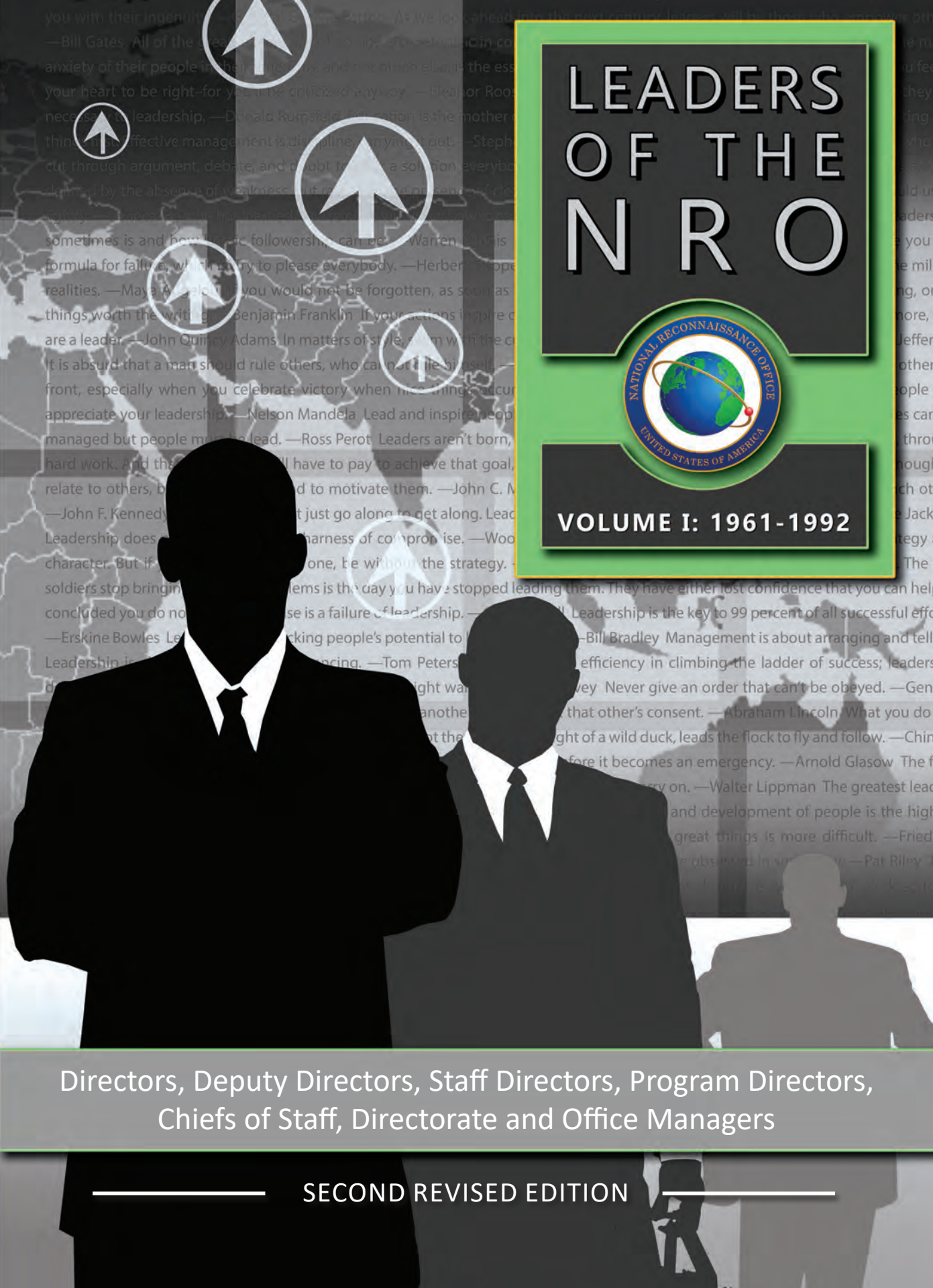
LEADERS OF THE NRO



VOLUME I: 1961-1992

Directors, Deputy Directors, Staff Directors, Program Directors, Chiefs of Staff, Directorate and Office Managers

SECOND REVISED EDITION

LEADERS OF THE NATIONAL RECONNAISSANCE OFFICE:

DIRECTORS, DEPUTY DIRECTORS, STAFF DIRECTORS, PROGRAM DIRECTORS, CHIEFS OF STAFF, DIRECTORATE AND OFFICE MANAGERS

Volume I: 1961-1992

Second Revised Edition

Dr. Clayton Laurie
and
Michael J. Suk

CENTER FOR THE STUDY OF
NATIONAL RECONNAISSANCE

JULY 2019

CENTER FOR THE STUDY OF NATIONAL RECONNAISSANCE

The Center for the Study of National Reconnaissance (CSNR) is an independent National Reconnaissance Office (NRO) research body reporting to the Director/Business Plans and Operations Directorate, NRO. The CSNR's primary objective is to advance national reconnaissance and make available to NRO leadership the analytic framework and historical context to make effective policy and programmatic decisions. The CSNR accomplishes its mission by promoting the study, dialogue, and understanding of the discipline, practice, and history of national reconnaissance. The CSNR studies the past, analyzes the present, and searches for lessons for the future.

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FOREWORD TO SECOND EDITION

In May 2002, the National Reconnaissance Office (NRO) History Office published Leaders of the *National Reconnaissance Office, 1961-2001*. This important work quickly became a vital reference tool for learning about the NRO's formation and organization as well as for providing background information on its leadership. Updating and republishing *Leaders of the National Reconnaissance Office* became the responsibility of the Center for the Study of National Reconnaissance (CSNR) after the history program joined the CSNR in 2005. This updated reference work is now in three parts with Volume I covering leaders from 1961 to 1992, Volume II covering leaders from 1993 to 2001, and a planned third volume that will cover leaders from 2002 to the time of publication. The volumes provide updated information from the first edition. The first volume ends in 1992 because in that year the NRO underwent its most significant reorganization to date—abolishing the "alphabetic" Programs A, B, and C (NRO cancelled Program D in 1974) in favor of functional directorates (IMINT, COMM, and SIGINT). In that same year, NRO leadership proposed collocating all component offices into a single headquarters building in Chantilly, Virginia. The second volume ends in 2001 with the September 11th terrorist attacks. The last volume will include NRO leaders since the war on terrorism began.

Like its predecessor volume, this updated multi-volume publication will be helpful for people seeking information on NRO Directors and Deputy Directors and principal NRO Directorate and Office heads and program managers before and during their NRO tenures. We look to these reworked volumes as the authoritative source of information on tours of service, awards, and accomplishments of the people who created and sustained the National Reconnaissance Program since its 1961 creation. Produced in unclassified form, we will make these volumes of the newer Leaders of the National Reconnaissance Office available to the public. In this way, we expect that their utility will extend far beyond the NRO and the intelligence and defense communities.

In his foreword to the first edition, then-Director of the National Reconnaissance Office Peter B. Teets described the importance of strong leadership to the success of the organization:

> *Today, throughout the world, the National Reconnaissance Office is recognized as the undisputed leader in space-based satellite reconnaissance. [I]t is gratifying to publicly acknowledge those individuals whose dedication, talents, and leadership shaped this organization into one of the nation's greatest national security and intelligence assets.*
>
> *Since its inception, the National Reconnaissance Office has attracted the top minds of the U.S. Intelligence Community, the Department of Defense, private industry, and the academic-scientific community. Its mission brought together leaders of a quality rarely found elsewhere during the latter half of the twentieth century, as the following pages ably demonstrate. United by common goals and motivated by a single-minded sense of patriotism and professionalism, NRO's leaders represent an unusual array of national origins and races, and social, educational, and occupational backgrounds. Together they forged a new multi-agency intelligence [and defense] team that produced remarkable results. The achievements of the National Reconnaissance Office in large measure are a tribute to the vision and dedication of these men and women; they made what many deemed impossible just fifty years ago into routine operations today.*
>
> *Under such leaders, supported by several thousand dedicated, hardworking personnel, the NRO has successfully and proudly lived up to its motto: Freedom's Sentinel in Space: One Team, Revolutionizing Global Reconnaissance.*

Mr. Teets words still ring true in commending the leadership of the NRO and recommending that all who work in the discipline of national reconnaissance learn from the leaders who went before them. This publication is one resource for doing so.

Robert A. McDonald, Ph.D.
Director, CSNR/Emeritus
National Reconnaissance Office

PREFACE TO SECOND EDITION

Dr. Clayton Laurie authored the first edition of *Leaders of the National Reconnaissance Office*, which was published in May 2002. Subsequently, Dr. Laurie left the NRO and later returned as the NRO's Chief Historian. He then took up efforts to revise the publication including restructuring it into three planned volumes.

The first volume contains information on the leaders of the NRO who served in the organization from its founding in 1961 to its major reorganization in 1992. The second volume contains information about the leaders of the newly reorganized NRO in 1993 through 2001 when the intelligence community initiated consequential structural changes in the wake of the terrorist attacks in the United States on September 11th of that year. The Center for the Study of National Reconnaissance, which now has responsibility for the project, will publish a third volume with background on leaders of the NRO since 2001.

As with the original publication, biographical information in the revised volumes came from information held in NRO directorates and offices, official military biographies, and open-source compendiums, as well as from NRO and other government records. When possible, each person included in the volumes received a copy of his or her biography for review. Unlike the original volume, the revised biographies conclude with the individual's NRO service.

As with the original *Leaders of the National Reconnaissance Office*, many individuals have contributed to the revised volumes. In addition to Dr. Laurie, those individuals include former deputy NRO historian David Waltrop; visiting senior historian Dr. Donald P. Steury; and former CSNR staff members Mrs. Faye Grubbs, Mr. Matt Doering, Ms. Cathy A. McConnville, and Ms. Frances Lawson who provided editorial and research assistance. Additionally, Mr. Charles Glover, CSNR's information and data presentation analyst, developed the revised layout and presentation of the material. Finally, Dr. Robert A. McDonald, director of the CSNR, provided ongoing support for this project and for the larger NRO history program.

Michael J. Suk
Chief, Historical Documentation and Research
Center for the Study of National Reconnaissance
National Reconnaissance Office

PREFACE TO FIRST EDITION

Between 1953 and late 1961 the administrations of Dwight D. Eisenhower and John F. Kennedy undertook a series of initiatives to protect the nation against surprise atomic attack by the Soviet Union. These initiatives resulted in creation of the National Reconnaissance Program (NRP) and the National Reconnaissance Office to manage it on 6 September 1961.

A unique hybrid organization, the NRO brought together the foremost intellects from the Central Intelligence Agency, the Department of Defense, the military services, private industry, and the American academic-scientific community to solve the technical challenges of overhead reconnaissance. The individuals who came to the National Reconnaissance Office shared a mission of securing, through overflight of "denied areas," intelligence on potential adversaries that posed a threat to the United States, and the vision and belief that space represented a new frontier exploitable to this end through advanced technology.

Within a few years of its creation, the National Reconnaissance Office achieved its original mission and vision to a degree far beyond the expectations of its founders and early leadership. The NRO provided the nation's command authorities with unparalleled global information supremacy. Not since the Manhattan District [Project] created the atomic bomb during the Second World War has an organization accomplished such groundbreaking technological feats in the national security interests of the United States so thoroughly, so effectively, or so quickly.

The success of any organization or endeavor ultimately depends on its leadership, and the National Reconnaissance Office has fortunately attracted leaders of a quality rarely found elsewhere. Indeed, the National Reconnaissance Office and its mission have always attracted an extraordinary group of highly gifted individuals. Long before the terms joint command and control, institutional flexibility, diversity, streamlined management, and public and private sector partnerships entered the lexicon and became philosophical dictums in American government, business, and industry, the leaders of the NRO had institutionalized and practiced them all for decades. Together they forged a new multi-organizational team and adopted a decentralized form of management that produced, in technical sophistication and capability, remarkable overhead satellite reconnaissance systems unequalled elsewhere in the world. These achievements in large measure are a product of, and a tribute to, the vision and dedication of the organization's leaders.

The majority of the men and women who created, directed, and managed the National Reconnaissance Program through the years have worked in anonymity, without official acknowledgement or public recognition. Yet their unswerving dedication to an intelligence mission and to the national security of the United States, and their commitment to innovation and excellence, contributed significantly to maintaining the peace and protecting the nation from foreign threats. In recognition of their contributions, the Office of the Historian has prepared these brief biographies of the directors, deputy directors, program directors, staff directors, chiefs of staff, and directorate and office managers of the National Reconnaissance Office. This collection provides a comprehensive biographical survey of the NRO's leaders and their dates of service—a source of information and perhaps inspiration for members of the National Reconnaissance Office, the U.S. Intelligence Community, the Department of Defense, and the public at large.

This reference book was not a solitary effort. First, the author thanks all of those included here, and the members of their staffs, who reviewed, edited, or supplemented various drafts of the biographies. Without their contributions, this monograph would be neither as accurate nor as comprehensive. The author also wishes to thank Matt Doering, who used his computer skills to create and lay out the present work. Equally important, Cathy A. McConville, former NRO History Staff secretary, completed an extraordinary amount of correspondence and administrative tasks associated with this monograph. The author also thanks those in the NRO's Visual Design Center, in the Intelligence Community, and the Department of Defense, who took time from their busy schedules to answer numerous inquiries, provide photographs, and otherwise make important contributions to this final work. Special appreciation goes to former NRO Deputy Director Jimmie

D. Hill and to Mrs. Sharilyn Watts, who provided unique firsthand information on this organization and its past leadership. Special thanks also go to R. Cargill Hall, the NRO Historian, whose editorial review much improved the final work.

The following biographies are listed alphabetically by last name. Military ranks, government positions, and other titles shown are those held at the time of NRO service and do not necessarily represent those held at the time of retirement from active duty or in subsequent military or government service. The text of each biography describes these various military assignments and government offices held in chronological order before and during NRO service. Individuals who served temporarily as interim leaders are included in the chronological listing with their dates of service and with the designation “Acting” in parentheses behind their names. Unless subsequently assigned permanently to that position, or to another NRO leadership position, their biographies and photographs do not appear in this edition.

The men and women listed in this work are, or were, the leaders of primary offices appearing on NRO organization charts following establishment in 1961. Leaders of subcomponents of the NRO director’s staff, of NRO staff offices, or of sub-elements of the larger offices and directorates, are not included in this edition unless that component previously existed as a primary office.

Biographical information came from a variety of sources. For most NRO leaders, at least those serving since the collocation of all NRO elements in 1996, the bulk of the data and photographs came from official National Reconnaissance Office biographies. United States Air Force, Navy, and Army offices handling public affairs provided official biographies for most past and present uniformed NRO leaders. Additional information and photographs came from the Library of Congress in Washington, D.C., the National Archives and Records Administration in College Park, Maryland, including various editions of the U.S. military service academy alumni registers, from Who’s Who and Who Was Who, Who’s Who in Science and Technology, Current Biography, etc., and, in some cases, the obituary listings of The New York Times and The Washington Post. In all cases, the history staff edited biographical sketches for stylistic consistency. When and where possible, individual subjects reviewed and edited their biographical sketches before publication. Final products reflect their contributions. When additional information becomes available, or when positions change, updated editions of this monograph will appear. As always, the author accepts responsibility for any errors that may remain.

Clayton D. Laurie, Ph.D.
Deputy Chief Historian
Office of the Historian
National Reconnaissance Office
Chantilly, Virginia
1 May 2002

INTRODUCTION

In the late 1940s, the United States began peacetime strategic reconnaissance overflights of "denied territories" to forewarn, if not forestall, a surprise nuclear attack and to provide knowledge about potential threats to the nation. President Dwight D. Eisenhower approved reconnaissance systems that included high-altitude balloons (such as Project Genetrix), aircraft (the CIA's U-2 and A-12), and reconnaissance satellites (the CIA's Corona for imagery intelligence; the Navy's Grab and Poppy for signals intelligence, and the Air Force's Samos for both). In August 1960, President Eisenhower created a civilian-led office, the Office of Missile and Satellite Systems, to direct the U.S. Air Force space-based reconnaissance satellite program. His successor, President John F. Kennedy, also strongly supported the development of overhead reconnaissance systems. On 6 September 1961, the Department of Defense and Central Intelligence Agency jointly established the National Reconnaissance Program (NRP) to consolidate all space-based and aerial reconnaissance assets, and founded a covert, highly compartmented, National Reconnaissance Office (NRO) to manage the NRP.

The NRO was a unique hybrid organization, staffed and led by military and civilian personnel drawn from both the U.S. Intelligence Community and the Department of Defense. Intelligence collection requirements and priorities were set by the United States Intelligence Board, chaired by the Director of Central Intelligence. Like President Eisenhower, President Kennedy, Secretary of Defense McNamara, and the early Directors of the National Reconnaissance Office believed that civilians, rather than the military, should control reconnaissance activities. Air Force Undersecretary Dr. Joseph V. Charyk and CIA Deputy Director/Plans Dr. Richard M. Bissell, Jr., were the first to co-direct the new organization. The Director NRO reported to the Secretary of Defense and to the Director of Central Intelligence (DCI) and, through them, to the President. This made intelligence derived from space-based reconnaissance satellites an exclusive and fundamental asset of the President and his national security team.

Because the National Reconnaissance Office was composed of representatives from the nation's civilian and military intelligence agencies, its position was unique within the U.S. Intelligence Community. NRO leaders had prior civilian service in the Department of Defense, the Central Intelligence Agency, or other federal executive and legislative departments and offices, or in private industry. Obtaining individuals from such a broad pool ensured a combination of the skills, experience, and perspectives necessary to manage the hybrid National Reconnaissance Office. In the early years of the organization, an Under Secretary of the Air Force or an Assistant Secretary for Space served as Director of the National Reconnaissance Office. The Secretary of Defense and the CIA Director selected the Director NRO; the U.S. Senate confirmed the candidate of their choice. It is the responsibility of the Director of the National Reconnaissance Office to acquire and operate all space-based reconnaissance and intelligence systems through the National Reconnaissance Program.

In the early 1960s, the CIA and Defense Department established the NRO Deputy Director's position, designating it as a CIA billet. This designation, following the earlier decision that the NRO director would serve as a senior civilian leader of the Department of the Air Force—often as the undersecretary—further enhanced the partnership between the Department of Defense and Central Intelligence Agency at the NRO. As the principal executive officer, the NRO Deputy Director reported to, and coordinated with, the Director NRO on the acquisition and operation of all space-based satellite reconnaissance activities, as well as on day-to-day management of the organization. Those individuals appointed to this post, according to former NRO Director Keith R. Hall, "historically hold a unique place in the evolution of space reconnaissance, balancing as they do complex technical issues with broader Intelligence Community matters." In short, the NRO Deputy Director, who also served as the Principal Deputy Assistant Secretary of the Air Force for Space, preserved the priority of the NRO mission while managing the tensions inherent within the Intelligence Community and the federal bureaucracy. "Through coordination, technical skills, and sound business practices," Hall once explained, the "Deputy Directors of the NRO have ensured appropriate requirements collection and considered exploitation methods in the development and operation of satellite systems. The NRO has been fortunate in attracting to these positions men of great stature in the scientific,

defense, and intelligence communities. Each has made a unique and lasting contribution to the NRO's legacy of innovation and technical excellence."

On 11 August 1965, Director of Central Intelligence William F. Raborn, Jr., and Deputy Secretary of Defense Cyrus R. Vance signed the agreement under which the NRO operated for some forty years. This agreement reaffirmed the NRO as a separate agency of the Department of Defense responsible for management and operation of the National Reconnaissance Program. It also reaffirmed the earlier decision to establish the NRO Director's position as a U.S. Air Force position and the NRO Deputy Director's position as a Central Intelligence Agency post, with the Secretary of Defense designated as the NRO executive agent. Perhaps most important, the 1965 agreement established an Executive Committee (ExCom) to approve or modify the National Reconnaissance Program and its budget, and to allocate funds to either the CIA or the Defense Department based on which organization was "best equipped with facilities, experience, and technical competence to undertake the assignment." To do this, the National Reconnaissance Office worked with its contractors to design, build, launch, and operate satellites.

When first established, the Director and Deputy Director of the NRO supervised four distinct reconnaissance programs—for the Air Force's Program A, the CIA's Program B, and the Navy's Program C, as well as a program for the U-2, SR-71, and A-12 aircraft under Program D. Although one coherent National Reconnaissance Program existed, each of the NRO's "alphabetic" programs was located in different parts of the United States, with NRO headquarters near Washington, D.C., at the Pentagon.

Program A managed the U.S. Air Force satellite reconnaissance effort, and maintained, for cover purposes, the Air Force Special Projects Office. For most of its existence, Program A operated from the West Coast in Los Angeles and at Sunnyvale, California. Its leaders, profiled in the following pages, generally consisted of U.S. Air Force flag rank officers who normally had spent their entire careers involved in reconnaissance and space fields. Program A also provided base facilities and acquired, integrated, launched, and in most cases operated on-orbit reconnaissance satellites for the Central Intelligence Agency and the U.S. Navy.

Program B oversaw the Central Intelligence Agency satellite reconnaissance program. It was first managed by Dr. Richard M. Bissell, Jr., and later, by the various Directors of the Office of Development and Engineering within the larger CIA Directorate of Science and Technology (DS&T).

Program C consisted of the U.S. Navy satellite reconnaissance program. Its members were assigned to the Technical Operations Group made up of representatives from the Naval Research Laboratory, PME-106, SPAWAR, the U.S. Navy Electronics Command, and the Naval Security Group—all located in Washington, D.C., and nearby Maryland. Program C developed the Galactic Radiation and Background (Grab) and Poppy signals intelligence satellites in the late 1950s and early 1960s. Grab produced the first successful launch of an American reconnaissance satellite in June 1960. As was true for Program A, the U.S. Naval officers who directed Program C were often commanders of staff or flag rank who counted years of service in their chosen fields. Many were highly decorated combat veterans of the Second World War, the Korean Conflict, or the War in Southeast Asia prior to service at the National Reconnaissance Office.

Program D, briefly known as "aircraft projects" when created in July 1962, embraced the acquisition and support of aerial reconnaissance assets in the NRP, under the CIA reconnaissance program. Program D consisted of the nation's high-altitude "air-breathing" aerial reconnaissance aircraft developed in the 1950s and 1960s including the U-2, the A-12, and the SR-71. Program D Directors possessed extensive command and flight experience with reconnaissance and combat aircraft dating from the Second World War and Korean Conflict. Many had additional experience with the design, development, and operation of reconnaissance aircraft and photographic and intelligence-gathering equipment. Program D remained part of the National Reconnaissance Office until 1 October 1974. On that date, all aerial reconnaissance assets transferred from NRO control to the U.S. Air Force in order to fill an increasing demand for tactical intelligence that directly served the needs of the military, since at the time, satellites primarily served the strategic intelligence needs of the President and other national command authorities, not the military.

In the 1980s, changes in the nature of threats to the United States, and in the Intelligence Community, prompted the National Reconnaissance Office to conduct several studies to determine more cost-effective and efficient means to meet the nation's changing intelligence and national security needs. As the nation's premier overhead collector of signals and imaging intelligence data, the NRO served many customers whose needs varied. Of particular concern were the physically separated alphabetic programs and the decentralized organization of the National Reconnaissance Office. This produced rivalries and, at times, expensive duplication of effort that adversely affected communication and cooperation, and left important customer needs unmet.

One of the first internal reorganizations to result from these initiatives was the formation at NRO headquarters of the Office of Plans and Analysis (P&A) in February 1990. P&A served as a "broker" in competitive disputes between the NRO alphabetic programs while also performing a range of central planning and analytic services for the entire organization, setting common goals and a common vision. Realizing that meeting customer needs required customer input, P&A also provided a window on the National Reconnaissance Office to facilitate customer participation and planning for the use of current satellite systems and capabilities as well as to solicit customer participation in the design and acquisition of future satellite constellations.

Since the end of the Cold War and the collapse of the Soviet Union in 1991, the National Reconnaissance Office has implemented some of the most extensive series of internal reorganizations in its history—again based on recommendations made by several study panels of the late 1980s. On 18 September 1992, the "fact of" the existence of the National Reconnaissance Office, its mission, and its top leadership were publicly identified for the first time in an official Department of Defense press release. On 31 December 1992, the NRO underwent a major realignment, abolishing its "alphabetic" programs in favor of three functional directorates: the Signals Intelligence (SIGINT) Systems Acquisition and Operations Directorate to acquire and operate satellites to collect electronic communications and telemetry; the Imagery Intelligence (IMINT) Systems Acquisition and Operations Directorate to acquire and operate imagery satellites; and the Communications (COMM) Systems Acquisition and Operations Directorate to direct NRO's communication systems. The realignment of directorates ended the duplication of effort that occurred in the old alphabetic programs; it pooled common resources and funding, and brought together members of the older, separate, institutional programs where they now worked side-by-side without regard to prior military or institutional affiliation. Now, instead of developing multiple systems with similar functions to meet the needs of multiple customers, single functional systems would meet the needs of all customers. Volume II in this series, dealing with the years 1992 to 2001, contains a more detailed discussion of NRO functional directorates.

