

LEGAL ASPECTS OF USING REMOTE SENSING SYSTEMS AS „NATIONAL TECHNICAL MEANS OF VERIFICATION“

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Abstract

The capacities of the present generation of remote sensing satellites demonstrate their potential for the monitoring of arms-control agreements. However, the UN 1986 Principles Relating to Remote Sensing of the Earth from Outer Space limit their scope on the use of satellite sensing methods for improving natural resources management, land use and the protection of environment. The purpose of this paper is to address the question as to whether and to which extent the rules concerning „classical“ remote sensing correspond to these new use. The conclusion is that if remote sensing methods are used for verification purposes, such use is not subject to the 1986 UN Remote Sensing Principles regime.

I. Introduction

At the beginning of space era, the cameras on board of space objects were used both for civil and military purposes. During the development of sensing technologies, two main areas of use of the data obtained from outer space developed: On the one hand, information with high spatial resolution found their application mostly in reconnaissance activities; on the other hand the data with less detailed resolution

proved to be a significant contribution to cartography, natural resource management, land use and protection of the environment.

Both categories of information are of an important strategic value; however, they differ as to the sensibility of their potential disclosure. In the 70ies and 80ies, this difference allowed to draw a line between those uses of satellite images which served primarily verification purposes and „remote sensing“ methods that aimed mainly at natural resources and environmental management; this differentiation was reflected also in the legal regulation of both activities.

The technological progress of the 90ies resulted in such an improvement of remote sensing methods that - from the technical point of view - there is no more substantive difference between the potential of remote sensing methods and satellite verification. The quality of data received from civil satellites improved significantly. Satellites such as the French SPOT can detect weapon-related facilities in considerable detail. The spatial resolution of some Chinese civil satellites is similar to that of the SPOT. Moreover, the number of states with own space programmes has increased. Many of the data received from satellites are commercially available.

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It is even more difficult to define whether a particular system is of a civil or a military character. The previous criteria for its determination - the ownership of the system, its purpose, the system management and control, the physical character of the system, the nature and relative quality of the service provided, and the system users¹ - lost their decisive role. Even if a system, such as a technologically sophisticated Earth observation system, meets all the criteria to qualify as a civil space system, its information products could still have a significant military utility², and *vice versa*. Many of the space systems are constructed to have not only a single, but a multiple capacity which makes that traditional characterisation impossible.

The question which arises therefore is as follows: What is the legal regime of remote sensing satellites and of the data which are received from their sensors in situations in which they are not used for „classical“ remote sensing purposes (resources, land management, environment), but as a means of verification of disarmament treaties?

II. Legal Regime of Remote Sensing

Since the intensive use of remote sensing technologies many states, especially those without own remote sensing system, urged for an international regime of data and information gathered by remote sensing methods:

The major problems arose in two areas: First, the sensed states, especially the developing countries - concerned about infringements of the sovereignty of their territory - demanded that their consent had to be given prior to each sensing of their territories. Second, the same countries, together with the states of the former socialist block, claimed a right to approve of each dissemination either of all data, or of special categories of sensitive data acquired from their territories. The United

States and their allies opposed to any restrictions on the collection and distribution of non-military data; on the other side, by limiting the scope of the new co-operation regime to information connected with environment, natural resources and land use, they denied to be under any obligation to share military-sensitive satellite information³.

The compromise reached was concentrated in the set of Principles Relating to Remote Sensing of the Earth from Outer Space⁴ which were adopted by consensus as resolution of the UN General Assembly Nr. 41/65 of 3.12. 1986⁵. As contained in a resolution, the Principles have only a recommendatory character; the fact of their being adopted by consensus gives them the character of a common interpretation of pertinent rules of international law.

Principle I of Resolution Nr. 41/65 defines remote sensing as „sensing of the Earth's surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment.“ The reason for this restrictive definition which excludes from the regime in question all systems not aimed at „improving natural resources management, land use and the protection of the environment“ was to ensure that the UN principles could not be interpreted as giving the sensed states a right of access to data from other countries military surveillance satellites⁶.

