

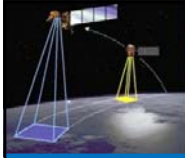


# UNSPIDER Programme and the International Charter for Major Disasters

By

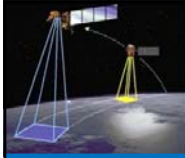
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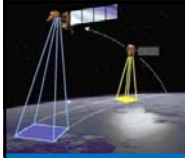
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- iii. African problems/challenges in disaster management and emergency response
- iv. Space-based technologies for disaster management
- v. Space-based applications in emergencies examples
- vi. Opportunities in disaster management
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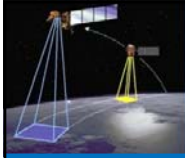
## Introduction

- A disaster occurs when abnormal or infrequent hazardous events impact on vulnerable communities, causing substantial damage, disruption and casualties, and leaving the affected communities unable to function normally without external assistance.
- A number of developed countries have made remarkable efforts towards the management and reduction of disasters using space-based systems such as satellites and their services.
- In Africa, little or no efforts/initiatives have been put in place to effectively manage disasters in the continent.



## Introduction ...

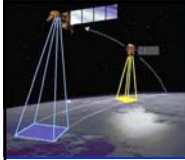
- West Africa, like other regions of the African continent, is experiencing rapid population growth and climatic variability. These events, in association with others are already manifesting in serious disasters such as
  - Growing water scarcity, shrinking of some water bodies, and desertification
  - Endemic and spreading drought
  - Flooding
  - Environmental and land degradation
  - Food security
  - Climate-related Conflicts
  - etc



## Disaster management

- Collection of policies, administrative decisions and operational activities which are related to the various stages of disaster.
- It is a cyclic activity

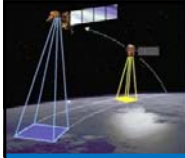




## Disaster management ...

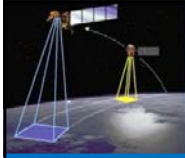
- Objectives
  - mitigating the vulnerability and negative impacts of disasters;
  - preparedness for responding operations;
  - responding and providing relief in emergency situations such as search and rescue, fire fighting, etc.; and
  - aiding in recovery which can includes physical reconstruction and the ability to return quality of life to a community after a disaster



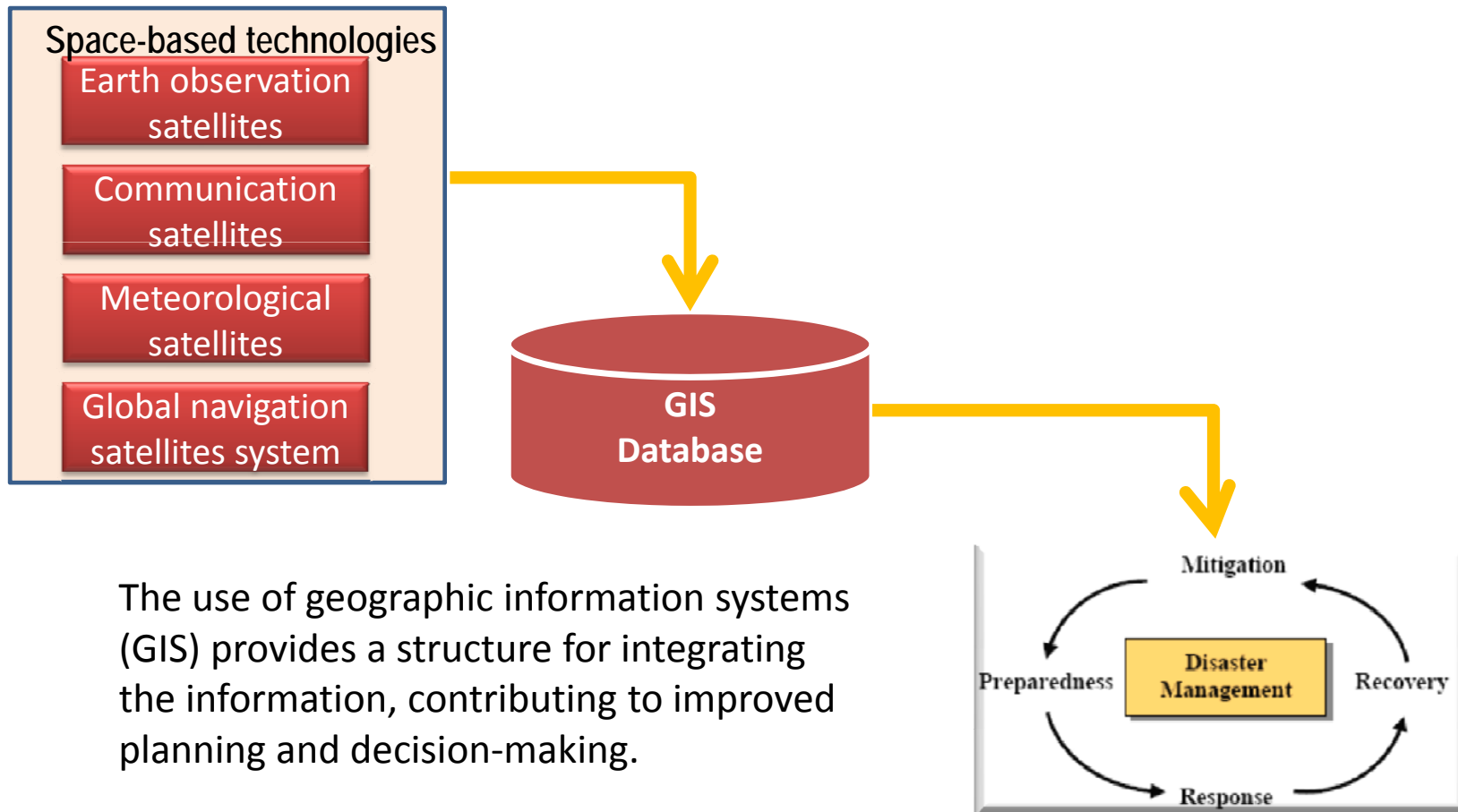


## **African problems/challenges in disaster management and emergency response**

- Inadequate ICT Infrastructure for data access and sharing
- Limited space-based resources for acquisition of needed data (only three prominent space agencies : South Africa, Nigeria and Algeria)
- Lack of well develop infrastructure for geospatial data sharing (e.g. GDI)
- Lack of awareness by decision makers about space based information

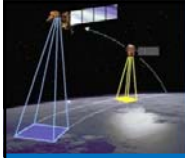


## Space-based technologies for disaster management



The use of geographic information systems (GIS) provides a structure for integrating the information, contributing to improved planning and decision-making.

