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19 June 2008

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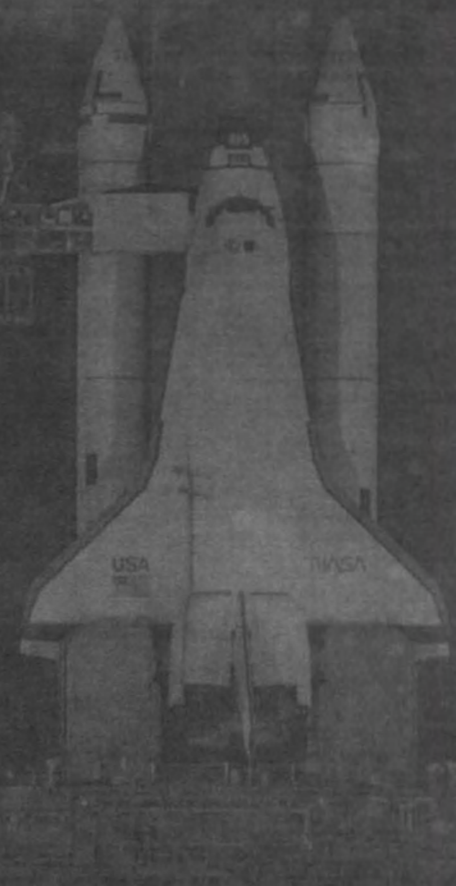
Center for the Study of National Reconnaissance

Combined 2002 Issue

BULLETIN

In Remembrance of Space Shuttle Columbia



For those of us in the space business, the tragic loss of the Space Shuttle Columbia and its crew hits particularly close to home. Their sacrifice to push the bounds of human knowledge by their exploration of space will be remembered by people around the world. As we each deal with this tragedy in our own personal way, I urge you to hold the memory of these brave space pioneers as we pursue unique and innovative space systems for our nation's security.

Peter B. Teets
6 February 2003

CENTER FOR THE STUDY OF NATIONAL RECONNAISSANCE BULLETIN

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The Center for the Study of National Reconnaissance (CSNR) publishes the CSNR Bulletin (ISSN 1534-505X) for the education and information of the national reconnaissance community. The CSNR Bulletin facilitates a synthesis of the technical, operational, and policy components that define and shape the enterprise of national reconnaissance.

The CSNR is the research and policy analysis component of the NRO Office of Policy. The primary mission of the CSNR is to promote the study, dialogue, and understanding of the discipline and practice of national reconnaissance. Through its research and analysis, the CSNR supports the NRO's contributions to national security, intelligence collection, and military operations. Under the direction of the NRO Office of Policy, CSNR makes policy recommendations to the Director of the National Reconnaissance Office.

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EDITOR'S NOTE

This issue of the CSNR Bulletin examines some of the transitional concerns ahead for the practice and discipline of national reconnaissance as we confront an unpredictable international environment with new threats posed by state and transnational actors.

In the opening article, DNRO Peter Teets outlines some of the key leadership and management challenges presently facing the National Reconnaissance Office. In particular, he talks about the results of three studies that led to a new mission statement, with new strategic goals of "executing, transforming, and partnering." He also addresses the necessity of building a cadre of space professionals and discusses the importance of national reconnaissance to military forces, especially the integration of space-based reconnaissance with military operations.

The growth of commercial space products and services, especially imagery, has eliminated the monopoly that governments once enjoyed in this arena. Colonels Dennis Miller and John Stocker, USAF, and Naval War College Professor William Martel discuss the potential impact of commercial systems on national security. They argue that to strengthen U.S. national security, the U.S. Government, especially the Defense Department and Intelligence Community, should develop policy that facilitates government use of commercial space services.

Not long after national reconnaissance capabilities were developed, many government officials realized the potential of these capabilities outside the realm of national security and defense. In 1975, President Gerald Ford established the Civil Applications Committee (CAC) to act as a bridge between the intelligence reconnaissance community and the civil remote sensing community. Dr. Joseph Baclawski and Mr. Thomas Nath provide an overview of the origin and current interests of the CAC.

In the Activities section, CSNR analysts describe several national reconnaissance related events that took place in the Fall of 2002. The National Imagery and Mapping Agency (NIMA) transferred unclassified NRO Cold War photoreconnaissance film to the National Archives. The NRO recognized the 2001 and 2002 Pioneers of National Reconnaissance during a ceremony at NRO Headquarters. Two Air Force units involved with Project Corona held reunions.

Finally, this CSNR Bulletin includes an appreciation for the contributions to national reconnaissance and the nation by two of its early leaders who passed away in 2002, former Director of Central Intelligence (DCI) Richard Helms and former Director, National Reconnaissance Office (DNRO) John McLucas.

Robert A. McDonald
Editor

THE CHALLENGES FOR NATIONAL RECONNAISSANCE IN THE FIRST DECADE OF THE 21ST CENTURY

by Peter B. Teets

The opportunities and challenges that face the National Reconnaissance Office (NRO) in the first decade of the 21st century are both significant and daunting. Following the attacks of 11 September 2001, the U.S. Intelligence Community refocused on and rededicated itself to the new threats to the nation's security. The NRO, as an integral component of National Security Space and in cooperation with other elements of the Intelligence Community, will continue to play a key role in identifying and responding to these threats.[1]

The National Security Space community continues to develop and acquire capabilities that can be brought to bear from space, in all–weather, day/night, and in areas denied to other intelligence collection sources and methods. The Intelligence Community is continuously learning how to improve the use of data collected from space and ways to disseminate the information into the hands of users.

National Security Space support to U.S. and combined forces worldwide has been superb. Space systems continue to perform admirably in the War on Terrorism, in support of forces in Operations Iraqi Freedom and Enduring Freedom, and on the Korean peninsula and other hot spots worldwide. Satellite communications transmit rapid, real–time information, and the Global Positioning System (GPS) enables delivery of precision–guided munitions with pinpoint accuracy. Supported by space–based reconnaissance, U.S. and coalition air assets in Afghanistan and Iraq have provided warfighters with an overwhelming asymmetric advantage. U.S. and coalition air, ground, and naval forces share all–source intelligence, including that derived from NRO systems. NRO space–based systems have become increasingly more valuable to the U.S. mission by enabling analysts and warfighters to operate more effectively against a host of threats. In conjunction with intelligence from aerial assets, such as manned and unmanned reconnaissance aircraft, NRO systems have been able to provide persistent battlefield awareness by relaying intelligence information directly to the warfighter.

(Photo courtesy of DoD Visual Information Center)

U.S. Military Forces in Operation Iraqi Freedom

Even before the attacks of 11 September 2001, the NRO was actively supporting the President's policies and strategies to fight terrorism and curb the proliferation of weapons of mass destruction (WMD). To continue this mission effectively, the NRO must ensure that the national reconnaissance systems in development—the satellites and ground system infrastructure—will meet performance,

[1] National Security Space (NSS) comprises those organizations and activities from the DoD and the Intelligence Community involved in the use of space to protect U.S. national security interests. In addition to the NRO, NSS includes the Offices of National Security Space Integration and the National Security Space Architect and elements of the military services, other defense agencies, and the Intelligence Community.

(Photo courtesy of DoD Visual Information Center)

The Pentagon following the attack of 11 September 2001

schedule, and cost goals. At the same time, the NRO must continue to transform its satellite reconnaissance systems to counter the increasingly clever denial and deception techniques being employed by U.S. adversaries.

The challenges that face the NRO and its NSS partners include:

- Ensuring mission success in space operations
- Fully integrating space capabilities for warfighting and national intelligence
- Getting space acquisition programs on track
- Pursuing operationally responsive assured access to space
- Developing a team of space professionals
- Pursuing innovative capabilities for national intelligence and defense priorities
- Enhancing space control capabilities and
- Focusing space science and technology resources and programs

To meet these challenges effectively will require a coordinated effort among all the NSS players and with the Congress to obtain the proper level of resources.

Findings of Recent External Study Groups

In this time of new challenges, the NRO requires a strategic perspective to properly lead and manage. From 1998 through 2001, three national–level study groups examined the missions and functions of the National Reconnaissance Office. The groups were the National Security Space Commission, the NRO Commission, and the Remote Sensing Strategy Panel. Their recommendations provided a framework for NRO strategic thinking and a basis for management and action.

National Security Space Commission

The congressionally–established National Security Space Commission, led by Mr. Donald Rumsfeld prior to his appointment as Secretary of Defense (SECDEF), worked for many months to craft a new approach for national security space. Several critically important decisions resulted from the commission's findings. First, the SECDEF designated the U.S. Air Force as the DoD Executive Agent for space. In addition, he appointed the Air Force Under Secretary as the Director of the NRO, putting one person in a position to ensure that both the NRO and broader DoD space components work together to serve the space needs of all users.

NRO Commission

The congressionally–established NRO Commission recommended a wide–ranging set of organizational changes, as well as specific suggestions for NRO management activities. One suggestion, also noted by the Space Commission, was the growing need to develop and maintain a cadre of talented space personnel. All of the organizations that provide personnel support to the NRO—the military, the Intelligence Community, and industry, among others—have endorsed this idea and are making certain that they manage their human resource programs not only to retain the people they have, but also to attract the best and the brightest into the space community.

