ACCESS OF THE PUBLIC TO ENVIRONMENTAL DATA FROM SATELLITE REMOTE SENSING†

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1. Introduction

Satellite-based observation of the earth originally had military purposes. Weather forecasting soon became another major goal. More recently, economic and ecological goals have been added, such as the detection of mineral, fish and water resources and the monitoring of desertification, deforestation, climate change, air and water pollution, land use patterns, agricultural pests, industrial accidents and natural disasters.[1] Remote sensing, although undertaken at a distance of 600–800 km from the earth, is capable of yielding photographs with a resolution of only a few metres. This makes remote sensing data a forceful tool of environmental politics and a valuable source for information of the public at large. But interests of data producing public and private actors may differ from interests of data users and the question arises how access to the data is, or may be, organized.

As access rights are, to some extent, influenced by the mode of production of the data one should be clear about how this production is organized. While initially the whole process of obtaining and enhancing satellite data used to be a public undertaking, the recent years have seen more and more privatization which worked its way from the output end of the process, ie from data sales, up to data analysis, raw data processing and data retrieval. Privatization of the very beginning of the data flow, ie remote sensing itself, will, however, have to wait for some time, because of the entailed high costs.[2]

In the United States most of the space segment will probably continue to be financed and managed by the government via public agencies, notably the National Aeronautics and Space Agency (NASA). While NASA also organizes the distribution of the Landsat 4 and 5 programme, a private company, Earth Observation Satellite Corporation

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[1] T. B. Malanczuk, 'Erdfernerkundung', in: K. H. Böckstiegel (ed), *Handbuch des Weltraumrechts*, 1991, 426–36.

[2] See for qualifications in respect to Japan, K. Tatsuzawa, 'Policy and Law in Japanese Space Commercialisation', *Zeitschrift für Luft- und Weltraumrecht* (*ZLW*), 1991, 394 sequ.

(EOSAT) was licensed to administer the dissemination of the new Landsat 6 programme. EOSAT has entered into contracts with national ground stations around the world providing them a non-exclusive licence to receive and use the data in exchange for a basic access fee—in one case, 1 million US $ per year and additional fees and royalties.[3]

In Europe[4] national programmes have been complemented by international efforts. In France, a government-controlled private company, Spot Image, distributes the scenes and products which are produced by a government agency, the Centre National d'Etudes Spatiales (CNES). In Britain, the whole process, even including the receiving of satellite data, is managed by a public/private partnership, the National Remote Sensing Centre (NRSC) together with its affiliate, the Earth Observation Data Centre (EODC). There are plans to transfer NRSC to a private consortium.

The European international undertaking consists of the ERS-1 satellite (already launched) and the planned ERS-2 satellite. These programmes are financed and managed by an international organization, the European Space Agency (ESA). ESA has licensed some corporations, including Spot Image, to administer the distribution of the data.

The European Commission does not involve itself in remote sensing activities. Nevertheless, the Commission has recenty announced proposals for a co-ordinated establishment of national teledetection data centres. The announcement leaves open what legal form these centres shall have.[5]

Adding a supranational component to what is basically the national business of enhancing and distributing data the Commission has become a major player in this field. It has set up data collecting programmes like MARS (Monitoring Agriculture by Remote Sensing), CORINE (Co-ordination of Information on the Environment) and TREES (Tropical Ecosystem Environment Observations by Satellites). In addition, the European Environmental Protection Agency (EPA) can be expected to become one of the most important repositories of teledetection data.

In the following sections I shall concentrate on access to data possessed by governmental and EC bodies. This certainly implies and has to reflect the fact that some of the data may have been obtained from private actors. My primary concern will be with analysed data because such information is of more value for the public than mere raw or processed data.