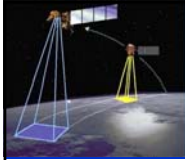




## Earth observation satellites

- Adequate spectral coverage:
  - Visible, near infrared, infrared, short wave infrared, thermal infrared and Synthetic Aperture Radar.
  - These allow computer enhancement of the data for extraction, management and analysis of disaster information
- Repetitive or multi-temporal coverage
  - Make the study of various dynamic phenomena whose changes can be identified over time possible

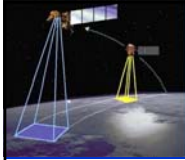




## Earth observation satellites

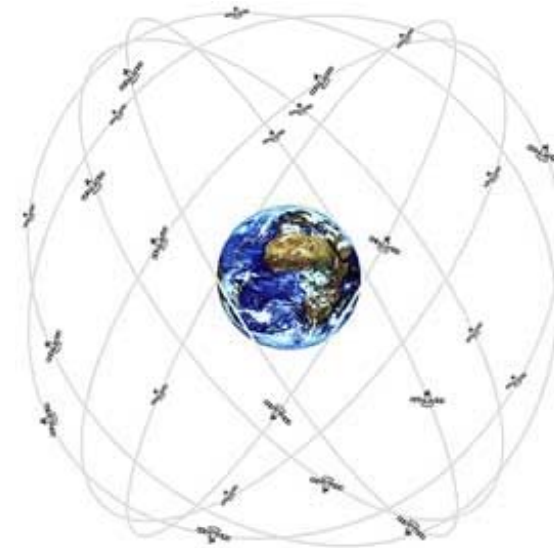
- Many types of disaster, such as floods, droughts, earthquakes, etc, will have certain precursors that satellite can detect
- Remote sensing also allows monitoring the event as it occurs
- From the vantage point of satellite we can consider, plan for and operationally monitor the event

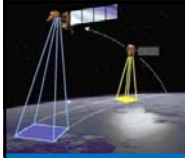




## Global Navigation Satellites System (GNSS)

- Location is a crucial attribute in disaster situations, GNSS can be used to acquire crucial positional information for disaster management.
- GNSS can be used for:
  - referencing of image for maps generation and updating of GIS for disaster management
  - mapping and field assessment
  - coordination and monitoring vehicles involved in disaster operations, combined with communication systems,
  - Search and Rescue operations in disasters
  - etc





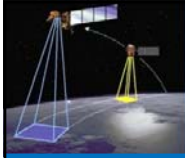
## Space-based applications in emergencies: Examples

**Tsunami and  
flood  
management**

Aerial photo  
of before  
tsunami hit



Aerial  
photo of  
after  
tsunami  
hit

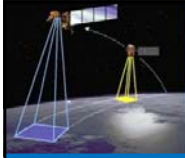


## Space-based applications in emergencies: Examples ...

### Hurricane monitoring

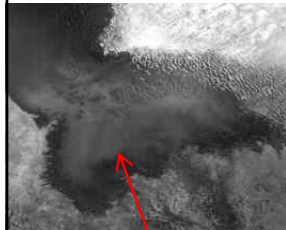
Hurricane Bret that hit  
Texas on August 22,  
1999





## Space-based applications in emergencies: Examples ...

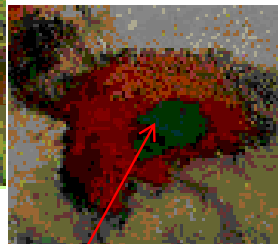
### Monitoring the gradual disappearance of Lake Chad



1963



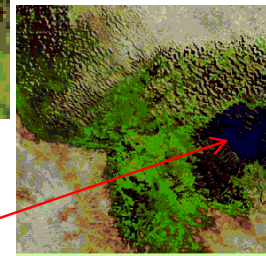
1973



1987



1997



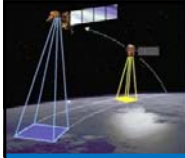
2001



2005

Originally believed to have an area of about 350,000 km<sup>2</sup>, the lake was reduced to 25,000 km<sup>2</sup> in the early 1960s. Today, it is reduced to about 2,000 km<sup>2</sup>!

