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**DEPARTMENT OF THE AIR FORCE**
**HEADQUARTERS SPACE AND MISSILE SYSTEMS CENTER (AFSPC)**
**LOS ANGELES AIR FORCE BASE, CALIFORNIA**

SMC/JA
483 N. Aviation Blvd.
Los Angeles AFB
El Segundo CA 90245

This letter is in response to your Freedom of Information Act (FOIA) request received by Los Angeles Air Force Base on 11 February 2009. The FOIA control number for this case is SMC-09-020.

This is a second interim response to your request, due to the voluminous amount of information that must be reviewed prior to release. A single document responsive to your request for "a copy of the most recent two internal annual reports from the SMC History Office" has been identified. The introductory material, Chapters 1-4, Chapter 6, and the appendices of the "*History of the Space and Missile Systems Center, October 1998 – September 2001*" are being provided at this time. The remaining chapters are still under review.

Should you decide that an appeal of this decision is necessary, you must write to the Secretary of the Air Force within 60 days from the date of this letter. Include in the appeal your reasons for reconsideration and attach a copy of this letter. Address your letter as follows:

Secretary of the Air Force
Through: SMC/PKX
483 N. Aviation Blvd.
Los Angeles AFB
El Segundo CA 90245

Include in the appeal your reasons for reconsideration and attach a copy of this letter.

Sincerely

JAY W. MOUNKES, Colonel, USAF
Staff Judge Advocate
Initial Denial Authority

HISTORY

OF THE

SPACE AND MISSILE SYSTEMS CENTER

October 1998 - September 2001

VOLUME I

Assigned to

Headquarters Air Force Space Command

Stationed at

Los Angeles Air Force Base, California

Harry N. Waldron
HARRY N. WALDRON
Historian

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OFFICE OF ORIGIN: SMC/HO

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**HISTORY OF THE**

**SPACE AND MISSILE SYSTEMS CENTER**

**1 October 1998 – 30 September 2001**

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# CHAPTER 1

# MISSION AND ORGANIZATION

During the period fiscal year (FY) 1998 through FY 2001, the Space and Missile Systems Center (SMC) at Los Angeles Air Force Base (AFB), California had been a component of the Air Force Materiel Command (AFMC). The mission of the SMC headquarters was to design and acquire the Air Force, and most of the Department of Defense's, military space systems. SMC also had the responsibility to oversee launches and complete on-orbit checkouts. From the beginning of the military space program in the 1950s, these space systems included satellites for such purposes as communications, navigation, surveillance and weather reporting; launch vehicles to transport the satellites into orbit; and control systems to command them in orbit.[1]

At the beginning of the reporting period, two major field units reported to HQ SMC: the Phillips Laboratory and the 377$^{th}$ Air Base Wing (ABW). The 377$^{th}$ ABW was the host wing at Kirtland AFB, New Mexico, where the Phillips Laboratory headquarters had also been located. However, both of these units at Kirtland ended their association with SMC as will be discussed below.[2]

## ORGANIZATION

### SMC Headquarters

At the beginning of FY 1998, the SMC headquarters carried out its mission through 10 two-letter program offices that developed and acquired space systems. Four of these organizations managed major programs and reported to the Air Force Program Executive Officer (PEO) for Space at the Pentagon. A fifth major program, the Airborne Laser (ABL) System program, reported to the Air Force PEO for Weapons. Five organizations managed non-major programs and reported to the Designated Acquisition

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[1] Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1); E-mail, SMC/CCX CC's Action Office to SMC/CCX All et al., "SMC Unit Mission Description," 24 December 1998, (Doc 1-2); Internet Document, SMC/PA, "Our Mission," 8 February 2000, http://www.losangeles.af.mil/SMC/PA/mission.htm (Doc 1-3); Fact Sheet, AFMC, "Air Force Materiel Command," printed 23 June 2000, http://www.af.mil/news/Air_Force_Materiel_Command.html (Doc 1-4); Robert Mulcahy, "Los Angeles Air Force Base," Private Pilot Magazine, February 2000, pp. 84-85, 89 (Doc 1-5); Document, William Evans (SMC/AXRX), "SMC Acquisition Programs," December 1997, (Doc 1-6).

[2] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 1.

Commander (DAC) who was the SMC commander. The major PEO programs included: Launch Programs (office symbol, SMC/CL), the Evolved Expendable Launch Vehicle (EELV) program (SMC/MV), the Military Satellite Communications (MILSATCOM) (SMC/MC) Joint Program Office (JPO), the Space-Based Infrared System (SBIRS) program (SMC/MT), and the ABL System Program (SMC/TM).[3] The five DAC programs included: the Advanced Systems Directorate (SMC/AD), the Meteorological Satellite program (SMC/CI), the Satellite and Launch Control program (SMC/CW), the NAVSTAR Global Positioning System (GPS) JPO (SMC/CZ), and the Space and Missile Test and Evaluation Directorate (SMC/TE).[4]

At the beginning of FY 1998, the organizations responsible for acquiring space hardware received support from four functional organizations: Systems Acquisition (SMC/AX), Comptroller (SMC/FM), Contracting (SMC/PK), and Developmental Planning (SMC/XR). Eight staff offices also provided support: Small Business Office (SMC/BC), History Office (SMC/HO), Inspector General (SMC/IG), Intelligence Office (SMC/IN), Staff Judge Advocate (SMC/JA), Manpower and Quality Office (SMC/MQ), Public Affairs Office (SMC/PA), and the Safety Office (SMC/SE) in addition to the 61st Air Base Group (ABG). For a complete list of these support organizations, see the organization charts in Appendix D of this history. For descriptions of the missions as well as the organizational relationships of the program and staff offices, see the 1998 edition of the "Organization and Mission Chart Book" produced by the SMC Manpower and Quality Office numbered as a supporting document in the footnote below.[5]

By the end of FY 2001, SMC altered its organizational and reporting structures. Four SMC organizations reported to the PEO for Space: the GPS JPO, the MILSATCOM JPO (including DSCS, Milstar and WGS), the SBIRS program (including DSP), and the EELV program. The SMC ABL System program reported to the PEO for Weapons. The supporting functional and staff organizations also had some changes, as will be discussed later in the chapter.[6]

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[3] The Milstar, DSCS, GBS, WGS, and AEHF satellite programs were managed under the MILSATCOM JPO, and the DSP program was managed under the Space-Based Infrared Systems Program Office.

[4] Organization Chart, SMC/MQ, "Space and Missile Systems Center Directory," October 1997, (Doc 1-7); Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1).

[5] Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, (Doc 1-1).

[6] Organization Chart, "Space and Missile Systems Center Directory," October 2001, (Doc 1-8); Organization Chart, "61 Air Base Group Organization Chart," October 2001, (Doc 1-9).

### Larger Field Units

The Phillips Laboratory (headquartered at Kirtland AFB) had directorates at Hanscom AFB, Massachusetts and Edwards AFB, California. The Phillips Laboratory supervised and coordinated the activities of six directorates—Geophysics, Propulsion, Space Experiments, Space and Missile Technology, Lasers and Imaging, and Advanced Weapons and Survivability.[7]

The 377th ABW (who reported directly to SMC) was the host organization that maintained and operated Kirtland AFB.[8] For the internal organization and activities of the 377th ABW, see the histories produced by the 377th ABW History Office.

### Organizational Changes at SMC Headquarters

The SMC headquarters had several organizational changes during the period FY 1998 through FY 2001. The most significant change realigned SMC from AFMC to the Air Force Space Command (AFSPC). This narrative cannot describe all the organizational changes, but it will mention the more significant realignments involving the creation, extinction, redesignation, or reassignment of two-letter offices.

On 30 June 1998, the Security Forces Division of the 61st ABG redesignated its organization title to the "61st Security Forces Squadron (61 SFS)." The squadron also changed its security personnel from contractors to Department of Defense (DoD) police officers. A 1997 memo from AFMC stated that the HQ AFMC/IG rated the Los Angeles AFB security forces' contract operation as "Unsatisfactory" due to conflicts with the California Business and Professions Code that sharply restricted the activities of private security contractors. The JA offices of both AFMC and SMC stated that a contractor could not legally conduct the Performance Work Statement without violating California state law. The JA offices concluded that the law enforcement duties at Los Angeles AFB were inherently government functions and could not be contracted out. Unlike the contractor security forces, the state of California recognized the DoD police personnel as peace officers with the authority to arrest civilians committing crimes in and adjacent to the property of the base. The local crime rate in Los Angeles (especially in San Pedro where Fort MacArthur was located) contributed in the decision to convert to a DoD police force. The contract for the contractor security forces expired on 30 June 1998, and it did not get renewed or recompeted. Special Order GA-7 activated the 61st Security Forces Squadron on 1 July 1998.[9]

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[7] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 5.

[8] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 5.

[9] Memo, AFMC/CV to HQ USAF/XP, "Los Angeles AFB Security Forces Contract," Faxed 15 October 1997, (Doc 1-10); Memo, SMC/CC to AFMC/CV, "Los Angeles AFB Security Forces Contract (HQ AFMC/XP SSS, 10 Oct 1997)," 17 Oct 1997, (Doc 1-11);

The Directorate of Plans and Programs (SMC/XP) first appeared as a two-letter organization on the January 1999 SMC organization chart. The XP mission provided strategic direction and center integration of all business areas that enabled the Commander to effectively manage the mission. XP included several support organizations: Manpower and Quality Division, the Programs Division, the Plans Division, the Commander's Action Group and the Protocol Office. The realignment of the XP took place as part of an AFMC reorganization plan. SMC/XP eventually received approval to become a two-letter organization on 25 September 2000, and the stand up date occurred on 6 January 2001.[10]

The Manpower and Quality Office (SMC/MQ) had its title redesignated and it became a three-letter office. On 22 July 1999, HQ USAF announced its decision to rename all of its "Manpower and Quality Offices" at all levels. The Air Force removed the word "quality" from all the Manpower organization titles on 1 August 1999, because all Air Force organizations should be considered "quality" not just Manpower. MQ

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Memo, SMC/CC to HQ AFMC et al., "Request for Law Enforcement Officer (LEO) Coverage and Special Pay Pursuant to the Federal Law Enforcement Pay Reform Act of 1990," 18 May 1998, (Doc 1-12); John Ryan, SMC/PA, "Los Angeles AFB to reactivate 61st Security Forces Squadron July 1," Astro News, 19 July 1998, p. 1 (Doc 1-13); Special Order, HQ AFMC, "Special Order GA-7," 30 June 1998, (Doc 1-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 17.

[10] Organization Chart, "Space and Missile Systems Center Directory," January 1999, (Doc 1-15); SMC/PA, "XP becomes two-letter" Astro News, 15 January 1999, p. 3 (Doc 1-16); Staff Summary Sheet, SMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate," 19 March 1999, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Establishment of SMC Plans and Programs Directorate (SMC/XP)," 6 September 2000, (Doc 1-17); Memo, HQ AFMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate (SMC/XP) (Your Memorandum, 6 Sep 00)," 25 September 2000, (Doc 1-18); E-mail, Alicia Hale (SMC/XPM) to Robert Mulcahy (SMC/HO), "History Report FY00," 24 January 2002, (Doc 1-19); Briefing charts, "SMC/XP Stand Up Activities," No date, (Doc 1-19-1); Memo, HQ AFMC/XPM to SMC/CD et al., "Proposal to Establish a Plans and Programs Directorate (XP) (HQ AFMC/XP Memo, 12 Jan 98)," 14 October 1998, (Doc 1-19-2); Memo, HQ AFMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate (SMC/XP)," No date, with attachment, Document, "Plans and Programs Directorate Proposed Organization," No date, with attachment, Document, "SMC/XP Mission Statements," No date, with attachment, Colonel Position Description, "Director, Plans and Programs," No date, (Doc 1-19-3); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, pp. 17-18.

became a part of the Directorate of Plans and Programs, and it was designated the "Manpower Office" (SMC/XPM).[11]

On 31 May 2000, the Space-Based Laser (SBL) project office (SMC/TL) became a two-letter organization. Previously, SBL had been a project within the Advanced Systems Directorate (SMC/AD) on base. SMC gave SBL increased priority to produce a national missile defense system. The SBL project separated from AD because it had progressed to the level where SBL needed to be recognized as a separate project office. Detachment 12 at Kirtland AFB also had an SBL office.[12]

The Human Resources Office (SMC/HR) was created from elements of the Directorate of Plans and Programs on 6 June 2000. SMC established SMC/HR to ensure an integrated corporate approach to managing resources at SMC. This structure provided a link between the center's priorities and the management of personnel resources. The organization provided a focal point for resource issues, it reduced processing time, and it had a more focused approach to meeting senior management goals and objectives.[13]

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[11] Organization Chart, "Space and Missile Systems Center Directory," July 1999, (Doc 1-20); E-mail, Alicia Hale (SMC/XPM) to Robert Mulcahy (SMC/HO), "History Report FY00," 24 January 2002, (Doc 1-19); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is not FOUO), HQ AFMC/HO, pp. 22-23.

[12] Staff Summary Sheet, SMC/XPM to SMC/CC, "Establish a Space Based Laser (SBL) Project Management Office," no date, with attachment Memo, SMC/XPM to HQ AFMC/XPM, "Establish a Space Based Laser (SBL) Project Management Office," 25 January 2000, (Doc 1-21); SMC/PA, "SMC/TL, new 2-letter, stands up May 1," Astro News, 31 March 2000, p. 3 (Doc 1-22).

[13] Memo, HQ AFMC/XPM to SMC/CC, "Establishment of HR at SMC (Your Memorandum, 15 May 00)," 6 June 2000, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Organization Change Request – Establishment of Human Resources Office (SMC/HR)," 15 May 2000, (Doc 1-23); History of Air Force Materiel Command 1 October 1999 – 30 September 2000 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 15.

## SMC's Realignment to Air Force Space Command (AFSPC)

Following the recommendations of the Space Commission, Air Force Special Order GD-019 (dated 22 August 2001) relieved SMC and the 61st ABG from their assignments to AFMC and reassigned the two organizations to AFSPC effective 1 October 2001. See below for the reasons for the reorganization. This reassignment to AFSPC included SMC Detachments 3, 8, 9, 11 and 12. It also included all of the squadrons of the 61st ABG: 61st Communications Squadron, 61st Medical Squadron, 61st Mission Support Squadron and the 61st Security Forces Squadron.[14]

## Organizational Changes in the Field

The SMC Phillips Laboratory was inactivated on 31 October 1997. Phillips Laboratory developed technology for military space systems. SMC Phillips Laboratory realigned into a new, unified Air Force laboratory organization that included the Armstrong Laboratory at Brooks AFB, Texas, Rome Laboratory at Rome, New York, and Wright Laboratory at Wright-Patterson AFB, Ohio. The newly aligned organization was designated the "Air Force Research Laboratory (AFRL)." The Air Force created the AFRL to streamline the organizational structure of the laboratories, to merge the resources and accountability of the laboratories, to reduce technology fragmentation, and to bring about a more focused laboratory mission.[15]

The AFMC Space Systems Support Group (SSSG) at Peterson AFB, Colorado was divided into two separate detachments (Detachments 5 and 11) in order to integrate the space systems between SMC and the Electronic Systems Center (ESC) based at Hanscom AFB. The AFMC commander ordered a review of the SSSG alignment in September 1997 because he "... felt this FOA [field operating agency] was not performing headquarters activities."[16] Special Order GA-5 activated SMC Detachment 11 and ESC Detachment 5 on 1 June 1998. The mission of Detachment 11 was to

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[14] SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); E-mail, Donna Jay (SMC/XPM) to distribution, "Special Orders for SMC realignment to AFSPC," 6 September 2001, with attachments Orders, HQ USAF to AFMC/CC and AFSPC/CC, "Reassignment of Certain Air Force Materiel Command Units," 16 August 2001, and Special Order, HQ AFSPC, "Special Order GD-019," 22 August 2001, (Doc 1-25); Peggy Hodge, SMC/PA, "'It's official!' AFSPC welcomes SMC into family," Astro News, 5 October 2001, p. 1 (Doc 1-26).

[15] Special Order, HQ AFMC, "Special Order GA-2," 29 October 1997, (Doc 1-27); History of the Air Force Research Laboratory October 1997 – September 1998 (FOUO, extracts are not FOUO), AFRL/HO, pp. xxxv (Executive Summary) 8-9.

[16] Staff Summary Sheet, HQ AFMC/DRS to SMC/CC, "Space Systems Support Group (SSSG) Inactivation," 8 April 1998, (Doc 1-28).

acquire and sustain Air Force satellite ground systems for SBIRs, DMSP, Milstar, GPS, the Satellite Control Network (AFSCN), and the Space Launch Range (SLR). Detachment 11 also acted as the AFMC command liaison to the AFSPC commander and HQ AFSPC.[17]

The Discoverer II (also known as "Space-Based Radar") JPO was a joint Air Force, Defense Advanced Research Projects Agency (DARPA), and National Reconnaissance Office (NRO) program that had been established in February 1998. The three organizations signed a Memorandum of Agreement to work in a partnership to produce and fund the project. The Discoverer II JPO was located in Arlington, Virginia and reported to the PEO for Weapons. The JPO planned to develop, fabricate, and launch two research and development, surveillance satellites in 2005. In July 2000, the House and Senate Appropriations Committees decided to terminate the Discoverer II program for fiscal reasons effective 30 September 2000.[18]

Falcon AFB, Colorado (which provided the command and control for DoD military satellites) was renamed "Schriever AFB" on 5 June 1998. The Air Force renamed the base in honor of Gen Bernard A. Schriever who is considered the "father of the U.S. Air Force's space and missile program."[19]

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[17] Special Order, HQ AFMC, "Special Order GA-5," 20 April 1998, (Doc 1-29); Staff Summary Sheet, SMC/MQ to SMC/CC, "Activation of SMC Detachment 11," 13 May 1998, with attachment Memo, HQ AFSPC to SMC/CC, "Activation of Space and Missile Systems Center (SMC) Detachment (Det) 11," 8 June 1998, (Doc 1-30); Chris McGiveney, "Detachment 11 becomes part of Team SMC," Astro News, 2 July 1998, p. 3 (Doc 1-31); Staff Summary Sheet, SMC/AXL to SMC/CC, "AFMC Liaison MOA," 2 December 1998, with attachment Memorandum of Agreement, "Memorandum of Agreement Between the Director of Requirements (HQ AFSPC/DR), the Director of Plans and Programs (HQ AFSPC/XP), the Commander, Space and Missile Systems Center (SMC/CC), and the Director of Requirements (HQ AFMC/DR) For the AFMC Liaison (SMC Det 11/CC) Supporting Air Force Space Command," latest signature dated 24 December 1998, (Doc 1-32); Internet Document, SMC, "Welcome to SMC Det 11," printed August 2000, http://www.cisf.af.mil/det11/focus/default.htm (Doc 1-33).

[18] Internet Document, Federation of American Scientists, "Discoverer II (DII) Starlite," 24 January 2000, http://sun00781.dn.net/spp/military/program/imint/starlight.htm (Doc 1-34); John Ryan, SMC/PA, "Discoverer II Touts Improved Surveillance," Astro News, 31 March 2000, p. 18 (Doc 1-35); Internet Document, InsideDefense.com, "Conferees Terminate Space-Based Radar Project," 14 July 2000, http://www.insidedefense.com/secu.../dalert_sam_reader.asp?FN=DefAlert01.ask&docnum=Dalert2000_36 (Doc 1-36).

[19] Internet Document, Air Force, "Schriever AFB," printed 18 March 2002, http://www.airforceallotment.com/afbases.html (Doc 1-37).

The AFMC HQ relieved the HQ 377 ABW at Kirtland AFB from its assignment to SMC on 1 October 1998 by Special Order GA-19. The 377th was reassigned with four other units to the Air Armament Center located at Eglin AFB, Florida. The reassignment took place so the Air Force could have one central point for Air Force armament issues. No personnel changes or location moves took place during the transfer of the 377 ABW.[20]

The AFMC HQ inactivated SMC Detachment 2 at Onizuka Air Station (AS), California effective 31 July 1998. The detachment's mission (engineering support for satellite control) at Onizuka continued and remained the same, only the organization's name was changed. Detachment 2 was redesignated as the "SMC Operating Location (AO)."[21]

The 1995 Base Realignment and Closure Commission (BRAC) directed the 750th Space Group (750 SG) at Onizuka AS to inactivate, and to either relocate its functions or to end them. The 750 SG had been a component of the 50th Space Wing of AFSPC. The BRAC required Onizuka AS to realign its organization - not to close the facilities or end its operation. The inactivation of the 750 SG took place on 25 June 1999. The realignment of the 21st Space Operations Squadron (SOPS) of AFSPC made the 21 SOPS the new host organization, and it assumed all of the Onizuka AS mission responsibilities on 25 June 1999. Various space missions and responsibilities transferred from Onizuka to Schriever AFB between 1999-2001. The 21 SOPS completed all the realignment activities at Onizuka as of 13 July 2001.[22]

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[20] Special Order, HQ AFMC, "Special Order GA-19," 17 September 1998, (Doc 1-38); Leigh Anne Redovian, "Air Force announces realignments," Astro News, 25 September 1998, p. 3 (Doc 1-39); E-mail, MSgt James Gildea (377 ABW/HO) to Robert Mulcahy (SMC/HO), "Transfer of 377 ABW from SMC," 11 December 2001, (Doc 1-40); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO, p. 14.

[21] Special Order, HQ AFMC, "Special Order GA-12," 27 July 1998, (Doc 1-41); A1C Elaine Tarello, "SMC Det. 2 inactivated," Astro News, 14 August 1998, p. 5 (Doc 1-42).

[22] Internet Document, Federation of American Scientists, "Onizuka Air Station, California," printed on 30 November 2001, http://www.fas.org/spp/starwars/offdocs/950301o.htm (Doc 1-43); Internet Document, California Economic Diversification and Revitalization, "Onizuka Air Station (Realignment)," printed on 30 November 2001, http://www.cedar.ca.gov/military/currentreuse/onizuka.htm (Doc 1-44); Internet Document, Western Disaster Center, "Why Onizuka?," printed on 30 November 2001, http://www.ndin. net/whyonizuka.htm (Doc 1-45); E-mail, Valerie Joseph (21SOPS/PA) to Robert Mulcahy (SMC/HO), "Onizuka BRAC," 18 March 2002, (Doc 1-46).

On 4 February 2000, AFSPC redesignated all of its "Air Stations" located within the United States to "Air Force Stations." AFSPC changed the designations so it would clearly identify the facilities as Air Force sites. The redesignation affected: Cape Canaveral AFS, Florida, Cape Cod AFS, Massachusetts, Cavalier AFS, North Dakota, Cheyenne Mountain AFS, Colorado, Clear AFS, Alaska, New Boston AFS, New Hampshire, Onizuka AFS, California, El Dorado AFS, Texas, and Pillar Point AFS, California.[23]

SMC Detachment 12 at Kirtland AFB became activated on 29 June 2001. The activation of Detachment 12 joined several SMC subordinate units under one local command in preparation for the 1 October 2001 realignment of SMC to AFSPC. The newly aligned programs included the SMC Test and Evaluation (SMC/TE) program, the Rocket Systems Launch (RSLP) program, the DoD Space Test (STP) program, the Research and Development Space and Missile Operations (RDSMO) program, and the SBL program.[24] The mission of SMC Detachment 12 was "to serve as the primary provider of launch capability, space flight, and on-orbit operations for the entire DoD space research, development, test, and evaluation community."[25]

## SPACE COMMISSION

Congress established the "Commission to Assess United States National Security Space Management and Organization," referred to as the "Space Commission," in compliance with Public Law 106-65, National Defense Authorization Act (NDAA) for FY 2000, Section 1622. The purpose of the Space Commission was to make an assessment of the management and organization of space activities that supported U.S. national security. This narrative cannot describe all the details of the Space Commission and its recommendations, but it will cite the most significant ones.[26]

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[23] Internet Document, Air Force News, "Air Force Space Command stateside air stations redesignated," 4 February 2000, http://www.af.mil/news/Feb2000/n20000204000163.html (Doc 1-46-1).

[24] Special Order, HQ AFMC, "Special Order GA-14," 29 May 2001, (Doc 1-47); Peggy Hodge, SMC/PA, "Det. 12 activates as SMC moves closer to realignment," Astro News, 13 July 2001, p. 1 (Doc 1-48); Internet Document, SMC, "History of Detachment 12," printed 30 November 2001, http://www.te.plk.af.mil/history.html (Doc 1-49).

[25] Internet Document, SMC, "Detachment 12 Mission," printed 1 February 2002, http://www.te.plk.af.mil/det12.html (Doc 1-50).

[26] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 1-2 (Doc 1-51); HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, pp. 3, 16 (Doc 1-52); E-mail, Col William G. Gardner (SMC/XR) to SMC Deputies; SMC Directors; SMC XOs, "Need Your Help!!!!!," 24 May 2000, (Doc 1-53).

By mandate, the Space Commission assessed several space-related proposals that had been designed to strengthen national security. Their report included the following topics. It described how military space assets could be used to support U.S. military operations. It reviewed the interagency coordination process for the operation of national security space assets. They assessed the relationships between intelligence and nonintelligence organizations in national security space, including the possibility of a partial or complete merger of the programs, projects, or activities. The Commission also addressed the military's space training approaches.[27]

The mandate also required the Space Commission to determine the probable benefits and costs of instituting several proposals. The proposals included the following topics. The Commission researched the possibility of instituting an independent military space department and service. It assessed the concept of forming a corps within the Air Force assigned to the national security space mission. The Commission reviewed the necessity to institute a position as the Assistant Secretary of Defense for Space within the Office of the Secretary of the Defense. It analyzed the merits of establishing a major force program to manage national security space funding within the DoD. The Commission also researched various changes in the organizational structure of the DoD for national security space management and organization.[28]

Col William G. Gardner (director of SMC Developmental Planning in 2002) was the SMC point of contact for the Space Commission. The SMC History Office interviewed Colonel Gardner in January 2002. Colonel Gardner described the necessity for the Space Commission.

> "Space is broken, and it has been for a very long time. There are many "stovepipes" [different programs not coordinating with each other which leads to similar independent programs and inefficiency], many fiefdoms. Basically, the space business was run by many, many people and it was very fragmented. In Congress, it was not something that occurred overnight. Space has been that way for a long, long time. Congress had asked the Department of Defense to take a look at the management structure and organization of the space business within the Department of Defense. The Commission was asked to take a look at this structure under various sets of guidance by way of the Authorization Bill. The Commission was to come back with the recommendations... The focus of the Commission was purely on the management of space and on how we're organized."[29]

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[27] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p.16 (Doc 1-52).

[28] *Ibid.*, p. 17.

[29] Interview, Col William G. Gardner (SMC/XR) with Robert Mulcahy (SMC/HO) about the Space Commission, 16 January and 1 February 2002, pp. 2-3 (Doc 1-54).

Several government officials appointed the members of the Space Commission. The government officials included the chairman of the Committee on Armed Services of the U.S. House of Representatives, the chairman of the Committee on Armed Services of the U.S. Senate, the ranking minority members of the Committee on Armed Services of the U.S. House of Representatives, the Committee on Armed Services of the U.S. Senate, and the Secretary of Defense in consultation with the Director of Central Intelligence.[30]

The Space Commission had 12 members and a chairman. The chairman was Donald H. Rumsfeld. The members of the Space Commission included Duane P. Andrews, Robert V. Davis, Air Force (USAF) Gen Howell M. Estes III (retired), USAF Gen Ronald R. Fogleman (retired), Army (USA) Lt Gen Jay M. Garner (retired), William R. Graham, USAF Gen Charles A. Horner (retired), Navy Admiral David E. Jeremiah (retired), USAF Gen Thomas A. Moorman Jr. (retired), Douglas H. Necessary, USA Gen Glenn K. Otis (retired), and Senator Malcolm S. Wallop (retired). See the 11 January 2001 *Executive Summary of the Report of the Commission To Assess United States National Security Space Management and Organization* for the resumes of the Space Commission members.[31]

Colonel Gardner described his assessment about the qualifications of the Space Commission's members.

> "There perhaps couldn't have been any finer group of folks pulled together to take a look at this business. They have each brought to the Commission, unique backgrounds with respect to space. Many had already been observed as extremely influential within the space business, both when they were on active duty or in influential civil service positions. Most currently occupy key consultant roles today and continue to be very heavily involved with space. Essentially, the best possible set of minds and intellectual capacity had been assembled."[32]

The final appointments for the Space Commission were completed in late May 2000. The official standup of the Space Commission occurred on 1 June 2000, and the Commission had its first meeting on 11 July 2000.[33] On 28 December 2000, Rumsfeld

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[30] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, Executive Summary (no page number) (Doc 1-51).

[31] *Ibid*, p. Attachment A.

[32] Interview, Col William G. Gardner (SMC/XR) with Robert Mulcahy (SMC/HO) about the Space Commission, 16 January and 1 February 2002, p. 4 (Doc 1-54).

[33] HQ USAF, "Air Force Response Plan to the Space Commission Report,"

resigned as the Space Commission chairman when President-elect George W. Bush nominated him as the Secretary of Defense. David E. Jeremiah became the acting chairman of the Space Commission after Rumsfeld's resignation.[34]

Prior to 2001, SMC had a major interest in the Space Commission because of SMC's military space-orientated mission. The Space Commission's proposals could have vast, long-term affects to the organization and management of SMC and to the Air Force Space Command (AFSPC), particularly if the proposals recommended a separate, new military space service. The Air Force wanted to continue its role as the central DoD organization in charge of the nation's military space mission.[35] As of January 2001, the Air Force had "more than 85% of the DoD personnel, budget, assets, and infrastructure dedicated to space-related assets. On a daily basis, all U.S. military forces depend on the full set of space assets acquired and operated by the Air Force."[36] The Air Force welcomed proposals to improve its space organization and priority, but it also wanted to continue its dominant military role in space.[37]

The Space Commission consulted with senior government leaders while making its assessment. In the DoD, this included the Secretary of Defense and the Deputy Secretary of Defense. Senior military leaders were consulted, including the military Commanders in Chief or their representatives, the Vice Chairman, the Joint Chiefs of Staff and the Chief of Staff of the Air Force. Meetings were conducted to gain the input of the directors of the Central Intelligence Agency, the National Security Agency, the National Reconnaissance Office (NRO), the National Imagery and Mapping Agency, and the Administrator of the National Aeronautics and Space Administration (NASA). Leaders in industry and previous senior government officials were also consulted. The Space Commissioners had access to classified space information during their research that the DoD and the NRO made available.[38]

After six months of evaluating, the Space Commission submitted its assessment to Congress in the *Report of the Commission To Assess United States National Security Space Management And Organization*, on 11 January 2001. The report included the

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11 January 2001, p.17 (Doc 1-52).

[34] *Ibid.*, p. 17.

[35] *Ibid.*, pp. 3, 10, 28.

[36] *Ibid.*, p. 10.

[37] *Ibid.*, p. 3.

[38] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 6 (Doc 1-51).

Space Commission's recommendations for the role of space in future national security affairs. It also stated the challenges the U.S. would likely meet with its commercial, civil, defense, and intelligence interests in space. The objectives assessed the advancement of U.S. interests in space by encouraging the development of policies, technologies, operations, and the personnel needed to maintain U.S leadership. The Space Commission recommended alternative approaches to the organization and management of U.S. agencies involved in national security space, to include the DoD and the Intelligence Community.[39]

The Space Commission unanimously agreed on five central conclusions to improve DoD space organization, leadership, and priority. The first major proposal recommended naming the president as the final authority in setting the national space policy. At the time of the report, the responsibility and accountability for space had been widely distributed throughout the government, and it did not provide the needed attention for space matters. The Commission recommended that the president should have the authority to provide specific direction and guidance to senior government officials concerning space policies, and to make space interests a top national security priority. This would allow the president to have the authority to ensure the cooperation of all the space sectors, including commercial, civil, defense, and intelligence.[40]

The second central conclusion recommended realigning various space organizations (especially within the DoD and the Intelligence Community) to meet future national security space requirements. The report emphasized the need to restructure the space organizations within the Air Force. With America's increased dependence on space, more focus was required for national security in this area. The Commission recommended that several different space activities should be joined, chains of command modified, lines of communication opened, and policies adjusted to gain greater responsibility and accountability. The Commission believed that this would lead to better management and prioritization of DoD space.[41]

The Space Commission determined that it would be preferable to restructure the Air Force's space organizations rather than create a new military space department.[42] The report stated that the Air Force was the best organization for implementing future national security space requirements. "... a realigned, rechartered Air Force is best suited to organize, train and equip space forces."[43] At the time of the report, the Air Force

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[39] *Ibid.*, pp. 6-7.

[40] *Ibid.*, pp. 49-50, 99.

[41] *Ibid.*, pp. 89-90, 99.

[42] *Ibid.*, pp. 80-81.

[43] *Ibid.*, p. 89.

provided most of the bases and facilities for the DoD space missions, it developed and acquired most of the DoD space assets, it launched most of the national security space systems, and it operated most of the DoD space assets.[44] The NRO continued to be an exception, because it had the responsibility for developing, acquiring, and operating reconnaissance satellites.[45] Creating a space department did not get recommended, because, "There is not yet a critical mass of qualified personnel, budget, requirements or missions sufficient to establish a new department."[46]

The third conclusion recommended that the Secretary of Defense and the Director of Central Intelligence work more closely and cooperatively together with the space programs that support national security. These two officials had the primary responsibility for the space programs that supported the president in times of war, crises, and peace. If this working partnership could be more successful, the Commission believed it would resolve the disputes that occurred between the two bureaucracies, and it would help provide a more efficient system for gaining national security information.[47]

The fourth conclusion proposed developing a defense against future attacks to U.S. space systems. America depended on space more than any other nation, but its defense of these systems lacked in priority. The loss of its space systems would drastically affect the manner in which the U.S. military could conduct operations and gain intelligence. Potential attacks might destroy satellites, ground stations, or launch capabilities. Other hostile actions could include disrupting satellite functions with jamming equipment or sabotaging computer systems. The report regarded a future attack against space systems as inevitable. To maintain America's dominance in space, the capability to deter or defend against this potential aggression should be a high priority.[48]

The fifth and final central conclusion stated that the U.S. needed to invest in science and technology expertise in order to maintain its space superiority. More military space professionals would be required in the future to develop and master highly complex technology. An improved cadre of space experts needed to be developed with additional

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[44] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, pp.10, 27 (Doc 1-52).

[45] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 55 (Doc 1-51).

[46] *Ibid*, p. 80.

[47] *Ibid*, pp. 51, 100.

[48] *Ibid*, pp. 17-25, 100; HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p. 9 (Doc 1-52).

focus on education, training, and career development in the field. The Commission stressed that the U.S. government had to take an active role in expanding the pool of military and civilian talent in the areas of engineering, science, and systems operations. The increasing requirement for engineers and scientists should be a national priority. The report stated that the Air Force had to increase its number of officers with space career backgrounds, retain more of its officers who specialized in space, improve space training, and provide better career development in space.[49]

The Space Commission proposed several organization changes in its second conclusion. Among the most significant of these proposals, the Commission recommended that the Air Force should consolidate its space organizations within one command, the AFSPC. This included transferring SMC (space acquisition) from AFMC and realigning it to AFSPC (space operations). The realignment would make AFSPC the single organization to determine and implement the Air Force's space priorities. AFSPC would then gain the responsibility for both space acquisition and operations in a "cradle-to-grave" management system of the Air Force space programs. The Commission believed this realignment would allow space acquisition specialists to gain knowledge and experience in space operations and vice-versa. It would help streamline the space acquisition process by enabling the Air Force to develop and incorporate future space systems in less time. AFSPC would also manage the space career field, and develop a cadre of space professionals who would establish doctrines and accomplish the DoD space requirements. To help make space a greater priority, the Commission also recommended assigning a four-star general to command AFSPC.[50]

The Space Commission recommended designating the Air Force as the DoD Executive Agent for Space, responsible for meeting the space requirements for all of the armed forces. The report stated, "... the Secretary of Defense [should] designate the Air Force formally as the Executive Agent for Space, with department-wide responsibility for planning, programming and acquisition of space systems."[51] The Air Force carried most

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[49] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 42-47, 100 (Doc 1-51).

[50] *Ibid.*, pp. 88-90, 93; SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); SSgt A.J. Bosker, "Commission calls for single space organization," Air Force Link, 12 January 2001, pp. 1-3, http://www.af.mil/news (Doc 1-55); No author, "Air Force begins the transformation of space," Air Force Link, 9 May 2001, pp. 1-3, http://www.af.mil/news/May2001/n20010509_0629.shtml (Doc 1-56).

[51] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 89, 92-93 (Doc 1-51).

of the burden for providing and financing the necessary space assets for all of the armed forces while lacking the formal Title 10 United States Code (USC) authority of them.[52] "... although the Army and the Navy represent DoD's largest users of space products and capabilities, their budget activities consistently fail to reflect the importance of space. Their rationale is that space technology projects should be funded by the Air Force."[53]

The Space Commission recommended that the Army and Navy continue to develop and fund space programs that met their unique requirements, and submit them to the Executive Agent to be included in the joint space program. Making the Air Force the Executive Agent for Space was expected to improve the organization of DoD space programs, improve the budgeting and planning for space, plus increase the priority of space within the Air Force.[54]

The Space Commission made additional significant recommendations for leadership positions and responsibilities in DoD space. The Under Secretary of the Air Force should be designated as both the Air Force Acquisition Executive for Space and as the Director of the NRO - responsible for both Air Force and NRO space acquisition. The Commission recommended that the Air Force should receive the responsibility under Title 10 USC to organize, train, and equip for space. The Commission made several additional leadership recommendations for space that can be found in their report.[55]

The Space Commission proposed that the Air Force and the NRO should align their space programs. "The Department of Defense and the Intelligence Community would benefit from the appointment of a single official within the Air Force with authority for the acquisition of space systems for the Air Force and the NRO based on the "best practices" of each organization. Assign the Under Secretary of the Air Force as the Director of the National Reconnaissance Office."[56] The Air Force considered the merger proposal with the NRO "conceivable," but not in the near future.[57]

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[52] *Ibid.*, pp. 55, 75-76; HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p.10 (Doc 1-52); SSgt Jason Tudor, "Space doctrine starts from the ground up," Space Observer, 17 August 2001, pp. 1, 3 (Doc 1-57).

[53] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 76 (Doc 1-51).

[54] *Ibid.*, p. 93.

[55] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, pp. 90-92 (Doc 1-51); Memo, Secretary of the Air Force to ASD/C3I, "Air Force Input to SecDef Response to Space Commission Report," 23 February 2001, pp. 1-5, 90-91, (Doc 1-58).

[56] Space Commission, "Report of the Commission to Assess United States National Security Space Management and Organization," 11 January 2001, p. 90 (Doc 1-51).

The Air Force reviewed the Space Commission's report, and agreed with its proposals about how to improve national defense in space and give it the necessary priority.[58] The Acting Secretary of the Air Force, Lawrence J. Delaney, stated in a 23 February 2001 memorandum, "After a thorough review of the Report, the Air Force fully supports all findings and recommendations."[59]

The Space Commission report would significantly affect SMC in the near future as the recommendations are implemented. To begin with, the Air Force realigned SMC from AFMC to AFSPC on 1 October 2001. The organization, training, education, acquisition, and priority for DoD space activities should all be affected as the Space Commission proposals are implemented.[60]

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[57] HQ USAF, "Air Force Response Plan to the Space Commission Report," 11 January 2001, p. 35 (Doc 1-52).

[58] SSgt A.J. Bosker, "Space Commission calls for consolidation," Air Force Link, 22 January 2001, p. 1, http://www.spacecom.af.mil/hqafspc/news/news_asp/nws_tmp .asp?storyid=01-07 (Doc 1-59); SSgt A.J. Bosker, "Air Force welcomes Space Commission's recommendations," Air Force Link, 8 February 2001, pp. 1-2, http://www. af.mil/news/Feb2001/n20010208_0185.shtml (Doc 1-60).

[59] Memo, Secretary of the Air Force to ASD/C3I, "Air Force Input to SecDef Response to Space Commission Report," 23 February 2001, (Doc 1-58).

[60] SMC/PA, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1, 3 (Doc 1-24); Peggy Hodge, SMC/PA, "'It's official!' AFSPC welcomes SMC into family," Astro News, 5 October 2001, p. 1 (Doc 1-26); Gerry Gilmore, "SPACECOM chief: Space must be top national priority," Astro News, 20 April 2001, pp. 1, 2 (Doc 1-61); Tim Dougherty, "SMC commander talks realignment, addresses concerns at town hall," Astro News, 27 July 2001, pp. 1, 3 (Doc 1-62); Cleota Drysdale, SMC/PA, "New career cross-flow between space ops and acquisitions," Astro News, 16 November 2001, pp. 1, 3 (Doc 1-63).

# CHAPTER 2
# RESOURCES

## Year 2000 (Y2K) Computer Rollover

Until the 1990s, the computer industry used only the last two digits (from 00 to 99) to count the current year when they programmed their memory chips. The programmers hard-coded the first two numbers (designating the century) as "19" (as in the 20th century) without a rollover to "20" for the 21st century. Many programmers were shortsighted and did not expect the software programs they produced to continue being used into the 21st century. With this assumption, the programmers did not adjust the time systems to go beyond 1999. At 0000 hours on 1 January 2000, the computers that did not get modified to rollover to the year 2000 (Y2K) would misinterpret the date as 1 January 1900, and potentially cause widespread computer failures for both individual computers and entire computer networks. In the early 1990s, the Y2K situation became a widely publicized concern, as computer experts acknowledged the potential crises and worked to remedy the situation. The Y2K-type concerns also existed for the leap year rollover on 29 February to 1 March 2000, and the rollover from 31 December 2000 to 1 January 2001.[1]

To maintain their operational statuses, every Air Force mission depended on its computer systems. The Air Force could potentially have had computer failures for its nuclear weapons systems, space systems, communications networks, command and control infrastructure, and its support systems, among several other disastrous possibilities if Y2K failures became a widespread reality. The Air Force also had concerns about the threat of information warfare by terrorists or foreign governments who might gain military intelligence if potential Y2K problems left the security of Department of Defense (DoD) computer systems vulnerable to espionage.[2]

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[1] 1Lt Yolanda Dozier, "Y2K is coming – what can you do to prepare at home?," Astro News, 23 April 1999, p. 7 (Doc 2-1); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 5-6 and 14 (Doc 2-2); Charter (FOUO, info used not FOUO), SMC/AXEC, "AFMC Year 2000 (Y2K) Issue IPTS Charter," no date (Doc 2-3).

[2] Dean J. Scouloukas, "Y2K computer glitch to trigger major global crises," USA Today, 30 July 1998, p. 11A (Doc 2-4); Associated Press, "Pentagon feels confident Y2K bug will be tamed," Gazette Telegraph, 15 January 1999, p. A7 (Doc 2-5); Memo, HQ AFMC/SC to SMC/CC et al., "Year 2000-Continuity of Operations Readiness Planning," 2 February 1999, (Doc 2-6); John Diedrich, "Russians get first look at missile warning center," The Gazette, 22 September 1998, p. 2 (Doc 2-7); Memo (FOUO, info used not FOUO), HQ AFMC/CC to SMC/CC et al., "Homestretch to Year 2000 (Y2K)," 24 November 1999, p. 7 (Doc 2-8); History of Air Force Materiel Command 1 October 1998 – 30 September 1999 (Secret, extract is U), HQ AFMC/HO, p. 210.

The Air Force made it a top priority to ensure its computer systems became Y2K-compliant prior to 2000. In June 1997, Gen Ronald R. Fogleman, the Chief of Staff of the Air Force, made fixing the Y2K problem the Air Force's top software sustainment issue. The Air Force Communications Agency (AFCA) became the overall focal point for the Y2K resolution effort throughout the Air Force. The HQ Air Force Materiel Command (AFMC) became the Y2K focal point for all AFMC units as it supported AFCA in the Y2K effort. SMC reported its Y2K assessments and compliance to HQ AFMC.[3]

The Air Force established Y2K Working Groups to provide information and directions about Y2K to the various Air Force commands and program offices. These groups assessed the Y2K problems, and relayed instructions about attaining Y2K compliance. The Directorate of Systems Acquisition (SMC/AXE) initiated the Y2K Working Group for SMC in October 1995.[4]

Eric Shulman (SMC/AXEC), a civilian software engineer for the Air Force, managed the Y2K Working Group at SMC. The Directorate of Systems Acquisition assigned him to be the project officer for Y2K issues at SMC from October 1995 until December 1999. A 1997 memorandum initially estimated that SMC managed 50 systems that required a thorough assessment for potential Y2K impacts. In a document he wrote in February 1997, Shulman described the Y2K problems that SMC faced. His introduction provided an informative background of the Y2K issue.[5]

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[3] E-mail, Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K Working Groups," 26 February 2001, (Doc 2-9); Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)... System Assessments for the Year 2000 Program, Space and Missile Systems Center...," November 1997, (Doc 2-10); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, pp. 202-203, 210-212.

[4] E-mail, Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K Working Groups," 26 February 2001, (Doc 2-9); Letter, SMC/CC to SMC/AX, "... thanks for the outstanding support Mr Eric Shulman," 28 January 2000, (Doc 2-11); Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12).

[5] Letter, SMC/CC to SMC/AX, "... thanks for the outstanding support Mr Eric Shulman," 28 January 2000, (Doc 2-11); Memo, SMC/AX and SMC/PK to Distribution, "SMC Guidance for Y2K Compliance," 30 September 1998, (Doc 2-13); Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)... System Assessments for the Year 2000 Program, Space and Missile Systems Center...," November 1997, (Doc 2-10); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, (Doc 2-2); Document (FOUO, info used not FOUO),

"Y2K is a serious problem. How did we get here? Most of the software that drives SMC and MWSSS [Missile Warning Space Surveillance Sensors] systems was written starting in the [19]70s and was rewritten, fixed, modified, and in some cases replaced. But this was always based on existing code. New systems were brought on line even in the [19]90s without incorporating compliant code. While date processing was critical to the operation of our systems, poor programming practices, reliance on old code, and assumptions that 'the system won't be around in the year 2000' led to a number of date processing problems to include Y2K. Thus, a time bomb had been planted. Complicating the environment is the wide variety of high order languages, such as C, Ada, COBOL, Fortran, Jovial, and PASCAL and real time languages used to support the missions. System specific assembly code such as MAC50, COMPASS, and RTL were used to meet time requirements.

"How real is the problem? A majority of the systems that have been analyzed and tested to date have shown significant Y2K impacts. Some of the systems have 'compliant code' where compliant code means the YYYYMMDD [year, month, day] eight-digit date code is used. In all fairness the six digit YYMMDD was mandated by Federal Information Processing Standards beginning in 1970."[6]

The Y2K Working Group provided compliance strategies and instructions from higher headquarters in addition to information from the computer industry. It also established and maintained a Y2K web site for the latest information and directions. SMC utilized a Y2K database to record the Y2K status for the program offices.[7]

The Y2K Working Group at SMC instituted the Air Force's "Weapon System Strategy for Year 2000." SMC used this five-phase strategy (Y2K awareness, assessment, renovation, validation, and implementation) as a guide to assess its Y2K issues, and the steps it would take to make the computer systems Y2K compliant. Phase One focused on promoting Y2K awareness and developing a Y2K Action Plan so an organized Y2K process could be established. The plan directed the two-letter offices to

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Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 19 (Doc 2-14).

[6] Document (FOUO, info used not FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 2 (Doc 2-14).

[7] Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12); Memo (FOUO, info used not FOUO), Lt Gen Otto Guenther to distribution, "Use of the Year 2000 (Y2K) Compliance Checklist," circa June 1997, (Doc 2-15); E-mail (FOUO, info used not FOUO), 61 CS Comm Center Image to SMC/CCA, "AF Year 2000 Database Data Quality," 4 September 1998, (Doc 2-16).

designate a Y2K point of contact for coordinating the Y2K program. Among other objectives, the Action Plan determined the activities that had to be accomplished, a time estimate of the activities, established goals and objectives, and it provided guidance for the formal testing of the software. Phase One had an AFMC completion deadline of June 1997.[8]

Phase Two consisted of a Y2K assessment of each computer system and its software. The Y2K Action Plan required three-letter programs to prepare and maintain an inventory of their computer systems and software that might have Y2K issues. The Y2K problems first had to be identified, then as the programmer investigated each occurrence, the programmer filtered out the problems until he identified the core problems. Scanning through the source code proved to be the most direct way of identifying Y2K problems. Eric Shulman stated, "Testing is really an iterative process. 'Test a little – Code a little' proved to be a very effective way of analyzing the software and prototypes. As each problem was encountered, a prototype was developed to allow further testing of the system."[9] A document called the "Y2K Scorecard" provided a summary of the Y2K status at SMC. The SMC program offices had to produce their Y2K status to AXEC on a monthly basis so the information could be incorporated into the Y2K Scorecard to help determine the Y2K priorities and the criticality of the mission. Phase Two had an AFMC completion deadline of October 1997.[10]

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[8] Memo (FOUO, info used not FOUO), AFAA Area Audit Office to SMC/CC and AFMC/CC, "(Draft)… System Assessments for the Year 2000 Program, Space and Missile Systems Center…," November 1997, p. 2 (Doc 2-10); Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, pp. 1-2 (Doc 2-17); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 8-9 (Doc 2-2); Document (FOUO, info used not FOUO), Eric Shulman (SMC/AXEC), "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 4-5 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[9] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, pp. 8 and 11 (Doc 2-2).

