

Questions Facing the **U.S. Defense Industry**

TREATY ON OPEN SKIES

Product No. 305P



This pamphlet was prepared by the Defense Treaty Inspection Readiness Program (DTIRP) to increase **Readiness Through Awareness** throughout the Department of Defense (DoD) and defense-contractor community. Additional copies of this pamphlet as well as other information and materials on the Treaty on Open Skies and other arms control security-related topics are available through the DTIRP Outreach Program Coordinator.

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INTRODUCTION

This pamphlet provides answers to many questions frequently asked by defense contractors and other DoD facilities about the Treaty on Open Skies and the potential impacts associated with the observation missions flown over U.S. territory. Specifically, the questions addressed in the pamphlet are designed to increase facility awareness about:

- how an observation mission could affect a facility's schedule and operations;
- the means for protecting facility safety and security when overflown;
- the capabilities of Open Skies aircraft sensors; and
- the services provided by the U.S. government to inform and assist facilities during overflights conducted inside the United States.

Remember: information can be a powerful security countermeasure.



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WHAT IS THE PURPOSE OF THE TREATY ON OPEN SKIES?

The purpose of the Treaty on Open Skies is to enhance military openness and transparency among the participating States of the Organization for Security and Cooperation in Europe (OSCE). This Treaty entered into force on January 1, 2002, and is specifically designed to permit the States Parties to fly observation missions anywhere over the territories of the other States Parties.

Observation missions are conducted under the Treaty on Open Skies using specially certified unarmed aircraft equipped with a number of treaty-approved imaging sensors to collect data. Approved sensors include optical panoramic and framing cameras, video cameras, infrared (IR) line-scanning devices, and synthetic aperture radar (SAR). Although IR and SAR sensors are approved, only wet film and video cameras are currently in use.



WHO ARE THE STATES PARTIES TO THE TREATY ON OPEN SKIES?

As listed in the table below, as of November 2008 there were 34 States Parties to the Treaty on Open Skies. In addition, Kyrgyzstan has signed but not yet ratified the Treaty. All States Parties are OSCE participating States.

34 STATES PARTIES AND 1 PROSPECTIVE STATE PARTY

Belarus	Finland	Latvia	Slovak Republic
Belgium	France	Lithuania	Slovenia
Bosnia-Herzegovina	Georgia	Luxembourg	Spain
Bulgaria	Germany	Netherlands	Sweden
Canada	Greece	Norway	Turkey
Croatia	Hungary	Poland	Ukraine
Czech Republic	Iceland	Portugal	United Kingdom
Denmark	Italy	Romania	United States
Estonia	[Kyrgyzstan] ¹	Russia	

¹Has signed, but not yet ratified the Treaty

For more information about the number of States Parties and the current status of treaty implementation activities, see the Treaty on Open Skies synopsis on the DTIRP Website at: <http://dtirp.dtra.mil/TIC/synopses/os.cfm>

HOW DO STATES ACCEDE TO THE TREATY?

States wishing to accede to the Treaty may apply to the Open Skies Consultative Commission (OSCC). The OSCC is the international forum and decision-making body established by the Treaty to oversee and facilitate treaty implementation.

The OSCC takes decisions by consensus and is empowered to consider the accession of any state, which in the judgment if the OSCC is able and willing to contribute to the objectives of the Treaty.

Former Soviet republics may sign, ratify, and deposit an instrument of accession at any time.



ARE ANY AREAS OF THE UNITED STATES EXEMPT FROM BEING OVERFLOWN?

Under the Treaty on Open Skies, any area or facility located on the entire territory of the observed Party, including its territorial waters, may be overflowed and imaged during an observation mission. Territorial areas may only be restricted for flight safety reasons, not for reasons associated with national security concerns.

U.S. territory subject to being overflowed includes Alaska and Hawaii. Even normally restricted or prohibited airspace, such as Cape Canaveral, is not exempt during an observation mission.

WHAT TYPES OF AIRCRAFT MAY BE USED?

Observation missions may only be flown using specially certified unarmed aircraft, but the Treaty does not specify a particular type of aircraft. The States Parties may choose the type of aircraft they prefer, and there are a number of different types of aircraft certified for use during Open Skies missions.