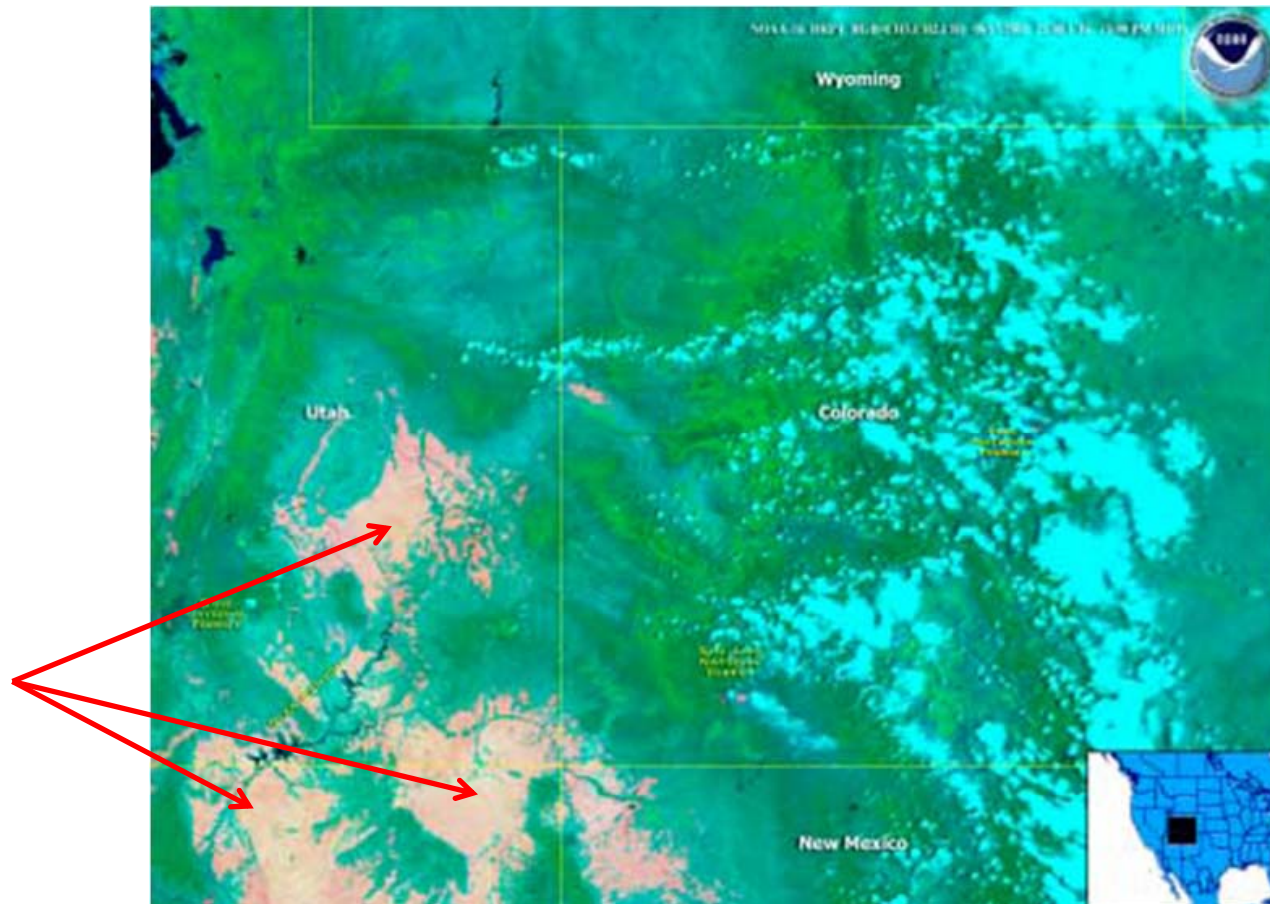
Decreasing sizes of the lake

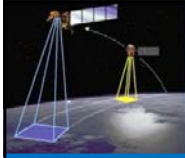


## Space-based applications in emergencies: Examples ...

### Monitoring of wild fire

NOAA-AVHRR  
image showing  
a fire (red)  
visible



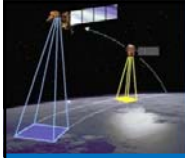


## Opportunities in disaster management

### Capacity building: RECTAS

- Established under the auspices of UN-ECA since 1972
- Regional Centre for capacity building in the use of space technologies: **Photogrammetry, Remote sensing, Global navigation satellites system, GIS and Cartography**, to generate geoinformation
- Promotes the development of Spatial Data Infrastructure in African countries
- Provides geoinformation services to governments, organisations and individuals.

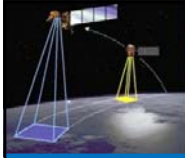




## Opportunities in disaster management ...

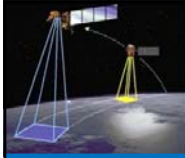
### Other opportunities in Africa (data access, services and capacity building)

- **RCMRD** – Regional Centre for Mapping of Resources for Development, Nairobi
- **Regional Support Offices (RSOs)** of UN-SPIDER (Nigeria, Algeria and South Africa)
- **SADC**- Remote Sensing Unit
- **ARCSSTE-E /F** (African Regional Centre for Space Science and Technology Education English(Nigeria) French(Morocco) affiliated to UNOOSA



## Opportunities in disaster management: UN-SPIDER

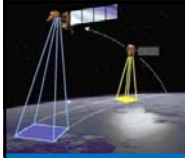
- **UN-SPIDER** = United Nations Platform for Space-based Information for Disaster Management and Emergency Response
- **UN** programme aimed at providing universal access to all types of space-based information and services relevant to disaster management;
- Managed by United Nations Office for Outer Space Affairs (UNOOSA) with HQ in Vienna
  - Offices in Bonn, Beijing (2010)
  - Africa Regional Support Offices
    - Nigeria, Algeria and South Africa



## Opportunities in disaster management: UN-SPIDER

### Space-based information and services

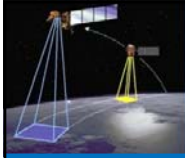
- Gateway to space information for disaster management support
- Support pp the access and share of disaster management case studies, guides and products
- Bridge to connect the disaster management and space communities
- Facilitate capacity-building and institutional strengthening



## Opportunities in disaster management: UN-SPIDER ...

### Network at National Level in Africa

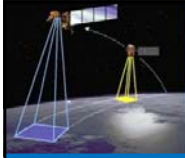
- UN-SPIDER networks countries with all through the National Focal Points (NFP)
- Role:
  - to work with UN-SPIDER staff to strengthen national disaster management planning and policies; and
  - implement specific national activities that incorporate space-based technology solutions in support of disaster management



## Opportunities in disaster management: UN-SPIDER

### Network at National Level in Africa ...

NFP nominations: Austria, Belarus, Belize, Bolivia, Bosnia & Herzegovina, **Burkina Faso**, Burundi, China, Egypt, El Salvador, **Ethiopia**, India, Iraq, Jordan, Kenya, Lebanon, **Malawi**, Malta, **Mauritania**, **Mauritius**, **Morocco**, Myanmar, New Zealand, Philippines, Qatar, Republic of Korea, Senegal, Singapore, Spain, Syria, Tanzania, Thailand, Trinidad and Tobago, Turkey, UAE, and Ukraine.