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 developing countries (Principle II). According to Principle IV, remote sensing activities shall not be conducted in a

manner detrimental to the legitimate rights and interests of sensed States.

Through Resolution 41/65, a broad co-operation regime has been established: The States carrying out remote sensing activities shall offer other States opportunities for participation therein; such participation shall be based in each case on equitable and mutually acceptable terms (Principle V).

In order to maximise the availability of benefits from remote sensing facilities, States are encouraged to provide, through agreements or other arrangements, for the establishment and operation of data collecting and storage stations and processing and interpretation facilities (Principle VI).

Landsat ground-stations operate on the basis of agreements concluded in the form of memoranda of understanding (MOUs) between the U.S. National Oceanic and Atmospheric Administration (NOAA) and the space agency of the ground-station state. The MOUs require that the ground-station operator makes all data received „available for sale on a public, non-discriminatory basis⁷.

SPOT agreements are negotiated between SPOT Image and the ground-station operator. The agreements grant the latter the exclusive right within a particular geographic area to market images from SPOT satellites; SPOT Image also requires the ground-station operator to make all images received at its station available without discrimination. An advantage of this regulation is that the SPOT ground station obtains images directly from the satellite in question; it possess those images and avoids the significant processing and distribution delays at EOSAT and SPOT-Image centres.

However, the distribution both of ground stations and data processing facilities is

uneven and results in disparity in timely access to remote sensing images. For security purposes, this disparity can be stark:

A country with a respective ground station may be able to acquire data about its neighbours on a near „real-time“ basis. In contrast, to receive images of the ground-station state, a regional „rival“ must first apply to the ground station state itself or to the data processing centre. However, the speed with which users receive the processed information is affected by the operations at each stage of the data elaboration process.

The crucial element of Resolution 41/65 is Principle XII: The sensed States shall have access to the primary data and the processed data concerning the territory under their jurisdiction as soon as they are produced, on a non-discriminatory basis and on reasonable cost terms. The sensed States also have access to the available analysed information concerning the territory under their jurisdiction in the possession of any State participating in remote sensing activities on the same basis and terms.

In practice, the equal access principle means the offering of data from the spacecraft at an equal price to all customers. The sale of the images with high spatial resolution makes it possible also for non-space states and other subjects to explore independently questions of compliance with arms control treaties.

However, although the images offered by each of the satellite operators are nominally available to all potential customers on a non-discriminatory basis, it is difficult to exclude that some users obtain images more rapidly than others because of technological and political policies of the satellite or ground station operator⁸.

Principle XIV provides that countries operating remote sensing satellites bear international responsibility for their activities, irrespective of whether the activities are carried out by government agencies or private companies. On the one hand, Article VI of the Outer Space Treaty provides that States Parties to the Treaty shall bear international responsibility for national activities in outer space. On the other hand, Principle Ie defines the „remote sensing activities“ as „the operation of remote sensing space systems, primary data collection and storage stations, and activities in processing, interpreting and disseminating the processed data.“ However, the data processing phases need not to be realised by the same provider as the owner of the space system; they can be realised by the sensed State itself or even on the territory of a completely different State. The scope of the term of the international responsibility for their „activities“ remains, thus, unclear⁹.

Any provisions concerning non-dissemination of the data without the consent of the sensed state has been left out of the set of principles.

III. Legal Regime of Space-Based Imagery as Means of Verification

1. Substantive Regulations

Space-based data and information began to play a role in treaty verification with the conclusion of the Treaty between the USA and the USSR on the Limitation of Anti-Ballistic Missile-Systems (SALT I)¹⁰ of 26.5. 1972, which limited anti-ballistic missile systems, and of the „Interim Agreement of 26.5. 1972“¹¹, which limited the launchers for strategic ballistic missiles. Article XII of SALT I Treaty provides that „...for the purpose of providing assurance of compliance with the provisions of this Treaty, each Party shall use national technical means of verification at its

disposal a manner consistent with generally recognised principles of international law“. Moreover, each Party undertook not to interfere with the technical means of verification of the other Party (Article XII, para. 2); article V of the Interim Agreement contains identical wording.

