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Articles

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CENTER FOR THE STUDY OF
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Center for the Study of National Reconnaissance (CSNR): The CSNR is an independent NRO research body that reports to the NRO Deputy Director, Business Plans and Operations. Our primary objective is to ensure that NRO leadership has the analytical framework and historical context to make effective policy and programmatic decisions. We accomplish our mission by promoting the study, dialogue, and understanding of the discipline, practice, and history of national reconnaissance. We chronicle the past, analyze the present, search for lessons for the future, and identify models of excellence that are timeless.

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COLUMNS

ARTICLES

Jock Stukes of the National Reconnaissance Office (NRO) Office of Inspector General discusses the challenges and complexities of properly classifying and declassifying intelligence information, where the need to protect vital national security secrets by limiting data dissemination seems in conflict with the principle of the public's right to know what its government is doing. The Obama administration has given the discussion heightened visibility by making information disclosure a policy priority, with the President calling for greater transparency and accountability in government. The White House's 21 January 2009 memo on the Freedom of Information Act (FOIA) stated, "All agencies should adopt a presumption in favor of disclosure…to usher in a new era of open government." In this article, Stukes examines the policies governing data classification and explains the difficulties NRO and Intelligence Community (IC) staffs have with complying with FOIA and Mandatory Declassification requests. He argues that contrary to charges by public interest groups that the IC must be forced to reveal any details about its activities, the IC agencies actually have initiated most of the substantive public disclosures of intelligence information, and their failure to meet mandated response times on some FOIA or declassification actions results more from lack of resources than from deliberate non-compliance.

COLUMNS

OTHER

Editor's Commentary

The NRO's core values—integrity and accountability, mission excellence, and teamwork built on respect and diversity—are themes that appear in the articles for this issue of *National Reconnaissance: Journal of the Discipline and Practice.* The Stukes article on balancing the protection of sensitive information against the public's right to know is relevant to the Obama Administration's emphasis on transparency as a way to promote greater accountability. The Schultz article on the World War II internment of two Japanese-Americans, who later had careers in national reconnaissance, is a case study on respect and the value of diversity. The Araki and Naka articles—where these two Japanese-Americans (whom the U.S. interned in wartime relocation camps) share their reflections on their work in national reconnaissance—are examples of how two individuals contributed to mission success.

Balancing Secrecy with Accountability

In *Protecting Sources and Methods versus the Public's Right to Know,* Jock Stukes[1] details the recurring challenge that the NRO and other national security agencies experience in limiting dissemination of information to protect national security, while having to more broadly share information to remain accountable to Congress and the electorate. This balancing of the need to protect sources and methods with the requirement to comply with the public's right to know creates a dilemma for IC agencies.

The bureaucratic processes for generating, handling, reviewing, and ultimately disclosing what reviewers determine to be no longer sensitive information is time consuming and labor intensive. At the same time, the timelines for release of information under the Freedom of Information Act (FOIA) often are demanding and could be viewed as unrealistic. Mr. Stukes frames his discussion by examining policies set forth in two documents: (1) Executive Order (EO) 13526 (which superseded 12958, as Amended), Classified National Security Information, and (2) the FOIA. The first document outlines requirements for classifying and declassifying information, while the second establishes a presumption that government records should be accessible to the public and, through this access, aims to promote accountability.

Stukes points out that the critical processes of classification and declassification are not well understood, even by many in the IC workforce. The subtle nuances of classification, the inability to determine the rationale for how or why some older information was classified in the first place, and the frequent use of derivative classification (using previously classified information in a different form or a new document) all complicate accurate marking and handling of information, even within IC agencies. This makes the mandatory declassification and release of information to the public even more problematic. Declassification decisionmakers must consider multi-agency concerns about the release of shared equities, security risks, Congressional and public accountability,

[1] Mr. Stukes is an inspector in the NRO's Office of Inspector General.

and cost. Stukes summarizes the scope of declassification by comparing the numbers of declassification personnel, information release requests, the median number of days to process a request, and overall cost to seven agencies. The numbers show the NRO to be minimally staffed with limited funds for declassification actions. This suggests that the office's difficulty in meeting mandated deadlines on Freedom of Information Act (FOIA) requests, for example, has as much to do with resources as with any other factor.

Stukes emphasizes the large overall cost of classified work, which he estimates to range into the billions of dollars annually, though such estimates include virtually any activity that could even be loosely associated with classification. These figures no doubt influenced the decision to form a task force to revise EO 12958, now superseded by EO 13526, but the stated primary goal is greater transparency to make government more open and accountable. All the difficulties of classification and declassification enumerated by Stukes suggest that an overarching policy change will be effective only to the extent that personnel enforcing the policy understand the nuances of classification.

Overcoming Internment to Become National Reconnaissance Contributors

In the second article, *From Camp Incarceration to U.S. National Reconnaissance*, Dr. Susan D. Schultz[2] recounts the story of mass internment of Japanese-Americans during World War II to highlight the extraordinary lives and careers of two innovative individuals who made major contributions to national reconnaissance: Sam Araki and Bob Naka. Both Araki, named a Pioneer of National Reconnaissance for his work on the Agena spacecraft, and Naka, hired as the first deputy director of the NRO (DDNRO) from private industry, spent many months in wartime detention camps. Despite this upheaval early in their lives, with its implication that because of their ancestry and ethnicity they were a threat to national security, although citizens by birth, Araki and Naka nevertheless dedicated most of their adult years to serving U.S. national security interests.

In establishing the historical background, Dr. Schultz details how President Franklin D. Roosevelt established the wartime detainment policy. Even though there were no intelligence reports indicating acts of espionage by Japanese-Americans, or any evidence indicating disloyalty within the Japanese-American community living on the mainland, Roosevelt issued Executive Order (EO) 9066 in February 1942. This order provided the Secretary of War and military commanders the authority to remove anyone, citizens or aliens, from certain areas designated as national defense sites. The policy formulation that ensued led to the creation of the War Relocation Authority (WRA), through EO 9012, which administered the ten relocation camps that the government set up across the states of Arkansas, Colorado, Utah, Idaho, Wyoming, Arizona, and California.

Dr. Schultz stitches Araki's and Naka's recollections into her historical account of the conditions of the camps. The U.S. government erected installations in sparsely populated desert or swamp areas, demarcated by barbed wire fencing and guard towers. Families lived in partitioned spaces of about 20 feet by 20 feet, set within hastily constructed barracks. Although Naka's father spent years in Manzanar, one of the largest camps,

[2] Dr. Schultz is Chief of the Research, Studies, and Analysis section within CSNR.

Naka left after nine months to continue his undergraduate education at the University of Missouri. As quoted in Schultz's piece, Naka related that being allowed to return to the university, "made me whole again." Araki knew no such reprieve. He was only a 10-year-old child when the government interned him. Araki and his family spent three years (1942-1945) at Poston III camp in Arizona before the government released the family, and they could struggle to regain their former lives.

Schultz includes a brief discussion of the decades-long process after the war through which formerly interned Japanese-Americans finally obtained compensation from the government. The article concludes with retrospective insights from Araki and Naka. Schultz notes that in her interviews with them, neither man seemed to harbor any bitterness about his unjust incarceration, nor did either express ambivalence about working for the national security of the very government that had branded him disloyal. To the contrary, Schultz writes, "both exhibited characteristics… [that] were to stand them in good stead in their work in national reconnaissance: namely, to choose to see the silver lining in any given set of circumstances." The remarkable achievements Araki and Naka were able to make with their opportunities is testament both to them and to the thousands of men and women from diverse backgrounds that have made, and continue to make, important contributions to this nation's security every day.

Our third and fourth pieces tell Araki's and Naka's stories more completely. Sharon Moreno and Patrick Widlake[3] produced two first-person narratives by compiling and editing the transcripts from several interviews for each of the men. Their stories of how these Japanese-Americans achieved the improbable provide examples of excellence and enumerate lessons that can inspire and instruct the current and future IC workforces.

Sam Araki and Innovating the Agena Spacecraft

In *Success Through Systems Engineering and Leading Lockheed Missiles and Space,* Mr. Araki recalls the events and lessons from his national reconnaissance career, beginning with his days as a systems engineer when he helped develop Agena, the world's first stabilized space platform, through the times when he served as President of Space Systems at Lockheed, and finally to when the DNRO named him a Pioneer of National Reconnaissance in 2004.

Araki began his career when "space was unknown ... there were no classes in space physics or space engineering." He and his colleagues had to develop essentially new technology for a not-well-understood space environment, and this gave them ample opportunity to experiment. Because computers were relatively primitive and scarce, these early space engineers had to employ slide rules and electro-mechanical calculators to work out orbital trajectories. Though the early results for satellite programs were discouraging—the first 12 Corona missions ended in failure—Araki recalls these formative years of space reconnaissance as a challenging time with opportunity for improvement, when the engineers and scientists charged with developing a national reconnaissance capability believed that the country's very survival depended heavily upon their success.

[3] Sharon Moreno is a CSNR analyst; Patrick Widlake is assistant managing editor for *National Reconnaissance*.

He notes that "lessons learned became the key phrase," and he discusses a number of lessons that he believes the NRO must learn.

Araki stresses risk taking and the vital need on every program for a technically proficient systems engineer who has end-to-end system responsibility. Only through taking risks can the NRO produce innovative technology. Araki also puts great emphasis on developing highly qualified, experienced systems engineers. His ideal systems engineer would be very strong technically in one field, and would have or would be provided hands-on experience on the factory floor, in the test labs, and at the mission operations center, to see satellites in a mission environment. Araki believes national reconnaissance "technology has progressed sufficiently … [to] integrate space and close-in sensors … [for] implantation and data extraction and … to automate close-in sensors in ways that couldn't be done before."

Robert Naka and Excellence in Leadership

In *Building Reconnaissance Systems and Running the National Reconnaissance Office,* Dr. Naka briefly tells his life story and career highlights, emphasizing his three years as DDNRO as "the best experience I … ever had." He reviews the environment in which the NRO operated during its first decade of existence, provides pointed insight about the office's 1990s reorganization, and offers recommendations on how the NRO can become more effective in the 21st century.

Naka began his professional life at the Lincoln Laboratory of the Massachusetts Institute of Technology. One day the director of the lab summoned him to a secret meeting with Edwin "Din" Land, inventor of the instant photograph, founder of the Polaroid Corporation, and scientific advisor to four U.S. presidents. Land employed Naka on what was then a top-secret, compartmented program to reduce the radar cross section of the U-2 photoreconnaissance aircraft, working with famous aircraft designer, Clarence "Kelly" Johnson. This started Naka on his long career in national reconnaissance. In 1969, DNRO John McLucas, a former colleague of Naka's from MITRE Corporation, hired Naka to be his deputy, the first time a senior NRO official had been appointed directly from private industry. Naka describes the NRO of the early 70s as an imaginative organization that "pushed the technology in very clever ways." He observes that the NRO at that time primarily supported strategic intelligence requirements and relates how he encountered the organizational distrust between Program Offices A and B.

For his parting thoughts, Dr. Naka criticizes the decision to consolidate the program offices ("a lousy idea"), extols the virtues of constructive competition in satellite acquisition, and advises the DNRO to streamline processes and reduce the NRO's size to make it the efficient organization it was in the past.

Book Review, Commentary Section, and In Memoriam Remembering the Legacy of a Former Principal Deputy Director

This issue includes a review of a book about the Jason Group, a commentary section, and an In Memoriam. The commentary section features some last thoughts from Dennis

Fitzgerald, the former Principal Deputy Director of the National Reconnaissance Office who died at the end of 2008, with an accompanying In Memoriam recalling his career.

In the book review section, Dr. William Cornette, a former NRO Chief Scientist, reviews *The Jasons: The Secret History of Science's Postwar Elite,* by Ann K. Finkbeiner. The Jason Group[4] is a group of independent scientists and academics who consult with and advise the government on technical challenges. A small group of scientists established Jason in the late 1950s and early 1960s when American leadership turned to the scientific community for advice in developing sensitive, technical government programs. The Corona and other early space reconnaissance programs are examples of activities in which Jason members played a role.

Cornette declares *The Jasons* to be an engaging, albeit informal, history of the Jason Group from their beginnings until 2002, but he asserts that the title misleads readers because Finkbeiner reveals no secrets. Instead she only cites open sources and personal interviews that she conducted with a sampling of past Jason members, and Cornette suggests her interview list is insufficient to tell the complete story. Even with its shortcomings, which include the lack of an appendix with brief biographies of all the major personalities discussed within, Cornette recommends the book to anyone interested in the role of science and scientists within the government during that 40-year period.

In 2006 Dennis Fitzgerald became the NRO's first principal deputy director when the NRO created that position. Fitzgerald's intellectual curiosity, indulged through extensive reading, compelled him to search for ways to improve how the NRO did business. He displays this characteristic in his commentary piece, which he originally delivered to a technical forum audience at the NRO two years before his death. He compares the NRO with other large successful organizations that experienced challenges and setbacks because of an inability to change. Fitzgerald posits the idea that "what made the NRO successful in its past may not be the formula for its success going into the future." He identifies five changes or trends that the NRO should consider for the national reconnaissance environment as it moves into the second decade of the 21st century. The *Journal's* staff edited his commentary without his review. It was an unfinished work that he was preparing for publication in the *Journal.*

Assistant Managing Editor Patrick Widlake pays tribute to Fitzgerald's influential career at the NRO in his "In Memoriam" piece about Dennis Fitzgerald. After Fitzgerald served in numerous leadership positions throughout the organization, he culminated his government service as a deputy under three different NRO directors: Keith Hall, Peter Teets, and Donald Kerr. His extensive technical knowledge and skill contributed to numerous NRO satellite acquisition programs. However, Widlake emphasizes that the workforce within the Office of Development and Engineering, which Fitzgerald directed for 12 years, remembers him best as a dedicated head of the Career Service Panel, a great mentor, and a friend.

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[4] The term Jason is not an acronym, nor does it have any particular meaning. Some suggest it refers to Jason, the mythological Greek hero who led the Argonauts in search of the golden fleece.

Living NRO Core Values—Lessons from the Articles

The NRO core values are critical aspects of the NRO as a functioning organization. In a statement before the House Permanent Select Committee on Intelligence, PDDNRO Betty Sapp (2009) pointed out that the NRO's space-based collection systems "stand alone in their ability to provide unmatched global access, timeliness, and sustained denied area collection capability. No other intelligence discipline can deliver the quality and types of data necessary to solve the nation's most challenging intelligence problems." This kind of success depends on the NRO continuing to live its core values, i.e., integrity and accountability, mission excellence, and teamwork built on respect and diversity.

The articles and features that follow in this issue of the Journal offer examples of how the workforce has lived those values in the course of attaining career success and meeting the NRO's mission challenges. In DNRO Bruce Carlson's (2009) remarks to the NRO workforce soon after his arrival as Director, he emphasized the importance of those core values to the NRO of 2009 and beyond. He stated, first, that if we do not have integrity and accountability, we will fail—they are "simply core to what we do"; second, for the NRO, mission excellence means the NRO has to get it right the first time—if we do not, we will fail; and third, teamwork built on respect and diversity are critical to the NRO—without that teamwork, we can not overcome stovepipes and deliver integrated intelligence.

I suggest that the themes embedded in the articles of this issue can serve as models and inspiration to implement the NRO's core values in the face of the NRO's ongoing challenges in the post-Cold War environment. This is a period when space systems will continue to play major roles in the nation's overall intelligence collection posture, and the NRO's success at contributing to the solution of the nation's most challenging intelligence problems will depend on the organization living the core values. You will find those values brought to life in the following articles.

Robert A. McDonald, Ph.D.
Editor

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Protecting Sources and Methods versus the Public's Right to Know:

Setting the Terms for a More Constructive Discussion[1]

Jock Stukes

> *Our democratic principles require that the American people be informed of the activities of their Government. Also, our Nation's progress depends on the free flow of information. Nevertheless…the national defense has required that certain information be maintained in confidence in order to protect our citizens, our democratic institutions, our homeland security, and our interactions with foreign nations.*
>
> —Executive Order 13526[2]

How does the National Reconnaissance Office (NRO) balance secrecy with accountability? The need to protect vital national security secrets while abiding by the requirement to remain accountable to Congress and the citizenry—i.e., comply with U.S. law, be effective stewards of the taxpayers' dollars—creates a recurring challenge for all Intelligence Community (IC) agencies as they determine what information should or should not be classified. Because of the large and growing volume of classified information that exists, even routine actions such as reviewing information scheduled for automatic declassification or redacting documents requested via the Freedom of Information Act (FOIA) can impose a heavy workload on IC agency staffs. Quite apart from mere staffing concerns, however, there are larger questions to consider: How far should agencies like the NRO go to keep information secret? To what extent does a public "right" to know even exist? Will the release of some information about the NRO help U.S. adversaries deduce more sensitive information that the NRO does not wish to release? Does the potential damage to national security of an unauthorized release justify the resources expended to protect and review data?

To put the NRO's dilemma into proper context, in this article I will examine the policies and processes that govern generating and handling classified information, and review-

[1] This article was extracted from the author's Capstone submission for the Georgetown University Masters in Policy Management program. Completed in April 2007 and entitled *Secrecy versus Accountability in the National Reconnaissance Office,* the full paper includes a case study analysis of a major NRO declassification effort (i.e., declassifying information about obsolete satellites), as well as further analysis of the NRO's standard information release process.

[2] On 29 December 2009, President Obama issued Executive Order 13526, superseding Executive Order 12958 of April 1995 and its amendments, including EO 13292 of March 2003. According to the Report of the Commission on Protecting and Reducing Government Secrecy (1997, p. 11), "Over the last fifty years, with the exception of the Kennedy Administration, a new executive order on classification was issued each time one of the political parties regained control of the Executive branch. These have often been at variance with one another…at times even reversing outright the policies of the previous order" (quoted in Jennifer K. Elsea, Congressional Research Service, The Protection of Classified Information: The Legal Framework, 21 December 2006, p. 3).

ing, declassifying, and releasing information. I will illustrate the challenge the NRO faces with being responsive to legitimate requests for information about its activities (complying with the public's right to know), while at the same time denying U.S. adversaries access to sensitive national security information (protecting sources and methods). This discussion requires a clear understanding of two critical policies that establish classification and declassification guidelines for the NRO and the IC: (1) Executive Order (EO) 13526, Classified National Security Information, which establishes requirements for classifying and reclassifying, declassifying, or releasing information; and (2) The Freedom of Information Act (FOIA), which promotes accountability through public access to government records. Though the scope for this article limits me from answering all the questions I have raised, I will illustrate the complex bureaucratic processes and realities that often impede government agencies from complying with the information-sharing spirit of these two policies.

Popular misconceptions about the IC undercut any official explanation of the NRO's difficulties with declassifying and releasing information. While a majority of the public understands at some level the necessity for the U.S. to protect intelligence sources and methods, some vocal "watchdog" groups maintain that all secretive intelligence activities are incompatible with the ideals of an open, democratic society.[3] Two different commissions that examined IC agencies and their national security roles noted how the public mistrusts intelligence work. The National Commission reviewing the NRO (2000) opined, "For the public, one of the most troubling aspects of intelligence activities is their perceived lack of accountability. Operating in secrecy, intelligence agencies are seen not simply as mysterious, but often as uncontrolled" (p. 139). The report of the *Commission of the Roles and Capabilities of the Intelligence Community* (1996, hereafter called "the IC Commission") similarly concluded, "Many Americans believe that U.S. intelligence agencies (who are perceived as operating outside the laws of foreign countries) do not obey the laws of the United States or the policies of the President. This is simply not the case" (p. 6). Given such mistrust, the NRO invites criticism or, worse, risks a lawsuit for being non-responsive whenever it denies access to official records. In actuality, what the public perceives as stonewalling or non-responsiveness really demonstrates the difficulties IC agencies encounter when trying to release legacy intelligence information.

One difficulty arises because too many IC professionals reflexively overclassify documents they generate, leading to an ever-growing volume of classified data to manage. Another results whenever declassification reviews require multi-agency coordination, usually entailing a complex, time-consuming process. Yet another occurs because inadequate funding for knowledgeable staff delays or even prevents substantive review, and stymies even the most well-intentioned declassification efforts. Each of these difficulties, moreover, imposes security concerns that prolong reviews and increase cost.

To comprehend the scope of the problem, one must understand how the NRO and IC implement classification processes to comply with the requirements of EO 13526, and the

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[3] At times, even members of Congress have expressed this view. At a 1980 Berkeley symposium, former U.S. Representative, Ronald Dellums (D-CA) said, "We should totally dismantle every intelligence agency in this country piece by piece, brick by brick, nail by nail."

FOIA. I will begin by discussing the rationale for classifying intelligence information and the role played by organizations that oversee classified intelligence activities.

The Rationale for Classifying Intelligence Information

> *"Secrecy is for losers."*
>
> —Senator Daniel Patrick Moynihan[4]

The purpose for which the U.S. created a national intelligence infrastructure implies the need for tightly controlled information. The introduction to the IC Commission report (1996, p. 6) states,

> Intelligence agencies, as a whole, have historically shared a common purpose: to collect information that is not otherwise available to the Government, combine it with information that is available, and produce analysis based upon both kinds of sources that benefit the Government. Put another way, intelligence agencies have attempted to provide the Government with information and insight it would not otherwise receive, to reduce the uncertainty of decisionmaking.

Intelligence agencies must protect "information that is not otherwise available" from disclosure to anyone not authorized to receive it, and by classifying data, agencies restrict dissemination. The NRO, for example, classifies most operational information about its on-orbit satellites, to include the satellites' names, mission numbers, and capabilities, to prevent U.S. adversaries from knowing these details. Such knowledge risks those adversaries accessing the classified satellite data or disrupting its downlink to a ground station. By limiting who can access information, the NRO reduces the potential for inadvertent disclosures or espionage, both of which can reduce or eliminate a spy satellite's usefulness. As the NRO Commission (2000) wrote, "The absence of information on NRO spacecraft attributes … hampered those who intended to use cover and denial and deception techniques to counter U.S. space reconnaissance."

In the Information Age, when data can swiftly and easily traverse many different systems and media, often bypassing human review, owners of secrets must practice constant vigilance. Most people have heard of classified information being "leaked" into the public arena, whether legitimately or otherwise. From Daniel Ellsberg's unauthorized release to *The New York Times* of the secret government report known as the *Pentagon Papers*, which unveiled classified Department of Defense (DoD) operations during the Vietnam War; to columnist Robert Novak's identification of Valerie Plame as a covert Central Intelligence Agency (CIA) operative; to *The New York Times* story revealing warrantless monitoring of U.S. persons by the National Security Agency (NSA), examples abound where supposedly protected information became public knowledge. At worst, unauthorized releases can jeopardize covert operations; at best, they cause embarrassment for the IC.

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[4] Source: *Secrecy: The American Experience* (1998, Yale University Press).

As already stated, the need for protecting sensitive intelligence information through classification is almost universally accepted. But having conceded that necessity, the public wants to believe that agencies with the authority to classify are held accountable. The loss of such faith breeds theories that destroy public confidence in government. The ideas of "transparent" versus "shadow" governments, full disclosure and public right to know versus conspiracies of silence and secrecy, are notions that have existed in our collective psyche since the inception of the first democratic state. On one side is the need to protect this nation from those who mean it harm. On the other is the need to protect this nation from itself; "It's an old story: the greater the secrecy, the deeper the corruption."[5] Contrary to rogue organizations depicted by Hollywood and novels, however, "Intelligence agencies …are institutions within a democratic form of government, responsible not only to the President, but to elected representatives of the people, and, ultimately, to the people themselves" (IC Commission, 1996, p. 139).

So the IC is and has always been accountable to the executive and legislative branches of the government. In one context, accountability means ensuring that intelligence activities are properly vetted and conform to national security requirements as defined by the President and his National Security Council. Through policy documents like Executive Order 12333, United States Intelligence Activities, the executive branch "sets forth the duties and responsibilities of intelligence agencies and places numerous specific restrictions on their activities" (IC Commission, 1996, p. 140). Additionally within this branch, "Inspectors General have been established within the agencies themselves or within their parent organizations. The White House also has an intelligence oversight office [the Intelligence Oversight Board (IOB)]" (IC Commission, 1996, p. 139).[6]

Accountability also means ensuring that the nation can afford intelligence gathering and analysis sources and methods. The NRO obtains funding for its programs from Congress, which must approve classified Congressional Budget Justification Books prepared and submitted by the NRO (portions of which have been requested and are pending release via the FOIA). Operational practices and other daily activities of the NRO are overseen by both House and Senate Committees on Intelligence[7] that are "charged with the oversight function, serving as surrogates for their respective bodies and for the public as well" (IC Commission, 1996, p. 139).

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5 Bill Moyers, from *In the Kingdom of the Half-Blind,* remarks delivered 9 December 2005 for the 20th anniversary of the National Security Archive, a non-governmental research institute and library at George Washington University.

6 Established by EO 12863, *President's Foreign Intelligence Advisory Board,* the IOB is tasked in Section 2.2 of the EO to "(a) prepare for the President reports of intelligence activities that the IOB believes may be unlawful or contrary to Executive order or Presidential directive; (b) forward to the Attorney General reports received concerning intelligence activities that the IOB believes may be unlawful or contrary to Executive order or Presidential directive; (c) review the internal guidelines of each agency within the Intelligence Community that concern the lawfulness of intelligence activities; (d) review the practices and procedures of the Inspectors General and General Counsel of the Intelligence Community for discovering and reporting intelligence activities that may be unlawful or contrary to Executive order or Presidential directive; and (e) conduct such investigations as the IOB deems necessary to carry out its functions under this order."

7 House Permanent Select Committee on Intelligence and Senate Select Committee on Intelligence.

Although compelling national security concerns argue for keeping most facts about on-orbit satellite reconnaissance missions and operations classified, maintaining classification incurs significant costs over time. The NRO has on occasion downgraded classification of some of its product to make it available to users lacking the requisite security clearances. For years, many argued that the NRO would be in an improved position to engage the DoD and IC if its satellite capabilities were better understood, and the requirements for its missions were better integrated into military and IC missions and operations. Of course, this was not how the organization was originally designed to operate; rather, it reflected a paradigm shift for the NRO, brought on by factors such as expanding space-based reconnaissance missions and an increasing user base.

The National Reconnaissance Office

> *This formerly secret spy agency develops, acquires and operates the most sophisticated satellite reconnaissance systems in the world. These satellites play a crucial role in protecting U.S. national security interests at home and around the world.*
>
> —Foreward, *Report of the National Commission for the Review of the National Reconnaissance Office*

Established in 1960 as a secret organization containing DoD and CIA elements, the NRO " … 'culture' … for 30-plus years was 'all black', resulting in classification decisions to be made with [the] assumption of 'start at [the Top Secret]/SCI [level] and only rarely move to a lower classification level.'"[8] During the height of the Cold War, this wasn't viewed as overclassification; national survival was at stake, and the NRO's mission provided a critical advantage over the Soviets that could not be risked. Any aspect of NRO operations that might have been exposed had a cover story in place designed to deflect attention away from space-based reconnaissance capabilities.

The environment began to change in 1992 when the NRO officially acknowledged its existence in a declassification announcement. Declassification of the NRO forced the organization to contend with public scrutiny for the first time in its history. Over the years, whenever espionage cases revealed glimpses of the NRO's mission, or space and intelligence industry observers speculated about the organization's being and functions (the first article mentioning the NRO appeared in 1971),[9] the NRO's policy was neither to confirm nor to deny any reports appearing in the press: "Those who speak don't know. Those who know don't speak."[10]

That policy has not substantively changed since declassification; obviously, the NRO must continue to protect sources and methods. So while the NRO's Internet homepage informs readers, "The NRO designs, builds and operates the nation's recon-

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[8] 15 March 2007 e-mail from the NRO Director of Imagery Intelligence (Imint) Security.

