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Legal aspects of using space-derived geospatial information for emergency response, with particular reference to the Charter on Space and Major Disasters

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Abstract
Increasing attention is being paid today to the potential offered by geospatial information in particular if generated with the help of satellites to contribute to mitigation of major disasters—tsunamis and earthquakes as much as man-made disasters. The current contribution seeks to outline some of the major legal issues involved in the use space-derived data for emergency response, focusing on four topics: copyrights, access to remote sensing data, responsibilities and liabilities, and security and dual use-issues involved. This contribution forms part of the Leiden faculty of Law research program "securing the rule of law in a world of multilevel jurisdiction: (coherence, institutional principles and fundamental rights."

1 Introduction

Major disasters, man-made as much as natural, seem to be rapidly increasing in both size and frequency over the last years, though this impression may be due partly to the increasing media average of such events—the images from the tsunami that hit South and Southeast Asia, then the catastrophic earthquake in Pakistan, are still fresh on everyone's mind. What is beyond doubt, is the increasing attention being paid to the potential offered by geospatial information, in particular if generated with the help of satellites in outer space, to contribute to mitigation measures in the various phases recognized, from preparedness and alert to long-time rehabilitation.

The most visible aspect thereof no doubt concerns the establishment of the Charter on Space and Major Disasters as of 2000 (Charter on Space and Major Disasters, 1999). The Charter, essentially the first rudimentary "organization" of activities in the field, was established by a number of leading space agencies with operational remote sensing capabilities, initiated by ESA and the French space agency CNES in 1999 as a follow-up to the Unispace in Conference where the potential earth observation in the context of major disasters was prominently discussed. The Canadian Space Agency (CSA), the US National Oceanic and Atmospheric Administration (NOAA), the Indian Space Agency ISRO, the Argentine National Commission on Space Activities CONAE, the Japanese Aerospace Exploration Agency (JAXA) and most recently the British National Space Centre (BNSC) joined on behalf of the Disaster Monitoring Constellation (DMC), so that the Charter currently counts eight full-fledged partners (Charter on Space and Major Disasters, 1999). The United States Geological Survey (USGS) has also joined the Charter as part of the US team.

In many respects, however, the establishment of the Charter merely represents the most institutionalized context for using geospatial information for disaster and emergency response purposes: most of the legal issues playing within the context of the Charter are of wider relevance for the field as a whole. Thus, the current contribution constitutes an effort to discuss some of those international

1 The author would like to thank in particular Gunter Schreier for pointing out some interesting additional facts, which he took the liberty of incorporating in this contribution. Of course, the current version is exclusively the author's responsibility.

legal issues considered of relevance from such a more general perspective. The main limitation here is that of focusing on satellite-derived geospatial information as opposed to *in situ* or airborne methods of generating geospatial information.

This is, indeed, a substantial limitation: mainly because of the novelty of the issue, there is as of yet *no* law or regulation dedicated to, and tailor-made for, the issue. While this does not result in a total legal vacuum, it does mean that recourse will generally be had to a few more general legal regimes, not at all developed with the prospect of deriving geospatial information from satellites in mind, yet turning out to have some bearing thereon as well. The novelty of the issue, moreover, will also mean there is as of yet insufficient practice to go into any details as to what precise impact those general regimes would have on space-derived geospatial information. Law, after all, only comes alive when persons or legal entities start using it for the purposes of defending their own self-perceived interests.

The current contribution will thus address the following four sets of legal international issues in somewhat greater detail:

1. The application of copyrights to geospatial information products relevant for emergency response as far as resulting from satellite activities.
2. The international regime applicable to access to data, which result from remote sensing, and the application of copyrights.
3. Responsibilities and (in particular) liabilities which may result from satellite-based geospatial information operations and activities.
4. Security and dual-use issues in the context of using geospatial information for emergency response, to the extent that existing international arrangements may have a bearing on the legal context within which certain emergency services or products might be provided.

This certainly does not pretend to offer an exhaustive list of relevant legal and/or organizational issues involved. However, such other legal issues as privacy (in view of the current state-of-the-art potential of some satellites to offer very detailed "pictures") or telecom law (as relevant for various telecom-related aspects of remote sensing satellite operations) would be one step further removed from the core aspect of using satellite-generated data for emergency response. Hence, they will not be considered here.

2 The Application of Copyrights

2.1 Copyrights and satellite remote sensing

Copyrights is the most relevant version of intellectual property rights in the current context since it directly refers to the intellectual ownership over the data and information generated. In view of their importance in stimulating creative activities, the first legal regimes to provide for copyrights—and a certain balance between the creator's interests of protection and the public interests of access—were developed already centuries ago. Obviously, this has been done without very much taking into account the possibility that space-based data and information could also be involved. Still, once satellites started to generate data, subject to more experience with space-derived geospatial information as well as more analysis, such regimes might explicitly or implicitly come to apply to such data as well.

The generation of geospatial information by means of satellite is but a version of satellite remote sensing: the core of the systems providing the data and information to be used for emergency purposes consists of remote sensing satellites. These satellites operate in outer space, which is an area not subject to any territorial sovereignty (Outer Space Treaty, 1967, Art II) As a consequence, freedom of activity is the point of departure and any limits to such freedom have to be derived from existing legal principles or from rules, obligations and rights of other states stemming from international treaties, including the UN Charter, or international customary law (Outer Space Treaty, 1967, Art I, III) For private parties involved, moreover, national regimes may (further) limit the opportunities to make use

of the freedom of exploration and use of outer space. This also includes copyrights, much as they did not take space-specific aspects into account. Still, except where specific aspects of satellite operations generating geospatial information would be explicitly or implicitly prohibited or conditioned, such operations are basically allowed.

Historically, copyright regimes have been developed first and foremost at the national level. In general, copyright protection may be obtained for an original work of authorship fixed in a tangible medium. Relatively early on the international ramifications of hugely diverging national copyright regimes having become clear, one of the oldest international treaties provides for a first effort to align those national regimes, which resulted in a measure of "mutual recognition" (Berne Convention, 1886, ATS 1901, No 126). This 1886 Berne Convention was followed by a number of other international treaties further harmonizing national regimes as to their international effects (Universal Copyright Convention, 1952). However, in spite of these international efforts, such fundamental differences as between a "first-to-file" regime (to which all European countries adhere) and a "first-to-invent" regime (to which *inter alia* the United States adheres) continue to exist.

2.2 The European context

In the international arena, developments towards harmonization have thus far stalled essentially at the level of "mutual recognition," leaving much to be desired especially in terms of substance. For that reason, further to the above it is instructive to take a look at how in Europe specifically the issue of applying copyrights protection to satellite remote sensing has been dealt with, in view of the fundamental involvement of two intergovernmental organizations in space activities: the European Union and the European Space Agency (ESA).

In the beginning, within Europe the topic of copyrights in the context of remote sensing was considered a matter for ESA because of its key role in European space activities, including remote sensing activities. Thus, "the Agency shall, with regard to the resulting inventions and technical data, secure such rights as may be appropriate for the protection of its interests, of those of the Member States participating in the relevant program, and of those of persons and bodies under their jurisdiction" (ESA Convention, 1975, Art III(3)). However, it rapidly became clear that ESA's own competencies were too limited for establishment of a more comprehensive legal regime; it could only effectuate relevant protection through, and as far as could be provided by, individual contracts.