One way of framing access to these categories of data is to place access within the legal forms of the market. The information would then be conceived of as a commodity which belongs to someone and can be sold by him or her. Under this perspective, property relations are of utmost importance. Until now the mere factual possession of the data seems to have given the possessor sufficient bargaining power for setting the terms of the sales contract but there is a general belief that property in remote sensing data needs reinforcement. Among the prevailing types of intellectual property protection the author's right/copyright comes closest to the point. The major concern would be to make the law reflect the investment of money and labour into the production and archiving of the information. For this purpose, the granting of the protection right for raw and processed data will probably be uncoupled from the criteria of

[3] P. A. Salin, 'Landsat contracts signed by US agencies with foreign ground-stations: Commercial remote-sensing from NASA scientific experiments to EOSAT private endeavours', *ZLW*, 1992, 165 sequ.

[4] H. J. Heintze, 'Rechtsfragen der Datenpolitik bei weltraumgestützter Erdfernerkundung', *ZLW*, 1992, 395 sequ.

[5] Com Doc (92) 360 final, *The European Community and the Outer Space: Challenges, Opportunities and New Actions*, No 42.

originality and skill which shape the author's right and the copyright, respectively.[6] As automatization rather than personal ingenuity is the source of raw and processed remote sensing data, new criteria which represent this need to be found. It can be expected that such criteria will come close to the notion of data banks which are about to receive a special protective regime under a proposed EC Directive.[7]

Alternatively, one could also think of moving the protective concept into the direction of patent rights. Certainly, a remote sensing photograph is not an invention. But some patent law systems extend patent protection to discoveries, and those which do not, have broadened their notion of invention, in particular in the areas of chemical compounds and genetic engineering. The practical result is that invention-oriented systems can also be regarded as protecting discoveries.[8] After all, there is no essential difference between discovering the gene coding for some property of an organism and discovering the Northern passage through the Arctic ice waters. If protection of remote sensing data is tapped on to the patent right tradition the pertinent criteria of novelty, non-obviousness and economic utilizability are the starting points for further considerations.

Logically, these approaches would primarily fit to information produced by the private sector. Although market forms are not principally inimical to the distribution of information produced by the public sector, the use of market forms in this field would somewhat contradict the fact that the effort was already paid out of the public purse and should not be paid a second time.[9]

Another approach of framing access conceptualizes remote sensing information (at least environmental information) not as a commodity but as part of the public sphere. The stress then lies on the content of the information rather than on the mode of its production: the data informs about mankind's life conditions and indeed form these very conditions, because it is by communication that we perceive our life conditions. From this it follows that the privatization of information is not something which happens in neutral territory. Instead, it is an intrusion into the spontaneous social construction and political reshaping of reality. From this perspective, the information must in principle be free. Forms of intellectual property and private sales contracts would not be excluded from the outset, but they would have to be subjected to qualifications reflecting the public aspect of the information.

Three legal regimes which shape different types of public access may be distinguished:

- access rights of individuals and associations
- access rights of public institutions
- access rights of other countries.

[6] See on the characteristics and differences of the author's right and copyright laws in various countries, Ph. Gaudrat, 'La protection des données de télédétection par les droits nationaux', paper presented to the Conference on the Law in Relation to Remote Sensing Satellite Techniques for the Benefit of the Environment, Strasbourg, June 1993. The US Supreme Court recently stressed that the originality criterion is to be taken seriously, see *Feist* v *Rural Telephone*, 111 S Ct 1282.

[7] OJ C 156, 23 June 1992, 4. See on related proposals, Ph. Gaudrat, 'Protection des données de télédétection par recours aux conventions internationales', paper presented to the Strasbourg conference.

[8] See on the development of patent law as applied to genetic engineering, G. Winter, 'Patent Law Policy in Biotechnology', *Journal of Environmental Law*, 1992, 167 sequ.

[9] L. R. Shaffer, 'US data policy for earth observations from space', in: *Proceedings of the Conference on Environmental Observation and Climate Modelling through International Space Projects*, Munich, 30 March–4 April 1992, vol 3, 1480.