[9] Benjamin Welles, "Foreign Policy Disquiet Over Intelligence Setup," *The New York Times,* 22 January 1971, pp. 1, 8.

[10] The NRO had a practice of giving retiring employees a half-black, half-white framed paper with reverse lettering bearing the inscription.

naissance satellites," [11] it also explains, "Specific NRO satellite capabilities, numbers and names are classified" (NRO, n.d.). Of course, while the NRO can easily justify this policy to safeguard active systems using sensitive technology, it finds itself increasingly challenged to provide reasonable explanations for refusing public access to information on decommissioned satellites that used now-obsolete technology. Such situations encapsulate some of the difficulty classified organizations have with being accountable to the public.

The most common public challenges to NRO and IC secrecy come via the FOIA process. Since its founding, the NRO has created thousands of classified facts and generated millions of pages of classified information.[12] Now that its mission is acknowledged, the NRO must contend with a myriad of requests through the FOIA process for documents and data that it had never considered it might have to release. Declassification changed the context of Congressional accountability by moving the discourse on national reconnaissance issues from classified channels into the public arena. The NRO and its employees have also become increasingly accountable to the judicial branch: "Like other government agencies and employees, they can be sued for actions undertaken in the course of their official duties. They can be subpoenaed in civil and criminal cases, and they must produce information when ordered by the courts" (IC Commission, 1996, p. 140). The courts have weighed in on cases involving FOIA requests and have not always ruled in favor of the government, even when the NRO invoked a permissible national security exemption.

> When the NRO reviews documents for release, it must consider
>
> ... the damage to national security which reasonably could be expected to be caused by an unauthorized disclosure against the benefit to the nation of having the information unclassified. [This is through a determination of] whether information disclosure damages exceed information-disclosure benefits [and] whether the information should be classified. (Quist, 2002b, p. 1)

In short, the NRO must balance secrecy and security concerns with accountability. "Compared with other areas of the federal government, intelligence agencies do pose unique difficulties when it comes to providing accountability. They cannot disclose their activities to the public without disclosing them to their targets at the same time" (IC Commission, 1996, p. 139). That risk must be considered whenever a declassification action is taken by the IC.

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[11] The NRO's Mission Statement expands on this generic description: "The NRO is a joint organization engaged in the research and development, acquisition, launch, and operation of overhead reconnaissance systems necessary to meet the needs of the Intelligence Community and of the Department of Defense. The NRO conducts other activities as directed by the Secretary of Defense and/or the Director of National Intelligence" (NRO, n.d.).

[12] NRO Plan for Compliance with the Automatic Declassification Requirements of Executive Order 12958, as amended, 31 December 2004. Hereafter referred to as "NRO Plan."

Compounding the risk is the tendency for time to act as the enemy of security. As one senior NRO Security official put it, "Protecting things is to buy time."[13] That is, sooner or later almost all secrets will be revealed. Security protections are designed to delay the inevitable for as long as possible. Regardless, knowing what can or cannot be released usually requires a thorough understanding of how and why information gets classified in the first place. I will now discuss this critical process.

The Classification Process

> *… when everything is classified, then nothing is classified, and the system becomes one to be disregarded by the cynical or the careless, and to be manipulated by those intent on self-protection or self-promotion.*
>
> —The Honorable Potter Stewart, Associate Supreme Court Justice, *New York Times Company v. United States,* 1971

The NRO's basis for classification stems from EO 13526 (superseding EO 12958, as Amended) Classified National Security Information, Section 1.4, Classification Categories: "Information shall not be considered for classification unless … it pertains to: … (c) intelligence activities (including covert action), intelligence sources or methods, or cryptology; …" EO 13526 advises that information is defined as Confidential, Secret, or Top Secret if its unauthorized disclosure would respectively cause damage, serious damage, or exceptionally grave damage to the national security (section 1.2). As I stated earlier, classifying information also limits its distribution and facilitates dissemination based upon a recipient's clearance level (security rules also stipulate verifying a potential recipient's need-to-know).

Most classified NRO data qualifies as Sensitive Compartmented Information (SCI), a category reserved for the most tightly controlled government secrets. In addition to a classification like Secret or Top Secret (there is no Confidential SCI), SCI contains compartment markings. To explain how security compartments function, I will use the analogy of a ship. Just as a ship's bulkheads seal off sections into watertight compartments, ensuring that the vessel will remain afloat even if one or a series of compartments is breached by water, within especially sensitive programs, compartments isolate individual access and activities so that any "leak," or act of espionage compromises that activity or compartment only, and not the entire program.

When classifying data, there are "three major actions that are required for the classification of [the] information: (1) determining whether it should be classified, (2) determining its classification level, and (3) determining the duration of classification" (Quist, 2002b, p. 1).

"Determining whether information should be classified is the most difficult of the three major actions. Five steps should be completed to determine whether information should be classified" (Quist, 2002b, p. 1). These steps are:

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[13] Interview of 8 February 2007 with NRO Imint and Signals Intelligence (Sigint) Directors of Security. Hereafter referred to as "Security Interview."

(1) Precisely defining the information to be classified (optional but recommended).

(2) Determining whether the information falls within one of the areas permitted to be classified by EO 12958 [superseded by EO 13526].

(3) Determining whether the information is under the control of the government.

(4) Determining whether disclosure of the information reasonably could be expected to cause damage to the national security.

(5) Precisely specifying why the information is classified (optional but recommended)"

(Quist, 2002b, pp. 4-5).

While listed as optional, both Steps 1 and 5 are

> …necessary to ensure that the scope of a classification determination is well defined and that its boundaries are well established [and] that the rationale of the classification decision can be readily understood by the derivative classifiers who will subsequently apply this classification guidance to a wide variety of fact situations. Knowledge of that rationale will assist those derivative classifiers in reaching correct classification decisions. Knowledge of that rationale will also help ensure that different derivative classifiers reach consistent derivative classification decisions. (Quist, 2002b, p. 5)

Per EO 13526, "Original Classification Authorities" (OCA) are the only members of the federal government authorized to create classified information. "Exceptional cases," such as the creation by a non-OCA entity of a breakthrough technology that may require classification, are referred "to the agency that has appropriate subject matter interest and classification authority with respect to this information" (2009, Section 1.3). As the executive branch reported only 3,959 OCAs for 2005 (not including the Office of the Vice President, the President's Foreign Intelligence Advisory Board, and the Homeland Security Council, all of whom failed to report their data), one might wonder why the amount of classified data continues to increase so rapidly (ISOO, 2005b, p. 9).

The answer is that while 4,000 people may create a substantial amount of classified information on their own, they are not the only ones who can *generate* classified information. To clarify this statement, I must distinguish generate from create. To generate classified information means to use previously classified information in a new form, format, document, or media, a process often referred to as derivative classification. For example, when the NRO developed the Corona photoreconnaissance satellite, anyone working on the project generated classified information when they used Corona facts or products in their work (e.g. reports, analysis, technical specifications, and memos). Almost anyone working in departments or agencies with original classification authority can generate classified information.

So if everyone working on classified projects for government departments and agencies is included, the number of classified information generators increases by several orders of magnitude. This results in millions of people holding some clearance level who can generate classified information. In order to discourage frivolous classifications, EO 13526 (2009) prohibits certain actions: "In no case shall information be classified … to … (2) prevent embarrassment to a person, organization, or agency; … or (4) prevent or delay the release of information that does not require protection in the interest of national security" (Section 1.7). Contrary to popular belief, however, under certain criteria information may be reclassified after declassification and release to the public, somewhat balancing out the provision on frivolous classifications (Section 1.7, c).

How much classified NRO data exists? Based on a 1995 survey of records subject to the 25-year automatic declassification provisions of now-superseded EO 12958, the amount of classified information is estimated to be 6.5 million pages.[14] Moreover, "By the very nature of the NRO mission, almost all NRO permanent records contain some classified information,"[15] so one can reasonably assume that there is at least double this number, 13 million pages or more, of classified records circulating throughout the NRO. Combined with classified hardware (e.g. satellites and associated parts), software (e.g. computer-aided design and satellite command and control programs), and equipment (e.g. data processing and infrastructure support equipment), the amount of classified material that the NRO needs to safeguard threatens to overwhelm the personnel responsible.

Managing this huge volume of classified material comes with a price tag. The total government and industry estimate for classification expenses in 2005 (including the DoD, but excluding the CIA whose numbers are classified) is $9.2B; this is $1.2B more than the previous year (ISOO, 2005a, p. 3). Included among these expenses are:

- Costs of fabricating classified hardware using cleared personnel and secure equipment in secure areas. (Includes extra personnel security costs for classified procurements or classified construction projects because of the high turnover rate of industry personnel, necessitating more security clearances).
- Extra costs of classified or "cover" procurements when buying classified hardware or materials (including preparation of security plans and periodic audits of those plans).[16]
- Extra costs of classified procurements because limited vendor interest in bidding on classified programs produces less competitive bids.
- Costs of preparing classified documents using "secure" office equipment in secure areas.
- Extra costs to transport or transmit classified hardware, materials, or documents (e.g., special modes of transport; receipting requirements).
- Costs of classified document storage, including periodic inventories.

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14 NRO Plan, p. 2.

15 Ibid, p. 3.

16 Sometimes the costs of hardware manufactured in a classified facility are more than double the costs of manufacture in an unclassified facility.

- Costs of reviewing classified documents for declassification or downgrading.
- Extra costs for destroying or otherwise disposing of classified documents, materials, or hardware.
- Pro rata share of salaries for classification office and security department staff.
- Physical security costs for protecting facilities, equipment, documents, and products (security fences; surveillance devices, etc.).
- Personnel security costs (security clearances, initial and periodic review).
- Employee time spent in classification and security education and training (initial briefings and periodic refresher briefings) (Quist, 2002b, pp. 17-18).

Unfortunately, the volume of classified material being produced seems unlikely to decrease in the near term. As mentioned previously, classified information generated through derivative classification exponentially increases the total volume. Two challenges for derivative classifiers are precisely defining the information to be classified, and understanding why that information was classified to begin with.

With its Program Classification Guides (PCG), the NRO precisely defines the classification level of many terms and facts to aid personnel generating classified reports, memos or other documents using the originally classified data. Specific items and associations are clearly identified and labeled with a classification; most are tabulated in matrices, grouped by subject matter for easy cross reference. The PCGs, however, do not specify why information is classified. To be fair, with all of the nuances of associations (i.e. two separate facts like a program name and a location are unclassified until they are associated with each other) and vague concepts (e.g. vulnerability and survivability of systems, and system sources and methods) that need protection, it is extremely difficult to lay out all possible combinations and permutations even in a "living" or "virtual" document, which the NRO's PCGs are.

In these situations classification may be rightly viewed as more of an art than a science. Clearly, knowledge of system capabilities or technology that would allow an adversary to perform effective countermeasures, or that would give the U.S. a decided technical advantage,[17] must be protected. But do you want to draw attention to the fragility of your capabilities by publishing such information in a PCG that has wide distribution, albeit within appropriate channels? There is another balancing act here. When trying to limit awareness, what is acknowledged as requiring security protection is seldom the entire compilation of what actually needs protection. Such considerations increase the difficulty of determining whether something should be classified or not.

Not surprisingly, security officers struggle to prevent the misuse or misapplication of the classification process. Personnel generating classified information simply do not understand the processes' many subtleties and ramifications. This is true especially of those personnel who only occasionally access or use the information; they are most likely to mishandle it. As Marsh articulated in Workshop on Training of Classification

[17] Security interview.

Managers, "Any rules or guidance that can be misunderstood will be misunderstood" (quoted in Quist, 2002b, p. 6). Additionally, when information is "many years old … reasons for initial classification may not be well understood" (Quist, 2002a, p. 151).

Even with PCGs and mechanisms in place for proper classification, it still comes down to personal responsibility to classify information correctly and to handle it accordingly. Unfortunately, more incentives exist to improperly classify through overclassification than to properly classify. The negative consequences for an employee overclassifying documents rarely exceed a simple reprimand (anecdotes abound about e-mails announcing lunch dates or blood drives classified at the Top Secret level), but the consequences to that same employee for releasing classified information to the public, even inadvertently, can be dismissal or arrest. Also, some employees perceive rewards for overclassifying. If knowledge is power, then the control of knowledge, or information, can make the holder even more powerful.

Moynihan (1998) wrote, "Here we have government secrecy in its essence. Departments and agencies hoard information, and the government becomes a kind of market. Secrets become organizational assets, never to be shared save in exchange for another organization's assets" (p. 73). He opined further, "In a culture of secrecy, that which is not secret is easily disregarded or dismissed" (p. 223), but that which is—whether legitimately or not—is held in high esteem. Do you want your report noticed? Classify it and it becomes important. But how useful is it, especially if those who really need it cannot access it due to dissemination restrictions?

As noted in the *Journal of the National Classification Management Society*, one of the major reasons that the Department of Defense (DoD) decided to emphasize paragraph/portion markings (i.e. identifying each paragraph in a document with its specific classification independent of the overall classification of the entire document) was the "belief that such marking would require disciplined analysis and evaluation and would lead to better classification decisions" (Quist, 2002b, p. 8). Of course, no amount of disciplined analysis can substitute for classification expertise, and portion marking provides no guarantee against overclassification in the interest of saving time.

Still, enforcing a policy to employ portion marking attempts to put the onus back on the information generator; without portion marking it is up to the recipient to determine the proper classification of extracted information. Diligent portion marking takes time, which is why many information generators perceive it to be burdensome. It is the recipients and the records managers (who, from October 1995 through December 2004 reviewed an estimated 1.4 billion pages of textual records for declassification action under EO 12958), after all, who reap the benefit of time invested in portion marking (ISOO, 2005b, p. 2).

As discussed earlier, all activities related to classification cost time and money. In addition to the dollar costs, there are "opportunity costs" as well. Moynihan (1998) wrote, "In the void created by absent or withheld information, decisions are either made poorly or not made at all" (p. 73). It should be noted that secrets and secret items are not the only things that are expensive to protect. As the NRO's Imint directorate security chief noted in an email (2007):

> Security costs are very difficult to separate from the protection of extremely valuable, fragile and unique [U.S. Government] hardware, software and capabilities. Even if most (or all) of the NRO's assets were not classified, the huge dollar value, coupled with the agreed upon invaluable contribution to National Security, would garner a good portion of the same physical security (guns, guards, fences, etc.).[18]

This does not absolve the workforce of its responsibility to classify and handle data correctly. The misapplication of the classification process creates the first major difficulty for the IC as it reviews information for release, and it complicates declassification, another critical process that I will now discuss.

Codewords to Corona: The Declassification Process

> *At the time of original classification, the original classification authority shall establish a specific date or event for declassification based on the duration of the national security sensitivity of the information.*
>
> —EO 13526, Classified National Security Information, Section 1.5

In my opinion, the requirements for declassification outlined in EO 13526 attempt to strike a reasonable balance between protecting sensitive sources and methods information and promoting accountability. Executive Order 13526 (2009) states that "all classified records that (1) are more than 25 years old and (2) have been determined to have permanent historical value under title 44 United States Code shall be automatically declassified whether or not the records have been reviewed" (section 3.3). There is a provision that

> An agency head may exempt from automatic declassification…specific information, the release of which should clearly and demonstrably be expected to reveal the identity of a…human intelligence source…or impair the effectiveness of an intelligence method currently in use, available for use, or under development. (section 3.3)

Typically, intelligence agencies will review any information slated for automatic release, and redact passages or withhold documents completely if they believe them to be too sensitive for public release. So, while creating classified information is easy, declassifying it even after it has been released by appropriately cleared personnel can be extremely difficult.[19]

One argument for removing secrecy is that it increases accountability. Certainly, one could argue that as the NRO has been forced to reveal more about itself, it has become

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[18] Email from the NRO's Imint security director, dated 15 March 2007.

[19] *Justifying* the original classification is another issue altogether.

more accountable to more entities. In the early years of space-based reconnaissance, Congress exercised less stringent oversight of NRO activities (compared to 2010 when six Congressional committees exercise oversight for NRO programs, and the NRO is accountable to all three branches of government). In those days,

> The U.S. Congress monitored all intelligence operations far less actively… relying instead on the executive branch to keep it informed on a strictly need-to-know basis. The Intelligence Community…determined who on Capitol Hill needed to know what sort of information, and when they needed to know it. (Laurie, 2001, pp. 11-12)

Past NRO declassification efforts range from codewords—nomenclature used for programs—to the Corona photoreconnaissance satellite program, and, of course, acknowledgement of its own existence. (The NRO has also undertaken "reclassification" efforts that may be epitomized by what some dubbed a "Back to Black" drive to quantify the organization's real crown jewels).

In most declassification situations, the decisionmakers must consider many criteria, including among them: multi-agency concerns about the release of shared equities, security risks, Congressional and public accountability, and cost. Implicitly, most IC agencies will use some variation of these criteria when evaluating the risks of a declassification decision. Declassifying a program name, assuming the program is obsolete, usually takes less effort, but declassifying programmatic details that could reveal facts about multiple entities often requires interagency coordination.

For larger declassification decisions affecting NRO and external assets, for example, the DNRO would have to commission an Internal Process Team (IPT) to study the feasibility of removing classification. Beyond consulting sister agencies and customers, the IPT almost certainly would have to involve them in the decisionmaking process, likely modeling their participation on the existing third party consultation provisions of EO 13256. These provisions call for agencies holding another's classified information to consult with the originating agency before releasing the information.

This inter-agency coordination involves costly time and effort, even in smaller declassification efforts. In its *Report on Cost Estimates for Security Classification Activities for 2005,* the Information Security Oversight Office (ISOO) within the National Archives and Records Administration (NARA) noted,

> While agencies have developed strategies to reduce the cost and time required, the referral of records remains one of the most costly and lengthy components of the declassification review process. This is one reason why the most recent amendment to [EO 12958] allowed agencies to delay the automatic declassification of classified records referred to them by other agencies for an additional three years. (p. 4)

As mentioned, tied to this review and redaction process is, of course, a price tag. Quist (2002a) observed

> Declassification costs can be particularly expensive for technical documents many years old, when reasons for initial classification may not be well understood. Much time and effort may be required of declassifiers to determine the reasons for the initial classification decision, which they must understand before they can reach a sound declassification (or downgrading) decision. (p. 151)

The ISOO (2005b) reported that, "Another noteworthy development was that cost estimates for declassification programs increased by $57 million or 18 percent" (p. 5). In order to implement the automatic declassification provisions of EO 12958 (since superseded) and meet the mandated 31 December 2006 deadline, the NRO estimated that it would cost $10 million.[20]

Declassification in and of itself is no panacea for public access to the information. In early 2007, the *Washington Post* observed, "There is a dirty little secret about these secrets: They remain secreted away. You still can't rush down to the National Archives to check them out. In fact, it could be years before these public documents can be viewed by the public" (Duke). The article continued:

> Fifty archivists can process 40 million pages in a year, but now they are facing 400 million. The backlog … measures 160,000 cubic feet … Not only are archivists overwhelmed by the number of documents that have arrived at the [NARA] facility; they also face the strange mumbo jumbo of competing declassification instructions from various agencies. (Duke, 2007)

Thus, it is far from certain that additional declassification of NRO programs would tip the balance towards public accountability. Just because the information had been declassified would not guarantee that it would be released immediately thereafter. So public accountability would depend on the public's thirst for knowledge, their actions to quench that thirst, and their patience. Researchers would still have to submit FOIA requests for specific documents and information, and then wait while archivists waded through 400 million pages at NARA (in 1995 the NRO released 800,000 Corona images to NARA) (NRO, n.d.). This hints at IC agencies' difficulties with processing FOIA requests. I will now outline the FOIA law and IC review processes.

Freedom of Information Act and Authorized Releases of Information

> *A popular Government without popular information or the means of acquiring it, is but a Prologue to a Farce or a Tragedy or perhaps both. Knowledge will forever govern ignorance, and a people who mean to be their own Governors, must arm themselves with the power knowledge gives.*
>
> —President James Madison[21]

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[20] *NRO Plan*, p. 5.

[21] From Madison's 4 August 1822 letter to William Taylor Barry.

The U.S. government created the FOIA "to promote public trust, an informed citizenry and openness in government by providing public access to federal records."[22] The FOIA "establishes a presumption that records in the possession of agencies and departments of the Executive branch of the United States government are accessible to the people …. Before enactment of the FOIA in 1966, the burden was on the individual to establish a right to examine these government records."[23]

To reiterate another of my points, despite the FOIA and other steps toward increased transparency, some continue to believe the government in general, and the IC in particular, remain overly secretive about their activities. The facts belie this, however, as the IC Commission (1996) noted:

> The most substantive public disclosures of intelligence information have come at the initiative of the intelligence agencies themselves …. Most of America's intelligence agencies, in fact, maintain public affairs offices which serve as official channels of information to the outside world. Thus, substantial accountability to the public is achieved in a variety of ways, wholly apart from the accountability achieved through the special oversight mechanisms [such as Congressional Intelligence Committees and Executive Orders]. (p. 141)

Nevertheless, the FOIA allows nine exemptions, and organizations can claim any to exclude the release of information. These are for (1) Classified Documents, (2) Internal Personnel Rules and Practices, (3) Information Exempt Under Other Laws, (4) Confidential Business Information, (5) Internal Government Communications, (6) Personal Privacy, (7) Law Enforcement, (8) Financial Institutions, and (9) Geological Information.[24] These exemptions are not guarantees of non-release; the NRO discovered this when a court blocked its attempt to use an exemption to exclude budget documents from a FOIA request.[25]

Under the provisions of the FOIA (2002), an "agency, upon request for records … shall (i) determine within twenty [business] days after the receipt of any such request whether to comply with such request…; and (ii) make a determination with respect to any appeal within twenty [business] days after receipt of such appeal" (section a.6.A). Agency statistics reveal that the IC often fails to meet the 20-day suspense date for all but the most simple requests. While these statistics may seem to confirm public skepticism of government transparency, the delays do not reflect willful governmental stonewalling, but rather the complex processes agencies must follow to conduct reviews.

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[22] NRO Freedom of Information Act (FOIA) Program brochure, August 2006.

[23] *A Citizen's Guide On Using the Freedom of Information Act and the Privacy Act of 1974 to Request Government Records,* First Report by The House Committee on Government Operations, Subcommittee on Information, Justice, Transportation, and Agriculture, 1993 Edition House Report 103-104 103rd Congress, 1st Session Union Calendar No. 53, Section II.

[24] *A Citizens Guide On Using the Freedom of Information Act and the Privacy Act of 1974 to Request Government Records,* Section VI.

[25] For full accounts, see Shaun Waterman, "Judge: Spy satellite budget can be FOIA-ed," United Press International, 28 July 2006 and Daniel Friedman, "Watchdog wins release of National Reconnaissance Office documents," federaltimes.com, December 2006.

For example, NRO FOIA activities in Fiscal Year (FY) 2006 cost an estimated $570,000 to employ four full-time staff, one part-time employee, and associated resources. Even with these allocated resources, the NRO's median time to process requests still exceeded the 20-day target. For "simple" requests, those "that an agency using multi-track processing places in its fastest (non-expedited) track based on the volume and/or simplicity of records requested," the median was 21 days. For "complex" requests, those "that an agency using multi-track processing places in a slower track based on volume and/or complexity of records requested," the median was 188 days. This is based on 112 simple and three complex requests. At the end of the FY there were 18 requests still pending and the median number of days that they had been pending was 196.[26]

Why the difficulty in achieving the mandated timeline? As with the NARA, which explains, "Like many government agencies, NARA faces budgetary and staffing challenges that impede [their] ability to meet FOIA goals,"[27] the NRO simply has too few dedicated personnel working FOIA and declassification requests (its four full-time and one part-time staffers have other job duties), and periodic FOIA requests have never constituted a sufficient priority to justify increasing staff size and budget.

Compounding this, agency review processes for releasing information include multiple steps and checks designed to ensure a thorough and accurate review. The NRO Information Access and Release Team's (IART) Records Access Process, for example, contains 26 steps, all of which have to be considered before FOIA, Privacy Act, Mandatory Declassification Review, and other ad hoc requested information may be released.

Moreover, the IART limits itself to its 26-step process only for information that is solely owned by the NRO. When the information requested originated with another agency, and affects its equities, IART additionally must refer the request to the other agency. Even when the information originated with the NRO, but contains another agency's equities, the IART must follow additional steps, including coordinating with the affected agency. Of course, each coordinating agency has its own multi-step review process to execute, adding to the total time to process the request.

To put this into context, here is how the NRO compares with some of its sister and other government agencies in staffing and processing FOIA requests:

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26 Statistics obtained from www.nro.gov/foia/Annual_Report_2006.pdf, p. 7.

27 *Annual Freedom of Information Act (FOIA) Report,* NARA, FY 06, p.3.

Table 1. A Statistical Comparison of Processing FOIA Requests

Agency	NRO	NARA	CIA	State Dept.	DoD, NSA	NASA*	ODNI*
Staff *(Full Time)*	5 *(4)*	32 *(28)*	74.5 *(38)*	143 *(85)*	752 *(381)*	18 *(15)*	0 *(0)*
Cost *(Amount for Litigation)*	$570K	$2.62M	$10.06M *($1.19M)*	$10.1M *($176K)*	$50.05M *($2.18M)*	$1.12M	$5,850
Processing Fees Collected *(% of Total)*	$0	$0	$4,732 *(<1%)*	$15,217 *(<1%)*	$470,829 *(<1%)*	$21,362 *(1.9%)*	$0
Simple Requests	112	8,667	395	1,647	66,979	938	7
Median # of Days Simple Requests	21	5	7	14	15.5	19	11
Complex Requests	3	217	2,184	2,216	11,385	410	N/A
Median # of Days Complex Requests	188	20	59	142	85	49	N/A
Pending Requests	18	7,193	896	2,728	14,953	135	0
Median # of Days Pending Requests	196	937	234	148	74	64	N/A

All information is from agency websites for the last available FY at the time of the original publication of this paper.
**NASA=National Aeronautics and Space Administration, ODNI=Office of the Director of National Intelligence*

As may be surmised from the table above, based on their individual resources and case loads, which vary widely, one agency's priorities most likely will differ from another's. Additionally, "Each agency has a different dialect, a different set of codes for communicating its wishes …" (Duke, 2007). This all serves to slow the process down. Classification reviews for articles such as this one impose an additional workload. National Reconnaissance Office Directive (NROD), 110-4, titled "Public Release of Information/Prepublication Review" governs public dissemination of such articles in order to "minimize the chances of releasing information potentially damaging or harmful to national security."[28] The IART has overall responsibility for this process and receives guidance from the NRO Offices of Security and Counterintelligence, Policy and Analysis, General Counsel, and Corporate Communications. "All persons, government or contractor, currently or formerly assigned to the NRO who signed nondisclosure agreements…shall submit to the [IART] any material proposed for release to the public by any means which deals with the NRO, its mission, or its functions."[29]

The IART allows itself half of the 20 business days of a FOIA response for prepublication reviews; I could not obtain any metrics on prepublication turnaround times.

[28] NROD 110-4, Information Management, Subject: Public Release of Information/Prepublication Review, 25 September 2001, p. 2.

[29] Ibid, p. 3.

There are, however, some rather technical books written by NRO employees in the NRO library that it would be difficult to read in two weeks, let alone determine what the classification level might be!