[10] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and Space Systems Support Group, Peterson AFB, "Solving the Year 2000 Software Problem," 16 May 1997, p. 8 (Doc 2-2); Charter (FOUO, info used not FOUO), SMC/AXEC, "Charter For SMC Year 2000 Working Group," no date, (Doc 2-12); Lt Col King (FOUO), "CW Year 2000 (Y2K) Action Plan (Draft)," 15 December 1996, (Doc 2-19); Document (FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 3-8 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extract is not FOUO), HQ AFMC/HO,

Phase Three renovated the computer systems. This phase involved the actual "fixing" of non-compliant system components. Determinations were made about the process of achieving Y2K compliance. After the process was resolved, then the planning, accomplishing, and verifying the corrective actions would be undertaken. The computers had their times forwarded to the Y2K-sensitive dates to test their reactions. If the systems could not be removed from dedicated operation, the programmers simulated the system's operation using an alternate platform for the testing; this alternative had serious drawbacks because questions remained about whether simulated testing could rigorously test the systems. Phase Three had an AFMC completion deadline of June 1998.[11]

Phase Four verified and certified the systems for Y2K compliance. The renovated computer systems would be tested prior to putting them into operation. A manager had to sign a document stating that everything in the Y2K certification checklist had been completed. The certification stated that the system would function in an acceptable manner, whether fully Y2K compliant or non-compliant. Phase Four had an AFMC completion deadline of September 1998.[12]

Phase Five implemented the computer systems. This was the final phase of the Y2K compliance strategy. It focused on placing the Y2K compliant systems into operation after they completed all the Y2K tests and had all the Y2K certifications. Phase Five had an AFMC completion deadline of December 1998.[13]

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p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[11] Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000," 11 August 1997, p. 2 (Doc 2-17); Document (FOUO, info used not FOUO), Eric Shulman (SMC/AXEC), "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, pp. 8-10 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 September 1996, p. 9 (Doc 2-18).

[12] Memo (FOUO, info used not FOUO), Lt Gen Otto Guenther to distribution, "Use of the Year 2000 (Y2K) Compliance Checklist," circa June 1997, (Doc 2-15); Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, p. 2 (Doc 2-17); Document (FOUO, info used not FOUO), Eric Shulman, SMC/AXEC, "Solving the Year 2000 Software Problem at SMC and SSSG [Space Systems Support Group]," 7 February 1997, p. 7 (Doc 2-14); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 Sep 1996, p. 9 (Doc 2-18).

[13] Strategy (FOUO, info used not FOUO), SMC/AXEC, "(Draft) Weapon System Strategy for Year 2000,"11 August 1997, p. 2 (Doc 2-17); History of Air Force Materiel

Y2K compliance within the classified programs at SMC proved to be a problem for the Y2K Working Group. If a program determined that its data was classified, the program could withhold the status of their Y2K compliance from the Y2K database. These programs reported their Y2K status to the SMC commander. At times this situation proved to be difficult for the Y2K experts when they made their overall assessments of the Y2K status at SMC. Out of necessity, the classified programs limited the access to their computer systems, but this sometimes hindered the Y2K experts in their progress to update the classified systems to Y2K compliance.[14]

Some of the space programs did not meet the various Y2K-compliance deadlines. Delays were sometimes caused by limited resources, technical difficulties, and the vast amounts of software and code that had to be renovated. The program offices wrote a contingency plan (Continuity of Operations Plan [COOP]) for their mission critical systems that provided alternative measures that could be used to ensure the continuity of their operations in case the Y2K fixes did not get completed or proved to be ineffective. These contingency plans had to be completed by 26 March 1999 and exercised by 30 June 1999.[15]

SMC had 60 total systems to make Y2K-compliant, 42 of them were mission critical/essential systems. As of 5 January 1999, 24 of the 42 mission essential systems completed the Y2K processing, one was in decommission, two were in renovation, five were in validation, four were in implementation, and six were in development. The Air Force considered a computer system "Y2K compliant" after it finished all of the Y2K

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Command 1 October 1997 – 30 September 1998 (FOUO, info used not FOUO), HQ AFMC/HO, p. 204; Briefing Charts (FOUO, info used not FOUO), HQ AFMC/DRS, "AFMC Y2K Status Briefing," 9 Sep 1996, p. 9 (Doc 2-18).

[14] Document (FOUO, info used not FOUO), AFAA to SMC/AXEC, "Y2K Audit Review Comments," 1997, (Doc 2-20); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21).

[15] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Systems Missing Year 2000 Renovation Date," 29 July 1998, (Doc 2-22); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail, IMAGE to SMC/CCA et al., "Contingency Plans," 8 January 1998, (Doc 2-24); Plan (FOUO, info used not FOUO), 61 ABG/CC, "Los Angeles Air Force Base Continuity of Operations Plan," 30 March 1999, (Doc 2-25); Memo, HQ AFMC/SC to SMC/CC et al., "Year 2000-Continuity of Operations Readiness Planning," 2 February 1999, (Doc 2-6); History of Air Force Materiel Command 1 October 1997 – 30 September 1998 (FOUO, extracts are not FOUO), HQ AFMC/HO, pp. 207, 214-217; E-mail (FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21).

processes; the "Y2K completion date" was when the computer system had finished all of the Y2K processes and had completed the administrative requirements.[16]

All the AFMC centers required battle staffs on a 24-hour basis beginning 30 December 1999 in case a Y2K emergency took place. The battle staff operations originally had schedules to continue operations until 15 January 2000, because Y2K problems might have taken several days to develop, depending on when the computer system ran.[17]

SMC completed most of its Y2K-compliance renovations prior to 1 January 2000. Two space systems did not complete the Y2K processes. The Titan IV Solid Rocket Motor Upgrade (SRMU) did not finish processing their computer systems by 2000, because the Air Force did not schedule their next launch until June 2000, so they had no urgency to complete it. The Titan IV SRMU computers completed their Y2K compliance prior to June and did not have any problems.[18]

The Air Force Satellite Control Network's (AFSCN) Orbital Analysis System (OAS) at Schriever AFB, Colorado did not complete the needed Y2K procedures by 1 January 2000. Development on the AFSCN OAS began in 1998; it was a new capability that had been minimally addressed by other hardware systems. The 50th Space Wing (SW) began developing the OAS prior to Y2K and intended it to accomplish the following tasks: carry out conjunction assessments that warned satellite operators if two satellites were getting too close together; to help determine satellite visibility angels; and to determine if satellites in orbit were in line with each other. During the OAS development, the 50 SW continued to use its baseline systems. Some of the Y2K procedure deadlines for the OAS did not get completed on schedule due to: DoD policy

[16] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Y2K Status Update," 14 December 1999, p. 9 (Doc 2-26); Document (FOUO, info used not FOUO), "Background Paper On SMC Year 2000 (Y2K) Status," 21 January 1999, (Doc 2-27); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, with Robert Mulcahy, SMC/HO, "Y2K Compliancy Date and Y2K Completion Date," 8 May 2002.

[17] Memo, HQ AFMC/XP to ALHQCTR/CC et al., "Y2K Critical Event-CY1999-CY2000 Rollover," 3 December 1999, (Doc 2-28); SSgt Cynthia Miller, Air Force News, "Air Force continues close watch on Y2K," 4 January 2000, http://www.af.mil/news/Jan2000/n20000104_000006 (Doc 2-29).

[18] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K edits," 9 April 2001, (Doc 2-21); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33).

delays; problems integrating several Commercial, Off-The-Shelf (COTS) hardware and software products; and due to the Base Realignment and Closure Commission (BRAC) of Onizuka Air Station, California. Several Onizuka missions moved to Schriever AFB and displaced units of the 22nd Space Operations Squadron from their main operations building where they created the OAS orbital products. The OAS development team identified a schedule slip in August-September 1999 for completing the Y2K processing.[19]

The AFSCN OAS became Y2K compliant on 10 September 1999, but the Air Force did not expect the Y2K completion date until March 2000. AFSCN then required the assistance of the 1st Command and Control Squadron (1 CACS) (redesignated the 1st Space Control Squadron on 1 October 2001) of the Cheyenne Mountain Operations Center (CMOC) at Peterson AFB, Colorado. The Air Force established procedures for requesting conjunction assessments on a limited basis beginning 1 January 2000 until the AFSCN OAS had "turned over" (completed development and declared operationally viable) and had accomplished its Y2K completion. The 50 SW practiced the procedures at Schriever AFB in late 1999.[20]

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[19] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC, "SMC Year 2000 Update to AFSPC/CV," 19 May 1999, pp. 16-18 (Doc 2-30); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "HQ AFMC/CC Year 2000 Update," 27 September 1999, (Doc 2-31); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "AFSPC/CC Year 2000 Update," 29 September 1999, pp. 6-8 (Doc 2-32); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33); E-mail, Capt Wesley Turner, SMC/Det11/ CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "Clarification," 29 May 2002, (Doc 2-35); E-mail, Capt Wesley Turner, SMC/Det 11/ CWSNC, to Robert Mulcahy, SMC/HO, "Another clarification," 29 May 2002, (Doc 2-36).

[20] Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "HQ AFMC/CC Year 2000 Update," 27 September 1999, (Doc 2-31); Briefing Charts (FOUO, info used not FOUO), SMC/CW to AFMC/CC, "SMC Systems Late in Completing Y2K," 1 March 1999, pp. 12-14 (Doc 2-37); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "Final Year 2000 Review," 20 December 1999, p. 8 (Doc 2-38); Briefing Charts (FOUO, info used not FOUO), SMC/AXEC and SMC/CW, "AFMC/CC Year 2000 Update," 17 December 1999, (Doc 2-39); Fact Sheet, Peterson AFB, "1st Space Control Squadron," printed 22 May 2002, http://www.peterson.af.mil/21sw/library/fact_sheets/1cacs.htm (Doc 2-40); E-mail, SSgt Trisha Morgan, SW/HO, to Robert Mulcahy, SMC/HO, "1st Space Control Squadron," 28 May 2002, (Doc 2-41); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34).

On 1 January 2000, the AFSCN implemented the Y2K Contingency Plan for the OAS. The CMOC orbital analysis workshop (a computer operations center) used their OAS computers to do collision avoidance calculations on a limited basis and provided 10 percent to 20 percent of the 50 SW's projected need. The 50 SW continued to use its baseline systems, and it telephoned into the CMOC orbital workshop during business hours. Around April 2000, the AFSCN OAS accomplished its Y2K completion, finished the turnover, and garnered a fully operational status.[21]

A classified reconnaissance satellite system experienced a Y2K failure during the 1 January 2000 rollover. On 4 January 2000, the Deputy Secretary of Defense, John Hamre, announced the failure of a "significant" reconnaissance satellite system to the media. Hamre declined to identify the intelligence system that failed, how many satellite(s) failed, or which government organization (probably the National Reconnaissance Office) operated the system. The space system had been successfully Y2K tested in segments prior to 2000, but it could not be tested altogether because of its operational necessity to national defense. The system crashed after the rollover occurred simultaneously to the entire space system on 2000. It took about four hours for the space operators to determine what happened to the failed system. The operators had control over the satellite(s) after the failure, but they could not process or receive any information from the ground. An unnamed, backup reconnaissance system took over operations for the failed space system after several hours had passed, and provided the majority of the information supplied by the failed space system. Hamre stated that the failure had an "insignificant impact" to national intelligence capabilities, because of the use of the backup system. The failed reconnaissance space system rapidly received repairs for its Y2K problems, and became fully operational again on the afternoon of 2 January 2000.[22]

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[21] Briefing Charts (FOUO, info used not FOUO), SMC/CW, "Year 2000 Emergency Response Team Plan," 17 December 1999, (Doc 2-42); Discussion (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Space systems that did not complete the Y2K process," 8 May 2002; E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "FW: Y2K," 20 May 2002, (Doc 2-33); E-mail, Capt Wesley Turner, SMC/Det 11/ CWSNC, to Robert Mulcahy, SMC/HO, "RE: Y2K," 28 May 2002, (Doc 2-34); E-mail, Capt Wesley Turner, SMC/Det 11/CWSNC, to Robert Mulcahy, SMC/HO, "[Y2K] Completion Date," 30 May 2002, (Doc 2-43); E-mail, Capt Wesley Turner, SMC/Det 11 /CWSNC, to Robert Mulcahy, SMC/HO, "OAS Summary," 31 May 2002, (Doc 2-44).

[22] Internet Document, DefenseLink, "DoD News Briefing [Deputy Secretary of Defense John J. Hamre]," 4 January 2000, http://www.defenselink.mil/news/Jan2000/t01042000_t0104asd.html (Doc 2-45); Internet Document, Paul Stone, "DoD Stands Down Y2K Operations Center," 5 January 2000, http://www.defenselink.mil/news/Jan2000/n01052000_20001052.html (Doc 2-46).

Los Angeles AFB did not have any serious Y2K problems. The commander of the 61st Air Base Group (Col David Price) summarized the results of the Y2K effort on base in the 28 January 2000 issue of *Astro News*.

> "Base organizations were well prepared for the year 2000 rollover, and it passed without incident. Our communications squadron worked hard to ensure that the base's comm/computer infrastructure was 100 percent ready-and it was! Nevertheless, the command post, civil engineers and communication squadron had people on duty around the clock over the New Year's weekend just in case a Y2K emergency surprised us. The senior battle staff was also on-call Dec. 31 through New Year's Day-just in case. Thanks to a comprehensive base wide planning effort and thorough system testing by our communications squadron, the calendar change we experienced was truly a non-event. Great job everyone!"[23]

SMC shut down its Y2K offices in February 2000.[24] Eric Shulman summarized the seriousness of Y2K at SMC.

> "If SMC had not conducted any Y2K fixes, or had not completed the most important Y2K fixes in time, Y2K at SMC probably would have resulted in several system operational degradations and perhaps failures. As an example, if the IBM 4381s [mainframes] used by DSP, the Ranges, and GPS had not been replaced/patched, the systems would have had some serious problems. If the telephone system at SMC was not replaced, you would have been without phones after December 31, 1999."[25]

The DoD spent $3.5 billion and used thousands of people to prepare the DoD computer systems for Y2K. AFMC had the responsibility of making 2,356 computer systems Y2K compliant, and all but one of them accomplished this goal; the Y2K turnover had almost no effect to AFMC. Overall, the DoD had minimal Y2K problems according to Deputy Secretary of Defense John Hamre.[26]

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[23] Col David Price, "Los Angeles AFB begins the new century," Astro News, 28 January 2000, p. 2 (Doc 2-47).

[24] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE, to Robert Mulcahy, SMC/HO, "Y2K info," 15 March 2001, (Doc 2-23); E-mail, Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "RE: Y2K Nice Job," 12 August 2002, (Doc 2-49).

[25] E-mail (FOUO, info used not FOUO), Eric Shulman, SMC/AXE to Robert Mulcahy, SMC/HO, "Re: IBM 4381," 13 March 2002, (Doc 2-48).

[26] Internet Document, SSgt Kathleen T. Rhem, "Computer Security, Y2K Effort Top Hamre Accomplishments," 22 March 2000, p. 2 (Doc 2-50); Internet Document, Paul Stone, "DoD Stands Down Y2K Operations Center," 5 January 2000, http://www.defenselink.mil/news/Jan2000/n01052000_20001052.html (Doc 2-46); History of Air Force Materiel Command 1 October 1999 – 30 September 2000 (FOUO, info used not FOUO), HQ AFMC/HO, pp. 177-179.

## LAND and FACILITIES

### Systems Acquisition Management Support (SAMS) Complex

By the fall of 1997, the Air Force began evaluating a facility modernization initiative for Los Angeles AFB that it designated the "Systems Acquisition Management Support (SAMS) Complex" project. The SAMS project proposed trading base property (including the 41-acre Area A) to a private real estate developer in exchange for the construction of new, seismically-secure Air Force facilities in Area B.[27]

In 2001, Area A consisted of six two-story buildings and one six-story building (constructed between 1956 and 1959) totaling approximately 835,000 square feet. The Air Force purchased the complex from the Ramo-Wooldridge Corporation in 1960. The older buildings at Area B (mainly built in the mid-1950s) originally supported aircraft production by the Douglas Aircraft Company. Largely due to the numerous base closure evaluations that had been conducted on Los Angeles AFB since the 1970s, no major renovations had been completed on the base facilities since their construction. The outdated buildings at Los Angeles AFB had numerous structural and deterioration problems in 2001. They were particularly susceptible to potential earthquake damage that placed personnel at significant risk.[28] Col Dieter Barnes (61 Air Base Group [ABG] Commander) organized and led the "Area A Integrated Product Team (IPT)" that included eight members of SMC/AXF and one from the 61 ABG Civil Engineering. The IPT produced a document on 25 July 1997 entitled, *Area "A" Facilities Assessment* that described the facility conditions on base and initiated SAMS project.[29]

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[27] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 1, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[28] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 1, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51); Document, Area A Integrated Product Team (FOUO, info used not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 1 and 5 (Doc 2-52); E-mail, Peggy Hodge, SMC/PA, to Robert Mulcahy, SMC/HO, "RE: SAMS History Review [this E-mail clears the entire eight-page description of SAMS in this SMC History 1998-2001 for public release]," 18 February 2004, (Doc 2-52-1); Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/section3.htm (Doc 2-53).

[29] Area A Integrated Product Team (FOUO, info used not FOUO), "Area "A" Facilities Assessment," 25 July 1997, (Doc 2-52).

*Area "A" Facilities Assessment* outlined the many defects within the Area A facilities. The main problem was the facilities' failure to meet earthquake safety design standards for Los Angeles County. On 1 December 1994, President Clinton approved Executive Order 12941 that set the minimum seismic safety standards for existing federally owned or leased buildings. The Interagency Committee on Seismic Safety in Construction established the seismic safety standards. The Air Force Civil Engineering headquarters at the Pentagon issued a memorandum on 18 May 1995 that required Air Force compliance with Executive Order 12941 and directed "... the Air Force to assess the seismic safety of existing buildings constructed without adequate seismic standards and to estimate the cost of mitigation."[30]

The Area A facilities had two seismic safety evaluations during the 1990s. The first evaluation was completed prior to Executive Order 12941. Wheeler & Gray, Inc. Consulting Engineers accomplished an earthquake evaluation on Buildings 100, 105 and 110 in February 1990. In accordance with the Uniform Building Code (UBC) of 1988, the three buildings were determined to be "structurally inadequate to resist lateral forces." The report stated that shear walls of concrete needed to be added to the facilities, and that seismic bracing should be constructed for the plumbing, air-ducts, and electrical wiring.[31]

In July 1996, the URS Consultants of San Francisco conducted a "rapid" seismic evaluation of Buildings 100, 105 and 120. This analysis determined the ability of the facilities to withstand an earthquake and evaluated their risk to human safety. Buildings 110, 115 and 125 had similar construction to Building 100, so URS Consultants assumed they had the same seismic safety conditions. The evaluation assessed all six buildings to be inadequate for seismic safety both structurally and non-structurally (partition, ceiling, light fixtures, cladding/glazing, mechanical & electrical, piping, and duct). The facilities did not meet the earthquake safety standards stated in the 1994 UBC. To comply with seismic life-safety, the Area A buildings needed to infill the shear walls, construct additional new shear walls, have building columns wrapped to support the floor slabs, and brace the interior subsystems.[32]

The facilities within Area A also did not meet the fire protection standards. The guidelines were listed in the Military Handbook (dated 29 April 1994) *Fire Protection for Facilities, Engineering, Design, and Construction* (MIL-HDBK-1008B), the *National Fire Codes* published by the National Fire Protection Association, and sections of the 1994 UBC. The buildings met the fire safety regulations until the mid-1990s; after that,

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[30] *Ibid* (FOUO, info used not FOUO), pp. 8 and 39-40.

[31] *Ibid* (FOUO, info used not FOUO), pp. 6-8 and 30.

[32] *Ibid* (FOUO, info used not FOUO), pp. 9-11.

the fire sprinklers and egress capabilities in the Area A buildings did not meet the existing standards.[33]

By 2001, the Area A facilities were over 40 years old and had numerous deficiencies that the 1997 *Area "A" Facilities Assessment* described. The aging electrical systems in the buildings became a problem to maintain and repair largely due to the insufficient spare parts. The electric wiring continued to deteriorate with age and should have been replaced.[34] "The current telephone management system is old, unreliable, and [has a] a Single Point of Failure should it fail."[35] Most of the heating, ventilation, and air conditioning (HVAC) units and their controls continued to deteriorate and should have been replaced. Major renovation work was recommended for the interior ductwork, the ceilings, and the lighting. Asbestos and lead paint could be found throughout the Area A facilities, but a comprehensive survey had not been accomplished in the buildings. The dominant office layout in the Area A facilities had each person in an individual office, rather than the current Air Force preference for open-bay, cubicles.[36] The Executive Summary in the 1997 *Area "A" Facilities Assessment* concluded by stating, "… due to their [Area A facilities] age and lack of previous funding for major renovations, these facilities currently do not provide a quality work environment for Air Force and civilian personnel."[37]

The predicted cost to bring Area A into safety compliance was prohibitive. An executive summary (dated 3 May 1999) estimated the cost of modernizing the base and bringing Area A up to safety compliance standards. "Fire safety and seismic upgrades alone are estimated to cost $69 million. Another $117 million would be required for necessary modernization projects. The cost of new facilities for the SMC work force would be well in excess of $100 million."[38]

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[33] *Ibid* (FOUO, extract is not FOUO), p. 13; Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, p. 2, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[34] Area A Integrated Product Team (FOUO, extract is not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 7 and 14 (Doc 2-52).

[35] *Ibid* (FOUO, extract is not FOUO), p. 14.

[36] *Ibid* (FOUO, extract is not FOUO), pp. 7, 15-16, 32-33, 37, 57; Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54).

[37] Area A Integrated Product Team (FOUO), "Area "A" Facilities Assessment," 25 July 1997, p. 1 (Doc 2-52).

[38] Staff Summary Sheet, SMC/PK to SMC/CC, "Letter of Transmittal to AFMC, Acquisition Management and Support (SAMS) Complex Legislation," 3 May 1999, with

**Illustration 2-1 Area A of Los Angeles AFB**

The SAMS project proposed that the Air Force trade up to 57 acres of Los Angeles AFB real property to a private real estate developer in exchange for the construction of new, seismically-secure Air Force facilities (totaling approximately 580,000 square feet) within Area B. The Air Force intended to use the best commercial policies in the implementation of the SAMS project. The proposed land the Air Force could exchange included Area A, the 13-acre Lawndale Annex (30,000-square feet) in Hawthorne, California on the east side of Aviation Boulevard between Rosecrans Avenue and Marine Avenue, and the 3.7-acre former Armed Forces Radio and Television Service facility (59,600-square feet) located at 10888 Latuna Canyon Road in Sun Valley,

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four attachments: Memo, SMC/CC to AFMC/CE, "Los Angeles Air Force Base Modernization Project Draft Legislation," 12 May 1999, and Executive Summary, "Proposed Legislation: 'Los Angeles Air Force Base Modernization,'" no date, and Draft Legislation, "Sec.__. Los Angeles Air Force Base Modernization," 3 May 1999, and Sectional Analysis For Proposed Legislation, "Los Angeles Air Force Base Modernization," 3 May 1999, (Doc 2-55).

California. Upon the completion of the new facilities in Area B, Los Angeles AFB would relocate all of its personnel from the exchanged sites (Area A and the Lawndale Annex). The real estate contractor would likely demolish the buildings at Area A and have new commercial buildings constructed in their place.[39]

The SAMS project included the option of a real estate developer offering alternative, local locations for the entirety of Los Angeles AFB. The real estate developer could construct an entirely new Los Angeles AFB, or existing facilities could be provided for the base. The alternate location for a new base had to be within five miles of the Aerospace Corporation's headquarters in El Segundo. The Area B support facilities (medical clinic, fitness center, commissary, base exchange, etc.) would also have to be duplicated at the alternate location. The real estate developer could receive both Area A and Area B from the Air Force if this proposal option was implemented. This alternative had to be cost effective, provide adequate office space, and insure the quality of life for the Air Force.[40]

Los Angeles AFB would gain numerous benefits with the implementation of the SAMS project. The base would have modern facilities that would meet the Los Angeles County seismic safety codes. The government could save an estimated $100 million if it did not have to fund the construction of new base facilities. Up to 1.1 million square feet of substandard base facilities could be disposed of. Annual maintenance and operating costs for the base could be reduced by millions of dollars. The SAMS project would consolidate all the base personnel in one location (Area B) rather than continuing to split them between Area A, Area B, and the Lawndale Annex. The quality of life for the base personnel would also be improved with the relocation to new facilities.[41]

If the Air Force accomplishes the SAMS project and new facilities are constructed in Area B, a new office layout could be implemented for the base personnel in accordance with the Air Force's current standard. The dominant office layout in the Area A facilities in 2001 had most of the personnel in individual offices with floor-to-ceiling

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[39] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, pp. 1-2 http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[40] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); Memo, SMC/CC to HQ AFMC/CE, "Proposed Enabling Language, Systems Acquisition Management & Support (SAMS) Complex," 18 October 1999, (Doc 2-57).

[41] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

walls and a door. This situation provided privacy, security, and reduced noise for the employee. The 1997 *Area "A" Facilities Assessment* stressed the Air Force's current standard of using open-bay, cubicle layouts as working spaces for its military and civilian personnel. This design would decrease the amount of office space required and reduce costs. The document also suggested that this office layout could increase productivity while promoting "creativity and innovation" as a result of the communal working areas.[42]

The Air Force posted a Request for Statements of Interest (RSI) on 24 June 1999 that summarized the SAMS project and solicited the potential interest of real estate developers. The real estate developers who had an interest in the SAMS proposal had to respond to the RSI by the 20 August 1999 deadline. The RSI generated a favorable response from the real estate community.[43]

On 25 July 2001, the Air Force issued Phase I of the Request for Proposal (RFP) soliciting the formal interest of real estate developers for the SAMS project. The Air Force planned to down-select to no more than five fully qualified developers from the RFP respondents. Submittals for the RFP from the interested developers had a deadline of 10 September 2001 to respond. The 25 July RFP was later amended by a 9 August 2001 RFP.[44]

The method the Air Force used for the SAMS source selection consisted of three phases that were outlined in the RFP. In Phase I the Air Force would evaluate and then choose no more than five fully qualified developers as the finalists for the SAMS project by the end of 2001. In Phase II the selected developers would provide the Air Force with business proposals detailing their plans to conduct the SAMS project. "Phase III consists of resolution of the project's administrative details and the closing."[45]

The SMC Directorate of Plans and Programs evaluated the developers for SAMS with members and advisors from the Staff Judge Advocate, Comptroller, Directorate of Contracting, Directorate of Systems Acquisition, and Civil Engineering. These

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[42] Area A Integrated Product Team (FOUO, extract is not FOUO), "Area "A" Facilities Assessment," 25 July 1997, pp. 15-16, 31, 33, 57 (Doc 2-52).

[43] Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); E-mail, SMC/XPB to 61 ABG/CED, "Congressman Kuykendall's Briefing," 7 July 1999, (Doc 2-58); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51).

[44] Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, pp. 1-2 http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56).

[45] *Ibid*, p. 3.

organizations provided the SMC commander, Lieutenant General Arnold, with their recommendations. General Arnold would then give his recommendations to the AFMC headquarters.[46]

The 5 September 2001 SAMS timeline provided a tentative schedule for the construction phase of the project. The construction of the new buildings at Area B should begin in July 2003. The first building should be complete in July 2004, and the second building should be complete in July 2005.[47]

In 2001, the SAMS concept had the endorsement of SMC, AFSPC, AFMC, the Pentagon and the local communities of Hawthorne and El Segundo, California. SAMS was not subject to Federal Acquisition Regulations, so enabling legislation from the United States Congress was a necessity for concept approval.[48] Congress approved the authorizing legislation (Public Law 106-398, Defense Authorization Act for FY 2001, Section 2861) to proceed with the SAMS project in September 2000.[49]

By the end of FY 2001, the SAMS project had not become an absolute certainty of being approved and accomplished, but the process continued to proceed as planned. In October 2001, the Phase I evaluation of the developers had been completed, but the Phase I final down-select to the best-qualified developers remained ongoing.[50]

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[46] Conversation and E-mail, 2Lt Paige Henning, SMC/XPM, to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59).

[47] Internet Document, SMC, "Estimated SAMS Timeline," 5 September 2001, http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-60).

[48] Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet.html (Doc 2-51); Internet Document, SMC, "SAMS Requests for Statements of Interest Los Angeles Air Force Base Consolidation," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/rsi.html (Doc 2-54); Conversation and E-mail, 2Lt Paige Henning, SMC/XPM, to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59); Otto Kreisher, "Air Force land swap moves ahead in Senate," Daily Breeze, 20 June 2000, p. A3 (Doc 2-61).

[49] Internet Document, SMC, "SAMS Enabling Congressional Language," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/language.html (Doc 2-62); Internet Document, SMC, "Request for Proposal (RFP)," 9 August 2001, Appendix F http://www.losangeles.af.mil/Special_Interest/SAMS (Doc 2-56); E-mail, 2Lt Paige Henning, SMC/XPM to Robert Mulcahy, SMC/HO, "SAMS," 18 December 2001, (Doc 2-63).

[50] Conversation and E-mail, 2Lt Paige Henning, SMC/XPM to Robert Mulcahy, SMC/HO, "SAMS History," 18 December 2001, (Doc 2-59).

## BASE REAL ESTATE

Los Angeles AFB had an unusual layout compared to the other Air Force bases in the United States. The base was located within a major urban area, it did not have any flight line facilities or airplanes, and it had separate locations for its program offices, support facilities, and its housing areas. Using various organizational names over the years, the SMC headquarters occupied the same land and buildings in El Segundo, California since 1964. Between 1964 and 1987, the Air Force property had been designated as Los Angeles Air Force Station. In August 1987 the Air Force redesignated the property to Los Angeles AFB.[51]

Los Angeles AFB measured 95 acres within its two El Segundo locations at the intersection of El Segundo Boulevard and Aviation Boulevard. The divided base had two separate sections, Area A and Area B. Area A (41 acres), at the southeastern corner of the intersection, contained seven office buildings occupied primarily by program offices and staff offices. Area B (54 acres), at the northwestern corner of the intersection, contained buildings occupied primarily by support facilities such as the Medical/Dental Clinic (Buildings 200, 201, 202, 209), the Commissary (Building 251), the Base Exchange (Building 244), the Child Development Center (Buildings 207 and 208), the Fitness Center (Building 242) and the automobile Gas Station (Building 235).[52]

The base started a program of replacing its aging facilities. Two of the old buildings at Area B were demolished in 2001 and would later be replaced with new facilities. Area A did not demolish or construct any buildings at this time. The Fitness Center at Building 205 (17,455 square feet) and Building 206 (2,400 square feet) were demolished in January and February 2001. The two buildings had been located at the western central section of Area B where Building 210 would later be built. The Navy constructed Building 205 in 1959. The Air Force used the facility as a fitness center from 1964-2000. Building 206 had been constructed by the Air Force in 1978. The Fitness Center equipment was transferred to Building 242 in Area B. A new Fitness Center

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[51] Timothy Hanley and Harry Waldron, Historical Overview Space and Missile Systems Center 1954-1995, June 1997, p. 4 (Doc 2-64); SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 1, 18-20, and 26-27 (Doc 2-65).

[52] SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 1, 18-20, and 26-27 (Doc 2-65); E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66).

(Building 286) at Area B would be constructed at the northwest section of the base, and it would have its groundbreaking on 11 October 2001.[53]

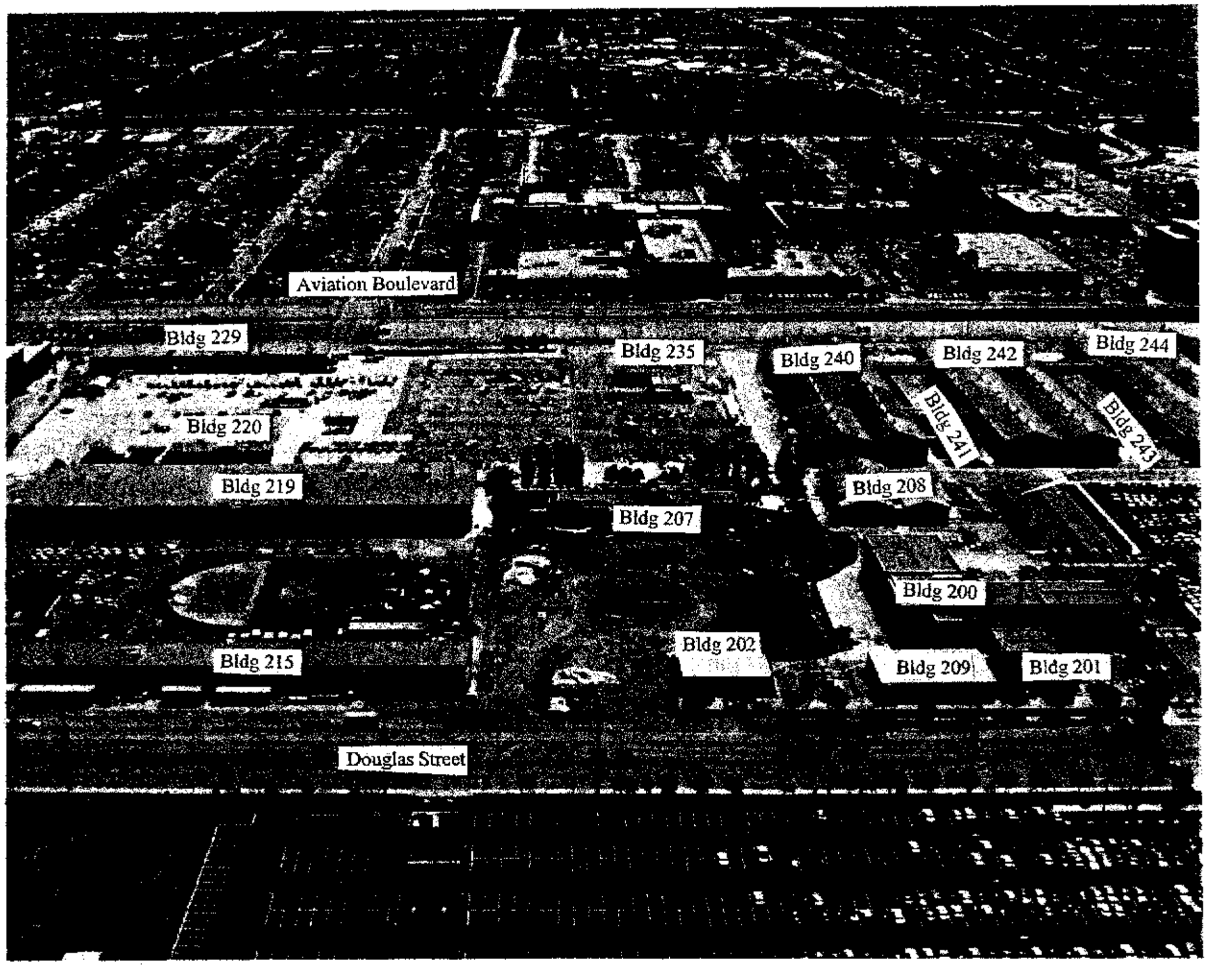


**Illustration 2-2 Area B of Los Angeles AFB in 2001**

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[53] Discussion, Elaine Jewell, 61 ABG/CEZER, with Robert Mulcahy, SMC/HO, "Square Feet of Buildings 205 and 206," 2 October 2002; Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/ Special_Interest/SAMS/section3.htm (Doc 2-53); Staff Summary Sheet, SMC/AXF to SMC/CC, "Proposed AFMC FY 02-05 Military Construction (MILCON) Future Years Defense Program (FYDP)," 28 October 1998, with attachment: Memo, SMC/CC to AFMC/CE, "Proposed AFMC FY 02-05 Military Construction Future Years Defense Program (FYDP)," 9 November 1998, (Doc 2-67); E-mail, 1Lt Michael Plumb, 61ABG/ CEM, to Robert Mulcahy, SMC/HO, "RE: Buildings 205 and 206," 7 September 2002, (Doc 2-68); No Author, "A ground-breaking workout," Astro News, 19 October 2001, p. 3 (Doc 2-69).

On 1 September 2000, the groundbreaking for a new Medical/Dental Clinic (Building 210) took place in Area B. The new facility would be located adjacent to the north side of the current Medical Clinic (Building 200) at the western central section of the base. The new 47,967-square foot clinic would cost about $12.7 million to construct, and it would replace the old clinic that had been built in 1959. The Air Force used Building 200 as the base medical clinic since June of 1980. The new clinic would be the first significant facility construction on base since the completion of the Child Development Center (Building 207) in 1987 and the Commissary (Building 251) in 1983. Building 210 would be completed in the summer/fall of 2002.[54]

Los Angeles AFB also controlled two annexes, Annex 2 and Annex 3. The Lawndale Facility (Annex 3) measured 13 acres, and it was located a few blocks south of Los Angeles AFB, on Aviation Boulevard between Rosecrans and Marine Avenues in the city of Hawthorne. It had a 19,454-square foot office building (Building 80), a parking lot, and a softball field. Personnel and contractors from the Space-Based Laser Project (SMC/TL) were the main occupiers of Building 80 at this time.[55]

Los Angeles AFB used Fort MacArthur (Annex 2) as a housing area for its military personnel. The fort had been an Army installation since its authorization in 1914, and it was transferred to the Air Force on 1 October 1982. Fort MacArthur measured 96 acres, and it was located on the southwest intersection of Pacific Avenue and West 22nd Street in the city of San Pedro, California (approximately 18 miles southwest of Los Angeles AFB). Fort MacArthur contained housing for officer families, enlisted families, and unaccompanied military personnel. It included 402 housing units (including 34 original structures with historical value), and various support facilities such as a chapel, community center, youth center, child development center, temporary quarters, shoppette, and a gym. The single enlisted personnel had three dormitories (81 units), but no dining facility. Dormitories did not exist for single officers.[56]

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[54] John Ryan, "Pardon our dust: Clinic construction starts," Astro News, 8 September 2000, p. 1 (Doc 2-70); Discussion, Elaine Jewell, 61 ABG/CEZER with Robert Mulcahy, SMC/HO, "Base construction dates, and the building number for the new medical clinic," 11 September 2002; Internet Document, SMC, "Facilities to be Demolished," printed 17 November 1999, http://www.losangeles.af.mil/Special_Interest/SAMS/ section3.htm (Doc 2-53).

[55] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 21; E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "RE: Lawndale Facility, Building 80," 11 September 2002, (Doc 2-71); Fact Sheet, SMC, "SAMS Fact Sheet," printed 16 February 2001, http://www.losangeles.af.mil/Special_Interest/SAMS/factsheet .html (Doc 2-51).

[56] SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 16-17 (Doc 2-65); Internet Document, Fort MacArthur Museum Association, "A Brief History of Fort MacArthur," printed 30 June 2000, http://www.ftmac.org.Fmhist.htm (Doc 2-72); Internet Document, SMC, "Historical Sketch of Los Angeles AFB and Fort MacArthur,"

In addition to Fort MacArthur, the Air Force had officer family housing at the Pacific Crest (22 acres) and Pacific Heights (12 acres) Housing Areas in San Pedro, located about one mile northwest of Fort MacArthur. Pacific Crest had 91 housing units and Pacific Heights had 79 housing units. Pacific Heights was located southwest of the intersection of West 25th Street and South Western Avenue, and Pacific Crest was located across the street on the north side of 25th Street. The construction of the two housing areas was completed in 1989.[57]

On 7 November 2000, construction was completed on the 24.4-acre Pacific Heights II Housing Area in San Pedro for the senior NCO families at Los Angeles AFB. The 71-unit family housing area began construction in May 1997, and it was completed within its $13.2 million budget. A ribbon-cutting ceremony took place for the opening of the new housing on 16 November 2000. Gen Lester Lyles (commander of AFMC) and Lt Gen Eugene Tattini (SMC) presided over the ceremony. SMC acquired the site in 1997 from the Navy who formerly called it "White's Point Naval Housing." The name of the housing area was changed by SMC to the "White Point Housing Area" in February 2001. Within in a year, SMC changed the name of the White Point Housing Area to the "Pacific Heights II" Housing Area. At the end of 2001, the Air Force had a combined total of 643 family housing units for the personnel at Los Angeles AFB.[58]

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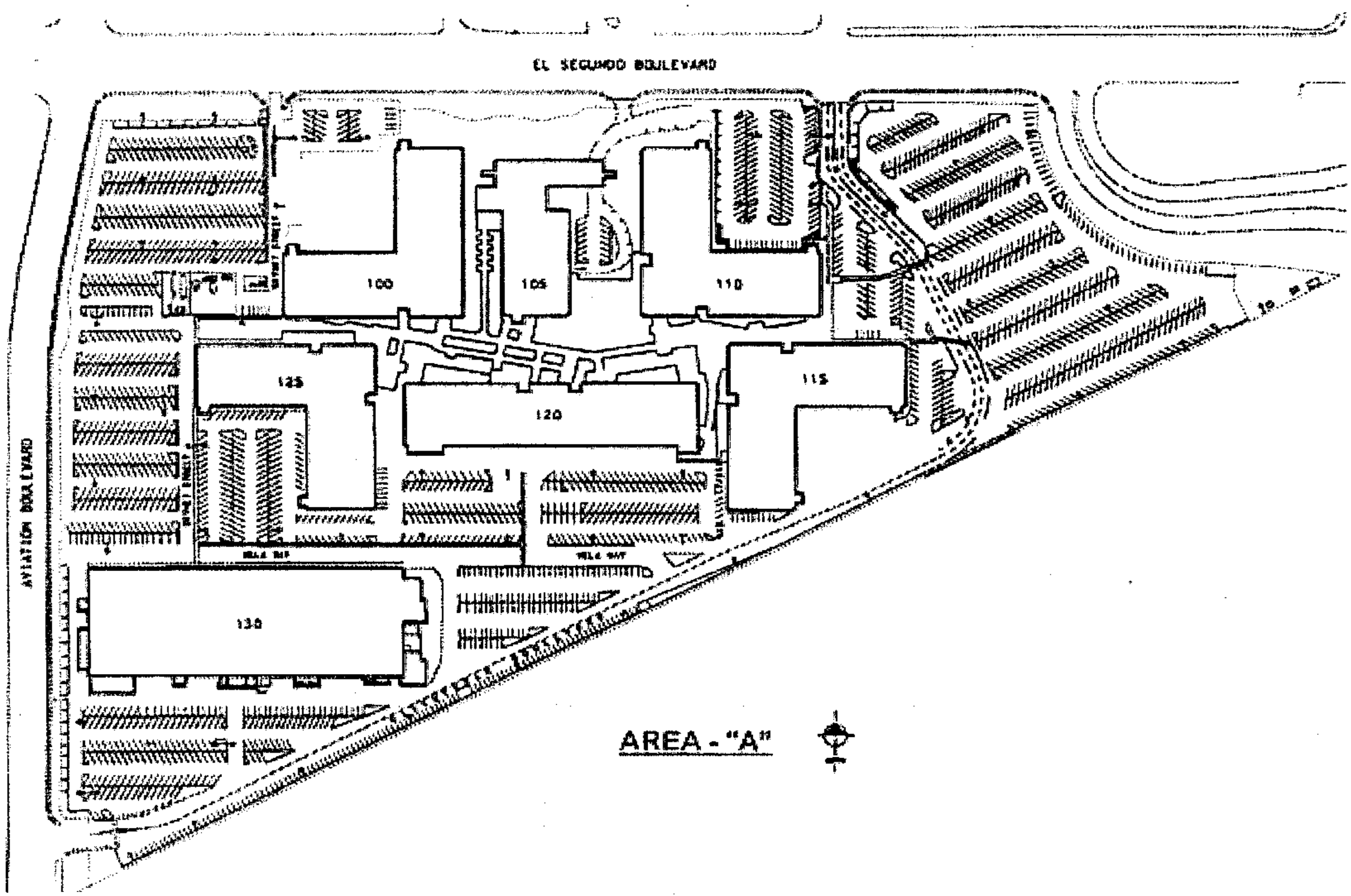
printed 1 February 2002, http://www.te.plk.af.mil/ABG/history.htm (Doc 2-73); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75).

[57] E-mail, Elaine Jewell, 61 ABG/CEZER to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75).

