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FOR INFORMATION

Question 22/2: Utilization of ICT for disaster management and active and passive space-based sensing systems as they apply to disaster prediction, detection and mitigation

STUDY GROUP 2

SOURCE: BDT FOCAL POINT FOR QUESTION 22/2

TITLE: BACKGROUND DOCUMENT FOR STUDY GROUP 2 MEETING ON QUESTION 22/2

Abstract:

This document provides background information for Study Group 2 Question 22/2 on the activities of the BDT in disaster prevention, preparedness, relief, and network reconstruction/rehabilitation. It also points to available resources and initiatives by ITU-T, ITU-R, and other United Nations Agencies. The document makes a number of recommendations in support of this Study Question. These include the strengthening of cooperation between the sectors, a proposal to establish a solid Platform for Public-Private Partnerships (PPPP), possible creation of a Global Emergency Telecommunications Fund (GETF), and the launch of a Tampere Convention Series of Events (TCSE).

The document is prepared against the backdrop of an unprecedented increase in disasters. The United Nations reported 360 natural disasters in 2005, with a death toll of 91'900 in addition to the Asian tsunami that claimed some 250'000 lives. Tens of millions were left destitute and in need of aid. These disasters have shown that relief work is often hampered by complete or partial break down in telecommunications. This, despite the fact that telecommunications/ICT are essential for coordinating complicated logistics and ensuring the effective delivery of rescue and relief operations i.e. finding out where the survivors are, how many people are injured or are dead, and how many need medical help or transportation to medical facilities.

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1. Background

Study Group 2 Question 22/2 was adopted by the fourth World Telecommunication Development Conference that was held in Doha, Qatar from 7-15 March 2006 (WTDC-06). The Study Question was proposed against the backdrop of a spate of disasters that have wreaked havoc in many parts of the world in recent years with devastating effects on human life and infrastructure.

2. Recent Work in this area by ITU Sectors

The work of the ITU in emergency telecommunications is rooted in all the three Sectors. Below is a summary of the work that has been carried out by each Sector to date:

2.1 Telecommunication Development Sector (ITU-D): Work Done by the Secretariat

2.1.1 Activities Related to the Tsunami

In 2002 BDT developed a project that resulted in a co-financing arrangement between Inmarsat Limited and ITU aimed at helping countries respond more effectively to disasters through the deployment and use of satellite terminals after disasters strike in line with Resolution 34 of the World Telecommunication Development Conference of 2002 (WTDC-02). This project has already been used to provide assistance to some of the countries affected by the December 26, 2005 tsunami, Kashmir earthquake of 2005, and Suriname floods of 2006.

In the aftermath of the earthquake and **tsunami** of 26 December 2004, BDT was requested by some of the countries that had been affected by the disaster to offer assistance to enhance their disaster response efforts. In the immediate term, assistance was provided to some of the countries through the deployment of Inmarsat satellite terminals with the airtime paid by the BDT. This assistance was given to **SRI LANKA** who received satellite terminals and related training in the use of that equipment. **THAILAND** received technical and operational training in the use of these terminals. BDT also carried out assessments of damages to the telecommunication infrastructure of the affected countries. This exercise resulted in the drafting of country-specific project documents for reconstruction/rehabilitation of networks and connecting ICT to Early Warning Systems. In the medium term, resource mobilization was carried. Four project documents on the rehabilitation and reconstruction of telecommunication infrastructure in **BANGLADESH, MALDIVES, SRI LANKA, and INDONESIA** were then drafted and submitted to the Telecom Surplus Steering Committee that immediately approved seed money to the tune of US$250’000 and requested that other partners be found to augment these funds. The **Australian government** contributed a sum of $452’000 and **Rohde & Schwarz**, an ITU-D private sector member contributed Euros 50’000.

Further deployments were done in Pakistan following the massive earthquake that struck the Pakistan-India border area in October 2005. The satellite equipment that was deployed was used to coordinate rescue operations and for telemedicine purposes. Most recently, a major deployment was carried out in Suriname following heavy rains that triggered floods.

Following the powerful magnitude 6.3 earthquake of Saturday 27 May 2006 that struck **Java Island**, **INDONESIA**, ITU, in partnership with UNITAR Operational Satellite (UNOSAT), assisted the government of **INDONESIA** with the provision of satellite imagery, mapping services and training in **Yogjakarta** for post-disaster telecommunication network planning, rehabilitation and vulnerability reduction.

