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“SOS”— Is Anyone Getting This Message?¹

SYLVIA OSPINA, JD, LL.M.
S. Ospina & Associates-Consultants
Coral Gables, Florida
sospina@bellsouth.net

Since December 2004, we have witnessed a series of devastating natural disasters, with huge losses of life and homes, as well as the displacement of millions of people. Hundreds of organizations of all kinds have endeavored to provide a variety of rescue and relief services to the victims of these calamities. But most of them seem to face the same problem: lack of communication amongst themselves, leading to, or resulting in less than well-coordinated and effective relief efforts.

One reason for the lack of coordinated efforts is that terrestrial means of communication, whether telephone lines or accessible roads, are usually the first to be knocked out of service. Another reason is that the different agencies, whether governmental, non-governmental, international, national, local, public or private institutions, each has its own communications policies and systems, utilizing different radio frequencies. These systems often are not compatible with each other, thus delaying notification amongst the users, and consequently, delaying relief efforts as well.

At the end of the day, communications will either “make” or “break” disaster relief efforts, and satellite communications have proven that they are the best, if not essential, means to convey information in times of disaster, since they do not rely entirely on the terrestrial infrastructure. Even so, much remains to be done to improve communications at all levels, even amongst users of satellite systems.

The International Telecommunication Union (ITU) as well as national entities involved in radio frequency management are striving to improve on this situation, by studying the possibility of ensuring that certain frequencies bands are available on a regional basis for emergency communications. If they succeed in setting apart frequencies to be used by most, if not all the entities involved in emergency response and relief efforts, in future these efforts will be more productive and efficient.

Greater coordination amongst national and international agencies is needed, as well as greater cooperation between the technical people and policy makers. This paper will examine some of the efforts that are being made to make better use of the radio frequency spectrum and in particular, of satellite systems, to improve rescue and relief efforts on a global basis.

Many natural (and man-made) disasters¹ have greatly affected our lives in the past few years. Are there more of them, or are they reported more frequently, thanks to the globalization of television and news programs? The same media that bring us the bad news are the ones that are used to facilitate emergency assistance, humanitarian aide to the victims of

these tragedies. The focus of this paper will be on natural disasters, those that occur without direct human intervention (such as wars), even though the results may be the same: displacement of people, contamination of arable land, destruction of the infrastructure.

Several “leitmotifs” recur when referring to natural disasters: lack of adequate

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forecasting, and therefore, lack of planning for them; lack of equipment, both minimal and back-up, and lack of coordination amongst the entities providing relief or recovery efforts after the event. Another "leitmotif" is the need for adequate means of communication, prior to, during, and after the disaster occurs.

Terrestrial means of communication, whether telephone lines or accessible roads, are usually the first to be knocked out of service, making local communications, and access to the victims difficult, if not impossible. While the provision of physical aid may be hindered, having more wireless communications available would improve the rescue and relief efforts; at least, they could be better coordinated. This will be elaborated upon later.

Another "leitmotif" are the regulatory/policy² hurdles faced by the emergency / relief entities, whether governmental or non-governmental, international or national. Regulatory barriers seem to exist at all levels; they tend to impede adequate assessments of the damages sustained, and thus affect subsequent recovery efforts. They may have a significant impact on local recovery efforts, from the deployment of manpower, to delivery of medical supplies, and other essential goods, such as wireless means of communication.

In examining some of the legal /regulatory aspects of disaster relief efforts, these seem to fall into two general categories: one, those that apply to man-made disasters, such as wars, and are subject to international humanitarian laws.³ The other, are regulations that may apply in times of natural disasters, but involve different treaties and laws. Two recent efforts at simplifying international satellite-based communications for disaster relief and rescue efforts are the Charter on Space and Disaster,⁴ and the Tampere Convention.⁵ These will be elaborated upon later.

Further, there seem to be four levels of regulations / legislation related to relief / rescue efforts: local, regional, national, and international. The local regulations are applicable within a particular community, such as city ordinances. Regional regulations may apply either within an administrative or a geographic sector.⁶ National regulations, however, may supercede regional ones, and

international laws, in turn, may be supercede national legislation. A brief examination of the local and international levels follows.⁷

Local Level

It's said that "charity (or in this instance, communications) begins at home," but at the local level, channels of communication usually are the first to be disrupted, and the local authorities are unsure of what course of action to take. Even where people are trained to provide emergency assistance, local policies (and politics) and regulations may cause unwanted interference in rescue /relief efforts, further exacerbating the crisis situation.⁸ This was quite evident during the relief efforts following Hurricane Katrina, as noted by the Independent Panel on Hurricane Katrina in its report to the Federal Communications Commission (FCC).⁹

