



UNITED NATIONS
Office for Outer Space Affairs

**“UNITED NATIONS REGIONAL UN-SPIDER WORKSHOP: BUILDING UPON
REGIONAL SPACE-BASED SOLUTIONS FOR DISASTER MANAGEMENT
AND EMERGENCY RESPONSE FOR THE PACIFIC REGION”**

ORGANIZED BY

**THE UNITED NATIONS OFFICE FOR OUTER SPACE AFFAIRS, THE UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC AND THE
PACIFIC ISLANDS APPLIED GEOSCIENCE COMMISSION**

WITH THE SUPPORT OF THE GOVERNMENT OF AUSTRIA

HOLIDAY INN, SUVA, FIJI, 16-19 SEPTEMBER 2008

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I. INTRODUCTION



The United Nations Office for Outer Space Affairs (UNOOSA), through its UN-SPIDER Programme (United Nations Platform for Space-based Information for Disaster Management and Emergency Response), the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) through its ICT and disaster risk reduction programme, and the Regional Space Applications Programme, and the Pacific Islands Applied Geoscience Commission (SOPAC) organised the “United Nations Regional UN-SPIDER Workshop: Building Upon Regional Space-based Solutions for Disaster Management and Emergency Response for the Pacific Region”, which was held in the Suva, Fiji, from 16-19 September 2008, in order to contribute to helping countries within the Pacific region learn how to access and use space technology for disaster management and emergency response.

In its resolution 61/110 of 14 December 2006 the United Nations General Assembly agreed to establish the “United Nations Platform for Space-based Information for Disaster Management and Emergency Response – UN-SPIDER”, as a programme of the United Nations Office for Outer Space Affairs, 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 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.

As part of the outreach activities in 2008, UN-SPIDER organised several workshops to raise awareness within the user community, to assess its needs and to contribute to specific activities of this new programme. The workshop in Fiji brought together decision-makers and senior experts mainly from disaster management community from within the Pacific region, to discuss regional space-based solutions for disaster management and emergency response.

The workshop was fully funded by the Government of Austria. The need to focus more on the Small Island Developing States (SIDS) when it comes to disaster management was clearly recognized by OOSA and the Federal Ministry for European and International Affairs, and

this need is reflected by the fact that the office organized in 2008 specific workshops for the Island States in both the Pacific and Caribbean regions.

The main topics discussed at the workshop included:

- (a) The current status of space technology for disaster management and emergency response in the Pacific;
- (b) The impact of global climate change on the increase in natural disasters in the region and how space-based technologies can contribute to mitigating that impact;
- (c) Regional space-based initiatives relevant to disaster management support (including risk reduction) and emergency response;
- (d) Identification of approaches towards the harmonization of the various existing initiatives that are helping developing countries in the Pacific access and use space-based technologies for disaster management and risk reduction;
- (e) Promotion of current disaster management and disaster risk reduction initiatives being implemented by the Economic and Social Commission for Asia and the Pacific and SOPAC, as well as by other relevant organizations, such as the United Nations Development Programme, the Office for the Coordination of Humanitarian Assistance, ISDR and the Pacific Disaster Center.

II. ATTENDANCE

A total of 53 participants from the following countries and territories took part in the workshop: Australia, Austria, Bangladesh, China, Cook Islands, Fiji, Kiribati, Indonesia, Italy, Micronesia (Federated States of), New Zealand, Niue, Philippines, Samoa, Solomon Islands, Tonga, Tuvalu, United States and Vanuatu. United Nations entities, regional institutions responsible for capacity-building in and promoting the use of space-based technologies, national space agencies, academic and research institutions and the private sector were also represented. A list of the participants can be accessed on the UN-SPIDER website (<http://www.unspider.org>).

The workshop was made possible by a significant contribution from the Ministry for European and International Affairs of Austria. Funds provided were used to defray the costs of the workshop, including side events, and the air travel and daily subsistence allowance of 18 participants and 3 staff members of the United Nations Office for Outer Space Affairs as well as one staff member from the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).