2. Access Rights of Individuals and Associations

The basic ideas behind providing individuals and associations with rights of access to official data range from democracy to the defence of individual rights and interests.[10] The public shall have adequate information in order to be able to participate in political debates and decision-making as well as to search for legal protection of individual rights and interests. Access rights of this kind are only established in relation to governmental bodies. Private sector information is not directly subject to this legal regime but may be affected if the information was transferred to the government.

As to environmental information the various national laws have now come under harmonizing pressure from the EC Directive on access to environmental information.[11]

According to the Directive 'environmental information' includes data about the environment, measures which harm the environment and measures which aim at abating environmental deterioration. Remote sensing environmental information falls under the first category. According to the Directive, access is to be given to everybody. No specific interest has to be shown.

Subject to access requests are public agencies in charge of environmental protection, but also included are private entities which serve the public interest in the area of environmental protection and are supervisd by public agencies in this respect. The latter category is difficult to understand because it refers to the notion of public service (in French: service public; in German: öffentliche Aufgaben) which in itself lacks precise contours and is even experiencing a substantial reorientation given modern or postmodern trends towards dismembering the State. Nevertheless, if applied to the field under discussion, one might infer that, for instance, the above-mentioned national teledetection data centres which the EC Commission plans to promote may be understood as public service even if they are run in a private form but under governmental supervision.

The Directive, however, recognizes exceptions to the everybody's right of access.

One exception is that access may be denied to unprepared data.[12] This could include in the present context those satellite signals received by the ground station. The same may be said about data resulting from the processing of the received signals as long as they consist of a rather amorphous mass. Only results of a certain selective effort (images, scenes, etc) can be understood as prepared data in the sense of the Directive.

A second and most pertinent exception is that the access to information can be denied if it violates intellectual property, for instance an author's right or copyright.[13] However, the protective regime pertains not to the content of data but to an aggregate of the data which is called a work (œuvre, Werk). What is forbidden is not the utilization of the content of the information but the reproduction of the work, as, for instance, copying a photograph, a scene, a map or, under the proposed Directive on

[10] While in the United States access rights are affiliated with democratic values ('freedom of information'), in Germany, for instance, they are regarded as means of pursuing propertied interests of an individual. See for the constitutional backgrounds, G. Winter (ed), *Öffentlichkeit von Umweltinformationen. Nordamerikanische und europäische Rechte und Erfahrungen*, 1990, 6–13.

[11] 90/313/EEC, OJ L 158 of 23 June 1990, 56.

[12] Art 3 para 3 of the Directive.

[13] Art 3 para 2 indent 4 of the Directive. See on the following, P. Katzenberger, The Legal Protection of the Images, Data, and Products of Remote Sensing Satellites, in: 1st Eumetstat Workshop on Legal Protection of Meteorological Satellite Data, 13th–14th March 1989, 80 sequ., 227.

data banks, a CD Rom. By contrast, the agency may well let an information requestor, say an environmentalist, have a look at the photograph and related explanatory information which, for instance, reveals that some industrial plant pollutes the adjacent sea. The subsequent publication of the fact that there is pollution cannot be counted as a reproduction of the information stored in the data bank. If one, nevertheless, took this as a reproduction one would certainly have to think about altering the concept of the author's right in order to preserve an opportunity for non-commercial public access. Art 9 of the revised Berne Convention[14] may be considered as a framework. This provision grants an exception to the author's monopoly of reproduction in certain special cases which may be determined by national legislation.

There is a third exception to access to environmental information which may apply even if the information is not protected by an author's copyright. According to the EC Directive on environmental information access is excluded to documents which a third party has submitted to the agency without being legally obliged to do this.[15] If taken literally this clause would also cover information which was provided to, say, the German Environment Protection Agency by Spot Image on a contractual or co-operative basis but is not recognized as protected by an author's right under German law. But the clause has a different meaning. Its aim is to encourage private enterprises to continue to regularly and voluntarily inform the supervisory agencies about their environmental performance. This aim does not cover information whose voluntary nature is based on commercial contracts or co-operative relationships with professional data distributors.

