

**“United Nations Regional UN-SPIDER Workshop: Building Upon  
Regional Space-based Solutions for Disaster Management and  
Emergency Response for the Caribbean”**

**UN House, Hastings, Christ Church, Barbados, 8 to 11 July 2008**

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## I. INTRODUCTION

Both the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna, Austria in 1999 and the World Conference on Disaster Reduction, held in Kobe-Hyogo, Japan, in 2005, recognized the important contribution of space technology to disaster reduction and emergency response and emphasized the need to routinely incorporate space-based services into disaster management.

Subsequently the General Assembly, in its Resolution 61/110 of 14 December 2006, decided to establish the “United Nations Platform for Space-based Information for Disaster Management and Emergency Response” (UN-SPIDER) as a programme of the United Nations Office for Outer Space Affairs (UNOOSA). UN-SPIDER has to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle by being a gateway to space-based information for disaster management support, serving as a bridge to connect the disaster management and space communities and being a facilitator of capacity-building and institutional strengthening, in particular for developing countries.

During an international UN-SPIDER workshop held in Bonn in October 2007, representatives of UNOOSA, the United Nations Development Programme (UNDP) Barbados and the OECS Sub-regional Office, the Caribbean Disaster Emergency Response Agency (CDERA) and the Organisation of American States (OAS) had a meeting to discuss a possible workshop for the Caribbean Region. During the following months plans evolved and once it was decided to hold the workshop in Barbados, the national Department of Emergency Management also came on board as a co-organiser.

The objectives of this workshop were to present the current status of space technology for disaster management and emergency response within the Caribbean Region; to showcase regional space-based initiatives relevant to disaster management support (including risk reduction) and emergency response; to identify approaches towards the harmonization of the various existing initiatives that are contributing to helping developing countries in the region access and use space-based technologies for disaster management and risk reduction; and to reflect on the best concepts for delivering support to both national activities and to national planning and policies, that consider the use of space-based technologies.

A total of 63 decision-makers and senior experts from disaster management institutions from within the region, national and regional institutions responsible for capacity building in and promoting the use of space-based technologies, UN agencies, space agencies, academic and research institutions as well as from the private sector took part in the workshop.

The workshop was made possible because of the significant contribution received from the Austrian Federal Ministry for European and International Affairs, in addition to the resources Austria is already providing to the UN-SPIDER Programme. A total of 25 participants were provided with funding support to attend the workshop. The need to put more focus on Small Island Developing States (SIDS) when it comes to disaster management was clearly recognized by the co-organisers and by the Austrian Federal

Ministry for European and International Affairs. This need is reflected by the fact that the office is organising in 2008 specific workshops for the Island States in the Pacific and the Caribbean regions.

## II. THE PROGRAMME

During the opening ceremony, chaired by Mr. Ian KING, Project Manager Caribbean Risk Management Initiative, UNDP, the following persons made statements underlining the usefulness of space-based solutions and the urgent need to integrate them into disaster management procedures within the Caribbean region:

- **The Hon. Mr. Freundel STUART Q.C., M.P.**, Attorney General and Minister of Home Affairs, Government of Barbados
- **Ambassador Ciro AREVALO-YEPES**, Chairman of the Committee on the Peaceful Uses of Outer Space (COPUOS)
- **Rene AMRY**, First Secretary, Embassy of the Republic of Austria to Barbados
- **Jeremy COLLYMORE**, Regional Coordinator, CDERA
- **Paula MOHAMED**, Governance Programme Manager, UNDP Barbados and the OECS

The Hon. Mr. Freundel STUART Q.C., M.P., welcomed the participants, thanked the sponsors and organisers of the workshop, and pointed out that the GA resolution establishing UN-SPIDER had been strongly supported by the Government of Barbados. He then mentioned the importance of the Hyogo Framework for Action and welcomed the objectives of the workshop as outlined in the Information Note. He said that there had been a technological quantum leap in space related issues during this space age and that the usefulness of satellites for disasters had again been demonstrated during the recent floods in Namibia and Angola and during the China earthquake. He welcomed activities of UN-SPIDER such as information sharing, improving access to data, support to national capacity building, networking and its contribution to develop relevant and appropriate solutions, stating how important they are especially for developing countries. The Hon. Mr. Stuart then called upon all states to continue supporting UN-SPIDER and he concluded by admitting his eagerness to receive the report of the workshop.

The last speaker of the opening ceremony, UN-SPIDER Programme Coordinator Mr. David Stevens, then thanked the Government of Barbados for hosting the Workshop as well as the co-organisers for their tireless efforts in bringing all ends together. He encouraged participants to make a maximum use of the coffee-breaks, lunches and receptions by discussing certain topics in more detail and by establishing networks.

The Opening Ceremony was followed by introductory presentations and by presentation sessions covering the following topics:

- **Session A: “International and Regional Initiatives”;**

- **Session B: “The End User Perspective”;**
- **Session C: “Building Upon Opportunities”;** and
- **Session D: “Building Capacity”.**

The **presentations** can be accessed through the CDERA website: <http://www.cdera.org/workshop/un-spider/index.html> .

The **final programme** can be accessed through the UNOOSA website: <http://www.unoosa.org/ooa/en/unspider/recentworkshops.html>

At the end of the first day participants were asked to brain storm on opportunities and needs specific to the Caribbean (ANNEX I) in order to establish a picture of the situation in the Caribbean that would both give an insight to participants not so familiar with regional settings as well as to set a platform from which the discussions in the break-out groups could evolve from. The results of the brain-storming exercise were then clustered into sub-groups. Under **opportunities** came *initiatives* such as the ones presented during the workshop, *regional capacity and coordination* as a key element to the way forward, *capacity building* as reflected in part IV below, *data* as in spatial data infrastructures and data standards, *information dissemination* and opportunities within the *private sector*. Under the topic of **needs** the sub-groups were *vertical coordination* as in the incorporation of space-based solutions into effective institutional arrangements, a strong additional need for all types of *capacity building and knowledge management*, *space-based information* fulfilling the requirements of the region and *technology* that would enable regional and national actors to make appropriate use of such information.