III. PROGRAMME

The programme of the workshop included plenary sessions, during which 19 presentations were given. Discussions took place in break-out groups to foster the sharing of knowledge and find common solutions and plans of action. The following four topics were discussed by the break-out groups:

- (a) Current use of space-based solutions and information in the Pacific (ongoing and planned initiatives, case studies and best practices, access to existing archived and real-time data and capacity-building opportunities);
- (b) Current needs of States in the Pacific and the role of space-based solutions and information;
- (c) Impact of global climate change on the increase in natural disasters in the Pacific and how space-based solutions can contribute to mitigating that impact;
- (d) Discussion on a framework for accessing and using geospatial information to support risk and disaster management in the Pacific.

The notes of all the discussions carried out has been included in Annex II.

During the workshop, SOPAC presented the Pacific Disaster Net, a web portal and database system designed to be the largest and most comprehensive resource for information on disaster risk management for Pacific island States. Participants at the workshop discussed ways of taking advantage of the communication and collaboration features offered by the Pacific Disaster Net (<http://www.pacificdisaster.net>).

On the final afternoon of the workshop, the participants were invited to the headquarters of SOPAC (Pacific Islands Applied Geoscience Commission), a significant contributor in the GIS and disaster management space in the Pacific Islands. There, the workshop participants were able to network with the rest of the SOPAC team, see the facilities, and learn about the operational process of SOPAC in more detail.

UN-SPIDER requested the participants from the Pacific Island Countries to support the process of filling out Country Profiles. The participants submitted their first drafts at the end of the workshop, and agreed to finalize the documents upon their return to their respective countries.

IV. RECOMMENDATIONS

The group on the current use of space-based solutions and information in the Pacific discussed: relevant ongoing and planned initiatives; examples of successful uses of space-based solutions and information in the Pacific; current opportunities for accessing archived and real-time satellite data; current capacity-building opportunities in the area of geospatial technologies; and ways in which States in the Pacific could have access to existing opportunities provided within the framework of, for example, the International Charter on Space and Major Disasters and Sentinel Asia. There was general agreement that SOPAC played an important role in the use of space-based technologies for disaster management in the Pacific. The Pacific Disaster Center offered to forward requests for the activation of the International Charter “Space and Major Disasters”.

The group on current needs of States in the Pacific and the role of space-based solutions and information discussed: the types of disaster that disaster managers in the Pacific currently had to deal with; for each type of disaster, the type of information currently being used to support

reactions to the disaster and how that information was obtained; and the type of space-based information that would be useful. Floods, storms, hurricanes, active volcanoes, coastal erosion and health related disasters, such as epidemics, were found to occur very frequently and have a high impact.

The group on the impact of global climate change on the increase in natural disasters in the Pacific discussed how global climate change contributed to determining the type, level and number of disasters in the Pacific; what current and planned initiatives for making geospatial information available could support the mitigation of that impact; and how space-based solutions and information contributed to mitigating that impact. Participants identified the need for good baseline time-series data showing changes. They also noted that capacity-building and awareness-raising measures should be aimed specifically at decision makers.

The group on a regional framework for accessing and using geospatial information to support risk and disaster management in the Pacific discussed the Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters, insofar as it related to the topic. Participants proposed the completion of an inventory list of data and human capacity based on a common schema. The Pacific Disaster Net was suggested as a platform for facilitating further cooperation.

The workshop has yielded a number of suggestions and recommendations regarding the improved use and integration of space-based information for disaster management within the Pacific Region. The details of the discussions have been included in Annex II.

The great challenge after a successful workshop is to move forward on the recommendations made. The discussions held during the workshop are part of an ongoing programme that will continue in 2009. The outcome of the workshop gave valuable orientation on the further implementation of UN-SPIDER activities in the Pacific Region, in terms of coordinating and cooperating activities. The Country Profiles which were submitted will support the activities of UN-SPIDER in the region.

To continue the dialogue, a session at the next UN-SPIDER International Workshop in Vienna, Austria, in 2009, will focus specifically on small island states. Experts that participated in the Caribbean and Pacific Regional Workshops will be invited. It will be an opportunity to have a group from both regions discussing the outcome of both meetings.

