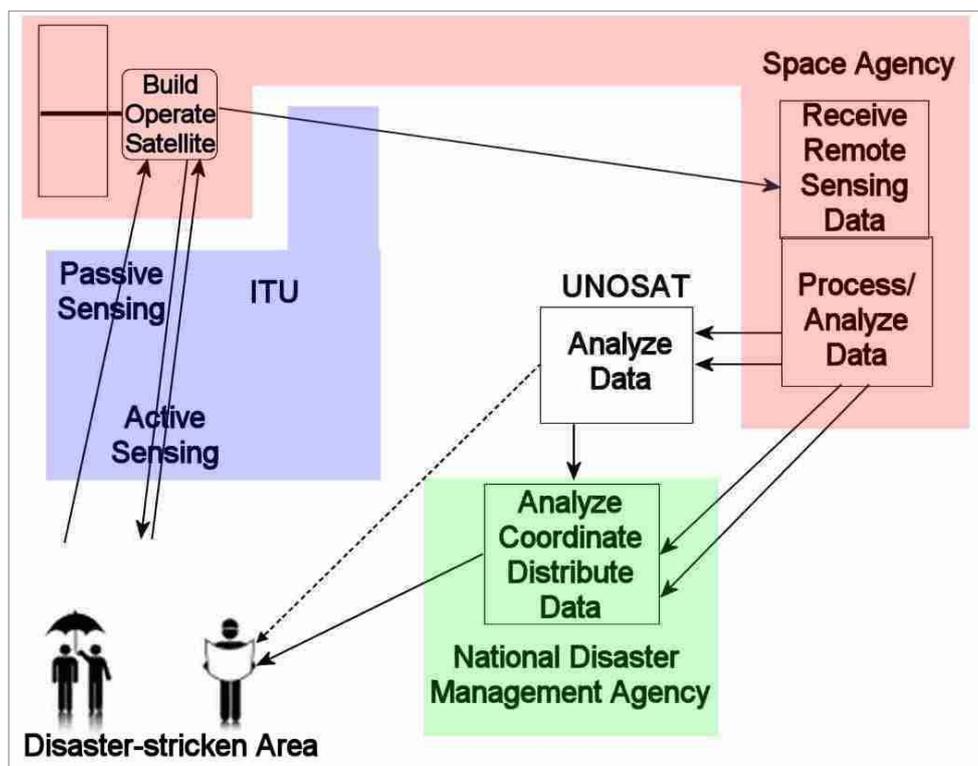


Figure 1. Data Flow from a Remotely Sensed Disaster Area to a User/Worker in the Field. Responsible agencies are shaded.

The sensors, the satellites that carry them and forward the sensor data to the ground, and the processing of those data are provided by commercial or government space agencies. Once the data are received on the ground and processed, it must be sent to the users in the field, and possibly further analyzed along the way. Ideally, a national disaster management agency provides the link between the providers of satellite data and the users in the field.

This document cannot present a course in remote sensing, but is intended to show where one may find information derived from remote sensing and where to obtain training in its use.

Several problems need to be addressed: how to set up a disaster management agency at a national level, how to train individuals to staff them, and how to provide needed information (and hopefully only the needed information) to an individual in the field.

The last problem arises because there are many sources of remote sensing data being provided by numerous national and multinational organizations, both government and private. It is important that the user in the field be provided only the information that is needed and not be burdened with additional irrelevant, redundant, or possibly inconsistent, information. Ideally, a national disaster management agency would be in place which would have survived the disaster and would be able to coordinate incoming data from the various sources so that workers in the field receive just what they need. Historically, such agencies have sometimes been crippled by the disaster. A single source of information under such dire circumstances has been identified.

## **A National Perspective**

It is assumed that each country has its own national disaster management agency. While this document cannot illustrate how one might organize such an agency, the United Nations Platform for Space-based Information for Disaster Management and Emergency Response ([UN-SPIDER](#)) has as its mission to "Ensure that all countries and international and regional organizations have access to and *develop the capacity to use* all types of space-based information to support the full disaster management cycle".

The UN-SPIDER programme provides access to space information for disaster management support, serves to connect disaster management and space communities, and facilitates capacity-building and institutional strengthening, in particular for developing countries. It provides workshops where members of such organizations can meet and share information, and it also provides training through regional support offices. UN-SPIDER has offices in Vienna, Austria and in Bonn, Germany and will have an office in Beijing, China. Additionally, a network of Regional Support Offices supports the work of UN-SPIDER worldwide.

The Regional Support Offices include: [Algeria Regional Support Office](#); [Asian Disaster Reduction Center \(ADRC\) Regional Support Office](#) in Kobe, Japan; [Islamic Republic of Iran Regional Support Office](#) in Tehran, Iran; [Nigeria Regional Support Office](#) in Abuja, Nigeria; [Pakistan Regional Support Office](#) in Karachi, Pakistan; [Regional Center for Mapping of Resources for Development \(RCMRD\)](#) in Nairobi, Kenya; [Romania Regional Support Office](#) in Bucharest, Romania; [Ukraine Regional Support Office](#); [University of the West Indies - Disaster Risk Reduction Centre](#) in St. Augustine, Trinidad, West Indies; and [Water Center for the Humid Tropics of Latin America and the Caribbean \(CATHALAC\)](#) in Panama City, Panama (also associated with SERVIR, see below).

