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The UN Principles on Remote Sensing Today

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Introduction

Part I of this paper addresses the validity of the 1986 UN Principles on Remote Sensing and their consistency in today's scenarios. After analysing the objectives of remote sensing activities in Principle I - drafted at a time when the magnitude of commercial space activities was not envisaged - the presentation looks at certain specific areas, such as the position of the industrialised world regarding the free distribution and commercialisation of data collected by satellites, once processed -which is seen by the developing world as a kind of "surrender of sovereignty"- and the demand for more precision on the part of this group of countries concerning certain clauses of the Principles. Such, *inter alia*, "the legitimate rights and interests of the sensed State", the implications of "international cooperation" and the "participation of the sensed state in remote sensing activities". This remains an element of discord confronting the industrialised and the developing world.

Part II discusses the advisability of a move towards binding rules on remote sensing given the reluctance of space-faring countries on the matter. The author perceives that a discussion of the Principles in new light, with no further implications -except, perhaps, the drawing up of interpretation criteria- would be useful today since remote sensing activities have grown considerably and are now more easily accessible to developing countries.

Part III refers to the delicate problems surrounding the use of data collected by earth observation satellites in different areas of the world and its value as evidence in court, particularly in connection with boundary disputes.

To this end the author takes into account the recent meetings on the subject, *inter alia,* the 71st Conference of the ILA (Berlin, August 2004), the IISL Colloquia of the last three years, the Argentina/Brazil Meeting on *Ciencia, Tecnología y Sociedad (*Buenos Aires, November 2004), the author's projects underway at the National Council for Scientific Research (Conicet, Argentina) the UN/Brazil Workshop on Space Law (Rio de Janeiro, November 2004), the 43rd meeting of the LS of Copuos and the IISL/ECSL Symposium on Remote Sensing (Vienna, April 2005), the ECSL Conference on Current Issues in Earth Observation (Surrey, April 2005), the International Symposium on Project 2001 Plus - Global and European Challenges for Air and Space Law at the Edge of the 21st Century (Cologne, June 2005) and further developments.

Part I: the issue of validity

Indeed the 1986 UN Principles on Remote Sensing have weathered well. Despite the many criticisms addressed to their scope and implications, lack of clarity and worrying gaps in the law - which were not easy to foresee in 1986- they have prompted a considerable number of bilateral and regional agreements in recent times which, to a great extent, are covering those lacunae. These agreements, involving both industrialised and developing countries, go a long way in redressing the initial shortcomings of the Principles and are illustrative examples of the increasing use of modern technologies and of the progressive development of the law in this field.

From a practical standpoint it is fair to say that the process of negotiating specific agreements has diminished the need for amending -or discarding- the Principles, especially if we have in mind, as will be seen in Part II, that the political moment has not been at all propitious to take such a step, let alone agreeing on a binding convention.

In brief, remote sensing technologies are being used today by a growing number of countries from the developed and developing world. International cooperation has played an important part in the conclusion of arrangements which have conveniently covered the gaps in the Principles in each concrete situation and circumstance.

The growing participation of private entities in space activities is yet another element of weight which eased the development of these technologies and their application in different geographical areas. This trend soon led to the adoption - by both developing and developed States - of specific agreements on the matter, particularly for environmental protection (e.g. monitoring the compliance with international obligations) as well as in the fields of agriculture, crop surveying, water and other natural resources.

Moreover, the increasingly commercial features of space activities in today's world no longer raise the fear that a State - acting as subject of public international law and at the slightest controversy over the interpretation of its clauses - may invoke a clause of sovereign immunity likely to hinder the development of agreements. In fact, as Frans von der Dunk points out, doubts have been expressed concerning private remote sensing activities actually coming under the existing regulations[1].

The validity of the UN Principles in today´s world and the extent to which they should be seen as reflecting customary international law on the topic are issues high up on the international agenda. The matter was exhaustively discussed at the 71st Conference of the International Law Association (Berlin 2004)[2] where it was noted that the wide space left by these Principles for interpretation was a source of concern to the developing world. It was also pointed out that, in the context of *Project 2001 - Legal Framework for the Commercial Use of Outer Space*[3] (Cologne University) the prevailing idea was that, in light of the 1986 Principles, the commercialisation of data collected by remote sensing technologies was by all means permissible. Thus the predominant line of thought in the industrialised world.

