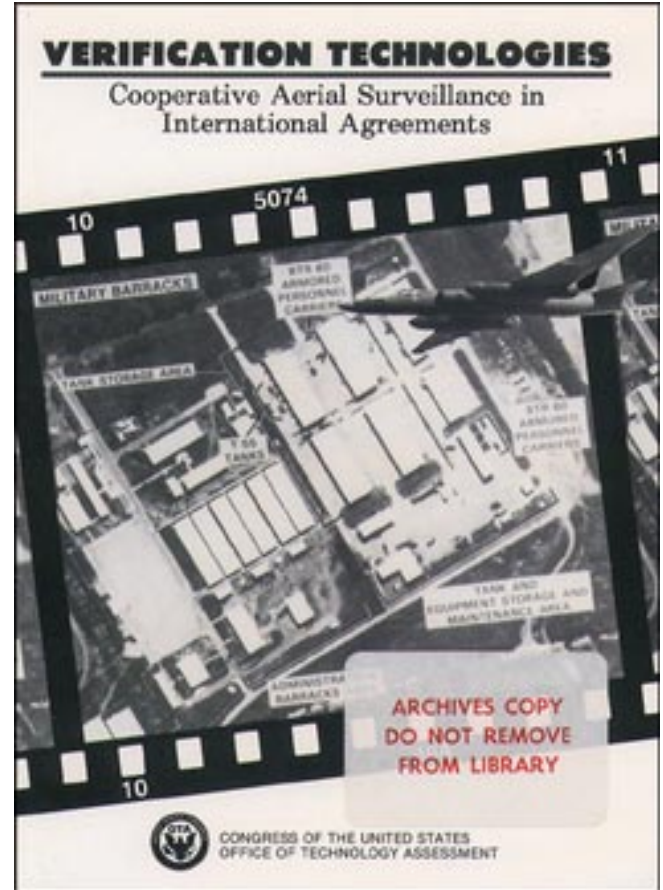


*Verification Technologies: Cooperative
Aerial Surveillance in International
Agreements*

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Foreword


In the changing geopolitical environment of 1989, President George Bush revived and amplified President Dwight D. Eisenhower's 1955 "Open Skies" proposal calling for mutual aerial surveillance of NATO and Warsaw Pact territories. Meanwhile, Conventional Armed Forces in Europe Treaty negotiators were considering aerial inspections as one measure for monitoring arms reductions. Although neither of these applications of cooperative aerial surveillance have yet been agreed to, negotiations continue on both. Recently, nations without access to the kinds of national technical means of verification available to the United States and the Soviet Union have shown interest in reciprocal overflights as a means of building confidence among international neighbors.

This report examines the potential and limitations of cooperative aerial surveillance as a means of supporting the goals of a variety of international agreements. It surveys the types of aircraft and sensors that might be used. It reviews the status of and issues raised by the Open Skies Treaty negotiations as an extended example of an aerial surveillance regime. The report concludes with a quantitative analysis of one possible use of cooperative overflights: the search for potential arms control violations.

In 1989 the Senate Committee on Foreign Relations and House Committee on Foreign Affairs asked OTA to undertake an assessment centering on the technologies and techniques of monitoring the prospective START Treaty. In its request, the Committee on Foreign Affairs also called on OTA to address the "... newer technologies that can be brought to bear on such cooperative verification measures as reamed on-site inspections, manned perimeter and portal monitoring, and unmanned on-site monitoring. The Committee added that "it would be useful to place these technologies in the broader context of verification technologies and methods." Since aerial surveillance is a potentially significant means of arms control monitoring, this report is one response to the latter request. (Another, *Verification Technologies: Managing Research and Development for Cooperative Arms Control Monitoring Measures*, was published in May 1991.)

The larger assessment has also produced two other, classified, reports: *Verification Technologies: Measures for Monitoring Compliance With the START Treaty* was delivered in the summer of 1990 and its unclassified summary was published in December 1990; *Monitoring Compliance With Limits on Sea-Launched Cruise Missiles* was delivered in the summer of 1991, with an unclassified summary scheduled for publication later in the year.

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NOTE: OTA appreciates and is grateful for the valuable assistance and thoughtful critiques provided by the advisory panel members. The panel does not, however, necessarily approve, disapprove, or endorse this report. OTA assumes full responsibility for *the* report and the accuracy of its contents.

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Acronyms Used in Text

ACV	—Armored Combat Vehicle, cf. AIFV, APC, and HACV	JSTARS	—Joint Surveillance and Tracking Reconnaissance System
AIFV	—Armored Infantry Fighting Vehicle, cf. ACV, APC, and HACV	MAD	—Magnetic Anomaly Detector
APC	—Armored Personnel Carrier, cf. AIFV, ACV, and HACV	MEL	—Mobile-Erector-Launcher, cf. TEL
ATTU	—Atlantic Ocean to the Ural Mountains (Region)	MRBM	—Medium-Range Ballistic Missile
CCD	—Camouflage, Concealment, and Deception	NATO	—North Atlantic Treaty Organization
CD	—Conference on Disarmament	NTM	—National Technical Means
CFE	—Conventional Armed Forces in Europe	OSI	—On-Site Inspection
CSBM	—Confidence- and Security-Building Measures	POE	—Point of Entry (Exit)
CSCE	—Conference on Security and Cooperation in Europe	RDA	—Restricted Deployment Area
EMCON	—Emissions Control	RPV	—Remotely Piloted Vehicle, cf. UAV
GLCM	—Ground-Launched Cruise Missile	RV	—Reentry Vehicle
HACV	—Heavy Armored Combat Vehicle, cf. AIFV, APC, and ACV	RVOSI	—Reentry Vehicle On-Site Inspection
ICAO	—International Civil Aviation Organization	SALT	—Strategic Arms Limitations Talks
ICBM	—Intercontinental Ballistic Missile	SAR	—Synthetic Aperture Radar
IIRS	—Image Interpretability Rating Scale	SIGINT	—Signals Intelligence
INF	—Intermediate-Range Nuclear Forces	SLAR	—Side-Looking Airborne Radar
IRBM	—Intermediate-Range Ballistic Missile	SNF	—Short-Range Nuclear Forces
		START	—Strategic Arms Reductions Talks
		TEL	—Transporter-Erector-Launcher, cf. MEL
		TERCOM	—Terrain Contour Matching
		TLE	—Treaty-Limited Equipment, cf. TLI
		TLI	—Treaty-Limited Item, cf. TLE
		UAV	—Unmanned Aerial Vehicle, cf. RPV
		WTO	—Warsaw Treaty Organization