DIRECTORS

OF THE NATIONAL RECONNAISSANCE OFFICE

AT 50 YEARS

NATIONAL RECONNAISSANCE OFFICE

50 YEARS OF VIGILANCE FROM ABOVE

DIRECTORS
OF THE NATIONAL RECONNAISSANCE OFFICE
AT 50 YEARS

CENTER FOR THE STUDY OF
NATIONAL RECONNAISSANCE

JULY 2011

Contact Information

CENTER FOR THE STUDY OF NATIONAL RECONNAISSANCE (CSNR)

The Center for the Study of National Reconnaissance is an independent National Reconnaissance Office (NRO) research body reporting to the NRO Deputy Director, Business Plans and Operations. Its primary objective is to ensure that the NRO leadership has 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 Center studies the past, analyzes the present, and searches for lessons-learned.

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Foreword

FOREWORD

On the occasion of the NRO's 50th Anniversary, we asked the former Directors of the National Reconnaissance Office (DNROs) to reflect on their tenures as director. I have had the privilege of working for a number of the former DNROs and meeting others, and I have been in regular contact with most of them as part of Center for the Study of National Reconnaissance's (CSNR's) research. I have been struck by the differences in their management styles and personalities. At the same time, I have been impressed with their dedication and commitment to the NRO mission and the insight they have on how to deal with the challenges of leadership—while each is a very different person with different philosophies, commitment and insight have been a common thread I have observed in all.

This collection of reflections from former DNROs is more than just a series of individual commentaries about serving as a DNRO. The commentaries present a panorama of the NRO's first 50 years from 16 interactive perspectives—perspectives that can help you learn not only about these 16 individuals, but perspectives that can offer you insight into history from those who were there. This is not a booklet that retrospectively looks at the past 50 years. It is a first-hand account from those who led the NRO.

The CSNR's mission is to advance and shape the Intelligence Community's understanding of the discipline, practice, and history of national reconnaissance. Our objective is to ensure that the current NRO leadership has the analytical framework and historical context to make effective policy and programmatic decisions. The reflections of the former DNROs offer current NRO leadership insight to assist them in preparing the organization for the future.

As you read the profiles of the Directors of National Reconnaissance, I encourage you to view the NRO and its ever-changing world through their eyes, and I challenge you to anticipate the NRO's future—envision what the NRO's leaders over the next 50 years will be encountering, and how they will be meeting those challenges.

Robert A. McDonald, Ph.D.
Director, CSNR

Preface

PREFACE

I was excited when I learned that one of my projects for the Center for the Study of National Reconnaissance (CSNR) would be editing a booklet of reflections written by the former Directors of the National Reconnaissance Office (DNROs). It offered me a wonderful opportunity to meet and talk with these leaders of national reconnaissance, whom we asked to write briefly about their tenures. I found them all kind, personable, and articulate. Hopefully, in reading their words, you'll get a sense about what was important to each of them.

To offer a clear picture of the continuity and flow of the challenges these men faced and the legacies they left, we present their story in chronological, rather than alphabetical, order. Although three of the sixteen former DNROs are deceased, we wanted to present their "reflections," using as many of their own words as possible. Richard Bissell's biographer, Jonathan Lewis, wrote his section. Mr. Lewis had worked with Bissell on a book of his reflections before his death and so knew what Bissell thought and felt about his time leading the NRO. For Brockway McMillan, we researched external sources and the CSNR reference collection to produce his section. We drew heavily on John McLucas' book, Reflections of a Technocrat, for his section.

I'd like to offer a little context for terms mentioned by the first several DNROs. The Executive Committee, or ExCom, was an oversight body comprising the Secretary of Defense (SecDef), the Director of Central Intelligence (DCI), and the President's Scientific Advisor. The DCI, who had oversight over all civilian intelligence, was also the Director of the CIA. Thus, when a few of the former DNROs mention the CIA Director as "boss," they are referring to his role as DCI. The position of DCI was abolished when the Director of National Intelligence was created in the wake of 9/11.

Finally, I gratefully acknowledge and thank the numerous others who have worked together to produce this publication in time for dissemination at the *Fifty Years of Directors of The National Reconnaissance Office* event for the NRO's 50th Anniversary. Dr. James Outzen offered sound advice and counsel. Each former Director willingly accepted the challenge we presented of summarizing his life and tenure into a single page. Jonathan Lewis graciously provided the section on Richard Bissell. The CSNR Editorial Review Board provided valuable insight and feedback. I'd especially like to give my heartfelt thanks to CSNR's graphics and editorial teams, NRO Security, and the Information Access and Release Team (IART) for their expert reviews, professional artistry, and timely responses. It is through their efforts that you have the opportunity today to learn about the last 50 years of NRO leadership.

Ginny Field

Ginny Field
Editor, CSNR

Introduction

INTRODUCTION

In this profile booklet, the former DNROs reflect upon the influences and experiences in their lives that prepared them to lead this organization and what they did after leaving it. They then delve into their vision for the organization and/or major challenge they faced in leading it. They each end with the legacy they believe they left behind for the organization and the national reconnaissance discipline. Each director shares his thoughts in a single page—a difficult task considering the number and kinds of contributions each of them made.

Reaching the 50-year mark of protecting our national security through national reconnaissance seemed a good time to foster an understanding about the NRO and its important mission through the lenses of the individuals who have led it. Even though the name and mission of the National Reconnaissance Office were declassified almost 20 years ago (in October 1992), many people in the United States still do not know what the organization does beyond having something to do with the nation's "spy satellites." Partly in hopes of changing this situation and partly because we believe their leadership reflects changes during the past five decades in the organization, as well as in society and politics, the CSNR decided to publish this booklet.

This introduction will help you understand the concept of national reconnaissance, the NRO's mission (both past and present), the means by which its Directors functioned openly while leading a secret organization, and major changes the organization underwent. First, what is national reconnaissance?

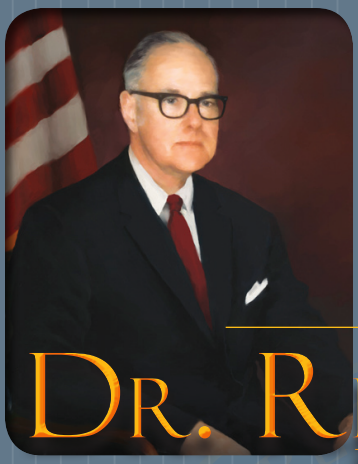
National reconnaissance is technical intelligence collection funded by the National Reconnaissance Program [a budgetary distinction] and conducted by the NRO under its mission to maintain *Vigilance from Above* by conducting research, development, acquisition, launch, and operation of satellite reconnaissance systems and other missions as directed, to include NRO communications infrastructure. In other words, the NRO designs, builds, buys, and operates the nation's "spy" satellites to, among other things, collect data about our adversaries that becomes actionable intelligence in maintaining our national security. In the 21st century, the NRO has also provided valuable information about natural disasters to help in relief efforts. So, how did this great organization start?

The NRO began life covertly, organized by alphabetic programs under the control of the DNRO and managed by "parent" intelligence and military organizations—a situation that created a unique personnel system in the NRO that continues into the second decade of the 21st century. The U.S. Air Force managed Program A; the CIA managed Program B; the Navy managed Program C; and a combination of USAF and CIA personnel managed the air reconnaissance program—Program D—while it existed. A decade into the 21st century, the NRO still, in 2011, employs a very small number of "its own" individuals (under 100), though it boasts a personnel roster into the thousands. The U.S. Air Force and CIA supply most of the NRO's employees, and how did this use of "parent agencies" affect the DNROs and their ability to lead?

This unique organization allowed each Director of the NRO—until 2005, when the position of DNRO became an open, singular one, starting with Donald Kerr's tenure—to operate overtly (openly) as an Air Force executive in the Pentagon while running the covert (secret, until 1992) NRO organization. Thus, most of the DNROs wore "two hats." The DNROs' concurrent positions in the Department of the Air Force generally comprised Presidential appointments requiring Congressional confirmation: Secretary of the Air Force, Under Secretary of the Air Force, or Assistant Secretary of the Air Force. These overt positions served a number of purposes—among them, giving the DNROs complete control over Program A personnel, great networking opportunities, and credibility with their peers at the Pentagon. Essentially, the dual-hattedness stopped with the creation of the Director of National Intelligence, who began appointing the Director of the NRO, with Congressional input and approval, but not confirmation.

Finally, the NRO underwent three major changes, to which different DNROs refer, during its first 50 years of operation. These changes, though begun as different decisions made independently, converged in the early to mid-1990's and caused fundamental differences in the NRO's operation from that of the past. The first was the decision to collocate the Programs, previously separated by the width of the continental United States (with Program A on the West coast and Programs B and C on the East). The second decision was to reveal the "fact of" the National Reconnaissance Office (essentially its existence and its mission). Finally, the third decision was to reorganize by function (e.g., imagery intelligence satellite systems, signals intelligence satellite systems, communication relay satellite systems, ground operations) instead of by program (parent organization).

No matter what the changes—internal or external—over time, the 16 former leaders of the National Reconnaissance Office guided the organization through an illustrious past, while at the same time shaping its essential and bright future of securing our nation by providing intelligence collection through national reconnaissance. Our nation is indeed fortunate to have had such dedicated leaders at the NRO's helm.



Dr. Richard M. Bissell, Jr.