In accordance with this interpretation, and as Bin Cheng had already pointed out in 1997, the only protection available to the sensed state -apart from Article VI of the 1967 Space Treaty- is Principle IV whereby the activities should be carried out on the basis of respect for the principle of full and permanent sovereignty of all states and peoples over their own wealth and natural resources and such activities should not be conducted in a manner detrimental to the legitimate rights and interests of the sensed state[4]. One may fairly conclude that the looseness of this provision does not meet the requirements of the sensed state. However, to correct this inequity experience is showing that regional and/or bilateral agreements are the most sensible course of action.

The overall conclusion of the ILA Space Law Committee was that most of the UN Principles reflected customary international law enabling them, therefore, to survive the times. This statement was fully supported by Joanne Gabrynowicz at a recent UN/Brazil Workshop on space law[5]. The nature, contents and substance of the Principles are certainly not new to other areas of modern international law. What is new, however, is their application to a very sensitive area such as remote sensing. Even though it is true that nowadays sovereignty claims are being gently outspaced by the far-reaching commercial implications of remote sensing, the need for a thorough review of state practice on the matter is of major importance.

The ILA Report to the Berlin Conference pointed out a contradiction -theoretical, at least- between the scope of Article VI of the 1967 Space Treaty and Principle XIV, both addressing state responsibility. On this issue the 1967 Space Treaty has gone much further than the 1986 Principles. Indeed, Article VI of the 1967 Treaty makes states responsible for "national activities in outer space" (in the widest sense) whereas Principle XIV is limiting the responsibility to "states operating remote sensing activities"[6].

In connection with the validity issue, Hedman[7] observes that in 1986 -when the idea of "common utility" prevailed over the commercial sides of the technology- the Principles were providing a balance of interests between the sovereignty of the sensed state and the interests of the sensing state in carrying out the activity without prior consent[8]. His conclusion is that, due to their great flexibility, the Principles are still valid as an instrument for international cooperation. Which is of course beyond question.

However so, and setting aside the various issues on where the Principles remain silent and which, as previously indicated, are being taken care of in the framework of specific regional arrangements, there are other problems as well. What about certain clauses in the Principles which still remain rather vague, such as the meaning of "detriment to the rights and interests of the sensed state", "participation of sensed states in remote sensing activities together with the sensing state", "the right of access of the sensed state to the data collected over its territory" and others? As a reasonable first step -on which the ILA Space Law Committee showed general acceptance- some interpretation guidelines for those obscure and controversial aspects of the Principles should be drafted [9]. Vladimir Kopal stressed the importance of this course of action as it would ease the implementation of the Principles by means of national space legislation, agreements on international cooperation

and the practice of states and private entities in the field[10]. To this end first priority should be given to the definitions contained in Principle I which describes the objectives of remote sensing activities as the improvement of natural resources management, land use and the protection of the environment. Secondly, the above-mentioned controversial clauses should, be tackled in turns. The alternative, as Joanne Gabrynowicz has wisely suggested, is to identify specific issues on which consensus could be achieved[11]. This, in fact, appears an ideal starting point for reviewing the Principles.

Conclusion on Part I (validity of the UN Principles): the 1986 Principles may be considered a valid instrument of international cooperation which reflect, on general lines, customary international law. Be that as it may, an updated review of state pratice on the topic would be appropriate at the moment. It seems equally useful to agree on some interpretation criteria concerning the most controversial clauses of the Principles in today's light. To this end, a realistic first step would be to identify concrete issues on which consensus appears viable. As to the present gaps in the law, experience shows that this problem is conveniently being solved by means of regional and bilateral agreements and national space legislation.

Part II: need for a binding instrument

José Monserrat Filho has championed this cause for several years on the basis of sound reasoning. In this sense his "Introductory Report" as Special Rapporteur of the ILA Space Law Committee for the 2004 Berlin Conference and, shortly after, his comments at the UN/Brazil Workshop on Space Law, are revealing[12]. Just as revealing are the views expressed at the 43rd Session of the LS of Copuos, in April 2005, on the gaps in the Principles, their anachronism and and consequent need for revision.[13]

No doubt, that objective is indisputable from a theoretical and strictly legal standpoint. The ILA Space Law Committee has fully agreed on the shortcomings and vagueness of some of the Principles[14] and so has the doctrine in general. Niklas Hedman, in his "Introductory Report" for the ILA Berlin Conference, underlines five of them which call for revision, namely the definitions (Principle I), the exact meaning of "the legitimate rights and interests of the sensed state" (Principle IV) as well as of the expression "taking into account the territoriality, the principle of non discrimination and the cost of obtaining the data" (Principles XII and XIII) and questions underlying state responsibility (Principle XV)[15].