In the early- and mid-1990s, seeking to meet post-Cold War threats and the needs of a growing customer base, the NRO created several new offices to provide policy guidance, liaison, and closer, more timely intelligence support for both the upper levels of the Federal Government and, especially, the military services. These new offices were the Office of the Deputy Director for National Support, the Office of the Deputy Director for Military Support (DDMS), and the Office of Resource Oversight and Management. With the exception of the Deputy Director for Military Support, these Deputy Directors took their positions after 1992; they are included in Volume II of this publication.

Established to improve the ability of the NRO to meet the needs of the military, the NRO established the Office of the Deputy Director for Military Support in August 1990 to work closely with the Office of the Secretary of Defense, the Joint Chiefs of Staff, and the intelligence components of the military services. The DDMS helped formulate policies and develop contacts that facilitated the provision of NRO-gathered intelligence to top commanders and decision makers at the staff and headquarters levels, to support their military planning and readiness, and provide intelligence to the warfighter in either combat or peace-keeping roles. The DDMS served as the Joint Staff/J-35 and as the focal point for NRO operational readiness for the J-3. The DDMS grew in significance with the post-Cold War downsizing of the military services and the 1991 Gulf War. Both events emphasized the increased importance of tactical intelligence in an era when military forces were likely to become smaller but, nonetheless would still have to react

rapidly and decisively in times of crisis or war. Since the early 1990s, the Office of the Deputy Director of Military Support has responded to an ever-growing demand for information gathered by NRO satellite constellations in near real-time.

During the past 25 years, the NRO has made an increased effort to declassify its history, beginning with the declassification of the existence of the organization in 1992. This was followed by the declassification of most information associated with the Corona photoreconnaissance satellite and declassification of elements of the Grab and Poppy signals collection satellite programs. Most recently, we have declassified the Quill radar imagery experimental program as well as the Gambit and Hexagon photoreconnaissance satellite programs. Leadership at the NRO was one fundamentally important ingredient in the successful formula that allowed these programs to flourish.

In the 21st century, satellite reconnaissance systems will continue to become an increasingly significant element of national power. No other nation has managed to duplicate the sophisticated American capability to see, hear, and detect activities around the globe. As the National Reconnaissance Office advances through the 21st century, it will continue to perform its mission of ensuring U.S. global information supremacy by providing unique, innovative technology, large-scale systems engineering, and space reconnaissance systems that are second to none.

Revised by
James D. Outzen, Ph.D.
Director, Center for the Study of National Reconnaissance
National Reconnaissance Office

PRINCIPAL NRO LEADERS BY OFFICE AND TERM OF SERVICE

DIRECTORS OF THE NATIONAL RECONNAISSANCE OFFICE		
Dr. Joseph V. Charyk	6 September 1961-28 February 1963	19
Dr. Richard M. Bissell, Jr. (Co-Director)	6 September 1961-28 February 1962	11
Dr. Brockway McMillan	1 March 1963-1 October 1965	83
Dr. Alexander H. Flax	1 October 1965-17 March 1969	35
Dr. John L. McLucas	17 March 1969-20 December 1973	81
Mr. James W. Plummer	21 December 1973-28 June 1976	91
Dr. Charles W. Cook (Acting)	28 June 1976-8 August 1976	21
Mr. Thomas C. Reed	9 August 1976-7 April 1977	95
Dr. Charles W. Cook (Acting)	7 April 1977-3 August 1977	21
Dr. Hans M. Mark	3 August 1977-8 October 1979	75
Dr. Robert J. Hermann	8 October 1979-2 August 1981	55
Mr. Edward C. Aldridge, Jr.	3 August 1981-16 December 1988	1
Mr. Jimmie D. Hill (Acting)	17 December 1988-27 September 1989	57
Mr. Martin C. Faga	28 September 1989-5 March 1993	33
DEPUTY DIRECTORS OF THE NATIONAL RECONNAISSANCE OFFICE		
Mr. Eugene P. Kiefer	2 July 1963-18 February 1965	63
Dr. James Q. Reber	1 September 1965-30 June 1969	93
Dr. F. Robert Naka	1 July 1969-31 August 1972	87
Mr. Robert D. Singel	18 September 1972-15 July 1974	105
Dr. Charles W. Cook	16 July 1974-30 November 1979	21
Mr. Donald L. Haas	9 December 1979-11 April 1982	47
Mr. Jimmie D. Hill	11 April 1982-26 February 1996	57
DEPUTY DIRECTOR FOR MILITARY SUPPORT		
Rear Adm. Dennis M. Brooks, USN	31 August 1990-1 January 1992	15
PLANS AND ANALYSIS		
Brig. Gen. Donald R. Walker, USAF	January 1990-30 December 1992	119
Mr. Boyd D. Sutton	1 October 1992-5 June 1994	113

DIRECTORS, OFFICE OF SPACE SYSTEMS, SECRETARY OF THE AIR FORCE (SAF/SS) (NRO STAFF DIRECTORS)		
Brig. Gen. Richard D. Curtin, USAF	31 August 1960-14 June 1962	25
Brig. Gen. John L. Martin, Jr., USAF	14 June 1962-2 August 1964	79
Brig. Gen. James T. Stewart, USAF	3 August 1964-1 February 1967	111
Brig. Gen. Russell A. Berg, USAF	1 February 1967-19 June 1969	7
Brig. Gen. Lew Allen, Jr., USAF	20 June 1969-20 August 1970	3
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Brig. Gen. David D. Bradburn, USAF	1 June 1971-7 January 1973	13
Maj. Gen. John E. Kulpa, Jr., USAF	8 January 1973-30 September 1974	67
Col. Harold P. Wheeler, USAF	1 October 1974-18 March 1976	121
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MR. EDWARD C. ALDRIDGE, JR.

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

3 AUGUST 1981-16 DECEMBER 1988

Born in Houston, Texas on 18 August 1938, Edward Cleveland “Pete” Aldridge, Jr., earned a Bachelor of Science in Aeronautical Engineering at Texas A&M University in 1960 and a Master of Science in Aeronautical Engineering at the Georgia Institute of Technology two years later.

The Douglas Aircraft Corporation in St. Louis, Missouri initially employed Aldridge as their manager of the Missile and Space Division, a post he held from 1962 until 1967. In the latter year, he began a four-year appointment as director of the Strategic Defense Division of the Department of Defense, leaving that post in 1972 to return for two years to private industry as manager of Advanced Systems Concepts at the Ling-Temco-Vought (LTV) Aerospace Corporation in Dallas, Texas. Between 1973 and 1974, he served as a senior management associate with the Office of Management and Budget, Executive Office of the President. Aldridge returned to the defense establishment in 1974 as deputy assistant secretary of defense for strategic programs. In 1976, he became director of planning and evaluation in the Office of the Secretary of Defense.

Once again returning to private industry in 1977, Aldridge served four years as vice president of the National Policy and Strategic Systems Group, System Planning Corporation. In 1981, he became under secretary of the Air Force and, concurrently, director of the National Reconnaissance Office. He served as Director NRO between 3 August 1981 and 16 December 1988. During this time he commissioned and led the first major examination of the National Reconnaissance Office—the Geiger-Kelly Study—which recommended consolidation and collocation of various office elements and the combining and functional realignment of the NRO’s separate institutional programs. Aldridge subsequently served as secretary of the Air Force between 1986 and 1988, while retaining his position as director of the National Reconnaissance Office. In addition to his primary assignments, he also has served as an advisor to the U.S. delegation at the Helsinki and Vienna sessions of the Strategic Arms Limitations Talks between the United States and the Union of Soviet Socialist Republics (U.S.S.R.).

Aldridge has received numerous awards for his public service and accomplishments. These include the Department of Defense Meritorious and Distinguished Civilian Service Medals, the Distinguished Public Service Award (with similar distinctions awarded by the U.S. Army and U.S. Navy), the Air Force Exceptional Civilian Service Award, the National Intelligence Distinguished Service Award, and the George M. Low Space Transportation Award from the American Institute of Aeronautics and Astronautics. He is past president and a fellow of the American Institute of Aeronautics and Astronautics.

BRIGADIER GENERAL
LEW ALLEN, JR., USAF

NRO STAFF DIRECTOR
20 JUNE 1969-20 AUGUST 1970
DIRECTOR OF PROGRAM A
1 APRIL 1971-21 JANUARY 1973

Lew Allen, Jr., was born in Miami, Florida on 30 September 1925. He entered the U.S. Military Academy in 1943 and earned a Bachelor of Science degree with the class of 1946. After completing flight training in November 1946, Allen joined the Strategic Air Command's (SAC's) 7th Bombardment Group at Carswell Air Force Base, Texas, where he flew B-29 and B-36 bombers. He also served in several positions dealing with nuclear weaponry. In September 1950, he entered the University of Illinois where, in 1952, he received a Master of Science in Nuclear Physics, followed by a Doctorate of Philosophy in Physics in 1954. Allen then served as a physicist in the Test Division at the Atomic Energy Commission's Los Alamos Scientific Laboratory in New Mexico, where he participated in experiments at several of the nation's nuclear test sites. These experiments involved the physics of thermonuclear weapons design and the effects of high-altitude nuclear detonations for ballistic missile defense.

From June 1957 to December 1961, Allen was assigned to Kirtland Air Force Base, New Mexico as scientific advisor in the Physics Division of the Air Force Special Weapons Center. There, he specialized in the military effects of high-altitude nuclear explosions and participated in several weapon test series. In December 1961, he began a four-year assignment with the Office of the Secretary of Defense, Space Technology Office, in the Directorate of Research and Engineering, Washington, D.C.

Between June 1965 and February 1973, Allen worked in the Office of the Secretary of the Air Force, initially in El Segundo, California as deputy director for advanced plans, Office of Special Projects (SAF/SP, National Reconnaissance Office Program A). He moved to the Pentagon in June 1968, where he served as deputy director of the NRO headquarters staff, and after 20 June 1969 until 20 August 1970, as the NRO staff director. Promoted to brigadier general in 1969, he returned to El Segundo in September 1970 as assistant to the director, Office of Special Projects, and in April 1971 became director of that office while concurrently serving as deputy commander for satellite programs, Air Force Space and Missile Systems Organization.

Brigadier General Allen served as director of NRO Program A between 1 April 1971 and 31 January 1973. The United States and the U.S.S.R. negotiated one of the first Cold War nuclear arms control treaties during this time, and Allen managed many of the overhead assets that monitored Soviet treaty compliance.

Allen's military decorations and awards include the Defense Distinguished Service Medal with two oak leaf clusters, the Air Force Distinguished Service Medal with one oak leaf cluster, the Legion of Merit with two oak leaf clusters, the Joint Service Commendation Medal, the National Intelligence Distinguished Service Medal, and the NASA Distinguished Service Medal. He died on 4 January 2010.

COLONEL BERNARD L. BAILEY, USAF

DIRECTOR OF PROGRAM D

21 JULY 1972-1 OCTOBER 1974

Bernard Lee “Buzz” Bailey was born on 17 June 1922 in Orland, California. He attended Redlands University in California in 1941, but left university studies after the Japanese attack on Pearl Harbor, Hawaii Territory, in December of that year, and he joined the U.S. Army Air Corps in January 1942. Receiving his pilot’s wings in March 1943, Bailey underwent an additional six months training in C-46, C-47 Dakota, and other similar military transport aircraft in Illinois, California, and Montana. In September 1943, the military assigned him to the China-Burma-India Theater, where he flew combat missions over the Himalayas, or the “hump,” from India to China. He also transported passengers and cargo elsewhere throughout the theater, amassing over 1,000 hours of flight time. In January 1945, he reported to the Air Corps Ferry Command at Long Beach, California, where he delivered P-38 Lightning fighter aircraft to various locations in the United States while also qualifying to fly B-17 Flying Fortresses and B-25 Mitchell bombers. He then moved to Stockton Army Air Field, California, where he flew with the Military Air Transport Service until December 1946, when he left the military to take a position with United Airlines.

After the Air Force became a separate service in 1947, Bailey was recalled to active duty in January 1948, and assigned to the Air Training Command at Barksdale Air Force Base, Louisiana, where he served as chief of the Synthetic Training Department and as an instrument flight examiner. In 1949, he transferred to the 3500th Pilot Training Wing at Lubbock Air Force Base, Texas, where he served as an instructor pilot in the B-25 and T-28. In February 1953, Bailey went overseas to the Northeast Air Command, Thule Air Base, Greenland, where he assumed duties as operations officer and commander of the 55th Air Rescue Squadron. Returning to the United States in early 1954, he went to Norton Air Force Base, California, as an analyst in the Directorate of Air Force Flying Safety, and he later served as a staff officer in the Office of the Assistant for Programs and Analysis, Deputy Inspector General, U.S. Air Force headquarters. In June 1958, he transferred to the 552nd Airborne Early Warning and Control Wing, McClellan Air Force Base, California, where he served as flight commander and aircraft commander in RC-121D aircraft. Then in April 1959, he became chief of the Allocations Branch at Western Air Defense Force headquarters at Hamilton Air Force Base, California.

In March 1961, Bailey began service at the 1040th Air Force Special Activities Squadron at Wiesbaden, Federal Republic of Germany. In 1964, Colonel Bailey returned to the United States and served for two years as chief of the Current Intelligence and Indications Center, U.S. Strike Command, MacDill Air Force Base, Florida. Following this tour, he served at U.S. Air Force Headquarters in Washington, D.C., as a staff officer in the Special Activities Division, Deputy Chief of Staff for Research and Development, Reconnaissance and Electronic Warfare office.

From May 1970 until May 1971, during the Vietnam War, Bailey served with the Pacific Air Force headquarters at Hickam Air Force Base, Hawaii. His duties included serving as chief of the Contingency Target Division, where he assisted the director of targets with data and strike recommendations for the staff and tactical units for current operations, contingency plans, and general war. In May 1971, Bailey became deputy and then chief of Special Projects, Office of the Secretary of the Air Force. Between 21 July 1972 and 1 October 1974, he served as director of aerial reconnaissance, National Reconnaissance Office Program D. During his tenure, Bailey successfully managed the U-2 and SR-71 programs and directed the acquisition of critical reconnaissance subsystems. In October 1974, the leadership of the National Reconnaissance Office and the Central Intelligence Agency assigned Program D to the United States Air Force. Bailey, the last director of NRO Program D, retired in late 1974 following 32 years of military service.

A command pilot with over 8,000 flying hours, Colonel Bailey’s decorations include the Legion of Merit with one oak leaf cluster, the Air Medal, the Joint Service Commendation Medal, the Distinguished Unit Citation, the Air Force Longevity Award, and eight other campaign and service medals. He died on 10 August 2014.

BRIGADIER GENERAL
RUSSELL A. BERG, USAF

NRO STAFF DIRECTOR

1 FEBRUARY 1967-19 JUNE 1969

Russell Allen Berg was born in Chicago, Illinois on 6 January 1917. He graduated from Grinnell College in Grinnell, Iowa with a Bachelor of Arts in Journalism in June 1940. In September 1940, he entered U.S. Army Air Corps flight training at Maxwell Field in Montgomery, Alabama, and upon completion received a commission as a second lieutenant in April 1941.

During World War II, his principal duties were those of a tactical photoreconnaissance pilot, flight commander, operations officer, and squadron and group commander, flying in the European Theater of Operations with the 12th Tactical Reconnaissance Squadron and 10th Photoreconnaissance Group from July 1942 until October 1945. For a period of five months, in 1943, he flew with the Royal Air Force 610th Fighter Squadron and completed combat missions in Spitfire and P-51 Mustang aircraft.

Berg returned to the United States in October 1945 for a series of assignments, first as a Tactical Reconnaissance Group commander, then as a senior air instructor with the Wisconsin Air National Guard, and then for duty with Tactical Air Command headquarters at Langley Air Force Base in Virginia. In 1952, during the Korean War, Berg served in East Asia, where he commanded the 67th Tactical Reconnaissance Wing attached to the Far Eastern Air Force, flying combat reconnaissance missions in jet aircraft over Korea. He returned to the United States in August 1953 for duty at U.S. Air Force headquarters, where he served as chief of the Reconnaissance Division in the Directorate of Operations, later serving as the Air Force project officer on Project Aquatone, the joint CIA and Air Force program then developing the U-2 high-altitude reconnaissance aircraft. He attended the National War College in 1956 and 1957, before becoming chief of the Reconnaissance Division of the Allied Air Forces in Central Europe, part of the North Atlantic Treaty Organization.

In August 1960, Berg returned to the United States and was assigned as chief of staff of the Ballistic Missile Division located at Los Angeles Air Force Station in El Segundo, California, before serving as vice commander of the Satellite System Division. Two years later, he became deputy director of the Air Force Special Projects Office in Los Angeles, California. In September 1965, Berg began work on various classified projects under Gen. Bernard A. Schriever before taking the position, on 1 February 1967, of director of the Office of Space Systems, Office of the Secretary of the Air Force at the Pentagon in Washington, D.C., serving as staff director of the National Reconnaissance Office. He died on 24 January 2002.

Among Brigadier General Berg's many military decorations and awards are the Distinguished Service Medal, the Legion of Merit with oak leaf cluster, the Distinguished Flying Cross, the Air Medal with eight oak leaf clusters, the Bronze Star Medal, the Army Commendation Medal, and the Air Force Outstanding Unit Award Ribbon. He further received the Distinguished Flying Cross with bar from Great Britain, the French Croix de Guerre with palm, the Belgium Croix de Guerre with palm, and the Republic of South Korea Presidential Unit Citation.

REAR ADMIRAL
THOMAS C. BETTERTON, USN

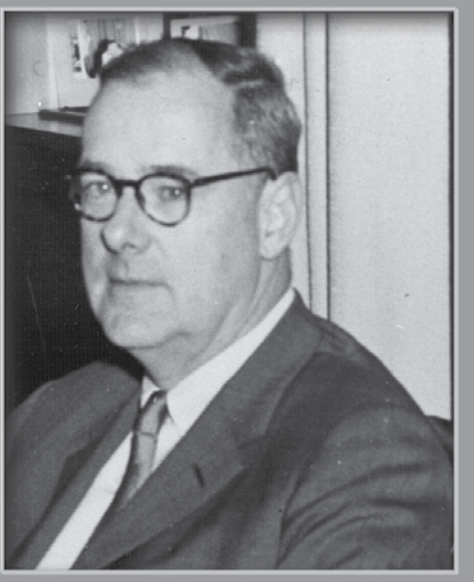
DIRECTOR OF PROGRAM C

20 MARCH 1985-31 JANUARY 1992

Thomas Cherrill Betterton was born in Berkeley, California on 6 March 1936. He graduated from the University of Notre Dame in 1957 with a Bachelor of Science in Electrical Engineering and, following flight training in 1958, served four and one half years in Patrol Squadron 21. Betterton subsequently attended the Naval Postgraduate School, Monterey, California for two years, and was accepted for a third year of study at the Massachusetts Institute of Technology, graduating with a Master of Science and Engineering degree in Aeronautics and Astronautics. His subsequent tours included time at the Naval Air Rework Facility in Norfolk, Virginia, where he served as Engineering and Quality Assurance Department head, the Naval Safety Center, and three years as project director in Air Test and Evaluation Squadron 1.

Betterton reported to the U.S. Navy Space Program in 1975 and served as chief of the space segment for two years. His next assignment was at the Bureau of Naval Personnel, where he served as aeronautical engineering duty officer. In 1978, Betterton returned to the Navy Space Program, where he served until 1985 as manager of the Navy Special Systems Program. Promoted to rear admiral, in November 1985 he became assistant commander for space technology, Space and Naval Warfare Systems Command. It was during this time that he also served as director of the Navy's National Reconnaissance Office Program C, between March 1985 and January 1992. His efforts led to the definition, acquisition, and operation of several space-based sensor systems responsive to U.S. Navy and Department of Defense needs.

Rear Admiral Betterton continued to participate in astronautical activities well into retirement. He supported the National Aeronautics and Space Administration as a member of several review teams and boards and, in August 1994, became visiting professor of space technology at the Naval Postgraduate School. Among his many military awards and decorations, Rear Admiral Betterton earned the Legion of Merit, the Distinguished Service Medal, the National Intelligence Distinguished Service Medal, the Meritorious Service Medal with one gold star, the Navy Unit Commendation, and the Meritorious Unit Commendation.



DR. RICHARD M. BISSELL, JR.

CO-DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
6 SEPTEMBER 1961-28 FEBRUARY 1962

Richard Mervin Bissell, Jr., was born in Hartford, Connecticut on 18 September 1909. He attended Yale University, where he received a Bachelor of Arts degree and Doctorate of Philosophy in Economics in 1932 and 1939, respectively. During World War II he worked as an economist for the Department of Commerce, the Shipping Adjustment Board, and the War Shipping Board before becoming economic advisor to James F. Byrnes, director of War Mobilization and Reconversion between 1945 and 1946. Returning to academia as a professor of economics at the Massachusetts Institute of Technology between 1946 and 1952, Bissell helped administer American aid programs to Europe. In particular, along with Paul H. Nitze, Bissell helped develop the European Recovery Act, or Marshall Plan, in 1947, and assisted with that program's administration during the following years as senior executive of the Economic Cooperation Administration and its successor organization, the Mutual Security Agency.

After two years with the Ford Foundation, the Central Intelligence Agency hired Bissell on 1 February 1954 as a special assistant to the director, Allen W. Dulles. That summer Bissell played a key role in the overthrow of the leftist government of Gen. Jacobo Arbenz Guzman of Guatemala, serving as Dulles' eyes and ears during this covert operation. His major assignments beginning in late 1954 through the early 1960s, and the Central Intelligence Agency programs for which he was best known, were Aquatone (development and deployment of the first U-2 reconnaissance aircraft) and the Corona imagery satellite that eventually became part of the National Reconnaissance Program administered by the National Reconnaissance Office. Under Bissell's direction, the U-2 moved rapidly from conception to flight, with Lockheed Corporation's Clarence "Kelly" Johnson as designer, working in a secret Lockheed facility known as the "Skunk Works"; the first prototype U-2 aircraft flew in August 1955, nine months after project initiation.

Bissell became the Central Intelligence Agency's deputy director (plans) in January 1959. Shortly after disclosure of the Agency's involvement in the failed April 1961 Bay of Pigs invasion of Cuba, Bissell became a co-director of the National Reconnaissance Office. Remaining in this position until his resignation from the Central Intelligence Agency on 28 February 1962, Bissell and his counterpart, NRO co-director Joseph V. Charyk, streamlined acquisition practices for aerial and satellite reconnaissance programs and developed a strategy for peacetime reconnaissance of denied areas. Bissell also guided the first U.S. imagery satellite, Corona, into full operation and introduced the compartmented security systems needed to protect these reconnaissance assets. He died on 7 February 1994.

MAJOR GENERAL
DAVID D. BRADBURN, USAF

NRO STAFF DIRECTOR
1 JUNE 1971-7 JANUARY 1973
DIRECTOR OF PROGRAM A
22 JANUARY 1973-31 JULY 1975

David Denison Bradburn was born in Hollywood, California on 27 May 1925. He earned a Bachelor of Science degree at the U.S. Military Academy, graduating with the class of 1946. After completing flight training, he served in the 47th Bombardment Group (Light), Tactical Air Command, where he remained until April 1948. In May of that year, the military sent him to Japan, where he served as a fighter intercept controller with the 610th Aircraft Control and Warning Squadron. Bradburn then joined the 3d Bombardment Group (Light) at Yokota and later Iwakuni Air Bases in Japan, where, during the Korean War, he flew 50 combat missions in B-26 Marauder medium bombers as a flight commander on daylight bombing, close air support, and night-intruder missions.

After completing his combat service in April 1951, he completed a Master of Science in Engineering at Purdue University. Then in December 1952, Bradburn served as a research and development staff officer at the headquarters of the Air Research and Development Command in Baltimore, Maryland, where he worked on aerial photoreconnaissance equipment and ground radar, the latter effort being the precursor of the ballistic missile early warning radar system.

In May 1957, Bradburn joined the WS-117L (later named SAMOS) Reconnaissance Satellite Program Office at the Western Development Division, Air Research and Development Command, Los Angeles, California, as a program control officer. Three years later, in December 1960, he was assigned to the SAMOS Project Office (the later Special Projects Office), Office of the Secretary of the Air Force, in Los Angeles, as plans and policy officer and later served as director of several research projects, the last of which was completed in June 1965.

In August 1966, after attending the Air War College and earning a Master of Science in International Affairs from The George Washington University in Washington, D.C., Bradburn became deputy director of the Special Projects Office in El Segundo, California, where he remained until April 1971 managing National Reconnaissance Office space programs. Promoted to brigadier general, Bradburn took the position of staff director of the National Reconnaissance Office, serving from 1 June 1971 until 7 January 1973.

Bradburn returned to the West Coast as director of the Special Projects Office (National Reconnaissance Office Program A) between 22 January 1973 and 31 July 1975, while also serving as deputy commander for satellite programs of the Air Force Space and Missile Systems Organization. He was promoted to major general in 1974. During his service with the National Reconnaissance Office, Major General Bradburn closely supervised ongoing research, helped integrate operations of the NRO and the National Security Agency (NSA), and introduced significant improvements in overhead signals collection.

