

# Verification Systems from Outer Space\*

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## 1. Introduction

The collapse of “Berlin wall” in 1989, and following drastic changes in U.S.S.R. and the East European states made the Cold War era end.

In the Cold War era, modern international law played an important role not to happen the hot war by prohibiting the use of force except in the case of self-defence. In fact, however, peace was kept ironically by the military confrontation between the east led by U.S.S.R. and the west

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\* This analysis in this paper is my personal opinion any not the one of the Japanese Government and its organizations.

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This is the modified version of the author’s article titled “Verification Systems from Outer Space – Revival of International Satellite Monitoring Agency”, presented at Proceedings of the 37th Colloquium on the Law of Outer Space, 1995.

led by U.S.A. Sometimes U.S.S.R. and U.S.A. have intentionally fired the regional disputes and ceased them. Because the disbandment of U.S.S.R., who was an important player of the east-west relations, means the end of the above-mentioned Cold War structure, the world now falls into an serious situation where no one may control the regional military disputes.

## **2. Increase of Instability**

Under these circumstances, the United Nations have strengthened the function of Peace Keeping Operations. After the first PKO mission (UNTSO in Middle East) in 1948, UN has held 34 missions. If we divide these 34 PKO missions before and after 1989 when the Cold War era ended, there were 15 missions for 41 years from 1948 to 1988 and 19 missions for only 6 years from 1989 to 1994. These numbers clearly show the rapid increase in disputes after the Cold War era and the heavier responsibility of UN.

## **3. New Structure for the Post Cold War — Confidence Building Measures**

Now is the time to make a new structure and try to maintain the world order. In this article, the verification system from outer space in relation to the confidence building measures will be examined.

### **(1) Confidence Building Measures**

Confidence building measures are established in some regional organizations including Europe, Asia etc. These measures aim to lessen the possibility of disputes and the tension through emphasizing 'peace by cooperation' rather than 'peace by competition'. More specifically, after the release of military information which was once kept in secret, the both opposite sides show no intention of armed attack, accept mutual verification to

achieve the whole confidence and security condition. This confidence has been built by various ways. The prior notice of military manoeuvres, acceptance of foreign personnels (inspectors) to such manoeuvres, and human exchange have benefit as confidence building measures.

## (2) Open Skies Treaty

One good example of confidence building measures is the Open Skies Treaty in 1992.<sup>(1)</sup> This treaty sets confidence building measures among states parties including NATO members and former Warsaw Pact members in the framework of CSCE (Conference on Security and Co-operation in Europe). Its purpose is to improve openness and transparency of members' military activities, to facilitate the monitoring of compliance with existing or future arms control agreements and to strengthen the capacity for conflict prevention and crisis management through the mutual aerial observation of all the territories of members. Any member state can fly over all the territories of other members and make an observation flight on condition that she makes the prior notice no less than 72 hours.<sup>(2)</sup> Though this treaty has not gone into effect yet, this open skies regime should be evaluated as progress because it is thought as a limitation to the strong sovereignty to territorial air space.

## (3) Confidence Building Measures from Outer Space

On the other hand, how can we utilize outer space which is more suitable for confidence building measures through observation?

Outer space has been recognized as an open space which "is not subject to national appropriation by claim of sovereignty, by means of use or occupa-

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(1) Treaty on Open Skies. This treaty was signed on 24 March, 1992 in Helsinki by 25 states, but not into effect yet.

(2) Ibid, Art. 6

tion or any other means.”<sup>(3)</sup> And though most of satellites in orbit (except Geostationally Orbit etc.) fly over various territories and areas of the world without any notice, no flight has received protests from the states concerned. Therefore, we can say that, both de jure and de facto, launching observation satellites in orbit is not prohibited.