ANNEX I – FINAL PROGRAMME

The presentations provided participants with the opportunity to learn how space-based information could be used in disaster management and emergency relief work. These presentations are available for viewing at the UN-SPIDER website: <http://www.unspider.org>.

Tuesday, 16 September 2008

OPENING CEREMONY

- 1.) **Ms. Natercia RODRIGUES** - UN-SPIDER Programme Officer, UNOOSA - *“Welcome Remarks”*
- 2.) **Mr. Bhaskar RAO** - Deputy Director, SOPAC - *“Opening Remarks”*
- 3.) **Mr. Guoxiang WU** - Chief, Space Technology Applications Section, ICT and Disaster Risk Reduction Division, UNESCAP - *“Opening Remarks”*
- 4.) **Mr. Wolfgang STROHMAYER** - Deputy Head of Mission, Embassy of the Republic of Austria to Australia - *“Opening Remarks”*
- 5.) **Mr. Osea TUINIVANUA** - Acting Permanent Secretary and Conservator of Forests - Representative of the Government of Fiji - *“Opening Remarks”*
- 6.) **Mr. David STEVENS** - UN-SPIDER Programme Coordinator, UNOOSA - *“Vote of Thanks”*

SESSION A – Building Upon Existing Opportunities

- 1.) **Mr. Bhaskar RAO** - SOPAC - *“SOPAC’s Mission and Programme Areas”*
- 2.) **Mr. Guoxiang WU** - UNESCAP - *“ESCAP’s New Priorities in Disaster Risk Reduction”*
- 3.) **Mr. Chris CHIESA** - Pacific Disaster Center - *“The PDC’s Mission and Program Areas”*
- 4.) **Ms. Stephanie ZOLL** - UNDP - *“UNDP Pacific Centre: An Overview of Information Needs for Disaster Risk Management in the Pacific Region”*.

5.) Mr. Martino PESARESI - European Commission, Joint Research Centre - *“Very High Resolution Satellite Data Exploitation for Risk and Disaster Management Support”*

6.) Ms. Karen JOYCE - GNS Science, New Zealand - *“Using Remote Sensing Data to Support Emergency Services in New Zealand”*

Wednesday, 17 September 2008

SESSION B – Understanding Current Needs

1.) Ms. Meelina AILESI - Tuvalu Telecommunication Corporation, Tuvalu - *“Implementing Geospatial Solutions to Support Disaster Preparedness, Reduction and Response in Telecommunications”*

2.) Ms. Litea BUIKOTO - SOPAC - *“Specific GIS and RS Needs for Disaster Management in the Pacific”*

3.) Mr. Ravind KUMAR - Fiji Meteorological Service, Fiji - *“Climate Variability Associated with El Niño Southern Oscillation (ENSO) in the South West Pacific”*

4.) Ms. Suzanne PAISLEY - OCHA - *“OCHA’s Cluster Approach and Outcomes of the Inter-Agency Contingency Planning Workshop”*

5.) Mr. Tony LYU - UN-SPIDER - *“Compiling Country Profiles”*

Thursday, 18 September 2008

SESSION C – Space-based Solutions for Risk and Disaster Management

1.) Mr. Yang SIQUAN - National Disaster Reduction Centre of China, China - *“NDRCC’s Experience in Using Space-based Technologies for Risk and Disaster Management”*

2.) Ms. Maryani HARTUTI - Indonesian National Institute of Aeronautics and Space (LAPAN), Indonesia - *“The Use of Space-based Information to Support Disaster Mitigation and Environmental Monitoring in Indonesia”*

3.) Mr. Olaf NEUSSNER - GTZ, Philippines - *“Establishing a Flood Early Warning System Using Space-based Information”*

4.) Mr. Wolf FORSTREUTER - SOPAC - *“New High Resolution Space-borne Sensors”*

5.) Mr. Scott PONTIFEX - Secretariat of the Pacific Community (SPC) - *“Linking Population Data to Pixels”*