If, however, the contract between the agency and the furnisher of the data provides that the agency is not entitled to pass the data on to other persons one would probably have to say that this is also binding under the regime of the public law of access rights.

There is still a fourth exception to the access right which may be considered in our context, ie the protection of trade secrets.[16] Can, for instance, satellite information about over-fertilization of a piece of agricultural land be regarded as a trade secret of the observer or even the farmer? One feels that the answer must be negative, but the doctrinal definition of trade secrets, ie hidden information the disclosure of which would harm the legitimate interests of the holder of the information, needs some qualification in order to justify this result. After all, the information is indeed secret, and its disclosure would possibly frustrate the observer's investment into obtaining the information on the one side and the farmer's goodwill on the other. Superficially, the definition of a trade secret is met. Nevertheless, as to the observer the secret does not concern his trade, and as to the farmer his interest in keeping the information secret cannot be accepted as legitimate because the public interest (in soil and groundwater protection) prevails.

The EC Directive contains further provisions, eg on the modalities of the access once the substantive preconditions are fulfilled and no exceptions apply. I shall not elaborate on these. It may only be mentioned that with regard to the costs the Directive

[14] Revised Convention for the Prevention of Literary and Artistic Works of 24 July 1971, Bundesgesetzblatt 1973 II 1071.
[15] Art 3 para 2 indent 6 of the Directive.
[16] Art 3 para 2 indent 4 of the Directive.

allows the agency to charge a fee which must not be unreasonably high.[17] This means that, for instance, the costs of identifying and copying the requested document may be charged, but not the costs of producing the information.

The EC Directive on access to environmental information does not apply to information in the possession of EC institutions including the proposed Environmental Agency. The Commission is currently preparing a proposal for a legal instrument which would fill this gap. In doing this the Commission is backed by a declaration attached to the Maastricht Treaty which stresses the need for improving the transparency of the Commission. Drawing on the information directive the proposal will establish a universal right of access to EC documents. The nature of these documents will still have to be defined and, of course, the access will be subject to the usual exceptions such as intellectual property, trade secrets and information submitted to the EC bodies on a confidential basis.[18]

3. Access Rights of Bodies in the Public Sphere

Three kinds of requestors for information shall be considered: a public agency, a public research institution and an organ of the EC. In all of these cases the reason for justifying free access is to improve public policy and infrastructure, namely by providing the government and the public with the necessary knowledge for devising new policies, enforcing existing laws or developing new technologies.

(1) Exchange of information among public agencies is widespread practice but is not always framed in precise legal terms. In the United Kingdom, for instance, there is no general duty of administrative agencies to exchange information.[19] However, a general power to do this seems to exist provided the agency does not act *ultra vires*. Some laws specifically provide the power to disclose information for the purpose of facilitating the carrying out by the agency of its functions.[20] In Germany, outside the area of military data secrecy the principle of mutual innergovernmental assistance (Amtshilfe) applies. This principle empowers and even obliges an agency to forward information to another agency if the latter needs the information for the fulfilment of its tasks.[21] Information protected by an author's right may even be reproduced for the purpose of law enforcement.[22] Therefore, for instance, a remote sensing photograph processed by a private receiver station showing oil sludge discharge from a tanker in the Baltic Sea can freely be telecopied to the coastguard by the supervising agency which had previously obtained the photography from the receiver station. It speaks for itself that providing data in the framework of mutual assistance among public agencies must be free of charge.

(2) There are a number of research institutions which should be given unhindered access to remote sensing data on the ground that they constitute a kind of infrastructure which provides a public service for society as a whole. The US Earth Observation

[17] Art 5 of the Directive.
[18] Com Doc (93) 191 final 3 ('Access of the Public to Documents in the Possession of Community Organs').
[19] D. Foulkes, *Administrative Law*, 7th ed, 1990, 46–9.
[20] See, eg, Water Act 1989, sec 174 (edited with annotations by R. Macrory, 1989).
[21] See Administrative Procedure Act, § 4.
[22] For the German law, see the Author's Right Act, Art 45. The provision is compatible with the Berne Convention, see art 9 para 2 of the Convention.