In August of 2005, Hurricane Katrina caused the worst natural disaster in the United States' recent history. Thousands were left homeless and without adequate medical care; thousands more people were displaced, with few means of knowing where they were after the hurricane and evacuation. Even now, families are looking for relatives that disappeared during or after the storm, and the Gulf coast is barely beginning to recuperate.¹⁰

One of the points emphasized or recommended by the Independent Panel is the need for better coordination of efforts at the local level, as well as loosening up and waiving some of the requirements to authorize people to act. Thus, at the very basic, local level, regulatory barriers were deemed to have made a bad situation worse. If the lack of coordination and preparedness caused such chaos in the world's most developed country, are these problems compounded in developing countries, where the infrastructure and resources are scarcer?

The Katrina report recommends paying greater attention to the resources available locally, prior to having to use them; the local level is the "last mile" or "first mile," and usually the weakest link. However, this is where satellites, both for communications, and earth observation, can play an important role.

Earth-observation / remote-sensing satellites can provide images and data from before, during, and after the disaster, which can

be used to assess the extent of the damage, as well give some indication as to the type of assistance that is required immediately. The following section will present an overview of recent major international legislative and cooperative efforts that have had a significant positive impact in disaster relief and mitigation endeavors.

International Disaster Mitigation Endeavors

I. The Charter to Achieve Coordinated Use of Space in the Event of Natural and Technological Disasters emerged from UNISPACE III, held in Vienna, Austria, in July, 1999, as an initiative of several space agencies, and was adopted in November 2000.¹¹ The Charter “aims at providing a unified system of data acquisition and delivery to those affected by natural or man-made disasters through Authorized Users. Each member agency has committed resources to support the provisions of the Charter and to help mitigate the effects of disasters on human life and property.”¹²

The purpose of the Charter is to provide data and information resulting from the exploitation of space facilities, in anticipation of a disaster, in the organization of emergency assistance or reconstruction or operations subsequent to a natural disaster.¹³ This objective reflects the intent of Principle XI of the UN Principles Related to Remote Sensing from Outer Space, which states: *Remote sensing shall promote the protection of mankind from disasters. To this end, States participating in remote sensing activities that have identified processed data and analysed information in their possession that may be useful to States affected by natural disasters, or likely to be affected by impending natural disasters, shall transmit such data and information to States concerned as promptly as possible.*¹⁴

Charter members cooperate on a voluntary basis, providing data collected by their earth observation /remote sensing satellites, making the data and processed information available to affected, or potentially affected States as soon as possible, allegedly at no cost to them, or at least “without exchange of funds between them.”¹⁵ It has been pointed out, however, that responding to Charter activations is expensive, but the cost is usually borne at the

agency level, without any significant impact on the national budget.¹⁶

The Charter encourages the widest possible accession of national or international space systems operators, primarily those of earth observation /remote sensing spacecraft, to the Charter,¹⁷ and to date, the Charter has been of benefit in more than 80 instances to countries in all regions of the world that have suffered from floods, hurricanes, earthquakes, forest fires, and other natural disasters.¹⁸ The numerous activations or interventions of the Charter members, attest to its usefulness, and to the value of remote-sensing images and other data in times of disasters.

While the achievements of the Disasters Charter members have been significant, the Charter itself has a few drawbacks. One of them is that becoming -and remaining a member- is on a voluntary basis, and it seems that the member has no legal obligation to provide data or processed information even if doing so would be beneficial to a State affected by a disaster. Since it is a “charter”, it has no force of law; there is no legal obligation for the Parties that have adopted it to comply with its purpose or intention. However, it would be pointless to join the Charter without being willing to share data and information; thus, the goodwill of the participating agency is assumed.

Another drawback is the fact that, should the data or information that is shared be erroneous, the Charter member(s) incur(s) no liability. Art.V, 5.4 states that “no legal action will be taken against the parties in the event of bodily injury or financial loss arising from the execution or non-execution of activities, services or supplies arising out of the Charter.”¹⁹ Thus, despite members’ best efforts, should they provide erroneous data or information that may further worsen the disaster, they are under no legal duty to mitigate the consequences of their error. Further, despite any “Good Samaritan” principle, the agencies are not obliged to provide assistance; they do so on a voluntary basis only.²⁰

However, could liability still be incurred by the State that has given the space agency its legal personality? The Charter members are juridical persons of a State that has launched or procured the launch of an object to outer space, and as such, the State in which it is organized

could be held liable under Art. VII of the Outer Space Treaty, which states: *“Each State Party to the Treaty which launches or procures the launching of an object into outer space...is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth.”*²¹ While it could be argued that remote-sensing data are not a component part of a space object, the data can be collected only by using one of the space object's components, i.e., transponders or other equipment on board the spacecraft.