2.1.2 Contributing to the Work of Radio Amateurs

In 2004, ITU held a joint training course with the contribution of the **INTERNATIONAL RADIO AMATEURS UNION (IARU).** The course on the role and challenges confronting radio amateurs was targeted at telecommunication regulatory agencies from English speaking African countries

and was held in Nairobi, KENYA. A similar course for the French speaking African countries is scheduled to run from 24-28 July 2006. It will be held in Dakar, SENEGAL. Course details are at: http://web/ITU-D/emergencytelecoms/events.html

Similar courses will be jointly developed and carried out for other regions.

2.1.3 Handbook on Emergency Telecommunications

In 2004, ITU-D embarked on a project to produce a new Handbook on Emergency Telecommunications that was later on published in January 2005. A questionnaire was sent out to all Administrations seeking contributions to this new Handbook. The responses that were received were incorporated into the work of a group of experts who contributed to this handbook.

The drafting of a Handbook on Emergency Telecommunications took into account the work of the ITU-D Study Group 2 (1998-2002) that produced the Handbook on Disaster Communications. Details on the Handbook on Emergency Telecommunications are available at: http://www.itu.int/pub/D-HDB-HET-2004/en

2.1.4 Contribution to International Conferences/Meetings

Since January 2005, ITU has participated in a series of high-level international meetings on preparedness, Early Warning Systems, response and relief, and reconstruction. The first such meeting was the International Meeting to Review the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States that was held in Port Louis, Mauritius from 10 to 14 January 2005.

Visit: *http://www.un.org/smallislands2005/*.

This meeting was then followed by the Kobe, Japan World Conference on Disaster Reduction that was held from 18 to 22 January 2005 in Kobe, Japan. See: *http://www.unisdr.org/wcdr*. Prior to this BDT contributed a paper to the United Nations publication, KNOW RISK, coordinated by the United Nations Inter-agency secretariat of the International Strategy for Disaster Reduction (see: www.unisdr.org). The publication is on sale at the United Nations bookshops.

Thailand organized the Phuket Ministerial Meeting on Regional Cooperation on Tsunami Early Warning Arrangements on 28 and 29 January. Visit: *http://ioc.unesco.org/indotsunami/documents/PhuketMinisterialDeclaration.pdf*.

From 17 to 19 February 2005, BDT participated in a Conference on ICT Solutions for Disaster Recovery Management and Global Warning: Learning from Tsunami, hosted by Thailand in Phuket, Thailand. Visit: *http://sipaphuket.org/materials.htm*.

BDT presented a paper at an ITU organized special themed session on telecommunications for disaster relief that was held on 22 February 2005 during the second Preparatory Meeting for Phase Two of the World Summit on the Information Society. Visit: *http://www.itu.int/osg/spu/wsis-pp/wsis-pp/dr/programme_itu.html*.

On 28 February 2005, a joint APT/ITU meeting on the role of ICT for disaster reduction was held in Bangkok, Thailand. See: *http://www.aptsec.org/meetings/2005/apg07-2/ict.htm*.

UNESCO organized the International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean within a global framework from 3 to 8 March 2005 in Paris, France. See: *http://ioc.unesco.org/indotsunami/paris_march05.htm*.

The Second International Coordination Meeting for the Development of a Tsunami Warning and Mitigation System for the Indian Ocean was also organized by UNESCO and held in Grand-Baie, Mauritius from 14 to 16 April 2005. See: *http://ioc.unesco.org/indotsunami/mauritius05/mauritius05.htm*.

From 19 to 20 October 2005, BDT participated in a conference on Disaster Risk Reduction that was hosted in George, South Africa by the Disaster Management Institute of Southern Africa (DMISA). Details of this meeting are at: http://www.disaster.co.za/view.php?id=drr2005

In November 2005 a World Conference on Disaster Reduction with a focus on corporate sector role and responsibility was held Mumbai, India from 16 to 18. Documents are available at: http://www.ids-environment.com/environment/europe/disaster_reduction_conference_mumbai/39/newsrelease_content.html

BDT participated at the Ministerial Conference on Disaster Risk Reduction Conference that was held from 5 to 7 December 2005 in Addis Ababa, Ethiopia. Visit: http://www.unisdr.org/africa/af-partners/docs/AU-meeting-report-DRR-experts.doc

From 23 to 24 May 2006, BDT participated in the Symposium on Multi-hazard Early Warning Systems for Integrated Disaster Risk Management that was hosted by the World Metrological Organization in Geneva. Details are at: http://www.wmo.int/disasters/ews_symposium_2006/

BDT participated in the European Forum on International Disaster Response Laws, Rules and Principles (IDRL) conference hosted by the International Federation of Red Cross and Red Crescent Societies in Antalya, Turkey from 25 to 26 May 2006. Documents are found at: http://www.ifrc.org/what/disasters/IDRL/euro-forum.asp