6 September 1961 - 28 February 1962

CAREER HIGHLIGHTS

Economic Advisor to Director of War Mobilization and Reconversion, 1945–1946

Chief Administrator of the European Recovery Act (Marshall Plan), 1946–1952

Professor of Economics, Massachusetts Institute of Technology

Member of the Ford Foundation, 1952–1954

Special Assistant to the Director, Central Intelligence Agency, 1954–1959

Director for Plans, Central Intelligence Agency, 1959–1961

Co-Director, National Reconnaissance Office, 1961–1962

PROFESSIONAL CREDENTIALS

Chief Administrator of the Marshall Plan, 1947

Key Administrator of CIA operations such as the U-2's development and the U.S. response to the Soviet Union's invasion of Cuba in 1961

EDUCATION

Ph.D., Economics, Yale University, 1939

B.A., Economics, Yale University, 1932

LIFE SKETCH

At first glance, Bissell was an unlikely leader of a technological revolution in intelligence collection. Born in 1909 in a Hartford mansion and groomed in elite prep schools, Bissell was the prototypical member of the East Coast establishment. Yet, he was also a rule breaker by temperament. He was willing to try new ideas and stand up for what he believed in—even if this meant taking a stand against his peers. For example, as Bissell's understanding of the looming conflict in Europe matured, he broke away from an "America first" mentality and became an interventionist. It was this essential Bissell quality, a willingness to embrace new realities and turn against what had been done before, that ultimately made him a critical leader in America's intelligence revolution and a superb choice as the first Co-Director [with Dr. Joseph Charyk] of the NRO.

Bissell's eyes gleamed when he spoke about overhead reconnaissance, the U-2, and Corona. He did not start work on his memoirs with me [Jonathan Lewis, Richard Bissell's biographer] until after he turned 80. It was hard for him to reconcile the most difficult moments of his career, such as the Bay of Pigs, with the moments of supreme triumph, such as the Marshall Plan, managing the U-2 Program, and developing Corona. His work on the Marshall Plan, designing the economic programs that were the core of its success, catapulted him to the top levels of government. Under President Eisenhower, he became the CIA Deputy Director of Plans.

VISION AND MAJOR CHALLENGE

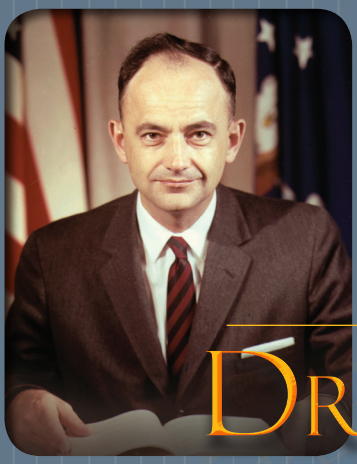
At the CIA, Bissell's management of the U-2 was historic. The values that drove his working relationships with the private sector and other government agencies would comprise the core values he would instill in the NRO at birth: streamlined management, minimal red tape, effective partnership with the private sector, a willingness to take chances, and the confidence to work and share authority with others, when needed, to get the job done.

Bissell's work with Joseph Charyk setting up the NRO epitomizes many of these qualities. The historic September 1961 agreement Bissell and Charyk co-authored, and Bissell's role in taking it to the finish line, takes on greater meaning and poignancy in the context of Bissell's personal history. By the summer of 1961, Bissell knew his career at CIA was essentially over. He was responsible for the Bay of Pigs invasion, and President Kennedy had made it clear his time was limited. Yet, he pushed ahead. His agreement with Charyk, negotiated and implemented with the weight of the very public Bay of Pigs failure on his shoulders, was perhaps his final triumph in government.

LEGACY

Richard M. Bissell, Jr. was truly a Founding Father of the NRO, and, in many ways, his values and management approach had an impact on the organization that lasted long beyond his brief tenure. Bissell leaned against convention. Rather than seeking to hold overhead reconnaissance as an exclusive purview of CIA, he institutionalized government partnership in the NRO. It worked, and the NRO was born. Bissell left government just months later, in early 1962, but his values of innovation in technology and management would live on in the NRO for the next 50 years.

> "I had no grand plan for advancing myself or any offices to which I particularly aspired. I did want to lead a challenging life and, if I could, participate in the key issues and events of my time."
>
> *—Richard Bissell, Jr.*



Dr. Joseph V. Charyk

6 September 1961 - 1 March 1963

CAREER HIGHLIGHTS

Section Chief, Jet Propulsion Laboratory, California Institute of Technology, 1945–1946
Assistant Associate Professor, Princeton University, 1946–1955
Director, Aerophysics and Chemistry Lab, Lockheed Aircraft Corporation, 1955–1956
Director, Missile Technology Laboratory, Aeronutronic Systems, Inc., 1956–1957
General Manager, Space Technology Division, Aeronutronic Systems, Inc., 1958–1959
Chief Scientist, U.S. Air Force, 1959
Assistant Secretary of the Air Force for Research and Development, 1960
Under Secretary of the Air Force, Co-Director, National Reconnaissance Office, 1960–1962
Under Secretary of the Air Force, Director, National Reconnaissance Office, 1962–1963

PROFESSIONAL CREDENTIALS

Head, Project Farside (one of America's first attempts into space)
Consultant, Air Force Scientific Advisory Board
Technical Advisor, Defense Department Aeronautics Panel

EDUCATION

Ph.D., Aeronautics, California Institute of Technology, 1946
M.S., Engineering and Physics, California Institute of Technology, 1943
B.S., Engineering and Physics, University of Alberta, 1942

LIFE SKETCH

Before becoming DNRO, I had been a research engineer, a university professor, and an industry executive. I came to Washington in 1959, served as Chief Scientist of the USAF for six months, then Assistant Secretary of the Air Force for Research and Development for another six months, and then became Under Secretary of the U.S. Air Force. In the latter capacities, I became directly involved in programs destined to become part of the NRO and worked on interfaces with the CIA. With the push by General Eisenhower for a much better worldwide intelligence gathering program, an ad hoc relationship between the DoD and the CIA evolved, with the day-to-day DoD responsibilities vested with the Under Secretary of the USAF. Later, under the new administration, this relationship was formalized into an agreement between the DoD and the CIA, setting up the NRO and naming the Under Secretary of the Air Force the Director of the NRO. I left the NRO in 1963 to assume the duties of President of the newly formed Communications Satellite Corporation.

VISION AND MAJOR CHALLENGE

I visualized a streamlined organization capable of acting rapidly and efficiently that directly used resources throughout the Department of Defense and the CIA. We needed to establish simplified and expedited procurement procedures and authorizations, and relationships with key congressional committees were vital. The NRO needed to bypass routine coordination and review with the regular staff levels of the armed service.

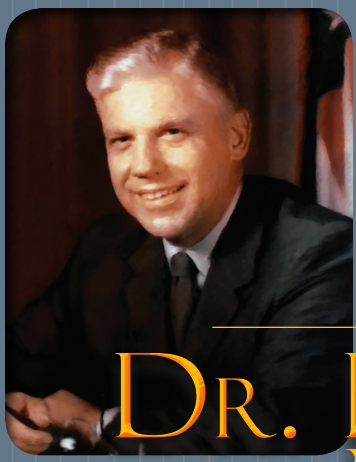
My major challenge was to gain acceptance of the principles comprising my vision. The opposition came from all those who worried about being bypassed in important programs in which they had been involved in a direct or supervising role. The concern extended into the loss of a role in future programs of importance to our whole intelligence gathering operation. Some of these concerns became acute in relationships with the CIA; some members worried about losing control of activities they felt were part of their traditional turf.

LEGACY

I wanted the NRO to be the vehicle for rapidly acquiring assets and information on worldwide operations having a direct bearing on our strategic position, particularly in the environment of a rapidly escalating Cold War. I felt it vital to push our technologies to permit us to obtain maximum intelligence. I felt it was also critical that the top echelons of government were quickly and accurately informed on all issues that could directly impact our strategic planning and resource allocations. I recalled Eisenhower's remark back in 1960, when he said that he didn't know how he could make the right decisions if he did not possess the best intelligence that technology could acquire and that this was critical to our national security.

I believe the philosophy that initiated the NRO and its results have made a vital and key contribution to our national security over the intervening years. It is an organization that has proved its worth. I must confess that I couldn't have imagined its strength and growth over so many years. I had thought that it would be an interim arrangement during the worst days of the Cold War and that things would revert to a more classic mode of operation in time.

> "We attempted to look at each of the NRO programs in great detail and tried to satisfy ourselves that we had reasonable confidence in their achievements and expenditures. The better we did that job, the better the organization would look. We didn't want to overpromise—we didn't want to overspend."
>
> *—Joseph Charyk*



Dr. Brockway McMillan

1 March 1963 – 1 October 1965

CAREER HIGHLIGHTS

Professor of Mathematics, Massachusetts Institute of Technology, 1936–1939

Proctor Fellow, Professor of Mathematics, Research Associate, Princeton University, 1939–1942

U.S. Navy, Naval Proving Ground and Los Alamos Lab, 1942–1946

Research Mathematician, Bell Telephone Laboratories, 1946–1955

Directory Military Research, Bell Telephone Laboratories, 1959–1961

Assistant Secretary of the Air Force for Research and Development, 1961

Under Secretary of the Air Force and Director, National Reconnaissance Office, 1963–1965

PROFESSIONAL CREDENTIALS

Member, Mathematics Society and Institute of Mathematical Statistics

Author, "The Basic Theorems of Information Theory," Annals of Mathematical Statistics, Vol. 24, Number 2, (1953)

EDUCATION

Ph.D., Mathematics, Massachusetts Institute of Technology, 1939

B.S., Mathematics, Massachusetts Institute of Technology, 1936

LIFE SKETCH

At the end of World War II, Dr. Brockway McMillan ended his stint with the U.S. Navy by joining Bell Laboratories, in Los Alamos, NM, as a Research Mathematician consulting on military projects and eventually becoming Director of Military Research. In this position, he became known to military officials at the Pentagon, who asked him to become Assistant Secretary of the Air Force for Research and Development. Thus, after almost two decades working for Bell, he once again joined the ranks of the U.S. military. His promotion to Under Secretary of the Air Force and Director of the NRO occurred just two years after his return, in 1963. In a 1976 letter to Gerald K. Haines, Dr. McMillan wrote that he considered being Director of the NRO as "the only job I ever had in which I really felt that I was doing something of genuine and immediate importance."