SESSION F – Building Capacity in the Region

1.) Prof. Serwan BABAN - Southern Cross University, Australia - *“Developing a Proactive Approach to Disaster Management and Risk Reduction Using Geoinformatics”*

2.) Mr. Cheng WANG - China National Space Administration, China - *“Space-based Technologies for Disaster Management: Current Opportunities”*

3.) Mr Conway Pene - University of South Pacific - *“Capacity Building in GIS & RS for Pacific Island Countries”*

ANNEX II – DISCUSSION NOTES

A. CURRENT USE OF SPACE-BASED SOLUTIONS AND INFORMATION IN THE PACIFIC REGION

DISCUSSION OBJECTIVES

The goals of this group were to list and examine:

- 1) Relevant ongoing and planned initiatives
- 2) Examples of successful uses in the Pacific region
- 3) Current opportunities to access existing archived and real-time data satellite data
- 4) Current capacity building opportunities in the area of geospatial technologies
- 5) How should the region access existing opportunities such as the Charter and Sentinel Asia

DISCUSSION OUTCOMES

There was general agreement that SOPAC played a strong role in the use of space-based technologies for disaster management in the Pacific region. China was seen as having the potential to contribute valuable resources to the region. The 10th European Development Fund (EDF10) was seen as a major potential funding source.

For capacity building, many UN initiatives were highlighted as providing relevant training opportunities. The need for training material for decision makers was stressed. The Pacific Disaster Center offered to forward activation requests of the International Charter to the appropriate party in the United States on behalf of the Pacific Islands.

Detailed results of the discussion were as follows:

- 1) **Relevant ongoing and planned initiatives**
 - a) SOPAC programs has been a major provider and contributor to-date.
 - i) Disaster impact mapping via satellite images (via SOPAC).
 - ii) Maps for national disaster management office (NDMO) (assistance via SOPAC), but data sources limited.
 - b) Cook Islands: GIS Program has been started recently. All agencies participating. NDMO has been doing some hazard mapping.
 - c) New Caledonia: Georeferenced database of dwellings (using GPS): extend to entire region.
 - d) China: R/T Satellite Imagery - geostationary satellite provides meteorological data, and is free via an agreement with WMO. Data can be accessed via the internet. Unclear if coverage includes all of Pacific region.
 - e) China: High Resolution Imagery is commercial, not free. But high-res imagery can be accessed via Int'l Charter during disaster response.
 - f) Imagery purchasing agreements (SOPAC, PDC, SPC): it is desired to improve and update regional coverage
 - g) EDF10 (10th European Development Fund) is a major potential funding source.

- i) There is focus on water resource applications including near-shore bathymetric mapping.
 - ii) Remote sensing is not a focus but will almost certainly be required to do the water mapping.
 - iii) Fund starts in 2009.
- h) Other initiatives
 - i) Risk management applications.
 - ii) Meteorological services and disaster management.
 - (1) In collaboration with land management agency.
 - (2) Infrastructure mapping and inventory.
 - (3) Vulnerable area identification.
 - (4) Supporting engineering field studies and seismology studies.
 - (5) Risk and vulnerability assessments supporting development, especially along the coast.
 - iii) Capacity development activities in the region: students become technicians, managers, leaders.
 - iv) Space-based imagery as backdrops.
 - v) Fire management applications.
 - vi) Risk communication, early warning, decision support systems/applications.
 - vii) High-temporal frequency (mostly for meteorological applications): not suitable for disaster management applications which require 1:10,000 resolution.

2) Examples of successful uses in the Pacific region

- a) SOPAC
 - i) Every country has map server, map & imagery coverage, training on use of system, data maintenance, etc.
 - ii) Currently being used by utilities.
 - iii) Vegetation mapping (Fiji Forestry, Palau, Solomon Islands Forestry).
 - iv) Change detection (historical photos), island movement mapping.
- b) Maritime boundary establishment/mapping.
- c) Vessel detection (illegal fishing boats).
- d) Disease surveillance (household-level mapping).
- e) American Samoa RVA and mitigation planning leading to post-disaster funding. Policy might be model for Donor agencies in region.
- f) Vietnam's National Disaster Mitigation Partnerships.
- g) Fiji Land Management System has GIS/GPS. So does IT dept.
- h) "Successful Failures" (lessons learned).
 - i) Brain drain → trained staff move to Aus/NZ or private sector
 - ii) Disaster mapping (post disaster damage assessment). However, limited direct use by NDMO agencies. Suggest close linkages with utility companies.