[58] SMC History 1994-1997 (FOUO, extract is not FOUO), SMC/HO, p. 21; SMC/PA, Newcomers Guide to Los Angeles Air Force Base, 2001, pp. 16-17 (Doc 2-65); E-mail, Elaine Jewell, 61 ABG/CEZER, to Robert Mulcahy, SMC/HO, "Base Acreage," 30 June 2000, (Doc 2-66); E-mail, Gabina Perez, 61 ABG/ CEH, to Robert Mulcahy, SMC/HO, "RE: AF Housing units," 26 September 2002, (Doc 2-74); E-mail, Gabina Perez, 61 ABG/CEH, to Robert Mulcahy, SMC/HO, "RE: Officer & enlisted housing," 26 September 2002, (Doc 2-75); Summary, Robert Mulcahy, SMC/HO, for Brig Gen William Wilson, SMC/CV, "Housing at White Point," 23 February 2001, (Doc 2-76); John Ryan, "Base opens new military housing," Astro News, 17 November 2000, p. 3 (Doc 2-77); Script, 61 CS/SCSV, "Space and Missile Systems Center Today," January 2001, pp. 20-21 (Doc 2-78).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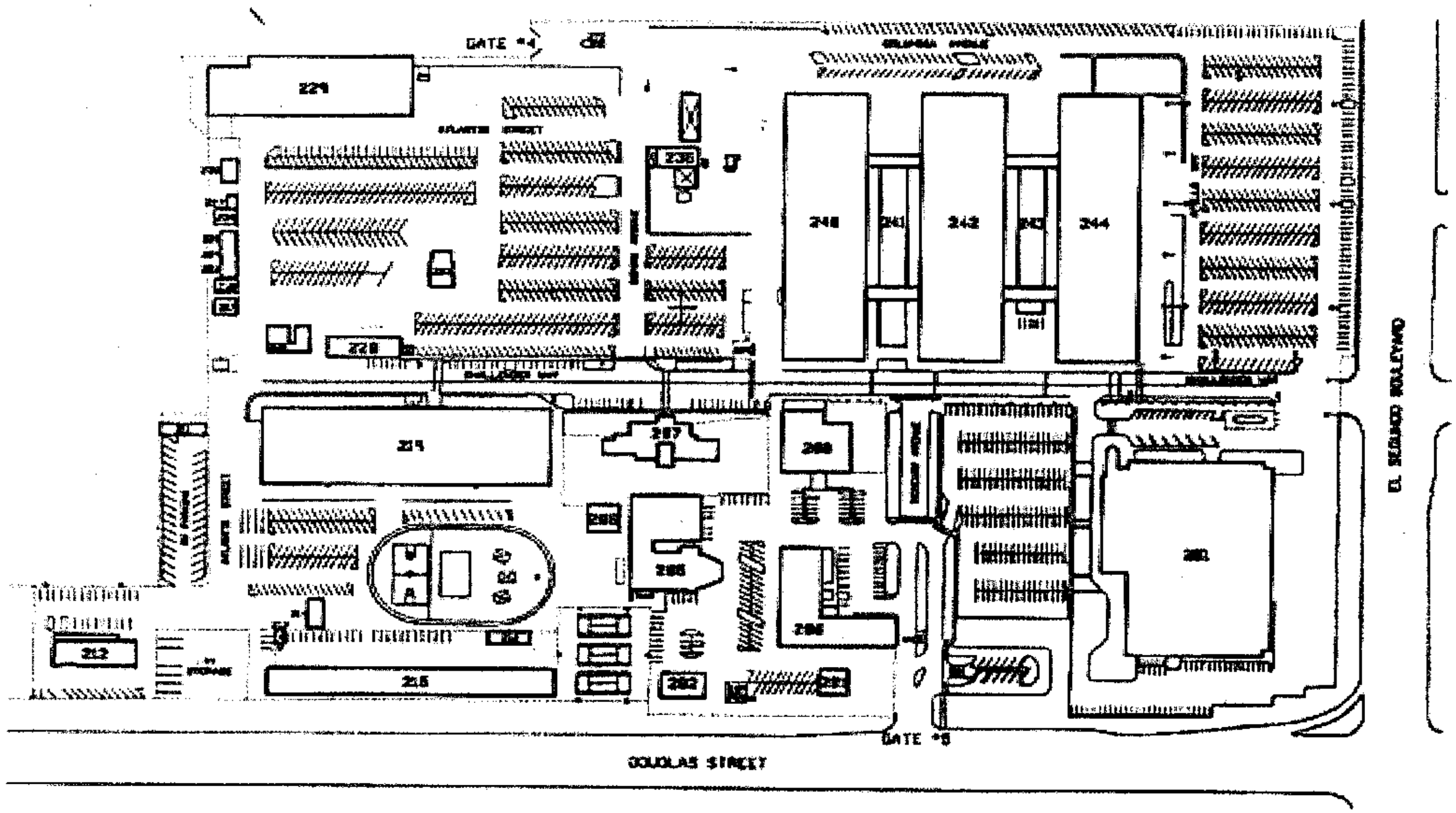
AREA - "A"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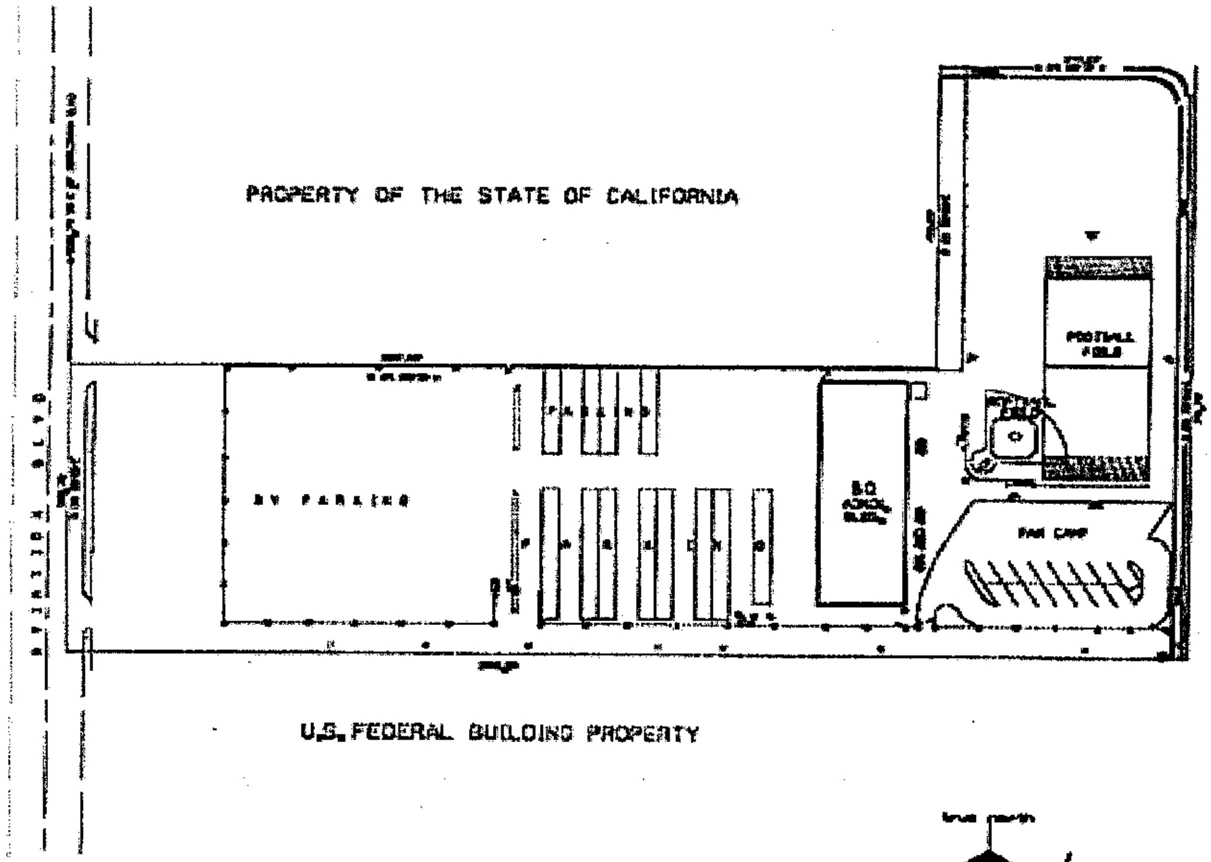
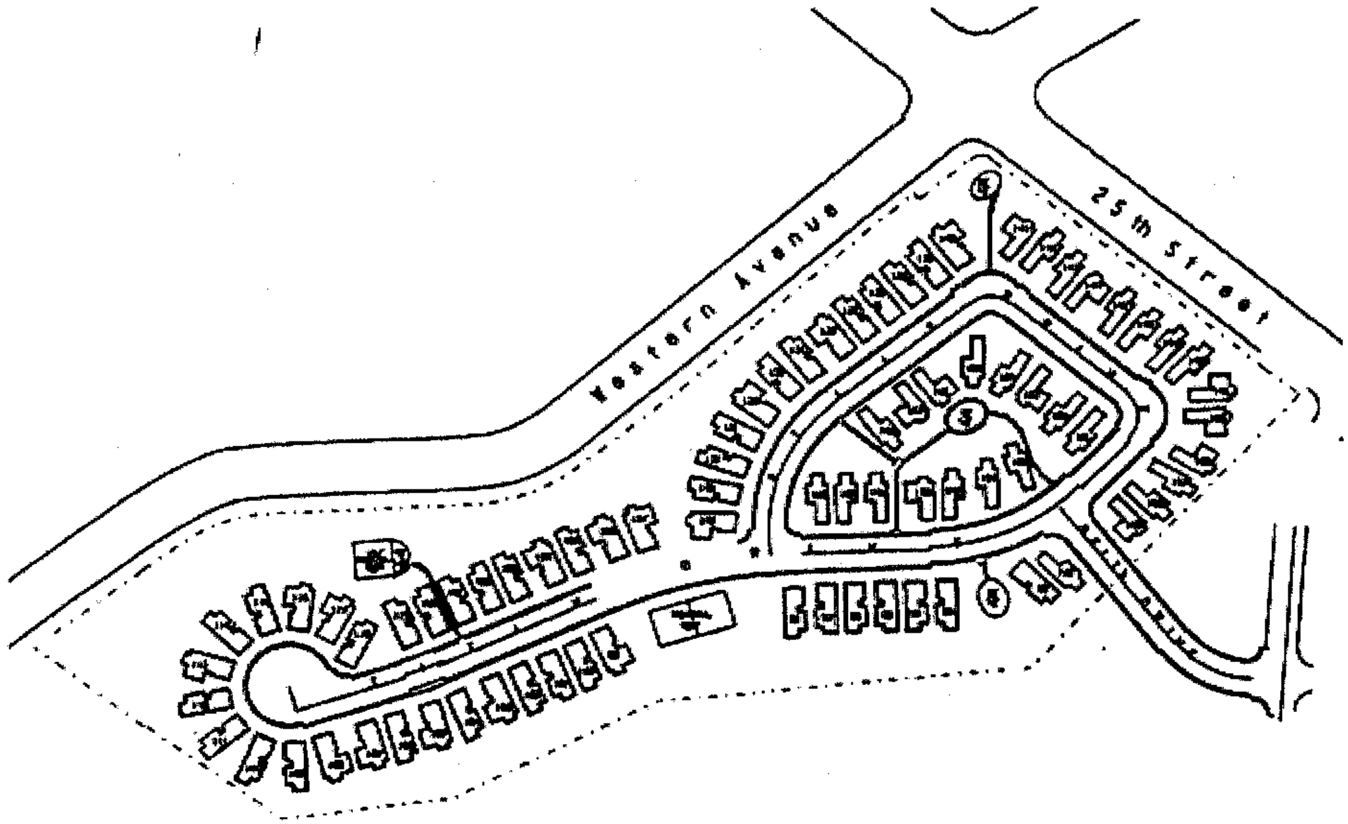
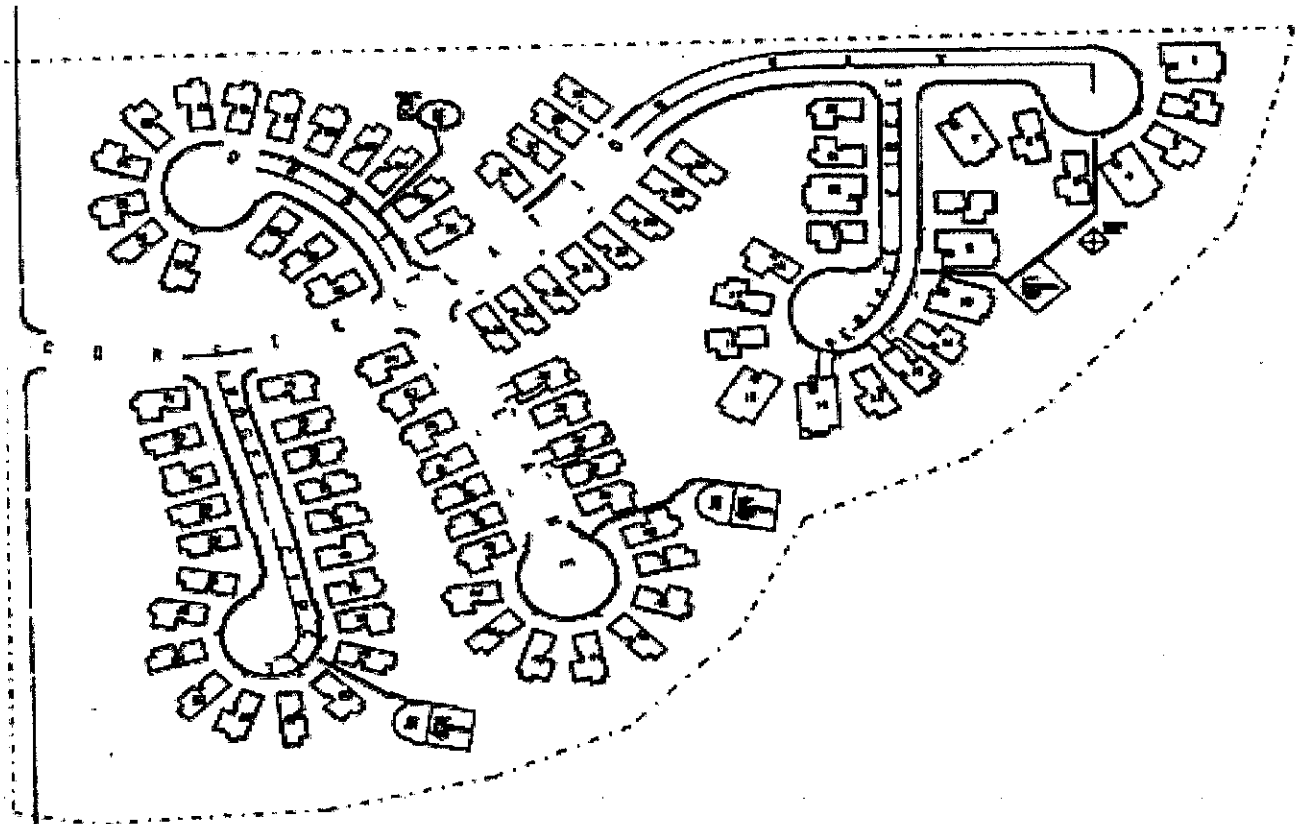
AREA - "B"



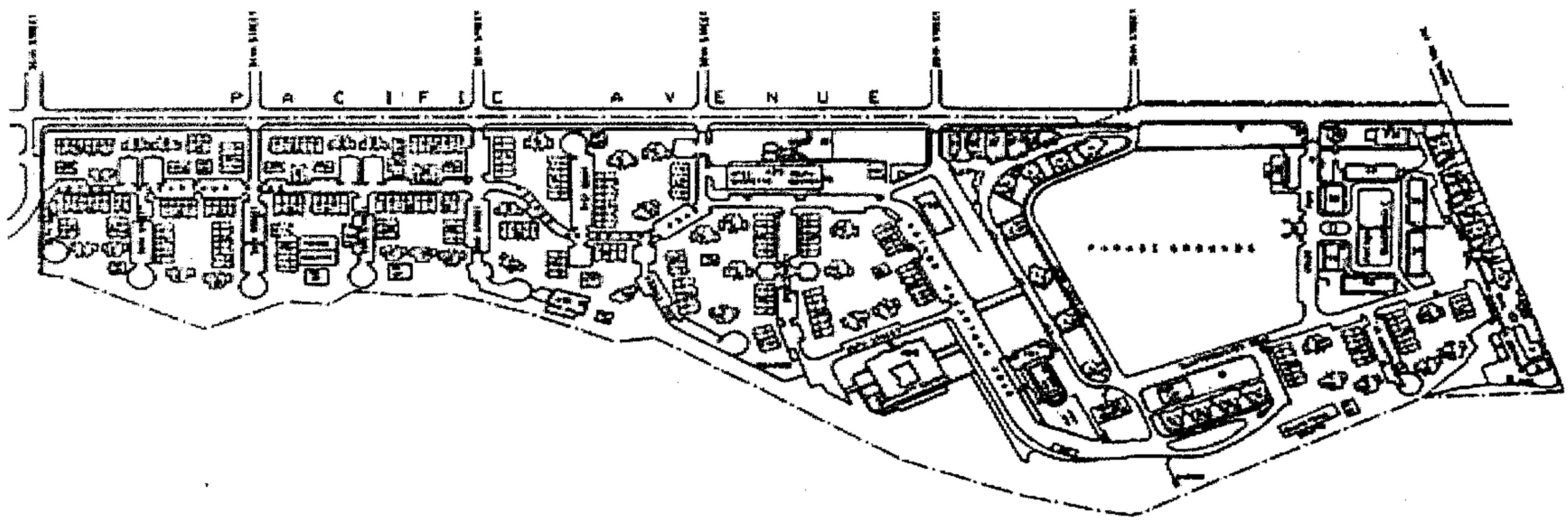

LOS ANGELES ANNEX




PACIFIC HEIGHTS ANNEX



PACIFIC CREST ANNEX




Fort MacArthur Family Housing

Data about SMC's other resources at Los Angeles AFB during fiscal years 1998 through 2001 can be found in the appendices to this history. Appendix F contains SMC's budget by year and program element. Appendix C contains personnel statistics by six-month intervals about assigned and authorized manning and personnel reductions by office, rank, and specialty. Appendix E contains descriptions by fiscal year of SMC's construction projects at Los Angeles AFB and elsewhere. Information about new contracts issued during this period has been tabulated in Appendix I.

# CHAPTER 3

## LAUNCH VEHICLES

During FY 1998 through FY 2001, SMC's Launch Programs office was managing the acquisition of four major kinds of launch vehicles for SMC's medium and heavy payloads as well as payloads from other agencies. Those vehicles were the Atlas II, the Delta II, the Titan II, and the Titan IV. The organization also managed the acquisition of upper stages such as the Centaur and the Inertial Upper Stage (IUS) for those vehicles. SMC's Space Test and Experimentation Program (STEP) also manifested relatively small, experimental payloads on NASA's Space Shuttle and on small launchers such as the Pegasus, the Taurus, and the Minotaur.[1]

The table below lists Air Force launches of military payloads on these systems during the period under consideration. Air Force Space Command was responsible for launching operational boosters. SMC was responsible for developing, acquiring, and modifying the launch systems, certifying their readiness for launch, and providing technical assistance.[2]

The pace of launch activities during this period was very rapid, approaching the most rapid U.S. launch activity on record, that of the early and middle 1960s. Indeed, the frequency of military launches from 15 October to 7 November 1997 was the highest for such a short span of time since 1962. During those 23 days, the Air Force launched three Titan IV rockets, an Atlas IIA, and a Delta II, each of which carried a military payload of major importance.[3]

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[1] The Pegasus was a commercially developed, air-launched, three-stage booster which could place about 400 to 600 pounds into a low orbit. The Taurus was a ground-launched booster consisting of the Pegasus added to the first stage of a Peacekeeper missile, and it could place about 1,000 pounds into a low polar orbit. The Minotaur was a ground-launched booster consisting of modified first and second stage segments of Minuteman II missiles added to Pegasus upper stages and avionics. It could place about 1,400 pounds into a low orbit.

[2] Program Management Directive (FOUO), SAF/AQS, "PMD 2138(47)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 15 March 2000 (information used not FOUO) (Doc 3-1); Program Management Directive (FOUO), SAF/AQS, "PMD 2138(48)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 18 September 2001 (information used not FOUO) (Doc 3-2).

[3] News Release (U), SMC/PA, "Air Force Closes 1997 With Space Launch Frenzy," 15 January 1998 (Doc 3-3).

**Table 3-1**
**Space Payloads Launched for DOD During FY 1998 - 2001**[4]

| DATE | SITE | VEHICLE | PAYLOAD | LAUNCHER PERFORMANCE |
|---|---|---|---|---|
| 22 Oct 97 | Air-launched | Pegasus XL F-18 | STEP M4 (USAF) | success |
| 24 Oct 97 | VAFB SLC-4E | Titan IVA 403 4A-18/K-18 NUS | classified (NRO) | success |
| 24 Oct 97 | CCAFS SLC-36A | Atlas IIA AC-131 | DSCS IIIB-13 (USAF) | success |
| 5 Nov 97 | CCAFS SLC-17A | Delta II 7925 D-249 | GPS IIA-28 SVN-38 [last Block IIA] (USAF) | success |
| 8 Nov 97 | CCAFS SLC-41 | Titan IVA 401 4A-17/K-20 + Centaur TC-16 | classified (NRO) | success |
| 29 Jan 98 | CCAFS SLC-36A | Atlas IIA AC-109 | classified (NRO) | success |
| 16 Mar 98 | CCAFS SLC-36A | Atlas II AC-132 [last launch of original Atlas II] | UHF Follow-On F-8 (USN) | success |
| 9 May 98 | CCAFS SLC-40 | Titan IVB 401 4B-25/K-25 + Centaur TC-18 + Centaur | classified (NRO) | success |

[4] Abbreviations: ARGOS = Advanced Research and Global Observation Satellite; AteX = Advanced Tether Experiment; CCAFS = Cape Canaveral Air Force Station; DSP=Defense Support Program; DMSP=Defense Meteorological Satellite Program; DSCS = Defense Satellite Communications System; GPS=Global Positioning System; LC = Launch Complex; NRO = National Reconnaissance Office; NUS=no upper stage; SLC = Space Launch Complex; STEX = Space Technology Experiments; STEP=Space Test Experiments Platform; STP = Space Test Program; UHF FO= UltraHigh Frequency Follow-On; USAF = U.S. Air Force; USN = U.S. Navy; VAFB = Vandenberg Air Force Base.

Sources: Jonathan McDowell, Master Launch Log, August 2001, accessible from http://hea-www.harvard.edu/~jcm/space/; Mark Wade, Encyclopedia Astronautica, accessible from http://www.astronautix.com/; The Aerospace Corporation, "Table of All Launches," accessible from http://ax.losangeles.af.mil/~gowerj/ssed/corporatelaunchlog/corpll.html.

| DATE | SITE | VEHICLE | PAYLOAD | LAUNCHER PERFORMANCE |
|---|---|---|---|---|
| 12 Aug 98 | CCAFS SLC-41 | Titan IVA 401 4A-20/K-17 + Centaur TC-9 | classified (NRO) | failure [Titan wiring. See note 36 below.] |
| 2 Oct 98 | VAFB SLC-576E | Taurus F3 1110-2 | STEX + AteX [DARPA experiments] | success |
| 20 Oct 98 | CCAFS SLC-36A | Atlas IIA AC-130 | UHF Follow-on F-9 | success |
| 29 Oct 98 | CCAFS SLC-17A | Space Shuttle STS-88 | Mightysat I [4 USAF experiments] | success |
| 23 Feb 99 | VAFB SLC-2W | Delta II 7920-10 D-267 | ARGOS (STP P91-1) (USAF) | success |
| 9 Apr 99 | CCAFS SLC-41 | Titan IVB 402 4B-27/45K-32 + IUS-21 | DSP F-19 (USAF) | failure [IUS] |
| 30 Apr 99 | CCAFS SLC-40 | Titan IVB 401 4B-32/45K-26 + Centaur TC-14 | Milstar II F-1 [aka Milstar-3] (USAF) | failure [Centaur] |
| 22 May 99 | VAFB SLC-4E | Titan IVB 404 4B-12/45K-26 NUS | classified (NRO) | success |
| 7 Oct 99 | CCAFS SLC-17A | Delta II 7925 D-275 | GPS IIR-3 SVN-46 (USAF) | success |
| 23 Nov 99 | CCAFS SLC-36B | Atlas IIA AC-136 | UHF Follow-On F-10 (USN) | success |
| 12 Dec 99 | VAFB SLC-4W | Titan II 23G-8 | DMSP Block 5D-3 S-15 (USAF) | success |
| 20 Jan 00 | CCAFS SLC-36A | Atlas IIA AC-138 | DSCS III B-8 (USAF) | success |
| 27 Jan 00 | VAFB CLF | Minotaur [Minuteman II and Pegasus stages; 1st flight] | JAWSAT [10 experiments, including Picosat 1 and 2 comm. tether by Aerospace Corp.] | success |
| 12 Mar 00 | | Taurus F5 1110-3 | Multispectral Thermal Imager experiment | success |
| 8 May 00 | CCAFS SLC-40 | Titan IVB 402 4B-29/45K-28 + IUS-22 | DSP F-20 (USAF) | success |

| DATE | SITE | VEHICLE | PAYLOAD | LAUNCHER PERFORMANCE |
|---|---|---|---|---|
| 10 May 00 | CCAFS SLC-17A | Delta II 7925 D-278 | GPS IIR-4 SVN-51 (USAF) | success |
| 7 Jun 00 | VAFB RW30/1 | Pegasus XL F29 M029 | TSX-5 + STEP M5 (BMDO + USAF) | success |
| 16 Jul 00 | CCAFS LC-17A | Delta II 7925 D-279 | GPS IIR-5 SVN-48 (USAF) | success |
| 19 Jul 00 | VAFB CLF | Minotaur F3 | Mightysat 2.1 + (DARPA/Aerospace Corp. Picosat tether experiment) | success |
| 17 Aug 00 | VAFB SLC-4E | Titan IVB 403 4B-28/45K-29 NUS | classified (NRO) | success |
| 19 Oct 00 | CCAFS LC-36A | Atlas IIA AC-140 [Last USAF Atlas IIA launched] | DSCS III B-11 + IABS-8 (USAF) | success |
| 10 Nov 00 | CCAFS LC-17A | Delta II 7925 D-281 | GPS IIR-6 SVN-41 (USAF) | success |
| 5 Dec 00 | CCAFS LC-36A | Atlas IIAS AC-157 [First DOD Atlas IIAS launched] | classified (NRO) | success |
| 30 Jan 01 | CCAFS LC-17A | Delta II 7925 D-283 | GPS IIR-7 SVN-54 (USAF) | success |
| 27 Feb 01 | CCAFS LC-40 | Titan IVB 401 4B-41/K-30 + Centaur TC-22 | Milstar 2 F-2 [aka Milstar-4] (USAF) | success |
| 18 May 01 | CCAFS LC-17B | Delta II 7925 D-285 | GeoLITE experiment (NRO) | success |
| 6 Aug 01 | CCAFS LC-40 | Titan IVB 402 4B-31 + IUS-16 | DSP F-21 (USAF) | success |
| 8 Sep 01 | VAFB SLC-3E | Atlas IIAS AC-160 [First DOD Atlas IIAS from west coast] | classified (NRO) | success |

## Launch Broad Area Review

Just before this period, the Delta II launch vehicle suffered its first ever launch failure with a military payload on 17 January 1997. During 1998 and 1999, U.S. space programs experienced a series of additional launch failures with their most powerful and hitherto most reliable launch vehicles. The Titan IV launch vehicle and its upper stages failed during three attempted launches of important military satellites, causing an estimated loss of over $3 billion. The Delta III launch vehicle, based on the Delta II used by the Air Force, failed in two attempts to launch commercial satellites during the same period, and the less-commonly-used Athena II also failed in a commercial launch. The table below provides more details about these launch attempts.

**Table 3-2**
**Launch Failures Leading to Broad Area Review**[5]

| Date of Failure | Launch Vehicle | Payload | Failure Mode |
|---|---|---|---|
| 12 August 1998 | Titan IVA-20 | Classified (NRO) | Electrical cable short |
| 26 August 1998 | Delta III | Galaxy 10 (commercial) | Vehicle roll instability |
| 9 April 1999 | Titan IVB-27/ IUS-21 | DSP 19 (USAF) | IUS Stage 1-2 separation |
| 27 April 1999 | Athena II | IKONOS (commercial) | Fairing failure to separate |
| 30 April 1999 | Titan IVB-32/ Centaur 14 | Milstar II F-1 (USAF) | Centaur guidance software |
| 4 May 1999 | Delta III | ORION III (commercial) | RL10-B2 engine system |

The accident investigation boards for the launch failures identified some specific failure modes and hardware deficiencies, but none that were common to more than one of the failures. They did identify a number of technical and process changes to make in manufacturing and preparing the vehicles for launch to lessen the chances of future anomalies.[6]

The prime contractor for the Delta—Boeing Space and Communications—and the prime contractor for the Titan—Lockheed Martin Corporation—began independent investigations of the anomalies that had affected their respective launchers. Boeing's review was chaired by Dr. Sheila Widnall, former Secretary of the Air Force, and

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[5] Briefing Charts (U), "Enhancing Launch Mission Assurance," 18 October 1999 (Doc 3-4).

[6] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date (Doc 3-5).

Lockheed Martin's review was cochaired by Thomas Young, former CEO of the corporation, and retired General Thomas Moorman, former Air Force Vice Chief of Staff.[7]

The government reacted to the launch failures on several levels. Congress' Conference Committee for FY 2000 Authorizations directed Secretary of Defense Cohen to submit a report on the launch failures to the President and to a number of Congressional oversight committees. President Clinton on 19 May 1999 directed Secretary Cohen to investigate the failures and to issue reports on their causes and the actions necessary to ensure access to space in the future. Secretary Cohen delegated the investigation to Acting Secretary of the Air Force Whitten Peters and Air Force Chief of Staff General Michael Ryan. General Ryan directed Air Force Space Command and the National Reconnaissance Office to jointly conduct a "broad area review" of the causes of the failures and to recommend changes in practices, procedures, and operations.[8]

The Air Force had already formally begun its Launch Broad Area Review (BAR) under a charter issued by its headquarters on 3 May 1999. It set up a Senior Steering Group for the review chaired by retired General Larry Welch, former Air Force Chief of Staff, and consisting of major figures in the space launch industry from both government and private industry. The BAR examined a wide range of concerns, but it concentrated on two "overarching issues." It defined the first of those issues as "mission success in fly-out of current (Atlas, Delta, Titan) systems—approximately $20 billion in launch vehicle and spacecraft assets—includes critical systems with no spares." It defined the second overarching issue as "transition to the future system—Evolved Expendable Launch Vehicle (EELV)—building confidence in launch success." The BAR issued its report and recommendations in the form of a briefing on 1 November 1999. Its 19 major recommendations, arranged under the two overarching issues, are summarized below.[9]

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[7] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date
(Doc 3-5).

[8] Briefing Charts (U), Gen Les Lyles (Vice CSAF), "DoD Assessment of Space Launch Failures," no date (Doc 3-5); Report (U), no author, "Department of Defense Assessment of Space Launch Failures: Executive Summary," no date (Doc 3-6), accessible at http://www.af.mil/lib/misc/spacebar99b.htm on 25 January 2000.

[9] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7); Letter (U), CSAF to AFMC/CC, AFSPC/CC, and Distribution C, "Launch Broad Area Review Follow-on Actions," 18 November 1999, with attachment: "Launch Broad Area Review (BAR) Recommendations and Action Assignments" (Doc 3-8).

SUMMARY OF LAUNCH BAR RECOMMENDATIONS[10]

**Fly-Out Programs**

1. Air Force track contractor actions to focus program management on disciplined systems engineering and processes and to implement corrective actions resulting from failures and Contractor Independent Reviews.
2. SECAF and CSAF assign clear responsibility, accountability and authority to the acquisition command for all launch vehicle activities through delivery of spacecraft on orbit (separation from the launch vehicle).
   –Make Space and Missile Systems Center (SMC) responsible for assembly and certifying readiness to launch (on the pad)—engineering responsibility retained through delivery on orbit. (SMC/CC names Mission Director for DoD missions; DNRO names mission director for NRO missions.)
   –AFSPACECOM supports SMC in launch base activities and retains launch decision authority, safety, and range responsibilities—conducts the launch after SMC certification.SECAF direct that AFSPACECOM and SMC produce a realistic launch schedule and funding profile.
4. Air Force institutionalize a formal launch risk management program.
   –Develop and manage a risk management plan for all fly-out systems.
   –Emphasize identifying and mitigating risks.
   –Formalize systems engineering and quality policies, practices and procedures.
   –Re-institute a comprehensive post-flight analysis program.
5. Air Force make SMC/CC responsible for timely, formalized mechanism to capture and disseminate lessons learned across programs and contractors.Reverse the draw-down in engineering support now.
   –SMC/CC identify engineering support needs (SPO, FFRDC, DCMC), consistent with the realities of the special nature of the fly-out programs and report requirements to the SECAF within 30 days.
   –SMC/CC return to full Independent Reviews vice current approach of sampling identified risk areas.
7. Air Force request DCMC increase in-plant technical support.Air Force increase launch base technical manpower commensurate with fly-out risk and maintain through transition period of EELV program.
9. SECAF direct SMC/CC to identify remaining opportunities and resources needed for value added government Independent Review.
10. Use straightforward mission performance incentives designed to properly balance the pervasive cost pressures.**Transition to EELV**
11. SECAF assign clear government responsibility, accountability and authority to SMC/CC for delivery of spacecraft on orbit.
    –Maintain an empowered program office with a clear reporting chain.
    –Ensure adequate engineering resources are made available.

[10] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7): Appendix A: Summary of Recommendations.

12. Air Force complete and widely disseminate an end state and transition plan that lays out the management approach and the approach to building confidence on the front end of the EELV program.
    –Ensure lessons learned from heritage programs are applied to EELV.
13. SAF/AQ and AFMC program resources, including engineering and other support staff to meet needs of transition.SECAF provide direction to develop and implement a joint government-industry plan for a "value-added" government role as a smart and involved customer that addresses:
    –Technical participation during the development of EELV configurations.
    –Building confidence in launch reliability.
15. SECAF direct SMC/CC to identify opportunities and resources needed for value added government Independent Review.
16. Air Force formulate a formal EELV launch risk management program.
    –Develop and manage a risk management plan for EELV systems.
    –Formalize systems engineering and quality policies, practices and procedures.
    –Develop and implement an improved mission assurance process based on the best attributes of SMC, NASA and NRO mission assurance practices.SECAF ensure robust engineering support until launch reliability is demonstrated.
    –Task SMC/CC to provide a revised estimate of government engineering support requirements within 30 days.
18. USD(A&T) and SECAF consider investment to accommodate needed reliability confidence-building (both contractors) to provide:
    –Added launch vehicle redundancy and built-in-test diagnostics.
    –Heavily instrumented early verification flights of medium and heavy lift configurations to verify models and simulations.
    –Use new micro-technologies to enhance instrumentation.
    –Government verification of qualification levels and design analyses at the component level for early launches.
    –Additional system level testing to reduce "qualification by similarity" and interaction risks.
    –Captive test firing of appropriate EELV configurations.SECAF direct a reassessment of the EELV contracts for benefit of:
    –Adding provisions (incentives or penalties) for mission success.
    –Early use of options for performance guarantee and mission assurance add-ons.
    –Examine the benefit of incorporating a cost-plus feature for the reliability confidence building investment.

In addition to its 19 recommendations, the Launch BAR defined five "BAR Bottom Lines" toward which the recommendations were directed.[11] They are listed below.

[11] Briefing Charts (U), "Space Launch Vehicles Broad Area Review Report," 1 November 1999 (Doc 3-7): Appendix A: Summary of Recommendations.

1. Government ensure industry acts to correct causes of recent failures and improve systems engineering and process discipline.
2. Government establish clear accountability for mission success for fly-out systems and transition to EELV.
3. Enhance government-industry partnership with needed management, engineering support and emphasis on mission success.
4. Provide a well-defined, coordinated, disseminated transition plan to EELV.
5. Government invest to build confidence in EELV reliability with enhancements and increased oversight.

It is apparent from the details of the Launch BAR's 19 recommendations that increased oversight and authority for SMC's commander was a large part of the solution as far as the members of the BAR were concerned. Some of the recommendations were aimed at broadening SMC's responsibility for each launch from the acquisition of the hardware through delivery of the spacecraft on orbit. Although Air Force Space Command was to retain responsibility for conducting the launch, SMC's responsibility for certifying that the hardware was ready for launch and for exercising engineering responsibility throughout the launch were to be made clear, explicit, and formal. Some other recommendations were aimed at obtaining enough engineering support for SMC so that it could adequately exercise its increased responsibilities.

## Delta II

SMC (then named Space Division) awarded a contract (FO4701-87-C-0005) to McDonnell Douglas in January 1987 for an upgraded version of the Delta booster. The new version was called the Delta II. It was developed primarily to launch the Global Positioning System's NAVSTAR Block II satellites, and it successfully launched 18 of them under this first contract, the last (NAVSTAR II-18) on 3 February 1993.

During the period under discussion (FY 1998-2001), the Delta II was manufactured in a variety of configurations to fit a variety of missions, both military and commercial. The newer configurations were known collectively as the 7900 series. The types most used by the Air Force were the 7925 configuration for GPS launches from the east coast and the 7920-10 configuration for launches from the west coast.[12] The 7925 configuration had three stages, and the 7920-10 had two stages. (An earlier series, known as the 6925 configuration, was used to launch the first nine GPS Block II satellites.) Vehicles in the 7925 series were 125.9 feet long and weighed 511,190 pounds at lift-off. The first stage was powered by one Rocketdyne RS-27A main engine and two LR-101-NA-11 vernier engines for roll and attitude control. At lift-off, the first stage was

[12] Each digit in the numerical desgnations referred to an element of the Delta's basic configuration: 1st digit 7 = RS-27A first-stage engine with strap-on solid rocket motors; 2nd digit 9 = nine solid rocket motors; 3rd digit 2 = Aerojet AJ 10-11 second-stage engine; 4th digit 5 = Star-48B third-stage motor; suffix -10 = payload fairing 10 feet in diameter and 29.1 feet in length. (The Boeing Company, Delta II Payload Planner's Guide, October 2000)

surrounded by a cluster of nine solid-fuel, graphite-epoxy motors (GEMs) made by Alliant Techsystems. The entire vehicle generated 699,250 pounds of thrust at lift-off. The second stage used a restartable, liquid-fuel Aerojet AJ 10-11 8K engine. The optional third stage used a Star-48B solid rocket motor deployed from a spin table. Air Force Space Command's 45th Space Wing managed the launch operations for the Delta II at Cape Canaveral Air Station, Florida, using Launch Complexes 17A and 17B. Space Command's 30th Space Wing managed the launches from Vandenberg AFB, California, using Space Launch Complex 2W.[13]

The contract for the follow-on procurement (FO4701-91-C-0031) was awarded to McDonnell Douglas in August 1991. It provided launches for the next 14 GPS Block IIA satellites, including the launch that provided a fully operational constellation of 24 GPS satellites on 9 March 1994. The last of these launches occurred on 5 November 1997, when GPS IIA-28 was placed into a nominal orbit. The contract also included production of the launch vehicle for the Space Test Program's ARGOS satellite, which was delayed many times and finally launched successfully on 23 February 1999. The contract therefore remained active until the end of February 1999.

On 9 April 1993, SMC awarded a contract (FO4701-93-C-0004) to McDonnell Douglas for the third procurement of Delta IIs. This contract was also known as the MLV III procurement. The newest Delta IIs had to satisfy a threshold payload-weight requirement of 4,480 pounds to the GPS transfer orbit (10,988 by 100 nautical miles), with an objective of 4,704 pounds. The MLV III contract ran from 1993 through FY 2002, and it provided for a maximum of 36 launches through six annual procurement options, each of which could buy from one to six launches. SMC exercised the last production option in January 1999 for five more Delta II boosters. After these were expended, GPS satellites would be launched on one of the varieties of Evolved Expendable Launch Vehicle (EELV) under development.[14]

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[13] National Security Space Road Map, "Delta II," 5 November 1997, accessible at http://fas.org/ spp/military/program/nssrm/iniitiatives/deltaii.htm (Doc 3-9); The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10); Fact Sheets (U), SMC/PA, AFSPC/PA, and HQ USAF/PA, "Delta II," (Doc 3-11).

[14] Briefing Charts (U), Lt Col Scott Swanson (SMC/CL) to SMC/CC, "Delta Program Management Review," 30 October 2001; Staff Summary Sheet (U), SMC/CLPM to SMC/CC, "Request Reviewing Official Signature for Delta Program Contractor Performance Assessment Report (CPAR)," 2 June 1999 (Doc 3-12); RDT&E Budget Item Justification Sheet (U), HQ USAF/AQS, "305119F Medium Launch Vehicles," February 2000 (Doc 3-13).

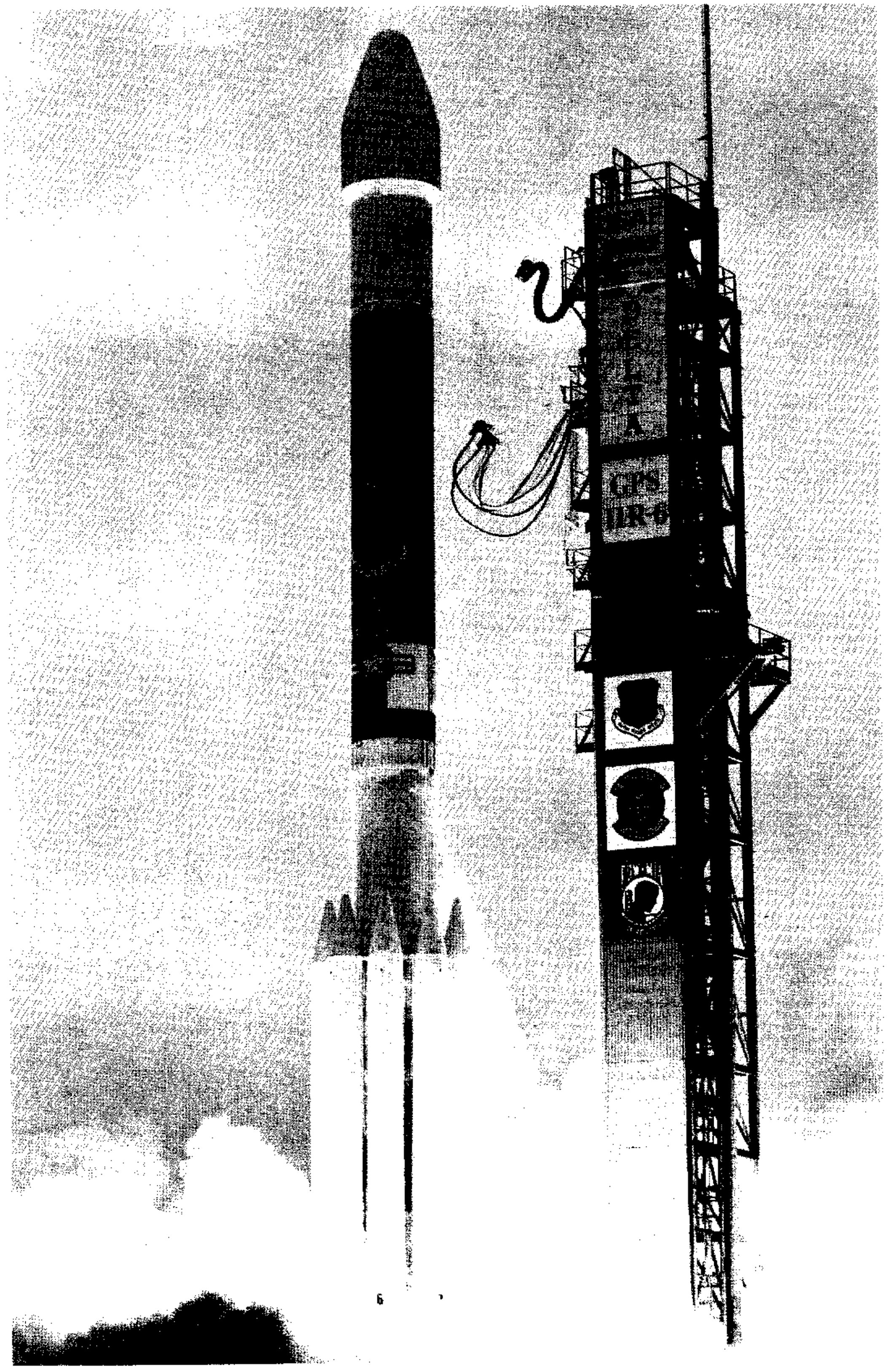


**Illustration 3-1: Launch of GPS IIR-6 on 10 November 2000**
(Photo Courtesy The Boeing Company)

Twenty-one of the launches on this contract were for GPS replenishment (Block IIR) satellites, for which Boeing would provide both hardware and launch services. (The launch services for the ARGOS satellite, though not the production of the Delta II, were also provided under this contract.[15]) Launching the replenishment satellites involved a basic change in planning and timing. The first 24 GPS satellites were launched according to a schedule designed to build the operational constellation rapidly but safely. After that, the replenishment satellites had to be launched only when GPS satellites failed or were about to fail. The new launch requirement was called Launch on Need (LON). A contractual modification to the MLV III contract required McDonnell Douglas to provide launches for GPS replenishment satellites within 40 days of a launch call from Air Force Space Command. They had to be provided at a rate of four launches, plus or minus two, per year.[16]

By early 2000, it was becoming obvious that GPS satellites were even healthier than launch planners had expected and that their Delta II launch vehicles therefore were not being expended as fast as they were being produced. To deal with the problem, SMC first issued a modification to Boeing's Delta II production contract (F04701-93-C-0004) on 28 September 2000. The modification provided for long-term storage of the waiting Delta II vehicles during 2001-2002. The modification was valued at $10,651,480. A longer-term solution would involve extending the Delta II contract from FY 2002 to FY 2006, but the unbudgeted costs of launch operations, spares, sustainment and obsolescence would create budget shortfalls for those years. SMC issued a request for proposal (RFP) for the extension in August 2001 while continuing to request the additional funding.[17]

SMC awarded only one major new Delta II contract during this period. On 23 June 1998, it issued a firm-fixed-price commercial contract (F04701-98-C-0012) to Boeing to provide for the launch of the National Reconnaissance Office's Geosynchronous Lightweight Technology Experiment (GeoLITE) satellite on a Delta 7925 vehicle. The launch took place successfully on 18 May 2001.[18]

[15] See note 14 above.

[16] National Security Space Road Map, "Delta II," 5 November 1997, accessible at http://fas.org/spp/ military/program/nssrm/iniitiatives/deltaii.htm (Doc 3-9); The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10); Fact Sheets (U), SMC/PA, AFSPC/PA, and HQ USAF/PA, "Delta II," (Doc 3-11).

[17] News Release (U), Office of the Assistant Secretary of Defense (Public Afffairs), "Contracts," 28 September 2000 (Doc 3-14); Monthly Activity Reports (U), SMC/CL, "Delta II Monthly Activity Report" [package of avilable FY 98-01 reports], October 1997-March 2001 (Doc 3-15). See especially portions of activity reports entitled "Delta (ACAT II—P/S)" (FOUO), 3 April 2000, 31 March 2001, 30 June 2001 (information used not FOUO).

The Delta II was heavily employed by both military and civilian payload organizations during this period (FY 1998-2001). It successfully launched eight military satellites. Six of these were GPS satellites provided by SMC's Global Positioning System Joint Program Office. On 23 February 1999, a Delta II 7920-10 successfully launched the Space Test Program's ARGOS satellite from Vandenberg AFB. On 18 May 2001, a Delta II 7925 vehicle successfully launched the GeoLITE experiment from Cape Canaveral AFS for the National Reconnaissance Office. Delta launches contributed to some additional significant milestones. On 5 November 1997, Delta II-249 successfully launched the last GPS Block IIA satellite. During 1999, the Delta set a new record for the largest number of satellites (both military and civilian) launched within the shortest period of time (68 days).[19]

## Atlas

Atlas rockets had been used to launch space payloads since 18 December 1958. The first Atlas boosters were ICBMs, and excessed or retired Atlas ICBMs were used as space launchers for over 36 years. The last Atlas space launch to use a refurbished ICBM occurred on 24 March 1995. Over the years, the Atlas had also been modified into a wide variety of vehicles that were especially configured for space launches. During the period under consideration (FY 1998-2001), four recent varieties of Atlas boosters were used for space launches: the Atlas II, Atlas IIA, Atlas IIAS, and Atlas III. The prime contractor for all Atlas boosters during this period was Lockheed Martin Space Systems Company, which acquired General Dynamics, the original Atlas manufacturer, in December 1993. Some of the major subcontractors for the Atlas are listed below.[20]

- Rocketdyne: MA-5A booster and sustainer engines for Atlas IIA and IIAS
- Pratt & Whitney: liquid rocket engines for Centaur RL10A-4 upper stage
- Thiokol Propulsion Division of Cordant Technologies, Inc.: solid rocket motors for IIAS
- Honeywell: inertial navigation unit
- BF Goodrich: digital acquisition system
- NPO Energomash: RD-180 main engines for Atlas III
- SAAB: payload adapter separation systems
- Marconi Integrated Systems, Inc.: avionics boxes

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[18] Report (U), SMC/CL, "Launch Programs Monthly Acquisition Report, June 1998," 9 July 1998 (included in Doc 3-15); SMC/PK, List of New Contracts Issued During FY 1998-2001, attached to this history as Appendix I. The acquisition was funded by the National Reconnaissance Office.

[19] See Table 3-1 above. See also The Boeing Company, "Delta" [and related web pages], 2002 (Doc 3-10).

[20] Lockheed Martin, "Atlas Facts," copyright 2000, accessible at http://www.ast.lmco.com/ launch_atlasFacts.shtml on 11 March 2002 (Doc 3-16).

Like the older Atlas/Centaur boosters on which its design was based, the Atlas II launch vehicle was configured with a version of the Centaur upper stage.[21] The Atlas vehicle as a whole was modified by lengthening the propellant tanks a total of 12 feet, replacing the MA-5 main engines built by Rocketdyne with the larger MA-5A engines also built by Rocketdyne, eliminating the booster's vernier engines and substituting a roll-control module fueled by hydrazine, insulating the Centaur's tanks of cryogenic propellants (liquid hydrogen and liquid oxygen) with a fixed layer of foam, and improving the booster's avionics and guidance systems, pre-eminently by adding a technologically advanced inertial navigation unit. The unmodified, basic Atlas II could place a payload weighing 6,050 pounds into a geosynchronous transfer orbit.[22]

During the period under consideration, acquisition and launch of Atlas rockets was authorized by the Air Staff's Program Management Directives for Medium Launch Vehicles, which dealt with the acquisition programs known as MLV I, II, and III. The Atlas II was the product of a procurement originally known as the Medium Launch Vehicle II (MLV II), the earlier procurement of the Delta II being considered the MLV I, and the later procurement of the Delta II being considered the MLV III. The primary mission of the new vehicle was to place satellites of the Air Force's Defense Satellite Communications System (DSCS) and the Navy's UHF Follow-On (UFO) satellite system into their correct orbits. The program achieved initial launch capability from the east coast on 28 October 1991, when modifications to SLC-36A at Cape Canaveral AFS were completed. The first Atlas II vehicle was actually launched from SLC-36A on 10 February 1992.[23]

In 1995, SMC began using a further modification of the Atlas II known as the Atlas IIA, which had already begun to launch commercial satellites in 1992. The major difference was an upgraded RL-10 Pratt & Whitney engine for the Centaur upper

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[21] Standardized Atlas space boosters, built specifically for space application rather than as ICBMs, had been in use since the early 1960s. The Atlas/Centaur series was launched during 1962-1989. The Atlas I, a modification, was launched during 1990-1997. See Fact Sheets (U), Atlas/Centaur, Atlas I, and Atlas General Fact Sheets.

[22] Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001; Fact Sheets (U), Atlas II Fact Sheets (Doc 3-17).

[23] Program Management Directive (FOUO), SAF/AQS, "PMD 2138(47)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 15 March 2000 (information used not FOUO) (Doc 3-1); Program Management Directive (FOUO), SAF/AQS, "PMD 2138(48)/PE 35119F: Program Management Directive for Medium Launch Vehicles Program," 18 September 2001 (information used not FOUO) (Doc 3-2). The Navy used the last vehicle of the Atlas II configuration on 16 March 1998 to launch a UFO satellite. The Navy procured this launch through its own satellite contractor. For other information about Atlas launches, see Table 3-1 below.

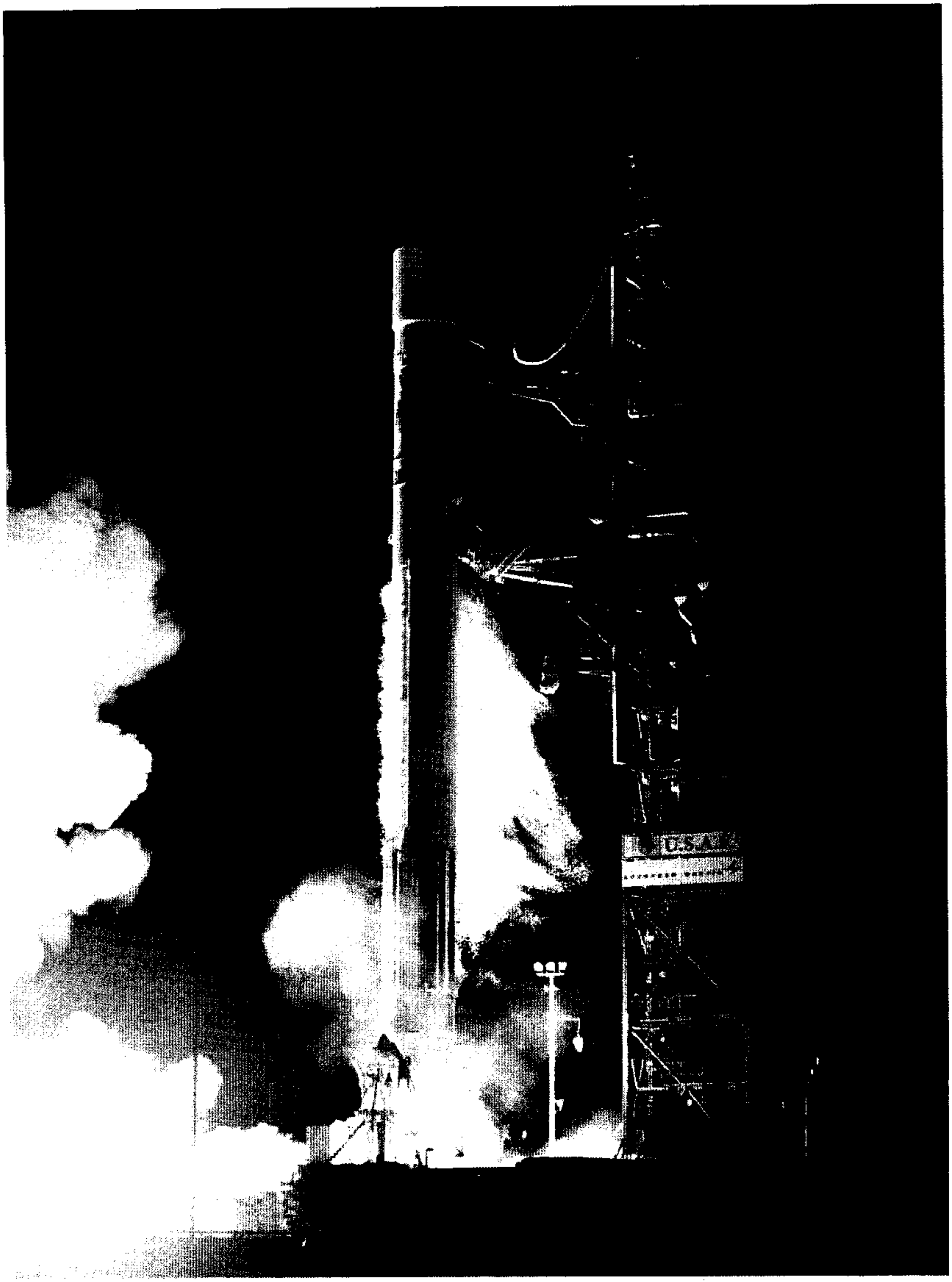


**Illustration 3-2: Atlas IIA Launch of DSCS III B-8 on 20 January 2000**
(Photo Courtesy Lockheed Martin Corporation)

stage, allowing the Atlas IIA to place a payload of about 6,125 pounds into a geosynchronous ransfer orbit.[24] Lockheed Martin also developed—originally for the commercial market—another modification, known as the Atlas IIAS, that added four strap-on solid rocket motors, firing two at a time, to raise the vehicle's actual performance payload weight to geosynchronous orbit to about 8,075 pounds.[25] The first commercial payload for the IIAS was launched at the end of 1993.

