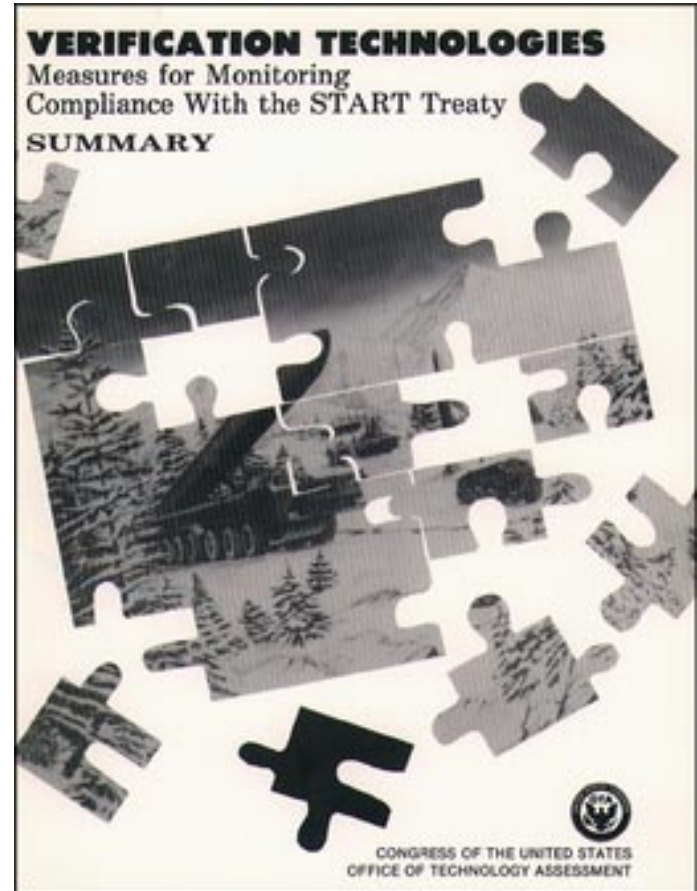


*Verification Technologies: Measures for  
Monitoring Compliance With the START  
Treaty*

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# Foreword

If negotiations continue on track, a Treaty between the United States and the Soviet Union on Strategic Arms Reductions may come before the Senate early in **1991 for its advice and consent. In the coming months and years**, Congress will be faced with various issues related to arms control in areas such as chemical weapons, conventional forces, and perhaps START II. In particular, arms control verification will be an issue of growing importance. Congress will need to reach conclusions about the verifiability of agreements, about the benefits and risks to the United States of increasingly comprehensive verification regimes, about what level of national resources should be devoted to verification activities, and about what directions the development of U.S. and international verification capabilities should take.

The Senate Foreign Relations and House Foreign **Affairs Committees** asked OTA to undertake a study centering on the technologies and techniques of monitoring the Strategic Arms Reduction Treaty, still under negotiation. This is the summary of the first of the reports to be produced by that study. The report describes the role of monitoring in the arms control verification process. It surveys the types of on-site inspection and their costs, risks, and benefits. It also examines the INF Treaty experience for lessons relevant to START. Our general discussions of the monitoring process and on-site inspections are relevant to other types of arms control as well as to START. The report outlines the monitoring tasks specific to START and suggests the cooperative and unilateral measures available for a START monitoring regime. It does not attempt to predict which of the possible cooperative measures will finally be negotiated in the START Treaty. The full, classified report is available to those with appropriate security clearance and "need to know."

In preparing the reports summarized here, OTA sought the assistance of many individuals and organizations (see Acknowledgments). We gratefully acknowledge their contributions. As with all OTA reports, the content remains the sole responsibility of OTA and does not necessarily represent the views of our advisors or reviewers.



JOHN H. GIBBONS  
*Director*

# START Verification Advisory Panel

Rodney Nichols, Chairman *ChairmanChairmun*  
Scholar-in-Residence  
The Carnegie Corporation of New York

James R. Blackwell  
Director, International Security  
Meridian Corp.

Ashton Carter  
Director  
Center for Science and International Affairs  
Harvard University

Sidney Drell  
Professor and Deputy Director  
Stanford Linear Accelerator Center

Richard Garwin  
IBM Fellow  
Thomas J. Watson Research Center

James Goodby  
Distinguished Service Professor  
Carnegie-Mellon University

Lt. Gen. Andrew Goodpaster, USA (retired)  
Chairman, The Atlantic Council

Sidney Graybeal  
Chief Scientist  
SAIC

Roger Hagengruber  
Vice President for Exploratory Systems  
Sandia National Laboratories

William R. Harris  
The Rand Corp.

Adm. Bobby Inman, USA (retired)  
**SAIC**

Michael Krepon  
President  
Henry L. Stimson Center

Stephen Lukasik  
Vice President and Chief Scientist  
TRW Space and Defense Sector

Raymond McCrory  
former Chief, Arms Control Intelligence Staff  
Consultant

Ernest Mettenet  
former CEO, Hercules Aerospace  
Consultant

Stephen Meyer  
Professor of Political Science  
MIT

Lt. Gen. William E. Odom, USA (retired)  
Director of National Security Studies  
Hudson Institute

George Rueckert  
Senior Analyst  
Meridian Corp.