The above interpretation and practice are also proved by the arms control agreements between U.S.A. and U.S.S.R. Two states, through the talks for the limitation of strategic arms, set the verification systems in order to verify the reduction of arms, which included the verification from outer space. They provided that the verification should be done by “national technical means (NTM)” in the ABM Treaty<sup>(4)</sup>, the SALT I Interim Agreement in 1972<sup>(5)</sup> and the SALT II Treaty in 1979<sup>(6)</sup>. This NTM was considered the verification by satellites by both parties. The NTM clause was article 12 of the ABM Treaty, article 5 of the SALT I Interim Agreement and article 15 of the SALT II Treaty. These verification provisions are almost the same, for example in the ABM Treaty of 1972, “For the purpose of providing assurance of compliance with this Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.” Considering these verification clauses in these treaties, both states believed that the observation satellites had enough technical capability in order to verify the ABM weapons, strategic arms including the bombers and missiles whose numbers were limited by these treaties. This historical development shows us that at least U.S.A. and U.S.S.R. have recognized the observation from space

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(3) Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies, 1967.

(4) Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems, 1972.

(5) Interim Agreement Between the United States of America and the Union of Soviet Socialist Republics on Certain Measures with Respect to the Limitation of Strategic Offensive Arms, 1972.

(6) SALT II Treaty was signed on 18 June, 1979 during the Vienna Summit.

as a confidence building measure from 1972.

#### (4) International Satellite Monitoring Agency

Apart from U.S.A. and U.S.S.R., some states have argued international confidence building regimes using outer space. The International Satellite Monitoring Agency (ISMA) which was proposed in 1978 by France was a good example.<sup>(7)</sup> This ISMA proposal by France was very short and consisted of only 6 parts. However, there was much implication in it. The purpose of ISMA is to advance disarmament efforts and the strengthening of international security and confidence.<sup>(8)</sup> The functions of ISMA includes participation in monitoring the implementation of international disarmament and security agreements and in the investigation of a specific situation which seems to be in danger.<sup>(9)</sup> For those purposes and functions, ISMA would have a centre for processing data (in Stage 1), would establish data-receiving stations (in Stage 2), and lastly (in Stage 3) ISMA itself would have the observation satellites required for the performance of its task.<sup>(10)</sup> The response to the ISMA proposal was depended on states.

Most of developing countries responded affirmatively, some states including West Germany and Japan approved fundamentally. Canada and U.K. insisted on waiting for further discussions, U.S.S.R. and east European block with no response, and U.S.A. and Cuba opposed the ISMA proposal. According to U.S.A., the establishment of ISMA would have political, financial and technical difficulties<sup>(11)</sup>.

In 1978, the states which had technical capability for such agencies as ISMA were only U.S.A. and U.S.S.R., the negative attitude from these two space powers straight meant the impossibility to establish ISMA. At present,

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(7) UN Doc. A/AC.1/7 (1978).

(8) Ibid, 1. Guiding Principles of the Work of the Agency.

(9) Ibid, 2. Functions of the Agency.

(10) Ibid, 4. Technical Resources.

(11) U.N.G.A. Doc. A/34/540 (1979).

there is no international organization like ISMA except one; Western Europe Union (WEU) Satellite Centre in Spain founded in 1993.

#### 4. Changing Situation

##### (1) Technology Development

After the ISMA proposal in 1978, the remote sensing technology which can be used for observation task has developed rapidly, especially in civil remote sensing. At the same time, international cooperation in this field has spread to many states and areas.

The resolution of sensors progresses and the participating states are increasing. In the near future, the resolution will be expected to reach 2 metre class or better. For example, resolution of LANDSAT (U.S.A.) was improved from 80 metre (LANDSAT1 : 1972) to 30 metre (LANDSAT5 : 1984) and resolution of ERS-1 (Japan : 1992) is 18 metre. French remote sensing satellites, SPOT series have 10 metre resolution. As of 1995, U.S.A., Russia, India, France, Japan and Europe Space Agency (ESA) are operating them. In international cooperation, each participant concludes the cooperation agreements for the reception of remote sensing data acquired by satellites. For instance, Japan agreed with the European Space Agency (ESA) for the acquisition of Japan's MOS-1 data in 1987.<sup>(12)</sup> In addition, they began to prepare for the 1 metre class sensing data sales in U.S.A. President Bill Clinton decided to allow the commercial sales of high-resolution remote-sensing imagery by some US companies. According the Aviation Week & Space Technology, for the 1 metre class Lockheed, GDE/Orbital Science/Litton team and Ball Aerospace, and for the 3 metre class WorldView Corp. planned to participate into this market.<sup>(13)</sup>

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(12) This agreement is titled "Memorandum of Understanding between the National Space Development Agency of Japan and the European Space Agency for the direct reception and distribution of MOS-1 Data".