The Disasters Charter and the Remote Sensing Principles have similar limitations; namely, they are not legally binding. Some authorities maintain that, in order for UN R/S Principle XI²² (and the Charter) to be meaningful, what is needed is an international system based on an enforceable international public policy to monitor potential natural disasters, as well as taking measures to prevent them, or at least reduce the chances of their occurring, and to mitigate their harmful consequences.²³ Another author stresses the need to have an unambiguous legal regime regarding remote-sensing and disasters, “clearly stipulating the...rights and obligations of sensed States and sensing States, data providers, and data recipients,” and their consequent liability.²⁴ Yet another author recommends that international obligations should be identified, policy and procedures clarified, with the aim of establishing a working [legal?] framework.²⁵

While the Disasters Charter is a good starting point in the use of remotely sensed data and information to prevent and mitigate disasters, its usefulness is limited at present by its being a voluntary effort on the part of some space agencies and associated bodies, and not having a clear legal mandate. (Notably absent from its membership roster is the US NASA, the Chinese Space Agency, and the Brazilian Space Agency (SBA), especially since China and Brazil have a cooperative program on earth observation, the CBERS.)²⁶

The Charter will become more useful as more agencies become members, and more countries and corporations develop earth observation capabilities, as well as the capacity to analyze the data. Further, having a more formal legal status than a voluntary association

would likely add to the Charter's and its members' credibility.

Greater cooperation between the operators of earth observation / remote sensing satellites and the telecommunication satellite operators is also needed. Without the latter, the data and information garnered cannot reach the intended recipient(s) in a timely manner. The following section will look at some of the telecommunications sector's disaster relief and mitigation efforts.

II. The Tampere Convention and the International Telecommunication Union (ITU)

Telecommunications play a crucial role in all emergencies, ranging from local calls to the fire brigade, to providing satellite data and images of disasters, as well as facilitating international post-disaster relief efforts.

The ITU Constitution has always accorded absolute priority to emergency life-saving communications, and has recognized the vital role played by telecommunications in deploying resources essential to reducing loss of life, human suffering and physical damage caused by disasters.²⁷ After many years of adopting Resolutions and holding conferences on Disaster Communications, the ITU, together with other United Nations agencies, determined that an International Convention on Disaster Communications was needed, to facilitate the deployment of emergency communication systems, thus facilitating disaster mitigation and relief efforts.

Removal of regulatory barriers and strengthening cooperation among States were endorsed at the first World Telecommunications Development Conference, held in Argentina in 1994. Following the Second World Telecommunications Development Conference (WTDC-98), held in Malta in 1998, the ITU's Development Sector was given the task of ensuring that attention be given to emergency telecommunications as an element of telecom development. One specific result was the drafting of a Handbook on Disaster Communications.²⁸

The 1991 Tampere Declaration on Disaster Communication called for a convention to facilitate reliable telecom systems for disaster mitigation, and finally it became part of the

Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations. It was adopted in 1998, and entered into force 8 January 2005, upon ratification by 30 States. Unlike the Disasters Charter, the Tampere Convention has many international legal underpinnings, and is enforceable law.

Coordination of operations under the terms of this convention is assigned to the United Nations Emergency Relief Coordinator, through the UN Office for the Coordination of Humanitarian Affairs (OCHA), but the Coordinator's responsibilities are limited to coordinating activities of an international nature.²⁹ A State Party requiring telecommunications for disaster mitigation may request assistance from any other State Party, either directly, or through the operational coordinator. The State requesting the assistance shall specify the scope and type of assistance required, and the State(s) to which the request is directed shall determine whether it will provide the assistance requested, and shall specify the terms and conditions, restrictions and cost related to such assistance.³⁰ (The Disasters Charter states that data and information shall be provided without exchange of funds between members.)

Art.4.5, recognizing the importance of national telecommunications law and policy, states that no telecoms assistance shall be provided without the prior consent of the requesting State Party. Intergovernmental and non-governmental agencies are not considered "requesting Parties", and may not request telecoms assistance under this Convention. In other words, the local chapters of international relief organizations, such as the Red Cross/Red Crescent, must ask the State to make the request for telecoms relief; they cannot request it on their own.