Albert D. Wheelon  
former Chairman and CEO, Hughes Aircraft Co.  
Consultant

Charles Zraket  
Trustee  
The MITRE Corp.

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.

## **OTA Project Staff—START Verification**

Lionel S. Johns, *Assistant Director, OTA*  
*Energy, Materials, and International Security Division*

Alan Shaw, *International Security and Commerce Program Manager*

**Thomas Karas**, *Project Director*

Arthur Charo

Brian McCue

Christopher Waychoff

### ***Administrative Staff***

Donna Reynolds

Jacqueline Robinson-Boykin

Louise Staley

### **Contractor**

Seymour Weiss

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Office of the Secretary of Defense  
On-Site Inspection Agency  
Pacific Sierra Research Corp.  
Sandia National Laboratories  
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## Congressional Requests for This Study

Early in 1989 the Senate Foreign Relations Committee requested the Office of Technology Assessment to:

... identify and analyze the monitoring and verification issues raised by the prospective regimes currently under negotiation respecting a START Treaty, including what kind and number of 'anytime, anywhere' inspections might be needed, if any, to resolve concerns about covert inventories or production facilities.

The Committee asked for a classified report, which they received in July 1990. The unclassified summary of that report is published here.

In April 1989, The House Committee on Foreign Affairs added its own request for OTA "... to assist Congress in understanding the technical issues connected with monitoring compliance with the prospective START Treaty." The request letter outlined the kinds of issues it thought an OTA study might usefully address:

- What kinds of monitoring tasks will be involved in verifying START compliance?
- What kinds of monitoring measures might be included in a START verification regime?
- How would various monitoring measures complement or substitute for one another?
- What would be the relative contributions of various kinds of monitoring measures to the overall verification process?
- What can be learned from the INF Treaty verification experience that might be relevant for START?

In addition, the House Committee letter expressed particular interest in the "... newer technologies that can be brought to bear on such cooperative verification measures such as manned on-site inspections, manned perimeter and portal monitoring, and unmanned on-site monitoring, ' saying that "it would be useful to place these technologies in the broader context of verification technologies and methods.

In May 1989, OTA put before the Technology Assessment Board (TAB), and the Board approved, a proposal for a project which would attempt to address the concerns of both the Senate and House

request letters. The report summarized here and the projected final report are to be the products of that project.

## Project Guidelines

In consultation with the Committees and TAB, OTA determined that it could best serve their wishes by observing the following guidelines:

- the implications for U.S. national interests of on-site inspections of U.S. facilities should also be considered (a point that emerged from consultations with TAB members);
- the report would analyze possibilities for cheating on agreements (a point emphasized strongly during TAB deliberation on the project proposal);
- the report would not offer a detailed critique of the START Treaty, which in any case was likely to remain under negotiation while OTA pursued its research (to provide background for Senate deliberations on START, ideally the interim report would precede by some months the submission of a signed treaty to Senate for ratification);
- the report would not offer a judgment on the verifiability or non-verifiability of the Treaty; instead, it would attempt to provide Congress with background about the monitoring process that would help with that broader judgment; and
- an overall assessment of the strategic implications of the prospective START agreement for U.S. national security would be outside the scope of the OTA study.

## Project Reports

The project proposal for this study conceived of an interim and a final report. As external events and the project itself developed, the OTA project staff decided to divide its tasks into two major sets that would address the somewhat differing concerns of the two requesting Committees. This seemed a more productive course than making an interim report that would be merely a preliminary version of the final report.

The initial report focuses on the needs of the Senate Foreign Relations Committee in preparing to

deliberate on ratification of the prospective START Treaty. It describes the role of monitoring in the arms control verification process. It surveys the types of on-site inspection and their costs, risks, and benefits. It also examines the INF Treaty experience for lessons relevant to START. The general discussions of the monitoring process and on-site inspections are relevant to other types of arms control as well as to START.

The report outlines the monitoring tasks specific to START and suggests the cooperative and unilateral measures available for a START monitoring regime. Note that not all of the cooperative measures available will necessarily be negotiated into the Treaty. *The Joint Draft Treaty was not directly available to OTA or to the requesting Committees, though information about its contents was. In the discussion of specific monitoring technologies, the report limits itself to those which may be available (though not necessarily applied) at about the time a START Treaty is ready to be signed and ratified.*

The final report of the project is due early in 1991. The bulk of the final report will not focus on the START Treaty as such, although it may contain a section updating the Special Report for the Senate Foreign Relations Committee to use in its START

ratification deliberations. Instead, the final report will look beyond the early implementation of a START Treaty to the longer term. It will explore technologies that may not be initially applied in START, but that might later supplement the START verification regime or be applied to other arms control arrangements. It may also review lines of further research on verification technologies that Congress might wish to support.

As the initial report most directly addresses questions posed by the **Senate Foreign Relations Committee**, the final report will concentrate on the issues raised in the **House Foreign Affairs Committee request letter**. **Topics for examination in the final report (which may be issued as a series of shorter reports) include:**

- the utility of an Open Skies agreement or other aerial surveillance arrangements for arms control monitoring;
- options for monitoring limits on sea-launched cruise missiles, should such an agreement be considered;
- program options for arms control monitoring technology research; and
- (tentatively) update of initial report in light of further information on Treaty contents.