The European Telecommunications Resilience and Recovery Association held its 4th Annual Conference from 1st to 2nd June 2006 hosted at the European Telecommunications Standards Institute in Nice, France. Details are at: http://www.etr2a.org/page/day1.cfm

BDT also contributed to the International Conference on Emergency Telecommunications that was held in Tampere, Finland from 18-20 June, 2006. The conference focused on the ratification and implementation of the Tampere Convention. As one of its recommendation, ITU should hold an information session at the 2006 Plenipotentiary Conference to be held in November 2006, in Antalya, Turkey. Details are found at:

http://www3.hermia.fi/in_english/icec2006/

ITU Focal Point for Emergency Telecommunications used all these occasions to highlight ITU's ongoing work in disaster mitigation through an ICT based multi-hazard approach, and also reinforced the organization's position as the competent United Nations Specialized Agency with the mandate to help the international community with appropriate ICT solutions that can ensure timely information dissemination be it before, during, and after disasters strike. To effectively showcase ITU-D's work on emergency telecommunications a website was created at: www.itu.int/itu-d/emergencytelecoms.

BDT is co-organizing with the Commonwealth Telecommunications Organization (CTO) a workshop for the Caribbean countries to be held in Jamaica from 26 to 28 September 2006. The objectives of the meeting will be to identify constraints faced by humanitarian organizations in using ICT for disaster mitigation and draw strategies for effective deployment of such resources.

2.1.5 Partnerships

BDT has developed and entered into a number of partnership agreements with governments, private sector, and regional organizations. For instance:

- Agreement with Inmarsat Limited to provide satellite terminals for disaster relief with ITU paying for airtime signed in 2002,

- Agreement with Rohde & Schwarz to provide funding for the production of the Handbook that was concluded in 2004
- Agreement with Asian Disaster Preparedness Center to improve emergency telecommunication in disaster situations that was signed in 2005,
- Agreement with Thuraya Satellite Company that was concluded in 2006.

More information is available at: http://web/ITU-D/emergencytelecoms/partnerships.html

2.1.6 WTDC-06 Outputs Relevant to Emergency Telecommunications

WTDC-06 made three key decisions related to Emergency Telecommunications. First, it adopted Question 22/2 on the Utilization of ICT for disaster management and active and passive space-based sensing systems as they apply to disaster prediction, detection and mitigation. Second, it adopted Resolution 34 on The Role of Telecommunications/ICT in Early Warning and mitigation of disasters and humanitarian assistance. Third, it adopted a programme that is responsible for Emergency Telecommunications. Details are available at: http://web/ITU-D/wtdc06/pdf/wtdc06-finalreport.pdf

2.2 Telecommunication Standardization Sector (ITU-T)

Although ITU-T is not involved in emergency and disaster relief operations per se, it develops Recommendations that are fundamental for the implementation of interoperable systems and telecommunication facilities that will allow relief workers to smoothly deploy telecom equipment. Supplementary information material has also been produced by some of the study groups. Substantial effort has been put into coordination and collaboration with other bodies, including the organization of a workshop in 2002.

2.2.1 Partnership Coordination Panel on TDR

In order to better support and coordinate its standardization work relating to emergency telecommunications, ITU-T has established a coordination group called Partnership Coordination Panel on Telecommunications for Disaster Relief (PCT-TDR) as a follow-up action from the ITU-T Workshop on Telecommunications for Disaster Relief (Geneva, 17-19 February 2003; see http://www.itu.int/ITU-T/worksem/ets). On 2 May 2006, a PCP-TDR meeting took place in Geneva. Documents can be found at: http://ftp3.itu.ch/pcptdr/meetings/0605-Geneva/.

The PCP-TDR gathers people working with standardization of telecommunications technologies for disaster relief (ITU, ISO, Organization for the Advancement of Structured Information Standards (OASIS), etc) and representatives of relief organizations, such as United Nations High Commissariat for Refugees (UN-HCR), UN Office for Coordination of Humanitarian Affairs (UN-OCHA), International Federation of the Red Cross and Red Crescent (IFRC), and Telecoms Sans Frontière (TSF).

At the Telecommunication Standardization Advisory Group (TSAG) meeting held in Geneva, 7-11 November 2005, a coordinating focal point was defined in ITU-T by designating ITU-T Study Group 2 as the Lead Study Group for Telecommunication for Disaster Relief/Early Warning instead of ITU-T Study Group 16 in accordance with the decision of the World Telecommunication Standardization Assembly of 2004 (WTSA-2004).