On the one hand, Art. 4.8 is quite emphatic on the issue of national sovereign rights: "Nothing in this convention shall interfere with the right of a State Party, under its national law, to direct, control, coordinate and supervise telecommunications assistance provided under this Convention within its territory."

On the other hand, the requesting State is urged to grant certain privileges and

immunities to persons and organizations (other than those domiciled within its territory) that have accepted the request for telecoms assistance, in order for them to perform their functions.³¹

Among the immunities recommended are immunity from arrest and other legal processes in regard to acts or omissions specifically and directly related to the provision of telecoms assistance, although nationals of the requesting Party are not granted these immunities. (The Disasters Charter also states that its members shall not be held liable for losses or injury due to their non/performance under the Charter.)³²

Another immunity sought is exemption from taxation, duties, and other charges for telecoms equipment brought into or purchased in the territory for the purpose of providing telecoms assistance. Further, the Convention urges the expedited issue of licenses, or even exemption from licensing of telecoms equipment brought into the requesting Party's territory. Ownership of the equipment remains with the Party responding to the request, and will be returned to that Party.³³

The Convention also emphasizes that the persons entering the requesting Party's territory have a duty to respect national laws and regulations, and have the duty not to interfere in the domestic affairs of the territory they enter. In other words, while providers of telecoms emergency assistance may enjoy certain privileges and immunities, they need to bear in mind that they are guests of the requesting State, and not above its laws.

One difference between the Disasters Charter and the Tampere Convention relates to payment or reimbursement of costs and fees for the provision of telecoms assistance. Whereas remote sensing data and information are supposed to be provided at no cost, telecoms assistance is provided with the expectation of being remunerated therefor. Article 7 states that these fees will be set forth in writing, as well as the currency in which they will be paid. In determining the cost of services, however, several factors should be kept in consideration, such as the nature of the disaster, the territory in which it occurred, the State's capacity to prepare and respond to the disaster.³⁴

Despite the fact that telecoms have become so essential at all times, but especially during a crisis or disaster, several hurdles remain which hinder rescue and relief efforts in a timely manner. Article 9 of the Tampere Convention addresses these regulatory barriers, urging States Parties to lift these restrictions, or at least reduce them. This Article is the core of the Convention.

Art. 9 of the Convention refers to certain practices, which the ITU Handbook on Disaster Communications regards as the “regulatory paranoia” prevalent among some ITU Administrations. The underlying fear is that communications, and not only telecoms equipment, may fall into the wrong hands, or cause harmful interference.³⁵

Regulatory barriers include, but are not limited to regulations restricting the import or export of telecommunications equipment; the use of the radio frequency spectrum and of certain telecoms equipment; restrictions related to the movement of personnel operating the telecoms equipment; delays in granting licenses or permissions, which impede the rapid deployment of telecom resources for disaster relief operations, and may even defeat the purpose of obtaining the license.

The Convention urges the adoption of several means to reducing regulatory barriers, such as revising existing national regulations (and streamlining the license application procedures); exemption from, or granting temporary waivers of the regulations for specific telecom resources (those that are being provided in response to a disaster).

Another recommendation is recognition of type-approval of telecom equipment and/or operating licenses. Acceptance of foreign type-approval also is one of the recommendations made in the Global Mobile Personal Communication Systems Memorandum of Understanding (GMPCS MOU) drafted by the ITU in the 1990s, to facilitate the deployment of the mobile personal satellite communications systems, such as Iridium and Globalstar. These systems, together with Inmarsat and Thuraya, have provided a variety of emergency telecommunication services around the world, including during and after the Hurricane Katrina disaster.³⁶

The Tampere Convention requests each State to notify the UN operational coordinator of

the measures that it has taken to reduce or remove regulatory barriers, pursuant to the Convention.³⁷ However, “nothing in this Article [9] shall permit the violation or abrogation of obligations and responsibilities imposed by national law, international law, or multi- or bilateral agreements,” including customs and export controls.³⁸

