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The Open Skies Treaty

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When the Treaty on Open Skies was signed in March 1992 it was seen as one of the most far-reaching and intrusive confidence-building measures ever agreed.[1] The treaty opens the full territory of its member states, 'from Vancouver to Vladivostok', to co-operative aerial observation overflights. After decades of bloc-to-bloc confrontation and secrecy in military matters it embodied the determination of its states parties to overcome the East–West military stalemate by enhancing transparency and openness.

Ten years later, the treaty faces an unexpected and somewhat uncertain future. After a lengthy ratification period it finally entered into force on 1 January 2002. Russia, which delayed its ratification until 2001, is now a keen supporter of the treaty. On the other hand, the recent détente between Russia and the United States and other developments have made confidence building through observation overflights a much lower priority for the former adversaries than it was 10 years ago. In addition, the availability of high-resolution commercial satellite imagery calls for a re-evaluation of the relative value of Open Skies images.

It is therefore time to address the role and potential of the treaty. Given sufficient political will the treaty's implementation can be adapted to the changed security situation and security needs of its members in its vast application area, which covers the territory of 26 member states of the Organization for Security and Co-operation in Europe (OSCE).[2] The area of application includes Siberia and North America, which are not covered by the 1990 Treaty on Conventional Armed Forces in Europe (the CFE Treaty) or the Vienna documents. The attractiveness of the treaty has been demonstrated by recent applications for admission by seven additional OSCE member states.[3]

The treaty provisions

The fascinating story of the treaty negotiations and their outcome has been told by Peter Jones in three VERTIC *Verification Yearbooks* and by other authors.[4] It is worthwhile recollecting the intentions and purpose of the treaty, as stated in the Preamble: 'employing such a regime to improve openness and transparency, to facilitate the monitoring of compliance with existing or future arms control agreements and to strengthen the capacity for conflict prevention and crisis management in the framework of the Conference on Security and Co-operation in Europe and in other relevant international institutions'. In this context, the states parties also see the possible contribution which an aerial observation regime of this kind could make to security and stability in other areas (outside the OSCE), as well as its extension to other fields such as the protection of the environment.

The core of the treaty is the right to observe any point on the territory of the observed state party, including areas designated as hazardous air space. The legitimate interests of the observed state party are taken into account by ensuring that the maximum ground resolution of the sensors to be used allows for the reliable identification of major weapon systems, although not for detailed analysis.

What is characteristic of the Open Skies Treaty is that it contains numerous and sophisticated provisions for balancing the two fundamental rights and interests of the parties (see the box). In contrast to many other treaties, it offers almost unlimited flexibility in permitting states parties to make different or modified arrangements if they wish.

Beyond that, the treaty incorporates several innovations. It establishes unprecedented openness of territorial access. It also has a strong co-operative element, since flight preparation, execution and follow-up as well as aircraft certification are carried out by bilateral or multilateral teams. It puts all states parties on an equal footing. It thus prevents a monopoly on information and ensures reciprocity of observation, in stark contrast to monitoring by reconnaissance satellites owned and operated by individual states.

Ratification and entry into force

Before entry into force the treaty had 27 signatories. By 1995 most member states had completed their ratification processes and deposited their instruments of

Provisions of the Open Skies Treaty

- Co-operative observation flights are carried out by unarmed fixed-wing aircraft which are equipped with imaging sensors.
- The agreed sensor set comprises:
  - optical panoramic and framing cameras with a ground resolution of 30 cm;
  - video cameras with real-time display and a ground resolution of 30 cm;
  - thermal infrared imaging sensors with a ground resolution of 50 cm at a temperature differential of 3°C; and
  - imaging radar (Synthetic Aperture Radar, SAR) with ground resolution of 300 cm.[A]

Infrared sensors can only be used in a second phase (starting on 1 January 2006). The full sensor set thus ensures an all-weather, day-and-night observation capability.