The United States maintains two OC-135B aircraft for conducting observation missions. Other States Parties have certified AN-30, TU-154, Andover, and C-130 aircraft, among others.

The performance characteristics of different aircraft do not greatly affect an observation mission. Although some aircraft, such as the OC-135B, may be capable of staying aloft longer than others, treaty limits on flight time and distance prevent it from outperforming other shorter-range aircraft.

The Treaty also allows the observed Party to invoke the “taxi option” which requires the observing Party to use an aircraft owned by the observed Party for the observation mission. When the observed Party does not invoke the “taxi option” (the United States plans not to do so), the Treaty allows the observing Party to use either its own aircraft or one owned by another State Party.

WHAT TYPES OF IMAGING SENSORS MAY BE USED?

The Treaty allows Open Skies aircraft to be equipped with the following four types of imaging sensors, each of which has unique imaging capabilities:

- optical panoramic and framing cameras;
- video cameras with real-time display;
- infrared (IR) line-scanning devices; and
- sideways-looking synthetic aperture radar (SAR).

Although these four types of imaging sensors are approved under the Treaty, Open Skies aircraft are currently equipped only with optical wet film panoramic and framing cameras, and with video cameras with real time display. Four optical cameras may be installed. One framing camera may be positioned to take pictures directly below the aircraft, while two others, one located on either side of the aircraft, take oblique pictures.

The vertical and oblique pictures can be overlapped to provide a stereographic image of the photographed area. This process can enable analysts to determine the height and size characteristics of objects on the ground. A fourth panoramic camera may also be used to take a series of pictures rendering a wide view of the photographed area.

IR devices, SAR, and other sensors, such as environmental sensors, could be installed on Open Skies aircraft in the future.

WHAT CAN OPEN SKIES AIRCRAFT SENSORS DETECT?

The Treaty on Open Skies limits optical and video cameras to a maximum ground resolution of 30 centimeters, or about one foot. This means that two objects must be at least 30 centimeters apart, or be at least 30 centimeters in size, to be recognizable as separate objects. This degree of resolution would permit analysts to detect groups of people engaged in outdoor activities and to identify industrial equipment and vehicles.

Optical cameras are also limited to imaging objects located within 50 kilometers, about 31 statute miles or 27 nautical miles, along either side of the aircraft. In the event cameras incidentally image objects more distant than 50 kilometers, the image resolution will be degraded.

Infrared (IR) line-scanning devices (not currently in use) are limited to 50 centimeters ground resolution, or about 20 inches. IR devices are capable of detecting relative temperature differences of as little as two degrees Celsius between objects on the ground, day or night. They can also detect large cool objects such as liquid inside storage tanks, or small warm objects such as operating (or recently operated) vehicles or machinery. In addition, IR sensors can detect things like exhaust vents and power sources which are not thermally shielded.

Ground resolution for SAR (not currently in use) is limited to three meters, or about ten feet. Despite its comparatively poor resolution, SAR images look more like a picture than a radar image. Regardless of weather or darkness, buildings are recognizable and both large and small aircraft can be detected.

With SAR images, an analyst would be able to confirm the presence or absence of large numbers of vehicles in a parking lot, for example. SAR is also capable of imaging through thin materials such as wood or canvas. In addition, the full three meters of ground resolution is easily obtainable from as far away as 50 kilometers.

As you would expect, Open Skies observation missions primarily affect outdoor activities such as research, testing, and evaluation programs involving large objects. The oblique observation angles provided by the aircraft's low altitude, and the near simultaneous views from other sensors, provide imaging capabilities not available from commercial or military satellites.

HOW DO WE KNOW ONLY PERMITTED SENSORS AND SENSOR CAPABILITIES ARE USED?

To ensure the sensors onboard Open Skies aircraft meet treaty specifications, each aircraft is required to pass a rigorous certification inspection. Both ground and in-flight inspections are conducted to confirm each sensor is in compliance with treaty specifications. The minimum altitude at which each sensor may be operated is also established to prevent the possibility of a sensor attaining a greater degree of resolution than is allowed under the Treaty.

Any State Party may attend the certification inspection of another Party's aircraft. Once certified, any changes to the aircraft or its onboard sensors will require the aircraft to be recertified before it can again be used for observation missions.

