The Nautilus Institute for Security and Sustainability

The Higher Management of Pine Gap

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Summary

The higher management of Pine Gap is and has always been an entirely American affair. To understand Pine Gap today, it is necessary to understand the organisations of the US intelligence community and military concerned with the acquisition of technical intelligence, and their politics over the past five decades. For the first two decades, responsibility for operation of the ground control station at Pine Gap resided with the Ground Systems Division of the Office of ELINT within the CIA's Directorate for Science and Technology. However, by the early 1990s control passed to the Systems Acquisition and Operations Directorate of the National Reconnaissance Office (NRO). In the mid-2000s the NRO itself underwent a profound change towards new organisational structures for integrating the imagery and SIGINT operations and making the whole system more responsive to users. The latest phase of these changes in the NRO stresses the role of ground systems, including Pine Gap, in creating 'a single networked information collection and distribution system' worldwide. The fundamental transformation of the higher management structure is more than an organisational matter. Along with the militarisation of the facility, it has important implications for Australia's involvement in the project. It warrants serious public discussion, which requires, in turn, greater transparency by the Australian authorities. As a 'joint' facility, its management structures are just as much of interest to Australians as to the US contractors to whom the NRO largely speaks.

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ADF	Aerospace Data Facility
AFB	Air Force Base
AFSATCOM	Air Force Satellite Communications
AFSPC	Air Force Space Command
AS&T	Advanced Systems and Technology
C-IED	Counter-Improvised Explosive Devices
C2ISR	Command, Control, Intelligence, Surveillance and Reconnaissance
C3I	Command, Control, Computing and Intelligence
CAC/CADD	Combined Arms Center/Combined Arms Doctrine Directorate
CCMD	Combatant Command
CENTCOM	US Central Command
CIA	Central Intelligence Agency
COCOM	Combatant Command
COMINT	Communications Intelligence
COMSAT	Communications Satellite
COTR	Contract Officer's Technical Representative
CSI	Combat Systems Integration
CT	Counter-terrorist
CTC	Combat Training Center
D/NRO	Director/NRO
DAGER	Director's Advisory Group for ELINT and Reconnaissance (NSA)
DCGS-A	Distributed Common Ground System-Army
DDS&T	Deputy Director for Science and Technology
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DMA	Defense Mapping Agency
DoD	Department of Defense
ELINT	Electronic Intelligence
EUCOM	US European Command
FISINT	Foreign Instrumentation Signals Intelligence
FLTCYBERCOM	Fleet Cyber Command
FLTSATCOM	Fleet Satellite Communications
FMSAC	Foreign Missile and Space Analysis Center
FORNSAT	Foreign Satellite
GED	Ground Enterprise Directorate
GEOINT	Geospatial Intelligence
GPS	Global Positioning System
GEOSPO	Geostationary Systems Project Office
HEO	Highly Elliptical Orbit
HSPO	HEO Systems Project Office
IC	Intelligence Community
IJC	ISAF Joint Command
IMINT	Imagery Intelligence
IOG	Intelligence Operations Group
IS	Intelligence Squadron
ISAF	International Security Assistance Force
ISR	Intelligence, Surveillance and Reconnaissance

JDFPG	Joint Defence Facility Pine Gap
JFCC-SPACE	Joint Functional Component Command for Space
JPL	Jet Propulsion Laboratory
JSOC	Joint Special Operations Command
JSPOC	Joint Space Operations Center
JWAC	Joint Warfare Analysis Center
LEO	Low Earth Orbit
LNO	Liaison Officer
LSPO	LEO Systems Project Office
MASINT	Measurement and Scientific Intelligence
MERIT	Military Exploitation of Reconnaissance and Intelligence Technology
MGS	Mission Ground Station
MHS	Menwith Hill Station
MI	Military Intelligence
MID	Mission Integration Directorate
MNF-I	Multi-National Forces Iraq
MOD	Mission Operations Directorate
MSA	Major Systems Acquisition
MSD	Mission Support Directorate
NCO	Non-Commissioned Officer
NGA	National Geospatial-Intelligence Agency
NORAD	North American Aerospace Defense Command
NORTHCOM	Northern Command
NRO	National Reconnaissance Office
NROC	NRO Operations Center
NSA	National Security Agency
NSD	National Systems Data
NSM	NRO Mission Support
NSSO	National Security Space Office
NTM	National Technical Means
OD&E	Office of Development and Engineering
OEL	Office of ELINT
OIO	Operational Integration Office
ORD	Office of Research and Development
OSD	Office of the Secretary of Defense
OSO	Office of SIGINT Operations
OSP	Office of Special Projects
OTS	Office of Technical Service
PACOM	Pacific Command
R&D	Research and Development
SALT	Strategic Arms Limitation Talks
SATCOM	Satellite Communications
SBIRS-Low	Space Based Infrared System - Low
SCA	Service Cryptologic Agency
SETO	Systems Engineering and Technology Office
SIGINT	Signals Intelligence
SLO	Space Launch Office
SMC	Space and Missiles Systems Center
SOCAFRICA	Special Operations Command Africa
SOCCEN	Special Operations Command Central
SOCOM	US Special Operations Command
SOUTHCOM	US Southern Command

SSA	Space Situational Awareness
STRATCOM	US Strategic Command
TacDSR	Tactical Defense Support Reconnaissance
TELINT	Telemetry Intelligence
TENCAP	Tactical Exploitation of National Capabilities
TT&L	Tagging, Tracking and Locating
UEO	User Engagement Office
UGA	Unified Ground Architecture
AFRICOM	US Africa Command
UEG	User Engagement Group

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Preface

The Joint Defence Facility Pine Gap outside Alice Springs in Australia's Northern Territory is one of the two or three largest and most important US technical intelligence facilities anywhere in the world. In recent years Pine Gap has expanded dramatically in terms of size, number of satellite ground terminals and roles in United States intelligence and military operations. Its original and principal role as the ground control station for geosynchronous signals intelligence (SIGINT) satellites has been critical to the United States for almost half a century, and remains so. Two new roles, acquired since the late 1990s, as a relay ground station for US missile launch detection early warning satellites and a FORNSAT/COMSAT (foreign satellite/communications satellite) interception facility have made it even more important, especially to US global military operations.

Australian debates about Pine Gap have tended to centre on the costs to the country of hosting the base, in terms of potential loss of independent foreign policy autonomy, potential inescapable entanglement in US military operations, and the security costs of 'drawing fire' as a lucrative and likely priority target for nuclear missile attack in the event of major conflict between the US and either China or Russia. Three important political counters to these concerns, developed principally by the Hawke and Keating Labor governments between 1983 and 1996, was the establishing of a position of deputy chief of facility to be held by an Australian defence official; the opening of almost all parts of the facility to the employment of Australians, in roughly equal numbers with US citizens; and the promulgation of a claim that the base is operated with 'full knowledge and concurrence' of the Australian government.[1]

Whatever the achievements of these 'Australianisation' policies, they must be set in the wider context within which the Pine Gap base was established and has been developed, which is an essentially US-centred story of the development of US space-based technical means of intelligence collection and their increasing application to ongoing military operations.

[1] *Testimony of Professor Desmond Ball to the Joint Standing Committee On Treaties, Reference: Pine Gap*, Official Committee Hansard, Parliament of the Commonwealth of Australia, Parliament of the Commonwealth of Australia, 9 August 1999; Minister for Defence Stephen Smith – Ministerial Statement on Full Knowledge and Concurrence, Department of Defence - Ministers, 26 June 2013, at http://www.minister.defence.gov.au/2013/06/26/minister-for-defence-stephen-smith-ministerial-statement-on-full-knowledge-and-concurrence/; and Richard Tanter, *The "Joint Facilities" revisited – Desmond Ball, democratic debate on security, and the human interest*, Special Report, Nautilus Institute, 12 December 2012, at http://nautilus.org/wp-content/uploads/2012/12/The-_Joint-Facilities_-revisited-1000-8-December-2012-2.pdf; (abridged earlier version appeared as 'American bases in Australia revisited', in B. Taylor, N. Farrelly and S. Lee (eds.) *Insurgent Intellectual: Essays in honour of Professor Desmond Ball*, (ISEAS, December 2012).

Consequently, very little of what follows takes place in Australia, other than the locating of the base as 'a suitable piece of real estate' and the facts of its subsequent development.

The management of Pine Gap, or more precisely, what we term the higher management of Pine Gap, is and has always been an entirely American affair. To understand Pine Gap today, it is necessary to understand the organisations of the US intelligence community and military concerned with the acquisition of technical intelligence, and their politics over the past five decades.

Introduction

There have been innumerable changes in the management structure since the geosynchronous SIGINT satellite program and the Pine Gap ground station became operational in 1970, reflecting both changes in the global geostrategic environment and bureaucratic developments in Washington. Overall, however, it is possible to divide the management history into two distinct and roughly equal periods, the first from the beginning of the program to the mid-1990s, when it was effectively managed by the Central Intelligence Agency (CIA), but with interminable bureaucratic struggles with the National Reconnaissance Office (NRO), and the second from the mid-1990s onwards, following the collapse of the Soviet Union and end of the Cold War, with the NRO completely ascendant.

Dennis Fitzgerald, who served through the transition as the Director of the Office of Development and Engineering (OD&E) in the CIA and Director of the NRO's SIGINT Systems Acquisition and Operations Directorate (1996-2001) has characterised the first period as the 'Technology Driven era', in which CIA/NRO satellite reconnaissance systems 'were based primarily on what technology would permit', and the second period as the 'Peace Dividend era', in which budget cuts forced program delays, cancellations and rationalisations, while from around 1990-91 (Operations *Desert Shield* and *Desert Storm*), and almost continuously since September 2001, both the NRO and CIA have been involved in direct support of US military operations.[2] Further, a major reorganisation was implemented within NRO in 2007-08 which reformed key areas of the management structure.

In addition to the CIA and NRO, the National Security Agency (NSA) has also been involved in the management structure since the program became operational. In December 1965, the CIA and NSA reached an agreement on 'joint planning' for NSA participation in the

[2] Dennis Fitzgerald, 'Commentary on "The Decline of the National Reconnaissance Office": The NRO Leadership Replies', *Studies in Intelligence*, (Vol. 46, No. 4), 2002, pp. 27-30, at http://fas.org/irp/nro/journal/fitz2.pdf.

CIA's RAINFALL/*Rhyolite* program, under which the NSA was given 'the job of collecting what COMINT [Communications Intelligence] they could from a bird whose job was TELINT [Telemetry Intelligence], not COMINT'. The details of NSA's participation in the program were negotiated by Charles Tevis, who headed the NSA's Director's Advisory Group for ELINT and Reconnaissance (DAGER). As the program developed, the CIA also agreed to the use of the satellites for electronic intelligence (ELINT) collection by the NSA. It was given a COMINT processing subsystem and an ELINT subsystem at the RAINFALL ground station, for which it covered the entire funding. As at the early 1990s, according to an official NSA history, 'NSA provided all the COMINT staff and about half of the TELINT crew'.[3] It also provided nearly all of the ELINT personnel.[4]

NRO Program B / CIA Deputy Director for Science and Technology

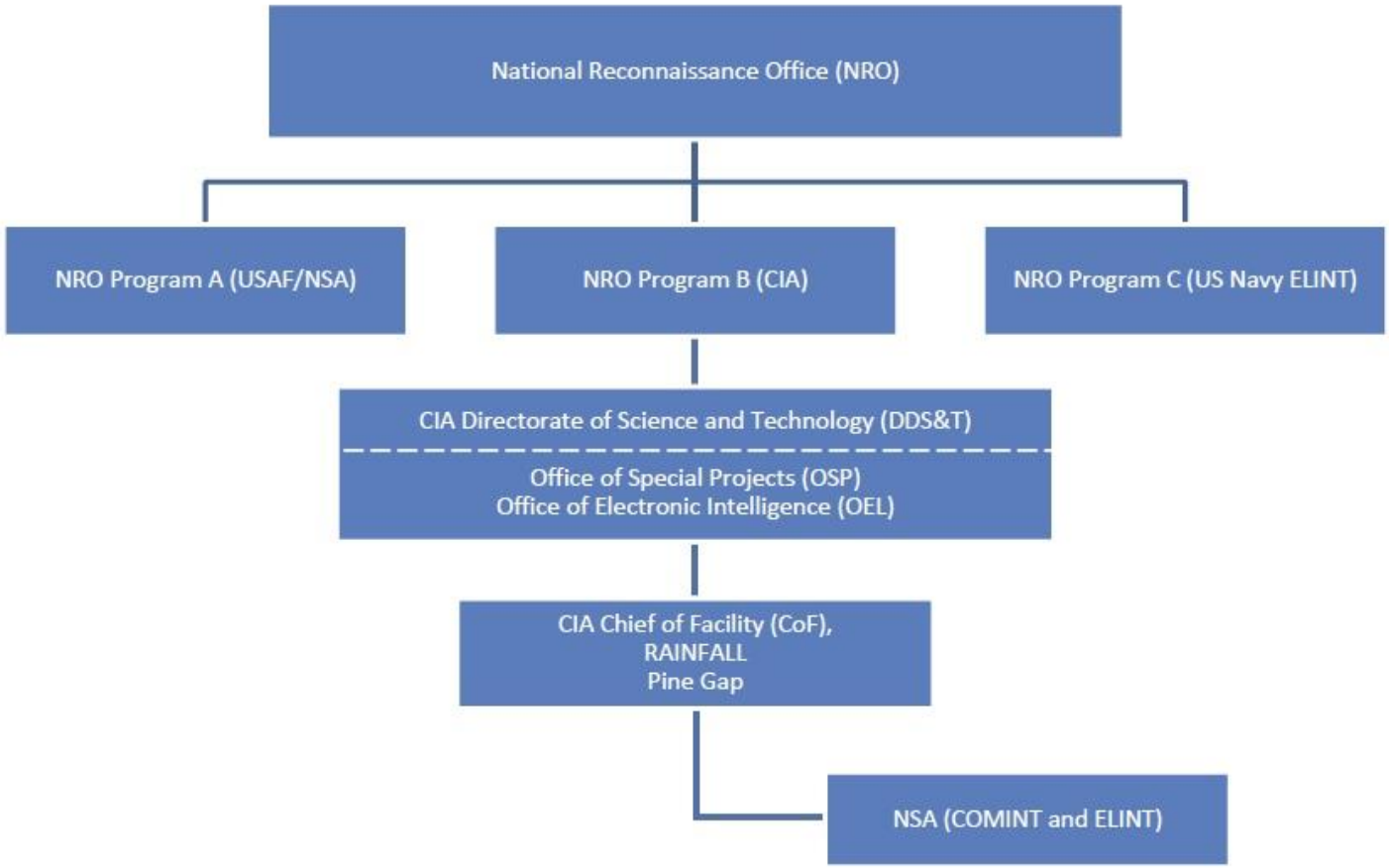
The NRO was established on 6 September 1961 to oversee and coordinate the satellite reconnaissance activities of the Air Force and the CIA, including both their photographic or imaging (IMINT) satellites and their SIGINT satellites. In practice, it functioned for the next three decades as little more than 'an umbrella organization for the ongoing reconnaissance efforts of the Air Force, the CIA, and the Navy', which remained essentially independent, with fierce bureaucratic fights between the CIA and the NRO/Air Force about successive imaging and SIGINT satellite programs. The Air Force's activities were designated Program A, the CIA's were Program B, and the US Navy's ELINT/ocean surveillance satellite system was Program C.[5]