## Staff Training

Many places can provide individuals staffing such national disaster management agencies with training in the use of the tools needed to analyze satellite-borne remote sensing data:

UNOSAT: The United Nations Institute for Training and Research (UNITAR) operates a UNITAR Operational Satellite Applications Programme ([UNOSAT](#)). Although UNOSAT specializes in analyzing data from a vast array of sources and forwarding the results to its clients, it also provides hands-on [training](#) with geographic information systems (GIS) equipment and has specific modules in training and education curricula up to post-university Master level.

UN-SPIDER: The [UN-SPIDER](#) operates under the United Nations Office of Outer Space Affairs (UNOOSA) and has a broad mandate which includes both [training](#) and building the capacity within nations to handle disasters.

SERVIR: [SERVIR](#)—Spanish for “To Serve”—is a Regional Visualization and Monitoring System that integrates earth observations (e.g. satellite imagery) and forecast models together with in situ data and knowledge for timely decision-making to benefit society. SERVIR also offers training. The first SERVIR regional operational facility – [for the Latin America and the Caribbean region](#) – was established in 2005 through the efforts of NASA, the United States Agency for International Development (USAID), the Water Center for the Humid Tropics of Latin America and the Caribbean (CATHALAC), the Central American Commission for the Environment and Development (CCAD), and other partners. A second SERVIR regional operational facility – for [East Africa](#) – was opened in 2008 at the Regional Center for Mapping of Resources for Development (RCMRD) in Nairobi, Kenya. A third regional operational facility was opened in Kathmandu, Nepal in 2010 through the efforts of NASA and USAID.

USTTI: The United States Telecommunications Training Institute ([USTTI](#)) offers a short introductory course with emphases on spectrum management and the science behind remote sensing. The ITU is concerned with managing the radio spectrum; the USTTI course offers training from that perspective with an overview of how the remote sensing data are used. However, the USTTI does not offer hands-on training in using GIS to analyze remote sensing data and to produce products for use in the field. That training is offered by the other organizations mentioned above.

## Data Sources

The source of the information needed in the field will depend on the operational capabilities of the local disaster management agency.

If that organization is intact and functional, it can obtain data ranging from analyzed products from UNOSAT to relatively raw data from sources such as those listed in the [SFCG Remote Sensing Disaster Database](#) (see the [User Guide](#)). Members of the [International Disaster Charter Space and Major Disasters](#) are committed to supply such data in an emergency. However, data from some sources may require further analysis to be useful. Regardless of the sources of the data, the results must be coordinated so that all users in the field receive needed and consistent information.

If local analysis and coordination are not available or have been destroyed by the disaster, a suggested approach is to go first to the [UNOSAT](#) organization. Working through its United Nations Development Program ([UNDP](#)) representative, a country can obtain help from the UNOSAT to identify and to obtain the needed information. UNOSAT has access to any satellite data that an individual country would have - an advantage when communications have been disrupted. Further, the UNOSAT specializes in quick-turnaround data analysis and tailors each product to the needs of the specific disaster.

Additional analyzed data may be found via the [UN-SPIDER](#) web site by clicking on the appropriate "Region" under "DISASTERS COVERED BY SPACE AID" (at the center of the bottom of the home page), and then clicking on "UN-SPIDER Space Aid: space-based information for [name of disaster]". Scroll down the last page to see a list of available data and sources.

## **In Conclusion**

Help in organizing a national disaster management agency is available from UN-SPIDER { <http://www.un-spider.org/> }.

Training to analyze the remote sensing data and to produce useful information products to be sent to the field is available from: UNOSAT { <http://www.unitar.org/unosat/training-services> }, UN-SPIDER { <http://www.oosa.unvienna.org/oosa/en/unspider/training.html> }, SERVIR { <http://www.servir.net/en/> }, and, at an introductory level, USTTI { <http://ustti.org/> }.

If a country's national disaster management agency has been disabled by the disaster, it is suggested that the country first turn, via their UNDP representative { <http://www.undp.org> }, to the UNOSAT { <http://www.unitar.org/unosat/> } for help. Later, additional information may be located through the UN-SPIDER { <http://www.un-spider.org/> }.

## ANNEX I: Web Sites

[International Disaster Charter](http://www.disasterscharter.org/home) Space and Major Disasters: <http://www.disasterscharter.org/home>

[SERVIR](http://www.servir.net/en/): <http://www.servir.net/en/>

Regional Operational Facility for the Latin America and the Caribbean region

<http://www.servir.net/america-latina-caribe>

Regional Center for Mapping of Resources for Development (RCMRD):

<http://www.servir.net/africa/>

[SFCG Remote Sensing Disaster Database](https://www.sfcgonline.org/remote%20sensing/): [https://www.sfcgonline.org/remote sensing/](https://www.sfcgonline.org/remote%20sensing/)

User guide:

<http://www.sfcgonline.org/Public%20Documents/Disaster%20Support%20Database%20Users%20Guide.pdf>

[UNOSAT](http://www.unitar.org/unosat/): <http://www.unitar.org/unosat/>

Training: <http://www.unitar.org/unosat/training-services>

[UN-SPIDER](http://www.un-spider.org/): <http://www.un-spider.org/>

Training: <http://www.oosa.unvienna.org/oosa/en/unspider/training.html>

United Nations Development Program ([UNDP](http://www.undp.org/)): <http://www.undp.org/>

United States Telecommunications Training Institute ([USTTI](http://ustti.org/)): <http://ustti.org/>