The presentation sessions during the first three days provided the participants with the opportunity to learn about existing initiatives using space-based information, about the use of such solutions in disaster management and about possibilities for collaboration. The presentations were also meant to prepare participants for the discussions within the break-out groups. The outcomes of those groups will be reflected in parts IV. - VII. of the meeting notes.

#### **IV. Capacity Building and Knowledge Management (Wednesday Group 2)**

#### **V. Existing Initiatives and Coordination for Space-based Disaster Response - Possible Elements of a Regional Coordinating Framework (Wednesday Group 1)**

#### **VI. Increasing Access to Space-based Information and Building upon GEO’s Proposal (Wednesday Group 3)**

#### **VII. Steps Forward and Template for National Disaster Management Offices (Thursday Group 1&2)**

The organisers of the workshop are particularly grateful to the sponsors from the private sector, namely to Craig BATSTONE from GeoOrbis Inc. and to William RANEY and Christopher WU from Globecom Systems Inc.. Craig BATSTONE ([cbatstone@georbis.com](mailto:cbatstone@georbis.com), <http://www.georbis.com/>) held a presentation entitled “**High Resolution Satellite Imagery Information Presentation**”, containing a lot of useful

information about satellite sensors, resolution, future developments and examples of the usefulness and availability of high-resolution imagery. The message he wanted to convey is that such imagery is not expensive if one considers the content and the added value it can deliver to planning and policies. William RANEY and Christopher WU ([christopher.wu@globecommsystems.com](mailto:christopher.wu@globecommsystems.com), <http://www.globecommsystems.com>) held a **presentation followed by the actual demonstration of a small VSAT unit** (Globecomm AutoXplora) on the parking lot of the UN House. Globecomm is one of the biggest providers of all types of transportable satellite communication devices that can be used in a disaster context when the usual communication methods are down or remote areas need to be connected to the outside world.

On Friday, a technical visit was arranged to visit the construction site of the Coastal Zone Management Unit (CZMU) of Barbados. In order to counteract coastal erosion, a Boardwalk that will eventually cover a length of nearly 2km is under construction, with sand being brought in from the Bridgetown deep sea harbour to recreate beaches. The construction is based on detailed computer models in order to avoid any adverse effects and it also takes into account a possible sea level rise based on a 50 year projection.

The second part of the tour took participants to the Caribbean Institute of Meteorology and Hydrology (CIMH), where some important ongoing projects were presented, followed by a tour of the facilities. The mission statement of the CIMH is to assist in improving and developing the Meteorological and Hydrological Services as well as providing the awareness of the benefits of Meteorology and Hydrology for the economic well-being of the CIMH member states. This is achieved through training, research, investigations, and the provision of related specialised services and advice. ([www.cimh.edu.bb](http://www.cimh.edu.bb))

### III. THE PRESENTATIONS

Several existing international and regional initiatives as well as regional challenges in the use of space-based solutions for disaster management were presented during the first day of the Workshop.

#### Introductory Presentations:

Ian KING from UNDP presented the **“Opportunities and Challenges of GIS and RS in Disaster Management: The Case for Caribbean SIDS”**. UNDP is assigned responsibility for Early Recovery in the Humanitarian Cluster, which is defined as the decisions and actions taken during and after a crisis with a view to restoring or improving the pre-crisis living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk. Based on experience gathered from previous disasters, Ian analyzed the challenges that the Caribbean Islands face and he then listed opportunities such as the Comprehensive Disaster Management (CDM) mechanism led by CDERA, the strengthening of regional institutions and the increased involvement of the user community. (<http://www.bb.undp.org/>)

Nicole ALLEYNE from CDERA talked about **“Space-based Information for Comprehensive Disaster Management – a CDERA Perspective”**, providing some background information on CDERA and focusing mainly on the enhanced CDM strategy and on relevant CDERA Space Based Info (SBI) projects. The presentation contained a number of considerations regarding the way forward for SBI projects and some “take home”

messages: learn from previous Caribbean applications of SBI for disaster management, explore opportunities such as UN-SPIDER and a regional coordination mechanism, realize the full potential of SBI applications by strengthening capacity building and use the CDM as a framework to advance the integration of SBI. ([www.cdera.org](http://www.cdera.org))

David STEVENS' (UNOOSA) presentation was entitled **“The United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER)”** and he provided an overview of the 11 main activities of the programme and explained how UN-SPIDER can help the Caribbean region access and use space-based information for disaster management. The expert reports leading to the establishment of UN-SPIDER by the UN General Assembly in December 2006, recognised the need for a coordinating entity bringing together the space and the disaster management communities. UN-SPIDER will help to put structures into place that will make access to space-based solutions, be it through the International Charter or through other opportunities, easier ([www.unspider.org](http://www.unspider.org)).

### **SESSION A – International and Regional Initiatives:**

Ahmed MAHMOOD from the Canadian Space Agency/International Charter Space and Major Disasters made a presentation on **“The International Charter “Space and Major Disasters”**, providing background information and detailing the procedures and mechanisms of the Charter. Some examples highlighted the success of this international mechanism meant to provide basic georeferenced imagery in the immediate aftermath of a disaster, with the possibility for member agencies to provide value added products on top of that. Authorized users can activate the charter and Project Managers will be designated to handle activations. To become an Authorised User of the Charter a staff member of the interested organisation has to attend a Charter training course and the institution will have to sign a non-disclosure agreement with the Charter. In the meantime the charter can be accessed through the local UNDP office which would then transmit the request to the UN Office for Outer Space Affairs ([www.disasterscharter.org](http://www.disasterscharter.org)).

Emil CHERRINGTON (CATHALAC/SERVIR) then spoke about **“SERVIR: A Platform for Space-Based Monitoring and Disaster Response for Mesoamerica and the Wider Caribbean”**. The SERVIR online portal ([www.servir.net](http://www.servir.net)) contains downloadable data, online mapping & animation applications, decision support tools and 3D visualization tools comprising multiple focal areas (i.e. GEOSS Societal Benefit Areas). Emil emphasised that a lot of data and tools were currently available and that capacity building and awareness raising in the wider Caribbean was essential. Participants were encouraged to visit the SERVIR portal and to consider registering for the **“2nd Global Earth Observation System of Systems (GEOSS) of the Americas Symposium”** to be held in Panama City, Panama from Sept. 30 – Oct. 3, 2008 (<http://earthobservations.org/meetings/meetings.html>).