Open Skies aircraft and onboard sensors also undergo a pre-flight inspection by the observed Party prior to each observation mission. In the United States, personnel from DTRA's Technical Equipment Inspection (TEI) branch carry out pre-flight inspection activities to confirm that no alterations have been made since the aircraft was last certified.

When the observed Party exercises its right to invoke the "taxi option," allowing the observed Party to provide its own Open Skies aircraft for use during the observation mission, the observed Party is obligated to give the observing Party an opportunity to inspect the aircraft and its sensors prior to takeoff.

As part of the pre-flight inspection, a State Party may request a demonstration flight of the other Party's aircraft to ensure that sensors and other associated equipment correspond to the certified specifications. A State Party may also request a demonstration flight when a pre-flight inspection indicates that a change has occurred since the aircraft was last certified.

WHEN DID OBSERVATION MISSIONS AND JOINT TRAINING FLIGHTS BEGIN?

Observation missions began in 2002, after the Open Skies aircraft certifications had been completed. The United States conducted its first observation mission in December 2002, over Russia.

In addition to observation missions, the United States regularly participates in joint training flights (JTFs) with its treaty partners. Since 1993, JTFs have helped the States Parties work out procedural details and prepare for observation missions. JTFs also provide U.S. personnel with opportunities to test and operate a variety of Open Skies aircraft and onboard sensors in a number of different situations.

HOW MANY OBSERVATION MISSIONS ARE FLOWN OVER U.S. TERRITORY EACH YEAR?

As of 2008, four was the highest number of observation missions flown over U.S. territory in a single year since the Treaty entered into force in 2002. This number is likely to increase over time, but may never exceed 42 flights per year.

The maximum number of observation missions each State Party may be obligated to accept over its territory each year is specified in Annex A to the Treaty. This number is the Party's maximum "passive quota." Both the United States and Russia have an annual maximum passive quota of 42, the two highest quotas specified in Annex A (quotas for other States Parties range between 2 and 12).

Each year, the actual number of observation missions a State Party is obligated to accept is determined by the Open Skies Consultative Commission (OSCC) during its annual quota negotiation and distribution process. Each year, by October 1st, the States Parties are required to submit their requests to fly observation mission over other States Parties in the coming year. These requests must be submitted to all States Parties and to the OSCC.

A Party's actual passive quota for the coming year is based primarily on the number of overflights other States Parties request to fly over that Party. If the number of requests does not exceed the Party's passive quota specified in Annex A, the Party's annual quota will be the same as the number of requests approved by the OSCC. If the number of requests exceeds the Party's passive quota specified in Annex A, the States Parties requesting overflights will be obliged to negotiate among themselves to reach an acceptable number.

As of 2008, the United States had flown 62 missions, 55 of which were over Russia, since the Treaty entered into force in 2002. The States Parties as a whole had flown 514 missions.

A detailed list of all observation missions flown to date is available under the Treaty on Open Skies in the Treaty Information Center section of the DTIRP Website. The direct link is: http://dtirp.dtra.mil/TIC/treatyinfo/os_flights.cfm.

HOW LONG CAN AN OBSERVATION MISSION LAST?

The Treaty limits both the time and distance allowed for an observation mission. The maximum time allowed for an observation mission is 96 consecutive hours. Mission time begins at the observing Party's estimated time of arrival at the observed Party's POE and ends when the observation aircraft makes its final landing (mission complete). This 96-hour time period includes any refueling or rest stops required during the mission and may only be extended, by up to 24 hours when a demonstration flight of the Open Skies aircraft is requested.

The maximum distance allowed for the mission flight is based on the geographical size of the observed Party and on the location from which the mission originates (initial takeoff). In the United States two maximum flight distances have been established. The maximum flight distance allowed for each of the four possible point of origination in the United States are listed in the table below. The different distances were established to ensure the observing Party would have an opportunity to fly over any part of U.S. territory.