On the other hand, when potential applications within Europe became a distinct probability, the European Commission became interested in the issue, in view of the possibility to use intellectual property rights as anti-competitive tools. Individual companies could, for example, use copyrights to sell licenses for exclusive access or usage in specific national territories, thus artificially carving up the Internal Market into nationally separated markets in contravention of relevant EU principles. A study initiated by the Commission has resulted in recommendations to make the then-draft Community Directive on the protection of databases applicable to remote sensing data. This concerned the so-called "Gaudrat study" of April 1993, which concluded that the best way to effectuate any protection of remote sensing data would be to bring them under the heading of databases, rather than for instance copyrights.

The problem of appropriate legal protection of the data resulting from remote sensing resulted from the way in which the concept of copyrights had been developed historically. One of the main problems with raw data is that it does not satisfy the originality criterion for protection by copyright: there usually is no creative human intervention involved in producing them—especially if they are generated automatically or in a pre-programmed fashion. Collections of raw, corrected or treated data also fail to satisfy the originality criterion if there is no creative human intervention involved in producing collections of such data, read databases. This, of course, equally applies to the specific area of satellite-derived geospatial information data.

Still, for want of better legal tools, most operators in Europe used copyright protection to protect their data resulting from activities in outer space. Of course, in the absence also of any specific Community legislation on the matter, risks abounded that protection could differ between European states due to varying national copyright laws and/or varying interpretations thereof.

In this regard, the resulting Community Directive 96/9 established a *sui generis* right of data base protection (Directive 96/9/EC, 1996). It obliges the member states to include databases, amongst them those containing remote sensing data, in their national intellectual property rights regimes, in conformity with the parameters further provided by the Directive. It applies both to nationals (including companies) from EU member states undertaking such activities, and to such activities if undertaken from the territory of any of the EU member states (Directive 96/9/EC, 1996, Art. 11(1),(2)).

In other words: any satellite activities generating geospatial information conducted either by EU nationals or from the territory of an EU member state could enjoy the protection of Directive 96/9—for example to limit access to the relevant data. Outside of these situations, that is if neither an EU national (whether person or legal entity) is crucially involved in the generation of date, nor such generation is (at least for a major part) conducted and undertaken from an EU member state, such protection exclusively depends upon the national regime of the state in question, where applicable in conformity with international treaties to which such a state is party.

In terms of substance, the Directive protects creative databases under copyright law and creates a unique protection—the *sui generis* right—for those databases which do not meet the requirement of originality, as long as they are individually accessible and require a substantial investment to be generated. In other words, the *sui generis* right extends protection to databases containing material not protected by copyright. As a result, data derived from activities in outer space and assembled in an original database are protected within the territory of the EU member states.

The protection offered by the Directive basically consists of two sets of rights, defined in Article 7(2) as the "extraction right" and the "re-utilization right" respectively, both principally resting with the creator/owner of the database and for him or her to license others to use. The "extraction right" refers to the right to permanently or temporarily transfer all, or a substantial part, of the contents of a database to another medium by any means or in any form. Likewise, the "re-utilization right" refers to the right to make available to the public all or a substantial part of the contents of a database by the distribution of copies, by renting, by on-line transmission or any other form of transmission. The first sale of a copy of a database within the European Union by the right holder, or with his consent, exhausts the right to control resale of that copy within the Union. The Directive by now has been transposed into national legislation by all EU member states, as was (of course) required by its terms.

2.3 Copyrights and remote sensing data for emergency response purposes

Let us go back to the issue of geospatial information data in support of emergency management. Not just within Europe, but everywhere copyrights will obviously constitute a major parameter determining the scope of usage of satellite geospatial information data being allowed or practically possible in the context of emergency response, since they give the owner of the data a very fundamental legal tool to control such data.

In many cases, the entities generating relevant data will be public in character and legal role, in a perhaps varied but generally large measure. Here the issue would sometimes be whether they can effectively own copyrights in the first place. At the same time, it may be pointed out that such a public entity will have considerably less interests in using copyrights as a tool to limit access to relevant data, certainly as long as not security-sensitive.[2] One main idea behind such constructs as the Charter after all is to provide what may be called public goods and services paid for at least in major part by the tax payers, which should benefit as much of society as possible, copyrights being used as little as possible to obstruct such benefits from being realized.

On the other hand, public investments in space-derived geospatial information should not allow private companies to take a free ride for their own, private and usually commercial purposes, piggy-backing on overly liberal access policies. In such cases, copyright may indeed present a handy tool for allowing some control over the downstream use of any satellite-generated data, which re-

2 See further *infra.* Section 5.

quires not only independent ownership of copyrights, but also attendant copyright strategies and policies.

The practical effects of such control tools of course ultimately depend on the general effectiveness of law monitoring and enforcement. There is certainly no perfect defense possible against malicious intentions, since in principle every state, organization or relevant entity can request remote sensing data. However, firstly the organizational structure for data request and delivery acts as a filter in a number of cases.

Secondly, as a consequence of the existence of copyrights, at least legally speaking instruments would be available to (try and) ensure that usage is made of the data downstream exclusively for proper purposes. One could draft an (additional) international protocol requiring any requesting organization to formally declare usage to be only for specific, well-delineated purposes. More pragmatically, one could also include relevant clauses in copyright licenses which certain data owners might require from users before allowing them access.

As a matter of fact, the Charter already knows of such a process to protect data exchanged under its sway. Raw satellite data is only exchanged between the Charter partners and entities defined by the "Charter Manager," whereas others, including affected states and aid organizations, will only receive derived geospatial information such as maps, tables and prints. This process, clarified in advance and known to every Charter participant, might have the obvious drawback of impeding the rapid and efficient usage of the Charter's data in a given event, if for example the information-derivers are missing relevant information which the affected states or aid organizations, if they were to analyze the data, would not miss out on, but it prevents at least raw data from being used for unintended, possibly abusive purposes.

Whether such measures would be sufficient "in the real world" to ban malicious use to a satisfactory extent is of course another matter, but with licenses and relevant clauses on usage one at least would have the legal tools to fight such use and criminalize those who undertake it. That certainly does not apply to Charter-induced data generation only, but to any geospatial information data with any real, read in particular potential commercial, value.

Furthermore, in a number of cases relevant data might be generated by (completely or partially) privately-owned and -operated satellite systems, like the French SPOT image, the Canadian Radarsat or various private US Very High Resolution-data satellite systems. Such private operators in principle would use their copyrights to control access to the relevant data, read to make money by allowing such access in individual cases against fees. It is their principled entitlement to decide whether, for example for reasons of public relations and public image, data would be provided when requested for emergency purposes, subject to any further conditions such as referring to usage other than directly emergency-related.

3 Access to Remote Sensing Data

3.1 From copyrights to data access rights

The previous Section dealt with the issue of copyrights, which provides an ad hoc-tool to deal with access to certain data sets — by establishing a specific balance between the rights of the general public to have access to a certain set, and the rights of the copyright owner to limit such access, as subject to applicable legislation. Apart from this issue at the international level there are a few legal parameters relevant for satellite-derived data, approaching the issue as it were from the other end: that of obligations to allow access to remote sensing data—which might, in principle, come into conflict with applicable rights of copyright owners to limit such access. If such data access rights are unequivocally established by comprehensive legal regulation, they would actually override any potential rights to limit access by copyright owners, but the situation is usually not so clear-cut. This makes it difficult at this point to establish more detailed guidance as to what happens in case of such a conflict.

The parameters currently calling for immediate attention would be found in three areas in particular: the international legal regime for access to remote sensing data in general, the specific devel-

opment of the Charter on Space and Major Disasters referred to earlier and general humanitarian obligations.