Program B, which was managed by the CIA's Deputy Director for Science and Technology (DDS&T), included the CIA's *Corona* 'search' film-return satellites, the high-resolution film-return *Hexagon* (KH-9) system, and the electro-optical digital imaging KH-11 system (initially code-named *Kennan* and later *Crystal*), as well as its geosynchronous SIGINT satellites from the first *Rhyolite* satellite through the first two *Magnum* (*Orion*) satellites in the 1980s. The DDS&T served as the official head of Program B. (Table 1) Albert ('Bud') Wheelon was the first to occupy the position following the initiation of the *Rhyolite* project in 1965. Wheelon was succeeded by Carl E. Duckett in September 1966, who had become Associate DDS&T four months previously. Duckett managed DDS&T through the decade during which

[3] Thomas R. Johnson, *American Cryptology During the Cold War, 1945-1989. Book II: Centralization Wins, 1960-1972*, (Center for Cryptologic History, National Security Agency, 1995), pp. 409-410, at http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB441/docs/doc%201%202008-021%20Burr%20Release%20Document%201%20-%20Part%20A2.pdf
[4] David Rosenberg, *Inside Pine Gap: The Spy Who Came in From the Desert*, (Hardie Grant Books, Melbourne, 2011).
[5] Jeffrey T. Richelson, *The US Intelligence Community*, (Westview Press, Boulder, Colorado, Sixth edition, 2012), pp. 37-38.

Figure 1

Pine Gap Management
1966 – 1992



the original *Rhyolite* satellites were developed and the first operational constellation placed into orbit. Duckett was succeeded as DDS&T by Leslie C. Dirks in June 1976.[6] Dirks had been a member of Wheelon's original team tasked with examining the concept of a geosynchronous SIGINT satellite for TELINT collection in 1963-64, and had been Director of OD&E since April 1973.[7]

Table 1
NRO Program B Directors, 1967–1992

Dates	Name
September 1966 – June 1976	Carl E. Duckett
6 June 1976 – 2 July 1982	Leslie C. Dirks
3 July 1982 – 28 August 1989	R. Evans Hineman
28 August 1989 – 31 December 1992	Julian Caballero

Source: Clayton D. Laurie, 'Leaders of the National Reconnaissance Office, 1961-2001: Directors, Deputy Directors, Staff Directors, Program Directors, Chiefs of Staff, Directorate and Office Managers', (Office of the Historian, National Reconnaissance Office, Washington, D.C., 1 May 2002), pp. 45-46, 82-83, 84-86, 135-136, at http://www.nro.gov/foia/docs/foia-leaders.pdf

Dirks was succeeded as DDS&T by Richard Evans Hineman in July 1982. Hineman had headed the Office of Weapons Intelligence in DDS&T in the 1970s, and had served as Associate Deputy Director of the CIA's Intelligence Directorate in 1980-82. James V. Hirsch succeeded Hineman as DDS&T in September 1989; he remained DDS&T until September 1995.[8]

In practice, the DDS&T was unable to devote sufficient time and attention to his Program B activities, which effectively devolved to the director of the Office of Special Projects (OSP), reorganised into the Office of Development and Engineering (OD&E) in April 1973. As Jeffrey Richelson has noted, OSP/OD&E 'owned' the *Rhyolite* satellites. The Directors of OSP/OD&E, who effectively served as the executive or operational directors of Program B, are listed in Table 2. They included John J. Crowley (1965-70), who established a good working relationship between the CIA on the one hand and the NRO, the Department of Defense and the Air Force on the other hand; Leslie Dirks (1973-76); Donald L. Haas (1976-78), who had previously headed the Office of Research and Development (OR&D); Bernard Lubarsky (1979-82), who headed OD&E during the *Magnum* development period; Robert J. Kohler (March 1982

[6] 'National Reconnaissance Office Review and Redaction Guide', (Version 1.0, 2008), p. 115, at https://fas.org/irp/nro/review-2008.pdf.
[7] Jeffrey T. Richelson, *The Wizards of Langley: Inside the CIA's Directorate of Science and Technology*, (Westview Press, Boulder, Colorado, 2001), pp. 110, 295, 297.
[8] *Ibid.,* pp. 222, 243, 295, 297.

to August 1985), whose tenure was marked by a bitter fight with the NRO and its Program A over the follow-on to the *Magnum* satellites (i.e., *Orion*-3 and its successors); and Julian Caballero Jr (1985-93), who managed both the *Aquacade* and *Magnum* programs.[9]

Table 2
NRO Program B Executive Directors,
1965-1995

Dates	Name
15 September 1965–16 November 1970	John J. Crowley
16 November 1970–17 March 1973	Harold L. Brownman
23 April 1973–23 May 1976	Leslie C. Dirks
23 May 1976–28 August 1978	Donald L. Haas
22 January 1979–8 March 1982	Bernard Lubarsky
8 March 1982–17 August 1985	Robert J. Kohler
17 August 1985–3 October 1993	Julian Caballero
3 October 1993–16 October 1995	Edmund Nowinski

Source: Jeffrey T. Richelson, *The Wizards of Langley: Inside the CIA's Directorate of Science and Technology*, (Westview Press, Boulder, Colorado, 2001), p. 297.

Responsibility for operation of the ground control station at Pine Gap resided with the Ground Systems Division of the Office of ELINT (OEL) within DDS&T, on behalf of the OSP/OD&E. (OEL's Ground Systems Division, which was formed in 1962, also maintained the CIA's SIGINT stations in Norway, West Germany and Iran.) The OEL was reorganised into the Office of SIGINT Operations in February 1977. The directors of the OEL/OSO from 1962 to 1993 are listed in Table 3. The OEL directors included George C. Miller (1962-1971), its founding chief, who was also a member of Wheelon's original team; John N. McMahon (1971-73), who had served as Deputy Director of OEL in 1970-71 and Deputy Director of OSP in 1965-70, and who has said that 'I built Pine Gap'; and James V. Hirsch (1975-77), who later became DDS&T.[10]

[9] *Ibid.*, pp. 212, 234, 236, 287, 297.
[10] *Ibid.*, pp.110, 156, 164, 296.

Roy ('Archie') Burks was Director of the Office of SIGINT Operations (OSO) from September 1981 to July 1984. He had joined the CIA in 1956, and had served as Technical Director of the *Corona* project in the 1960s. He also served as the first head of the Special Collection Service (SCS), a joint CIA-NSA organisation set up in 1977 to conduct SIGINT operations from US Embassies.[11] In April 2007, to mark its 50th anniversary, the CIA honoured a select group of 'Trailblazers', which included Burks, who 'created technical programs which gave the nation new capabilities in signals and imagery intelligence'. According to the citation, as Director of the OSO, 'he developed technical intelligence programs which are still producing quality intelligence'.[12]

Table 3
Directors, CIA Office of ELINT (OEL)/Office of SIGINT Operations (OSO), 1962-1993

Dates	Name
30 July 1962–14 June 1971	George C. Miller
14 June 1971–21 May 1973	John N. McMahon
21 May 1973–14 June 1974	James V. Hirsch (Acting)
14 June 1974–22 September 1975	Robert D. Singel
22 September 1975–14 February 1977	James V. Hirsch
14 February 1977–30 May 1978	Edward Ryan
30 May 1978–28 September 1981	D. Barry Kelly
28 September 1981–15 July 1984	A. Roy Burks
15 July 1984–21 March 1989	Milton Corley Wonus
21 March 1989–23 August 1993	Joseph B. Castillo

Source: Jeffrey T. Richelson, *The Wizards of Langley: Inside the CIA's Directorate of Science and Technology*, (Westview Press, Boulder, Colorado, 2001).

Milton Corley Wonus was Director of OSO from July 1984 to March 1989. He had been the CIA Station Chief in Canberra in 1975-80, and had then served as Director of the Office of Technical Service (OTS) in DDS&T from June 1980 to July 1984. He had begun his career as a young USAF Security Service SIGINT analyst at Misawa in Japan in January 1955.[13] After his

[11] *Ibid.*, pp. 209-211.
[12] Central Intelligence Agency (CIA), '"Trailblazers" and Years of CIA Service', at https://www.cia.gov/news-information/press-releases-statements/press-release-archive-1997-1/trailblazers.html.
[13] Jim Sweeney, 'USAFSS Misawa Family Guestbook', at http://www.usafssmisawa.com/guestbook/index.php?page=30; and Ray Stevens, 'Updates [on the 1st Radio Squadron and Misawa]', at http://www.bobnfumi.com/1radioupdate.html.

Misawa tour, he transferred to the NSA. He was recruited into the new Foreign Missile and Space Analysis Center (FMSAC) in DDS&T by Carl Duckett in 1963.[14]

Joseph B. Castillo was Director of OSO from March 1989 to August 1993. He had joined the CIA in February 1971, and was a specialist in 'analysing foreign weapons systems' based on intercepted telemetry and associated electronic emissions. He provided technical support to senior US policy-makers during the Strategic Arms Limitation Talks (SALT) between Washington and Moscow in the 1970s and 1980s.[15]

NRO ascendance and the demise of Program B

The first period of Pine Gap's higher management structure ended in the early 1990s with the abolition of Programs A, B and C, and the transition from an organisational to a functional structure within a much more powerful NRO. As essentially a coordinating body, the NRO HQ had hitherto been located in a relatively small compartmented area in the Pentagon (around 4C-956), but in 1994 it moved to a large new complex at 14825 Lee Road in the Westfields area of Chantilly, in northern Virginia, about five km south of Dulles International Airport or about 20 km west of Washington, D.C.

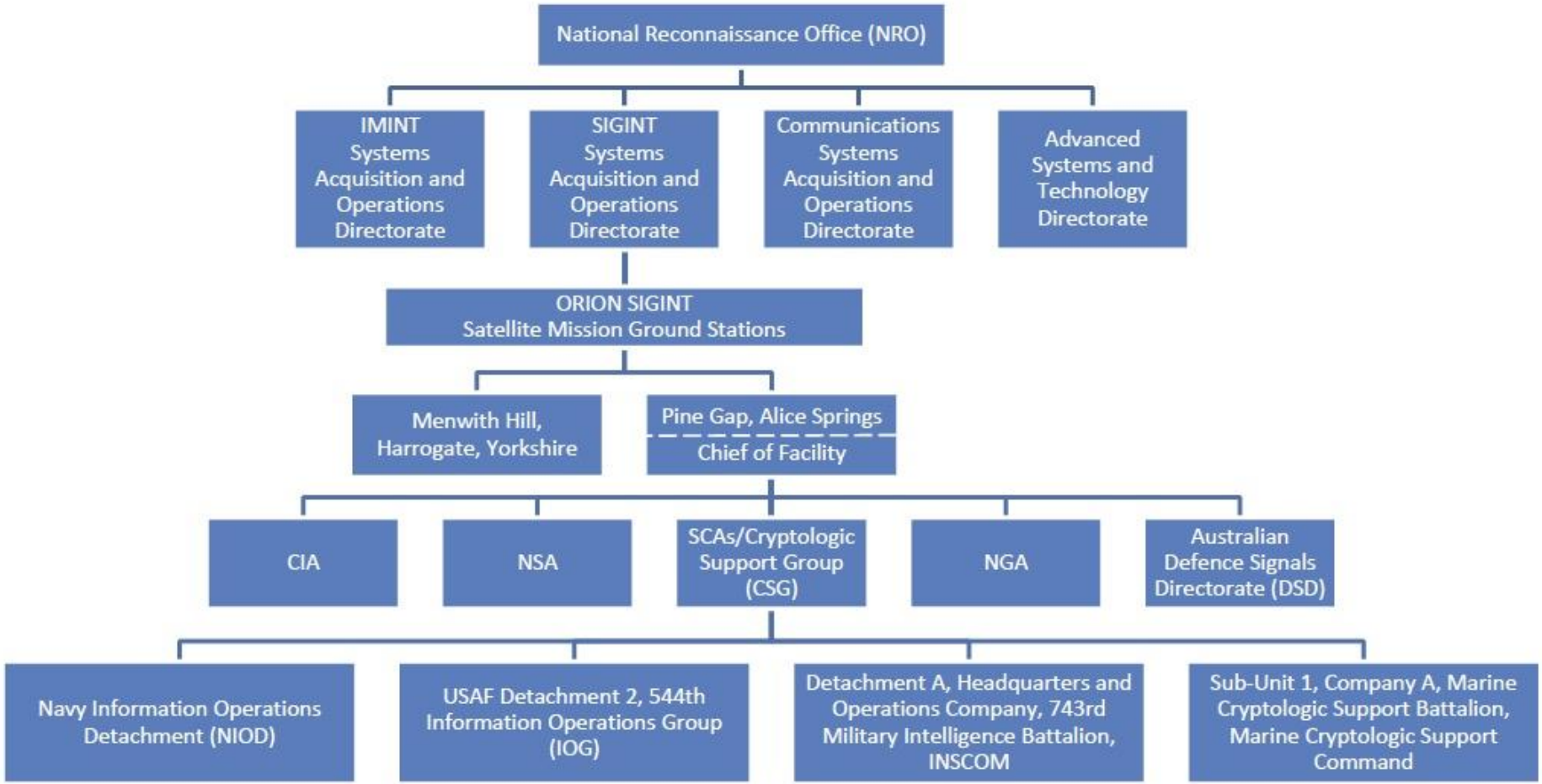
Three factors shaped this transition. First, as Dennis Fitzgerald has described, the end of the Cold War brought the 'Peace Dividend era', in which NRO funding was 'severely constrained', 'everything… has been directed toward cutting costs', programs were cancelled and ground stations were consolidated. Second, since around 1990-91, with Operations *Desert Shield* and *Desert Storm*, and almost continuously since September 2001, both the NRO and CIA have been involved in direct support of US military operations.[16] As Fitzgerald noted in 2002,

> During the Technology Driven era, the Intelligence Community and the primarily civilian National Command Authorities were the major consumers of NRO systems products. The major consumers today are the US military services. Today's reality is that most of the intelligence that the NRO collects on a daily basis is in direct support of combat operations. The performance of NRO systems has been spectacular in terms of preventing the loss of lives, directing the fire of weapons systems with unprecedented

[14] Richelson, *The Wizards of Langley*, pp. 81, 296-297.
[15] Central Intelligence Agency (CIA), '"Trailblazers" and Years of CIA Service', at https://www.cia.gov/news-information/press-releases-statements/press-release-archive-1997-1/trailblazers.html.
[16] Dennis Fitzgerald, 'Commentary on "The Decline of the National Reconnaissance Office": The NRO Leadership Replies', *Studies in Intelligence*, (Vol. 46, No. 4), 2002, pp. 27-30, at http://fas.org/irp/nro/journal/fitz2.pdf.