His military citations and decorations include two awards of the Distinguished Service Medal, the Legion of Merit with two oak leaf clusters, the Distinguished Flying Cross, the Meritorious Service Medal, the Air Medal with three oak leaf clusters, and the Distinguished Unit Citation Medal. He died on 18 October 2008.

REAR ADMIRAL
DENNIS M. BROOKS, USN

DIRECTOR OF PROGRAM C
4 OCTOBER 1982-19 MARCH 1985
DEPUTY DIRECTOR FOR MILITARY SUPPORT
31 AUGUST 1990-1 JANUARY 1992

Dennis Matthew Brooks was born in Fairfield, Alabama on 23 November 1934. He entered the U.S. Naval Academy in June 1953 and completed a bachelor's degree, graduating with the class of 1957. After completing flight training in February 1959, he began 20 years of service with U.S. Navy air units, including Fighter Squadrons 32, 101, 103, and 174. During this time, he also completed a Bachelor of Science in Aeronautical Engineering at the Naval Postgraduate School in 1965, and seven years later graduated from the Armed Forces Staff College. He also served as a production test pilot for the F-4 Phantom and as an instructor with the Division of Engineering and Weapons at the U.S. Naval Academy. Returning to command of flying squadrons in September 1973, Brooks served with squadrons 51 and 121 until March 1977. In addition, he had ship commands during the late 1970s and early 1980s, serving as commanding officer of the USS *Kansas City* between January 1979 and June 1980, and as the commanding officer of the aircraft carrier USS *Constellation* between April 1981 and September 1982.

Following these duties, now-Rear Admiral Brooks was assigned as director of National Reconnaissance Office Program C and, concurrently, as director of the Navy Space Project, Naval Electronic Systems Command, between 4 October 1982 and 19 March 1985. During his tenure as Program C director, Brooks' aeronautical expertise was invaluable in the direction and management of surveillance, intelligence, and environmental sensing systems.

On leaving the National Reconnaissance Office, Brooks first commanded Carrier Group Seven between July 1985 and July 1986, then Carrier Group Five, Carrier Strike Force, Seventh Fleet, from July 1986 until July 1988, while also serving part of that time as commander of Joint Task Force Middle East. After these sea commands, he became director of warfare systems architecture and engineering, Space and Naval Warfare Systems Command, before becoming deputy director for operations, National Systems Support, Joint Staff, and the first deputy director of the newly established NRO Office of the Deputy Director for Military Support on 31 August 1990. Brooks retired from active military service on 1 January 1992.

Rear Admiral Brooks has been awarded the Defense Superior Service Award, the Defense Distinguished Service Medal, the Legion of Merit with three gold stars, the Joint Meritorious Unit Award, a Meritorious Unit Commendation, the U.S. Navy "E" Ribbon, and the Navy Expeditionary Medal (Cuba) with one bronze star.

MR. JULIAN CABALLERO, JR.

DIRECTOR OF PROGRAM B

28 AUGUST 1989-31 DECEMBER 1992

DIRECTOR OF IMINT SYSTEMS, ACQUISITIONS, AND OPERATIONS DIRECTORATE

1 JANUARY 1993-3 OCTOBER 1993

Julian Caballero, Jr. was born on 15 September 1930 in Harlingen, Texas. Following his high school graduation in 1948, he worked for two years as a radio technician in Texas. He entered the U.S. Army in January 1951 and served in the Federal Republic of Germany as a non-commissioned officer, radio operator, and technician until December 1952. Melpar Incorporated, a Virginia-based electronic research and development firm, employed Caballero the next year as a project engineer and technical assistant to the aerospace program manager. During his time with Melpar between 1953 and 1965, he worked in a series of research and development, engineering, and supervisory positions while engaged in the study and development of electronic reconnaissance and countermeasure systems. He was manager of the electronic warfare laboratories at Melpar when he resigned to join the Central Intelligence Agency in March 1965. His initial assignment with the CIA was as a signals intelligence officer with the Office of Special Projects (the later Office of Development and Engineering).

Caballero left the agency in 1967 to serve as vice president of Applied Systems Tech Incorporated, in Vienna, Virginia, but rejoined the CIA in April 1968 as chief of the Systems Requirements Division. A self-educated expert in electronic and signals intelligence systems, Caballero became director of the Special Program Group in November 1978. He served as deputy director and then director of the Office of Development and Engineering, Directorate of Science and Technology, from 8 March 1982 to 3 October 1993.

Caballero served as director of the National Reconnaissance Office Program B between 28 August 1989 and 31 December 1992, the last agency member to hold that post before it was abolished in favor of the functional directorates. The day following abolition of the old Program B, on 1 January 1993, Caballero became the first director of the Imagery Intelligence Systems Acquisition and Operations Directorate at the National Reconnaissance Office and remained in that position until 3 October 1993. While at the NRO, he directed the development and operation of new imagery and signals intelligence technical collection systems and assisted in establishing a responsive and flexible imagery system that served the needs of several U.S. intelligence agencies.

During nearly 30 years of government service, Mr. Caballero received the Distinguished Intelligence Medal, the Intelligence Medal of Merit, two CIA Meritorious Unit Citations, the Department of Defense Distinguished Civilian Service Medal, the NASA Distinguished Service Medal, and the National Security Agency Distinguished Service Medal. He died on 5 August 2011.

DR. JOSEPH V. CHARYK

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
6 SEPTEMBER 1961-28 FEBRUARY 1963

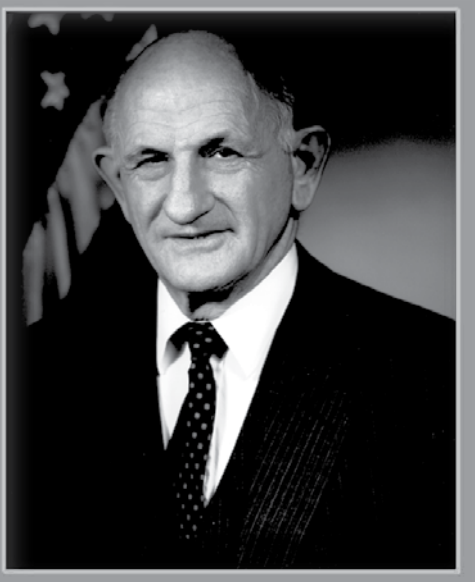
Joseph Vincent Charyk was born in Canmore, Alberta, Canada on 9 September 1920. He earned a Bachelor of Science in Engineering and Physics at the University of Alberta in 1942 and a Master of Science degree at the California Institute of Technology the following year. Continuing his studies at Caltech, he completed a Doctorate of Science in Aeronautics, magna cum laude, in 1946 with minors in physics and mathematics. He also holds an honorary Doctorate of Law from the University of Alberta and an honorary Doctorate of Engineering from the University of Bologna. He became a naturalized American citizen in 1948.

In 1945 and 1946, Charyk served as a section chief at Caltech's Jet Propulsion Laboratory, and as an instructor in the Department of Aeronautics at Caltech. In the fall of 1946, he accepted the position of assistant professor in the Engineering School at Princeton University and rose to the rank of associate professor. While at Princeton, he helped establish the Guggenheim Jet Propulsion Center at that institution. He left Princeton in 1955 to join the Missile Systems Division of the Lockheed Aircraft Corporation as director of the Aerophysics and Chemistry Laboratory. In 1956, he joined Aeronutronic Systems, Incorporated, a subsidiary of the Ford Motor Company, as director of the Missile Technology Laboratory and later became general manager of the Space Technology Division there, a post he held until 1959. In the late 1950s, Charyk served as a consultant and member of the Air Force Scientific Advisory Board and as a member and technical advisor to the Defense Department Aeronautics Panel.

In 1959, Charyk left Ford Motor Company to assume the post of chief scientist of the Air Force. Six months later, he became assistant secretary of the Air Force for research and development and six months after that became under secretary of the Air Force. In this position, he was actively involved in the form-a-tive processes and organizational arrangements that ultimately led to formal creation of the National Reconnaissance Office. Under Secretary of the Air Force Charyk served as the first co-director of the newly formed NRO between 6 September 1961 and February 1962. Thereafter, until 28 February 1963, he was the sole NRO director. During the earlier period, from 1960 until early 1962, Charyk worked closely with co-director Richard M. Bissell, Jr. of the Central Intelligence Agency to bring together the appropriate existing programs of the CIA, U.S. Air Force, U.S. Navy, and U.S. Army to form the nucleus of a comprehensive reconnaissance organization. Later, as sole NRO director, Charyk authorized the polar-orbiting Defense Meteorological Satellite Program and the Gambit imagery satellite program that followed Project Corona, as well as other satellite projects involving the collection of signals intelligence from space. During his tenure, the National Reconnaissance Office operated the U-2 reconnaissance aircraft and, after 1962, managed development of the CIA's successor program, the supersonic A-12 and a variant that became the Air Force SR-71. Dr. Charyk died on 28 September 2016.

For his significant contributions to space communications and national defense, Joseph V. Charyk received a number of notable awards. These include the National Medal of Technology, the Department of Defense Distinguished Service Medal, the Guglielmo Marconi International Award, the Distinguished Aviation Aerospace Service Award, the National Medal of Technology, the Theodore von Karman Award in aeronautics, the Robert H. Goddard Astronautics Award, the Computer and Communication Foundation Award, the Emmy award of the Academy of Television Arts and Sciences, the Arthur C. Clarke Award in communications, and Distinguished Alumni Awards of the University of Alberta and the California Institute of Technology.

Joseph Charyk was a fellow of the American Institute for Aeronautics and Astronautics, a fellow of the Institute of Electrical and Electronics Engineers, and a member of the National Academy of Engineering. He also served on numerous bank and corporate boards, as well as on the boards of the Abbott and Charles Stark Draper Laboratories.



DR. CHARLES W. COOK

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

16 JULY 1974-30 NOVEMBER 1979

Charles William Cook was born on 27 September 1927 in Yankton, South Dakota. Serving in the U.S. Army Air Force as a cryptographic technician starting in October 1944, he left the service in August 1947 to seek a higher education. He subsequently graduated summa cum laude in 1951 with a Bachelor of Arts in Mathematics and Physics from the University of South Dakota. In 1952, he completed a degree in reactor physics at the Oak Ridge School of Technology at Oak Ridge, Tennessee, before earning a Master of Science in Physics and a Doctorate of Science in Physics from the California Institute of Technology in 1954 and 1957, respectively.

Dr. Cook first worked for CA Research and Development Corporation as a theoretical physicist before joining North American Aviation in 1954. Between 1957 and 1960, Cook served as the head of nuclear physics at Convair Corporation in San Diego, California, before serving for one year as chief of the Ballistic Missile Defense Branch, Advanced Research Project Agency in Washington, D.C. Concurrently, he was chief of research, ballistic missile defenses, for the Institute for Defense Analyses. Returning to private business in late 1961, Dr. Cook served as corporate director of electronics research and development for North American Aviation in El Segundo, California.

In September 1967, Cook joined the Central Intelligence Agency, where for four years he analyzed foreign missile defense and guided missile systems. In September 1971, he became deputy director of defense research and engineering (defense systems) at the Department of Defense before serving as deputy under secretary for space systems and as deputy director of the National Reconnaissance Office, where he remained from 16 July 1974 until 30 November 1979. During his NRO tenure, Cook worked with the National Aeronautics and Space Administration to assure cross-utilization of the many advances in state-of-the-art space technology. He also supervised the announcement revealing the first near real-time electro-optical imagery collection system. Ever an advocate of new capabilities, Cook impressed on Presidents Gerald R. Ford and Jimmy Carter, as well as key Congressional leaders, the value of advances in imagery capabilities.

Dr. Cook received multiple service awards and commendations, including the Defense Department Meritorious and Distinguished Service Awards, the Air Force Exceptional Civilian Service Award with three oak leaf clusters, the National Intelligence Medal of Achievement, the National Aeronautics and Space Administration Distinguished Service Medal, and the Distinguished Service Award from the National Reconnaissance Office. Cook is a fellow of the American Institute of Astronautics and Aeronautics, the American Physical Society, the National Space Club, Phi Beta Kappa, and Sigma Xi. He died on 28 March 2012.

BRIGADIER GENERAL
DONALD L. CROMER, USAF

NRO STAFF DIRECTOR

5 MAY 1982-11 JUNE 1984

Donald Lee Cromer was born in Grand Junction, Colorado on 23 January 1936. Raised in Idaho and Washington state, he attended Washington State University in Pullman between September 1954 and June 1955, and graduated with a Bachelor of Science in General Engineering from the U.S. Naval Academy with the class of 1959. On graduation, Cromer received a commission as an Air Force second lieutenant and was assigned to the Strategic Air Command and the 549th Strategic Missile Squadron (Atlas D) at Offutt Air Force Base in Omaha, Nebraska, as a guidance control officer and deputy missile combat crew commander. From January 1963 until August 1965, he served as an engineer analyst in the 4000th Aerospace Applications Group, also at Offutt Air Force Base. During this time, he completed Squadron Officer School.

Following duty with SAC, Cromer served at the Kennedy Space Center at Cape Canaveral, Florida, where he worked with the National Aeronautics and Space Administration on the Project Gemini Manned Spacecraft Program as a spacecraft test conductor. In December 1967, he returned to SAC headquarters, to the office of the director of plans in the Future Systems Division. He earned a Master of Science in Electrical Engineering from the University of Denver in 1969, and from December 1969 until August 1972 served as chief of the payload branch, Satellite Data Systems Program Office, at the Space and Missile Systems Organization at Los Angeles Air Force Station.

In June 1973, Cromer worked as program element monitor for the Satellite Data Systems and Defense Dissemination System Programs, Directorate of Space, Office of the Deputy Chief of Staff for Research and Development, U.S. Air Force headquarters in Washington, D.C. He then became a project director with the Office of the Secretary of the Air Force, stationed at Fort Belvoir, Virginia.

Returning to California, from May 1977 until June 1978 Cromer served as deputy for the Defense Meteorological Satellite System and as director of the Defense Meteorological Satellite Program Office with the Space Division at the Los Angeles Air Force Station. He later served as director of advanced technology for the Secretary of the Air Force Special Projects Office in Los Angeles. With his experience in Air Force space applications, he became director of space systems, Office of the Secretary of the Air Force in Washington, D.C. in May 1982, serving two years as staff director of the National Reconnaissance Office.

General Cromer wears the Master Missile and Master Space Badges and includes among his many military decorations and awards the Distinguished Service Medal, the Legion of Merit with oak leaf cluster, the Meritorious Service Medal with oak leaf cluster, and the Joint Service Commendation Medal. In 2001, he received recognition as an NRO National Reconnaissance Pioneer.

BRIGADIER GENERAL
RICHARD D. CURTIN, USAF

NRO STAFF DIRECTOR
31 AUGUST 1960-14 JUNE 1962

Richard Daniel Curtin was born in Taunton, Massachusetts on 2 April 1915. He attended Brown University for two years, majoring in civil engineering, before winning an appointment to the U.S. Military Academy in 1935. He earned a Bachelor of Science degree at the academy, graduating with the class of 1939. Entering the U.S. Army Air Corps, Curtin served with the Ninth Tactical Air Force headquarters during World War II, where he was instrumental in developing tactics used in attacking German targets heavily defended by antiaircraft artillery, and in selecting routes used by Allied airborne forces in Normandy in June 1944 and in the Rhine River assaults in March 1945.

Following his return to the United States, Curtin was one of the original faculty members of the Air University at Maxwell Air Force Base, Alabama in April 1946. Following two years at Maxwell, and after serving as a lecturer at the Air Command and Staff School and at the Air War College, he attended the University of Michigan, earning a Master of Science in Aeronautical Engineering in 1950. During the following four years, Curtin served in the War Plans Division of U.S. Air Force headquarters, where in conjunction with Col. (later General) Bernard A. Schriever's Research and Development Plans Division, he formulated the original concepts for the Matador, Falcon, Rascal, Snark, and Navajo guided missile systems. During this time, he frequently briefed U.S. Air Force Chief of Staff Gen. Nathan F. Twining and Chief of Staff Gen. Thomas D. White on the future value of missiles to the Air Force.

From 1954 until 1956, Curtin served as the director of plans, and then as the chief of staff of the Seventeenth Air Force in North Africa and Turkey. There he helped to build the base and logistical structure for the Strategic Air Command's operations that targeted the Soviet Union, and for intelligence radars monitoring Soviet missile and space activity. Returning to the United States in 1956, Curtin served as executive to the deputy commander of systems at Air Research and Development Command headquarters. In February 1958, he became a member of the Select Officer Group at the Air Force Ballistic Missile Division in Los Angeles, where he assumed the post of assistant deputy commander. Curtin became commander of the Air Force space effort, serving as deputy commander of the Ballistic Missile Division in September 1958. Curtin's group developed methods for operating space vehicles, ran worldwide space networks, and held responsibility for launching NASA's early space vehicles. From June until August 1960, Curtin served as deputy director of systems development, and as deputy chief of staff for development at Air Force headquarters.

From August 1960 until June 1962, Curtin served as director of Missile and Satellite Systems, Office of the Secretary of the Air Force. During this time, under the direction of Under Secretary of the Air Force Dr. Joseph V. Charyk, Curtin played a leading role in the founding of the National Reconnaissance Office, serving as its first staff director.

Among his many awards and decorations, Major General Curtin received the Legion of Merit, two Bronze Stars, and the Distinguished Service Citation. He died on 5 November 2010.

CAPTAIN ROBERT T. DARCY, USN

DIRECTOR OF PROGRAM C

24 JULY 1975-30 JUNE 1977

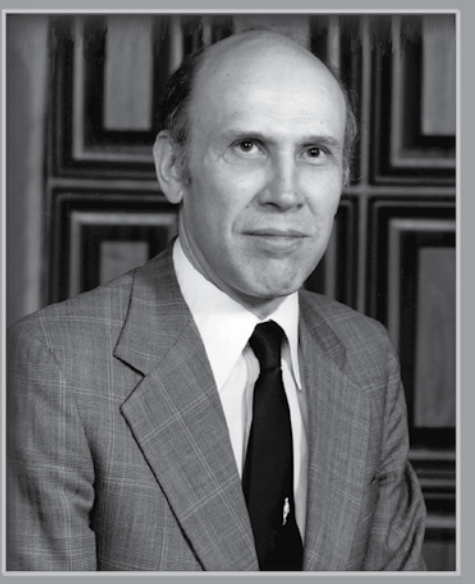
Robert Thomas Darcy was born in Woodside, New York on 20 November 1925. He entered the U.S. Navy in 1943 and, after completing flight training, received his commission in May 1947. His first duty assignment was in Air Transport Squadron 3 where he served until 1951, providing air support during the Berlin Airlift and during the Korean War. Between 1951 and 1953, he joined the Air Force Aviation Supply Office, where he served as a provisioning team chair responsible for determining requirements and initiating the procurement of aviation parts for many types of aircraft then in service. From 1953 to 1955, Captain Darcy served in Patrol Squadron 18 as patrol plane commander and antisubmarine warfare officer. He also participated in antisubmarine operations throughout the Atlantic, while completing a Bachelor of Science in Aeronautical Engineering from the Naval Postgraduate School in 1957 and a Master of Science in Engineering from the University of Michigan in 1958.

Returning overseas for duty from 1958 until 1960, Darcy served as an aircraft engineering and maintenance officer on the staff of the commander, Fleet Air Western Pacific/Fleet Air Japan. Here he provided maintenance and technical engineering support for all carrier and shore-based naval aircraft units in the Western Pacific. Between 1960 and 1962, Darcy served as operations and executive officer of Air Antisubmarine Squadron 23, attached to the Pacific Fleet. During this assignment, he had operational deployments to the Seventh Fleet in the Western Pacific aboard the aircraft carrier USS *Yorktown*. On returning to the United States, from 1962 until 1964 he served in the Bureau of Naval Weapons, Research and Development Directorate as a project engineer responsible for the integration of, and improvements to, the sensor, armament, instrument, and electronics suite of S-2 aircraft.

Returning to an operational role in 1965, Captain Darcy was named executive officer of Air Antisubmarine Squadron 38, assuming command of that squadron in 1966. Operating from the aircraft carrier USS *Bennington* on Yankee Station in the Tonkin Gulf, Darcy received two Air Medals for operations during the Vietnam War. From 1967 to 1968, Darcy served as commander of Carrier Antisubmarine Air Group 51. In this capacity, he was responsible for training all officers and enlisted aviation personnel destined for helicopter and fixed-wing Pacific Fleet antisubmarine warfare carrier-based squadrons. From 1968 until 1972, he served as a U.S. Navy member of the Weapons Systems Evaluation Group at the Pentagon, where he studied and analyzed future navigation systems, including satellite navigation, as well as a wide variety of other air weapons platforms and systems. In 1972, he served as assistant chief of staff for antisubmarine warfare programs with the commander, Hunter-Killer Force, U.S. Atlantic Fleet, where he supervised improvements to hardware and the tactical operational effectiveness of sea-based fixed-wing and helicopter antisubmarine forces.

In 1973, Captain Darcy joined the Naval Electronic Systems Command as deputy director of the Plans, Programs and Resources Management Directorate. In May 1974, he became deputy manager, Navy Space Project, becoming its manager in July 1975. As manager of the Navy Space Project, Darcy also served as director of the U.S. Navy's National Reconnaissance Office Program C from 24 July 1975 until 30 July 1977, where he supervised the engineering and development of satellite communications, navigation, and surveillance systems. In addition to his duties at the NRO, Captain Darcy concurrently served on the Chief of Naval Operations Research and Development Staff as director, Space and Command, Control, and Communications Division, and as assistant to the director of Anti-Submarine Warfare for Ocean Surveillance Space Systems.

Captain Darcy received the Legion of Merit, two Air Medals, the Meritorious Service Medal, and Navy Meritorious Unit Commendations in addition to several campaign and service medals. He died on 20 August 2016.



MR. LESLIE C. DIRKS

DIRECTOR OF PROGRAM B

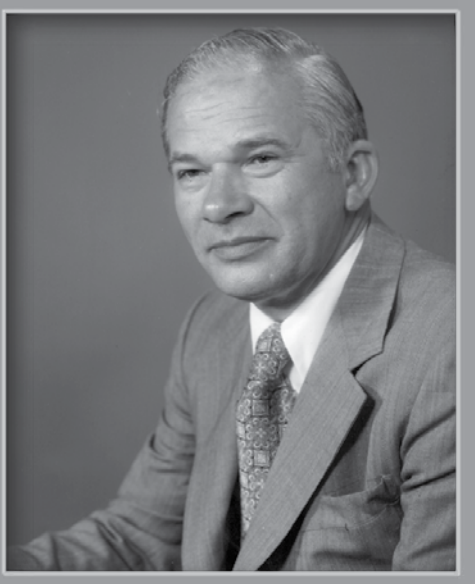
6 JUNE 1976-2 JULY 1982

Leslie Chant Dirks was born on 7 March 1936 in New Ulm, Minnesota. He received a Bachelor of Science in Physics at the Massachusetts Institute of Technology in 1958 and, as a Rhodes Scholar, earned a Bachelor of Science in Physics at Oxford University, England two years later. From 1956 until 1958, while still a student at MIT, Dirks worked as a researcher and analyst for Raytheon Manufacturing Corporation, Ewen Knight Corporation, and Edgerton, Germes, and Grier Incorporated. While attending Oxford University, he also worked as a part-time mathematics instructor for the University of Maryland Overseas Program. On his return to the United States in 1960, Dirks taught physics for one year at Philips Academy in Andover, Massachusetts.

Dirks joined the predecessor office of the Central Intelligence Agency's Directorate of Science and Technology in August 1961 as a physical science intelligence officer with the Office of Scientific Intelligence, Anti-Ballistic Missile Branch. Between 1963 and 1966, he served as chief of the DS&T Plans and Policy Staff, before becoming staff chief in the Office of Special Projects, with responsibilities for systems analysis and design of intelligence collection systems and for liaison with intergovernmental technical panels.

Beginning in 1971, Dirks spent three years as director, Office of Special Projects. He also founded and became the first director of DS&T's Office of Development and Engineering, between 23 April 1973 and 3 May 1976, and then served briefly as acting associate deputy director, Directorate of Science and Technology. On 1 June 1976, Dirks became CIA's deputy director of Science and Technology, a position he held until 3 July 1982. While in the latter position, Dirks served as director of the Central Intelligence Agency's Program B in the National Reconnaissance Program, administered by the National Reconnaissance Office. His inspiration and technical expertise helped create a new class of satellites that revolutionized intelligence collection. These systems represented a major breakthrough in the nation's ability to achieve intelligence dominance during the closing years of the Cold War. He died on 7 August 2001.

Mr. Dirks received the National Security Medal, the Intelligence Medal of Merit, and the Distinguished Intelligence Medal, and was a member of the National Academy of Engineering and the National Research Council.