Conclusion

The effectiveness of … classification policies depends significantly on the willing cooperation of those who must implement the resulting classification guidance. It is important that they have confidence that the information we are continuing to classify is indeed truly sensitive for national security reasons. This confidence is the manifestation of the … classification program's credibility.

—R.G. Jordan, Union Carbide Corporation, Nuclear Division

My recommendations attempt to balance concerns about classifying information that realistically cannot be protected, while maintaining an ability to protect matters that must remain classified.

—Martin C. Faga[30]

Secrecy in intelligence activities is an absolute necessity for U.S. national security, but it comes at a cost. In this article, I have discussed the challenges of classification activities in an attempt to demonstrate how balancing protection of classified secrets with the public's right to know can be a very complex problem. The processes established to handle sensitive information and prevent its unauthorized disclosure complicate classification and release decisions. With all of the nuances of classification, coupled with the age of documents and the largely unknown reasons for originally classifying something, misclassification by even cleared individuals (usually through overclassification) seems unavoidable. Consequently IC secrets suffer from a lack of credibility, and the volume of protected information grows at an unmanageable rate.

I have shown how volume of data overwhelms agencies as they try to comply with the mandatory declassification actions of EO 13256 that pertain to documents determined to have permanent historical value. I have examined the NRO response to requests for data through the Freedom of Information Act, and compared that response to other federal agencies. Contrary to one view in the public, the reason the NRO struggles to meet mandated response times has more to do with inadequate resources than with secretiveness. Nevertheless, the IC as a whole could improve in this area.

The estimated annual multi-billion dollar cost attributed to classification activities might seem excessive, and cause some to conclude that intelligence agencies are wasting taxpayer dollars. As I pointed out, however, that estimate includes costs for nearly anything that could be even loosely categorized as "intelligence activities," and must be assessed accordingly. Moreover, the funding for those activities comes only with Con-

[30] The former DNRO quoted in a 30 July 1992 memorandum to the Secretary of Defense and DCI.

gressional approval, making intelligence agencies accountable to those representatives, and indirectly, to the voters who elect them.

Overall I have only considered a slice of the huge pie that makes up classification activities and security. As it goes forward, the NRO, and all IC agencies, will almost certainly have to declassify additional information to remain accountable to Congress and a good steward of taxpayer dollars. The challenge will be to ensure that any changes in security posture likewise enhance the nation's security. Given the vulnerability of data in the Information Age, the best any entity can hope to achieve is a controlled release of information so that it can manage the consequences—both intended and otherwise. These considerations will continue to influence classification decisions. At the end of it all there is the late Senator Moynihan's acknowledgement that there are some secrets worth keeping—at least for a time.

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From Camp Incarceration to U.S. National Reconnaissance:

The Case of Two Americans of Japanese Ancestry— NRO Pioneer Sam Araki and Former DDNRO Dr. F. Robert Naka

Susan D. Schultz, Ph.D.

On the 7th of December 1941—a "day that will live in infamy"—the Japanese launched a surprise attack on the U.S. Naval Base at Pearl Harbor, destroying 12 American warships, 188 aircraft and killing 2,403 American servicemen and 68 civilians. Within 48 hours, U.S. officials had rounded up more than one thousand American citizens of Japanese ancestry, holding them for more than three years with no formal charges and stripping them of their right to legal counsel. Most would be held indefinitely until the end of World War II. Indeed, by the summer of 1942, practically all Japanese-Americans on the U.S. mainland and the U.S. territories of Hawaii and Alaska—approximately 120,000 men, women, and children—had vanished from their homes, schools, and employment throughout the Pacific Coast states. Nearly two-thirds were citizens of the United States.

Two gentlemen who later would provide major contributions to U.S. intelligence through their innovation and leadership in national reconnaissance were among the nearly 120,000[1] the U.S. government eventually detained, first in temporary "assembly centers," and then relocated to a series of over ten camps spreading across Arizona, Utah, Arkansas, Wyoming, Idaho, Colorado, and California and four Department of Justice internment camps in New Mexico, North Dakota, Texas, and Montana.[2] Anyone with 1/16th or more Japanese blood was, by definition, forced to evacuate to a camp. Both Sam Araki and Bob Naka were American citizens, born on U.S. soil. Their only crime was one of ancestry—their parents were Japanese who had settled in the U.S., but as "non-whites" were ineligible to become naturalized U.S. citizens.[3]

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1 Some historians list the total number to be 110,000; others use the 120,000 figure. I have chosen to use the 120,000 figure for this article because the 1982 *U.S. Commission on Wartime Relocation and Internment of Civilians* calculates the total number in custody of the War Relocation Authority (WRA) to be 120,313. See the *U.S. Commission*, p. 150.

2 The 10 camps were: Manzanar, California; Tule Lake, California; Poston, Arizona; Gila, Arizona; Minidoka, Idaho; Heart Mountain, Wyoming; Granada, Colorado; Topaz, Utah; Rohwer, Arkansas; and Jerome, Arkansas. The four Department of Justice internment camps were: Santa Fe, New Mexico; Bismarck, North Dakota; Crystal City, Texas; and Missoula, Montana. There were also two Citizen Isolation Camps—Moab, Utah and Leupp, Arizona. Manzanar was designated a National Historic Site in 1992, and is today maintained by the U.S. Park Service. For a brief history of and overview of the camps, see Jeffrey Burton et.al.'s *Confinement and Ethnicity* on the National Park Service website, www.cr.nps.gov/history/online_books/anthropology74/ce.htm.

3 Immigrants from Asia—as "non-whites"—were not permitted to become naturalized U.S. citizens until after World War II, with the Immigration and Nationality Act of 1952 (the McCarren-Walter Act). The Naturalization Act of 1790 had restricted U.S. citizenship to aliens who are "free white persons" of "good moral character." In the wake of the Civil War, Congress passed the Naturalization Act of 1870, expanding citizenship to African-Americans, though still excluding Asians. See Harvard University library open collections program at http:ocp.hul.Harvard.edu/immigration/dates.html.

Sam Araki was only 10 years old when he and his family—after a year of being on the run from the Federal Bureau of Investigation (FBI)—voluntarily entered the relocation center[4] in Poston, Arizona in 1942. F. Robert Naka, an A student at the University of California at Los Angeles (UCLA), was only 19 when he and his family were forced to enter one of the largest relocation centers, Manzanar, in central eastern California.

Both Sam Araki and F. Robert Naka would pick up their lives after internment, forging ahead to become major contributors in the field of U.S. national reconnaissance during the Cold War. Araki, working for Lockheed, would perform a key systems engineering role in all 13 efforts to launch the country's first imagery satellite—Corona. He would go on to work at and eventually serve as president of Lockheed Missiles and Space Company and—after it merged with Martin Marietta—became the first president of Lockheed Martin Missiles and Space. The National Reconnaissance Office (NRO) honored him as an NRO Pioneer for his work on Corona at a September 2004 ceremony at its headquarters in Chantilly, Virginia. In 2005, the U.S. National Academy of Engineering awarded Araki—and four colleagues—the prestigious Charles Stark Draper Prize for their work on Corona.[5]

Naka, rescued from internment by the Quakers, went on to complete a Doctor of Science degree at Harvard University, and rapidly became engaged in cross-cutting, state-of-the-art research in radar at Lincoln Laboratory at the Massachusetts Institute of Technology (MIT). In the 1950s, at the request of Edwin Land, Naka was asked to work on efforts to reduce the radar cross section of the U-2 aircraft for the Central Intelligence Agency (CIA). He was also the sole designer of one aspect of radar cross section reduction of the A-12 Oxcart aircraft. He went on to serve as Deputy Director of the NRO (DDNRO) between July 1969 and August 1972.

How did Sam Araki and Bob Naka come to be major contributors and leaders in national reconnaissance in light of their experience as detainees in Japanese-American internment camps during World War II? What impact did this experience have on their work in national security? Why would and how could former detainees in Japanese-American internment camps end up serving the U.S. government at the highest levels of security?

This is their story.

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[4] In the secondary literature, a variety of names have been used to denote the detention camps. Ironically, U.S. government documents of the 1942-45 period frequently refer to them as "concentration camps." But as the 1982 *U.S. Commission on Wartime Relocation and Internment of Civilians* correctly notes, this term is misleading in light of the atrocities committed by the Nazis in the death camps of Europe; the systematic extermination of and atrocities against entire races that the Germans committed in the concentration camps makes the term misleading in comprehending the nature of the WRA camps. For this article I have, like the Commission, chosen therefore to use "relocation center"—"not to gloss over the hardships of the camps, but in an effort to find an historically fair and accurate phrase" (*Commission*, footnote, p. 27).

[5] The other recipients were Don Schoessler, James Plummer (a former DNRO), Francis Madden (a 2000 Pioneer of National Reconnaissance), and Edward Miller (a 2005 Pioneer).

Life Prior to Camp

At the time of the attack on Pearl Harbor, Japanese-Americans were roughly divided between the Issei (literally "first generation") approaching retirement age (the average age was 60), and the Nisei ("second generation")—not much beyond adolescence with an average age of 18. More than 75 percent of the total Japanese-American population is estimated to have been Nisei when the war broke out (Kitagawa, p. 20).

Keenly aware of the impending potential of hostilities with Japan, in October of 1941 President Franklin Delano Roosevelt directed Special Representative of the State Department Curtis B. Munson to undertake an intelligence gathering investigation on the loyalty of Japanese-Americans. The subsequent *Munson Report* not only concluded that there "... is no Japanese 'problem' on the Coast" but rather astutely assessed the cultural and political identities of Japanese-American sub-groups, assessments corroborated by subsequent historians as well as the 1982 *U.S. Commission on Wartime Relocation and Internment of Civilians* (*Commission*, p. 3).

While noting that the Issei's cultural background was entirely Japanese, the report emphasized that they had made their home here, brought up their children here, had worked hard to accumulate wealth, were "old men fifty-five to sixty-five," "analogous to the pilgrim fathers," and that "many would have become American citizens had they been allowed to do so" (Munson, 1941, p. 1). Ineligible for U.S. citizenship, the Issei were also not permitted to own land in most states. Nonetheless, they lived to provide their children a better life, and their dream was to see their Nisei sons and daughters grow up into first-rate Americans.

The Nisei had received their entire education in the United States and, according to Munson (1941), despite discrimination and insults hurled at them, showed "a pathetic eagerness to be Americans" (p. 1). The median age of the Nisei in 1943 was about 18 (James, 1987, p. 112). But the Nisei found himself caught between the two Americas—the one of his parents' dreams and the one in which he was living (Kitagawa, p. 22). Despite the conflict between fulfilling their Issei parents' dreams and the prevalent discrimination against them in mainstream society, the Nisei—according to Munson—"are not oriental or mysterious, they are very American and are of a proud, self-respecting race suffering from ... a lack of contact with the white boys they went to school with ... " and "are eager for this contact and to work alongside them" (p. 1).[6]

The Sakai Araki Family Prior to the Camps

Sam Araki was born in 1931 at a small house on a large Saratoga, California estate where his father, Sakai, worked as a gardener. Sakai had arrived in the U.S. in 1906

[6] *The Munson Report* also delineates two additional groups—the "Kibei" and the "Sansei." The "Kibei" were those among the Nisei who received part or all of their education in Japan. By 1941, there were some 8,000 of these native-born Americans who had received three or more years of schooling in Japan (Kumamoto, 1979, p. 58). Munson notes that the Kibei are considered to be the most dangerous, but points out that many Kibei who visited Japan subsequent to their early American education come back with added loyalty to the United States. As for the "Sansei": "The third generation of Japanese is a baby and may be disregarded for the purpose of our survey." See *The Munson Report*.

when he was only 13 years old. His father had come to the U.S. to seek a better life and worked as a ranch hand. Sakai's father died, however, when Sakai was 18.

Although not particularly gifted in learning the English language, Sakai became an astute and extremely entrepreneurial businessman: He managed to save enough money by the mid-1930s to the point that Mrs. Blaney—the kind owner of the estate where he was living—encouraged him to go out into the world to make a better life for his family. So in 1935 Sakai started his own business as a fertilizer importer from Manchuria. But keenly aware of impending hostilities and potential end of his ability to import fertilizer from Manchuria, by 1939 he sought greater security for his family by using the cash earned from the fertilizer business to buy a farm in San Jose. Since he was, as an alien, not allowed to own property, Sakai "borrowed" someone else's name to buy the farm.[7] The friend had been born in the U.S. and was of the age to buy property.

The 1930s were, all in all, years of extremely hard labor and tenuous financial security for the Araki family. The farm Sakai bought in 1939 was large—some 20 acres—but the fruit trees were in bad shape and crop yield was very poor. Using his fertilizer business experience, Sakai rejuvenated the trees rapidly, and by the time the war started, the farm was beginning to produce enough fruit crop to make an adequate living.

Given their tenuous financial situation, Sakai and his wife reluctantly decided to send Sam's three older siblings back to Japan to be raised by paternal and maternal grandparents.[8] Sam was young enough to remain with his parents; thus, for all practical purposes, Sam was an only child during his formative years. However, with the threat of war in 1939, Sakai brought two of Sam's siblings back to the U.S.

Meanwhile, Mrs. Blaney died, and her nephew, Robert C. Kirkwood, inherited the estate. Kirkwood was to become instrumental in helping the Araki family flee from the FBI and preserve their meager property during their years of internment.

The Kaizo Naka Family Prior to the Camps

Dr. F. Robert Naka's father—Kaizo Naka—arrived in the U.S. in May 1900, having completed high school in Japan. He had been brought to the U.S. by a relative, the "potato king" George Shima (Kinji Ushijima), in order to obtain an education and then handle the finances of Shima's farm in Stockton, California. After briefly studying at Stanford University, Kaizo earned a B.A. in economics—with a minor in English literature—from the University of California at Berkeley in 1912. In 1913, he completed an M.A. with a thesis on Japanese farmers in California.

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7 In 1913, California had passed the Alien Land Law, which prohibited the ownership of agricultural land by aliens ineligible for U.S. citizenship—as was the case with Sakai Araki. The even more stringent 1920 Alien Land Act prohibited leasing sharecropping as well.

8 This decision would eventually come to provide a source of conflict for the Araki family. Raised in Japan, the two siblings who returned to California were particularly bitter during the years the Araki family was detained in Poston. These siblings had received a major part of their education in Japan, and had hardly known their parents during their formative years; moreover, as teenagers their lives were significantly disrupted by war and the subsequent prevailing anti-Japanese sentiment in the U.S. (Araki, 2007).

Kaizo married Shizue Kamegawa and their only child Robert (Bob) was born on 18 July 1923 in San Francisco. Kaizo was by then a passenger and freight agent for a trans-pacific steamship company, Toyo Kisen Kaisha. When Bob was only 2 ½, the family moved to Los Angeles—Kaizo was put in charge of opening and managing a new office for Toyo Kisen Kaisha, which had decided to extend its passenger and freight transport route on to L.A. from San Francisco.[9] Bob's mother was a housewife, in keeping with Japanese tradition, although she had taught math at a girl's school before marrying Kaizo (Naka, 2007).

The Kaizo Naka family did not live in a Japanese enclave in L.A., but rather a virtual melting pot. As Bob later described it, "When I looked across the street from my early childhood home, 722 N. Boyle Avenue, I saw persons with last names 'Lombino,' 'Calagna,' 'Cook,' 'Meyer,' 'Lardizabel,' and 'Juarez.' Melting Pot, you bet." Not only the neighborhood, but the Kaizo Naka household was multi-cultural far ahead of its time, with Kaizo a Buddist by birth and Shizue a Roman Catholic. As a compromise, they sent their son Bob to a Baptist Church (Naka, 2007).

For his part, Bob Naka did exceedingly well in school, graduating from Theodore Roosevelt High School at age 16 because he had skipped two grades in elementary school. He was a sophomore engineering student with an A-plus average at the University of California at Los Angeles (UCLA) when the Japanese attacked the U.S.

7 December 1941 and Executive Order 9066

There is no Japanese 'problem' on the Coast. There will be no armed uprising of Japanese.

—The Munson Report

I'm for catching every Japanese in America, Alaska, and Hawaii now and putting them in concentration camps….Damn them! Let's get rid of them now!

—Congressman John Rankin[10]

Even before the attack on Pearl Harbor, the FBI had been maintaining a list of over 2,000 Japanese on the mainland—Japanese deemed potentially dangerous to the U.S.[11] The list included fishermen, farmers, businessmen, Buddhist and Shinto priests, Japanese-language schoolteachers, newspaper editors, travel agents, martial arts instructors, Kibeis,

9 Several years later, Toyo Kisen Kaisha was bought by Nippon Yusen Kaisha.

10 Quoted in the *Congressional Record,* 15 December 1941.

11 U.S. government surveillance of the Japanese community had begun as early as 1932, right after the September 1931 Japanese occupation of Manchuria. State, Navy, Commerce, Justice, and Army Intelligence (G-2) had begun maintaining files on the daily activities and personal affiliations of those members of the Japanese community who showed "enthusiastic regard for Japan and its culture." See Bob Kumamoto, The Search for Spies: American Counterintelligence and the Japanese-American Community 1931-1942 in *Amerasia Journal* 6(2), pp. 45-75.

and community leaders, grouped into A, B, and C categories that designated the supposed danger they represented. On the evening of 7 December, 1941, President Roosevelt and Attorney General Biddle ordered the FBI to immediately round up all those on the A, B, and C lists. The apprehended suspects were given no formal explanation of the charges against them; those apprehended at their jobs or in transit were not allowed to go home first to bid adieu to their families (Kumamoto, 1979; Okihiro, 1996, p. 160).

By 9 December, 1,291 Japanese, 865 Germans and 147 Italians were in custody in Hawaii and on the U.S. mainland (Okihiro, 1996, p. 161). The U.S. government placed other restrictions on citizens of Germany and Italy, but gradually relaxed most restrictions on aliens and Americans of Italian and German descent.[12] Treatment of Japanese-Americans was notably different.

The question of loyalty among Americans of Japanese ancestry along the West Coast had been carefully investigated in the years preceding Japan's attack on Pearl Harbor, with U.S naval intelligence and the FBI doing exhaustive surveillance of the Japanese minority over the years. Both services could not find a single instance of espionage and ultimately opposed President Roosevelt's decision for evacuation.[13] As previously indicated, at the end of September 1941 President Roosevelt had ordered a highly secret intelligence investigation into the issue, *The Munson Report*, which could find no instance of disloyalty among residents of Japanese descent, both on the West Coast as well as in Hawaii, and could find no examples of espionage (Weglyn, 1976).

But despite the findings of *The Munson Report* and FBI investigations, on 19 February 1942, ten weeks after the Pearl Harbor attack, President Franklin D. Roosevelt signed Executive Order 9066, empowering the Secretary of War and the military commanders with the authority to exclude any and all persons—citizens and aliens—from designated areas in order to secure national defense sites against sabotage, espionage, and fifth column activity. The Executive Order designated the Secretary of War to be responsible for providing "transportation, food, shelter and other accommodations as may be necessary" (*Executive Order* 9066).[14]

On 2 March 1942 General John L. De Witt, head of the Western Defense Command, issued Public Proclamation No. 1 creating Military Areas #1 and #2. Military Area #1

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[12] The U.S. Justice Department did intern some East Coast Germans it viewed to be dangerous, but there was never a mass exclusion of German aliens or German-American citizens from the East Coast. Within the War Department, there was discussion of extending Executive Order 9066 to include Germans and Italians, but it was quickly recognized that with about one million German and Italian aliens—not to mention many more second-generation Americans of German or Italian descent—moving such a large group *en masse* would present enormous practical difficulties and economic dislocations with broad implications for the entire U.S. (*Commission*, 1982, p. 286).

[13] The only case of espionage seems not to have been by a Japanese-American, but rather by a language officer in the Imperial Japanese Navy, Itaru Tachibana. Tachibana was arrested in June 1941 in Hollywood and charged with "'conspiracy to obtain national defense information for a foreign power.'" A search of Tachibana's quarters revealed a variety of maps, photographs, and reports on U.S. naval movements. Wanting to avoid the media sensationalism that almost certainly would arise from a public trial, the U.S. government chose to immediately deport Tachibana (Kumamoto, 1979, p. 55).

[14] For a detailed and exhaustive study of the internal decisionmaking within the U.S. government on the issue of Japanese internment, see the *U.S. Commission on Wartime Relocation and Internment of Civilians*.

included the western portion of California, Oregon, and Washington, and part of Arizona while Military Area #2 included the rest of these states. Shortly thereafter, both houses of the U.S. Congress overwhelmingly passed Public Law 503, making it a federal offense to violate any and all restrictions issued by a military commander in a "military area."[15] On 18 March 1942 President Roosevelt signed Executive Order 9102 establishing the War Relocation Authority (WRA) with Milton Eisenhower as director.[16] It was allocated $5.5 million to carry out its order to transport and house potential evacuees.

Curfews were instituted. Bank accounts were frozen, and travel of Japanese-Americans was immediately restricted. Without trial or due process, the U.S. government could forcibly remove any alien or U.S. citizen of Japanese ancestry from Military Zone #1 and #2, which basically encompassed the entire West Coast, to include all of California and the southern part of Arizona. Anyone with 1/16th or more of Japanese blood was automatically included in the evacuation.

General James DeWitt—in charge of the Military Western Zone—and the Army posted Civilian Exclusion Orders on telephone poles and in store windows in Japanese-American neighborhoods. The Army set up 64 Civil Control Stations where every Japanese-American had to register. Evacuees were given only a short amount of time to put their affairs in order, as few as six days before the residents were scheduled to be "relocated" (Daniels, 1993).

Only three men—Minoru Yasui, Gordon Hirabayaski, and Fred Korematsu—openly risked challenging the military curfew and exclusion orders. Yasui, a young lawyer in Portland, Oregon, had volunteered for military service after the Japanese attack but was rejected because of his Japanese ancestry. So he broke the curfew on the first night, believing firmly that citizens had a duty to challenge unconstitutional regulations. He was found, arrested, and spent nine months in solitary confinement before being sent to Minidoka Relocation Center. Hirabayaski, a student at the University of Washington, deliberately violated the evacuation orders, arguing that the U.S. government was violating the 5th Amendment by unlawfully restricting the freedom of Japanese-Americans. He was found and jailed, eventually ending up in a federal prison in Arizona. Korematsu was a U.S.-born Japanese-American who decided to stay in San Leandro, California and knowingly violated Civilian Exclusion Order No. 34 of the U.S. Army. Refusing to be separated from his Italian-American girlfriend, he changed his name, altered his facial features—trying not to look "Japanese"—and went into hiding. When the authorities found him, they sent him to Topaz Relocation Center.

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[15] The House of Representatives did hold hearings on the West Coast between 21 February and 7 March, the Tolan Committee, but did not openly abandon support of the Executive Order after the hearings, although it was eager to see that the property of aliens was safeguarded by the government (*Commission,* 1982, p. 95ff). In another tragic irony of U.S. history, future U.S. Supreme Court Justice Earl Warren—then the Attorney General of California—testified at length to the Tolan Committee, unequivocally joining the anti-Japanese side of the argument, that the Japanese population of California was "… ideally situated … to carry into execution a tremendous program of sabotage on a mass scale should any considerable number of them be inclined to do so" (*Commission,* 1982, p. 97).

[16] Youngest brother of Dwight D. Eisenhower, Milton gradually became distraught by conditions in the camps and what he, as director of WRA, was responsible for. He resigned in June of 1942, telling his successor, Dillon Myer, "I can't sleep and do this job. I had to get out of it." See http://www.geocities.com/Athens/8420/politicians.html.

All three took their cases to court, but received criminal convictions. They then appealed, with their cases eventually being heard by the U.S. Supreme Court. But in all three cases, the U.S. Supreme Court upheld the Army's actions.[17]

Japanese-Americans were allowed only to take what they could carry, and no provisions were made for the sale or safeguarding of their property. Literally overnight, there were thousands of auctions as the designated evacuees attempted to either sell their possessions, or bring them into safekeeping with friends. Needless to say, it was difficult for evacuees to get reasonable prices in a hostile marketplace; businessmen were forced to dispose of their inventory at distress prices.

Indeed, the 1982 *U.S. Commission* later determined that a large number of "scam artists" had profited handsomely from distress sells. Similarly, a post-World War II survey revealed that 80 percent of goods privately stored were "rifled, stolen or sold during absence" (Weglyn, 1976, p. 77). Another expert estimates that by the time internees returned home in 1946, they had lost property (homes and businesses) worth 4-5 billion dollars in 1999 currency (Burton, 1999).

The Sakai Araki Family: On the Run from the FBI

Aside from the immediate roundup of all Japanese community leaders, the authorities were intent in taking into custody other individuals on the FBI's A, B, C list—a list including farm owners and those engaged in martial arts. Martial arts—uniquely Asian—were mysterious and unknown in the U.S., and the FBI viewed anyone engaged in this activity to constitute a threat to U.S. security. Sakai Araki was a kendo (martial arts fencing) expert and almost certainly on the FBI A, B, C list for this reason. But he also owned a farm (albeit registered in someone else's name).

The Japanese agricultural community in California had long been a target of jealous West Coast farmers. Japanese farmers had been particularly successful in achieving high crop yields and, much to the chagrin of native farmers, the Japanese controlled a good portion of California's agricultural income by 1941 (Kumamoto, 1979, p. 60ff). Agriculture as a means of employment was a major source of income for the evacuees—in 1940, 45 percent were gainfully employed in the agricultural sector (*Commission*, 1982, p. 122).

Sakai Araki knew that if he were apprehended he would be permanently separated from his family and sent off to a particularly stringent detention center—probably Thule Lake, a special camp for the most "dangerous" of the Japanese-Americans—so

[17] Four decades later in 1983, lawyers for Yasui, Hirabayaski, and Korematsu filed legal petitions asking federal judges to vacate their convictions and wipe them off the judicial record. It still took another five years before the courts vacated the charges against the three men. Peter Irons, one of the lawyers who took up the cause of the three, was instrumental in winning the four-decades-later exoneration. Using an obscure and arcane legal procedure termed *coram nobis*, Irons was able to eventually convince the courts that General DeWitt had wittingly lied when he argued that there was evidence of acts of sabotage and espionage warranting the imposition of curfew and evacuation orders. See the fascinating account in Peter Irons, *Justice at War*. In 1998, President William Clinton awarded Fred Korematsu the Presidential Medal of Freedom, the nation's highest civilian honor. The Public Broadcasting Station (PBS) has recently released a well-done documentary on the Korematsu case: "Korematsu versus the United States: Of Civil Wrongs and Rights."

his instinct was to flee with his family. He had decided to relocate his family outside of Military Zone #1, inland at Reedley in Military Zone #2 where they had family friends. Robert Kirkwood came immediately to the aid of the Araki family, assuring Sakai that he would take care of the farm. Indeed, he "leased" it from Sakai, giving the Araki family an income over the next four years, an income that assisted them in their flight from the FBI and provided some comfort during their years in the camps.

The Araki family had only half-packed their truck when a friend informed them that the FBI had just picked up his own father, and that Sakai was next. Kirkwood said, "Just go, we'll pack for you—go!" This was on a Thursday, and Sam remembers that his father drove a circuitous route to Reedley in order to evade detection. On Saturday Kirkwood and his foreman brought the packed truck to the Araki family and agreed that the foreman would stay at the Araki farm, safeguarding it and watching over the meager Araki family possessions (Araki, 2007).

All in all, the Araki family *moved six times in six months* in Sakai's efforts to evade the FBI. Time and again, a network of friends warned that the FBI knew their most recent address and were about to apprehend Sakai. Sam—10 years old at the time—remembers being afraid and constantly starting classes in a new school.