- Sensors and aircraft have to pass a certification procedure in order to make sure that the agreed resolution is not exceeded.[B]
- A system of flight quotas has been negotiated. For example, in the first year of application the UK can carry out four observation flights per year (active quota) and has to accept three overflights (passive quota), whereas Russia (with Belarus) has an initial active quota of 26 flights and a passive quota of 28 flights.[C]
- At the insistence of Russia, each state to be overflown has the choice of either: receiving the aircraft of the observing state; or providing an aircraft with full sensor equipment of its own for the observing state (the 'taxi option').
- The flight time line allows for a certain element of surprise. The time span between announcement of the planned flight route and the beginning of the flight is typically 24–30 hours.
- Treaty implementation matters are decided by an Open Skies Consultative Commission (OSCC) in Vienna, Austria. Such matters include the reallocation of the active quotas on an annual basis, the admission of new members, the upgrading of existing sensors and the scheduling of extraordinary flights in times of tension. The Commission consists of representatives of all states parties and is empowered to take such decisions between conferences of the states parties.
- Image data are shared between the observing and the observed state. Other states parties can acquire copies of the imagery at nominal cost.

NOTES

A The resolution definition of the treaty as specified in Decision 3 of the OSCC deviates from the standard photogrammetric definition by a factor of 2 (a resolution of 30 cm under Open Skies corresponds to a ground resolved distance of 60 cm).

B At a certification event the aircraft is examined by representatives of all member states in order to check compliance with treaty regulations. In addition, the flight altitude at treaty resolution of the sensors is determined by a series of precisely defined procedures and parameters (treaty Appendix D, Decisions 2, 3, 7, 12–16 to the Treaty; and OSCC Sensor Guidance Document).

C Annex A of the treaty; and Peter Jones, 'Open Skies: events in 1992', in Verification Technology Information Centre (VERTIC), *Verification 1993*, Brassey's, London and New York, 1993, p. 152.

ratification: these were Belgium, Bulgaria, Canada, the Czech Republic, Denmark, France, Germany, Greece, Hungary, Iceland, Italy, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Spain, the Netherlands, Turkey, the United Kingdom and the United States. Georgia followed in 1998. Kyrgyzstan has signed the treaty but has not started its ratification process.

Belarus, Russia and Ukraine did not ratify until 2000–2001. This threatened to endanger the whole process, since ratification by these states was mandatory for entry into force. The delay in Russian ratification was the result of several factors. Initially the treaty met resistance and suspicion in the political and the military class, in particular in the Duma, which was at odds with President Boris Yeltsin. It took between eight and nine years before Russia and Ukraine recognised the objectives and advantages of the treaty and no longer perceived it as a tool of reconnaissance and espionage. This example demonstrates that epoch-making changes may take many years to achieve acceptance. In addition, seen from the perspective of the US, ratification of the first (1991) Strategic Arms Reduction Treaty (START I) was a much higher political priority than Open Skies.

A change in the Russian position was signalled by its increased participation in annual trial flights, from 2 in 1995 to some 14–18 annually in the years 1997–2001. Several factors contributed to the final move to ratification by the Duma in early 2001: continuous quiet diplomacy by some states parties, in particular Germany and the US; the election of President Vladimir Putin and his growing influence on the Duma; the participation of Duma representatives in joint trial flights in the US as well as over the Benelux countries (Belgium, the Netherlands and Luxembourg), the UK and Germany; and the faltering performance and decline in numbers of the Russian reconnaissance satellite fleet.[5]

On 2 November 2001, the final steps towards entry into force of the treaty were taken when Russia and Belarus deposited their instruments of ratification with the depositary states, Canada and Hungary. Ukraine had ratified the treaty on 2 March 2000 and deposited its instruments of ratification on 20 April 2000. Thus, according to the treaty provisions, it could enter into force in 60 days, on 1 January 2002. Encouraged by these events, the Open Skies Consultative Commission (OSCC) increased its activity in order to make the necessary preparations for entry into force.