3) Current opportunities to access existing archived and real-time data satellite data

- a) SOPAC acts as redundant back-up for other agencies; scans airphotos and puts on DVD
- b) SOPAC developing catalogue of imagery, which can be shared among Pacific countries
- c) Australian Defence mapping (1:50,000 scale) – IFSAR – for DEM production; but imagery is limited (or not existing)
- d) PDC's Asia Pacific Natural Hazards Information Network for imagery and GIS data

- e) Real-time data: use currently limited mostly to meteorological applications
- 4) Current capacity building opportunities in the area of geospatial technologies**
- a) There are training within Fiji agencies.
 - b) Respond, ITC, etc.
 - c) ESRI virtual campus courses, ESRI Press as starting points.
 - d) UNESCO Bilko: Virtual global faculty for remote sensing.
 - e) FAO also has good resources, targeted to professionals.
 - f) However, there are few resources for managers and decision-makers.
- 5) How should the region access existing opportunities such as the Charter and Sentinel Asia**
- a) The participant from Indonesia has had successes using Sentinel Asia, which typically had a 1 to 2 day response/approval cycle with imagery arriving within 1 week. She had no recollection of International Charter activations.
 - b) Charter requests can be made via UNOOSA but require parallel request/approval by local UN agency.
 - c) Potential exists to request via PDC; will verify and provide feedback.

B. CURRENT NEEDS OF THE PACIFIC REGION AND THE ROLE OF SPACE-BASED SOLUTION AND INFORMATION

DISCUSSION OBJECTIVES

The goals of this group were to list and examine:

- 1) What are the current types of disasters that disaster managers have to deal with in the region
- 2) For each type of disaster, what type of information is currently being used to support the disaster and how is this information being obtained
- 3) What type of space-based information could be useful

DISCUSSION OUTCOMES

High-frequency, high-impact disasters that disaster managers have to deal with in the region were found to be floods, storms, hurricanes, volcanoes, coastal erosion, and health-related hazards. The main type of information currently being used to support the disaster was information on the affected area and population. The sources of information were varied – mentioned were Meteorological Services, USGS, SOPAC, and Geological Offices. The type of space-based information most in demand was Radar imagery, and in some cases, digital terrain models. Participants agreed that the reactive approach is no longer the way to go, and that a proactive approach to dealing with disasters is needed. A step in that direction would be national plans for decision-making processes in times of disasters.

The discussion group found that the best way to recording their ideas was in a table. The detailed results of their discussion is as follows:

Disaster	Freq.	Impact	Type of Info	Source of Info	Metadata
Forest fires	Low (local)	Low	Areas and population affected Forested areas Road network Nearest water source Wind and weather predict fire spread Communication	Manned watch towers in the forest Lands Department Forest stations in the forest with fire fighting facilities Meteorological Services	RADAR Optical (satellite) Thermal (limited) Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/topographic maps
Floods (flash/river)	High	High	Areas and population affected Weather forecast: rainfall	Community, committees, police officers, health stations on outer islands via HF radio and AM/FM Met. Office	RADAR Optical (satellite) Thermal (limited) Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/topographic maps Infrastructure, critical facilities Flood hazard maps
Typhoons, cyclones, storms, hurricanes	High	High	Areas and population affected Weather forecast – TC track, intensity, predicted path Reports from affected community, rapid assessment teams Shelters	Met office NOAA Statistics, Provincial Profiles Disaster Management Office	RADAR Meteorological data – rainfall, intensity, winds Optical (satellite) Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/topographic maps Infrastructure, critical facilities
Landslides	Low	Med	Areas and population affected Landslide susceptibility maps (FSM) Ground and aerial assessment	USGS Dept. of Geology/ Mineral/ Natural Resources SOPAC	Optical (satellite) Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/topographic maps Infrastructure, critical facilities Landslide susceptibility maps
Drought	Low	High	Rainfall data Areas and population affected	Met. Office Island profiles	RADAR Optical (satellite) Aerial photos: controlled and uncontrolled Infrastructure, critical facilities Population Distribution Groundwater alternatives
Earthquakes	Low	High	Areas and population affected Epicentres magnitude	USGS, Geology /Seismology Departments PTWC	RADAR Optical (satellite) Aerial photos: controlled and uncontrolled GPS