VISION AND MAJOR CHALLENGE

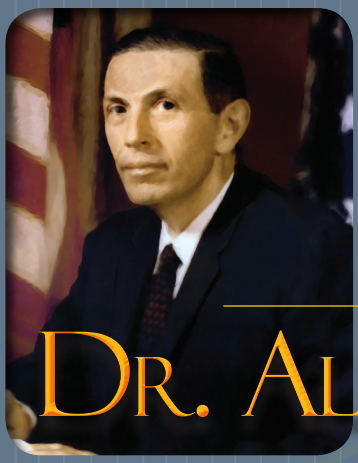
Dr. McMillan was a strong advocate of maintaining the National Reconnaissance Office as the single primary American agency in the realm of space reconnaissance. He guided the Corona program, begun by Co-Directors Charyk and Bissell, from fledgling to work-horse status. This program "gave unmistakable evidence … that the missile gap [with the Soviet Union] did not exist." It also provided intelligence on the Soviet's large rocket program, which proved useful to U.S. government decision-makers. Another system that McMillan moved into continuing productive operation was the Defense Meteorological Satellite Program (DMSP), which helped improve Corona's collections by forewarning mission operators of bad weather conditions. Each Corona satellite's film supply was finite, and the NRO did not want to waste it on photos obscured by bad or cloudy weather.

One of Dr. McMillan's longest challenges was a political struggle for control over Program B (CIA assets) with CIA's new Director of Science and Technology, Mr. Albert "Bud" Wheelon, which lasted throughout his tenure. Mr. Wheelon believed CIA controlled all Program B activities, while Dr. McMillan believed Program B, as part of the NRO, belonged under his leadership and control. However, Dr. McMillan himself considered it more of an annoyance than a real problem and once told former NRO Historian, Gerald Haines, "Don't overemphasize it." It certainly did not stop Dr. McMillan's push for continual research in the area of imaging from space.

LEGACY

Dr. McMillan ensured that the DMSP became a staple satellite system. He also initiated an imaging program using exciting new technological advances to meet the growing intelligence needs. As he said in the summer of 1963, after preliminary studies, "we [the NRO] initiated a program for high-resolution imaging, based on a camera of a design proposed by, and ultimately developed and supplied by, Eastman. … This program created a new camera and a new spacecraft, complete with infrastructure for continuing operation, adapted these to a booster not previously used for reconnaissance missions, and 30 months after the first design studies, on its first mission, returned images of a resolution that met design goals and intelligence of a quality not before seen in satellite imagery. That system flew missions for a decade or more. Its basic optical design persisted through later improvements in image recovery and communications." Thus, Dr. Brockway McMillan left a legacy on which future DNROs continued to build.

> "As DNRO, most of my attention was taken by satellite programs. And I kept track of the aircraft program, but it was rather jealously guarded by the people at Langley; it was their program, and it was going well."
>
> *—Brockway McMillan*



Dr. Alexander H. Flax

1 October 1965 – 17 March 1969

CAREER HIGHLIGHTS

Structural and Vibration Engineer, Airplane Division, Curtiss-Wright Corporation, 1940–1944
Chief of Aerodynamics and Structures, Piasecki Helicopter Corp., 1944–1946
Vice President, Technical Director, Cornell Aeronautical Laboratory, 1946–1959, 1961–1963
Member, National Advisory Committee for Aerodynamics, 1952–1954
Member, NASA Advisory Committees, 1958–1962
U.S. Air Force Scientific Advisory Board, Woods Hole Study on Space, 1957
Chief Scientist, U.S. Air Force, 1959–1961
Assistant Secretary of the Air Force for Research and Development, 1963–1969
Director, National Reconnaissance Office, 1965–1969
President, Institute for Defense Analyses, 1969–1982

PROFESSIONAL CREDENTIALS

Member and Senior Consultant, Defense Science Board, 1970–1994
Advisory Board, Defense Intelligence Agency, 1970–1995
Member, National Academy of Engineering
Fellow, American Institute of Aeronautics and Astrophysics
Lawrence Sperry Award, Institute of Aerospace Sciences
NATO Theodore von Karman Award
U.S. Air Force Exceptional Civilian Award
General Thomas D. White Space Trophy
Development team leader for the first twin-rotor tandem helicopter
Elder Statesman of Aviation of the National Aeronautic Association
Public Service Awards: DoD, NASA, DIA Guggenheim Medal of the AIAA, ASME, SAE, and AHS

EDUCATION

Ph.D., Physics, University of Buffalo, 1958
B.Aero.E., Aeronautical Engineering, New York University, 1940

LIFE SKETCH

I pursued an engineering career, first with the Curtiss-Wright Corporation and later with the Piasecki Helicopter Corporation, where I was part of a small team that developed the first successful tandem-rotor helicopter, forerunner of a long line represented today by the Boeing CH-47. I then went to the Cornell Aeronautical Laboratory, where I eventually became Vice President/Technical Director responsible for operating large test facilities and for guiding a number of semi-autonomous departments engaged in R&D of aeromechanics, aerodynamics, materials, flight research, and electronics. Before becoming DNRO in 1965, I served as Chief Scientist of the Air Force and Assistant Secretary of the Air Force for R&D. After leaving the NRO, I was appointed President of the Institute for Defense Analyses. I retired in 1983, becoming a Senior Fellow of the National Academy of Engineering and consulting independently. I later joined the Washington Advisory Group as a partner and retired from that affiliation in 2002.

VISION AND MAJOR CHALLENGE

As an Assistant Secretary of the Air Force, I was aware both of the achievements of the NRO and of the internal dissensions that by, 1964-65, were threatening to tear it apart. Experience with inter-service and inter-agency programs in the DoD had taught me that competition was valuable up to a point, but if uncontrolled could become destructive. When offered the DNRO position, I was informed of the new charter, which definitively established the management authorities in the NRO under an ExCom comprising the Director of Central Intelligence, the Deputy Secretary of Defense, and the President's Special Assistant for Science and Technology. With that, I hoped I could put the NRO on a path toward constructive and collaborative efforts to exploit the potential for the greatly improved intelligence collection systems that new technologies were making possible.

Various program managers immediately tested the new NRO charter and its application. With support from the ExCom and after some heated debates, I subdued these issues over time. In the DoD, staff elements tried to subject NRO programs and funds to "normal" management processes, most of which I successfully fended off. In program reviews, it became evident that most dedicated low-orbit sigint programs were not producing much useful intelligence in relation to their costs. Clearly we needed to move to higher orbits and longer collection dwell times, but allocating collection tasks in both the spectrum and geographical dimensions and downlinking near-real-time data streams to ground stations required resolution of numerous trade-offs in system design and overall architecture. Because of their central national role in sigint, I engaged the National Security Agency (NSA) fully in this effort, building mutual confidence and understanding among senior managers, which facilitated mutual working relations at program levels.

LEGACY

The legacies are found in the continued progression of the NRO toward greater collaboration and integration of its constituent programs and organizations. In imaging systems, I approved the last film-return system for development and deployment and initiated preliminary R&D on the real-time downlinking systems in use today. In sigint, the overall architecture of high-orbit, long-dwell-time sigint systems still reflects the configurations established during my tenure. Sigint's importance in the NRO greatly increased, going from less than ten percent to about thirty percent of the budget.

> "The great strength of the NRO was not so much the secrecy, but that it covered everything from the beginning of research and development to operations."
>
> *—Alexander Flax*

Dr. John L. McLucas

17 March 1969 – 20 December 1973

CAREER HIGHLIGHTS

Deputy Director of Defense for Research and Engineering, Tactical Warfare Programs, 1962–1964

Assistant Secretary General for Scientific Affairs, NATO Headquarters, Paris, France, 1964–1966

President and CEO, MITRE Corporation, 1966–1969

Member, U.S. Air Force Scientific Advisory Board, 1966–1969

Under Secretary of the Air Force and Director, National Reconnaissance Office, 1969–1973

Secretary of the Air Force, 1973–1975

President, COMSAT General Corporation, 1977–1985

Established the International Space University, 1989–1990

Chairman, Air Force Studies Board, 1990–1993

PROFESSIONAL CREDENTIALS

Fellow, Institute of Electrical and Electronic Engineers, 1962

Associate Fellow, American Institute of Aeronautics and Astronautics, 1971

Member, National Academy of Engineering, 1969

Recipient of the Defense Medal for Distinguished Public Service, 1964, and Bronze Palm, 1973

Recipient of the Air Force Exceptional Service Award, 1973

Co-author, *Reflections of a Technocrat: Managing Defense, Air, and Space Programs During the Cold War*, Air University Press (2006)

Author, Space Commerce: Frontiers of Space, Harvard University Press (1991)

EDUCATION

Ph.D., Physics, Pennsylvania State University, 1950

M.S., Physics, Tulane University, 1943

B.S., Science, Davidson College, 1941

LIFE SKETCH

Dr. John McLucas spent his professional life moving back and forth between military and private careers that spanned work (often R&D) in radar, electrical engineering, and physics. He became a leader early in his career, heading an electronics firm, leading R&D for the DoD, chairing NATO committees on applied defense research, and running the non-profit MITRE Corporation before becoming DNRO in early 1969 and Secretary of the Air Force in 1973. In his book, *Reflections of a Technocrat* (2006, p. 170), McLucas writes, "I am grateful to have had the opportunity to oversee both the Air Force and NRO space programs when each scored some major achievements and prepared for future breakthroughs." He left the Air Force in 1975, when President Ford asked him, at age 55, to become Administrator of the Federal Aviation Administration. In 1977, he became President of COMSAT General Corporation, remaining there in some capacity until he retired in 1985.

VISION AND MAJOR CHALLENGE

According to McLucas, "As the NRO's fourth director, I had the privilege of running the organization during what might be considered its golden age. By this, I mean after its turf wars had been mostly settled, but before it became subject to increased oversight from Congress and micromanagement by the Office of Space Development (OSD). With a streamlined bureaucracy, I thought we had about the best-run operation in Washington."

"I was at the NRO as it began to transition to the second generation of satellite reconnaissance technology. The major issue was whether to continue improvements and extend production beyond 1972. We took steps to keep as many experienced government and contractor personnel as possible working on the Corona program, to refurbish remaining components, and to procure adequate spare parts."