(13) Joseph C. Anselmo, "HIGH-RESOLUTION SATELLITES COMPETITION HEATS UP," Aviation week & Space Technology, 11 July, 1994, p.56.

## (2) Technical Feasibility of new ISMA

If we see these development in remote-sensing technology, now we have to start again the feasibility study of new ISMA which uses the civil satellites' data positively.

Of course, because the military observation satellites (reconnaissance satellites) are thought to have a centimetre class resolution, it is impossible to replace all observation activities by reconnaissance satellites with civil satellites. However, some aspects of the proposed functions in ISMA, for example to monitor the implementation of disarmament agreements and to investigate the disputing area, can be achieved effectively by the satellites with 1 metre or 2 metre class resolution. The report titled "The Implications of Establishing an International Satellite Monitoring Agency"<sup>(14)</sup> in 1981 which was written by some experts appointed by the Secretary-General said that in monitoring the disarmament agreements, a resolution of 3-5 metre is needed for area surveillance and a needed resolution is 0.5 metre for close-look<sup>(15)</sup>. And in monitoring international crises, a resolution of 3-5 metre is sufficient for detection, while a resolution of 0.5 metre is sufficient to identify and describe most of the objectives<sup>(16)</sup>. According to this report, 1-2 metre class data which will be achieved by civil sector in the near future may be used for some parts of the ISMA functions. Further, the end of the Cold War Era now brings the international society a new atmosphere to accept the establishment of international organization which can contribute to the international security and stability.

## (3) WEU satellite centre

Western European Union (WEU) founded a satellite centre in Torrejon of Spain in 1993 and began its operations. This centre aims to contribute

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(14) UN Doc. A/AC.206/14 (1981).

(15) Ibid, paras.136-160.

(16) Ibid, para.169.

to the security of European area through the acquisition, processing and distribution of satellites' data. In fact, WEU satellite centre makes contribution for treaty verification, crisis monitoring and environmental monitoring. For example, in treaty verification, the centre supports for inspection visits of CFE and CSCE, and for open skies treaty missions. It plans to receive the data of Helios, the first European reconnaissance satellite to be operated by France, Italy and Spain jointly in the future, and it presently uses the data from SPOT, LANDSAT and ERS. Relationship between this Torrejon satellite centre and the security in European area is described as follows :  
“The security problems that have arisen in the Balkans, Eastern Europe and the Mediterranean region have made the creation of a space-based observation system for both military and civil purposes, that makes optimum use of existing resources, a matter of the utmost urgency.”<sup>(17)</sup> If we use this WEU satellite centre as a precedent, we can consider the revival of ISMA in order to prevent and respond the small scale disputes we face in the present world.

#### (4) World Environmental and Disaster Observation System (WEDOS)

In this presentation, I will introduce one system proposal which may provide useful information to new ISMA in the future. In 1987, the Society of Japanese Aerospace Industries, Inc. proposed one satellite system called WEDOS (World Environmental and Disaster Observation System). The purpose of this system is to monitor changes of the Earth environment and the situation of disaster from outer space in order to minimize the damages. This system makes all the areas of the Earth monitored at least once a day. However, in this proposal and study, there was no reference to security problems directly.

WEDOS is composed of two parts, remote-sensing satellites which install

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(17) The Development of a European space-based observation system - Part II, Assembly of Western European Union, Document 1393, 8 November, 1993, para.1.

sensors and a ground system which receives and processes the data. This is a typical combination of remote-sensing systems.

The most different points from the present remote-sensing systems are the numbers of satellites and the resolution of sensors. According to the WEDOS proposal, 38 satellites will be launched into the orbit. 8 satellites in 3 different sun-synchronous orbits, 2 satellites in a sun-asynchronous orbit and additional 12 relay satellites are planned to be used. By these satellites, we can observe all the areas of the Earth once a day and if necessary, the frequency will be increased by moving sensors to the point to be seen (the pointable function). As compared with the existing systems, this frequency is very high. For example, the LANDSAT system can observe one point every 16 days. The resolution of sensors on the WEDOS satellites will be developed drastically. The best resolution of the sensors on satellites, visible near-infrared sensor is planned to reach 2 metre. In the existing systems, the resolution of LANDSAT is 30 metre, SPOT of France is 10 metre and ERS of ESA is 25 metre. As I already mentioned above, 2 metre resolution is sufficient for detection of the objects in verifying the disarmament agreements and monitoring international crises.<sup>(18)</sup>