Figure 2

Pine Gap Management
1992 – 2007



accuracy, and locating enemy positions, all the while providing a synoptic understanding of the battle-space.[17]

Third, the CIA and DDS&T eventually succumbed in the vicious bureaucratic/political struggles over control of its Program B satellites. As Robert Kohler, the former director of OD&E and of Program B, has recounted, a bitter fight was initiated by the Air Force's Program A in 1985 over the follow-on to the CIA's *Magnum* satellites (*Orion*-1 and *Orion*-2). The head of Program A, Major General Ralph H. Jacobsen, proposed 'a far bigger system', whereas Program B favoured more evolutionary developments and was deeply suspicious of Program A's intentions. According to Kohler,

> In the mid 1980s, Program A/B competition came to a head in a serious confrontation over the future of large-aperture SIGINT systems. The budget crunch was just getting underway and D/NRO wanted one last big start. Since every major program decision on his watch had gone in favor of Program B (with his support), he was inclined this time to let Program A win one. He made his position clear to Program B. The new program, however, was not needed—the requirements foundation was weak and Program B thought it would cost considerably more than necessary. Program B concluded that enhancing one of its existing programs would be more cost effective and could be done in an incremental way allowing a flexible response to requirements over time. DCI William Casey bought Program B's arguments and overruled D/NRO's recommendation for a Program A start. This triggered a series of events that resulted in the NRO that exists today.

D/NRO decided that Program A/B competition and Program B's ability to influence the DCI had to stop. Collocation of the NRO's three main programs became one part of a solution.

Meanwhile, DCI Casey had passed away and Robert Gates was Acting DCI. Gates had always had reservations about the NRO—he considered it too expensive (gold-plated, in his view) and thought that Program B had undue influence. Setting out to remedy these 'faults', he established the 'Fuhrman Panel', chaired by Robert Fuhrman, the former CEO of Lockheed, to recommend changes to the NRO structure. The Fuhrman Panel recommended realigning

[17] *Ibid.*

responsibilities to consolidate imagery programs in one directorate and SIGINT programs in another, in effect breaking up Programs A and B and eliminating competition.[18]

To replace Programs A, B and C, the NRO established three functional directorates: the IMINT Systems Acquisition and Operations Directorate, the SIGINT Systems Acquisition and Operations Directorate, and the Communications Systems Acquisition and Operations Directorate. These directorates 'were purely NRO entities (that fully integrated Air Force and CIA personnel, along with personnel from the Navy, NSA, DIA, and other organizations)'. The mission of the CIA's OD&E, which had developed the *Rhyolite*, *Aquacade* and *Magnum* satellites, became to provide personnel to the NRO rather than conduct its own research and development of satellite systems.[19]

Each of the functional directorates was given responsibility 'for selection and supervision of contractor research and development as well as procuring and operating the relevant spacecraft and ground stations'.[20] Hence, the SIGINT Systems Acquisition and Operations Directorate was responsible for the development and operation of all SIGINT satellites, including the US Navy's Low Earth Orbit (LEO) ELINT system, the NRO's Highly Elliptical Orbit (HEO) SIGINT satellites, and the geosynchronous SIGINT satellite programs previously managed by Programs A and B, regardless of whether they primarily collected COMINT, ELINT or foreign instrumentation signals intelligence (FISINT), as well as the associated ground stations. These systems were managed respectively by the Directorate's LEO Systems Project Office (LSPO), HEO Systems Project Office (HSPO), and Geostationary Systems Project Office (GEOSPO).

Command and control of the NRO satellites was consolidated into five Mission Ground Stations (MGSs): Menwith Hill and Pine Gap, the control stations for the geosynchronous SIGINT satellites; Aerospace Data Facility (ADF)-Colorado, at Buckley Air Force Base in Denver, which controls the HEO SIGINT satellites; Aerospace Data Facility (ADF)-Southwest at White Sands in New Mexico, which controls NRO's *Onyx/Lacrosse* radar imaging satellite reconnaissance system; and ADF-East, at Fort Belvoir in Virginia, which controls the electro-optical digital imaging satellite reconnaissance systems.[21]

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[18] Robert Kohler, 'One Officer's Perspective: The Decline of the National Reconnaissance Office', *Studies in Intelligence*, (Vol. 46, No. 2), 2002, pp. 13-20, at http://fas.org/irp/nro/journal/kohler.pdf; and Richelson, *The Wizards of Langley*, pp. 250-254.
[19] Richelson, *The Wizards of Langley*, pp. 253-254.
[20] Richelson, *The US Intelligence Community*, p. 39.
[21] 'National Reconnaissance Office Review and Redaction Guide', p. 56.

Robert Kohler, the former executive director of Program B (1982-85), has been extremely critical of the decisions to abolish the Program A/B/C structure and transfer all acquisition, operation and management authority to the NRO. He argued in 2002 that 'the NRO today is a shadow of its former self', notwithstanding an enormous increase in its personnel; that 'its once outstanding expertise in system engineering has drastically eroded'; that the 'relationship between the NRO and the CIA, which traditionally supplied a major portion of the organization's technical expertise', was 'dissolving'; and that 'the fundamental cause of the decline of the NRO… was the abolition of Programs A, B, and C in 1992 and the consolidation of the Office's components in the new Westfields building' in Chantilly.[22] He argued that the new structure was 'pushing the organization on a downward slide toward mediocrity that the country cannot afford', and that

> Mediocrity in the NRO will result in less innovation and risk taking, more reliance on contractors who are less accountable than government staff, and more cost overruns and schedule delays. Acquisition cycles will be longer. It will become harder and harder to attract the high caliber people needed to keep this a "first in class" organization. Evidence of these problems is already surfacing.[23]

Kohler was especially concerned that, 'among NRO components, the slide toward mediocrity is having the most damaging effect on the CIA's mission and people, and opined that, 'at this juncture, it is likely that the CIA will withdraw from the organization.[24]

In 2005, Kohler stated that 'CIA doesn't care anymore', but that it needed 'to make a conscious decision on its continued participation in the NRO'. He noted that, 'currently, only 25% of the total CIA contingent in the NRO are engineer/scientist/program management personnel', with the rest being 'administrative types', and said that 'the CIA should not be the administrative arm of what is increasingly becoming a DoD organization'.[25]

NRO SIGINT Systems Acquisition and Operations Directorate, 1992-2007

The first Director of the NRO SIGINT Systems Acquisition and Operations Directorate was Brigadier General Donald R. Walker, USAF (4 December 1992 to 16 July 1995), who served simultaneously as the last Director of Program A. In the 1980s he had been program director in

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[22] Kohler, 'One Officer's Perspective: The Decline of the National Reconnaissance Office', pp. 13-20.
[23] *Ibid.*
[24] *Ibid*, pp. 13-20.
[25] Robert Kohler, 'Recapturing What Made the NRO Great: Updated Observations on "The Decline of the NRO"', *National Reconnaissance: Journal of the Discipline and Practice*, 2005, at http://fas.org/irp/nro/journal/kohler2.pdf.

charge of the acquisition and operation of the Defense Satellite Communications System (DSCS), NATO III, Fleet Satellite Communications (FLTSATCOM) and Air Force Satellite Communications (AFSATCOM) satellite programs, and was Director of Operations at Program A in 1985-86. After retiring from the USAF, he worked at the Aerospace Corporation in El Segundo, Los Angeles, from September 2002 to June 2008, supporting the USAF Space and Missiles Systems Center (SMC) and the NRO.[26]

Brigadier General Thomas J. Scanlan, USAF, was Director for SIGINT Systems Acquisition and Operations from July 1995 to August 1996. He also served as Director of the NRO's Space Launch Office (SLO) from April 1993 to August 1996. In these roles, he 'led 1,500 people and industry partners in development, and launched and operated numerous classified national space programs', and was also responsible for the planning and execution of a $3.5B annual budget for acquisition and operational locations around the world, as well as the acquisition, operations and launch decision for all classified DoD boosters'. Before heading the SIGINT Directorate, Scanlan served as Director of the NRO's Communications Acquisition and Operations Directorate, where 'he created a 600-person organization responsible for the development, acquisition and operations of a worldwide communications and computer network'. He became director of operations at US Space Command at Peterson AFB in August 1996.[27]

Brigadier General Robert E. Larned, USAF, served briefly as Director of the SIGINT Acquisition and Operations Directorate, from 15 August to 31 October 1996, before becoming Director of Imagery Systems Acquisition and Operations from November 1996 to November 1998.[28]

Dennis Fitzgerald headed the SIGINT Directorate from 1 November 1996 to 11 June 2001. He had joined the CIA's DDS&T in January 1974, and served concurrently as director of

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[26] Clayton D. Laurie, 'Leaders of the National Reconnaissance Office, 1961-2001: Directors, Deputy Directors, Staff Directors, Program Directors, Chiefs of Staff, Directorate and Office Managers', (Office of the Historian, National Reconnaissance Office, Washington, D.C., 1 May 2002), pp. 250-252, at http://www.nro.gov/foia/docs/foia-leaders.pdf; 'U.S. Air Force Biography: Brigadier General Donald R. Walker', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/105284/brigadier-general-donald-r-walker.aspx; and 'Donald R. Walker', *377Omega*, at http://www.377omega.com/www/donald-r-walker/.

[27] 'U.S. Air Force Biographies: Brigadier General Thomas J. Scanlan Jr.', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/105706/brigadier-general-thomas-j-scanlan-jr.aspx; and 'Horizon Strategies Group, Key Personnel: Thomas J. Scanlan, Jr.', at http://thehorizonstrategiesgroup.com/category/key-personnel/thomas-j-scanlan-jr.

[28] Laurie, 'Leaders of the National Reconnaissance Office, 1961-2001: Directors, Deputy Directors, Staff Directors, Program Directors, Chiefs of Staff, Directorate and Office Managers', pp. 147-149; and 'U.S. Air Force Biographies: Brigadier General Robert E. Larned', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/106445/brigadier-general-robert-e-larned.aspx.

OD&E, to which position he had been appointed in October 1995, while he headed the SIGINT Directorate. He became deputy director of the NRO in August 2001.[29] He noted in 2005 that the SIGINT Directorate had inherited a legacy of stellar but aged satellites supported by powerful constituencies in either the intelligence community (IC) or the DoD which constrained NRO's ability to embark on new enterprises. He said that 'even 22-year-old crippled satellites are almost impossible to turn off', presumably referring to the *Chalet/Vortex*-4 satellite launched in January 1984. This was not only 'a testimony to the power of space-borne collection', said Fitzgerald, but 'also demonstrates the continuous intelligence demand on NRO systems'.[30]

Table 4
Directors of NRO SIGINT Systems Acquisition and Operations Directorate, 1993-2008

Dates	Name
1 January 1993–16 July 1995	Brig. Gen. Donald R. Walker, USAF
17 July 1995–26 August 1996	Brig. Gen. Thomas J. Scanlan, USAF
15 August 1996–31 October 1996	Brig. Gen. Robert E. Larned, USAF
1 November 1996–11 June 2001	Dennis D. Fitzgerald
11 June 2001–April 2005	Brig. Gen. James B. Armor, USAF
July 2005–May 2007	Brig. Gen. Larry D. James, USAF
May 2007–April 2008	Brig. Gen. Katherine E. Roberts, USAF

A major reorganisation of the SIGINT Directorate's three ground stations, at Menwith Hill, Pine Gap and Buckley, was instituted in 1997-2000. It was planned and implemented by Carol Staubach, who was Director of the Ground Systems Program Office in the SIGINT Directorate from October 1997 to May 2000, and involved a Ground Merged Architecture for the ground stations. Staubach had joined the CIA in 1970. She had served as director of the GEOSPO in the SIGINT Directorate from November 1996 to October 1997. She later served

[29] Laurie, 'Leaders of the National Reconnaissance Office, 1961-2001', pp. 94-96; and Richelson, *The Wizards of Langley*, p. 212.
[30] Dennis Fitzgerald, 'Commentary on Kohler's "Recapturing What Made the NRO Great: Updated Observations on "The Decline of the NRO""", *National Reconnaissance: Journal of the Discipline and Practice*, 2005, at http://fas.org/irp/nro/journal/kohler2.pdf.

as Director of the Advanced Science and Technology (AS&T) Directorate from May 2000 to August 2001, and then Director of the IMINT Systems Acquisition and Operations Directorate.[31]