Remote Sensing Strategy Panel

The Secretary of Defense and Director of Central Intelligence jointly commissioned the Remote Sensing Strategy Panel. Led by Dr. Donald Kerr, now the CIA Deputy Director for Science and Technology, the panel examined current remote sensing technology and concluded that the space community needed a revolutionary leap in persistent surveillance capabilities.[2] In the coming years, the space community expects to see significant technology breakthroughs that will permit the achievement of those kinds of enhanced capabilities. The panel also strongly recommended increases in research and development funding for breakthrough technologies.

Strategic Planning and Management at the NRO

Armed with the input from these external panels, the NRO Board of Directors (BOD) initiated a review of its strategic plan in December 2001 and refined the major components of the NRO strategy.

The BOD concluded that the NRO vision was still valid and should remain the same as it has been since 1996:

> ***Freedom's sentinel in space:***
> ***One team revolutionizing global reconnaissance***

The vision describes an end state yet to be attained. To help the NRO achieve this vision, the NRO's Executive Committee (EXCOM) revised the NRO mission statement to better reflect its new role in supporting multiple national security interests. This new mission statement is:

> ***The NRO develops and operates unique and innovative space reconnaissance systems and conducts intelligence-related activities essential for U.S. National Security.***

Ultimately, the Intelligence Community wants to achieve "universal situational awareness" with uninterrupted collection of multiple types of intelligence in any region of the world. To maintain movement in the right direction, the NRO senior leadership continued its work by updating the strategic plan within the context of the new and emerging threats to national security. Throughout the process, the BOD actively solicited and incorporated ideas from NRO employees. The 2003 Strategic Plan sets the future course for the organization with three strategic goals:

- *Execute*—acquire, operate, and maintain high-value space reconnaissance systems, providing the United States with a robust space reconnaissance capability and capacity that meet operational demands and satisfy evolving requirements.
- *Transform*—evolve to deliver innovative new sources and methods by developing, demonstrating, and transitioning technology and operational concepts to satisfy user information needs.
- *Partner*—work cooperatively to deliver vital intelligence to national leaders and operational users by strengthening partnerships in the defense, space, and intelligence communities.

Execute

The four fundamental activities that the NRO must accomplish to achieve the "execute" goal are: reduce constellation fragility; uphold the NRO commitments to satisfy existing customer requirements; operate, maintain, and evolve both space and ground systems to respond to operational demands; and protect the operational infrastructure. This demanding set of objectives requires the full attention of the entire NRO management chain.

There are other challenges that face NRO management in addressing the "execute" goal, especially the acquisition process. The NRO has forty years of outstanding acquisition experience, and has been recognized for its ability to acquire space capability rapidly without huge bureaucratic liabilities or encumbrances. While there is much to be proud of, improvements are in the pipeline. DoD is promoting the NRO acquisition process as a model for incorporation into the Defense Acquisition Board (DAB) process. The DAB is very complex and takes months to complete. The NRO process has a dramatically reduced cycle time. It is focused, with fewer people involved, and receives inputs from multifunctional organizations. Decisionmakers resolve issues on the spot. The challenge on both the DoD and NRO sides is to capitalize on these advantages and apply them to all national security space.

The most risky part of operating a space system has always been the launch. In past years when DoD relied on a single family of launch vehicles, a failure could interrupt

[2] Persistent surveillance is defined as sustained dwell-time of an overhead sensor on a selected target or area.

(Photo courtesy of Aerospace Corporation)

An Atlas II AS rocket lifting off from Vandenberg Air Force Base in September 2001, carrying a national security payload.

access to space for weeks or months at a time. DoD has since built some redundancy into its satellite launch acquisition strategy to preclude such a situation from recurring. Such protections must continue to assure U.S. access to space in both the near and far terms. NASA and the Air Force have created a partnership to determine the viability of reusable launch technology. They also are studying the possibility of employing small expendable launch vehicles. Clearly, the DoD needs to make a greater investment in new launch technologies that show promise for improving the ability to assure future access to space.

In carrying out the "execute" goal, the NRO is working hard to ensure the financial health of current and future systems by mitigating cost risk and assessing the adequacy of funding, while at the same time improving the quality of its operational support through re-capitalization of aging ground systems and by ensuring the survivability of NRO ground stations.

Two of the most important new activities to carry out the "execute" goal are the Future Imagery Architecture (FIA) and the Integrated Overhead SIGINT Architecture (IOSA). Acquisition and operation of both of these major new programs will provide the nation with the robust space reconnaissance capability and capacity to meet operational demands and satisfy evolving requirements.

All of these activities are vitally important to assure uninterrupted collection while the NRO is developing and deploying transformational systems.

Transform

The second of the NRO strategic goals, "transform," presents an even greater challenge. The inherent flexibility of National Security Space systems which comprise the full spectrum of intelligence and defense space assets has permitted the adaptation of tasking and processing to counter new threats with great success. These assets are essential elements of the nation's sources of reliable, high quality, global intelligence information. They are expensive and take years to develop, build, and launch. As the NRO looks to the future, it must first focus on completing and launching the transitional systems whose acquisitions were begun in the 1990s to replace Cold War-era systems. The NRO must simultaneously develop and employ concepts and technologies that will keep the U.S. ahead of its adversaries.

The space surveillance systems of the future will have to be agile, reliable, precise, and persistent. They will need to work harmoniously with elements of the Defense Department and Intelligence Community. They also will need to support a variety of new missions, including disaster relief, environmental monitoring, and homeland security activities.

In the interim, the NRO must continue to transform its reconnaissance assets so that they are able to efficiently support a variety of needs. It must develop a concept of

(Photo courtesy of DoD Visual Information Center)

The fall of the Berlin Wall symbolized the end of the Cold War.

operations for space intelligence that innovatively integrates into overall operational and support concepts. The technology that will provide the necessary tools to do these jobs must be developed simultaneously.

An excellent example of an activity that is evolving from NRO transformation efforts is the Transformational Communications Architecture (TCA). When this new architecture is implemented, the NRO will have taken a giant step forward towards achieving its objectives of universal situational awareness and near real–time support to both analysts and warfighters. It is vitally important to build an acquisition plan that will permit the NRO to sustain and maintain current capabilities while bringing on line transformational capabilities that will remove the constraints of bandwidth and access. The NRO, working with the National Security Space Architect, will play a vital role in ensuring that the process considers and accommodates the needs of all the necessary organizations.

Partner

The third NRO strategic goal, "partner," demands a strengthening of relationships among the three components of the space reconnaissance business: the Intelligence Community, the Defense Department, and the space industry. Operating in close cooperation with these communities, the NRO must implement best practices and continuously focus on integrating advanced space technology to deliver vital intelligence products to its customers.

Operating collaboratively with all of its partners, the NRO must also improve the organization, management, and planning to integrate itself more effectively into the overall intelligence surveillance and reconnaissance enterprise. To do this, the NRO must find the proper mix of systems and products, better integrate space with land, air, sea, and cyber capabilities, reduce the risk of surprise attacks, and deny sanctuary to the enemy.

Finally, the NRO and its strategic partners must work together to develop the products, processes, and policies to ensure mission success. The community will succeed only through enhanced communication, combined focus, and cooperative planning among mission partners.

Enabling Objectives

Each of the strategic goals has its own set of supporting objectives, highlighted in the paragraphs above. The NRO senior leadership also has identified and adopted a set of capabilities, competencies, skills, business processes, and infrastructure elements called "enablers," which will assist in executing its strategy. These are:

NRO Headquarters, Chantilly, Virginia

- *Program Management Competency*—Improve program management excellence to effectively acquire capability in a dynamic and uncertain environment.
- *Financial Resource Management*—Adroitly resource requirements and allocate the limited funding available to accomplish the mission.
- *Systems Engineering Competency*—Re-establish systems engineering as an essential core competency of acquiring highly technical and complex state-of-the-art space systems for the benefit of the nation.
- *Enterprise Excellence–Support Infrastructure*—Establish and maintain a robust physical and functional infrastructure so that the NRO workforce can do their jobs in the most efficient manner possible.
- *World Class Enterprise Information Services*—Create the tools and processes with which to effectively and efficiently communicate the information needed by the workforce and customers.
- *World Class Workforce*—Attract, develop, and retain a team of dedicated, talented, and innovative professionals committed to mission success and the pursuit of excellence.
- *Space Industrial Base*—Ensure the health of the space industrial base from which the NRO can incorporate the cutting edge technologies that will provide the foundation for future space systems.

Human Resources—Building a Team of Space Professionals

All of the elements of the NRO Strategic Plan in one way or another involve people—recruiting them, training them, networking them, enabling them, and keeping them.

If the NRO is to be successful, it is absolutely critical that it develop a team of space professionals across the many organizations and agencies of the Intelligence Community and the Defense Department. These must be highly skilled professionals that have experience in building and operating space systems. All of the military services have initiated meaningful programs to find and develop cadres of such talented people. Similarly, the Intelligence Community and the DoD must create career tracks for its civilian personnel involved in space operations and intelligence analysis.

The NRO workforce has been and must continue to be characterized by unparalleled strength and diversity. Collaboration and teamwork have been essential for meeting the challenges of gathering intelligence from space. As it moves forward, the NRO must have leaders and managers who will continue to foster its culture of mission success, never tolerating unexplained failure, and who will adopt acquisition strategies that preclude single–point failures.

