

# Disaster Management Law in the Space Age

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## I. Introduction

Climate change entails prospective increase in natural disasters. Too often governments fail to anticipate and mitigate despite known vulnerability at the disaster site. To illustrate, this paper describes two recent landslide disasters. One landslide is in a developed economy (the United States), the other landslide is in a developing economy (Sri Lanka). Although the country with the developed economy could be expected to have more resources to deal with a disastrous landslide, it appears that neither of these countries was effectively proactive, and neither was prepared for disaster relief after the events. Instead, the main burden falls upon local authorities and the people involved or who live nearby. These observations apply not just to landslides, but to all types of disasters.

The prevailing disaster philosophy of the International Red Cross and Red Crescent is that international disaster assistance should become available only when States are unable to cope with their local disasters. Should such assumptions apply in the space age where satellite technology is available? Satellites can observe and locate disasters as they develop; and the data they collect can be preserved in international data banks and be made available to national authorities to improve their capacity to handle disasters. In the future States may well have to resort to assistance from international sources on a continuing basis rather than wait until they become overwhelmed.

This paper discusses how international resources can be activated for use at an early stage, in particular outer space resources such as remote sensing, Global Navigation Satellite Systems (GNSS) and communications satellites. Existing international authorities, such as the Group on Earth Observations

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(GEO), UN-SPIDER and the International Telecommunication Union (ITU) as well as Non-Governmental Organizations (NGOs) can assist in disaster situations.

There is a fundamental humanitarian duty to assist in emergency situations. That duty was expressed in United Nations General Assembly (UNGA) Resolution 41/65 of 1986 (UN Principles Relating to Remote Sensing of the Earth from Outer Space, UNGA Res. 41/65). Principle X of the UNGA Resolution states that remote sensing shall be used to protect Earth's natural environment so as to avoid harm, and concerned States shall be informed of the danger remotely. States in possession of information about impending natural disasters "shall transmit such data and information to States concerned as promptly as possible." Likewise the Liability Convention, Art XXI, expresses that States, in particular launching States, "shall examine the possibility of rendering appropriate and rapid assistance to the State which has suffered the damage [from a space object], when it so requests." The same humanitarian principle about helping affected States is expressed in the 1972 Stockholm Declaration, Principle 18 (Declaration of the UN Conference on Human Environment, Stockholm 1972, 11 ILM 1416). It is expressed in Principles 18 and 19 of the 1992 Rio Declaration

## **II. Comparison of Two Recent Disastrous Landslides**

The concern of this paper is with disasters in general. But it is useful to compare two actual similar disasters. One is in the developed economy of the United States and one is in the developing economy of Sri Lanka.

### **II.1. Disaster in a Developed Economy: Washington State, USA, Landslide in 2014**

The landslide in Oso, just North of Seattle, Washington in the United States, occurred on March 22, 2014. The event has now been thoroughly studied and analyzed and its causes and effects are well understood. Forty three people perished. The landslide demolished many buildings and caused great physical damage to roads, rivers and to the environment.

The hilly area of the slide was prone to slide. The fragile hills were formed by retreating ice age glaciers about 20.000 years ago. The sediments of the glaciers consist mostly of sand and gravel interspersed with clay and rocks. Steep hills are prone to slide when the level of ground water rises. There were sustained heavy rains prior to the landslide, as described in the 2014 Geer Report.

The area of the 2014 Oso slide has a long history of prior similar slides. "[T]he 2014 Oso Landslide was a reactivation of one of these ancient landslides." At the time of the slide no earthquake activity was recorded on any seismic measuring instrument, thus excluding seismic activity as the cause of the slide. However, heavy rains (as much as 30 inches or 76 centimeters

fell during the month prior to the slide. Heavy logging of timber may have increased the lubricating effect of the groundwater. Trees and plants help to hold hills from sliding.