Brigadier General James B. Armor, USAF, was Director of the NRO SIGINT Systems Acquisition and Operations Directorate from 11 June 2001 to April 2005, in which capacity he 'directed [an] office of over 630 personnel with $3 billion annual budget in developing, launching and operating the U.S. Signals Intelligence satellite constellation, [the] US Government's second largest satellite constellation [after the GPS system], and related global ground systems, in support of intelligence and military operations worldwide', and 'planned [the] next generation constellation with users and intelligence partners'.[32] He served as director of the National Security Space Office (NSSO) in the Pentagon from April 2005 to January 2008, before moving to the corporate sector. In August 2006, while director of the NSSO, he publicly expressed his frustration at the poor cooperation between the NRO and the Air Force.[33] He said in September 2008 that the NRO had engaged 'in outright warfare' with the Air Force, that 'the Air Force and NRO fought so fiercely over budget, acquisition, and operational authority that program[s] failed to crystallize', and argued that the US national security space mission was 'faltering' because of poor NRO management.[34]

Brigadier General Larry D. James, USAF, headed the directorate from July 2005 to May 2007. He had previously held several assignments with US Space Command at Peterson and Schriever Air Force Bases in Colorado, and had served as Vice Commander of the Space and Missile Systems Center at Los Angeles AFB in 2004-05. In May 2007, he became Deputy Commander of the 5th Air Force at Yokota Air Base in Japan. From January 2011 to August 2013, he was Deputy Chief of Staff for Intelligence, Surveillance and Reconnaissance (ISR) at HQ USAF in the Pentagon. He was appointed Deputy Director of NASA's Jet Propulsion Laboratory (JPL) at Pasadena, California in August 2013.[35]

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[31] Laurie, 'Leaders of the National Reconnaissance Office, 1961-2001', pp. 227-228; and 'Women in Aerospace: Carol Staubach', at http://www.womeninaerospace.org/leadership/bios/407.html.
[32] 'Jim Armor', *LinkedIn*, at https://www.linkedin.com/pub/jim-armor/6/493/8a; and 'Integral Announces Appointment of Major General James B. Armor, Jr., USAF (Ret.) to Board of Directors', *Integral Systems Press Release*, 20 March 2008, at http://www.prnewswire.com/news-releases/integral-announces-appointment-of-major-general-james-b-armor-jr-usaf-ret-to-board-of-directors-57054802.html.
[33] Jeremy Singer, 'Armor Frustrated Over Direction of NRO, Air Force Cooperation', *Space News*, 29 August 2006, at http://spacenews.com/armor-frustrated-over-direction-nro-air-force-cooperation/.
[34] James B. Armor, Jr., 'The Air Force's Other Blind Spot', *The Space Review*, 15 September 2008, at http://www.thespacereview.com/article/1213/1.
[35] 'U.S. Air Force Biography: Lieutenant General Larry D. James', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/104799/lieutenant-general-larry-d-james.aspx; 'NSA/CSS National Cryptologic Museum Unveils New Poppy Exhibit', *NSA Press Release*, 14 December

Brigadier General Katherine E. Roberts served as the Director of the SIGINT Acquisition and Operations Directorate from May 2007 to April 2008, when it was replaced by the SIGINT Systems Acquisitions Directorate. Before joining the NRO in 2006, she had held appointments at USAF Space Command (AFSPC) and US Strategic Command (STRATCOM) at Peterson AFB, and in 1997-2000 had been Program Manager of the Space Based Infrared System (SBIRS)-Low Component at the Space Based Infrared System Program Office, Space and Missile Systems Center, Los Angeles AFB.[36]

An important figure in the SIGINT Systems Acquisition and Operations Directorate under both James and Roberts was Dominic F. Pohl, who served from October 2006 to May 2008 as Director of the Systems Engineering and Technology Office (SETO) within the Directorate. (He had previously served as the Deputy Director of SETO from June 2005 to October 2006.) Before joining the NRO in June 2005, he had served as a SIGINT officer in the USAF and held senior appointments in both the CIA and the NSA. As Director of SETO, Pohl was the Chief Systems Engineer for the SIGINT Directorate, in which capacity he 'provided the architectural systems engineering and integration to define and verify the implementation of the end-to-end SIGINT program'. He left Chantilly in June 2010 to become Deputy Director of Air, Space, and Cyberspace Operations at HQ Air Force Space Command at Peterson Air Force Base, Colorado, where he also served as the Senior NRO Advisor to the Commander, AFSPC. He moved to the HQ, 25th Air Force at Joint Base San Antonio-Lackland in Texas in June 2012, where he has been involved in 'multisource intelligence, surveillance and reconnaissance products, applications, capabilities and resources; electronic warfare; strategic command and control; and integrating cyber ISR forces and expertise.'[37]

The transformation of the NRO, 2006-08

A major reorganisation of the NRO was implemented in 2007-08. It was initiated by Donald Kerr, who became Director of NRO in July 2005, and who was directly motivated by the terrorist attacks on the US homeland on 11 September 2001. The organisational changes were directed by Scott Large, who succeeded Kerr as Director of the NRO on 19 October 2007,

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2006, at https://www.nsa.gov/public_info/press_room/2006/poppy_exhibit.shtml; and 'Larry D. James, Deputy Director', Jet Propulsion Laboratory, at http://www.jpl.nasa.gov/about/bio_james.php.

[36] 'U.S. Air Force Biography: Brigadier General Katherine E. Roberts', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/104957/brigadier-general-katherine-e-roberts.aspx; and Brigadier General Katherine E. Roberts, 'Reflections on the Integration of Black and White Space', *High Frontier: The Journal for Space & Missile Professionals*, (Vol. 4, No. 4), August 2008, pp. 17-19, at http://www.afspc.af.mil/shared/media/document/AFD-080826-020.pdf.

[37] 'U.S. Air Force Biography: Dominic F. Pohl', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108820/dominic-f-pohl.aspx.

and who had served as Director of the Imagery Systems Acquisition and Operations Directorate from July 2003 to November 2006. He told Congress in March 2008 that the changes amounted to 'perhaps the most fundamental transformation ever undertaken by the NRO'. It involved the complete integration of operational activities, specifically including the operations and products of both IMINT and SIGINT satellites; expanding the roles of the NRO's Mission Ground Stations; and radically improving the responsiveness of the collection and processing activities to the demands of the 'users' or 'customers' within the IC, the DoD, or other government agencies.[38]

The process began in April 2006 with a document entitled 'NRO's Strategic Framework'. It articulated two goals, that the NRO be 'the Foundation for Global Situational Awareness', and that it 'Deliver Information to Users on Timelines Important to Their Needs'; and it stated that, in order to achieve these, the NRO needed 'better integration with our mission partners and customers' and 'to better emphasize the role of our ground systems'.[39] A Steering Commission was formed, co-chaired by Brigadier General Ed Bolton, the NRO deputy director for systems integration and engineering, and Ralph Haller, Director of the Imagery Directorate, to develop new organisational structures for integrating the imagery and SIGINT operations and making the whole system more responsive to users. Some of the new arrangements were implemented in late 2007, with the entire reorganisation scheduled for completion 'no later than September [2008]'.[40]

In organisational terms, the 2006-08 transformation involved severe truncations of the three functional directorates and the creation of three new directorates. The functional directorates lost their responsibilities for operating both the spacecraft and the ground stations, reducing them essentially to system acquisition agencies. This was reflected in their new names, the IMINT Systems Acquisition and Operations Directorate becoming the IMINT Systems Acquisition Directorate and the SIGINT Systems Acquisition and Operations Directorate becoming the SIGINT Systems Acquisition Directorate. The three new directorates were called

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[38] Jeremy Singer, 'Large Shakes Up NRO to Better Integrate Data, Imagery', *Space News*, 16 November 2007, at http://spacenews.com/large-shakes-nro-better-integrate-data-imagery/; Ben Iannotta, 'A Tale of Four Towers: With Reorganization, NRO Aims for Internet-like Access to Data', *Defense News*, 7 April 2008, at http://archive.defensenews.com/article/20080407/C4ISR02/804070322/A-tale-four-towers; and Scott Large, 'Statement for the Record Before the House Armed Services Committee Subcommittee on Strategic Forces Joint Hearing: Fiscal Defense Authorization Act Budget Request and Status for Space Activities', 5 March 2008, at http://www.nro.gov/news/testimony/2008/2008-01.pdf.

[39] Scott Large, 'Statement for the Record Before the House Armed Services Committee Subcommittee on Strategic Forces Joint Hearing: Fiscal Defense Authorization Act Budget Request and Status for Space Activities'.

[40] Singer, 'Large Shakes Up NRO to Better Integrate Data, Imagery'; and Ben Iannotta, 'A Tale of Four Towers: With Reorganization, NRO Aims for Internet-like Access to Data'.

the Mission Operations Directorate (MOD), the Ground Enterprise Directorate (GED), and the Mission Support Directorate (MSD).

The Mission Operations Directorate (MOD) was given responsibility for the operational control of all NRO satellites, including the radar and electro-optical IMINT systems, the LEO, HEO and GEO SIGINT systems, and the NRO's own communications and data-relay satellite systems. The Ground Enterprise Directorate (GED) was responsible not merely for management of NRO's five MGSs but for transforming these into multi-source intelligence centres, at which all of the IMINT and SIGINT is integrated or 'fused' and made accessible to all NRO users world-wide. The Mission Support Directorate (MSD) was established to engage 'with users of NRO systems to understand their operational and intelligence problems and provide solutions in collaboration with NRO's mission partners'.[41]

The importance of revitalising and integrating NRO's ground systems was stressed by NRO Director Scott Large in his statement to a Congressional Subcommittee on 5 March 2008. He stated that

> The NRO builds complete satellite systems, but an often under-appreciated aspect of this is the importance of the ground portion of these systems. Many of our newest capabilities are ground-based. Through ongoing algorithm development and processing improvements, we are providing quick-turnaround solutions to urgent user needs. This makes it clear that our most flexible 'system' is not in space, but on the ground. Therefore, the key is to build a functional flexibility on our satellites which enables us to be operationally responsive on the ground. Responsive ground-based solutions are critical to the continued success of NRO systems against our Nation's most daunting adversaries.
>
> Recognizing the importance of the ground element to the entire NRO system architecture, one significant and foundational step in response to the strategic framework has been the stand-up of the Ground Enterprise Directorate (GED). The GED is responsible for delivering a ground architecture integrated across the organization based on a multi-intelligence, ground system-of-systems that can provide near real-time responsiveness to pressing intelligence problems. By standing up the GED, we are taking the first vital step to ensure effective, flexible, seamless solutions to our customers needs

[41] 'NRO Organization', at http://www.nrojr.gov/teamrecon/res_nro-org.html.

across the IC, and to ensure that we have processes and systems that enable common tasking, timely cross-cueing, and a synergy that allows for immediate response.[42]

A detailed account of the transformation of the NRO, derived from its '2009 National Reconnaissance Strategic Plan', was provided to Congress in May 2009 in the NRO's Congressional Budget Statement for FY 2010. It stated at the outset that the NRO acquired and operated 'the most capable set of satellite intelligence collection platforms ever built', and that it provided a variety of special ground processing applications and tools to support the IC and DoD'. It then stated that

> The 2009 National Reconnaissance Strategic Plan defines a new value model for the NRO: the NRO is now focused as much on what it does with the data it collects as it is on collecting it; and programs must make good business sense as well as good technical sense. In addition to continuing to design and build state-of-the-art satellites that provide unparalleled information advantage for the Nation and our users, the emphasis is on accelerating the delivery of innovative ground capabilities that amplify overhead capabilities and that are more responsive to dynamic and rapidly changing user needs. The NRO is working to implement fully integrated space and ground architectures characterized by synergistic, cross-domain mission management, multi-INT data fusion at the source, common processing, and closer linkages with other IC and DoD technical architectures and functions. The NRO is also leveraging its extensive ability to move data, both on the ground and in space, to enable its mission partners to more effectively execute their missions.
>
> The NRO Transformation is arguably the most ambitious organizational, business process, and management realignment in the history of the NRO. The INT-based organizational and management approach that had been the foundation of the NRO's structure for the past 40 years has been replaced with a functionally-based structure that, for the first time, enables us to manage ourselves and our systems as single integrated entity.[43]

It reported that the 'new Ground Enterprise Directorate focused on synergistic ground development, the development of integrated tasking capabilities, and the production of fused

[42] Scott Large, 'Statement for the Record Before the House Armed Services Committee Subcommittee on Strategic Forces Joint Hearing: Fiscal Defense Authorization Act Budget Request and Status for Space Activities'.
[43] 'National Intelligence Program, FY 2010 Congressional Budget Justification. Volume IV: National Reconnaissance Program', May 2009, at https://fas.org/irp/nro/fy2010cbjb.pdf.

products'. It also described a 'GEOINT and SIGINT Station Integration and Support project', which evidently involved the integration of geospatial intelligence and SIGINT at each of the NRO satellite ground stations, and a 'Unified Ground Architecture (UGA) Ground Development project', which 'develops and maintains capabilities that enable planning, scheduling, and resource control of GEOINT and SIGINT collection, processing, and information sharing systems'. It noted that 'these systems provide a key interface with the mission partners (NGA [National Geospatial-Intelligence Agency] and NSA) to receive their overhead col1ection requirements, build joint collection strategies, and assess mission performance'.[44]

It noted that in 2008 the GED had formed a collaborative partnership with the NSA and NGA in order to 'transform the NRO ground architecture', the 'vision' for which was as follows:

> A fully integrated ground architecture where information is virtual, assured, available on demand, and globally accessible to authorized users empowered with the tools and services necessary to generate tailored, timely, trusted, and actionable intelligence products.[45]

A central feature of the new ground architecture, involving the integration of all NRO ground-related GEOINT and SIGINT activities, was a realignment of all current equipment and future Major Systems Acquisitions (MSAs) at both the GED and the ground stations into four 'functional lines of business': Command and Control; Mission Management; Mission Processing; and Mission Frameworks, concerned with data services and distribution.[46]

The statement also described an NRO Mission Support (NMS) project, which 'directly supports the Director, NRO and the NRO Senior Leadership in making decisions on the acquisition of satellite and ground system capabilities in response to IC and DoD information needs'. Its responsibilities included 'leveraging NRO-wide enterprise solutions to operational and intelligence challenges'. In addition, 'the NMS project directly supports war-fighters and operators in harm's way with capabilities and tools that enable real-time access to overhead collected data, tailored data processing, and information fusion tools to enable mission planning and execution'. It noted that 'these capabilities are being used to prosecute high-value targets'.[47]