"Although we focused much of our attention on evolutionary improvements to photographic capabilities during my tenure, we were also looking toward a true revolution in overhead reconnaissance. The main hallmark of the next generation of imagery satellites would be near-real-time return of images and other data from orbit through use of new technologies [with no moving parts] and communications links. Not only would it be much more capable, it promised to be even more dependable." "Overseeing development of this complex and revolutionary new system and a related data transmission network were among the top priorities during my time with the NRO."

LEGACY

"Soon after arriving at the NRO, I began to wonder why we were still operating our own little fleet of aircraft, especially when we had so much else on our plate with major satellite programs." In a 1995 letter to Cargill Hall, McLucas wrote "So, I took all the airplanes—U-2's and SR-71's [reconnaissance "spy" planes]—and put them under regular U.S. Air Force management. I think they flew just as well after I gave them up."

"The Defense Meteorological Satellite Program (DMSP), developed primarily to support the NRO and SAC, is a real success story. I believed its data could be valuable for civil and scientific purposes, [so] I pursued lifting its special access dissemination control. In late 1972, we began to furnish data routinely to the National Oceanic and Atmospheric Administration and its National Weather Service. On 16 March 1973, I held a news conference to announce declassification of the DMSP."

> "If you make a decision without enough information, it's probably going to be wrong most of the time. If you wait until you get all the information you want, you will be wrong by not having made the decision in time, you see. So the object is to get as much information as you need, but not as much as you want, and then make the decision."
>
> *—John McLucas*

Mr. James W. Plummer

21 December 1973 – 28 June 1976

CAREER HIGHLIGHTS

U.S. Naval Test Center, 1947–1955

Manager, Satellite Payload Department, 1955–1958

Manager, Satellite Recovery Systems Development, Lockheed Missiles & Space Co. (LMSC), 1958–1959

Program Manager, Discoverer Space Program, LMSC, 1959–1961

Deputy Director, Special Programs, Space Systems Division, LMSC, 1961–1962

Director, Military Programs, Space Systems Division, LMSC, 1962–1965

Vice President and Assistant General Manager, Space Systems, LMSC, 1965–1968

Vice President and Assistant General Manager, Research and Development, LMSC, 1968–1969

Vice President and General Manager, Space Systems, LMSC, 1969–1973

Under Secretary of the Air Force and Director, National Reconnaissance Office, 1973–1976

Executive Vice President, LMSC, 1976–1979

PROFESSIONAL CREDENTIALS

Co-author, *UHF Propagation*, John Wiley Publisher, 1953

Honorary Fellow, American Institute of Aeronautics and Astronautics

Fellow, American Astronautical Society

U.S. Naval Weapons Center Advisory Board, China Lake, 1971–1972

U.S. Air Force Meritorious Achievement Award (Discoverer Space Program, Corona)

EDUCATION

M.S., Electronic Engineering, University of Maryland, 1953

B.S., Electrical Engineering, University of California at Berkley, 1942

LIFE SKETCH

My technical life started at the University of California studying Electrical Engineering, graduating with a Bachelor of Science in Electrical Engineering in 1942. I volunteered for military service and received a commission in the U.S. Navy, with special training in radar applications. Later, I had two cruises with Torpedo 10 and Night Air Group 90 on the *USS Enterprise*. After the war, I enrolled at the University of Maryland and received a Master of Science in Electrical Engineering.

With this background, I was hired by Lockheed, where I helped write the proposal for "Pied Piper"—the first USAF space program. We won the systems contract for that effort, and I became manager of the reconnaissance payloads. Shortly thereafter, the company named me Program Manager for project Corona, a very successful and landmark effort. This led to my promotion to Vice President/General Manager of the Space Division of Lockheed. In all my space work, I had the pleasure of working closely with each of the original directors of the NRO and other key people in government.

VISION AND MAJOR CHALLENGE

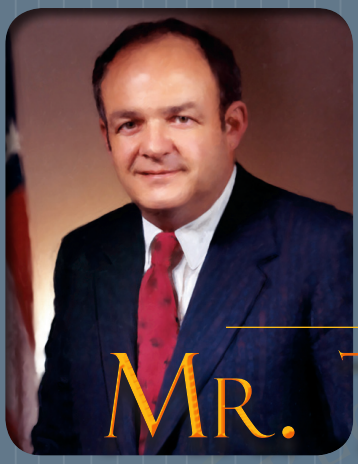
For NRO matters, reporting only to the Secretary of Defense and the Director of Central Intelligence (also the Director of CIA), my vision of the task when I started was to expand the number of space applications. Guidance from these two men presented the challenge of keeping up the current successful flight effort while pressing for expanded use of the data already obtained. This, in spite of serious security restrictions, led to wide usage of critical intelligence data.

All the original space effort by NRO, USAF, and CIA was accomplished under strict special access security. But such restrictions allowed all to work under streamlined management, which allowed us to make decisions with approval of only the Secretary of Defense and Director of CIA—free from all outside reviewers. Other problems between departments of our government led to the creation of Senator Church's Committee on Intelligence. Such action led to a conversion to the more standard procurement methods, changed relationships and expanded staffs. For many of us, this was a step backward.

LEGACY

As others have noted, there was a serious competition between the technical staffs of the CIA and the Defense Department during this period. With my background as a supporting contractor to each of those organizations, I was able to concentrate in building—at the working level—an improved and more harmonious relationship between the organizations.

> "We actually put the reconnaissance data in the hands of the user."
> *—James Plummer*



Mr. Thomas C. Reed

9 August 1976 – 7 April 1977

CAREER HIGHLIGHTS

Project Officer, Minuteman Missile Re-entry Vehicle, Ballistic Missile Division, U.S. Air Force, 1956

Thermonuclear Weapons Physics, Lawrence Radiation Laboratory, University of Southern California, 1959–1967

Founding/Managing Partner, Supercon, Ltd., 1962–1973

Assistant to the Secretary of Defense and Deputy Secretary of Defense, 1973–1974

Director, Telecommunications and Command and Control Systems, Office of the Secretary of Defense, 1974–1975

Secretary of the Air Force and the Director of the National Reconnaissance Office, 1976–1977

PROFESSIONAL CREDENTIALS

Author, *At the Abyss: An Insider's History of the Cold War*, Presidio Press, 2004

Co-author, (with Danny B. Stillman), *The Nuclear Express: A Political History of the Bomb and its Proliferation*, Zenith Press, 2009

EDUCATION

M.S., Electrical Engineering, University of Southern California, 1959

B.S., Mechanical Engineering, Cornell University, 1956

LIFE SKETCH

The 1950's saw the birth of the American ballistic missile program in Los Angeles, as well as the birth of the thermonuclear age in the distant Pacific. Those years also saw my graduation from engineering school at Cornell, followed by graduate work completed at the University of Southern California. All of these "planets" aligned with my entry into the U.S. Air Force in 1956. I served as the technical project officer for the first Minuteman re-entry vehicle and then transferred to the Lawrence Livermore Laboratory to assist in designing and testing the warhead for that bird. The ensuing years brought me to politics, culminating in my chairmanship and management of Ronald Reagan's statewide gubernatorial re-election campaign in 1970. Soon thereafter, at the time of the 1973 Yom Kippur War, I was recruited for intelligence work at the Pentagon. During the Ford and early Carter years, I served as both Secretary of the Air Force and DNRO.

VISION AND MAJOR CHALLENGE

My eight-month service as DNRO fell between four titans of the aerospace history: first John McLucas and then Jim Plummer preceded me. At Lockheed, Plummer had been the genius behind Corona. I helped recruit him as USAF Under Secretary, and I escorted him through the Senatorial confirmation process without a hiccup. First Hans Mark and then Bob Hermann succeeded me. They were the ones with vision for the future. My watch came in between, as the Ford, post-Vietnam, post-Watergate, oil embargo years drew to a close. The charge from my Executive Committee (the DCI, George H. W. Bush, and the DepSecDef, Bill Clements) was to keep the ship plowing steadily through the water: deliver properly-tasked film-return capsules on schedule, avoid fights with Congress, initiate near-real-time reconnaissance to operational use, and otherwise remain invisible. My vision was one of creating and maintaining tranquility as a tumultuous era drew to a close.

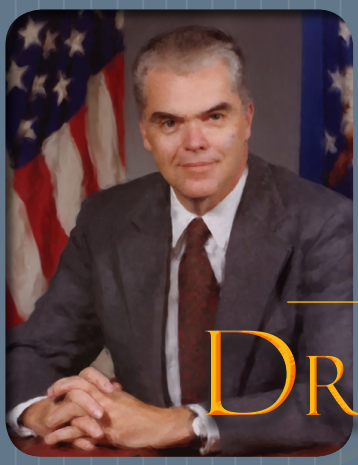
Accomplishing my vision was not easy. The post-Watergate Congress, elected in 1974 and strengthened in 1976, was eager to dismantle the Pentagon. Continuing to operate the then-unlisted NRO in the black world, to justify satellite links having no apparent reason for existing, and to continue disbursing funds without massive committee oversight proved difficult.

LEGACY

My big-picture legacy was the NRO's survival through that valley of political darkness and the continued and reliable support of the intelligence community with useful product, while introducing near-real-time overhead photo intelligence to operational use.

I am equally proud of another legacy, since it has produced much reminiscent comment. In 1977, I spent significant time thanking the worker-bees in the NRO world. Neither they, nor their families, had received much in the way of praise or even acknowledgement. How could they? The NRO did not exist back then. Yet their contributions had been back-breaking, and in some cases, family-destroying. I was pleased to tour the aerospace industries, the downlink stations, and the analytic offices to thank those people and their families for indispensible Cold War service. The grand finale was presenting a (secret) NRO award to Edwin Land, the guiding spirit of near-real-time imagery. It was a great trip.