Santos RODRIGUEZ from NOAA then presented **“The Emergency Managers' Weather Information Network (EMWIN)”**, which is a low cost priority-driven computer weather data broadcast system that takes advantage of minimal bandwidth. EMWIN provides rapid satellite, VHF radio, and internet dissemination of alerts/watches/warnings < 1 minute, forecasts, graphics, Imagery and hurricane tracking and tropical storm data. Detailed charts explaining technicalities and expected system enhancements were provided in the presentation. As of 2007 many Caribbean island nations started implementing EMWIN systems for emergency management.

Edward ANDERSON from the World Bank talked about the “**Central America Probabilistic Risk Assessment – CAPRA**”. CAPRA’s vision is to become the nucleus of a regional strategy that is local, versatile and effective, to advance risk evaluation and risk management decision making. This will be achieved by developing risk evaluation and communication tools based on open-source software in order to sensitise decision makers to the potential for natural disasters and to develop risk management strategies at regional, national and local levels. The result will be a Disaster Risk Information Platform for decision making using a common methodology and tools for evaluating and expressing disaster risk. ([www.eird.org/capra](http://www.eird.org/capra))

Nate SMITH from USAID/Office of U.S. Foreign Disaster Assistance, concluded this session by presenting “**USAID/OFDA Imagery Support Mechanisms and Options**”. The three general criteria for a response from USAID/OFDA are that the affected country must ask for, or be willing to accept, USG assistance, that the disaster is of such magnitude that it is beyond the country’s ability to respond adequately and it must be in the interest of the USG to provide assistance. More detailed information on how to successfully request support was provided in the slides. ([http://www.usaid.gov/our\\_work/humanitarian\\_assistance/disaster\\_assistance/](http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/))

Participants were then given the time to make comments or to ask questions. Some of the topics touched upon and also reflected in the recommendations of the working groups were: the large amount of outdated maps in the Caribbean, the role of CDERA in the response phase, the need for a data sharing infrastructure, the advantage of having maps produced locally or regionally and that regional best practices have the potential to influence local practices, how to avoid duplication of efforts, the possibility of working with regional institutions such as UWI to build upon regionally available data and access to the International Charter for the Caribbean region.

### **SESSION B - The End User Perspective:**

Although the majority of the participants were end users and therefore familiar with the needs of the Caribbean when it comes to understanding what information is needed, it was important to share experience and lessons learned within the region as well as to provide the space experts and other participants from outside the region with some first hand insight. Any initiative that wants to provide support to the Caribbean has to clearly understand the requirements of the local end users as well as the national and regional institutional setting.

Tricia-Anne Mc LEAN (Office of the PM of Jamaica) and Nikolai THOMAS (Office of Disaster Preparedness and Emergency Management (ODPEM)) made a presentation about “**Facilitating Disaster Management and Mitigation: A National Spatial Data Infrastructure Approach**”, detailing how space-based information is being used in Jamaica and updating the audience on the status of the National Spatial Data Infrastructure.

Marie GONZALEZ (DHS/FEMA) talked about the “**Department of Homeland Security - Federal Emergency Management Agency**” providing an insight into the work of the “Caribbean Area Division” (CAD) based in San Juan, Puerto Rico which is responsible for coordinating emergency management programs in the Commonwealth of Puerto Rico and the Territory of the U.S. Virgin Islands. The slide show provided participants with a wealth of information, e.g.: a number of relevant links to Hurricane related resources such as HURREVAC (<http://www.fema.gov/plan/prevent/nhp/hurrevac.shtm>), ([www.fema.gov](http://www.fema.gov)).

Maurice MASON of the University of the West Indies(UWI)/DRRC presented **“The Disaster Risk Reduction Centre: An Insight”**. The vision of the DRRC is to become a multi-disciplinary centre of excellence in Capacity Building, Training and Research related to: Risk Reduction, Resilience building; Continuity of Operations, Emergency and Incident management and Disaster Mitigation.

Roderick STEWART’s (UWI Seismic Research Centre) presentation was entitled **“Use of Satellite Imagery in Monitoring Earthquakes and Volcanoes in the Eastern Caribbean”**, basically saying that the title was nowadays still wishful thinking due to limited financial resources but that high-resolution satellite imagery, ideally from radar sensors, would be very useful in the work of the Centre. ([www.uwiseismic.com](http://www.uwiseismic.com))

Elizabeth F. KLUTE, Director of the Department of Disaster Management of Anguilla presented the **“The Anguilla National Warning System”**. The main issues of the presentation were policy aspects, alert levels and functionalities as well as the Common Alert Protocol (CAP) Network concept. Participants were cordially invited to visit Anguilla (or to communicate with Elizabeth) in order to learn more about the warning system.

### **SESSION C - Building Upon Opportunities:**

Chester LAYNE from the Barbados Meteorological Service/CMO presented the **“Radar and Other Weather Observations for Disaster Preparedness”**, providing an overview of meteorological activity in Barbados and the Caribbean since the first access to a meteorological satellite was established in 1960.

Lorna INNIS from the Coastal Zone Management Unit, Barbados talked about the **“Tsunami and Coastal Hazards Warning System for the Caribbean and Adjacent Regions”**, pointing out how devastating a tsunami could be for the low lying and tourist-filled beaches of the Caribbean. Hazard and risk assessment modelling tools for credible scenarios and data sharing are therefore instrumental in preparedness. ([www.coastal.gov.bb](http://www.coastal.gov.bb))

Silvia GIADA from UNEP-DEWA provided information on **“UNEP-DEWA Initiatives on Applications of Earth Observation Technologies for Environmental Resource Management”**. The Mission Statement of UNEP’s Division of Early Warning and Assessment is to provide the world community with improved access to meaningful environmental data and information, and to help increase the capacity of governments to use environmental information for decision making and action planning for sustainable human development. Silvia invited participants to provide ideas for imagery or the imagery itself for UNEP’s “Atlas of Our Changing Environment”. ([www.unep.org/DEWA/index.asp](http://www.unep.org/DEWA/index.asp))