Exhausted from the stress of constantly moving and being on the run from the FBI, by summer of 1942 Sakai decided to surrender and with his family voluntarily entered a camp—Poston in Arizona.

News of Evacuation Orders and the Kaizo Naka Family

Even prior to 7 December 1941, Kaizo Naka had little doubt that open conflict between Japan and the U.S. was imminent. Shortly after Japan invaded Indochina in September 1940, President Roosevelt had placed an embargo on scrap iron and steel shipments to Japan—followed in July 1941 by an embargo on shipment of oil. Working in the transpacific shipping business and dealing a lot with U.S. Immigration and Customs personnel, Kaizo was keenly aware of the geopolitical climate, and, after the U.S. embargoed steel and oil to Japan, he warned his son: "Japan will probably retaliate in some way. Because our family is of Japanese lineage, we are going to have a difficult time when Japan retaliates" (Naka, 2007).

On the morning of 7 December, Bob Naka had been at church with his cousin Tomoo Inouye and heard the news when he returned home. He describes his parents as "being numb" and later noted that the "reaction of the populace was immediate hatred but the reaction of our neighbors and friends was supportive" (Naka, 2007).

Through his business, Kaizo Naka had contacts in the U.S. government, and used these to spare his family the required stay in the miserable conditions of the assembly centers. So he arranged a "paper move" of his family to a hotel in an area that was scheduled to move directly to the relocation center of Manzanar.

The Naka family had about one month to get their affairs in order. UCLA, where Bob was a sophomore, arranged for him to complete half of the spring semester to obtain credit for the courses. Bob's church gave him a rudimentary course in leadership to prepare him for life in the relocation center. The family "loaned" some of their furniture to neighbors; much was stored in the living room of a Dr. Iseri. Taking only what they could carry, on the day of departure the Naka family was accompanied by friends to Central Station in Los Angeles where they boarded the train that took them to Manzanar. Each family was given an identification tag they were required to wear. Armed soldiers accompanied them. As they walked into the camp—a "dusty bleak installation"—Bob, 18 at that time, remembers he felt "bewildered" and wondered about the future (Naka, 2007).

Life in the Camps

> *Has the Gestapo come to America? Have we not risen in righteous anger at Hitler's mistreatment of the Jews? Then, is it not incongruous that citizen Americans of Japanese descent should be similarly mistreated and persecuted?*
>
> —James M. Omura[18]
>
> *It was very depressing to be labeled as a distrusted, unwanted American in the only country I ever knew.*
>
> —F. Robert Naka[19]

In all, there were eventually ten camps scattered across the states of Arkansas, Colorado, Utah, Idaho, Wyoming, Arizona, and California, all administered by the War Relocation Authority (WRA) set up specifically by the Army to run the camps; four Department of Justice internment camps over four states; and finally, two "Citizen Isolation Camps," one in Utah and one in Arizona. By war's end, more than 120,000 aliens and Americans of Japanese ancestry had been incarcerated. Two-thirds were American citizens and more than one-third were children.

Prior to camp internment, however, was an intermediary step—to be temporarily assigned to one of the 15 assembly centers. These were makeshift. Inmates were housed in horse stalls next to racetracks, the smell of urine very common. Bedding consisted of gunnysacks filled with straw, laid out on linoleum that had been put over manure-covered floorboards (Sinnott, 1995).

After a brief interval in the assembly centers, evacuees were transported to one of ten relocation camps located in isolated areas—most in deserts or swamps—on unused or under-utilized federal land. Camps were enclosed by barbed-wire fences and guard towers equipped with machine guns and searchlights; military police had orders to shoot anyone attempting to escape. To deter and punish dissident activity, the WRA directly and indirectly employed the threat of isolation, exile, forced labor, public humiliation, and even torture and death (Hata et.al., 1995, p. 12).

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[18] Testimony before the Tolan Committee Hearing, February 1942 (quoted in Weglyn, 1976, p. 67).

[19] Quoted by Gilbreth, 2005.

Periodically, there was rebellion in the camps, and violence did break out. There was a general strike at Poston. At Manzanar several Nisei were shot and killed; they were not trying to escape—rather, they died when guards fired into unarmed public demonstrations prompted by unpopular actions and policies of the camp's director (Hata, 1995, p. 14ff; Armor & Wright, 1988, p. 89).

Living conditions were extremely challenging, with each family crowded into a space about 20 by 20 feet in a larger barracks containing many such individual family units. Partitions between the units were thin and only extended to the eaves (not to the roof), resulting in incessant noise and little privacy. Camp inmates experienced body-numbing extremes in temperatures, from over 130 degrees Fahrenheit in Poston, Arizona, to as low as minus 30 degrees Fahrenheit in Heart Mountain, Wyoming (Armor, 1988). Residents at Manzanar, Topaz, Minidoka and Heart Mountain in particular suffered through constant dust storms—clouds of debris and sand that turned day into night and shut down all activity for hours at a time. Dust filtered through cracks in barrack floorboards. As one inmate later recalled: "Down in our hearts we cried and cursed this government every time when we were showered with dust. We slept in the dust; we breathed the dust; and we ate the dust" (Yancey, 1998, p. 47).

One in every four Japanese-Americans in the camps—around 30,000—was of school age. They received instruction from about 600 Caucasian teachers, 50 certified Japanese-American teachers, and 400 Japanese-American assistant teachers (James, 1987, p. 43). Ad hoc classrooms were set up in barracks and mess halls. On some days the schools could not open because of the bad weather—whether dust storms, *blizzards*, swampy pools, or clay mud. Teachers often lacked supplies. Ironically—and much to the chagrin of Caucasian teachers—students were required to say the "Pledge of Allegiance" every morning (Goodwin, 1994, p. 429).

Even with all Japanese aliens and their U.S.-born sons and daughters incarcerated in camps, resentment against them remained high in the U.S. Despite the austere living conditions in the camps, the general U.S. public was convinced inmates were being treated too well. With widespread rumors and media reports that inmates were being "coddled," Eleanor Roosevelt visited the Gila Relocation Center in 1943. She immediately authored an article for *Collier's* magazine entitled "To Undo a Mistake is Always Harder Than Not to Create One Originally," where she assured the American public that the evacuees were not being coddled, noting: "The day I was at Gila there was no butter and no sugar on the tables…Neither in the stock-rooms, or on the tables did I notice any kind of extravagance" (Roosevelt, 1943).

The Sam Araki Family at Poston

Sam Araki and his family were to spend three years (1942-1945) at the relocation camp in Poston III, Arizona. Poston was actually composed of three camps, built on an Indian reservation in the Arizona desert, that were nicknamed by the internees "Duston," "Roaston," and "Toaston." As the names suggest, the heat was abominable and dust from incessant storms was a daily part of life. At its peak, Poston had about 20,000 inhabitants (Okihiro, 1996, p. 198; Yancey, 1998, p. 47).

As they entered the camp, the Japanese were asked to swear "loyalty to the United States" and agreed to work "to contribute to the needs of the nation and in order to earn a livelihood for myself and my dependents." After the WRA reviewed loyalty questionnaires, those inmates deemed to be "disloyal" were shipped to Tule Lake camp (Hata, 1995, p. 158; Okihuro, 1996, p. 199ff).

Living conditions were the worst feature of internment at Poston III. The barracks had no partitions originally; makeshift walls did not extend to the ceiling. Hence, there was little privacy, and everyone could hear every conversation in the barracks. The barracks' outside walls were composed of single-plywood and tarpaper construction, meaning that the living quarters were stifling hot in the summer and freezing cold in the winter. With his brother and sister, who had been raised in Japan, and parents, Sam shared a narrow area, probably around 20 by 20 feet. They slept on cots, and shared centralized restrooms and showers, as well as a cafeteria in another building.

Despite the dire living conditions, the Japanese inmates quickly organized and formed their own community and governmental structures—to include a police force and medical facilities. The U.S. government paid salaries to all working inmates, e.g., $10/month to police, doctors, and teachers. Sakai was initially a policeman, and then became a janitor. To supplement their austere living conditions, inmates grew their own vegetables. If they had enough money, they were also permitted to buy goods by using mail order through Montgomery Ward and Sears catalogues. Indeed, one of the happiest memories of the camps for Sam was when his parents bought him and his brother a bicycle through mail order (Araki, 2007).

According to Sam, they were particularly fortunate in their section of Poston—a former restaurant chef became their cook and their meals were—given the conditions—relatively good. Indeed, the chef quickly established a routine of feeding the truck drivers who delivered rationed meat to the camp; in exchange, the drivers gave Sam's section of Poston the best cuts of meat (Araki, 2007).

Sam adapted very quickly, finding friends easily and has many happy memories of life in the camps. As a young boy during the years in the camp—10 to 13 years of age—he had many playmates within immediate proximity, and they had one adventure after another. They spent a lot of time fishing—there were fishing holes in the desert and they could also hike to the Colorado River (within camp confines) where they would fish for bass and perch. At one point, he and his friends even built a pond outside their barracks where they put the fish they caught. There were a variety of sports—including baseball and basketball—all of which he and his teenaged friends enjoyed playing. He attended the Poston camp school and graduated from grammar school (Araki, 2007).

The Japanese inmates also organized entertainment—forming bands and orchestras and putting on plays. As a child, Sam particularly relished the weekly outdoor movies where they sat on the ground or brought chairs; his favorite was *Flash Gordon*. The community held block dances, playing Glenn Miller records. The community also set up churches, which formed a center for many community social activities (Araki, 2007).

Life was more difficult for Sam's parents. Sam remembers that his father became very involved in community activities, and kept very busy; indeed, Sam says that's what "kept him going." But life in the narrow confines of the barracks was not easy for the Araki family, with the crowded living conditions only exacerbating family tensions. On his part, Sakai would take walks in the desert to look for rocks (agates, etc.). He also adopted a philosophy of positive thinking, following Norman Vincent Peale's teachings. Six decades later, Sam recalled Sakai's ever-positive attitude, and reflected that his father's example played a major part in developing his own outlook on life (Araki, 2007).

Inmates in the camps could receive mail, but were not allowed to communicate with their relatives remaining in Japan. AM radio—but not FM—was allowed. Fortunately in Poston, guards were far away, and did not intrude on daily life. As Sam remembers, they were visible "but not in the backyard" (Araki, 2007).

Six decades later, Sam recollects that the environment in Poston was in certain ways an "equalizer": everyone was in the same boat, and the only recourse they had was to make the best of the situation (Araki, 2007).

The Naka Family—Life in Manzanar

Bob Naka was to spend nine months at Manzanar, his family four years. Manzanar[20] was one of the largest camps, holding over 10,000 men, women and children, and guarded by eight towers with machine guns. Situated on some 6,000 acres of land, the evacuee living area consisted of nearly one-square-mile expanse dominated by 36 blocks of tarpaper barracks, most of the residents living in spartan conditions in 20- by 25-foot overcrowded apartments. The area encompassed communal mess halls, laundry facilities, and communal latrines for each block, as well as a hospital, school, church, recreational and cultural facilities, and cooperative store. Immediately outside the evacuee living area were agriculturally developed lands, enabling Manzanar to become largely self-sufficient in vegetables, meat and poultry products, and even augmenting other WRA camps' food supplies.

Living conditions were exceedingly primitive. Allegedly, Manzanar had "mosquitoes as big as flies" (Okihuro, 1996, p. 195), but the constant cyclonic dust storms were the worst; inmates slept in, constantly breathed, and even ate the dust (Okihuro, p. 195; Yancey, 1998, p. 46ff).

[20] The famed photographer, Ansel Adams, was permitted by the U.S. government to take photographs of Manzanar in 1943. His collection documents starkly the arid, desolate environment. When he offered the collection to the Library of Congress (LOC) in 1965, he noted: "The purpose of my work was to show how these people, suffering under a great injustice, and loss of property, businesses and professions, had overcome the sense of defeat and dispair [sic] by building themselves a vital community in an arid (but magnificent) environment …." See the LOC website at http://memory.loc.gov/ammem/collections/anseladams/. Another excellent collection of photographs is to be found in *Impounded,* edited by Linda Gordon and Gary Y. Okihiro. The collection features photographs of Manzanar taken by Dorothea Lange, who was commissioned by the U.S. Army to make a photographic record of the times. But the photographs were impounded and languished in the National Archives until recently.

Assigned to Block 26, Barracks 9, Room 3, the Naka family shared, with a woman and her son, a barracks room about 30 by 30 feet. The barracks had been hastily constructed of uncured wood that soon shrank, allowing sand to blow into the rooms during sand storms. Gradually, however, inmates were able to lay linoleum floors and erect plaster-board walls for better insulation from the weather.

Just as in Sam Araki's experience in Poston, inmates in Manzanar quickly organized a communal life. Jobs were plentiful, and inmates were paid modest salaries. Bob himself began as a junior cook learning how to chop vegetables. Later, a UCLA classmate convinced Bob to help with distributing diesel oil used to heat the kitchen stoves and the barrack living areas. Shortly thereafter, the friend left to harvest sugar beets and Bob was promoted to foreman—with his pay increasing from $16.00 to $19.00 a month.[21] Even here in the camps, Bob Naka was to employ his considerable dexterity in math: when the mountain passes to Manzanar froze in the winter, he used calculus to figure out how to deliver precise amounts of diesel from the tank trucks so the camp could properly ration it throughout the winter (Naka, 2007; Love).

At Manzanar, the Naka family had little contact with the outside world. There was freedom of movement within the Camp, but to go outside the barbed wire fence with manned guard towers required special permission. They did have local AM radio, but by military decree, FM access had been removed from their radios. They too were able to buy clothes and furniture from the Sears Roebuck catalogue. They did receive mail and were permitted to send mail to friends outside of the Camp. One of Bob Naka's UCLA classmates, Harry Larson, even came to visit him at Manzanar, but the authorities would not permit him in (Naka, 2007).[22]

Somewhat ironically, the U.S. government tried to persuade Kaizo to make radio broadcasts to the Japanese saying they were going to lose the war. But Kaizo reminded the U.S. government official that he had not been allowed to become a U.S. citizen, that he was accordingly still a citizen of Japan, and that what the U.S. official was asking him to do would constitute treason. Even though Kaizo had little patriotism for his country of origin, he could not and would not be used in such a fashion (Naka, 2007).

Leaving the Camps: Readjustment

As early as 1943, the WRA began to encourage "voluntary" departures from the camps. In December 1944, the War Department announced the lifting of the ban excluding all persons of Japanese ancestry from the military areas of the West Coast. In 1945, the U.S. government officially closed the camps.

Readjustment was by no means easy, however—particularly for the Issei. Although there were only around 60,000 people in the relocation centers by March of 1945, most of them were elderly or young children. The average age of the elderly still in the camps

[21] Kaizo was amused that with Bob's salary of $19/month his son by then was making more money than his father (Naka, 2007).

[22] It was only in later years that Bob Naka found out about Harry Larson's ill-fated attempt to visit his friend incarcerated in the camp.

was 58—a difficult age to pick up, find work, and begin a new life. Ironically, when the camps finally closed, many remaining Issei had to be forced outside the gates (Hata, 1995, p. 19).

Each evacuee was given $25—hardly enough to begin a new life even by 1945 standards. One inmate describes the preparation for leaving Topaz, and having to attend seminars on "How to Make Friends" and "How to Behave in the Outside World." On the day of departure, she received a train ticket and $25 plus $3 a day for meals while traveling, and a booklet entitled "When You Leave the Relocation Center" (Okihuro, 1996, pp. 218-219).

The WRA instituted a loyalty registration program, issuing certificates of loyalty to departing inmates. The WRA established the program in the belief that if the U.S. public was informed that prior to their release all evacuees had been cleared by a loyalty oath, resettlement would transpire more easily (Kitagawa, 1967, p. 115ff). However, this was not to be the case: many former internees faced considerable hostility when they tried to return to their communities on the West Coast. Homes had been ravaged, personal items stolen—some even found their homes burned down (Okihuro, 1996, pp. 230-231).

Of the 120,000 evacuees, more than one-third (some 43,000) scattered to Illinois, Colorado, Utah, Ohio, Idaho, Michigan, New York, New Jersey, and Minnesota (Hata, 1995, p. 21). Even the Quaker initiative that had enabled many college-aged Nisei to be released from camps to attend universities recommended that students they had helped should not—when possible—return to the West Coast where hostility remained high; rather, they should relocate to the "east and middle west where prejudice against the Oriental is less pronounced" (National Japanese-American Student Relocation Council, 1945).

The Araki Family: Leaving Poston and Facing a Challenging Readjustment

In early 1945, Sakai Araki began to pave the way for his family to leave Poston, taking his 13-year-old son Sam on an exploratory trip back to San Jose. They took the train—a somewhat traumatic memory for Sam who negatively associated train rides with the uncertainty of their "voluntary surrender" into Poston four years earlier. As they journeyed west, he accordingly had some understandable initial dread and apprehension (Araki, 2007).

They stayed at Japan Town in San Jose for several days. During his almost four years in camp, Sam had developed a list of things he had missed, and he remembers longing for and getting his first ice cream cone. Sakai and Sam were relieved to find their car and farm still intact. Kirkwood had honored his promise and safeguarded the family's invaluable possessions.[23] Even the rifles—which they had buried under the house before they left—were still there. As Sam noted more than six decades later, "We were very fortunate. We were one of the few who had something to come back to …" (Araki, 2007).

[23] Incidentally, Robert Kirkwood was later to become Comptroller of the State of California.

Despite having their farm and many of their original possessions, readjustment for the Araki family was to prove immensely challenging in the coming years. The farm was actually a large orchard—apricots, prunes, and walnuts—but getting it up and running again demanded an immense amount of hard work. Sam went to Campbell High School, but for whatever reason—possibly the disruption from fleeing from the FBI and incarceration in the camps—had little interest in studying, and received poor grades. Moreover, he had to work on the farm—after school, Saturdays and Sundays; helping his father and family survive and getting the farm working was his major priority (Araki, 2007).

But Sakai was a firm believer in the value of a higher education, and given Sam's poor grades first sent him to San Jose State where Sam took remedial courses. It was at this point that Sam became serious about his studies, getting A's in math; he chose to specialize in engineering because at that time engineering was the "best place to earn a living." His father wanted him to go to Stanford; Sam passed the entrance exam and transferred there after two years.[24]

Sam blossomed at Stanford where he also continued on to do a master's degree. Although there were only a few Americans of Japanese descent, establishing friends proved nonetheless to be quite easy and he never felt like an outsider; however, he never did talk with his Stanford colleagues about his experience of having been interned in Poston. Six decades later, Sam recollected that he wanted to forget that stage (Poston) of his life, and did not discuss it for decades (Araki, 2007).

The Naka Family: The Quakers Aid Bob

A few months after Bob arrived in the Manzanar camp, Helen Ely, a Quaker teacher, told him that her organization had arranged for him to leave camp and continue his education at Ohio State University; after a riot against Japanese students erupted on campus, the Quakers then sent him to the University of Missouri. According to Naka, the night before he was to leave his parents began arguing. His father did not want him to go saying he would be killed "out there," but his mother encouraged him, claiming if he remained in camp he was "as good as dead. Let him go out there and take his chances. If he is killed, at least he tried" (Love; Naka, 2007).

Clarence Pickett, then Director of American Friends Service Committee in Philadelphia, friend to Eleanor Roosevelt and frequent visitor to the White House, was instrumental in ensuring the success of a program facing considerable obstacles, but one that eventually would free more than 4,000 Japanese-Americans from internment camps and allow them to pursue higher education at universities throughout the U.S. It was Milton Eisenhower, then director of the War Relocation Authority, who initially called Pickett to ask if the American Friends Service Committee would undertake to organize the transfer of Japanese students from West Coast universities to inland institutions (Miller, 1999, p. 221).

Pickett's American Friends Service Committee then spearheaded organizing the National Japanese-American Student Relocation Council, which worked to convince

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[24] Robert Kirkwood had also been a Stanford graduate.

colleges and universities outside of the military zones to accept Nisei students from colleges and universities on the Pacific Coast.[25] Various church boards and several philanthropic foundations provided generous grants to finance the costs of operation, as well as paying for scholarships.

During the early months of the war, the efforts to get students out of the camps faced considerable obstacles, obstacles that prompted insiders to term the effort the "underground railroad." Many colleges throughout the country were adamantly against accepting Nisei students. The President of the University of Southern California—Rufus B. von Kleinsmid—refused to even transmit pre-war transcripts on the grounds that to do so would be to "aid and abet the enemy." Princeton University, the Massachusetts Institute of Technology and Indiana University were among the many other campuses that declined to accept Nisei. Moreover, even the federal government declined to provide students any financial assistance, aside from the minimal WRA funds allotted for travel expenses (Hata, 1995, p.13).

As eloquently noted by one author, the Nisei themselves faced a kind of Faustian bargain: either they pursued academic education and a future—thereby allowing themselves to be dispersed and isolated from their racial group—or they remained segregated in the slow, dispiriting, communal life of the camps.

Should they decide to pursue an education and leave the camps, they—or a camp counselor—had to navigate a maze of bureaucratic challenges to ensure the U.S. government had:

- Proof that they had been accepted at an institution outside the Western Defense Command
- Evidence of adequate financial resources[26]
- Testimony from a public official that the Nisei student would be acceptable to the local community where the university was located
- Proof that the institution/university had been "cleared" by the U.S. Department of War
- Certification that the FBI had conducted a security check and had granted the Nisei student a clearance (James, 1987, p. 117).

Finally, once a Nisei student arrived at the host university he felt considerable pressure to succeed—to somehow "prove" himself worthy of being an American citizen. As one author astutely notes, "…freedom was no longer an inalienable right; it depended on successfully managing the perceptions of others, persuading them that one deserved

[25] The 1947 Nobel Peace Prize was awarded to both the American Friends Service Committee and the (British) Friends Service Council for "activities relating to peace and social justice." Pickett proudly accepted the award on behalf of the American Friends Service Committee (Miller, 1999, pp. 247-248).

[26] Bob Naka recalls one particular question on the application forms: "Will you need a scholarship?" His parents recommended he answer "no" to remove a possible impediment to his being released to continue his college education. He went on and held various part-time jobs on campus in order to fund his education at the University of Missouri (Naka, 2007).

to be free. One had to gain recognition and the approval of whites to be selected and sponsored to leave the camps" (James, 1987, p. 121).

Indeed, shortly before Bob Naka was to leave for Ohio State University, there was a riot on campus where students demonstrated against having Japanese-Americans on campus.[27] The Quakers quickly shifted gears, four months later sending Bob instead to the University of Missouri in Columbia, Missouri.

Following his mother's advice, Bob Naka entered the University of Missouri—Columbia College of Engineering in February 1943 with an understandable high degree of trepidation. He was given a bus ticket from Manzanar to Reno, Nevada, and a railroad ticket from Reno to Columbia, Missouri. An adult from the camp accompanied Bob initially to Reno, but left him there to continue the journey on his own. Six decades later, Bob reminisced that he "was alone and frightened. Perhaps what saved me was that I was wearing a Navy pea coat that had been issued at Manzanar to keep us warm" (Naka, 2007).

There were only a handful of Japanese-American students at Missouri, but not all had come via a relocation center. But the professor designated to guide them, Jesse Wrench, had them over to his home for Sunday afternoon tea. Meanwhile, gradually Naka came to realize that his fears had been unfounded: "I was just another kid on campus. I made good grades and was very popular. The experience made me whole again for which I have been very grateful to the American Friends Service Committee" (Naka, 2007).

Bob's parents, however, faced more challenging prospects. Not released from Manzanar until 1946, they found that Dr. Iseri's home had been broken into and pilfered and thus had lost many of their possessions. Given the still pervasive hostility on the West Coast, Kaizo eventually found a job as an accountant at the Edgewater Beach Hotel in Chicago. Given Kaizo's education, he almost certainly was vastly underemployed, but as Bob Naka reflected decades later, "At least it was a job." His mother worked as a seamstress in a woman's apparel shop. Kaizo Naka unfortunately was to die in 1949—not living long enough to witness what Bob went on to achieve in safeguarding the national security of the country that had incarcerated his parents for four years in Manzanar (Naka, 2007).

[27] The riots at Ohio State were eventually quelled when a Japanese-American student put on saddle shoes—the trademark college dress uniform of the era—and reminded his Caucasian audience, "'We are just like you'" (Naka, as quoted by Gilbreth).

From Incarceration to National Reconnaissance

> *What made me work for the government that had deprived me and my family of civil liberties? The issue was survival, not bitterness. America is the only country I had and knew. I had to succeed.*
>
> —F. Robert Naka
>
> *[During the 1950s and 1960s in space launch efforts]…we knew we had a real mountain to climb. There were a lot of problems in front of us …. Everybody said, the nation needs this so we have to succeed ….*
>
> —Sam Araki

Sam Araki and Dr. F. Robert Naka went on to become major contributors in developing intelligence capabilities during the early stages of the Cold War, using attributes and values—whether consciously or unconsciously—developed and honed during and from their experience of internment in Japanese-American camps: the drive to succeed; the necessity of perseverance; the ability to exploit available resources to achieve the most favorable outcome; the importance of cooperative teamwork; a highly developed degree of adaptability and flexibility; and the investigative curiosity and brains that had allowed Naka to use calculus to ration fuel at Manzanar and Araki to develop a keen sense of exploration while a teenaged boy in Poston.

Indeed, it was curiosity and sense of exploration that drove Araki into the unknown world of space during the 1950s. While at Rocketdyne, he had worked on all major early U.S. rocket engines for Intercontinental Ballistic Missiles (ICBMs), Intermediate Range Ballistic Missiles (IRBMs) and Space Launch Vehicles (SLVs)—to include Redstone, Thors, Atlas, Jupiter and Saturn. But with an avid curiosity, he wanted to venture into the unknown—namely, space. But: "At that time there were no classes in space physics or any space engineering at all. Space was unknown" (Araki, 2004). So he joined Lockheed, learning "by doing" and spearheading U.S. space efforts with Discoverer (Corona), Samos, and Midas.

It was from his experience with the 12 failed launches of Corona that Araki became keenly aware of the importance of cooperation, teamwork, risk-taking, innovation, "learning-by-doing," and perseverance. During the tense 1959 and 1960 period—overshadowed by the 1957 Soviet success of Sputnik and U.S. fear that the Soviets had indeed achieved a strategic missile superiority—U.S. prime contractor representatives and government managers working on Corona held weekly sessions ("Black Tuesdays") to discuss their failures and take corrective actions. Experience and analyzing "the hell out of" a failure was critical for learning, since no one taught "space" in a classroom: "…you had to experience problems, fix them, and move on. But make sure it doesn't happen again. Lessons learned became the key word" (Araki, 2004).

Six decades later, Sam Araki reflected that he never had any ambivalence about working for U.S. national security. He and his generation believed the U.S. was facing an overwhelming national imperative. He remembers a U-2 being shot down in the middle of one of the 12 Corona failures and the Soviets successfully launching Sputnik: both events drove those working on Corona to keep trying until they succeeded (Araki, 2007).

The urgency to develop an imagery capability from space took priority over all other concerns. The common mission and urgency fostered a close-knit community between government and industry and—not unlike his assessment of the environment at Poston—was an "equalizer": everyone was in the same boat, and the only recourse they had was to make the best of the situation and to meet the challenge head-on.

Sam's camp experience as well as his father's use of labor from Mexico on the Araki farm in the immediate post-war period almost certainly also played a role here. Sam learned to play and work cooperatively, and came to understand the key role mediation has. Responsible for Corona's systems engineering, he had to find ways of making the total engineering effort work, meaning he had to navigate a role between Program A (Air Force) and Program B (CIA) government managers, the contractor (Lockheed), and sub-contractors.