MR. CARL E. DUCKETT

DIRECTOR OF PROGRAM B

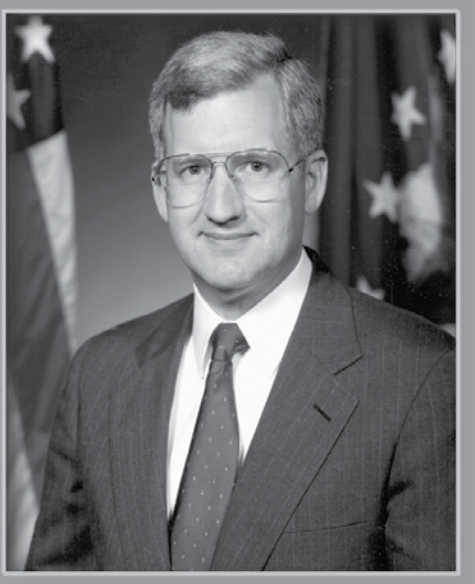
14 JANUARY 1967-28 MAY 1976

Carl Ernest Duckett was born on 22 March 1923, in Swannanoa, North Carolina, near Asheville, and graduated from high school in 1940. In 1942, Duckett joined the U.S. Army and began training in electronics and radio engineering at Johns Hopkins University in Baltimore, Maryland, continuing earlier training undertaken during the previous two years at Danville Technical School in Danville, Virginia. At the completion of this training, and while still in the military, he worked for Westinghouse Electric in Baltimore as a testing and field engineer on radar systems. From 1943 until 1946, Duckett, now an officer in the U.S. Army, went to England to install and test a moving target indicator antiaircraft system designed to help counter German V-1 “Buzz Bombs” then being launched against Allied forces in the United Kingdom. He also installed and operated other radar systems that proved crucial to the success of Allied landings in Normandy in June 1944. He then tested and installed the same system in the Pacific in 1945 to assist U.S. Naval forces in blunting the attacks of Japanese Kamikaze aircraft then taking place in the Philippine Islands and around Okinawa. During the closing days of World War II, Duckett served at the White Sands Missile Test Range, New Mexico, where he worked with American and German rocket scientists on a broad spectrum of missile test activities involving captured German V-2 rockets.

Following the war, Duckett worked briefly as an engineer at radio station WMVA in Martinsville, Virginia, before accepting employment in 1946 as the general manager and chief engineer of the Carroll-Grayson Broadcasting Corporation, then operating radio station WBOB in Galax, Virginia. He remained in this position for four years before returning to active duty with the U.S. Army in 1950 after the outbreak of hostilities in Korea. Duckett again served at the White Sands Missile Test Range in New Mexico as an Army project engineer and chief of plans and programs. After leaving military service in 1953 with the rank of captain, he became the civilian deputy assistant for engineering, plans, and programs as part of the Department of the Army Technical Staff at White Sands.

Three years later, in 1956, Duckett joined the U.S. Army Ballistic Missile Agency at Redstone Arsenal in Huntsville, Alabama as scientific advisor and director of missile intelligence. Having consulted with Central Intelligence Agency officials on Soviet missile systems in the early 1960s, Duckett joined the CIA in September 1963 as scientific advisor to the deputy director of the Directorate of Science and Technology. The following March, he became the first director of the Foreign Missile and Space Analysis Center, a post he held until 16 May 1966, when he was named assistant deputy director of DS&T. In September 1966, Duckett became acting deputy director of DS&T, and in April 1967, deputy director of DS&T, remaining in that post until 26 April 1976. Between 14 January 1967 and 28 May 1976, Duckett concurrently served as director of Program B at the National Reconnaissance Office. There he played an important role in supervising the development and introduction of key satellite reconnaissance systems. He died on 1 April 1992.

Mr. Carl Duckett received numerous awards during his career, including the Distinguished Intelligence Medal and the National Civil Service League’s Career Service Award.



MR. MARTIN C. FAGA

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

28 SEPTEMBER 1989-5 MARCH 1993

Born in Bethlehem, Pennsylvania on 11 June 1941, Martin Clark Faga received a Bachelor of Science degree in 1963 and a Master of Science degree in 1964, both in electrical engineering from Lehigh University. At Lehigh, Faga was a member of the U.S. Air Force Reserve Officer Training Corps and received his commission as a second lieutenant on graduation. He served as a research and development officer in the Air Force through 1968, working in the field of infrared reconnaissance and the application of laser technology to reconnaissance. He then worked briefly for the Perkin-Elmer Corporation in customer liaison before joining MITRE Corporation in 1969 as a member of the technical staff, working in the field of remote sensors.

In 1972, Mr. Faga joined the Central Intelligence Agency, where he worked as an engineer on advanced systems for intelligence collection by technical means. He became a member of the professional staff of the Permanent Select Committee on Intelligence of the House of Representatives in 1977, assigned to the Program and Budget Authorization Subcommittee. In 1984, he became head of the staff assigned to that subcommittee. There his responsibilities included staff oversight of technical collection programs and coordination of all subcommittee work.

Mr. Faga became assistant secretary of the Air Force for space in September 1989, a position in which he was responsible for overall planning, budgeting, and supervision of Air Force space matters. His duties also included maintaining cooperative liaison between the Air Force and other military services, the National Aeronautics and Space Administration, and executive departments responsible for civil and military space activities. Concurrently, between 28 September 1989 and 5 March 1993, Assistant Secretary of the Air Force Faga served as director of the National Reconnaissance Office. In that position he declassified the existence of the NRO in September 1992, following over 30 years during which the organization had been classified secret within compartmented channels. He was a strong proponent for improved support to military operations—he appointed the first deputy director for military support and championed increased access by U.S. military forces to NRO products. He began re-engineering and upgrading programs for most NRO satellite systems during his tenure and worked to combine the NRO's separate Central Intelligence Agency, U.S. Air Force, and U.S. Navy satellite programs into functional directorates.

DR. ALEXANDER H. FLAX

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
1 OCTOBER 1965-17 MARCH 1969

Alexander Henry Flax was born in Brooklyn, New York on 18 January 1921. He received a Bachelor of Science in Aeronautical Engineering from New York University in 1940 and a Doctorate of Science in Physics from the University of Buffalo in 1958. Between 1940 and 1944, the Airplane division of the Curtiss-Wright Corporation employed Flax as a structural and vibration engineer. For the next two years, he served as chief of aerodynamics and structures at the Piasecki Helicopter Corporation. From 1946 until 1963, Flax served several roles supervising research and development at the Cornell Aeronautical Laboratory. During these years, he also participated on a number of boards and commissions including the National Commission on Aerodynamics from 1952 to 1954, its subcommittee on high-speed aerodynamics between 1954 and 1958, and the National Aeronautics and Space Administration Advisory Commission on aircraft aerodynamics between 1958 and 1962.

Named chief scientist of the U.S. Air Force in 1959, Flax served in this position until 1961. From 1963 until 1969, he served as assistant secretary of the Air Force for research and development. In addition to, and concurrent with, this position, Flax also served as the third director of the National Reconnaissance Office between 1 October 1965 and 11 March 1969. He supported major growth in the National Reconnaissance Program and in critical signals intelligence satellite systems that, in a modified and greatly improved form, even today comprise the major elements of such systems. Flax also strongly promoted the initial development of a near real-time imaging satellite reconnaissance system.

Dr. Flax received the Department of Defense Distinguished Public Service Medal, the Air Force Exceptional Civilian Service Award on two occasions, the NASA Distinguished Service Medal, the Civilian Service Medal from the Defense Intelligence Agency, and the Theodore von Karman award from the NATO Advisory Group for Aerospace Research and Development. He was a member of the National Academy of Engineers and the American Institute of Aeronautics and Astronautics. He died on 30 June 2014.

REAR ADMIRAL
EUGENE B. FLUCKEY, USN

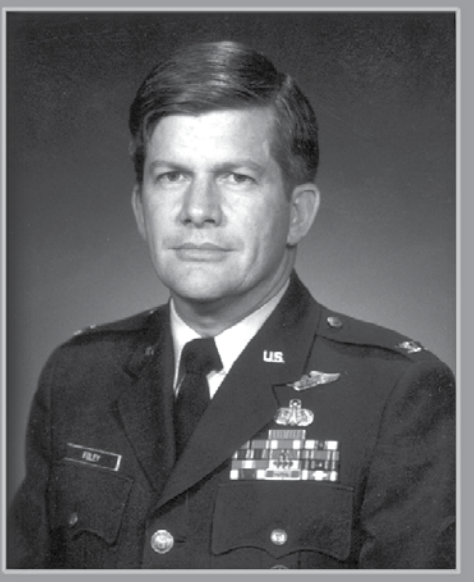
DIRECTOR OF PROGRAM C
8 JULY 1966-30 JANUARY 1968

Eugene Bennett Fluckey was born in Washington, D.C., on 5 October 1913. He entered the U.S. Naval Academy in 1931 and graduated with the class of 1935. Initially assigned to surface vessels, including the USS *Nevada* and USS *McCormick*, in June 1938 he reported to the Submarine School in New London, Connecticut, for training prior to assignment to the USS *S-42*. On 11 June 1941, Fluckey transferred to the USS *Bonita,* where he later served five war patrols protecting the Panama Canal Zone following the American entry into World War II in December 1941. Selected for a command of his own in November 1943, he underwent further training before reporting to the Pacific Fleet for duty aboard the USS *Barb*. Fluckey assumed command of that submarine on 27 April 1944 and, during five successful war patrols, the *Barb* sank more enemy tonnage than any other American submarine during World War II. Ending the war in command of the *Barb*, Fluckey worked for Secretary of the Navy James V. Forrestal on plans for armed services unification. He subsequently joined the War Plans Division and, in December 1945, became the personal aide of incoming Chief of Naval Operations Fleet Admiral Chester W. Nimitz.

On 9 June 1947, Fluckey returned to submarines, assuming command of the USS *Halfbeak*. Two years later, he transferred to the staff of the commander, Submarine Force, Atlantic Fleet, where he was responsible for setting up the submariner portion of the U.S. Naval Reserve. A year later, he became the flag secretary to Adm. James Fife, Commander Submarine Force, Atlantic Fleet. From October 1950 until July 1953, he served as U.S. Naval Attaché and Naval Attaché for Air in Lisbon, Portugal. In September 1953, Fluckey assumed command of Submarine Division 52 and, on 11 June 1954, became commanding officer of the submarine tender USS *Sperry*. He next served as commander of Submarine Squadron Five, and after a year in that position returned to the U.S. Naval Academy to help raise funds to build the Navy-Marine Corps Memorial Stadium before attending the National War College in 1958. In June 1959, he worked at the National Security Council in Washington, D.C., as a briefer on nuclear issues for President Dwight D. Eisenhower and Vice President Richard M. Nixon.

Three months after achieving the rank of rear admiral in July 1960, Fluckey reported as the commander of Amphibious Group Four. In November 1961, he became president of the Naval Board of Inspection and Survey and, in March 1964, served as temporary duty task force director of the Shipyards Appraisal Group. In June 1964, he reported as commander Submarine Force, Pacific Fleet, commander Anti-Submarine Warfare Submarine Patrol Group, commander Submarine Patrol Group, and commander Missile Attack Group, positions he held from 1 June 1964 until 11 June 1966. On 8 July 1966, Rear Admiral Fluckey became assistant chief of naval operations for intelligence and director of National Reconnaissance Office Program C, positions he held until January 1968.

Rear Admiral Fluckey's decorations include the Medal of Honor for service aboard the USS *Barb,* the Navy Cross with three gold stars, the Distinguished Service Medal, the Legion of Merit with gold star, the Presidential Unit Citation Ribbon, and the Navy Unit Commendation Ribbon. For distinguished service in Portugal, Fluckey received the Medal of Military Merit awarded by the Portuguese Government, the first time it ever awarded this decoration to a foreigner. In 1989, the U.S. Navy honored him by naming the Nuclear Submarine Combat Systems Training Center in New London, Connecticut, Fluckey Hall. He died on 28 June 2007.



COLONEL PAUL F. FOLEY, USAF

NRO STAFF DIRECTOR

15 JULY 1984-31 JANUARY 1985

Paul Francis Foley was born in Medford, Massachusetts on 28 May 1940. He graduated from the U.S. Air Force Academy on 7 June 1961. His initial Air Force assignment was with the 551st Strategic Missile Squadron (Atlas F) at Lincoln, Nebraska. He served on a missile combat crew from December 1961 until June 1965, and was on missile alert duty during the Cuban Missile Crisis in October 1962.

In July 1965, Foley attended Rensselaer Polytechnic Institute in Troy, New York as an Air Force graduate student. He completed studies there in June 1966 and received a Master of Arts in Business Management. He then served in the Space Systems Division at Los Angeles Air Force Station in California. There Foley worked in the Communications Satellite Program Office planning new communications satellite systems. In July 1968, he transferred to the Seventh Air Force at Tan Son Nhut Air Base in Saigon, Republic of South Vietnam, as an operations research analyst. During his tour in Southeast Asia, he was a member of a team whose objective was to improve the effectiveness of combat air operations. On his return to the United States in July 1969, Foley attended the U.S. Air Force Command and Staff College in Alabama. Following his June 1970 graduation, he received his first National Reconnaissance Office assignment as a project engineer at the Secretary of the Air Force Special Projects Office in Los Angeles. Three years later, in 1973, he was designated chief systems engineer for NRO Program A, Special Projects Office. In this role, Foley managed concept formulation and source selection competition for a major NRO satellite program.

In June 1975, Foley became a student at the Naval War College in Newport, Rhode Island, where he remained until his graduation in June 1976. He served with the Air Force Research and Development Staff at the Pentagon in Washington, D.C., before again receiving an assignment to the National Reconnaissance Office in 1978; he worked to improve communications between the Air Force Special Projects Office, the NRO staff, and the overall Intelligence Community. Foley returned to California in April 1979 to direct a major sigint satellite constellation, while also supervising changes to existing systems. On 15 July 1984, Colonel Foley became NRO staff director, serving in this position until 31 January 1985.

His service decorations include the Legion of Merit, the Bronze Star Medal, the Combat Readiness Medal, and the Vietnam Service Medal with four campaign stars.

BRIGADIER GENERAL
LEO P. GEARY, USAF

DIRECTOR OF PROGRAM D

2 MAY 1962-15 JULY 1966

Born on 13 October 1917 in Boston, Massachusetts, Leo Paul Geary attended Tufts University and graduated with a Bachelor of Science degree in Chemistry in 1940. He enlisted in the U.S. Army Air Corps as an aviation cadet in April 1941 and completed pursuit and bombardment aircraft flight training between December 1941 and March 1943. He then began a variety of flying assignments that lasted until 1954. These assignments included combat duty in World War II as a B-24 Liberator pilot in Italy with the 449th Bombardment Group, Fifteenth U.S. Army Air Force.

In May 1954, Geary joined the Office of the Deputy Chief of Staff for Operations at U.S. Air Force headquarters, where he served as an intelligence staff officer, Special Projects Branch, Psychological Warfare Division, and chief, Special Activity Branch, Subsidiary Plans Division. From June 1955 to September 1966, he served as a staff officer and special assistant to the inspector general for special projects, Office of the Inspector General, U.S. Air Force. During this 11-year period, Geary worked closely with Dr. Richard M. Bissell, Jr., of the Central Intelligence Agency, providing Air Force support for CIA development, acquisition, and program management of the U-2 and its follow-on supersonic A-12 reconnaissance aircraft.

Geary served as the first director of the National Reconnaissance Office aerial reconnaissance Program D from 2 May 1962 to 15 July 1966; he managed all Air Force support for CIA U-2 and A-12 flights and served as the original program director of the Air Force SR-71 supersonic reconnaissance aircraft deployment. He served concurrently as assistant for reconnaissance to the deputy chief of staff for research and development at U.S. Air Force headquarters. As the first program director for the National Reconnaissance Office's high-altitude aircraft or "air-breathing" reconnaissance platforms, Geary pioneered the development and operation of these aerial assets.

Brigadier General Geary's military awards and decorations include the Legion of Merit with two oak leaf clusters, the Air Medal, the National Defense Service Medal with one service star, the Air Force Longevity Service Award Ribbon with six oak leaf clusters, and the European Theater of Operations service medal with three campaign stars. He died on 23 March 2009.

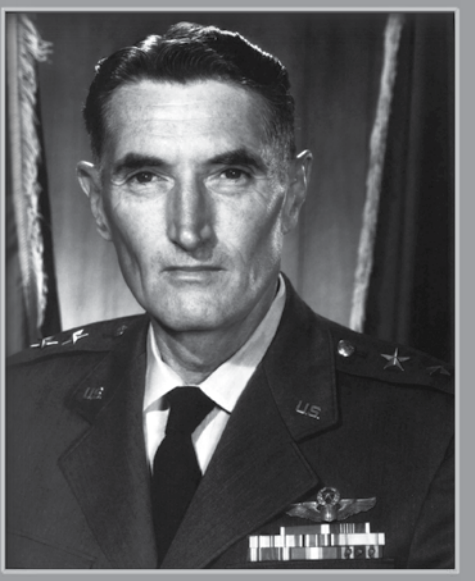
REAR ADMIRAL
ROBERT K. GEIGER, USN

DIRECTOR OF PROGRAM C
5 JANUARY 1971-23 JULY 1975

Born in White Cloud, Kansas on 27 October 1923, Robert Keith Geiger attended the Georgia Institute of Technology for two years before enlisting as a private in the U.S. Army, where he served between December 1942 and June 1944. He entered the U.S. Naval Academy in 1944 and graduated with the class of 1948-A (accelerated due to World War II) on 6 June 1947. Following his graduation, Geiger served on the USS *Bairoko* and then as a physics instructor at the Naval Preparatory School in Bainbridge, Maryland. He entered flight training in May 1949, received his wings in August 1950, and then joined Patrol Squadron 21 the following month. In July 1953, Geiger reported for instruction at the U.S. Naval Postgraduate School, Monterey, California, from which he received a Bachelor of Science in Ordnance Engineering. He then attended the Massachusetts Institute of Technology, where he received a Master of Science in Aeronautical Engineering degree in June 1956. Geiger joined Air Development Squadron One and in July 1958 reported for duty in connection with antisubmarine research and development in the Bureau of Naval Weapons, Department of the Navy, Washington, D.C. In July 1961, he reported as the antisubmarine warfare officer on the staff of the commander, Fleet Air Wing Two, and in September 1963, he returned to the Bureau of Naval Weapons as program manager for an advanced antisubmarine warfare avionics system.

Assigned to the Air Force Special Projects Office, El Segundo, California in January 1966, Geiger served as assistant deputy director for advanced plans and then deputy director for programs until April 1969. He then reported to the Office of the Under Secretary of the Air Force for Space Systems, where he served until December 1970. On 5 January 1971, he became a project manager in the newly established Navy Space Projects Office, Navy Material Command, concurrently serving as director of National Reconnaissance Office Program C between that date and 23 July 1975. While still at the NRO, in May 1973, he reported as project manager, Navy Space Projects Office, Naval Electronic Systems Command, Department of the Navy. In July 1974, the Navy promoted Geiger to rear admiral.

During his military career, Geiger received the Distinguished Service Medal, the Air Force Legion of Merit with one oak leaf cluster, and the Air Force Commendation Medal. He died on 1 June 2013.



MAJOR GENERAL
ROBERT E. GREER, USAF

DIRECTOR OF PROGRAM A
23 JULY 1962-30 JUNE 1965

Robert Evans Greer was born in Orange, California on 7 August 1915 and graduated from the U.S. Military Academy with the class of 1939. He entered flight school and received his wings in the U.S. Army Air Corps in July 1940. After serving as a flying instructor, he joined the 58th Bombardment Wing in October 1943 and was a member of the first B-29 Superfortress crew to leave the United States in April 1944 for bases in the China-Burma-India Theater. After serving as the assistant operations officer for the 58th Bombardment Wing, and as the supply officer of the 20th Bomber Command, he accompanied the unit to Tinian in the Marianas Islands, where he served as deputy chief of staff for supply and maintenance during the final air assaults against Japan in the spring and summer of 1945.

Returning to the United States at the end of 1945, Greer served at Wright Field, Ohio as assistant to the chief of administration for technical matters at Air Materiel Command headquarters. After teaching electrical engineering courses at West Point and attending Columbia University, Greer reported to the Office of the Assistant for Atomic Energy at U.S. Air Force headquarters in June 1949. He next attended the Air War College, after which he went to Paris in July 1954 to serve on the Special Staff of British Field Marshal Bernard L. Montgomery at Supreme Headquarters Allied Powers Europe (SHAPE). Following that, Greer worked at Headquarters, 49th Air Division, and later Headquarters, Third Air Force, in England, where he served as director of operations and deputy chief of staff for operations.

Greer returned to U.S. Air Force headquarters in July 1957, where he became deputy assistant chief of staff and then, promoted to brigadier general in 1959, assistant chief of staff for guided missiles. He subsequently served as vice commander for satellite systems, Air Force Ballistic Missile Division, until a major reorganization of the Air Research and Development Command and the Air Materiel Command occurred on 1 April 1961. At that time he became vice commander, Space System Division, Air Force Systems Command, in Inglewood (the division later moved to El Segundo), California. In July 1961, the Air Force promoted Greer to major general.

Shortly before he became vice commander of Space Systems Division in late 1960, Greer put on another hat as director of the West Coast SAMOS Program Office, reporting directly to Under Secretary of the Air Force Joseph V. Charyk in the Office of Missile and Satellite Systems (SAF/MS) at the Pentagon. The following year, 1961, the name of the West Coast SAMOS Program Office changed to the Office of Special Projects, when it formally became the Air Force element of the National Reconnaissance Office (called Program A after 23 July 1962). Initially consisting of the SAMOS Program, SAF/SP activity soon expanded to embrace development of the NRO Defense Meteorological Satellite Program and several intelligence satellite programs. Major General Greer remained director of SAF/SP from 1961 until his retirement on 30 June 1965. He died on 11 February 1976.

During his military career, Greer received the Legion of Merit, the Army Commendation Medal, and the Air Force Longevity Service Award with four bronze oak leaf clusters.

MR. DONALD L. HAAS

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

9 DECEMBER 1979-11 APRIL 1982

Donald Leo Haas was born on 16 February 1925 in Norwalk, Ohio. He began his university education at the University of Wisconsin in 1943. As a member of the U.S. Navy V-12 Educational Program, he graduated from Purdue University in 1946 with a Bachelor of Science in Electrical Engineering after which he served aboard a U.S. Navy destroyer as an ensign in charge of communications. Following his military service, he worked as an electronics engineer at the Philco Corporation beginning in March 1947. One year later, he moved to the Crosley Division of AVCO Manufacturing Corporation.

Mr. Haas joined the Central Intelligence Agency in April 1951 as an electronics engineer with the Office of Communications, Research and Development Branch. During this time, he also continued his education, earning a Master of Science in Electronics and Communications degree at the Massachusetts Institute of Technology in 1958. Haas left government service in 1960 to work for the Martin Marietta Corporation and the Aerospace Corporation and helped manage the development of military satellite and digital communications systems. He returned to the Central Intelligence Agency in September 1967 to become deputy program director of the Office of Special Projects in the Directorate of Science and Technology. For one year, beginning in 1974, Haas served as deputy director of the Office of Development and Engineering, DS&T, before taking the position of director of the Office of Research and Development. He returned to the Office of Development and Engineering as its director in 1975.

Haas retired from the Central Intelligence Agency in November 1978 after 20 year's service and went to work for the Defense Advanced Research Projects Agency at the Department of Defense in Washington, D.C., where he served as director of the Strategic Technology Office.

He subsequently became deputy director of the National Reconnaissance Office, where he served between 9 December 1979 and 9 April 1982. His engineering skills and creativity were vital to the extraordinary success of many National Reconnaissance Office programs, especially those involving sensors and other technical collections systems that he had previously helped design and develop. He strongly supported retaining expendable launch vehicles and was a main proponent of emergency launch systems.

During his nearly 30-year government service career, Mr. Haas received the Distinguished Intelligence Medal, the Intelligence Medal of Merit, the National Intelligence Distinguished Service Medal, the Defense Department and Air Force Exceptional Civilian Service Award, a Meritorious Unit Citation, and the Senior Executive Service Presidential Award.

BRIGADIER GENERAL
DONALD G. HARD, USAF

NRO STAFF DIRECTOR

5 NOVEMBER 1987-5 FEBRUARY 1989

Donald Gordon Hard was born on 6 September 1940 in Sunderland, Vermont. He entered the U.S. Naval Academy in 1958, graduated with a Bachelor of Science degree in 1962, and received a commission as a second lieutenant in the U.S. Air Force. Hard continued studying engineering while assigned to the Air Force Institute of Technology Training Program at the University of Illinois at Champaign-Urbana. In July 1963, he served at the Air Force Space Systems Division at the Los Angeles Air Force Station in California as the operations planning officer for the DynaSoar and Manned Orbiting Laboratory programs.