Let us now move on to some views of ILA Committee members. Armel Kerrest, for example, does not hesitate to refer to the "weaknesses" of the Principles, stating that they have not been correctly applied in practice. As to the obligation of international cooperation, Kerrest observes that it means no more than an obligation to negotiate but not to reach agreement. Furthermore, the access to data on the part of the sensed state is still an unanswered question. However, to draw up an international binding instrument on remote sensing today seems to Kerrest a mission impossible[16]. Gabriella Venturini, on the specific question of definitions, supports Monserrat´s proposal of adding the term "analysed data" in an updated definition

of these activities[17]. Carl Q. Christol considers that the term "remote sensing" should be enlarged to cover commercial space activites[18]. Mahulena Hofmann holds that national space legislation is of major importance in the field of remote sensing and that it would be opportune to consider the possibility of drafting a model national law on this subject[19]

Indeed, a great majority are today aware of, and familiar with, the main shortcomings of the Principles. It therefore follows that an updated, binding instrument replacing them seems, at first sight, a sensible proposal. Yet, as the present author has noted in recent publications, there are other elements involved which clearly indicate that the political moment is not favourable for a swift move in that direction[20]. This does not mean, of course, losing sight of what should be the ultimate objective, i.e. a binding convention. At the moment, however, this idea appears untimely.

Be that as it may, this issue should be reviewed in a few years´ time when state practice becomes more enlightening. Meanwhile, as held earlier, regional and bilateral agreements, together with further national space legislation and a *bona fide* compliance with the obligations enshrined in Article VI of the 1967 Space Treaty (supervision and authorisation of activities carried out by private entities in space) should have a leading role.

Conclusion on Part II (need for an international binding instrument): This conclusion is very much in line with Part I of this paper. In other words, it is believed that, before embarking in any such quest, a discussion of the Principles in today´s international context, without further implications, appears more sensible. At this stage, the drafting of a set of interpretation guidelines would be helpful. In the interest of a neat drafting process an advisable approach for the initial steps is to single out, among the controversial clauses in the Principles, those on which consensus appears more viable.

Part III: satellite data in court

The use of data collected by earth observation satellites is another topical question today. It was the object of close attention in 2004 at different international meetings. I shall not pause on the background of this question which may be found extensively in recent publications[21]. Suffice it to recall that one of the first initiatives to tackle the problems stemming from the switch from conventional photography to digital mapping was taken by the British Institute of International and Comparative Law in 2001, in a pioneer piece of work on the matter[22].

The problem may be summarised as follows. It is true that digital mapping is infinitely more accurate than conventional mapping - such as aerial photography - and allows very little margin for human error in the resulting image. Yet, there is a wide space for error in the interpretation of the image. This leads to the undesirable consequence that what is used in court is the opinion of the expert - necessarily called upon to interpret the digital map - and not the satellite data proper. The judge would therefore be deciding according to the expert´s opinion and not on the basis of the data on the map. Which is, no doubt, a rather troubling thought.

Glaring examples were provided in recent years[23] in a number of boundary disputes decided by the ICJ, such as Nigeria-

Cameroon (judgment of 10 October 2002), Botswana-Namibia (13 December 1999), Qatar-Bahrein (23 March 2001) and others. For more information the author refers to the sources mentioned at the outset, in the Introduction to this presentation.

Of course, the precision of the product resulting from the use of earth observation satellites is an element of major importance. This is a very powerful reason for supporting the use of digital maps as evidence in court. It implies unprecedented progress over past inaccuracies and thus its use, at first sight, should be prompted. So far so good.