Despite the United Nations and the ITU’s urging for its speedy adoption, it took 7 years for the Tampere Convention to come into force. Only 30 States have ratified it, even though natural disasters have struck all regions in the last few years. Countries that have been the most affected recently by tsunamis, earthquakes, hurricanes and floods, including Afghanistan, China, Cuba, Indonesia, Malaysia, Mexico and Thailand, have not signed the Tampere Convention, although they benefited from emergency telecommunications assistance, *post facto*. However, had early warning equipment been available, some of the damage caused by these disasters may have been avoided, or at least reduced.³⁹ The lack of planning for disasters seems to prevail in most countries, although some are making efforts to be better prepared for future emergencies and natural catastrophes.⁴⁰

The ITU, and the UN’s Secretary-General, Kofi Annan, have emphasized the importance of reliable telecoms links in disaster reduction, and encouraged partnerships among inter/national development programs and the private sector to take appropriate preventive and planning measures to cope with future disasters.⁴¹ But it seems that many States remain unpersuaded. Are there means to induce the ITU Administrations that have not acceded to the Tampere Convention, to do so? Could these States be held liable under some international humanitarian law for not signing this Convention, especially if, by not subscribing to it and not seeking emergency assistance, they worsen the crisis in their territory? Do States not have some responsibility to protect their citizens, to provide emergency (and on-going) rescue and relief to them, or at least to mitigate the damages caused by natural disasters in their territory?

Conclusion and Recommendations

Numerous international organizations, NGOs, and national entities have expended much energy and countless hours in mitigating potential disasters, providing post-facto emergency assistance, and in rebuilding efforts. The recommendations, resolutions, and even international conventions that have emerged from their experience and efforts all stress the crucial role played by telecommunications operators and service providers in times of emergencies or disasters, and the need to have trained telecoms personnel, beginning at the local level.

Both the Disasters Charter⁴² and the ITU-D Handbook on Disaster Communications⁴³ as well as the Katrina Report⁴⁴ point to this need, and make specific recommendations to improve disaster communications and relief efforts. Emergency (and basic) telecom equipment providers could be very instrumental, since they usually provide some training to service providers on the use of their equipment which, in turn, could train the end users. Further, new technologies and equipment are more widely available, which can facilitate emergency communications efforts locally.

At the international level, the ITU and other UN agencies are providing training as well as satellite imagery, for post-disaster telecoms network planning in several countries.⁴⁵ These efforts are in addition to their cooperation within the framework of the World Summit on the Information Society (WSIS),⁴⁶ one of whose aims is to diminish the "digital divide," the gap between the telecom "haves" and the "have-nots."⁴⁷

One proposal that emerged from the 2003 WSIS was the creation of a "digital solidarity fund" to help the less developed countries / regions acquire the necessary equipment to bridge the "digital divide," thereby facilitating their joining the information society. These funds could be used to acquire equipment for basic as well as emergency telecommunications, thus reducing what seems to be a "disaster divide;" i.e., the lack of basic telecoms, let alone back-up equipment for use in emergency situations.⁴⁸

The UN's and ITU's efforts also entail cooperation with the private sector, particularly

now that the major international satellite service providers and operators are mostly private corporations.⁴⁹ The intergovernmental part of INTELSAT, now called "ITSO", and its counterpart at INMARSAT (IMSO) play a key role in enforcing the public service obligations undertaken by their new private owners, to provide services in thin routes and underserved regions. Intelsat and Inmarsat and other private satellite operators have provided emergency telecommunications during and after the recent tsunami, hurricanes and earthquakes, but at cost, without necessarily giving any special discounts to the afflicted territory. (The Tampere Convention states that the cost of the emergency telecoms shall be put in writing, and agreed to prior to services being provided.)⁵⁰

Specific recommendations that have been made by those involved in emergency telecommunications and disaster relief efforts include having solar powered emergency equipment available; more satellite telephones (Globalstar, Iridium, Inmarsat, Thuraya), and radios. It would also be helpful to have these systems operators' willingness to provide low-cost communications for authorities and even the victims' families. (Could they be considered as tax-deductible charitable contributions?)

While much of the emergency telecom and relief efforts are provided by international organizations based in developed countries, the developing countries can also provide lessons on the use of rudimentary equipment that is available to them, and that does not require specialized training to operate. Hand-held radios, simple battery-powered generators, solar energy are available worldwide, and can be used when the infrastructure is damaged. Even hand-cranked radios and telephones are available, and useful in all countries.

Of great importance, regardless of the territory concerned, is the designation of one agency as head coordinator of communications (as recommended in the Katrina Report and ITU-D Handbook, and established in the Tampere Convention). In this respect, the Amateur Radio operators can play a significant role, since they provide services at the local level as well as at the international level, and are familiar with a variety of telecoms equipment and radio frequency usage. At the community level, it would be helpful to designate a few

individuals as focal points for relief or emergency communications and operations.