3.2 The international regime for access to remote sensing data

As referred to before, one of the most fundamental rules of space law is the principle of freedom of space activities (Outer Space Treaty, 1967, Art. I). Consequently, the point of departure under international space law is that the activity of using satellites for remote sensing purposes is allowed. The Outer Space Treaty itself only provides for a few principles to which any space activities should conform, such as international cooperation, mandatory supervision and authorization of private space activities (for which a state is held responsible without further qualification), and sincere efforts to minimize harmful effects of one's space activities, for example as to the environment (Outer Space Treaty, 1967, Art III, VI, IX).

More in particular, states are also held liable for damage caused by space objects involved in any private activities as long as they would have been involved in the launching of the space object concerned in a sufficiently substantial manner (in addition of course to liability for damage caused by their own space objects) (Outer Space Treaty, 1967, Art. VII). This regime was further elaborated by means of the Liability Convention of 1972 which formally qualifies such involvement as that of a "launching State" (Liability Convention, 1972, Art I(c), n. III).

The issue of remote sensing specifically, as a sub-set of space activities, at the global level has only been dealt with in any detail by UN General Assembly Resolution 41/65, adopted by consensus on 3 December 1986 (Resolution 41/65,1986). This adoption by consensus, as well as the general respect accorded to its contents, leads most experts to consider those contents as reflecting customary international law—as Resolution *per se* is not binding. The Resolution acknowledges the freedom of remote sensing activities, as one particular manifestation of the freedom of space activities subject only to international law (Resolution 41/65,1986, Principle III). Further to this, the Resolution provides some important parameters for remote sensing activities, including those that are geospatial information related, as follows.

At the outset it should be noted that the Resolution applies to remote sensing activities "for the purpose of improving natural resources management, land use and the protection of the environment" (Resolution 41/65, 1986, Principle I(a)). Since such usage arguably would not require the quality of spatial resolution of better than in the range of 10 meters. Very High Resolution (VHR) data issues might actually fall outside the scope of the Resolution. They certainly were not taken into consideration—or even envisaged—at the time the Resolution was drafted. In view of the fact that much geospatial information data would likely fall within the range of VHR data, this may present a rather important issue in regard of which to further elaborate the law, so as to at least establish the desired clarity.

In other words: the Resolution does not clarify to what extent the individual discretion of states, European Union and international remote sensing operators as to how to deal for example with dissemination and usage issues regarding VHR data would still be intact. Privacy aspects typical of VHR remote sensing data dissemination at the very least have not been considered. Another issue following from this, somewhat narrow, definition of remote sensing for the purposes of the Resolution, is that it might be taken to exclude from its scope any military activities.

Then, Principle II provides that "Remote sensing activities shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic, social or scientific and technological development, and taking into particular consideration the needs of the developing countries'. This Principle reflects the similarly-phrased Article I of the Outer Space Treaty. Obviously, it very much supports the general use of data, and information derived from them, for emergency response purposes, although it also raises some questions as to the extent in which such benefits are to be shared in a mandatory fashion.

Here, the frequently-found and rather general reference to "the benefit and […] interest of all countries" with special consideration for the developing countries was developed further in 1996, by means of another UN Resolution (Resolution 51/122, 1996). This Resolution left complete freedom to

states "to determine all aspects" of such cooperation, and furthermore repeatedly referred to the requirement of "an equitable and mutually acceptable basis" for any activities undertaken in its implementation (Resolution 51/122,1996, Principles 2,3).

Principle IV of Resolution 41/65 then deals with the core issue of satellite remote sensing: the dilemma between the freedom of use of outer space, in its particular manifestation of freedom of information-garnering making use of satellites, and the principle of sovereignty of states over their own territory, more in particular over their own wealth and natural resources. These two concepts at the time of drafting the Resolution were considered to collide in particular where the "sensed state" finds itself in a situation that a "sensing state" might obtain valuable information, especially in economic terms, with regard to the territory of the" sensed state" which that state itself does not possess.

A balance of sorts has been established by Resolution 41/65, which in the final analysis tilts towards the freedom of space activities. The principle of full and permanent sovereignty, it is true, is to be respected, consequently legitimate rights and interests of the "sensed state" shall not be harmed, and also the benefit and interest of all countries shall be taken into account (that is, including those of the "sensed state") (Resolution 41/65,1986, Principle IV).

This is no mere theory. In the recent activation of the Charter in the case of Pakistan, VHR data were available—and in some cases already used—to monitor the areas affected by earthquakes. In spite of the clear emergency character of the context in which this took place, however, the United Nations authorities involved then requested all Charter participants not to use VHR data for fear to alienate the government of Pakistan in view of the potential impact on security or other crucial interests of Pakistan. Luckily, it turned out the Pakistani government took a relaxed approach and made it clear that, as far as it was concerned, VHR data could be used for the intended purposes, but it is very well possible that other countries in other circumstances would not be so relaxed about this.

All this, however, does not alter the fact that the" sensed state" neither has a veto to prevent it from being "sensed," nor an exclusive, free or even merely preferential right of access to the data — and neither is it entitled automatically to becoming a partner in the relevant remote sensing operations (Resolution 41/65,1986, Principle XIII). This becomes especially clear when these principles are seen in conjunction with Principle XII, since for the purpose of a particular set of remote sensing data—whether geospatial information related or not—concerning its territory the "sensed state" is no different from any other state interested in such data.

Principle XII namely provides: "As soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed State shall have access to them *on a non-discriminatory basis and on reasonable cost terms.* The sensed State shall also have access to the available analyzed information concerning the territory under its jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms, particular regard being given to the needs and interests of the developing countries."[3]

In general it has not been considered "discrimination" when data disseminators—so far especially governments or intergovernmental organizations—apply different prices to scientific and/or non-commercial users on the one hand and commercial users on the other. Consequently, on a national or regional level distinctions are usually made between users from the scientific, educational or other evidently-public sectors (which normally have to pay nothing or only cost-based fees) and commercial users (who have to pay substantially higher, essentially commercial fees). Geospatial information data for emergency management purposes would squarely fall within the former category.

Also, where public authorities co-fund, subsidize or substantively support remote sensing activities, it seems obvious that they would have a right of access distinct from those of others to the resulting data, as (his would not be tantamount to "discrimination" in the real sense of the word. However, due to the vagueness at the level of the principles contained in Resolution 41/65, national and regional implementation of this principle has taken place in many different ways.

The difference between primary and processed data on the one hand and analyzed information on the other hand is further noteworthy, in particular as geospatial information data would usually

3 Emphasis added.

refer to either processed data or analyzed information (rather than to primary data as such). As to the first, a "sensed state" will only have access to the data concerning its territory if the "sensing state" or any entity for whom it is responsible is interested in marketing and selling those data—and then, of course, at the same ("non-discriminatory") price and in conformity with the other relevant conditions. As to the second, the—already inarticulate—right of access ("as soon as" data have been produced) is further diluted; this time no time limit at all is provided for. Moreover, a right of non-discriminatory access for a "sensed state" exists only with regard to analyzed information in the hands of a "sensing state"—not, therefore, in the hands of any entity for whom it is internationally responsible. At least, that has been the interpretation to date of experts, states and international organizations alike.

Gradually, some practice is becoming clear in this respect. For example, whilst InfoTerra Germany has the commercial distribution rights of TerraSAR-X, it has licensed (only) Japan to receive data, where Japan may opt to program TerraSAR to acquire data over North Korea. Thus, while the satellite owner in the last resort is Germany (more precisely: the German Space Agency, DLR, on behalf of the government), the commercial rights lie with InfoTerra and the operator (in the relevant region) is Japan — with the sensed state being North-Korea. This raises some legal issues, for example as to who is responsible for any "violation" of the Principles of Resolution 41/65, or any relevant rule of the Outer Space Treaty?