Lacking knowledge of the land slide history of the area, many people built houses in the dangerous slide-prone area. In fact neither the United States government nor the State of Washington government have existing land-planning regulations or guidelines governing the risks of building and living in the natural landslide-prone areas. On the US Federal level of government the US Federal Emergency Management Agency (FEMA) is charged with Federal management of disasters in the United States. However, other government agencies also become involved in US disaster management. No agency, including FEMA, keeps comprehensive records of disaster remedial efforts by agencies. Such lack of record-keeping undermines US national preparedness for disaster. A report for the US Government Accounting Office recently reported that “FEMA is not aware of the full range of information” possessed by other government agencies.

The Geer Report on the Oso landslide was sponsored by the US National Science Foundation. This report is just a recommendation. The US National Science Foundation, is not a government regulatory agency. It has no enforcement authority. However, the federal government and the state of Washington are free to adopt and enforce these recommendations. The Geer report studied the Oso landslide from a national perspective and recommended as follows:

1. That the geological history of landslide-prone areas be carefully considered by government authorities when planning human activities in those areas.
2. The risks of building in landslide areas must be effectively communicated to people wanting to build in those areas.
3. Slide-prone areas must be closely monitored and for that purpose monitors must be built into the system.
4. Weather must be closely monitored by use of rain gauges and otherwise, and dangers must be communicated to people in slide-prone areas.
5. (5.) New ways to monitor earth slides must constantly be considered.
6. LIDAR and remote sensing imagery should be used to identify potential landslides.

The Governor of the state of Washington also appointed a commission to study the Oso landslide (SR 530 Landslide Commission, Final Report, December 15 2014). It viewed the Oso landslide from the local perspective. The commission made several useful recommendations to the Governor:

1. Using the latest technology such as LIDAR the State should collect data on landslides for local land-use planning. The State should also establish a geological hazards resilience institute.

2. The State emergency management system is in need of improvement and should include proactive preparations for landslides and other disaster emergencies.
3. The State should standardize tracking, mobilizing and demobilizing requests for disaster emergency resources.
4. The State should continue to investigate potential landslides in the area of the 2014 Oso landslide.
5. The State should prioritize requests for emergency assistance in order not to overwhelm emergency management.
6. The State should manage local volunteers for emergencies such as landslides. (7) The State should organize a more effective unified communication system.
7. The State should establish guidelines for designating geological hazard areas and for making assistance available.

The Governor is now acting on several of the Washington state commission's recommendations. Some of the recommendations require the state legislature to provide money for their implementation

## **II.2. Disaster in a Developing Economy Country: Landslide in Badulla, Sri Lanka, 2014**

Sri Lanka has many active landslides. The Sri Lankan government estimates that 20% of Sri Lanka, mostly on the inland tea plantations, is prone to landslides. The Sri Lankan National Building Resources Organization (NBRO) has issued "active warnings for the districts of Kalatara, Niswera Eliya, Badulla, Kand, Matale, Kegalle and Ratnapura which have a combined population of 5.3 million." The emergency management problems regarding the 2014 landslide in Badulla, Sri Lanka are not unlike the emergency management problems in the US state of Washington. The Sri Lanka, landslide occurred on 29 October 2014 on a tea plantation. Initially several hundred people were feared killed.

Like the OSO landslide, the Sri Lanka landslide was preceded by heavy rainfall which caused the hillside to collapse and to bury the tea workers and their homes in a thick layer of mud. The Sri Lankan Disaster Management Center had warned people about the danger of a slide and had conducted evacuation drills. Because Sri Lanka suffered severely from the 2004 Indian Ocean tsunami in 2004, in which 31,000 people died, the government has been diligent about organizing exercises and drills about escaping from natural disasters. The Sri Lanka Disaster Management Center selects locations that are most likely to experience disasters. The Badulla disaster location had a simulated disaster exercise one year prior to the 2014 landslide. However, the tea plantation workers are very poor and do not have alternative places to live, so they tend to remain where they grew up.

In consequence of the Badulla land slide, Sri Lanka is preparing to focus its emergency preparedness more on landslides. In fact the National Building Resources Organization (NBRO) surveyed the Badulla landslide area and proposed that the entire settlement be relocated elsewhere. The Sri Lanka government's Disaster Management Center has included its relocation in its long term plan.