U.S. MAXIMUM FLIGHT DISTANCES

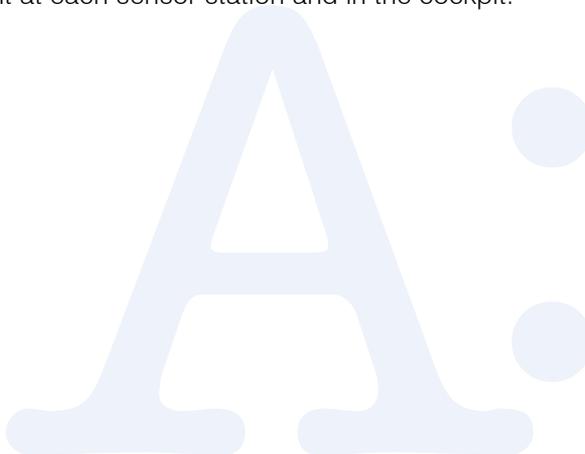
<i>Origination</i>	<i>Distance</i>
McConnell AFB, KS	6,000 km (3,720 nm)
Travis AFB, CA	6,000 km (3,270 nm)
Wright-Patterson AFB, OH	6,000 km (3,270 nm)
Elmendorf AFB, AK	3,750 km (1,989 nm)

WHO ACCOMPANIES THE OBSERVING PARTY INSIDE THE UNITED STATES?

Personnel from DTRA's Open Skies Division accompany the observing Party while inside the United States. DTRA escorts ensure mission activities are conducted in accordance with Treaty provisions. When in flight, the escorts monitor the aircraft to ensure it follows the agreed flight path. They also monitor the imaging sensors to ensure they are operated within the specified ground resolution limits.

When a U.S.-owned aircraft is used for an observation mission, a crew from the U.S. Air Force will fly the plane. DTRA escorts will either operate the sensors while the observing Party watches, or will monitor the observing Party while its members operate the sensors.

When the United States allows an observing Party to fly either its own aircraft or the aircraft of a third Party, DTRA escorts will be present at each sensor station and in the cockpit.



WHAT HAPPENS TO THE IMAGERY DATA COLLECTED?

The observed and the observing Parties receive copies of all imagery data collected during the observation missions they conduct. When the United States is the observed Party, the U.S. government receives either a duplicate or a first generation copy of the imagery collected during missions flown over U.S. territory. Upon request, the Treaty also allows any other State Party to obtain a copy of the imagery collected during an observation mission, provided the Party is willing to cover the costs of reproduction.

When film or magnetic tape is removed from a sensor used to collect imagery data during an observation flight, the observed and the observing Parties must be present. Once removed from the sensor, the film or magnetic tape is placed inside a sealed container for transport to an agreed processing facility. Depending on whether the observed or the observing Party processes the film, the Treaty allows either three or ten days, respectively, to develop the film and prepare duplicate copies.

All States Parties are obligated only to use Open Skies imagery data exclusively for legitimate treaty purposes. For this reason, the U.S. government may not release Open Skies imagery to private citizens or organizations without first obtaining permission from the observed Party.

HOW CAN FACILITIES KNOW WHEN THEY MAY BE OVERFLOWN?

To keep facilities in the United States informed about when they may be overflowed during an observation mission, the Open Skies Division at DTRA operates the Open Skies Notification System. This system is used to send advance notification and flight status messages to subscribed facilities via email, fax, pager, or voice phone call messages.

These messages provide facilities with a period of time—estimated to be a maximum of 24 hours—within which to implement appropriate measures as needed to ensure both facility and flight safety and security.

- **Facility safety and security:** It is recommended that facilities evaluate the most efficient and cost-effective means for preventing or minimizing any adverse impacts an observation flight could have on their schedule and activities. In particular, it may be important to assess certain outdoor activities or indicators such as power sources, ventilation systems, cooling ponds, or pollution-affected vegetation that could reveal proprietary, national security, or other sensitive information.
- **Flight safety and security:** Equally important, it is recommended that facilities determine whether changes to their schedules or activities may be necessary to prevent or minimize any adverse impacts on an observation flight. Specifically, it may be necessary to suspend certain activities at satellite, rocket, or missile launch facilities that could interfere with aircraft navigation, endanger flight safety, or otherwise affect the safe passage of an observation aircraft.

The first message some facilities may receive is an Intent to Fly message. This message is only sent to facilities requesting to be notified at this early stage in the mission process—at least 72 hours prior to the observing Party’s estimated time of arrival at the U.S. point of entry (POE). At this point, it will not be known where the observing Party intends to fly or which facilities may be overflowed.