> "…those were not the times for creative genius—it was a time for continuing to do things. That is the secret of a lot of what we need to do in Washington, changing our mind is what is expensive."
>
> *—Thomas Reed*



Dr. Hans M. Mark

3 August 1977 – 8 October 1979

CAREER HIGHLIGHTS

Acting Head, Neutron Physics Group Lab for Nuclear Science, Massachusetts Institute of Technology, 1954–1955
Research Physicist, Lawrence Radiation Laboratory, University of California (UC) at Berkeley, 1955–1958
Head, Experimental Physics Division, Lawrence Radiation Laboratory, UC-Berkeley,1960–1964
Associate Professor/Professor of Nuclear Engineering, UC-Berkeley, 1961–1969
Chairman, Department of Nuclear Engineering and Administrator, Berkeley Research Reactor, 1964–1969
Director, Ames Research Center, NASA, 1969–1977
Under Secretary of the Air Force and Director, National Reconnaissance Office, 1977–1979
Secretary of the Air Force, 1979–1981
Deputy Administrator, NASA, 1981–1984
Chancellor, University of Texas, 1984–1992
Professor, Aerospace Engineering, University of Texas at Austin, 1988–Present

PROFESSIONAL CREDENTIALS

Member, President's Advisory Group on Science and Technology
Member, National Academy of Engineering
Co-author, *Experiments in Modern Physics*, McGraw–Hill (1966)
Co-author, *Power and Security*, Lexington Books (1976)
Initiated the Bell XV-15 Experimental Tilt-Rotor Aircraft Program (led to the V-22 Osprey)

EDUCATION

Ph.D., Physics, Massachusetts Institute of Technology, 1954
B.A., Physics, University of California at Berkeley, 1951

LIFE SKETCH

The immediate post World War II era was good preparation for working with the people in the NRO. I earned a Bachelor's degree in Physics at the University of California at Berkeley in 1951 and a Ph.D. in Physics at MIT in 1954. Between 1955 and 1969, I was associated with the University of California at Berkeley and the nuclear weapons work at the Livermore Laboratory. In 1969, I joined NASA and helped persuade the Reagan Administration to adopt the Space Station program. I served as Chancellor (CEO) of the University of Texas System from 1984 to 1992, and, in 1998, I returned to the Pentagon to serve as Director of Defense Research and Engineering for almost three years. I have been a member of the National Academy of Engineering for 35 years and hold six honorary doctorates.

VISION AND MAJOR CHALLENGE

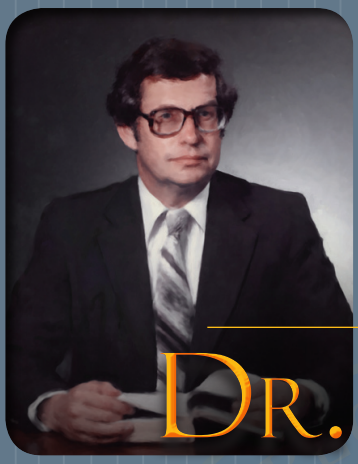
The principal priority of the NRO during my term of service was to develop space systems that could monitor and verify the provisions of the second major Strategic Nuclear Arms Limitation Treaty (SALT II). Shortly after his election, President Carter initiated negotiations to develop a follow-up arms control treaty to extend the one (SALT I) President Nixon had concluded in May 1972. We worked with the Director of the Arms Control and Disarmament Agency, Paul Warnke, and his deputy, Dr. Spurgeon Keeny, to develop the requirements that would guide the new technology we had to create to achieve the President's objectives. Defense Secretary Harold Brown and DCI Admiral Stansfield Turner approved of our plan, which featured the development of a highly-capable imaging satellite using new technology, and the upgrade of two of our electronic intelligence (elint) satellites. The new imaging satellite would provide greatly needed images of Soviet installations under most weather conditions. The improved elint systems would make it possible to accurately monitor soviet ICBM tests. The creation of these new capabilities resulted in an increase of the NRO's funding in Fiscal Year (FY) 1981 to over double what it had been in FY 1977.

In addition to new hardware, we also initiated some organizational improvements. We established an NRO Management Council, consisting of the Directors of Programs A, B and C, the Chief Financial Officer, the Staff Director in the Pentagon, the Deputy Director and the Director of the NRO. We held monthly meetings and direct conversations that resulted in lessening the traditional tensions between the program offices that had been a feature of the NRO since its establishment.

LEGACY

A great many people helped me make things happen. The first was former NRO Director Jim Plummer, with whom I had several long and very useful conversations before I left California in April 1977. Major General John E. Kulpa; Leslie C. Dirks (the Deputy CIA Director for Technology), Dr. Spurgeon Keeny, and Admiral Stan Turner all became close friends. Probably the most important personnel decision I made was to promote Jimmie D. Hill from comptroller to NRO Staff Director when Brigadier General William Shields was reassigned. Shortly before I left office, I recommended that Jimmie Hill be named Deputy Director of the NRO, a post which he held with great distinction until his retirement in 1996. Finally, I recommended Bob Hermann to succeed me, and he was the first one to take serious steps toward using NRO satellites to support tactical military operations.

> "My strategy was simple—stay technical."
> *—Hans Mark*



Dr. Robert J. Hermann

8 October 1979 – 2 August 1981

CAREER HIGHLIGHTS

Chief, Office of System Engineering, National Security Agency, 1965–1970

Chief, Systems Engineering & Electronic Intelligence, National Security Agency, 1970–1973

Chief Deputy Director of Research & Engineering, National Security Agency, 1973–1975

Special Assistant to the Supreme Allied Commander, Casteau, Belgium, 1975–1977

Principal Deputy Assistant Secretary of Defense for Communications, Command, Control and Intelligence, 1977–1979

Assistant Secretary of the Air Force for Research, Development and Logistics and Director, National Reconnaissance Office, 1979–1981

PROFESSIONAL CREDENTIALS

Professional Engineering Citation, Iowa State University, 1979

W. O. Baker Award, Security Affairs Support Association, 1994

Distinguished Achievement Citation, Iowa State University, 1995

George S. Wham Medal for Visionary Leadership, American National Standards Institute, 2003

Eugene G. Fubini Award, Department of Defense, 2004

Hall of Honor Inductee, National Security Agency, 2007

EDUCATION

Ph.D., Electrical Engineering, Iowa State University, 1963

M.S., Electrical Engineering, Iowa State University, 1959

B.S., Electrical Engineering, Iowa State University, 1954

LIFE SKETCH

During a 20-year career with the National Security Agency (NSA), I was an early mission partner for the NRO and became very familiar with the nature, history, people, and processes surrounding it. I also served on the Secretary of Defense Intelligence and Reconnaissance staff in the Pentagon and, later, at NATO's European Military Headquarters in Belgium. Both of these latter assignments provided perspectives well beyond the NSA mission. I ended my NSA career as Deputy Director for Research and Engineering and, after two years at SHAPE, took the position of Principal Deputy ASD (C3I). I then became DNRO in September 1979. At that time, the existence of the organization and my position remained unacknowledged. My advertised, and very real, position was Assistant Secretary of the Air Force for Research, Development, and Logistics. This dual assignment was the rule in this era and provided for many mutually supportive responsibilities and authorities. After my NRO career, I joined the United Technologies Corporation, staying there 16 years and eventually becoming Senior Vice President for Science and Technology.

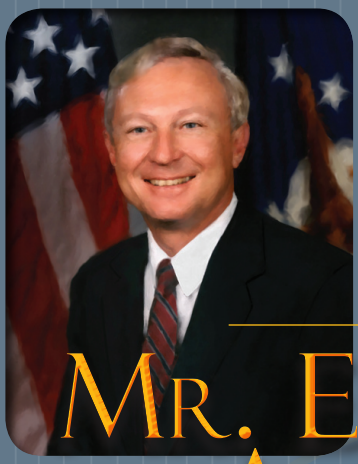
VISION AND MAJOR CHALLENGE

I entered the DNRO assignment with specific issues I wished to address. First, I wanted to make sure the NRO played its important role for the nation with competence and professionalism. I believe we did this. Second, I recognized that the NRO was ill-equipped to support regular military operations. It had been created to address the strategic interests of the country and serve very senior leaders of the Executive Branch. It had relatively little institutional capability to serve general purpose forces and lower military echelons of the Government. I believe we made improvements on this issue. Third, the NRO of 1979 had a truncated mission responsibility. It did not have responsibility for deciding what programs it should implement and had no responsibility or capability for analyzing the data it collected or for producing and distributing processed information. Despite these constraints, Congress regularly expected me, as DNRO, to explain why it should support future investments and to justify these, in part, on the basis of past results. The NRO had a secondary role in the former and little capability to address the latter. This skewed institutional configuration plagued me at the time, but I was unable to fashion any solution for it. Later changes did not fix the fundamental issue, which still plagues the NRO of 2011. Fourth, the DNRO of my time reported directly to the Secretary of Defense, but was charged with satisfying the requirements of the DCI. This duality, which I believed the best compromise available for that time, did create a platform for "creative tension" and challenge.

LEGACY

I look back on three areas with satisfaction. First, I believe the NRO of my time retained its good reputation as an organization of system implementation. Second, we established the previously non-existent concept and mechanisms for the NRO to apply its charter, skills, and capabilities to support on-going military operations. We also established the Defense Reconnaissance Support Program, which permitted the Secretary of Defense to budget defense resources to expand or modify NRO programs to serve interests of the DoD beyond those of the DCI. I believe these changes paid off in subsequent military conflicts. Finally, during my time, the NRO significantly expanded its investment in signals intelligence, and my long background with NSA helped in their sound implementation.

> "I believe it is time to devise new ways to use the NRO organization, the NRP, and their relationships to Defense in assuring that satellite reconnaissance capabilities are designed and available for supporting military operational units in crises and conflict as well as in peace."
>
> *—Robert Hermann*



Mr. E. C. "Pete" Aldridge, Jr.

