

# **SPY** **SATELLITES** **AND OTHER** **INTELLIGENCE** **TECHNOLOGIES** **THAT CHANGED** **HISTORY**

**THOMAS GRAHAM JR. and KEITH A. HANSEN**

**Foreword by ROBERT HUFFSTUTLER**

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**THOMAS GRAHAM JR. AND KEITH A. HANSEN**

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**TO THOSE** who have devoted their expertise and energies to providing the best information possible to support U.S. national security deliberations and arms control initiatives. In particular, to the memory of our colleague and friend, Howard Stoertz, for selfless dedication to his country, leadership within the U.S. Intelligence Community, and a unique contribution to efforts to defuse the nuclear arms race.



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## Foreword

**TOM GRAHAM AND KEITH HANSEN**—both experts, one on legal and policy issues and the other on verification issues—collaborated on several arms control negotiations as members of U.S. delegations. This book is based on their long and personal experience in the arms control arena. As professionals, they give us a helpful and accurate overview of the interplay between diplomacy, intelligence capabilities, and international arms control policies, a major component of

U.S. foreign policy during the Cold War. And the story they tell is a success story of intelligence and verification capabilities that made arms control possible.

National Technical Means (NTM) is an arms control code word connoting an array of satellite, airborne, and ground- or sea-based sensors and associated analytical methodologies used by the U.S. Intelligence Community to observe and assess foreign military weapons and force developments. As a generic term, NTM was used for purposes of negotiations and in treaty texts without actually disclosing, and thus compromising, intelligence sources or methods. NTM capabilities are used to monitor and to verify arms control treaties. To monitor a treaty is to observe and report activities surrounding controlled (i.e., limited or banned) capabilities. Verification is a legal and policy determination that the observed activities are either permitted or are violations of a treaty's terms. The Intelligence Community monitors agreements. The Department of State and the National Security Council verify the treaties.

Early in the 1950s, as the Cold War became increasingly characterized by a strategic nuclear arms competition, the effectiveness of Soviet security rendered traditional intelligence collection methods inadequate. In the absence of data, debates over the "bomber gap" and the "missile gap" erupted in the United States and spilled over into presidential politics. At the direction of President Eisenhower, the Intelligence Community, in conjunction with industry, moved to create a remote sensing capability that could gather information on Soviet strategic forces. Major programs were launched in overhead imagery collection—the U-2 aircraft and Corona satellite—and in the collection of signals intelligence from ground-, air-, sea-, and space-based sensors. Their initial purpose was to answer policy questions and to support defense planning. But by the early 1970s, this array of intelligence programs had matured to a level of sophistication that it could promise the two qualities upon which the verification of arms control agreements could rest: independence and reliability. That is, without the USSR's permission or cooperation,

the United States could assess Soviet strategic force developments independently; and, the data from such assessments were sufficient in quantity and quality to be accurate and, therefore, reliable.

This book focuses primarily on the Intelligence Community's contribution to harnessing the nuclear arms race through monitoring the development and eventual control of intercontinental ballistic missiles, submarine-launched ballistic missiles, and intercontinental-range bombers, which were the primary public measure of a superpower's relative status. The arms control process that is described, however, and its support by the Intelligence Community is similar to negotiations on other types of military forces such as the Anti-Ballistic Missile Treaty, the Intermediate-Range Nuclear Forces Treaty, and the Treaty on Conventional Armed Forces in Europe (theater forces) negotiations that unfolded during the Cold War.

This book will be appreciated, I believe, by students of the arms control process as part of the larger record on Cold War relations between the superpowers. In conjunction with other books in the field, such as the *Wizards of Langley*, *Deep Black*, and other chronicles of technical collection, along with accounts of the various negotiations, this story gives an expanded appreciation of what was done with the information gleaned from the Intelligence Community's technical collection and analysis to support major policy and diplomatic undertakings. It describes some of the middle ground (necessarily in sketchy detail) between why certain technical systems were created and how the output was used. Moreover, in one passage, the authors point out that one reason for secrecy in the satellite reconnaissance program was to prevent the international legal strictures barring unauthorized aircraft overflights from being extended to space surveillance. This is a little-known fact among professional intelligence officers and the first reference to it that I have seen in print. The strategy was successful, and this may help a reader appreciate why official silence on satellite reconnaissance was maintained long after it was an open secret in the press.

Other literature will have to be consulted for understanding the

economic, political, and strategic imperatives that led both superpowers to the bargaining table. But the fact that agreements limiting, reducing, and banning strategic nuclear forces were negotiated and ratified at the height of the Cold War is a tribute to the ability of the negotiators to craft it and to the Intelligence Community to ensure that the limitations could be monitored and, therefore, effectively verified. From the perspective of one who spent many years analyzing Soviet military forces, I can say with confidence that Tom Graham and Keith Hansen are to be commended for their roles in the various negotiations and for the excellent presentation of the story they tell in this book.

**ROBERT M. HUFFSTUTLER**

EXECUTIVE DIRECTOR (RET.)