Over the past few years, space professionals have been leaving the field in large numbers. The DoD and Intelligence Communities need to halt this loss in key personnel, retain the bright, talented people they have, and recapture some of those who have left. The NRO is committed to strengthening its talent base and to getting the appropriate resources to make that happen. The space, defense, and intelligence worlds are exciting places to work these days and the NRO must capitalize on that excitement.

Conclusion

For over forty years the NRO effectively has acquired, deployed, and operated satellite–based reconnaissance systems to provide civilian and military leaders with valuable intelligence that supports critical national security decisions. America's national security relies heavily on the NRO's ability to maintain and build upon its advantages in space. With the Strategic Plan serving as a foundation, the NRO must continue to serve as the model for its partners and customers, leading the efforts in research and development, acquisition, program management, systems engineering, and operations.

Current and emerging challenges for national reconnaissance are different from those of the second half of the 20th Century. These new challenges will include finding and tracking mobile targets, defeating adversaries' denial and deception techniques, and detecting and locating nuclear, biological, and chemical weapons systems. The Intelligence Community will need to acquire information in real–time, and pass it to its customers, who can act immediately to locate, monitor, and counter these threats.

To meet these new challenges successfully, the NRO must maintain a close working relationship with the other members of the national security community, including the National Imagery and Mapping Agency, the National Security Agency, the Central Intelligence Agency, the Air Force, and other military services. As the NRO and its mission partners meet these challenges, NRO leadership must ensure that it also maintains its close working relationship with the Congress. By continuing to keep the Congress informed about current national reconnaissance systems and future requirements, it will be able to make informed decisions regarding funding for NRO programs. Only with the proper resources will the NRO be able to acquire and operate the necessary systems and infrastructure to accomplish its mission. At this critical time, it is essential that the NRO continue to be the eyes and ears of the nation, truly "Freedom's Sentinel in Space."

The Honorable Peter B. Teets serves as the Under Secretary of the Air Force and the Director of the National Reconnaissance Office (DNRO). Designated the Department of Defense Executive Agent for Space, Mr. Teets develops, coordinates and integrates plans and programs for space systems and the acquisition of all DOD space major defense acquisition programs. In his capacity as the DNRO, he is responsible for the operation of all U.S. space–based reconnaissance and intelligence systems. He also manages the National Reconnaissance Program, which the Secretary of Defense and the Director of Central Intelligence oversee.

COMMERCIAL SPACE SYSTEMS: IMPLICATIONS FOR NATIONAL SECURITY

by Dennis M. Miller,
John E. Stocker, and
William C. Martel

During the last decade, satellite systems have become increasingly important to the U.S. military forces' ability to project power and conduct operations on a global basis. At the same time, rapidly–growing information requirements and the increasing unpredictability of where and against whom the U.S. military may be called to fight have increased the value of satellite systems. Space imagery, for example, proved its relevance in Kosovo and in Afghanistan in the war against terrorists. Today, space imagery is being integrated with unmanned aerial vehicles (UAVs) and other intelligence sources to provide real-time situational awareness and a common operating picture. Consequently, the ability to project power and conduct military operations globally depends increasingly on space-based systems for warning, surveillance, reconnaissance, navigation, and communications.

The Department of Defense (DoD) is becoming increasingly dependent on commercial space systems to augment U.S. Government military and national space systems. This development is most evident in the fields of commercial satellite reconnaissance and communications, and, more recently, in the emergence of commercial firms that provide high–resolution satellite imagery and radar imagery products.[1] As a result, senior national and military officials should evaluate the utility of exploiting these capabilities. In particular, they should determine if commercial imagery services are able to satisfy military imaging requirements. If they can, the use of commercial satellites for DoD operations and intelligence collection will require changes in policy and methods of operation.

(Photo courtesy of DoD Visual Information Center)

A Marine Light Armored Vehicle operating in close coordination with an Army AH1W Super Cobra near Kandahar, Afghanistan during Operation Enduring Freedom.

Evolution of Commercial Satellite Presence

Commercial satellite applications and services are evolving into a significant global business. Consider, for example, the growth of mobile communications and navigation services that depend on the Global Positioning System (GPS). In fact, revenues from commercial space firms grew dramatically in the 1990s—from $26 billion in 1996 to $60 billion in 1998, with projections of $170 billion in 2007 (Goodman, pp. 39-41). Today more than 1,000

[1] For more information on the use of commercial space systems, see Dennis M. Miller and John E. Stocker III, "Commercialization of Space Systems: Policy Implications for the United States."

(USAF photo)

Launch of Space Imaging's IKONOS high-resolution satellite from Vandenberg Air Force Base, California, 24 September 1999

companies worldwide are involved in developing, manufacturing, and operating space systems (Goodman, Jr., pp. 39–41). In 1997, the number of commercial space launches exceeded that of launches by the U.S. military, the National Reconnaissance Office (NRO), and the National Aeronautics and Space Administration (NASA) combined. More significantly, U.S. Government agency launches account for a very small percentage of the total number of all U.S. space launches (Hewish, pp. 20-25). In May 1998, for the first time in the history of space development, there were more commercial satellites on orbit than military satellites (Riebe and Schweitzer, p. 83).

To complicate matters, the U.S. military relies heavily on commercially-developed systems to provide leading–edge communications, as exemplified by direct broadcast television and mobile telephone services (Gregory, pp. 39–41). According to U.S. Space Command's Long Range Plan, the U.S. reliance on space will increase for both military and commercial applications and services (U.S. Space Command, Long Range Plan: Implementing USSPACECOM Vision for 2020).

Global Information Transparency

An underlying factor is that global information is by its nature transparent, which has profound effects on military planning and operations, particularly as the United States depends increasingly on commercial space assets. Satellites increase global transparency because they encourage the collection and use of data and information that readily and instantaneously transcends national boundaries (Baker and Williamson, p. 221). In addition, satellites directly enhance the power and prestige of the states that possess them. The fact that any organization with sufficient resources can use satellites to monitor the actions of others and can use a global communication network to pass the information easily to any location on the globe represents a revolutionary development. As more than 35 nations and seven international companies or consortia are involved in space, the potential uses of space systems available to allies and adversaries will increase (Air Force Association, "Space Almanac"). In fact, commercial space consortia increasingly take the form of multinational enterprises that take advantage of the infrastructure, expertise, and equipment that exist within many nations.

In the future, adversaries may have access to the same commercial space systems that the United States uses when it conducts military operations. For example, the U.S. Air Force was a significant consumer of commercial satellite imagery generated by the French Satellite Pour l'Observation de la Terre (SPOT) satellite during the Persian Gulf War (Winnefeld, Niblack, and Johnson, p. 201). To cite another case, the U.S. military already competes with the Cable News Network (CNN) when it buys excess SATCOM capacity. When doing this, it

(Photo courtesy of Space Imaging LLC)

SPOT imagery of Kuwait Oil Well Fires, 9 February 1991 often finds that commercial firms buy out the market before the military realizes that it needs commercial space systems to support its military operations. This is precisely what happened in 1999 during military operations in Kosovo.

Fundamentally, global information transparency makes it more difficult to achieve surprise, requires better planning, and simplifies strategies for dealing with the United States. As a result, the possession of, or access to, satellite services and products is potentially destabilizing when hostile parties have access to such information (Johnson, Pace, and Gabbard, p. 32). More ominously, information that can be derived from commercial satellite imagery products can school adversaries in how to conceal their activities from U.S. reconnaissance satellites and may thus deprive the United States of the information that it currently acquires from its own satellites (Florini and Dehqanzada). As the United States and other states rely increasingly on space assets and the threats posed to them, protecting these assets, as well as denying or degrading their use by adversaries, is a critical U.S. national security priority.[2]

Several factors determine the correct balance between commercial and military systems: current military systems are becoming inadequate in the first decade of this century; political and economic forces enhance competition for access to space; the capabilities and services of commercial satellites are expanding both domestically and internationally; the requirements for U.S. military forces are changing constantly; and the Defense and Intelligence Communities cannot fulfill all of these requirements by themselves.

Policy Implications

The United States must be sure that its policies help, or at least do not hinder, the efforts of commercial firms that develop advanced space technologies and systems. At the same time, those who argue that commercial space systems are necessary undoubtedly are aware of the risks associated with increasing U.S. dependence on commercial space systems. There also are those who equally are aware of the risks of not accelerating the use of commercial space systems. Given the competing demands for space capabilities by U.S. friends and foes alike, as well as by commercial firms and news organizations, the ability to protect these vital assets is critical to U.S. economic and military security.

[2] According to the Space Commission Report, p. ix, "the present extent of U.S. dependence on space, the rapid pace at which this dependence is increasing and the vulnerabilities it creates, all demand that U.S. national security space interests be recognized as a top national security priority."

(Photo courtesy of Space Imaging LLC)

Ikonos imagery of Odessa, Texas, 15 September 2002

First, the U.S. Government must develop long-range policies for using commercial space systems if they are to make a contribution to U.S. military technologic and economic security. Those policies should create the opportunities and incentives to help government and commercial organizations strike the right balance between national security and economic interests. The challenge, as yet unmet, is to establish sensible and enforceable rules and standards that encourage the use of commercial space systems. The failure to do so could permit U.S. adversaries to pursue partnerships and contracts with commercial firms, buy vital capabilities, and thus deny them to the United States and its allies.