Sam does not remember his loyalty to the U.S. or his security status ever being an issue during the 1950s and 1960s. With the post-World War II Allied occupation of Germany and Japan and subsequent advent of the Cold War, the geopolitical environment had changed tremendously since he had been at Poston. Japan was no longer an enemy, and by 1962 Sam had received top-secret security clearance. But he does remember that his Chinese friends encountered problems when it came to obtaining top-secret clearances (Araki, 2007).

Meanwhile, after graduating from Harvard University with an Sc.D. in 1951, Dr. Naka began working with the Massachusetts Institute of Technology to perfect radar detection of aircraft. Accordingly, he began to work on radar detection for Russian bombers. Venturing into the unknown, he eventually led a team that developed the first automatic analog radar signal detection equipment. He was also able to reduce the radar cross section on the U-2 and the A-12 aircraft.

In these efforts, Bob Naka also displayed characteristics honed during his wartime experience as a Japanese-American: the drive to succeed despite the obstacles; a high degree of adaptability; innovative application of his brain to a given situation; and the courage to push on into the unknown—even while knowing that a Navy pea coat actually offered only limited protection. Despite his father's (possibly justified) fears, in 1943 he had taken that lonely train ride from Manzanar into the unknown world of Caucasian Missouri, at a time when the U.S. appeared to be losing the war with his father's country of origin.

Bob Naka says he had no difficulty in obtaining a secret clearance: he filled out the forms truthfully, listing Manzanar as a former address. As he said later, "I am not aware that my past as a Japanese-American was ever an issue, but behind the scenes it might have been" (Naka, 2007). He does, however, relate a humorous incident displaying how seriously security was taken in the 1950s. Before he had top-secret clearances—and had only "secret"—he wrote a report on radar that he thought was secret, but management ruled it to be "top secret." It was taken away from him, barring him from being able to correct errors, even though he had written it (Naka, 2007).

The 1980s: Redress

> *The promulgation of Executive Order 9066 was not justified by military necessity, and the decisions which followed from it—detention, ending detention and ending exclusion—were not driven by analysis of military conditions. The broad historical causes which shaped these decisions were race prejudice, war hysteria and a failure of political leadership…. A grave injustice was done to American citizens and resident aliens of Japanese ancestry who, without individual review or any probative evidence against them, were excluded, removed and detained by the United States during World War II.*
>
> —U.S. Commission on Wartime Relocation and Internment of Civilians

In 1948, the U.S. Congress passed the Japanese-American Evacuation Claims Act designed to compensate for the damage to or loss of real or personal property not compensated by insurance. Altogether 26,568 claims totaling $148 million were filed under the Act; the U.S. government ultimately distributed approximately only $37 million (*Commission,* 1982, p. 118).

The Act was structured in such a way that receiving just compensation was difficult for former camp inmates who had the burden of proof in providing financial documents justifying their claim. Financial records were hard to find: having been allowed to take only what they could carry into the camps, few inmates had retained any records. Those records given to friends for safekeeping had often disappeared or had been destroyed by the end of the war. To make things more difficult, the Internal Revenue Service (IRS) had already destroyed most of the 1939-1942 income tax returns of the evacuees, a source that might have provided the most comprehensive pre-war accounting. In short, the Act provided little relief and "settlement procedure was tilted in favor of the government" (*Commission,* 1982, p. 118).

It was to take another four decades for the U.S. government to finally conduct a thorough investigation, provide recommendations, and eventual compensation to those unlawfully incarcerated. The U.S. Commission on Wartime Relocation and Internment of Civilians published their report in 1982, clearly signaling their key finding in their choice of the sub-title: *Personal Justice Denied.*

Chaired by Washington lawyer Joan Z. Bernstein, the Commission held 200 days of hearings and took testimony from more than 750 witnesses between July and December of 1981. The Commission concluded that not a "single documented act of espionage" had occurred on the West Coast and that the evacuation and internment had been unjust—not based on any real danger to U.S. national security, but a result of haste and fear.

As a follow-up to the findings of the U.S. Commission, in 1988 President Ronald Reagan signed the Civil Liberties Act, providing each inmate a lump sum payment of $20,000. The bill had been pushed through Congress by Representative Norman Mineta and Senator Alan K. Simpson. The two had initially met four decades earlier when they had been boy scouts. Mineta and his family had been incarcerated at Heart Mountain in Wyoming, and Simpson had often visited the camp. The two remained friends and later joined forces to right the injustice that had been committed against Japanese-Americans.

Initial redress payments were made at a ceremony in Washington, D.C. on 9 October 1990. The 107-year-old Reverend Mamoru Eto of Los Angeles was the first to receive his check for $20,000. But redress arrived too late for at least half of the 120,000 incarcerees. Most of the immigrant pioneer Issei were dead and only some 60,000 of their Nisei children were still alive (Hata, 1995, p. 28).

Sam Araki—as well as his wife, who had also been interned—each received $20,000. His mother—who by now had been allowed to become a U.S. citizen—received her letter of apology and check; however, her husband, Sam's father, had died in 1977. Indeed, Sam was sad that his father did not live long enough to receive at least an acknowledgement from the U.S. government that it had acted wrongly and in haste. Sakai had finally received U.S. citizenship in the early 1950s; according to Sam, however, after the war he was so driven to survive and make a living, educate his children, and improve his farm that he never looked back to talk about his bitter experience (Araki, 2007).

Dr. Naka was also ambivalent about the 1988 compensation bill, believing that no amount of money could compensate for the losses endured by people wrongfully imprisoned in the first place. His father had died in 1949, not living long enough to see the U.S. government self-critically examine its own troubled history and attempt to right the wrongs the U.S. had committed against Japanese-Americans. His mother was still alive and did receive a letter of apology from the President together with a check for $20,000.

Reflecting on his father six decades later, Dr. Naka observed that he believed internment had been a "huge disappointment" to his father. Kaizo had freely chosen to take the risky path of moving to the U.S. as opposed to a life of considerable ease and comfort in Japan; but his means of earning a living had suddenly been removed and he had had subsequently to bear the scars of being "distrusted" in the U.S. (Naka, 2007).[28]

Despite Dr. Naka's ambivalence about compensation and "redress," he decided to accept the reparation check for $20,000 (tax-free). He discussed the situation with his wife, his college sweetheart Patricia Ann Neilon Naka; they decided to add $10,000 of their own money. They gave half ($15,000) to the University of Missouri for undergraduate scholarships. At the date of my interview with Dr. Naka (2007), nearly 40 students

[28] Dr. Naka also observed that it was a pity that his father hadn't lived long enough to see what his son had ended up doing in U.S. national reconnaissance. Naka expressed deep regret that he had not had more time to get to know his father, and that his father—due to the vagaries of history—had never been able to become a U.S. citizen. Naka's mother, Shizue, did become a U.S. citizen with the McCarren Act in the 1950s.

at Missouri had benefited from their largesse. The other half ($15,000) they donated to the Quakers who—due to the courage and engagement of Clarence Pickett—had managed ultimately to free some 4,000 inmates from the camps and place them in universities throughout the U.S.

In 2007, Dr. F. Robert Naka was still doing volunteer work in the spirit of the Quakers and was on the Board of Directors of the Nisei Student Relocation Commemorative Fund, a fund fostering awards to students today and commemorating the work done by the wartime National Japanese-American Student Relocation Council—the organization that had enabled F. Robert Naka to be released from Manzanar so he could pursue the higher education interrupted by internment in the camps.

Retrospect and Outlook

> *The most precious lesson I learned from my internment years is how desperately important it is for American society to strengthen the moral fiber and the backbone of the fair and open-minded majority so that it will not be trampled by any vocally gifted… minority….How to protect America from being so preyed upon by one or another of these antidemocratic forces remains a worthy challenge to the American people.*
>
> —Daisuke Kitagawa, *Issei and Nisei*

Amazingly, when I interviewed Sam Araki and Bob Naka more than six decades after their unjust incarceration in Japanese-American internment camps, I could detect no bitterness in either. Indeed, they both exhibited characteristics that they had learned from their fathers, characteristics which not only had seen them through their internment in Manzanar and Poston, but also were to stand them in good stead in their work in national reconnaissance: namely, to choose to see the silver lining in any given set of circumstances and to revel in the challenge of dealing constructively with the "cards they had been dealt." Faced by one obstacle after another through 12 failed Corona launches, though not without moments of anxiety, Sam Araki dauntlessly applied his brains after each failed launch, determined to figure out the systems engineering and learn what had gone wrong in the failed attempt. For Araki, each failed launch—not unlike his experience in Poston and the difficult years immediately following World War II—was an opportunity for learning. An opportunity for learning meant an opportunity for growing and absorbing the lessons learned from experience. Similarly, Bob Naka learned perseverance and "making the best out of difficult situations" from his experience in Manzanar.

Indeed, the only time I noted even a slight degree of possible bitterness—or at least of deep regret—was when Sam Araki and Dr. F. Robert Naka spoke of their fathers. When Sam's father died in 1977, he only knew in general that his son was working on the frontiers of space, but of course did not live long enough to witness the declassification of Corona. Dr. Naka also regretted that his father had died in 1949 and as an Issei had had a more difficult time in picking up the threads of his life after internment.

Similarly to Araki's father, however, Kaizo—after his initial fears of what might befall his son "out there"—lived long enough to be proud to see his son leave Manzanar to pursue higher education, believing this to be an avenue for his son to make a place for himself in American society.

Although their fathers did not live long enough to comprehend fully what their sons had achieved, we today are alive to take note, to witness their journey, and be humbled by their achievements despite the "unfair set of cards" dealt to them by a U.S. acting unjustly out of fear.

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Timeline: Selected Dates Concerning the World War II Detention of Americans of Japanese Descent*

7 December 1941	Pearl Harbor is attacked.
19 February 1942	President Roosevelt signs Executive Order 9066.
25 February 1942	The first group removed en masse: the Navy informs Japanese-American residents of Terminal Island near Los Angeles that they must leave in 48 hours.
2 March 1942	General John L. DeWitt issues Public Proclamation #1 which creates Military Areas #1 and #2. {#1 includes the western portions of California, Oregon, and Washington.}
18 March 1942	President Roosevelt signs Executive Order 9102 establishing the War Relocation Authority (WRA) with Milton Eisenhower as director. It is allocated $5.5 million.
21 March 1942	The first group of Japanese-Americans — "volunteers" — arrive at Manzanar, CA. The WRA takes it over on 1 June and transforms it into a "relocation center."
29 May 1942	A Philadelphia Quaker leader — Clarence E. Pickett — forms the National Japanese-American Student Relocation Council. By war's end, 4,300 Nisei have been released and are in college.
20 October 1942	President Roosevelt calls the "relocation centers" "concentration camps." The WRA insists they are "relocation centers."
13 April 1943	General John L. DeWitt, Western Defense Command, testifies before the House Naval Affairs Subcommittee: "A Jap's a Jap. There is no way to determine their loyalty…This coast is too vulnerable. No Jap should come back to this coast except on a permit from my office."
21 June 1943	The U.S. Supreme Court rules on the Hirabayashi and Yasui cases — two who had violated curfew and the exclusion order. The Court upholds the constitutionality of the curfew and exclusion orders.
2 January 1945	Restrictions preventing resettlement on the West Coast are removed.
2 July 1948	President Truman signs the Japanese-American Evacuation Claims Act.

14 July 1981	The Commission on Wartime Relocation and Internment of Civilians (CWRIC) begins holding public hearings.
10 August 1988	President Ronald Reagan signs H.R. 442, which provides for individual payments of $20,000 to each surviving internee.
9 October 1990	Initial redress payments are made at a ceremony in Washington, D.C. 107-year-old Rev. Mamoru Eto of Los Angeles is the first to receive his check.

*This timeline is a summary of that done by Public Broadcasting Service. www.pbs.org/childofcamp/history/timeline.html. Accessed 28 March 2007.

Reflections of M. Sam Araki—Success Through Systems Engineering and Leading Lockheed Missiles and Space

Sharon K. Moreno, ed.

Minoru Sam Araki pioneered the development of Agena, the spacecraft used for many National Reconnaissance Office (NRO) imagery and signals intelligence satellites of the 1960s and 70s, including Corona, the world's first photoreconnaissance satellite. His career in national reconnaissance and the space industry spanned more than 38 years, including recognition by both the NRO and the National Academy of Engineering.

As a lackluster student required to take remedial courses upon entering college, Sam Araki's future selection for a prestigious engineering award would have seemed highly improbable. His background, too, as a second-generation Japanese-American, whose family was pursued by the FBI for more than a year before internment in an Arizona relocation camp, would have seemed incongruous with a career requiring access to the U.S. government's highest levels of security. Yet, Araki went on to Stanford University's graduate school and began a career in systems engineering, which led to his making major contributions to the U.S. space reconnaissance program and eventually becoming the first president of Lockheed Martin Missiles and Space.

Following Stanford, Sam Araki worked for three years in rocket engine development with Rocketdyne before moving on to a career in the satellite business with Lockheed. As a chief systems engineer for Lockheed Missiles & Space Company, he employed a methodological approach to systems engineering that became a standard for the space industry. For the complex task of engineering the world's first stabilized space platform, Araki and his team conducted rigorous testing and analysis, and took corrective actions to resolve faults and ensure mission success. The Agena spacecraft's reliability (with a perfect ascent mission record over the final 33 Corona missions) contributed to the successful recovery of every Corona film capsule orbited in the program's final seven years. In recognition of Araki's accomplishments, former Director of the National Reconnaissance Office (DNRO) Peter Teets named him a pioneer of national reconnaissance in 2004. In 2005, the National Academy of Engineering bestowed its Charles Stark Draper Prize—for engineering accomplishments that significantly benefit society—upon Araki and four others connected with the Corona program.

This first-person narrative, compiled from several interviews, recounts key incidents and lessons from Araki's long career in national reconnaissance, which spanned much of the Cold War era and extended into the 21st century. It recounts his rise from young rocket engineer to system integrator on the Corona program to his leadership roles at Lockheed. Araki presents his account of how he became a pioneer on the Corona program when space was the great unknown, and the potential for using satellites to solve national security challenges had yet to be exploited. Araki recounts key incidents and challenges in the quest for a successful Corona launch and how they led to discovery of the need for systems engineering and the importance of hands-on and end-to-end experience.

Though now retired from Lockheed, Sam Araki continues his involvement with national reconnaissance as head of a company working on development of software that may be useful in helping to counter the asymmetric threats facing the NRO and the United States today.

From Japanese Internment Camp to National Reconnaissance Pioneer

I was born in 1931 in Saratoga, California, and I went to school and spent most of my career there in the Santa Clara Valley. Since my retirement after 38 years at Lockheed Missiles and Space, I have continued to live and work in the Saratoga area. I enjoy gardening and spend some of my time participating with the Hakone Foundation, which supports Saratoga's Hakone Gardens—gardens modeled after the hillside gardens popular during Japan's 19th-century Edo Period. And, I'm running a company that aggregates sensors and data in real time from various sources to improve information integration and decisionmaking. We are working with a software platform that the gaming industry uses to collect individual identification and financial information so they can decide very quickly whether to give money above the bank limit to high roller gamblers, and I realized that this kind of software could be applied to countering asymmetric threats like the ones we're facing now.

I believe that meeting asymmetric threats is one of the greatest challenges for the space industry today. What we'll need to do in this new threat environment—and what the NRO has been doing to contend with the monolithic threat environment—represents a big change in the space business. It has been a big change [for me] because I started my career when there was no space. In 1955, when I began my engineering career at Rocketdyne, we really started from scratch on everything.

Becoming an Engineer

I spent my first two years of college at San Jose State, where I had to take a lot of remedial courses because I got bad grades in high school. I had attended Campbell High School in Campbell following the three years my family spent in a Japanese-American internment camp. After the disruption of living in the camp and returning to our home in San Jose, I didn't take school seriously and didn't study very hard. Initially I went to college only because my father wanted me to go.

At San Jose State I found out that I could get good grades and, at first, thought about going into drafting or architecture. I really wanted to study engineering because, at that time, there was a shortage of engineers and it was the best way to earn a living. But I didn't think I was smart enough to be an engineer. Then, when I started getting As in math and physics, my father told me I had to go to Stanford—go take the test, he said. It was much harder than San Jose State, but Stanford really made me.

In 1955 I was in graduate school at Stanford, studying jet engines and nuclear power, when I got an opportunity to visit several companies where I might be able to interview for a job. During the Easter break, one of my professors bought airline tickets for me and another student to go to Peoria to see Caterpillar. So we went to Peoria, where it was really cold! Then we flew to Chicago to visit Argonne National Lab, and Chicago was having a blizzard. After that we went to Cincinnati to see a jet engine plant and to Pittsburgh to visit Westinghouse Nuclear Division. Pittsburgh was covered with coal dust, and it was cold, too. When we came home, we said no way we're going back there. Then I got an interview with Rocketdyne in southern California. That's how I got into engineering.

Rockets at Rocketdyne

After earning my bachelor's and master's degrees at Stanford, I really wanted to get into a new field so I started looking at both space and the nuclear field because those seemed to be the two new frontiers of science. I interviewed with Rocketdyne, which was developing rocket engines, and concluded that was where I really wanted to go because it looked like an exciting place to work. I'm glad I took that job because I got in on the forefront of rocket engine development.

Because of my training in thermal dynamics, I became Rocketdyne's combustion expert and worked on high frequency instability, which was one of the key problems in the early days. This instability was very disruptive, causing engines to blow up, which led to a lot of booster failures. To try to understand the instability process, we built a two-dimensional chamber and measured the detonation wave inside it. We used fast-track cameras to study the motion of instability and correlated the acoustic frequency in the chamber to the detonation velocity. That's how we concluded that, with the detonation wave, we were inducing instability which matched the acoustic resonance frequency. To kill the instability we put radio baffles on the engine, the Saturn 5 engine. I worked on almost every rocket engine that was flown on boosters—ICBM, IRBM, or space launch vehicles—Redstone, Thor, Atlas, Jupiter, Navajo, and Saturn.[1] It was fascinating. That was all within less than three years, from 1955 to 1958.

Then, with the Saturn, somehow I had the feeling that most of the rocket engines in this country were already developed; Saturn was a million-and-a-half-pound thrust booster. We worked on both the first stage launcher hydrocarbon engine and the second stage launcher hydrogen engine. I felt that, with the development being accomplished, we were probably going to reach a plateau. By 1958 I began to see that the rocket engine era was passing, and that the creative edge of discovery was now in satellites. So I wanted to get out of the rocket engine business and into the satellite business.

Satellites at Lockheed

When Lockheed started the satellite—the WS-117L—program, I really wanted to go work on that program.[2] And, I didn't like Los Angeles; I had grown up in the Bay

[1] ICBM=intercontinental ballistic missile; IRBM=intermediate range ballistic missile.

[2] The U.S. Air Force established the WS-117L reconnaissance satellite program in 1956, with Lockheed as prime contractor. Building upon satellite feasibility studies conducted under Project RAND (Research And Development, the long-running research effort begun in 1946 by the Air Force), the WS-117L program became the precursor to all U.S. space reconnaissance efforts (see Davies and Harris, *RAND's Role in the Evolution of Balloon and Satellite Observation Systems and Related Space Technology*, 1988).

Area and wanted to go back, so when I heard they had opened a plant at Stanford Research Park, I said Lockheed is where I'm going. Besides, I really wanted to get into the interesting satellite business. But I didn't want to come to Lockheed as a propulsion engineer; I really wanted to come to Lockheed as a systems engineer. I broke with my past, and, in fact, turned down jobs in the propulsion field just to break into the satellite business, which I'm glad I did. I was hired at Lockheed as a research scientist on the WS-117L program.

When I began at Lockheed, I knew that they had the 117L program, including Discoverer, Samos, and Midas programs, and I knew this work was on the ground floor [of satellite development].[3] But I really didn't know what I was getting into. They threw me right into the Agena Program. I landed aboard a system engineering team and worked day and night, right off the bat. I joined Lockheed in November of 1958, and there was a launch scheduled in February 1959, as quickly as they could get the first satellite ready. They didn't have enough people, so they said to me, "You go work it."

The first job I had was being system integrator on the Discoverer program, which, of course, was the Corona program. I was hired to integrate the ascent timer. It was really an interesting experience. We had an ascent timer and an orbit timer, and the ascent timer was electric-motor-driven cam switches. We had 16 microswitches, a bank of cams, one electric motor, and the microswitches initiated the commands for the ascent sequence of events. That's how we timed and commanded all the events.

We had another timer that operated in orbit, which was basically a tape drive. We used Mylar tape, which we had punch holes in, just like on a player piano, to sequence the orbital commands and telemetry readout. We cut holes in this tape so that we could control the command and telemetry readout orbit by orbit, and we had a clutch on that timer so we could adjust the phasing of the timer to the orbit we achieved after launch. That was the on-orbit programmer. The orbit timer was called the H-timer, and the ascent timer was called the D-timer. That's how we operated the early satellites.

This was all new technology, of course. There were no computers at that time—no electronics, basically. All we had were slide rules, electro-mechanical calculators, vacuum tubes, and electric motors. We did everything by hand, and we cut trajectories on a calculator. In 1958 there were no classes in space physics or space engineering. Space was unknown. So, when we went into space we didn't understand the vacuum, zero gravity, radiation, etc. We didn't understand how materials sublimated in a vacuum because nobody had ever researched that before. We tried some materials that, in hindsight, were terrible.

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[3] The WS-117L program was renamed Sentry in 1959, and later renamed again to Samos. Samos encompassed several sub-programs, including Discoverer, the cover name for the Corona film-recovery, photoreconnaissance satellite, and Midas, an infrared sensor designed to detect missile launches and bombers (see F.C.E. Oder & M. Belles, Corona: A Programmatic Perspective in R.A. McDonald, Ed., *Corona—Between the Sun & the Earth: The First NRO Reconnaissance Eye in Space,* 1997).

Experience With Corona

Our first launch was the infamous Discoverer's Zero, which aborted on the pad. It's burning in my memory; I'll never lose that event as long as I live.

When we ran out of contacts on the D-timer to create a sequence of events for the ascent trajectory, we doubled up. We used the backside of the contact of the micro-switches, and we set up 32 contacts. Doubling up events was a big mistake. When we were ground testing we wanted to run a hydraulic test on the Agena engine, and we forgot that the ullage rocket was on the same contact switch. Ullage rockets were used to make sure propellant settled at the bottom before ignition.

We were just getting through fueling for the first launch, and we tested the hydraulics—turned the hydraulics on, and we fired the ullage rocket on the stand. When the ullage rocket fired, it burned the wire that triggered the timer start. The timer started, fired the pin-pullers for the separation rocket, and the ullage rocket kept on burning. Everyone just ran for cover. It was terrible. Fortunately, the ullage rocket burned another wire to shut down the timer, which is how we survived the whole thing. That was our first launch attempt.

Moving toward a solution. Before the second launch, our team brought all of the subsystem schematics together and created an end-to-end schematic of the whole system. We re-wired the entire satellite and ground equipment, and in one month we re-fired. On this launch attempt, we did go into orbit, but just barely because it came down very fast. By the time we got to the thirteenth launch, we knew we were getting close because we had taken every conceivable corrective action we could take. I think we were expecting this launch to succeed, and it turned out to be a very exciting moment.[4]

Responding to challenges. I think the big difference in those times is that we were all challenged; we knew we had a real mountain to climb. There were a lot of problems in front of us, but everybody said the nation needs this, so we had to succeed. Since we really had to start from scratch with everything we did, cooperation, teamwork, innovation, and risk-taking became important factors. They were the foundation for the whole way we did things. Risk-taking was considered an absolutely necessary thing to learn because we had no textbooks or procedures to lean on. And, we had no simulation capability in those days. Every time we failed, we analyzed the hell out of it and took corrective action. That was the only way we could improve ourselves. In fact, the only way to proceed was to experience problems, fix them, and move on, but we also had to make sure the problem didn't happen again. Lessons learned became the key phrase.

Lessons Learned From Corona

Perform systems engineering during all development phases. After the [Discoverer Zero] launch blew up on the pad, I became part of an after-action team that stud-

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[4] The Discoverer XIII diagnostic mission ended successfully 12 August 1960 with the first recovery of an object sent into space. A Navy helicopter retrieved the satellite recovery vehicle—a capsule containing an American flag—after it had landed in the Pacific Ocean. Six days later, on 18 August 1960, Corona Mission 9009 (Discoverer XIV) took the first-ever satellite reconnaissance image: a Soviet bomber base at Mys Shmidta.

ied what went wrong. It turned out that all these engineers had their own schematics in their own labs and never shared with anybody. Nobody knew what was going on in the entire system, so one of the factors in the explosion was the lack of systems engineering. In fact, things were disconnected to beat the band. If that first launch hadn't blown up, worse things would have happened. Discoverer Zero was the best thing that happened to us.

Take end-to-end system responsibility. Our Corona experience taught us that three important elements had to come together to make it work. On the business end, we recognized that we needed a person to make sure that we met each day's milestone—not an auditor of cost and schedule, but an expeditor who planned and executed. This person was the cost-schedule driver, or what we called the "chief expeditor." He could knock down walls to get things done. I used to have expeditors who would climb walls and steal equipment out of storage at night so we could meet our schedule. We also learned that we needed a responsible equipment engineer, a person who would take end-to-end responsibility at the equipment level. The number one element, though, was systems engineering; we definitely needed a person with a small group on the program to be responsible technically from end to end.

I remember one instance when we were getting ready for launch and I had just come out of the managers' review, ready to ship to Vandenberg. The government vehicle engineer, Dick Williamson, and I walked back to the office, and when we got there the people in my office told us a major failure had occurred only about an hour ago.

The failure was in one of the guidance boxes. This one device had a lid that leaked and flowcoat had gotten inside the chip and eaten into about a third of the circuit. Here we had gone through all the environmental testing and spent thousands of hours on this little chip, and it finally failed. We thought: how many more chips could we have like that? So, this was where we had to break our rules because the quality assurance (QA) officer had all the documents locked up and he was out of town. We had to go re-trace the document to find out how many chips were in this box that could be of the same family where we might potentially have a leak. We did that all over the weekend. Dick and I made a commitment to turn this around over the weekend, because this was Friday night and we were ready to ship. We said, "You get the approval on your side, and I'll get the approval on my side, and we're going to make it happen, and, if we succeed, we're going to meet that launch schedule."

Over the weekend we went through and audited everything. We reasoned that there were only a few parts and that we knew exactly which lot date code it was, so we decided we were going to replace in that box every suspect part. We ran a full environmental test and re-validated the box. Then we took the lid off another box that was already in the vehicle, inspected the lot date code number, and checked everything; we decided that box was okay. Before the plant opened on Monday, we were out of there. We did what we had to do to stay on schedule and the expeditors made it happen. The QA officer would have said, you can't do that, but we all said, "Let's go do it." The launch went off on schedule, and we accomplished complete mission success.

Develop systems engineers with technical depth. Another thing I have learned about being a systems engineer is that you have to have one discipline you are very strong in. You can't be a generalist without any depth in one field; you have to have depth in mechanical engineering, electronics engineering, or—in today's world—software engineering. When you have deep roots in one technical field, you can apply that to other fields. If you are just a generalist, you haven't mastered anything yet, and the people you deal with see that. Again, respect is everything; to be a good systems engineer, you have to carry the respect of everybody.