			Road network		Digital Terrain Model/ topographic maps Infrastructure, critical facilities Seismic hazard maps
Tsunamis (local)	Low	High	Areas and population affected Resources available Shelters Hospitals/clinics/s chools damage Info on those who can help	Statistics Red Cross	RADAR Optical (satellite) Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/ topographic maps Infrastructure, critical facilities Inundation maps Coastal bathymetry Coastal land cover EWS
Volcanoes	High (local)	High	Type of impact (lava, ash...) Affected communities Level of activity (procedure)	Geology/seismology Community	RADAR Optical (satellite) Thermal Aerial photos: controlled and uncontrolled GPS Digital Terrain Model/ topographic maps Infrastructure, critical facilities volcanic hazard zones EWS
Coastal erosion/hazard s	High (local)	High	Areas and population affected Coastal hazard mapping	Geology/Natural Resources	RADAR High definition Digital Terrain Model - LIDAR Optical (satellite) Aerial photos: controlled and uncontrolled RTK GPS Topographic maps Infrastructure, critical facilities Inundation maps Coastal bathymetry Coastal land cover

C. IMPACT OF GLOBAL CLIMATE CHANGE ON THE INCREASE OF NATURAL DISASTERS IN THE REGION

DISCUSSION OBJECTIVES

The goals of this group were to list and examine:

- 1) How will global climate change impact on the type, level and number of disasters in the region
- 2) What current and planned initiatives that make geospatial information available could support the mitigation of this impact

- 3) How could space-based solutions and information contribute to mitigating these impacts

DISCUSSION OUTCOMES

The impact of global climate change was seen to affect the commercial, agriculture, tourism, and health industries. Additional impacts were on political stability and on land erosion. Participants identified the need for good baseline time-series data showing changes. High-resolution digital terrain models were seen as important for the mitigation of the impacts of climate change. It was again noted that capacity-building and awareness raising measures should consider decision-makers as a core target.

Detailed results of the discussion are as follows:

1) Impact of Climate Change

- a) Severity of Cyclones
- b) Changes in rainfall patterns
- c) Sea level rise
 - (1) more coastal erosion
 - (2) salt water intrusion
 - (3) more storm surge
 - (4) destruction to infrastructure
- d) Small Islands are vulnerable (economy, agriculture, tourism, health)
- e) Forest fires - desert rectification
- f) Marine resources
- g) Changes in types of disasters (PIC face)
- h) Potential impact on political stability & increase in conflict (land & culture)
- i) Unpredictable weather
- j) Land erosion – loss of arable land

2) Plans & initiatives to support mitigation of impacts of climate change

- a) Need for a good baseline data & timeline showing changes (historic, present, predict)
- b) Quantifying trends in objective manner
- c) Identification of potential hazard areas
- d) Suitability analysis
 - (1) Land for crops
 - (2) Land for housing
 - (3) Types of crops
- e) High resolution digital terrain model (DTM) – Satellite
- f) Impact of models
- g) Utilising Pacific Disaster Risk Management Partnership Network – Pacific Disaster Network to share information
- h) “One picture is worth a thousand words”
 - (1) Maps
 - (2) Promotion campaigns / communication

3) Space-based information contributes to mitigating these impacts

- a) Focus for decision making
 - (1) Capacity building
 - (2) CRA
- b) Leads to suitable programmes for reducing risk
- c) Dissemination of information – knowledge via satellite
- d) Designation of safe evacuation sites (infrastructure)
- e) General land use planning - What you can / should do where
- f) Ensure use of proper map / right tool for the job

D. REGIONAL FRAMEWORK FOR ACCESSING AND USING GEOSPATIAL INFORMATION TO SUPPORT RISK AND DISASTER MANAGEMENT IN THE PACIFIC REGION

The discussion on a Regional Framework was conducted by two groups simultaneously. The purpose of this division was to 1) encourage all voices to be heard within smaller group sizes and 2) to encourage innovative solutions by comparing different approaches to the Framework.