The reference to „national technical means of verification“ have been generally understood in such a way as to include imaging satellites¹².

The binding legal framework of the verification of the implementation of the Treaty between the USA and the USSR on the Limitation of Strategic Offensive Arms (SALT II) of 18.6. 1979¹³ consists of identical elements as of SALT I, extended in Article XV para. 3 by the obligation of each Party „...not to use deliberate concealment measures which impede verification by national technical means of compliance“ with the treaty in question. However, this obligation „...shall not require changes in current construction, assembly, conversion, or overhaul practices“.

The Strategic Arms Reduction Treaty¹⁴ (START) was signed in Moscow on July 31, 1991 originally as a bilateral agreement between the USA and the USSR. After the dissolution of the Soviet Union, it was adapted to the new multilateral context and ratified by the heads of State of the USA the USSR, Belarus, Kazakhstan and Ukraine in Budapest, December 1994.

The means of verification of this agreement are similar to those of SALT II Article XV:. For the purpose of verification of compliance with the provisions of this treaty, each Party shall use national means of verification at its disposal in a manner consistent with generally recognised principles of international law. Furthermore, each Party undertakes not to interfere with the national technical means of verification of the other Party; the

Parties undertake not to use concealment measures that impede verification, by national means of verification, of compliance with the provisions of this Treaty (Article IX).

A comparable structure of verification means was taken over into the next significant disarmament treaty - the Treaty between the USA and the Russian Federation on Further Reduction and Limitation of Strategic Offensive Arms¹⁵ (START II), signed on January 3, 1993 but not yet ratified by the Russian Federation. Under Art. 5 of the START II agreement, the comprehensive START verification regime applies to the new Treaty: „Except as provided for in this Treaty, the provisions of the START Treaty, including the verification provisions, shall be used for implementation of this Treaty.“ In addition, START II includes some new verification measures, such as observation of SS-18 silo conversion and missile elimination procedures.

An extensive multilateral verification regime is part of the Comprehensive Nuclear Test-Ban Treaty¹⁶ (CTBT) which was opened for signature on September 24, 1996. As of September 14, 1998, 150 nations had signed, and 21, including France and the United Kingdom, had deposited their instruments of ratification; for entering into force, 44 ratifications are necessary. Under Art. IV(4) of the Treaty, all States Parties, irrespective of their technical and financial capabilities, shall enjoy the equal right of verification and assume the equal obligation to accept verification.

The substantive rules concerning the main verification procedures are provided for by Art. IV of the Treaty; its para. (5) and (6) remind of the comparable provisions on national verification means of the START I and START II Treaties: Under Art. IV(5), no State Party shall be precluded from

using information obtained by national technical means of verification in a manner consistent with generally recognised principles of international law, including that of respect for the sovereignty of States. Art. IV(6) contains the non-interference principle: States Parties are obliged not to interfere with elements of the verification regime of this treaty or with national technical means of verification. However, the States Parties have a right to protect their sensitive installation, activities or locations not related to this Treaty.

The right to protect information not related to the subject of the Treaty is strongly accentuated in further provisions: Under Art. IV(7), each State Party has the right to take measures to protect sensitive installation and to prevent disclosure of confidential information and data not related to this Treaty. Moreover, all necessary measures shall be taken to protect the confidentiality of any information related to civil and military activities and facilities obtained during verification activities (Art. IV(8)). On the other hand, information obtained by the organisation through the verification regime established by the Treaty shall be made available to all Parties in accordance with the relevant provisions of the Treaty and its Protocol.

In Art. IV(11), satellite monitoring as one of the „additional monitoring technologies“ is explicitly mentioned: Under this provision, States Parties shall undertake to co-operate with the Comprehensive Nuclear Test-Ban Treaty Organisation and other States Parties in the improvement of the verification regime, and in the examination of the verification potential of additional monitoring technologies such as electromagnetic pulse monitoring or satellite monitoring, with a view to developing, when appropriate, specific measures to enhance the efficient and cost-effective verification of the Treaty. These measures shall, when agreed, be

incorporated into existing provisions of the Treaty or into its Protocol.