Program follows this line and appears to be applicable as well to Europe. A NASA Management Instruction[23] states that

> spaceborne remote sensing data acquired by the Earth Science and Applications Program as part of its experimental remote sensing programs, and data from related experimental or research programs, will be made available to all users and other entities for use in Federally-funded research, development, and cooperative research programs. This data will be made available as soon as practical after acquisition and without any period of exclusive access for any user group. Access terms will specify that such users may not engage in commercial applications of NASA-provided data without authorization ... Data will be provided to research users ... at a price not to exceed the marginal cost of reproduction and distribution.

In short, the policy, which was also written into sec 502 of the US Landsat Act of 1984,[24] grants public research and development programs but not commercial activities open access to the information at very low prices, ie the cost of fulfilling user requests.

The new Landsat Act of 1992 even extends this data policy to all users, if only users of unenhanced data stemming from the oncoming Landsat 7.[25] The government claims property only in unenhanced data. 'Property' is not to be understood as copyright.[26] It probably means real property in the material substratum of the data, but also the factual and exclusive possession of the incorporeal information.

According to the new policy the business of enhancing raw data is exclusively left to the private sector.[27] Of course, private firms will seek an author's and copyright protection for their value-added services. This provokes the question how public research institutions will be treated once the enhanced data have been given intellectual property protection. First of all, access will become much more expensive. Therefore, when redesigning intellectual property protection one may consider introducing some kind of research privilege in terms of cost which adds to another privilege being already established in author right's law, ie that only the reproduction of the materialized form of the information, eg a photograph, is forbidden while the content of the information may freely be used.[28] Therefore, under the regime of the traditional author's right the obstacles to making use of the information are not extreme.

But access becomes more difficult if one envisages a reinforced protection for remote sensing data that moves the protective regime into the direction of patent law. Then, the wider public is excluded from making use of the content of the information (which then would be paralleled to an invention). But even under a patent right system research, including private research, would be privileged in that it may make use of the information for experimental purposes.[29] Only when the research leads to new patentable information is the second patent right holder obliged to share his rights with the first.

(3) A third aspect of access by public institutions concerns the data flow from the member states to the EC institutions, in particular to the Commission and more

[23] Cited in L. R. Shaffer, 'US data policy for earth observation from space', in Conference Proceedings (see ng), 1477.
[24] The official name is Land Remote Sensing Commercialization Act.
[25] Sec 102.
[26] It is a general policy of the US Government not to claim copyright.
[27] Sec 105(a).
[28] See above n13 and related text.
[29] For the German law, see the German Patent Law, Art 11 No 2.

specifically to the proposed Environmental Agency. The EEC treaty contains a general obligation of the member states to assist the community organs in fulfilling their tasks.[30] In combination with the legal task of the Agency under the relevant regulation[31] which is to gather and publish data about the environment this general obligation means that the member states have to forward to the Agency any information fit for EPA's task, including remote sensing information.

Aside from this general principle, there are more specific reporting duties of the member states which are established by a wide range of environment-related directives. Implicitly, ie by the nature of the relevant information, remote sensing data can sometimes be included. For instance, the basic water protection Directive obliges the member states to monitor waste water discharges and pass the results on to the Commission.[34] If the monitoring is assisted by remote sensing it follows that the resulting data would also have to be forwarded to the Commission. Nothing is said about pricing, but it must be assumed that the data flow between the member states and the Commission is free of charge.

4. Access Rights of Other Countries

Access by other countries to information produced by one country is primarily an issue of international law. However, as the communication normally flows not through diplomatic channels but through routine direct interactions between public agencies, research institutions and similar bodies within participating states, the international framework must be transformed into national laws which regulate what body may in what way react to what kind of foreign information requestor. In spite of this not much can by now be found in the national laws in this respect.[33] Therefore, I shall confine myself to the international level.