## UN-SPIDER: Technical Advisory Mission (TAM) in Togo in July 2009

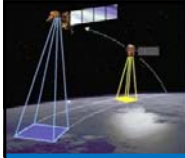
- Identified need to update disaster management plans
- Boosted efforts to establish NSDI
- Strengthened links of Togo with regional and international initiatives for capacity building



*Visit of the UN-SPIDER mission team  
to flood affected area in Lomé.*

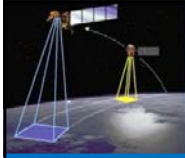


*Visit of the UN-SPIDER mission team  
to a shelter camp.*



## Opportunities in disaster management: International Charter

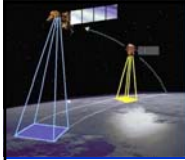
- Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters, also known as the International Charter “Space and Major Disasters”, was created as a result of UNISPACE III in 1999
- Initiated by the European and French Space Agencies (ESA, CNES) in 1999
- Aims: provide a unified system of space data acquisition and delivery to those affected by natural or man-made disasters through Authorized Users



## Opportunities in disaster management: International Charter ...

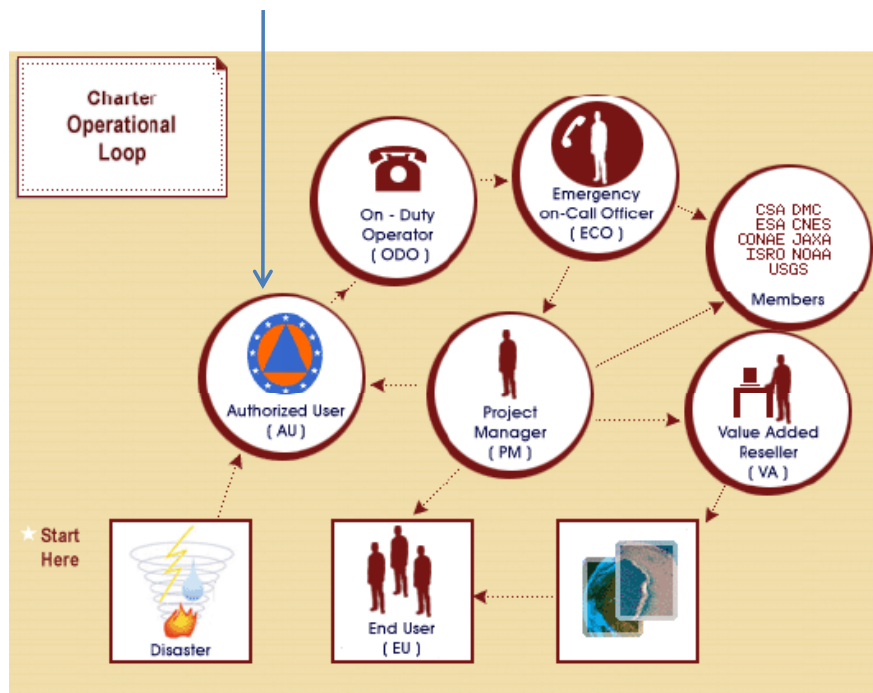
- User can request the mobilization of the space and associated ground resources in case of disaster occurrence
- Data acquisition and delivery takes place on an emergency basis
- Now essentially all space agencies are part of the Charter
- See <http://www.disasterscharter.org/>



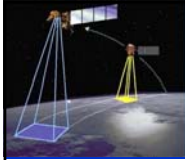


## Activating the International Charter - Sequence of events

### Authorized Users (AU)

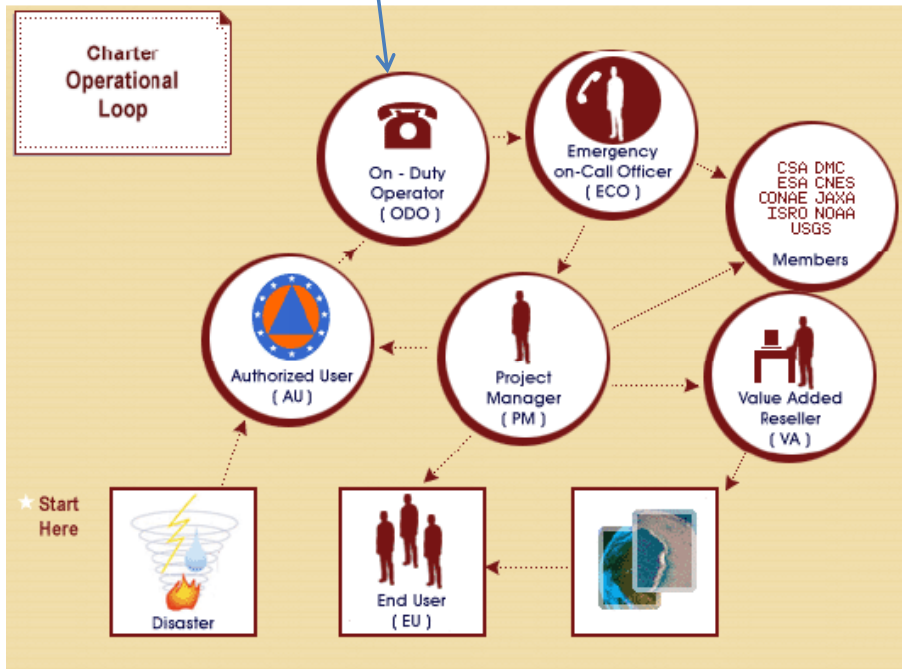


- They are the bodies authorized to request the services of the Charter
- They are recognized to be the Charter Associated Bodies
- They receive the single (ODO) phone number
- They represent the civil protection, rescue, defence and security bodies of the country to which the Participating Agencies belong