Quinta Ana PEREZ-SIERRA from the Las Americas Institute of Technology (ITLA) presented her project **“GIS for the Prevention of Catastrophes through Floods in the Dominican Republic”** which is a GIS-based early warning system. After presenting her institution, Quinta Ana explained the system using detailed charts. ([www.itla.edu.do](http://www.itla.edu.do))

Ahmed MAHMOOD then presented the **“GEO Disaster Management Pilot Project in the Caribbean”**, on behalf of Guy Seguin ([Guy.seguin@space.gc.ca](mailto:Guy.seguin@space.gc.ca)) from the Canadian Space Agency who is co-leading, together with David STEVENS from UNOOSA/UN-SPIDER, the GEOSS task DI-06-09 “Use of Satellites for Risk Management”. The new list of actions elaborated under the Committee on Earth Observation’s (CEOS) disaster management task group focus on three main activities: development of architecture to meet

user needs, technology demonstrations to increase user awareness and pilot projects to demonstrate operational feasibility. The third topic was subsequently discussed in a break-out group (part VI).

During the Q&A session, Caribbean nations were encouraged to join the Group on Earth Observations (GEO), which has over 70 member states and a number of observer organisations. There are various benefits such as access to resources and to technical assistance, the GEO-Portal and the GEONetcast system (<http://earthobservations.org>).

#### IV. BUILDING CAPACITY IN THE REGION, INFORMATION SHARING AND KNOWLEDGE MANAGEMENT

**Session D** of the workshop was entitled “Capacity Building and Knowledge Management” and the following presentations were held under this topic:

Valrie GRANT-HARRY from URISA on “**Using GIS to Enhance Comprehensive Disaster Management in the Caribbean**”. This presentation provided a detailed overview of the current situation, the challenges and a way forward for the use of GIS and geospatial information in the Caribbean. A strong case was made for a Comprehensive Disaster Management approach and for the establishment of a regional spatial data infrastructure. ([www.urisa.org](http://www.urisa.org))

Esteban LEON and Daniel LEWIS from UN-HABITAT presented “**Human Settlements and Crisis**”, an introduction about the work their organisation is doing with regard to the vulnerability of human settlements. The UN-HABITAT disaster assessment portal contains 80+ tools that have been applied at least once before: [www.disasterassessment.org](http://www.disasterassessment.org).

Jacob OPADEYI from the Department of Surveying and Land Information/UWI presented “**Towards the Effective Development and Use of Space-based Technology for Disaster Management and Emergency Response in the Caribbean Region**”. He argued that a regional approach/institution would facilitate the development of regional standards for the acquisition, processing, integration, classification, and use of remote sensing imageries. Amongst other things such as cost saving issues, it would be able to attract leading international trainers and researchers for high quality capacity building in the Caribbean. (<http://www.eng.uwi.tt/depts/survey/index.htm>)

Paulette BYNOE from the University of Guyana talked about “**The Socio-Economic, Health and Psychological Impacts of the 2005 Flood in Guyana and the Urgent Need for Spaced -Based Solutions**”. Some of her recommendations include: institutional collaboration and support to facilitate institutional capacity building (training, infrastructure, etc.) to enhance preparedness for any future disasters; the design and implementation of a comprehensive Community Awareness Programme on the use of space-based technology and on-going technical training programmes for government agencies and NGO’s in support of flood mitigation and recovery planning. ([www.uog.edu.gy](http://www.uog.edu.gy))

Boby Emmanuel PIARD from CNIGS (National Centre for Geo-Spatial Information) presented “**HAITI : Towards a Global Observatory of the Territory**”, focusing on the Main

natural hazards that Haiti is facing, on current projects focusing on risk assessment, prevention and monitoring, on the global observatory and on the way forward.

Richard TEEUW from the Geohazard Research Centre of Portsmouth University spoke about **“Mapping for the Masses: Using Low-cost or Free Remote Sensing Data for Disaster Risk Reduction”**, further explaining the possible use of satellite maps and opportunities for low-cost remote sensing as well as focusing on problems such as the lack of free GIS software and internet bottlenecks in many developing countries. ([www.port.ac.uk](http://www.port.ac.uk))

Subsequently, one of the three break-out groups on the second day of the workshop discussed **“Capacity Building and Knowledge Management – Needs & Requirements of the Region”**. The recommendations on which aspects to focus on were summarised under four topics, overarched by the cross-cutting issue of **funding** (e.g.: append existing budget systems to accommodate space-technology, equipment acquisition...) and **sustainability** (e.g.: regional image processing and continuous training institution(s), starting at schools, brain-drain problem):

#### **1) Training and Education:**

- √ Personnel/professionals exchange/secondments
- √ Image processing and analysis (linked to regional needs)
- √ Data management
- √ Technical workshops including public awareness
- √ Training of trainers (& sometimes of consultants...)
- √ Product generation
- √ Scholarship programme
- √ Development of materials

#### **2) Institutional Systems & Policy:**

- √ Project formulation/design expertise
- √ Mainstreaming space-based technology in national disaster management plans
- √ Cost beneficiaries arrangements
- √ Strengthen & expand existing partnerships
- √ Create new partnerships
- √ Identification of facilitating in institutions
- √ Development of secondment protocols

#### **3) Research and Development:**

- √ Partnerships
- √ Technical support centre - client support (queries, FAQ, e-discussions...)
- √ Best practices
- √ Demonstration projects (e.g.: for decision makers...)
- √ Space-based technology applied to disaster risk management
- √ Risk mapping & vulnerability assessment
- √ Early recovery planning, response planning