It is essential for the relevant government agencies—notably the DoD, the NRO, the National Imagery and Mapping Agency (NIMA), and the U.S. Strategic Command (USSTRATCOM)—to develop partnerships and contracts with commercial space system companies, and consider providing incentives (such as tax breaks) that create an environment that could prevent adversaries from inhibiting the United States from using these capabilities during hostilities. Such agreements may spur commercial space firms to protect their space systems, in particular the vulnerable uplinks, downlinks, and crosslinks, so that they do not lose their customers and profits during a conflict. One solution may be to establish a central military command as the focal point for providing commercial space systems to the Department of Defense, the regional combatant commanders, and the operational commands.

Conclusion

The United States has made extraordinary strides in developing governmental and commercial space systems. The U.S. Government now needs to move forward by eliminating the policy and time constraints that inhibit the use of all available commercial space services. If the United States Government and military can capitalize on the potential of the commercial space sector, it will both strengthen the U.S. technological base and increase its ability to safeguard the national security. It is time for the U.S. Government to accelerate its use of commercial space systems.

Editor's Note: Since the time this article was written, the U.S. Government has continued to employ and assess the value of commercial imagery as recommended in this article. As reported in FEDERAL TIMES on January 27, 2003, "... the Defense Department has committed to purchase up to $1 billion worth of commercial satellite imagery ... over the next five years ... in part to strengthen the remote sensing industry through increased government purchases of commercial imagery and new export licensing guidelines for satellite imaging technology ..." Defense policymakers also are in the process of developing and promulgating policies that will define the procedures for and expedite the process of acquiring and exploiting commercial space products.

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THE CIVIL APPLICATIONS COMMITTEE'S ROLE IN NATIONAL RECONNAISSANCE

by Joseph A. Baclawski and Thomas B. Nath

In the 1960s and early 1970s, national security remote sensing data were collected almost exclusively by classified overhead sensors carried on U.S. space or aircraft platforms. As the national reconnaissance program evolved, its applications expanded beyond solely national security operations into the civil and commercial sectors. The Civil Applications Committee (CAC) was established in 1975 at the U.S. Geological Survey (USGS) as the interagency committee that links the defense intelligence reconnaissance world with the civil remote sensing community by coordinating and overseeing the federal civil use of classified remote sensing information.

As the Corona photoreconnaissance satellite system gave way to more advanced follow–on programs, the benefits of national reconnaissance extended first into the federal civil sector and then into the commercial sector to include both the classified and unclassified worlds. The CAC has been the official federal mechanism that links these two worlds. In the first decade of the 21st century, the CAC continues to evolve, with a revised charter that expands its ability to collect and utilize remote sensing data for a wide range of civil purposes. The CAC has a long history of overseeing the incorporation of national security data into civil remote sensing activities, but the use of these data by federal civil agencies actually preceded the CAC's establishment by more than a decade.

The Founding and Development of the CAC

Presidential and Congressional actions during the past 35 years indicate a consistent national objective to facilitate federal civil agencies' access to remote sensing technology and data from classified systems. The overall purpose has been to help the agencies carry out their mandated missions and programs at lower funding levels in the national budget. Federal civil agencies' use of remote sensing data from satellite systems increased as the national reconnaissance capabilities evolved. (USGS Advanced Systems Center pamphlet, 2001)

Corona Image of the Washington Monument, 25 September 1967

Initial Civil Agency Focus

President Lyndon Johnson's Science Adviser initiated federal civil agency use of national security remote sensing data in the 1960s (Commission on CIA Activities within the United States).[1] The objective was to utilize more fully the military and intelligence advances in classified overhead imaging technology for important domestic purposes.[2]

[1] The Commission Report indicated the position title as "Science Adviser," whereas the current spelling for the position is "Science Advisor."

[2] This article uses the terms "overhead imaging" and "overhead photography" as specific examples of the generic concept of remote sensing by various overhead sensors, whether carried on satellite or aircraft platforms.

(Photo courtesy of USGS)

The United States Geological Survey Building

These activities were advanced further in 1969, when the DCI established a special facility in the Washington area where federal civilian agencies could use classified remote sensing technology and data on a regular basis in their various research, mapping, and other production programs. The principal focus of these early activities was to fill the gaps in basic large-scale mapping of the United States and its possessions. The facility was operated by the U.S. Geological Survey, the agency assigned responsibility for topographic mapping of the U.S., and the largest civil user of defense-intelligence reconnaissance data. But the Department of Agriculture also used national security data for updating maps of national forest lands; the Department of Commerce used the data to compile accurate coastal navigation charts; and the Environmental Protection Agency used the data to locate areas with pollution problems.

The interagency sharing arrangements at the special facility worked well, demonstrating the usefulness and viability of these new concepts and their applications in national reconnaissance. Interactions that involved classified imaging system resources continued uninterrupted from the 1960s into the 1970s, even after the abolition of the position of the Science Adviser in 1973.

CAC Establishment

In the mid–1970s, the Congressional Commission on CIA Activities within the United States (also known as the Church Committee), as part of its broad investigation of domestic intelligence collection activities, examined allegations that the Intelligence Community was using classified imaging systems to spy illegally on U.S. citizens. President Ford's response to this investigation in 1975 was to establish the Rockefeller Commission. The Commission's tasks included a detailed review of classified domestic imaging activities.

The Commission's review failed to substantiate the allegations of impropriety, and concluded that the existing applications of overhead imagery by federal civilian agencies were appropriate and desirable uses of costly, nationally-funded resources. The Commission report stated, "Aerial photography systems have been used for ... diverse civilian projects." It then cited examples: "... mapping, assessing natural disasters such as hurricane and tornado damage and the Santa Barbara, California oil spill, conducting route surveys for the Alaska pipeline, conducting national forest inventories, determining the extent of snow cover in the Sierras to facilitate the forecast of runoff, and detecting crop blight in the Plains States." (Commission on CIA Activities in the United States, 1975)

However, the review also pointed out that the 1973 abolition of the position of the President's Science Adviser left no oversight authority for such activities, and recommended that an interagency committee of federal civil agencies be established to oversee such applications.[3]

(Library of Congress Photo)

The Church Committee , 1976

The report stated, "A civilian agency committee should be re–established to oversee the civilian uses of aerial intelligence photography in order to avoid any concerns over the improper domestic use of a CIA–developed system." (Commission on CIA Activities in the United States, 1975)

The President responded to this recommendation by directing that such a committee be established. A memorandum on 3 October 1975 (signed jointly by the Assistant to the President for National Security Affairs, the Director

[3] The position of Science Advisor to the President was re-established in 1976. The break in continuity effectively removed the position from direct responsibility for the CAC and its activities.

of the Office of Management and Budget, and the DCI) subsequently implemented the President's directive. This memorandum directed the Secretary of the Interior to establish the "Committee for Civil Applications of Classified Overhead Photography of the United States." The memorandum also defined the CAC's mission and responsibilities, and thus established its charter.[4]

Table 1: CAC Membership

Voting Members
Department of Agriculture
Department of Commerce
Department of Energy
Department of the Interior
Department of Transportation
Environmental Protection Agency
Federal Emergency Management Agency
National Aeronautics and Space Administration
National Science Foundation
U.S. Army Corps of Engineers
Nonvoting Associate Members
Department of State
DCI Environmental and Societal Issues Center
National Imagery and Mapping Agency
National Reconnaissance Office

About the CAC

Since its establishment, the CAC has been the Presidentially–established mechanism through which federal civil agencies have gained access to national security technology and data. The committee provides interagency oversight and advocacy for the collection and use of classified overhead imagery and data by federal civil agencies. In addition to the basic mapping and charting activities, other major applications of these data include emergency responses to natural disasters, such as hurricanes, earthquakes, and floods; detecting and mapping the spread of wildfires; monitoring volcanoes and ecosystems; mapping wetlands; and studying global change.

In addition to this direct operational support, the CAC serves a critical functional role as the primary mechanism linking the national reconnaissance and the civil remote sensing communities. The CAC facilitates imagery acquisition, provides technical support for imagery exploitation, coordinates research activities, provides an interface to the military and intelligence communities, and ensures the appropriate and effective use of classified information.

The CAC is made up of voting representatives from the U.S. federal civil remote sensing community and nonvoting associate members from the national security community.

Current Civil Remote Sensing and CAC Operations

Since its inception, the CAC has grown in scope, membership, and range of activities. This development demonstrates the significance of the evolution of U.S. national reconnaissance in the late 20th century. The quantity and sophistication of space imaging systems have increased dramatically, and the associated remote sensing activities by the national security community, the federal civil agencies, and the commercial sector have expanded correspondingly. These advancements, combined with improved analytical tools, have led to an increase in the use of remote sensing imagery for various environmental and scientific applications that support federal civil agency missions. Now is the time for federal civil agencies to advance their support of U.S. leadership in the technical exploitation of remote sensing data collected by space platforms.

In addition to assisting federal agencies in meeting these needs, the CAC provides a mechanism through which the federal civil agencies coordinate data requirements, develop tasking strategies, oversee the proper use of data, and track and plan for the progress and evolution of national reconnaissance systems. It is also the key legal mechanism used to provide the civilian agencies with advanced technology, data, and ideas from national reconnaissance programs, minimizing the duplication of effort and expenditures that would occur if agencies attempted to perform these tasks individually. The CAC makes arrangements for technical support from military and intelligence community agencies. It also represents the civil community in national security forums and serves as an advocate for policies and

[4] As noted in a subsequent paragraph, the 1975 Charter was revised in October 2000.

technology of common benefit to the civil, military, and intelligence communities. These functions are critical in the link between the classified and unclassified worlds of national reconnaissance, and facilitate the important expansion of national reconnaissance from solely national security applications to the civil remote sensing arena.