### **II.3. Evaluation**

Failure of disaster management in the United States and Sri Lanka landslides resulted in significant loss of lives and property damage. In some ways Sri Lanka was better prepared than the United States for landslides, having identified vulnerable sites and having marked the site which did slide. But that knowledge did not translate into relocation of the people affected by the landslide. So whether the landslides in both countries were surprises or not, the outcome was the same. Both relied primarily on local resources for prevention and for emergency assistance. Neither of the two countries significantly used international proactive nor post-disaster management assistance. Several important international tools, that can benefit individual countries, will be discussed in the following sections.

## **III. International Disaster Tools**

### **III.1. Weather Forecasting: World Meteorological Organization (WMO)**

Excessive rainfall is a basic ingredient of the Earth liquification process that causes landslides. Therefore, advance information about approaching rains is important in predicting landslides. Storms and hurricanes are also causes of disasters and advance warnings are essential. Warnings are available through highly developed weather prediction. Meteorological satellites observe and report on developing weather patterns. Countries exchange meteorological information within the framework of the WMO. It is now reliably known when it is going to rain 3 days before that happens. If available meteorological data is used skillfully, governments can put effective disaster management into effect before the event occurs. WMO facilitates the international distribution and availability of meteorological information. Developed economy countries are rich sources of weather information. Both the United States and Sri Lanka receive weather information under the framework of the WMO.

### **III.2. Tracking Disasters: Remote Sensing**

Lots of remote sensing data about potential landslides are available. The main problem is for the data to be collected, coordinated, analyzed, and then to be submitted to government decision-makers who are supposed to transmit it down to the low government level at the location of potential disaster areas. The Oso landslide reports indicated both ineffective data collection and

failure of the high and low level government to act despite known dangers. Finally, the people who live in landslide-prone locations may refuse to move for reason of poverty as happened on the Badulla tea plantation in Sri Lanka.

### **III.3. Tracking Disasters: GNSS**

Global Navigation Satellite System (GNSS) satellites provide positioning, timing and navigation services all around the globe. There are four GNSS services in existence: The US Global Positioning System, (GPS) The Russian Global Navigation Satellite System (GLONASS), The European GALILEO, and the Chinese Beidou, in addition to several GNSS augmentation systems. GLONASS faltered financially during the 1990s but is now reestablished. However during that period most of the world became dependent on GPS. European Galileo and Chinese Beidou are available in limited areas. They are in the process of becoming globally available. GNSS can identify and track Earth movements and can track the dynamics and energy of hills likely to slide. Atomic clocks on board each GNSS satellite measure time and movement precisely. Receivers on the ground receive timing signals from several satellites. The receivers on the ground are programmed to compare timing signals and to establish location. Thus receivers planted on the Earth's surface will be able to identify Earth movements at landslide areas.

### **III.4. Tracking Disasters: Telecommunication**

Emergency telecommunication provides important support during disasters. A disaster requires instant decision-making by a coordinator of resources that includes assessment of dangers, knowledge of whether people are trapped, and deployment of rescue workers and their equipment. Communication is needed not only to locate victims at the site of the disaster but also to connect with the outside world to inform government authorities of the magnitude of the disaster so that more resources can be delivered. These are basic lessons learned in past disasters such as the Oso landslide, the Sri Lanka landslide, as well as the 2004 Indian Ocean tsunami and the 2010 Haitian earthquake.

## **IV. United Nations International Disaster Observation and Management**

### **IV.1. The United Nations Coordination Attempts**

The UN Office for the Coordination of Humanitarian Affairs (OCHA) was created to be the centralized coordinator for disaster assistance. However the coordination functions of OCHA are carried out by a number of other UN-related bodies: There is an Emergency Relief Coordinator (ERC) who chairs the Interagency Standing Committee (IASC). The non-governmental assistance groups participate in the IASC. The ERC must coordinate with individual country humanitarian coordinators who in turn represent the assistance team of that country. Coordination with other UN offices is also necessary, including the UN Disaster assistance team, the International

Search and Rescue Advisory Group (INSARAG), the UN Commissioner for Refugees (UNHCR), the World Health Organization and the UN Children's Fund. The responsibilities of these UN offices tend to overlap with each other.