3 August 1981 – 16 December 1988

CAREER HIGHLIGHTS

Manager, Space and Missile Division, Douglas Aircraft Corporation, 1962

Operations Research Analyst, Office of the Assistant Secretary of Defense for Systems Analysis, 1967–1972

Director, Strategic Defense Division, Office of the Secretary of Defense (advisor to the strategic arms limitation talks), 1970–1972

Senior Manager, LTV Aerospace Corporation, 1972

Senior Management Associate, Office of Management and Budget, Executive Office of the President, 1973

Deputy Assistant Secretary of Defense for Strategic Programs, 1974–1976

Director, Office of Planning and Evaluation, Office of the Secretary of Defense, 1976–1977

Vice President, National Policy and Strategic Systems Group, Systems Planning Corporation, 1977–1981

Under Secretary of the Air Force for Space, 1981

Secretary of the Air Force and Director, National Reconnaissance Office, 1986–1988

President, McDonnell Douglas Electronic Systems Co., 1988–1992

President and CEO, Aerospace Corporation, 1992–2001

Under Secretary of Defense for Acquisition, Technology, and Logistics, 2001–2003

PROFESSIONAL CREDENTIALS

Secretary of Defense Meritorious Civilian Service Award

Wright Brothers Memorial Trophy Recipient

EDUCATION

M.S., Aeronautical Engineering, Georgia Institute of Technology, 1962

B.S., Aeronautical Engineering, Texas A&M University, 1960

LIFE SKETCH

I served as the Director of the NRO longer than any previous or subsequent DNRO to date. I served as the Under Secretary of the Air Force, and later, in 1986, as the Secretary of the Air Force, while retaining the responsibility of DNRO. I came to the NRO having been educated as an aeronautical engineer (Texas A&M and Georgia Tech), having served in the aerospace industry, and having government service in which I was a customer of the intelligence product and a participant in national security space systems development. After departing as the DNRO, I returned to the aerospace industry, eventually becoming the President/CEO of The Aerospace Corporation, which still supports the NRO in 2011.

VISION AND MAJOR CHALLENGE

My vision for the NRO can be summarized in two words: "Mission Success." However, achieving mission success involved many other accomplishments: delivering on our promises, providing credible performance and cost estimates for decisions, solving problems quickly, and working cooperatively with related agencies to minimize program disruption during development. Providing advanced collection technologies to meet the Intelligence Community and military warfighter needs, launching on time with high reliability, and delivering performance on orbit contributed to mission success.

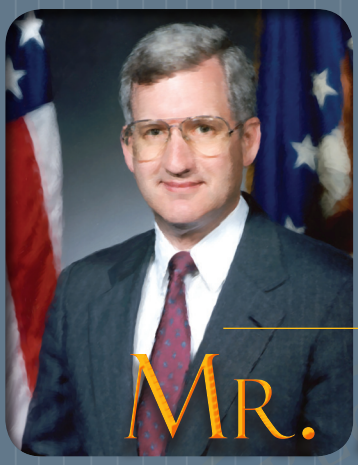
I also sought to have a good relationship with Congress and a cooperative relationship with the Secretary of Defense and the Director of Central Intelligence.

As I recall, we had many challenges during my tenure as the DNRO, but two most important challenges deserve discussion. The first was a flawed space launch strategy—which called for the newly launched Space Shuttle to be the exclusive means of achieving orbit for civilian, commercial, and national security satellites. After a heated period of debate on the pros and cons of this strategy, the President signed a directive revising the space launch policy to permit a "mixed fleet" strategy—a combination of expendable launchers and the Shuttle. I was the DoD and NRO spokesman in support of this revised strategy. The Challenger accident in 1986 validated the wisdom of this decision. The second major challenge was internal to the NRO. After a period of infusion of funds for the Intelligence Community when President Reagan entered office, and then a period of budget reductions at the end of his term, the NRO found itself with more desired technology than we had funds to support. This led to an internal situation where a good idea (a "winner") had to be funded from another program (a "loser"). Unhealthy internal NRO competition ensued. I commissioned an internal NRO study that determined that the solution to this problem would be the collocation of the NRO program offices, which still exists.

LEGACY

Fundamentally, I wanted to achieve the vision I outlined above. I wanted a highly efficient and credible organization that was known for rapid decision-making and delivering what it promised. I believe I left the legacy of a viable space launch strategy for national security space systems, an organization that could more effectively respond to the needs of the nation and Intelligence Community, and an organization that could rapidly acquire advanced technology for new and improved intelligence-gathering capability.

> "I realized that the people who support the space program—and the NRO, with stations all over the world, do so many fantastic things."
>
> *—"Pete" Aldridge, Jr.*



Mr. Martin C. Faga

28 September 1989 – 5 March 1993

CAREER HIGHLIGHTS

Member of the Technical Staff, MITRE Corporation, 1969–1972

Advanced Systems Engineer (intelligence collection by technical means), Central Intelligence Agency, 1972–1974

Professional Staff Member, Permanent Select Committee on Intelligence, U.S. House of Representatives (HPSCI) Program and Budget Authorizations Subcommittee, 1977–1984

Head of Staff for HPSCI Program and Budget Authorizations Subcommittee (oversight of technical collection programs), 1984–1989

Assistant Secretary of the Air Force and Director, National Reconnaissance Office, 1989–1993

PROFESSIONAL CREDENTIALS

Researched infrared sensors as a USAF officer

Contributed to the study of remote sensors with MITRE Corporation

EDUCATION

M.S., Electrical Engineering, Lehigh College, 1964

B.S., Electrical Engineering, Lehigh College, 1963

LIFE SKETCH

I came to the NRO in 1989 with degrees in electrical engineering and 25 years in sensor and intelligence work. I initially served in the Air Force as a development officer involved with laser and infrared cameras for tactical aircraft application. I worked for MITRE Corporation as an engineer developing ground-based sensors for use in Vietnam. I joined the CIA/NRO Program B as an engineer in 1972 and worked on the design of advanced satellite reconnaissance systems. In 1977, I joined the staff of the Permanent Select Committee on Intelligence of the House of Representatives as the staff monitor for NRO and other technical collection programs. During that time, I came to know then-Representative Richard Cheney, who became Secretary of Defense in 1989 and recommended my appointment as Assistant Secretary of the Air Force for Space and Director of the NRO to President George H. W. Bush.

VISION AND MAJOR CHALLENGE

I arrived at the NRO after long involvement with the organization and having watched the transition of NRO systems from those that largely operated on timescales of weeks-to-months to those that operated in near-real-time. This had added great value to the systems for all intelligence purposes, and, in particular, meant that tactical military forces would become major customers of the NRO.

I believed this resulted in several major implications for the NRO. First of all, the tactical user would have to be considered in system design and operation, including considerations of direct downlinks, specialized processing, and rapid retransmission. Secondly, the NRO would need to be reorganized, as it could no longer be a federation of entities existing largely to support the satellite reconnaissance needs of their parent organizations. Finally, the existence of the NRO would need to be declassified, as it would not be realistic to support the NRO's dramatically enlarged customer base as a covert organization.

My term saw the start of the downturn in intelligence spending that was to continue for a decade. Several programs ready to start major development or already in operation were scaled down or cancelled. Conflicts developed between traditional national intelligence users—policymakers and the new tactical users—military forces over priorities. This was especially evident after the military saw the utility of NRO systems during the first Gulf War. Efforts to reorganize and collocate the elements of the NRO were met with reactions ranging from easy acceptance to hostility, but they were eventually resolved. Finally, my belief that the existence of the NRO should be declassified met easy acceptance almost everywhere except inside the NRO. I needed a year of negotiating to bring this to reality by means of Presidential approval, and it occurred in October 1992.

LEGACY

I believed that real-time services and tactical relevance were real opportunities for the NRO, and I wanted to seize them. It largely happened—but at a high cost. The NRO added many new stakeholders, as well as the bureaucratic processes accompanying them, broadening its base. This created an immediate challenge that continues today.

> "The best intelligence is the intelligence the other side doesn't know you can get. Or even better, doesn't even believe is possible by the laws of physics to do."
>
> *—Martin Faga*

Mr. Jeffrey K. Harris

9 May 1994 – 26 February 1996

CAREER HIGHLIGHTS

Photo Technologist, National Photographic Interpretation Center, Central Intelligence Agency, 1975–1978
Chief System Analysis, Associate Director System Acquisitions, Central Intelligence Agency, 1978–1993
Manager, Research and Development for Space Technologies, 1978
Office of Development and Engineering, Satellite Development Programs, 1978
Associate Executive Director for IC Affairs – Supervising the Community Management Staff, 1993–1994
Assistant Secretary of the Air Force for Space and Director, National Reconnaissance Office, 1994–1996
President, Space Imaging Inc., 1996–2000
President, Lockheed Martin Special Programs, 2000–2001
President, Lockheed Martin Missiles and Space, 2001–2002
Corporate Vice President, Lockheed Martin Situational Awareness, 2002–2011

PROFESSIONAL CREDENTIALS

Intelligence Community Task Force on the Restructure of the National Reconnaissance Office
National Reconnaissance Program Task Force for the Director of Central Intelligence
Director, Analytic Graphics Inc.
Director, Open Geospatial Consortium

EDUCATION

B.S., Photographic Science and Instrumentation, Rochester Institute of Technology, 1975

LIFE SKETCH

As an imagery science graduate of the Rochester Institute of Technology, I joined the CIA to support the airborne and satellite programs at the National Photographic Interpretation Center. Working closely with analysts and devising new methods to improve reconnaissance collection and exploitation were instrumental in my understanding of the importance of mission-driven outcomes. My transition to the NRO, with responsibilities for developing and operating state-of-the art satellite and ground systems, including R&D, provided important program management skills and industry insights. I gained experience with the larger intelligence community and a relationship with Congress as the Deputy of the Intelligence Community Staff. I followed my government service with work in industry, as President of Space Imaging and President of Lockheed Martin Missiles and Space.