As we consider the technical capability, although the security problems are not referred in the plan, WEDOS may contribute to the area surveillance and detection which were described in the ISMA report in 1981. Further, when we see in the WEU report that the challenge (of WEU satellite centre) is to integrate military and civil aims in order to achieve optimum use of existing resources, which would not be sufficient to create independent systems<sup>(19)</sup>, we have to consider the feasibility of the new ISMA which may use the civil satellites' high-resolution data effectively. However, I here emphasize that WEDOS system, which is proposed by the Society of Japanese Aerospace Industries, Incis planned to be used for monitoring change of the Earth environment and the situation of disaster in order to minimize the natural damage. Finally let me stress that the analysis

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(18) *Supra*, note 14 para.169.

(19) *Supra*, note 17 para.45 and 46.

and opinion in this presentation is my personal opinion and not the one of the Japanese government and its organization.

## 5. Case Study of Japan

If Japan considers the implementation of such a kind of organization, we have to overcome some obstacles for outer space utilization in Japan. I will explain briefly these hurdles.

The Japan Diet adopted one resolution in 1959, which set principles for the utilization and exploitation of outer space by Japan. In this Diet resolution, the use of outer space was limited exclusively for peaceful purposes. At that time when the space development just started, there were some different interpretations about the words 'peaceful purposes' in the international space law. For Instance, with regard to drafting the article 4 of Outer Space Treaty, the U.S.A. and the U.S.S.R. insisted in the United Nations that 'peaceful' meant 'non-aggressive'. They had to make such interpretation, because both countries and some others were aiming to use military satellites for their national and their national block securities and already launched them. Using this interpretation, non-aggressive, defensive use including launching reconnaissance satellites etc. is allowed. On the other hand, some countries including Japan interpreted that 'peaceful' meant 'non-military'. This interpretation showed the anxiety among most of non-space powers about the militarization of outer space in 1960's.<sup>(20)</sup> With this latter interpretation, the implication of the Diet resolution is that Japan prohibits any military related utilization of outer space. In this context, the law which founded National Space Development Agency of Japan and other governmental documents set the same clauses for the peaceful purposes. So, under these hard conditions, Japan cannot launch and use her own military satellites for verification or monitoring.

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(20) In fact, now, most of the outer space activities are made basing upon the former interpretation, 'peaceful' is 'non-aggressive'. Military (defensive) Activities in outer space are fundamental to national and international security environment.

However, afterwards, Japanese government allowed one exception for outer space utilization. Government sets a new guideline for space exploitation that Japan Self Defense Forces can use satellites in case of such satellites are publicly used. In 1985, this announcement was made in the Diet assembly relating whether the Forces can use telecommunication satellites or not. And now, Japan Self Defense Forces uses communication satellites and further purchases the commercialised remote sensing data from satellites including LANDSAT, SPOT etc. If we can apply this new guideline for acquiring data for verification purposes, Japan possibly founds the monitoring organization only using civil satellites. And in addition to these allowable activities, we have to review our space policy, because this kind of verification system can surely contribute global and regional stability and her own national security.

And here, I would emphasize the unique character of Japanese space utilization by military sector. As you easily understand, Japan does not permit any military use of outer space. Therefore, what a military sector can do under such circumstances is to depend upon the civil technology and systems which already exists. In most of the other countries, contrarily, military sector generally has a priority and superiority in high technology fields, because there is less limitation in budgeting, and the national security is a reasonable measure to proceed the non-beneficial, non-commercial activities.

## 6. Conclusion

If the spirits of ISMA proposal revives in the future and plans to use the data from civil satellites, this organization may contribute to the international security and peace as a part of the new structure for maintaining the world order of post Cold War. For that purpose, in case of Japan, we have to revise our space policy based on the discussion on Japan's new role in the international and regional stability. In the academic society, we should start feasibility study of the new style ISMA or other appropriate

organisations and exchange opinions in technical and legal matters internationally.