Yet, on second thoughts, next to the worries arising from the expert's role in interpreting the map there is a point of substance which is sometimes missed when analysing the pros and cons of this modern technology and its use in international and domestic litigation. Armel Kerrest sums it up in crystal clear terms as follows:

> *....the difficulties concern the very nature of satellite imagery which mainly consists of data and not photographs proper. This point is essential where evidence is concerned. A photograph cannot be modified unless an expert, at a later stage, can prove the falsification. This is not the case when dealing with numbered images that are merely a list of data which can be modified without possibility of detection. On this assumption, and taking into account the presently available techniques, it is imperative to supervise the process of obtaining the image from the moment it is collected right up to the time it is used in court*[24].

Hence the underlying reason for judges to question the value as evidence of digital cartography, especially in boundary disputes where delicate sovereignty issues are likely to surface. It is also the reason for the agents of the parties to any such dispute not to favour the production of this means of evidence until clearer and reliable rules are outlined and agreed upon to govern the matter. In simple terms, if an aerial photograph is faked, this may subsequently be discovered. Conversely, where digital maps are concerned, this is not the case.

Apart from boundary disputes digital mapping may prove useful for environmental protection and land-use. For illustration purposes the following examples have been taken at random, one from an industrialised country and the other from a developing one.

In the United Kingdom courts show a general openness towards the use of new technologies as evidence but, as Richard Macrory and Ray Purdy indicate, to ensure that such evidence be regarded as reliable and convincing it will be necessary to put in place safeguards to ensure the highest levels of authenticity and accuracy throughout[25]. However, the information collected by these satellites has hardly been used in British courts, which indicates uncertainty as to their effectiveness as evidence. Conversely, this data has been effectively used to provide an early warning mechanism to detect offences[26].

In the developing world, examples are yet scarce. The Supreme Court of Argentina recently resorted to satellite data in connection with floods, despite

the Argentine law not contemplating the production of this kind of evidence. It concerned damages to a farm where the owner claimed the flooding of his land as a result of works out carried in the vecinity by the local government[27].

This topic was the object of stimulating discussion at the ILA Berlin Conference, the UN/Brazil Workshop on Space Law and the Conference of the ECSL in Surrey, among others. Vladimir Kopal, in Berlin, clearly foresees the importance of the use of satellite data in international litigation recommending that its value in court be further explored by the doctrine.[28] Also in Berlin, Gabriella Venturini firmly supports the idea of developing internationally recognised standards[29]. So does Joanne Gabrynowicz in the UN/Brazil Workshop when stating that this technology is here to stay and that the international community should recognise the dangers of digital imagery and have in mind that current methods of authentication are not enough[30]. The Surrey Conference reflected clear concern on the absence of reliable standards to back satellite imagery produced as evidence in legal proceedings[31].

Conclusion on Part III (satellite data in court): Digital images can be modified (or faked) without possibility of detection. The main concern is therefore on a point of substance that stands against the use of satellite imagery in court due to the deficient methods of authentication available today. This remains an open question calling for prompt solutions to enable the full use of satellite data and its many advantages. In addition to the elaboration of international standards on authentication, together with reliable mechanisms of production of satellite imagery in court, it is essential to verify the method by which the satellite data was interpreted in order to confirm the accuracy of the end product from the initial stages. In this challenging quest, the possibility of agreeing on a list of experts of international renown, from which the courts and the parties may draw for interpretation purposes, should not be overlooked. Unless safeguards of the kind are implemented without delay, satellite imagery as evidence in court will be facing a particularly gloomy future.

Notes

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[1] Frans von der Dunk, Working Session of the Space Law Committee (20 August 2004) during the 71st Conference of the International Law Association, Berlin 2004. See Report of the Seventy-First Conference of the ILA, London 2004, p. 766.

[2] Op.cit. , loc.cit. See *Report of the Space Law Committee to the Berlin Conference* and discussion during the Working Session thereof, pp. 732-772.

[3] *Project 2001 - Legal Framework for the Commercial Use of Outer Space*, ed. K.H.Böckstiegel, Carl Heymanns Verlag 2002, especially the Working Group on Remote Sensing Issues (Toulouse Meeting, 28 October 1998).

[4] Bin Cheng, *Studies in International Space Law*, Clarendon Oxford 1997, Chapter 22, pp. 572-597.

[5] See Joanne Gabrynowicz in her inspiring comments (pp.143-4) to the discussion paper submitted by the present author (See Maureen Williams, *Space Law and Remote Sensing Activities,* pp. 121-136 of the *Proceedings* of the UN/Brazil Workshop on "Disseminating and Developing International and National Space Law: The Latin American and Caribbean Perspective", Rio de Janeiro, 22-25 November 2004, United Nations, New York 2005, ST/Space 28.