Preparing Open Skies aircraft

Immediately after the treaty's signature and parallel to the ratification process, most states parties started to establish an operational unit in charge of technical preparations, trial implementation and actual observation flights (after entry into force). Several states decided to use existing medium-range observation aircraft (Bulgaria, the Czech Republic, Hungary, Romania, Russia, Ukraine and the UK) or to retrofit existing long-range aircraft for Open Skies use (Germany and the US). The 'Pod Group' (Belgium, Canada, France, Greece, Italy, Luxembourg, the Netherlands, Norway, Portugal and Spain) use Lockheed C-130 Hercules transport aircraft, which can carry a sensor container (the 'pod') under one of their wings. Turkey is planning to acquire one or two CASA Airtech CN 235 aircraft for Open Skies purposes. Table 1 shows a list of existing and planned Open Skies aircraft and their initial sensors.

The aircraft are adequate choices in terms of range and seating capacity. In particular, the Boeing, Lockheed and Tupolev types have ample space for escorts and observers but relatively high operational costs. The German aircraft was lost in an accident in 1997 and was not replaced. The Benelux states operate jointly and act as a single state party (as provided for in Article XIV of the treaty). Several states parties decided not to equip an Open Skies aircraft of their own, notably Denmark, Georgia, Iceland, Poland and Slovakia. Each of these countries can participate in Open Skies missions by leasing an aircraft from another state party or by making arrangements with the state party to be overflown.

Russia originally intended to insist on the taxi option. Overflights over Russia would have to be carried out with Russian observation aircraft operated by Russia for the observing states parties. However, this position is softening. As it stated on 22 July 2002 in the OSCC, Russia will not in principle provide its own observation aircraft for flights from the Open Skies airfields related to the point of entry of Ulan-Ude (near Lake Baikal in Siberia). States parties will be able to conduct such observation flights either with their own aircraft or that of a third party.

Trial implementation

In 1992 the states parties began their first trial observation flights within the framework of the preliminary application of the treaty. By the end of 2000, more than 400 trial observation flights had taken place. All states parties conducted them in

Table 1 Open Skies aircraft

State	Type	Range[A]		Sensor operation altitude		Ground swath		Seats[B]
		1000 m	6000 m	Panorama camera	Vertical camera	Vertical camera	Panorama camera	
Bulgaria	1 Antonov 30	1500 km	2650 km	2724 m 3149 m	1174 m	4.1 km 4.7 km	6.5 km	24
Czech Rep.	1 Antonov 30	1500 km	2650 km	1803 m 2047 m	–	4.6 km 5.2 km	–	24
Hungary	1 Antonov 26	1500 km	2650 km	1972 m 2993 m	–	3.0 km 4.5 km	–	30
Pod Group	Hercules C 130	2500 km	5000 km	1354 m 1965 m	3999 m 5290 m	2.0 km 3.0 km	22.0 km 29.1 km	20
Romania	1 Antonov 30	1500 km	2650 km	1972 m 2993 m	–	3.0 km 4.5 km	–	24
Russia	3 Antonov 30	1500 km	2650 km	1210 m 3103 m	–	2.8 km 5.6 km	–	24
	3 Tu 154[C]	2500 km	5000 km	tbd[D]	tbd	tbd	tbd	30[E]
Turkey	2 CN 235[C]	2000 km	4000 km	tbd	tbd	tbd	tbd	25[E]
Ukraine	1 Antonov 30	1500 km	2650 km	1073 m 2308 m	–	2.5 km 2.1 km	–	24
UK	1 Andover MK1	1300 km	–	–	750 m	–	10.7 km	16
US	2 OC 135	3000 km	6000 km	1440 m 2172 m	4834 m 10841 m	2.2 km 3.3 km	10.2 km 22.8 km	39
Sweden	1 Saab 340	1500 km	2500 km	tbd	–	–	–	25