#### **4) Knowledge Management:**

- √ Data management

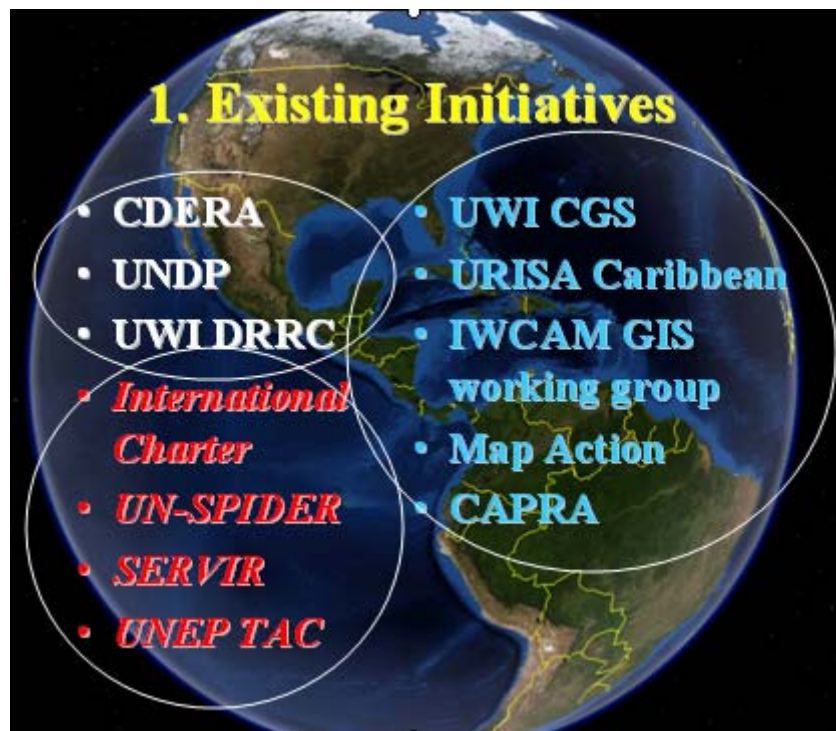
- ✓ Disseminations of materials to users and public (e.g., multi-purpose use of image shared by sectors)
- ✓ Standardization of products
- ✓ Share information! (also about past mistakes...)

The need to create a regional capacity building and knowledge management vision/strategy that can be translated into a policy and a workplan providing detailed implementation steps down to the national level became obvious and should be based on the above elements. It is important to get this process started and it has to be led by a regional institution such as CDERA or UWI that would take ownership of the process and lead it with the support of interested participants and any other institution willing to provide support.

## V. EXISTING INITIATIVES AND COORDINATION FOR SPACE-BASED DISASTER RESPONSE

The discussion within this working group was meant to assess the current situation based on the presentations held previously and to look at ways of coordinating initiatives in order to make existing structures and information more accessible to the region.

**1) The group identified the initiatives that might be the backbone of a regional coordination or facilitation framework:**



**2) The second step consisted in identifying the elements of a national and regional coordination strategy:**

- a. Coordination of space-based disaster response in Caribbean could be affected in conjunction with institutions / initiatives listed above.
- b. Regional-level policy on access to spatial data during disasters; CDERA should incorporate data-sharing into legislation adopted by participating countries on data sharing and access; e.g. need to access met data through CIMH which will require a policy to on data access.
- c. Ministerial buy-in required for data sharing agreements to be approved; access to information needs to go through established mandates. One way is through Ministers responsible for disaster management, Ministers of the Environment, through Decision 11 of the XV Forum of Environmental Ministers also endorsed need for data access, work being facilitated through a regional Technical Advisory Committee (TAC).
- d. Outcome of this year’s GSDI10 Conference in Trinidad & Tobago – data sharing framework agreement is being worked on by Jamaica and Trinidad & Tobago, and will be updated at URISA Caribbean.
- e. Issue of continuity for disaster-management projects, issue of duplication and simultaneous need for technology transfer to apply lessons that were learned elsewhere.
- f. Utilise existing political-level networks to pass data access policies, e.g. CARICOM’s COTED, CEDRA Council, Forum of LAC Environmental Ministers.
- g. Ministerial mandates should – in theory - increase access to available data, in usable formats.
- h. Revise data access policies that have been proposed at prior forums.
- i. National Spatial Data Infrastructures (NSDI) across the Caribbean MUST be promoted, incl. Regional SDI.
- j. Lobby donors to insist on Hazard Risk Assessments as part of assistance conditions; dissemination of results in public domain.

**3) The group then discussed ways of making more available what is currently available and came up with the suggestions below:**

- a. [Short-term] Develop a regional inventory of required spatial datasets / implement a metadata catalogue based on that inventory (e.g. can be based on CDERA inventory).
- b. [Short-term] implement a regional platform for dissemination / sharing of disaster information, preferably using an EXISTING platform (e.g. regional data platform coordinated through TAC / UNEP).
- c. Coordination between agencies such as CATHALAC, CDERA, UWI-CGS, URISA Caribbean, UNEP for implementation of that regional platform.

- d. Designate a central coordinating body for the Caribbean for receiving satellite imagery (e.g. CDERA as Charter Project Manager...).
- e. Assess the Charter’s role in the region, as well as how UN-SPIDER might facilitate the analysis and management of data received. Capacity needs to be built across the Caribbean in data analysis and management.

## **VI. INCREASING ACCESS TO SPACE-BASED INFORMATION AND BUILDING UPON GEO’s PROPOSAL**

The topic was divided into three parts, focusing on the actual access procedures and opportunities.

### **1) Opportunities for accessing space-based information (SBI). Recommendations to increase access and use:**

- a. Identify focal points/middlemen to serve as coordinators between the data providers and the end users. Such persons will act as advisor, interpreter of user needs and/or image analyst.
- b. Create a knowledge database with website links in order to collect all the available resources.
- c. Obtain CDERA/Disaster Risk Reduction Centre (DRRC) support for the creation of an inventory of all the existing SBIs for the Caribbean region countries. It is to be noted that some work has already been done by CATHALAC.
- d. Ensure that the International Charter ‘Space and Major Disasters’ provides the link between the user and the provider with regard to space data.
- e. Ensure that CDERA promotes the existence and the availability of the Charter among the participating Member States.
- f. Recognize the need to support awareness and training workshops for the countries after completing the inventory of existing SBIs.
- g. Seek CDERA’s support for the opportunity of developing agreements for linkages with universities and disaster reduction and management offices.
- h. Seek the support of the World Bank for the above effort by CDERA.
- i. Interface with the efforts of organizations such as CATHALAC in the same areas to influence partnerships and region-specific initiatives.