DISCUSSION OBJECTIVES

The goals of this discussion were to develop a Regional Framework, which could possibly cover the following topics:

- 1) Understanding the Current Needs and Opportunities
 - a. What are the current needs (types of information, expertise, etc.)
 - b. What are the existing structures, mechanisms? Regional policies, plans and programmes
 - c. Which international and regional institutions could play a leading role in helping countries in the region access and use space-based information.
 - d. What is the contribution of the private sector, academia, NGOs. etc.
 - e. Which are the training opportunities available in the region
- 2) Further understanding of the current Gaps and Constraints
 - a. Which are the current gaps that have to be considered
 - b. Which are the known constraints and limitations specific to the region
- 3) Defining the Regional Framework
 - a. Which are the elements that should be included in a Regional Framework
 - b. Which existing and planned initiatives should be considered when defining and implementing this Regional Framework
 - c. How do we ensure coordination of the various initiatives
 - d. How do we build capacity
- 4) Elements of National Guidelines for Accessing and Using Geospatial Information to Support Risk and Disaster Management
 - a. Which elements/topics/information could be included in specific National Guidelines to be made available to national institutions to help them access and use space-based information

DISCUSSION OUTCOMES

Participants proposed the completion of an inventory list of data and human capacities based on a common schema. The Pacific Disaster Net was suggested as a platform for further cooperation. Pacific Island States expressed the need to have a self-run system in place. Also mentioned was a need reserve funding for purchase of image data (alternative to International Charter / Sentinel Asia) as a local 'solution,' without the need for external 'approval.' The need for a dedicated GIS staff at each country's NDMO was highlighted.

A detailed list of the issues raised from the discussions are as follows:

Group 1

Goal:

To develop a proactive approach to disaster management (DM) and disaster risk reduction (DRR) for the Pacific region to support the implementation of the Pacific Island Regional Framework for DM/DRR and the Pacific Island Framework for Climate Change.

Tasks:

- 1) Develop a **regional inventory** of available datasets for DRR and DM and its usability for decision making
 - a. Individual country inventories
 - b. Common schema
 - c. Include access to communications and communications quality/capacity
- 2) Determine the regional **human capacities** to implement DRR and DM initiatives
 - a. Individual country inventories
 - b. Common schema
- 3) Bridge the **data gaps** through UN-SPIDER, UNESCAP and other spaced based technology support mechanisms and address human capacities through **training**
- 4) Strengthen **national information systems** to support decision making
- 5) Develop a **regional spatial data infrastructure** to facilitate data discovery, sharing, analysis and information dissemination
- 6) Strengthen existing **networks** as well as **collaborate** with potential new partners involved in providing space based solutions for DRR and DM

Notes:

- 1) Main regional organizations: SOPAC, SPC, USP, SPREP, UN(s), GREAT, GNS, etc.
 - a. Need technical support node (e.g. SOPAC) to process space data products and pass on to countries/regions
 - i. Should be able to integrate downstream with national data to do integrated analysis
 - ii. Capacity already exists, but can be streamlined
 - iii. Space/gis/rs tech taskgroup... activated as/when needed or permanent
 - b. How will this group/mechanism be financed?