NOTES A Range at different flight altitudes; B Including crew; C Planned; D To be determined; E Approximation. The data on Bulgaria, Hungary, the Pod Group, Russia, Ukraine, UK and US correspond to their certification in 2002. Some of the parties have more than two sensor configurations and related operation altitudes. The table gives the minimum and maximum altitude. The values are subject to change. Pod Group Panorama Camera with reduction filter 786 m (ground swath 4.3 km). The data for Romania are expected to be the same as for Hungary (the camera and film are the same). SOURCE German Verification Center, Geilenkirchen.

reasonably close accordance with the treaty with respect to both its objectives and its complicated rules and regulations. In addition, two multinational trial certifications were conducted at Fürstenfeldbruck airbase in Bavaria, Germany, in 2000 and 2001. These events provided a good opportunity to clarify all important organisational and technical issues and to agree on common standards for the certification of aircraft. Some of the test flights involved non-member states, in particular Estonia, Finland, Latvia, Lithuania, Slovenia and Sweden. These states obtained practical experience with a view to future accession to the treaty.

In summary, the trial implementation and trial certifications of the treaty can be considered a success. The activities:

- involved virtually all states parties (except Iceland);
- proved the functionality of the equipment and the treaty provisions;
- demonstrated that the treaty's objectives could be met through co-operative observation flights; and
- showed that even small states with modest resources can play a distinctive role (as an example, Bulgaria now has, due to prudent investment, some of the most advanced camera equipment of all Open Skies states).[6]

The trial implementation also underlined one special characteristic of Open Skies inspections compared to the inspection regimes of other arms control and disarmament agreements. The inspections are mainly shaped by the professional spirit of aviators, especially since most Open Skies experts are recruited from air forces or naval aviation. Only a joint team of the observed and observing state can act successfully on board an Open Skies aircraft. Therefore, it is crucial that the verification teams make joint flight preparations and co-operate closely. Once the mission plan has been agreed, it is important for everyone aboard to obtain optimum results from the use of sensors. The very practice of inspection thus has a strong co-operative and confidence-building element and trains military personnel in a culture of international co-operation.

Certification

One main goal of the OSCC in 2001 and early 2002 was to enable states parties to begin observation flights quickly and comprehensively after entry into force. To

do this, the OSCC began by clarifying the intention of states parties with respect to the certification of their observation aircraft in 2002, the desirable time and place of such certification, and their willingness to conduct joint certification. To this end, the German delegation declared its government's readiness to conduct a joint certification on its territory.

The first results were apparent within one month, when the OSCC, at its plenary meeting of 17 December 2001, adopted a decision regarding the provisions for the initial certification period and a Chairperson's Statement on issues related to the certification of observation aircraft and sensors. The initial certification period was designated to last from 1 January to 31 July 2002. During this period, observation flights were to be conducted on an agreed bilateral basis only, and in accordance with the treaty's provisions. The utilisation of states parties' active quotas for the first year of application (Annex A of the treaty) will take place during the period 1 August 2002–31 December 2003. The decision also established the initial certification schedule.

Subsequently a group of states parties comprising Belarus, Hungary, Russia and Ukraine proceeded with joint certification at Nordholz Naval Air Station (NAS) in northern Germany from 15 to 29 April 2002. The American aircraft was certified from 8 to 15 May 2002 at the Wright-Patterson Air Force Base (AFB) in the US. The pod users' unique certification event took place from 19 to 26 June 2002 at Orléans Brecy AFB in France. According to an agreement in the OSCC, the certification results for one C-130H Hercules aircraft and its pod system will be valid for all states parties of the Pod Group. In order to facilitate this, the pod users were obliged to take additional steps while both collecting their data prior to certification and providing information on their aircraft. The United Kingdom and Bulgaria conducted a joint certification event from 8 to 16 July 2002 at RAF Brize Norton in the UK .[7]

By August 2002 all these certifications had been concluded successfully. Thus, Bulgaria, Hungary, Russia (with Belarus), Ukraine, the UK, the US and the Pod Group have certified aircraft and sensors ready for resuming observation flights under treaty rules. Table 1 shows the certified sensor operation altitudes at treaty resolution. Certification of the Czech, Romanian and a newly equipped Swedish observation aircraft is expected in 2003.