CENTRAL INTELLIGENCE AGENCY

## **Preface and Acknowledgments**

**INTELLIGENCE**—what it is and what it has contributed to U.S. national security—is often misunderstood and misrepresented. Unfortunately, the secrecy that necessarily surrounds national intelligence tends to perpetuate a general level of ignorance and allows free rein to those who wish to mischaracterize it in the media. Fortunately, a few authors have been able to rise above the din of misinformation and present a more correct, if not complete, picture of

what intelligence is and how it functions. One of the best general explanations of intelligence is available in Mark Lowenthal's *Intelligence: From Secrets to Policy*. In this present volume, we want to help clarify some of the mystique, but we also wish to provide an as-yet-unrecorded account of how U.S. intelligence capabilities contributed to the end of the Cold War by facilitating the negotiation of strategic nuclear arms control agreements.

Intelligence has made a unique but largely unheralded contribution to world peace with respect to arms control. Over a thirty-year period, improved intelligence capabilities eliminated the time-honored practice of worst-casing the strategic capabilities of the Soviet Union, which had made the early Cold War years exceedingly dangerous. The United States and its allies and partners attempted, in part through arms control initiatives, to reduce the risk of war involving nuclear weapons or other weapons of mass destruction (WMD) and to increase world stability. Modern intelligence capabilities deserve much of the credit for making such achievements possible.

We wish to shed light on the critical role that “national technical means” (NTM) of verification, a euphemism for remote technical intelligence collection capabilities and intelligence analysis, played in the significant accomplishments of the past four decades in increasing U.S. and world security by harnessing the nuclear arms race and preventing, at least to some degree, efforts to proliferate nuclear and other WMD. While there remains much to be done in this arena, intelligence—both collection and analysis, aided by the expertise and partnership of U.S. industry—has done much to make these accomplishments possible.

But the U.S. Intelligence Community cannot rest on past achievements. For its capabilities to remain effective, national security tools, continued protection of sensitive sources and methods, and new advancements in technology and methodologies are needed. As was demonstrated by the Iraq WMD episode, the challenges of monitoring small, clandestine WMD programs in various parts of the world are vastly greater than those related to monitoring the large strategic

nuclear forces that were of prime concern during the Cold War. Unfortunately, many of the details of advancements that have been made, or even of some current capabilities, must remain hidden from public view to ensure that they remain effective against the efforts of those who intend us harm. Nevertheless, there is an important story regarding past accomplishments that can and should be told. It is our hope that through this analysis the contributions to date of intelligence to these critical national security challenges will be understood and appreciated by those who value ongoing efforts to reduce nuclear arsenals and to prevent the proliferation of WMD, especially among international terrorists. To continue these important contributions to national security, current intelligence capabilities must be protected and further investments made to their advancement.

The opportunity to contribute to U.S. national security through service on arms control and nonproliferation delegations over the span of thirty years was one of the distinct privileges of our professional careers. We arrived on the scene with different backgrounds, but our paths continually crossed. Our teamwork and commitment to U.S. and international efforts to halt the nuclear arms race and to restrain the further proliferation of nuclear weapons was deeply satisfying. Although not all of the negotiating efforts were successful, attempts to negotiate and implement agreements have made the world a safer place, and we salute and thank those with whom we have served.

The decision to write this book was the result of a breakfast chat several years ago, when we were reflecting on what had helped make arms control agreements successful. Without reliable and effective verification, none of our efforts, especially in the bilateral U.S.-Soviet negotiations, would have been possible. Although books have been written about verification issues in general, little has been said about one key ingredient: U.S. national intelligence capabilities that facilitated the remote monitoring of Soviet strategic nuclear forces during the dark days of the Cold War. We agreed that we should record as much as possible about this aspect of verification to complete the record. Our objective has been to write an account that is informa-



tive to the general public, instructive to students of international relations, and helpful to those charged with formulating and executing future U.S. national security policy. We thank all who have contributed to its research, writing, and publication.

While this story focuses mainly on how U.S. policymakers capitalized on the novel intelligence capabilities that were developed during the Cold War, most of the credit for the development of sophisticated technical collection and analytic methodologies goes to dedicated experts in key agencies of the Intelligence Community who worked hand-in-glove with scientists and engineers from U.S. industry. None of the achievements about which we write would have happened without their hard work, creativity, and invaluable expertise.

We want to thank the following colleagues and experts for reviewing and critiquing the manuscript in an effort to make it as accurate, informative, and useful as possible. Sidney Drell, an expert on technical issues, has dedicated much of his career to improving U.S. monitoring and verification efforts; R. Evans Hineman, a technical intelligence expert, has worked tirelessly to help develop and effectively utilize U.S. national monitoring capabilities; and Robert M. Huffstutler, a senior intelligence manager and analyst, spent much of his career helping U.S. policymakers understand the military capabilities and intentions of the Soviet Union.

We are grateful also to Frances Eddy for her tireless efforts to ensure that the two of us stayed in synch as we worked on the manuscript from opposite sides of the continent. We thank Michael Duckworth and his associates at the University of Washington Press for their support during the publication process.

**THOMAS GRAHAM JR.**

**KEITH A. HANSEN**

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