As a result of the source selection known as MLV II, SMC awarded a firm-fixed-price contract (F04701-88-C-0042) for Atlas II launches to General Dynamics Corporation's Space Systems Division in June 1988. This contract covered the procurement and launch of nine Atlas II and IIA vehicles for Air Force payloads, primarily satellites of the Defense Satellite Communications System (DSCS). Two of these were primary vehicles, and seven were contractual options, all of which were exercised. The contract was originally scheduled to end in December 1997, but SMC extended the MLV II contract in March 1997 because DSCS satellites, which were one of the primary payloads for Atlas II, were lasting longer on orbit than expected. Some Atlas launches to replenish the DSCS constellation therefore were delayed. The contract now covered launches through the year 2000. The Atlas vehicles and associated hardware had to be stored, and the contractor's services at the launch site (SLC-36A) were reduced or changed until the required launch dates. The contract ended on 1 July 2000 with a final value of about $550 million.[26]

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[24]The Atlas IIA was therefore operating slightly above its required performance threshold of 6,025 pounds to geosynchronous transfer orbit. See Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001. See also International Launch Services, "Atlas Launch System Mission Planner's Guide," December 1998 (filed in archives of SMC/HO); and International Launch Services, "Atlas Launch System Mission Planner's Guide," September 2001 (filed in archives of SMC/HO).

[25] The Atlas IIAS was therefore operating considerably above its required performance threshold of 7,000 pounds to geosynchronous transfer orbit. See Briefing Charts (U), SMC/CL (Maj Chuck Williamson) to SMC/CC, "Atlas Program Management Review," 30 October 2001. See also Lockheed Martin Fact Sheets (U), Atlas IIA and Atlas IIAS Fact Sheets (Doc 3-16); and Atlas mission planner's guides cited in note 24 above.

[26] Staff Summary Sheet (U), SMC/CLM to SMC/CC, "1999 Atlas Contractor Performance Assessment Reports," 29 November 1999, with attachments (FOUO) (information used not FOUO) (Doc 3-18); Staff Summary Sheet (U), SMC/CLM to SMC/CC, "Request Reviewing Official Signature for Atlas Program Contractor Performance Assessment Report (CPAR)," 18 February 1999, with attachment (FOUO) (information used not FOUO) (Doc 3-19); Briefing Charts (U), SMC/CL to SAF/AQ, "DAC Portfolio Review," 10 February 2000 (Doc 3-20).

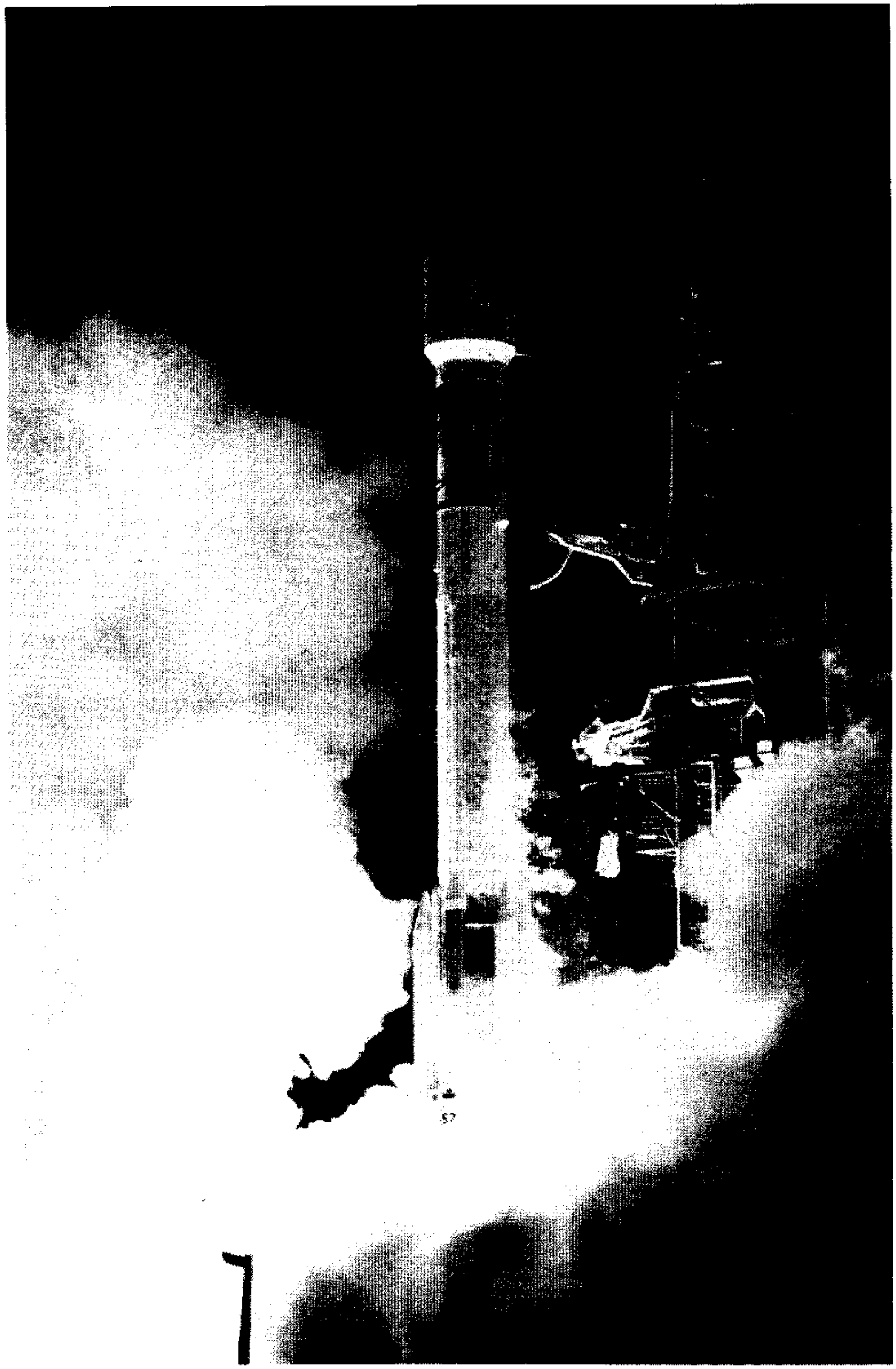

**Illustration 3-3: Atlas IIAS Launch on 5 December 2000**
(Photo Courtesy Lockheed Martin Corporation)

SMC also undertook a new procurement to add Atlas IIAS launches for DOD payloads from both Cape Canaveral AS and Vandenberg AFB beginning in 1998. Originally, the procurement was to consist of one firm Atlas IIAS launch with options for five more. During 1998, however, one of the options was dropped (see paragraphs below). The contract now covered five Atlas IIAS launch vehicles with associated storage, logistics, and management of non-commercial launches. Launches from Cape Canaveral would be conducted under commercial launch procedures, and launches from Vandenberg would be non-commercial. The actual launch operations at Vandenberg (that is, non-commercial launches), however, were removed from the provisions of the new contract and combined instead with the follow-on contract (F04701-95-C-0012) for Titan launch operations to form a new Launch Base Operations contract discussed below in the section dealing with the Titan IV. The new Atlas IIAS procurement contract (FO4701-96-C-0002) was awarded to Lockheed Martin Commercial Launch Services on 30 August 1996. The first and second DoD payloads for the IIAS—both of them classified spacecraft from the National Reconnaissance 0ffice (NRO)—were launched on 6 December 2000 (see Illustration 3-3) and 8 September 2001.[27]

In 1998 and 1999, SMC and the NRO both placed orders with Lockheed Martin for a newer type of Atlas booster known as the Atlas III. Lockheed Martin had developed it for the commercial market in two variations, known as the IIIA and the IIIB. Both of these variations departed from the traditional Atlas stage-and-a-half configuration by using a more powerful, two-chamber liquid rocket engine known as the RD-180 as the single-stage main propulsion unit. The RD-180 engine was a throttleable engine using liquid oxygen and kerosene propellants. It was designed and built by the Russian firm of NPO Energomash. The Atlas IIIA used a new Centaur upper stage with dual RL-10A engines, and the Atlas IIIB used a new Centaur with a single RL-10Aengine. The Atlas IIIA was 170.2 feet in total length with a large payload fairing, and the IIIB was 174.2 feet in total length with a large payload fairing. Both retained the Atlas' traditional diameter of 10 feet. The Atlas IIIA could place a payload weighing 9,200 pounds into a geosynchronous transfer orbit, and the IIIB could do the same with a payload weighing 9,920 pounds.[28]

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[27] See Table 3-1 below. See also note 7 above and Staff Summary Sheet (U), SMC/CLM to SMC/CC, "Request Reviewing Official Signature for Atlas Program Contractor Performance Assessment Report (CPAR)," 27 January 1999, with attachment (FOUO) (information used not FOUO) (Doc 3-21).

[28] Lockheed Martin, "Atlas Facts," copyright 2000, accessible at http://www.ast.lmco.com/ launchatlasFacts.shtml on 11 March 2002; International Launch Services, "Atlas Launch System Mission Planner's Guide," September 2001 (filed in archives of SMC/HO); Briefing Charts (U), SMC/CL, "Atlas Program Management Review," 15 July 1999; Press Release (U), Lockheed Martin, "Lockheed Martin Unveils New Atlas III Launch Vehicle Family," 8 April 1998, accessible at http://www.lmco.com/ILS/ txtnews/n980408a.htm (Doc 3-22). The payload weights for the Atlas IIIA and IIIB in the last sentence of this paragraph were corrected from the weights provided in the original version of this history.

The six vehicles originally planned for procurement under the IIAS contract (FO4701-96-C-0002) were numbered MLV-10 through MLV-15. Early in 1998, the NRO notified SMC that it would not exercise the option for MLV-13. To replace MLV-13, the NRO entered directly (without SMC's involvement) into a commercial type of contract with Lockheed Martin to buy on-orbit delivery of its classified payload using an Atlas IIIA launch vehicle. The NRO's Atlas IIIA mission had not yet been launched at the end of FY 2001. However, the very first Atlas IIIA mission, a commercial launch of a satellite for the European Telecommunications Satellite Organization (Eutelsat), took place successfully at Cape Canaveral on 24 May 2000.[29]

SMC purchased the second Atlas III launch vehicle to be used for a military payload in February 1999, but it contracted for the more powerful configuration, the Atlas IIIB. SMC procured the new vehicle under the Atlas IIAS contract (F04701-96-C-0002) in place of MLV-15. Therefore, the contract still covered five vehicles (four Atlas II-AS and one Atlas IIIB). On 25 February 1999, SMC awarded the additional work to Lockheed Martin for an additional value of $70.7 million on the contract. At the end of September 2001, the Air Force's launch of its first Atlas IIIB was scheduled to take place in September 2003.[30]

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[29] Press Release (U), NRO, "National Reconnaissance Office Awards Launch Contract," 11 June 1998 (Doc 3-23); Press Release (U), Lockheed Martin, "NRO Selects Atlas III For Satellite Launch," 11 June 1998 (Doc 3-24); Internet Document (U), Lockheed Martin, "Launch Archives," no date [after 8 March 2002], accessible at http://www.ilslaunch.com/launches/prebody.html; Mark Wade, "Atlas IIIA," Encyclopedia Astronautica, accessible at http://www.astronautix.com/lvs/atlsiiia.htm.

[30] Press Release (U), OSD/PA, "Contracts: Air Force," 25 February 1999 (Doc 3-25); Briefing Charts (U), SMC/CL to SMC/CC, "SMC Launch Programs DAC Program Manager Review," 9 March 2000; Briefing Charts (U), SMC/CL to SMC/CC, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001; Monthly Activity Reports (FOUO), SMC/CL, "Atlas IIA/IIAS Monthly Activity Report" [package of available FY98-01 reports], October 1997 - June 2000 (information used not FOUO) (Doc 3-26).

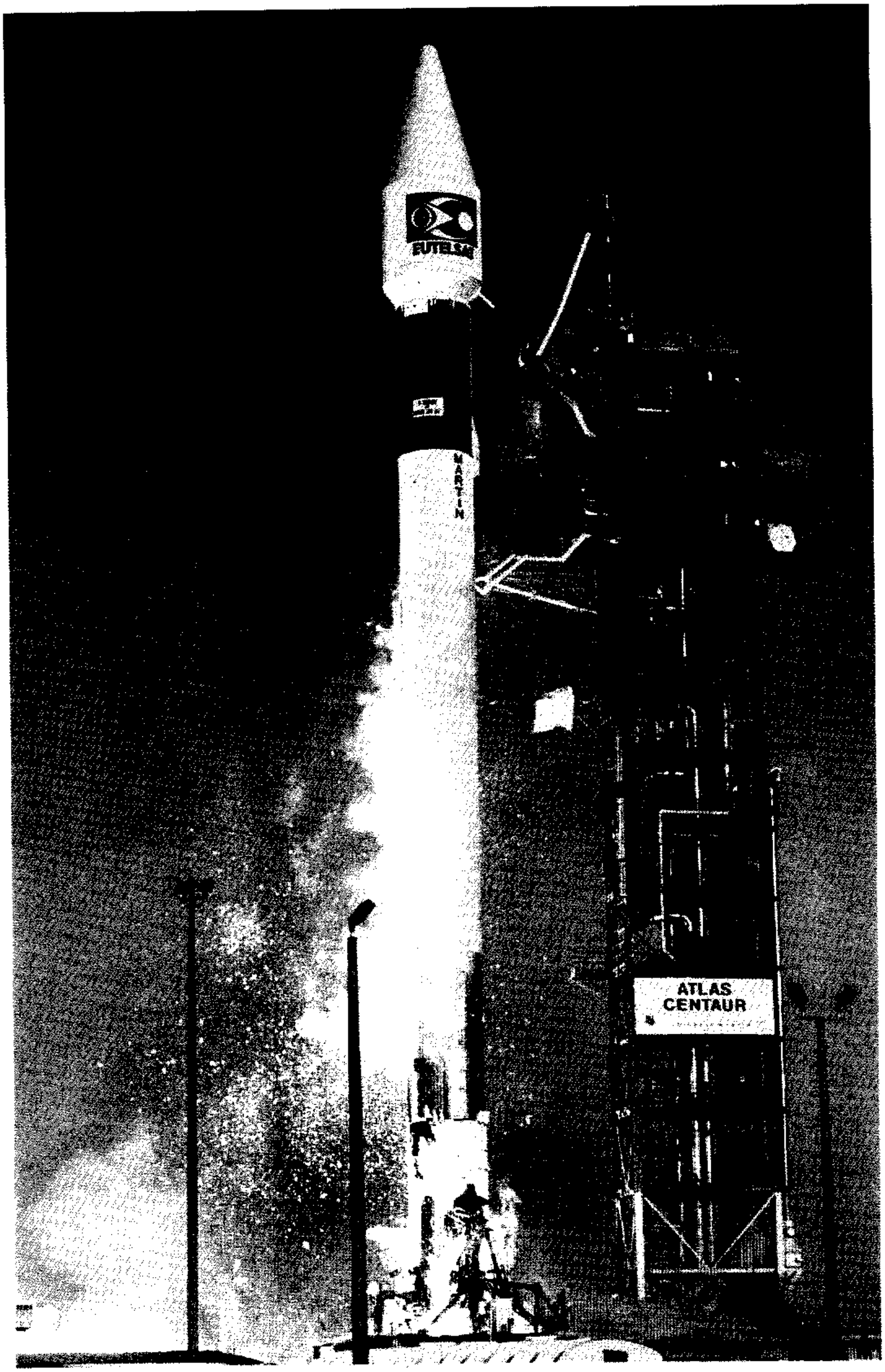


**Illustration 3-4: First Atlas III Launch, 24 May 2000**
(Photo Courtesy Lockheed Martin Corporation)

## Titan

Two major varieties of Titan launch vehicles were in use during FY 1998-2001: the Titan II and the Titan IV. Titan II launch vehicles were inactivated Titan II ICBMs, individually refurbished and modified to launch space payloads. They were capable of placing 4200 pounds into a low earth orbit and were therefore classed as medium launch vehicles. Titan IIs had been used during the 1960s as launch vehicles for the Gemini Program, but the most recent program to modify obsolete Titan II missiles had launched its first space payload in September 1988.

Lockheed Martin refurbished, modified, and launched the vehicles under SMC's contract F04701-85-C-0085. The seventh, eighth, ninth, and tenth launches of these Titan IIs took place during the period FY 1998-2001. The ninth launch successfully placed the first Block 5D-3 satellite (F-15) of SMC's Defense Meteorological Satellite Program into a nominal suborbital trajectory from which the Star 37S upper stage inserted the satellite into its correct operational orbit. The seventh and tenth launches successfully placed civilian weather satellites from the National Oceanic and Atmospheric Administration (NOAA) into their proper orbits. The seventh was the first time that NOAA used the Titan II. The eighth launch carried a satellite (QuickScat) for NASA to track ocean winds.[31]

As the reader may infer, the primary customers of the Titan II were meteorological satellites. However, the Air Staff's last official program directive for this period called for funding for Titan II launches to end on 30 September 2002. The remaining Titan II ICBMs would be returned to storage.[32] At the end of FY 2001, there were 38 Titan II first stages and 39 second stages in storage in the Aerospace Maintenance and Regeneration Center (AMARC) at Davis Monthan AFB, Arizona. The only existing plan

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[31] For further information about launches, see Table 3-1 earlier in this chapter. See also Fact Sheet (U), SMC/PA, "Titan II," March 1997 (Doc 3-27); Fact Sheet (U), National Security Space Road Map, "Titan II," 4 November 1997, http://fas.org/spp/military/program/nssrm/initiatives/titanii.htm (Doc 3-28); Mark Wade, "Titan II," Encyclopedia Astronautica, accessible from http://www.astronautix.com/ (Doc 3-29); Table (U), NASA, "Worldwide Space Launches" tables for 1998-2001, accessible from http://www.hq.nasa.gov/osf/.

[32] Program Management Directive (FOUO), SAF/AQ, "PMD 0938(8)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 18 September 2001 (information used not FOUO) (Doc 3-30). See also Program Management Directive (FOUO), SAF/AQ, "PMD 0938(7)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 15 March 2000 (information used not FOUO) (Doc 3-31).

for using the missiles was as spare parts for Lockheed Martin's Titan integrated logistics and Titan IV production contracts (see below).[33]

The Titan IV was the largest and most powerful expendable launch vehicle produced in the United States since the Saturn family of boosters used in the Apollo program. In design, it was fundamentally an enlargement of the Titan III (34)D vehicles, the last of which was launched in September 1989. Compared to the dimensions of the 34D, the Titan IV's first stage was a few feet longer (86.5 feet compared to 78.6 feet), its second stage was a little shorter (32.6 feet compared to 37.0 feet), its strap-on solid rocket motors were considerably longer (seven segments or 112.9 feet compared to five and a half segments or 90.4 feet), and its payload fairing was much wider (16.7 feet in diameter compared to 9.5 feet in diameter). In its original design, known as the Titan IVA, it was capable of placing 39,100 pounds into a low-Earth orbit from the Eastern Test Range without an upper stage, 10,000 pounds into geosynchronous orbit (22,300 nautical miles at the equator) using the Centaur upper stage, and 38,780 pounds into low earth orbit (5,200 nautical miles) using the Inertial Upper Stage. The Titan IVA was developed and manufactured by Lockheed Martin Corporation. The vehicle was launched from Cape Canaveral AFS's Launch Complexes 40 and 41 by the 5th Space Launch Squadron of Air Force Space Command's 45th Space Wing. It was launched from Vandenberg AFB's Space Launch Complex 4E by the 4th Space Launch Squadron of Space Command's 30th Space Wing. The first Titan IV launch took place on 14 June 1989 from Cape Canaveral, and its first launch with a Centaur upper stage took place on 7 February 1994 from Cape Canaveral.[34]

The Titan IVA was launched three more times during this period, all of them carrying classified payloads for the National Reconnaissance Office (NRO). The first two of these launches—on 24 October and 8 November 1997—helped to set a new record for the most rapid rate of Titan launches when added to the launch of NASA's Cassini mission on a Titan IVB on 15 October 1997.[35] Unfortunately, the last IVA launch, that of

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[33] Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[34] Fact Sheet (U), SMC/PA, "Titan IV," September 1995 (Doc 3-32); Lockheed Martin, "Titan IV Facts," copyright 2000, accessible at http://www.ast.lmco.com/launch_titan.shtml on 11 March 2002 (Doc 3-33); National Security Space Road Map, "Titan IVA," 23 October 1997 (Doc 3-34); Mark Wade, "Titan 4," Encyclopedia Astronautica, accessible from http://www.astronautix.com/ (Doc 3-35).

[35] The new record, therefore, was three Titan launches within a span of only 23 days. See Howard Antelis, "Air Force Rewrites Record Book with Five Successful Payload Launches in 23 Days," *Astro News*, 14 November 1997, p. 1; "Three Launches in 23 Days Sets New Record," *Space and Missile Times*, 14 November 1997, p. 4. The first two of these launches, combined with an Atlas IIA launch on 25 October 1997, also contributed to a new record for rapidity of mixed vehicle launches: three launches within

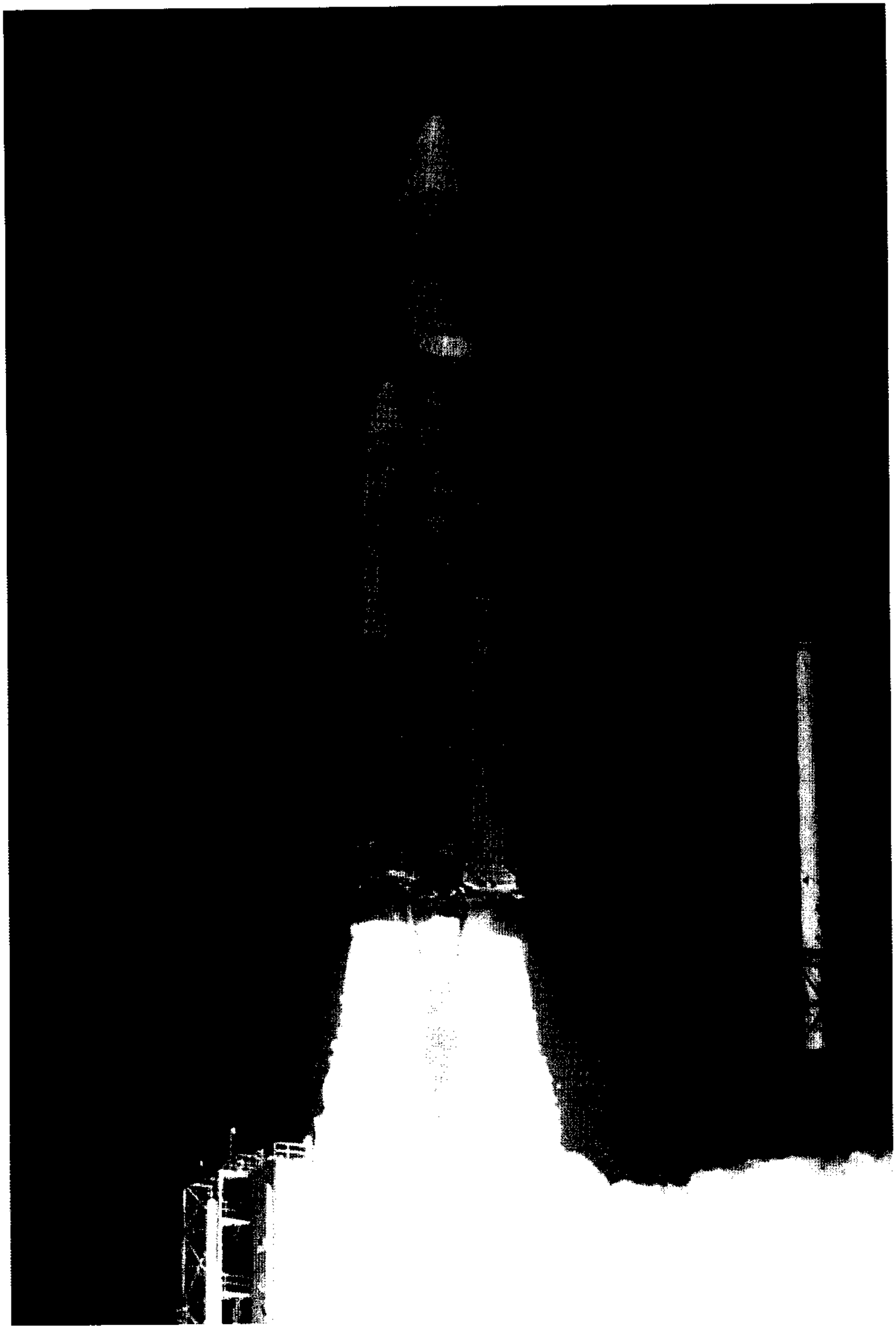

**Illustration 3-5: Attempted Launch of Titan IVB-27 on 9 April 1999**
(Photo Courtesy of Lockheed Martin Corporation)

Titan IVA-20 on 12 August 1998, failed to reach orbit and was the first of the major launch vehicle failures which ultimately led to the Launch Broad Area Review (BAR). (For the Launch BAR, see the earlier section in this chapter.) Titan IVA-20 was destroyed by internal self-destruct mechanisms as well as the range safety officer's destruct command when it veered out of its planned trajectory. Investigators finally decided that the cause was electrical shorts in the wiring for the second stage power supply which affected the vehicle's guidance computer and inertial measurement unit. The root cause of the electrical shorts was nicks in the wire harness. There were no more scheduled launches of the Titan IVA after this one.[36]

SMC and Lockheed Martin also developed an upgraded version of the Titan IV known as the Titan IVB. Using the lighter and more powerful solid-rocket motors developed by the Solid-Rocket Motor Upgrade (SRMU) program, the Titan IVB used with a Centaur could place 12,700 pounds into geosynchronous orbit. The IVB also featured improved guidance and avionics as well as shorter processing times. The first Titan IVB successfully launched a satellite for SMC's Defense Support Program on 23 February 1997 from Cape Canaveral.[37]

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10 days. See Howard Antelis, "Launch Programs Helps Meet Hectic Spacelift Schedule," *Astro News*, 31 October 1997, p. 1.

[36] "Remarks by Maj Gen Robert C. Hinson, Accident Investigation Board President" at Press Conference, Cape Canaveral AS, Florida, 2 September 1998, available at http://www.fas.org/spp/military/program/ launch/nr98-09-02.htm (Doc 3-40); "Titan IVA-20 Accident Investigation Board Summary," 15 January 1999, available at http://www.fas.org/spp/military/program/launch/titan_iv-20_sum.htm (Doc 3-41); Janene Scully, "Report: Frayed Wire Led to Billion-Dollar Titan 4A Mishap," Los Angeles Times, 16 January 1999 (Doc 3-42); David Atkinson, "Air Force Blames Titan IVA Explosion on Faulty Wiring," Defense Daily, 19 January 1999 (Doc 3-43); Air Force News Service, "Titan IVA-20 Accident Investigation Board Releases Results," 19 January 1999 (Doc 3-44); Air Force News Service, "Air Force Clears Way for Titan Rockets to Return to Flight," 2 February 1999 (Doc 3-45); E-mail, William M. Evans to SMC Directors, et al., "RE: CSAF/SecAF Media Breakfast – 26 Apr 99," 21 April 1999, with attachment (Briefing Charts: "What is the status of the Titan IV A-20 failure investigation and its impact on the Titan program? (AQS)") (Doc 3-46). See also remarks written by the program office for a review of this history during March 2005: "The root cause of the failure was nicks in the wire harness. This condition impacted the guidance system, but the guidance system was not the root cause."

[37] Fact Sheet (U), SMC/PA, "Titan IVB Launch Vehicle," April 1999 (Doc 3-36); Fact Sheet (U), SAF/PA, "Titan IV Expendable Launch Vehicle," 20 July 2001 (Doc 3-37); Fact Sheet (U), SAF/PA, "Titan IVB," March 2002 (Doc 3-38); National Security Space Road Map, "Titan IVB," 12 July 1999 (Doc 3-39).

Nine more Titan IVBs were launched during FY 1998-2001, and all but one of these (NASA's Cassini mission to Saturn) carried DoD payloads: three classified payloads for the National Reconnaissance Office (NRO), three for SMC's Defense Support Program (DSP), and two for SMC's Milstar satellite communications program. Unfortunately, the DSP launch attempt on 9 April 1999 and the Milstar launch attempt on 30 April 1999 were failures that led directly to the Launch Broad Area Review of 1999. Ultimately, both failures were attributed to the upper stages rather than the Titan IVB's core stages. The launch failure involving DSP 19 on 9 April 1999 was caused by the failure of the second stage of the Inertial Upper Stage (IUS) to separate from its first stage. The launch anomaly of 30 April 1999, which placed the Milstar II F-1 satellite into an unusable orbit, was caused by software errors in the Centaur upper stage.[38]

SMC (then called Space Division) awarded the development contract (F04701-85-C-0019) for the Titan IV to Martin Marietta Denver Aerospace on 28 February 1985. Beginning in 1989, the contract also provided for the production of 41 Titan IV vehicles. However, it was restructured in 1993 because of declining launch requirements and the resulting necessity of slowing down the rate of production and stretching out the period of production. In 1996, the program office carried out a sweeping contractual restructuring intended to achieve efficiencies by combining the Titan II and Titan IV contracts and dividing the contractor's responsibilities by function. SMC closed out the original development and production contract and phased in a new contract with Lockheed Martin (F04701-95-C-0012) for Titan II and IV launch operations and integrated logistics. The Center awarded a new contract (F04701-96-C-0001) for production and a new contract (F04701-96-C-0035) covering new research and development as well as resolution of major anomalies to Lockheed Martin. Finally, it awarded a new Unified Payload Integration Follow-on (UPIF) contract (F04701-98-C-0005) for Titan II and IV payloads on 1 October 1997. (For a description of these contracts as of October 2001, see the table below.)[39]

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[38] For the Launch Broad Area Review, see the section with that title earlier in this Titan section. For more details about Titan launches and failures, see Table 3-1 and Table 3-2 earlier in this section. For published details about launch failures, see Marc Strass, "Next Titan IVB Launch Hits Snag Due to Flight Stability Concerns," Defense Daily, 9 November 1999 (Doc 3-47); "Milstar Accident Board Results," Astro News, 30 July 1999, p.4 (Doc 3-48); "Lockheed May Face Penalty Over Launch," Baltimore Sun, 23 July 1999 (Doc 3-49); Aaron Renenger, "Wayward Milstar II Satellite Challenges SMC Controllers," Astro News, 2 July 1999, p. 1 (Doc 3-50); "Milstar Launch a Mission Failure," Astro News, 7 May 1999, p. 1 (Doc 3-51).

[39] History of SMC, October 1994-September 1997, p. 40; Briefing Charts (U), SMC/CL to SMC/CC, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

**Table 3-3**
**Titan Contracts in Effect During October 1997 – September 2001**[40]

| Contract | Contractor | Period | Value | Purpose |
|---|---|---|---|---|
| F04701-96-C-0001 | Lockheed Martin Co. | 1 Oct 95 – 30 Sep 02 | $2.7 B | Titan IV production, storage, final assembly |
| F04701-95-C-0012 | Lockheed Martin Co. | 1 Oct 95 – 30 Sep 02 | $2.0 B | Titan launch operations, integrated logistics |
| F04701-96-C-0035 | Lockheed Martin Co. | 1 Jul 96 – 30 Sep 02 | $255 M | Research and development, studies, anomalies |
| F04701-98-C-0005 | Lockheed Martin Co. | 1 Oct 97 – 30 Sep 02 | $321 M | Payload Integration Follow-on |

The new Titan contracts were based on production of only 40 Titan core vehicles and the actual launching of only 39 missions. Program management direction from the Air Staff continued to specify that remaining Titan IVB launches would be limited to 39 launches, and that subsequent payloads in the Titan IV class would move to the Evolved Expendable Launch Vehicle (EELV—see below). At the end of September 2001, SMC was planning to complete the assembly of the last Titan IVB core vehicles by April 2002. Seven potential missions remained. They consisted of four launches for the National Reconnaissance Office (NRO), two launches of SMC's Milstar communications satellites, and one launch for SMC's Defense Support Program (DSP).[41]

## Inertial Upper Stage and Centaur

Two varieties of upper stages were used with the Titan IV to transfer payloads to higher orbits: the Centaur and the Inertial Upper Stage (IUS). The Centaur upper stage was used in fourteen launches of military payloads during FY 1998 – 2001. In nine of those launches it was used with an Atlas II or IIA, and in five it was used with a Titan IVA or IVB. However, it was considered to be the cause of failure in the attempted launch of Milstar II F-1 on 30 April 1999. The IUS was used in three Titan launches of

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[40] Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000; Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[41] Program Management Directive (FOUO), SAF/AQ, "PMD 0938(8)/PE 35144F, Program Management Directive (PMD for Titan Space Launch Vehicle Program," 18 September 2001 (information used not FOUO) (Doc 3-30); Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

military payloads during that period, and it was considered to be the cause of failure in the attempted launch of DSP F-19 on 9 April 1999.[42]

The Centaur was manufactured by Lockheed Martin under its Titan and Atlas production contracts. Each Centaur was driven by two RL10 liquid rocket engines manufactured by Pratt and Whitney. These engines used liquid hydrogen and liquid oxygen as propellant and were capable of multiple restarts in space. Earlier versions of the Centaur were used on Atlas and Titan boosters, and newer versions were used with the Atlas II and Titan IV boosters. The Centaur configurations used with the Atlas II were called Centaur II and IIA, and the configuration used with the Titan IV was called the Titan IV Centaur. Their characteristics are given in the table below.[43]

**Table 3-4**
**Types of Centaur Upper Stages In Use During October 1997 – September 2001[44]**

| Configuration | Length | Diameter | Engines | Total Thrust |
|---|---|---|---|---|
| Centaur II | 33 feet | 10 feet | two RL 10A-3A | 41,000 pounds |
| Centaur IIA and IIAS | 33 feet | 10 feet | two RL 10A-4-1 | 44,600 pounds |
| Titan IV Centaur | 29.1 feet | 14.2 feet | two RL 10A-4 or two RL 10A-4-1 | 41,600 pounds 44,600 pounds |

The IUS could be used as an upper stage on either the Titan IV or the Space Shuttle. It was a two-stage, solid propellant vehicle manufactured by Boeing Space and Communications. The solid motors were manufactured by Chemical Systems Division and developed thrusts of 45,600 lbs (first stage) and 18,500 lbs (second stage). It was capable of placing payloads weighing up to 5,300 pounds into geosynchronous orbit from either the Titan IV or the Space Shuttle. It featured totally redundant avionics and was therefore considered one of the most reliable space vehicles ever developed. Unfortunately, it failed to deliver its payload to a useable orbit on 9 April 1999, when its first and second stages failed to separate properly. Fortunately, it successfully launched

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[42] See the section entitled Launch Broad Area Review earlier in this chapter. See also Table 3-1 earlier in this chapter.

[43] National Security Space Road Map, "Inertial Upper Stage (IUS)" (U), accessible at http://fas.org/spp/ military/program/nssrm/initiatiatives/ius.htm on 30 May 2002; Fact Sheet (U), SMC/CL, "Titan IV Centaur Upper Stage," accessible at http://www.laafb.af.mil/SMC/CL/cltcent.htm on 1 February 1999.

[44] See note above.

the next two DSP satellites, F-20 and F-21, from Titan IVB boosters on 8 May 2000 and 6 August 2001.[45]

**Table 3-5**
**IUS Contracts in Effect During October 1997 – September 2001[46]**

| Contract | Contractor | Period | Value | Purpose |
|---|---|---|---|---|
| F04701-91-C-0011 | Boeing Co. | 1 Oct 91 – 31 Dec 99 | $191.3 M | Fourth IUS production contract (23 vehicles) |
| F04701-97-C-0004 | Boeing Co. | 1 Jul 97 – 30 Sep 03 | $207.7 M | IUS Integration and launch support |
| F04701-97-C-0038 | Lockheed Martin Co. | 1 Jun 97 – 31 Dec 01 | $12.8 M | Independent validation and verification |

Contractual activity in the IUS program during this period was primarily involved with closing out the last production cycle, integration, and launch activity. The fourth and last IUS production contract (F04701-91-C-0011) was closed out at the end of 1999 after producing 23 IUS vehicles. After the launch of DSP F-21 on 6 August 2001, only two IUS vehicles remained in the inventory. One of these (IUS-10) was scheduled to launch another DSP satellite in 2003. The remaining one (IUS-23) was requested by NASA for an interplanetary mission, but it might be needed for yet another DSP satellite. In 1999, the Air Staff placed all of the remaining funding for the IUS under the Titan program element, and the IUS was thereafter managed by the Titan program office.[47]

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[45] See Table 3-1 earlier in this chapter. See also Fact Sheet (U), USAF, "The Inertial Upper Stage," 20 July 2001; Fact Sheet, SMC/CL, "Titan IV Inertial Upper Stage (IUS)," accessible at http://www.laafb.af.mil/ SMC/CL/cltius.htm on 1 February 1999; Fact Sheet (U), Boeing Space Systems, "Inertial Upper Stage," accessible at http://ww.boeing.com/defense-space/space/ius/ on 22 September 1998.

[46] Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000 (Doc 3-20); Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

[47] Staff Summary Sheet (U), SMC/CLTO to SMC/CV, "IUS-23 Requirements From NASA," 18 August 1999, with attachment (Doc 3-52); Briefing Charts (U), SMC/CLTO, "Program Management Review: Inertial Upper Stage," 22 September 1999; FY98 USAF Military Space RDDS, "0305138F Upper Stage Space Vehicles (Space)," accessible at http://www.fas.org/spp/military/budget/peds_98f/0305138f.htm on 1 February 1999; Briefing Charts (U), SMC/CL, "DAC Portfolio Review," 10 February 2000; Briefing Charts (U), SMC/CL, "SMC Commander's Program Management Review for Launch Programs," 30 October 2001.

# CHAPTER 4

## EVOLVED EXPENDABLE LAUNCH VEHICLE (EELV) PROGRAM

The National Defense Authorization Act for Fiscal Year 1994 directed the Secretary of Defense to develop and submit to Congress a plan for the "modernization of space launch capabilities for the Department of Defense (DoD) or, if appropriate, for the government as a whole." In response, the Air Force initiated the Space Launch Modernization Plan, commonly known as the "Moorman Study," which identified options for modernizing the current fleet of expendable launch vehicles, milestones for each option, and associated development and operations costs.[1] President Clinton issued a National Space Transportation Policy on 5 August 1994, based on one of those options. It directed that "the Department of Defense will be the launch agent for the national security sector and will maintain the capability to evolve and operate those space transportation systems, infrastructure, and support activities necessary to meet national security requirements."[2] DoD's objective was to improve and evolve current expendable launch vehicles to reduce costs while improving reliability, operability, responsiveness, and safety.[3]

### EELV Acquisition

The initial phase of the EELV program was known as Low Cost Concept Validation (LCCV). For this first phase, SMC awarded four 15-month study contracts, each with a face value of $30 million, for preliminary design, trade analyses, and risk reduction demonstrations of an EELV concept. (See table 4-2 below.) The first phase

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[1] DoD, "Space Launch Modernization Plan: Executive Summary," April 1994 (SMC historical archives).

[2] National Science and Technology Council, "National Space Transportation Policy (NSTC-4)," signed by William J. Clinton, President of the United States, 5 August 1994, http://www.au.af.mil/au/awc/awcgate/ nstc4.htm.

[3] History of SMC (U), 1994-1997, pp. 45-50. For other descriptions of the program's goals, see Program Management Directive (FOUO), SAF/AQ, "Program Management Directive (PMD) for the Evolved Expendable Launch Vehicle (EELV) Program," 30 May 2000 (information used is not FOUO) (Doc 4-2); SMC/MV, "EELV Strategic Plan," November 2000, http://www.losangeles.af.mil/SMC/MV/eelvhome. htm (Doc 4-3); Fact Sheets (FOUO), Office of the National Security Space Architect, "Evolved Expendable Launch Vehicle (EELV) Medium Lift Vehicle (MLV)," 24 September 1997, and "Evolved Expendable Launch Vehicle (EELV) Heavy Lift Vehicle (HLV)," 24 September 1997, accessible from http://www.wslfweb.org/docs/roadmap/irm/initlist. htm (information used is not FOUO) (Doc 4-4); Fact Sheet (U), AFSPC/PA, "Evolved Expendable Launch Vehicle," no date [2000] (Doc 4-6); Peter L. Portanova (Doc 4-4); Fact Sheet (U), SMC/PA, "Evolved Expendable Launch Vehicle," October 1998 (Doc 4-5); Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7).

was successfully completed in November 1996. After receiving Milestone I approval from the Defense Acquisition Executive in November 1996, SMC awarded two 17-month Pre-Engineering and Manufacturing Development (Pre-EMD) contracts for the second phase on 20 December 1996, one to Lockheed Martin and the other to McDonnell Douglas. (McDonnell Douglas was later acquired by The Boeing Company.) Each contract was valued at $60 million. This phase involved refining the concepts developed in Phase One, producing detailed system designs, and preparing for the next phase, Engineering and Manufacturing Development (EMD).[4]

The original acquisition strategy called for awarding one cost-type contract for EMD, worth about $1.6 billion, to the winner of the Pre-EMD competition. During the third and final phase, the winning contractor would complete full-scale engineering and development, leading up to two demonstration flights. The medium-lift EELV was to have a first launch in 2001, and the heavy-lift EELV was to be launched in 2003. The EELV was to reach full operational capability (FOC) in 2004.[5]

In 1997, representatives of the Air Force, the Department of Transportation, and private industry conducted a six-month cooperative review of the program's objectives and the potential market. The review found that the commercial satellite market was projected to grow much faster than had been expected when the EELV's acquisition plan was written early in 1995, based on the recommendations of the SLMP. Instead of dominating the launch market during the EELV's first decade of operation, government payloads would be outnumbered by commercial payloads at an estimated ratio of three to one. The U.S. market, therefore, would be large enough to support two EELV providers instead of one. Those providers could diversify their customer base and be competitive in the international market place by capitalizing on their EELV development efforts with the same government investment that was originally planned for just one.[6]

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[4] History of SMC (U), 1994-1997, pp. 48-49.

[5] History of SMC (U), 1994-1997, pp. 49-50.

[6] Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); Chet DelSignore, "New EELV Strategy: A Significant Change," Astron News, 26 November 1997; SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10); Col Richard W. McKinney, Peter L. Portanova, et al., "EELV Meets CAIV," Aerospace America, May 1999, pp. 68-74 (Doc 4-11); R.W. McKinney, P.L. Portanova, et al., "Evolved Expendable Launch Vehicle: The Competitive New Launcher," 49th International Astronautical Congress, September 28-October 2 (Doc 4-12); J Knauf, L. Drake, and P. Portanova, "Evolved Expendable Launch Vehicle System: The Next Step in Affordable Space Transportation," 52nd International Astronautical Congress, 1-5 October 2001 (Doc 4-13).

The EELV Program Office was thus in a position to negotiate and place both Boeing and Lockheed Martin under contract for a lower combined price than it had originally estimated for only one contractor. By developing two EELV systems, the government would be able to maintain competition and obtain lower individual launch costs throughout the program's life cycle. This new approach was anticipated to reduce the government's overall launch costs by 25 percent or more. In addition, DoD could simply buy launch services from the contractors without ever having to acquire the hardware.[7] The program office contrasted the original and new acquisition strategies as in table 4-1.

**Table 4-1**
**Change in Acquisition Strategy for EELV EMD Phase[8]**

| 1995 Strategy | 1997 Strategy |
|---|---|
| Cost-type contract for EMD phase | Fixed government investment for development in addition to contractor investment |
| Two system flight tests | No system flight tests |
| Down-select to one contractor for EMD phase | Two contractors compete over the life of the program |
| Government pays for production effort | Government pays for launch services only |

The innovative features and mutual advantages of this procurement were striking. The EELV Program Office and its contracting contingent won several prestigious acquisition and technical awards for their work. The awards included the 1998 John Welch Award for Excellence in Acquisition Management, the 1998 Secretary of the Air Force and Air Force Materiel Command Strategic Acquisition Reform Awards for Contracting Excellence, the 1999 Defense Standardization Program National Honorary

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[7] Briefing Charts (U), SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Program Overview," 20 November 1997 (Doc 4-8a); Briefing Charts (U), "Evolved Expendable Launch Vehicle (EELV) Briefing to 1998 National Space Symposium, Catching a Ride to Orbit Session," no date [1998] (Doc 4-8b); Peter L. Portanova (Aerospace Corporation), "Evolved Expendable Launch Vehicles (EELV)," no date [October 2001] (Doc 4-7); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10).

[8] Briefing Charts (U), SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Program Overview," 20 November 1997 (Doc 4-7); Briefing Charts (U), "Evolved Expendable Launch Vehicle (EELV) Briefing to 1998 National Space Symposium, Catching a Ride to Orbit Session," no date [1998] (Doc 4-8).

Award, the 1999 David Packard Excellence in Acquisition Award, the 1999 DOD Value Engineering Achievement Award, and many others.[9]

The acting Under Secretary of Defense for Acquisition and Technology, Noel Longuemare, approved the new acquisition strategy on 3 November 1997.[10] Boeing and Lockheed Martin completed the Pre-EMD contracts in May 1998. SMC filed the required Final Environmental Impact Statement for the EELV with the Environmental Protection Agency on 1 May 1998, and the Air Force's Assistant Secretary for Science, Engineering and Technology signed a Record of Decision on 8 June 1998 that permitted the development and launch of both contractors' proposed vehicles. SMC issued a final request for proposals (F04701-97-R-0008) on 14 July 1998. On 16 October 1998, SMC awarded four EELV Federal Acquisition Regulation (FAR) Part 12 commercial-type contracts, two development agreements, called Other Transaction Agreements (OTA), and two contracts for the Initial Launch Services (ILS). They are described at the bottom of Table 4-2.[11]

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[9] SMC/MV, "Evolved Expendable Launch Vehicle System Program Office Achievements," no date, accessible at http://www.losangeles.af.mil/SMC/MV/intro_files/public/awards/awards.htm on 5 July 2002; SSgt Jeff Capenos, "EELV Garners Air Force Awards," Astro News, 18 June 1999, p. 1; News Release, SMC/PA (1st Lt Tonya Summerall), "EELV Program Saves Billions, Honored With Top Award," 3 July 2000, accessible at http://www.af.mil/news/Jul2000/n20000703_001010.html on 12 July 2002; Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives).

[10] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc 4-10); News Release, SAF/PA, "New Acquisition Strategy for Evolved Expendable Launch Vehicle," 6 November 1997 (Doc 4-9); Chet DelSignore, "New EELV Strategy: A Significant Change," Astro News, 26 November 1997.

[11] Memo (U), SMC/MVK to All Potential Offerors, "RFP F04701-97-R-0008, Request for Proposal (RFP) F04701-97-R-0008, Evolved Expendable Launch Vehicle (EELV) – Development and Initial Launch Services (ILS) Amendment 0003," 14 July 1998, with attachment; News Release, SMC/PA, "EELV Gets the Environmental Green Light," 8 June 1998 (Doc 4-14); Record of Decision, Air Force Acting Deputy Assistant Secretary (Science, Technology and Engineering), "Evolved Expendable Launch Vehicle (EELV)," 8 June 1998 (Doc 4-15); Finding of No Practicable Alternative, Deputy Assistant Secretary of the Air Force (Environmental, Safety and Occupational Health), "Evolved Expendable Launch Vehicle Program," 10 June 1998 (Doc 4-16); Final Environmental Impact Statement, HQ USAF/ILEVP, "Evolved Expendable Launch Vehicle Program," 30 April 1998.