A Joint ITU/OASIS Workshop and Demonstration of Advances in ICT Standards for Public Warning will take place in October 2006 that will bring together all these partners to review current developments in Early Warning (EW) and telecommunication for disaster relief (TDR), cover all areas that can benefit from telecom standards and ensure standardization activities are well coordinated. Invitations were issued under Circular Letter 98.

2.2.2 Technical documents for TDR/EW

A number of Recommendations have been developed for call priority schemes that ensure that relief workers can get telecommunication lines when they need to. For example E.106 defines the International Emergency Preferential Scheme (IEPS), which aims to provide authorised emergency personnel a higher probability of successful communication using the PSTN under high network load conditions such as those that might occur in an emergency. There are also Recommendations that extend call priority to IP-based systems designed by ITU, H.323 and IP-Cablecom, and other provisions such as telecom network management in emergency situations (M.3350), and a Framework for support of emergency communications in the Next Generation Network (Y.1271).

Complementary to the need to provide call priority during emergencies is the ability to deliver warnings to users. The new Recommendation H.460.21 provides a message broadcast mechanism in H.323 systems, which are widely deployed worldwide for Voice over IP (VoIP) communications. This mechanism is akin to that of Cell Broadcast for mobile systems and can be used by network operators and service providers to deliver early warning messages to a large number of users on an administrative domain without causing overload of the underlying network infrastructure. Work is ongoing on national and international numbering schemes for disaster management.

There are two Recommendations under consideration i.e. on Emergency Telecommunications Services (ETS) for national use and on Telecommunications for Disaster Relief (TDR). This is in support of Recommendation E.106.

2.2.3 ITU-T Action Plan

ITU-T also created an *ITU-T Action Plan for Standardization on Telecommunications for Disaster Relief and Early Warning (TDR/EW)* motivated by the identification of the need for new telecommunication standards following the Indian Ocean tsunami of December 2004. It was sent to all ITU-T Study Groups for their action and comment.

All Study Groups were encouraged to increase their activities in the definition of Recommendations and other materials (e.g. handbooks) on TDR/EW and to provide feedback to TSAG and ITU-T Study Group 2 (which is to coordinate the effort) on actions taken and on proposals for improvement to the Action Plan.

2.3 Radiocommunication Sector (ITU-R)

The Radiocommunication Bureau is involved in a number of activities that has to do with disaster mitigation. These include spectrum management, establishment of globally/regionally harmonized frequency bands, and application of amateur and amateur-satellite services, emergency broadcasting, and remote sensing. The Maritime mobile Access and Retrieval System (MARS), has been deployed by ITU since 1995 with the purpose of providing the maritime community, in particular those entities that are involved in search and rescue activities, with the most up-to-date data registered in the ITU master ship station database. The ITU has a major role in the implementation and operation of the Global Maritime Distress and Safety System (GMDSS) to provide the communication support needed to implement the search and rescue plan. The system is based on a combination of satellite and terrestrial radio services, and has changed international distress communications from being primarily ship-to-ship based to ship-to-shore based (Rescue Coordination Centers). Information is available at: http://www/ITU-R/terrestrial/mars/index.asp

ITU-R has produced a number of Recommendations and resources that are compiled in a new publication entitled: Emergency and Disaster Relief (ITU-R Special Supplement, Edition 2006). Detailed information on the activities of Study Groups in ITU-R is given below:

http://www.itu.int/ITU-R/information/emergency/index.asp

ITU-R is also invited to pursue studies on the further identification of suitable frequency bands that could be used on a global/regional basis for public protection and disaster relief (PPDR), as well as on facilitating cross-border circulation of equipment intended for use in emergency and disaster relief situations - the second of these tasks being reinforced by the Tampere Convention on the provision of telecommunication resources for disaster mitigation and relief operations. Impetus for the work also comes from several Resolutions of World Radiocommunication Conferences (Resolution 644 (WRC-2000) , Resolution 646 (WRC-03)) requesting ITU-R to study aspects of radiocommunications relevant to disaster mitigation and relief operations.

2.3.1 Study Group 4 (Fixed-satellite service)

Work is ongoing to revise Recommendation ITU-R S.1001 entitled “Use of systems in the FSS in the event of natural disasters and similar emergencies for warning and relief operations”, (approval on April 2006; see Document 4/67r1). The revision contains a new section on the use of small earth stations for relief operations.

2.3.1 Study Group 6 (Broadcasting services)

The Study Group looks at how Broadcasting-Satellite Service (BSS) can assist in warning the public of impending disasters and in disseminating information relating to relief operations (Document 6/183). This was followed by the approval of Question ITU-R 118/6 entitled “Broadcasting means for public warning and disaster relief”.