In terms of further legal parameters to the freedom to distribute remote sensing data, finally two further Principles contained in Resolution 41/65 are of special importance with a view to emergency response.

Firstly, Principle X provides: "Remote sensing shall promote the protection of the Earth's natural environment. To this end, States participating in remote sensing activities that have identified information in their possession that can be used to avert any phenomenon harmful to the Earth's natural environment shall disclose such information to States concerned."

The clear moral value of this Principle, coupled with general duties of care, international cooperation and respect for benefit and interest of all countries, makes it rather difficult for states not adhere to it, or even not to make private or other disseminators or users adhere to it. Thus, although directed again at states, and probably even in the absence of explicit obligations on the domestic/private level for disseminators and users, neglecting these provisions in disseminating or using remote sensing data might not be legally excusable on the international plane any longer. This might even mean that if a satellite operator has obtained satellite data that would clearly show global warming to lead to future degradation of the global environment, and such information is not duly transmitted to other states, it would violate Principle X.

Since, under Principle X, remote sensing shall promote the protection of the Earth's natural environment, it may be asked what is included in that term "natural environment." The Principle would not apply to "man-made environments," certainly not according to the letter of the law. Since, however, the drafters of the text of the UN Resolution simply would not have had the possibility of dealing effectively at an international level with disasters in "man-made environments" such as factory explosions in mind, a development in interpretation could come to include such events. It is interesting to note from this perspective that the Charter does not limit itself so much to the "natural environment" as the UN Resolution does; thus, the train explosion in North Korea a few years back triggered the Charter into operation just as much as the tsunami did.

Secondly, Principle XI provides in a fashion rather similar to Principle X: "Remote sensing shall promote the protection of mankind from natural disasters. To this end. States participating in remote sensing activities that have identified processed data and analyzed 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. "The Charter, from this perspective, constitutes an institutional and structured elaboration of this Principle, and thus represents the next step to actually implementing it and making it work.

Principle XI largely mirrors Principle X; the latter dealing with man-originating threats to the natural environment of the earth, the former with nature's threats against mankind. Consequently, the evaluation of Principle X largely applies here as well; for example, when it comes to the *prima facie*-fo-

cus on states possessing data, or as regards the vagueness of terminology, from which no actual conditions for disclosure can readily be distilled. Nevertheless, the obvious moral value of this Principle too would imply close-to-binding effects also upon non-state disseminators or users—at least it results in an international responsibility for relevant states to make sure these entities would adhere to the Principle. Both Principles, in short, clearly support liberal access to geospatial information data for emergency management purposes.

Finally, one noticeable difference with Principle X is that Principle XI explicitly applies to "processed data" in addition to "analyzed information," as opposed to mere "information" as it is contained in the former Principle.

3.3 The Charter on Space and Major Disasters

Of major impact in the area of disaster and emergency response, the Charter on Space and Major Disasters was already briefly introduced supra. Prior to the Charter's existence, generally speaking there was a lack of awareness on the side of the potential victims as much as of the providers regarding the potential usefulness of such data, coupled with a general attitude on the side of potential data providers of unease: what are my risks in terms of giving away valuable and/or sensitive data? How do others deal with such requests? How should I handle this? More in practical terms finally, there was no general system or format to handle any such requests; with the Charter there is at least such a system, with people and states knowing who has what role, and what they can normally expect when calling for help in this domain.

The Charter focuses directly and exclusively on the mitigation of major disasters and their harmful effects without creating any new international organization. It may therefore be said that it constitutes, so far, the sole international structured *system* for handling space-derived geospatial information data for emergency management. While there are no obligations to conduct geospatial information emergency management operations through the Charter, as such it clearly represents the most advanced context therefore, justifying extended discussion here. The Charter also represents a specific manifestation of such general principles of space law as pertaining to the benefit of all countries and the requirement to allow free and uninhibited access to data if natural or man-made disasters are at hand, as discussed above in the context of Resolution 41/65 (Outer Space Treaty, 1967, Art I, Resolution 41/65,1986, Principle X, XI).

The Charter, formally declared operational on 1 November 2000, aims at providing a unified system of space data acquisition and delivery to those affected by natural or man-made disasters. Formally, such information would have to be requested by the affected state, even if in practice it may (have to) end up in the hands of third states and relief organizations supporting the affected state, which might not even have the technical means to work with the satellite information. This would also raise some legal issues worthy of further discussion and investigation.

Each member agency has committed resources to support the provisions of the Charter and thus helps to mitigate the effects of disasters on human life and property: ESA provides data from ERS and Envisat, CNES from the SPOT satellites, CSA from the Radarsat satellites, ISRO from the IRS satellites, NOAA from the POES and GOES satellites and CONAE from SAC-C.

Article 6(1) of the Charter stipulates that requests to adhere to the Charter may be made by any space system operator or space agency with access to space facilities agreeing to contribute to the commitments made by the parties. In other words, it is a *de facto* prerequisite for membership to the Charter to possess capability to operate satellite systems; or at least to start doing so in the near future. Those space facilities are not necessarily limited to earth observation satellites or instruments; "space systems for observation, meteorology, positioning, telecommunications and TV broadcasting or elements thereof such as on-board instruments, terminals, beacons, receivers, VSAT's and archives" are also included (Charter on Space and Major Disasters, 1999, Art. 1). Indeed, GOES and POES for example are meteorological satellites.

Upon request by a "beneficiary body," the member agencies acquire the data on the area affected by the disaster from their satellites, process them into images, analyze them further if necessary, and distribute the resulting information free of charge to those states affected by the disaster via "associ-

ated bodies."[4] A state affected by disaster (or one intent upon coming to the rescue) that wishes to access relevant data needs to contact either associated bodies or "cooperating bodies"[5] acting in partnership with an associated body.

The effective determination of which satellites should provide data for a particular disaster is to be facilitated by *a priori* scenario-writing, although this seems to be largely theory so far. The partners agree to engage themselves in writing a range of scenarios to anticipate which data and information would be useful for different types of crisis. The parties shall together analyze recent crises for which space facilities could have provided or did provide effective assistance to the authorities and rescue services concerned (Charter on Space and Major Disasters, 1999, Art. 4(2)), draw conclusions and prepare sample response plans for future events. The scenarios cover the issue of the type of sensors effective for specific disasters, and even more specifically include selection criteria for a specific satellite. Such scenario analyses save time when decisions are due with respect to provision of the most appropriate data to crisis victims, and hence facilitate rapid assistance.

A number of legal issues with respect to the operation of the Charter remain to be solved. The underlying point of note is that parties to the Charter continue to be obliged to follow all the international agreements they are party to, including those on copyrights, data access and liability as discussed in this contribution. The mere fact of signing a Charter, even if it would be fully legally binding, does not allow such signatories to ignore other international duties which they have to abide by.

In any particular case, one would have to look at which state, party to the Charter, has become party to which agreement, for if a state has not become party to an international treaty it is, basically, legally free to ignore its contents, m the case of the treaties dealt with in the present contribution, these include all or at least most of the Charter partners amongst their parties. If a state would consider that its' obligations "or interests with respect to the Charter would be interfered with by obligations resting upon it as the result of an international treaty, it could—within the terms of that treaty, e.g. as to a one-year-advance-notice—denounce its membership to that treaty, or announce that certain reservations would henceforth apply.