**Table 4-2**
**Major EELV Contracts Through FY 2001**[12]

| Contractor | Contract | Award Date | End Date at Award | Value at Award |
|---|---|---|---|---|
| **Preliminary Design, Trade Analyses, and Risk Reduction** | | | | |
| Alliant Techsystems, Inc. | F04701-95-C-0032 | 24 Aug 1995 | 6 Feb 1997 | $30 M |
| The Boeing Company | F04701-95-C-0033 | 24 Aug 1995 | 10 Jun 1997 | $30 M |
| Lockheed Martin Corp. | F04701-95-C-0034 | 24 Aug 1995 | 24 Nov 1996 | $30 M |
| McDonnell Douglas Corp. | F04701-95-C-0035 | 24 Aug 1995 | 17 Jan 1997 | $30 M |
| **Pre-Engineering and Manufacturing Development** | | | | |
| Lockheed Martin Corp. | F04701-97-C-0003 | 20 Dec 1996 | May 1998 | $60 M |
| McDonnell Douglas Corp. | F04701-97-C-0005 | 20 Dec 1996 | May 1998 | $60 M |
| **Engineering and Manufacturing Development** | | | | |
| Lockheed Martin Corp. | F04701-98-9-0004 | 16 Oct 1998 | 30 Sep 2002 | $500 M |
| The Boeing Company | F04701-98-9-0005 | 16 Oct 1998 | 30 Sep 2002 | $500 M |
| **Initial Launch Services** | | | | |
| Lockheed Martin Corp. | F04701-98-D-0001 | 16 Oct 1998 | 30 Sep 2006 | $649 M |
| Boeing Launch Services | F04701-98-D-0002 | 16 Oct 1998 | 30 Sep 2006 | $1,378 M |

The OTA contracts, which awarded $500 million each to both Boeing and Lockheed Martin for the EMD phase, required each contractor to make large capital investments which they were expected to recover in profits from launch services for both DoD and commercial companies. Launch services were awarded to the ILS contractors competitively for launches expected during the period FY 1999-FY 2006. Boeing's Delta IV launch vehicle won 19 missions worth $1.38 billion, while Lockheed Martin's Atlas V won 9 missions worth $650 million. Additional competitions would be held for future government payloads.

The OTA contracts included the key performance parameters and other operational requirements laid out by Air Force Space Command in its Operational Requirements Document (ORD) of 15 September 1998, the most important features of which are reproduced in table 4-3.

[12] Office of Assistant Secretary of Defense (Public Affairs), news releases dealing with contracts, 18 May 1998 (No. 685-96), 18 May 1998 (No. 469-95), 6 April 1998 (No. 054-M), 16 October 1998 (No. 538-98), 16 October 1998 (No. 536-98), 13 December 2000 (No. 742-00), 14 December 2000 (No. 745-00), accessible at http://www.defenselink.mil/news/archive.html (Doc 4-1).

**Table 4-3**
**EELV Operational Requirements Document of 15 September 1998**[13]

| REQUIREMENT | THRESHOLD | OBJECTIVE |
|---|---|---|
| MASS TO LEO* | 17,000 LBS | +15% |
| MASS TO POLAR 1* | 4,400-7,000 LBS | +15% |
| MASS TO POLAR 2* | 41,000 LBS | +5% |
| MASS TO SEMI-SYNC* | 2,500-4,725 LBS | +15% |
| MASS TO GTO* | 6,100-8,500 LBS | +15% |
| MASS TO MOLNIYA* | 7,000 LBS | +15% |
| MASS TO GEO* | 13,500 LBS | +5% |
| VEHICLE DESIGN RELIABILITY * | 98% | >98% |
| STANDARD LAUNCH PADS* | ABLE TO LAUNCH ALL CONFIGURATIONS | SAME |
| STANDARD PAYLOAD INTERFACE * | STANDARD PAYLOAD INTERFACE FOR EACH VEHICLE CLASS | ONE STANDARD PAYLOAD INTERFACE |
| COST SAVINGS: REDUCTION OVER CURRENT SYSTEMS | 25% | 50% |
| TIMELINESS: PROBABILITY OF LAUNCH WITHIN 10 DAYS | 80% | 90% |
| RESPONSIVENESS | 45 DAYS (MLV)<br>90 DAYS (HLV) | 30 DAYS (MLV)<br>60 DAYS (HLV) |
| LAUNCH RATE DURING A 12 MONTH PERIOD | 14 | 26 |

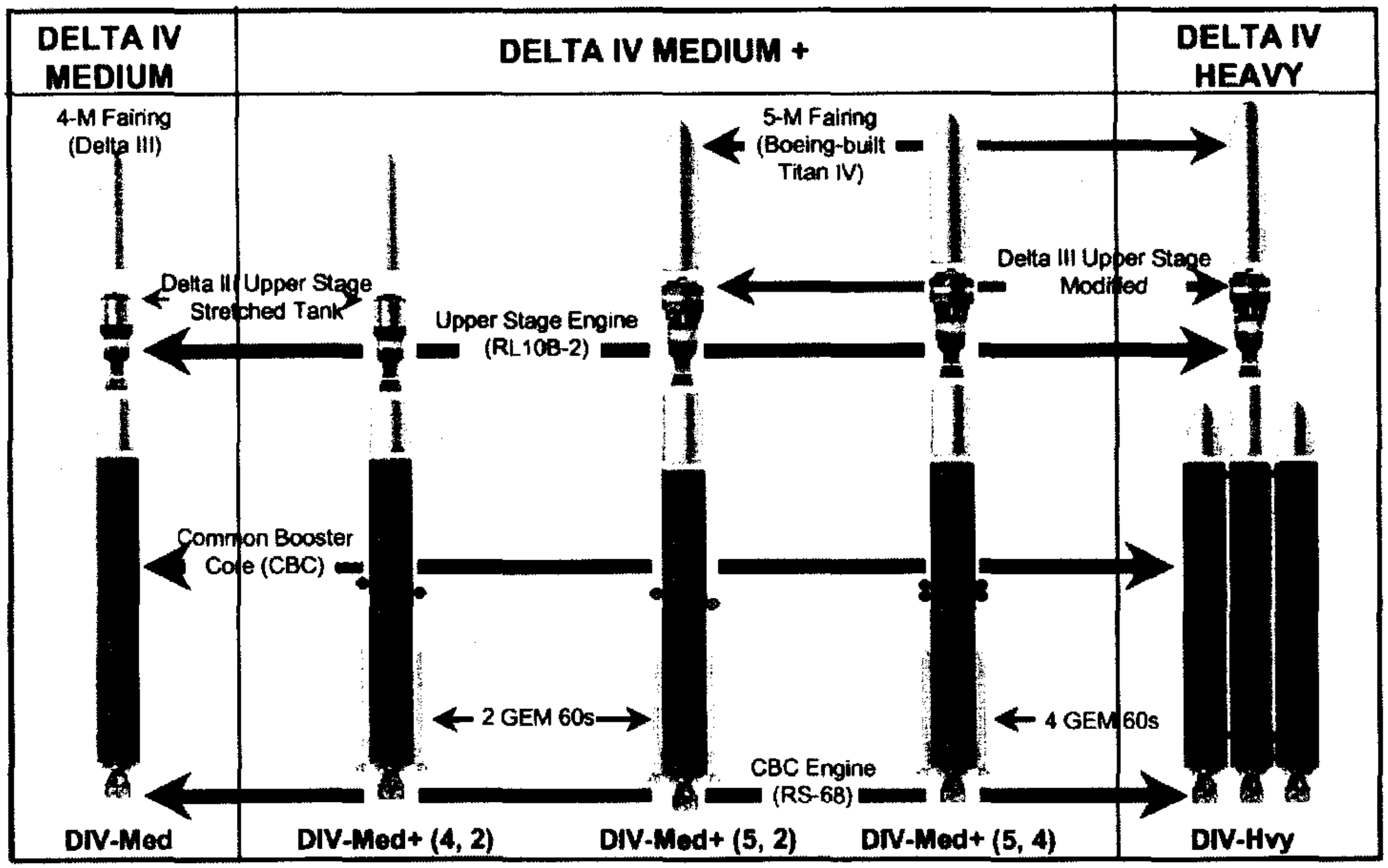
* DENOTES KEY PERFORMANCE PARAMETERS

## EELV Configurations

Both contractors originally planned to develop a small-, medium-, and heavy-lift version of their EELVs in response to SMC's mission requirements as identified in the request for proposals for the OTA and ILS contracts. These original concepts would have used common core liquid boosters to meet all the government mission requirements and no solid-rocket motors for government launches, although Boeing's concept included small solid-rocket motors for some commercial launches. However, between October

[13] AFSPC/DRSV, "Air Force Space Command Operational Requirements Document (ORD) II, AFSPC 002-93-II, for the Evolved Expendable Launch Vehicle (EELV) System," 15 September 1998, SMC historical archives.

# Delta IV
## Launch Vehicle Family

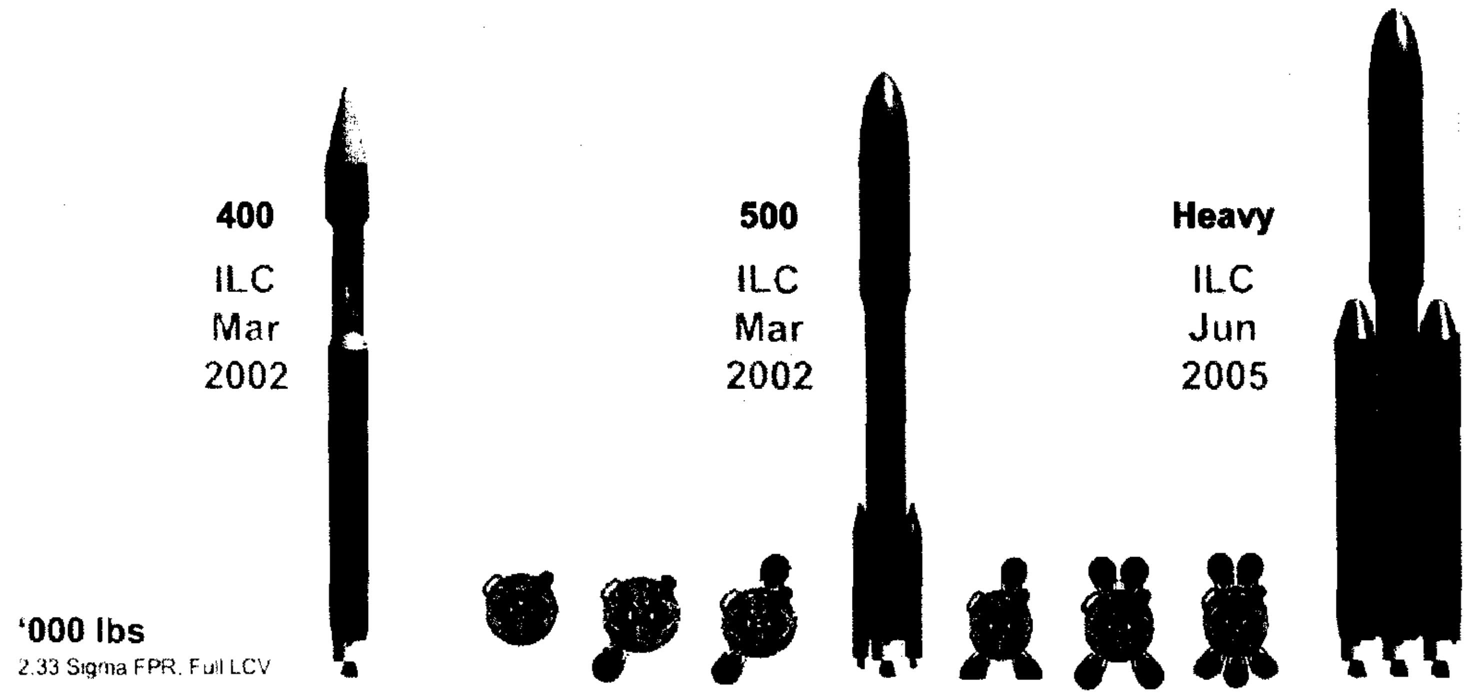



| Performance: GTO (lbs) | 9,200 | 11,700 | 9,600 | 13,500 | 27,400 |
|---|---|---|---|---|---|

Illustration 4-1
Delta IV EELV Family of Vehicles as of June 2000

# Atlas V

## *System Capability*




| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| GTO | 11.0 | 9.0 | 10.8 | 13.2 | 15.2 | 16.7 | 18.0 | 29.0 |
| GSO | – | 3.3 | 3.9 | 4.9 | 6.6 | 7.5 | 8.2 | 14.0 |
| LEO Polar[2] | 20.0[1] | 20.0 | 22.5 | 26.1 | 32.2 | 35.0 | 37.4 | 42.0[1] |

1 - Additional Capability with Mission Unique Accommodations up to 23,700lb on 402, 53,000 on HLV
2 - DEC except HLV

Illustration 4-2
Atlas V EELV Family of Vehicles as of June 2000

1998 and April 1999, both contractors proposed adding large solid-rocket auxiliary motors to their medium-lift core vehicles to create an intermediate (also referred to as a "medium-plus") class of EELVs, and to eliminate the need for a small system. These proposals responded to forecast increasing demand for launch vehicles in this payload range from both the commercial and government sectors. The augmented versions of the medium-lift vehicles would enhance flexibility and be less expensive than the heavy-lift versions. Environmental studies for EELV had been based on the earlier concepts; therefore additional studies were conducted, and the results were published in a supplemental environmental impact statement in March 2000. The Air Force Associate Deputy Assistant Secretary for Acquisition signed the Record of Decision on 25 May 2000, approving the addition of up to five solid rocket motors on the Atlas V medium-lift and Delta IV medium-lift vehicles. By early 2000, therefore, the new concepts and their capabilities looked like illustrations 4-1 and 4-2.[14]

**DELTA IV**

Boeing's concept for the Delta IV family of launch vehicles used a first-stage common booster core (CBC) and a cryogenic second-stage for each configuration. The CBC was 16.4 feet in diameter and about 173 feet in length. It included a structurally stable airframe, propellant tanks, and a main engine known as the RS-68. The RS-68 was a new engine developed and manufactured by Rocketdyne, now a division of The Boeing Company. The engine, based on Rocketdyne's Space Shuttle expertise, used liquid hydrogen and liquid oxygen to produce a thrust of 650,000 pounds. Rocketdyne had designed it to be environmentally friendly (producing few waste products besides water), easier to manufacture with fewer parts, and 30 percent more efficient than the liquid oxygen and kerosene engines used in earlier Delta vehicles.[15]

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[14] SMC/MV, "Final Supplemental Environmental Impact Statement for the Evolved Expendable Launch Vehicle Program," March 2000, accessible from http://ax.losangeles.af.mil/axf/eaapgs/eis.htm on 1 July 2002; Record of Decision, HQ USAF/AQR, "Final Supplemental Environmental Impact Statement (FSEIS) for the Evolved Expendable Launch Vehicle (EELV), May 2000," signed 25 May 2000 (Doc 4-20); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

[15] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Boeing Launch Services, "Delta IV Launch Vehicles" and associated world-wide web pages, copyright 2002, accessible from http://www.boeing.com/defense-space/space/delta/delta4/ delta4.htm on 2 July 2002 (Doc IV-21); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000; The Boeing Company, "Delta IV Payload Planner's Guide," October 2000 (SMC historical archives).

The Delta IV medium-lift configuration consisted of one CBC plus a second-stage, payload accommodations, and payload fairing. The second-stage engine for the medium-lift and medium-plus versions of the Delta IV was Pratt & Whitney's restartable RL-10B-2 cryogenic liquid oxygen/liquid hydrogen engine—the same engine used in the second-stage of the Delta III, but with longer fuel tanks. (It was a variant of the RL-10 engine used in the Centaur upper stage for Titan IV and Atlas systems.) The RL-10B-2 could produce a thrust of 24,750 pounds for 700 seconds. Together, the first- and second-stages of the medium-lift configuration could place a payload of about 9,200 pounds into a geosynchronous transfer orbit (GTO). The payload fairing was 13.1 feet in diameter.[16]

By the year 2000, Boeing was developing three configurations of the medium-plus Delta IV, distinguished primarily by the number of solid-rocket motors employed at liftoff. Boeing referred to these motors as graphite-epoxy motors (GEMs). The first medium-plus variant employed a 4-meter (13.1-foot) diameter payload fairing with two GEMs, and hence was designated the "Delta IV medium-plus 4,2." It could place a payload weighing about 11,700 pounds into GTO. The second variant employed a 5-meter (16.7-foot) fairing with 2 GEMs and was designated the "5,2." It could launch 9,600 pounds to GTO. The third variant employed a 5-meter (16.7-foot) fairing with 4 GEMs and was designated the "5,4." It could launch 13,500 pounds to GTO. The 5,2 and the 5,4 also had larger second-stage fuel and oxidizer tanks.[17]

The Delta IV heavy-lift vehicle had three CBCs mated together. The center CBC was mated to the same RL-10B-2 second stage engine—but with larger tanks than the medium 5,2 and 5,4 variants had—and employed a 5-meter (16.7-foot) diameter payload fairing. It could place a payload weighing about 27,400 pounds into GTO.[18]

**ATLAS V**

Lockheed Martin's Atlas V family of launch vehicles also used a first-stage common core booster (CCB) and a second-stage. The CCB was 12.5 feet in diameter by 106.6 feet in length. It included a structurally stable airframe, propellant tanks, and a main engine known as the RD-180. The RD-180 engine was developed and manufactured by NPO Energomash of Khimky, Russia. This engine was also used on the Atlas III commercial launch vehicle, which was first launched in May 2000. The RD-180 had two thrust chambers and could be throttled in flight. It used liquid kerosene (RP-1)

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[16] See note above.

[17] See note above.

[18] See note above.

as a fuel and liquid oxygen as an oxidizer to generate 860,200 pounds of thrust at sea level with relatively little environmental contamination.[19]

The Atlas V medium-lift vehicle design, which was also known as the Atlas V 400 series, was almost identical to the Atlas III. It consisted of the CCB plus a Centaur second stage. The Centaur could be configured with either one or two RL-10A-4-2 engines from Pratt & Whitney. Each of the restartable, cryogenic liquid oxygen/ liquid hydrogen Centaur engines could generate 22,300 pounds of thrust. The performance of the medium-lift vehicle could be further tailored to the payload by adding from one to three solid rocket boosters (SRBs), each of which generated about 306,000 pounds of thrust. The various configurations of the Atlas 400 series could place payloads weighing about 11,000 to 13,200 pounds into GTO. The payload fairings, which were also used on the Atlas II and III, could accommodate payloads up to 13.2 feet in diameter and 17.7 feet in length.[20]

The other Atlas V intermediate configuration was known as the Atlas V 500 series. It consisted of the CCB plus the dual-engine Centaur second stage and up to five solid rocket boosters. The payload fairings for the Atlas 500 series were developed and manufactured by Contraves Space of Zurich, Switzerland. They were 5 meters (16.4 feet) in diameter and 68 or 77 feet in length, enclosing both the Centaur and the payload. The 500 series could launch about 15,200 pounds (using three SRBs) to 18,000 pounds (using five SRBs) to GTO.[21]

The Atlas V heavy-lift vehicle design consisted of three CCBs mated together. The center CCB was mated to the dual-engine Centaur second stage. It used a longer Contraves fairing, 5.4 meters (17.7 feet) in diameter and 26.4 meters (86.6 feet) in length, enclosing both the Centaur and the payload. The Atlas V heavy-lift vehicle could launch approximately 29,000 pounds to GTO.[22]

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[19] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Lockheed Martin Space Systems Company, "Atlas" and associated world-wide web pages, copyright 2000, accessible from http://www.ast.lmco.com/launch_atlas.shtml on 2 July 2002 (Doc IV-22); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); International Launch Services, "Atlas Launch System Mission Planner's Guide, Atlas V Addendum (AVMPG)," Rev 8, December 1999 (Doc IV-24).

[20] See note 19 above.

[21] See note 19 above.

[22] See note 19 above.

## EELV Launch Services and Facilities

The OTA contract covered not only launch vehicle development, but also the development of new launch pads, satellite interfaces, and other support infrastructure, and demonstrations that the launch systems satisfied all of the government's requirements. A key requirement was the standard payload interfaces for each EELV launch vehicle class. This included mechanical connections, services, ground support equipment, and environmental conditions. The payloads and approximate launch periods for the two EELV systems at first looked like the estimates in table 4-4 below.

**Table 4-4**
**Launches Awarded Under Launch Services Contracts in October 1998**[23]

| | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|---|---|---|---|---|---|---|
| Boeing<br>19 missions | DSCS | DSP<br>A/B-1<br>DSCS<br>SBR/MTI<br>GPS IIF | A/B-4<br>Mission C<br>WGF<br>SBR/MTI<br>GPS IIF (2) | WGF<br>GPS IIF<br>STP (TSX) | SBIRS-G<br>GPS IIF (3) | |
| Lockheed<br>Martin<br>9 missions | | DMSP<br>GPS IIF | A/B-2<br>SBIRS-G<br>GPS IIF | DMSP<br>WGF<br>SBIRS-G<br>GPS IIF | | |

However, as new satellite programs encountered development issues, the launch profile covered by the ILS contracts gradually changed also, until by February 2000 it resembled the estimates in table 4-5.

[23] Acronyms: DSCS = Defense Satellite Communications System; DSP = Defense Support Program; SBR/MTI = Space-Based Radar/Moving Target Indicator; GPS = Global Positioning System; WGF = Wideband Gap-Filler; STP = Space Test Program; SBIRS = Space-Based Infrared System; DMSP = Defense Meteorological Satellite Program. Table 4-4 is taken from Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives).

**Table 4-5**
**Launches Under Launch Services Contracts in February 2000**[24]

| | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 |
|---|---|---|---|---|---|---|
| Boeing 19 missions | DSCS | DSP A/B-1 DSCS | A/B-4 Mission C WGF | WGF GPS IIF STP (TSX) SBR/MTI | SBIRS-G GPS IIF (2) | |
| Lockheed Martin 9 missions | | DMSP | A/B-2 SBIRS-G | DMSP WGF SBIRS-G | GPS IIF (2) | GPS IIF |

The original contracts were modified in late 2000 when Lockheed Martin requested a change in scope to relieve them from their west coast Atlas V launch capability requirement. With a limited number of west coast missions, two launch providers were no longer needed. Furthermore, commercial market demand was far below the anticipated robust levels. In December 1999, a team of government experts examined the alternatives for restructuring the contracts. The team decided that Lockheed Martin's remaining west coast launches, which consisted of two satellites for the Defense Meteorological Satellite Program (DMSP), could be shifted to Boeing's Delta IV, eliminating the need for Lockheed Martin to construct a launch pad on the west coast. The Atlas V would launch only from the east coast. Lockheed Martin would have to bring the development of a heavy-lift version of their vehicle only to a Critical Design Review until a launch order was made. Boeing's ILS contract was revised to add the missions cited above, and the OTA contract was changed to include funding for a demonstration launch of their heavy-lift variant.[25]

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[24] Six additional GPS IIF missions were delayed to FY09 and FY10. Acronyms: DSCS = Defense Satellite Communications System; DSP = Defense Support Program; SBR/MTI = Space-Based Radar/Moving Target Indicator; GPS = Global Positioning System; WGF = Wideband Gap-Filler; STP = Space Test Program; SBIRS = Space-Based Infrared System; DMSP = Defense Meteorological Satellite Program. Table 4-5 is taken from Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

[25] SMC/MV, "EELV Program Overview & Status," November 2000, accessible at http://www.losangeles. af.mil/SMC/MV/eelvhome.htm on 28 June 2002 (Doc IV-17); "De Leon: EELV Restructure Is Complete, Congress Has Been Notified," Inside the Air Force, 22 September 2000, accessible from http://www. insidedefense.com/secure/ on 31 October 2000 (Doc IV-18); Frank Sietzen, Jr., "Spacelift Washington: Air Force Will Buy Test Flight of First Heavy Lift EELV," SpaceRef.Com, 8 October 2000, accessible at http://www.spaceref.com/news/viewnews.html on 13 June 2002 (Doc IV-19); Briefing Charts (U), SMC/MV, "EELV Update to General Lyles," 9 June 2000 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives).

By early June 2000, the EELV Program Office had completed and negotiated the contractual modifications and had written the Justification and Approval statement for the Air Force's Assistant Secretary for Acquisition to approve the changes. In September 2000, after approving the revised acquisition strategy, Assistant Secretary of Defense Rudy de Leon announced the restructuring of the contracts. The demonstration launch of Boeing's heavy-lift Delta IV was added to the company's OTA contract (F04701-98-9-0005) on 13 December 2000 for $141 million.[26]

## Technical Progress FY 1998 – FY 2001

### DELTA IV

Development efforts and launch preparations were driven by the projected launch schedules. By the end of the period under discussion, the first government payload for Boeing's Delta IV, Defense Satellite Communications System (DSCS) III B-6 was scheduled to launch from the east coast in June 2002. It had also contracted for its first commercial payload for the Delta IV, a telecommunications satellite for Eutelsat S.A. of France, to be launched from the east coast in April 2002. After the contractual amendment of December 2000, the demonstration launch of its Delta IV heavy-lift configuration from the east coast was planned for late 2002.[27]

Boeing's greatest challenges in meeting this schedule were the development and qualification of the Delta IV's RS-68 main engine, the construction of its two launch complexes, and the delivery of the flight hardware. The Rocketdyne RS-68 liquid oxygen/liquid hydrogen engine was the first large, liquid-fueled rocket engine to be developed in the U.S. since the Space Shuttle Main Engine, which Rocketdyne also developed. It required a significant amount of testing to achieve flight certification, first as an independent subsystem and then integrated with a CBC test article. Development testing for the engine started in January 1998 at the Air Force Research Laboratory's test site.[28]

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[26] Briefing Charts (U), SMC/MV, "EELV Update to General Lyles," 9 June 2000 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); News Release, OASD/PA, "No. 742-00, Contracts: Air Force," 13 December 2000 (Doc IV-24).

[27] Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); "U.S. Air Force Funds First Evolved Expendable Launch Vehicle Mission," SpaceDaily, 11 June 2000, SMC historical archives; "Boeing Delta IV Stands Ready On Launch Pad," SpaceDaily, 6 May 2002, accessible from http://www.spacedaily.com on 6 July 2002; "Boeing Delta IV Program Progresses On West Coast," SpaceDaily, 17 October 2001, accessible from http://www.spacedaily.com on 6 July 2002.

[28] Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); News Release, Boeing, "Boeing Rocketdyne RS-68 Engine

By April 2001, three test engines had accumulated 11,639 seconds of static firing. Despite the engine's encountering some significant delays in its development schedule related to its turbo machinery, its first commercial and military launches had slipped only a few months by the end of FY 2001. At that time, the development testing was scheduled to end with certification of the engine in December 2001.[29]

While the development testing of the RS-68 was under way, the first CBC was assembled at Boeing's factory in Decatur, Alabama. From there, the CBC frame went to NASA's Stennis Space Center, Mississippi, where an RS-68 main engine was integrated with the CBC, and the whole core stage was prepared for hot-fire qualification. The first test occurred on 17 March 2001, when the CBC was successfully fired for 15 seconds. During the third test, on 3 April 2001, the engine was fired for 145 seconds and tested various operations, including depletion of its hydrogen fuel, gimbaling of the engine, and manipulation of the throttle settings from 58 to 101 percent of power. The final hot fire test of the CBC occurred on 6 May 2001 and simulated a Delta IV heavy-lift mission for 303 seconds. All of the integrated CBC tests were successful.[30]

Having successfully completed qualification testing, the CBC was transported from Decatur to Florida on the Delta Mariner (a custom designed cargo ship), to be used as a pathfinder in testing the newly constructed Delta IV launch processing facilities at Space Launch Complex 37 (SLC-37). On 25 September 2001, the first CBC production

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Triumphs In 10K Run," 23 April 2001, accessible at http://www.boeing.com/news/releases/2001/q2/news_release_010423s.html on 2 July 2002.

[29] A program schedule for the Delta IV from September 1999 shows development engine testing as originally scheduled to end with certification in about June 2000, but as having already slipped about four months. See Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives). See also Briefing Charts (U), SMC/MV to HQ USAF, "Evolved Expendable Launch Vehicle (EELV)," 14 September 2001 (SMC historical archives). According to this briefing, the RS-68's "turbo machinery issues slipped development schedule 18 mos;" however, those "issues now resolved; on track for Apr 02 first launch." This proved to be optimistic: halfway through FY 2002, the first (commercial) launch was scheduled for August 2002, although the additional delay was not necessarily the fault of the RS-68 ("U.S. Air Force Funds First Evolved Expendable Launch Vehicle Mission," SpaceDaily, 11 June 2000, accessible from http://www.spacedaily. com on 6 July 2002). See also News Release, Boeing, "Rocketdyne RS-68 Engine Certified for Boeing Delta IV,"19 December 2001, accessible at http://www.boeing.com/news/releases/2001/q4/ nr_011219s.html on 2 July 2002.

[30] News Release, Boeing, "Boeing Delta IV Solid Rocket Motor Qualification Testing Completed," 23 June 2000, accessible at http://www.boeing.com/news/releases/2000/news_release_000622h.html on 2 July 2002.

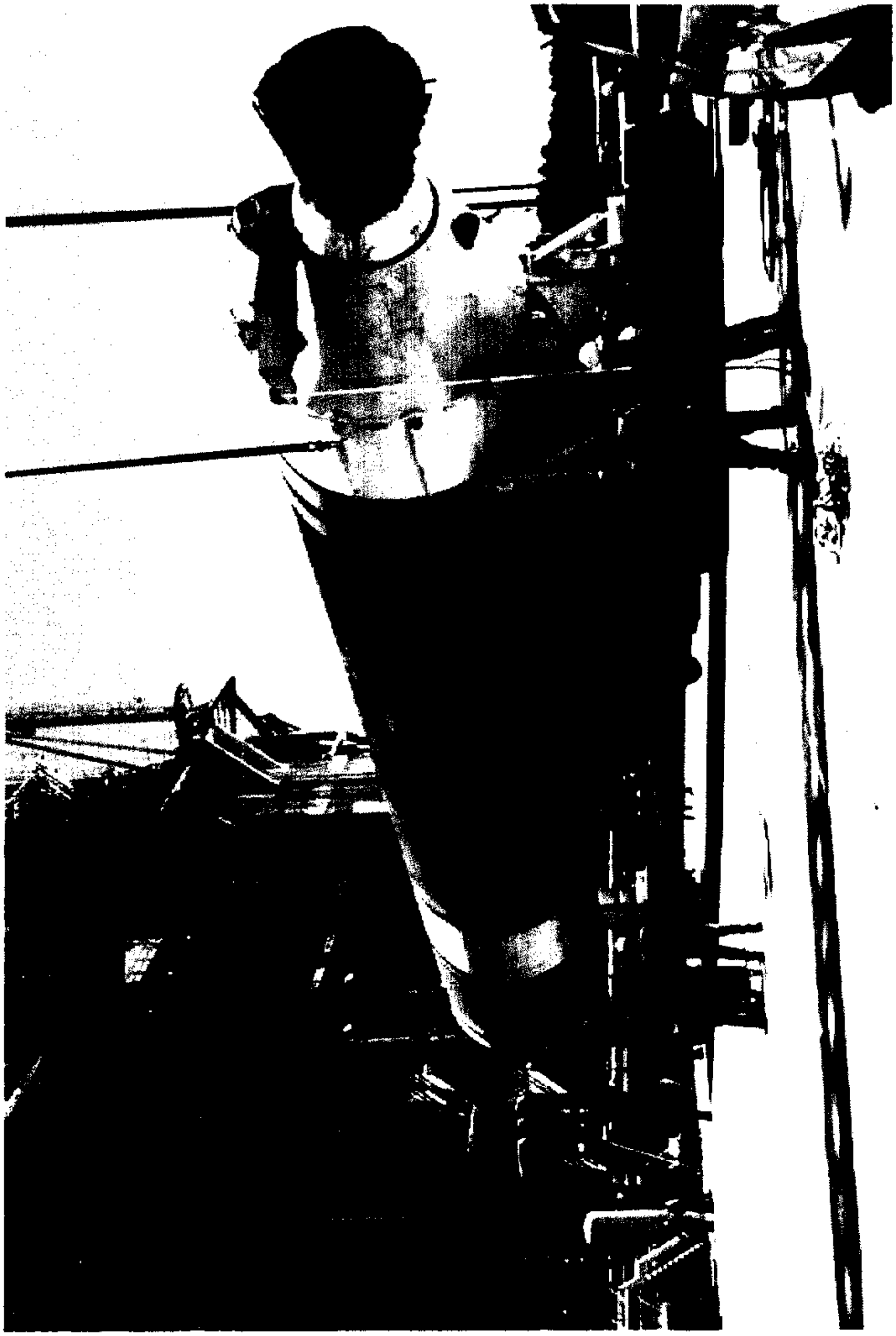

**Illustration 4-3**

**A Delta IV CBC is removed from test stand at Stennis Space Flight Center, Mississippi, in May 2001** (Boeing Company photograph) unit was rolled out of the factory. At the end of the fiscal year, it was in transit to the launch processing facilities to be prepared for the first launch of the Delta IV, the Eutelsat commercial communications satellite.[31]

Other major components had already completed qualification testing. The solid rocket motors, known as graphite epoxy motors (GEMs) because of their lightweight casings, were built by Alliant Techsystems. GEMs were manufactured in various sizes for various configurations of Delta launch vehicles. The GEM motors to be used with the Delta IV Medium-Plus EELVs were 60 inches in diameter (the largest manufactured) and therefore were called GEM-60s. The GEM-60 successfully completed its qualification testing on 22 June 2000 at Alliant Techsystems' facilities in Utah.[32]

As mentioned previously, Boeing was under contract to develop launch facilities and conduct launches for the Delta IV at both major coastal launch sites: Vandenberg AFB for polar launches and Cape Canaveral AFS for geosynchronous and other easterly launches. Since the first Delta IV launches would take place from Cape Canaveral, those facilities were started earlier. On 27 July 1998, Boeing announced plans to completely rebuild the existing, inactive, Space Launch Complex 37 (SLC-37) at Cape Canaveral AFS.[33] Boeing awarded a subcontract for the effort to Raytheon Engineers & Constructors, a subdivision of Raytheon Company, on 30 September 1998.[34] Some of the major facilities under construction were the launch pad, the fuel tanks for liquid oxygen and liquid hydrogen, the Mobile Service Tower (MST), the Horizontal Integration Facility (HIF), the Delta IV Operations Center, Hangar E, and the Common Support Building.[35] Boeing and Raytheon completed the construction of the MST on 2 March

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[31] News Release, Boeing, "First Flight Delta IV Heads to Launch Site," 26 September 2001, accessible at http://www.boeing.com/news/releases/2001/photorelease/q3/pr_010926h.html on 2 July 2002.

[32] See note 30 above.

[33] SLC-37 had been built in 1962 to launch the earlier, unmanned Apollo missions using Saturn 1 launch vehicles. See Wayne Tomkins, "Boeing Lays Out Its Plan to Resurrect Complex 37 for Delta 4 Rocket," Florida Today Space Online, 28 July 1998, accessible at http://www.flatoday.com/space/explore/ stories/1998b/072898f.htm on 11 July 2002; and News Release, Boeing, "Boeing Unveils Plan to Develop Delta IV Launch Facilities," 27 July 1998, accessible at http://www.boeing.com/news/releases/1998/news_release_980727a.html on 2 July 2002.

[34] News Release, Raytheon, "Raytheon Engineers & Constructors Awarded Turnkey Contract by Boeing," 30 September 1998, accessible at http://www.raytheon.com/press/1998/sep/eelv3.html on 11 July 2002.

[35] For detailed descriptions of these facilities, see The Boeing Company, "Delta IV Payload Planner's Guide," October 2000, SMC historical archives, and updated

2000. At the end of September 2001 (the end of the period under discussion), Air Force and Boeing officials were preparing for a ceremony to be held on 9 October 2001 to mark the completion of construction on the whole launch complex.[36]

The most innovative component of these facilities was the HIF, where prelaunch integration and testing for Delta IV launches would take place. It would be a six-story building of 75,000 square feet, including two processing bays measuring 250 feet by 100 feet. The HIF would enable the contractors to assemble and test Delta IV vehicles horizontally, then transport them a short distance to the launch pad, rather than assembling them vertically on the pad, as with earlier vehicles and launch facilities. This improvement would reduce processing time, and therefore costs, a great deal. Boeing estimated that Delta IV vehicles could be completely assembled within 30 days after arrival from the factory. With other efficiencies built into the launch complex, the vehicles' time on the pad could be reduced to 10 days. On 28 January 1999, Boeing announced that it had signed an agreement with the Spaceport Florida Authority by the terms of which the State of Florida would finance and build the HIF, then allow Boeing to operate it under a long-term lease. The construction of the HIF was completed in September 2000, and it was dedicated in a ceremony on 11 September 2000.[37]

Boeing also had to construct launch facilities at Vandenberg AFB—the only EELV launch facilities at Vandenberg—to support the government's mission manifest. It

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descriptions in The Boeing Company, "Delta IV Payload Planner's Guide Update," April 2002, SMC historical archives.

[36] News Release, Boeing, "Boeing, Raytheon Top Off Nation's Newest Launch Tower," 2 March 2000, accessible at http://www.boeing.com/news/releases/2000/news_release_000302h.html on 2 July 2002; News Release, 45th SW/PA (2nd Lt Eric Badger), "Cape Completes New Launch Facility," 15 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011015_1465.shtml on 28 June 2002.

[37] News Release, 45th SW/PA (2nd Lt Eric Badger), "Cape Completes New Launch Facility," 15 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011015_1465.shtml on 28 June 2002; News Release, Boeing, "Boeing Signs Agreement for Delta IV Integration Facility," 28 January 1999, accessible at http://www.boeing.com/news/releases/1999/news_release_990128b.html on 2 July 2002; News Release, Florida Space Authority, "State Completes Delta IV Facility for Boeing," 12 September 2000, accessible at http://www.spaceportflorida.com/ NewsReleases3qtr2000.html on 11 July 2002. The Florida Space Authority was a state government space agency created by Florida in 1989 to support and regulate space industry within the state (Internet document, Spaceport Florida Authority, "Background," no date, accessible at http://www.spaceportflorida.com/ Background.html on 11 July 2002.

**Illustration 4-4**
**Launch Complex 37 under construction at Cape Canaveral, February 2001, Delta IV Launch Tower at center** (Boeing Company photograph)

planned to modify the old SLC-6 launch facilities[38] on Vandenberg, adding a Horizontal Integration Facility (HIF) similar in design and operation to the HIF at Cape Canaveral. Construction began on some of these facilities before the end of FY 2001. In October 2000, Boeing placed The Clark Construction Group, Incorporated, under contract to retrofit SLC-6, and completion of the launch complex was scheduled for about March 2002. An enormous new launch table, weighing 65 tons and measuring 86 feet by 46 feet, was scheduled for arrival by ocean-going barge in the middle of October 2001. Other alterations to SLC-6 involved enlarging the existing Mobile Service Tower. The HIF was placed under contract to A.J. Diani Construction Company, which completed the design in May 2001.[39]

**ATLAS V**

At the end of FY 2001, Lockheed Martin's Atlas V was scheduled to launch its first government payload in 2005. However, it was also designated as the backup vehicle for the launch of DSCS III B-6 on the Delta IV in June 2002. The Atlas V's first commercial launch was to be Eutelsat's Hot Bird 6 TV and data broadcasting satellite, then scheduled for May 2002. Its next commercial launch, Telesat Canada's Nimiq 2 TV broadcasting satellite, was scheduled for later in 2002.[40]

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[38] Space Launch Complex 6 had been constructed in the late 1960s to launch the Manned Orbiting Laboratory (MOL) on the Titan IIIM launch vehicle. Neither the MOL nor the Titan IIIM had been completed, however, and SLC-6 had been mothballed until the early 1980s, when it was heavily modified to launch the Space Shuttle into polar orbits. This purpose had also been rendered obsolete by design changes in the Space Shuttle following the Challenger disaster in 1986, and the launch complex had been mothballed again. (See SMC History Office, "Historical Overview of the Space and Missile Systems Center, 1954-2003," 2003, p. 27.)

[39] News Release, Boeing, "Boeing Delta IV Program Progresses on West Coast," 17 October 2001, accessible at http://www.boeing.com/news/releases/2001/q4/ nr_011017h.html on 6 July 2002; News Release, 30th SW/PA (SSgt Andrew Leonhard), "New Launch Table Arrives at Vandenberg," 29 October 2001, accessible at http://www.af.mil/news/Oct2001/n20011029_1544.shtml on 28 June 2002; News Release, Boeing, "NASA Orders Additional Launch from Boeing Delta Rocket Program Anniversary Year of Achievements, Orders, Launches Paves the Way for Boeing Delta IV," 21 December 2000, accessible at http://www.pressi.com/ us/release/24902.html on 12 July 2002; News Release, Clark Construction Group, "Clark Construction Awarded Contract for Boeing's New Space Launch Complex," 27 October 2000, accessible at http://www.clarkus.com/wn_ reel/001030b.shtml on 12 July 2002; Newsletter, Diani Construction Co., "Building Division Highlights," July 2001, accessible from http://www.diani.com/ newsletter.htm on 12 July 2002.

[40] News Release, International Launch Services, "Air Force Funds ILS & Lockheed Martin to Plan for First EELV Launch," 27 March 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/ rec150/ on 12 July 2002; News

Like Boeing's Delta IV, the Atlas V was constrained in its progress toward launch primarily by the development and qualification of a new main engine—in this case the Russian-developed and -built RD-180 rocket engine—the construction of a launch site at Cape Canaveral, and the delivery of the flight hardware. The RD-180 was also the main engine for Lockheed Martin's Atlas III launch vehicle, a commercial variant that was scheduled for a first launch during FY 2000. If the Atlas III launch were successful, the RD-180 could be considered flight-qualified two years before the first Atlas V launch was attempted. The engine was the first variable-thrust (i.e., throttleable) main engine ever used in a U.S. launcher, a capability that a series of static firing tests were designed to thoroughly verify.[41]

During 1996-2001, the RD-180 underwent a lengthy series of development, qualification, and certification firing tests in Khimky, Russia, at the facilities of NPO Energomash. The first development firing was conducted on 15 November 1996, and the last certification firing on 6 December 2001. By then, the engine had completed 91 tests

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Release, International Launch Services, "ILS Adds Telesat's Nimiq 2 Launch to Atlas V Roster," 28 June 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec157/ on 12 July 2002; News Release, International Launch Services, "Inmarsat, ILS Sign Contract for Atlas V to Launch Inmarsat I-4 Satellite," 25 July 2001, accessible at http://www.ilslaunch. com/newsarchives/newsreleases/rec159/; News Release, International Launch Services, "Lockheed Martin's First Atlas V Rocket Stacked Vertically, Capping Period of Highly Successful Milestones On the Way to First Launch," 27 March 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec167/ on 12 July 2002.

[41] SMC/MV, "Evolved Expendable Launch Vehicle (EELV) Product Support Management Plan (PSMP)," 27 February 2002 (Doc IV-10); Briefing Charts (U), SMC/MV, "PEO Portfolio Review," 1 September 1999 (SMC historical archives); Briefing Charts (U), SMC/MV, "Program Status Briefing," 29 June 2000 (SMC historical archives); News Release, Lockheed Martin, "Lockheed Martin Tests Russian Rocket Engine at NASA Facility in Ala.," 30 July 1998, accessible at http://www.fas.org/spp/mi;itary/program/ launch/980730-eelv.htm on 12 July 2002; News Release, Lockheed Martin, "RD-180 Rocket Engine Launches Into Another Milestone," 27 March 1998, accessible at http://www.fas.org/spp/military/program/launch/980327-astro-180.htm on 12 July 2002; News Release, Lockheed Martin, "Atlas III RD-180 Successful Test Firing," 29 July 1998, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/ rec77/prebody.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Receives Three More RD-180 Engines for Atlas III Rockets," 7 January 2000, accessible at http://www.ast.lmco.com/2000pressReleases/den001.shtml on 12 July 2002; News Release, Lockheed Martin, "First Atlas V Flight Engine Arrives at Lockheed Martin," 30 November 2000, accessible at http://www.ast.lmco.com/ 2000pressReleases/den001.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin's Atlas V RD-180 Engine Successfully Completes Testing Proigram," 19 December 2001 http://www.ast.lmco.com/2001press Releases/den031.html on 12 July 2002.

**Illustration 4-5**
**The RD-180 engine undergoes a static firing test for the Atlas IIIA at Marshall Space Flight Center, November 1998** (Lockheed Martin photograph)

designed to replicate the flight regime and power levels of an Atlas III, 30 designed for an Atlas V medium-lift launch vehicle, and 14 for an Atlas V heavy-lift vehicle. During the total 25,449 seconds of firing tests, the engine performed well. It also performed well during the first Atlas IIIA (AC-201) launch, which placed the Eutelsat W4 satellite into a nominal orbit on 24 May 2000.[42]

Lockheed Martin awarded the subcontract for the solid rocket motors (SRMs) to Aerojet on 4 February 1999. Three SRBs would be added to the Atlas V 400 series, and up to five SRBs would be added to the Atlas V 500 series to launch increasingly heavier payloads with the Atlas V medium-lift vehicle. Aerojet began its qualification test firings of the new 67-foot-long motors on 30 August 2001, achieving thrust levels for the motor of 285,000 to 390,000 pounds. At the end of the reporting period (30 September 2001), more static firing tests were scheduled for FY 2002.[43]

By the terms of the contract restructuring of September 2000, Lockheed Martin agreed to build launch facilities for the Atlas V at only the east coast launch site. The company announced on 9 June 1998, even before the EMD contracts were awarded, that its east coast launch site would be Launch Complex 41, then used for Titan IV launches and earlier used for Titan III launches. One of the first steps in the new construction was to lay a large concrete foundation for the vertical integration facility (VIF) on 27 March 1999. The last beam in the VIF structure was put in place on 6 March 2000. Delays in the Titan IV's launch schedule caused construction on the pad to start about six months late. On 14 October 1999, the builders demolished the existing Titan launch towers with explosives; they began to erect new structures two months later. The last steel section of the new Mobile Launch Platform (MLP), on which Atlas V vehicles would be erected and launched, was put in place on 4 June 2001. In a test during 7-9 September 2001, two control vans moved the completed MLP about 2,600 feet to the launch pad for fit checks, and then moved the MLP from the pad into the VIF for further fit checks and component testing. After the successful conclusion of these tests, the MLP and VIF were considered to have attained operational status. The 60-ton bridge crane that would lift and handle

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42 See note 41 above.

43 News Release, Aerojet, "Aerojet Wins $500 Million Solid Rocket Motor Contract for Lockheed Martin's Atlas V Launch Vehicle," 4 February 1999, accessible at http://www.aerojet.com/program/news/nr_atlasv_0299_04.htm on 12 July 2002; News Release, Aerojet, "Aerojet Awarded $8.8 Million Contract to Build Nose Fairings for Atlas V Solid Rocket Motors," 4 May 2000; accessible at http://www.aerojet.com/program/news/nr_050400_aerojet_awarded_8.8m_atlasv_nose_fairing_co.htm on 12 July 2002; News Release, Aerojet, "Aerojet Successfully Test Fires World's Largest Monolithic Solid Rocket Motor," 30 August 2001, accessible at http://www.aerojet.com/program/news/ nr_083001_aerojet_successfully_test_fires_worlds_largest.htm on 12 July 2002; News Release, International Launch Services, "Aerojet Successfully Tests Strap-on Motor, 30 August 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec163/prebody.html on 12 July 2002.

Atlas V vehicles completed its installation in the VIF, underwent validation testing, and achieved operational status on 17 September 2001.[44]

The flight components for the first Atlas V launch (Eutelsat's Hot Bird 6) arrived at the launch site for integration during 2000 and 2001. The first flight conical interstage adapter, manufactured by Construcciones Aeronauticas S.A. of Spain, arrived at Cape Canaveral AFS on 10 February 2000. Lockheed Martin delivered the first flight Centaur upper stage to Cape Canaveral on 3 May 2001. After a rollout ceremony at the Final Assembly Building near Denver, Colorado, on 30 April 2001, it delivered the first flight common booster core (CBC), designated AV-001, to Cape Canaveral on 5 June 2001, using an An-124-100 Russian transport aircraft. The CBC and the Centaur were then placed in the Atlas Spaceflight Operations Center (ASOC) to test the support systems in that facility. In preparation for moving the CBC and Centaur to the VIF, a booster simulator was erected in the VIF on 18 September 2001 to test the handling mechanisms. The CBC and Centaur were scheduled to be moved to the VIF in October 2001, where they would be used for validation testing of the VIF and MLP.[45]

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[44] "Lockheed Announces EELV Launch Sites," SpaceDaily, 9 June 1998, accessible at http://www. spacedaily.com/news/eelv-98a.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Meets Milestone for New Atlas V Launch Facility," 27 March 1999, accessible at http://www.ast/lmco.com/1999 pressReleases/den019.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Demolishes Old Launch Towers in Spectacular Fashion for Future Atlas V," 14 October 1999, accessible at http://www.ast/lmco. com/1999pressReleases/den048..shtml on 12 July 2002; News Release, Ken Warren, 45th SW/PA, "Cape Canaveral Launch Gantry Toppled," 20 October 1999, accessible at http://www.af.mil/news/Oct1999/n19991020_991933.html on 12 July 2002; Justin Ray, "Lockheed Martin Building Atlas 5 Rocket Launch Site," Spaceflight Now, 6 March 2000, accessible at http://spaceflightnow.com/news/0003/06slc41/index.html on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin Successfully Performs First Power-On Test in New Atlas V Spaceflight Operations Center," 6 June 2001, accessible at http://www.ast/lmco.com/2001press Releases/den060601.shtml on 12 July 2002; News Release, Lockheed Martin, "Lockheed Martin's First Atlas V Rocket Stacked Vertically, Capping Period of Highly Successful Milestones on the Way to First Launch," 18 October 2001, accessible at http://www.ilslaunch.com/newsarchives/newsreleases/rec167/ on 12 July 2002; News Release, Lockheed Martin, "Atlas V Updates," 4 June 2002, accessible at http://www.ilslaunch. com/stories/AtlasVUpdates/prebody.html on 12 July 2002.