### **2) Ensuring that all Member states in the Caribbean region can access the International Charter ‘Space and Major Disasters’:**

- a. CDERA should consider submitting an application to the Charter Board to become a Co-operating Body. Channel and request support from USGS/OFDA for technical assistance to fill out the documents.
- b. Pursue with CDERA to create a cadre of regional Project Managers and approach OFDA for support to perform the training and develop partnerships for the benefit of the training effort.

### **3) Ideas for the GEO Disaster Management Pilot Project in the Caribbean:**

- a. Email through round-robin ideas about the possible pilot project that the Chair could eventually pass on to the CEOS Disaster SBA team.
- b. Inform the CEOS disaster SBA team of the interest of the Caribbean region in its future meetings and notify that CDERA/DRRC can play a key role, but will need support to facilitate the role(s) elaborated.

## **VII. STEPS FORWARD AND TEMPLATE FOR NATIONAL DISASTER MANAGEMENT OFFICES (NDMO's)**

Discussions within the break-out groups of the third day of the workshop on the topics of Capacity Building, coordinating initiatives and access to space-based information, the dynamics went clearly towards the definition of steps that would have to be taken in order to ensure the integration and maximum use of such information to make communities within the Caribbean safer from disasters and to be better prepared during the emergency response phase.

It is instrumental for the director of a National Disaster Management Office with often very limited human and financial resources to have a template detailing how, what kind of and in which sequence space-based information can be used most effectively.

These thoughts were guiding the deliberations within the two break-out groups on the third day. The spirit was to move from previous discussions that were guided by the ideal scenario to a maybe more realistic one beginning with small steps and, if possible, easy-to-implement set of actions to be taken by NDMO's.

### **1) What do we need to do?**

- a) Formulate how to take advantage of and move forward on the current initiatives: SHUTTER, UN-SPIDER and GEOSS.
- b) Internal communication role within organizations on accomplishment of disaster group and obtaining high level buy-in; begin dialogue to move forward.
- c) Get the data assessment inventory from CATHALAC for a mechanism to collect on current status of data and software within the Caribbean arm.

- d) Awareness (strategic, administrative and technical level), capacity building and training on data uses should be done within the next 6 months.
- e) Assessment should be made on sharing expertise and capacity building in respect to capacities in place and then training be provided based on results.

**Summary:**

- √ Raise awareness
- √ Focus on capacity building and institutional arrangements
- √ Develop Institutional mechanisms
- √ Communicate outcomes from meeting to strategic level for buy-in.
- √ Develop List of exchange for expertise and buy-in
- √ Formulate how to take advantages of existing mechanism

**2) What arrangements do we have in place?**

- a) Initial requirements to design a portal or use one of the already implemented geospatial portals.
- b) Draft a letter / memo through CDERA and UNDP to all national disaster management agencies detailing ways to access space based images, mechanisms available including Charter.
- c) Protocols for impacted state to trigger mechanism and access geospatial portals.
- d) Minimum requirements to use and benefit from spatial data.

**Summary**

- √ Data portals
- √ Minimum requirements to use as benefits

**3) What are the institutional arrangements? Who are the key people to involve and how?**

- a) **Proposal:** consider CEDRA as an authorised user of the charter that they be given status of authorized charter user.

**N.B.** Cooperating body is not needed to start Charter activation requests. Charter is accessible to the region through UNDP.

- b) Develop small working committee containing two task forces – one for institutional arrangements and one for technical committee.

**N.B.** identify if the institutional arrangements can be tested as part of the Charter pilot project.

**Summary**

- √ Identify spokesperson to focus on authorised user

√ Technical working committee

#### 4) First and most important steps to be taken:

- a) Draft a letter / memo through CDERA and UNDP to all national disaster management agencies detailing ways to access space based images, mechanisms available including Charter.
- b) Develop small working committee containing two task forces – one for institutional arrangements and one for technical committee.

**N.B.** identify if the institutional arrangements can be tested as part of the Charter pilot project.

- c) UNDP to organize Charter project management training.
- d) UNDP to organize an e-Knowledge network established with workshop members – discussion forum.

Mainly based on the discussions of the last two break-out groups but also taking into consideration the main recommendations of the other groups, a draft **Template for NDMOs** was drafted and circulated to participants for their comments and additional ideas. The result of this exercise is attached to the meeting notes as ANNEX II.

This document has enough substance to enable NDMO's to implement a policy using space-based information for disaster management. Besides the technical advisory services available from UN-SPIDER, CDERA, UNDP and some of the other initiatives presented, this template will be presented and discussed at the UN-SPIDER Fiji Workshop. This will hopefully yield some more elements or improvements that will be shared with the participants of the Barbados workshop.

## VII. CONCLUSION(S)

By reading through the meeting notes, it becomes apparent that this workshop has yielded a great number of ideas and recommendations regarding the improved use and integration of space-based information for disaster management within the Caribbean Region. For those of us that managed to free up time to come to Barbados, we will always remember the dynamic and challenging atmosphere of the workshop which led to vibrant discussions within the working groups.

The great challenge after a successful workshop is always to capture the dynamic and the commitment of the participants and to move forward on the recommendations made. Every one of us has his/her role to play in this and from the perspective of the organisers we can assure our ongoing involvement and we hope for yours. Each one of us has probably identified some ideas in this report that he or she would like to follow-up on by providing input or maybe even by initiating a discussion with the clear aim of a tangible result.

When drafting this report we thought about listing at this stage something like the “Top 10 recommendations”, but then we decided not to take the risk to have some important ones forgotten. Everything is listed above and mostly in bullet form so that no text can obstruct the view on to the results of the discussions. There is also ANNEX II, the Template for NDMO’s, and we would like to thank Judy Thomas for requesting such a template.