For Corona's successor program, I became the chief systems engineer, with end-to-end responsibility. I had to make sure that everything worked, from the components to the total system. I learned that a systems engineer has to earn respect and be open to new ideas and learning about new subjects. Every day you have something new you have to think about, and you have to make sure that you get people from different disciplines to work together. You have to respect individual responsibilities, understand every person and what they are doing, and develop a technical rapport so that you can begin to trade information. You have to take the time to understand their fields and be able to ask intelligent questions. When you can do that, they feel comfortable trading information with you, which is the only way you can begin to solve problems.

I know that a lot of universities today are offering degrees in systems engineering, and my concern is that it would be very easy for a systems engineering curriculum to get tied into the academic, technical side of engineering. We have a lot of simulation tools now, which are very important for a systems engineer, but I am not sure enough time is being spent on the thinking process. A systems engineer has to learn how to think in a certain way, has to develop a certain mindset, and I am not sure that is being taught. In fact, I am not sure that is teachable in a classroom; it's almost gained through experience. I think you need hands-on experience–get on the factory floor, get in the test labs, get in the launch base, go in the mission operations center and see the satellite fly. I found it was really exciting to see the mission operators capturing the signals. The whole act of having hands-on experience and seeing how your satellite really does in a mission environment is invaluable. If you want to be a good systems engineer, you need to get out to one of the mission ground stations.

Maintain cooperative relationships between government and contractor teams. Lockheed hired me to work on Discoverer, which, of course, was not classified, so I was not briefed in until the early 1960s. Because Samos and Midas were much more open, though, I did suspect that there were different components to Discoverer. Except for Corona, everything else at that time was [classified] plain secret.

Around 1963 I gained compartmented access into the program. I liked working in this classified environment because it allowed all of us to stay focused and dedicated. A cooperative relationship between the contractor and government teams was very important. At that time, the government took great efforts to ensure that these two groups could work together and had key people who made a point to form a team between the government and contractors. Between 1959 and 1960, we had weekly reviews with our government counterparts—what we called "Black Tuesdays"—when the prime contractor and government managers met to probe in depth all the failures that had occurred each week. It involved a lot of rigor and a lot of hard questions being asked, but it was always to solve problems.

In the mid-1960s while I was at Lockheed, I lived with the tension that existed between the CIA and Air Force Special Projects in Los Angeles—Program A and Program B. Since we were always the integrating contractor, one of the things that Lockheed tried to do was to mediate between Programs A and B. While I was the chief systems engineer on Corona's successor program, we had both customers living in our factory so I got immersed in working with both organizations. One thing that was very amazing to me was that at the very beginning of the program, we would have major battles trying to get ICDs (interface control documents) to come together—it was a monumental task. In spite of all this, however, there was a rallying point when the hardware began to come together; people forgot what organizations they were from and finally said, "We are going to have to make this thing work." The team spirit that developed from all that was amazing. There was nothing like hardware on the floor to bring everybody together.

Take risks to develop innovative technology. In fact, as I think about what happened over this time period, one of the key differences between the National Reconnaissance Office and some of the unclassified programs I was associated with on the outside is that the NRO was willing to reinvent itself as soon as a new technology came into being. The NRO also led in technology development. The fact that we went from a film-based system, which was a mechanical system, to an all-digital system very early on was a daring move. In fact, the Russians never did make this move. But it was absolutely the right thing to do. It took a tremendous amount of not only teamwork, but also risk-taking and innovation to make this happen in the time period it did. Every subsystem had to be re-invented, from Corona to the follow-on systems.

Of all the various failures we experienced during this period, one key lesson comes to mind. In those days all we had were rolls and rolls of strip charts that we analyzed day in and day out, looking for little anomalies. When computers came along, we wanted to go to automatic testing where we could set limits and print out only when we were out of limits. That was a rude awakening for everybody. All these people who were used to reading the paper readouts said, "Even if we go automatic, I still want these readouts." And we said, "No, you are going to get them only if we exceed the limits." We had a cultural shock to overcome. The engineers had a hard time trusting that the limits were at the right level. We had to re-analyze and make sure that every limit was set right, and we re-tested to make sure limits were set properly. As we did more testing, we became a lot more confident in how to set limits. Of course, we do that all the time now.

How to Get Into Orbit

In the early 1960s I spent most of my time figuring out how to get into orbit. We were overweight, and we didn't know it because we would cut trajectories on a nominal basis. We didn't account for any errors. There were gyro drifts and timer errors and propellant loading uncertainties, and we had horizon sensor bias errors—a whole bunch of error sources. So, we cut these trajectories thinking that everything was going to work well. But, since the way we cut trajectories was very crude, we had errors in the way we computed them.

We made many unsuccessful attempts to get into orbit. It was a serious problem. So, we went on a campaign to begin to understand each of these error sources; it was hard to analyze and quantify all the electro-mechanical error sources of the components. We didn't understand upper atmospheric drag. We hadn't measured all the atmospheric characteristics at that time, so we had to start collecting drag data because obviously the draft coefficients that we had assumed for the ascent body weren't correct. We had more drag in some cases, and we didn't account for the angle of attack while we were flying through the atmosphere. All of these things required a lot of learning process, and we spent a great deal of time trying to understand it all and setting up error budgets.

Finally we reached the point where we knew how to get into orbit properly. At that time we also decided that we had to increase the performance of the Thor booster because we just didn't have enough lift capability. We worked with Douglas Aircraft Corporation to add solid strap-on motors, which we called Thorad. We used it for Corona exclusively after about 1962 or 1963.

Experimental film-readout systems. The original 117-L included the film-readout Samos E-2. It was cancelled in about 1964. A couple of things happened in that case. We had the Eastman-Kodak camera, which was a film system. Then, we had to chemically process that in orbit, which meant we couldn't do it in a vacuum. We had to create a chemical lab that was sealed in orbit. Once the film was processed, we had to read it out and scan it optically, and then read that out with electronic technology that was almost nonexistent at that time. To me, it was a real Rube Goldberg; I don't think that thing ever would have worked.

On the first flight of that system, we had a booster failure—an Atlas failure 18 inches off the pad, which destroyed the whole satellite. Not only was the E-2 hard to develop, but we had a major abort on the launch pad; it really died a sort of violent death.

There was another E payload called E-5, where we put the camera in the capsule; that never worked either. So, the whole E series of optical payloads never reached fruition.

Applying Lessons Learned From Corona to Follow-on Programs

Now, in the meantime—probably the mid-1960s—the Agena-A had progressed to the Agena-B and then Agena-D. We went from the D-timer and H-timer to an onboard computer, and all the Agena follow-on satellites flew with a computer on board. Going to a computer really changed our whole ops concept because we could reprogram everything. With a timer we had been stuck with whatever brains we built in, so the computer bought a lot of flexibility and capability in the system. Another significant evolution was the way we tested, which changed dramatically from the Agena series to the successor program. We outgrew the Agena's upper-stage-and-spacecraft combination and used the booster to get us into orbit; this allowed us to design a pure spacecraft rather than an ascent-vehicle-spacecraft combination.

There was more technology coming to bear now, and we used the lessons we learned from Agena and Corona to totally re-design the successor system. As a matter of fact, I think the successor was an order of magnitude better performance and reliability.

The thing that was most rewarding was that when we rolled up all the lessons learned from how we approach a design—a no-single-failure design approach—we went to complete redundancy. We developed a totally integrated test program, from parts to components to systems-level testing. We developed the environmental test rigor, and then we did design reviews, audits, end-to-end schematic checks—all the things that we learned we should do. When we did that, we got 100-percent success, and I said to myself, "There is a way to do it right."

Avoiding bureaucracy: working nights and weekends. By the 1970s and 80s, things were becoming more bureaucratic. When bureaucracy began to set in at Lockheed, we decided that the best time to get things done was at night and on weekends when we could avoid the company red tape. We got more work done then because during the day we would have people calling us and ten thousand things going on—at night, nobody is there!

I would get calls in the middle of the night or on weekends when I was chief systems engineer on the successor program. I used to really get after the guys because I would say, "You guys had a problem last night and you didn't fix it; here it is the middle of the day, and it's still unfixed!" They would say, "Well, there was nobody around at night to help fix it." I told them, "Well, damn it, bring in whoever you need." So, they would call me. Every time we had a major failure, they made sure I got called at night to let them know that, by golly, we are going to go fix this problem.

During this time, I think my wife adopted a philosophy about my working so much; she said, "I think sometimes you love your work more than you love me." But, she was very understanding. Obviously she did not understand technically what we were doing, but I think emotionally she knew. My wife knew when I was having good times or not-so-good times. She knew enough to know that what we were doing was very important, and, since I was very excited about my work, she really was very supportive.

My children have all chosen not to become scientists or engineers. They did not want to be engineers because they said Dad worked too hard—and now they are working just as hard in business!

From Advanced Programs and Development to Space Systems

Following Corona's successor program, Lockheed wanted to branch out into new directions and asked me to head up this whole area of preliminary design and advanced systems, so I became vice president of advanced programs and development. In the early 1980s, Lockheed won Milstar and I managed that for a while. Milstar was a major win for us. Then I came back as assistant general manager for space systems. After that, I became Lockheed's president of space systems.

Lockheed's Sunnyvale campus was a good environment to work in, with great people, facilities, and tools. I also developed some really great personal relationships with some of the other contractors. In fact, I used to know TRW people as much as I did Lockheed people; TRW did a lot of payloads for us and we had a wonderful working relationship. The military and the Agency were always involved, too, and I came to know the Agency people just as well. Lockheed was the most creative period of my career.

Looking Back and Looking Ahead

In looking back on my career in national reconnaissance, one of the things I treasure the most is the people of the NRO. I believe the NRO was the only organization where a team made up of government and contractors was able to work together in a cohesive way toward a common set of objectives with a can-do attitude and accomplish things within a short time.

NRO organized for national security threats of the time. The hallmark of the NRO in the early days was that it was very much threat driven—driven by national needs. The threat was advancing in such a way that we were forced to apply the best technology that we could put together, the best minds, and the best organizational approach. Now in doing that, the government program offices—both CIA and the Air Force at that time—were able to marshal their best people on the teams. They really had to incentivize people, as well as the organization, to develop a long-term view of developing career growth within those organizations in order to attract the best people. As a result, we had a super set of people with enough longevity that the experience buildup made the difference between the NRO and the other service organizations that existed at the time. As time went on, I think the people longevity of the NRO began to slip because the changes that occurred in both agencies caused more [personnel] rotation and, in some cases, even encouraged thinking that rotations may be the way to bring in new blood. Also, as the Soviet threat began to mature, we were no longer as threat driven; instead, we were driven to maintain a balance between the amount of money that was spent and the number of advancements that we had to make in terms of conquering new threats because the Soviet threat was much better understood and the progress maybe was not quite as rapid as it had been in the early days.

21st-Century IC not fully organized to respond to terrorist threats. As a result of this maturity, the NRO became more functionalized. We have an organization today that is much more institutionally driven than threat driven. One observation I'd like to make is that we are in a new world today where we are no longer responding to the Soviet threat, but responding to a set of new emerging threats with very, very different characteristics. The Soviet threat was monolithic; today's emerging threats are very, very heterogeneous. Some of the major threats aren't even nations any more; they are groups of terrorists or bodies of people. These are highly individualized types of threats. We are tied to some very dangerous threats because with nuclear, biological, chemical weapons, and weapons of mass destruction, the technology has advanced to the point where almost anybody can lob a missile with a very deadly weapon. I don't believe the Intelligence Community has gone to the extent of organizing to really respond to those threats yet because we are still too closely tied to the Cold War threat type, a more monolithic threat.

Realigning the NRO and Intelligence Community to Respond to New Threats

I would encourage the Intelligence Community and the NRO to think about how to get back to the old days of the NRO when we were threat driven and tied to a timetable; it means that the NRO has to think this way, and the whole Intelligence Community, as well as the various heads of the agencies, have to begin to think this way. There is a major opportunity here for the Intelligence Community and the NRO to realign to a new set of threats and a new era.

Re-streamline NRO processes. I think the NRO has to figure out a way to re-streamline itself. It's easy to say, but very hard to do, but I think it is even more needed today because we have a totally new threat. That totally new threat should drive the NRO to reinvent itself.

Congress and the Intelligence Community would agree, I think wholeheartedly, to move out and do things in a streamlined way, but, in doing so, the approach has to be to develop a threat-driven total system program office that can pull things together in a different way than we have been doing lately. In the old days the program office had the freedom to cut across all the organizations and pull things together in ways that would be harder to do today because we have a much more ingrained bureaucratic situation.

Advocate advanced concepts and technologies. Back in the days when the DDS&T organized the advanced projects area, there was a tremendous amount of dedicated talent—people with capabilities to originate advanced concepts and technologies. If we could set the environment in the charter to pursue a course along that line today, I believe we have within the Intelligence Community and the NRO a vast amount of new talent that could be brought to bear. I think people are just aching to participate in something like that.

Focus workforce on common objectives. What distinguished all those people in the early days was a drive to meet a common objective. They were very spirited and very smart, and they were all driven in their own ways. I don't believe that anybody necessarily agreed with everybody at any one time—there was a great amount of debate. But, out of these strong-willed debates came a direction, which led to focusing ourselves to drive to accomplish a mission. That drive was always central to the purpose of the organization.

Be willing to take risks. It was also a time period when people were willing to take risks. We are much more risk averse now. In those days, the whole system was willing to take risks, and that may be the problem today—we really need to bring back the kind of environment where people will take risks. I think there is a big difference between those days and today in terms of maturity and technology. We are now able to simulate and ground-test ahead of time. A lot of the risks in those days were taken because there were no other ways to learn than to fly and have failures, but today you can anticipate a lot of failures through simulation and ground tests—far more than we were able to do in those days. In some respects, it seems that we should have fewer failures today than we did then, and I think we do have far greater flight successes. But we still have human errors and quality problems, and every once in a while a design problem creeps in. Those are hard to overcome, even today.

Allow program managers and system engineers hands-on, end-to-end experience. I think the problems the engineers have today, both government and contractor, is that they don't get enough hands-on experience—and the reason that happens is because too much time is spent making studies. We spend a lot of time planning programs and not enough time in hands-on execution. I think very few engineers today—both on the contractor and government side—ever experience during their career a complete program execution. The programs take too long and the engineers, as a result, don't have the total end-to-end experience they need to become good managers. In those days, we all went into management with end-to-end experience. In fact, we made a point to have all upcoming managers get this experience—if you haven't experienced and run a program end to end, we should not promote you until you do that. You need hands-on experience to get into a leadership position. In those days, we used to have career planning sessions for every outstanding engineer that we wanted to grow into management. We filled out their checklist of all the things they had to accomplish before they could begin to move up—not that they had to do it all at one time, but someplace in their careers they had to go fulfill all these experiences that we felt necessary for them to round themselves properly.

We are missing longevity today, and, even with all the computing tools we have now, it's still people who build the satellite and make it work properly. You can't change the whole institution; you have to form a small group. You have to do things fast. It's the people that make success—you have to succeed in the life cycle of individuals, from design to test to operation. If you do it fast, you capture the people within their career span. Three years is about the lifetime that you can capture people. If you stretch it any longer, you can't prevent people from moving on, and frequent movement means you don't have the expertise.

I had the privilege of seeing Corona and the next generation all the way through. As programs stretched out over time, we lost systems engineering. There was no one person who saw the whole problem through—you broke up their careers into little pieces. You can't have incremental systems engineers—one person comes in and doesn't know what the last person did, and reinvents the wheel. Now what you have is a bunch of processes on paper and a lack of continuity of people and historical knowledge. So you have to follow processes or you don't know what to do.

The Need for Innovation in Intelligence in Confronting Asymmetric Threats

I believe there are two challenges to space: number 1, the asymmetric threat is so different from the monolithic threat that we have to reinvent space; number 2, we have to transform space into the information age because space information is the key enabler.

Integrate space technology with other sensors. I believe there is a great opportunity now to utilize space in conjunction with close-in sensors—implanted sensors of various types. The technology has progressed sufficiently so that we can now integrate space and close-in sensors, in terms of implantation and data extraction, and begin to automate close-in sensors in ways that couldn't be done before. We have a whole different environment now that is worldwide and hard to find. You have to have distributed sensing and real-time information; we have to think about how to do some distributed sensing and multi-domain sensing because you can't detect the asymmetric threat with one domain. You can't see everything from space any more so you have to do it cooperatively with ground sensors.

Our biggest problem today is that we are looking through many microscopes, and what is going on around us is much broader than what you can see through individual microscopes. My biggest concern is, yes, those microscopes we have in the sky do a very good job of looking at point source, but what's happening around us we don't see at all. We need a mix. We still need the microscopes, but we also need another kind of sensing system that looks at everything.

Maybe not any one sensor will be totally complete in its capability, but when you aggregate together many different sensors from many different domains, you may get some indicators. You look at events, monitoring thresholds of your sensor, and then you look for other indicators. When you see one sensor exceeding a threshold, you look at other sensors around there or in other parts of the world, which may be indicators that what this sensor saw here and that sensor saw there are correlatable. You have movement occurring throughout the world that are indications of something beginning to develop, because now you are dealing with individual people or cargo movement or money movement. All these things have to be correlated.

We don't have enough eyes and ears in the sky because we are basically fixated to point source collectors and on the past. If you look at a monolithic threat versus an asymmetric threat, the nature of the problem is very, very different, and some of it is very hard to capture from space. So, you say if I can't capture it, then I won't worry about it. Well, you need to worry about it. If you can't get it from space, you need to ask how else you can get it. Even if it is not collected from a satellite, you need to figure out how to go get that information from other sources.

I think we are at a crossroads. I think the NRO should take advantage of this crossroads and make a major shift or change because the asymmetric threat environment—just like the Cold War environment—will be around for thirty to forty years. The fact that terrorists have now seen that they can destroy the World Trade Center if they set their minds to it, in such a simplistic way, tells you that they are not going to go away.

—Compiled and edited by Sharon K. Moreno

Reflections of F. Robert Naka—Building Reconnaissance Systems and Running the National Reconnaissance Office

Patrick D. Widlake, ed.

F. Robert Naka served as deputy director of the National Reconnaissance Office (DDNRO) from 1969 to 1972. His career in national reconnaissance and space programs spans more than 50 years and includes senior engineering and management positions with defense contracting companies and the U.S. government.

As a young man, Fumio Robert Naka seemed unlikely to become a prominent figure in national reconnaissance, with its attendant access to technical data on the country's most secret national security assets. Shortly after Japan bombed Pearl Harbor on December 7, 1941, Naka, along with many other U.S. persons of Japanese descent, endured forced relocation to the Manzanar, California internment camp. Naka had been studying engineering at the University of California, Los Angeles (UCLA). The National Japanese-American Student Relocation Council—formed by Quaker leader Clarence E. Pickett—facilitated Naka's release from the camp to continue his education. He earned his bachelor's and master's degrees in electrical engineering at the universities of Missouri and Minnesota, respectively, and attained a doctorate in electron optics from Harvard University in 1951.

Dr. Naka began his industry career as a Lincoln Laboratory staff member at Massachusetts Institute of Technology (MIT). Within five years, the director of Lincoln Laboratory, Marshall Holloway, selected Naka and two other engineers to be given compartmented access to experiment with ways to decrease the radar cross section of the U-2, then the CIA's revolutionary, high-altitude reconnaissance aircraft. Naka performed similar tests with the A-12 aircraft while taking a leave-of-absence as technical director of Mitre Corporation's Applied Sciences Laboratories in 1961. Thus, in two decades Naka had gone from being a distrusted American, to directing a laboratory for a large company contracted to develop systems for the U.S. Department of Defense and the U.S. space industry.

After a brief period serving as a consultant to the deputy director of the CIA's Directorate of Science and Technology in 1969, Naka accepted the position of DDNRO. Naka became the first DDNRO hired from outside the CIA and he conducted the NRO's day-to-day operations while concurrently serving as deputy undersecretary of the Air Force for space systems. He later became the Air Force's chief scientist.

Today, Naka continues to serve in an advisory role to the Intelligence Community. This first-person narrative, assembled from several oral interviews, gives a brief glimpse into Naka's early life, his education, his fortunate release from detention, which enabled him to finish his degrees, and finally, his national reconnaissance career, culminating with his years as the DDNRO.

From Japanese Intrernment Camp to DDNRO

I was born in San Francisco at Children's Hospital, which is still there. I grew up in Los Angeles and went to Bridge Street School. I skipped two semesters, which put me ahead in school a full year. I went to Hollenbeck Junior High School and Theodore Roosevelt High School, and was a year younger than just about everybody else when we graduated. I took a three-prong major in mathematics, science, and architecture. It's sort of interesting that I had a "Dickens of a time" in physical education because I was two to three years younger than a lot of my classmates. The only advantage I had was that I was fairly tall and I could run just about as fast as they could, but I certainly was not as strong! So I had an interesting time in physical education—it was quite a challenge.

I entered the University of California at Los Angeles (UCLA) in the fall of 1940. I majored in engineering. The plan was to pick a major and complete the degree at the University of California at Berkeley. I got mostly As; much to my surprise, I found college to be not difficult.

Attack on Pearl Harbor and Forced Relocation

When President Franklin D. Roosevelt began to place steel and oil embargoes on Japan, my father took me aside. He was a rather learned man for his day, with bachelor's and master's degrees from the University of California at Berkeley. He told me that Japan would retaliate in some way, so we, as individual persons of Japanese lineage, could be in trouble. I was a sophomore on December 7, 1941 when the Japanese attacked Pearl Harbor. Although my father had warned me of such an attack, I was very surprised by the boldness of it. Shortly thereafter, in May of 1942, my family and I were forced to leave our home by the Exclusion Order signed by President Roosevelt in February 1942.[1] We were sent to Manzanar War Relocation Center, what people now have begun to call an "American concentration camp," in Owens Valley, CA. At that time, the vernacular was "camp."

One of the very fortunate things that happened to me was the Quakers, the American Friends Service Committee, I have since learned with support by Eleanor Roosevelt, worked actively to move Japanese-American college students from their incarceration. I fortunately was one of some four thousand who were removed. The Quakers did a marvelous thing in persuading the faculty of the University of Missouri to look after my well-being so that I wouldn't be ambushed or hurt in any way, and they pledged to do that. I marveled that that was possible. In retrospect, I can see why the faculty was willing to do that. When I arrived in this little college town of Columbia, I was just another kid in town, and so just another student, and I got along just fine. The town was benign.

The Midwest curiously was very, very isolated and insulated. This is at a time when you must remember there was no television yet, travel was by train, and everything was slow. As a consequence, the reactions of the people on the West Coast and the East Coast never permeated the Midwest, and so it was fairly benign.

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[1] Roosevelt signed Executive Order 9066 on 19 February 1942, establishing a policy of forced evacuation and mass internment of Japanese-Americans living on the West Coast of the United States.

The University of Missouri was very important in my growing up because it gave me back my balance. It kind of straightened me out. After all, I was then a despised, distrusted American. Well, that's the repercussions of the forced evacuation. I was a mistrusted American and the University of Missouri fixed that imbalance. I was okay.

Academic Excellence in Engineering and Mathematics

I took a lot of mathematics courses at Missouri. I took a course in linear algebra from the head of the department and can remember the final exam. It was long! My classmates asked the professor if they could come back in the afternoon and the professor asked, "How many of you would like to come back?" and everybody except me raised his or her hand. The professor looked at me and said, "Do you want to come back?" and I said, "Sir, there's no point in my coming back. I've done the exam as far as I can do it, and I can sit here for another two hours, but you are not going to get much more out of me." So I didn't go back. I met the professor on the campus the next day, walking along. I said, "Hello Professor," and he turned after we had passed and called me back and I said, "Yes, that was a pretty hard final you put on us." He said, "You really understood that material, didn't you?" That was a nice compliment.

I finished my work for a degree at the University of Missouri with about 145 credits, but only 138 were required for engineering graduates. When I was a kid, I became fascinated with a number of subjects: astronomy was one. So when I got to college and took engineering, I also took courses in astronomy and celestial mechanics, so that gave me a leg up on understanding outer space.

When I finished my course work in February of 1945 I had been trying to figure out what to do next, and I had written a number of colleges to go on for a master's degree. One of my mechanical engineering professors, Milo Myrum Bolstad, helped me get into the University of Minnesota, which offered me an instructor's position in electrical engineering. It was half time because I was going to spend the other half working on my degree and that was a very, very fruitful experience. The University of Minnesota and their immense friendliness, the Scandinavian culture, provided me with a wonderful, wonderful experience. That teaching experience and working on a master's degree gave me confidence. I should mention that I met my future wife, Patricia Ann Neilon, also a graduate student, working on her master's degree in child development.

So then I decided I would go for a doctorate. I wrote MIT (Massachusetts Institute of Technology), Stanford, Caltech, and Harvard. Most wanted me to teach. I had decided by then that I wanted to go straight through, and Harvard offered me a scholarship. In addition, one of the professors, Chester L. Dawes, stopped by to see me. So I went to Harvard. It was as simple as that. I'm quite pleased I did, because in my observation, Harvard raised people as opposed to machines, and that is very, very important.

It was apparent in the summer or fall of 1950, that I would probably finish my doctoral degree in about a year. My wife, by then a practicing clinical psychologist, wanted to go to the annual meeting of the American Psychological Association, which that summer just happened to be in State College, Pennsylvania. So I went with her. I figured while she was in the symposium, I'd go interview for a job. On the drive home, I told my wife very enthusiastically about the interview I had had, about a possible position at Pennsylvania State College as it was known then.

She said, "You don't mean to tell me that when you get your doctorate that you're going to teach engineering?" I said, "Yeah, what's wrong with that?" And she said, "Well, what's wrong with it is that you wouldn't have actually done any of it. You will be teaching what you think is engineering, not what is actual engineering because you won't know." So I said, "Gee, I guess you've got a point there." The net result was, I said to myself, "All right, I'll go out into industry first, and then I'll go back to a university." I never went back.

Meeting with Din Land

The most interesting employment offer I got was from Lincoln Laboratory at MIT. I also had a very attractive offer from Raytheon, with a whole lot more money, but I figured it would be more fun to be with what was called "project Lincoln." That indeed turned out to be the case and I started working at MIT in June 1951. I worked on a new radar picket line, the distant early warning line, and I led the team that developed the first automatic analog signal detection equipment for radars. It was a fascinating experience.

In about January or February 1956, then-Director of Lincoln Laboratory Marshall Holloway asked me to come to his office at 9:30 on a particular morning. I showed up and there were two other guys there, Thomas C. Baysmore and Franklin A. Rodgers, and we were sitting there outside the director's office and asking each other: "What are you doing here?" "Don't know, all we know is Dr. Holloway asked us to show up." And he beckoned us into his office and said "Now, we're going to go outside the laboratory. What you see and hear you don't tell anybody, not even at Lincoln Laboratory or your wives." We went out there and sitting in a convertible was Edwin H. Land whom we later got to know as Din Land. He told us about a very high flying airplane that had a huge radar cross section, and he wanted us to help reduce the radar cross section. That was my introduction to the CIA and the U-2 program. Din Land proceeded to tell us that only 200 people in the United States knew anything about the totality of this project. He got us together with Ed Purcell, the Nobel laureate.

Later, we asked Marshall Holloway, "Now, what was significant about the three of us?" He said that Din Land asked him to get three guys from the laboratory who were smartest on electro-magnetics, and who knew something about radar, "and you were the guys." Now go back to my college days: I was the distrusted American. Here all of sudden, I was being trusted to engage and help on a very tightly held program.