Shortly after the 2 Indian Ocean tsunami disaster, The 2005 United Nations World Conference on Disaster Reduction (WCDR) met in Hyogo, Japan to establish the important International Strategy for Disaster Risk Reduction. The objective of the Conference was to create a strategic and systematic approach to reducing vulnerabilities to hazards. The resulting disaster risk reduction strategy applies to all disasters including earthquakes, tsunamis, and landslides such as those in described in this paper.

#### **IV.2. UN-SPIDER in the United Nations Office of Outer Space Affairs (UNOOSA)**

UNGA Resolution 61/110 of 14 December, 2006 established the "United Nations Platform for Space-based Information for Disaster Management and Emergency Response" – UN-SPIDER, Satellite capabilities have developed significantly since 2006. This Resolution gives UN-SPIDER a significant mandate to engage in space-based disaster risk reduction.

As a result, UN-SPIDER was created as the United Nations Platform for Space-based Information for Disaster Management and Emergency Response. It was created in 2006:

“[T]o 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 circle by being a gateway to space information for disaster management support, serving as a bridge to connect the disaster management and the space communities and being a facilitator of capacity-building and institutional strengthening in particular for developing countries.”

### **V. Beyond the United Nations: The Disaster Charter and Tampere Convention**

#### **V.1. The Disaster Charter**

The International Charter on Space and Major Disasters (Disaster Charter) stems from a recommendation of the 1999 UNISPACE III conference. The Charter is not a treaty. It is an interagency agreement among outer space-related agencies in several countries including the United States, Russia, China, ESA and Canada. All the parties participate in the governing board. It is a voluntary organization. Each participant contributes its own resources (remote sensing, meteorological information, geological information etc). They do not contribute money. The governing board has adopted a policy of universal access to disaster assistance. All countries, whether members of the Charter or not, have the right to obtain assistance from Charter members. The Disaster Charter has been activated hundreds of times and has been

activated in several landslide disasters. One single communication to the Executive Secretariat of the Charter will activate all the resources committed under the Charter, thus providing an efficient delivery of help. The assistance is free to the recipients. However the assistance is limited to the period immediately after the occurrence of the disaster. That includes evacuation and saving of people, immediate assistance and damage assessment. Preparedness, mitigation, risk assessments before the event is outside the scope of the Charter. Furthermore, ongoing assistance, reconstruction, redevelopment activities after the disaster are also outside the scope of the Charter. The Charter must be activated within 10 days of the occurrence of the disaster and is limited to 15 days after the occurrence. Countries may assist individually outside the scope of the Charter.

### **V.2. Tampere Convention**

Several UNGA Resolutions have recommended sharing telecommunication resources. The ITU Constitution Art. 46 requires ITU Member States to accept and communicate emergency distress signals giving them due priority. States are also required to investigate false distress signals within their individual jurisdictions.

The Tampere Convention on the provision of Telecommunication Resources for Disaster Mitigation and Relief Operations (Tampere Convention) facilitates and expedites communication during disasters. The Convention was adopted in Finland in 1998 and entered into force in 2003. The parties are bound by the terms of this treaty to share telecommunication services with countries suffering from disasters. The treaty is a recognition that in the space age disasters are not only local events but they affect communication with other countries. Communication satellites can play a vital part. The experience in many natural disasters has been that local land-based communication systems were destroyed and that the management of the emergency urgently requires replacement communication systems. Frequently satellite communication becomes the main medium of communication. Many countries do not have large scale access to communication satellites. Thus countries in possession of satellite technology must provide it.