[6] See Bin Cheng, op.cit. in note 4, pp.596-597. According to Hedman, Principle XIV should be read together with Principle IV (see note 5) as it recognises the freedom of exploration and use of outer space on the one hand, and provides that remote sensing activities shall be conducted on the basis of respect for the principle of full and permanent sovereignty of all states and peoples over their own wealth and natural resources, with due regard to the rights and interests, in accordance with international law, of other states and entities under their jurisdiction.

[7] Niklas Hedman was one of the ILA Space Law Committee's Special Rapporteurs on the topic for the Berlin Conference. See op.cit. in note 1, p.740 et seq.

[8] The present writer, albeit not fully adhering to this view, points out that the so-called "balance of interests" is, in the eyes of the developing world, far from perfect.

[9] In this regard there is almost consensus on the need to update Principle 1 on "definitions". Similarly, Principle IV referring to the "legitimate rights and interests of the sensed state", Principles XII and XIII on "territoriality", the principle of non-discrimination and the "cost" of obtaining data, and Principle XIV should be clarified.

[10] See Vladimir Kopal's views, op.cit. in note 1, p.767.

[11] See Joanne Gabrynowicz's comments, op.cit. in note 5, pp. 144-145.

[12] For further details on José Monserrat's views on remote sensing, op.cit. in note 1, pp.743-745 and 764-765 (Berlin working session of the Space Law Committee). Also in op.cit. in note 5, in his comments to the discussion paper submitted by the present writer, pp.137-141.

[13] See, in particular, the position of European and Latin American countries on the subject in the Reports of the Legal Subcommittee of Copuos for 2004 and 2005.

[14] See op.cit. in note 1, pp.751-2 (*Comments and Conclusions from the Committee Chair*).

[15] See Niklas Hedman's views, op.cit. in note 1, pp. 740-743.

[16] See Armel Kerrest's comments, op.cit. in note 1, p.746.

[17] See Gabriella Venturini's remarks, op.cit. in note 1, p. 747.

[18] See Prof. Christol 's remarks, op.cit. in note 5, p.130.

[19] See Mahulena Hofmann's remarks, op.cit. in note 1, p.768.

[20] See *Report on the Legal Aspects of the Privatisation and Commercialisation of Space Activities. Remote Sensing,* by the present writer, op.cit. in note 1, pp.732-753. Also, by the same author, *Space Law and Remote Sensing Activities*, op.cit. in note 5, pp. 121-136. Cf. Joanne Gabrynowicz, in her comments to this paper, op.cit. in note 5, at p.143.

[21] See op.cit. in notes 1 (pp.748-751) and note 5 (pp.132-135, and 158).

[22] See the Report on *Earth Observation Data in the Legal Sector* to be found in the website of the BIICL (www.biicl.org) .

[23] In Nigeria-Cameroon, for instance, Nigeria used a satellite image of a certain area to show its location to the ICJ and the interpretation by the parties was in conflict. Thus, instead of clarifying the issue to the Court, it added confusion. In the end, what Nigeria saw as a very clear way to show a straightforward point to the Court had the contrary result.

[24] These statements by Armel Kerrest in 2004 may be found in op. cit. in note 1, p. 751.

[25] Ibid.

[26] See Richard Macrory and Ray Purdy, *The Use of Satellite Images as Evidence in Environmental Actions in Great Britain,,* Revue de l'Institut des Études Juridiques et de la Construction "Droit de Ville", N° 51, 2001.

[27] Supreme Court of Argentina, in *Terrero v. Province of Buenos Aires*, judgment of 26 February 2002 published in "El Derecho", Buenos Aires, Vol. 198, pp.527-530.

[28] See Vladimir Kopal's comments in Berlin 2004, op.cit. in note 1, p. 767.

[29] See Gabriella Venturini, op.cit.in note 1, p.751.

[30] See Joanne Gabrynowicz's remarks, op.cit.in note 5, p. 158, when quoting Jill Witkowski's article *Can Juries Really Believe What They See? New Foundational Requirements for the Authentication of Digital Images*, 10 Wash. U.J.L. & Policy 267, 293-294 (2002).

[31] The paper referred to in note 26 was distributed to participants in the Surrey ECSL Conference.