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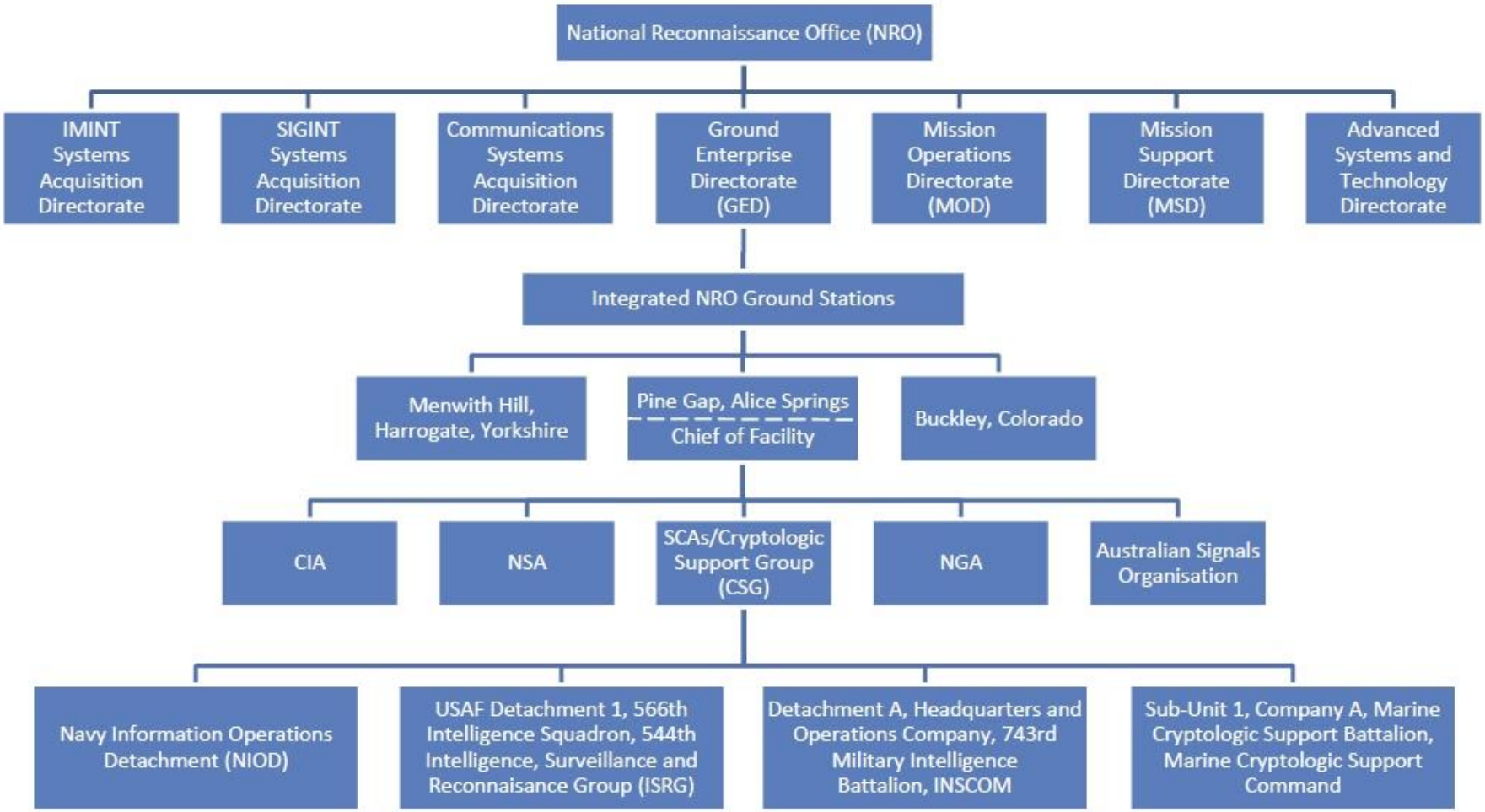
[44] *Ibid.*
[45] *Ibid.*
[46] *Ibid.*
[47] *Ibid.*

Figure 3

Pine Gap Management

2007 - present



NRO SIGINT Systems Acquisition Directorate, 2008-present

The first director of the SIGINT Systems Acquisition Directorate was Brigadier General Katherine E. Roberts, who headed it from April to October 2008, and who had previously headed the SIGINT Systems Acquisition and Operations Directorate. She said in August 2008 that she was 'responsible for the development, acquisition, and deployment of multi-billion dollar space and C3I systems needed to satisfy military, intelligence community, and civil needs', and that 'her multi-service and multi-agency organization's advanced SIGINT systems are used as force multipliers by national and DoD policymakers, providing direct satellite reconnaissance and intelligence products to unified combatant commanders and deployed war-fighters'.[48]

Table 5
Directors of NRO SIGINT Systems Acquisition Directorate, 2008-present

Dates	Name
April 2008–October 2008	Brig. Gen. Katherine E. Roberts, USAF
November 2008–October 2013	Dr. Troy E. Meink
December 2013–present	Kristina Harrington

Roberts was succeeded by Dr Troy E. Meink, USAF, who was director from November 2008 to December 2013, and was responsible 'for the design, development and acquisition of US signals intelligence space systems for the intelligence community, military services and allied partners'. Meink had previously served as Program Director for the Transformational Satellite Communications System from June 2003 to January 2006, and was Director of the Communications Directorate in the Office of the Assistant Secretary of Defense (Networks and Information Integration) from January 2006 to November 2008. He was appointed Deputy Undersecretary of the US Air Force for Space in December 2013.[49]

[48] 'U.S. Air Force Biography: Brigadier General Katherine E. Roberts'; and Brigadier General Katherine E. Roberts, 'Reflections on the Integration of Black and White Space', *High Frontier: The Journal for Space & Missile Professionals*, pp. 17-19.
[49] 'United States Air Force Biography: Dr. Troy E. Meink', at http://afstagingpreview.dma.mil/information/bios/bio_print.asp?bioID=12019&page=1; and 'Meink Succeeds McKinney at Senior Air Force Space Post', *Space News*, 9 December 2013, at http://spacenews.com/38555meink-succeeds-mckinney-at-senior-air-force-space-post/.

Bill B. Nead was the Chief Scientist for the SIGINT Directorate from March 2006 to November 2010. He 'provided scientific and engineering support' for the Directorate, which 'provides full life-cycle acquisition and operations support for all overhead SIGINT systems'.[50]

Kristina Harrington was appointed Director of the SIGINT Systems Acquisition Directorate in December 2013. As such, she said in April 2015 that she 'leads a joint team responsible for the design, development, and acquisition of United States Signals Intelligence Space Systems for the Intelligence Community, military services, and allied partners'. She had previously served, from 2010 to 2013, as Director of the NRO's System Engineering Directorate (SED) and as the SIGINT Directorate's Chief Scientist, 'where her responsibilities included leading Intelligence Community and Department of Defense studies on satellite based signals intelligence architectures for 2020 and beyond'. She had joined the CIA's DDS&T in 2006, serving in the Low Earth Orbit (LEO) System Program Office (LSPO) in the NRO SIGINT Directorate. In 2009-10, she served as Deputy Director of the LSPO, 'where her responsibilities were program management of the acquisition and development of a state-of-the-art satellite collection system'.[51] She said in May 2014 that, while NRO 'builds the best satellites in the world and hires the best satellite builders', it does not have the best networks or cyber experts, and that the NRO was 2-3 years behind current cyber warfare technologies.[52]

Although Harrington's core responsibility is management of the design and acquisition of the NRO's various SIGINT satellite systems, she has on several occasions expressed strong concerns about the vulnerability of the associated ground systems. She said in May 2014 that while 'both satellites and the ground need to be secure from cyber intrusion or supply chain infection', the 'more pressing vulnerability' was on the ground. She said that the ground networks had become 'increasingly complex and had become a growing target of cyber attacks'.[53] She said in April 2015 that changes in the ground infrastructures of NRO's satellite programs were 'vital', and argued that 'Ground is where a lot of the magic occurs, and it is the place where we invest in last. But it's one of the things that we can make the greatest leaps with'.[54]

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[50] 'United States Air Force Biography: Bill B. Nead', at http://afstagingpreview.dma.mil/information/bios/bio_print.asp?bioID=9353&page=1.
[51] 'Kristina Harrington', 31st Space Symposium, Colorado Springs, 13-16 April 2015, at http://www.spacesymposium.org/speakers/kristina-harrington.
[52] Colin Clark, 'Adversaries Outpace US in Cyber War; Acquisition Still Too Slow', *Breaking Defense*, 19 May 2014, at http://breakingdefense.com/2014/05/adversaries-outpace-us-in-cyber-war-acquisition-still-too-slow/.
[53] *Ibid*.; and Andrea Shalal, 'Military Acquisition Rules Hamper U.S. Ability to Counter Cyber Threats', *Reuters*, 19 May 2014, at http://www.reuters.com/article/2014/05/20/us-cybercrime-usa-military-idUSBREA4J03L20140520.
[54] Harrison Donnelly, 'Peering Into the Satellite Future', *Geospatial Intelligence Forum*, 7 April 2015, at http://www.kmimediagroup.com/gif/articles/424-articles-gif/peering-into-the-satellite-future.

NRO Mission Operations Directorate (MOD), 2007-present

The Mission Operations Directorate (MOD) was established on 14 November 2007 to control all NRO satellite operations, specifically including the imaging and SIGINT satellites previously operated by the Imaging and SIGINT Acquisitions and Operations Directorates. Its first director was Dave Shields, who had 'previously served as an imagery ground station manager'.[55] According to the NRO,

> MOD operates, maintains and reports the status of NRO satellites and their associated ground systems. MOD also manages the 24-hour NRO Operations Center (NROC) which, working with US Strategic Command, provides defensive space control and space protection, monitors satellite flight safety, and provides space situational awareness.[56]

The NRO Operations Center (NROC) cooperates closely with the US Strategic Command's (STRATCOM's) Joint Space Operations Center (JSPOC), under 14th Air Force at Vandenberg Air Force Base in California.[57] As Scott Large told a Congressional Subcommittee in March 2008,

> The National Reconnaissance Operations Center now also serves as a back-up facility for elements of USSTRATCOM's Joint Space Operations Center. This allows us to share the wealth of space situational awareness information we collect across multiple domains and provide a back-up capability with little additional cost.[58]

The director of NROC from September 2012 to December 2014 was Colonel David J. Maloney, a US Air Force officer. He had previously been Deputy Director of the MOD (2011-12) and deputy commander of the Launch Group at Vandenberg AFB (2008-11).[59]

Brigadier General Cary C. Chun was director of the MOD from September 2009 to August 2012. His official US Air Force biographical note at the time stated that 'as Director for Mission Operations, he leads operations for all NRO overhead reconnaissance systems, ground stations, operational communications, and the operations center used to conduct intelligence activities essential for the national security of the U.S. and its allies', and that 'he helps lead all Department of Defense space forces aligned with USSTRATCOM and provides tailored,

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[55] Singer, 'Large Shakes Up NRO to Better Integrate Data, Imagery'.
[56] 'NRO Organization' [as of September 2010], at http://www.nrojr.gov/teamrecon/res_nro-org.html.
[57] Armor, 'The Air Force's Other Blind Spot'.
[58] Large, 'Statement for the Record Before the House Armed Services Committee Subcommittee on Strategic Forces Joint Hearing'.
[59] David J. Maloney, *LinkedIn*, at https://www.linkedin.com/in/davidjohnmaloney.

responsive, local and global effects in support of national, USSTRATCOM and combatant commander objectives'. He had previously held senior command appointments at Peterson, Schriever and Vandenberg AFBs, and had been Commander of the Space Operations Wing at the NRO's Aerospace Data Facility-Colorado at Buckley AFB from July 2005 to August 2007.[60]

Joseph Huntington was director of the MOD from July 2012 to early 2015. He says that he led 'a global 9,000-member joint military, civilian, and contractor team operating, maintaining, and defending over $60B in space, ground, and cyber intelligence programs', and that he delivered 'innovative, indispensable multi-source intelligence and worldwide communication services to Intelligence Community, DoD, and US and allied leaders'.[61] Dr Ray Cook was Director of the MOD in April 2015.[62]

NRO Ground Enterprise Directorate (GED), 2008-present

Dr. Pete Rustan became the first Director of the Ground Enterprise Directorate (D/GED) on 16 January 2008, after serving as the NRO's Director of Advanced Systems and Technology (AS&T) since 2003. He became Director of the Mission Support Directorate on 8 September 2009, from which position he retired from the NRO in October 2011.[63] In August 2008, he argued that in addition to being 'the premier acquirer and operator of the nation's space reconnaissance capabilities', the NRO 'must also transform itself into a world class provider of information products and services'. He said that

> To start this transformation, the NRO must work with the National Geospatial Agency (NGA) and the National Security Agency (NSA) to build an integrated and scalable ground architecture capable of fusing overhead geospatial intelligence and signals intelligence with air and ground based collectors, as well as integrating other sources of information.[64]

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[60] 'U.S. Air Force Biographies: Brigadier General Cary C. Chun', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108464/brigadier-general-cary-c-chun.aspx.
[61] Joseph Huntington, *LinkedIn*, at https://www.linkedin.com/pub/joseph-huntington/90/b8a/367.
[62] 'Program: AFCEA NRO Industry Day 2015, Wednesday, 22 April 2015', at http://www.afcea.org/events/nro/15/program.asp.
[63] 'Dr. Peter Rustan, Director, Ground Enterprise Directorate', at http://geoint2009.com/system/uploads/494/original/Dr_Rustan.pdf?1250021149; Pete Rustan, 'Building an Integrated Intelligence Network: Challenges and Opportunities', *High Frontier: The Journal for Space & Missile Professionals*, (Vol. 4, No. 4), August 2008, pp. 10-14, at http://www.afspc.af.mil/shared/media/document/AFD-080826-020.pdf; 'Dr. Pete Rustan, Deputy Director for Mission Support', at http://geoint2009.com/system/uploads/600/original/Rustan_Bio_2_Oct_2009.pdf?1254962874; and Warren Ferster, 'Former NRO Manager Pete Rustan Dies', *Space News*, 29 June 2012, at http://spacenews.com/former-nro-manager-pete-rustan-dies/.
[64] Rustan, 'Building an Integrated Intelligence Network', pp. 10-14.