### **V.3. The Group on Earth Observations (GEO)**

The aim of the Group of Earth Observations (GEO) is to fill the international gap in Earth observation and particularly in distribution of Earth observation data. GEO is a voluntary international partnership of governments and scientific and technical organizations collaborating to develop a Global Earth Observation System of Systems (GEOSS). The ultimate vision is to create an informed overview of the entire panoply of Earth resources by a coordinated, comprehensive and sustained Earth observation and information service. GEO is independent of the United Nations, but membership of States is limited to UN Members including the European Union.



## **VI. Coordination of international Disaster Assistance**

There is a mixture of efforts supported by a variety of international agreements. There is no single core of multilateral law specifically on international disaster assistance. International disaster assistance stems from a mixture of international agreements, charters, UN Resolutions, State laws, special humanitarian impulses and voluntary actions. Some of the technologies relied on are specifically for disasters, but many are not, for example Earth observation satellites that happen to orbit over disaster areas and observe images of unfolding disasters. The mixture of sources include the Disaster Charter, the Tampere Convention, UN-SPIDER, GEO, and many UNGA resolutions as well as numerous nongovernment organizations (NGOs), specifically the 2007 guidelines of the International Red Cross and Red Crescent Federation and many national humanitarian organizations

### **VI.1. Lack of Coordination among the International Governmental Organizations**

Lack of over-all coordination leads one knowledgeable observer to conclude:

“The costs of coordination failures are serious. Uncoordinated responses lead to duplication, confusion, increased expenses, inefficient use of resources, inappropriate aid and sometimes fatally result in disaster affected persons “not receiving the right aid at the right time, delivered in the right way.”

Thus lack of coordination is a great problem for international disaster assistance. The law governing disasters, whether hard or soft law, needs to be clarified, made uniform, and needs to be extended to cover more than just the aftermath of disasters. It should be broadened to provide relevant assistance prior to disasters in order to mitigate the effects of disasters such as landslides, earthquakes and tsunamis. It should also cover coordination of more of the post-disaster recovery activities including assignment of personnel and allocation of supplies and equipment, assistance to victims. Recognition of the need for greater coordination both among the NGOs and with the UN and with the States that suffer disasters motivated the International Red Cross and Red Crescent in 2007 to address this as an urgent need.

“The International Federation [of the International Red Cross and Red Crescent] believes that improving the regular environment governing all international disaster response actors will increase the speed and effectiveness of both Red Cross and Red Crescent assistance and the overall, response, saving more lives in disasters and public health emergencies, and more completely addressing disaster impact. Sensibly balancing the interest in speed and efficiency of international assistance with the needs for coordination, quality control and complementarity will also help to check the erosion of the roles of local responders that has occurred in some major international operations and that has been regularly criticized in “lessons learned” evaluations.”

### **VI.2. Lack of Coordination in the Activities of Individual States**

Most individual States do not have protocols and laws that assure coordination of relief when a disaster strikes. There are usually few contacts within the national government to deal with disaster assistance from the United Nations and from NGOs. There are usually many government offices with authority only in their area of responsibility. Existing regulations and practices prove to be inadequate for these extraordinary situations. Establishment of new regulations after the disaster is extremely difficult and often comes too late. Some ministries are not able to change. The result is tremendous confusion and consequent frustration of assistance personnel and waste of resources in spite of the very best intentions. For instance, two particularly difficult problems are obtaining entry visas for relief workers and customs entry clearances for relief shipments through local customs.

### **VI.3. The 2007 Red Cross and Red Crescent Guidelines**

As a consequence of the Indian Ocean tsunami disaster, the Red Cross and Red Crescent Federation issued their 2007 Guidelines for the Domestic Facilitation and Regulation of International Disaster Relief and Initial Recovery Assistance (IDRL). The IDRL guidelines are widely appreciated. NGOs are concerned with wasted relief assistance due to lack of coordination. These are the guidelines:

1. The rules are voluntary recommendations. They do not have the binding effect of international law.
2. The guidelines apply to the United Nations as well as to NGO relief organizations.
3. Humanitarian assistance is recognized as a fundamental right by all people.
4. Assistance will not be given to further any political or religious objective.
5. Relief organizations will not act as political instruments of foreign governments.
6. Relief organizations must respect local culture and customs.
7. Relief organizations shall seek to use local sources to provide relief.
8. The beneficiaries of assistance should be involved in relief management.
9. Assistance shall be given with a view towards reduction of future dependence on assistance.
10. Relief organizations will hold themselves accountable both to people being assisted and to those people, organizations or States providing relief resources.
11. Relief organizations will respect the human dignity of disaster victims.
12. Host governments should provide rapid access to the disaster victims.
13. Host governments should facilitate entry of relief goods.
14. Governments should coordinate with and keep relief organizations informed about essential events.

15. Donor governments should respect the independence and impartiality of relief organizations.
16. Cooperation among Inter-governmental organizations and relief organizations is essential.

## **VII. Conclusion and Recommendations**

The following options for improvements in coordination of international disaster management exist:

### **VII.1. A Future Short Term Strategy: Reorganization within the International Organizations and Agencies (incl. UN-SPIDER and UN Committees)**

Art. 1 of the UN Charter gives the United Nations mandate to “achieve international co-operation in solving international problems of [...] humanitarian character. This gives the UN authority to coordinate international humanitarian assistance in disaster situations.

It is commended that data about satellite Earth observation of disaster risks and relief be collected and exchanged on a centralized basis by UN-SPIDER which operates within the scope of the United Nations. Establishing a clearing house of space-related data would not be an unusual activity for UN-SPIDER because UN-SPIDER functions within UNOOSA which already collects space-related data.

### **VII.2. Three Long Term Strategies: Extensions of Tampere, World Trade Organization, and Customary International Law**

At the present time it seems that a new UN treaty on disaster assistance is impractical. There are three other legal regimes that could be changed to permit more effective disaster relief.

#### **VII.2.1. Extension of the Tampere Convention to Include Disaster Assistance Additional to Telecommunications.**

The Tampere Convention is remarkable because it is the first and only treaty on civilian disaster assistance. The treaty recognizes that major disasters can be global issues and that the space age is now available to deal with these issues.

The scope of the convention is currently limited to telecommunication assistance, but the Convention has succeed in breaking new ground on the difficult issues of entry into those sovereign States experiencing the disaster by donor groups (both international governmental and NGOs). The Convention respects the sovereignty of the donor State, it also places responsibility on the host State to arrange for entry of relief workers and relief goods.(Art 9). The Convention is moving in the direction of shifting the legal basis for international assistance from the rights of the donors to provide assistance, to placing the responsibility on the host State to arrange for aid and to facilitate the entry of the donors into the host State.

It is recommended that that the scope of the Tampere Convention be broadened beyond telecommunication to include aspects of international disaster assistance problems.

**VII.2.2. Extension of World Trade Organization to Require Unhindered Importation of Relief Supplies**

The World Trade Organization (WTO) deals with international trade and trade restrictions among States. It might be possible to attach a clause to the WTO trade agreements permitting free imports of goods and services into countries experiencing severe disasters. That would resolve one limited but important problem of disaster relief. Using as a precedent the establishment of the Tampere Convention by the ITU, perhaps WTO could be similarly motivated to adopt a narrow disaster relief clause into the next WTO multilateral trade agreement, because import and export through customs are an aspect of international trade.

**VII.2.3. New Customary International Law Based on the Red Cross and Red Crescent Guidelines**

The Red Cross and Red Crescent Guidelines are *de minimus* guidelines for coordination of all disaster assistance among the NGOs and United Nations as well as for individual disaster assistance. It is in the interest of these parties to avoid waste. They have a self-interest in using these guidelines for coordination. The guidelines are considerate of the concerns of the host countries. They place responsibility on host States to facilitate the entry and use of the disaster assistance being offered to their countries. These guidelines are gaining in acceptance. In the short term they operate as a code of conduct for everybody. They could eventually become generally accepted as customary international law.