Since its inception, the CAC has had to cope with continuing changes in the evolution of remote sensing systems. The introduction of U.S. commercial and foreign commercial and government satellite systems has created new challenges for the CAC as it continues to refine its role.

Evolving Civil Remote Sensing Sources

In contrast to the early years of national reconnaissance when classified assets were the only U.S. source of satellite imaging data, various additional remote sensing collectors from classified and unclassified sources emerged during the subsequent decades. At the present time, this multiplicity of sources is a major asset, but also a major challenge because of the difficulty in determining which data source, or combination of sources, is the best and most economical to use in various applications.

(Photo courtesy of Space Imaging LLC)

LANDSAT Imagery of Kennedy Space Center, 15 September 2002

The era of open, civil satellite remote sensing on a systematic operational basis began in 1972 with the U.S. launch of the LANDSAT platform. The basic LANDSAT sensor (multi-spectral scanner) had an 80–meter spatial resolution. This was too coarse for large–scale mapping or other production, research, or planning activities, which required precise, detailed measurements of objects on the surface of the earth. However, its multispectral capability and electronic data dissemination introduced an entirely new dimension to satellite remote sensing.[5] LANDSAT systems subsequently acquired improved imaging sensors and employed other technological advances. Other U.S. civil and commercial satellite systems, such as Naval Earth Map Observer (NEMO), Ikonos, Orb View, and Quick Bird, later joined the LANDSAT systems. (McDonald, 1999)

Another significant development is the relative abundance of data from foreign and commercial satellite imaging systems. In the early to mid 1990s, the French Satellite Pour l'Observation de la Terre (SPOT) program was the foremost foreign civil operational satellite system. Throughout that decade, remote sensing systems with various capabilities—spatial, spectral, optical, and radar—became available from Russia, Japan, India, Canada, Australia, and the European Space Agency. Examples of foreign commercial or civil satellite systems are: European Space Agency (ERS), Indian Remote Sensing (IRS)–IC (India), RADARSAT (Canada), Spin (Russia), Advanced Land Observation System (ALOS) (Japan), Australian Resource Information & Environmental Satellite (ARIES) (Australia), China–Brazil Earth Resources Satellite (CBERS) (bilateral), and EROS (multinational). (McDonald, 1999)

Increased Data-Processing Requirements

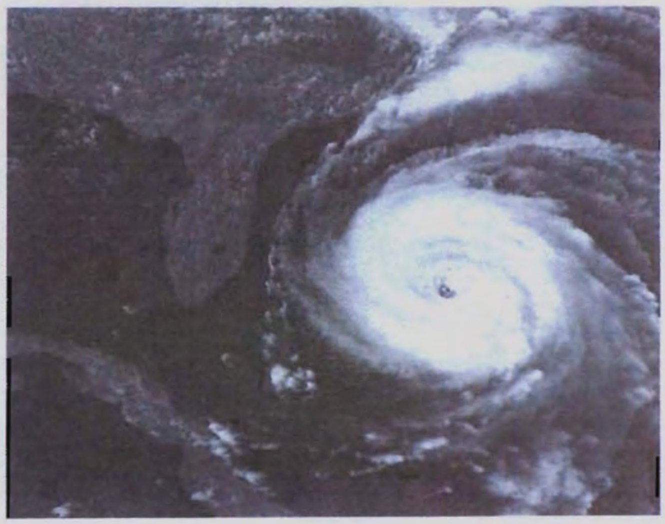
The almost exponential increase in remote sensing data from new systems with improved or different capabilities has created a formidable challenge for federal civil agencies striving to accomplish their respective missions in a cost-effective manner. Keeping informed of the characteristics of the various satellite sensors and developing the associated complex data processing technology requires major efforts. Previous conventional imagery procedures were relatively simple, involving processing, analyzing, and extracting pertinent information from a single photographic image in hard-copy format. Remotely sensed data with different spatial resolutions and spectral capabilities must be collected (ideally at the same time), brought together in a digital format, precisely merged, and then manipulated with

[5] This is the ability to detect and record different specific emanations from earth surface objects. The data were in digital format, not hard-copy photographs

(Photo courtesy of Space Imaging LLC)

SPOT Satellite/Imagery of Kuwait Oil Fires, March 1991

computer assistance. These procedures must be performed in various combinations by software programs designed to extract specifically desired information about features on the earth's surface. To maximize utility, the extracted data must be incorporated into formats suitable for insertion into Geographic Information Systems (GIS). The Gulf War demonstrated the potential contribution of remotely sensed data, as well as the need for such processing equipment and experienced personnel capable of effectively using this advanced technology.



(Photo courtesy of USGS)

Geostationary Operational Environmental Satellite Photo of Hurricane Fran off the East Coast of the United States, 20 September 1996

Expanded Missions and Information Requirements

The U.S. civil remote sensing community continues to operate in an era of expanding missions and requirements, and it is involved increasingly in remote sensing activities related to a growing list of global and national concerns and interests. These activities include more intensively monitoring global warming and other environmental trends, participating in assistance projects to developing countries, and performing other scientific research activities on subjects such as worldwide earthquake patterns, foreign crop conditions, and the assessment and control of natural and man-made disasters.

For the U.S. civil remote sensing community to accomplish its expanded mission, it needs to have the best available data so that the federal agencies involved can make objective scientific recommendations to U.S. policymakers. To meet this challenge will require greater access to available

(Photo courtesy of USGS)

(Photo courtesy of USGS)

A satellite image of a thermal signature and an aerial photograph of Pavlov Volcano acquired on 23 September 1996 show new volcanic activity. In the satellite image, the new thermal feature is red, low meterological clouds are light blue, and water is dark blue.

and future remote sensing data, as well as more expertise in managing the sensors and analyzing the data. Many federal agencies already possess considerable expertise, and interaction with military and intelligence community personnel will help to improve the situation further. The major initiative will have to come from the federal civil agencies themselves in partnership with the national security community. Creating and maintaining a close working relationship between these two groups, as well as with the rapidly advancing commercial satellite world, remains a crucial task for the CAC in its revised worldwide mission.

CAC Charter Revision and Continued Evolution

The CAC's original charter, which limited its activities to solely U.S. territory, subsequently became an impediment to the effective support of national policy objectives, and resulted in a requirement to revise the charter. In October 2000, the CAC charter was revised in two major respects. The revision removed the geographic limitation to U.S. territory and broadened the CAC's scope so as to encompass new remote sensing technology. These changes will assist federal agencies in better fulfilling their global responsibilities. These changes also reflect the fact that the CAC's role as the link between the national security and civil communities remains critical both for the maintenance of U.S. reconnaissance leadership worldwide and the successful application of remote sensing information by federal civil agencies. To reflect its new scope, the official title of the CAC was changed from the "Committee for Civil Applications of Classified Overhead Photography of the United States" to the "Committee on Civil Applications of Classified Overhead Remotely Sensed Data."

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Joseph A. Baclawski is a geographer and former CIA intelligence officer who served as the principal mapping adviser to the Chairman of the DCI Committee on Imagery Requirements and Exploitation. On the CIA's 50th Anniversary in 1997, the CIA honored Dr. Baclawski as one of fifty individuals selected as CIA Trailblazers. Dr. Baclawski was recognized for providing U.S. political and military leaders with accurate, reliable mapping information on the Soviet Union.

Thomas B. Nath is a former CSNR policy analyst and Assistant Editor of the Bulletin. He currently is a graduate student at Johns Hopkins University's Nitze School of Advanced International Studies.

DECLASSIFICATION OF EARLY SATELLITE RECONNAISSANCE FILM

by Sarah E. Kindig and Jack Munson

In October 2000, the Director of Central Intelligence (DCI) authorized the declassification and release of film from the retired KH–7 surveillance camera and the KH–9 mapping camera, both space–based photoreconnaissance systems. In September 2002, the National Imagery and Mapping Agency (NIMA) held a Historical Imagery Declassification Conference during which it formally transferred the reformatted declassified film to the National Archives and Records Administration, who will make it available to the public.

The scope of the related information that was released under this DCI authorization differs from that of the earlier declassification for Project Corona (the first photoreconnaissance satellite). That 1995 decision authorized the release of both the film and programmatic details of Corona. This new decision is restricted to only the film from the KH–7 surveillance and KH–9 mapping cameras and does not include programmatic data. However, some limited technical details about these cameras have been made available to the public and are summarized in the accompanying table.[1]

Table 1. Comparison of KH-7 and KH-9 Systems

Specifications	KH-7 Surveillance Camera	KH-9 Mapping Camera
Best Resolution	2 feet	20 feet
Ground Coverage	10nm x 12nm	70nm x 140nm
Mission Duration	1-8 days	42-119 days
Number of Missions	38	12
Film Acquisition	43,000 linear ft.	50,000 linear ft.

Aswan Upper Dam, KH–9 Mission 1212–05, August 1976

The KH–7 and KH–9 cameras were both part of Cold War film–return satellites. The high-resolution KH–7 surveillance camera system operated from July 1963 to June 1967, gathering information for intelligence analysis, and returned both black and white and color imagery. The KH–9 mapping camera system operated from March 1973 to October 1980 and was devoted exclusively to gathering information for mapping, charting and geodesy.