He entered flight training at Reese Air Force Base in Texas and received his pilot wings in December 1967. After completing C-130 training at Sewart Air Force Base in Tennessee and at Pope Air Force Base in North Carolina, he served at the 776th Tactical Airlift Squadron at Ching Chuan Kang Air Base, Republic of China, with subsequent duty in Southeast Asia. Following overseas service, Hard worked at the 6594th Test Group at Hickam Air Force Base, Hawaii from November 1969 until June 1974. He then transferred to Sunnyvale Air Force Station in California, where he served as an orbital operations officer before becoming chief of the Launch Operations Planning Branch, Office of Special Projects, Office of the Secretary of the Air Force, at Los Angeles Air Force Station in September 1975.

Hard completed the Air Command and Staff College course in 1975, followed by the Industrial College of the Armed Forces course in 1976. He also received a Master of Science in Business Management from California State University in Dominguez Hills. Hard then transferred to Yokota Air Base in Japan in June 1978, and served first as assistant operations officer of the 345th Tactical Airlift Squadron and, later, as deputy commander for operations of the 316th Tactical Airlift Group.

In October 1980, Hard began service in the Office of Space Systems, Office of the Secretary of the Air Force in Washington, D.C., as the NRO deputy director for policy and security. From July 1982 to January 1983, he served as the director of operations support integration, reporting to the deputy commander for space operations, Space Division headquarters in El Segundo, California. After January 1983, he became director of plans, Space Division. Returning to Hawaii, Hard commanded the 6594th Test Group at Hickam Air Force Base from May 1984 to May 1985, before returning to Sunnyvale, California as commander of the U.S. Air Force Satellite Control Facility.

From July 1986 until February 1987, Hard was vice director of the NRO's Air Force Office of Special Projects at Los Angeles Air Force Station, before serving as deputy commander for launch and control systems at Space Division headquarters. From 5 November 1987 through 5 February 1989, as director of space systems, Office of the Secretary of the Air Force in Washington, D.C., Hard served as staff director at the National Reconnaissance Office.

General Hard is a command pilot with more than 4,000 flying hours and wears the Master Space Badge. In addition to his graduate degree, Hard attended the Harvard University National and International Security Program for Senior Executives. He is also a Massachusetts Institute of Technology Seminar XXI Fellow. His military awards and decorations include the Defense Superior Service Medal, the NASA Distinguished Service Medal, the Air Force Distinguished Service Medal, the Legion of Merit, and the Meritorious Service Medal with four oak leaf clusters, the Air Medal with three oak leaf clusters, the Joint Service Commendation Medal, and the Air Force Commendation Medal. He is an honorary Chief Master Sergeant.

REAR ADMIRAL
FREDERICK J. HARLFINGER II
USN

DIRECTOR OF PROGRAM C

10 SEPTEMBER 1968-4 JANUARY 1971

Frederick Joseph "Fritz" Harlfinger II was born in Albany, New York on 14 September 1913. He entered the U.S. Naval Academy in 1931 and graduated with a Bachelor of Science degree with the class of 1935. He served aboard the USS *Arizona* for two years before attending the Submarine School at New London, Connecticut. Following sea duty with the Asiatic Fleet, he returned to the United States in July 1940 and reported to the USS *Trout*, where he served between November 1940 and March 1942. The Navy commended Harlfinger for his outstanding service aboard the *Trout* during the early days of the Second World War, when it amassed a record of 43,000 tons of Japanese shipping sunk and a further 31,000 tons damaged. Detached from the *Trout*, he next served on the USS *Whale,* before commanding the USS *S-32,* USS *Trigger*, and USS *Sirago*, respectively, during the remaining years of World War II and in the immediate postwar years.

In May 1947, Harlfinger began a series of shore assignments lasting eight years at the Submarine School, at the Advanced Undersea Weapons School in Key West, Florida with Submarine Squadron 4, at the Armed Forces Staff College in Norfolk, Virginia, and at the Navy Department in Washington, D.C., where he served as head of Submarine Warfare, Research and Development Division, Office of the Chief of Naval Operations. Following attendance at the Industrial College of the Armed Forces in 1954 and 1955, Harlfinger became naval attaché and naval attaché for air in Bonn, Federal Republic of Germany. Returning to sea in June 1957, he commanded the USS *Mauna Loa* before assuming command of Submarine Squadron 12. In August 1959, he became head of the Submarine Branch in the Office of the Chief of Naval Operations, completing that tour in October 1962, before assuming command of Submarine Flotilla One.

On 29 January 1964, Admiral Harlfinger reported as assistant director for acquisition, Defense Intelligence Agency, Washington, D.C., a post he held until assuming command of the South Atlantic Force, U.S. Atlantic Fleet. In August 1968, he reported as assistant chief of naval operations for intelligence, Commander Naval Intelligence Command, Navy Department, and in March 1971, he became director of support programs in the Office of the Chief of Naval Operations. Concurrently, he served as director of National Reconnaissance Office Program C between 10 September 1968 and 4 January 1971. He died on 21 December 1993.

In addition to the Navy Cross, Vice Admiral Harlfinger was awarded the Distinguished Service Medal, the Silver Star Medal with two gold stars, the Legion of Merit with gold star, the Bronze Star with combat "V," the Navy Commendation Medal with "V," a Presidential Unit Citation, and Navy Unit Commendation.

COLONEL
FRANK W. HARTLEY, JR., USAF

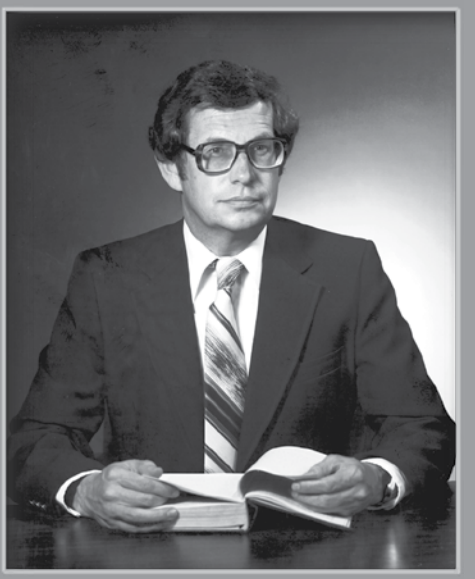
DIRECTOR OF PROGRAM D

1 NOVEMBER 1967-30 JUNE 1972

Frank William Hartley, Jr., was born on 12 March 1918. He joined the U.S. Army Air Forces on 16 February 1943 and underwent flight training in California. During his flying career, he logged 9,000 flying hours and completed 34 combat missions. After World War II, Hartley served in Japan, Germany, and Italy, and at Hamilton, Maxwell, and McCoy Air Force Bases in the United States. Hartley served as director of aerial reconnaissance, National Reconnaissance Office Program D, between 1 November 1967 and 30 June 1972.

At the National Reconnaissance Office, his leadership and initiative resulted in the success of several projects vital to the security of the United States. During this period, working with difficult schedules, he directed and coordinated the efforts of many contractors, elements of the Department of Defense, and other agencies of the government and foreign nations. He also performed as program manager of a major support system. The test squadron under his direction attained operational readiness with a zero accident rate and an outstanding rating on the aerospace safety survey. In conjunction with other major operational systems, he managed and exercised operational control of widely diversified test activities.

Upon his retirement, Colonel Hartley received the Distinguished Service Medal. He died on 16 February 1992.



DR. ROBERT J. HERMANN

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

8 OCTOBER 1979-2 AUGUST 1981

Robert Jay Hermann was born on 6 April 1933 in Sheidahl, Iowa. He received a Bachelor of Science in Electrical Engineering degree in 1954, a Master of Science in Electrical Engineering in 1959, and a Doctorate of Science in 1963, all from the Iowa State University in Ames. He was a first lieutenant in the U.S. Air Force between 1955 and 1957.

Following 16 years of work on programs that are still classified, Hermann spent from 1973 until 1975 as deputy director of research and engineering at the National Security Agency, Fort George G. Meade, Maryland. There he helped shape NSA's expanding role in space reconnaissance. On leaving that organization in 1975, he became special assistant to the Supreme Allied Commander, Supreme Headquarters Allied Powers Europe in Casteau, Belgium, a position he held until 1977. Returning to the United States, Hermann became deputy under secretary of defense for research and engineering, before taking on similar duties as assistant secretary of the Air Force for research, development, and logistics between 1979 and 1981. In the latter post, Hermann also served concurrently as director of the National Reconnaissance Office between 8 October 1979 and 2 August 1981. During his tenure, he advocated broadening the NRO's support to tactical military customers through establishment of the Defense Reconnaissance Support Program in the Office of Joint Chiefs of Staff. For his significant contributions to national defense, Hermann received the Air Force Distinguished Service Medal in 1980.

MR. JIMMIE D. HILL

NRO STAFF DIRECTOR

12 JUNE 1978-9 APRIL 1982

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

11 APRIL 1982-26 FEBRUARY 1996

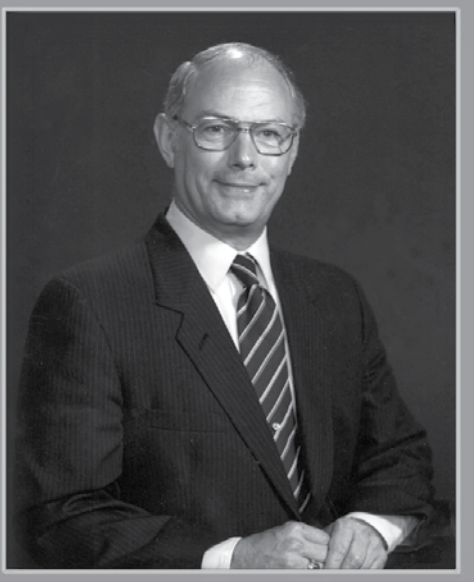
Born on 28 December 1933 in Fort Worth, Texas, Jimmie Dale Hill enlisted in the U.S. Air Force in 1951 and, after receiving a commission through Officer Candidate School in 1960, rose through the ranks to major by 1974. He also studied business and mathematics at Del Mar College between 1955 and 1957, business at the University of Oklahoma between 1957 and 1958, mathematics at San Antonio College between 1960 and 1961, and accounting at the University of Wichita between 1963 and 1964.

Before receiving his commission in the U.S. Air Force, Hill served as an aircraft mechanic and as a training noncommissioned officer. After completing Officer Candidate School, he became involved in a variety of comptroller activities related to Air Force weapon systems acquisition through 1966. During the next five years, he served at the Secretary of the Air Force's Special Projects Office in El Segundo, California, which comprised Program A of the National Reconnaissance Office. In 1971, he transferred to the Office of the Under Secretary of the Air Force and the National Reconnaissance Office in Washington, D.C. for duty with Program B, the Central Intelligence Agency's element of the National Reconnaissance Program. In 1973, he transferred from Program B to the NRO director's staff, where he remained until his retirement from the U.S. Air Force in February 1974.

On separating from the Air Force, Hill was appointed comptroller of the National Reconnaissance Office and special assistant to the under secretary of the Air Force, as an Air Force civilian. In 1978, he became director, Office of Space Systems, Office of the Secretary of the Air Force, an assignment that also made him staff director of the National Reconnaissance Office. He became the deputy director of the National Reconnaissance Office and deputy under secretary of the Air Force for space on 11 April 1982, positions he retained until he retired from government service on 26 February 1996.

Beginning in 1967, Hill served a total of 29 years at the National Reconnaissance Office at all levels, 14 of them as deputy director. During this time, he participated in the decisions for all new NRO overhead reconnaissance systems. At the end of the Cold War, Hill was instrumental in the restructuring of the National Reconnaissance Office that replaced the separate program elements with functional directorates, and collocating them in the new headquarters facility in Chantilly, Virginia.

Jimmie Hill's Air Force awards include the Legion of Merit, the Meritorious Service Medal, and the Commendation Medal with three oak leaf clusters. As a member of the Air Force senior executive service, he received the Presidential Rank Award of Distinguished Executive in 1981 and 1991. He also received the Presidential Rank Award of Meritorious Executive in 1980 and 1988. Hill received the Department of Defense Distinguished Civilian Service Award in 1977, 1981, 1987, and 1996, and the Air Force Exceptional Civilian Service Award in 1988 and 1996. He also received the National Intelligence Distinguished Service Medal, the Central Intelligence Agency Distinguished Intelligence Medal, the NASA Distinguished Service Medal, the Defense Intelligence Agency Director's Award, the NRO Distinguished Service Medal, and the National Security Agency Bronze Medal. In 1996, Hill received the Goddard Memorial Trophy awarded by the National Space Club. In 1998, he received the Goddard Astronautics Award from the American Institute of Aeronautics and Astronautics. He died on 23 April 2013.



MR. R. EVANS HINEMAN

DIRECTOR OF PROGRAM B

3 JULY 1982-28 AUGUST 1989

Born on 29 June 1934 in Claymont, Delaware, Richard Evans "Evan" Hineman graduated in 1956 from Lafayette College in Easton, Pennsylvania with a Bachelor of Science in Mechanical Engineering. Working briefly for Pratt and Whitney Aircraft Company, he entered the U.S. Army in 1956 as a second lieutenant, serving at Aberdeen Proving Ground, Maryland as a technical intelligence officer in the Ordnance Corps. Upon leaving active duty in 1958, he joined the Ordnance Technical Intelligence Agency, where he worked as an intelligence analyst specializing in Soviet guided missile and space programs. In 1962, he joined the U.S. Army Foreign Science Technology Center as an aerospace engineer.

In 1964, Hineman joined the Central Intelligence Agency as a physical scientist leading trajectory analysis efforts in the newly formed Foreign Missile and Space Analysis Center (FMSAC). In 1967, he became chief of the Systems Division, FMSAC, holding that position until 1973, when he was promoted to deputy director of the Office of Weapons Intelligence. In addition, Hineman served as chair of the Guided Missiles and Astronautics Intelligence Committee (GMAIC), where he oversaw Intelligence Community missile and space analysis activities for Directors of Central Intelligence Richard M. Helms, James R. Schlesinger, and William E. Colby. In 1976, Hineman became the director of weapons intelligence, and shortly thereafter DCI George H. W. Bush appointed him chair of the director's Weapons and Space System Intelligence Committee, successor to GMAIC. From 1979 until 1982 Hineman served as associate deputy director of intelligence and in that position helped manage all Central Intelligence Agency analytic and intelligence production activities.

Hineman became the CIA's deputy director for Science and Technology and director of Program B in the National Reconnaissance Program on 3 July 1982, serving in that position until September 1989. In that capacity, he was responsible for the management of an organization engaged in research, development, engineering, and operations of various intelligence collection and information processing systems, and for advising the DCI on scientific and technical matters.

On the Central Intelligence Agency's 50th anniversary, Hineman received one of 50 Trailblazer Awards for his service. He holds the CIA Distinguished Intelligence Medal, the National Reconnaissance Office Distinguished Service Medal, and two National Intelligence Distinguished Service Medals.

MAJOR GENERAL
RALPH H. JACOBSON, USAF

DIRECTOR OF PROGRAM A

20 JANUARY 1983-19 FEBRUARY 1987

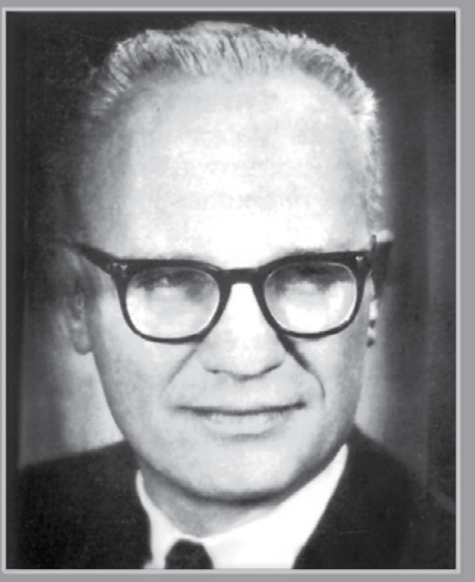
Ralph Henry Jacobson was born on 31 December 1931 in Salt Lake City. He attended the University of Utah until 1952, when he entered the U.S. Naval Academy, graduating in 1956 with a Bachelor of Science degree. Shortly after receiving his wings, in August 1957 he joined the 778th Troop Carrier Squadron at Pope Air Force Base, North Carolina as a C-119 and C-123 pilot. He entered the astronautical engineering course at the Air Force Institute of Technology in September 1960, and following graduation with a Master of Science in Astronautics degree in August 1962, he was assigned to the Air Force Ballistic Systems Division at Norton Air Force Base, California as a project officer for the inertial guidance system used in the Titan II intercontinental ballistic missile.

From July 1965 until July 1966, Jacobson attended the Air Command and Staff College at Maxwell Air Force Base in Alabama, and then earned a second Master of Science in Business Administration from The George Washington University in Washington, D.C. He then served for three years in the Directorate of Plans at the U.S. Air Force headquarters in Washington, D.C. Jacobson volunteered for combat service in Southeast Asia and, from July 1969 to July 1970, was assigned as wing operations officer with the 14th Special Operations Wing at Nha Trang Air Base, Republic of South Vietnam, where he flew 299 sorties in UC-123Ks.

Following combat service in Vietnam, Jacobson served in the Secretary of the Air Force Special Projects Office, National Reconnaissance Office Program A, in El Segundo, California. He served successively as a research and development project officer, division chief, and deputy director for research. Following graduation from the Industrial College of the Armed Forces in 1974 and the Naval War College in 1976, he returned to the West Coast as commander of the Air Force Satellite Control Facility in Sunnyvale, California. In March 1979, he joined the Office of the Deputy Chief of Staff for Research, Development, and Acquisition at Air Force headquarters in Washington, D.C., initially as assistant deputy chief of staff for space shuttle development and operations. In June 1980, promoted to brigadier general, he was named director of space systems and command, control, and communications.

On 20 January 1983, Jacobson became director of the Secretary of the Air Force Special Projects Office, NRO Program A, and assistant deputy commander of the Air Force Space Division, El Segundo, California. The Air Force promoted him to major general in April 1983. He remained director of the NRO's Program A until 19 February 1987 and retired from active military duty on 28 February of that year.

His military awards and decorations include the Defense Department, National Intelligence Community, and Air Force Distinguished Service Medals, the Legion of Merit with one oak leaf cluster, the Distinguished Flying Cross, the Air Medal with two oak leaf clusters, the Joint Service Commendation Medal, and the Air Force Commendation Medal with two oak leaf clusters. He died on 1 November 2014.



MR. EUGENE P. KIEFER

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

2 JULY 1963-18 FEBRUARY 1965

Eugene Peter Kiefer was born on 28 May 1918 in Buffalo, New York. He earned a Bachelor of Science degree at Notre Dame University in 1940 and studied at the University of Dayton in 1940 and 1941. From July 1940 through December 1951 Kiefer served in the U.S. Air Force at Wright-Patterson Air Force Base, Ohio as an aeronautical engineer. Beginning in January 1952, he served as development executive officer to Col. Bernard A. Schriever, deputy chief of staff, Office for Development Planning, where he worked closely with Col. Richard S. Leghorn in the preparation of Air Force development planning objectives for intelligence and reconnaissance. Leaving military service in 1955, Kiefer became a senior associate manager at the Planning Research Corporation, while he completed a Master of Business Administration degree at The American University in Washington, D.C.

In May 1958 Kiefer joined the Central Intelligence Agency as a special assistant for technical analysis, first to the chief, Development Projects Division, and then to Deputy Director (Plans) Richard M. Bissell, Jr., whom he had come to know at the inception of the U-2 aerial reconnaissance project in 1955. He subsequently served in the newly formed CIA Directorate of Science and Technology, and as the first deputy director of the National Reconnaissance Office between 2 July 1963 and 18 February 1965. During his tenure as deputy director, Kiefer attempted to mediate differences between the Department of Defense and the CIA over NRO's authority. He died on 17 June 1998.

BRIGADIER GENERAL
WILLIAM G. KING, JR., USAF

DIRECTOR OF PROGRAM A
1 AUGUST 1969-31 MARCH 1971

William Gregg King, Jr., was born in Topeka, Kansas on 14 December 1918. He attended Kansas State University where, in 1937, he entered the Reserve Officer Training Corps (ROTC) and later received his commission as a second lieutenant in the Coastal Artillery Corps in 1941. The Second World War interrupted his education, and he spent 39 months in the Pacific Theater as an antiaircraft artillery officer participating in operations on Guam, in the Philippine Islands, and on Okinawa. Returning to Kansas State University after the war, he completed a Bachelor of Science degree in engineering in January 1946.

King accepted a regular commission and returned to active military duty in 1947 as a member of the U.S. Army Corps of Engineers, joining the U.S. Air Force after its formation that same year. After additional training, he served in the newly formed Joint Long Range Proving Center at Patrick Air Force Base in Florida in 1950. In this assignment, he participated in the initial exploration and surveys of the islands that became the downrange stations of the Eastern Test Range at Cape Canaveral. After completing a Master of Business Administration degree at the University of Chicago in 1955, King worked at the Air Research and Development Command at Wright-Patterson Air Force Base as a weapons system project officer for the Snark Intercontinental Missile Program and the WS-117L (SAMOS) satellite reconnaissance system. In July 1959, King began a series of assignments with the Air Force Space Systems Division (later the Space and Missile Systems Organization). He served first in the SAMOS Program Office, which became the NRO Office of Special Projects in 1961. Between 1962 and 1966, he served as deputy director of the Office of Special Projects. In September 1966, he became commander of the Air Force Satellite Control Facility in Sunnyvale, California. A year later, he moved to Andrews Air Force Base in Maryland, where he was assistant deputy chief of staff for operations, Air Force Systems Command.

Promoted to brigadier general in 1968, King returned to the West Coast in January 1969 as assistant to the director, Office of Special Projects, National Reconnaissance Office Program A. He became director in July that same year. Brigadier General King remained as Program A director until 31 March 1971, when he retired from active duty.

Brigadier General King's military decorations include the Distinguished Service Medal, the Legion of Merit with one oak leaf cluster, the Bronze Star Medal, and the Air Force Commendation Medal with one oak leaf cluster. In 1989 and 1997, he received honors as a space pioneer from the Smithsonian Institution and the U.S. Air Force Space Command. He died on 21 June 2009

MAJOR GENERAL
JOHN E. KULPA, JR., USAF

NRO STAFF DIRECTOR
8 JANUARY 1973-30 SEPTEMBER 1974
DIRECTOR OF PROGRAM A
1 AUGUST 1975-19 JANUARY 1983

John Edward "Jack" Kulpa, Jr., was born on 11 May 1929 in Newark, New Jersey. He entered the U.S. Military Academy in 1946 and graduated with a Bachelor of Science degree with the class of 1950. After receiving navigator wings in September 1951, Kulpa served at the Strategic Air Command's 343rd Strategic Reconnaissance Squadron at Ramey AFB, Puerto Rico, and in March 1952 was sent to Yokota Air Base, Japan, on temporary duty, where he completed a Korean War combat tour. In November 1952, he returned to the 343rd Strategic Reconnaissance Squadron, and in March 1954 served with the 55th Strategic Reconnaissance Wing at the Royal Air Force bases at Mildenhall and Lakenheath in England. Upon his return to the United States in late 1954, he joined the 4024th Bombardment Squadron and later the 97th Bombardment Wing at Biggs Air Force Base, Texas.

After completing a Master of Science degree at the Air Force Institute of Technology at Wright-Patterson AFB in August 1957, Kulpa joined the Wright Air Development Center as a project engineer for propulsion and flight-testing in the Snark Project Office and later the GAM-77 Hound Dog Project Office. From August 1962 until July 1963, Kulpa attended the Air Command and Staff College and worked at the Secretary of the Air Force Special Projects Office in El Segundo, California, as a project manager. In February 1965, he became director of the Defense Meteorological Satellite Program. In August 1969, following graduation from the National War College, Kulpa became commander and director of the Air Force Avionics Laboratory at Wright-Patterson, before serving, between August 1971 and August 1972, as deputy for engineering at the Aeronautical Systems Division at Wright-Patterson.

Promoted to brigadier general in 1973, Kulpa served in the Office of the Secretary of the Air Force, Office of Space Systems, as staff director of the National Reconnaissance Office from 8 January 1973 until 30 September 1974. He then served as principal deputy for plans to the deputy director of the Central Intelligence Agency, where he remained until 1 August 1975, when he became director of the Secretary of the Air Force Special Projects Office, National Reconnaissance Office Program A. He had additional duty as deputy commander of the Air Force Space and Missile Systems Organization in El Segundo, California. He was promoted to major general on 6 February 1976. MG Kulpa served as the Director of Program A until 19 January 1983, becoming the longest serving director in the program's history, and retired shortly thereafter, on 1 April 1983. He passed away on 12 March 2018.

MG Kulpa's military decorations and awards included the Distinguished Service Medal with one oak leaf cluster, the Legion of Merit with one oak leaf cluster, the Distinguished Flying Cross, the Air Medal, the Air Force Commendation Medal with one oak leaf cluster, and the Distinguished Unit Citation emblem. In 1980, he was awarded the prestigious General Thomas D. White Space Trophy, awarded annually to a USAF military or civilian person for outstanding contributions to American aerospace progress.