- i. Need reserve funding for purchase of image data (alternative to International Charter / Sentinel Asia) – a local ‘solution’, no need for external ‘approval’
 - c. USP possible base for Pacific Geospatial Centre
 - i. Long-term sustainable environment (funding and human capacity)
 - ii. New ICT centre with high-spec facilities
 - d. Other possible homes – SOPAC / SPC
 - e. Pacific ground receiving station
 - i. Longer term goal, but high costs and tech support
- 2) Pacific Disaster Risk Management Partnership
 - a. We know what’s happening through regional activities
 - b. Need to know what is happening at national level in DRR/DM
- 3) Need a funding source to ‘do’ this stuff
- 4) Need a data ‘charter’ to encourage organizations to share data
 - a. ‘Activated’ during a disaster
 - b. Difficult to implement for private organizations
- 5) Needs Analysis of Disaster Managers
 - a. Fiji – need standardized process for damage assessment - How does information get communicated from the field back to DM centre?
 - b. New Zealand – Fire service is the main data agency that provides support to DM communications
- 6) Collaboration method
 - a. Pacific Disaster Net (chat/forum)
 - b. GISPacNet

Initial steps to be taken:

- 1) Complete a inventory of data and human capacities based on a common schema
 - a. Template distributed within 1 month, returned 2 months later
 - b. Use this as an opportunity to lean on national GIS community to keep up with inventory
 - c. Forward to PDC/SOPAC and posted on PDN
- 2) Inventories compared and gaps identified
 - a. Who does this? UNESCAP, and can also suggest / coordinate training opportunities with / supporting existing training / capacity building opportunities

Group 2

Understanding the Current Needs and Opportunities, Gaps and Constraints

- 1) Governance
 - a. National Action Plans needed
 - b. Policies and plans need to include technology
 - c. Structures for ‘free’ and easy information sharing at the sector level
 - d. Established lines of communication – response perspective
 - e. Who has decision making power?
 - f. Socio-political will on reducing poverty and risks

- 2) Information / Knowledge
 - a. Awareness of Public
 - b. Mapping of hazards
 - c. Training
 - d. Dissemination
 - e. Location specific / hazard specific geospatial information
 - f. Creation of Information Manager role
 - g. Strengthen prediction
 - h. Knowing who does what - role in a natural disaster?
 - i. Need to know who is responsible for communication using / via geospatial technology e.g. - who talks to whom?
 - j. Engagement with regional information sharing networks (Pacific Disaster Risk Management Partnership Network)
 - k. Archiving of knowledge
- 3) Hazard analysis & evaluation
 - a. Prediction of severity and regularity of hazards
 - b. Vulnerability analysis
 - c. Identification of prone areas
 - d. Photo inventory database
- 4) Planning for preparedness response and recovery
 - a. Development of sufficient geo-tech infrastructure
 - b. Preparedness of up to date 'relevant' hazard maps
 - c. Identification of shelters and clinical facilities
 - d. Population / Demographic mapping
 - e. Database of inventories / stock piling
 - f. Utility database
 - g. Geo-database
 - h. Including infrastructure – such as hardware/software
 - i. Early warning systems
- 5) Early warning systems
 - a. Improved monitoring and detection of hazards
 - b. Warning at different stages
- 6) Risk reduction
 - a. Integrate every day knowledge with geo-tech techniques for hazards – so we can simplify for non-technical audiences with other forms of knowledge to make information easily understood
 - b. Timely and accurate information relating to possible risks
 - c. Mapping of vulnerabilities and identification of development programme aimed at building resilience

Guidelines for National Disaster Management Offices:

- 1) Lands, Health, Education, Agriculture, Meteorology, Geology, etc.
 - a. Filling personnel (GIS)
 - i. Creation of role
 - ii. Upgrading of skills of existing staff
- 2) Specific courses and institutes for GIS & disaster management
 - a. ESRI
- 3) Produce case studies and models to outline the value of GIS capacity building
 - a. Develop local, national, and regional modelling capacities

- i. Tsunamis and cyclones – Regional impact models needed
 - ii. Other hazards – national models
 - b. Use information from one model to feed into another
 - i. Cyclone information can feed flood models, for example
 - c. Pacific Disaster Net could be used to share data, which can be fed into the model
- 4) Identify current research projects which can be duplicated and tested.
- 5) Coordinate funding
- 6) Coordinate expertise transfer
- 7) Create mechanism for accessing available imagery
- 8) Early Warning Systems
 - a. Creation of a EWS is needed for extreme events, in collaboration with WMO and NHMS
 - b. Disseminated information should be audience-specific