Both the KH–7 surveillance system and the KH–9 mapping system contributed greatly to national reconnaissance. The KH–7 surveillance camera monitored vital targets, including Intercontinental Ballistic Missile (ICBM) complexes, radar systems, and other high interest targets. The KH–9 mapping camera provided the Department

Eiffel Tower, KH–7 Image, Mission 4026, March 1966

of Defense with accurate point locations for air, sea, and ground operations.

Sarah E. Kindig and Jack Munson are policy analysts at the NRO's Office of Policy, Center for the Study of National Reconnaissance.

[1] The decision authorized the declassification of only film from the two camera systems and did not declassify other capabilities or names associated with the KH–7 and KH–9 programs.

Pioneer Recognition Day

September 24, 2002

by William M. Naylor

The National Reconnaissance Office (NRO) established the National Reconnaissance Pioneer Recognition Program in 2000 to identify and honor those who have made significant and lasting contributions to national reconnaissance. Each year a selection board appointed by the Director of the National Reconnaissance Office (DNRO) and consisting of seven senior people with diverse backgrounds in national reconnaissance, considers nominations that are solicited from a variety of sources. The selection board reviews the nominations and makes recommendations to the DNRO, who makes the final selections.

On Tuesday, 24 September 2002, DNRO Peter B. Teets, presided over a ceremony to honor the National Reconnaissance Pioneers for 2001 and 2002. Five of the seven honorees attended the ceremony, and a sixth was represented by his widow.

The formal recognition and award ceremony took place in the Jimmie D. Hill Auditorium at NRO Headquarters, during which DNRO Teets addressed the audience citing the important roles that the pioneers played in national reconnaissance. He recognized each pioneer's accomplishments and contributions, and he thanked all of them and their families for their hard work and sacrifices.

Mr. Teets was followed by the keynote speaker, Ms. Joan Dempsey, the Deputy Director of Central Intelligence for Community Management, who represented the Director of Central Intelligence, Mr. George Tenet. Ms. Dempsey acknowledged the significant accomplishments and contributions of the pioneers and their families. In her remarks, Ms. Dempsey called the pioneers "patriots" who "showed us the way ahead" and "set the first standards for success in space." She also thanked the families of the pioneers who gave them "the strong foundation they needed to excel and soar." Finally, she characterized the pioneers as "outstanding examples of duty to country and service to liberty … [from whom] … the new generations of the NRO have learned and learned well." After the ceremony, the DNRO hosted a reception during which the Pioneers and their families had the opportunity to interact with members of the current NRO work force.

For 2001, the DNRO chose the following pioneers:

Lieutenant General Donald L. Cromer, USAF (Ret). Then-Colonel Cromer directed the design, development, and acquisition of a new imaging satellite system that became a critical part of U.S. national reconnaissance. His work led to vital new imaging capabilities, and his efforts in this and other NRO programs were critical to the evolution of NRO systems.

Mr. A.J. (Tony) Iorillo. Mr. Iorillo conceived a new concept in spacecraft control and operation, which became a fundamental design for many NRO spacecraft. He also was a leader in the Hughes design and development effort that fielded the critical, near–real–time optical imagery-transmission relay system. He guided corporate and government–funded research efforts on critical technologies that produced significant advances in national reconnaissance capabilities. His efforts contributed to the successful achievement of a challenging and important vision: near–real–time optical imaging, with data relayed directly from space to a ground processing system.

Pioneers for 2001—(l to r) LtGen Donald Cromer, USAF (Ret.) and Mr. Vincent Rose [Mr. A.J. Iorillo (absent), Mr. John Walton (deceased)]

Mr. Vincent S. Rose. Mr. Rose of the Naval Research Laboratory designed the first electronic intelligence (ELINT) payload used in signals intelligence (SIGINT) reconnaissance satellites. His achievements enabled the earliest receivers to collect radar emissions across broad frequency ranges that produced "horizon to horizon" area coverage capabilities. His exceptional designs gave the U.S. its first space reconnaissance collection success, and he contributed to the development of advanced ELINT receivers, antennas, and associated elements for four decades.

Mr. John Walton. Mr. Walton, as manager of the General Electric system integration organization for the first near-real–time electro-optical reconnaissance satellite, made possible the combined, successful operation of the earth and space-based program elements. He served as a key architect and leader in the system's definition, development, and deployment, and established and implemented management processes for the system integration and execution of this large, complex, multi–contractor acquisition program. Walton provided leadership to decision–making forums in defining and evaluating program cost, schedule, and performance data, and facilitated a cohesive government and contractor team. His revolutionary methodology addressed the entire life cycle of program events, and has been applied to other NRO programs.

The DNRO selected the following Pioneers for 2002:

Dr. Vance D. Coffman. Dr. Coffman's technical and management skills were instrumental in developing and initiating on-orbit operations of the first near–real–time electro–optical–imaging satellite system. From 1971-1984, he served at Lockheed Missiles and Space Company (later incorporated into Lockheed Martin Corporation) as the program's controls design engineer, attitude control system manager, Chief Systems Engineer, and finally, Program Manager. Coffman led the development of a new satellite attitude control capability needed to provide major improvements in producing large quantities of geographically accurate, highly–detailed maps from satellite-collected images.

Mr. Lee M. Hammarstrom. For more than 40 years, Mr. Hammarstrom enhanced and extended the reach of U.S. near–real–time satellite intelligence collection, processing, and data dissemination capabilities. His concepts and developments for satellite, ground station, and processing systems greatly improved the accuracy, timeliness, and volume of NRO ELINT products. Hammarstrom worked in various positions in Program C for HRB–Singer and the Naval Research Laboratory from 1964–1990. He served as the key conceiver and system integrator for a Program C ELINT satellite system, and greatly improved Program C ELINT ground stations. He was named Head of the NRO's Technology Office in 1990, and the NRO's Chief Scientist in 1996. He retired in 2002.

NRO Pioneers for 2002—(l to r) Mr. Lee Hammarstrom, Col Robert L. Paulson, USAF (Ret.), Dr. Vance Coffman

Colonel Robert L. Paulson, USAF (Ret.). Colonel Paulson served as the Air Force Program Manager for an IMINT satellite system, directing its development, launch and initialization. The success of this program is the result of his dynamic management of resources and technical knowledge. He saved the program from cancellation during a time of technical, schedule, and funding problems. He then successfully led his program office and operations team through the critical design, development, and testing of the system, and developed its complex ground architecture.

Nominations for 2004 Pioneers of National Reconnaissance may be submitted to

The National Reconnaissance Office
Office of Policy/CSNR
Pioneer Recognition Program
14675 Lee Road
Chantilly, VA 20151-1715
or email to: **csnr@nro.mil**

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PROJECT CORONA UNIT REUNIONS

by William M. Naylor

Corona Film Capsule being recovered by the 6593rd AF Test Squadron

Two of the satellite photoreconnaissance organizations that supported the Corona program held reunions in the Fall of 2002. One was the unit that was responsible for the mid-air recovery of Corona re–entry film buckets; the other was the unit that processed the returned film.

6593rd Test Squadron (Special)

The 6593rd Test Squadron (Special) held its reunion at NRO Headquarters near Washington, DC. The 6593rd was responsible for aerial recoveries of the Corona film buckets that returned to earth by parachute from space. The squadron had its roots in the late 1950s when it became involved in Project Genetrix, recovering film gondolas from balloons that were launched from Europe and overflew the former Soviet Union and China. In 1958, the squadron took up the Corona mission, operating out of Hickam AFB in Hawaii. They recovered the film from the first successful Corona mission in 1960.

The NRO Deputy Director for Military Support, Brigadier General William Fraser, USAF, welcomed the attendees and thanked them for their contributions to the Corona program. Center for the Study of National Reconnaissance (CSNR) personnel briefed them on current NRO operations and, following lunch, escorted them on a tour of Pioneer Hall.

Chuck Dorigan, the reunion organizer, expressed the group's gratitude for the tour and briefing, and emphasized their appreciation that the squadron had been "... personally recognized by the Intelligence Community for what they did so many years ago."

Members of the 6593rd Test Squadron at their reunion at NRO Headquarters, 10 September 2002.

Members of the 6594th Squadron/Air Force Special Projects Production Facility at their Reunion in Branson, Missouri, 1 October 2002.

6594th Test Squadron /Air Force Special Projects Production Facility

The 6594th Test Squadron/Air Force Special Projects Production Facility held a reunion 29 September–3 October 2002 in Branson, Missouri. The unit, also known as the 6594th Test Squadron, was the organization responsible for processing the Corona photography that was recovered by the 6593rd squadron. Operating out of Westover AFB in Massachusetts, the group received the film in unmarked containers, processed it, and delivered it to the National Photographic Intelligence Center and other intelligence nodes.

The Director, National Reconnaissance Office, Mr. Peter Teets, sent a letter to the group thanking them for their service and congratulating them on their successes over the years. In his letter, Mr. Teets recognized the members of the unit for "their important contributions to the success of the Cold War–era Corona photoreconnaissance program." Recounting their many successes, Mr. Teets cited the unit's processing of "2.1 million feet of film in 39,000 cans," its "important role in technical evaluation and analysis," and its "many innovative quality control and production techniques ..." According to the reunion organizer, LtCol Al Crane, USAF (Ret.), the complete text of the letter was read at the closing banquet at "attention to orders," during which "one could have heard a pin drop" as the squadron members finally received public recognition for their important contributions in bringing about a peaceful end to the Cold War.