Rustan was a strong proponent of integrated data centres, involving 'master data repositories across agencies'. As he also argued in August 2008,

> Data centers provide extraordinary opportunity for integration of mission data and applications, effective tipping and cueing, multi-INT data fusion, and hardware and software cost savings by capitalizing on mission commonality. Data centers can also provide a common repository for mission data archiving. By merging our data into master data repositories across agencies, we can ensure the pedigree of our data and provide our customers with a flexible platform capable of meeting their needs.[65]

He also argued that

> We can leverage economies of scale by developing integrated mission management, mission processing, and command and control. We should no longer build a specific ground system for each spacecraft, but build a basic, common architecture for new systems to 'plug into' with minimum customization. Depending on the model being used, one can demonstrate that between 50 percent and 80 percent of the mission management, mission processing, and command and control are the same regardless of the specific spacecraft mission. Consolidating these functions using data centers and operating the spacecraft using SOA should provide economies of scale.[66]

Table 6
Directors of NRO Ground Enterprise Directorate (GED), 2008-present

Dates	Name
16 January 2008–8 September 2009	Dr. Pete Rustan
2010–2012	Jan L. Janssen
January 2013–present	Michael M. Hale

Jan L. Janssen was D/GED in 2010-2012.[67] In March 2011, she was publicly credited with having 'defined a new architecture for the NRO ground system, charted an implementation plan, and built the cross-agency, cross-government team needed to execute it'. When she began as D/GED, she inherited 'a dozen go-forward ground systems at the NRO'. These 'did the job,

[65] *Ibid.*
[66] *Ibid.*
[67] The Aerospace Corporation, 'Ground Systems Architecture Workshop', 1-4 March 2010, at http://sunset.usc.edu/GSAW/gsaw2010/agenda10.html

but having evolved independently of each other, they blocked any broad enterprise-wide investment in infrastructure and operations'; they 'were effective, but inefficient'. Janssen transformed this architecture into 'an NRO ground enterprise that uses just four commercially-based systems that will allow for more easily shared data and a far higher operating efficiency'.[68]

Michael M. Hale has been Director of the GED since January 2013. A former USAF officer, he had joined the NRO at Chantilly in 2002. He served as Deputy Director of the Signals Intelligence Systems Acquisitions Directorate from August 2008 to March 2012, and as Program Director of the NRO's Activity-Based Intelligence System Program Office from April to December 2012. According to his biographical note, 'As GED Director, he leads a multi-faceted and multi-agency team of acquisition and intelligence professionals to plan, synchronize, strategize, and collaborate to deliver multiple major system acquisitions connecting space systems to space operators, mission partners, and end-users necessary to fulfil the requirements of the Intelligence Community, the Department of Defense, and allied partners'.[69]

Apart from the successive Directors, an important figure in the management of relations between the GED and its civilian and military customers has been Edward J. Lane, who joined the NRO as the Program Manager for Tactical Applications and the Program Manager of the Distributed Common Ground System Intelligence Community (DCGS-IC) program in 2004, and worked in the NRO's SPAWAR Space Field Activity in 2009-13. In August 2013, he was Director of the Enterprise Management Group (EMG) within the Mission Framework System Program Office (MF SPO) in the GED; later in 2013, he became Director of the Application Service Provider (ASP, or NASP) Group within the MF SPO. In these capacities, he also managed the DCGS-IC program and the SIGINT Data Distribution System (SDDS). In March 2014, he also held the positions of Applications and Common Services Sub-Portfolio Manager and S2P2 [Software Services Platform Provider] Program Director within the GED.[70]

Lane said in April 2014 that 'We ultimately want to have the applications separate from the data so that we don't have to deliver end-to-end stove-piped systems. We are really walking away from the old way of having systems and then integrated systems. We are really moving into

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[68] Brian Robinson, '2011 Federal 100 Awards Program: Jan L. Janssen', 28 March 2011, at http://fcw.com/articles/2011/03/28/federal-100-janssen-jan.aspx.
[69] 'U.S. Air Force Biographies: Michael M. "Mike" Hale', at http://www.af.mil/AboutUs/Biographies/Display/tabid/225/Article/108864/michael-m-mike-hale.aspx.
[70] 'Ed Lane, Director, National Reconnaissance Office's (NRO) Enterprise Management Group (EMG), U.S. Department of Defense', *Maritime Security 2013 West*, 19-21 August 2013, at http://maritimesecurity2013.com/west/index.php/presenters/86-lane; and 'Agenda: 3rd Annual NRO IT Winter Way Forward Conference & Technology Expo', 4 March 2014, at http://www.ncsi.com/nrowwf/2014/agenda.php.

Web-based services and composite services'. He noted, more specifically, that whereas the Intelligence Community IT Enterprise (ICITE) was functioning satisfactorily, the Defense Department was only 'making incremental progress on collapsing its own IT stovepipes into a set of standards it calls the Joint Information Environment (JIE)', hence making it difficult to merge the ICITE and JIE into a composite service. A Defense Intelligence Information Enterprise (DI2E) was established in the Pentagon to expedite progress, and in May, Lane produced a briefing paper entitled 'DI2E Clearinghouse Process' to assist the process.[71]

In March 2013, Betty J. Sapp, who had become Director of the NRO in July 2012, discussed the importance of the NRO's ground systems and the progress made by the GED with respect to constructing 'a single networked information collection and distribution system'. She said that

> Ground functions are absolutely critical to planning and executing ISR missions, and in processing the data collected from our national satellites. One of the major challenges NRO faces is the current stove-piped nature of our systems—specific ground systems supporting specific space systems and specific functions. While these stove-piped systems were necessary in the past to address mission needs and provide critical information, they are not right for us today and into the future.

The NRO GED team has already made considerable headway in moving us toward a more holistic, 'horizontal' ground enterprise—a single networked information collection and distribution system more responsive to user needs, more resilient in the face of projected threats, and much more efficient and effective in providing mission capabilities. The future NRO ground enterprise will enable the delivery of information to our mission partners and users when they need it and where they need it.[72]

Robert Kohler, the former Director of NRO Program B and Director of the CIA's OD&E, and voluble critic of the NRO, has been strongly opposed to the GED. He argued in December 2013 that it should be 'abolished' and that the NRO and CIA should 'go back to the days when the program manager had real end-to-end responsibility'. He said that 'the legitimate

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[71] Jared Serbu, 'Pentagon Looks to Build a Bridge Between Military, Intelligence IT Consolidation Efforts', *Federal News Radio*, 18 April 2014, at http://federalnewsradio.com/defense/2014/04/pentagon-looks-to-build-a-bridge-between-military-intelligence-it-consolidation-efforts/; and Ed Lane, 'DI2E Clearinghouse Process', 22 May 2014, at http://www.afei.org/PE/4A07/Documents/Thursday_DI2EPlugfest2014-EdLane-v1.pdf.

[72] 'Q&A: Betty J. Sapp', *Geospatial Intelligence Forum*, (Vol. 11, No. 3), 28 March 2013, at http://www.kmimediagroup.com/geospatial-intelligence-forum/magazines/1485-gif-2013-volume-11-issue-3-april-alt/6917-qaa-betty-j-sapp.

desire of the NRO to have its ground stations better integrated can be done cheaper and better with decent system engineering at the NRO level'.[73]

Mission Support Directorate (MSD)/Mission Integration Directorate (MID)

The Mission Support Directorate (MSD), the NRO's 'outreach' organisation, was renamed the Mission Integration Directorate (MID) in 2013. In April 2015, the director of the MID, Randy Barber, said that

> The Mission Integration Directorate (MID) plays a crucial role in maintaining close ties with the NRO's user community and mission partners. Understanding the utility of the NRO's "mission output" is critical to ensuring that the NRO's current operations and future capabilities are responsive to user mission needs. MID maintains important relationships with IC and DoD partners in an effort to provide unique operational support services while collecting feedback on NRO performance.[74]

The MID also sponsors the launch of special payloads for particular users elsewhere in the IC and DoD. It also undertakes 'rapid prototyping projects to meet high priority user requirements'.[75]

Brigadier General Jeffrey C. Horne, US Army, was head of the MSD from April 2007 to July 2009.[76] He noted in June 2009 that 'our user base is exploding'. He said that 'the space-based missions and the NRO systems that are now being used in everything from tactical to national strategic means—by user sets we never envisioned before—are a growth industry'. He also noted that, 'after more than seven continuous years of war [in Afghanistan], we can see that we're delivering capability that we never envisioned when a particular satellite or ground system was originally developed'. Most importantly, he noted that the NRO now recognised that 'movement of the data itself' was just as important as 'the building, launching and operation of satellites'. He said,

> That is a fundamental change to our emphasis. The stovepipes and divisions between users, DoD, the intelligence community, allies and even industry are beginning to fade, and this is very important to our future. Our partners at NSA and NGA do the analysis

[73] Robert J. Kohler, 'Commentary. The Essential Revolution of the NRO: A Second Opinion', *Space News*, 16 December 2013, at http://spacenews.com/38719the-essential-revolution-of-the-nro-a-second-opinion/.
[74] 'Program: AFCEA NRO Industry Day 2015, Wednesday, 22 April 2015'.
[75] Martin Generous, *LinkedIn*, at https://www.linkedin.com/pub/martin-generous/67/420/299.
[76] 'Department of the Army Bio: Brigadier General Jeffrey C. Horne', at http://www.armyg1.army.mil/hr/docs/Bio%20Horne.pdf.

> work and produce the products from the collection that takes place on the NRO side, and then, in turn, we distribute the information to the intermediate and end users. We have a new ground enterprise directorate, which is focused entirely on the business of moving the data and connecting the data to the users.[77]

Dr Pete Rustan, who had headed the GED in 2008-09, served as director of the MSD from September 2009 to October 2011.[78] In April 2011, he described the MSD's mission and its relationship with the NRO's principal partners, the NSA and the NGA, which process and analyse the SIGINT and IMINT it collects. He said that

> The Mission Support Directorate's mission is to engage our users proactively, understand their urgent intelligence needs, and provide rapid, innovative solutions.
>
> NRO systems collect about 75 gigabits of data per second, around the clock. MSD ensures our diverse users receive that information in near real-time so they are further equipped to make high-fidelity decisions.
>
> We have to be able to put the geospatial and signal-collected data fragments together, and evolve from data to product—and from product to information. Our users can then use our information and fuse it with all their other sources of information almost instantaneously to make timely intelligence decisions.
>
> We are not sought to analyze the data we collect. That responsibility rests in the hands of the National Geospatial-Intelligence Agency and the National Security Agency functional managers. All the geospatial images NRO collects are transmitted wholesale to NGA, as is our signals collection to the NSA.
>
> At the same time, we are taking this wealth of unfiltered information and making it available to our user community around the world without exploitation, in near real-time. This information does not have any annotation, nor does it compare anything to previous events. If time is a constraint, then the user has the information to make more timely decisions until higher-fidelity analysis becomes available.
>
> We also provide geolocations of signals of interest to NSA and help them to correlate those geolocations with available metadata.

[77] Harrison Donnelly, "Q&A: Brigadier General Jeffrey C. Horne', *Geospatial Intelligence Forum*, 3 June 2009, at http://www.kmimediagroup.com/geospatial-intelligence-forum/articles/151-geospatial-intelligence-forum/gif-2009-volume-7-issue-3/1329-qaa-brigadier-general-jeffrey-c-horne-sp-694.
[78] 'Dr. Pete Rustan, Deputy Director for Mission Support'.

> We at the NRO are an extension of the NGA and NSA workforce. MSD ensures a user can overlay what we see and what we hear within a few seconds from the various events. We have communication networks to make sure this near real-time information is discoverable and accessible for the users.[79]

Robert Zitz was Deputy Director of the MSD from April 2009 to August 2011. He said in March 2011 that he 'led several hundred technical personnel deployed worldwide', who worked directly with customers and mission partners. He noted that the NRO was 'improving [its] operational relevance by integrating previously stove-piped systems'. He also noted that, in his capacity as Deputy Director of the MSD, he was 'responsible for being the bridge between NRO and NGA'.[80]

Arthur A. Zuehlke was Deputy Director of the MSD in December 2012, and Deputy Director of the MID in December 2014.[81] He had previously served as Director of the Measurement and Scientific Intelligence (MASINT) and Technical Collection Directorate in the Defense Intelligence Agency (DIA) from 2003 to 2012.[82] Colonel Brendan Harris, USAF, was Deputy Director of the MID in 2014-15.[83]

The director and deputy director of the MID are supported by a Chief of Staff, who also serves as the Contract Officer's Technical Representative (COTR). The Chief of Staff from September 2010 to April 2013 was Martin Generous, a former Air Force officer, who says that he 'led the establishment of a new office, chartered with the integration of intelligence data from multiple sources and intelligence disciplines', and that he was responsible for 'expansion of a collaborative intelligence collection environment to encompass new mission areas such as Geospatial Intelligence'.[84]

The MID contains an Operational Integration Office (OIO), which also has a Chief of Staff. Lieutenant Colonel Terry A. Windmiller, US Army, occupied the post from July 2013 to

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[79] 'Dr. Pete Rustan: Information Provider', *Geospatial Intelligence Forum*, (Vol. 9, No. 3), April 2011, pp. 17-21, at http://www.kmimediagroup.com/files/GIF%209-3_final.pdf.
[80] 'GEOINTeraction Tuesday', *United States Geospatial Intelligence Foundation (USGIF)*, at http://usgif.org/events/geointeraction.
[81] Advanced Technical Intelligence Association (ATIA), *Techint 2012*, 11-13 December 2012, at https://www.regonline.com/builder/site/tab1.aspx?EventID=1166278; and 'Law Enforcement Homeland Security Forum & Technology Exposition', (J.D. Hill Conference Center, National Reconnaissance Office, Chantilly, Virginia, 10-11 December 2014), at http://www.ncsi.com/lehs/2014/agenda.php.
[82] 'Mr. Arthur A. Zuehlke', *Zoominfo*, at http://www.zoominfo.com/p/Arthur-Zuehlke/484462736.
[83] Brendan Harris, *LinkedIn*, at https://www.linkedin.com/pub/brendan-harris/8a/4b0/396; and 'Automated ISR', Washington, D.C., 12-13 March 2015, at http://www.nextgenerationisr.com/wp-content/uploads/2014/12/AISR-C_sp15.pdf.
[84] Martin Generous, *LinkedIn*, at https://www.linkedin.com/pub/martin-generous/67/420/299.