The information potential of Open Skies imagery

Open Skies images may be used for monitoring all kinds of military installations and activities, but also for assessing transport infrastructure and industries. Crisis monitoring applications will include the detection of illegal traffic in border zones, refugee camps, terrorist training camps, freshly laid minefields and post-conflict damage assessment.

Photographic black-and-white images at treaty-approved resolution will allow for the detection and general identification of land vehicles, rockets and artillery, as well as detection and precise identification of troop units, aircraft, airfield facilities, missile sites, surface ships and infrastructure such as roads and headquarters. In addition, test missions have demonstrated an excellent capacity for monitoring the effects of environmental disasters such as floods and hurricanes.

In the context of Open Skies, thermal infrared (IR) imaging (not to be used until 2006) will be particularly useful for monitoring military manoeuvres and production plants at day and night. Thermal IR image detectors are sensitive to the thermal radiation which each body emits. The operational status of vehicles and equipment can be deduced from their heat profile. The fuel status of aircraft and storage tanks can be determined, as well as thermal differences in effluent and cooling ponds.

Synthetic Aperture Radar (SAR) images can be taken through cloud cover and in darkness. The 3-metre (m) resolution under Open Skies, however, is quite crude: it will permit only the detection and general identification of large structures such as buildings, airports and ships.

Open Skies flights can be scheduled at short notice with a flexible choice of flight routes. However, they do not provide continuous coverage. They rather give spot checks which can be exploited best in combination with other sources of information. Open Skies missions will be extremely useful for the preparation of ground inspections or ground missions by providing 'indicators of suspicious activity' and imagery which can be used as a map in foreign terrain.

Open Skies images have already been successfully used to support the verification of several arms control agreements or arrangements. Once the full sensor set is operative, its potential for such a contribution will be significantly enhanced. Three treaties are illustrative:

- **The 1990 Conventional Armed Forces in Europe (CFE) Treaty.** During the negotiations on this treaty it was anticipated that this would be accompanied by an aerial verification regime, but negotiations were not concluded in time. The Open Skies Treaty will assume the role of monitoring Siberia and North America, which are not accessible to CFE inspections. For example, in 1995 a German–Russian trial flight over Siberia monitored huge amounts of weapon systems which had been brought over the Ural Mountains from the European part of Russia shortly before the conclusion of the CFE Treaty. Open Skies flights have a much wider area coverage than on-site inspections under the CFE Treaty. A single Open Skies flight can cover more sites than the total annual passive CFE inspection quota of Germany (39, including those for stationed forces) or even Russia (50). Flights and inspections are complementary. Flights can be used for monitoring facilities and equipment parked in the open, whereas CFE inspections can focus on weapon systems under cover.
- **The 1993 Chemical Weapons Convention (CWC).** This treaty does not foresee aerial inspections. However, images of chemical weapon sites from Open Skies trial flights have been very informative. Delegates at the Organisation for the Prohibition of Chemical Weapons (OPCW) in The Hague, Netherlands, have used the information successfully in bilateral exchanges. The general disclosure of such imagery to all CWC states parties will require the consent of the observed state. This should be supported by diplomatic efforts. The value of Open Skies imagery will be much enhanced once thermal IR sensors allow the monitoring of the operational status of suspect chemical weapon plants.
- **The Global Exchange of Military Information.** An additional data exchange agreed by the CSCE in Budapest on 28 November 1994,[8] it covers all kinds of weapon systems, including naval vessels and aircraft of all OSCE members, regardless of their deployment site, worldwide. The exchange is not being verified by on-site-inspections. Open Skies flights can be used to verify notifications of forces.

Open Skies in comparison to commercial satellite monitoring

How does Open Skies imagery fare in comparison with commercial satellite images, which are now available to every member state irrespective of their access to information derived from American, Russian or French military reconnaissance satellites?