Before identifying access rights we should clarify the property position of the holder of the information. On the international level this means asking whether the acquisition and possession of remote sensing data is at all legal according to international law. It is striking how fast the remote sensing states have arrived both at practising remote sensing without caring for prior consent of the 'sensed' states and at claiming ownership in the harvested data. But can one really speak of a principle of international customary law stating that remote sensing is free and the data is the property of the sensing state? The related legal debate has circled around arguments like the following:

What does Art I of the Outer Space Treaty of 1967[34] mean by the freedom of exploration and use of outer space? Does this exclusively relate to space-oriented activities or include earth-oriented activities like teledetection?

Can, under a physical perspective, sovereignty at all be intruded given the remote sensing techniques of employing electromagnetic rays which neither cause physical

[30] Art 5 para 1 sentence 2 EC Treaty.
[31] Regulation No 1210/90/EEC of 7 May 1990, OJ L 120, 1.
[32] Directive 76/464/EEC, OJ 1976 L 29, 23, Art 11 and 13.
[33] The universal right of access to environmental information under the relevant EC Directive (see n11) extends also to foreign citizens. This openness although not intentiously created for fulfilling interstate information obligations can certainly be taken as such.
[34] See P. Malanczuk, op cit (above n1), 747; C. D. Classen, *Fernerkundung und Völkerrecht*, 1987, 107–26, 165–79.

harm nor even affect the air space of the country? Or is the ether to be regarded as part of the territorium beneath? Does sovereignty include monopoly rights in the information about a country, or does sovereignty presuppose effective power which is impossible to be exercised where information is concerned?

Does sovereignty include exclusive rights about a state's natural resources, and, if so, does this imply control over access to and distribution of information concerning these resources?

Is there a counter principle of freedom of information the sensing state may invoke, and, if so, does this embrace remote sensing?

During the preparatory work towards the later UN Resolution 41/65 of 1986 on Remote Sensing of the Earth from the Outer Space[35] the majority of the developing states had advocated the need for prior consent by the sensed state to teledetection activities. In the final version of the resolution the question was left open. The focus had been shifted to the problem of dissemination of remote sensing information. It was also not decided whether the distribution of information should be subject to prior consent of the sensed state. By contrast, this requirement was established by the Moscow Treaty of 1978 on the Transfer and Use of Data of the Remote Sensing of the Earth from the Outer Space, Art IV.[36] However, the contracting parties of this treaty do not extend beyond Eastern Europe.

Time has apparently passed by debates of this kind, and some do speak of a customary rule that remote sensing is free and the data belong to the sensing state.[37] This may indeed be the preferable solution given the urgent need for monitoring the global environmental conditions. But then the problem of free access to the data at low fees from the side of states not exercising teledetection becomes all the more significant.

Four legal foundations of such access rights may be distinguished:

- international customary and soft law supporting the position of the sensed state
- international customary and soft law organizing environmental data transfer from remote sensing
- treaties related to environmental protection or other policy areas
- treaties concerning technical co-operation between industrialized and less industrialized states.

(1) As to the first category, ie the position of the sensed states, Principle XII of UN Resolution 41/65 cited above establishes that the sensed state shall have access to any primary or processed data and to analysed data to the extent that the data are possessed by any state participating in remote sensing activities. This clause appears to give a privilege to the sensed states as far as access to data is concerned. Such a privilege could indeed be justified on the ground that after all remote sensing does interfere with sovereign rights of the sensed state. But on closer examination the privilege does not extend very far. There is no unlimited access to data concerning the sensed state. There is only access 'on a non-discriminatory basis'.[38] It follows that the observing state may retain data if it does this on equal terms in relation to any

[35] Reprinted in *S* v *Welck*, R. Platzöder (ed), *Weltraumrecht. Law of Outer Space*, 1987, 638.
[36] Reprinted in *S* v *Welck*, R. Platzöder, op cit, 146.
[37] See G. Catalano-Sgrosso, 'Mise en œuvre des principes des Nations Unies, de 1986 sur la télédétection—le point de vue de juriste' (contribution to the Strasbourg Conference), 107–26, 165–79.
[38] H. J. Heintze, op cit (above n4), 400.

other state. This possibility is of the utmost importance with regard to data on areas such as mineral and other exploitable resources.