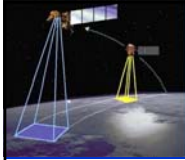


# Activating the Charter - Sequence of Events ...

## On-Duty Operator (ODO)

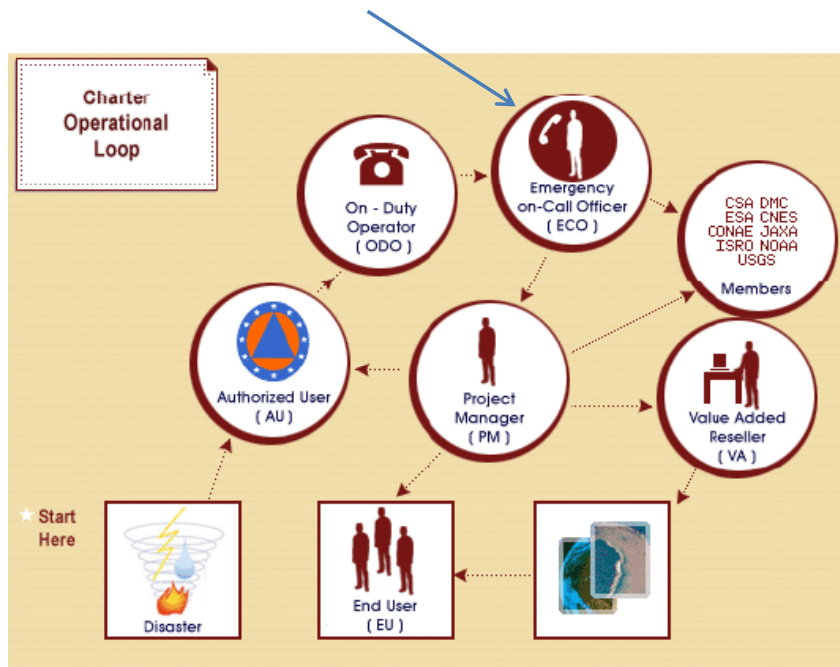


- Available 24h/day, 7 days/week
- Receives calls requesting space data images and information
- Identifies the caller as being an AU
- Obtains and confirms with the AU the information required
- Transmits the information to the ECO (AU coordinates)
- Contacts the ECO within an hour

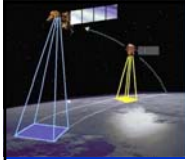


## Activating the Charter - Sequence of Events ...

### Emergency On-Call Officer (ECO)

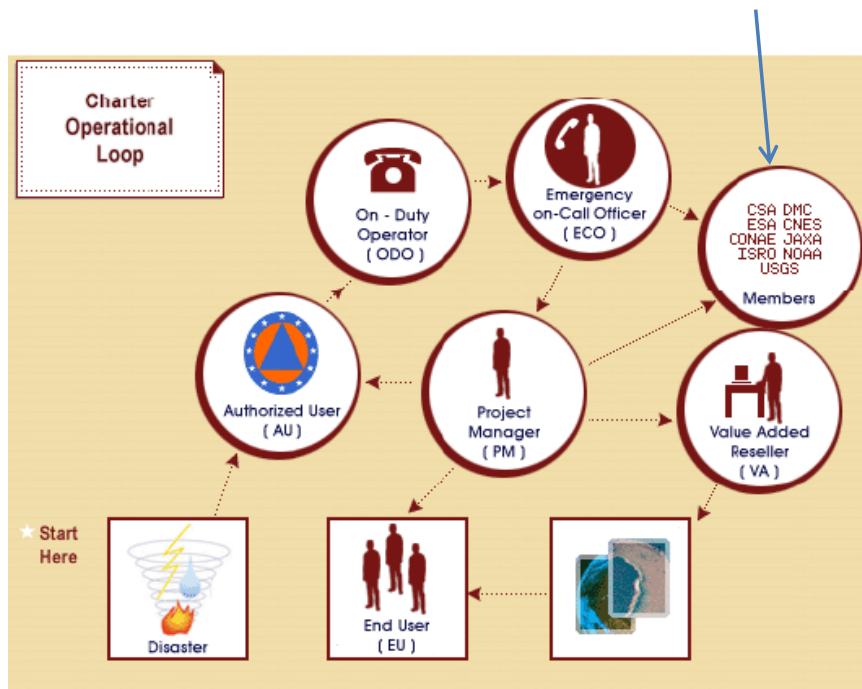


- Available 24h/day, 7 days/week
- Processes the information received from the ODO
- Verifies the validity of the disaster relief data request
- Identifies the most timely and appropriate satellite resource and prepares a draft plan
- Gets the Space Agency user's approval AAP (Archives / Acquisition plan)
- Tasks the appropriate Space Agency
- Submits request for new images or archives
- Gathers all relevant information in the dossier
- Transfers dossier to the Project Manager
- Informs Space Agencies of the status of their space resources

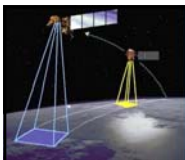


## Activating the Charter - Sequence of Events ...

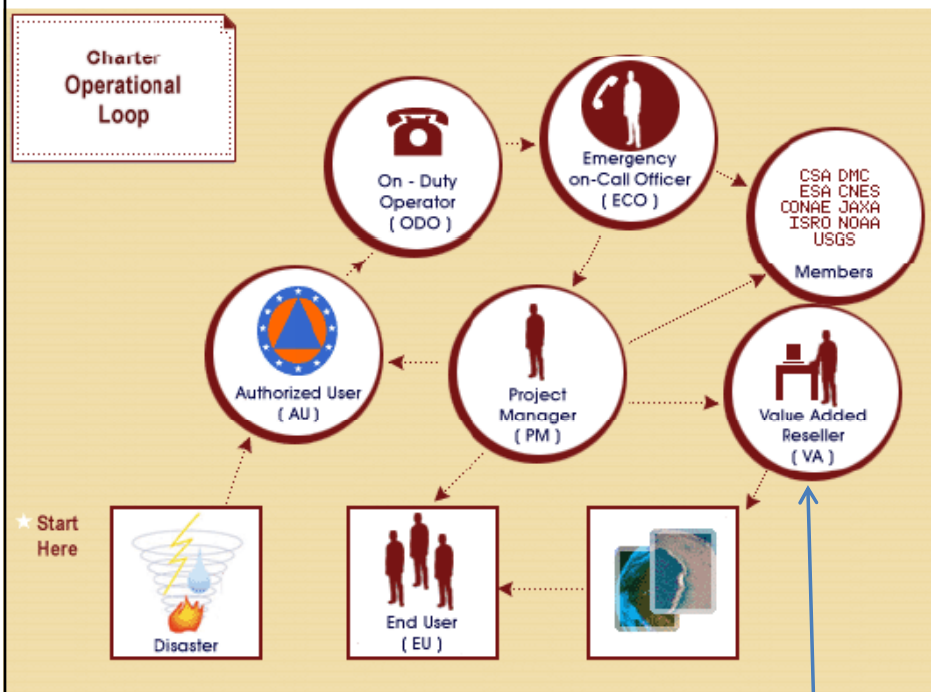
### Members (Space Agencies)