As soon as the observing Party arrives at the POE, they will submit a proposed mission plan to the observed Party. Once the details of this plan are entered into the Passive Overflight Module (POM) of the Open Skies Management and Planning System (OSMAPS), the details of the proposed flight path will be analyzed and compared with the locations of subscribed facilities to determine which facilities could be within range of onboard sensors during the mission.

Based on this analysis, appropriate “Proposed Mission Plan” messages will be generated and sent to selected facilities. Subsequent messages will be sent throughout the mission to keep facilities informed about the aircraft’s location and status. These messages include “Final Mission Plan” messages, “Interim Landing” and “Interim Takeoff” messages, and “Mission Complete” messages.

HOW DO FACILITIES SUBSCRIBE TO RECEIVE ADVANCE NOTIFICATION AND FLIGHT STATUS MESSAGES?

To receive advance notification and flight status messages, it is necessary for facilities to subscribe to the Open Skies Notification System by completing a Database Management Facility (DMF) form. This form only requires you to provide general information about your facility, such as the facility's name, location (including latitude and longitude coordinates), point of contact, and telephone numbers.

To request a copy of the DMF form, you may contact the Open Skies Division at DTRA by phone or fax at the numbers listed below. Your point of contact will also be able to answer any questions you may have about this service.

OPEN SKIES DIVISION CONTACT INFORMATION

Phone: (703) 767-0802

DSN 427-0802

Fax: (703) 767-0505

DSN 427-0505

Additional information about the Open Skies Notification System is also available in the Products section of the DTIRP Website. A direct link to the pdf version of the Open Skies Notification System pamphlet describing this service in detail is: <http://dtirp.dtra.mil/Products/pdfs/315p.pdf>.

HOW MUCH DOES IT COST TO RECEIVE ADVANCE NOTIFICATION AND FLIGHT STATUS MESSAGES?

The Open Skies Division sends advance notification and flight status messages at no charge to subscribed facilities. The costs for this service are paid by Department of Defense.

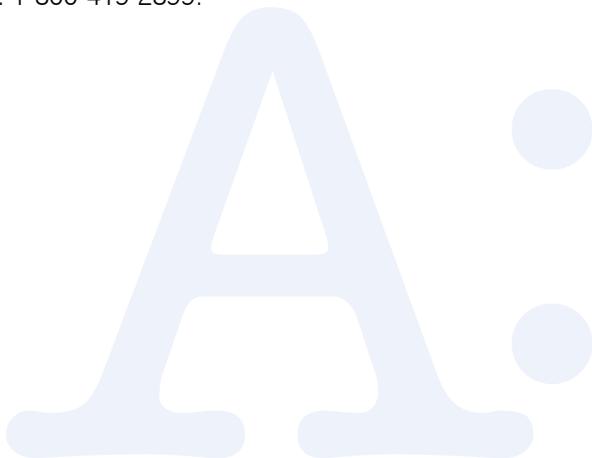


WHO COVERS FACILITY COSTS ASSOCIATED WITH DISRUPTIONS TO OPERATIONS DUE TO AN OBSERVATION MISSION?

Facility costs associated with disruptions to operations due to an observation mission are the responsibility of the affected facility. This is also the case with the implementation costs associated with compliance verification activities conducted under other arms control treaties and agreements.

The U.S. government makes every effort to minimize these costs and provides various types of site assistance to help facilities evaluate vulnerabilities and develop cost-effective security countermeasures. These assistance services, like Open Skies notification messages, are provided at no charge to facilities.