January 2015. He described the OIO as 'a 220 person joint and inter-agency organization consisting of 26 Field Grade Officers, 16 Company Grade Officers and NCOs, 16 Government Civilians, and contract/industry partners with a global mission of developing and rapidly integrating Intelligence, Surveillance, and Reconnaissance (ISR) and other space-based support solutions in direct support of combatant commands and Services'. Windmiller had previously served as Program Manager for the Rapid Capabilities Office in the MSD.[85] The director of the OIO is supported by a technical advisor expert in 'GEOINT subject matter'.[86]

The MID also maintains a close working relationship with the US Strategic Command (USSTRATCOM). It was agreed during the planning for the reorganisation of the NRO in 2006-07 that the Director of the MSD would also serve as the deputy commander of STRATCOM's Joint Functional Component Command for Space (JFCC-SPACE), headquartered at Vandenberg AFB.[87]

The MID is also responsible for management of the Tactical Defense Support Reconnaissance (TacDSR) program, which is mandated 'to expeditiously develop, mature and integrate technologies that facilitate the dissemination of national systems data (NSD) to the warfighter in the field'. Lieutenant Colonel Jeff Jordan, the TacDSR program manager, stated in March 2013 that

> TacDSR accomplishes its mission through short-term, high-impact advanced R&D efforts that integrate mission-critical NSD into military platforms, combat systems, weapons and architectures, thus providing crucial NRO capabilities to operational warfighters. Since its inception, the TacDSR program has successfully transitioned more than 70 percent of all TacDSR programs to DoD users.
>
> TacDSR directly answers emerging war fighting intelligence requirements of the combatant commands (CCMDs), services and other tactical users.[88]

The TacDSR 'consists of two major R&D programs': Military Exploitation of Reconnaissance and Intelligence Technology (MERIT), which 'examines and assesses critical

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[85] 'Terry Windmiller', *ICWatch*, at https://icwatch.wikileaks.org/nsadocs/terry-windmiller451b569921stTheaterSustainmentCommandDeputyG22005-07-01.
[86] Terance T. Parker, *LinkedIn*, at https://www.linkedin.com/pub/terance-t-parker/11/38a/442.
[87] Brigadier General Jeffrey C. Horne, 'Transforming National Space Security: Enabling DoD and Intelligence Community Defensive Space Control Collaboration', *High Frontier: The Journal for Space & Missile Professionals*, (Vol. 4, No. 4), August 2008, pp. 15-16, at http://www.afspc.af.mil/shared/media/document/AFD-080826-020.pdf.
[88] 'Focus on Innovation: National Reconnaissance Office Programs Explore Cutting-edge Technological Innovations', *Geospatial Intelligence Forum*, 28 March 2013, at http://www.kmimediagroup.com/geospatial-intelligence-forum/articles/1485-geospatial-intelligence-forum/gif-2013-volume-11-issue-3-april-alt/6920-focus-on-innovation.

technology developments with the goal of increasing the utility and accessibility of national technical means (NTM) data for joint war fighting commanders'; and the Combat Systems Integration (CSI) program, which 'accelerates the integration of NTM-related applied development into combat systems, platforms or architectures that address the needs of the CCMDs and military services'. The 'CSI solutions may consist of software algorithms, hardware, exploitation tools, or system engineering solutions that support warfighter requirements'.[89]

Mission Support User Engagement Group

The MID has a User Engagement Group (UEG), more recently called the User Engagement Office (UEO), which includes representatives from the IC and Service users, and which is responsible for both developing technical capabilities required by the users and, together with the GED, ensuring that all data collected at the NRO's ground stations is disseminated to users in near real-time. The Director of the UEO in December 2013 and December 2014 was Iris R. Sartor.[90]

The deputy director of the UEO since April 2014 has been Colonel John M. Haynicz, US Army, who also serves as the Director of Deployed Operations. He had previously served (July 2012-April 2014) as the director of the OIO in the MID, and had commanded the 441st Military Intelligence Battalion at Camp Zama, Japan, in 2006-08.[91]

The Service intelligence agencies maintain substantial elements in the UEO. For example, the Naval Intelligence Command advertised in February-March 2015 for a Supervisory Management Specialist in the UEO. The advertisement said that the specialist was 'charged with directing a mixed 50-person strong workforce of active duty military, civilian, and contractor staff in the execution of NRO User Engagement Strategy'.[92]

The US Army Service Team in the UEO 'reaches out to Army units and ensures the US Army tactical and Strategic needs are being injected into future development of NRO systems'. The team includes a GEOINT technical representative, who serves as 'the technical lead for all

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[89] *Ibid.*
[90] '2013 Law Enforcement Homeland Security Forum and Technology Exposition', (J.D. Hill Conference Center, National Reconnaissance Office, Chantilly, Virginia, 11-12 December 2013), at http://www.ncsi.com/lehs/2013/agenda-day1.php; and 'Law Enforcement Homeland Security Forum & Technology Exposition', (J.D. Hill Conference Center, National Reconnaissance Office, Chantilly, Virginia, 10-11 December 2014), at http://www.ncsi.com/lehs/2014/agenda.php.
[91] John Haynicz, *LinkedIn*, at http://www.linkedin.com/profile/view?id=3007554&authType=name&authToken=jdRH&trk=prof-sb-browse_map-name.
[92] 'Supervisory Management Specialist', at http://www.americajobs.com/federal/supervisory-management-specialist/1084438/.

MID/OIO/UEO GEOINT initiatives', and as 'the Government GEOINT lead between Tactical Exploitation of National Capabilities (TENCAP) and Distributed Common Ground System-Army (DCGS-A) users and National systems as the TENCAP/DCGS-A user's representative and provides Army-centric operational, technical and tactical expertise in all facets of the GEOINT capabilities and applications'.[93]

The UEO also maintains a variety of Field Representative posts and Field Offices, located in both the US and in combat theatres. For example, a UEO Field Representative is posted to the US Army's Combined Arms Center/Combined Arms Doctrine Directorate (CAC/CADD) at Fort Leavenworth in Kansas. His job is to ensure that NRO's capabilities and products are incorporated into US Army doctrine, and that the NRO is continually apprised of the Army's needs. The Field Representative at Fort Leavenworth from January to May 2015 was Lieutenant Colonel Terry Windmiller, who had previously been Chief of Staff of the OIO.[94] A Field Representative was appointed to the US Army Intelligence Center at Fort Huachuca, Arizona, in 2006. The first incumbent was 'an NRO contractor', who was regarded as 'one of the NRO's lead concept developers for National Technical support to the CTCs [Combat Training Centers]'.[95]

In the case of the Air Force, the NRO has maintained an institutionalised relationship with the Air Force Space Command (AFSPC) HQ at Peterson AFB since 7 June 2006, when the USAF and the NRO signed a memorandum whereby a senior NRO civilian would serve as 'the senior NRO advisor to the AFSPC commander' at Peterson.[96] A Field Representative was appointed to Wright-Patterson AFB in Dayton, Ohio, 'a hub of Air Force acquisition, design, testing and research', in September 2011.[97] A Field Representative is also assigned to the USAF's Command, Control, Intelligence, Surveillance and Reconnaissance (C2ISR) Center at Langley AFB in Virginia.[98] There is also a Field Representative at the Operationally Responsive Space

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[93] Terance T. Parker, *LinkedIn*.
[94] Terry Windmiller, *LinkedIn*, at https://www.linkedin.com/pub/terry-windmiller/45/1b5/699.
[95] Donald Smith, 'NRO's Outreach Program for Tactical Units', *Military Intelligence Professional Bulletin*, 1 October 2006, at http://www.thefreelibrary.com/NRO%27s+outreach+program+for+tactical+units.-a0190699601.
[96] Jeremy Singer, 'U.S Air Force, NRO Accord Meant to Strengthen Relationship', *Space News*, 29 June 2006, at http://spacenews.com/us-air-force-nro-accord-meant-stengthen-relationship/; and Tech. Sgt. Kate Rust, 'AFSPC, NRO Strengthen Ties, Exchange Leaders, Ideas', *Air Force Print News Today*, 16 November 2006, at http://www.afspc.af.mil/news/story_print.asp?id=123032152.
[97] John Nolan, 'National Reconnaissance Office's Move to Wright-Patt a Chance for Jobs', *Dayton Daily News*, 21 January 2012, at http://www.daytondailynews.com/news/news/national-reconnaissance-offices-move-to-wright-pat/nMySL/; and 'Chris Boring', *ICWatch*, at https://icwatch.wikileaks.org/nsadocs/chris-boring16a5b87aCACISeniorProgramManager%28Intel%292013-01-01.
[98] 'NRO Senior Field Representative Profiles: Dave Palmer', at http://www.yatedo.com/s/jobtitle%3A%28NRO%2C+Sr.+Field+Rep.%29.

Office at Kirtland Air Force Base at Albuquerque, New Mexico, which is tasked with providing rapid-response tactical space-based capabilities to war-fighters.[99]

The UEO maintains Field Representatives with each of the various unified combatant commands. In the case of the US Strategic Command (USSTRATCOM), headquartered at Offutt AFB, in Nebraska, a contractor, VOLANT Associates, advertised the position of Field Representative on behalf of the NRO in June 2015. The responsibilities of the post included serving as the NRO's 'on-site representative at Offutt', providing USSTRATCOM with 'detailed technical information about [NRO] satellite system capabilities', being 'able to identify, capture and prioritize USSTRATCOM operational requirements/needs/gaps that map against [NRO] intelligence surveillance and reconnaissance (ISR) system capabilities', and being 'able to recommend courses of action to leverage current [NRO] ISR capabilities against USSTRATCOM critical mission needs/shortfalls'.[100] In addition, a Field Representative is also posted to the Joint Warfare Analysis Center (JWAC), a 'functional component' of USSTRATCOM but located at the Naval Surface Warfare Center in Dahlgren, Virginia. The Field Representative at the JWAC from 2006 to 2010 was employed by Sciolex Corporation, an NRO contractor based near the NRO HQ at Chantilly. He had previously been the Field Representative at the USAF's C2ISR Center at Langley AFB.[101]

The Field Representative to Pacific Command (PACOM) serves as the 'lead NRO Rep in the PACOM theater'. A former representative says that he 'provided insight into national systems operations [and] training to DoD/Intel forces in the Pacific', and managed 'the integration of national systems across platforms'.[102] In February 2008, the NRO representative to PACOM participated in Operation *Burnt Frost*, in which an inoperable NRO imaging satellite was intercepted and destroyed by a missile fired from an Aegis destroyer stationed northwest of Hawaii.[103] The current representative to PACOM is Commander Jeff Debolt, who was appointed in November 2013.[104]

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[99] Philip Lorenz, '718th Test Squadron Holds Change of Command Ceremony', *High Mach*, (Vol. 57, No. 12), 2 July 2010, p. 7, at http://www.arnold.af.mil/shared/media/document/AFD-100702-016.pdf.
[100] VOLANT Associates, 'USSTRATCOM Field Representative for NRO', 15 June 2015, at https://www.clearancejobs.com/jobs/2025038/usstratcom-field-representative-for-nro.
[101] 'Joint Warfare Analysis Center Employees: Dave Palmer', at http://www.yatedo.com/search/profil?c=normal&q=companyname%3A%28Joint+Warfare+Analysis+Center%29&rlg=en&uid=-1&start=16&p=2.
[102] Mike Rayfield, *LinkedIn*, at https://www.linkedin.com/pub/mike-rayfield/2b/22/4a2.
[103] Rear Admiral Thomas F. Kendziorski, 'Navy Net-Centric Warfare Group: Commander's Brief', 6-12 January 2009, at usncra.org/docs/NNWG-Command-Brief-01JAN2009.ppt.
[104] Jeff Debolt, *LinkedIn*, at https://www.linkedin.com/pub/jeff-debolt/29/b13/271.