Another initiative that merits greater attention is allocating and allotting certain radio frequencies on a worldwide and regional basis for emergency telecommunications. Several ITU Members are working on this issue, albeit for implementation at the national level.

Perhaps one of the most important recommendations made in the Tampere Convention, the ITU-D Handbook and the Katrina Report is the need to relax, reduce, or waive some of the national regulatory requirements, all while respecting national sovereignty over telecommunications. Perhaps special licenses could be devised and granted *a priori* to certain organizations or individuals (and type-approval for their essential equipment), that would be registered as emergency telecom providers / operators. If and when their services were required, they would be licensed, and ready to provide services, without having to wait for official decisions.

In this respect, some of the European Union/ European Commission initiatives could serve as guidelines; namely, reform of spectrum management, and easing of licensing requirements, as well as achieving greater harmonization in the provision of services.⁵¹ These issues, however, are not new; they have been discussed and proposed not only in Europe, but also at the WSIS⁵² and in the Global Mobil Personal Communications Services/ Systems Memorandum of Understanding (GMPCS MOU).⁵³ Perhaps the recommendations to reduce regulatory barriers would be accepted more readily by States if they acknowledged that fast telecoms response are crucial in times of disasters. The law should not be an impediment in providing emergency humanitarian aid.

In times of emergencies, mankind tends to unite or bond in ways that do not usually occur, perhaps because what affects our brother humans on one side of the globe affects us all, thanks to the immediacy of global communications. And so, we need to acknowledge that satellite imagery and communications have become an essential component of all these rescue and relief and other humanitarian endeavors, at all levels.

¹ The American Heritage Dictionary of the English Language defines 'disaster' as 'an occurrence inflicting widespread destruction and distress; a grave misfortune; an evil influence of a celestial body, or "ill-starred", from the Italian *disastro*, and French *désastre*.'

² The distinction between policies and regulations is sometimes blurred, particularly when personal decision-making power or authority is involved. Thus, rather than violate "policies", and take action, an agency's policy may be interpreted as a regulation, and result in lack of action.

³ The International Red Cross / Red Crescent Societies (ICRC) play a significant role in times of war, and in enforcing the observance of the Geneva Convention and other treaties related to man-made disasters or casualties. The aid these organizations provide at times of natural disasters, such as earthquakes or floods is significant, but different rules and regulations apply. For the Principles and Rules that the ICRC applies in response to humanitarian assistance and protection, see www.icrc.org.

⁴ Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters [Cited hereinafter as the Disasters Charter.] For the full text, see www.disasterscharter.org.

⁵ Tampere Convention on the Provision of Telecommunications Resources for Disaster Mitigation and Relief Operations, adopted by the Intergovernmental Conference on Emergency Communications (ICET-98), entered into force 8 January 2005. [Cited hereinafter as the Tampere Convention.] For the full text see www.reliefweb.int/telecoms/tampere/icet98-e.htm.

⁶ The International Telecommunication Union (ITU), for purposes of allocating use of the radio frequency spectrum (RFS), has delimited the world in three regions: Region 1 encompasses Europe and Africa; Region 2, the Americas; Region 3, the rest of the world.

⁷ Regional and national regulations are so varied that they deserve a more in-depth analysis than can be provided in this paper.

⁸ See note 2, *supra*, and notes related to the Tampere Convention, *infra*.

⁹ Federal Communications Commission (FCC), Independent Panel Reviewing the Impact of Hurricane Katrina on Communications Networks. One result of this report was the Notice of Proposed Rulemaking, EB Docket No. 06-119, 71 Fed. Reg. 38564, July 7, 2006, aimed at addressing and implementing the recommendations of the

Independent Panel. [Cited hereinafter as the Katrina Report.]

¹⁰ The casualties incurred as a result of this and other hurricanes seem minimal when compared to a recent headline: “Chinese storms leave 15 million homeless”. AP (Associated Press), 25 Aug. 2006.

¹¹ The space agencies participating in the Charter are the European Space Agency (ESA), the French Centre national d'études spatiales (CNES), the Canadian Space Agency (CSA); Argentina's Comisión Nacional de Actividades Espaciales (CONAE); the Indian Space Research Organisation (ISRO); Japan's Aerospace Exploration Agency (JAXA), the US National Oceanic and Atmospheric Administration (NOAA); Centre National des Techniques Spatiales of Algeria; the Nigerian National Space Research and Development entity; Turkey's Tübitak-BILTEN, the UK's BNSC and Surrey Satellite Technology Ltd.