2. Institutional Rules

The Comprehensive Nuclear Test-Ban Treaty established a broad institutional framework of supervising its implementation, using satellite information as „additional monitoring technologies“. The responsibility of supervising its implementation is assigned to the Comprehensive Nuclear Test-Ban Treaty Organisation, to be established in Vienna.

There is a long history of efforts aimed at creating a multilateral organisation empowered to control the implementation of respective international treaties: In 1978, France proposed the establishment of an International Satellite Monitoring Agency (ISMA) as a means of verifying compliance with the terms of existing and future arms control treaties, and monitoring crisis areas¹⁷. Then, both superpowers were opposed to this concept as well as to sharing data obtained from their reconnaissance satellites. At the time, the only openly source of data obtained from space were the U.S. Landsat satellites, and the resolution of the data was too poor to be much use for the kind of application envisaged by France¹⁸.

In August 1985, the then Soviet Union introduced in the United Nations a proposal entitled „International Co-operation in the Peaceful Exploitation of Outer Space under Conditions of Non-Militarisation“¹⁹. In this document, the setting up of a World Space Organisation (WSO) was suggested, one of the roles of which should have been „...to facilitate the necessary monitoring of compliance with agreements which have been concluded or which will be concluded with the view of preventing an arms race in outer space...“. The main task of the WSO in the area of monitoring the implementation of the pertinent legal rules

should have been the observation of the space-related arms control agreements.

While the question of a universal monitoring agency was under discussion, the idea of regional satellite monitoring agencies (RSMA's) arose. Europe has been discussed as a promising region for a RSMA in the Stockholm conference on Confidence and Security-Building and Disarmament in Europe²⁰.

The Comprehensive Nuclear Test-Ban Treaty Organisation established under Article II of the Comprehensive Nuclear Test-Ban Treaty will consist of all Member States to that Treaty. It will have three main organs: the Conference of States Parties, a 51-member Executive Council, and the Technical Secretariat.

The Technical Secretariat will supervise the operation of and provide technical support for the International Monitoring System, operate the International Data Centre, and prepare for and support the conduct of on-site inspections. Under Art. IV (14 f), the Technical Secretariat should provide to all States Parties equal, open, convenient and timely access to all stored data.

The International Monitoring System shall be placed under the authority of the Technical Secretariat. It will comprise facilities for monitoring in four technologies - seismic, hydroacoustic, radionuclide, and infrasound; each State Party shall have the right to participate in the international exchange of data and to have access to all data made available to the International Data Centre²¹. The Treaty requires each State Party to establish a National Authority that will serve as the focal point within the State Party for liaison with the organisation and other States Parties.

IV. Conclusion

The capacities of the present generation of remote sensing satellites demonstrate their significant potential for the monitoring of arms-control agreements. Neither the 1967 Outer Space Treaty, nor the United Nations 1986 Principles Relating to Remote Sensing of the Earth from Outer Space prohibit observing the earth's surface to detect military activities or terrestrial weapons.

The disarmament agreements such as the SALT and ABM Treaties, as well as START I and START II, are controlled by national technical means of verification. The reference to „national technical means of verification“ has been generally understood so as to mean that they include imaging satellites. The multilateral 1996 Comprehensive Nuclear Test-Ban Treaty which, however, has not yet entered into force, mentions explicitly satellite monitoring as one of the „additional monitoring technologies“.

The regime of these binding agreements, however, differs from those regulated by the 1986 Remote Sensing Principles. The duty not to interfere with the national means of verification of the other Party and the prohibition to use concealment measures constitutes the basis of this regime.

In case remote sensing methods would be applied for the control of any of the mentioned bilateral disarmament agreements, their legal regime will adapt to these agreements: One reason for that is that the 1986 Principles are not a binding international instrument; even if they were such a binding document, they would not contradict these disarmament agreements because of their limited scope on the uses „for the purpose of improving natural resources management, land use and the protection of environment“.