Services under the Charter are provided on a "best efforts" basis, implying that Charter members will take all necessary measures in rendering aid but do not guarantee successful results. A specific provision in the Charter waives the liability of satellite operators called upon to provide data under the Charter: "The parties shall ensure that associated bodies which, at the request of the country or countries affected by disaster, call on the assistance of the parties undertake to: "[…] confirm that no legal action will be taken against the parties in the event of bodily injury, damage or financial loss arising from the execution or non-execution of activities, services, or supplies arising out of the Charter" (Charter on Space and Major Disasters, 1999, Art. 5(4)). So the member agencies would not assume liability arising from services offered under the Charter. Death cases are also subject to the waiver of liability, even though this is not stipulated specifically in the above clause.

This waiver of liability, however, does not comprehensively solve the problem. Firstly, since the Charter is concluded among the partner agencies but (obviously) not with all the potential crisis victims, the waiver of liability is not mutually agreed upon in any comprehensive sense. Therefore, certainly in those cases where the victim of a crisis is not (in) one of the countries to which the Charter partners belong, the unilaterally-declared waiver of liability raises questions as to its validity.

Furthermore, the Charter provides for a waiver of liability only concerning cases arising between the affected country and the Charter partners. It does not mention, for instance, cases arising from po-

4 An "associated body" is "an institution or service responsible for rescue and civil protection, defense and security under the authority of a State whose jurisdiction covers an agency or operator that is a party to the Charter"; Art. 5(2), Charter on Space and Major Disasters.

5 Cooperating bodies includes the European Union, the UN Bureau for the Coordination of Humanitarian Affairs and other recognized national or international organizations with which the parties may have cause to cooperate in pursuance of the Charter. A "cooperating body" does not operate a space system but acts in partnership with an associated body which does; see Art. 3(5), Charter on Space and Major Disasters.

tential liability of intermediate actors with respect to Charter partners or countries affected by a disaster. The Charter does not stipulate whether such a state can assert a legal claim against intermediate actors directly, in case these are somehow involved in the damage being caused.

The above finally raises issues regarding the so-called "Good Samaritan" principle, a principle known in various national jurisdictions. This principle essentially means that a person who injures another in imminent danger while attempting to aid him (as long as not under an obligation to do so), is not to be charged with contributory negligence unless the rescue attempt is an unreasonable one or the rescuer acts unreasonably in performing the attempted rescue (http://pa.essortment.com/goodsamaritanl.redg.htm). Its purpose is to prevent people from being unduly reluctant to help a stranger in need, for fear of legal repercussions should they make some mistake in doing so.

The "Good Samaritan" doctrine has been used widely in different jurisdictions throughout the world. In Canada and the United States it is incorporated by means of specific acts. The principle is also reflected in different national laws of European states. If the rescuer has actually worsened the condition of the imperiled person many techniques are available to assess the rescuer's conduct: from mitigation of damages in Dutch law to the presumption of a low standard of care in French and English law. Since the "Good Samaritan" principle is incorporated into domestic law of many states, it is generally considered to reflect customary international law.

What it means in the context of the Charter, however, and whether its main criteria and parameters are overruled by it, remains an issue to be dealt with in further detail. For example, the principle is usually found to apply only when there is no specific (legal) obligation resting upon someone to come to the rescue. Are states or governmental agencies in the possession of relevant knowledge, alternatively of technological means to easily acquire such knowledge, however, not obliged to share such information? In other words, do the Charter partners qualify as "Good Samaritans" so as to be able to invoke this principle in their defense?

3.4 General humanitarian obligations

As already indicated, both the international space law-rules pertinent for remote sensing and the Charter on Space and Major Disasters are representations of a broader duty under general international law for states to assist other states and their peoples in cases of larger humanitarian disasters, whether natural or man-made. This excludes, understandably but of course very unfortunately, those man-made disasters created by wars, persecution and other forms of violence, since in particular those states where events in these categories take place are generally unwilling to have other states come to the rescue on humanitarian grounds.

Suffice it therefore here to make reference briefly to the existence of these underlying general humanitarian principles. Though they would apply also in cases not covered by either the international space law-regime or the Charter (whether *ratione materiae* or *ratione personae*), and as such would have a general bearing on a number of emergency response-related activities, their main disadvantage from a more practical perspective is their very broad and vague content. At every turn, a different set of issues and situations are at stake, making it very difficult to determine what, in any particular case, such general humanitarian duties would amount to in terms of, for example, concrete actions or measures.

For that reason, these obligations should be best perceived as obligations-of-effort, as opposed to obligations-of-result. Their practical reach remains to be determined for each specific instance, and in the last resort they may serve more as guidelines to prefer one course of action over another if, all other things essentially being equal, the one course would be more in tune with such humanitarian obligations.

3.5 Implications/or emergency response purposes

Mirroring to some extent the copyrights issue, data access represents a major area of legal issues relevant for the present theme. For emergency response purposes especially the general international

law regime on access to remote sensing data and the more specific requirements under the Charter resting upon key satellite operators should be taken into account. These regimes would considerably limit the discretion of any such key operator in deciding whether and how to distribute certain data.

Such limitations should essentially ensure that wherever geographical information becomes available that is of value for the purpose of emergency management activities—whether in the context of the Charter or not—of whatever nature (and perhaps, although this goes beyond the scope of the present contribution, also when not generated by satellites), it shall be made available without further ado for such purposes. Operators in the possession of such data, if worried mat inappropriate use thereof might result from granting liberal access to their data, would do best to become part of the Charter-structure to the extent possible (if they are not already part thereof): even if also the Charter does not, as of yet, provide for a solid and general measure of protection against abuse, it is the only structure currently available where at least *some* protection can be enjoyed.

4 Responsibility and Liability Issues

4.1 State responsibility and satellite-based information for emergency response

A further (very general and in first instance abstract) aspect of basic importance concerns that of responsibility and liability under international (space) law. As for responsibility, the general form of international accountability, states are responsible in broad terms for ensuring that activities conducted on their territory or within their jurisdiction do not violate the rights of other states. (See for a general abstract treatise of state responsibility and how it works in the context of space activities e.g. von der Dunk, 1998.)

In addition however to such state responsibility principles as they arise under general international law. Article VI of the Outer Space Treaty has caused a specific version of those principles to be applicable to space activities (Outer Space Treaty, 1967, Art. VI). Space activities, or more precisely "activities in outer space," would certainly include everything from the operation of a ground station controlling (part of) a satellite system to the activities of the latter itself, up to the generation of any geospatial information data (Outer Space Treaty, 1967, Art. VI).

Furthermore, Article VI of the Outer Space Treaty provides that states are internationally responsible for "national activities in outer space," including cases where these are "carried on […] by non-governmental entities." This responsibility pertains to "assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty." States are thus responsible for activities undertaken in outer space in case these activities violate obligations under international space law. Moreover, states are responsible to the same extent for private activities as they are for their own, public activities—even, or perhaps more to the point: precisely—in the context of emergency management, in view of the clear public and humanitarian character of the relevant activities.

Whilst Article VI then begs the question: for which categories of private space activities is which particular state to be held responsible on the international plane, it would be beyond the purpose of the present article to deal with those issues. In any case, the answer to this question would lie in the interpretation of the key term "national activities." However, no authoritative definition of the (scope of) "national activities" of a state for which it is to be held responsible has been provided by the Outer Space Treaty or elsewhere, and consequently no agreement exists as to the interpretation of this term. From the author's perspective, the most effective and sound interpretation of private "national activities" would make states internationally responsible precisely for those activities over which they can exercise legal control (for further discussion see von der Dunk, 1998). In other words: a state would be held responsible for those private activities that are undertaken from within its jurisdiction.