¹² Main web page, Disasters Charter, supra, note 4.

¹³ Art. II, “Purpose of the Charter.” Disasters Charter, supra, note 4.

¹⁴ Principles Related to Remote Sensing from Outer Space; UN Resolution 411/65, adopted 3 December 1986. [Cited hereinafter as the UN R/S Principles.]

¹⁵ Art. III, 3.1, Disasters Charter, supra note 4.

¹⁶ Gabrynowycz, Joanne. Contribution to the IISL/ECSL symposium on ‘Legal Aspects of Disaster Management and the Contribution of the Law of Outer Space,’ held during the 45th Session of the UN COPUS Legal Subcommittee, Vienna, Austria, 3 April 2006.

¹⁷ Art. VI – Accession, Disasters Charter, note 4.

¹⁸ “Recent Activations”, www.disasterscharter.org. (Accessed 10 July /06.)

¹⁹ Art. 5.4 –Associated Bodies, Disasters Charter, supra, note 4.. The 1972 Liability Convention is unlikely to be applicable, since liability is limited to damage caused by a space object to aircraft in flight and to the surface of the Earth.

²⁰ Ito, Atsuyo provides a good discussion on the applicability of the “Good Samaritan” principle to remote-sensing activities and the Disasters Charter. See “Legal Aspects of the International Charter on Space and Major Disasters.” Proceedings of the 47th Colloquium on the Law of Outer Space, Vancouver, Canada (2004), pp.233-41.

²¹ Art.VII, Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies. Entered into force Oct. 1967. [Cited as the Outer Space Treaty hereinafter.]

²² UN R/S Principles, supra, note 14.

²³ Jose Monserrat Filho, Vice President, Brazilian Society of Aerospace Law, in response to this author's query. Dr. Monserrat is one of Brazil's

Delegates to the UN COPUOS. On 15 June 2006, COPUOS approved a new agenda item proposed by the Brazilian delegation, “International Cooperation in the Promotion of the Use of Geospatial data for Sustainable Development.” This item includes a 3-year work plan, which promises to have a positive impact in the use of remote sensing data for sustainable development.

²⁴ Ito, supra, note 20.

²⁵ International Law and Disasters. Contribution of the Japanese delegate to the IISL/ECSL symposium on “Legal Aspects of Disaster Management and the Contribution of the Law of Outer Space,” held during the 45th Session of the UN COPUS Legal Subcommittee, Vienna, Austria, 3 April 2006.

²⁶ According to a recent press report, Brazil will join the US NOAA and other space agencies to create a “planetary big brother,” the Global Earth Observation System of Systems (GEOSS), whose objective will be to track natural disasters before they occur, and attempt to mitigate them. GEOSS plans to compile data from satellites, buoys, and other monitoring systems; to coordinate and centralize the location of the data collected, so that they will be useful. Brazil will be represented by its National Space Research Institute, the Instituto Nacional de Pesquisas Espaciais (INPE) in this endeavor. “Folha de S. Paulo”, 26 Aug, 06. (This press item does not mention the Chinese-Brazilian earth observation satellite program, CBERS.)

²⁷ Preamble, Tampere Convention, supra, note 5. The introduction to this Convention includes references to the numerous UN and ITU Resolutions on which it is based.

²⁸ ITU-D Handbook on Disaster Communications, Chapter 3, “The International Regulatory Framework.” In Sept. 2000 the International Amateur Radio Union (IARU) issued a two-part Handbook on Disaster Communications for the ITU's Telecom Development Sector (ITU-D), to provide training to persons and organizations involved in disaster relief operations and communications. According to IARU, amateur radio operators play a key role at the local—and international—level in times of natural disasters. The Handbook drafters rightfully urge its wide dissemination among all Administrations, telecoms users and operators, not only those in developing countries. It is available at www.itu.int/ITU-D/SG-D/SGO2/100/167VE.DOC. [Cited as the ITU-D Handbook hereinafter.]

²⁹ Art. 2, Tampere Convention, supra, note 5.

³⁰ Art. 4.1-4.3, *ibid*.

³¹ Art.5,, *ibid*. “Privileges, Immunities, and Facilities.”

³² Art.V, 5.4, Disasters Charter, supra, note 4.

³³ Art.5, 5.2-5.5, Tampere Convention, supra, note 5.