We flew into Los Angeles, and a Lockheed employee met us at the airport and took us to meet Kelly Johnson.[2] Kelly took us in his Cadillac, a pink convertible, around

[2] Clarence L. "Kelly" Johnson was one of America's most prolific aircraft designers. In a career spanning 1933-1975, Johnson designed over 40 aircraft, including the P-38 Lightning and P-80 fighter planes for the military, and the U-2 and A-12 high-altitude reconnaissance aircraft for the national intelligence and national security communities. He completed many of these designs while directing Lockheed's Advanced Development Projects Division, better known as the "Skunk Works." See Taubman, *Secret Empire: Eisenhower, the CIA, and the Hidden Story of American's Space Espionage,* New York: Simon and Schuster, 2003.

the plant to show us the status of the .program and meet some of the people. He introduced me as "Mr. Thomas." That was my introduction, and then I became involved in the program.

Reducing Radar Cross Section on the U-2 and A-12 Aircraft

I made an instrumentation error and we stumbled on the answer. Well, I made an instrumentation error based on a hunch that Ed Purcell had. Had we been smarter we would have said to Ed, "You got this all wrong." But we didn't know enough to realize that it wasn't right, and what we did worked for a different reason. We wouldn't have found it unless I had not made that instrumentation error, so we stumbled on it. Afterward I calculated the theoretical foundations of what we had done and stuck the numbers into an equation. Then we understood what we had done and why it worked. We were able to reduce the radar cross section of the U-2. We had figured that out, so we left it for the workmen to do the rest. We had started in February and by about June 1956 we had figured that out, and so we said, okay, that's it. Land was going to produce the absorbent material—his company produced the material to apply to the airframe—somebody else was going to apply it.

The next thing that happened was, I was out in the back yard mowing the lawn when my wife yelled to me, "There's a Mr. Bissell on the telephone; he wants to talk to you."[3] So I said, "Holy smokes, I thought I had gotten rid of this problem." I said, "Oh hello, Dick, what's up?" and he said, "Well, you know, down in Cambridge, they're trying to produce the material and you left instructions about your experiments, but when they make the adjustment, it doesn't work. Could you go figure out what the problem is?" and I said, "Well, let's see. Dick, I know what's wrong. If you make an incremental shift rather than recalculate the spacings, the derivative of the equation throws off a two. They had forgotten a two, there's a square root in the denominator and the derivative throws off a two and you've got to correct it by twice, not once." And I said, "I'll go down there and I'll talk to them," and I fixed it.

In the spring of 1961 and as an employee of the Mitre Corporation, I started work to reduce the radar cross section of the single seat A-12. This fellow, Herb Miller of the CIA, came to me and said, "We have terrible problems. These guys are stuck, have walked off the job, and we don't know what to do. We'd like you to come out and work this problem." And I said, "Well, is it a single-shot thing or is it going to take six months or what? What about this company I'm working for?" And he said, "You will need to take a leave of absence; this will take a lot of time." So I took a leave of absence from Mitre, and joined a firm Herb Miller had set up, Information Fidelity, Inc. For the actual work, I went to the Ranch where I had worked on the U-2.

I finally figured out what was wrong, and why the guys were so frustrated. There were two materials that were being considered to be employed: one was a honeycomb struc-

[3] As special assistant to Central Intelligence Agency (CIA) Director Allen Dulles, Dr. Richard Bissell, Jr. directed U-2 development under Project Aquatone. Bissell later served as NRO co-director 6 September 1961 – 28 February 1962 (see Laurie, 2002, *Leaders of the National Reconnaissance Office 1961-2001)*.

ture and the other was a polyfoam structure. And Kelly liked the polyfoam structure. It was much easier to apply because you could just have a sheet of it and stick it on, whereas honeycomb you'd have to cut and shape it with a machine to fit, and he didn't like it.

To understand better what was taking place, I took a trip out to where the model aircraft was placed in the radar scattering range. The workmen were impressed when I went up in the crane with them. I watched what they did and how they did it. They pressed down on the polyfoam material as they spread it out on the model. I finally determined on a measurement bench in the laboratory that the polyfoam material was unstable by inserting it in waveguide before and after pressing down on the polyfoam material. When I finally proved that beyond a doubt to them they said, "Okay, we've got to go with the honeycomb." And then I designed the honeycomb and that's what's in the airplane today.

Becoming the First DDNRO Hired Directly From Industry

John McLucas became aware that I had done this work for the CIA and he figured that "by God, if anybody knows the CIA, it's this guy in my company."[4] He was president of Mitre Corporation in the mid-1960s, and I was technical director of the Applied Sciences Laboratory. I ran a quarter of the company. Today that guy's called a vice president and general manager. That's why John picked me to become his deputy and, in effect, to run the NRO.

I think it was St. Patrick's Day in 1969 when John telephoned me and said, "Bob, I could use your help. Can you come down tomorrow?" I said, "I can't come down. I have a visitor from England. I'll come down the next day." I went down, and I walked into his office, and he asked me when I could move to Washington. It was a terrible shock, but I did move the family there. I told John I would stay two years.

Now why do I say run the NRO? Let me give you a comparable situation. At that time, Mel Laird was the Secretary of Defense and Dave Packard was Deputy Secretary of Defense. Mel Laird was 'Mr. Outside.' He dealt with the Congress. He dealt with the cabinet members. Dave Packard was 'Mr. Inside'—he ran the Defense Department for Mel. John McLucas and I had the same relationship when it came to the NRO. You have to remember that John also wore the hat of the under secretary of the Air Force. So if you had asked him how much time he spent on the NRO, he would have told you about 20 percent. It was more like 10 percent. And mine was 100. So he went around telling people that Bob Naka is the highest-ranking, full-time employee of the NRO--he runs the place. "I, John McLucas, set the policy. Bob runs the place."

I arrived officially in the summer of 1969. However, John asked me first to chair a committee to figure out with reasonable certainty when a new imagery satellite would achieve its first launch and what the probability of a successful mission would be. So in April of that year, before I became DDNRO, I chaired this committee and we scrubbed the heck out of the status of the program. It was quite interesting. I came back and

[4] John McLucas served as DNRO from 17 March 1969 to 20 December 1973 (Laurie, 2002).

briefed John and said, "Okay, the first launch, the first vehicle will be ready to launch by approximately the summer of 1970, and we have a 90 percent probability of getting at least one bucket back," and that seemed to satisfy him.

Getting the NRO Program Offices to Work Together

As for my NRO service, it was interesting that I had come from the outside. I had worked with the CIA and was somewhat familiar with the Air Force, but not very familiar with Program A Special Projects. I found that there was a fair amount of distrust, not necessarily friction, but a certain amount of distrust between Program A and the CIA reconnaissance programs. Okay, the two U-2 programs I would say managed to co-exist. They were separated by location.

But on the NRO satellite programs, they were bumping into each other all the time. And I discovered there was sort of a distrust between them, at least in my day. My predecessor, James Q. Reber, had fixed things up a little bit, but they still didn't work together and they should have. So here I am at Lockheed Missiles and Space Company, and I attended a meeting with John Crowley, who at the time was the CIA director of the Office of Special Projects. And we were at this Lockheed meeting and I ran into Brigadier General (BG) King, director of Program A.[5] I said, "Gee, Bill I didn't realize you were going to be here, because if I had, I would have had you join us." And he replied, "Well, I got something else going on, I can't do it now." Afterwards, I said to John, "How come Bill King didn't know about this meeting? He's also involved in the program, you know. It isn't as if there's a separation—you guys are working on the same payload." And Crowley said, "We don't invite those people." And I said, "John, that doesn't make any sense to me. Here's what I want you to do. Whenever you have a meeting like this, you're going to invite General King to take part. Only General King, no substitution. He comes if he wants to. If he can't make it, he doesn't come, that's it. You invite him. I'm going to tell him the same thing. If he has a meeting, he will invite you, John Crowley. John said, "That makes good sense to me, I will do it."

Now, Al Flax had separated [that satellite program], and luckily the camera was a CIA project, coming out of DDS&T, and I think the buckets belonged to the Air Force.[6] It was a little more complicated than that. The dividing line was very intricate. I think the objective was to get the two sides to have a piece of the action, but it caused a lot of friction. What I did was beat down that friction so that it would be constructive instead of destructive. So by the time I had been officially at the NRO for about six months, then-DCI Dick Helms called me in. I used to go see Dick Helms periodically to talk things over—after all, he was also my boss.

At one of these meetings he said, "Bob, in the year you've been here, you've really helped straighten things out." So I said, "Gee, Dick, thank you very much. I appreciate your comments." Then I went back to see John McLucas. I said "Hey John, Dick Helms

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[5] BG William G. King directed NRO Program A from 1 August 1969 to 31 March 1971 (Laurie, 2002).

[6] Alexander Flax served as DNRO, 1 October 1965 – 17 March 1969 (Laurie, 2002).

said that in the year I have been here that I've straightened things out, but I've only been here six months." John said, "Don't worry about that, take the credit." I appreciated the compliment, but I found it to be pretty amusing.

So I did manage to get the two sides to work together and I think that they carried on fairly harmoniously until we got into the interaction over near-real-time satellites in 1971. And the friction started to build up again. After the decision was made to go with an electro-optical imaging (EOI) satellite, about a year after that, I found it desirable for family reasons to leave the Pentagon, and not stay on, which is what I did. Maybe in retrospect I should have stayed, and maybe I could have helped beat that friction down again. My regret about that experience is that I favored the EOI approach [advocated by NRO Program B] and John McLucas favored the [NRO Program A] film-readout approach. John's view was that film readout employed more proven technology than did the EOI approach. I felt that there was still a lot of unproven technology in the film-readout system. I was very much concerned that it was going to have trouble in space.

Advising Panels and Observing Launches

I used to go to all the Land Panel meetings.[7] I have mentioned the imagery axis, but I was fairly active in sigint business as well. Another thing I did was to go to the launch of a revolutionary sigint system. In fact, I went to a lot of launches. I went to the last Poppy launch. When McLucas retired from the Office of the Secretary of the Air Force, Major General David Bradburn came to the event, and he paid a tribute to McLucas, and said a lot of good things about him. Then General Bradburn said, "John went to a large number of the space launches of the United States Air Force disguised as Bob Naka." And everybody laughed.

I said that in April of 1969 John had me chair a committee on a Corona follow-on system. Well, it turned out I chaired a whole bunch of committees during the time that I was there. The DDNRO was the secretary of the ExCom.[8]

Before every [ExCom] meeting, I went to every principal with subjects that we were going to cover. I would sit down with McLucas and the controller. He would outline the budget issues and we would talk about the questions we would put to the ExCom and then I would go up and talk to Dave Packard, then to Dick Helms, and to Ed David, the President's science advisor. Those were the three voting members. In addition, I would go over and talk to Jim Schlessinger, because he was in the Bureau of the Budget, later called the Office of Management and Budget.

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7 The Land Panel, more formally known as the National Reconnaissance Panel of the President's Science Advisory Committee, reviewed national reconnaissance programs and provided technical advice to senior national security decisionmakers. It consisted of scientists and engineers drawn from industry and academia. See R.A. McDonald, Ed., 2002, Beyond Expectations—Building an American National Reconnaissance Capability: Recollections of the Pioneers and Founders of National Reconnaissance.

8 The Executive Committee (ExCom) for the National Reconnaissance Program consisted of the Deputy Secretary of Defense, the Director of Central Intelligence (DCI), and, before 1973, the President's science advisor. The DNRO served as a non-voting member (see McDonald, 2002).

I also attended the United States Intelligence Board (USIB) meetings. It was called the USIB even though it dealt with foreign intelligence. Its primary mission was to oversee the collection of all United States intelligence information and to set priorities and policies. It set what was needed, but not too precisely. The services set the requirements more precisely, and the services didn't tell the NRO how to do it, they told us what they wanted. In fact, that's still true today. The difference between the NRO and the military back in the 1970s was that the NRO supported the strategic intelligence community of the United States, while the military was always interested in tactical imagery, with the possible exception of Strategic Air Command.

At USIB meetings, I sat to Dick Helms' left, and Marine Lt. Gen. Robert Morrison, the deputy director, sat to his right. Ray Kline sat to my left and Vice Adm. Noel Gayler, who was the director of the National Security Agency (NSA), was in the next seat. The issue came up at one meeting of moving a sigint system. Dick Helms asked various opinions, and although I was the instigator that it ought to be moved, I declined to respond, because I was the collector and not the requirements establisher. Gayler says, "It's got to be moved." He asked the Director of the Defense Intelligence Agency Donald Bennett, what he thought, and he said "No, don't move it." But then Dick Helms did something I didn't realize he was going to do. Instead of stopping at that point, he asked each of the intelligence chiefs of the military services what they thought, and each of them said it should not be moved. And so the vote was not to move it.

Noel Gayler made an impassioned speech. He said, "You're making a mistake. There's important information to collect, and you're making an assumption that's not true. You're assuming that this satellite is going to live forever and that its replacement is going to be up there and collect data. There is a finite probability that the next launch will fail, and this satellite that's up there now will last only a certain length of time, and then we won't be collecting anything."

Well, the next launch failed. The launch after that failed, too. So, I woke up the troops and I said, "Look, we got to prove that this is an important program; otherwise, it'll get cancelled." So I put the NSA people together with the program managers of the system I thought should be re-targeted and pointed out that their system could collect very important material over the area we wanted to target.

So I put that story together and I went to McLucas and I said "Okay John, I've laid it all out. At the next Executive Committee meeting, you defend it."[9] And he said, "I won't." I said, "John, you're the director, what do you mean you won't?" He said, "Bob, you don't understand. I could lose this argument, and if I lost, it would be terrible. I can't do that." And I said, "I think you just said it's okay for me to defend the program." And he said, "Yeah, go ahead and defend the program," and I did, and I won!

A couple of years later, Bob Hermann said to me, "Bob, the United States Government owes you a debt of gratitude for putting that story together and preventing that program from being cancelled."[10]

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[9] The Executive Committee (ExCom) for NRP: see footnote 8.

[10] Robert J. Hermann served as DNRO from 8 October 1979 to 2 August 1981 (Laurie, 2002).

The NRO was very imaginative and pushed the technology in very clever ways; yet at the same time, the NRO was very cautious. The NRO made very sure the technology would work, that we could put the technology in the satellite and payload, that it would withstand the launch environment and it would last. I heard Pete Aldridge say that the NRO was a risk-taking outfit, but I disagree with that. If by taking risks, he meant to push a technology, then I would agree, but in terms of building a payload and making sure it would work, the NRO was very cautious and methodical.

Greatest Achievement as DDNRO

Maybe the greatest achievement of the NRO during my time as DDNRO is that we increased the number of days in orbit of the photoreconnaissance satellites. The lifetime of Corona at that time was about a week, maybe 10 days. The problem was that if we wanted to take photographs, there would often be no satellite [in orbit].

One day John McLucas was meeting with William Rogers, who was Secretary of State. I get a call on the secure line from McLucas, and he says, "Bill Rogers wants to know the soonest that he could get a photograph or image of a particular spot on this earth if he asked for it right now. How long would it take?" I told John, "We don't have a satellite up right now. And the next launch is on such and such a date, and the normal mission is to drop a bucket after seven days, but we could probably photograph a particular spot two days after launch. Then we could retrofire the rocket, stay over the spot until we were pretty sure we got enough photographs, and then we could drop the bucket. From there, it would probably take another day to get ourselves into position, so we could recover the bucket in the right place, and then fly the thing back, process it, look at it. So you add up days, it might take five days. But that doesn't count the time to launch." That's the answer I gave him. Then McLucas began to campaign for days in orbit.

So, what we were trying to do was to have a photographic satellite in space and operating every day of the year. The way that was done was to improve the orbit adjust gas quantity. The orbit adjust gas load [on Corona] was insufficient to permit the satellite to make its orbit correction maneuvers for an extended period. By increasing the days in orbit for each satellite—and we had a lot of launches—it was possible to decrease the time when there was no satellite up. In other words, there was a satellite up almost every day of the year. By the time I left, we were doing very well.

A Personal Regret

The only personal regret I have is that I might have left too soon. I was only there a little over three years. Near the end of my second year as DDNRO, my daughter was to enter her senior year at Langley High or go back to Lexington High and finish there. She preferred to stay at Langley High. I discussed the matter with Pat, my wife, and decided to stay another year. McLucas was quite pleased with that. But then, the next year, after three years at the NRO, I told McLucas I had to leave for personal reasons. John said, "You know that Defense Secretary Mel Laird said that everybody stays four years. At the end of four years you should leave. In fact, I'll encourage you to leave." McLucas got Laird's blessings that I could leave after the three years and I left.

Still, in 1972 I was very reluctant to leave. I could have been like Jimmie Hill.[11] I could have stayed there forever. After I left, John and I periodically had dinner when I came down to Washington for business. One time, John asked me what was the best job I had ever had. I told him the NRO. There's no question of the NRO being the best experience I had ever had. "Just think about it," I told him, "you have tremendous authority to get things done, with the money to get it done. You could give an order, and it would happen. It was really remarkable. On the downside, there's a tremendous amount of responsibility, and you can't screw up. You have to be very careful how you conduct yourself. It was a superb job." And John leaned back and agreed with me: from his perspective, the NRO was the best job he had ever had, too.

Observations on Consolidating the Alphabetic Program Offices

The idea to consolidate the NRO's program offices into functionally aligned directorates was a lousy idea. That recommendation was made by Pete Aldridge in the waning days of his being in office.[12] I think he did that because the management control [over the alphabetic program offices] had deteriorated. In my opinion, Pete Aldridge found it very difficult to control the differences [between the program offices' separate developments]. He thought one way to change that was instead of having both program offices working on photographic and signals intelligence, to have one of them concentrate on photographic intelligence and the other to concentrate on signals intelligence. I told Jeff Harris it was a lousy idea because it was important to have competition.[13] If you streamline something the competition disappears. Destructive competition is a bad thing, but constructive competition is a wonderful thing. I think that both Program A and Program B should be working on photographic and signals intelligence technology because if you destroy that constructive competition, the capability of the NRO is going to go down. Jeff said, "That's worrying me and I will keep that in mind."

Advice for the 21st-Century NRO

I think the [21st-century] NRO as a functioning organization is much too large. Congress treats the NRO like any other [DoD] organization. Because of that, the staff of the NRO is bloated. If I had a chance to talk to the director of the NRO today, I would say to make every move you can possibly make to reduce the size of the NRO. Try to get Congress to trust you more so that it would become a very small, high caliber, hard-hitting organization that it once was. It was very, very effective, and I think it could still be very effective.

—*Compiled and edited by Patrick D. Widlake*

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11 Jimmie D. Hill was deputy director from 11 April 1982 to 26 February 1996, making him the longest-serving senior leader in NRO history. Hill's NRO career also included assignments as director of the Office of Space Systems, Secretary of the Air Force (the NRO staff director) and twice as acting director of the NRO, from 17 December 1988 to 27 September 1989 and from 6 March 1993 to 19 May 1994 (Laurie, 2002).

12 Edward C. "Pete" Aldridge served as DNRO from 3 August 1981 to 16 December 1988. He concurrently served as Undersecretary of the Air Force from 1981 to 1986 and as Secretary of the Air Force from 1986 until 1988 (Laurie, 2002).

13 DNRO from 19 May 1994 to 26 February 1996 (Laurie, 2002).

Book Review

Finkbeiner, Ann K., *The Jasons: The Secret History of Science's Postwar Elite*. New York: Viking. 2006, 304 pp., $27.95

Review by William M. Cornette, Ph.D., former NRO International Chief Scientist

It is appropriate that I provide some personal background before delving into the review. I have a Ph.D. in Mathematics with a B.S. and S.M. in a combination of Physics and Mathematics. During my career, I have had professional involvement with a few of the Jasons, although not directly with the Jasons as a group. The author, Finkbeiner, is married to a retired physicist, and early in the book states "physicists as a group are off-scale intelligent, gossipy, competitive, relentlessly rational, and promiscuously curious."

Finkbeiner also states that physicists are "famous for [their] arrogance." Since these judgments are expressed in the introduction (page xvii), I began reading with a negative attitude toward the book and author. Many of the characteristics that Finkbeiner assigns to physicists can easily be assigned to other groups (e.g., politicians, economists, chemists) and arrogance can be found in any large group. While I have met a number of physicists who are rather arrogant, I also know a larger number who are humble: physicists are human, after all.

Also, while the title is meant to grab the public's attention, it misleads potential buyers about the actual content of the book. There is nothing secret about the existence of the Jasons, nor about the general topics of many of the projects that they have worked on, although the results of the studies are frequently classified. Anyone who has been involved in science and technology in the Federal Government, either as a civilian employee or a contractor, has heard about the Jasons. Many will recall the Jasons' involvement with studies on the practicality of using tactical nuclear weapons in the Vietnam War and employing electronic intelligence devices along the Ho Chi Minh trail. Finkbeiner, while clearing up some misconceptions, covers only the information available in the public media, supplemented by some unclassified reminiscences of current and former Jasons. No secrets are revealed in the book, although the history of the Jasons up to approximately early 2002 is quite well covered.

Groups like the Jasons can trace their lineage at least back to World War II and the Manhattan Project, which was led by notable university scientists Enrico Fermi, Richard Feynman, John Archibald Wheeler, and others. Academics also contributed to radar development. Some leading university scientists continued assisting the government in technical areas after the war, even though most had returned to their universities, research, and teaching. The relationship partnering academia and the government soured after the Atomic Energy Commission's hearing regarding Robert Oppenheimer, and the subsequent loss of his security clearances, which is discussed only briefly in this book. The event tended to polarize the physics community into opposing camps of those scientists who had condemned Oppenheimer, such as Edward Teller, and those who had testified on Oppenheimer's behalf, including Fermi, Hans Bethe, and I. I. Rabi.

Initially, groups like the Wheeler-Wigner-Morgenstern Summer Study and Project 137 (named after the fine structure constant 1/137) were started in the mid-to-late 1950s, with some competition between the "Charles River Crowd" (e.g., MIT, Harvard) and others (e.g., Princeton).[1] However, on 1 January 1960, the Jasons became an official entity under the direction of the Institute of Defense Analyses (IDA) with funding from the Advanced Research Projects Agency (ARPA), later the Defense Advanced Research Projects Agency (DARPA). In 1973, the Jasons moved from IDA to the Stanford Research Institute (SRI), then again in 1981 to Mitre Corporation. In 2002, the funding relationship with DARPA was terminated, after a disagreement regarding autonomy initiated by the Secretary of Defense, Donald Rumsfeld.

Finkbeiner points out very late in the book that DARPA only provided about 40 percent of the Jasons' funding, but acted as a channel for other agencies to pass funding to the Jasons. The book very nicely lays to rest the incorrect origination of the name: it does not stand for July-August-September-October-November, the months that the Jasons supposedly meet (actually, they typically meet for six weeks in June and July, and produce a report by November). In reality, it was originally called Project Sunrise; Mildred Goldberger, the wife of one founding member of the Jasons, recommended that it be named after the Greek mythological hero Jason, who led the Argonauts in search of the Golden Fleece. It became customary in some circles to spell the group name with all capitals (i.e. JASON), which probably led to the month acronym story.

From the beginning, the Jasons were very autonomous: they selected their own members and chose their own issues to study. Finkbeiner details quite well the problems caused by politicians trying to control the group (and failing), including the disagreements in late 2001 that resulted in the Jasons losing their funding from DARPA and becoming temporarily disbanded. During the initiation of the Jasons, John Wheeler, Edward Teller, Hans Bethe, and Eugene Wigner were established as "senior advisors," although, after quoting several members who state that they were "somewhat figureheads," Finkbeiner never refers to them again.

One major weakness in Finkbeiner's book is that a number of names are mentioned, sometimes discussed, and then never heard from again. Admittedly, the Jasons are somewhat loosely organized. Formal admission to the Jasons is by a vote of the membership, but a member may stop participating for a while or quit altogether in a rather informal manner. Also, many of the names, while very familiar to any physicist trained in the 1960s through 1980s (e.g., Sidney Drell's excellent graduate texts *Relativistic Quantum Mechanics* in 1964 and *Relativistic Quantum Fields* in 1965, written with James Bjorken),

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[1] The fine structure constant, 1/137.03599907, is the dimensionless fundamental physical constant characterizing the strength of the electromagnetic interaction in atomic and molecular physics. It is the ratio of the velocity of the electron in an atom to the speed of light, as well as representing the strength of the interaction between electrons and photons (http://en.wikipedia.org/wiki/Fine_structure_constant).

may not be at all familiar with younger physicists, and are probably completely unknown to the general public. An appendix listing the people mentioned in the book, with a short biographical paragraph and their dates of involvement with the Jasons, when appropriate, would have been helpful. For example, John Archibald Wheeler is mentioned in a section detailing the creation of the Jasons, but no biographical information is provided to give the reader context. Some simple facts, including that he collaborated with Albert Einstein and served as Richard Feynman's dissertation advisor, as well as the chief scientist at the Hanford Nuclear Reservation during the Manhattan Project, would have been interesting. Also the index, while generally adequate, could have been improved significantly; I could not always find topics I remembered reading about.

Finkbeiner interviewed only 36 individuals that she discusses in her book as being members of the Jasons. It is unknown if this is largely due to an unwillingness of other members to discuss their work, but since Wikipedia lists 100 potential members of the Jasons, it would seem that Finkbeiner may be missing a portion of their history.[2] Also, the omission of any comments from Tony Tether, Director of DARPA, is unfortunate, because the disagreement between Tether and the Jasons is discussed at length in the book.

Finkbeiner admirably discusses the major topics examined by the Jasons over a period of more than 40 years, including:

- Missile defense and directed energy weapons; MX missile concept
- Submarine communications and detection
- Detecting nuclear bursts and tests; nuclear stockpile stewardship
- Electronic barriers across the Ho Chi Minh trail in Vietnam
- Use of tactical nuclear weapons in Vietnam
- Adaptive optics
- Urban battlefield
- Climate studies

She discusses briefly the national exposure (with resulting demonstrations both in the United States and abroad) the Jasons encountered with the release of the Pentagon Papers on 13 June 1971. However, younger readers may not have the context to fully appreciate the importance of these events, which are discussed on only a few pages in the book. Finkbeiner also states that adaptive optics was one of the "few unrelievedly [sic] good results of SDI, a program that scientists agreed was generally useless." The climate group, founded in 1977, was responsible for the establishment of the Atmospheric Radiation Measurement (ARM) program within the Department of Energy.

The book discusses in several sections the problems the Jasons had with classified and compartmented work. For example, security compartments prohibited the Jasons from working on satellite reconnaissance in the 1960s (although members of the Jasons, such as Dick Garwin, were involved in Corona) and from stealth technology projects in the

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[2] See (http://en.wikipedia.org/wiki/JASON_Defense_Advisory_Group).

1970s. Nevertheless, about 75 percent of Jason studies are classified, though a number of members felt that "science without shared knowledge has no rigor, no foundation, and no future." Some compartmentalization of the Jasons did occur (e.g., with the Navy submarine programs), which resulted in select groups of Jasons involved in certain areas. This compartmentalization of the Jasons was felt by many members to be detrimental to their effectiveness.

Although Finkbeiner mentions the arrogance of physicists only, the Jasons began adding chemists and biologists as the types of programs (e.g., atmospheric chemistry, biological weapons) required it (e.g., biologists in the 1990s). The 2001 disagreement with Secretary Rumsfeld and DARPA Director Tether involved adding non-academics, particularly in the information technology field; while the Jasons prevailed in this disagreement (DARPA funding was replaced by funding from the Director, Defense Research and Engineering (DDRE)), the importance of cyber warfare and other computer issues has led to computer academics being added to the Jasons. As an interesting historical note, the original contract establishing the Jasons included the phrase "minimum expenditures will be made for computers" since physics problems were solved by thinking, not by using computers.