At the time of drafting of the meeting notes, the following actions related to the workshop were under way:

- √ Rod Stewart has activated the International Charter Space and Major Disasters for the volcanic activity in Montserrat ([http://www.disasterscharter.org/disasters/CALLID\\_213\\_e.html](http://www.disasterscharter.org/disasters/CALLID_213_e.html)).
- √ Elizabeth Klute was the winner of 25km2 of archived imagery from GeoOrbis (<http://www.geoorbis.com/products/collection-alerts/>).
- √ The Template for NDMO’s was circulated via Google apps for your comments and suggestions for improvement.
- √ Nate Smith was nominated as Project Manager for the Charter activation for the floods in Togo. The Charter activation was requested by the UN-OCHA Regional Office for Western Africa through UNOOSA. ([http://www.disasterscharter.org/disasters/CALLID\\_214\\_e.html](http://www.disasterscharter.org/disasters/CALLID_214_e.html))

The following meetings were mentioned during the workshop. They are relevant for the region and will touch upon the topic of space-based information:

- √ URISA Caribbean GIS Conference, Cayman Islands, 25-29 August 2008 (<http://www.urisa.org/conferences/caribbean>).
- √ XIII SELPER Symposium, La Havana, Cuba 22-26 September 2008 (<http://www.selpercuba.unaicc.cu/>).
- √ “2nd Global Earth Observation System of Systems (GEOSS) of the Americas Symposium” to be held in Panama City, Panama from Sept. 30 – Oct. 3, 2008 (<http://earthobservations.org/meetings/meetings.html>).
- √ Mitch+10 Meeting in Honduras, December 2008 (tbd)

## ANNEX I - OPPORTUNITIES AND NEEDS

<b>OPPORTUNITIES</b>
<b>INITIATIVES</b>
CDERA - CDM framework – CDERA as a Regional Broker
UN-SPIDER – as a facilitator to access and use of space-based information
EMWIN (to page out emergency products to those responders that will prepare for emergency UN-CATHALAC/SERVIR -
CAPRA (along with GIS modelling offers the chance to systematically estimate the size of comprehensive risk faced by small island of the Caribbean) - World Bank
INT. CHARTER – an opportunity for accessing satellite imagery during an emergency. Access through UNDP (existing agreement already in place) or through CDERA as a Cooperating Body.
UWI – DRRC
<b>REGIONAL CAPACITY AND COORDINATION</b>
Sharing of resources, collaboration, working together for positive results, exercise information sharing
Larger (urban) networks (i.e. more people)
Existing Regional structures to provide solutions (UWI, CDERA)
Resilient regional coordinating mechanism
Roll out imaging technology to the entire region using existing reg. organisations to ensure same opportunities/training/ institutional strengthening for all actors in the region
<b>CAPACITY BUILDING</b>
UN-SPIDER as a facilitator of capacity building working closely with Centres of Excellence
Use CB infrastructure of the UWI
Trainable population
<b>DATA</b>
Standard data and data sharing policies
Setting up of National Spatial Data Infrastructures
Existing opportunities for accessing free or low cost satellite-based data
Damage assessment application for EOC decision making process
<b>INFORMATION DISSEMINATION</b>
Agreed disaster management platform, Creation of a regional focal point/portal for data for DM
Public awareness and info dissemination through practical examples (national level!)
<b>PRIVATE SECTOR</b>
Private commercial equipment deployment for first responders
Teaming opportunities for private companies to provide: training, management, equipment,

<b>NEEDS</b>
<b>COORDINATION – Vertical Coordination (specifically regarding the incorporation of space-based information in the risk and disaster management process)</b>
Template for moving forward at national level – Vertical Coordination Strategy
Better coordination of all actors with regard to data sharing, projects and new tools
Institutional strengthening of disaster offices to incorporate technology in DRR strategies
Institutional mechanisms for regional dissemination of data and products
Main focus should be on prevention
Universal collaboration
Collaboration on data, policies for data distribution
Policy and (regional) standards for spatial data and to facilitate data exchange
<b>CAPACITY BUILDING AND KNOWLEDGE MANAGEMENT</b>
Training (in the use of the systems to support DM), courses, workshops, provision of tools (e.g. software), on image processing and product generation, DRR, GIS for DM experts and policymakers
Train/share use & implementation of data in DM (Hurricane/hazus/DHS/FEMA)
Expertise to develop and manage systems
Regional capacity for the analysis of space-based info
Risk assessments, comprehensive assessment methodology: models – imagery – direct observations
Complete base mapping
Historical imagery for comparative analysis
Monitor coastal erosion and accretion in small island states
New typologies to organise and use information, template/approach to moving disparate data collection systems to information for decision making
Methodological multi-level approach
Local data, local models
Multilingual documentation and methodologies, interpretation at workshops
<b>SPACE-BASED INFORMATION</b>
Relevant timely and accurate data which can be shared
Metadata policy and guidelines
Metadata profile for the Caribbean
Time series imagery and Systematic revisit image products
Frequent real-time high-res imagery and archiving and expert advice on product selection, high resolution digital elevation models
<b>TECHNOLOGY</b>
Caribbean emergency products with WMO headers for EMWIN distribution to Caribbean nations
Mechanisms for data delivery to first responders
Simplified tools
Space-based technologies for flood levels, reliable flood extent mapping service
Infrastructure for space-based solutions
Common grid equipment software
Updated data sets, institutional capacity to absorb/apply, physical infrastructure, appropriate bandwidth, reduced costs
Mechanisms for unified access
Exposure data
Expanded geographic extent of HM, NA, RA