4.2 The concept of liability

When analyzing liability in the case of geospatial information products and/or services generated by satellites, one has to realize that again most of existing law and regulation is non-specific. Most

of the legal environments further elaborating the concept, consequences and parameters of liability, moreover, are nationally defined, that is: operate within the territory of one particular state (only), even if (for example under space law) international regimes may be superimposed.

Liability therefore itself, as a concept and term used in numerous national as well as a considerable number of international legal regimes, may be differently interpreted, applied and, in particular, further elaborated, in each case. The consequence thereof is that at the international level quite often a large measure of confusion has arisen as to the scope, meaning and consequences in law of that concept.

"Liability" has for example been defined as the "condition of being responsible for a possible or actual loss, penalty, evil, expense or burden," and as "the state of being bound or obliged in law or justice to do, pay, or make good something"(Garner, 1999). For the purpose of discussion here, this may be restated as: "the accountability of a person or legal entity to compensate damage caused to another person or legal entity, in accordance with specified legal principles and rules and based upon specified sources of law." Thus, liability depends upon a specific legal regime, which itself determines the boundaries of the particular liability regime at issue for example as regards where it applies, which persons or legal entities are involved on both sides of the damage (the causing respectively suffering side), what type of liability is provided for, how compensation is being dealt with, and suchlike.

Furthermore, the fundamental threefold distinction between contractual liability, non-contractual liability and product liability should be noted, leaving aside for the moment the question as to the extent in which each of those types of liability would actually come to be involved in the context of geospatial information supported emergency management activities. The key issue distinguishing the three different types of liability focuses on the legal relationship between the alleged victim of the damage at issue and the alleged responsible therefore—in other words: between the claimant and the defendant.

Contractual liability should be defined as "the liability which arises from a contract or agreement," and thus deals with liability as between partners to a contract, regarding activities undertaken in relation to respectively damage suffered in the context of that contract and its subject matter. *Black's Law Dictionary,* 295, and *West's Law & Commercial Dictionary in Five Languages,* Vol. I, 339, define "contractual obligation" as "the obligation which arises from a contract or agreement." "Contractual liability" is essentially a term coming from national law, and, by way of common denominator is explicit and formalized by way of the contract, already in existence at the time the relevant accident leading to damage occurs. Hence, for the purpose of analysis here it coincides in a principled sense with inter-party liability as it is often discussed on the public international level, where international treaties between states would essentially take the place of contracts.

From a legal point of view, dealing with contractual or inter-party liability is a matter of the freedom of parties to contract between themselves. This freedom may only—exceptionally—be restricted by an overriding public interest to ensure mat contracts are generally fair, if indeed such public interests are expressed through a law or other general statute.

Non-contractual liability, in view of the above definition of "contractual liability" then logically constitutes liability for damage occurring outside a contractual relationship, most prominently where the person or entity suffering the damage is in no way formally or contractually related to the person or entity causing it (or at least any damage caused would not be covered by any such formal or contractual relationship), and likely neither aware of the possibility of damage occurring nor able to take precautionary measures against it. Thus, it equates at this level of abstraction with the tort liability [6] of national legal systems, respectively the third-party liability known in international law: its common denominator would thus be that the legal relationship is implicit, not formalized and solely based precisely on the fact that one party is the proven cause of the damage sustained by the other party.

6 "Tort" is defined as "a private or civil wrong or injury, other than breach of contract, for which the court will provide a remedy in the form of an action for damages" (Garner, 1999, pp. 1334); *West's Law & Commercial Dictionary in Five Languages,* Vol. II, 660.

As a consequence, in contrast with contractual liability, protecting the interests of third parties through non-contractual liability regimes clearly in itself is a public matter, to be taken care of preferably by legislative means, since by definition bystanders cannot protect their interests themselves by contract or otherwise. Hence, this is also the type of liability which a public legislative document on the international level is most often concerned with. On the national level, this equates with the need for, preferably, a clear written law or statute, or—in common law countries—at least clear jurisprudence and customary law.

Product liability finally is defined as: "the legal liability of manufacturers and sellers to compensate buyers, users, and even bystanders, for damages or injuries suffered because of defects in goods purchased" (Garner, 1999, p. 1089; *West's Law & Commercial Dictionary in Five Languages,* Vol. II, 358). Thus, it is of a fundamentally different nature; not imposing liability upon someone for activities undertaken and damage suffered as a consequence, but imposing it upon someone having manufactured and/or sold a product by which, in the course of using it, damage has been caused. In a sense this constitutes an indirect form of liability, as the occurrence which triggers liability claims may take place (long) after the manufacturer or seller—the entity to be held liable—has had any involvement with the cause of the occurrence—me product. The relevant legal relationship here is effectively created through the product concerned.

Also product liability, even if elements thereof may have found their way into contracts (on the sale of the product), in the last resort has usually been considered a matter of general public interests being preserved through the enunciation of explicit laws, statutes or (occasionally, that is: largely in the case of the European Union) international legal documents of a binding nature.

4.3 Contractual liability in the context of emergency response activities

For contractual liability, of course any analysis would only be relevant in as far as in the context of emergency response activities contracts would be required, for instance with satellite data providers. In any case, two main categories of contracts could be at issue: public contracts and private (commercial) contracts. In either case of course potential liability will at the primary level depend on the contract terms negotiated between parties. The claimant will then have to prove that the service or product provider did not comply with its obligations of providing certain data or services.

Further to that, however, a private entity's contractual liability would be limited to the services and products it provides under the relevant contract, whether or not it would itself provide additional data or services downstream or confine itself to the provision of raw data only.

By contrast, some contractual relationships may be of a totally different nature since dealing with safety and security services: the value-added service providers would then (likely) be public entities or entities that benefit from public prerogatives justified by the fact that they are running a public activity. Hence these relationships would be more likely to take the form of public contracts, and be subject to public contract law, whether national or at a European level.

The most important thing to note, however, is that such contractual liability does not deal with any damage caused to those victimized or threatened by the emergency situation at issue, nor at the other end with damage caused to those trying to come to the rescue. Thus, it is an issue perhaps not of primary relevance in the present context.

4.4 Non-contractual liability in the context of emergency response activities

The main element of non-contractual liability to be discussed here, in the context of victims of emergency situations and addressees of emergency response activities, concerns the issue of "negligence" involved in the provision of relevant data and services. Which activities in the present context could or would qualify as a negligent public act or negligent omission, and if so, what would that mean in terms of liability? The United States' National Oceanic and Atmospheric Administration (NOAA) has already been taken to court for its "failure" to warn (adequately) against the December 2004-tsunami. Would there be an inherent obligation to provide certain guarantees? Or would it be lawful to waive or disclaim liability for (absence of) provision of relevant guarantees?

States under international law assume a certain responsibility for ensuring that relevant activities conform to rules of international law. States may not be held liable automatically at the international level, unless this has been expressly provided for in a treaty somehow applicable to the matter. Nevertheless, relevant operators or data providers might remain liable for negligence under national law, though one would have to study such relevant national laws in considerable more detail before more substantive conclusions would be feasible.

One specific regime at the international level meriting to be mentioned here concerns that of international space law. As far as direct physical damage caused by space activities is concerned, this is ruled by Article VII of the Outer Space Treaty, further elaborated by the Liability Convention. This regime provides for liability for damage caused by a space object resting upon the "launching State(s)" of that space object; the concept of "launching State" being defined in a fourfold fashion. The term "launching State" means: (i) a state which launches or procures the launching of a space object; (ii) a State from whose territory or facility a space object is launched (Liability Convention, 1972, Art. I(c)). It may be noted once more, that such state liability would apply regardless of whether the actual operation causing the damage was privately conducted or even if the whole satellite venture would be a private one (see also von der Dunk 1998).