In general, the book is engaging, and I can recommend it to anyone with interest either in the history of the period or in the role of science and scientists within the U.S. Government (particularly the Department of Defense). While Finkbeiner employs a too-familiar style in her writing (at least for a serious historical work), it fits well with the large number of quotes from Jason members that are also casual and familiar in tone. Much of the historical material can be found easily using an Internet search (e.g., Wikipedia). Perhaps one of the book's main strengths is that it is fairly friendly toward the Jasons, while a number of other works (e.g., Charles Schwartz's *Science Against the People: The Story of Jason,* which can be found at http://ist-socrates.berkely.edu/~schwrtz/SftP/Jason.html#INTRODUCTION) take a biased view by focusing their account on many of the articles and demonstrations after the release of the Pentagon Papers.

One unfortunate fact is that the book (with a 2006 copyright) essentially stops at the transition of the Jasons from DARPA to DDRE in early 2002. There are a few mentions of events in 2003 and one in 2004, but none of any substance. The final chapter, *Epilogue: Outcomes and Updates,* mostly updates material from earlier in the book (e.g., adaptive optics) without presenting any new activities that occurred after 2002. The Wikipedia article lists 15 report titles between January 2002 and June 2005 (plus 36 others going back to March 1967), amply demonstrating how much the Jasons were doing during that time.

Commentary

The Implictations of Losing Focus: The Need for the NRO to Change Its Business Practices

Dennis D. Fitzgerald

All large, successful organizations, including the National Reconnaissance Office (NRO), have an aversion to change. Large organizations that find successful ways of doing business, often only after repeated failures, will cling to the product or service that made them successful. It is their success and the desire to stick to what has worked in the past that actually sows the seeds of their eventual downfall. The fear of change is a chronic pathogen that seems to afflict nearly all successful organizations, and the greater the success, the more deadly the affliction. As 20th-century British literary critic and author Cyril Connolly observed, "The past is the only dead thing that smells sweet."

How does the NRO avoid becoming a sweet smelling thing of the past? One thing is clear: it cannot continue to approach its mission the way it did during the Cold War or even in the 1990s aftermath of that conflict. The NRO of the early 21st century operates in an environment that is significantly different. The NRO must cope with increased Congressional oversight and unstable budgets, a changed primary user base and principal target for collection, and increased openness about its activities and competition from commercial imagery providers. The tactical users of 2008 and beyond require actionable intelligence in near real time to solve problems that intersect and overlap the requirements of traditional intelligence disciplines. But having developed and operated many of its resources for Cold War-era missions, can the NRO fundamentally alter the way it does business? Perhaps it would do well to examine examples of organizations that stuck to traditional ways of doing business and with successful product lines only to see them become the seed of downfall.

Examples Where Organizations Lose Focus

The history of multiple well-known, successful organizations suggests that the NRO will face some challenges. We can see this in the experience of the U.S. Navy, General Motors, and several other organizations.

The U.S. Navy embraced the battleship. In the years immediately following World War I, Navy leadership believed that the battleship was the ultimate instrument of naval power, invulnerable to all threats, save another battleship. Assistant Chief of the Army Air Service Billy Mitchell, who advocated a greatly increased role for aircraft in military operations, publicly challenged the Navy's dreadnought doctrine. Using the press to promote his ideas, Mitchell agitated to demonstrate that aircraft could sink battleships. The press ran articles calling for the demonstrations to go forward.

Military leadership finally granted Mitchell permission and the Navy scheduled test bombing runs targeting captured German ships. Over the course of three days in July 1921, Mitchell's bombers sank a German destroyer, an armored light cruiser, and, in their most dramatic demonstration of Mitchell's theories, one of the world's largest war vessels, the German battleship *Ostfriesland* (Miller, 2004).

Of course, the Navy did not concede gracefully and built many more battleships during the interwar years.[1] As late as 1941, the program for the Army-Navy football game showed a picture of the USS Arizona with the caption: "It is significant that despite the claims of air enthusiasts, no battleship has yet been sunk by bombs." Eight days later the Japanese sank the USS Arizona during their air attack on Pearl Harbor, Hawaii.

The Navy failed to grasp how emerging air power technology would fundamentally alter naval battle tactics. Let us next look at the corporate world for examples of successful organizations that, in resisting change, failed to recognize lucrative opportunities in emerging technologies.

General Motors (GM) embraced the view of controlling the market. At one time, GM had two thirds of the U.S. automobile market. By 2008 GM's market share was less than half that and the company was headed toward bankruptcy. General Motors' downfall probably best illustrates my point. It was a huge, vertically integrated company that believed it could simply dictate what the driving public wanted. The company could not conceive, following the gas shortages of the 1970s, that the American public would abandon their gas-guzzling, poorly made behemoths. General Motors' inability to respond to changes in the marketplace has had devastating economic impact on the city of Detroit.

Swiss watchmakers embraced traditional timepieces. Who invented the digital watch? The Swiss. Who has made all the money from digital watches? The Japanese, the Koreans, and the Taiwanese. While Swiss watch manufacturing emphasized skilled, mechanical craftsmanship and design, those other countries employed integrated circuits to produce lower-cost watches with greater accuracy than the most expensive Swiss watch.

Kodak embraced film. Who invented the digital camera? Kodak in 1985. Who introduced the digital camera? Sony. Why not Kodak? Because digital cameras competed with what Kodak saw as their core business: film. It has been all downhill since, for both Kodak and the city of Rochester, as the company has struggled to figure out what its future business will be. Kodak global employment has gone from 145,300 in 1988 to below 50,000. In 2003 Kodak finally acknowledged that its film businesses were in irreversible decline and outlined a strategy to become a digital heavyweight in photography, medical imaging, and commercial printing. Imagine where they might be today had they made that decision in 1985.

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[1] Although the U.S. Navy's Board of Observers conceded in the aftermath of Mitchell's tests that the ships had been sunk by bomb-dropping airplanes alone, they pointed out that those ships had been at anchor and without any crew aboard. The vessels thus had no ability to maneuver and no crew on deck to return antiaircraft defensive fire or to conduct damage control procedures to stay afloat after being struck (Miller, 2004).

IBM embraced mainframe computers. In the 1950s and 1960s, the name IBM was synonymous with computers. IBM computers operated at that time in a closed system, in which customers could only use IBM peripherals and even had to buy IBM printer paper. It is perhaps not surprising, then, that IBM came late to the personal computer (PC) market. Their entry into the PC market in 1981 was so half-hearted that they could not be bothered with writing an operating system for their own hardware. Instead, they went to a Seattle company headed by Bill Gates and asked Gates if his company could write it for them. The result was the "Microsoft Disk Operating System" or MS-DOS.

Perhaps because it failed to recognize the potential of the PC market, IBM allowed Microsoft to retain the rights to license MS-DOS separate from IBM's PC hardware. The rest of the story is well known: Gates and Microsoft made a fortune by licensing MS-DOS. Thirty years later, the market capitalization of IBM was $132B, while Microsoft was twice that, at $278B. How could such a technology-savvy company like IBM miss the PC market so badly? Because the thing that made them successful was selling expensive mainframes to large corporations, and they could not conceive of there being any money in inexpensive, low margin PCs.

Microsoft embraced PC software. Of course, now Microsoft is in crisis as it searches for where it should go in the future. The delay of the long-awaited upgrades of Microsoft mainstay products like the Vista OS and MS Office caused it some embarrassment. Much more frustrating for the company has been its stock price, which barely budged between 2002 and 2008, whereas, Google quadrupled in an even shorter period. Wall Street simply no longer sees Microsoft as a growth business. Microsoft still sees itself as a vendor of proprietary code in a world that is moving toward open software, encouraged by the technical leadership and financial resources of, ironically, IBM. The total worldwide market for software is estimated to be $120B and this is where Microsoft competes. Annual worldwide advertising spending amounts to about half-a-trillion dollars, and about 20 percent of all media viewership today is online and growing. This is where Google competes. The issue for Microsoft is how does it move off your hard drive and out onto the net before it becomes irrelevant.

Xerox embraced photocopies. The Xerox Corporation is another company whose name is synonymous with its product, photocopiers, and which has become a noun and a verb in the American lexicon. As with IBM equipment, customers could not buy Xerox hardware; they leased it. A Xerox copier had its own room, the "Xerox Room," and its own permanent Xerox repairman to keep it running. Like IBM before it, Xerox discounted the idea that there was any market for a reliable, inexpensive desktop model that, like the PC, would open up the range of potential buyers beyond Xerox's corporate accounts. Of course, Minolta and Cannon proved them wrong and eventually drove them into bankruptcy.

Apple Computer embraced hardware. Who has the more intuitive, easiest-to-use operating system, Apple or Microsoft? I believe the Macintosh system is superior to Windows. Steve Jobs incorporated what originally were Xerox—yes, another lost opportunity for the copier giant—designs for the computer mouse, windows, and the graphical user interface (GUI) into his design for the influential Mac PC. But while the Mac OS hit the market before the Windows OS, Microsoft's GUI became more widely distributed. Why? Steve Jobs refused to license the Mac System in part because he believed selling hardware would be more profitable than licensing software. He couldn't let go of the thing that made him successful initially, namely the Apple hardware.

Wang Laboratories embraced hardware. Wang Laboratories made the same mistake as Apple. When Wang first introduced their business computers in the early 1980s, it freed secretaries from the tyranny of the IBM electric typewriter. Secretaries no longer needed whiteout to correct misspellings, and with the improved quality came huge productivity increases. However, Wang would not license the software because it thought it was in the computer hardware business. How many people have Wang computers on their desk today?

Implications of Losing Focus

All of these organizations I have mentioned share a set of common characteristics. They were all very successful at what they did, they tended to be large, and they dominated their field. Though most saw the future, they discounted the potential for new developments to supplant their existing product lines. All paid dearly for their refusal to embrace the future, and many caused collateral damage to the communities where they were located.

Does any of this apply to the NRO? Of course it does. The NRO has been a large successful organization. But like these other organizations, what made the NRO successful in its past may not be the formula for its success going into the future.

Trends to Consider

There are at least five trends or changes in the environment that the NRO needs to consider as it moves forward. They are related to security classification, tactical operations, targeting, funding, and the commercial sector.

More openness. The NRO now operates in a security classification environment that is significantly different from the 1970s and 1980s. The fact of the NRO's existence was declassified in 1992. Along with other structural changes the NRO made in the 1990s, declassification had far-reaching implications for Congressional oversight and Department of Defense (DoD) and Intelligence Community (IC) involvement with NRO programs. Prior to 1992, whenever the NRO experienced difficulties, few people were aware of them and the NRO always had enough budgetary margin to compensate. With declassification bringing about tighter fiscal control and increased openness, more people in Congress, the DoD, and the IC feel empowered to design the future direction of the NRO or to second-guess everything it does.

Move toward more support to tactical operations. The 21st-century NRO missions focus on delivering time-critical data to support tactical military operations, a far cry from the predominantly strategic focus of its early years. Over the years, the primary user base for NRO products has moved from the offices of the President and National Security Council, to all the agencies within the Beltway, and finally to the military services and homeland security. Unlike strategic users, the military requires timeliness to match its operational tempo, metric accuracy for targeting, and synoptic battle space coverage. Because the military experiences frequent personnel turnover, the NRO is limited in how much complexity it can push out to the user. Ultimately, tactical users want reliable, actionable intelligence regardless of how much data the NRO has to collect to produce it.

Move toward targeting elusive non-state actors. The principal target of space-based collection has changed from the military forces and nuclear weapons sites of large states like the former Soviet Union and Communist China, who were fairly stable and predictable in their actions, to elusive cells of Islamic terrorists, smaller states who sponsor terrorist activities, like Syria and Iran, or rogue states who possess nuclear arsenals, like North Korea, all of which are less stable and predictable. During the Cold War, although the Soviet Union possessed enough nuclear weapons to destroy the world many times over, the threat of retaliation from the U.S.—a strategy known as mutual assured destruction or MAD—with its comparable stockpiles of missiles and its multiple, dispersed delivery systems, deterred the Soviets from launching a nuclear strike. But U.S. nuclear power is largely irrelevant against non-state actors like terrorists—whom or what do you target?—so detecting and preventing weapons proliferation has become a primary focus for space-based collection. If a terrorist group obtains nuclear, biological, or chemical weapons of mass destruction, the U.S. and its allies will be vulnerable to catastrophic attack.

Move toward reduced funding. The development time for many NRO systems, from Vu-graph to on-orbit capability, spans a decade. That means that we are now reaping the consequences of decisions made in the mid-1990s. From a national strategic perspective, the 1990s were characterized by the downfall of the Soviet Union and the expulsion of Saddam Hussein's forces out of Kuwait. The U.S. celebrated these two victories by cutting defense spending to realize a peace dividend. As the IC's budget is a percentage of overall defense spending, IC agencies saw cuts in personnel and real spending of 20 to 30 percent. What we have today are the choices and compromises we were forced to make in the mid-1990s. As horrific as 9/11 was, it resulted in a reversal of this downward budget spiral. We have to ask ourselves what will happen to defense spending after we ultimately declare victory in Iraq, not to mention what cuts will be needed to fund Social Security and Medicare benefits for 75 million retired baby boomers, and service the National debt.

Move toward commercial imaging. For the first time in the history of the NRO, we face competition in the imagery world from commercial providers. "Commercial" is a misnomer because these providers (GeoEye and Digital Globe) would quickly go out of business were it not for substantial National Geospatial-Intelligence Agency (NGA) purchases every year. Nevertheless, NGA continually petitions Congress for an increasing share of the imagery budget. There is a place for commercial imagery in the collection of non-time-dominant, low-resolution area collection. The issue for GeoEye and Digital

Globe will be whether NGA can afford to buy enough commercial imagery to keep them both in business.

Responding to the Trends

What should the NRO do in response to these trends of increased openness, a growing military user base, a changing target environment, growing budget uncertainty, and increasing competition from commercial providers? These trends present new challenges—issues related to data volume, persistence and timeliness, and program development. The NRO must address these challenges as a way to responding to the trends in the environment:

Date volume issues. Together with our mission partners, NGA, the National Security Agency (NSA), and the Defense Intelligence Agency (DIA), the NRO needs to move aggressively to address the data volume issue. Even with much sigint data being processed by computer, the volume of data the NRO collects far exceeds what human analysts can process. Our mission partners take some of this data and turn it into information that gets disseminated and entered into their databases. A large amount of imagery data doesn't get looked at before being archived for future reference. Even so, the volume of data that gets converted into information is still overwhelming to our users. Worse, much of it is not timely enough for some ongoing military operations. What's the answer? More needs to be done by the NRO and its mission partners to create fused, actionable intelligence. There is a lot going on in the Combatant Commands and at the NRO ground stations that we need to convert to products that better serve our tactical customers' needs.

Persistence and timeliness in collection. The NRO needs to increase persistence and timeliness of its satellite collection. As we refresh and increase the number of imagery and sigint satellites, they need to be operated more as an enterprise instead of the current stovepipe model. Not only does the NRO need to change, but so do our mission partners. They need to change from tasking by imint or sigint requirements, to tasking by intelligence problems. Tasking the NRO enterprise by intelligence problems offers the opportunity to make NRO collection much more persistent, relevant, and efficient, but also requires the development of an NRO cadre capable of translating an intelligence problem into satellite tasking decisions. Such a cadre does not exist in the NRO today.

Development timelines for programs. The NRO needs to reduce the development timelines for our new spacecraft, currently ranging from seven to ten years. These longer timelines have been driven by several factors: increased spacecraft complexity, defective parts, the testing of flight software, and budget inflexibility. Each factor creates development challenges.

> *Spacecraft Complexity.* Increased spacecraft complexity has resulted from the NRO's longstanding practice of adding capabilities to each subsequent spacecraft. While this provides additional data for our users, it makes the spacecraft more difficult to build and, more importantly, to test. Often we find ourselves in the situation where the Technology Readiness Level of new

capabilities is not as high as the building contractor originally thought. Of course, the weight or volume constraints we impose on sub-contractors make even mature technologies difficult to build and integrate.

There are several answers to the challenges posed by spacecraft complexity. First, the government needs much better upfront systems engineering. Second, instead of attempting to cram everything into infrequently launched, long-lived spacecraft, we need to build multiple, less complex spacecraft that provide more opportunities for hosting new capabilities. The current proposal in imint to disaggregate the points and area missions from today's single spacecraft to two spacecraft, each optimized for the points or area mission, is a step in the right direction. The combination of the two designs provides better performance than the single spacecraft design; it puts more eyes in space and offers the potential to balance the workflow through our contractors' and sub-contractors' facilities.

Defective Parts. Defective parts are a huge problem for both the space industry at large and the NRO. The discovery of defective parts late in the assembly process makes repair or replacement of those parts time consuming and complicated. During the 1990s, under the mantra of acquisition reform, the government ceased following military standards (MIL-STD) on parts in favor of best commercial practices. This proved disastrous and expensive when many bad parts—some as simple as capacitors, others as complicated as field programmable gate arrays—began to enter the spacecraft supply system. The only answer to this problem is to institute greater upfront mission assurance measures and reinstate MIL-STD-1546 and MIL-STD-1547 on all parts entering the NRO supply system.

Testing Flight Software. The development of flight software frequently ends up being the critical path for many spacecraft. With an increasing trend to put more functionality into the spacecraft, the testing of spacecraft software has become an increasing problem. Assuring that you have tested all the "if-then" paths is a major issue, as is regression testing while discrepancy reports are worked off. The only real answer is to develop software architecture with testing as part of the design.

Budget Inflexibility. Budget inflexibility at the NRO has been a problem for over a decade. Following the financial meltdown in the NRO in 1995, we moved to budgeting programs at the 50-percent Most Probable Cost (MPC). Budgeting to MPC means that you have a 50-50 chance of making the overall cost, and from year to year you have little or no budget carry forward as margin. For a second or subsequent vehicle, MPC budgeting usually works. However, for a new or first-of-a-kind design, budgeting at MPC is usually a disaster because of uncertainty surrounding the cost of elements that make up a new space system. Lack of margin on NRO programs ensures that it has little flexibility to fix budget problems internally. Instead, the NRO is forced to go back through the Director of National Intelligence, Office of Management and Budget, and six committees in Congress, to do its mea culpa and beg for help. This time-consuming process could be eliminated if the Director of the NRO had more budget flexibility.

Conclusions

From a spacecraft standpoint, in the future the NRO needs to put as much emphasis on producibility as innovation. As the Federal Budget shrinks, Congress will have even less tolerance for large overruns. To reduce the risk of elongated development timelines and high costs, the NRO must conduct more systems engineering early in development with an emphasis on testing. It also needs better parts screening and adherence to MIL-STD specifications. Finally, the NRO needs to incorporate testing as part of the design of spacecraft software.

I believe that for the NRO to make future breakthroughs in national reconnaissance, it must focus these developmental efforts on ground station operations. The old focus on greater data volume is not the answer for the future—the NRO cannot keep inundating the tactical user with increased data. The NRO needs to understand the tactical user's need well enough so the NRO can task its systems and process its data in such a way that it can produce timely, actionable intelligence for its users. The same focus applies to the development of new national reconnaissance systems. The NRO needs to develop these systems with the tactical user in mind and on a time scale that can impact on the tactical user's problems.

There is a fundamental need for the NRO to realign its business practices. Unless the NRO can respond to its new operating environment and conditions and change the way it does business, it risks becoming the IBM, Xerox, or GM of the Intelligence Community: it risks no longer being a groundbreaking, successful organization and faces the threat of becoming less and less relevant by its failure to capitalize on new ideas in a changing environment.

Dennis D. Fitzgerald *served as Deputy Director and Principal Deputy Director of the National Reconnaissance Office from August 2001 until his retirement from the Central Intelligence Agency in April 2007. His government career spanned 33 years, during which time he held numerous senior-level positions including: director of OD&E and chairman of the Career Service Panel; director of the Signals Intelligence Systems Acquisition and Operations Directorate (Sigint); deputy director of the Technology Application Group; deputy director for Systems Collection; director of the Office of Systems Applications; and, associate deputy director of the CIA's Directorate of Science and Technology (DS&T). He held four master's degrees from Johns Hopkins University in applied physics, mathematics, electrical engineering, and space technology, and he began his professional career as a field engineer working on the Polaris and Poseidon missile programs for Sperry Gyroscope. Mr. Fitzgerald died on 31 December 2008.*

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In Memoriam

Dennis D. Fitzgerald
Principal Deputy Director of the National Reconnaissance Office
(28 February 1943 – 31 December 2008)

Mr. Dennis D. Fitzgerald, the first principal deputy director of the National Reconnaissance Office (PDDNRO), died on 31 December 2008. Fitzgerald served the NRO and the Intelligence Community for 33 years as a Central Intelligence Agency (CIA) officer. He spent most of his career assigned to the Office of Development and Engineering (OD&E), contributing to the acquisition of advanced satellite technology, and the development and cultivation of the NRO's CIA workforce. As an engineer, a procurement manager, and a senior leader in many NRO directorates or their predecessor organizations, Fitzgerald influenced how the NRO achieved its mission for three decades. His leadership positions included the following: director of OD&E and chairman of the Career Service Panel; director of the Signals Intelligence Systems Acquisition and Operations Directorate (Sigint); deputy director of the Technology Application Group; deputy director for Systems Collection; director of the Office of Systems Applications; associate deputy director of the CIA's Directorate of Science and Technology (DS&T); and, deputy director and acting director of the NRO. He retired from the CIA in April 2007 after serving as PDDNRO, a new position established in 2006 as part of NRO corporate management realignment. After retirement, Fitzgerald continued to consult with and advise NRO senior leaders.

In his varied assignments, Fitzgerald applied his extensive technical knowledge, skill, and intellectual curiosity—demonstrated by the four master's degrees he earned from Johns Hopkins University in applied physics, mathematics, electrical engineering, and space technology—to development of breakthrough satellite technologies and new intelligence collection concepts. He procured multiple vehicles for some of the NRO's most advanced systems, helping evolve the capabilities and architecture still in use in 2010. In addition to his many technical engineering accomplishments, Fitzgerald's legacy includes his involvement as OD&E director from 1995–2007 in shaping the careers of the NRO's CIA personnel for more than a decade. Upon becoming a consultant to the NRO after he retired from the CIA, Fitzgerald designed and taught a course in spacecraft design, and helped establish a training program for the NRO workforce composed of instructor-led and online courses, underscoring his life-long commitment to learning. Former Director, NRO (DNRO) Scott Large called Fitzgerald "a role model for all of us," and observed that "much of the NRO's successes over three-plus decades, I believe, are directly attributable to Dennis and his passion for the mission."[1] Robert Pattishall, the first director of the NRO Advanced Systems and Technology directorate, remembered

[1] Large made these comments at the NRO's memorial service for Fitzgerald, held at NRO headquarters 18 February 2009.

Fitzgerald as a "great teacher and mentor … [a] champion of people in the organization." Large honored Fitzgerald posthumously by dedicating a January 2009 satellite launch to his memory.

Fitzgerald joined the DS&T in 1974 following 10 years working as a field engineer in private industry on the Polaris and Poseidon missile programs. He supported several revolutionary sigint systems in the 1970s and contributed to definition studies for future advanced systems as part of the Systems Analysis Group within NRO Program B.[2] After Fitzgerald had served six years with the Systems Analysis Group, then-OD&E Director Robert Kohler assigned him to be deputy director for Systems Collection, in which capacity Fitzgerald helped procure state-of-the-art imagery vehicles. He temporarily left OD&E to become associate director of the National Photographic Interpretation Center (NPIC) where he helped its transition to a new data system. Fitzgerald's NPIC position represented one of several government assignments he held outside of the NRO; the others were deputy director of CIA's Office of Research and Development and associate deputy director of DS&T.

Beginning in 1995, after more than 20 years in government service, Fitzgerald accepted two assignments in which he would make a great impact on the post-Cold War NRO and its workforce. First, he became the director of OD&E and oversaw a CIA-NRO workforce in transition following the decision to downsize intelligence agencies as part of 1990s acquisition reform policy. Then in 1996, acting DNRO Keith Hall[3] selected Fitzgerald to head the Sigint directorate. In one of his last interviews with CSNR, Fitzgerald said that he believed he made his greatest contributions to the NRO as Sigint director. In less than six years, he led the acquisitions of multiple sigint satellite systems and instituted fundamental changes at the ground stations that serviced the spacecraft.

In August 2001 Director of Central Intelligence George Tenet selected Fitzgerald as deputy director of the NRO (DDNRO). By the time of his retirement in 2007, he had served as the deputy for three different directors, Keith Hall, Peter Teets, and Donald Kerr, during an eventful period in NRO history. In the aftermath of the 9/11 attacks and the subsequent U.S. military response, the NRO—and the entire Intelligence Community (IC)—had to adapt its mission to accommodate the new operational environment and tempo, and Fitzgerald and other senior leaders worked with satellite program managers to ensure multiple launch successes for the NRO that provided its users new systems and capabilities. These successes blunted, but did not eliminate, critical assessments by

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[2] Between 1962 and 1992, the NRO had independent program offices acquiring and developing systems. Simply named Programs A, B, C, and D, or the alphabetic program offices, they received staffing and human resources support from larger organizational entities that had helped establish a revolutionary national reconnaissance capability before the NRO even existed. These entities included the U.S. Air Force, whose personnel involved in national reconnaissance satellite programs constituted Program A; the CIA, whose OD&E personnel staffed Program B; and the U.S. Navy, who provided the personnel for Program C activities. Until 1974 when it was removed from the National Reconnaissance Program (NRP), Program D contained personnel involved with developing aerial reconnaissance vehicles, including the CIA's U-2 and A-12 aircraft, and the Air Force's SR-71 supersonic reconnaissance aircraft (Laurie, 2002).

[3] Hall was confirmed as DNRO in March 1997 and served as director until December 2001.

multiple review panels of the NRO's acquisition performance during those years. Several panels concluded that acquisition reform had negatively affected the NRO workforce by reducing the number of experienced government program managers. Fitzgerald imparted his insights on the 21st-century NRO workforce in two articles he published in response to criticism of the post-Cold War NRO penned by his former OD&E boss and colleague, Robert Kohler. The first Kohler article—followed by Fitzgerald's reply—appeared in 2002 in the CIA journal Studies in Intelligence; the second ran in this publication in 2005 (to read all four articles, see *National Reconnaissance: Journal of the Discipline and Practice, 2005-U1).* Taken together, the articles form a substantive dialogue on challenges that continue to confront the NRO.

Fitzgerald was born 28 February 1943 in New Haven, Connecticut. He attended Fairfield University in Connecticut and earned a bachelor of science degree in physics in 1964. He held professional certificates as a Professional Engineer in New York and Virginia, and as a licensed Master Electrician in Virginia. Fitzgerald's interests outside of the workplace included horse racing and long-distance running, and he completed 10 marathons in his lifetime. He is survived by his son, David Fitzgerald, his daughter, Mrs. Erin Vires, and his wife, Mrs. Deborah Fitzgerald.

Soon after his death, many of Fitzgerald's colleagues at the NRO posted online messages to express their appreciation for his leadership and sorrow at his passing. Arguably the most striking display of the NRO workforce's respect for Fitzgerald was unveiled on the Delta-IV rocket at the launch dedicated to him. Those who witnessed the event could not have failed to notice a message that launch personnel had added to the booster's upperstage. In blue lettering, spread across a five-meter diameter and above an American flag, they had inscribed: "The Delta Team: In memory of Our colleague, friend, and patriot Dennis Fitzgerald, 1943 – 2008, Principal Deputy Director, NRO & rock star."

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