2.3.2 Study Group 7 (Science services)

The Study Group addresses those services associated with scientific aspects of the subject. The meteorological aids, meteorological-satellite and Earth exploration-satellite services play a major role in the prediction and detection of disasters and in retrieving and relaying data from monitoring equipment (e.g. on buoys) to land-based siren systems.

Amongst new texts currently in preparation are Recommendations on ground-based meteorological aids systems using optical frequencies, spectrum aspects of active and passive sensors (for example used for meteorological observations, vegetation cover assessment, detection of fires and oil leaks, etc.), data collection and dissemination, and interference mitigation techniques applicable in certain bands used by the Earth exploration satellite service. (See http://www.itu.int/ITU-R/study-groups/rsg7/index.asp for further details.) In addition, a Handbook is in preparation on the Earth exploration satellite service which will complement the already existing handbook on the use of radio spectrum for meteorology, written in conjunction with IMO, that also describes modern meteorological systems, tools and methods; (http://www.itu.int/publications/productslist.aspx?lang=e&CategoryID=R-HDB&product=R-HDB-45).

2.3.3 Study Group 8 (Mobile, Radiodetermination, Amateur and related satellite services)

The Study Group is responsible for many Recommendations that have a bearing on emergency and disaster relief communications. Typically these provide the technical characteristics of equipment associated with the GMDSS (Global Maritime Distress and Safety System), which include such examples as the transmission characteristics of emergency position-indicating radio beacons (EPIRB) and of a universal shipborne automatic identification system. The Study Group has also been instrumental in studies on PPDR (Public Protection and Disaster Relief) and in this respect organized a Workshop on the topic in 2002

(See http://www.itu.int/ITU-R/study-groups/rsg8/rwp8a/seminars/protection/index.html).

2.3.4 Study Group 9 (Fixed service)

Two new Questions have been adopted addressing the need for technical and operational characteristics of systems in the fixed service for disaster mitigation and relief, one of the Questions placing particular emphasis on systems operating in the MF/HF bands, (Documents 9/54, 9/52). At the same time, the Study Group has prepared a significant revision to Recommendation ITU-R F.1105 - "Fixed wireless systems for disaster mitigation and relief operations".

3. Recommendations

3.1 Strengthening Cooperation between the Sectors

BDT should continue to coordinate its work with the two other sectors related to disaster relief and mitigation. The challenge is to bring information dissemination to centre stage in all the ongoing disaster mitigation work. The strategy should be to promote the use ICT for multi-hazard preparedness, response and relief and to ensure that current efforts to establish Early Warning Systems take into account the need for reliable and timely telecommunications networks that provide a variety of channels of communication such as broadcasting, Internet, mobile through voice and short messaging service (SMS), etc. As new technologies emerge, relevant telecommunications standards, appropriate spectrum for emergency telecommunications, and appropriate regulatory frameworks should be developed so as to facilitate the deployment and use of telecommunications equipment for disaster relief.

3.2 Establishment of a solid Platform for Public-Private Partnership (PPPP) By BDT

Partnership building with satellite, fixed and mobile operators, broadcasters, industry, and governments is critical. These entities should bring together resources for effective disaster mitigation.

3.3 Possible creation of a Global Emergency Telecommunications Fund (GETF)

This fund should provide immediate financing to countries affected by disasters in those activities within the mandate of the ITU. The Fund is proposed to be managed by ITU in providing telecommunications/ICT facilities for Early Warning, and Disaster Relief.

3.4 Launch of a Tampere Convention Series of Events (TCSE)

The aim of this initiative is to promote the ratification and implementation of the Tampere Convention in line with WTDC-06 Resolution 34. National and regional multi-stakeholder events will be organized in all the regions to explain the importance of this international treaty, the ratification process and how to overcome implementation barriers. The first such event will be held at the ITU Plenipotentiary Conference 2006 in Turkey as recommended by the International Conference on Emergency Telecommunications (ICEC-2006).

3.5 Integrate the output of Q 22/2 into yearly BDT activities carried out on the basis of implementing the Doha Action Plan. Also, to prepare relevant input documents to the Study Group on this Question. Any such reports should take into account the resolutions of PP-06.

3.6 Conclusions

The output of the Question will provide administrations with information on the establishment or modernization of national or regional disaster management systems and plans. A report will be developed, providing a survey of active and passive space-based sensing systems and applications that can be used for the purpose of disaster prediction, detection and mitigation. The Rapporteur's Group will work in collaboration with BDT Programme 6, and ITU-T and where relevant with

ITU-R. Draft final reports and any proposed draft recommendations/guidelines will be submitted to Study Group 2 within four years.