Conclusion

The two squadrons represent the foundation of early satellite reconnaissance efforts and expressed their appreciation for the kind words and their being able to pass on to their families and friends information about their roles in the early days of national reconnaissance.

Through the tour, briefings, videos, and exhibits, they were able to learn about some of the significant advancements in national reconnaissance over the years and realize the fruits of their labors.

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RECENT PUBLICATIONS

Commercial Observation Satellites: At the Leading Edge of Global Transparency

Edited by John C. Baker, Kevin M. O'Connell, and Ray A. Williamson, Santa Monica, California: RAND, 2001

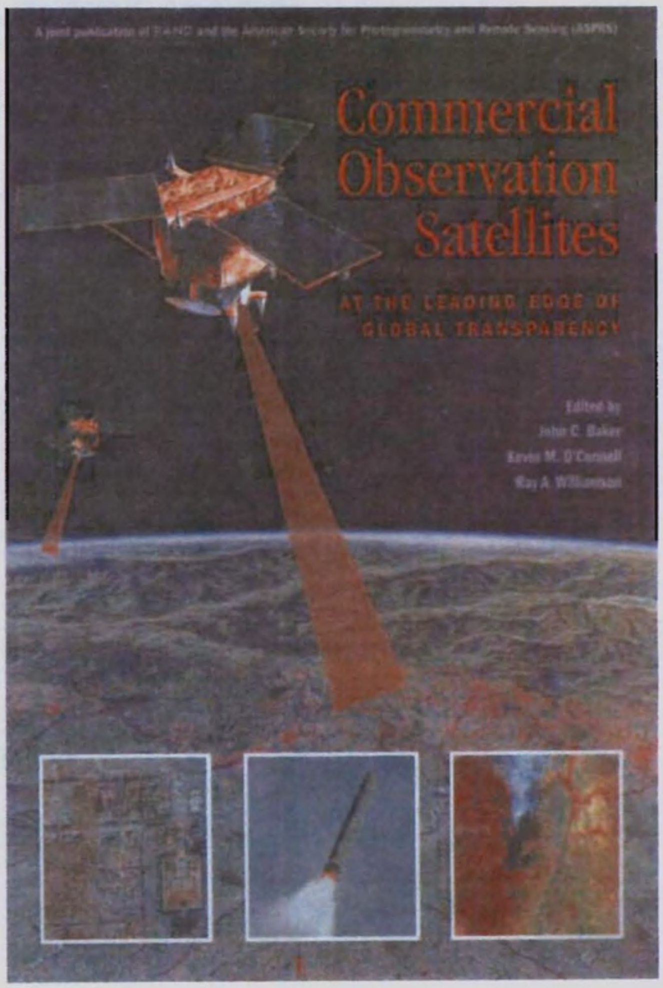
Reviewed by David F. Nefzger

The focus of this work is policy related to commercial space imagery rather than technical matters, and no important policy aspect is overlooked in its 26 chapters. The book is divided into four sections, each composed of chapters contributed by subject matter experts.

The first section lays the foundation for the balance of the book by providing the history and conceptual context of commercial remote sensing. The remaining sections deal with national programs, applications, and policy issues. The editors (Baker and O'Connell from RAND, and Williamson from George Washington University's Space Policy Institute) provide solid introductions to each section, individual chapters, and a helpful concluding summary. They also include a list of abbreviations, a detailed bibliography and index, several pages of color plates, and a list of past and current world remote sensing satellites.

Although the editors conclude that the new capabilities and increased global transparency brought about by commercial imaging satellites are good things for the U.S., they also clearly articulate the accompanying security risks and concerns. Several of the policy issues covered in this work are relevant to National Reconnaissance Office interests as it develops plans for future capabilities along with mission partners and customers.

In summary, this is a comprehensive, authoritative, and readable discussion of an important policy area. It is a resource that has the potential to become a standard reference on the subject of commercial remote sensing policy.



David F. Nefzger is a senior analyst in the NRO's Office of Policy.

IN MEMORY AND APPRECIATION

Richard M. Helms

National Reconnaissance Supporter

Richard M. Helms, former Director of Central Intelligence (DCI), died at his home in Washington, DC, on 22 October 2002. He was 89.

Vice President Gore shaking hands with former DCI Helms after Corona Declassification Ceremony at CIA Headquarters, 24 February 1995. Also shown is former DCI James Woolsey.

In April 1965, President Lyndon Johnson appointed Helms as Deputy Director of CIA and in June 1966 as Director of Central Intelligence (DCI). Subsequently, President Richard Nixon re-appointed him DCI, but Helms resigned in 1973 when President Nixon appointed him Ambassador to Iran. In 1977, Helms retired from government service and became a private consultant.

At CIA, Mr. Helms initially was associated most with the clandestine service; however, he came to fully understand and appreciate the contribution of technical collection systems. In the 1960s, he clearly saw the value of national reconnaissance satellite imagery acquired by Corona's KH–4 camera and the follow–on KH–7 camera. This imagery from these camera systems enabled photo interpreters to find and report on strategic threats to the United States. This enabled Mr. Helms, as DCI, to provide valuable intelligence information to the President.

Although KH–4 Corona and other film-return imaging satellite systems provided invaluable information to the President and national authorities, Mr. Helms and other senior officials noted that these systems were not timely during periods of crisis. This led to a series of technical proposals and debates as to the best approach for the intelligence community to develop a "read–out," or near–real–time system that could provide imagery in a matter of hours as opposed to the days or months of film return systems. In these debates Mr. Helms joined with other key and influential officials—such as National Reconnaissance Founders Edwin Land, Richard Garwin and Sidney Drell—in providing position papers on proposals for a near–real–time crisis capability. This led to the decision by President Nixon in September 1971 to proceed with the development of an "electro–optical imaging (EOI) system."

As DCI—and the official responsible to the President for providing responsive exploitation and intelligence—Mr. Helms' support of the EOI proposal played a major role in the decision. The EOI capability remains a vital part of the U.S. national reconnaissance program into the 21st century.

Mr. Helms was honored on 20 November 2002 by current DCI George J. Tenet at a Memorial Service at Fort Meyer, Virginia, following burial in Arlington National Cemetery. In his remarks, Mr. Tenet commented in part:

> Though associated most closely with our clandestine service, which he had guided with tremendous insight, Richard Helms is for all of us the complete intelligence officer ... For he not only understood the complicated mechanics of his business, he understood both its possibilities and its limits ... He saw intelligence for what it truly is: An essential service to the President of the United States. His goal as he used to say was to try to 'keep the game honest'—to stick to the facts and their interpretation, to be an impartial voice, and to leave policy decisions to others.

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IN MEMORY AND APPRECIATION[1]

Dr. John L. McLucas

DNRO and Secretary of the Air Force

Dr. John L. McLucas, the fifth Director of the National Reconnaissance Office and former Secretary of the Air Force, died on 1 December 2002 in Alexandria, Virginia. He was 82. A highly respected scientist and senior manager, he had a distinguished career in government and industry.

(Photo courtesy Mrs. Harriet McLucas)

Dr. John L. McLucas

Dr. McLucas had extensive government service. A Navy veteran, he served as a radar officer in the Pacific during World War II. Senior positions included Director of Defense Research and Engineering, Chairman of the Air Force Scientific Advisory Board, Chairman of the Defense Science Board, NATO Assistant Secretary General for Scientific Affairs, Undersecretary and Secretary of the Air Force, and Director of the National Reconnaissance Office (DNRO). From July 1973 to November 1975, he was the first to serve as both the Secretary of the Air Force and DNRO. Dr. McLucas also served two years as Administrator of the Federal Aviation Administration (FAA) at the request of President Gerald R. Ford.

In industry, Dr. McLucas held a number of positions in which he applied his scientific, engineering and management skills. He served as president of HRB Singer, C–COR Electronics, and the MITRE and COMSAT Corporations. He also served on many boards and advisory councils supporting the aerospace industry.

Dr. McLucas' accomplishments in national reconnaissance made significant contributions to U.S. national security. For example, while Director of the NRO from March 1969 to November 1975, Dr. McLucas played a key role in the improvement of signals intelligence collection, increased the Navy's role in space reconnaissance, and directed the final development of the CORONA photoreconnaissance satellite system. He was involved extensively with several Founders of National Reconnaissance (Edwin Land, Sydney Drell, Richard Garwin) and DCI Richard Helms in the debate that influenced final approval by President Nixon in 1971 to develop a new generation of electro-optical imaging satellites.

Although slowed by ill health, he remained active, and at the time of his death he was working on an autobiography, which contained his recollections of the National Reconnaissance Office, Air Force Space Programs, and his experiences in the development of early and current national reconnaissance systems.

Current NRO Director Peter B. Teets called McLucas "one of the most capable and productive leaders" to serve at the helm of the organization. "He managed advances in overhead technical collection that continue to serve us well. John was a patriot who put service to his country above personal gain."

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[1] Portions of this article are derived from "An Appreciation" of John L. McLucas by the NRO Historian, R. Cargill Hall, and from an NRO History, Leaders of the National Reconnaissance Office, 1961-2001, by Clayton D. Laurie, 1 May 2002.