In case remote sensing technology would be used for the purposes of the verification of the Comprehensive Nuclear Test-Ban Treaty, it would follow its own regime which does not differentiate substantially from the mechanism of the 1986 Remote Sensing Principles. However, the multilateral co-operative regime under the 1996 Comprehensive Nuclear Test-Ban Treaty is a further step ahead: The Technical Secretariat of the Comprehensive-Nuclear Test-Ban Treaty should provide - with the support of the International Monitoring System - to all States Parties equal, open, convenient and timely access to all stored relevant data. Each State Party shall have the right to participate in the international exchange of data and to have access to all information made available to the International Data Centre.

If remote sensing methods would be applied for verification purposes outside the framework of the mentioned agreements, there are no specific binding legal rules applicable to such uses - except of the general norms of international law such as the 1967 Outer Space Treaty - which would constitute a special regime for these data and information. Again, the UN Remote Sensing Principles would not be applicable in such a case because of their scope limited to natural resources and environmental management. Thus, subjects engaged in such sensing activities would be free and not bound by any specific legal rule except of the general obligation to co-operate under the Outer Space Treaty.

¹ Cf. *S.E. Doyle*, *Civil Space Systems; Implication for International Security* (UNIDIR, 1994), 82 *et seq.*

² *Ibid.*, p. 84 *et seq.*

³ A different approach was chosen by the States Parties to the Convention on the Transfer and Use of Data of the Remote Sensing of the Earth from Outer Space, concluded by nine states of the former socialist block in 1978. As criterion for the determination of the mode of the distribution of the remote sensed data, the spatial resolution of 50 m had been used.

⁴ Cf. *M. Hošková, Dálkový průzkum Země z kosmu a mezinárodní právo*, (Praha, 1989), 129 pp.

⁵ UN Doc. A/RES/41/65, 3.12. 1986.

⁶ *N. Jasentuliyana, Remote Sensing and the Role of the United Nations*, in: *M. Krepon, P.D. Zimmermann, L.S. Spector, M. Umberger* (eds.), *Commercial Observation satellites and International Security* (Houndmills, 1990), 152.

⁷ See e.g. Memorandum of Understanding between the National Space Development Agency of Japan and the United States Department of Commerce National Oceanic and Atmospheric Administration, July 5, 1983, reproduced in: *L.S. Spector, The Not-so-Open-Skies*, in: *Commercial Observation Satellites and International Security* (Houndmills, 1990), 164 *et. seq.*

⁸ *L.S. Spector, ibid.*, p.170.

⁹ Cf. *N. Jasentuliyana, ibid.* 5, 152-153.

¹⁰ Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems, 26.5. 1972, reproduced in: *R. Fahl, International Law of Arms Control*, Vol. 3, 8.2.1.

¹¹ Interim Agreement between the United States of America and the Union of Soviet Socialistic Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms, 26.5. 1972, *ibid.*, 8.2.3.

¹² *P.D. Zimmermann, Verification With Civilian Remote Sensing Satellites: an Introduction to the Technology and a Review of the Events of 1989 and 1990*, in: *Verification Report 1991* (London, 1991), 105 *et seq.*

¹³ Treaty Between the United States of America and the Union of Soviet Socialistic Republics on the Limitation of Strategic Offensive Arms, 18.6. 1979, in: *R. Fahl, International Law of Arms Control*, Vol. 3, 14.2.1.

¹⁴ For the text see: <http://www.acda.gov/treaties/start/treatyar.htm>.

¹⁵ For the text see: <http://www.acda.gov/treaties/st2text.htm>.

¹⁶ For the text see: <http://www.acda.gov/treaties/ctbt1.htm>.

¹⁷ UN Doc. A/S-10/AC1/7. 1.7.1978.

¹⁸ *N. Jasani, Commercial Observation Satellites and Verification*, in: *Commercial Observation Satellites and International Security* (Houndmills, 1990), 143-144.

¹⁹ UN Doc. A/40/192, (Appendix), 16.8. 1985 and UN Doc. A/C.1/40/L.1, 10.10. 1985.

²⁰ Cf. *B. Jasani, ibid.* 18, 147.

²¹ Cf. <http://www.acda.gov/factshee/wmd/nuclear/ctbt/ctbtsigs.htm>.