This is, however, not the whole story when it comes to liability for satellite activities in the context of emergency response. The international space law regime for liability is only relevant for damages caused by a satellite physically harming another space object or causing terrestrial damage—arguably even restricted to such damage caused by physical impact, that is a crash. In the case of emergency response, while this is not a negligible issue, attention also needs to be paid to the possible damage caused by the user of data or information, for example when that user, wrongfully trusting the data and services provided to him, causes damage which may in turn trigger other liability regimes to become applicable—with the user being held liable for such damage! Such other liability regimes may be both of a very general nature—tort or wrongful act—or of a more specific nature, yet still (arguably) applicable. In this context finally the "Good Samaritan" principle once more may play a role in determining ultimate liabilities for damage occurring.

4.5 Product liability in the context of emergency response activities

Finally a few words on product liability in the current context. The generation and distribution of emergency response data and other products could involve product liability claims against the relevant providers. Two aspects of such activities are actual candidates for product liability suits: the equipment used to generate, transmit or receive data, and the data products themselves. Existing product liability law was, of course, not at all designed for such activities, and considerable *lacunae* and inconsistencies might arise when applying it to them nevertheless. It may, once more, be illustrative to zero in on the European context as established within the European Community legal framework, to illustrate how product liability law might be applied in the context of emergency response.

The Council of the Community adopted Directive 85/374 in June 1985, amending it by means of Directive 1933/34 [7] in May 1999, to harmonize the product liability regimes of the member states (Council Directive 85/374,1985). Directive 85/374 provides in Article 1 that the producer shall be liable for damage caused by a defect in his product.

Further to this general rule, the Directives contain the following main elements: liability without fault of the producer; burden of proof on the claimant as to the damage, the defect and the causal relationship between the two; joint and several liability of all the operators in the production chain, providing a financial guarantee for compensation of the damage; exoneration of the producer when he proves the existence of certain facts explicitly set out in the Directives; liability limited in time by virtue of uniform deadlines; and illegality of clauses limiting or excluding liability towards the victim.

7 Directive 1999/34/EC of the European Parliament and of the Council of 10 May 1999 amending the Council Directive 85/374/EEC on the approximation of laws, regulations and administrative provisions of the Member States concerning liability for defective products, OJ L 141,04/06/1999, 20.

The Directives allow member states to derogate from the common rules adopted with regard to three issues: (1) to include unprocessed agricultural products in its scope of application; (2) to not exonerate the producer even if he proves that the state of scientific and technical knowledge at the time when he put the product into circulation was not such as to enable the existence of a defect to be discovered; or (3) to fix a financial ceiling of not less than €70 million for damage resulting from death or personal injury and caused by identical items with the same defect.

This is, of course, the general regime for product liability within the European Union. Applying the Directives to products generated in the context of emergency response activities would be subject to a number of criteria being fulfilled. This concerns: (1) whether an emergency response data product will qualify as a product under them; (2) the extent to which the claimant is able to establish a defect in such product; (3) the extent to which the claimant is able to establish the alleged damage and the causal relationship between the defect and the damage; (4) establishment of the fact that a relevant entity is the producer within the meaning of product liability law and the Directives in particular; and (5) whether that producer has any justifiable and recognized defense.

In view of the liability cap in the Directives, and the prescription and liability periods introduced, it is possible, particularly in jurisdictions where contractual liability or general law of negligence offer better opportunity to him, that a claimant would choose alternative avenues for claims. This possibility is left open by the Directives; they shall not affect any rights which an injured person may have according to the rules of the law of contractual or non-contractual liability, or a special liability system.

4.6 Summarizing: the liability issue and emergency response

The effect of the liability issue on emergency response activities should not be underestimated. The willingness to undertake such activities would, after all, be considerably lessened if liability claims would be possible at each and every turn. Relevant partners will face a number of non-contractual liabilities where there would be little opportunities to fundamentally deflect or alter such liabilities—and consequently will have to somehow face them and deal with them.

In the field of contractual liabilities, by contrast, relevant operators and information providers have a large discretion to determine the extent of such liabilities. Thus the question from the other end arises to what extent these would be prepared and willing to accept liabilities.

In terms of product liability finally, as was illustrated by the EU example, regimes may exist that have a bearing on emergency response products also, subject to a number of criteria being fulfilled.

It is beyond the scope of this contribution to develop further details on how to handle liability in the case of emergency management using space-based geospatial information data. To start with, more experience needs to be had with relevant operations somehow resulting in damage (rather than mitigating it), and how the resulting, conflicting interests were handled in practice. More importantly, probably, an analysis would then be necessary of the ways in which liabilities, and such more specific concepts as the "Good Samaritan" principle, are elaborated and implemented within the national jurisdictions at least of the major countries and as representing the major legal systems of the world.

5 Security and Dual-Use Issues

5.1 The Wassenaar Arrangement

The Wassenaar Arrangement is a global, formally non-binding arrangement on export controls for conventional weapons and sensitive dual-use goods and technologies (Wassenaar Arrangement, 1995). It was designed to promote transparency and greater responsibility in transfers of conventional arms, dual-use goods and dual-use technologies. Participating states commit themselves to ensure through national policies and, where appropriate, regulations that cross-border transfers of these

items do not contribute to the development or enhancement of military capabilities of other states (Wassenaar Arrangement, 1995, Art. 1(1)).

The decision to allow or deny transfer of any item, however, remains the sole responsibility of each individual state (Wassenaar Arrangement, Art. 11(3)). Thus, export controls differ from state to state (in terms of documentation required, license fees, length of time to get a license, and duration of validity of the license).

The participating states only agree to notify transfers and denials, as well as to control all items in the List of Dual-Use Goods and Technologies and the List of Munitions, annexed to the Arrangement (Wassenaar Arrangement, 1995, Art. II(4), III(1), Appendix 5). Controls do not apply to technology or software in the public domain, to basic scientific research or to the minimum necessary information for patent applications. The Lists have two annexes of sensitive items and of very sensitive items respectively, to which different levels of control should be applied, and are reviewed regularly to reflect technological developments.

The participating states finally agree to exchange general information on risks associated with transfers of conventional arms and dual-use goods and technologies in order to consider, where necessary, the scope for coordinating national control policies to combat these risks (Wassenaar Arrangement, 1995, Art. IV(1)).

As to emergency response activities, subject to further analysis but above all experience, some of the products and services envisaged in their context might turn out to be, explicitly but especially implicitly, included in the relevant List. If so, the question arises what could be done about that and about the resulting potential obstacles to distribution of relevant satellite-generated information.

5.2 Regulation 1334/2000

The Wassenaar Arrangement as such does not recognize the European Union in any substantive manner. Partially as a result thereof, within Europe the same issue was also dealt with in a more classical, legally binding format by means of Regulation 1334/2000, which sets up a regime for the control of exports of dual-use items and technology for the EU member states (Regulation 1334/2000, 2000). An authorization is required for export of the dual-use items listed in Annex I (which is essentially similar to the Wassenaar Arrangement's List of Dual-Use Goods and Technologies). If the prospective exporter is aware that an item, even if it is not listed in Annex I, might be used in a way proscribed by the Regulation, it is still bound to apply the applicable provisions (Regulation 1334/2000, 2000, Art. 4). Under the Regulation export is defined to include transmission of software or technology by electronic media, fax or telephone to a destination outside the Union.