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IN MEMORIAM

Dr. James Q. Reber

Former NRO Deputy Director

Dr. James Q. Reber, the second Deputy Director of the National Reconnaissance Office (1 September 1965–30 June 1969) died on 16 January 2003.

Dr. Reber earned a Doctor of Philosophy Degree in International Relations at the University of Chicago in 1939. In 1943, he began his career in government service with the State Department working as an economist and foreign affairs specialist. He joined the Central Intelligence Agency (CIA) in 1950 and served in planning and coordination positions until 1957.

In 1955, Dr. Reber assumed a leadership role in national reconnaissance when he became the Chairman of the Ad Hoc Requirements Committee (ARC). The ARC developed lists of intelligence requirements and prioritized targets for the U–2 overflights of the USSR. He continued to chair the committee after it was taken over by the U.S. Intelligence Board (USIB) in 1960 and renamed the Committee on Overhead Reconnaissance (COMOR). COMOR activity eventually included prioritizing targets for early satellite imaging missions. Dr. Reber's leadership of the COMOR contributed to the refinement of procedures for prioritizing requirements in support of current national reconnaissance systems.

Dr. Reber served as Deputy Director of the National Reconnaissance Office from 1 September 1965 to 30 June 1969. During the NRO's early years, Dr. Reber was instrumental in fostering more effective relationships between the CIA and the Department of Defense (DoD) in the operation of the National Reconnaissance Program. In 1969, at the conclusion of his service with the NRO, he became the Chairman of the USIB's Signals Intelligence (SIGINT) Committee. He retired from government service in July 1972.

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IN MEMORIAM

James B. Pranke

NRO Project Engineer

James B. Pranke, a senior project engineer with the Aerospace Corporation, passed away on 31 August 2002. Mr. Pranke worked for the NRO Office of Policy doing international policy planning.

Mr. Pranke was a native of St. Paul, Minnesota, and a graduate of the University of Minnesota. He received a master's degree in astrogeophysics from the University of Colorado. Mr. Pranke began his career in the mid–1960s as a geomagnetic and auroral observer for the U.S. Coast and Geodetic Survey at Byrd Station, Antarctica. In 1966, he became the geophysicist and station scientific leader at Plateau Station near the South Pole. In recognition of his work, a small island off Marie Byrd Land was named Pranke Island.

Mr. Pranke's work for the Aerospace Corporation began in 1974 and included design and construction of remote sensing instruments for satellites and sounding rockets. Among other things, Mr. Pranke served as the lead Aerospace systems engineer for the National Oceanic and Atmospheric Administration on a Polar–Orbiting Operational Environmental Satellite System. This system combines defense and meteorological satellites into one system. In 1999, Mr. Pranke's final assignment brought him back to the NRO to support the international research and development program, where his broad experience with space systems made him invaluable.

On 28 April 2003, the Office of Policy held a dedication ceremony for Mr. Pranke at NRO Headquarters. Ms. Linda Pranke, his widow, and sons Stephen and Dirk, were presented with an American flag flown over NRO Headquarters. They also unveiled a plaque and picture that will be permanently displayed in the Office of Policy to commemorate the valuable contributions Jim Pranke made to the NRO and the nation.

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IN MEMORIAM

Colonel Robert W. Yundt, USAF (Ret.)

Pioneer of National Reconnaissance

Colonel Robert W. Yundt, USAF (Ret.), died on 23 February 2002 in Los Angeles, California, after a long illness. Col Yundt was in the first class of individuals whom the Director of Central Intelligence and the Director of the NRO honored as Pioneers of National Reconnaissance. Col Yundt was inducted into NRO's Pioneer Hall for his work in the development of new, long–life low–orbiting signals intellience (SIGINT) satellites.

In addition to being honored as a National Reconnaissance Pioneer, President Bill Clinton and DCI George Tenet also recognized Col Yundt for his contribution to the advancement of SIGINT satellites. In 1966, Col Yundt received the Legion of Merit for his leadership role in the formation of the nation's satellite reconnaissance program.

Col Yundt was born on 27 June 1920 in Pittsburgh, Pennsylvania. During World War II, he served in both the Pacific and European theaters and became a highly decorated fighter pilot. After the war, Col Yundt accepted a permanent commission in the Air Force. He subsequently served in the NRO's Program A as the Director of the Signals Intelligence Project Office. After his retirement from the Air Force in 1966, Col Yundt worked for TRW for 20 years.

IN MEMORIAM

Colonel C. Lee Battle, Jr., USAF (Ret.)

Pioneer of National Reconnaissance

Colonel C. Lee Battle, Jr., USAF (Ret.), passed away at his retirement home in Hawaii on 2 August 2002. Col Battle was born in Alpine, Texas, on 25 May 1915. He received a bachelor's degree in chemical engineering from the University of Oklahoma in 1941, and a master's degree from the Massachusetts Institute of Technology (MIT) in 1946.

Col Battle was commissioned in the Air Force in 1942. His first assignment in national reconnaissance was as director of the Discoverer and Corona programs. He implemented a management principle of emphasizing a streamlined approach combined with simplicity and clarity. By selecting a small group of good people, demanding quality performance, focusing on mission accomplishments, and not wasting time, Col Battle achieved top quality results. These principles became known in the Intelligence Community and NRO as "Battle's Laws."

Before his retirement from the Air Force in 1968, Col Battle held the position of Military Assistant to the Deputy Director of Research and Development in the Central Intelligence Agency. After leaving the Air Force, Col Battle joined the Lockheed Missile and Space Corporation. He retired from Lockheed in 1980 to pursue an active lifestyle, which included physical fitness, golf, and tennis.

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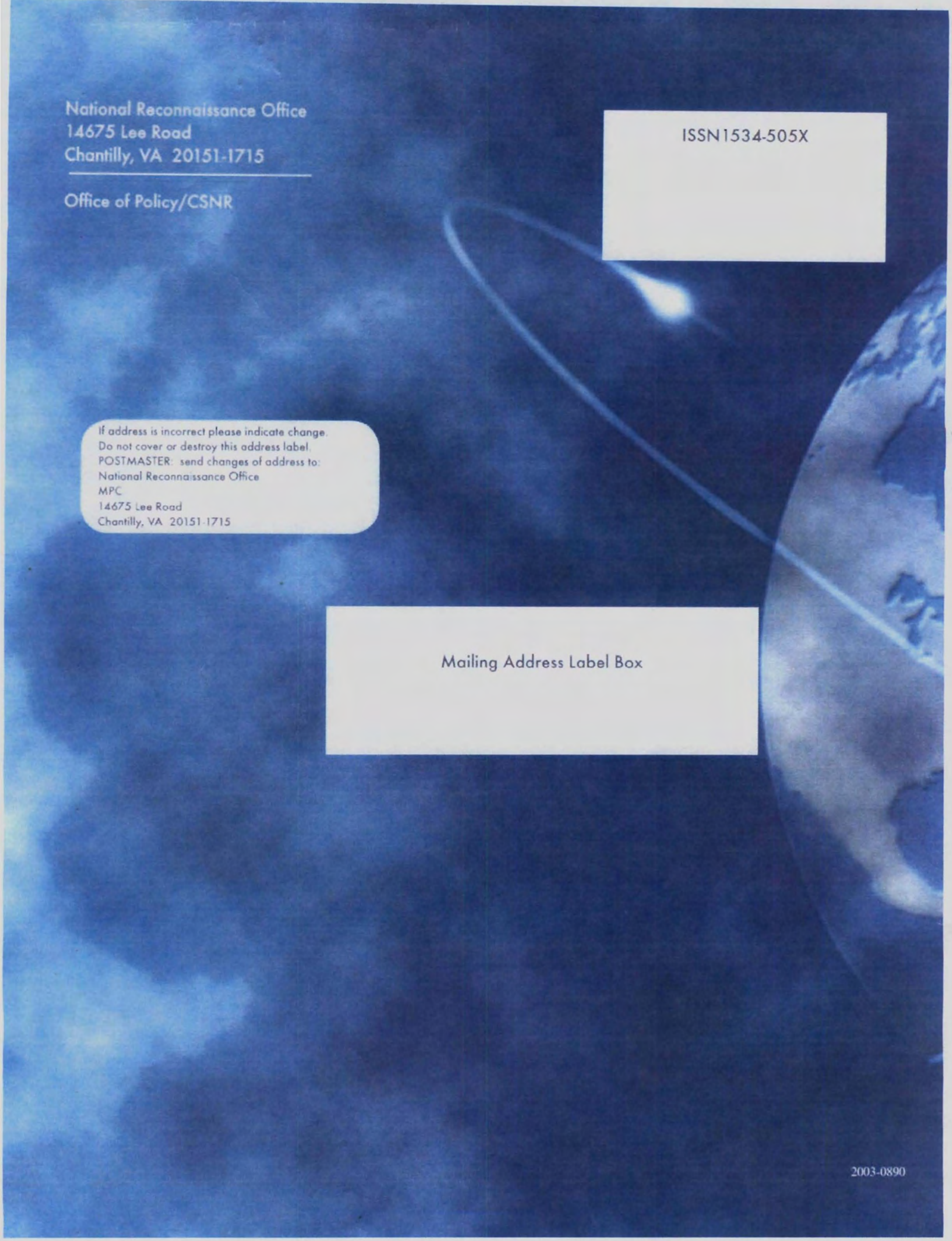

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