[45] 1st Lt Colleen Lehne, "EELV Celebrates Tank Rollout," Astro News, 17 December 1999, p. 3; News Release, Lockheed Martin, "Lockheed Martin Processes First Atlas V Interstage Adapter," 11 February 2000, accessible at http://www.ast.lmco.com/2000pressReleases/den002.shtml on 12 July 2002; Ken Warren, 45th SW/PA, "Atlas Booster Arrives at Cape Canaveral," 8 June 2001, accessible at http://www.af.mil/news/Jun2001/n20010608_0772.shtml on 12 July 2002; News Release, Lockheed Martin, "Atlas V Updates," 4 June 2002, accessible at http://www. ilslaunch.com/ stories/AtlasVUpdates/prebody.html on 12 July 2002.

**Illustration 4-6**

**Launch Complex 41 at Cape Canaveral, March 2002,**

**AV-001 in Mobile Launch Platform at left** (International Launch Services photograph)

# CHAPTER 6

## METEOROLOGICAL SATELLITE PROGRAMS

The mission of the Defense Meteorological Satellite Program (DMSP) was to generate terrestrial and space weather data for operational U.S. military forces worldwide. The space segment of the system nominally consisted of two satellites in 458-nautical mile, sun-synchronous, near-polar orbits. Sensors aboard these satellites collected meteorological, oceanographic, and space environment data in the visible and infrared spectra, and readout stations and terminals around the globe received the data and made it available to users throughout the Department of Defense and other agencies. With a constellation of two satellites functioning nominally, weather data could be refreshed every six hours. Dedicated DMSP ground facilities exercised command and control of the satellites. At the beginning of the period under discussion (October 1997 – September 2001) Air Force Space Command operated these ground facilities and exercised operational command and control of DMSP satellites.[1]

However, the command and control of all government weather satellites was already in the process of transition to an Integrated Program Office reporting to the National Oceanic and Atmospheric Administration. (See the section entitled National Polar-orbiting Operational Environmental Satellite System (NPOESS) later in this chapter.) That Integrated Program Office actually assumed operational command and control of DMSP as well as NOAA satellites on 29 May 1998. The Air Force Weather Agency and the Navy's Fleet Numerical Meteorology and Oceanography Center continued to analyze, evaluate, and disseminate the data. SMC's DMSP Program Office continued to procure hardware and software and to perform sustaining engineering functions for the system's space and ground segments.[2]

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[1] History of SMC (FOUO), October 1994 –September 1997, p. 79 (information used not FOUO) (HO archives). See also Fact Sheet, SMC/PA, "Defense Meteorological Satellite Program," 27 July 2000 (Doc 6-1); Fact Sheet, SAF/PA, "Defense Meteorological Satellite Program," May 2002 (Doc 6-2); Fact Sheet, AFSPC/PA, "Defense Meteorological Satellite Program," no date (Doc 6-3); SMC/CI, "DMSP Overview," 3 July 1997, accessible from http://www. losangeles.af.mil/SMC/CI/overview/index.html (Doc 6-4); Office of the National Security Space Architect (NSSA), National Security Space Road Map, "Defense Meteorological Satellite Program (DMSP)" and related articles, accessible from http://www.wslfweb.org/docs/roadmap/irm/internet/ emonitor/init/html/dmsp.htm (Doc 6-5).

[2] History of SMC (FOUO—information used not FOUO), October 1994-September 1997, pp. 79, 96-100 (HO archives); News Release, SAF/PA, "Air Force Turns Over Weather Satellite Control to NOAA," 2 June 1998 (Doc 6-6).

## Space Segment

Each DMSP satellite consisted of a spacecraft and its sensor payloads. The spacecraft began to function at liftoff during launch, when it monitored the ascent phase guidance of the booster. After separation from the booster, an apogee kick motor propelled the satellite to its nominal altitude, and, as it did so, the spacecraft provided ascent guidance, electrical power, and telemetry. A trim burn by the hydrazine propulsion system inserted the satellite into its final orbit. Once the satellite was in orbit, the spacecraft carried out the necessary housekeeping functions, including thermal control, attitude determination and control, generation and distribution of electrical power, communication with ground stations, processing of commands from ground stations, and monitoring and control of spacecraft equipment. All spacecraft activities, from launch through orbital operations, were controlled by on-board computers that were reprogrammable from the ground.[3]

The satellite's payload was made up of a primary sensor and several mission (secondary) sensors. The unclassified primary and mission sensors being flown on DMSP satellites in operation during FY 1998-2001 are listed in Table 6-1. The primary sensor was called the Operational Linescan System (OLS). It used a telescope to scan the earth's surface, moving back and forth along a swath 1600 nautical miles wide and covering the entire globe in about 12 hours. Visible and infrared optical detectors inside the sensor picked up imagery of cloud cover on the earth's surface. This imagery could be downlinked to the ground immediately or stored in the sensor's four tape recorders for transmission at a later time.[4]

The DMSP satellites in orbit during FY 1998 were of the Block 5D-2 configuration.[5] However, a somewhat different DMSP satellite designated F-15 was already in storage awaiting launch at the beginning of this period. It had been produced under a separate procurement, contract FO4701-86-C-0038 with RCA, and had been delivered in FY 1992. F-15 was sometimes considered a prototype of the later model Block 5D-3 spacecraft, although it was sometimes considered the last Block 5D-2

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[3] See note 1 above.

[4] History of SMC (FOUO), October 1994 –September 1997, p. 84 (information used not FOUO) (HO archives); NOAA/National Geophysical Data Center, "DMSP Data Availability," accessible at http://dmsp.ngdc. noaa.gov/html/availability.html (1 August 2002) and HO archives.

[5] The 5D-2 satellites weighed between 1400 and 1700 pounds in orbit and measured 5 feet in diameter by 14 feet in length.

## TABLE 6-1

### DMSP Satellites and Unclassified Sensors Operational between 1 October 1997 and 30 September 2001[1]

| DMSP Satellites=> | F-10 (S-10) **Block 5D-2** | F-11 (S-12) **Block 5D-2** | F-12 (S-11) **Block 5D-2** | F-13 (S-13) **Block 5D-2** | F-14 (S-14) **Block 5D-2** | F-15 (S-15) **Block 5D-3** |
|---|---|---|---|---|---|---|
| Launch Date | 1 Dec 90 | 28 Nov 91 | 29 Aug 94 | 24 Mar 95 | 4 Apr 97 | 12 Dec 99 |
| Satellite Declared Operational | 10 Jan 91 | 17 Dec 91 | 25 Sep 94 | 24 Apr 95 | 28 Apr 97 | 24 Jan 00 |
| Satellite Became Non-operational | 14 Nov 97 | 22 Apr 95 and 16 May 00[2] | | | | |
| OLS (Operational Linescan System)[3] | 10 Jan 91 (Failed 8 Feb 95) | 17 Dec 91 (Failed 22 Apr 95)[2] | 25 Sep 94 | 24 Apr 95 | 28 Apr 97 | 15 Aug 00 |

[1] Sources: NOAA/National Geophysical Data Center, "DMSP Data Availability," accessible at http://dmsp.ngdc. noaa.gov/html/availability.html (1 August 2002); History (S), History of Space Systems Division, 1 Oct 91-30 Sep 92. Information used is unclassified. For descriptions of these sensors, including the processing and application of their data, see NOAA/National Geophysical Data Center, "Satellite and Sensor Descriptions," accessible at http://ngdc.noaa.gov/dmsp/descritpions/dmsp_sensors.html and linked Internet sites. Each DMSP satellite carried classified sensors in addition to the unclassified sensors listed in this table. See History of SMC, 1 Oct 92-30 Sep 93, pp. 195-197.

[2] Satellite F-11 was turned off 22 April 1995, turned on again 21 April 1997 (although without the use of the OLS), and turned off again 16 May 2000.

[3] Dates in these rows are dates data was available from sensors indicated.

**TABLE 6-1 (continued)**

**DMSP Satellites and Unclassified Sensors**
**Operational between 1 October 1997 and 30 September 2001**

| **DMSP Satellites=>** | **F-10** (S-10) **Block 5D-2** | **F-11** (S-12) **Block 5D-2** | **F-12** (S-11) **Block 5D-2** | **F-13** (S-13) **Block 5D-2** | **F-14** (S-14) **Block 5D-2** | **F-15** (S-15) **Block 5D-3** |
|---|---|---|---|---|---|---|
| SSM/I (Microwave Imager)[3] | 10 Jan 91 (Failed 14 Nov 97) | 17 Dec 91 (Failed 16 May 00)[2] | Failed | 24 Apr 95 | 28 Apr 97 | 15 Aug 00 |
| SSM/T (Atmos-pheric Temperature Profiler)[3] | 10 Jan 91 (Failed 14 Nov 97) | 17 Dec 91 (Failed 16 May 00)[2] | 25 Sep 94 (Failed 25 Nov 95) | 24 Apr 95 | 28 Apr 97 (Failed 24 Jul 97) | 15 Aug 00 |
| SSM/T2 (Atmos-pheric Water Vapor Profiler)[3] | Not Equipped | 17 Dec 91 (Failed 16 May 00)[2] | 25 Sep 94 | Not Equipped | 28 Apr 97 | 15 Aug 00 |
| SSJ/4 (Precipitating Electron and Ion Spectrometer)[3] | 10 Jan 91 (Failed 14 Nov 97) | 17 Dec 91 (Failed 16 May 00)[2] | 25 Sep 94 | 24 Apr 95 | 28 Apr 97 | 15 Aug 00 |
| SSIES (Ion Scintillation Monitor)[3] | 10 Jan 91 (Failed 14 Nov 97) | 17 Dec 91 (Failed 16 May 00)[2] | 25 Sep 94 | 24 Apr 95 | 28 Apr 97 | 15 Aug 00 |
| SSM (Magnetometer)[3] | Not Equipped | Not Equipped | 25 Sep 94 | 24 Apr 95 | 28 Apr 97 | 15 Aug 00 |

instead. In configuration and capabilities, it fell between these two standard DMSP spacecraft blocks. It had a larger, more advanced bus, but its suite of sensors and overall capabilities were similar to the Block 5D-2 satellites.[6] F-15 was also equipped with two digital tape recorders and two solid state recorders (SSRs).

The F-15 spacecraft was shipped to Vandenberg AFB on 19 March 1998 to await launch, but it was affected by some problems during the wait. As we have seen, each DMSP satellite had four recorders to store data that could not be downlinked immediately, a situation that usually occurred when the satellite was not within sight of a ground station. Block 5D-3 satellites beginning with F-16 would be equipped with four solid state recorders (SSRs) that would not be subject to the mechanical failures that had shortened the operational lifespans of earlier DMSP satellites. However, two recorders on F-15 were digital tape recorders (DTRs)—storing data in digital format but operating with mechanical moving parts and tapes—as the recorders on F-14 had been. DTRs were, of course, subject to the same kinds of mechanical failure that had plagued DMSP Block 5D-2 spacecraft. This became more of an issue when three of the four DTRs on F-14 failed during its second year on orbit.[7] The program office decided to request funding for early acquisition of SSRs for F-15 and F-16, despite their approaching launch dates. Ultimately, it decided to replace two of the DTRs on F-15 and all four of the DTRs on F-16 with SSRs. SEAKR Engineering, Incorporated, which manufactured the SSRs under subcontract to Northrop Grumman's contract (F04701-95-C-0014) with SMC, delivered two SSRs for F-15 on 26 March 1999 and four SRRs for F-16 around April 2000. The SRRs for F-17 through F-20 would be delivered during CY 2002.[8]

The launch of F-15, scheduled near the beginning of this period for August 1999, slipped somewhat because of several anomalies that the spacecraft experienced during processing for launch. First, a 50 Ah nickel-cadmium battery exploded during post-shipment testing of the spacecraft at Vandenberg AFB on 1 July 1998. The explosion caused collateral damage to hydrazine thruster number four. The program office estimated that total repair costs could reach $1 million. During August 1998, the contractors replaced the 50 Ah batteries with 40 Ah batteries designed by SAFT Battery

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[6] History of SMC (FOUO), October 1994 –September 1997, p. 86 (information used not FOUO) (HO archives).

[7] F-14 was launched on 4 April 1997, and the three recorders failed on 24 February 1998, 13 October 1998, and 20 November 1998. See Briefing Charts (U), SMC/CI, "DMSP S15/Titan II 23-G8 Executive Mission Readiness Review," 17 August 1999 (HO archives).

[8] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives); Defenselink, "Contracts," 5 May 1999, http://www.defenselink.mil/news/May1999/c05051999_ct214-99.html.

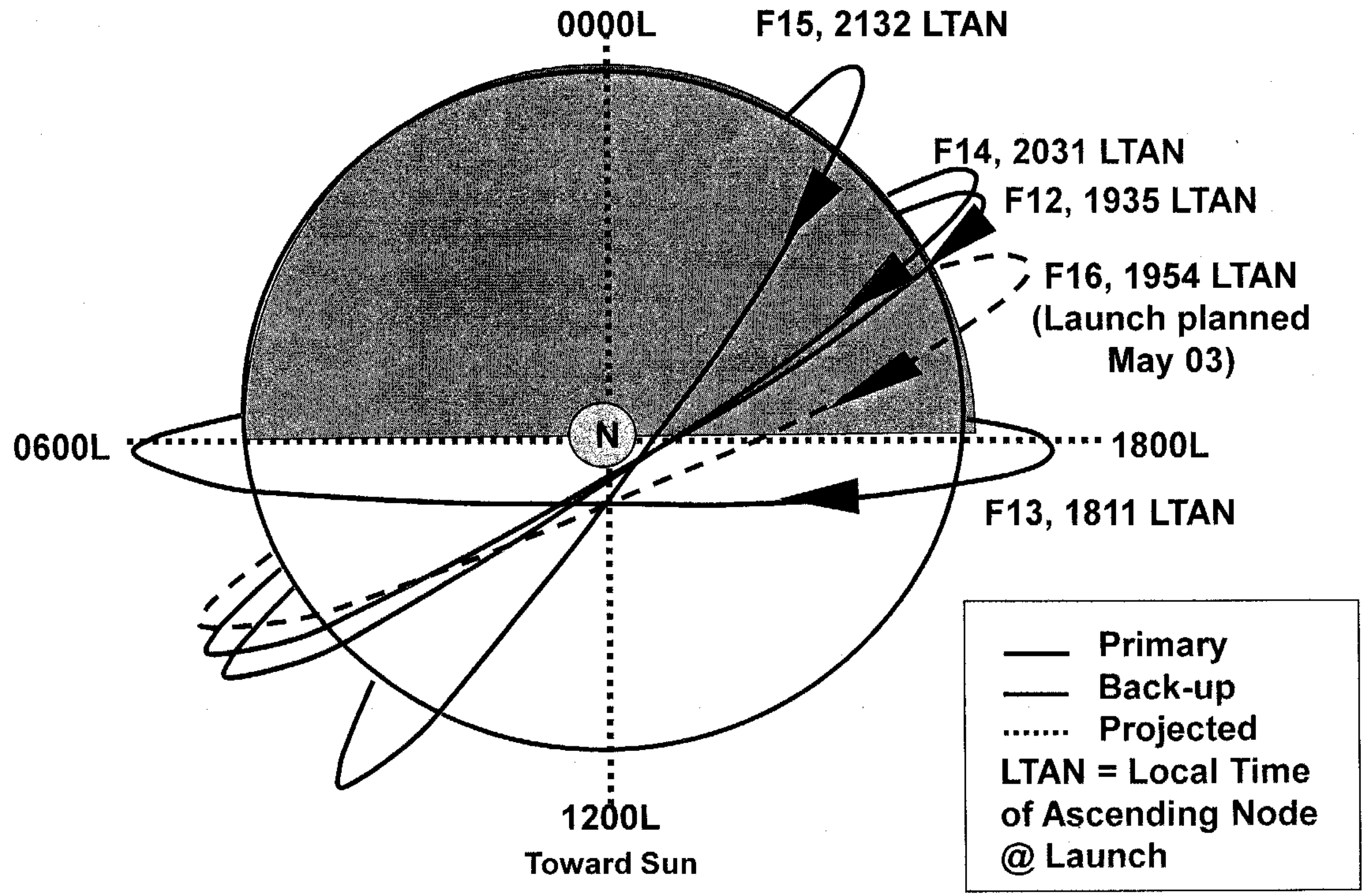


**Illustration 6-1: DMSP Constellation as of 1 October 2001**

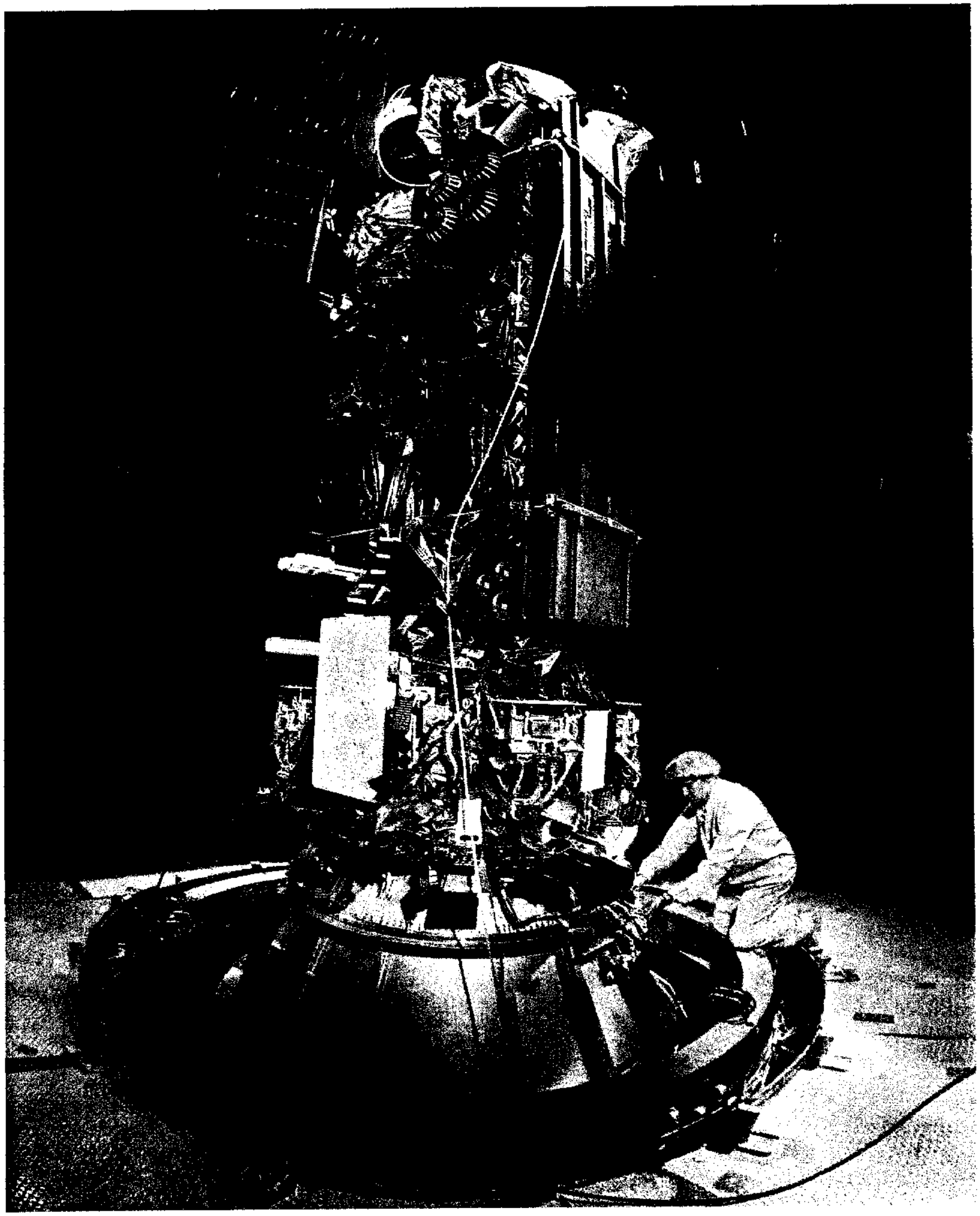

**Illustration 6-2:**
**DMSP Satellite F-16 mated to Titan II Launch Vehicle 12 January 2001**
(photograph courtesy Lockheed Martin)

Company, replaced the hydrazine thruster, and repeated the tests. The costs were met by a reprogramming action from Air Force headquarters (SAF/AQSS) and delayed procurement of seven Small Tactical Terminals (see Tactical Terminals later in this chapter).[9]

Some other anomalies in the spacecraft were found before launch. A faulty inertial measurement unit (IMU) in the spacecraft had to be replaced, and the new unit had to be tested during June 1999. An electrical short in the spacecraft's solar array caused a complete drain in battery power and had to be repaired during August 1999. During October 1999, a random variation in a clock signal occurred at the SSR interface, and the spacecraft had to be demated from the Titan II booster for replacement of parts and retesting. Shortly before launch, final testing of the reaction wheel assembly revealed that one reaction wheel did not meet specifications, requiring replacement and retesting of the assembly during November and December 1999.[10]

F-15 was launched successfully from Vandenberg AFB on 12 December 1999, using Titan II vehicle 23G-8. The on-orbit checkout was completed successfully on 23 December 1999, and satellite control authority was transferred to the Integrated Program Office (IPO) of the National Polar-orbiting Operational Environmental Satellite System (NPOESS) on 23 December 1999. (See the section entitled "Command and Control Segment" later in this chapter.) The primary sensor, the Operational Linescan System (OLS), was successfully calibrated early in January 2000, and satellite F-15 was declared operational on 19 January 2000, with all sensors operating nominally.[11]

To replenish the constellation after F-15, the DMSP Program Office was procuring a new type of satellite called the Block 5D-3. While generally similar to the Block 5D-2, the 5D-3 incorporated a larger solar array and a third battery pack, which would increase its ability to generate and store power and would help to lengthen its mean mission duration to 42 months. To accommodate the extra battery and larger solar array, the spacecraft structure had been enlarged and strengthened, and modifications had

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[9] Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998 (HO archives); Briefing Charts (U), SMC/CI, "DMSP S15/Titan II 23-G8 Executive Mission Readiness Review," 17 August 1999 (HO archives).

[10] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives).

[11] See note 10 above. Additional information about the launch is contained in Table 3-1 in Chapter 3 of this history. See also News Release, AFSPC/PA, "Titan II Launch Delayed," 9 December 1999 (Doc 6-7); News Release, AFSPC/PA, "Titan II Launched," 13 December 1999 (Doc 6-8); Justin Ray, Spaceflight Now, "Mission Status Center: December 12, 1999," 12 December 1999 (Doc 6-9).

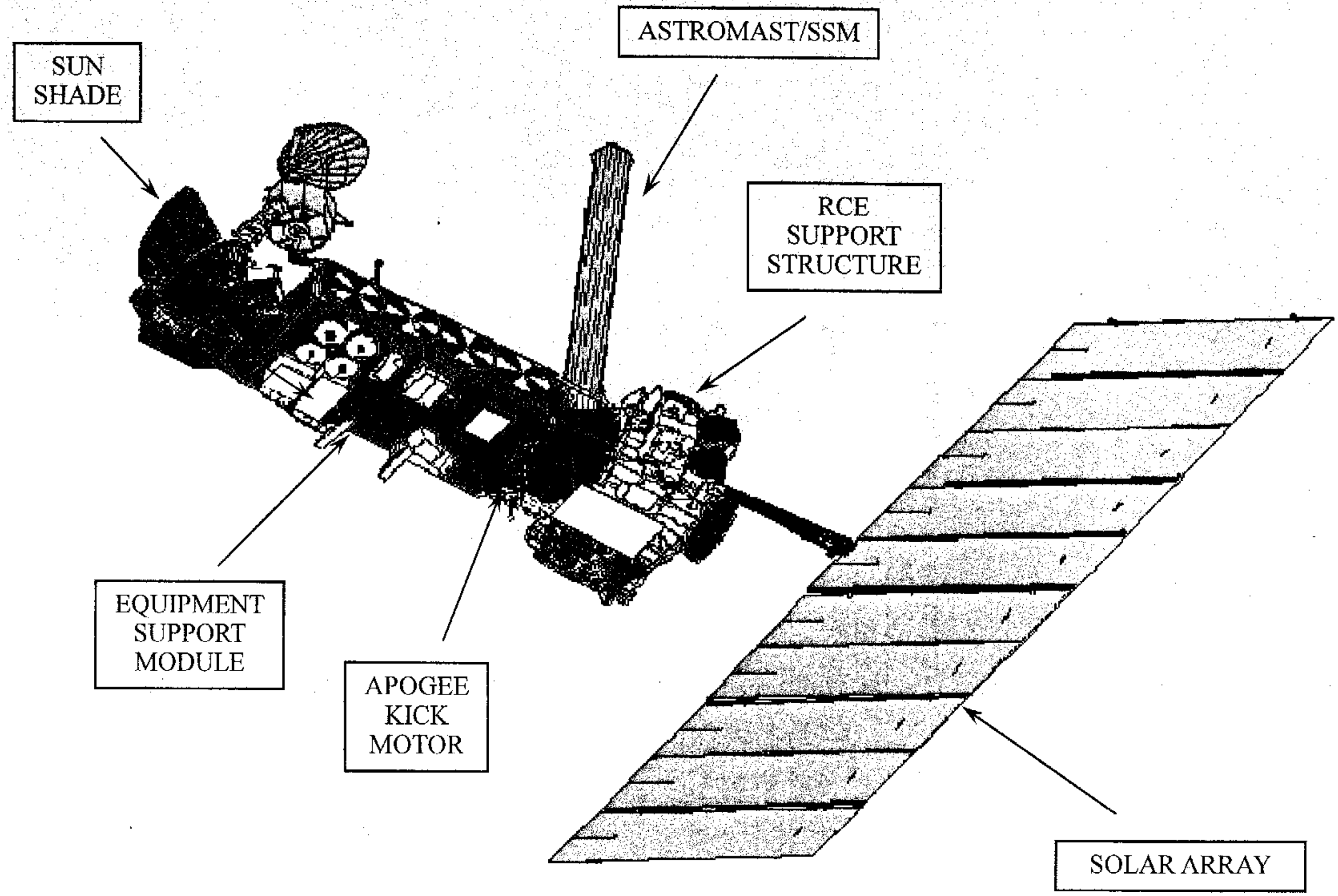



**Illustration 6-3:**
**Drawing of Block 5D-3 Spacecraft in Orbit**

been made in the attitude control and thermal control subsystems. The spacecraft also would be equipped with four solid-state recorders instead of the two solid-state recorders used on F-15. As another improvement, the spacecraft would use a higher commanding rate: 10 Kbs for F-16 compared to 2 Kbs for F-15 and prior satellites. They would also incorporate a new deployable UHF antenna system. Several of the sensors would also be changed. The new OLS incorporated upgraded bearings and a 66 kbps downlink modification retrofitted into the sensors of the later Block 5D-2 satellites. Finally, 5D-3 satellites would be equipped with four new sensors, designated in Table 6-2 below as SSMIS, SSUSI, SSULI, and SSF.[12]

**Table 6-2**
**Comparison of Sensor Suites on F15 and F16[13]**

| Sensors | F15[14] | F16[11] |
|---|---|---|
| Operational Linescan System (OLS) | 5D-2 Configuration | 5D-3 Configuration |
| Microwave Imager | SSMI | SSMIS |
| Microwave Temperature Sounder | SSMT1 | SSMIS |
| Microwave Water Vapor Sounder | SSMT2 | SSMIS |
| Ultraviolet Limb Imager | not equipped | SSULI |
| Ultraviolet Spectrographic Imager | not equipped | SSUSI |
| Survivability | SSZ | SSF |
| Precipitating Electron Spectrometer | SSJ4 | SSJ5 |
| Triaxial Fluxgate Magnetometer | SSM | SSM |
| Scintillation and Plasma Monitor | SSIES2 | SSIES3 |

[12] The mechanical wearing out of tape recorders on orbit had been one of the primary causes of degradation for all DMSP satellites. The tape recorders were to be replaced in the newer satellites with solid-state recorders to enhance the reliability, life span, and worldwide data quality of the units. See History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 86 (HO archives); and Briefing Charts, Aerospace Corporation, "Aerospace President's Review: DMSP F-16/Titan II," 16 January 2002 (HO archives).

[13] Briefing Charts, Aerospace Corporation, "Aerospace President's Review: DMSP F-16/Titan II," 16 January 2002 (HO archives).

[14] Acronyms: SSMI = Special Sensor Microwave Imager, SSMIS = Special Sensor Microwave Imager Sounder, SSMT = Special Sensor Microwave Temperature Sounder, SSULI = Special Sensor Ultraviolet Limb Imager, SSUSI = Special Sensor Ultraviolet Spectrographic Imager, SSZ = Special Sensor Laser Threat Detector, SSF = Special Sensor F, SSJ = Special Sensor Electron/Ion Spectrometer, SSM = Special Sensor Fluxgate Magnetometer, SSIES = Special Sensor for Ions and Electrical Plasma Drift/Scintillation.

Five Block 5D-3 satellites were being procured under a contract awarded to General Electric's Astro Space Division in 1989. They were designated F-16 through F-20. As with earlier DMSP satellites, the sensors were being acquired from a variety of contractors and government agencies and provided to the spacecraft contractor for integration into the spacecraft. Table 6-2 above shows the suite of sensors to be flown on F-16 in comparison to the sensors used on F-15 for the same missions.[15]

Plans had originally called for further system upgrades for satellites 18-20. The OLS was to be upgraded with additional data channels to improve snow and cloud detection, detection of low clouds, and measurements of sea surface temperatures. A new GPS occultation sensor was supposed to improve worldwide location and pointing and to measure electron densities. Unfortunately, these plans had to be canceled.[16]

**Table 6-3[17]**
**DMSP Development and Production Contracts for Blocks 5D-2 and 5D-3**

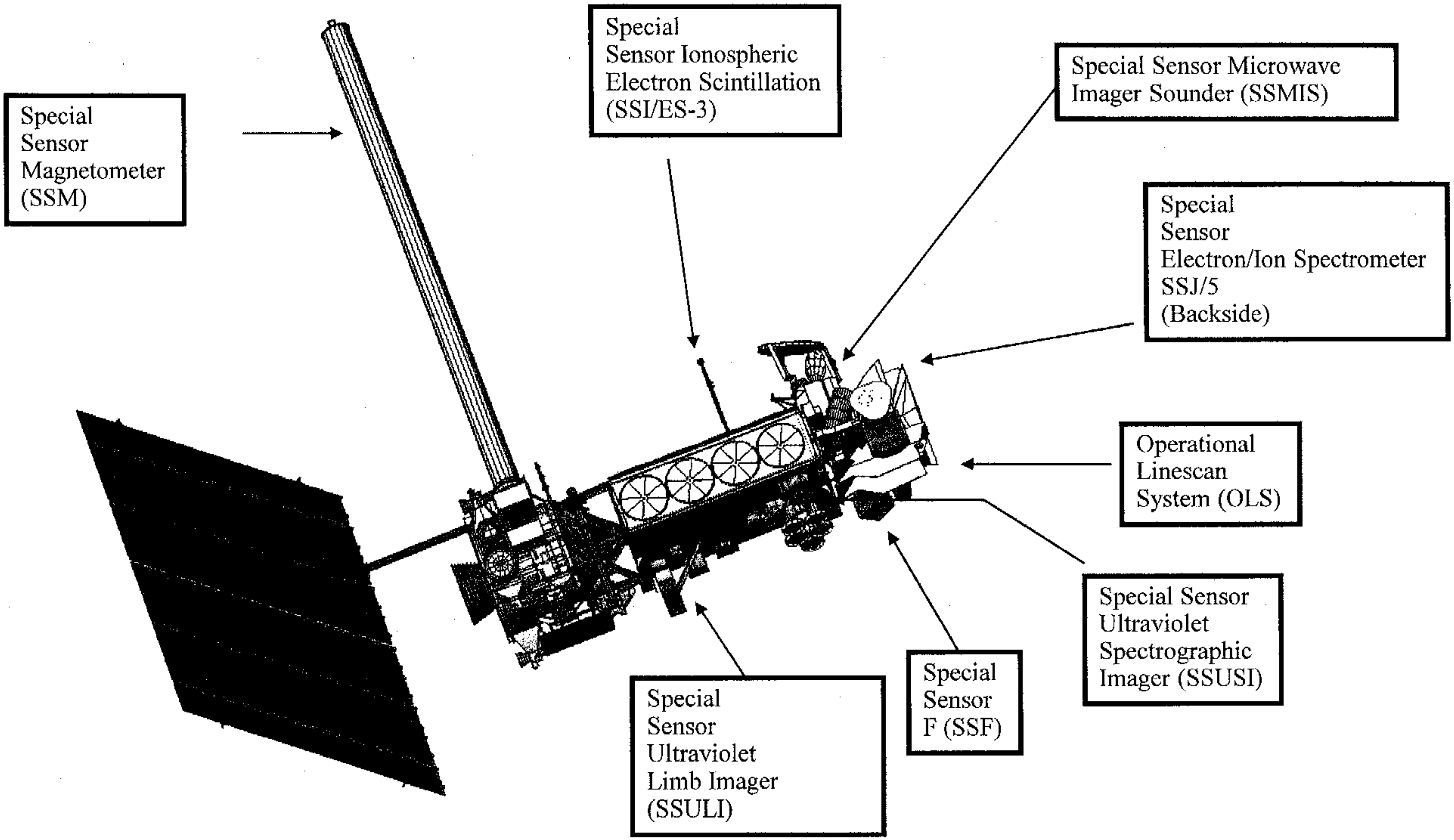
| Contract Number | Contractor | Block Number | Satellite Numbers | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|---|
| F04701-75-C-0182 | RCA | 5D-2 | F-6 > F-7 | 30 Jun 75 | 30 Apr 86 | $228,227,076 |
| F04701-78-C-0063 | RCA | 5D-2 | F-8 > F-10 | 26 Sep 79 | 14 Nov 86 | |
| F04701-83-C-0030 | RCA | 5D-2 | F-11 > F-14 | 2 Aug 83 | 31 Mar 90 | |
| F04701-86-C-0038 | RCA | 5D-2/3 | F-15 | 7 Jul 86 | 30 Oct 91 | |
| F04701-89-C-0029 | GE (acquired by Lockheed Martin) | 5D-3 | F-16 > F-20 | 10 Jul 89 | 12 Jun 99 | |

[15] For additional information about the contract, see Table 6-3 below. In 1993, GE Astro Space was absorbed by Martin Marietta, later part of Lockheed Martin as a result of a merger. See History of SMC (FOUO—information used not FOUO), October 1994 – September 1997, pp. 87-88 (HO archives).

[16] Notes provided by Mr. John Bohlson, Aerospace Corporation, 4 December 2001 (HO archives); History of SMC (FOUO—information used not FOUO), October 1993 – September 1997, p. 89 (HO archives).

[17] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp. 86-87 (HO archives); contract listings in appendices of SMC histories for 1986-1997 (HO archives); various Contractor Performance Assessment Reports (CPARS) (FOUO—information used not FOUO) in HO archives.

**Illustration 6-4:**
**DMSP Block 5D-3 Sensor Suite**



Lockheed Martin began production of the 5D-3 satellite vehicles in January 1996. The contractor delivered F-16 and F-17 during FY 1997, F-18 and F-19 during FY 1998, and F-20 early in FY 1999. These vehicles went into long-term storage to await production of the sensors, integration, and delivery to the launch site closer to their scheduled launch dates. F-20, the last 5D-3, was to be launched around February 2009.[18] Satellites F-17 through F-20 would be launched on a new type of launch vehicle, the Evolved Expendable Launch Vehicle. (For information about the EELV, see Chapter III of this history.) On 3 June 1999, SMC awarded a modification to Lockheed Martin's existing contract (F04701-97-C-0024) to design changes to the satellites that would allow them to be launched on EELVs. Lockheed Martin was carrying out the integration efforts under contract F04701-96-C-0023.[19]

**Table 6-4**
**Major DMSP Component (Spacecraft and Sensor) Contracts in Effect During FY 1998-2001[20]**

| Contract Number | Contractor | Efforts[21] | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|
| F04701-89-C-0036 | Aerojet Elec. Systems Div. | SSMIS | 27 March 1989 | 31 March 2003 | |
| F04701-92-C-0020 | Aerojet Elec. Systems Div. | SSM/TW/IS S&S | 1 April 1992 | 30 April 1998 | |
| F04701-95-C-0014 | Northrop Grumman | OLS S&S; SSRs | 1 May 1995 | 30 September 2000 | $32,766,604 |
| F04701-96-C-0026 | Raytheon | SSM/I S&S | 1 April 1996 | 31 March 2001 | |
| F04701-00-C-0001 | Northrop Grumman | Consolidated Sensor S&S | 3 May 2000 | 30 November 2004 | $99,156,144 |

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[18] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives).

[19] Defenselink, "Contracts," 3 June 1999, http://www.defenselink.mil/news/May1999/c06031999_ct276-99.html, and 6 August 1999, http://www.defenselink.mil/news/Aug1999/c08091999_ct370-99.html.

[20] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives); Contract Listing in Appendix G of this history and preceding history.

[21] Acronyms: CDFS = Cloud Depiction and Forecast System; OLS = Operational Linescan System; S&S = Support and Services; SSM/I= Special Sensor Microwave Imager; SSMIS = Special Sensor Microwave Imager/Sounder; SSM/TW/IS = Special Sensor Microwave Temperature Sounder/Water Vapor Profiler/Imager Sounder; SSRs = Solid State Recorders; STT = Small Tactical Terminal.

As we have seen, DMSP satellites carried many specialized sensors, and SMC's program office had to manage many contracts to procure and support them. It was becoming increasingly difficult to manage a large number of contracts as the program office's manpower declined with the buildup of the National Polar Orbiting Operational Environmental Satellite System (NPOESS) under the Department of Commerce. (See the NPOESS section below). In 1999, the program office undertook an initiative to combine the major sensor contracts under one contract for Consolidated Mission Sensor Support and Services that would be simpler to manage. These efforts culminated in the award of such a contract (F04701-00-C-0001) to Northrop Grumman on 1 May 2000. By the terms of this contract, Northrop Grumman would provide support and services to upgrade, prepare, sustain, integrate, and operate a maximum of 13 sensors on DMSP satellites. It would also manage the sensor-related efforts of a number of subcontractors and government laboratories. (See Table 6-4 above.)[22]

Early in 1998, F-16 (the first Block 5D-3) was scheduled for launch about February 2001, but it encountered various fiscal and technical delays. By June 1999, the program office was planning to launch F-16 in September 2000 to support weather forecasting for operations in Kosovo, to conduct a "fast track" procurement of four SSRs for F-16 (along with the two for F-15 mentioned above), and to refurbish four DTRs for F-16 to provide a contingency backup capability in case the aging satellite F-13 were to fail. Although an early contingency launch proved to be unnecessary, the launch had to be delayed twice in late CY 2000. In January 2001, the launch encountered a third, more significant delay when the spacecraft's inertial measurement unit (IMU) failed during testing on the launch pad. The spacecraft had to be demated from the booster and taken back to the Payload Integration and Test Facility (PITF) at Vandenberg AFB. This delay brought it into conflict with a higher priority Titan IV launch at Vandenberg and ensured aa additional delay past August 2001. Further inspection of the spacecraft revealed some breaks in the electrical lines for clocks, and the engineers for Lockheed Martin decided that the spacecraft's controls interface unit (CIU) for distribution of the clock signals would have to be replaced. The replacement was no sooner accomplished than inspecting technicians discovered a crack in the bond between the solar array panel and an assembly

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[22] Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 27 April 2000 (HO archives); Defenselink, "Contracts," 1 May 2000, http://www.defenselink.mil/news/May2000/c05012000_ct220-00.html; Staff Summary Sheet (U), SMC/CIKE to SMC/CC, "Required coordination and approval of Justification Review Document (JRD) for Other Than Full and Open Competition for DMSP Consolidated Mission Sensor Support and Services (Ref SMC/CI-JRD-99-07)," 30 June 1999, with attachments (FOUO—information used not FOUO) (Doc 6-34); Staff Summary Sheet (U), SMC/CIKE to SMC/CC, "Fee Determining Official and Clearance Dele-gation for the DMSP Sensor Support and Services Consolidated Contract," 22 October 1999, with attachments (Doc 6-35); Staff Summary Sheet (U), SMC/CIK to SMC/CD, "CPAR for Contract F04701-00-C-0001, Consolidated Sensor Support and Services Contract," 23 July 2001, with attachments (FOUO—information used not FOUO) (Doc 6-36).

that supported its hinge to the to the deployment boom. Consequently, the solar array was also replaced while the spacecraft was in the PITF. Further delays in the Titan launch queue at Vandenberg, combined with additional testing of F-16's IMU, delayed the launch into the next fiscal year. Engineers were especially concerned about the performance of F-16's IMU because by then F-15 was experiencing failures in the gyroscopes of its IMU on orbit. By the end of FY 2001, launch projections called for F-16 to be launched no earlier than 20 December 2001.[23]

**Table 6-5**
**Major DMSP System Support Contracts**
**in Effect During FY 1998-2001[24]**

| Contract Number | Contractor | Efforts[25] | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|
| F04701-97-C-0007 | Integral Systems, Inc. | IV&V Flight Software | 16 February 1997 | 15 February 1999 | $1,192,900 |
| F04701-97-C-0024 | Lockheed Martin | Spacecraft S&S | 26 June 1997 | July 2002 | $308,500,000 |
| F04701-98-C-0006 | Aerojet Elec. Systems Div. | S&S | 4 May 1998 | 30 April 2003 | |

## Command and Control Segment

At the beginning of FY 1998, the DMSP command and control segment was in the process of transition from its old Command and Control Segment to a new Command and Control Segment as part of the Presidentially directed convergence of the military and civilian meteorological satellite programs. (See the section about the National Polar-orbiting Operational Environmental Satellite System (NPOESS) later in this chapter.) The old segment had relied upon two dedicated ground facilities—the Fairchild Satellite Operations Center (FSOC), located at Fairchild AFB, Washington, and the Multi-Purpose Satellite Operations Center (MPSOC), located at Offutt AFB, Nebraska. The FSOC and the MPSOC generated commands for transmission to the satellites and processed

[23] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts (U), SMC/CI, "Program Management Review: DMSP," 23 July 1998, 19 July 2000 (HO archives); Briefing Charts (U), SMC/CI, "Program Management Review: SMC/CI Portfolio," 5 September 2001, 27 November 2001 (HO archives).

[24] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998 (HO archives); Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001 (HO archives); Contract Listing in Appendix G of this history and preceding history.

[25] Acronyms: IV&V = Independent Validation and Verification; S&S = Support and Services.

telemetry received from them. The FSOC could use its own antennas to transmit commands and receive telemetry, and it could also send commands and receive telemetry through the Thule and New Hampshire tracking stations of the Air Force Satellite Control Network (AFSCN). These two tracking stations had been specially modified to communicate directly with the FSOC and the MPSOC and function as part of the DMSP command and control segment. Finally, the FSOC and the MPSOC could send commands and receive telemetry through the other tracking stations of the AFSCN, although there were not yet any direct communication links between the FSOC and the MPSOC and the other tracking stations.[26]

However, Presidential Decision Directive NSTC-2 of May 1994 had directed the phasing out of the two separate polar-orbiting environmental satellite programs, DMSP for military users and the National Oceanic and Atmospheric Administration's Polar-orbiting Operational Environmental Satellite System (POESS) for civilian users. The Departments of Defense and Commerce were to "converge" their systems into a single integrated program. As part of that convergence, the command and control systems would have to become a single system. Under the direction of a joint National Polar-orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office (IPO), DMSP satellite operations would be transferred to a command and control system known as the Integrated Polar Acquisition and Control Subsystem (IPACS). IPACS would have ground facilities in the Satellite Operations Control Center (SOCC) at Suitland, Maryland, (the site of the existing ground facilities for POESS) and at Falcon AFB (the site of the AFSCN's ground facilities).[27]

As the first significant step in combining the military and civilian meteorological programs, the SOCC successfully took over satellite control authority (SCA) as well as actual operational control of the DMSP system in addition to POESS on 29 May 1998, one month ahead of schedule. On 11 June 1998, Air Force Space Command's 6th Space Operations Squadron at Offut AFB, Nebraska, closed down the MPSOC, and in October 1998, an alternate POES control facility opened at Falcon AFB, Colorado, staffed by Air Force reservists.[28] The SOCC at Suitland—staffed by personnel from NOAA, the Air Force, and contractors—successfully supported the launch of DMSP satellite F-15 on 12

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[26] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp.90-92 (HO archives).

[27] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp.91-92 (HO archives).

[28] News Release, Air Force News Service, "Air Force Turns Over Weather Satellite Control to NOAA," 2 June 1998 (Doc 6-10).

December 1999 and successfully assumed operational control of the new satellite on 23 December 1999.[29]

## User Segment

Weather data collected by the sensors on DMSP satellites was downlinked in real time and was also stored in tape recorders (or, beginning with F-15, solid state recorders) on board the satellites. The real time data, which covered local weather conditions only, was received by tactical terminals deployed in numerous locations worldwide and was made available to field commanders to support tactical military operations. The stored data, which covered weather conditions all over the globe, was downlinked to the FSOC and to the AFSCN tracking stations at Thule, New Hampshire, and Hawaii. From those sites, it was relayed to the Air Force Weather Agency (AFWA) at Offutt AFB, Nebraska, and to the Fleet Numerical Meteorology and Oceanography Center (FNOC) at Monterey, California. There, it was reconstructed and processed to support strategic missions.[30]

**Table 6-6**
**Major DMSP User Equipment Contracts in Effect During FY 1998-2001[31]**

| Contract Number | Contractor | Efforts[32] | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|
| F04701-94-C-0019 | Harris Corporation | STT | 15 June 1994 | 30 November 2004 | $53,752,085 |
| F04701-95-C-0013 | Sterling Software | CDFS II | 2 June 1995 | 30 September 2005 | |

## TACTICAL TERMINALS

The DMSP Program Office had completed the global deployment of a new, improved tactical weather terminal called the Mark IVB in 1995, and it had brought the

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[29] Background Paper, NOAA, "The National Polar-orbiting Operational Environmental Satellite System (NPOESS)," 12 August 2002, accessible at http://www.ipo.noaa.gov/backgrounderAugust2002.html (Doc 6-11).

[30] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 93 (HO archives).

[31] Briefing Charts, SMC/CI, "Portfolio Review to Ms Darleen Druyun, SAF/AQ," 3 December 1998; Briefing Charts, SMC/CI, "Program Management Review," 27 November 2001; Contract Listing in Appendix G of this history and preceding history.

[32] Acronyms: CDFS = Cloud Depiction and Forecast System; STT = Small Tactical Terminal.

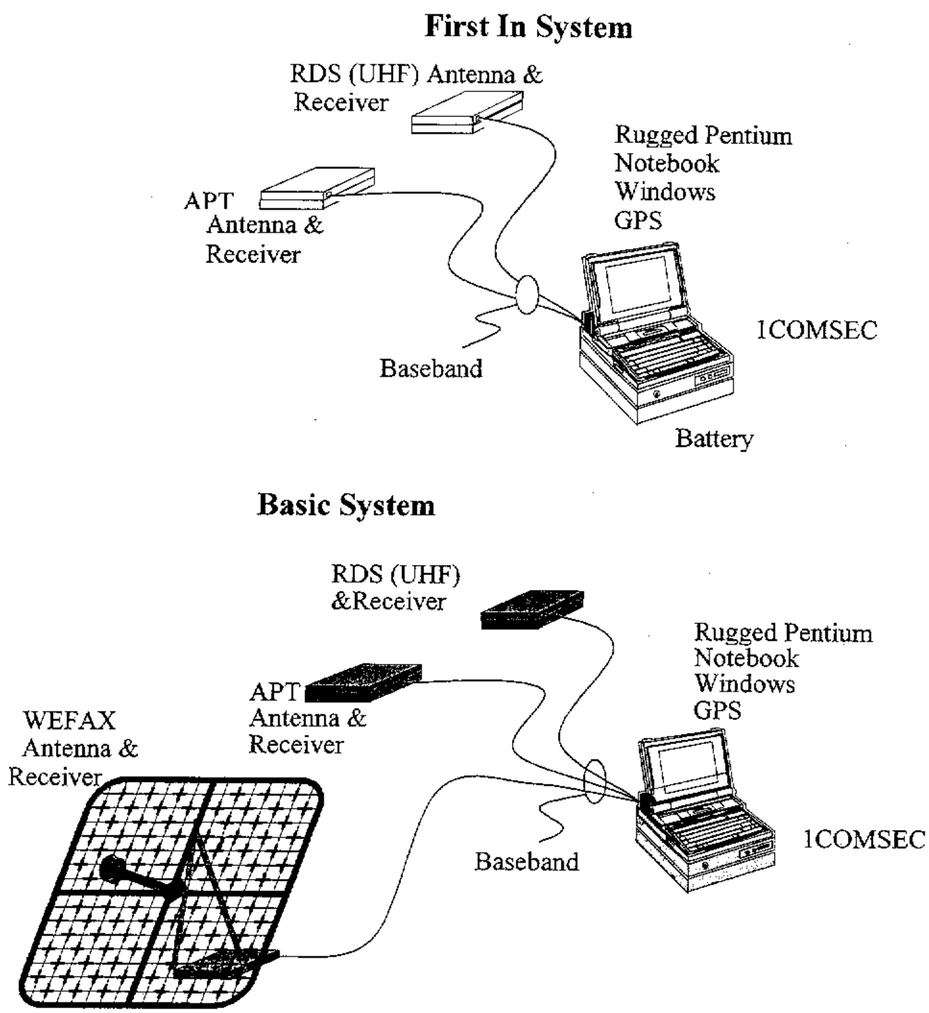


**Illustration 6-5:**
**Initial Configurations for Tiny Tactical Terminal**

system to full operational capability in 1997. The Mark IVB was significantly more capable than earlier terminals, but it was large and heavy, weighing 26,000 pounds and requiring a C-130 to transport it to, or within, the theater of operations. Tactical forces often needed weather satellite data in situations where the use of a large terminal with a ten-foot antenna and associated processing equipment was not practical. To meet that need, the DMSP Program Office was procuring a ruggedized and highly portable Small Tactical Terminal (STT). Three versions of the STT were being procured. The basic version would ingest, process, store, and display low-resolution, real-time data from DMSP and other US and foreign meteorological satellites. The enhanced version (known as the High Resolution STT or H-STT) would do that as well as doing so with high-resolution, real-time data from DMSP and NOAA satellites. A version known as the Joint Task Force Satellite Terminal (JTFST) would provide the capabilities of the enhanced version as well as ingesting, processing, storing, and displaying high-resolution data from additional US and foreign meteorological satellites.[33]

SMC had awarded a production contract (FO4701-94-C-0019) for STT units to Harris Corporation in June 1994, and the Air Force had declared initial operational capability for the basic version of the STTs in 1997. By the beginning of FY 1998, Harris was under contract to deliver a total of 183 units. Deliveries of the L-STTs and JTFSTs were completed early in calendar year 1999, bringing the total number of STT units delivered up to 143. Harris also received a delivery order to provide sustaining systems engineering support for STTs. During FY 2000, the program office managed the successful delivery of software upgrades which would allow users in the field to access data from European meteorological satellites.[34]

However, the program office negotiated a production change in July 1998 in response to a requirement from the Air Force Weather Agency. Production plans called for the last 40 units of the total 183-unit production of STTs to be a specially configured, miniature version known as Lightweight STTs (L-STTs). Instead, the user wished to convert the last 40 units to an even smaller version of the tactical terminal known as

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[33] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, p. 94 (HO archives); Internet Documents, Harris Corporation, "Small Tactical Terminal (STT)," copyright 2002, accessible at http://www.govcomm.harris.com/solutions/marketindex/product.asp? ccsource=alpha&product_id=275 (Doc 6-12).