First, the resolution of the photographic cameras used in Open Skies is unmatched by any existing or proposed commercial imaging satellite. Space Imaging Inc. in the US is licensed to launch a 50-centimetre (cm) resolution sensor, but this is still above the 30-cm resolution under Open Skies. Moreover, Open Skies images are routinely taken in stereo, which provides much enhanced power for object identification through height determination. Second, it would be extremely difficult to match from space the 50-cm resolution of Open Skies thermal IR images. It would require mirrors of 5 m in diameter or more. No commercial satellite provides thermal images even at 10-m resolution, nor does any military satellite provide thermal images at a resolution comparable to those of Open Skies.

In contrast, the 3-m radar image resolution under Open Skies will soon be overtaken by a commercial radar satellite of 1-m ground resolution developed by the German Aerospace Establishment (Deutsches Luft- und Raumfahrtzentrum, DLR), which is due for deployment in 2005.

The Open Skies community has the technical potential and opportunity to provide first-class imagery of crisis areas either for its own benefit or at the request of an international organisation such as the OSCE or the UN, which do not have routine access to the highly classified images of American, French or Russian reconnaissance satellites. The treaty's sensor suite of high-resolution stereo imaging and thermal imaging day and night, and the ability to fly under dense cloud cover, make Open Skies information-gathering technically superior to the satellite data accessible to most treaty members.

Perspectives and outlook

Entry into force has meant that the opportunity is now open for other states to accede to the treaty. In general, the regime is open to any state which in the opinion of the existing states parties is able and ready to make its contribution to the objectives of the treaty.

In January 2002 Finland and Sweden applied for accession. Both had been actively involved in the trial implementation. In their applications Finland and Sweden also asked for passive quotas to be allocated of five and seven observation flights, respectively. The OSCC accepted the applications on 4 February. On 28 June 2002, Sweden deposited its instrument of ratification, meaning that it became a state

party 60 days thereafter, on 27 August 2002. The ratification of Finland was still in progress at the time of writing.

By 20 July five additional states had applied for accession: Bosnia and Herzegovina, Croatia, Cyprus, Latvia and Lithuania. All were accepted by the OSCC on 22 July, except for Cyprus, because of a veto by Turkey. The handling of the veto is a challenge for OSCE diplomacy. Turkey had already strongly opposed Cyprus becoming a state party in 1991–1992 and was even more opposed to Cyprus having a quota (it was at Turkish insistence that there is a rule that countries with a territory of less than 10,000 square kilometres (km) have no active quota).[9]

These applications have particular political relevance to and underline the future potential of the treaty in areas of tension. Many new states parties have unresolved issues with one or more neighbours. The relationship between the Baltic states and Russia could, for instance, be eased by Open Skies flights—especially after the former were invited to join the North Atlantic Treaty Organization (NATO) in 2002. Croatia wishes to integrate itself into the network of European institutions. It was involved in two wars between 1991 and 1995, and is a main player in the future peaceful development of the Balkans. Bosnia and Herzegovina is still struggling with the wounds of war and ethnic conflict. It hosted six multilateral aerial observation demonstration flights between 1997 and 2000. It is thus fully aware of the potential of Open Skies. The applications of Bosnia and Herzegovina and Croatia to join are also a reaction to the failure to establish a separate aerial monitoring regime under Article V of Annex 1b to the 1995 Dayton Accord.[10]

The future of the Open Skies Treaty

The future of the Open Skies Treaty will depend on the states parties' security policies. However, this is true for all arms control treaties and agreements. It is an open question how much importance will be attached to the future security balance within the OSCE area. The existing confidence-building instruments may not continue to be appreciated and developed as an insurance policy for more turbulent times. There are also questions as to whether Open Skies practice can help address current threats such as the proliferation of weapons of mass destruction, internal conflicts and terrorism. These issues will have to be addressed and clarified at the first review conference for the treaty in 2005.