³⁴ In regard to fees and cost of telecoms service, bilateral agreements between Administrations and service providers, as well as the World Trade Organization's Annex on Telecommunications should be kept in mind. Now that many, if not most telecommunications operators and service providers are private companies, and no longer State-run monopolies, the issue of paying for services takes on a different meaning. Even during Hurricane Katrina, telecoms services provided by the Red Cross and other agencies were not exactly free. Globalstar, Iridium, Inmarsat, and other satellite operators and service providers charged for their services and the equipment they supplied, ranging from satellite antennas to personal hand-held satellite telephones.

³⁵ Chapter 1, ITU-D Handbook, supra, note 28.

³⁶ "Télécommunications sans frontières (TSFI), an organization based in France, has provided emergency telecom satellite services to many countries, in cooperation with the UNDP, UNICEF, under the terms of the Tampere Convention. TSFI is a member of the UN's Working Group on Emergency Telecommunications (WGET), which was responsible for developing and drafting the Tampere Convention; it is also a partner in the European Community's Humanitarian Office (ECHO). See www.tsfi.org for some of TSFI's telecom partners and projects in which they have been involved.

³⁷ Art. 9.5, Tampere Convention, supra, note 5.

³⁸ Art. 9.7, *ibid.*

³⁹ A recent US government report concluded that 5 years after the 9/11 attacks and months after Hurricane Katrina, most cities and states are unprepared for these types of catastrophes. Major failures include plans to take care of the elderly and others who are unable to help themselves; lack of early warning to the citizens, and failure to designate a clear chain of command. (AP wire service, 6/16/06.)

⁴⁰ An interesting example worth emulating is a disaster communication network set up in one state in India, which has been operating since March 2000. The network is based on VSAT and VHF networks, and has built-in redundancies. In addition to being used for disaster management, the network serves for general government administration and rural development. For a fuller account, see N.K. Chhibber, "Maharashtra's Communication Network for Disaster Management." ITU copyright 2005. <http://www.itu.int/ITU-D/pdf/fg7/mah001.html>.

⁴¹ Excerpt from the Intergovernmental Conference on Emergency Communications (ICET-98), Tampere, Finland, as cited by Zavazava, Cosmas in his article, "[ITU's] Role in Disaster Reduction Through Emergency Telecommunications. ITU, Geneva,

2005. Dr. Zavazava is the ITU's Focal Point for Emergency Telecommunications.

⁴² Disasters Charter, supra, note 4.

⁴³ ITU-D Handbook, supra, note 28.

⁴⁴ Katrina Report, supra, note 9.

⁴⁵ See ITU Newsroom, in particular the ITU-D, or BDT Newslog, (<http://itu.int/ITU-D/CDS/newslog>), which centralizes news activities related to the ITU-D, including emergency telecommunications.

⁴⁶ The World Summit on the Information Society (WSIS) was first convened in Geneva in 2003, and met again in Tunisia in 2005.

⁴⁷ Since its establishment in 1989, the ITU's Development Bureau (ITU-D) has served as a means of channeling UNDP and other funds for telecom development, particularly in the less developed regions of the world. It also serves as a focal point for emergency telecommunications. (See note 41, supra.) The UN's Office for Outer Space Affairs (OOSA) has also been instrumental in the use of space technology in disaster management. See www.oosa.unvienna.org/SAP/stdm.

⁴⁸ Prior to Phase Two of the WSIS in Tunisia (Nov. 2005), a Special Session on Telecoms for Disaster Relief was held in February 2005 in Geneva. It included an overview of ITU work in Telecoms for Disaster Relief, highlighted the key elements of the Tampere Convention, and presumably addressed the "disaster divide" issue.

⁴⁹ INMARSAT and INTELSAT were privatized under terms and conditions specified in the "Open-market Reorganization for the Betterment of International Telecommunications Act, or the ORBIT Act." Public Law 108-180, 17 March 2000. Their intergovernmental components (IMSO and ITSO respectively) are relatively small and less influential than in the past.

⁵⁰ Art.4, Tampere Convention, supra, note 5.

⁵¹ See Gerald Oberst, *European Communications Rules in Play*; VIA SATELLITE, Sept. 2006, p. 14.

⁵² WSIS, supra, note 46.

⁵³ The GMPCS MOU, drafted in the 1990s, could be a useful model and tool to facilitate the importation, type approval, and use of mobile equipment in times of emergency or disaster, if the country involved has incorporated the GMPCS recommendations in its legislation. Otherwise, the GMPCS MOU is not legally binding.