BRIGADIER GENERAL
JACK C. LEDFORD, USAF

DIRECTOR OF PROGRAM B

12 AUGUST 1963-27 SEPTEMBER 1965

Jack Clarence Ledford was born on 1 September 1920 in Blairsville, Georgia. He graduated from Massanutten Military Academy in Woodstock, Virginia in 1938, and attended The Ohio State University, majoring in physics. In 1940, he entered the U.S. Army Air Corps Aviation Cadet Program, graduated in October 1941, and became a flight instructor at Goodfellow Field, Texas, prior to entering B-24 Liberator transition training. Six months later, he became one of the first B-29 Superfortress pilots when he joined the 45th Bombardment Squadron of the 40th Bombardment Group. Sent to India with that group, he flew 21 combat missions in the Asiatic-Pacific Theater before returning to the United States in May 1945. Ledford then graduated with honors from the U.S. Army Command and General Staff School at Fort Leavenworth, Kansas, and remained as an instructor until June 1946, when he transferred to Tyndall Field, Florida. During this time, he returned to attend The Ohio State University and completed a Bachelor of Science degree in 1949.

Ledford began a series of assignments with the Strategic Air Command at Carswell Air Force Base, Texas, with the 7th Bombardment Wing, and as a B-36 bomber instructor pilot and executive officer with the 26th Bombardment Squadron, 11th Bombardment Group. In December 1950, he became chief of the plans section, director of plans, Eighth Air Force, followed by assignment as officer in charge of the Nuclear Bomb Commander's School and later the Special Weapons Unit Training Group at Sandia Air Force Base, New Mexico. After a tour as special weapons advisor to the British Royal Air Force in the Federal Republic of Germany in September 1956, he became commander of Etain Air Base, France. His final assignment in Europe was as director of materiel, 49th Fighter-Bomber Wing, U.S. Air Forces Europe.

Returning to the United States in August 1958, Ledford became deputy chief of staff for weapons effects and tests at the Defense Atomic Support Agency headquarters in Washington, D.C. He also attended the Industrial College of the Armed Forces, graduating with distinction in August 1962. During this time, he also earned a Master of Business Administration and Management degree from The George Washington University. In September 1962, he served at the 1040th Air Force Field Activity Squadron at Bolling Air Force Base, as well as with the Central Intelligence Agency. At the CIA in 1963, he succeeded Herbert Scoville as director of National Reconnaissance Office Program B, a position in which he served between 12 August 1963 and 27 September 1965. Concurrently, Ledford led the CIA's Office of Special Activities between 4 September 1962 and 6 July 1966.

A command pilot with more than 8,000 hours of flying time, Brigadier General Ledford has been awarded the Distinguished Service Cross, the Air Force Distinguished Service Medal with one oak leaf cluster, the NRO Distinguished Service Medal, the Legion of Merit, the Air Medal with one oak leaf cluster, the Air Force Commendation Medal with one oak leaf cluster, the Purple Heart, the Distinguished Unit Citation Emblem with two oak leaf clusters, and the Republic of China Cravat Medal of Cloud and Banner. He died on 16 November 2007.

MAJOR GENERAL
NATHAN J. LINDSAY, USAF

DIRECTOR OF PROGRAM A

20 FEBRUARY 1987-31 DECEMBER 1992

Born on 24 May 1936 in Monroe, Wisconsin, Nathan James Lindsay earned a Bachelor of Science in Mechanical Engineering and a military commission through the Air Force Reserve Officer's Training Corps at the University of Wisconsin in 1958. He entered the U.S. Air Force in January 1959 and, after completing the ammunition officer course at Lowry Air Force Base, served in the Air Force Europe Weapons Center, Wheelus Air Base, Libya as the base munitions officer. In December 1960, he transferred to Lindsey Air Station, Federal Republic of Germany, as a staff officer for conventional munitions and logistics at Headquarters, U.S. Air Force Europe.

Lindsay entered advanced courses at the Air Force Institute of Technology in June 1963, while he completed a Master of Science in Mechanical Engineering at the University of Wisconsin. Following graduation from the Institute of Technology in February 1965, he served at the Propulsion Directorate, Titan III System Program Office, Space Systems Division, in El Segundo, California as a development project officer for large solid rocket boosters. Five years later, he joined the Development Division, Air Force Armament Laboratory, Elgin Air Force Base, Florida as chief of the Guns and Rockets Branch. He graduated from the Armed Forces Staff College in January 1971 and served at the Air Force Systems Command headquarters at Andrews Air Force Base, Maryland as a program management auditor in the Office of the Inspector General. He completed Defense Systems Management School in June 1973.

From July 1973 to August 1978, Lindsay served consecutively as assistant deputy for policy, chief of the Launch Vehicle Integration Division, and deputy director of launch systems integration, Secretary of the Air Force Special Projects Office, National Reconnaissance Office Program A, in El Segundo, California. During this time, he completed a Master of Science in Systems Management at the University of Southern California. He then transferred to NRO headquarters in Washington, D.C., where he was responsible for space systems policy, plans, and security. In November 1980, he returned to Los Angeles as director of operations support and integration in the Air Force Space Systems Division. In April 1982 he became assistant deputy commander for space operations and, in March 1983, assistant deputy commander for launch and control systems.

In December 1984, he became commander of the Eastern Space and Missile Center, Patrick Air Force Base, Florida. The Air Force promoted him to brigadier general in April 1986. In June of that year he returned to the West Coast as deputy commander of launch and control systems at Air Force Space Systems Division, where he was responsible for acquisition of Air Force launch vehicles, management of Air Force elements of the Space Shuttle Program, and management oversight of the Air Force Satellite Control Network.

Lindsay was designated director, Secretary of the Air Force Special Projects Office, and assistant commander, Headquarters, Space Systems Division, Los Angeles Air Force Base, in February 1987. At the same time, he served as the last full-time director of the National Reconnaissance Office Program A on the West Coast between 20 February 1987 and 31 December 1992, when the NRO combined its institutional programs into functional directorates. He was promoted to Major General on 1 October 1988. During his tenure, he focused on program integration, user satisfaction, launch successes, and new technologies.

Lindsay's awards and decorations include the Defense Distinguished Service Medal, the National Intelligence Medal, the NASA Distinguished Service Medal, the National Geographic Society's General Thomas D. White U.S. Air Force Space Trophy, the American Astronomical Society Military Space Trophy, the Defense Superior Service Medal, the Legion of Merit with oak leaf cluster, the Meritorious Service Medal with oak leaf cluster, the Joint Service Commendation Medal, and the Air Force Commendation Medal with oak leaf cluster. He died on 25 May 2015.

REAR ADMIRAL
VERNON L. LOWRANCE, USN

DIRECTOR OF PROGRAM C
23 JULY 1962-19 JUNE 1963

Vernon Long Lowrance was born on 19 April 1909 in Catawba, North Carolina. He entered the U.S. Naval Academy in 1926 and graduated with the class of 1930. He served on both surface ships and submarines until August 1937, when he returned to Annapolis for instruction at the Naval Postgraduate School. He then completed a tour of duty in the Hydrographic Office, Washington, D.C., and a year of service aboard the USS *Bushnell* on survey and mapping duty in the South Pacific.

During World War II Lowrance commanded three submarines, the USS *R-16,* the USS *Kingfish,* and the USS *Seadog*. On seven war patrols in these vessels, Lowrance and his crews destroyed more than 56,000 tons of Japanese shipping and severely damaged tens of thousands of additional tons. Near the end of the war and into the immediate postwar years, Lowrance commanded Submarine Divisions 121 and 72. In 1949, he served as reserve coordinator on the staff of the commander, Submarine Force, Atlantic Fleet, before taking command of Submarine Squadron 8.

From 1951 until 1953, Lowrance served as a plans officer on the staff of the commander-in-chief, Atlantic Fleet, before spending nearly a year as a student at the National War College. Then in July 1954, he assumed command of the cruiser USS *Macon* before returning to Washington, D.C., in September 1956, to serve as deputy director of naval intelligence for security in the Office of the Chief of Naval Operations. Returning to sea duty in December 1958, Lowrance commanded Cruiser Division 3 and, in December 1959, assumed command of the Training Command, U.S. Pacific Fleet.

In September 1960, Rear Admiral Lowrance was designated assistant chief of naval operations for intelligence and director of naval intelligence. While in this position, he also served as the first director of National Reconnaissance Office Program C, between 23 July 1962 and 19 June 1963. During this crucial time in the nation's history, as the U.S. Navy developed its first sea-based missile systems, Rear Admiral Lowrance directed development of a Navy signals intelligence satellite system and significant advances in antisubmarine warfare weapons systems. He died on 12 May 1995.

During his career, Lowrance received the Navy Cross, the Distinguished Service Medal with gold star, the Silver Star Medal with two gold stars, and the Bronze Star Medal with gold star and combat "V," in addition to several other campaign and service medals.

DR. HANS M. MARK

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
3 AUGUST 1977-8 OCTOBER 1979

Hans Michael Mark was born in Mannheim, Germany on 17 June 1929. He immigrated to the United States in 1940 and became a naturalized citizen in 1945. Educated at the University of California, Berkeley, he received a Bachelor of Arts in Physics in 1951, and a doctorate of philosophy from the Massachusetts Institute of Technology in 1954. From 1954 to 1955, he served as acting head of the Massachusetts Institute of Technology's Neutron Physics Group.

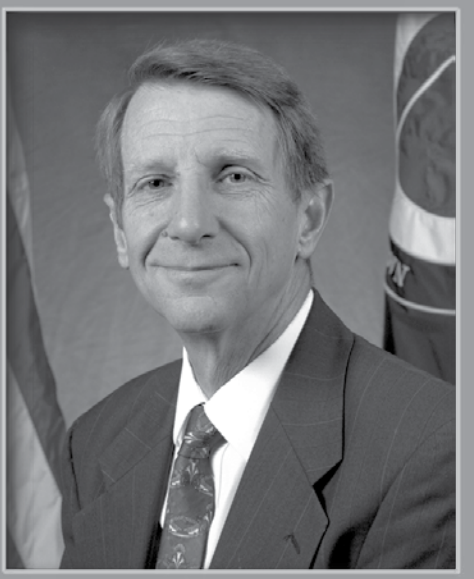
From 1955 until 1969, Mark was associated with the University of California at Berkeley, where he served as a professor of nuclear engineering and as department chair. He also served as a research scientist and division leader at the university's radiation laboratory, now known as the Lawrence Livermore National Laboratory. Mark led research groups working in nuclear and atomic physics and contributed to astrophysics and to programs developing instrumentation used in the testing of nuclear weapons.

Appointed as director of the National Aeronautics and Space Administration Ames Research Center in Mountain View, California in 1969, Mark served in this capacity until 1977. During his term as director, Mark was responsible for initiating the Bell XV-15 Experimental Tilt Rotor Aircraft Program that led to later development of the V-22 "Osprey" tilt rotor transport aircraft. While at Ames, he also supervised the Pioneer Planetary Exploration Program, and in 1975 and 1976, he served as a member of the President's Advisory Group on Science and Technology. He also lectured in the Department of Applied Science at the University of California, Davis and served as a professor of engineering at Stanford University.

Moving to Washington, D.C., in 1977, Mark entered full-time government service in August as under secretary of the Air Force and, concurrently, director of the National Reconnaissance Office, positions he held until 8 October 1979. During his tenure, he advocated the use of reusable launch vehicles and supervised major upgrades to existing satellite systems, while beginning a second major NRO expansion in budget and personnel.

Recognized as a public servant, educator, physicist, and engineer, Mark also worked with the Institute of Defense Analyses from 1958 until 1961, the National Science Foundation from 1966 until 1969, the Air Force Scientific Advisory Board from 1969 until 1976, and the President's Advisory Group on Science and Technology between 1975 and 1976. He also served on the Defense Science Board as well as the board of directors of the MITRE Corporation, BDM International, Astronautics Corporation of America, MAC Equipment Company, and Texas Biotech Corporation.

Mark is the author or co-author of more than 190 scholarly articles and numerous books including *Experiments in Modern Physics, The Management of Research Institutions, Power and Security, The Space Station: A Personal Journey,* and *Adventures in Celestial Mechanics*. He holds four honorary doctorates and has received numerous awards that include the Distinguished Service Medal from NASA, the Department of Defense Distinguished Public Service Medal, the Air Force Exceptional Civilian Service Award, as well as the NASA Exceptional Scientific Achievement and Exceptional Engineering Achievement Medals. He was elected to the National Academy of Engineering in 1976 and was a fellow of the American Physical Society, the American Institute of Aeronautics and Astronautics, and the American Association for the Advancement of Science.



MR. ROGER C. MARSH

DIRECTOR, MANAGEMENT SERVICES
& OPERATIONS OFFICE

15 JANUARY 1992-16 JULY 2001

The first director of the Management Services and Operations Office at the National Reconnaissance Office, Roger Carroll Marsh was born on 22 December 1945 in Charlottesville, Virginia. Raised and educated in Virginia, Marsh entered the U.S. Army in December 1965 and served in South Carolina, Maryland, and the Republic of South Vietnam.

In November 1967, Marsh joined the Central Intelligence Agency's Directorate of Intelligence. In 1971, he moved to the Directorate of Science and Technology, Office of Development and Engineering. During the next ten years, he held a series of management positions of increasing responsibility within the directorate. In March 1982, he became special assistant to the director of the Office of Development and Engineering. During this time, in 1977, he received a Bachelor of Science in Business Administration from George Mason University in Fairfax, Virginia.

On 15 January 1992, Marsh became the first director of the newly formed Management Services and Operations office at the NRO. As the senior administrative officer, he became responsible for providing all support services, which included facilities development and operations, headquarters security, human and personnel resources, information management, program services, logistics, and employee assistance programs. He retired on 16 July 2001 after nearly 36 years of government service. He died on 16 April 2006.

During his career, Marsh received numerous awards and commendations. Of special significance was the National Reconnaissance Office Gold Medal for Distinguished Service, recognizing his contribution in the consolidation and collocation of NRO headquarters in the Westfields facility in Chantilly, Virginia between 1992 and 1996. He also received the Central Intelligence Agency's Intelligence Medal of Merit in 1977 for his outstanding service in the development, acquisition, deployment, and operation of a sophisticated space-based technical intelligence collection system. The NRO recognized Marsh as a Pioneer of National Reconnaissance in 2005.

BRIGADIER GENERAL
JOHN L. MARTIN, JR., USAF

NRO STAFF DIRECTOR
14 JUNE 1962-2 AUGUST 1964
DIRECTOR OF PROGRAM A
1 JULY 1965-31 JULY 1969

John Landrum Martin, Jr., was born near Spartanburg, South Carolina on 18 October 1920. He studied mechanical engineering at Clemson A&M College from 1937 until July 1940, when he entered the U.S. Army Air Corps as a flying cadet. He received his wings in March 1941. After two years as a flight instructor, and after completing additional training in B-24 Liberator heavy bombers, in April 1943 Martin was assigned to the 444th Bombardment Group, 58th Bombardment Wing, XX Bomber Command, which took the first B-29 Superfortress bombers to the China-Burma-India Theater in April 1944 to begin bombing targets in enemy-occupied territories in Manchuria, China, and the Japanese home islands. He was one of the original B-29 aircraft commanders and was his squadron's operations officer. He flew 14 combat missions before returning to the United States in March 1945 to command a B-29 training group.

Following World War II, Martin earned a Bachelor of Science in Aeronautical Engineering from the Polytechnic Institute of Brooklyn in 1948, and a Master of Science in Aeronautical Engineering from the Massachusetts Institute of Technology in 1951. He then served three years as an assistant professor on the faculty of the Air Force Institute of Technology at Wright-Patterson Air Force Base, Ohio. In July 1954, he served at the Wright Air Development Center, where he was chief of the Flight Control Laboratory until reassigned to U.S. Air Force headquarters in Washington, D.C. in July 1958. In the summer of 1960, after serving two years on the Air Staff, he was reassigned to the Office of the Secretary of the Air Force as deputy director of the Office of Missile and Satellite Systems, led by Under Secretary of the Air Force Dr. Joseph V. Charyk. When SAF/MS became the Office of Space Systems (SAF/SS) and when the Headquarters, National Reconnaissance Office was organized following September 1961, Martin served as the second NRO staff director.

Promoted to the rank of brigadier general in 1963, Martin was reassigned in August 1964 as vice director, Office of Special Projects, also known as NRO Program A, in El Segundo, California. On 1 July 1965, Martin became director of Program A. In addition to directing Program A, he was deputy commander for satellite programs at the Space Systems Division of the Air Force Systems Command (which later became the Air Force Space and Missile Systems Organization). While serving as the director of National Reconnaissance Office Program A, Martin devised and implemented a special incentive contract structure for satellite projects that is still in use 30 years later, and he introduced important changes in component and system testing, as well as, a factory-to-pad system of processing satellite payloads and launch vehicles.

Among his decorations and awards are the Distinguished Service Medal, the Legion of Merit with one oak leaf cluster, the Distinguished Flying Cross with one oak leaf cluster, and the Air Medal with two oak leaf clusters. He died on 15 November 2009.

DR. JOHN L. MCLUCAS

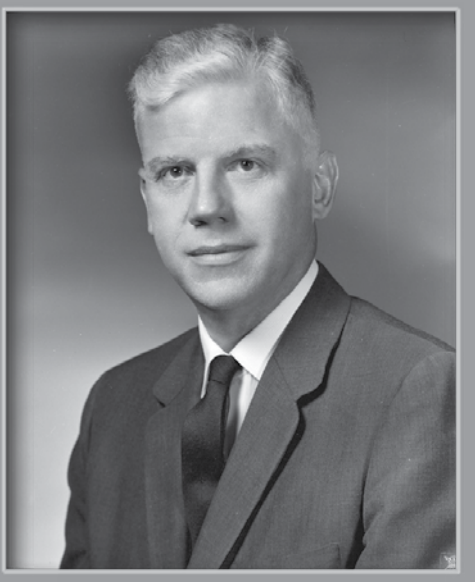
DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
17 MARCH 1969-20 DECEMBER 1973

John Luther McLucas was born in Fayetteville, North Carolina on 22 August 1920. He received a Bachelor of Science in Physics from Davidson College in 1941, and a Master of Science in Physics and Mathematics from Tulane University in 1943. After serving in the U.S. Navy as a radar, communications, and counterintelligence officer between 1943 and 1946, McLucas returned to school and completed a Doctorate of Science in Physics at Pennsylvania State University in 1950. Between 1946 and 1950, he served as a radar officer in the Pennsylvania Air National Guard and as a physicist at the U.S. Air Force Cambridge Research Center. McLucas then became vice president and technical director of Haller, Raymond, and Brown Incorporated, located in State College, Pennsylvania. He served as president of that company following its merger with Singer Corporation in 1957. He also founded and served as president of C-COR Electronics between 1953 and 1958.

In 1962, McLucas entered government service as deputy director of research and engineering, Tactical Warfare Programs, Department of Defense, where he stayed for two years. Going overseas, he then served as the assistant secretary general for scientific affairs, North Atlantic Treaty Organization, in Paris, France. Returning to private industry in 1966, McLucas became the president and chief executive officer of MITRE Corporation in Bedford, Massachusetts, while also serving the first of two terms as a member of the U.S. Air Force Scientific Advisory Board (1966-1969 and 1977-1984). During this period, he was also a member of the Advisory Committee of the Defense Intelligence Agency and the Defense Science Board.

In 1969, McLucas returned to government service as under secretary of the Air Force and director of the National Reconnaissance Office. At the NRO, he supervised the final operations of the Corona Project and guided development of a new generation of imaging satellites. Under his leadership, between 17 March 1969 and 20 December 1973, the National Reconnaissance Office significantly improved signals collection. Appointed secretary of the Air Force in 1973, McLucas become the first director of the National Reconnaissance Office to serve in both roles. He died on 1 December 2002.

In recognition of government service, McLucas received the Department of Defense Distinguished Service Award with bronze and silver palms. Among many other associations and groups, he was an honorary fellow of the American Institute of Aeronautics and Astronautics, a fellow of the Institute of Electrical and Electronic Engineers and the American Association for the Advancement of Science, and a member of the International Academy of Astronautics as well as the National Academy of Engineering.



DR. BROCKWAY MCMILLAN

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

1 MARCH 1963-1 OCTOBER 1965

Brockway McMillan was born in Minneapolis, Minnesota on 30 March 1915. Raised in Hinsdale, Illinois, he attended the Armour Institute of Technology and later the Massachusetts Institute of Technology, where he received a Bachelor of Science degree in mathematics in 1936. In 1939, he received a Doctorate of Science, also at the Massachusetts Institute of Technology. Between 1936 and 1939, McMillan served as a part-time instructor at MIT, and in 1941 and 1942 he held a research instructorship at Princeton University. Entering the U.S. Navy in 1942, he served at the Naval Proving Ground in Dahlgren, Virginia, and later at the Los Alamos Laboratory in New Mexico.

Following World War II, McMillan worked at the Bell Telephone Laboratories in New Jersey, eventually becoming director of military research. An advisor and consultant to the Department of Defense on weapons development in the late 1950s, he entered government service on 1 June 1961 as assistant secretary of the Air Force for research and development.

On 1 March 1963, McMillan became the second director of the National Reconnaissance Office and, on 12 June of that year, became under secretary of the Air Force. During his tenure as NRO director, until 1 October 1965, he guided the Corona program and the Defense Meteorological Satellite Program from fledgling status to continuing productive operation. After leaving the NRO, McMillan returned to Bell Laboratories where he worked until 1979. He died on 3 December 2016.

Dr. McMillan was a member of the National Academy of Engineering, a member and fellow of the Institute of Electrical and Electronic Engineers, a member and fellow of the American Association for the Advancement of Science, a member of the American Mathematical Society, and former president of the Society for Industrial and Applied Mathematics.

BRIGADIER GENERAL
THOMAS S. MOORMAN, JR., USAF

NRO STAFF DIRECTOR

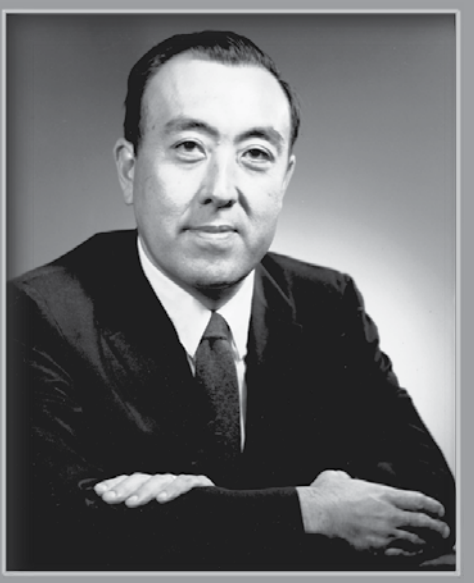
5 FEBRUARY 1985-18 OCTOBER 1987

Thomas Samuel Moorman, Jr., was born on 16 November 1940 in Washington, D.C. He was commissioned through the Air Force Reserve Officer Training Corps as a distinguished military graduate in 1962 at Dartmouth College in Hanover, New Hampshire, where he also received Bachelor of Arts degrees in history and political science. His first Air Force assignment was as an intelligence officer with a B-47 wing at Schilling Air Force Base in Kansas between July 1962 and August 1965. Moorman then served 14 months as an SR-71 mission planner with the 9th Strategic Reconnaissance Wing at Beale Air Force Base in California, while also completing Squadron Officer School at Maxwell Air Force Base. Going overseas, Moorman served 13 months as the operations officer of the 432nd Reconnaissance Technical Squadron at Udorn Air Force Base in Thailand, then supporting U.S. combat operations in Southeast Asia, until November 1967. He next served as a reconnaissance intelligence staff officer with the 497th Reconnaissance Technical Group at Schierstein, Federal Republic of Germany.

Returning to the United States, Moorman served between November 1970 and August 1975 as assistant director, later as executive officer, of the U.S. Air Force Special Photographic Processing Facility at Westover Air Force Base in Massachusetts. The Air Force Special Photographic Processing Facility, a component of the National Reconnaissance Office, processed film retrieved from space-based reconnaissance satellites including Corona, Argon, and Lanyard. During this time, he continued his education, earning a Master of Arts degree in Business Administration at Western New England College in Springfield, Massachusetts. In 1975, he also completed studies as a distinguished graduate at the Air Command and Staff College while he earned a Master of Arts degree in political science at Auburn University. That August, Moorman began four years of NRO service as staff executive director and, later, as deputy director of plans and programs. Immediately following that tour, Moorman completed studies at the National War College before becoming the deputy military assistant to two secretaries of the Air Force. He also completed studies at the Air War College by correspondence.

In August 1981 Moorman began a series of assignments in Colorado, first as director of space operations at the North American Aerospace Defense Command, then as deputy director of space defense with the Office of the Deputy Chief of Staff for Plans, Peterson Air Force Base, and then, between August 1982 and July 1984, as the first director of the Commander's Group, U.S. Air Force Space Command. During this assignment, he helped establish the U.S. Air Force Space Command; now many consider him a founder of the organization. Moorman's next assignment, between July 1984 and March 1985, was as vice commander of the 1st Space Wing. Returning to Washington, D.C., now-Brigadier General Moorman served as NRO staff director between 5 February 1985 and 18 October 1987.