In addition, free access it not worth much if the cost is high. Therefore, rules on costs are of crucial importance. Again, Principle XII by granting access only 'on reasonable cost terms' is disappointing in this respect. 'Reasonable cost' can well go beyond the cost of handling a request (which is the formula of the US Landsat Acts) and include an element of sharing the cost of obtaining and processing of the data.

At this point it becomes clear that postulating a customary principle of free remote sensing and of data ownership is very one-sided if one does not add as a twin principle that unlimited access of the sensed state must be provided at incremental cost. Otherwise it would have been a bad trade-off for the sensed states to have, by agreeing to the UN Resolution, implicitly given up the strict sovereignty position on the one side and, on the other, to have got only half-way to a full concept of free sensing and free access.

(2) Resolution 41/65 contains two provisions on disclosure of remote sensing environmental data. One is concerned with 'normal' environmental harm, the other with natural disasters.

Principle X states:

> 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 is capable of adverting any phenomenon harmful to the Earth's natural environment shall disclose such information to States concerned.

Principle XI reads:

> 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 analysed information in their possession that may be useful to States affected by natural disasters, shall transmit such data and information to States concerned as promptly as possible.

As no mention is made of costs these principles must be understood to establish information obligations at no costs to the states concerned. Information promoting environmental protection is, thereby, given a special status, ie that of a public good, in other words as being an element of an international public sphere which excludes its treating as a commodity.

Both principles assume that the information is in the possession of a state. They do not mention information belonging to private companies. This raises the question if the growing trend towards commercialization of remote sensing data frees the states from their obligation under Principles X and XI, or if the states participating in remote sensing activities have to instill the rationale of this obligation into their contracts with data receiving stations and data distribution companies and/or into their relevant legislatory framework. The latter interpretation is supported by the introductory sentences of both Principles X and XI.

Some doubts arise as to the field of application of the principles. Principle XI applies to natural, not to man-made disasters. But man-made disasters affecting the environment, such as the Chernobyl accident, fall under Principle X. Harmfulness to the natural environment in the sense of Principle X, by being related to the earth, is

to be understood as something rather grave and long-lasting.[39] This narrow reading would also keep the information obligation realistic.

It must be added that these principles, being laid down in a UN Resolution, are not binding international law. They constitute soft law but provide an important contribution towards customary rules.

(3) The numerous environmental protection conventions are a rich source for obligations of states to inform each other. This is particularly true for situations of imminent danger to the environment. For instance, the International Convention for the Prevention of Pollution from Ships of 1973[40] says in Art 6:

> Parties to the Convention shall cooperate in the detection of violations and the enforcement of the provisions of the present Convention, using all appropriate and practicable measures of detection and environmental monitoring, adequate procedures for reporting and accumulation of evidence.

Art 4 para (2) b) specifies this:

> Whenever such a violation occurs that Party shall (...) furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.

The Geneva Convention on the Law of the Sea of 1982[41] states in Art 198:

> When a state becomes aware of cases in which the marine environment is in imminent danger of being damaged or has been damaged by pollution, it shall immediately notify other states it deems likely to be affected by such damage, as well as the competent international organization.

Although the Geneva Convention is not yet in force some of its provisions have already become international customary law. The above provision is so basic and convincing that one can assume a related common practice and acceptance and consequently its becoming customary law. This interpretation is supported by the above-discussed Principle XI of UN Resolution 41/65.