VISION AND MAJOR CHALLENGE

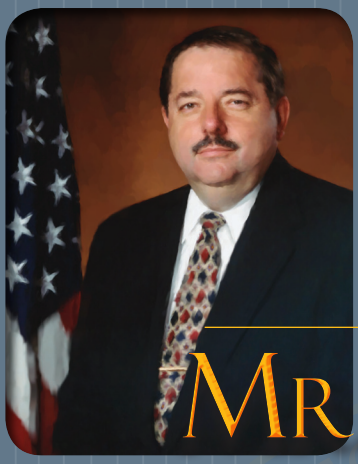
I believed that the NRO needed a continuing dialog with its principal customers and Congress. Integral to this objective is a leadership doctrine that assesses intelligence needs and constructs an integrated program that, over the long term, addresses those needs in a prioritized manner. It is fallacy to expect DoD, Congress, or the production agencies (e.g., NSA, NGA) to develop the appropriate acquisition plan. It requires an end-to-end mission and system analysis/engineering process, with the results validating the conclusions. As defense resources decline, the military increasingly depends on the national systems, so it is imperative that military needs are factored into NRO programs in a systematic and comprehensive manner.

The program landscape during my tenure required a massive reduction in post-Cold War spending, resulting from the Woolsey Panel's review of the NRO, ordered by DCI Gates, seeking additional programmatic efficiencies. The reduction took place simultaneously with the integration of NRO systems into the tactical military after the first Gulf War, highlighting the need for improved synoptic coverage and the addition of new phenomenology to be responsive to operational demands. Despite well-understood needs and a program plan, the Congress, using a drawn-out approval process, appeared unnecessarily capricious and arbitrary with regard to these capabilities.

LEGACY

During my tenure, the NRO extended comprehensive systems engineering across programs with the Plans and Analysis organization; developed a network of detailed program dependencies delivered as part of a Congressional justification to foster improved dialog and comprehensive management; and transitioned CIA contracting warrant to the NRO. The NRO fully integrated NSA personnel into the Sigint Directorate to leverage and align sigint mission and development expertise; established contracts with the commercial remote sensing firms to improve the commercial interface with national capabilities; and transitioned NRO-developed technology to the public sector in the "Missiles-to-Mammograms" program to improve breast cancer detection.

> "I ended up with a very successful career in the nation's space enterprise. I'm a photographic scientist and engineer by training, so I learned spacecraft on the job. And we had the best and the brightest in government and industry to learn from."
>
> *—Jeffrey K. Harris*



Mr. Keith R. Hall

28 March 1997 – 13 December 2001

CAREER HIGHLIGHTS

Chief, Intelligence Collection Management and Commander, Human Source Collection, U.S. Army, Augsburg, West Germany, 1970–1974

Commander, Signals Intelligence Company, U.S. Army, South Korea, 1974–1975

Budget Examiner, Office of Management and Budget, Executive Office of the President, 1979–1983

Deputy Staff Director/ Budget Director Senate Select Committee on Intelligence, 1983–1991

Deputy Assistant Secretary of Defense for Intelligence and Security, 1991–1995

Executive Director for Intelligence Community Affairs, Office of the DCI/ CIA, 1995–1996

Deputy Director and Acting Director, National Reconnaissance Office, 1996–1997

Under Secretary of the Air Force and Director, National Reconnaissance Office, 1997–2001

Senior Vice President, Booz Allen Hamilton, 2002–2009

Senior Vice President Retired & Senior Executive Advisor, Booz Allen Hamilton, 2010–Present

PROFESSIONAL CREDENTIALS

Chair, National Counterintelligence Policy Board

Co-Chair, Intelligence Systems Board

Co-Chair, Security Policy Forum

Co-Directed the study that conceptualized the National Imagery and Mapping Agency

EDUCATION

M.A., Public Administration, Clark University, 1979

B.A., History and Political Science, Alfred University, 1969

LIFE SKETCH

My NRO tenure culminated a rewarding 31 years in U.S. intelligence. I began as an Army Intelligence Officer, where I commanded operational units in both Europe and Korea. After 10 years in the military, I moved into the civilian ranks, becoming a Presidential Management Intern assigned as a Budget Examiner in the Intelligence Branch of the Office of Management and Budget. This was my first exposure to the world of the NRO, as well as to all other intelligence activities, both national and tactical. This broad exposure to the issues, challenges, and programs of U.S. intelligence continued in my subsequent assignments as Deputy Staff Director of the Senate Intelligence Committee, Deputy Assistant Secretary of Defense (Intelligence & Security) at the Department of Defense, and Executive Director of Intelligence Community Affairs at the CIA. This diverse background served me well when I was appointed Director of the NRO, as it gave me a comprehensive, long-term view of the NRO's programs and all its stakeholders. After retiring from federal service, I served as Senior Vice President at Booz Allen Hamilton, where I was able to continue to serve my country.

VISION AND MAJOR CHALLENGE

I came to the NRO when it was at a critical crossroads, with Cold War programs (and the generous budgets to fund them) coming to an end, a new functional organizational arrangement and new Headquarters facility to physically consolidate the NRO's workforce, and numerous issues giving rise to increased oversight and criticism of the organization from stakeholders and Congress. My vision for the NRO was to focus the organization on the future by getting our financial house in order, improving our relationships with stakeholders, and preparing the NRO for the 21st century mission. The Executive Leadership team developed a vision statement that summed it up: "Freedom's Sentinel in Space—One Team, Revolutionizing Global Reconnaissance," and we launched an extensive and effective strategic planning process to make it happen.

The hardest challenge I faced during my tenure was securing the resources needed to accomplish our vision. During this difficult time for the Intelligence Community, the NRO frequently had to "pay the bill" for other IC needs, requiring us to constantly re-baseline our programs to accommodate changing budget realities. In addition, a number of programs experienced costly delays—often due to low-tech issues, such as parts failures discovered in testing—exacerbating the budget difficulties. Nonetheless, the NRO worked through these challenges and continued its track record of outstanding mission performance, delivering the capabilities needed as the nation fought wars in Bosnia and Kosovo and patrolled the skies of Iraq. Finally, and most importantly, on 9/11, the NRO was ready with the technologies needed to respond to the harsh new world of international terrorism.

LEGACY

I am proud of what we achieved during difficult times. We delivered the satellite capabilities needed by our country 24/7 to cope with a difficult world. We elevated the priority of R&D by creating a dedicated, unified organization at the Directorate level and made the tradeoffs necessary to triple R&D expenditures. We restored confidence in the NRO's financial management and became the only organization in the federal government to achieve a clean audit to commercial standards. We strengthened our partnerships with our stakeholders and coined the term "mission partner" to describe how the sometimes fractious agencies of the intelligence community should work together. Finally, we safeguarded one of the crown jewels of national security and delivered it into the new millennium, fully mission capable and ready to face the diverse challenges ahead.

> "There are a lot of things that keep me awake at night—screams in the night, as I call them. Number one is the fear associated with something like a terrorist attack at one of our installations that really could have a tremendously deleterious effect on the nation's intelligence capabilities."
>
> *—Keith R. Hall*

Mr. Peter B. Teets

13 December 2001 – 25 March 2005

CAREER HIGHLIGHTS

President, Martin Marietta Denver Aerospace, 1985–1993

President, Martin Marietta Space Group, 1993–1995

President/Chief Operating Officer, Lockheed Martin Information and Services Sector, 1995–1997

President/Chief Operating Officer, Lockheed Martin Corp., 1997–1999

Under Secretary of the Air Force and Director, National Reconnaissance Office, 2001–2005

PROFESSIONAL CREDENTIALS

General James E. Hill Lifetime Space Achievement Award, 1990

W. Stuart Symington Award (for most significant contribution by a civilian for national defense) 2004

Sloan Fellow, Massachusetts Institute of Technology, 1978

EDUCATION

M.S., Management, Massachusetts Institute of Technology, 1978

M.S., Applied Mathematics, University of Colorado at Denver, 1965

B.S., Applied Mathematics, University of Colorado at Boulder, 1963

LIFE SKETCH

I graduated from the University of Colorado with a B.S. degree in Applied Mathematics from the College of Engineering in 1963. I went to work for The Martin Company in Denver, which became Martin Marietta Corporation, and then Lockheed Martin Corporation. I worked for many years as a guidance and flight controls system engineer on Titan III and Titan IV space launch vehicles and, in this role, had a good deal of exposure to the NRO as one of our most valued customers. I enjoyed a 38-year career with The Martin Company, Martin Marietta Corporation, and Lockheed Martin Corporation. I became the Director of the National Reconnaissance Office and Under Secretary of the Air Force in December 2001, having retired as President and Chief Operating Officer of Lockheed Martin Corporation in February of that year.

VISION AND MAJOR CHALLENGE

My vision for the NRO was to bring online a new generation of collection systems. I wanted to replace the existing constellation with much more capable, reliable, and user-friendly systems that would directly support intelligence collection and war-fighting operations. I was determined to accomplish this by fostering a true spirit of teamwork among all of the elements making up our national security space community.

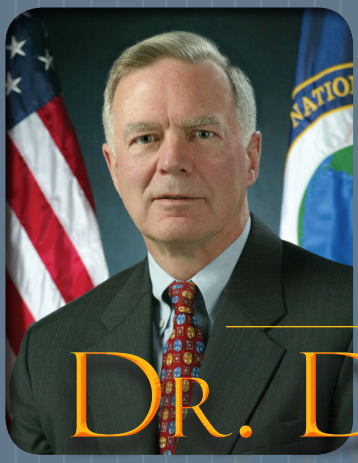
The most difficult challenge I faced during my tenure as DNRO was to secure adequate funding to properly execute the programs needed to achieve my vision. This was very difficult to do after the senior management of an NRO prime contractor told Congress and the Office of Management and Budget that one of our important new programs was "on schedule and on predicted cost," when, in fact, we had no chance of executing the contract with the resources then allocated. Ultimately, the NRO terminated a major portion of this particular contract.

LEGACY

As DNRO, I wanted to successfully achieve my vision for the NRO. I think our efforts to foster a spirit of teamwork succeeded. We also made significant progress in getting timely information to warfighters that, I do believe, saved lives and enhanced our ability to successfully execute war-fighting operations. In addition, we successfully implemented several major capability upgrades to our collection systems and implemented an aggressive new technology development effort. Over the time of my tenure, our relationship with the Congressional Intelligence Committees improved, and they allocated adequate resources.