In addition to holding the Master Space Badge, Brigadier General Moorman's awards include the Defense Distinguished Service Medal, the Air Force Distinguished Service Medal with oak leaf cluster, the Defense Superior Service Medal, the Legion of Merit with oak leaf cluster, the Meritorious Service Medal with oak leaf cluster, the Air Force Commendation Medal with oak leaf cluster, and the National Intelligence Distinguished Service Medal with oak leaf cluster, along with many other distinctions.



DR. F. ROBERT NAKA

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

1 JULY 1969-31 AUGUST 1972

Fumio Robert Naka was born on 18 July 1923 in San Francisco, California. He attended the University of California at Los Angeles but was removed from school in early 1942 and confined with other West Coast Japanese-Americans in an internment camp for nine months during World War II. Released to attend school, he completed his Bachelor of Science in Electrical Engineering at the University of Missouri in 1945, and subsequently earned a Master of Science in Electrical Engineering at the University of Minnesota in 1947. Continuing his education at Harvard University, he completed a Doctorate of Science in Electrical Optics in June 1951. Naka began his career as a staff member at the Lincoln Laboratory of the Massachusetts Institute of Technology, where he engaged in, and supervised, radar research. At the request of Edwin H. “Din” Land, in the mid-1950s he became involved in efforts to reduce the radar cross section of the U-2 high-altitude reconnaissance aircraft for the Central Intelligence Agency. In January 1959, he joined the MITRE Corporation, eventually becoming its chief scientist in 1969.

Dr. Naka served briefly as a consultant to the Central Intelligence Agency Directorate of Science and Technology from April 1969 until 1 July 1969, when he became the deputy director of the National Reconnaissance Office. He served in this position until 31 August 1972, while concurrently serving as deputy under secretary of the Air Force for space systems. Naka was the first official of the National Reconnaissance Office hired directly from private industry. As chair of the Naka Panel, he worked to devise, and later implement, a successful strategy that significantly improved overhead signals intelligence collection. He also supported research on what later became a new imagery satellite program.

Dr. Naka was a member of the National Academy of Engineering, the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, and the New York Academy of Sciences, as well as a fellow of the Explorers Club. He received the U.S. Air Force Exceptional Service award on four occasions, as well as the University of Missouri Honor Award for Engineering and the Faculty Alumni Award. He died on 21 December 2013.

CAPTAIN
LEE ROY PATTERSON, USN

DIRECTOR OF PROGRAM C

31 AUGUST 1981-10 SEPTEMBER 1982

Lee Roy Patterson was born in Stockton, California on 10 March 1931. He entered the U.S. Naval Academy in July 1950 and graduated with a Bachelor of Science degree with the class of 1954. After completing flight training at the Pensacola Naval Air Station in Florida in 1955, and having been designated a naval aviator in February 1956, Lieutenant Patterson was assigned to Hutchison Naval Air Station, Kansas, where he served as a flight instructor before joining Patrol Squadron 19 as a commander and avionics officer.

Following completion of a Master of Science degree in chemistry at the Naval Postgraduate School in Monterey, California in 1963, Patterson served for two years as a maintenance officer with Antisubmarine Squadron 26. Returning to the U.S. Naval Academy in September 1965, Patterson served as chair of the chemistry department until July 1968, when he became the assistant projects officer, Anti-Radiation Missile Systems Program, Naval Systems Command. Following a three-year assignment at the Bureau of Naval Personnel between February 1971 and August 1973, Patterson became head of the Ground Support Equipment Department at the Naval Air Engineering Center. Going overseas for his next assignment, Patterson served as commander of the branch office of the Office of Naval Research in London, England, before returning to the United States in August 1978 to become deputy manager of the High-Energy Laser Program at the Naval Sea Systems Command.

In August 1979, Captain Patterson became deputy director of the Navy Space Project, Naval Electronics Command, later serving as director of that office between August 1980 and September 1982. Patterson also served concurrently as director of the Navy's National Reconnaissance Office Program C between 31 August 1981 and 10 September 1982. As Program C director, Captain Patterson was instrumental in the development, acquisition, and operation of several joint service surveillance programs.

Captain Patterson's military awards and decorations include the Legion of Merit, the Meritorious Service Medal, the Navy Unit Commendation Medal, and the National Defense Service Medal.

MR. JAMES W. PLUMMER

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

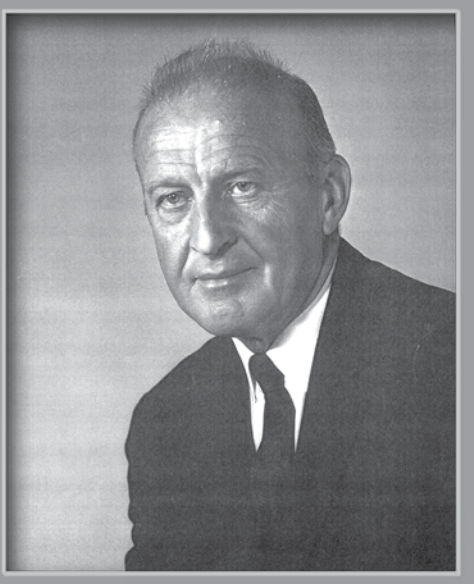
21 DECEMBER 1973-28 JUNE 1976

James Walter Plummer was born on 29 January 1920 in Idaho Springs, Colorado. He earned a Bachelor of Science in Electrical Engineering at the University of California, Berkeley in 1942, and a Master of Science in Electrical Engineering, at the University of Maryland in 1953. During the Second World War, Plummer served in the U.S. Navy in the Pacific as a member of Air Groups 10 and 90 aboard the USS *Enterprise*. He stayed in the U.S. Naval Reserve, rising to the rank of lieutenant commander by 1946. Following his military service, and during the completion of his education, Plummer served as a branch head of the Electronics Test Division of the U.S. Naval Test Center from 1947 until 1955. In that later year, Plummer joined the Lockheed Missile Systems Division (later the Lockheed Missile and Space Company) where he stayed until 1983, serving in various positions relating to military research and development and national security space programs.

During his time with the Lockheed Missile and Space Company, Plummer was closely involved with the National Reconnaissance Office as Lockheed's program manager of the Corona, Argon, and Lanyard systems, among other satellite programs. Plummer became the first National Reconnaissance Office director to come from private industry rather than from a military or government background. His National Reconnaissance Office tenure extended from 21 December 1973 until 28 June 1976. During his time as director, Plummer focused much of his efforts on developing electro-optical imaging systems.

Mr. Plummer was a member of the advisory board of the Naval Weapons Center, China Lake, California between 1971 and 1973, a member of the Defense Science Board in 1972, a consultant to the Office of the Secretary of Defense, and for a period of five years, a member of the Air Force Scientific Advisory Board.

Among his more notable decorations and awards are the Air Medal, the Defense Department Distinguished Public Service Award with oak leaf palm, the Air Force Meritorious Service and Exceptional Civilian Service Awards, the Robert H. Goddard Astronautics Award, the Air Force Association Jimmy Doolittle Award, and the Silver Knight of Management Award given by the Lockheed Missiles and Space Company Management Association. A published author, Plummer is also an honorary fellow of the American Institute of Aeronautics and Astronautics and a member of the American Astronautical Society and the National Academy of Engineering. He died on 16 January 2013.



DR. JAMES Q. REBER

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

1 SEPTEMBER 1965-30 JUNE 1969

James Quinter Reber was born on 16 July 1911 in Elizabethtown, Pennsylvania. He completed a Bachelor of Arts in History and Biological Sciences at Manchester College, Indiana in 1933, and a Master of Arts in History at the University of Chicago in 1935. From 1933 until 1937, he taught biology and social sciences in public schools before beginning work on a Doctorate of Philosophy in International Relations at the University of Chicago, a degree he completed in 1939.

Following employment as a public school teacher in Wabash, Indiana, and as an instructor at Washburn College in Kansas, Wilson City College in Chicago, Manchester College in Indiana, and then at the University of Chicago, Reber joined the U.S. State Department in August 1943. He remained at the State Department for seven years, working as a research associate, an economist, a foreign affairs specialist, and, eventually, chief of the Committee Coordinating Section, chief of the Staff Committee Secretariat, and chief of the Committee Secretariat. He also continued to teach part time at The American University in Washington, D.C. in 1946 and 1947.

Reber joined the Central Intelligence Agency in 1950, where he served as assistant director of the Office of the Intelligence Coordinator until 1954, and then as special assistant to the director for planning and coordination, Office of Intelligence Coordinator, until 1957. During the latter period, Reber chaired the Committee on Overhead Reconnaissance (COMOR) and its ad hoc predecessor that selected targets for U-2 reconnaissance overflights of the U.S.S.R. that began on 4 July 1956. This committee included representatives of all U.S. Intelligence Community elements and established the Highest Priority Targets list for reconnaissance overflight missions—a list that eventually would embrace targets for satellite reconnaissance as well.

Following other assignments in the Central Intelligence Agency's Directorate of Science and Technology, Reber became deputy director of the National Reconnaissance Office, a position in which he served between 2 September 1965 and 30 June 1969. During this time, he established a more effective working relationship between the Central Intelligence Agency and the Department of Defense in the conduct and operation of the National Reconnaissance Program. Highly respected within the U.S. Intelligence Community and regarded as entirely unprejudiced in service affiliations, as the NRO deputy director, Reber received the support of key CIA and Defense Department officials. He died on 16 January 2003.

MR. THOMAS C. REED

DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE
9 AUGUST 1976-7 APRIL 1977

Born on 1 March 1934 in New York City, Thomas Care Reed received a Bachelor of Science in Mechanical Engineering in 1956 at Cornell University, graduating first in his class. He received a Master of Science in Electrical Engineering at the University of Southern California in 1959. At Cornell, having enrolled in the Air Force Reserve Officer Training Corps as an undergraduate, Reed received his commission in June 1956 and served on active duty with the U.S. Air Force until May 1961, completing his service as a first lieutenant. Reed's duty assignments included time with the Air Force Ballistic Missile Division, where he served as the first technical project officer for the Minuteman re-entry vehicle, and at the University of California's Lawrence Radiation Laboratory (now known as the Lawrence Livermore National Laboratory), where he helped design devices fired in the Dominic nuclear test series of 1962. Thereafter he continued as a consultant to Livermore Laboratory through 1966, rejoining the laboratory in that capacity in 1988. In 1962, Reed founded and became managing partner of Supercon, Ltd. of Houston, Texas, a firm that developed and produced alloys that were superconducting at cryogenic temperatures. He remained with this company until 1965, when he organized and became the chief executive officer of the Quaker Hill Development Corporation in San Rafael, California.

Reed returned to government service in 1973, serving most of that year as an assistant to the secretary and deputy secretary of defense for various special projects. He served as director of telecommunications and command and control systems in the Office of the Secretary of Defense during 1974 and 1975, before becoming Secretary of the Air Force in 1976, the first secretary to have served previously as an Air Force officer. As Secretary of the Air Force between 9 August 1976 and 7 April 1977, a period that covered the election of 1976 and the transition from the administration of Republican President Gerald R. Ford to that of Democratic President Jimmy Carter, Reed also served as director of the National Reconnaissance Office. NRO Director Reed served during a time when the already operational film-return and signals intelligence satellite systems continued to extend their on-orbit lifetimes, and while the electro-optical imaging systems envisioned by his predecessors became operational. The latter project revolutionized overhead imaging.

COLONEL
CLASON B. SAUNDERS, USAF

DIRECTOR OF PROGRAM D

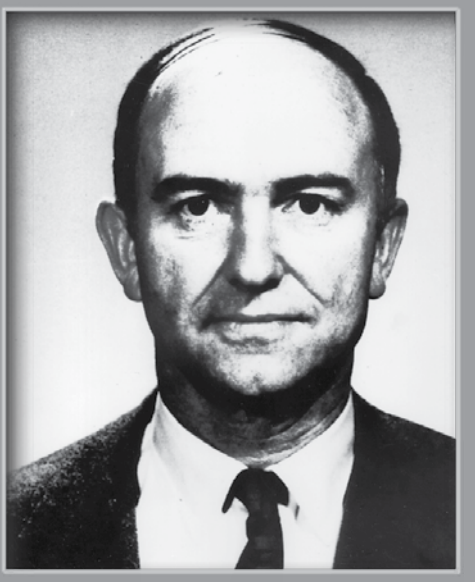
15 JULY 1966-31 OCTOBER 1967

Clason Bastable “Clay” Saunders was born in Westfield, New Jersey on 15 July 1918. He received a Bachelor of Arts degree from Northern Ohio University and participated in the Aviation Cadet Corps of the U.S. Army. Following flight training in fighters, he went to England, where he flew 57 combat missions over Europe during World War II.

After the war, Saunders began a career in military reconnaissance as commanding officer of the 30th Tactical Reconnaissance Squadron, Tactical Air Command. He went on to become chief of the Air Operations Center at Twelfth Air Force headquarters in Europe and chief of the Special Reconnaissance Division under the deputy chief of staff for operations with the U.S. Air Force Europe.

Colonel Saunders’ last career posting was as the director of the National Reconnaissance Office Program D from 15 July 1966 to 31 October 1967. There he managed and supported operations of high-altitude reconnaissance aircraft including the U-2, A-12, and SR-71. His technical expertise in optics and firsthand knowledge of aerial requirements associated with high-altitude reconnaissance greatly assisted Central Intelligence Agency and National Reconnaissance Office leaders. He died on 28 February 1995.

During his military career, Colonel Saunders received the French Croix de Guerre, the Belgian Fourragère, the Distinguished Flying Cross, two Air Medals, the Legion of Merit, and U.S. Air Force Commendation Medals.



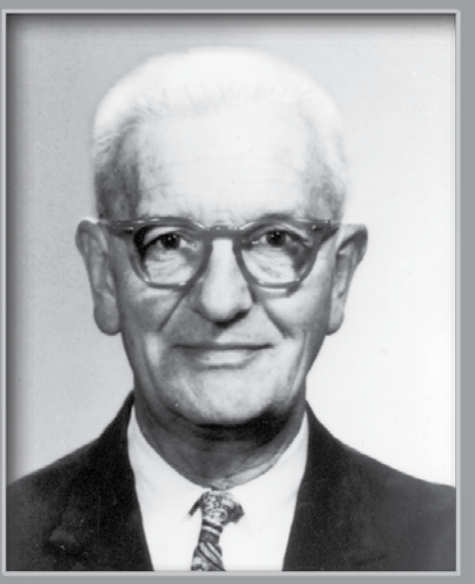
DR. HERBERT SCOVILLE, JR.

DIRECTOR OF PROGRAM B

1 MARCH 1962-14 JUNE 1963

Herbert “Pete” Scoville, Jr. was born on 16 March 1915 in New York City. He graduated from Yale University with a Bachelor of Science in Physics and Chemistry in 1937 and then earned a Doctorate of Science in Physics and Chemistry at the University of Rochester in 1942. He began his professional career as a chemist with the National Defense Research Committee in 1941. Between 1946 and 1948, he served as an Atomic Energy Commission senior scientist at Los Alamos Laboratory in New Mexico. He was also the technical director of the Armed Forces Special Weapons project from 1948 to 1955, helping to develop the nation’s nuclear arsenal. As early as 1954, however, Scoville called for negotiation of a U.S.–Soviet nuclear test ban treaty.

Scoville joined the Central Intelligence Agency in August 1952 as assistant director of the Office of Scientific Intelligence, the unit that tracked development of nuclear energy and missile technology in the U.S.S.R. In the late 1950s, he became one of the early developers of satellite technology required for peacetime strategic reconnaissance and eventual independent verification of the number and location of strategic nuclear weapons—an essential ingredient for arms control treaties. He became the first director of the National Reconnaissance Office Program B, serving from July 1962 to June 1963; he was the CIA’s deputy director for research between March 1962 and 14 June 1963, when he resigned from CIA. He is credited as one of the original developers of verification methods that became essential for ensuring compliance with later nuclear arms control treaties. He died on 31 July 1985.



MR. HUNTINGTON D. SHELDON

DIRECTOR OF PROGRAM B

27 SEPTEMBER 1965-13 JANUARY 1967

Huntington Denton “Ting” Sheldon was born on 14 February 1903 in Greenwich, Connecticut. Raised in England and France, Sheldon attended Eton College in England between 1916 and 1921, and he graduated from Yale University with a Bachelor of Arts in Economics in 1925. Sheldon first worked for Price Waterhouse as an auditor before accepting employment as an investment banker with Blair and Company in New York City, where he remained between 1927 and 1934. In the midst of the Great Depression, Sheldon became president of the Petroleum Corporation of American and stayed with this firm through 1942, when he joined the U.S. Army Air Forces, rising to the rank of colonel before the end of World War II. For several years following the war, Sheldon owned and operated a fish hatchery in Toms River, New Jersey.

In June 1952, Sheldon joined the Central Intelligence Agency and served in a variety of positions involving signals intelligence and with the United States Intelligence Board (USIB), before becoming special assistant to the deputy director, Directorate of Science and Technology, in November 1963. Two years later, he became director of the CIA’s Program B in the National Reconnaissance Program, a position in which he served from 27 September 1965 to 13 January 1967. During this time, he focused much of his efforts on management restructuring and the start of major imaging and signals intelligence satellite programs. Sheldon also helped mend strained relations between the Department of Defense and the Central Intelligence Agency over control of the National Reconnaissance Program. For outstanding performance during his government career, Sheldon received the Distinguished Intelligence Medal. He died on 19 May 1987.

BRIGADIER GENERAL
WILLIAM L. SHIELDS, JR., USAF

NRO STAFF DIRECTOR
18 MARCH 1976-12 JUNE 1978

William Laurie Shields, Jr. was born on 2 January 1928 in Napa, California. He graduated from high school in Biggs, California in 1944 and attended the University of California. In 1948, he entered the U.S. Military Academy at West Point, where he received a Bachelor of Science degree in 1952. Although Shields began his military career as a U.S. Army private in 1946, he received a second lieutenant's commission in the U.S. Air Force upon graduation from West Point. He completed pilot training in August 1953 at Williams Air Force Base, Arizona, and in December of that year completed fighter-gunnery training at Nellis Air Force Base in Nevada. He then served as a fighter-interceptor pilot in the 71st Fighter-Interceptor Squadron then stationed in Pittsburgh, Pennsylvania.

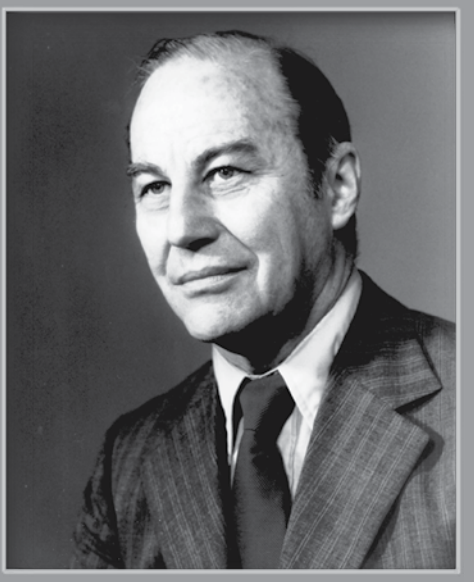
Continuing his education, Shields completed a Master of Science degree in nuclear engineering from the University of Michigan in 1958, before joining the Air Force Intelligence Center in Arlington, Virginia as an analyst specializing in Soviet and Chinese nuclear weapons programs. In September 1965, Shields earned a Doctorate of Science in Aeronautics and Astronautics from Stanford University. He then moved to the Air Force Weapons Laboratory at Kirtland Air Force Base in New Mexico, where he served as chief of the Aircraft Section in the Weapons Integration Branch, bearing responsibility for compatibility testing of nuclear weapons with tactical and strategic aircraft.

Shields returned to operational flying in October 1966, when he entered an F-4 Phantom operational training course at Davis-Monthan Air Force Base in Arizona. In June 1967, he left for the Republic of South Vietnam and served with the 12th Tactical Fighter Wing at the Cam Ranh Bay Air Base. During his service in Southeast Asia, he flew 104 combat missions. In December 1967, he served as an operations staff officer in the Directorate of Operational Requirements, Seventh Air Force headquarters, at Tan Son Nhut Air Base in Saigon, Republic of South Vietnam.

When he returned to the United States in July 1968, Shields served as a project scientist in the Mechanics Division, Air Force Office of Scientific Research in Arlington, Virginia. There he was responsible for research in aerophysics and aeroacoustics, and established that agency's scientific research program in aircraft wake turbulence. In September 1969, he transferred to U.S. Air Force headquarters in Washington, D.C. to serve as chief of the Analysis Division in the Directorate of Operational Requirements and Development Plans, where he managed long-range development planning studies and served as the directorate's representative on the Program Review Committee of the Air Staff Board.

In June 1971, Shields became executive assistant to the undersecretary of the Air Force, and he served in that position until July 1973. The following month, Shields attended the missile staff officers course at Vandenberg Air Force Base and in September was assigned as vice commander of the 44th Strategic Missile Wing at Ellsworth Air Force Base in South Dakota. Shortly thereafter, in February 1974, he became commander of the 321st Strategic Missile Wing at Grand Forks Air Force Base in North Dakota. On 15 December 1975, the Air Force promoted him to brigadier general. Brigadier General Shields became director, Office of Space Systems, Office of the Secretary of the Air Force, in March 1976. It was during this time that he served as staff director at the National Reconnaissance Office.

A command pilot with more than 3,500 flying hours, Brigadier General Shields wore the Senior Missileman Badge. His military decorations and awards include the Legion of Merit with two oak leaf clusters, the Distinguished Flying Cross, the Bronze Star, the Air Medal with five oak leaf clusters, the Air Force Commendation Medal, the Air Force Outstanding Unit Award ribbon with "V" device, and the Republic of South Vietnam Cross of Gallantry with palm.



MR. ROBERT D. SINGEL

DEPUTY DIRECTOR OF THE
NATIONAL RECONNAISSANCE OFFICE

18 SEPTEMBER 1972-15 JULY 1974

Robert Duane Singel was born in Eau Claire, Wisconsin on 4 December 1919. He entered the University of Wisconsin in February 1939 and received a Bachelor of Science in Geology in June 1942. Upon graduation, Singel began working as a cartographic drafter and hydrographic and geodetic engineer for the U.S. Department of Commerce, Coast and Geodetic Survey, Division of Charts. During World War II, he entered the U.S. Navy as a lieutenant (j.g.) and received his naval aviator wings in February 1947.

Singel remained with the Department of Commerce until joining the Central Intelligence Agency Geophysics Division as a seismologist in December 1950. During this time, he also studied geography at The George Washington University in Washington, D.C. At the Central Intelligence Agency between 1952 and 1965, he served in a variety of positions dealing with military, scientific, and space requirements with the Space Division and the Directorate of Science and Technology. He completed a Master of Business Administration degree at The George Washington University in 1967. In that same year, he also completed a course of study in business administration at the Industrial College of the Armed Forces. He was the first assignee from the Office of Science and Technology to the CIA Office of the Inspector General, where he served for two years.

In May 1970, Singel became deputy director for special activities, the CIA office in the Directorate of Science and Technology responsible for U-2 reconnaissance aircraft. Two years later, on 18 September 1972, he joined the National Reconnaissance Office as its deputy director, serving until 29 July 1974. Singel was prominent in the field of electronic intercept—an area in which he possessed exceptional knowledge, having earlier developed procedures to interpret foreign telemetry. During his career, he introduced many important changes in signals collection.

Robert Singel received the Intelligence Medal of Merit for managing the reconfiguration of P-3A Orion aircraft for low-level reconnaissance, the Air Force Outstanding Unit Award, and the Meritorious Unit Citation for successful U-2 deployments. He died on 15 May 2009.

REAR ADMIRAL
JAY W. SPRAGUE, USN

DIRECTOR OF PROGRAM C

31 JANUARY 1992-31 DECEMBER 1992

Born in St. Louis, Missouri on 13 May 1943, Jay Woodrow Sprague entered the U.S. Naval Academy in June 1961 and completed a Bachelor of Science degree, graduating with the class of 1965. After flight training in Florida and Georgia, Sprague earned his wings in August 1966 and completed a Master of Science in Computer Science at the Naval Postgraduate School in 1972. He subsequently served at sea with Carrier Airborne Early Warning Squadron 11 and as an avionics officer in VAW-113, completing two combat deployments to Southeast Asia during the Vietnam War. Sprague was operations officer in VAW-125 during that squadron's first deployment of the E-2C Hawkeye airborne early warning aircraft. He also served, between February 1979 and July 1981, as executive officer and then as commander of VAW-121 during its first E-2C deployment. During his tenure as commander, the squadron received three consecutive Battle "E"s, the CNO Safety "S," and the Airborne Early Warning Excellence Award.