It is interesting to note that these and many other treaties do not restrict the information duty to cases where the territorial or economic zone of the beneficiary of the duty is affected. Cases of danger for the High Seas and other common resources beyond national property rights are also included. The information duty has therefore two sources of justification: sovereignty and the protection of the common heritage of mankind.

There are also treaties that establish information obligations related to non-catastrophic 'normal' pollution or other environmental destruction. For instance, the EC Convention of 1979 on Long-range Transboundary Air Pollution and its offspring, the Helsinki and Sofia Protocols of 1985 and 1988 contain rather specific duties of the member states to report the yearly amount of sulphur and nitrogen oxides emissions. But this is hardly pertinent to our question because remote sensing data do not say much about quantities of emissions.

Information about the location and nature of 'normal' environmental deterioration is more relevant. There are a number of treaties that contain information duties in this respect. For instance, the Ramsar Convention of 1971 on Wetlands of International

[39] H. J. Heintze, 'Rechtsfragen der Nutzung von Fernerkundungssatelliten bei humanitären Hilfsaktionen', *ZLW*, 1993, 278 sequ 289.
[40] ILM 12 (1973) 1319 sequ.
[41] ILM 21 (1982) 1261 sequ.

Importance requires the contracting parties to inform the secretariat without delay about any change or likely change in the ecological character of any wetland in its territory and included in the list of wetlands of international importance. Remote sensing may well register such changes. Unfortunately, the Ramsar Convention still assumes that only the territorial state is capable of noticing changes in its wetlands. The contracting parties may consider amending the Convention in order to broaden the information duty such that the foreign remote sensing states or international organizations have to provide access at least for the territorial state if not also for the Convention secretariat.

All of the environmental conventions containing information duties are silent on one crucial question—whether the access to the information shall be free or, if not, be granted at a limited price. Charging the full cost of obtaining and processing remote sensing data would come close to refusing the information to the poorer states. From this one may infer that the price, if any, should be calculated at most according to the marginal cost. Inversely, the data furnishing state is not obliged to require compensation. Unfair competition rules which may come to mind do not exclude courtesy services and are anyway not part of international customary law.

(4) Developing countries are often in great need of data for urban planning, minerals exploration, agricultural pest abatement, nature conservation, etc, data which may also be available from remote sensing. Access to this type of data will in most cases already be covered by the legal regimes discussed sub (1) to (3). But the framework of technical co-operation between industrialized and less industrialized states may also be relevant.

Thus, Principle II of UN Resolution 41/65 says that remote sensing shall take 'into particular consideration the needs of the developing countries'. More specifically the Rio Convention of 1992 on Climate Changes[42] states in Art 5 that the contracting parties must support the efforts to strengthen the capacity (notably of the developing states) in relation to the systematic observation and the scientific and technical research activities. The contracting parties must also further data access and exchange including analyses derived from the data regarding areas outside the national spheres, particularly taking into account the needs and interests of the developing states. In addition, Art 4(1) h calls for co-operation in a complete, open and immediate exchange of scientific information relating to the climatic system. Again, nothing is said about prices for providing information. But one can infer from the context of development assistance in which the Convention stands that fees, if they are charged at all, must be affordable for the developing countries.

It may be noted, by the way, that access by these countries should not only relate to data about their territory and the global commons but also to data about the territory of the industrialized states. For instance, information about the cutting of forests in the Northern sphere (which are part of the global sink for carbon dioxide) ought to be furnished also to the southern states. This would allow them to point to the northern potential of preserving the climate in the course of international negotiations following the Rio Convention. Just as development is not an autonomous, but interacting process, development discourses are not monologues of 'southern' states, but dialogues between them and their 'northern' counterparts.

[42] Reprinted in EC OJ 1993, C 44, 1 sequ.

Summing up, remote sensing information should be seen not only as an economic good but also as an important element of public discourses. More and more these transcend national borders and are evolving towards a responsive and participative international political decision-making about how to preserve the spaceship earth.