"I'm a strong believer in our National Defense; I think that is a constitutionally mandated part of the Federal Government, and the most important part of what the Federal Government should do. And so, naturally I would feel very positively about the National Reconnaissance Office."

—Peter B. Teets



Dr. Donald M. Kerr

26 July 2005 – 4 October 2007

CAREER ACHIEVEMENTS

Director, Los Alamos National Laboratory, 1979–1985
President and Director, EG&G, 1989–1992
Corporate Executive Vice President and Director, SAIC, 1993–1996
Executive Vice President and Director, SAIC, 1996–1997
Director, Laboratory Division, Federal Bureau of Investigation, 1997–2001
Deputy Director for Science and Technology, Central Intelligence Agency, 2001–2005
Director, National Reconnaissance Office, 2005–2007
Principal Deputy Director of National Intelligence, 2007–2009

PROFESSIONAL CREDENTIALS

Chair, Department of Defense, Central Intelligence Agency, Remote Sensing Panel, 2001
Member, Defense Science Board, 1993–1997, 2010–Present
Trustee, MITRE Corporation, 2009–Present
Distinguished Intelligence Medal, Central Intelligence Agency, 2005
National Intelligence Distinguished Service Medal, 2009

EDUCATION

Ph.D., Plasma Physics and Microwave Electronics, Cornell University, 1966
M.S., Microwave Electronics, Cornell University, 1964
B.S., Electrical Engineering, Cornell University, 1963

LIFE SKETCH

Prior to becoming DNRO, I was fortunate to have government, industry, and national laboratory experience, all of which included space systems. I came to the NRO from four years as CIA Deputy Director for Science and Technology. My earlier government service included four years as an Assistant Director of the FBI in charge of the Laboratory Division and time as an Assistant Secretary of Energy responsible for Defense Programs. Industry positions include President and a Director of EG&G, Inc. and Corporate Executive Vice President and a Director of SAIC. I was also the fourth Director of the Los Alamos National Laboratory. Following my time at the NRO, I was nominated by the President and confirmed by the Senate to serve as Principal Deputy Director of National Intelligence.

VISION AND MAJOR CHALLENGE

I assumed the leadership of the NRO at a time when the U.S. was involved in two wars, Afghanistan and Iraq, making the quality, timeliness, and extent of information derived from NRO systems of paramount importance. My vision for the NRO was that it was not simply an acquisition organization but was, in fact, an intelligence agency. This meant that staff attitudes and values needed to change, so the NRO would be more responsive to national and military intelligence needs. Attention needed to be balanced between space platforms, communications, and integration with a multitude of users.

Major challenges driven by the two wars were to provide near-real-time access to actionable information, while simultaneously delivering global situational awareness, when many other collection capabilities had been diverted to support tactical military needs. I also declassified the ground stations. At the same time, I had to deal with the failed development and acquisition of the Future Imagery Architecture. Finally, the reputation of the NRO as an innovative entity had suffered, and the science and technology program needed to be invigorated. I met all of these challenges, and, I did so when the Intelligence Community was being restructured as a consequence of the 9/11 attack.

LEGACY

My greatest interest was to provide the NRO a lasting, important role in delivering integrated intelligence to users. This meant a renewed focus on our ground capabilities, since they are the touch points for all who use our data, and could no longer be an afterthought attached to space platform acquisition offices. We also had to emerge from the past as a space reconnaissance office with no known ground stations, so I proposed, and later approved, declassification of their existence. Together with the Directors of CIA, NGA, NSA, and DIA, I began the initiative to unite our ground systems to truly begin an Integrated Intelligence Architecture. At the same time, we acquired new space assets on a commercial basis—faster and more efficiently than through standard government procurement. Lastly, I take pride in the fact that we were able to deal with an unintended consequence of intelligence reform that could have disenfranchised the CIA and Air Force partners in the NRO joint venture. Out of that has emerged a stronger relationship with both that should help the NRO attract the same strong performers in the future as it has in the past fifty years.

> "Of note, NRO systems play a unique role by their ability to continue providing global situational awareness when other capabilities must be concentrated against a regional crisis."
>
> *—Donald M. Kerr*

Mr. Scott F. Large

19 October 2007 – 18 April 2009

CAREER HIGHLIGHTS

Executive Assistant to the Director National Reconnaissance Office, 1994–1995

Deputy Director, Office of Technical Collection, Central Intelligence Agency, 2000

Associate Deputy Director for Science and Technology, Central Intelligence Agency, 2001–2003

Director, Imagery Systems Acquisition and Operations Directorate, National Reconnaissance Office, 2003–2006

Director, Source Operations and Management, National Geospatial Intelligence Agency, 2006–2007

Principal Deputy Director, National Reconnaissance Office, 2007

Director, National Reconnaissance Office, 2007–2009

Senior Vice President and Strategic Advisor of SRA 2009–Present

PROFESSIONAL CREDENTIALS

Granted three patents in fiber optic technology, 1979–1986

EDUCATION

B.S., Engineering, University of Central Florida, 1979

LIFE SKETCH

After 21 years in the CIA, primarily with the NRO, I was given the opportunity to lead the nation's foremost space systems acquisition and operations organization. My background as an engineer, systems engineer, and program manager gave me the foundation for guiding the organization at a transformative time. That experience, combined with five years in the Directorate of Science and Technology at the CIA and as the Director of Source Operations and Management at NGA, broadened my understanding of the greater intelligence community's mission. The NRO is a key member of the national intelligence community, and, as such, its leadership needs to fully understand all facets of intelligence support for both national and military customers. Since leaving government service, I have focused on providing mission support to the intelligence community through our nation's industrial base. I have also continued to provide intelligence advisory support to various government entities and associations.

VISION AND MAJOR CHALLENGE

At its fundamental core, my vision for the NRO was two-fold. First, regain the historical preeminence of the NRO as the nation's premier space acquisition and operations organization. This meant shaking off the effects of acquisition reform from the mid-1990's and re-establishing the discipline and focus of solid program management practices. Second, move the NRO forward in addressing the nation's most pressing intelligence challenges from the venue of space. This not only entailed new space-based capabilities, but also a new way of thinking about our ground architecture and its potential in a broader community role.

The most difficult challenge I faced during my tenure surrounded the definition and approval of a plan for our next generation of imagery systems. This issue highlighted many of the challenges faced by the NRO during a period of expanded external oversight and multiple entities asserting decision authority. I believe that this situation was exacerbated by the lack of an updated and clear charter for the NRO.

LEGACY

My first priority for the NRO was to move past the programmatic challenges faced by some high-profile programs and to regain our reputation as a leader in large, complex systems acquisition. I believe that we accomplished a great deal towards that goal with a focus on systems engineering and programmatic discipline. I also believe that the NRO was able to define the vast potential for enhancing our mission contribution through thoughtful leadership in ground system development and work with our mission partners on broader community opportunities.

"How important is this mission to the Nation? Are we willing to invest the time, money, and resources required to build and maintain an agile, responsive NTM architecture for the future? Can we afford to continue to provide the second-to-none overhead and communication capabilities that our users rely on today to maintain global decision advantage? How can we best support an industrial base to do so? My question is, can we afford not to?"

—Scott F. Large

Gen. Bruce Carlson (ret)

12 June 2009 - Present

CAREER HIGHLIGHTS

OV-10 Forward Air Controller and Instructor Pilot, 23rd Tactical Air Support Squadron, 1974–1975

Director of Advanced Programs, Headquarters TAC, 1989–1991

Commander, 49th Fighter Wing, 1995–1996

General, U.S. Air Force, 2005–2009

Commander, Air Force Materiel Command, 2005–2009

Director, National Reconnaissance Office, 2009–Present

PROFESSIONAL CREDENTIALS

Command Pilot with over 3,700 hours flown in ten different aircraft

Recipient of Defense Distinguished Service Medal with Oak Leaf Cluster

Recipient of Distinguished Service Medal with Oak Leaf Cluster

Recipient of Legion of Merit

Recipient of Meritorious Service Medal with Two Oak Leaf Clusters

EDUCATION

M.A., Distinguished Graduate, Naval War College, 1989

M.A., Webster University, 1980

B.A., University of Minnesota, 1971

CURRENT DIRECTOR'S PERSONAL NOTE

The dedication and accomplishments of the 16 former Directors of the NRO produced an organization today made up of hard-working, often selfless people, dedicated toward our mission of providing our great nation with "Vigilance From Above." Following in the footsteps of these men of leadership, innovation, vision, and tenacity can be challenging, but it is also an honor.

The people we serve, from our forces in the field to the President of the United States, are counting on us to develop the capability necessary to meet both the collection and threat challenges of the 21st century and beyond. The last five decades have seen tremendous advances in technology and our ability to monitor our adversaries from space. My goal is to prepare this organization for another five decades of exciting technical innovation and dedication to safeguarding the security of our nation.

To do this, the course of our next 50 years, like our first, will be guided by our core values of integrity and accountability, mission excellence, and teamwork built on respect and diversity. We will center our focus squarely on our strategic goals of improving our foundational competencies, collaborating to deliver intelligence capabilities possible only through multi-faceted solutions, developing cutting-edge systems and the innovative techniques needed to stay ahead of the threat, strengthening and developing our workforce, and taking the lead for the Intelligence Community in Space.

I see a bright future for the National Reconnaissance Office in the years ahead.

Bruce Carlson
Director, National Reconnaissance Office

"We must find ways to increase the number of hard facts upon which our intelligence estimates are based, to provide better strategic warning, to minimize surprise in the kind of attack, and to reduce the danger of gross overestimation or gross underestimation of the threat. To this end we recommend the adoption of a vigorous program for the extensive use, in many intelligence procedures, of the most advanced knowledge in science and technology."

—Edwin H. "Din" Land

CENTER FOR THE STUDY OF
NATIONAL RECONNAISSANCE

JULY 2011