[34] RDT&E Budget Item Justification Sheets (R-2 Exhibits), HQ USAF, "0305160F Def Meteorological Satellite Prog (Space)," Sheets dated February 1998, February 1999, February 2000, June 2001, February 2002 (Doc 6-13); Briefing Charts, SMC/CI, "Program anagement Review," 27 November 2001 (Doc 6-14); Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); News Release, Harris Corporation, "U.S. Air Force Awards Harris Corporation $2.3 Million Engineering Support Contract for Small Tactical Weather Terminal," 3 July 2001, accessible at http://www.govcomm.harris.com/view_pressrelease.asp?act=lookup&prid=772 (Doc 6-16).

Workstation STTs (W-STTs). W-STTs would have no satellite antennas of their own, but would ingest and display data from satellites when the data was transmitted by the planned Global Broadcast Service (GBS). Since GBS was not yet fully developed, the W-STTs would use common-user communications installed ahead of time in buildings rather than in the field.[35]

In 1997, SMC issued Phase I of a type of contract known as a small business innovative research (SBIR) contract, designed to encourage technological breakthroughs by private industry, for an even smaller DMSP tactical terminal known as the Tiny Tactical Terminal (T3) to the ViaSat Corporation. The T3 featured a ruggedized, commercially available notebook computer powered by a battery and solar cells. It could be connected to physically separate programmable receivers and antennas for reception and display of three types of weather data features: Automatic Picture Transmission (APT), Real-time Data Smooth (RDS), and Weather Facsimile (WEFAX). It would receive and display both high-resolution and low-resolution images from satellites in low earth orbit and geosynchronous orbit. The basic version of the T3 weighed only 75 pounds, and the enhanced version only 132 pounds.[36] Phase 2 began in 1998, but in 2000 the program office decided not to proceed to Phase 3. During FY 2000, SMC held discussions with Harris about the T3. The DMSP program office participated in a mid-term planning meeting during 28 February – 3 March 2000 and decided to use the Harris W-STT concept rather than the T3. Harris produced two prototypes in June 2000, and they were used in a Joint Warrior Interoperability Demonstration during 3-28 July 2000 as well as a Joint Contingency Force Advanced Warfighter Experiment in September 2000.[37]

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[35] See note 26 above. See also Staff Summary Sheet, SMC/CISB, "Request for authority to Issue an Undefinitized Contract Action (UCA) to Purchase Workstation Small Tactical Terminals (W-STTs), Contract F04701-94-C-0019, 8 July 1998 (Doc 6-17); Staff Summary Sheet, SMC/CIK, "CPAR for Contract F04701-94-C-0019, Small Tactical Terminal (STT) Production, 15 December 1998, with attachment (FOUO—information used not FOUO) (Doc 6-18); Staff Summary Sheet, SMC/CISB, "Y2K Memorandum for CINC Approval of Configuration Change to STT (AN/TMQ-43)," 30 November 1999 (Doc 6-19); Contractor Performance Assessment Report (FOUO—information used not FOUO), SMC/CI, "Meteorological Satellite (METSAT) Small Tactical Terminal (STT) Production," 5 January 2001 (Doc 6-20); Staff Summary Sheet, SMC/SDDM, "Contractor Performance Assessment Report (CPAR) on Harris Corporation, Contract Number F04606-92-C-0457-P00004, CPAR 98-95," no date (ca. August 1997), with attachment (FOUO—information used not FOUO) (Doc 6-21).

[36] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts, SMC/CI, "Program Management Review: Defense Meteorological Satellite Program Office," 12 January 2000 and 27 April 2000 (HO archives).

[37] Comments from reviewer, John S. Bohlson, Aerospace Corporation, SMC/WX, April 2005.

The upgrade to H-STTs still had to be placed under contract. SMC began negotiations with Harris during August 2000 and issued the definitized contract (that is, the written contract containing the negotiated cost) in September 2000. Initial operational capability for the H-STT was scheduled for February 2002. Beginning in 2001, funding for tactical terminals would be transferred from the DMSP program element (35160F) to the Air Force Weather Agency's program element (35111F).[38]

## CLOUD DEPICTION AND FORECAST SYSTEM II

The DMSP program office was also upgrading the hardware and software capability known as the Cloud Depiction and Forecast System (CDFS), located within the Air Force Weather Agency's facilities at Offutt AFB, Nebraska. The original CDFS system was "task saturated" and limited in its ability to support software upgrades. The upgraded data processing system was known as CDFS II, and it was designed to meet an increasing demand for cloud analysis and forecasts at higher resolutions in theaters of combat.[39]

SMC had awarded a contract for the effort to Sterling Software in 1995. Sterling was to develop a system to replace the existing CDFS capabilities that were resident on three mainframe computers—known as systems 3,5, and 6—at Offutt. With the new CDFS II capability, the computers would be able to process data simultaneously from nine meteorological satellites in polar and geosynchronous orbits (including the four DMSP satellites transmitting sensor data) to provide a new three-dimensional cloud analysis model and a worldwide cloud forecast model. The new system would be able to provide hourly, worldwide cloud analyses. By comparison, the original CDFS system could use data from only four polar-orbiting satellites and provide regional cloud updates only every three hours. Furthermore, CDFS II would provide cloud forecasts with a resolution of 24 kilometers, while the original system provided a resolution of only 48 kilometers.[40] Late in 1997, the program office reported that Sterling's progress in developing CDFS II had been slow and that efforts to recover schedule in the design of one of the fundamental software increments (Build 1C) had led to cost growth.[41]

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[38] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15); Briefing Charts, SMC/CI, "Program management Review," 27 November 2001 (Doc 6-14).

[39] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 96.

[40] Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999, 1 April 2001-30 September 2001 (HO archives).

[41] Monthly Activity Reports (MARs) (FOUO), SMC/CI, October 1997 – June 2001 (information used not FOUO) (Doc 6-15). See MAR for December 1997.

In 1998, the Director of Weather under the Air Force Deputy Chief of Staff for Air and Space Operations asked for development of a capability to produce weather images with higher resolutions than the existing resolutions of 48 kilometers. In response the Aerospace Corporation undertook a feasibility study aimed at using their CDFS II prototype to produce cloud images for analysis and forecast with resolutions of only 6 kilometers (a resolution for weather imagery known as 64$^{th}$ mesh). Such a resolution would be an important achievement because it was not only eight times better than the resolution produced by the existing system, but also four times better than the resolution that the CDFS II program was required to achieve. Early in 1999, Aerospace successfully demonstrated a working prototype of its 64$^{th}$ mesh CDFS II product, using high-resolution data from DMSP satellites only. The Air Force Weather Agency asked the program office to make the capability (known then as the CDFS II Risk Reduction Prototype) operational as soon as possible, using the existing CDFS II contract. Indeed, such a capability was rapidly becoming a critical operational goal as NATO's air campaign against Serbian forces in Kosovo—soon named Operation Allied Force—got under way on 24 March 1999 and lasted until 10 June 1999. Cloud cover was a potential problem for Air Force bombers during much of the operation. The initial operational deployment of the prototype provided vastly superior weather imagery to Allied forces in Kosovo, including 48-hour cloud forecasts at 3-hour intervals.[42]

To provide and fund for incremental improvements in the prototype, the Air Staff authorized the creation of a Combat Mission Need Statement (CMNS), sponsored by the commander of U.S. Air Forces in Europe (USAFE), which was providing much of the fighting force for Allied operations in Kosovo. SMC's DMSP Program Office began work on the CMNS on 7 May 1999, with a maximum of 60 days to provide the required target scale weather forecast improvements. This portion of the CMNS was called the Integrated Weather Information Nephanalysis 64$^{th}$ Mesh (IWIN 64) effort. The program office coordinated the efforts of its own personnel, the Aerospace Corporation's scientists, and Sterling Software's technical experts, meeting all of the milestones required by the CMNS. The team improved the prototype by incorporating data from the two available NOAA satellites as well as the four available DMSP satellites, by improving on the merging and display of cloud data with wind modeling, and by improving quality control for the system. The first products of this process were available to USAFE in only 30 days. The team provided 24-hour, 7-day support to the system's users through the end of September 1999. After Operation Allied Force, the

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[42] SMC/CI, "Talking Paper on Combat Mission Needs Statement (C-MNS) For Target Scale Weather Forecast," no date (1999) (Doc 6-22); SMC/CI, "Operation Allied Force Appreciation Event Nomination for Contributions," no date (Doc 6-23); Briefing Charts, SMC/CI, "DMSP Kosovo Support to The Honorable F. Whitten Peters, Secretary of the Air Force," 5 August 1999 (Doc 6-24); Briefing Charts, SMC/CI, Program Management Review: DMSP," 15 July 1999 (HO archives); Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999 (HO archives).

improved prototype system was used and maintained as a forecasting tool by the Air Force Weather Agency.[43]

During the remainder of the period under discussion (FY 1998-2001), Sterling Software continued with its program of incremental software "builds" designed to achieve an initial operational capability for the overall CDFS II system by 29 December 2000. However, by April 2000, the program office was reporting that Sterling would not be able to adhere to that schedule and that a cost increase would accompany the delay. On 9 November 2000, the Air Force Weather Agency approved additional funding and a new schedule for CDFS II, and the program was officially rebaselined on 12 January 2001. The new schedule called for initial operational capability on 12 October 2001. AFWA would pay for a cost increase of $4.285 million with funds from other weather development programs, one of which was the Small Tactical Terminal (see above). At the end of September 2001, it appeared that Sterling would exceed the new schedule by about a month.[44]

## SPACE WEATHER ANALYSIS AND FORECAST SYSTEM

Although DMSP was concerned primarily with monitoring and forecasting terrestrial weather, it was also involved in efforts to monitor and forecast environmental conditions in space—conditions such as solar activity which could heavily affect spacecraft. Some of the sensors on DMSP satellites monitored the space environment, and the program office also became involved in upgrading the Air Force Weather Agency's equipment and sensors which monitored the space environment from the ground.

The Air Force Weather function underwent a great deal of restructuring during 1997-1999. To draw weather analysis and forecasting more tightly into the operational

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[43] SMC/CI, "Talking Paper on Combat Mission Needs Statement (C-MNS) For Target Scale Weather Forecast," no date (1999) (Doc 6-22); SMC/CI, document (no title, subject DMSP support to operations in Kosovo), no date (ca. late 1999) (Doc 6-25); Aerospace Corporation, "Aerospace Corporation Team Helps Improve Weather Forecasting for Yugoslavia Operations," 16 May 1999, accessible at http://www.aero.org/news/current/weather.html (Doc 6-26); Schirite Zick (SMC/PA), "New Weather System to Aid Warfighter," 27 May 1999, accessible at htt://www.af.mil/news/May1999/n19990527_991074.html (Doc 6-27); Schirite Zick, "Product Team Accelerates Acquisition for Warfighters," Astro News, no date (ca. July 1999) (Doc 6-28); Aerospace Corporation, "Annual Report to the Commander, Space and Missile Systems Center," 1 April 1999-30 September 1999 (HO archives).

[44] Briefing Charts, SMC/CI, Program Management Review: DMSP," 27 April 2000, 19 July 2000, 15 November 2000, 28 March 2001, 5 September 2001, 27 November 2001 (HO archives).

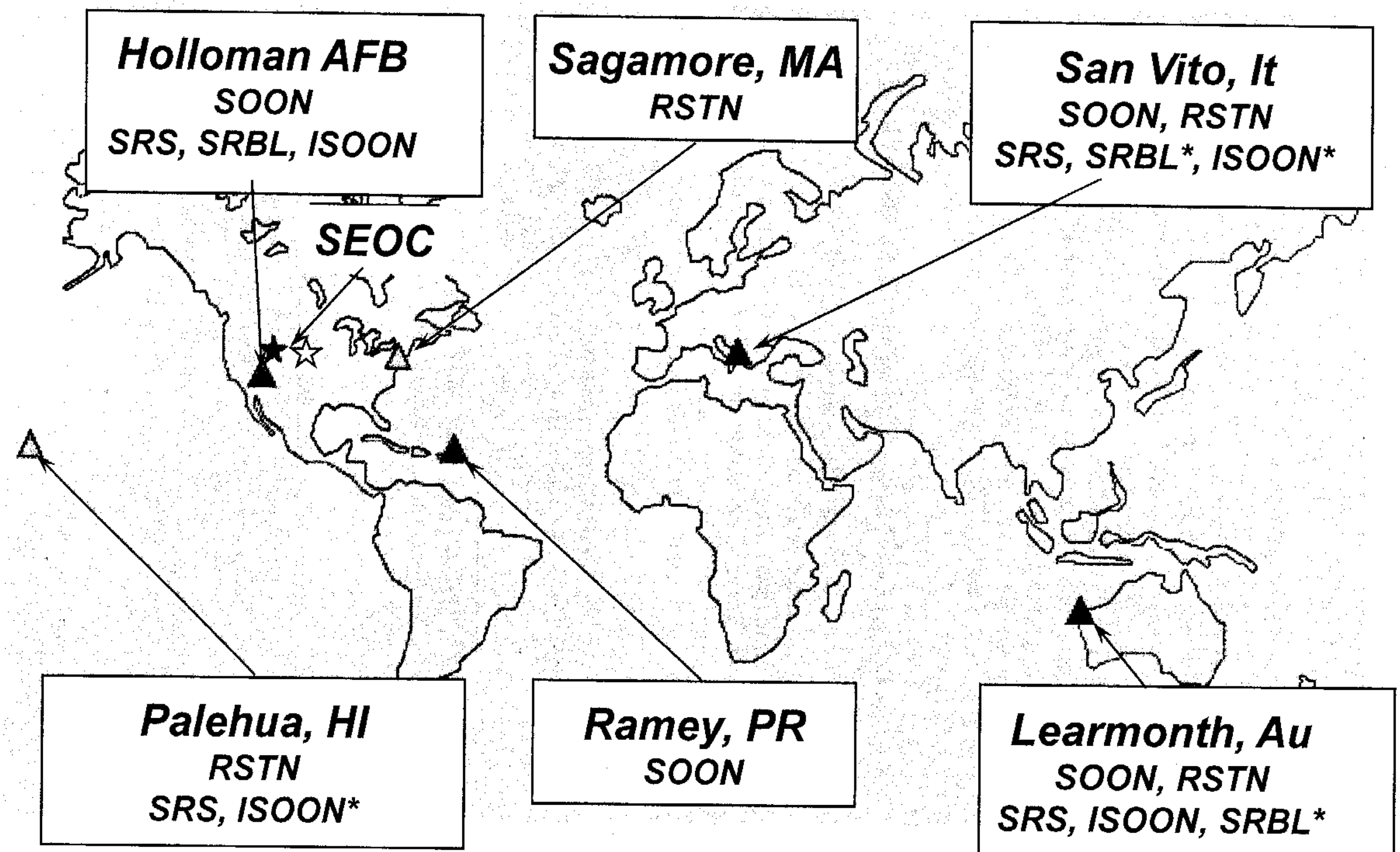


Illustration 6-6: SEON Sites

community, the Weather Agency's 50th Weather Squadron became Air Force Space Command's 55th Space Weather Squadron, with headquarters at Schriever AFB. In March 1997, SMC's DMSP program office inherited the responsibility for acquisition and development of new equipment to monitor the space environment from Air Force Materiel Command's Electronic Systems Division. Despite inadequate funding for the overall program known as the Space Environment Support System (SESS), the program office planned to upgrade the 55th Space Weather Squadron's Control Center with a modernized system known as the Space Weather Analysis and Forecast System (SWAFS). At the same time, it would upgrade and modify associated ground sensors and monitoring equipment for solar activity known collectively as Solar Electro-Optical Network (SEON). These modifications included a work station in the Control Center to monitor solar emissions known as the Solar Analyst Work Station (SAWS) and ground sensors to monitor solar activity. The ground sensors included a radio telescope called the Solar Radio Burst Locator (SRBL) to provide the location of solar radio bursts, an upgraded sensor called the Swept Frequency Interferometric Radiometer (SFIR), and a more advanced optical telescope system called the Improved Solar Observing Optical Network (ISOON). When combined, these upgraded sensors would replace the old sensor system known as the Radio Solar Telescope Network.[45]

However, these efforts were complicated by two external changes. One was a reduction in the budget for SESS caused, at least in part, by the cost of war efforts in Kosovo. The other was a decision—requested by the Air Force Weather Agency (AFWA) and endorsed by the Air Staff—to consolidate all space weather functions and terrestrial weather functions at AFWA's headquarters at Offutt AFB, Nebraska, beginning in 1999. The Air Staff's Program Action Directive 99-04, "Restructuring Space Environmental Support Operations," called for placing sustainment contracts for both CDFS (see preceding section) and SWAFS under the Air Force Weather Agency after the system's deployment, and the Air Force Weather Agency requested the transfer of all sustainment activity in a letter dated 2 October 2000. However, this schedule was gradually delayed by the difficulty of developing SWAFS at the Air Force Weather Agency's headquarters in time to allow it to take over the weather functions performed by the 55th Space Weather Squadron.[46]

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[45] HQ USAF/XOW, "Concept of Operations for Reengineered Air Force Weather," 20 April 1998 (HO archives); HQ USAF, "PMD 2326 (4)/PE0604707F/0305111F/ 0305117F, Program Management Direction for the Weather System (WXSYS)-IWSM," 6 October 1995 (Doc 6-29); Briefing Charts (FOUO—information used not FOUO), SMC/CI, "Space Environmental Support System (SESS)," Space Day Senior Management Review, 12 November 1997 (Doc 6-30); HQ USAF, "RDT&E Budget Item Justification Sheet: 0305111F Weather Service," February 1997, February 1998, February 1999, February 2000, June 2001 (HO archives); Memo (U), SAF/AQ to ESC/CC and SMC/CC, subj: "Air Force Weather Study," 2 April 1999 (Doc 6-33).

[46] Briefing Charts (U), SMC/CI, "Program Management Review: Defense Meteorological Satellite Program Office," 31 March 1998, 23 July 1998, 15 July 1999 (HO archives); SMC/CI, "SESS Monthly Acquisition Report," (FOUO—information used not FOUO)

SWAFS was being developed in three phases referred to as spirals. Each spiral was built up from a number of different capabilities called threads. Spiral 1, for example, would give AFWA an initial operational capability in space weather monitoring and analysis and would allow it take over the mission of the 55th Space Weather Squadron. Spiral 2 would consist of near term technology improvements, and Spiral 3 would consist of far term technology improvements. Spiral 1 would be completed in eight threads. Thread 1 was delivered in November 2000; threads 2 and 3 were delivered in March 2001; threads 4 through 8 had been scheduled for delivery near the end of FY 2001, but by then the delivery date had slipped to about April 2002, causing the initial operational capability for SWAFS (and the closure of the 55th Space Weather Squadron's facilities at Schriever AFB) to slip as well.[47]

## The National Polar-orbiting Operational Environmental Satellite System

The civilian space-based meteorological system was known as the Polar-orbiting Operational Environmental Satellite (POES) System. Its satellites were procured by the National Aeronautics and Space Administration (NASA) and operated by the National Oceanic and Atmospheric Administration (NOAA), an agency of the Department of Commerce. The DMSP satellites and the NOAA satellites were produced by the same contractor, and both were injected into low altitude polar orbits. Given the similarity between the two satellite systems, various government agencies from time to time had advocated merging the two meteorological systems into a single system that would serve both military and civilian users and would be less expensive to operate than two parallel systems. The idea of merging DMSP and POES took flight during FY 1993-1994 when both Congress and the White House began to advocate it simultaneously. In 1993, Congress had mandated studies of a combined system, and Vice President Al Gore had recommended consolidation of the military and civilian polar-orbiting remote sensing satellite systems in his "National Performance Review" calling for government efficiencies, issued in September 1993.[48]

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June 1999-March 2001 (Doc 6-31); Staff Summary Sheet (U), SMC/CI, "Commander's Action Item Suspense #11484, HQ USAF Program Action Directive (PAD) 99-04, Restructuring Space Environmental Support Operations," 10 September 1999, with attachments (Doc 6-32).

[47] SMC/CI, "SESS Monthly Acquisition Report," (FOUO—information used not FOUO) June 1999-March 2001 (Doc 6-31); Briefing Charts (U), SMC/CI, "Program Management Review: Defense Meteorological Satellite Program," 5 September 2001 (HO archives).

[48] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 96-97; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

On 5 May 1994, President William J. Clinton issued Presidential Decision Directive/NSTC-2 through the National Science and Technology Council. It ordered the convergence of the two systems under the management of an Integrated Program Office (IPO) to be created by a memorandum of understanding among DOD, NASA, and the Department of Commerce by 1 October 1994. The three agencies sketched out their planned sharing of roles and responsibilities in an "Implementation Plan for a Converged Polar-orbiting Environmental Satellite System," issued on 2 May 1994, and they signed a formal agreement on roles and responsibilities on 26 May 1995. All three agencies began to use the converged system in their budget requests for FY 1996.[49]

The IPO was officially established on 3 October 1994 in Silver Spring, Maryland, the location of NOAA's Satellite Operations Control Center. (See COMMAND AND CONTROL SEGMENT above.) Although the IPO's membership was drawn from all three agencies, as was the department-level executive committee for the converged system, the IPO reported directly to NOAA, which appointed the System Program Director, had overall responsibility for the converged system, and would also operate it. By design, therefore, the new system—soon named the National Polar-orbiting Operational Environmental Satellite System (NPOESS)—would have a predominantly civilian character.[50]

The NPOESS program planned to obtain 54 types of environmental data from the system. To generate the data, the NPOESS spacecraft would carry at least 14 major kinds of instruments. At least eight of these instruments would be new sensors (four of them considered critical) that would have to be developed for the program using major contracted efforts. The NPOESS IPO decided to manage seven of the sensor development efforts. NASA would manage the eighth. The major sensor efforts and the purposes of the instruments are listed in Table 6-7 below.

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[49] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 97; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

[50] History of SMC (FOUO—information used not FOUO), October 1994–September 1997, p. 98; Craig S. Nelson and John D. Cunningham (NPOESS IPO), "The National Polar-orbiting Operational Environmental Satellite System: Future U.S. Environmental Observing System," no date [2002], (Doc 6-40).

**Table 6-7[51]**
**Sensors Under Development for NPOESS Satellites**

| Sensors in Development | Purposes |
|---|---|
| Ozone Mapping and Profiler Suite (**OMPS**) | To collect data to permit the calculation of the vertical and horizontal distribution of ozone in the Earth's atmosphere. (Development managed by IPO) |
| Cross-track Infrared Sounder (**CrIS**) | To measure Earth's radiation to determine the vertical distribution of temperature, moisture, and pressure in the atmosphere. (Development managed by IPO) |
| Global Positioning System Occultation Sensor (**GPSOS**) | To measure the refraction of radiowave signals from GPS and Russia's Global Navigation Satellite System (GLONASS) to characterize the ionosphere. (Development managed by IPO) |
| Visible/Infrared Imager Radiometer Suite (**VIIRS**) | To collect visible and infrared radiometric data of the Earth's atmosphere, ocean, and land surfaces. Data types include atmospheric, clouds, Earth radiation budget, land/water and sea surface temperature, ocean color, and low light imagery. (Development managed by IPO) |
| Conical-scanning Microwave Imager Sounder (**CMIS**) | To collect global microwave radiometry and sounding data to produce microwave imagery and other meteorological and oceanographic data. (Development managed by IPO) |
| Space Environment Sensor Suite (**SESS**) | To collect data related to the neutral and charged particles, electron and magnetic fields, and optical signatures of aurora. (Development managed by IPO) |
| Aerosol Polarimeter Sensor (**APS**) | To retrieve specified aerosol and cloud parameters using multispectral photopolarimetry. The APS will need to simultaneously measure scene radiance in orthogonal polarizations over a range of viewing angles in order to make these retrievals. (Development managed by IPO) |
| Advanced Technology Microwave Sounder (**ATMS**) | In conjunction with CrIS, to conduct global observations of temperature and moisture profiles at high temporal resolution ~ daily. (Development managed by NASA) |

SMC remained closely involved in the new program and had the specific responsibility of carrying out major systems acquisitions, including launch vehicles. The program office merged its two existing contracts with RCA (FO4701-91-C-0066) and Lockheed (FO4701-91-C-0068) for concept studies of the now-superseded DMSP Block 6 into the NPOESS program's Phase 0 activities. On 10 March 1997, the NPOESS Executive Committee approved the program's acquisition strategy and major milestone

[51] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37); National Environmental Satellite, Data, and Information Service, "Sensor Summary," 12 November 2002, accessible at http://www.ipo.noaa.gov/Technology/sensors.html (Doc 6-38).

decision documents produced during Phase 0, thereby authorizing NPOESS to enter Phase I, Program Definition and Risk Reduction. SMC issued contracts on 31 July 1997 for preliminary design concepts for a new group of sensors for the NPOESS spacecraft, and those contracts are summarized in Table 6-8 below. Preliminary design reviews of the sensor efforts took place during the following months: CrIS in April 1999, OMPS in January 1999, GPSOS in November 1998, VIIRS in May 2000, and CMIS February 2001. Critical design reviews were scheduled for 2002-2004.[52]

**Table 6-8[53]**
**Phase I Development Contracts for NPOESS Sensors**

| Contract Number | Contractor | Efforts[54] | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|
| F04701-97-C-0028 | Hughes Santa Barbara Remote Sensing | NPOESS CrIS & VIIRS sensors | 30 Jul 97 | 30 Jun 00 | $36,772,433 |
| F04701-97-C-0029 | ITT Aerospace Communications Division | CrIS & VIIRS sensors | 30 Jul 97 | 30 Jun 00 | $35,740,180 |
| F04701-97-C-0032 | Ball Aerospace and Technologies Corporation | NPOESS OMPS & CMIS sensors | 30 Jul 97 | 28 Apr 00 | $35,509,941 |
| F04701-97-C-0033 | Hughes Space and Communications | NPOESS CMIS sensor | 30 Jul 97 | 28 Apr 00 | $32,000,000 |
| F04701-97-C-0034 | Orbital Sciences Sensor Systems Division | NPOESS OMPS sensor | 30 Jul 97 | 2 Sep 00 | $4,874,570 |
| F04701-97-C-0036 | Saab Ericsson Space (Sweden) | GPS Occultation Sensor (GPSOS) | 30 Jul 97 | 2 Jun 00 | $4,000,000 |

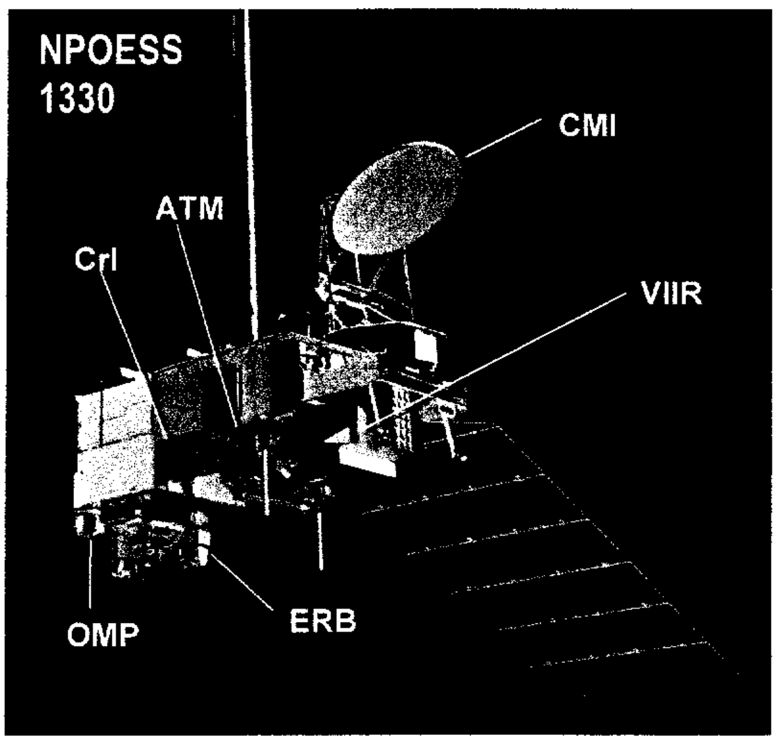
The joint agency planning for the evolution of NPOESS called for NOAA and DOD to continue launching the POES and DMSP spacecraft acquired under their existing contracts until they ran out. Each agency would continue to maintain two fully operational satellites in orbit until the European Organization for Exploitation of Meteorological Satellites (EUMETSAT) launched its new Metop satellite into a polar orbit in 2005. Presuming that EUMETSAT signed the final agreements for cooperation, the constellation would then consist of one Metop, one POES, and two DMSP satellites

[52] Briefing Charts (U), NOAA, et al., "National Polar-orbiting Operational Environmental Satellite System (NPOESS), The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39); History of SMC (FOUO—information used not FOUO), October 1994–September 1997, pp. 98-99.

[53] History of SMC (FOUO—information used not FOUO), October 1994 –September 1997, pp. 86-87; contract listings in appendices of SMC histories for 1991-1997.

[54] Acronyms: CMIS = Conical Microwave Image Sounder; OMPS = Ozone Mapping and Profiler Suite; CrIS = Cross-track Infrared Sounder; VIIRS = Visible/Infrared Imager Radiometer Suite; GPS = Global Positioning System.

Illustration 6-7 (top): Artist's Concept of NPOESS Satellite in Orbit
Illustration 6-8 (bottom): Locations of Sensors on NPOESS Satellite



for several years. After that, the newly developed NPOESS spacecraft would be launched beginning about 2009, and a fully operational NPOESS constellation would be in orbit by about 2013. The final NPOESS constellation would consist of three operational satellites in circular orbits of 833 kilometers at an inclination of 98.7 degrees. All of the satellites would be sun-synchronous, crossing the equator at the hours of 0530, 0930, and 1330 local time. However, the spacecraft would not have identical configurations. The early morning (0530) and afternoon (1330) NPOESS spacecraft would each have a full set of environmental sensors, but the mid-morning (0930) spacecraft, known as NPOESS Lite, would host only the most important sensors for national data requirements, such as the Visible/Infrared Imager Radiometer Suite (VIIRS) and the Conical-scanning Microwave Imager Sounder (CMIS).[55]

The Phase I sensor contracts described in Table 6-8 above were followed after about two years by Phase II sensor contracts under which a single contractor for each sensor would complete the follow-on development and fabrication of the first flight units. By the end of the period under consideration (FY 1998-2001), the final designs had been completed, and development of prototypes was well under way. Most of the Phase II sensor efforts were being conducted under contracts awarded by SMC and described in Table 6-9 below.[56]

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[55] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37).

[56] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounderAugust2002.html (Doc 6-37).

**Table 6-9[57]**
**Phase II Development Contracts for NPOESS Sensors**

| Contract Number | Contractor | Efforts[58] | Start Date | Completion Date | Value in 2002 |
|---|---|---|---|---|---|
| F04701-99-C-0044 | Ball Aerospace Corporation | NPOESS OMPS Phase II | 14 May 99 | 30 Sep 07 | $74.8M |
| F04701-99-C-0061 | ITT Corporation | NPOESS CrIS Phase II | 30 Aug 99 | 31 Aug 07 | $74.1M |
| F04701-99-C-0311 | SAAB Ericsson Space AB | NPOESS GPSOS Phase II | 27 Aug 99 | 31 Mar 03 | $6.7M |
| F04701-01-C-0500 | Raytheon Systems Company | NPOESS VIIRS Phase II | 20 Nov 00 | 30 Sep 07 | $297.6M |
| F04701-01-C-0502 | Boeing Satellite Systems, Incorporated | NPOESS CMIS Phase II | 30 Jul 01 | 30 Sep 07 | $298.0M |
| NASA Contract | Northrop Grumann | NPOESS ATMS | Dec 00 | Mar 07 | $206.6M |

In December 1999, the NPOESS program entered a new phase that it labeled Program Definition and Risk Reduction (PDRR). The vehicles for doing so were two competitive contracts for PDRR awarded to Lockheed Martin and TRW on 13 December 1999. Table 6-10 below contains additional information about the two contracts. During the next two years, the contractors were to define the system requirements for NPOESS, conduct system architecture trades, carry out the preliminary design of the four major NPOESS segments (the space segment; the command, control, and communications segment; the launch support segment, and the integrated data processing segment). Additionally, each contractor was to demonstrate its ability to provide the data processing segment in incremental builds. In the course of the efforts, each contractor would undergo system requirements reviews, system functional reviews, four ground demonstrations, and a priced, optional preliminary design review. At the end of this phase, the NPOESS IPO would select one of the two contractors for to carry out the next phase, known as Acquisition and Operations (A&O). During A&O, the winner would

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[57] Defenselink, "Contracts," 14 May 1999, 30 August 1999, 13 December 1999, 21 November 2000, 31 January 2001, accessible from http://www.defenselink.mil/news/; News Release, Boeing, "Boeing to Build Next-Generation Weather Instrument Under Potential $300 Million Contract," 31 July 2001, accessible at http://www.boeing.com/news/releases/2001/q3/nr_010731s.html; Briefing Charts (U), NPOESS IPO, , "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39); contract listings in Appendix G of this history.

[58] Acronyms: CMIS = Conical Microwave Image Sounder; OMPS = Ozone Mapping and Profiler Suite; CrIS = Cross-track Infrared Sounder; GPSOS = Global Positioning System Occultation Sensor; VIIRS = Visible/Infrared Imager Radiometer Suite.

exercise a high degree of trusted oversight in a contractual relationship that the IPO called Shared System Performance Responsibility.[59]

**Table 6-10[60]**
**NPOESS Program Definition and Risk Reduction Contracts**

| Contract Number | Contractor | Efforts[61] | Start Date | Completion Date | Value at Award |
|---|---|---|---|---|---|
| F04701-00-C-0500 | TRW Space and Defense Sector | NPOESS PDRR (+ System PDR) | 14 Dec 99 (31 Jan 01) | 30 Mar 02 (31 Dec 02) | $20,650,000 (+$25,600,000) |
| F04701-00-C-0501 | Lockheed Martin Corporation | NPOESS PDRR (+ System PDR) | 14 Dec 99 (31 Jan 01) | 30 Mar 02 (31 Dec 02) | $20,650,000 (+$25,600,000) |

The overall development would also include a separately contracted flight demonstration of the most critical new sensor technology for the purpose of risk reduction. The IPO planned to competitively select a contractor in 2002 to build a spacecraft for on-orbit testing of at least the VIIRS, CrIS, and ATMS sensors. The project and spacecraft were both referred to as the NPOESS Preparatory Project (NPP). The NPP would be launched in 2005.[62]

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[59] NPOESS IPO, "Program Definition and Risk Reduction," 22 July 2001, accessible at http://www.ipo. noaa.gov/prog_def.html (Doc 6-41); National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounder August2002.html (Doc 6-37); News Release, NOAA, "Contracts Awarded for Preliminary Design of Environmental Satellite System of the Future, NOAA Announces," 13 December 1999 (Doc 6-42); Briefing Charts (U), NPOESS IPO, "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39).

[60] Defenselink, "Contracts," 13 December 1999, accessible from http://www.defenselink.mil/news/; contract listings in Appendix G of this history.

[61] Acronyms: PDR = Preliminary Design Review; PDRR = Program Definition and Risk Reduction.

[62] National Environmental Satellite, Data, and Information Service, "NPOESS Background Detail," 12 August 2002, accessible at http://www.ipo.noaa.gov/About/backgrounder August2002.html (Doc 6-37); Briefing Charts (U), NPOESS IPO, "National Polar-orbiting Operational Environmental Satellite System (NPOESS): The Nation's Tri-Agency Environmental Satellite Program," 22 July 2002 (Doc 6-39).

# APPENDIX A

# LINEAGE AND HONORS

LINEAGE AND HONORS DATA

APPENDIX A-1

Unit Designation
Space and Missile Systems center (SMC)

Previous Designation
System Systems Division

Authority
Redesignated on Jul 92 per AFR 26-2, DAF/MO 162r ltr, Redesignation of Certain Air Force Systems Command Units, 23 August, 1991, and AFSC SO GA-12, 3 Apr 92

Higher Headquarters
Headquarters Air Force Materiel Command (AFMC)
(Reassigned on 1 Jul 92 per DAF/MO 338r, DAF/CS ltr, 5 Jun 92)

| Commander | |
|---|---|
| Maj Gen E. L .Tattini | 12 Aug 1998 – 25 May 2001 |
| Lt Gen Brian A. Arnold | 25 May 2001 - Present |

| Vice Commander | |
|---|---|
| Brig Gen M.A. Hamel | 20 Aug 1998-1 Jan 2000 |
| Brig Gen W.M. Wilson | 19 Aug 1999 - 19 Oct 2001 |
| Brig Gen Cooning | 20 Oct 2001- 23 Jun 2004 |

| Assigned Units | Symbol | Authority |
|---|---|---|
| Detachment 3 | Det 3 | 1 Oct 2001, Colorado Springs CO, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| Detachment 8 | Det 8 | 1 Oct 2001, Patrick AFB FL, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| Detachment 9 | Det 9 | 1 Oct 2001, Vandenberg AFB, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| Detachment 11 | Det 11 | 1 Oct 2001, Peterson CO, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| Detachment 12 | Det 12 | 1 Oct 2001, Kirtland AFB NM, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| 61st Air Base Group | 61 ABG | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| 61st Communications Squadron | 61st CS | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |

| Cont Assigned Units | Symbol | Authority |
|---|---|---|
| 61st Medical Squadron | 61st MS | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| 61st Mission Support Squadron | 61st MSS | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |
| 61st Security Forces Squadron | 61st SFS | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD-019, 22 Aug 01 |

Assigned Units Reassigned
Detachment 12 Kirtland AFB NM  Det 12

Assigned Units Lost
HQ 377th AB W  1 Oct 98  Kirtland AFB NM, AFI 38-101, GA-19, 17 Sept 98 (relieved)

Internal Reassignments
0L-AW00 to Det 12 realigned (L.B. Johnson Space Center)  29 May 01, Houston TX, AFI 38-101, GA-14, 29 May 01

Activated

| | |
|---|---|
| SMC Logistics | 1 Sept 04, Peterson AFB CO, DAF/DPM ltr 539s, 19 Aug 04, AFI 38-101, GD-001, 16 Nov 04 |
| HQ SMC-Loc A | 1 Sept 04, Peterson AFB CO, AFI 38-101, amended GD-001, 16 Nov 04 |
| SMC Center Log | 1 Sept 04, Schriever AFB CO, AFI 38-101, *amended* GD-001, 16 Nov 04 |
| Det 12 –A,HQ SMC | 1 Jul 03, Vandenberg AFB CA, AFI 38-101, GD-017, 27 Jun 03 |
| Det 3 HQ SMC-Loc | 20 Nov 02, Peterson AFB CO, AFI 38-101, GD003, 20 Nov 02 |
| Loc C Det 12 HQ SMC | 4 June 02, Camp Parks Communication Annex, Ca, AFI 38-101, GD-011, 3 June 02 |
| Loc D HQ SMC | 4 June 02, Hanscom AFB MA, AFI-38-101, GD-011, 3 June 02 |
| Loc E HQ AFSPC | 4 June 02, Moffett Field CA, AFI 38-101, GD-011, 3 June 02 |
| 61 SFS/SMC | 1 Jul 98, Los Angeles CA, DAF/XPM ltr 012s, 29 Jun 98 AFI 38-101, GA-7, 30 Jun 98 |
| Det 5 -Loc | 1 Jun 98, Peterson AFB, CO, AFI 38-101, GA-5, 30 Apr 98 (Electronic System Center) |
| Det 11 SMC | 1 Jun 98,Peterson AFB, AFI 38-101, GA-7, 30 April 98 |

Inactivated

| | |
|---|---|
| Loc HA, Det 11 HQ | 1 Sept 04, Schriever AFB CO, AFI 38-101, GD-001, 16 Nov 04 |
| Det 11 HQ SMCC | 1 Sept 04, Peterson AFB CO, AFI 38-101, GD-001, 16 Aug 04 |
| Loc C HQ AFSC | 13 Jun 03, Pentagon ADM Virginia, AFI 38-101, GD-016, 13 Jun 03 |
| Loc A HQ SMC | 13 Jun 03, Hill AFB UT, AFI 38-101, GD-016, 13 Jun 03 |
| Loc AH HQ SMC | 1 Jul 03, Huntsville City AL, AFI 38-101, GD-014, 23 May 03 |
| Det 3 HQ SMC-Loc | 20 Nov 02, Colorado Springs City CO, AFI 38-101, GD-003, 20 Nov 02 |
| HQ SMC-AFMC | 1 Oct 2001, El Segundo CA, DAF/XPM ltr 250s dtd 16 Aug 01, AFI 38-101, GD 019, 22 August 2001 *(relieved of assignment)* |

LINEAGE AND HONORS DATA

Station

Los Angeles Air Force Base, Los Angeles

Aircraft Flown

None

Decorations

**Advanced Systems Directorate** (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-121, 22 June 1999) for the period 1 May 1997 – 30 April 1999

**SMC Operating Location AW [Space Test Program, Space and Missile Test and Evaluation Directorate]** (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000)for the period 1 March 1998 – 29 February 2000

**Defense Meteorological Satellite SPO** (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000) for the period 1 January 1998 – 31 December 1999

**Military Satellite Communications Joint Program Office** (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-173, 29 February 2000) for the period 1 January 1999 – 31 December 1999

**61st Air Base Group** (Space and Missile Systems Center) Air Force Outstanding Unit Award (AFMCSO GB-164, 20 July 2000) for the period 1 January 1999 – 31 December 1999

**SMC Detachment 9 [Vandenberg AFB]** (Space and Missile Systems Center) Air Force Organizational Excellence Award (AFMCSO GB-134, 2002 for the period 1 October 1999 – 30 September 2001

Emblem:

Description: Azure, three bendlets couped or issuing from triangle in chief of the like voided of the field surmounted by an annulet of the second, all within a diminished bordure or.

SPACE AND MISSILE SYSTEMS CENTER

The SMC emblem represents the cooperation of science, industry, and the military in advancing the defense technology of the United States, and the role of the Center in unifying and directing this effort. It also symbolizes the major elements of the mission—space and missile booster power and satellites in orbit.

In the first symbolism, the diagonal lines represent the role of science, industry, and the military, respectively, in advancing defense technology, and the triangle depicts the function of the Center in directing and managing the work of these elements in the pursuit of desired military objectives. The circle surrounding the diagonal lines represents the total integrating role of the Center in planning, developing, and testing military systems, and in acquiring them for the national defense.

In the second symbolism, the triangle joined by the three lines symbolizes rocket booster power payloads as the basis for both space and ballistic missile systems, while the circle represents both satellites and their orbital traces.