The trial observation missions conducted in the current area of application to date have already shown the potential for confidence building and enhancement of transparency. Moreover, four areas can be identified in the OSCE region which will continue to require special political attention—the Balkans, the Caucasus, Central Asia and to some degree the Baltic states, especially following their accession to NATO and the European Union (EU).[11]

There has been little discussion in the open literature on the future adaptation of the Open Skies Treaty. James Marquardt has rightly pointed out that its original intention, of contributing to détente between the former NATO and Warsaw Pact adversaries, has been largely accomplished by other means since 1992.[12] Klaus Arnhold has suggested the negotiation of a memorandum of understanding which would focus future implementation on crisis prevention and post-crisis management, the prevention of the proliferation of weapons of mass destruction and the fight against international terrorism.[13] Arnhold also proposes the establishment of an international pool of Open Skies aircraft which could be used by all member states. The EU could and should play an active role by providing one or several such aircraft.

The present authors by and large support these proposals. In addition they emphasise the following objectives for optimally exploiting the treaty's potential:

- the admission of as many OSCE member states as possible, in particular through diplomatic efforts to persuade the Central Asian republics to join;
- efforts to give Open Skies monitoring a more explicit role in support of the 1968 Nuclear Nonproliferation Treaty (NPT) and the CWC;
- the use of Open Skies flights to monitor illegal trafficking in weapons, drugs and people across borders; and
- appreciation of the Open Skies Treaty as an insurance policy for more turbulent times. It is essential to be prepared for the unexpected. In this respect it might even be beneficial to anticipate, as proposed by Arnhold, reciprocal overflights by NATO states.

Outside the OSCE region, equipment and procedures developed for the Open Skies Treaty could be applied to many regions in crisis, for example, under a UN mandate. The treaty could also be a model for separate Open Skies agreements in other

regions. For example, two former air marshals from India and Pakistan have drafted a detailed aerial monitoring concept for the India–Pakistan border area, which incorporates many elements of the multilateral Open Skies Treaty (as well as initial technical assistance from its member states).[14]

For the time being, the US opposes the admission of non-OSCE member states to the existing Open Skies Treaty. On the other hand, between 1997 and 2000 it was active in advocating the Open Skies idea for other regions, for instance, by displaying its Open Skies aircraft in Japan and Latin America.

Apart from these political questions, a number of technical and procedural questions will soon arise for the Open Skies states parties.

- **Quota distribution.** The meetings of the OSCC in Vienna in 2003 promise to be intense as the quotas for 2004 are negotiated, including those for new members like Finland and Sweden.
- **Joint aircraft.** Most of the existing Open Skies aircraft are more than 20 years old and will have to be replaced in the next decade. In addition major sensor upgrades are due in 2006 when the full sensor set becomes mandatory (especially if states choose to apply the taxi option). This offers the opportunity to consider joint aircraft equipped and operated by several states or by a larger group of states such as the EU.
- **Additional types of sensor.** Technological developments and potential applications in environmental monitoring dictate that at least three types of additional sensors and film be considered: IR-sensitive film (false colour IR film) which is essential for the monitoring and evaluation of vegetation; digital cameras which are becoming the state of the art in civilian aerial photography; and SAR at 1 m resolution (or better) in order to compete with commercial radar satellites.
- **Environmental disasters.** Most states parties have adequate means for regular environmental monitoring. It would be useful, however, to allow short-notice Open Skies flights in the event of cross-border environmental disasters. Germany and the US have demonstrated that such flights can be arranged easily without much additional cost using the mandatory quota of national training flights.

In summary, it is now particularly crucial for the Open Skies states parties to move the spirit and the implementation of the treaty into the new century. Otherwise

it will become a relic of the last. If this risk is seen as likely, states parties should have the courage now to discuss the issue openly. The first review conference in 2005 will provide a good opportunity for such a fundamental stocktaking. The necessary preparations should start in the OSCC in good time, preferably in 2003, and be conducted expeditiously.