As with the Wassenaar Arrangement, under Regulation 1334/2000 the responsibility for deciding on applications for export authorizations lies with the national authorities. Some items on the List of Dual-Use Items and Technology (Annex 1) are not controlled if they accompany the user and are for the user's personal use: Regulation No. 1334/2000 "does not apply to the supply of services or the transmission of technology if that supply or transmission involves cross-border movement of natural persons" (Regulation 1334/2000, 2000, Art. 3(3)).

The Regulation establishes a Community General Export Authorization (CGEA) as set out in Annex II for certain exports. Annex II, Part 1, specifies that the CGEA is possible for all dual-use items listed in Annex I, except those specified in Annex II, Part 2, dealing with the more security-sensitive items. National export authorities are not automatically obliged to provide a CGEA, however, and, in any event, the exporter must comply with certain reporting requirements, as set out in Annex II, Part 3.

For all other items, authorization shall be granted by the member state where the exporter is located (Regulation 1334/2000, 2000, Art. 6). This authorization may be an individual, global or general authorization. Member states must maintain or introduce in national legislation the possibility of granting a global authorization to a specific exporter for dual-use items valid for export to one or more specified countries. The competent authorities may refuse to grant an export authorization and may annul, suspend, modify or revoke an export authorization which they have al-

ready granted (Regulation 1334/2000, 2000, Art. 9). Exporters are required to keep detailed records of their exports.

Once more, with a view to emergency response activities, the Regulation may turn out, under its present status and contents, to unduly obstruct the distribution of some of the relevant products and services. This ultimately depends, of course, upon the extent to which those products and services may, prima facie, be seen as dealing with dual-use and/or sensitive software or information.

5.3 The United Nations system for international security

For completeness' sake, it would be appropriate to refer here briefly to the general global system for dealing with international security issues, as developed in the context of the United Nations. The United Nations under the UN Charter has been given the major task by the member states to try and establish alternatively preserve international peace and security, using the various competencies allotted to it (UN Charter, 1945). Those competencies in particular rest with the UN General Assembly, which has the possibility to issue (non-binding) Resolutions as well as a role in dispatching peacekeeping or peace-making forces, but especially with the Security Council, which has the power to issue binding Resolutions in this regard.

Under this system, the Security Council may, for example, impose boycotts, economic blockades or even authorize full-fledged military actions if it considers international peace and security sufficiently threatened (UN Charter, 1945, Art. 41,42). Throughout the last decades, these powers have been used in such cases as Yugoslav civil wars *vis-à-vis* Serbia in particular, the Iraqi invasion in Kuwait in 1990, and the military actions against Afghanistan in 2002 and Iraq in 2003.

The main point to keep in mind for emergency response activities is that, should any such measures be imposed by the Security Council in the future, the relevant operators and geospatial information providers would be bound to comply with them as well. It could be imagined in particular that certain data products or services would not be allowed to be delivered to certain parties, or that certain international cooperation ventures with certain parties would have to be suspended or cancelled in cases where the Security Council would determine a threat to international peace and security to exist.

In such an event, a close reading of the actual decision by the Security Council would be requisite, since it will have to draw a very delicate balance between the political needs behind for example the suspension or cancellation of international cooperation and the obvious humanitarian needs resulting from the disaster at issue requiring geospatial information for alleviating the disaster's consequences. A comparison with the "Food for oil" program of the United Nations *vis-à-vis* Iraq at the time Iraq was already being internationally isolated in punishment for its refusal to comply with inspections of their purported facilities for weapons of mass destruction is illustrative from this point of view.

5.4 Summarizing: Security issues and emergency response

Discussion of issues of security and dual-use character in the context of emergency response activities is not that farfetched. Data generated by those activities or information based on such data, could very well be found to be subject to (he legal regime, summary as it may be, applicable to international trans-frontier movement of security-sensitive information or become involved in international actions trying to preserve international peace and security.

It would therefore sooner or later be necessary to address these issues in more detail: analyze those situations where the issue has, or could have, come up, and then offer further suggestions to ensure that security interests and the humanitarian interests of emergency response are fairly and transparently balanced. For example, in the context of the Wassenaar Arrangement (and for Europe Regulation 1334/2000) exceptions could be drafted here necessary to enhance the clarify of what is, and what is not, appropriate in any given case of geospatial information supported emergency management involving potential security interests.

6 Final Remarks

Maybe the above, first analysis raises more legal questions than it provides answers. This is, however, no doubt due to the novelty of the issue of emergency response on such an international level and with the fundamental involvement of satellite technology. To reiterate, one would need considerably more and deeper analysis, but in particular experience with legal, pre-legal or para-legal discussions and disputes, before any thorough discussion of the many issues specific to geospatial information data derived from space and used to support emergency management operations could be undertaken. It may perhaps come as an unwelcome surprise that such activities, normally undertaken with the best of intentions, might be subjected to legal scrutiny and run into legal obstacles or at least raise legal issues which may make potential rescuers think twice before doing the seemingly obvious.

Nevertheless, major legal issues (and in their wake also organizational ones) can indeed already be seen to arise, as the above has hopefully demonstrated, and precisely in order to ensure that the best intentions are allowed maximum leeway whilst undesirable side-effects are mitigated or even, preferably, ruled out, work should be done to solve those legal issues in the most appropriate way. In a number of respects, moreover, the European situation is particularly relevant and/or illustrative, in view of the fundamental legal developments taking place in the EU context and the extended legislative opportunities to deal with issues relevant for emergency response.

It is all about balance. A proper balance will have to be found for example between justified interests of a copyright owner in protecting his intellectual property regarding certain data products useful for emergency response action and the obvious public interest in allowing such data products to be, in essence, so used. Similarly, interests stemming from security perspectives should not unduly hinder humanitarian efforts to respond effectively and swiftly to disasters or emergencies. The attendant responsibilities and liabilities, which will not of themselves go away by the mere fact of an action being of a humanitarian, emergency-response related character, will have to be distributed appropriately.

In view moreover of the international character, both of many of the major emergencies and disasters and of the use of satellite images to try and deal with them, such a balance should preferably have a strong international component. While there is no denying the relevance of national interests and national sovereignties in today's world in spite of creeping globalization, and many legal issues cannot but be solved at a national level, a certain international understanding based on sound international—read essentially inter-state—agreements seems to be indispensable.

Actually, the Charter on Space and Major Disasters represents the, so far, furthest step in that direction. Without creating as of yet an institutional structure or even undisputed legal obligations, it has brought into focus the serious and substantial willingness of a number of satellite operators to (allow others to) use geospatial information generated by their satellites for overly humanitarian purposes. The almost weekly growing number of Charter activations moreover show that the practical value of such constructs for many is not at issue anymore. Finally, from the perspective of international law it is very interesting to note the range of states having so far triggered—or at least grudgingly accepted—activation of the Charter since threatened by or suffering from major disasters: developing countries as much as developed ones, from the South to the North, from the East to the West, literally from the United States to North Korea (in which last case it actually was the United Nations Office for Outer Space Affairs that activated the Charter).

All this means that global acceptance of certain duties cannot be far, and that seems to predict a bright future for further efforts to clarify the legal issues that need to be solved—such as those elucidated in the present contribution. It certainly means that using satellite-generated data and information is considered to be a prime example of the "benefits and interests" of mankind and all countries, which Article I of the Outer Space Treaty posits as one of the legal cornerstones of all usage of outer space.

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