## ANNEX II – TEMPLATE FOR NATIONAL DISASTER MANAGEMENT OFFICES (NDMO's)

<b>STEP 1: NEEDS and GAP ANALYSIS</b> (to be complemented by STEP 5 in the medium-term)	
NEEDS	<ol style="list-style-type: none"> <li>1. What type of disasters? (e.g. floods, earthquakes, etc.)</li> <li>2. What type of expertise is needed ?</li> <li>3. What type of space-based information and products?</li> </ol>
EXISTING STRUCTURES	<ol style="list-style-type: none"> <li>1. What are the national plans and policies in place and do they consider SBI?</li> <li>2. Is there a national coordination mechanism related to the use of space-based information? (common acquisition of imagery, common archive, sharing of value-added maps, sharing of satellite communication...)</li> <li>3. Which Government entities use SBI?</li> <li>4. Are agreements/contracts with the private sector in place?</li> <li>5. Identify Champions</li> </ol>
EXISTING RESOURCES	<ol style="list-style-type: none"> <li>1. What type of SBI is currently being used?</li> <li>2. Who is using SBI and what level of expertise is available in the NDMO?</li> <li>3. Is relevant expertise available within other Government offices? Is it accessible for the NDMO?</li> <li>4. Identify any additional financial resources to acquire SBI.</li> </ol>
IDENTIFY THE GAPS	<ol style="list-style-type: none"> <li>1. List the gaps that can be identified with the current level of knowledge and expertise.</li> <li>2. Discuss those gaps that can be addressed with the next steps.</li> </ol>
SBI STRATEGY	<ol style="list-style-type: none"> <li>1. Draft a strategy paper with clear milestones, benchmarks and timelines on how to integrate SBI into national disaster management plans and policies (entire disaster cycle!). Include specific goals, actions and target dates.</li> </ol>
<b>STEP 2: DEVELOP AND BUILD UPON EXISTING INSTITUTIONAL MECHANISMS</b>	
RESEARCH	<ol style="list-style-type: none"> <li>1. Build on lessons learned.</li> <li>2. Use examples and templates of national disaster management policies and plans that include the use of space-based technology solutions.</li> <li>3. Compile relevant case studies</li> </ol>
NATIONAL	<ol style="list-style-type: none"> <li>1. Develop a collaborative framework through MOU's, agreements etc... with other national governmental or non-governmental institutions.</li> <li>2. Integrate SBI into national disaster management plans and policies.</li> <li>3. Develop standard operating procedures, ToR for mechanisms, and a plan of work (resulting from the strategy)</li> </ol>
REGIONAL & INTERNATIONAL	<ol style="list-style-type: none"> <li>1. Identify relevant regional and international initiatives (such as the ones presented during the UN-SPIDER workshop)</li> <li>2. Identify contact person(s) and seek ways of formalizing the working relationship.</li> </ol>

	<ol style="list-style-type: none"> <li>3. Ask your Government to nominate the NDMO as a UN-SPIDER National Focal Point.</li> <li>4. Draw on existing expertise and lessons learned.</li> <li>5. Standardize (regional) operating procedures and share spatial data through a portal (URISA presentation)</li> <li>6. Outline amongst Member States what is expected of CDERA with regard to using and providing SBI services - incorporate into short-term CDM activities.</li> </ol>
<b>STEP 3: CAPACITY DEVELOPMENT (CD) AND KNOWLEDGE MANAGEMENT</b>	
DRAFT a CB strategy	<ol style="list-style-type: none"> <li>1. For your office only or together with other governmental entities</li> <li>2. Draw up a prioritized list of national experts and required training topics based on STEP 1.</li> </ol>
IDENTIFY Training Opportunities and Institutions	<ol style="list-style-type: none"> <li>1. Read UN-SPIDER Monthly Updates</li> <li>2. UN-SPIDER Database of Training Opportunities (in development)</li> <li>3. UN-SPIDER relevant organizations &amp; initiatives – links list</li> <li>4. Preventionweb (Trainings, Space Technology, GIS &amp; Mapping) <a href="http://www.preventionweb.net">http://www.preventionweb.net</a></li> <li>5. SERVIR</li> </ol>
IDENTIFY Funding Sources	<ol style="list-style-type: none"> <li>1. Some of the CD opportunities above might have scholarships.</li> <li>2. Make a list of potential donors and actively seek their support based on the (national) CB strategy</li> </ol>
TRAIN and RETAIN	<ol style="list-style-type: none"> <li>1. Keep the glass full</li> </ol>
<b>STEP 4: AWARENESS RAISING</b>	
MATERIAL	<ol style="list-style-type: none"> <li>1. Gather awareness raising material from regional and international initiatives (e.g. UN-SPIDER)</li> <li>2. Produce your own material</li> <li>3. Formulate who to target and how</li> </ol>
DECISION MAKERS	<ol style="list-style-type: none"> <li>1. Present the NDMO strategy and the usefulness of SBI based on past and successful examples - including Caribbean and SIDS examples.</li> <li>2. Communicate outcomes and recommendations of attended meetings and trainings (short, precise not technical).</li> <li>3. Convince decision makers to request a UN-SPIDER technical advisory mission. This will in itself further increase awareness within decision makers</li> </ol>
ADMINISTRATIVE AND TECHNICAL LEVEL	<ol style="list-style-type: none"> <li>1. Targeted awareness raising material and presentations.</li> </ol>
POPULATION	<ol style="list-style-type: none"> <li>1. Inform and distribute awareness raising material on the benefits of SBI.</li> <li>2. Target schools</li> <li>3. Target the media</li> </ol>
<b>STEP 5: TECHNICAL ADVISORY MISSIONS (TAM)</b>	

UN-SPIDER TAM	<ol style="list-style-type: none"> <li>1. Organize and participate in a technical advisory mission to meet with national focal points and representatives of relevant institutions; and discuss training needs and institutional strengthening mechanisms during the technical advisory missions.</li> <li>2. Contribute to the definition of national action plans with national focal points, keeping in mind the national platforms for disaster reduction</li> <li>3. Assist national focal points in the implementation of a (vertical) coordination strategy.</li> </ol>
<b>FURTHER INFORMATION</b>	
WHERE	<ol style="list-style-type: none"> <li>1. Know where to find and how to acquire SBI (+step 3)</li> <li>2. Keep a list of websites and contacts relevant for YOUR region.</li> <li>3. UN-SPIDER Knowledge Portal, SERVIR and GEO Portal</li> </ol>
The International Charter Space and Major Disasters  <a href="http://www.disasterscharter.org">www.disasterscharter.org</a>	<ol style="list-style-type: none"> <li>1. Satellite imagery and value added products in the case of imminent danger to lives and property or in the aftermath of a disaster.</li> <li>2. Access through Ian KING, UNDP Barbados and the OECS who will channel request through UNOOSA</li> <li>3. In the medium term a regional institution will become Authorised User of the Charter and local Project Managers will provide value added products.</li> </ol>
Involve Private companies	<ol style="list-style-type: none"> <li>1. Make a list of private companies that could be called upon to support both emergencies and risk reduction activities.</li> </ol>

### ANNEX III – PHOTOGRAPHS