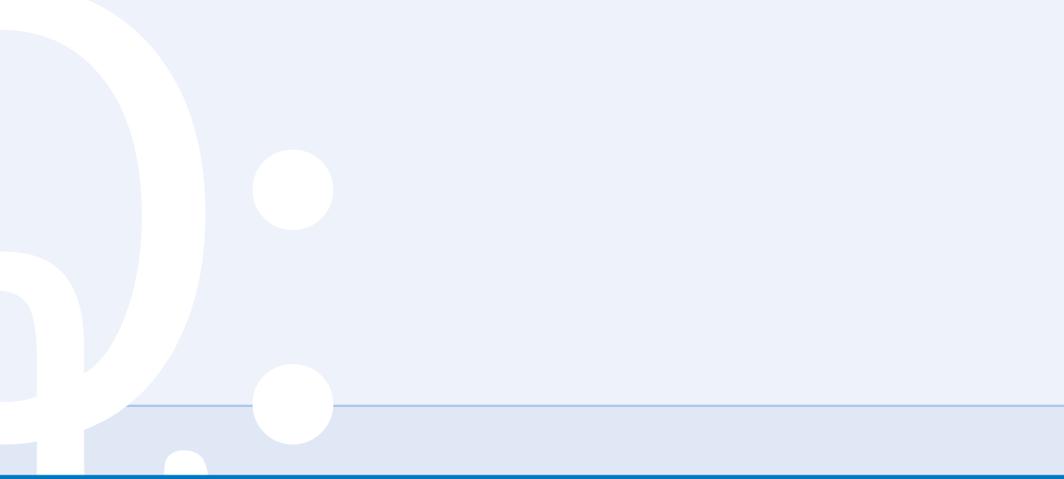
For more information about the types of arms control security and site assistance services available, go to the DTIRP Website at <http://dtirp.dtra.mil> or send an email to dtirpoutreach@dtra.mil. You may also contact the DTIRP Outreach Program Coordinator by calling: 1-800-419-2899.



CONCLUSION

This pamphlet addressed many of the important questions frequently asked by defense industry facilities about the Treaty on Open Skies and the observation missions flown over the United States. A summary of the key points covered in this pamphlet are listed below for quick reference.

- The Treaty on Open Skies permits the States Parties to fly observation missions anywhere over the territories of other States Parties, including the United States; areas may only be excepted due to flight safety reasons, not for reasons associated with national security concerns.
- U.S. escorts accompany the observing Party throughout the mission; they monitor the flight path and the operation of imaging sensors.
- Through 2008, since the Treaty entered into force in 2002 no more than four observation missions have been flown over the United States each year; this number may increase in future years but may never exceed 42 missions (the maximum passive quota for the United States stated in Annex A to the Treaty).
- The imaging sensors currently installed on Open Skies aircraft only include optical wet film panoramic and framing cameras and video cameras with real time display; the Treaty also allows IR and SAR, which could be added in the future.

- 
- Advance notification and flight status messages keep subscribed facilities informed about when they may be within range of aircraft sensors during observation missions; these messages provide facilities with an opportunity to prepare for being overflown and imaged.

For more information about the Treaty on Open Skies and how to prepare your facility for observation missions, contact the DTIRP Outreach Program Coordinator at 1-800-419-2899 or send an email to dtirpoutreach@dtra.mil. Additional information is also available on the DTIRP Website at: <http://dtirp.dtra.mil>.

You may also contact the Open Skies Division at DTRA (see page 18 for contact information), your local Defense Security Service (DSS) Industrial Security representative, or your government sponsor.



LIST OF ACRONYMS

DMF	Database management facility
DMS	Defense Messaging Service
DoD	Department of Defense
DSS	Defense Security Service
DTRA	Defense Threat Reduction Agency
EIF	Entry into force
IR	Infrared line-scanning devices
JTF	Joint training flight
OSCC	Open Skies Consultative Commission
OSCE	Organization for Security and Cooperation in Europe
OSMAPS	Open Skies Management and Planning System
TNS	Telephone notification system
POE	Point of entry
POM	Passive overflight module
SAR	Synthetic aperture radar

RELATED MATERIALS

*To order, contact the DTIRP Outreach Program Coordinator
by phone at: 1-800-419-2899 or by email at: dtirpoutreach@dtra.mil,
or visit the DTIRP Website at <http://dtirp.dtra.mil>*

Pamphlets

Treaty on Open Skies: The Impact (302P)
Open Skies Notification System (315P)
Guide for Treaty on Open Skies Observation Overflights (314P)
Arms Control Agreements Synopses (408P)
Arms Control Security Glossary (941P)

CD's

Arms Control Treaties Information (407C)
The Arms Control OPSEC Process (930C)

Videos on CD

The Treaty on Open Skies and Its Impact on U.S. Facilities (304W)
The Treaty on Open Skies Sensor Capabilities (308W)
The Technical Equipment Inspection (TEI) Process (950W)

Articles & Bulletins (available only on the DTIRP Website)

Treaty on Open Skies Joint Training Flights (316A)
Facility Observation Flights under the Treaty on Open Skies (301B)

Brochures

DTIRP Brochure (911M)

NOTES

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