- Plan acquisitions according to request submitted by ECO
- Resolve any conflicts and suggest alternate acquisitions if necessary
- Program their respective space resources (satellites) to acquire the requested data over the area affected by the disaster
- Not all of the space resources can provide relevant data for all types of disasters.
- Hence, not all of the space resources are necessarily tasked for each Charter request

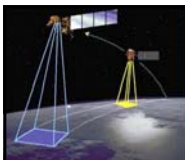


# Activating the Charter - Sequence of Events ...



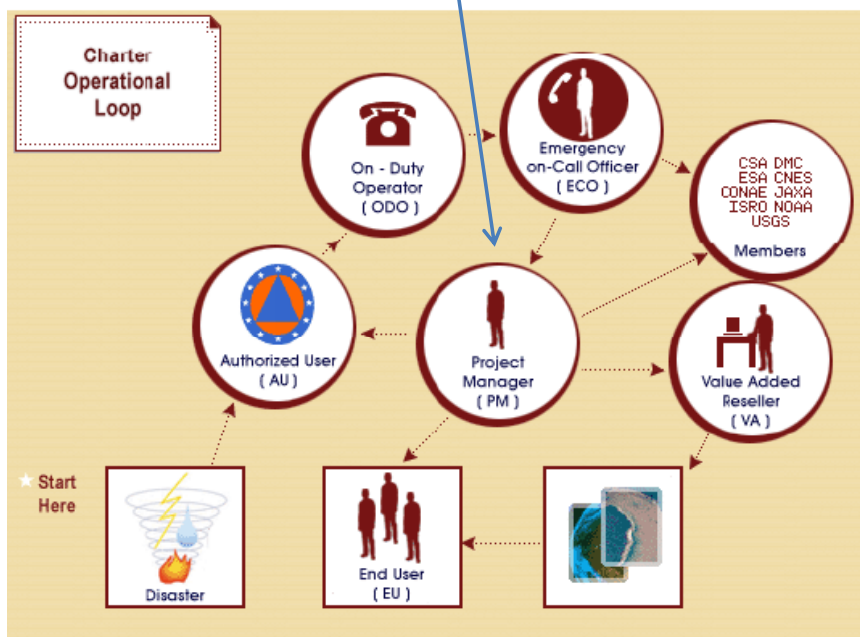
- Once the data is acquired, it is processed into images
- VA further processes and interprets the data acquired over the area affected by the disaster and delivers the images to the End User

**Value Added Reseller**

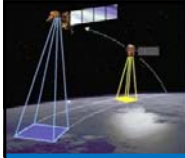


## Activating the Charter - Sequence of Events ...

### Project Manager (PM)



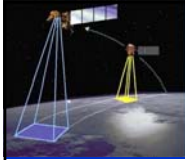
- Identified by Executive Secretariat when Charter is activated
- Available during normal working hours
- Ensures data is sent to the end user
- Confirms accuracy of data sent to user
- Ability to interpret data
- Coordinates, when required, the delivery of value-added products and information
- Completes dossier with a report submitted to the International Charter Executive Secretariat



## Opportunities in disaster management ...

### SpaceAid

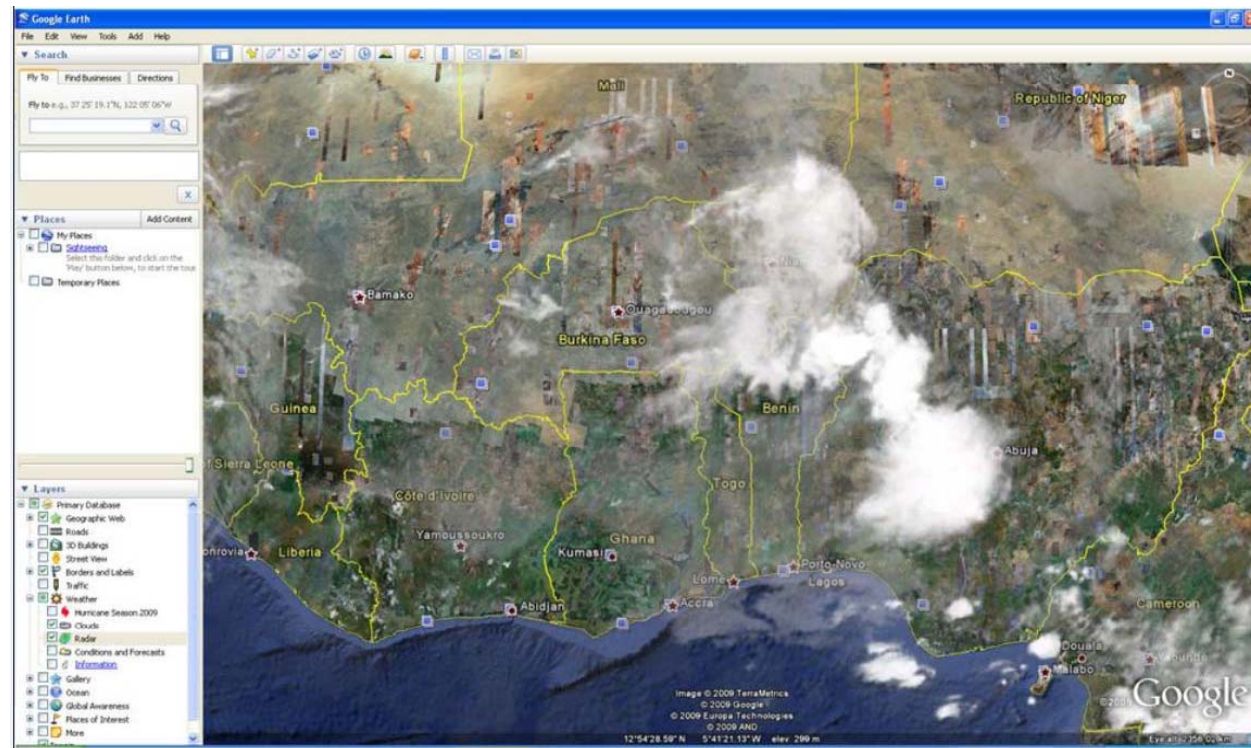
- A UN-SPIDER information dissemination service supporting the access and use of space-based information during an emergency and/or humanitarian response
  - Networks space agencies and satellite data providers
- Recently, SpaceAid consolidated the support from NASA, Taiwanese Space Agency, DLR, Italian Space Agency