The US Southern Command (SOUTHCOM), headquartered at Doral, near Miami, Florida, is responsible for all US military activities in Central and South America. A former representative to SOUTHCOM says that he provided the Command with 'subject matter expertise on the capabilities, limitations, and employment of all NRO assets', and 'ensured SOUTHCOM's space-based requirements were properly articulated to the NRO'.[105] The senior representative from February 2008 to June 2011, Chauncy Nash, says that his job was to 'advise US SOUTHCOM Commander, Staff and Subordinate entities on the incorporation and utilization of national space assets and capabilities at the National Reconnaissance Office available for the US SOUTHCOM area of responsibility'.[106]

The US Northern Command (NORTHCOM) is headquartered at Peterson AFB, where it is co-located with the Air Force Space Command; its primary responsibility is command of the North American Aerospace Defense Command (NORAD), also based at Peterson. Since September 2011, one person, Charles Laing, has served as NRO Senior Field Representative to both AFSPC and USNORTHCOM at Peterson. His job is two-fold. On the one hand, he 'provides AFSPC and USNORTHCOM [with] a detailed understanding of national reconnaissance systems missions, capabilities, limitations and tasking procedures and helps integrate these capabilities with AFSPC and USNORTHCOM's missions'. On the other hand, the AFSPC and NORTHCOM/NORAD provide the NRO with Space Situational Awareness (SSA) and, more specifically, notice of potential threats to NRO's space-based assets.[107]

The US Central Command (CENTCOM) is headquartered at MacDill AFB in Tampa, Florida, but has major subordinate commands in Iraq, Afghanistan and elsewhere in Southwest Asia. The Field Representative to the HQ from June 2011 to June 2013 was Todd Hogan.[108] Since November 2013 it has been Bill Golden, who is employed by TASC Inc. under contract to the NRO.[109] A CENTCOM Branch at Chantilly manages the team at MacDill as well as 'the NRO deployed personnel supporting ISAF [International Security Assistance Force in Afghanistan] and IJC [ISAF Joint Command]'.[110]

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[105] Greg Glover, *LinkedIn*, at https://www.linkedin.com/pub/greg-glover/1a/121/401.
[106] Chauncy Nash, LinkedIn, at https://www.linkedin.com/pub/chauncy-nash/5/a93/598; and 'NRO Senior Field Representative Profiles: Chauncy Nash', at http://www.yatedo.com/s/jobtitle%3A%28NRO%2C+Sr.+Field+Rep.%29.
[107] Charles Laing, *LinkedIn*, at https://www.linkedin.com/pub/charles-laing/8/11a/735.
[108] Todd Hogan, *LinkedIn*, at https://www.linkedin.com/pub/todd-hogan/14/199/57.
[109] Bill Golden, *LinkedIn*, at http://www.linkedin.com/profile/view?id=44810319&authType=name&authToken=ihMs&trk=prof-sb-browse_map-name.
[110] Mark Torreano, *LinkedIn*, at https://www.linkedin.com/pub/mark-torreano/2a/601/902

The US Special Operations Command (SOCOM), which is also headquartered at MacDill AFB, has senior NRO representatives who are 'embedded' in its staff.[111] In addition, a Field Representative is assigned to Fort Bragg in North Carolina (Tel. 396-9450/2758), the home of the 82nd Airborne Division and the Joint Special Operations Command (JSOC).[112]

An NRO representative was assigned to the US European Command (EUCOM), headquartered near Stuttgart, Germany, in the 1990s, where he spearheaded support to US forces engaged in the Balkans Crisis.[113] An NRO Field Representative is attached to the HQ of US Africa Command (USAFRICOM), which is also located near Stuttgart. The current Senior Field Representative to USAFRICOM is Lieutenant Colonel John Butler, who had previously been chief of the USSTRATCOM Division in the User Engagement Office.[114] A former commander of the 743rd Battalion's detachment at Pine Gap, James Riley Johnson, retired from the Army after a three-year assignment as a systems engineering program manager in EUCOM. Johnson then stayed in Germany as a contractor, working as 'Representative to AFRICOM'—acting as 'Regional manager and executive level representative for all satellite programs for the African continent'.[115]

A Field Representative is also assigned to the Department of Homeland Security (DHS). The representative since 2010 has been Tom Shirk, who is an employee of L3 STRATIS under contract to the NRO, and who had previously managed NRO and NSA programs at Buckley, Colorado.[116]

NRO Field Offices have been established in Iraq and Afghanistan. In the case of Iraq, after his Pine Gap deployment Jameson Riley Johnson, then Lieutenant-Colonel, served from August 2007 to January 2009 as the first NRO Senior Field Representative on the staff of Multi-National Forces Iraq (MNF-I), based at Camp Victory and Camp Slayer in Baghdad, where he was responsible for establishing an NRO 'field office' to provide 'on-the ground NRO support'

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111 Committee on Armed Services, House of Representatives, US Congress, *Hearings on the Posture of the U.S. Central Command, U.S. Special Operations Command and U.S. Transportation Command*, (U.S. Government Printing Office, Washington, D.C., 2013), at http://www.gpo.gov/fdsys/pkg/CHRG-113hhrg79956/html/CHRG-113hhrg79956.htm.

112 *Fort Bragg Official Telephone Directory 2015*, p. 11, at www.bragg.army.mil/ContactUs/Documents/Sprint.doc.

113 Steven Pearson, *LinkedIn*, at https://www.linkedin.com/pub/steven-pearson/48/4a2/527.

114 'Commander, Stuttgart Area: John Butler', *LinkedIn*, at https://de.linkedin.com/title/commander/stuttgart-area.

115 'Jameson Riley Johnson', *LinkedIn*, at https://www.linkedin.com/profile/view?id=78620833&authType=NAME_SEARCH&authToken=PYPj&locale=en_US&srchid=338795201439018262279&srchindex=5&srchtotal=18&trk=vsrp_people_res_name&trkInfo=VSRPsearchId%3A338795201439018262279%2CVSRPtargetId%3A78620833%2CVSRPcmpt%3Aprimary%2CVSRPnm%3Atrue%2CauthType%3ANAME_SEARCH.

116 'Tom Shirk: Homeland Security and IC Professional', at http://www.yatedo.com/p/Tom+Shirk/normal/bba570187924338a0278cd2e1afa1085.

to the Command.[117] Johnson had served as commander of the US Army detachment at Pine Gap in 2004-06.[118] He was awarded the National Intelligence Meritorious Unit Citation in 2009 for his involvement in Task Force Ulster Lion.[119] In 2008 another member of the MSD's User Engagement Group arrived in Iraq as the NRO's US 1st Corps Field Representative, based at the Al-Faw Palace in Baghdad.[120] In 2008-09, the number of NRO personnel deployed to support Operation Iraqi Freedom amounted to about 50, including contractors.[121]

The Senior NRO Representative in Iraq from September 2009 to January 2010 was Colonel Shawn McCamish, USAF, who supported US Forces in Iraq (USF-I), Multi-National Forces-Iraq (MNF-I), Multi-National Corps-Iraq (MNC-I), and 'others at Camp Victory and Camp Slayer'. He says that he 'ensured fusion and integration of National Technical Means (NTM) intelligence in support of theater operations for Joint Special Operations Command (JSOC), Central Command (CENTOM) and Task Force 714', and that, as the NRO liaison officer, he 'clarified operational understanding of NRO capabilities and refined NRO's approach and response to Combat Command (COCOM) and theater needs', and 'gathered needs from the warfighter on the front lines in Iraq, and found/offered timely NTM intelligence solutions in coordination with NSA and NGA'.[122]

In the case of Afghanistan, an NRO liaison office was located with the HQ of the International Security Assistance Force/ISAF Joint Command (ISAF/IJC) in Kabul.[123] In addition, the NRO deployed a 'command representative to the 82nd Airborne, a special operations task force, and other warfighting units', based at Bagram Air Base, about 40 km north of Kabul. In 2010, this was Lieutenant Colonel Gregg Leisman, who had previously served as the NRO's Senior Field Representative at the Operationally Responsive Space Office at Kirtland AFB.[124]

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[117] Jayson Sawyer, 'In Harm's Way: NRO Field Representatives Support Operation Iraqi Freedom', *Space Sentinel*, (Vol. 1, No. 1), 2009, at http://www.nro.gov/news/sss/2009/sss-2009-01.pdf.
[118] Jameson Riley Johnson, *Yatedo*, at http://www.yatedo.com/p/Jameson+Riley+Johnson/normal/5c9de70cbc3566f0d289dfa4adbf354e.
[119] 'Johnson, Jameson, Col.', *Together WeServed.com*, at http://army.togetherweserved.com/army/servlet/tws.webapp.WebApp?cmd=ShadowBoxProfile&type=DecorationExt&ID=2102089.
[120] Jayson Sawyer, 'In Harm's Way: NRO Field Representatives Support Operation Iraqi Freedom'.
[121] *Ibid.*
[122] Shawn McCamish, *LinkedIn*, at https://www.linkedin.com/pub/shawn-mccamish/97/245/697.
[123] T.J. Lincoln was NRO Country Lead in Kabul for 5 months in 2012, and is currently the Acting Director of the Mission Operations Directorate at the NRO. 'TJ Lincoln', *LinkedIn*, at https://www.linkedin.com/in/tjlincoln. See also 'Resume: Kevin J. Walchko, Major, PhD, USAF', 1 Dec 2013, at http://walchko.github.io/Resume/walchko%20resume%209%20Mar%2014.pdf.
[124] Philip Lorenz, '718th Test Squadron Holds Change of Command Ceremony'.

A member of the NRO liaison office at Bagram was assigned to ISAF's Regional Command East/Combined Joint Special Operations Task Force-Afghanistan (CJSOTF-A), where he 'trained users on NTM systems and capabilities' and 'engaged all facets of National and Tactical ISR Operations including GEOINT, HUMINT, TT&L [Tagging, Tracking and Locating] and C-IED [Counter-Improvised Explosive Devices] support'. He was also a member of Task Force ULSTER LION, which was 'heavily involved in CT [Counter-terrorist] and C-IED operations', in which capacity he deployed to 'Africa, Qatar and Iraq', as well as elsewhere in Afghanistan.[125] About 60 NRO personnel were serving in Afghanistan in mid-2011.[126]

In March 2013, the Director of the NRO, Betty J. Sapp, stated that

> We directly support the war in Afghanistan by deploying liaison officers [LNOs] to key staffs and operational commands. This allows us to be responsive to the needs of the warfighter and intelligence analysts, and to ensure that they can fully leverage the capabilities of NRO ISR systems, capabilities and intelligence-derived products.
>
> We typically have about 75 men and women deployed into harm's way on any given day serving as liaison officers to units, providing technical expertise, or supporting those focused NRO programs. Every day, they have a direct and positive influence on combat operations and mission success, to include saving the lives of U.S. and coalition forces.[127]

The National Geospatial-Intelligence Agency (NGA)

In 1996, the CIA and the Department of Defense agreed to the establishment of the National Imagery and Mapping Agency (NIMA), which consolidated the CIA's National Photographic Interpretation Center (NPIC) and the DoD's Defense Mapping Agency (DMA). In November 2003, NIMA's name was changed to the National Geospatial-Intelligence Agency (NGA), which better reflected the organisation's charter, viz: to 'merge imagery, maps, charts and environmental data to produce… 'geospatial intelligence' (GEOINT)—the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth'. The NGA moved into a new HQ building at Fort Belvoir in 2011, about three km northwest of the NRO's Aerospace Data Facility (ADF)-East.[128]

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[125] Michael Fisher, *LinkedIn*, at https://www.linkedin.com/pub/michael-fisher/75/308/b38.
[126] John A. Tirpak, 'Problem Solvers at the NRO', *Air Force Magazine*, July 2011, p. 45.
[127] 'Q&A: Betty J. Sapp', *Geospatial Intelligence Forum*.
[128] Richelson, *The US Intelligence Community*, pp. 42-47.

The NGA processes, analyses and distributes all imagery collected by the NRO's radar imaging and electro-optical digital imaging satellites, controlled by the ground stations at White Sands (ADF-SW) and Fort Belvoir. On 15 October 2008, the NRO declassified 'the fact that NGA and NSA are present at ADF-E, ADF-C, ADF-SW, MHS and JDFPG'.[129] However, it is likely that the NGA presence at Buckley (ADF-C), Menwith Hill and Pine Gap began in the late 1990s, coinciding in Pine Gap's case with the influx of elements of the Service Cryptologic Agencies (SCAs), and, more particularly, the introduction of FORNSAT/COMSAT collection activities at the facility. By late 2005, the US Air Force detachment at Pine Gap, then known as Detachment 2 of the 544th Information Operations Group (IOG), headquartered at Peterson AFB, included a Geospatial Metadata Analysis unit which 'optimizes information flow to the warfighter', and especially Special Operations Forces teams.[130] The detachment had moved to Pine Gap around 2000, and had presumably included geospatial intelligence specialists since the outset.

The NGA was completely integrated into all relevant parts of the NRO during the 'transformation' of the NRO in 2007-08. NGA personnel can now be found throughout the NRO, but the organisational focal point of the relationship is the Deputy Director of the Mission Integration Directorate (MID), who serves as 'the bridge between NRO and NGA'.[131] Most importantly, all GEOINT and SIGINT activities of the Ground Enterprise Directorate (GED) and its Mission Ground Stations were thoroughly integrated. As described above, the 2009 National Reconnaissance Strategic Plan included a 'GEOINT and SIGINT Station Integration and Support project' aimed at integrating geospatial intelligence and SIGINT at each of the NRO satellite ground stations, and a 'Unified Ground Architecture (UGA) Ground Development project' which enabled 'planning, scheduling, and resource control of GEOINT and SIGINT collection, processing, and information sharing systems'. It envisioned the full integration of 'space and ground architectures characterized by synergistic, cross-domain mission management, multi-INT data fusion at the source [station]'. The activities of the GED and the ground control stations were organised on functional lines (Command and Control, Management, Processing, and data services and distribution) rather than type of intelligence (GEOINT, SIGINT satellite collection or FORNSAT/COMSAT interception).[132]

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[129] 'National Reconnaissance Office Review and Redaction Guide', p. 56.
[130] Robert Donaldson, *LinkedIn*, at https://www.linkedin.com/pub/robert-donaldson/91/57b/2b8.
[131] 'GEOINTeraction Tuesday', *United States Geospatial Intelligence Foundation (USGIF)*.
[132] 'National Intelligence Program, FY 2010 Congressional Budget Justification. Volume IV: National Reconnaissance Program'.

Conclusion

In the early 1990s, following the end of the Cold War, the higher management of Pine Gap and its geostationary SIGINT satellites changed significantly, both organisationally and physically, from the CIA HQ at Langley in Virginia to the NRO HQ at Chantilly. The NRO structure was itself fundamentally transformed in 2006-08. Whereas the CIA had maintained very tight control on the intelligence collected at Pine Gap, and most particularly the TELINT which underpinned National Technical Means of Verification (NTMV), the SIGINT collected at Pine Gap is now integrated with imagery and geolocation data provided by the NRO's 'partners', NSA and NGA, and made accessible in near real-time to a multitude of accredited 'users' in the intelligence community, the Department of Defense and the Combatant Commands. From a stove-pipe connecting Pine Gap and Langley, it has become a highly networked structure reaching directly to war-fighters.

The changes in the management structure have been reflected in changes involving the personnel at Pine Gap, and particularly the increase in the proportion of US military personnel, as well as the militarisation of its principal missions, among which counter-terrorist and special operations forces are accorded highest priority. In Canberra, these changes have engaged those in the Department of Defence, the Australian Defence Force (ADF) and the intelligence agencies directly involved with the facility, although few of them would be interested in any historical perspective on the evolution of the higher US management structure.

The fundamental transformation of the higher management structure is more than an organisational matter. Along with the militarisation of the facility, it has important implications for Australia's involvement in the project. It warrants serious public discussion, which requires, in turn, greater transparency by the Australian authorities. As a 'joint' facility, its management structures are just as much of interest to Australians as to the US contractors to whom the NRO largely speaks.