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Endnotes

[1] Peter Jones, 'Open Skies: events in 1992', in Verification Technology Information Centre (VERTIC), *Verification 1993,* Brassey's, London and New York, 1993, pp. 146–161.

[2] The treaty was originally signed by members of NATO and the former Warsaw Treaty Organization. It has been ratified by Belarus, Belgium, Bulgaria, Canada, Czech Republic, Denmark, France, Georgia, Germany, Greece, Hungary, Iceland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Turkey, the UK, Ukraine and the US. Kyrgyzstan has signed but not ratified.

[3] Bosnia and Herzegovina, Croatia, Cyprus, Finland, Latvia, Lithuania and Sweden. See below in this chapter.

[4] Peter Jones, 'Open Skies: a review of events at Ottawa and Budapest', in VERTIC, *Verification Report 1991,* The Apex Press, New York, 1991, pp. 73–82; Peter L. Jones and Marton Krasznai, 'Open Skies: achievements and prospects', in VERTIC, *Verification Report 1992*, London, 1992, pp. 47–56; Peter Jones, 'Open Skies: events in 1992', in VERTIC, *Verification 1993*, Brassey's, London and New York, 1993, pp. 146–161; Sergey Koulik and Richard Kokoski, SIPRI, *Conventional Arms Control*, Oxford University Press, Oxford, 1994, pp. 156–90 and appendix C (full text of the treaty); and Rüdiger Hartmann and Wolfgang Heydrich, *Der Vertrag über den offenen Himmel* [The Open Skies Treaty], Nomos, Baden-Baden, 2000. This last book was written by two of the negotiators at Vienna. It comprises the text of the treaty, background comments and the decisions of the OSCC (in German), as well as the Sensor Guidance Document of the OSCC (in English).

[5] See, e.g., Sergei Ladygin, 'Russia and Open Skies', *Military Parade November, 2001: Armed Forces, MIC and Politics* (Internet magazine), www.milparade.com.

[6] The cameras are also frequently used for civil cartographic and monitoring missions.

[7] The fact that several separate certifications were held was to some extent an expression of national priorities. It also eased the workload and complexity of particular events.

[8] Conference on Security and Co-operation in Europe, Forum for Security Co-operation, 'Global exchange of military information', Budapest, Nov. 1994. The Conference on Security and Co-operation in Europe (CSCE) became the OSCE on 1 January 1995.

[9] Pal Dunay, Geneva Center for Security Policy, Geneva, Switzerland, private communication.

[10] See Dieter Rothbacher, 'Verification of the Dayton arms control agreements', in Trevor Findlay and Oliver Meier (eds), *Verification Yearbook 2001,* The Verification Research, Training and Information Centre (VERTIC), London, December 2001, pp. 182–183.

[11] In particular, Open Skies flights, because of their symbolic and co-operative nature, can contribute to confidence building between or even within the successor states of the former Yugoslavia. Open Skies flights could usefully complement ground monitoring of the OSCE in the Caucasus, for example, in Georgia (Ossetia and Abkhazia), Azerbaijan or Armenia (if an international peacekeeping operation is ever deployed as part of a solution to the Nagorny-Karabakh conflict). In Central Asia, Open Skies flights could also become a highly effective tool for early warning and confidence building along the borders between the Central Asian states and between them and Afghanistan.

[12] James Marquardt, 'Open Skies: not a moment too soon', *Bulletin of the Atomic Scientists,* January/February 2002, pp. 18–20; and July/August 2002, pp. 5 and 68.

[13] Klaus Arnhold, *Der Vertrag über den Offenen Himmel* [The Open Skies Treaty], SWP-Studie S-21, Stiftung für Wissenschaft und Politik, Berlin, June 2002 (in German).

[14] Mohammed Arshad Chandry and K.C. Cariappa, 'How cooperative aerial monitoring can contribute to reducing tensions between India and Pakistan', Sandia National Laboratories Report SAND 98-0505/22, December 2000, www.cmc.sandia/gov/Links/about-mainframe.htm.