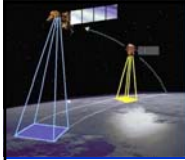
## SpaceAid of UN-SPIDER ...

- Facilitates access to space based information through multiple mechanisms
- Close coordination with commercial providers such as GeoEye, Digital Globe and Google

Burkina Faso:  
TerraMetrics image  
on Google





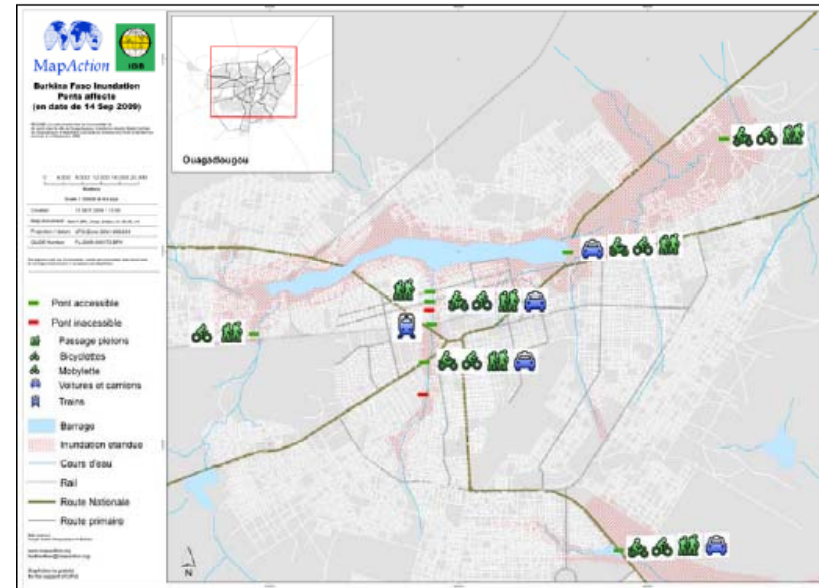


## SpaceAid of UN-SPIDER ...

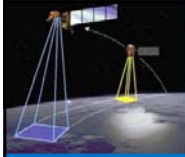
- Facilitates response through mapping agencies such as MapAction, EXPRESSMaps, ITHACA and RSO network



Burkina Faso: Flood zones map by Geographic Institute



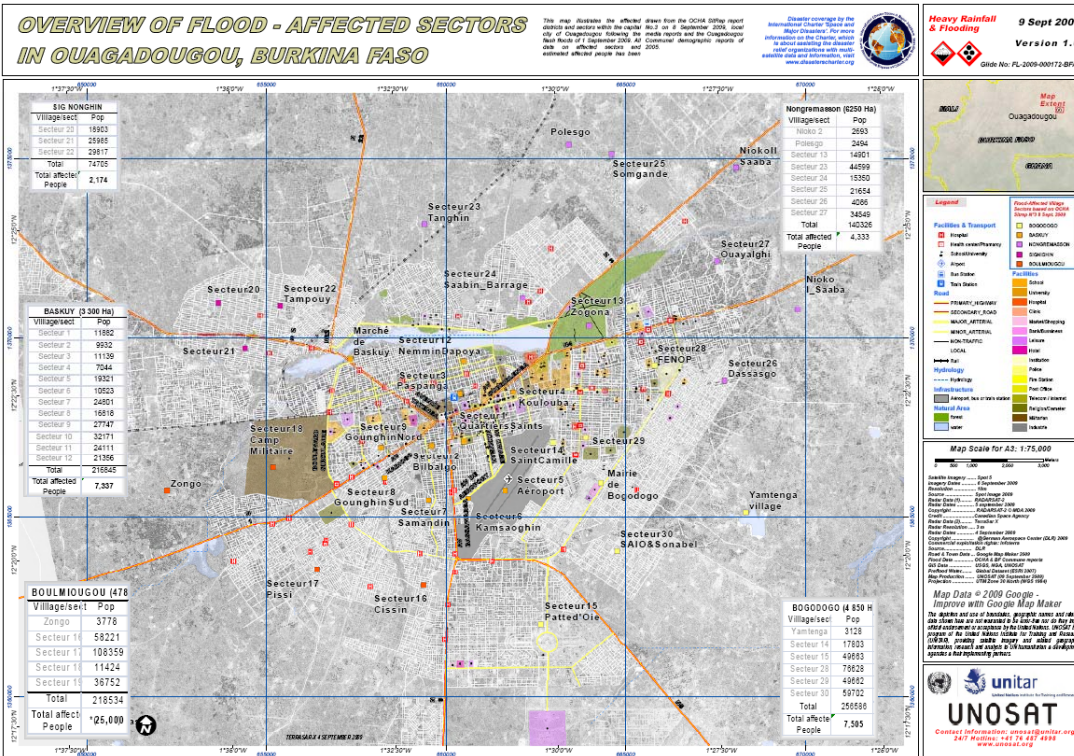
Burkina Faso: MapAction provides accessibility map