Ashore between 1981 and 1987, Sprague served as an instructor for the E-2B aircraft fleet introduction and as project officer for the first E-2C tactics trainer procurement. He was the naval flight officer in charge of training and later commanding officer of VAW-120 and the E-2/C-2 training squadron during fleet introduction of the C-2A Greyhound. In Washington, D.C., he served as special assistant to the director, naval warfare, on the staff of the deputy commander for research and development at the Naval Air Systems Command, and as military assistant to the deputy assistant secretary of the Navy.

In July 1987, Sprague reported to the Naval Air Systems Command as deputy to the U.S. Navy air acquisition executive and deputy commander for operations. Following this position, from May 1988 to January 1992, Sprague served as program manager for the E-2C and the C-2A at the Naval Air Systems Command. Promoted to rear admiral, Sprague reported in January 1992 as the assistant commander for space technology and as the last director of the U.S. Navy's National Reconnaissance Program C, serving in this post until 31 December 1992, when the NRO reorganized its alphabetic programs into functional directorates.

Rear Admiral Sprague received the Legion of Merit, the Meritorious Service Medal, the Air Medal, the U.S. Navy "E" Ribbon, and the Republic of South Vietnam Air Gallantry Cross.

CAPTAIN
JAMES M. STEPHENSON, USN

DIRECTOR, OPERATIONAL SUPPORT OFFICE
28 AUGUST 1992-1 SEPTEMBER 1993

James Mell Stephenson was born in Athens, Georgia on 9 August 1946. He attended Valdosta State University, where he earned a Bachelor of Science in Business Administration in 1968. Following flight training at the U.S. Naval Air Station, Pensacola, Florida between March 1969 and March 1970, Stephenson began his career as a naval flight officer in an EC-121M aircraft conducting reconnaissance missions in support of military operations in the Republic of South Vietnam, as well as national priority collections throughout the Western Pacific as part of Fleet Air Reconnaissance Squadron 1. Stephenson remained with that unit from August 1970 until March 1973; he also qualified as a senior evaluator and accumulated over 3,000 flight hours in various aircraft including the EC-121, EP-3E, and EA-3B. Subsequently, between March 1973 and March 1976, he joined the Joint Strategic Target Planning Staff at Strategic Air Command headquarters at Offutt Air Force Base in Bellevue, Nebraska, where he was responsible for special targeting operations in support of the Single Integrated Operational Plan (SIOP). Additionally, he was singly responsible for the threat and route analysis for all planned manned bomber sorties.

In April 1976, then-Lieutenant Stephenson began a 13-year association with the EA-6B "Prowler" community. During that period, he served in two operational squadrons and with the Fleet Replacement Training Squadron. His first operational squadron tour was with Tactical Electronic Warfare Squadron 130 from 1976 until 1979. Then from 1979 until 1982, he served as head of the Electronic Warfare Department in Tactical Electronic Warfare Squadron 129 and reached the rank of lieutenant commander. In 1982, he served at the Naval Air (NAVAIR) Systems Command in Washington, D.C. During this assignment, Lieutenant Commander Stephenson was responsible for the development and deployment of the Tactical EA-6B Mission Support System, as well as the advanced tactical jammer and exciter for the Improved Capability II (ICAP II) ALQ-99 System. While assigned to NAVAIR, Lieutenant Commander Stephenson was one of the key managers in the integration of the High Speed Anti-Radiation Missile (HARM) on the EA-6B aircraft. Promoted to the rank of commander, the Navy selected Stephenson for aviation command, and he returned to the Naval Air Station at Whidbey Island, Washington with Squadron 140.

Commander Stephenson subsequently served in the U.S. Navy's Space Technology Program Office between May 1989 and August 1992, where he managed the evolution and deployment of the Tactical Receive and Related Applications Broadcast Program and the multi-mission advanced tactical receiver. In 1990, he established and directed the Systems Application Program Office, which provided crucial support to the Joint U.S. and multinational coalition forces later deployed against Iraq during Operations Desert Shield and Desert Storm. On 28 August 1992, Captain Stephenson joined the National Reconnaissance Office, where he became director of the newly formed Operational Support Office, established to provide closer liaison between the NRO and its customers and mission partners, adapting to lessons learned during the Gulf War. He served in this position until 1 September 1993, when he retired from the U.S. Navy.

During his 25 years of active military duty, Captain Stephenson engaged in tactical and strategic strike operations, tactical reconnaissance, and electronic warfare. Besides attending Valdosta State University, he completed courses of study at Creighton University in Omaha, Nebraska, and at the Defense Management College. In recognition of his service, Captain Stephenson received the Defense Superior Service Medal, the Meritorious Service Medal, the Air Medal with three gold stars, the Navy Commendation Medal with Combat "V," the Joint Service Commendation Medal, and numerous other awards and citations.

BRIGADIER GENERAL
JAMES T. STEWART, USAF

NRO STAFF DIRECTOR

3 AUGUST 1964-1 FEBRUARY 1967

James Thompson Stewart was born in St. Louis, Missouri on 2 April 1921. He attended the University of Michigan, and in 1941, he enlisted as an aviation cadet and received his pilot wings and a commission as a second lieutenant in the U.S. Army Air Corps Reserve at Brooks Field, Texas. In 1942, Stewart served in the 116th Observation Squadron at Fort Lewis, Washington, where he flew coastal patrol missions during the early months of World War II. That fall, he attended B-17 Flying Fortress transition training at Geiger Field, Washington, where he became an instructor pilot. Shortly thereafter, he became a flight leader in a newly activated B-17 bombardment group that went to England in May 1943. The next month, Stewart became commander of the 508th Bombardment Squadron, 351st Bombardment Group, Eighth U.S. Army Air Force, stationed in Polebrook, England, and subsequently flew combat missions against Axis targets in Europe until V-E Day in May 1945. Following World War II, Stewart returned to the University of Michigan and graduated in June 1948 with a Bachelor of Science in Aeronautical Engineering.

Following the completion of his education, Stewart served at the Air Proving Ground Command at Eglin Air Force Base in Florida, where for the next four years he held key posts in operational suitability test organizations. During his tour at Eglin, he helped pioneer techniques for long-range cruise control and dive-bombing delivery of nuclear weapons in jet fighter aircraft. In 1952, Stewart transferred to the Far East Air Force headquarters in Tokyo, Japan, at the height of the Korean War. There he helped establish requirements for war materiel, supervised local modifications of equipment, and served as a key planner in the development of nuclear delivery capability of F-84 aircraft. During the last year of his tour, he became assistant deputy for operations for the Far Eastern Air Force. In 1955, he was assigned to U.S. Air Force headquarters in Washington, D.C., in a research and development planning and programming capacity, and subsequently, became the assistant for development planning. In 1958, he published a book entitled *Airpower: The Decisive Force in Korea.*

Stewart continued his education, attending the Industrial College of the Armed Forces from August 1959 until June 1960. He then joined the Air Research and Development Command (ARDC) at Andrews Air Force Base in Maryland as assistant for programming and later as assistant deputy chief of staff for systems, when ARDC became the Air Force Systems Command. In 1962, Stewart returned to Air Force headquarters as executive officer to the deputy chief of staff for research and development. The next year, he became director of science and technology, while also attending night classes at The George Washington University in Washington, D.C., where he earned a Master of Business Administration degree. The following year, in August 1964, Stewart served in the Office of the Secretary of the Air Force as director, Office of Space Systems. During this three-year period, between August 1964 and February 1967, Stewart served as staff director of the National Reconnaissance Office. He died on 3 September 1990.

Brigadier General Stewart received the Air Medal seven times, as well as the French Croix de Guerre. He also received the Distinguished Flying Cross twice, as well as the Distinguished Service Medal, the Legion of Merit with oak leaf cluster, the Bronze Star, the Air Force and Army Commendation Medals, the European-African-Middle Eastern Campaign Medal with six service stars, the World War II Victory Medal, the Korean Service Medal, and the United Nations Service Medal.

MR. BOYD D. SUTTON

DIRECTOR OF PLANS & ANALYSIS

1 OCTOBER 1992-5 JUNE 1994

Boyd Davis Sutton was born in Phoenix, Arizona on 29 July 1941. He lived overseas with his parents from 1947 to 1959 while his father served with the Central Intelligence Agency in various posts in Europe and the Middle East. He earned a Bachelor of Arts in Political Economy from Pennsylvania Military College in 1964. On graduation, he received a commission as a second lieutenant in the U.S. Army. Following infantry officer basic and airborne training, he served with the 25th Infantry Division stationed in Hawaii. He deployed overseas with the 1st Battalion (Mechanized), 5th Infantry, for combat duty in the Republic of South Vietnam, where he served as a platoon leader, assistant battalion logistics officer, and battalion intelligence officer.

When he returned to the United States, then-Captain Sutton attended the Area Officers Intelligence Course at Ft. Holabird, Maryland. He then accepted an assignment with the 513th Military Intelligence Group in the Federal Republic of Germany, where he specialized in human intelligence collection. He completed a second tour of duty in South Vietnam in mid-1968 and served with the 525th Military Intelligence Group, then working on a clandestine project with the Central Intelligence Agency. He received two Bronze Star medals during this tour.

Returning from South Vietnam, Captain Sutton worked at the Defense Intelligence College, then moved to the Defense Intelligence Agency, where he created a new branch of analysis to study Soviet command and control systems. He subsequently joined CIA in a military capacity before resigning his commission to accept a permanent CIA position. He served in various analytic assignments studying Soviet military forces. As an estimate manager, he worked on the annual assessments of Soviet strategic forces. He then became the chief of the Soviet and Warsaw Pact Ground Forces Branch, serving in that capacity during the Soviet invasion of Afghanistan in late 1979 and the Polish crises of 1981 and 1982.

Mr. Sutton was selected for attendance at the National War College in 1982 and received first prize from the chairman of the Joint Chiefs of Staff, Gen. John W. Vessey, Jr., for his essay on “Strategic and Doctrinal Implications of Deep Attack Concepts for the Defense of Central Europe.” Sutton then served in the Office of the Assistant Secretary of Defense for International Security Policy, where he managed production of papers on the use of advanced technologies to improve NATO’s conventional defenses, working closely with the Secretary of Defense and U.S. Congress. For his work in this position, which led to changes in U.S. and NATO strategies, Sutton received the Defense Superior Service Medal by Secretary of Defense Caspar W. Weinberger.

Mr. Sutton returned to the Central Intelligence Agency in 1985 and created a new staff to analyze collection program investments. In this capacity, he became a principal advisor to Director of Central Intelligence William J. Casey and was instrumental in guiding several major investment decisions in the late-1980s. During this time, he entered the Harvard University program for senior government executives. When Director of Central Intelligence William H. Webster established a panel in early 1989 to examine potential restructuring of the National Reconnaissance Office, Sutton was the CIA member. This effort led to creation of the NRO’s office of Plans and Analysis, with Mr. Sutton as its first deputy director. Sutton served in that capacity until becoming director of the NRO Office of Plans and Analysis on 1 October 1992, serving in that position until 5 June 1994.

He continued to work at the CIA until his retirement in 1996. He died on 17 April 2018.

COLONEL EDWIN F. SWEENEY, USAF

NRO STAFF DIRECTOR

21 AUGUST 1970-31 MAY 1971

Edwin F. Sweeney was born in Shortsville, New York on 24 June 1921. He entered the U.S. Army Air Corps as an aviation cadet on 15 January 1942, and he received his wings and a commission as a second lieutenant on 10 October 1942.

After serving in the Southeast Training Command in B-26 Marauder and B-24 Liberator aircraft in 1943, he worked at the Army Air Force Proving Ground Command at Muroc Field, California and at the Cold Weather Testing Detachment at Ladd Field in Fairbanks, Alaska Territory. In September 1945, he was assigned to the chairman of the board of military advisors of the U.S. Strategic Bombing Survey at the Pentagon in Washington, D.C., and piloted a B-17 aircraft that flew this group around the world as they assessed the impact and effectiveness of the American strategic bombing campaign against Axis powers during the Second World War. Leaving the service following this assignment, Sweeney entered Purdue University in Indiana, graduating with a Bachelor of Science degree in 1949.

Returning immediately to the Air Force after completing his education, Sweeney completed Atomic Energy and Airborne as well as Ground Radar training at Keesler Air Force Base in Biloxi, Mississippi. In 1951, he joined the Office of the Assistant for Atomic Energy with duty at Shemya, Aleutian Islands, in the Alaska Territory as an operations officer. From 1952 through 1955, Sweeney served with the 1009th Special Weapons Squadron at Eniwetok Atoll in the Marshall Islands, at McClellan Air Force Base in California, at Eielson Air Force Base in Alaska, and at Bikini Atoll in the Marshall Islands, as an air operations officer. After a further one-year tour in 1956 at Headquarters, 1009th Special Weapons Squadron, located within U.S. Air Force headquarters, Sweeney joined Team 407 of the 1009th Special Weapons Squadron, then stationed at Yokota Air Base, Japan as director of operations of the 35th Fighter-Inceptor Wing (Sampling).

Continuing his service education, Sweeney graduated from the Air War College at Maxwell Field, Alabama, and from the Armed Forces Staff College at the Norfolk Naval Operations Base in Virginia by 1959. He then served at the Air Force Ballistic Missile Division with responsibility for planning the deployment of prototype intercontinental ballistic missiles into hardened missile silos. In 1962, while he served as executive officer for the deputy for engineering, the military temporarily assigned him to the Project Forecast Office at the RAND Corporation in Santa Monica, California as executive officer providing administration and technical support for 200 scientists and engineers. In 1964, Sweeney transferred to the Office of the Deputy Director for Advanced Plans at Space Systems Division headquarters, where he served for three years. He then moved to Air Force Systems Command headquarters at Andrews Air Force Base, Maryland, in 1967 as program director for Compass Link, a system successfully deployed to the Republic of South Vietnam that year. Sweeney reported to the National Reconnaissance Office in 1968 and first served as deputy director of technical services. On 21 August 1970, Colonel Sweeney became NRO staff director and remained in this position until 31 May 1971.

Among Colonel Sweeney's many military awards and decorations are the Legion of Merit, the Air Medal, the U.S. Army Commendation Medal with two oak leaf clusters, and the Air Force Commendation Medal with three oak leaf clusters.

REAR ADMIRAL
RUFUS L. TAYLOR, USN

DIRECTOR OF PROGRAM C
19 JUNE 1963-14 JUNE 1966

Rufus Lackland Taylor was born in St. Louis, Missouri on 6 January 1910. He entered the U.S. Naval Academy in 1929 and graduated with the class of 1933. On accepting his commission in the Navy in June 1934, Taylor joined the USS *Arizona*, serving with that ship's aviation unit, Observation Squadron 2-B, before transfer late in 1936 to duty aboard the destroyer USS *Preston*. From September 1938 until September 1941, Taylor was a student of the Japanese language at the U.S. Embassy in Tokyo, Japan, before transferring to Headquarters, Sixteenth Naval District, located at Cavite, Philippine Islands, for duty as a communications officer. After the Japanese invasion of the Philippines in late December 1941, and the subsequent surrender of American and Filipino forces on the Bataan Peninsula and Corregidor Island in April and May 1942, Taylor was among the very few Americans who escaped from the islands by motor torpedo boat and submarine to Australia. From April 1942 until February 1943, he served on the staff of the commander, Allied Naval Forces, Southwestern Pacific.

Returning to the United States, Taylor served from March 1943 until November 1944 in the Office of the Chief of Naval Operations in Washington, D.C. Ordered to the Pacific in December 1944, he performed various intelligence duties at Headquarters, Fourteenth Naval District, at Pearl Harbor, Hawaii for the remainder of the war. Following the war, Taylor continued with his communications intelligence activities, serving in a series of appointments including director of the Office of Naval Intelligence.

From 19 June 1963 until 14 June 1966, Rear Admiral Taylor served as director of the U.S. Navy's National Reconnaissance Office Program C. During his NRO tenure, Taylor was instrumental in supervising the introduction and operation of an important low-altitude signals intelligence satellite system. Following service at the National Reconnaissance Office, the Navy promoted Taylor to vice admiral and appointed him deputy director of the Central Intelligence Agency, where he served until 1 February 1969. He had the distinction of being the only NRO program director to serve in this capacity within the CIA, serving as deputy director of the Defense Intelligence Agency during this same period. He died on 14 September 1978.

His awards and decorations, in addition to nine campaign and service medals, include the Distinguished Service Medal, the Central Intelligence Agency Distinguished Service Medal, the Bronze Star Medal with combat "V," the U.S. Army Distinguished Unit Badge with oak leaf cluster, and the U.S. Navy Unit Commendation Ribbon.

BRIGADIER GENERAL
DONALD R. WALKER, USAF

NRO STAFF DIRECTOR
6 FEBRUARY 1989-30 NOVEMBER 1992

DIRECTOR OF PLANS & ANALYSIS
JANUARY 1990-30 DECEMBER 1992

DIRECTOR OF SIGINT SYSTEMS, ACQUISITIONS, AND OPERATIONS DIRECTORATE
4 DECEMBER 1992-16 JULY 1995

Donald Robert Walker was born on 26 April 1944 in Buffalo, New York. He entered the U.S. Air Force Academy in 1962 and graduated with a Bachelor of Science in Engineering Science in 1966. Upon graduation, he received a second lieutenant's commission. Walker's first active-duty assignment was as a propulsion project engineer in the Titan III Systems Program Office of the Space and Missile Systems Organization at the Los Angeles Air Force Station in California. From September 1969 until February 1971, he continued his education at the University of Southern California through the Air Force Institute of Technology Program and earned a Master of Science in Mechanical Engineering, while at the same time completing Squadron Officer School.

Walker next served as a project engineer in the Engineering Division at Ogden Air Logistics Center, Hill Air Force Base, Utah, before transferring in June 1974 to the Sunnyvale Air Force Station in California, serving as deputy commander for satellite operations and mission director with the Air Force Satellite Control Facility. In 1980, he completed a Master of Arts in Business Administration at Auburn University and studies at the Air Command and Staff College, before assignment to the National Reconnaissance Office, Office of Space Systems with the Office of the Secretary of the Air Force. There he served as director of national space systems planning and as deputy director for systems and technology. Five years later, in June 1985, he returned to the Los Angeles Air Force Station as director of operations with NRO Program A. At the same time, Walker completed studies at the Air War College and was designated a distinguished graduate in 1985.

In July 1986, Walker returned to Sunnyvale, California to serve as the last commander of the Air Force Satellite Control Facility and as the first commander of the Consolidated Space Test Center at Onizuka Air Force Station. There he was responsible for the worldwide satellite control network and mission control center that provided on-orbit support to National Reconnaissance Office and Department of Defense spacecraft. In November 1987, Walker became program director for the Defense Satellite Communications System (DSCS) and deputy commander for defense surveillance at the Los Angeles Air Force Base, where he was responsible for the acquisition and operation of the DSCS, NATO III, Fleet Satellite Communications, and Air Force Satellite Communications programs.

On 6 February 1989, Walker became director of the Office of Space Systems within the Office of the Secretary of the Air Force in Washington, D.C., as staff director of the National Reconnaissance Office. Promoted to the rank of brigadier general on 1 May 1990, Walker became director of the NRO Office of Plans and Analysis, a position he held until 30 December 1992. That same year, on 4 December, Brigadier General Walker became director of the Special Projects Office, Office of the Secretary of the Air Force, at Los Angeles Air Force Base in California, as well as the first director of the newly created National Reconnaissance Office Signals Intelligence Systems Acquisition and Operations Directorate, remaining in the latter position until 16 July 1995.

Among Brigadier General Walker's military awards and decorations are the Legion of Merit, the Meritorious Service Medal with three oak leaf clusters, the Air Force Commendation Medal, the Air Force Outstanding Unit Award with oak leaf cluster, the Air Force Organizational Excellence Award with two oak leaf clusters, and the National Defense Service Medal. He was a member of the Tau Beta Pi National Engineering Honorary Fraternity and was chosen as an Honorary Chief Master Sergeant in 1987.

COLONEL
HAROLD P. WHEELER, USAF

DIRECTOR OF OFFICE OF SPACE SYSTEMS
1 OCTOBER 1974-18 MARCH 1976

Harold Peyton Wheeler was born in Champaign, Illinois on 25 March 1932. He graduated from the United States Military Academy at West Point in 1953, but chose to go into the Air Force. After graduation, he received pilot training in the C-54 Skymaster at Kadena Air Force Base in Okinawa. In 1957, he became Commandant of Cadets and class director for Air Sciences for the Air Force ROTC program at Bradley University in Peoria, IL. Wheeler then went on to the Air Force Institute of Technology and received his Master's degree in astronautics in 1962.

For the next three years, Wheeler was an operations officer and then chief of Development Division at the Central Inertial Guidance Test Facility at Holloman AFB in New Mexico. In 1965, he served for a year as an Air Force liaison officer at the Massachusetts Institute of Technology in Cambridge, MA. In 1966, Wheeler served a combat tour in Vietnam as a squadron advisor for the Vietnamese 417th Transport Squadron, where he activated the squadron, brought it to combat ready status, and flew on 111 missions.

Wheeler returned to the United States in 1967 and reported to the NRO for the first time as a program manager for the SAF/Special Projects Office at Los Angeles Air Force Station. In 1970, he attended the Air War College at Maxwell AFB in Alabama, and after graduation in 1971, he was assigned to the Pentagon as the chief of the Requirements, Development, Test, and Evaluation Programming Division.

He returned to the NRO in 1974, first as the deputy for programs and later director in the Office of Space Systems (SAF/SS), serving as the NRO Staff director from 1 October 1974 until 18 March 1976. Col. Wheeler returned to the Air Force as part of Air Force Systems Command and retired in 1981. He died on 5 March 1983.

Col. Wheeler's military decorations included the Legion of Merit, the Distinguished Flying Cross, the Bronze Star, the Meritorious Service Medal, the Air Medal, and the Air Force Commendation Medal.

REAR ADMIRAL
GROVER M. YOWELL, USN

DIRECTOR OF PROGRAM C
1 JULY 1977-29 AUGUST 1981

Grover McClelland Yowell was born in Paducah, Texas on 30 October 1928. He entered the U.S. Navy through the Aviation Midshipman Program in May 1946, earning his wings as a naval aviator in October 1949. He joined Patrol Squadron 5 in Jacksonville, Florida in 1950 as an electronics officer. There he was responsible for avionics maintenance of squadron aircraft; at the same time he trained for, and qualified as, a patrol plane commander in P-2V Neptune aircraft. In July 1953, he entered the Naval Postgraduate School in Monterey, California, receiving both a Bachelor of Science and a Master of Science in Electrical Engineering in 1956. He then joined Air Development Squadron 1 in Key West, Florida, where he managed, and was a project pilot for, antisubmarine warfare equipment evaluation programs for radar, acoustic, magnetic, and infrared detection of submarines.

In July 1959, Yowell was assigned to the Naval Air Development Center in Warminster, Pennsylvania, where he directed the ANEW Program, which proposed to install the first programmable digital computer in antisubmarine warfare aircraft. That first computer was actually borrowed from an Air Force space program, an early example of inter-service cooperation, and was installed and tested in Navy P-3C Orion aircraft at the Naval Air Development Center. The outgrowth of this program became an integrated avionics system structured around a central digital computer for the P-3C aircraft. In August 1962, Yowell joined COMFAIRHAWAII as staff avionics officer. Three years later, he entered Stanford University, where he received a Doctorate of Science in Engineering Economics Systems in October 1968. He then joined the Anti-Submarine Warfare Systems Project Office, and while in that post, assumed responsibility for management, planning, and programming of all air anti-submarine warfare projects. In August 1972, he became a plant representative in Burbank, California, and two years later in June 1974, he returned to the Naval Air Development Center in Warminster, Pennsylvania as its commander.

In June 1976, Yowell was ordered to the Naval Air Systems Command in Washington, D.C., where he was assigned as assistant commander for research and technology and thereby took on responsibility for all research and development projects in that command. Selected for flag rank on 27 June 1977, the Navy promoted him to rear admiral. Following this promotion, Yowell had concurrent responsibilities as manager of the Navy Space Project in the Naval Electronic Systems Command, Washington, D.C., and as director of Program C for the National Reconnaissance Office. This unique assignment gave him responsibility for all U.S. Navy space programs, supporting the Navy's emerging space systems requirements, principally in communications, navigation, and weather. He served in this capacity between 1 July 1977 and 29 August 1981. During his tenure on the overt U.S. Navy side, the Navy launched the first of the planned FLTSATCOM satellites for communications between ships, submarines, and aircraft and initiated the next-generation system, the LEASAT. On the NRO covert side in Program C, under Rear Admiral Yowell's leadership, NRO maintained ongoing program operations in support of military units for all services and expanded the reconnaissance constellation through successful launches of additional satellites. Further, NRO approved and funded a major redesign for an advanced system with improved capabilities in timeliness, identification, and accuracy. Yowell retired from active military service when his assignment with the National Reconnaissance Office ended on 29 August 1981.

Rear Admiral Yowell is the recipient of the Navy Service Medal, the Legion of Merit with gold star, the Meritorious Service Medal, and the Navy Unit Citation. He died on 20 June 2009.

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