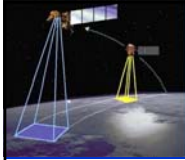


# SpaceAid of UN-SPIDER ...

- SpaceAid support extends beyond immediate response phase
- Official gateway for UN agencies to activate the International Charter – Space and Major Disaster

Burkina Faso:  
Immediate response  
by International  
Charter





## How to get involved in UN-SPIDER

- Nominate NFP
- Develop the country profile
- Technical advisory support
- Participate in UN-SPIDER workshops
- Contribute in UN-SPIDER Knowledge Portal ([www.un-spider.org](http://www.un-spider.org))

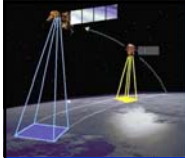
The screenshot shows the UN-SPIDER Knowledge Portal website. At the top, it features the United Nations logo and the text 'UNITED NATIONS | UNOOSA | UN-SPIDER'. Below this is the full name of the organization: 'United Nations Platform for Space-based Information for Disaster Management and Emergency Response'. A navigation menu includes 'HOME', 'NEWS', 'SPACE AID', 'KNOWLEDGE BASE', 'COMMUNICATION', and 'ABOUT US'. There is also a search bar and a 'Visual Globe' link.

The main content area is divided into several sections:

- What is UN-SPIDER:** A text block explaining the platform's mission to provide universal access to space-based information for disaster management.
- DISASTER INFORMATION:** A table listing recent disasters with columns for Disaster, Region, and Date.
 

Disaster	Region	Date
Earthquake	Belize	30/06/2000
Earthquake	Honduras	29/05/2009
Floods	Thailand	27/05/2009
Landslide	Papua New Guinea	27/05/2009
Tropical Cyclone	India	26/05/2009
Tropical Cyclone	Bangladesh	26/05/2009
- SPACE APPLICATION MATRIX:** A circular diagram with segments for different disaster types: RECOVERY, EPIDEMIC, VOLCANO, and EARTHQUAKE. A video player is embedded below the diagram.
- VISUAL GLOBE:** A globe image with a 'Visual Globe' link.
- GUIDE TYPES:** A list of available guides including Capacity Building Guides, Case Studies, Disaster Management Guides, Health Support Guides, Institutions Guides, Mechanisms Guides, Person Guides, Space Aid Guides, and Technology Guides.
- User login:** A section for user authentication with fields for Username and Password, and a 'Log in' button.

UN-SPIDER Knowledge Portal



## Upcoming UN-SPIDER Meetings

- UN-SPIDER Regional Workshop "Building Upon Regional Space-based Solutions for Disaster Management and Emergency Response for Africa", Addis Ababa, Ethiopia in 2010.
- Check out: <http://www.unspider.org>
- UN-SPIDER Promotional Video: <http://www.youtube.com/watch?v=pAnEZU5BIXM>



United Nations Platform for Space-based Information for  
Disaster Management and Emergency Response

### UN-SPIDER Newsletter

October 2008 Vol. 2/08

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#### UN-SPIDER Connects Disaster Managers with Satellite Imagery Providers

Assists Satellite Imagery Acquisition for Volcanic Activities in Montserrat and Flooding in Southeast Nepal/Indian Bihar

ON 26 JULY 2008, seismic activity at the Soufriere Hills Volcano started to increase in Montserrat, a British Overseas Territory in the Caribbean. This volcano has been intermittently active for 13 years. On 28 July, an explosion took place on the west side of a large lava dome at the summit. The dome partially collapsed, and there was a strong possibility that the explosion had caused instability in the rest of the dome, with the possibility to cause further collapses and endanger inhabited areas of the island.

The Montserrat Volcano Observatory (MVO) is part of Montserrat's disaster management system and plays an important role in providing early warning to the authorities of a possible eruption of the volcano. Staff at the MVO, however, were not able to make any assessment of the sta-



Before-and-after false-colour satellite images of the volcanic dome

bility of the dome this time, due to persistent clouds obscuring the volcano. Aerial surveys or optical satellite imagery could not penetrate the clouds. An additional challenge was to obtain a set of comparable before-after images that would allow the staff to analyse the terrain and determine the extent of change in the volcanic dome.

(see "Satellite Imagery" on page 3)

#### UN-SPIDER Readies Technical Mission to Burkina Faso

Will Advise Policymakers and Practitioners on the Use of Space-Based Information for Disaster Management

AT THE UNITED Nations Committee on the Peaceful Uses of Outer Space (COPUOS) meeting in Vienna in June



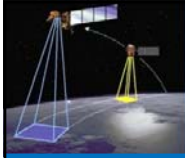
UN-SPIDER preparatory visit to a disaster management office in Ouagadougou, Burkina Faso

2008, the government of Burkina Faso made an official request to UN-SPIDER for a Technical Advisory Mission. The Mission, taking place from 12 to 21 November 2008, will assess Burkina Faso's existing use of space-based information for disaster management, identify potential areas where such information could play a greater role, and propose recommendations on how to improve Burkina Faso's utilization of this information.

The vulnerability of Western African countries such as Burkina Faso to climate and environmental change is likely to increase as demands on resources continue to rise in tandem with rapidly growing populations. The disaster management agencies in the region have to adapt to the increasing number of natural disasters, ranging between the poles of drought and flood. Additional impacts triggered by environ-

(see "Advisory Mission" on page 4)

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## Recommendations

- Partnership building - Inter-agency & inter-governmental cooperation
- African governments should strive to commit more resources to the acquisition of EOS and communication satellites towards improved data availability and internet services
- Implementation of AFREF-CORS: for georeferencing, regional data integration, navigation, etc.
- Regional access policies & data license principle for African EOS that will make data available, affordable and facilitate regional integration
- African countries need to speed up SDI implementation in their respective countries to improve data interoperability.



**Thank you for your attention**

**Questions?**