# APPENDIX B

# ROSTER OF KEY PERSONNEL

| Org | Title | Position | Name | Begin Tenure | End Tenure |
|---|---|---|---|---|---|
| SMC/CC | Commander | Commander | Lt Gen Roger G. DeKok | 19-Aug-96 | 12-Aug-98 |
| SMC/CC | Commander | Commander | Maj Gen E.L. Tattini | 12-Aug-98 | 25-May-01 |
| SMC/CC | Commander | Commander | Lt Gen Brian A. Arnold | 25-May-01 | |
| CV | Vice Commander | Vice Commander | Brig Gen John L. Clay | 22-Jul-96 | 20-Aug-98 |
| CV | Vice Commander | Vice Commander | Brig Gen (Sel) M.A. Hamel | 20-Aug-98 | 1-Jan-00 |
| CV | Vice Commander | Vice Commander | Brig Gen W.M. Wilson | 1-Jan-00 | 20-Oct-01 |
| CV | Vice Commander | Vice Commander | Brig Gen Craig R. Cooning | 20-Oct-01 | |
| CD | Executive Director | Executive Director | Mr. William Maikisch | 7-Mar-94 | |
| TM | Airborne Laser System Program Office | System Program Director | Col Michael W. Booen | 8-Jan-97 | 1-Apr-00 |
| TM | Airborne Laser System Program Office | System Program Director | Col E. Pawlikowski | 1-Apr-00 | 12-Oct-01 |
| TM | Airborne Laser System Program Office | | | 12-Oct-01 | |
| MC | MILSATCOM JPO | System Program Director | Col Joseph B. Sovey | 30-Apr-96 | 1-Dec-98 |
| MC | MILSATCOM JPO | System Program Director | Brig Gen Craig R. Cooning | Dec 1998-Jan 2001 | 1-Jan-01 |
| MC | MILSATCOM JPO | System Program Director | Ms. Christine M. Anderson | 1-Jan-01 | |
| MT | Space Based Infrared Systems Program Office | Program Director | Col Daniel L. Burkett, II | 4-Jul-97 | 17-Apr-00 |
| MT | Space Based Infrared Systems Program Office | Program Director | Col Michael W. Booen | 17-Apr-00 | 1-Jun-01 |

| | | | | | |
|---|---|---|---|---|---|
| MT | Space Based Infrared Systems Program Office | Program Director | Col Mark S. Borkowski | 25-Jun-01 | |
| MV | Evolved Expendable Launch Vehicle Program Office | System Program Director | Col Richard W. McKinney | 1-Jul-95 | 7-May-99 |
| MV | Evolved Expendable Launch Vehicle Program Office | System Program Director | Col R.K. Saxer | 7-May-99 | |
| CL | Launch Programs | System Program Director | Col Jeffery J. Norton | 25-Jan-97 | 14-May-99 |
| CL | Launch Programs | System Program Director | Col M.J. Dunn | 14-May-99 | |
| BC | Small Business Office | Chief | Mr. Charles R. Willett | 1-Oct-93 | |
| HO | History Office | Chief | Dr. Harry N. Waldron | 1-Dec-95 | |
| IG | Inspector General | Chief | Lt Col Stephen Marchitelli | 3-Jul-95 | 1-Jul-99 |
| IG | Inspector General | Chief | Ms. D. Brown (Acting) | 1-Jul-99 | 1-Oct-99 |
| IG | Inspector General | Chief | Lt Col J. Woodcock | 1-Oct-99 | |
| IN | Intelligence Office | Chief | Lt Col John D. Davidson | 29-Apr-96 | 1-Jan-99 |
| IN | Intelligence Office | Chief | Maj L.J. Harambasic (Acting) | 1-Jan-99 | 1-Apr-99 |
| IN | Intelligence Office | Chief | Lt Col (Sel) J.L. Hollett | 1-Apr-99 | 1-Jul-01 |
| IN | Intelligence Office | Chief | Lt Col J.P. Johanson | 1-Jul-01 | |
| JA | Staff Judge Advocate | Chief | Col William M. Henabray | 1-Aug-95 | 1-Jul-98 |
| JA | Staff Judge Advocate | Chief | Col S.S. Bagley | 1-Jul-98 | |

| | | | | | |
|---|---|---|---|---|---|
| MQ | Manpower and Quality Office | Chief | Ms. Sandra C. Semrod | 25-Nov-96 | 1-Oct-00 |
| HR | Human Resources Office | Chief | Ms Sandra C. Semrod | 1-Oct-00 | |
| PA | Public Affairs Office | Chief | Maj Alton G. Cherney | 7-Jun-96 | 1-Jul-99 |
| PA | Public Affairs Office | Chief | Lt Col R. Potter | 1-Jul-99 | 1-May-01 |
| PA | Public Affairs Office | Chief | Lt Col (Sel) J.E. Cherry | 1-May-01 | |
| SE | Safety Office | Chief | Lt Col Homer L. Tackett | 1-Jun-96 | 1-Apr-00 |
| SE | Safety Office | Chief | Dr. L.C. Huang | 1-Apr-00 | 1-May-01 |
| SE | Safety Office | Chief | Mr. P. Rodriguez | 1-May-01 | |
| AX | Systems Acquisition | Director | Mr. Leslie L. Bordelon | 14-Jun-96 | 1-Oct-00 |
| AX | Systems Acquisition | Director | Col T.A. Fitzgerald (Acting) | 1-Oct-00 | 1-Jan-01 |
| AX | Systems Acquisition | Director | Ms. K.L. Gaskins | 1-Jan-01 | |
| FM | Comptroller | Director | Col Roy E. Smoker | 27-Sep-97 | 1-Jun-00 |
| FM | Comptroller | Director | Col Andrew E. Notestine III | 1-Jun-00 | |
| PK | Contracting | Director | Mr Milton C. Ross | 1-Oct-96 | 12-Aug-98 |
| PK | Contracting | Director | Col J.F. Thumser (Acting) | 12-Aug-98 | 1-Oct-98 |
| PK | Contracting | Director | Ms. P. Kirk-McAlpine | 1-Oct-98 | |
| TE | Space and Missile Test & Evaluation Directorate | Director | Col Craig S. Martin | 10-Mar-95 | 16-Jan-98 |

| | | | | | |
|---|---|---|---|---|---|
| TE | Space and Missile Test & Evaluation Directorate | Director | Col James E. Ford | 16-Jan-98 | 1-Jul-00 |
| TE | Space and Missile Test & Evaluation Directorate | Director | Col Ralph D. Monfort | 1-Jul-00 | 1-Jun-01 |
| XR | Developmental Planning | Director | Col Robert B. Preston | 3-Aug-96 | 1-Jun-98 |
| XR | Developmental Planning | Director | Col Robert S. Cox | 1-Jun-98 | 1-May-00 |
| XR | Developmental Planning | Director | Col William G. Gardner | 1-May-00 | |
| AD | Advanced Systems Directorate | System Program Director | Col Douglas L. Loverro | 24-Mar-97 | 1-Nov-99 |
| AD | Advanced Systems Directorate | System Program Director | Col E.T. Alexander, Jr. | 1-Nov-99 | |
| CI | Defense Meteorological Satellite SPO | System Program Director | Col Norton B. James, III | 18-Dec-95 | 1-Jan-98 |
| CI | Defense Meteorological Satellite SPO | System Program Director | Col J.A. Quirk | 1-Jan-98 | 30-Jun-00 |
| CI | Defense Meteorological Satellite SPO | System Program Director | Col R.T. Odle | 1-Jul-00 | |
| CW | Satellite & Launch Control SPO | System Program Director | Col Barry G. Morgan | 15-Aug-97 | 1-May-01 |
| CW | Satellite & Launch Control SPO | System Program Director | Col M. Mantz | 1-May-01 | |
| CZ | NAVSTAR Global Positioning System JPO | System Program Director | Col James B. Armor, Jr. | 26-Jul-96 | 1-Nov-99 |
| CZ | NAVSTAR Global Positioning System JPO | System Program Director | Col D. L. Loverro | 1-Nov-99 | |
| XP | Plans and Programs | Director | Col J.F. Thumser | 18-Jan-99 | 1-May-01 |

| | | | | | |
|---|---|---|---|---|---|
| XP | Plans and Programs | Director | Mr. E.M. Salem (Acting) | 1-May-01 | 1-Oct-01 |
| XP | Plans and Programs | Director | Col D.J. Murphy | 1-Oct-01 | |
| TL | Space Based Laser Project Office | Director | Col W.N. McCasland | 1-Jul-00 | 9-Aug-01 |
| TL | Space Based Laser Project Office | Director | Col I. Falto-Heck | 9-Aug-01 | |
| MT3 | SBIRS Low Program Office | SBIRS Program Manager | Col R.S. Weidenheimer | 1-Oct-01 | |
| LM | OO-ALC/LM ICBM System Program Office | System Program Director | Col R.P. Fisher | 1-Oct-01 | |
| ESC/NW | 2nd Space C2 System Program Office | System Program Director | Col J.T. Corley | 1-Oct-01 | |
| DS | Director of Staff | Director of Staff | Col D.J. Murphy | 1-Oct-01 | |
| 61 ABG/CC | 61 Air Base Group | Commander | Col Dieter Barnes | 12-Sep-97 | 18-Jun-99 |
| 61 ABG/CC | 61 Air Base Group | Commander | Col D.E. Price | 18-Jun-99 | 15-Sep-00 |
| 61 ABG/CC | 61 Air Base Group | Commander | Col P.W. Parker, Jr. | 15-Sep-00 | |
| 377 ABW | 377 Air Base Wing, Kirtland AFB, New Mexico | Commander | Col Gary D. Dills | 21-Nov-96 | |
| Det 2 | Det 2, Onuzuka AFS, California | Commander | Lt Col Randy T. Odle | 20-Jun-97 | |
| Det 8 | Det 8, Cape Canaveral AFS, Florida | Commander | Lt Col Mike J. Dunn | 10-Dec-96 | 1-Jul-98 |
| Det 8 | Det 8, Cape Canaveral AFS, Florida | Commander | Col G. Muntzner | 1-Jul-98 | 1-Aug-00 |
| Det 8 | Det 8, Cape Canaveral AFS, Florida | Commander | Col Michael T. Baker | 1-Aug-00 | |
| Det 9 | Det 9, Vandenberg AFB, California | Commander | Col John Pesapane | 6-Jun-96 | 19-Jun-98 |
| Det 9 | Det 9, Vandenberg AFB, California | Commander | Col (Sel) J.F. Wagner | 19-Jun-98 | |

| | | | | | |
|---|---|---|---|---|---|
| Det 11 | Det 11, Peterson AFB, Colorado | Commander | Col M.C. Dickerson | 1-Jul-98 | 21-Oct-98 |
| Det 11 | Det 11, Peterson AFB, Colorado | Commander | Col R.A. Hayes | 21-Oct-98 | 1-Jul-01 |
| Det 11 | Det 11, Peterson AFB, Colorado | Commander | Col L.M. Johnson | 1-Jul-01 | |
| Det 12 | Det 12, Kirtland AFB, New Mexico | Commander | Col James A. Neumeister | 29-Jun-01 | |
| 61 CS/CC | 61 Communications Squadron | Commander | Lt Col Mark D. Hall | 8-May-97 | |
| 61 MDS/CC | 61 Medical Squadron | Commander | Mr. Mark P. Wisniewski | 5-Oct-98 | |

# APPENDIX C

# PERSONNEL STATISTICS

| | | 18-Sep-98 | | | |
|---|---|---|---|---|---|
| | | CIV | ENL | OFF | Grand Total |
| | **SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND** | | | | |
| CC | Command Section (CC/CD) | 12 | 9 | 12 | 33 |
| | COMMAND SECTION TOTAL | 12 | 9 | 12 | 33 |
| | | | | | |
| | **SMC STAFF** | | | | |
| BC | Small Business Office | 4 | | | 4 |
| HO | History Office | 2 | | | 2 |
| IG | Inspector General | 1 | 2 | 2 | 5 |
| IN | Intelligence Office | 4 | 11 | 8 | 23 |
| JA | Staff Judge Advocate | 16 | 5 | 12 | 33 |
| MQ | Manpower and Quality | 14 | 4 | 3 | 21 |
| PA | Public Affairs Office | 7 | 2 | 4 | 13 |
| SE | Safety Office | | | 1 | 1 |
| SF | Security Forces | 88 | 15 | 1 | 104 |
| | SMC STAFF TOTAL | 136 | 39 | 31 | 206 |
| | | | | | |
| | **BASE OPERATING SUPPORT (BOS) ORGANIZATIONS** | | | | |
| | 61 Air Base Group | 66 | 55 | 16 | 137 |
| | 61 Communications Squadron | 43 | 53 | 15 | 111 |
| | 61 Medical Squadron | 16 | 83 | 28 | 127 |
| | 61 Mission Support Squadron | 57 | 40 | 10 | 107 |
| | BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL | 182 | 231 | 69 | 482 |
| | | | | | |
| | **SMC FUNCTIONAL ORGANIZATIONS** | | | | |
| AX | Systems Acquisition | 145 | 12 | 77 | 234 |
| FM | Comptroller | 164 | 32 | 90 | 286 |
| PK | Contracting | 186 | 14 | 71 | 271 |
| TBXM | Matrix | 2 | | 14 | 16 |
| XR | Developmental Planning | 30 | 8 | 77 | 115 |
| | SMC FUNCTIONAL ORGANIZATIONS TOTAL | 527 | 66 | 329 | 922 |
| | | | | | |
| | **PROGRAM OFFICES*** | | | | |
| AD | Advanced Systems Directorate | 15 | 5 | 26 | 46 |
| CI | Defense Meteorological Satellite SPO | 12 | 3 | 32 | 47 |
| CW | Satellite & Launch Control SPO | 17 | 5 | 79 | 101 |
| CZ | NAVSTAR Global Positioning System JPO | 30 | 5 | 78 | 113 |
| TE | Space and Missile Test & Evaluation Directorate | 2 | | 6 | 8 |
| | PROGRAM OFFICES TOTAL | 76 | 18 | 221 | 315 |
| | | | | | |
| | **PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS** | | | | |
| CL | Launch Programs | 17 | 9 | 82 | 108 |
| MC | MILSATCOM JPO | 20 | 5 | 80 | 105 |
| MT | Space Based Infrared Systems | 42 | 8 | 91 | 141 |
| MV | Evolved Expendable Launch Vehicle P | 5 | 2 | 26 | 33 |
| | PEO ORGANIZATIONS TOTAL | 84 | 24 | 279 | 387 |
| | | | | | |
| | **SMC OPERATING LOCATIONS (OIs)**** | | | | |
| | Arlington, VA (AX, CI, PK, TE, XR) | 3 | 1 | 6 | 10 |
| | Aurora City, CO (CW) | | | 1 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| | Buckley AGB, CO (MT) | | 2 | 4 | 6 |
| | Crystal City, VA (MC) | | | 2 | 2 |
| | Falcon AFS, CO (AD, AX, CW, CZ, TE) | 15 | 3 | 40 | 58 |
| | Huntsville, AL (TE, MT) | | | 2 | 2 |
| | Kirtland AFB, NM (AX, PK, TE, TM) | 89 | 32 | 128 | 249 |
| | LB Johnson Space Center, TX (TE) | 2 | | 8 | 10 |
| | Onizuka AFS, CA (CW) | 7 | 1 | 11 | 19 |
| | Unknown Exst. (AD) | 8 | 26 | 74 | 108 |
| | Washington, DC (QP) | | | 10 | 10 |
| | SMC OPERATING LOCATIONS TOTAL | 124 | 65 | 286 | 475 |
| | | | | | |
| | **SMC DETACHMENTS** | | | | |
| DET 8 | Cape Canaveral AFS, FL (AX, CC, CL, CW, CZ, PK) | 37 | 5 | 25 | 67 |
| DET 9 | Vandenberg AFB, CA (CC, CL, CW, PK, TE) | 53 | 23 | 36 | 112 |
| DET11 | Peterson AFB, CO (AP, AX, CC, CI, CW, CZ, MT, PK, RM, SD) | 139 | 38 | 41 | 218 |
| | SMC DETACHMENTS TOTAL | 229 | 66 | 102 | 397 |
| | | | | | |
| | **377 AIR BASE WING (ABW) ORGANIZATIONS** | | | | |
| | HQ 377 ABW, Kirtland AFB, NM | 92 | 66 | 30 | 188 |
| | Comptroller Squadron | 20 | 38 | 4 | 62 |
| | Medical Group | 76 | 277 | 113 | 466 |
| | Logistics | 182 | 1 | 2 | 185 |
| | Transportation Squadron | 49 | 113 | 2 | 164 |
| | Support Group | 1 | 1 | 3 | 5 |
| | Mission Support Group | 61 | 56 | 4 | 121 |
| | Communications Squadron | 89 | 142 | 3 | 234 |
| | Services Squadron | 82 | 55 | 2 | 139 |
| | Security Police Squadron | 6 | 347 | 7 | 360 |
| | Civil Engineering Squadron | 318 | 181 | 5 | 504 |
| | 896 Munitions Squadron, Nellis AFB, NV | 3 | 97 | 3 | 103 |
| | 898 Munitions Squadron, Kirtland AFB, NM | 12 | 140 | 4 | 156 |
| | 377 ABW ORGANIZATIONS TOTAL | 991 | 1514 | 182 | 2687 |
| | | | | | |
| | SMC GRAND TOTAL | 2361 | 2032 | 1511 | 5904 |

* The proper nomenclature is not known

** The list of OL may include Phillips Laboratory locations (data did not specify)

| | | 31-Jul-99 | | | |
|---|---|---|---|---|---|
| | | CIV | ENL | OFF | Grand Total |
| | **SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND** | | | | |
| CC | Command Section (CC/CV) | 11 | 11 | 13 | 35 |
| | COMMAND SECTION TOTAL | 11 | 11 | 13 | 35 |
| | | | | | |
| | **SMC STAFF** | | | | |
| BC | Small Business Office | 4 | | | 4 |
| HO | History Office | 3 | | | 3 |
| IG | Inspector General | 2 | 1 | 2 | 5 |
| IN | Intelligence Office | 4 | 11 | 9 | 24 |
| JA | Staff Judge Advocate | 16 | 5 | 12 | 33 |
| PA | Public Affairs Office | 7 | 3 | 4 | 14 |
| SE | Safety Office | | | 1 | 1 |
| XP | Plans and Programs | 18 | 6 | 11 | 35 |
| | SMC STAFF TOTAL | 54 | 26 | 39 | 119 |
| | | | | | |
| | **BASE OPERATING SUPPORT (BOS) ORGANIZATIONS** | | | | |
| | 61 Air Base Group | 66 | 52 | 17 | 135 |
| | 61 Communications Squadron | 57 | 51 | 15 | 123 |
| | 61 Medical Squadron | 16 | 83 | 28 | 127 |
| | 61 Mission Support Squadron | 59 | 36 | 10 | 105 |
| | 61 Security Forces Squadron | 88 | 7 | 1 | 96 |
| | BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL | 286 | 229 | 71 | 586 |
| | | | | | |
| | **SMC FUNCTIONAL ORGANIZATIONS** | | | | |
| AX | Systems Acquisition | 158 | 11 | 74 | 243 |
| FM | Comptroller | 163 | 32 | 85 | 280 |
| PK | Contracting | 195 | 14 | 62 | 271 |
| TBXM | Matrix | | 3 | 2 | 5 |
| XR | Developmental Planning | 22 | 8 | 67 | 97 |
| | SMC FUNCTIONAL ORGANIZATIONS TOTAL | 538 | 68 | 290 | 896 |
| | | | | | |
| | **PROGRAM OFFICES*** | | | | |
| AD | Advanced Systems Directorate | 16 | 5 | 27 | 48 |
| CI | Defense Meteorological Satellite SPO | 12 | 3 | 30 | 45 |
| CL | Launch Programs | 15 | 9 | 72 | 96 |
| CW | Satellite & Launch Control SPO | 17 | 5 | 79 | 101 |
| TE | Space and Missile Test & Evaluation Directorate | 2 | | 6 | 8 |
| | PROGRAM OFFICES TOTAL | 62 | 22 | 214 | 298 |
| | | | | | |
| | **PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS** | | | | |
| CZ | NAVSTAR Global Positioning System JPO | 33 | 5 | 78 | 116 |
| MC | MILSATCOM JPO | 20 | 5 | 80 | 105 |
| MT | Space Based Infrared Systems | 41 | 8 | 88 | 137 |
| MV | Evolved Expendable Launch Vehicle Program Office | 6 | 2 | 26 | 34 |
| | PEO ORGANIZATIONS TOTAL | 100 | 20 | 272 | 392 |
| | | | | | |
| | **SMC OPERATING LOCATIONS (OIs)**** | | | | |
| | Aurora City, CO (CW) | | | 1 | 1 |
| | Buckley AGB, CO (MT) | | 2 | 4 | 6 |

| | | | | | |
|---|---|---|---|---|---|
| | Crystal City, VA (MC) | | | 2 | 2 |
| | Holloman AFB, NM (CI) | | 1 | | 1 |
| | Huntsville, AL (TE, MT) | | | 2 | 2 |
| | Kirtland AFB, NM (AX, PK, TE, TM) | 89 | 32 | 129 | 250 |
| | LB Johnson Space Center, TX (TE) | 2 | 1 | 6 | 9 |
| | Onizuka AFS, CA (CW) | 6 | 1 | 8 | 15 |
| | Pentagon, DC (CI, MT, PK, TE, TR, XR) | 2 | 1 | 7 | 10 |
| | Schriever, CO (AD, AX, CW, CZ, TE) | 15 | 5 | 40 | 60 |
| | Unknown Exst. (AD) | 9 | 26 | 74 | 109 |
| | Washington, DC (QP) | | | 10 | 10 |
| | SMC OPERATING LOCATIONS TOTAL | 123 | 69 | 283 | 475 |
| | | | | | |
| | **SMC DETACHMENTS** | | | | |
| DET 8 | Cape Canaveral AFS, FL (AX, CC, CL, CW, CZ, PK) | 33 | 6 | 24 | 63 |
| DET 9 | Vandenberg AFB, CA (AX, CC, CL, CW, PK, TE) | 49 | 23 | 36 | 108 |
| DET11 | Peterson AFB, CO (AP, AX, CC, CI, CW, CZ, FM, MC, MT, PK, RM) | 207 | 61 | 43 | 311 |
| | SMC DETACHMENTS TOTAL | 289 | 90 | 103 | 482 |
| | | | | | |
| | SMC Grand TOTAL*** | 1463 | 535 | 1285 | 3283 |

* The proper nomenclature has not been verified

** The list of OL may include Phillips Laboratory locations (data did not specify)

| | | EOM Sep 00 | | | |
|---|---|---|---|---|---|
| | | CIV | ENL | OFF | Grand Total |
| | **SPACE & MISSILE SYSTEMS CENTER (SMC) COMMAND** | | | | |
| CC | Command Section (CC/CV) | 11 | 11 | 13 | 35 |
| | COMMAND SECTION TOTAL | 11 | 11 | 13 | 35 |
| | | | | | |
| | **SMC STAFF** | | | | |
| BC | Small Business Office | 4 | | | 4 |
| HO | History Office | 3 | | | 3 |
| HR | Human Resources | 3 | 1 | | 4 |
| IG | Inspector General | 2 | 1 | 2 | 5 |
| IN | Intelligence Office | 4 | 10 | 9 | 23 |
| JA | Staff Judge Advocate | 17 | 5 | 12 | 34 |
| PA | Public Affairs Office | 9 | 3 | 4 | 16 |
| SE | Safety Office | | | 1 | 1 |
| XP | Plans and Programs | 16 | 5 | 12 | 33 |
| | SMC STAFF TOTAL | 58 | 25 | 40 | 123 |
| | | | | | |
| | **BASE OPERATING SUPPORT (BOS) ORGANIZATIONS** | | | | |
| | 61 Air Base Group (TB +2 CIV) | 67 | 46 | 21 | 134 |
| | 61 Communications Squadron | 69 | 3 | 2 | 74 |
| | 61 Medical Squadron | 15 | 76 | 34 | 125 |
| | 61 Mission Support Squadron | 59 | 36 | 10 | 105 |
| | 61 Security Forces Squadron | 106 | 9 | 2 | 117 |
| | BASE OPERATING SUPPORT (BOS) ORGANIZATIONS TOTAL | 316 | 170 | 69 | 555 |
| | | | | | |
| | **SMC FUNCTIONAL ORGANIZATIONS** | | | | |
| AX | Systems Acquisition | 164 | 9 | 116 | 289 |
| FM | Comptroller | 169 | 26 | 82 | 277 |
| PK | Contracting | 207 | 4 | 61 | 272 |
| TBXM | Matrix | | | 10 | 10 |
| XR | Developmental Planning | 27 | 8 | 61 | 96 |
| | SMC FUNCTIONAL ORGANIZATIONS TOTAL | 567 | 47 | 330 | 944 |
| | | | | | |
| | **PROGRAM OFFICES*** | | | | |
| AD | Advanced Systems Directorate | 3 | 6 | 16 | 25 |
| CI | Defense Meteorological Satellite SPO | 12 | 3 | 28 | 43 |
| CL | Launch Programs | 12 | 9 | 76 | 97 |
| CW | Satellite & Launch Control SPO | 17 | 5 | 79 | 101 |
| TE | Space and Missile Test & Evaluation Directorate | 2 | | 6 | 8 |
| | PROGRAM OFFICES TOTAL | 46 | 23 | 205 | 274 |
| | | | | | |
| | **PROGRAM EXECUTIVE OFFICER (PEO) ORGANIZATIONS** | | | | |
| CZ | NAVSTAR Global Positioning System JPO | 33 | 3 | 97 | 133 |
| MC | MILSATCOM JPO | 19 | 4 | 81 | 104 |
| MT | Space Based Infrared Systems Program Office | 39 | 6 | 95 | 140 |
| MV | Evolved Expendable Launch Vehicle Program Office | 5 | 2 | 26 | 33 |
| | PEO ORGANIZATIONS TOTAL | 96 | 15 | 299 | 410 |
| | | | | | |
| | **SMC OPERATING LOCATIONS (Ols)**** | | | | |
| | Aurora City, CO (CL, CW) | | | 2 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| | Buckley AGB, CO (MT, AX) | 2 | 2 | 6 | 10 |
| | Crystal City, VA (MC) | 1 | | 2 | 3 |
| | Edwards AFB, CA (TM) | | | 1 | 1 |
| | Huntsville, AL (TE, MT) | | | 3 | 3 |
| | Kirtland AFB, NM (AX, PK, TE, TL, TM) | 90 | 31 | 135 | 256 |
| | LB Johnson Space Center, TX (TE) | 2 | 1 | 6 | 9 |
| | Onizuka AFS, CA (CW) | 5 | 1 | 8 | 14 |
| | Patrick AFB, FL (AX, CW) | 26 | | 8 | 34 |
| | Pentagon, DC (CI, MT, PK, TE, TR, XR) | 1 | 1 | 10 | 12 |
| | Schriever, CO (CZ, RM, TE) | 5 | | 7 | 12 |
| | Unknown Exst. (AD) | 14 | 26 | 76 | 116 |
| | Washington, DC (QP) | | | 10 | 10 |
| | SMC OPERATING LOCATIONS TOTAL | 143 | 60 | 260 | 463 |
| | | | | | |
| | **SMC DETACHMENTS** | | | | |
| DET 8 | Cape Canaveral AFS, FL (AX, CC, CL, CZ) | 4 | 6 | 29 | 39 |
| DET 9 | Vandenberg AFB, CA (AX, CC, CL, CW, TE) | 46 | 23 | 44 | 113 |
| DET11 | Peterson AFB, CO (AD, AP, AX, CC, CI, CW, CZ, FM, MC, MT, PK, RM, XR) | 217 | 63 | 63 | 343 |
| | SMC DETACHMENTS TOTAL | 267 | 92 | 136 | 495 |

SMC GRAND TOTAL 1504 443 1352 3299

* The proper nomenclature has not been verified

** The list of OL may include Phillips Laboratory locations (data did not specify)

# APPENDIX D

# ORGANIZATIONAL CHARTS

SMCVA 23-4

# SPACE & MISSILE SYSTEMS CENTER DIRECTORY
JULY 2001

## COMMANDER
LT GEN B. A. ARNOLD
CC 31971
LT COL P.T. SMITH
EXEC OFF

**COMMAND CHIEF MASTER SERGEANT**
CMSGT D. C. CLEVELAND
CCC 31653

**EQUAL EMPLOYMENT OPPORTUNITY OFFICE**
MR. L. M. GONZALES
CCD 31565

**MOBILIZATION ASST**
BRIG GEN T. D. TAVERNEY
CCR 31434

**RESERVE AFFAIRS**
MS. L. M. MONEY
CCV 32470

**VICE COMMANDER**
BRIG GEN W. M. WILSON
CV 31772
CAPT M. A. VOGEL
EXEC OFF

**EXECUTIVE DIRECTOR**
MR. W. MAIKISCH
CD 31134

**PROGRAM EXECUTIVE OFFICER (WEAPONS)**
MR. J. G. DIAMOND
AFPEO/WP DSN 425-1292

**AIRBORNE LASER SYSTEM PROGRAM OFFICE**
COL E. PAWLIKOWSKI
SYSTEM PROGRAM DIRECTOR
TM DSN 246-2102
DEPUTY DIRECTOR
LT COL J. A. FORREST

**PROGRAM EXECUTIVE OFFICER (SPACE)**
BRIG GEN C. R. COONING
AFPEO/SP 33565

**NAVSTAR GLOBAL POSITIONING SYSTEM JPO**
COL D. L. LOVERRO
SYSTEM PROGRAM DIRECTOR
CZ 31576
ACTING DEPUTY DIRECTOR
COL W. A. BALLENGER, JR.

**MILSATCOM JPO**
MS. C. M. ANDERSON
SYSTEM PROGRAM DIRECTOR
MC 336-4879
DEPUTY DIRECTOR
MR. P. J. DEVINE

**SPACE BASED INFRARED SYSTEMS PROGRAM OFFICE**
COL M. S. BORKOWSKI
SYSTEM PROGRAM DIRECTOR
MT 31807
DEPUTY DIRECTOR
COL C.O. CORNELL

**EVOLVED EXPENDABLE LAUNCH VEHICLE PROGRAM OFFICE**
COL R. K. SAXER
SYSTEM PROGRAM DIRECTOR
MV 336-4614
DEPUTY DIRECTOR
COL S. K. MASHIKO

**SMALL BUSINESS OFFICE**
MR. C. R. WILLETT
CHIEF
BC 32655

**HISTORY OFFICE**
DR. H. N. WALDRON
CHIEF
HO 32136

**HUMAN RESOURCES OFFICE**
MS. S. C. SEMROD
CHIEF
HR 30375

**INSPECTOR GENERAL OFFICE**
LT COL J. WOODCOCK
INSPECTOR GENERAL
IG 30602

**INTELLIGENCE OFFICE**
LT COL J. P. JOHANSON
CHIEF
IN 30316

**OFFICE OF THE STAFF JUDGE ADVOCATE**
COL S. S. BAGLEY
STAFF JUDGE ADVOCATE
JA 31272

**PUBLIC AFFAIRS OFFICE**
LT COL J. E. CHERRY
PA CHIEF 30030

**SAFETY OFFICE**
MR. P. RODRIGUTZ
SE CHIEF 36436

**SYSTEMS ACQUISITION**
MS. K. L. GASKINS
DIRECTOR
AX 33816
DEPUTY DIRECTOR
VACANT

**COMPTROLLER**
COL A.E. NOTESTINE III
DIRECTOR
FM 30183
DEPUTY DIRECTOR
MR. K. L. YODER

**CONTRACTING**
MS. P. KIRK-McALPINE
DIRECTOR
PK 30887
DEPUTY DIRECTOR
COL D. J. MURPHY

**PLANS AND PROGRAMS**
MR. E. M. SALEM
ACTING DIRECTOR
XP 33571
ACTING DEPUTY DIRECTOR
MS. S. C. SEMROD

**DEVELOPMENTAL PLANNING**
COL W.G. GARDNER
DIRECTOR
XR 35440
DEPUTY DIRECTOR
MR. T. J. JAGGERS

**ADVANCED SYSTEMS DIRECTORATE**
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SMCVA 23-4

# SPACE & MISSILE SYSTEMS CENTER DIRECTORY
# JANUARY 1998

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EXEC OFF

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CV 31722
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CCC 31653

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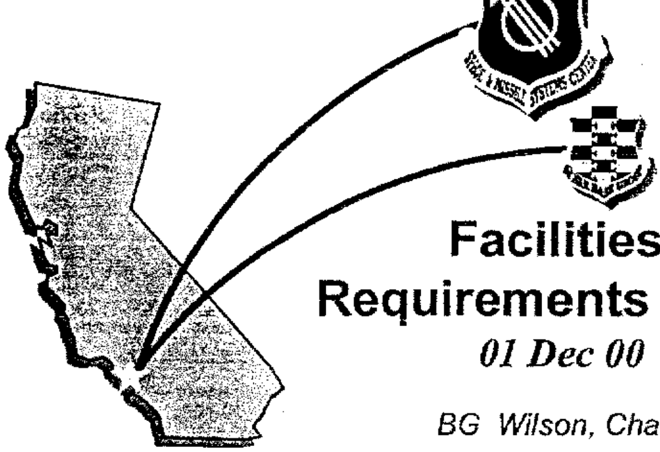
# APPENDIX E

# CIVIL ENGINEERING CONSTRUCTION PROJECTS

# *SMC Facilities Requirements Board - 01 Dec 00*

Team SMC



## Facilities Requirements Board

*01 Dec 00*

*BG Wilson, Chair*

As of: 01 Dec 00



## Overview

- FRG Action Items
- FY 98 Program Execution
- FY 99 Program Execution
- FY 00 Program Execution
- FY 01 Program Priorities
- Demolition Program
- MILCON Update
- Base Energy Program
- Space Allocation
- Single Facility/Building Manager

As of: 01 Dec 00

# SMC Facilities Requirements Board - 01 Dec 00

## FY98 RPMC Program

| PROJ NUM | PROJ TITLE | | ($000) | USER | START DATE | STATUS CONST |
|---|---|---|---|---|---|---|
| ~~ACJP990201A~~ | ~~Renovate ABG/CC Office, Add Office, B219~~ | ~~$~~ | ~~15.3~~ | ~~CC~~ | ~~27-Mar-00~~ | ~~Complete~~ |
| ACJP970020 | Install Heating System, B219 | $ | 300.0 | CE | 24-Oct-98 | 81% |
| HHEK998401 | North Perimeter Wall, Ft Mac | $ | 292.2 | CE | 30-Oct-00 | 0% |
| | Total | $ | 607.5 | | | |

As of: 01 Dec 00



## FY 99 Program

# *SMC Facilities Requirements Board - 01 Dec 00*

## FY01 Project Funding Strategy

- **RPMC**
  - Maintain Service Systems and Equipment
    - FY00 HVAC
    - FY01 Electric & Duct Cleaning
  - Facilities Programmed for Replacement by SAMS or MILCON
    - Maintenance only
    - Projects reprogrammed to FY02
- **MFH**
  - FY04 Whole House Improvement MILCON
  - FY01 - FY03 Infrastructure Upgrades
    - Pavements
    - Utilities
  - Necessary repairs required to maintain homes
    - Waterlines
    - Carpet
    - Minimal Upgrades (Units that can't wait to FY04)

# SMC Facilities Requirements Board - 01 Dec 00

## FY01 Funding Strategy

- **Preventive Maintenance (PML)**
  - Justified work to prevent future failure OR major repairs
- **Critical (CRI)**
  - SIGNIFICANT loss of mission capability OR frequent mission interruptions AND continuous work-around.
  - Minor Construction not considered CRITICAL
- **Next FY Design Requirements**
- **Base Special Interest (BSI)**
  - Limited to 10% of remaining funding
- **Command Special Interest**
- **Degraded (DEG)**
  - LIMITED loss of mission capability OR occasional mission interruptions AND work-around required often.
- **Minimal (MIN)**
  - MARGINAL or no adverse mission impact AND work-around seldom required.

As of: 01 Dec 00



## FY 00 RPMC Program

| PRI | PROJ NUM | PROJECT TITLE | | ($000) | USER | FIM | MA | START DATE | STATUS CONST |
|---|---|---|---|---|---|---|---|---|---|
| | ***HHEK005201*** | ***Paint Exterior, B50*** | ***$*** | ***22.1*** | ***SV*** | ***PML*** | ***CS*** | ***Mar 01*** | ***0%*** |
| | ***ACJP001202*** | ***Install Trees, Gate 5*** | ***$*** | ***72.0*** | ***CE*** | ***MIN*** | ***BS*** | ***Jun 01*** | ***0%*** |
| | ***ACJP001203*** | ***Install Landscaping Area B Perimeter*** | ***$*** | ***20.0*** | ***CE*** | ***MIN*** | ***BS*** | ***May 01*** | ***0%*** |
| | ***ACJP011022B*** | ***Repair Circuit Breakers, Area B*** | ***$*** | ***204.5*** | ***CE*** | ***DEG*** | ***BS*** | ***Jan 01*** | ***0%*** |
| | ACJP001227A | Area B South Wall, Part A | $ | 274.3 | CE | MIN | MS | N/A | Move to FY01-FP |
| | ACJP001227B | Area B South Wall, Part B | $ | 198.8 | CE | MIN | MS | N/A | Move to FY01-FP |
| | ACJP001227C | Area B South Wall, Part C | $ | 26.1 | CE | MIN | MS | N/A | Move to FY01-FP |
| | ACJP001218 | Replace Carpet, B105, Room 4030 (PA) | $ | 39.0 | PA | MIN | PM | N/A | Move to FY01 |
| | ACJP001107 | Gym Locker Room Carpet, B242 | $ | 12.0 | SV | MIN | BS | N/A | CANX |
| | ACJP001208 | Gym Floor Carpet, B242 | $ | 42.0 | SV | MIN | BS | N/A | CANX |
| ***1*** | ***ACJP009712*** | ***Pave Areas, Propane Tank, B251*** | ***$*** | ***20.0*** | ***CE*** | ***DEG*** | ***BS*** | ***13 Nov 00*** | ***50%*** |
| ***2*** | ***ACJP002675*** | ***Replace Heat Floor 2, 3, 4 & 5, B105*** | ***$*** | ***46.8*** | ***CE*** | ***DEG*** | ***PM*** | ***Dec 00*** | ***0%*** |
| ~~***3***~~ | ~~***ACJP011142***~~ | ~~***Repair North Perimeter Fence, Area A***~~ | ~~***$***~~ | ~~***55.0***~~ | ~~***CE***~~ | ~~***DEG***~~ | ~~***MS***~~ | ~~***22 May 00***~~ | ~~***100%***~~ |
| ***4*** | ***ACJP998218*** | ***Install Window Screens, B242*** | ***$*** | ***27.9*** | ***SV*** | ***MIN*** | ***BS*** | ***13 Nov 00*** | ***20%*** |
| ~~***5***~~ | ~~***ACJP001311***~~ | ~~***Replace Trap Primers, Area A***~~ | ~~***$***~~ | ~~***50.0***~~ | ~~***CE***~~ | ~~***PML***~~ | ~~***BS***~~ | ~~***18 Sep 00***~~ | ~~***100%***~~ |

Note. Bold and Italicized Projects have been funded

As of: 01 Dec 00

# *SMC Facilities Requirements Board - 01 Dec 00*

## FY 00 RPMC Program

| PRI | PROJ NUM | PROJECT TITLE | | ($000) | USER | FIM | MA | START DATE | STATUS CONST |
|---|---|---|---|---|---|---|---|---|---|
| 38 | ACJP002275 | Install Seismic Ceiling Bracing | $ | 500.0 | CE | DEG | BS | N/A | Move to FY02 |
| ***39*** | ***ACJP990902*** | ***Replace Gazebo, Area A Mall*** | ***$*** | ***13.0*** | ***CCC*** | ***MIN*** | ***BS*** | ***Jan 01*** | ***0%*** |
| 40 | ACJP009922 | Replace Zone Controls, B105 | $ | 26.6 | CE | DEG | PM | N/A | Move to FY02 |
| 41 | ACJP001117 | Repair Roof Air Handlers, B130 | $ | 100.0 | CE | DEG | BS | N/A | Move to FY02 |
| 42 | ACJP001792 | Replace Dampers, B130 | $ | 150.0 | CE | DEG | BS | N/A | Move to FY02 |
| 43 | ACJP001101 | Replace Dampers, B125 | $ | 150.0 | CE | DEG | PM | N/A | Move to FY02 |
| 44 | ACJP001872 | Replace Dampers, B115 | $ | 150.0 | CE | DEG | PM | N/A | Move to FY02 |
| 45 | ACJP009852 | Replace Dampers, B110 | $ | 50.0 | CE | DEG | PM | N/A | Move to FY02 |
| 46 | ACJP001812 | Repair Basement HVAC, B120 | $ | 150.0 | CE | DEG | PM | N/A | Move to FY02 |
| 47 | ACJP001892 | Repair HVAC Controls, B219 | $ | 250.0 | CE | DEG | BS | N/A | Move to FY02 |
| 48 | ACJP001912 | Repair HVAC Controls, B100 | $ | 250.0 | CE | DEG | PM | N/A | Move to FY02 |
| 49 | ACJP001932 | Repair HVAC Controls, B105 | $ | 250.0 | CE | DEG | PM | N/A | Move to FY02 |
| 50 | ACJP001143 | Install AC in Room, B105, Command Post | $ | 30.0 | CE | DEG | PM | N/A | Move to FY01 |
| 51 | ACJP001169 | PK Office Renovation, B110 | $ | 5.0 | PK | DEG | PM | N/A | Move to FY02 |
| 52 | ACJP002174 | Pave Area, B220 | $ | 18.0 | CE | MIN | BS | N/A | CANX |
| 53 | ACJP011535 | Install Curbs & Gutters, Area B | $ | 154.0 | CE | MIN | BS | N/A | Move to FY01 |
| | | TOTAL | $ | 6,708.6 | | | | | |

Note: 1. Bold and Italicized Projects have been funded

As of: 01 Dec 00

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## FY 00 QOL Program

| PRI | PROJ NUM | PROJECT TITLE | | ($000) | FIM | MA | START DATE | STATUS CONST |
|---|---|---|---|---|---|---|---|---|
| | ***ACJP990801*** | ***Construct Mini Park, B220*** | ***$*** | ***37.2*** | ***MIN*** | ***BS*** | ***Jan 01*** | ***0%*** |
| ***1*** | ***HHEK970023A*** | ***Repair Structure, Youth Cent, B425*** | ***$*** | ***1,084.0*** | ***DEG*** | ***CS*** | ***7 Aug 00*** | ***35%*** |
| ***3*** | ***ACJP998214A*** | ***Renovate Rec Equip Rental, B242*** | ***$*** | ***32.0*** | ***MIN*** | ***CS*** | ***14 Aug 00*** | ***95%*** |
| ***4*** | ***HHEK001253*** | ***Dormitory Gazebo, B40*** | ***$*** | ***7.2*** | ***MIN*** | ***CS*** | ***Dec 00*** | ***0%*** |
| ***5*** | ***ACJP001166*** | ***Replace Bus Stop with Gazebo, Area B*** | ***$*** | ***15.0*** | ***MIN*** | ***CS*** | ***Jan 01*** | ***0%*** |
| ***6*** | ***ACJP002152*** | ***Install Gazebo, Area B*** | ***$*** | ***7.2*** | ***MIN*** | ***CS*** | ***Dec 00*** | ***0%*** |
| 7 | HHEK002153 | Install Gazebo, B56 | $ | 14.0 | MIN | CS | N/A | Move to FY01 |
| 8 | HHEK990619 | Install HVAC, Dorm, B33 (Dorm Master Plan) | $ | 250.0 | DEG | BS | N/A | Move to FY01 |
| 9 | HHEK970013 | Repair Bathhouse, B401 | $ | 300.0 | MIN | CS | N/A | Move to FY01 |
| 10 | HHEK990113 | Convert Toilet Facility, B113 | $ | 60.0 | MIN | CS | N/A | Move to FY01 |
| 11 | HHEK960003/A | Refurbish Dorm Basements, B32 & B41 | $ | 340.0 | MIN | BS | N/A | Move to FY01 |
| 12 | NSAL990908 | Relocate Water Faucets, FamCamp | $ | 15.0 | MIN | CS | N/A | CANX |
| | | TOTAL | $ | 2,161.6 | | | | |

Note Bold and Italicized Projects have been funded

As of: 01 Dec 00

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# SMC Facilities Requirements Board - 01 Dec 00

## FY 00 (P722)MFH Program

| PRI | PROJ NUM | PROJECT TITLE | ($000) | FIM | MA | START DATE | STATUS CONST |
|---|---|---|---|---|---|---|---|
| *9* | ***HHEK004242*** | ***Rpr Qtrs 10A Bathroom*** | ***$ 12.5*** | ***MIN*** | ***BS*** | ***Dec 00*** | ***0%*** |
| *10* | ***HHEK993408*** | ***Repair Family Room, Qtrs #1 (Design)*** | ***$ 11.3*** | ***MIN*** | ***CS*** | ***16 Oct 00*** | ***N/A*** |
| 11 | HHEK990015 | Upgrade Officers Road Park (Road Pavement) | $ 50.0 | MIN | CS | N/A | Move to FY01 |
| 12 | HHEK990005 | Demo Qrts. #18 | $ 30.0 | MIN | BS | N/A | Move to FY01 |
| 13 | HHEK990404 | Renovate Guard Shack Pacific Crest | $ 120.0 | MIN | MS | N/A | Move to FY01 |
| 14 | HHEK990405 | Replace Guard Shack & Widen Road, Whites Point | $ 358.0 | MIN | MS | N/A | Move to FY01 |
| 15 | HHEK004202 | Replace Trash Enclosures | $ 160.0 | MIN | CS | N/A | Move to FY01 |
| 16 | HHEK014402 | Repair Utility Entrances, Multi | $ 45.0 | MIN | CS | N/A | Move to FY01 |
| | | | | | | | *Design Status* |
| *17* | ***HHEK950041A*** | ***Pave Community Center Road, Ft Mac (Design)*** | ***$ 18.0*** | ***MIN*** | ***MS*** | ***10 Aug 00*** | ***5%*** |
| *18* | ***HHEK961014*** | ***Replacement Carpet, 41 Units*** | ***$ 205.0*** | ***MIN*** | ***CS*** | ***1 Oct 99*** | ***98%*** |
| *19* | ***HHEK004195*** | ***Install Carpet 77 Units*** | ***$ 385.0*** | ***MIN*** | ***CS*** | ***1 Oct 99*** | ***98%*** |
| *20* | ***HHEK004631*** | ***Redo Flooring, Qrts 7B*** | ***$ 8.0*** | ***MIN*** | ***BS*** | ***TBD*** | ***0%*** |
| 21 | HHEK014455 | Install Fences, Smallwood Dr. | $ 20.1 | MIN | CS | N/A | Move to FY01 |
| | | TOTAL | $ 2,474.7 | | | | |

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00



## FY 00 (P721)MFH Program

| PRI | PROJ NUM | PROJECT TITLE | ($000) | FIM | MA | STATUS CONST | STATUS CONST |
|---|---|---|---|---|---|---|---|
| | ***HHEK011161*** | ***Painting and Carpeting of Housing Office, B37*** | ***$ 6.0*** | ***MIN*** | ***BS*** | ***10 Oct 00*** | ***95%*** |
| | | TOTAL | $ 6.0 | | | | |

Note: Bold and Italicized Projects have been funded

As of: 01 Dec 00

# SMC Facilities Requirements Board - 01 Dec 00

## FY 00 Medical Program

| PRI | PROJ NUM | PROJECT TITLE | ($000) | FIM | MA | Start Date | STATUS CONST |
|---|---|---|---|---|---|---|---|
| | ***HHEK001200*** | ***Repair / Seal Basement Walls, B30*** | ***$ 17.2*** | ***MIN*** | ***CS*** | ***Jan 01*** | ***0%*** |
| | ***HHEK001222*** | ***Restore ADA Sidewalk & Install Railing, B30*** | ***$ 5.5*** | ***MIN*** | ***BS*** | ***Jan 01*** | ***0%*** |
| ***1*** | ***HHEK019432*** | ***Repair Boiler, B30*** | ***$ 15.0*** | ***DEG*** | ***MS*** | ***Dec 00*** | ***0%*** |
| ~~2~~ | ~~ACJP001142~~ | ~~Install (3) Temp Alarms, B200 & 202~~ | ~~$ 13.0~~ | ~~DEG~~ | ~~BS~~ | ~~Aug 00~~ | ~~100%~~ |
| ~~3~~ | ~~ACJP998213~~ | ~~Install Panic Hardware, B200~~ | ~~$ 3.0~~ | ~~DEG~~ | ~~MS~~ | ~~Aug 00~~ | ~~100%~~ |
| | | TOTAL | $ 53.7 | | | | |

Note: Bold and Italicized Projects have been funded. As of: 01 Dec 00 21

## FY 00 User Funded Program

| PRI | PROJ NUM | PROJECT TITLE | ($000) | USER | FIM | MA | Start Date | STATUS CONST |
|---|---|---|---|---|---|---|---|---|
| | ACJP941051 | Handicap Ramp, B130 | $ 19.2 | CS | DEG | BS | N/A | Move to FY01 |
| | ACJP001126 | Base Consolidated Network Control Cntr, B130 | $ 75.0 | CS | DEG | BS | N/A | Move to FY01 |
| ~~1~~ | ~~ACJP001703~~ | ~~Renovate OSI Offices, B130~~ | ~~$ 55.0~~ | ~~OSI~~ | ~~MIN~~ | ~~BS~~ | ~~N/A~~ | ~~100%~~ |
| 2 | ACJP990907 | Install Fire Sprinklers, B251 | $ 80.0 | DeCA | DEG | CS | N/A | Move to FY01 |
| ***4*** | ***ACJP001093*** | ***Renovate Office Area, B110*** | ***$ 35.0*** | ***CW*** | ***MIN*** | ***PM*** | ***N/A*** | ***95%*** |
| ***5*** | ***ACJP998109*** | ***Renovate 1st Flr, Multimedia Spt, B130*** | ***$ 130.0*** | ***CS*** | ***MIN*** | ***MS*** | ***N/A*** | ***95%*** |
| ~~6~~ | ~~ACJP001102~~ | ~~Replace Security Doors, B125~~ | ~~$ 28.0~~ | ~~CL~~ | ~~MIN~~ | ~~PM~~ | ~~N/A~~ | ~~100%~~ |
| ~~7~~ | ~~ACJP009361~~ | ~~Carpet Offices, B130~~ | ~~$ 15.0~~ | ~~MZ~~ | ~~MIN~~ | ~~MS~~ | ~~N/A~~ | ~~100%~~ |
| 9 | NSAL001143 | Renovate Server Room, B80 | $ 110.0 | ADC | MIN | BS | N/A | Move to FY01 |
| ***10*** | ***HHEK009152*** | ***Upgrade Tot Lot, B425*** | ***$ 15.1*** | ***SV*** | ***MIN*** | ***BS*** | ***Dec 00*** | ***0%*** |
| ~~11~~ | ~~ACJP009571~~ | ~~Paint Second Floor, B130~~ | ~~$ 28.0~~ | ~~SC~~ | ~~MIN~~ | ~~MS~~ | ~~N/A~~ | ~~100%~~ |
| 12 | ACJP009695 | Remove Walls, B115 | $ 15.0 | MT | MIN | PM | N/A | Move to FY01 |
| ***13*** | ***HHEK991149*** | ***Install Satellite Dish, B425*** | ***$ 20.0*** | ***SV*** | ***MIN*** | ***CS*** | ***N/A*** | ***95%*** |
| ***14*** | ***HHEK995103*** | ***Renovate Post Office, B418*** | ***$ 120.0*** | ***PO*** | ***MIN*** | ***CS*** | ***N/A*** | ***95%*** |
| ***15*** | ***HHEK995115*** | ***Install Alarm System, B403*** | ***$ 15.0*** | ***SV*** | ***MIN*** | ***CS*** | ***N/A*** | ***95%*** |
| 16 | ACJP009140 | Replace Carpet, B105, 5th Flr | $ 7.5 | XP | MIN | PM | N/A | Move to FY01 |
| | | TOTAL | $ 767.8 | | | | | |

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Note. Bold and Italicized Projects have been funded

# SMC Facilities Requirements Board - 01 Dec 00

## FY 01 RPMC Program

| Previous FRB Priority | Project No | Project Title | ($000) | Design | FM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| *FY01-3* | *ACJP011032* | ***Repair Underground Electrical Ducts, Area B*** | *$ 250.0* | *65%* | *DEG* | *BS* | ***Red Horse*** |
| | | **SUB-TOTAL** | **$ 250.0** | | | | |
| | ACJP001103/A-F | Replace Refrigerant Leak Detectors | $ 46.0 | 65% | DEG | BS | VENDOR |
| | ACJP001208 | Restreching and Cleaning of Gym Floor Carpet, B242 | $ 5.7 | 95% | DEG | BS | GSA |
| FY01-20 | HHEK011512 | Repair Chapel Roof, B420 | $ 55.0 | 0% | PML | BS | IDIQ |
| FY01-19 | HHEK991504 | Paint Chapel, B420 | $ 20.0 | 0% | PML | BS | IDIQ |
| FY01-23 | HHEK941502 | Paint Exterior B37 | $ 110.0 | 100% | PML | BS | IDIQ |
| | | Demolish B235 (Design) | $ 16.0 | 0% | DSG | BS | A&E |
| | | Demolish B244 (Design) | $ 16.0 | 0% | DSG | BS | A&E |
| | | Demolish B243 (Design) | $ 16.0 | 0% | DSG | BS | A&E |
| | | Demolish B242 (Design) | $ 16.0 | 0% | DSG | BS | A&E |
| | | Demolish B241 (Design) | $ 16.0 | 0% | DSG | BS | A&E |
| | ACJP001180 | Restore B229 for Base Consolidation | $ 311.0 | 5% | DEG | BS | A&E |
| | | **SUB-TOTAL** | **$ 627.7** | | | | |
| | HHEK001111 | Repave Road for Emergency Evacuation of Children, B31 | $ 180.0 | 65% | DEG | BS | IDIQ |
| FY00-26 | HHEK950041 | Repave Source Selection Road | $ 427.0 | 5% | DEG | MS | COE |
| FY00-50 | ACJP001143 | Install AC in Room B105 Command Post | $ 30.0 | 0% | DEG | PM | 8A |
| FY00-24 | ACJP998617 | Repair Thermostats, B100 & B105 | $ 281.0 | 100% | DEG | PM | SABER |

Note: Bold and Italicized Projects have been funded



## FY 01 RPMC Program

| Previous FRB Priority | Project No | Project Title | ($000) | Design | FM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| FY00-11 | ACJP990717 | Utility Distribution Study, Area B | $ 84.1 | 100% | DEG | MS | A&E |
| FY01-17 | ACJP001372 | Repair Exterior Lighting, Area A | $ 75.5 | 100% | DEG | BS | 8A |
| FY01-21 | ACJP998216 | Replace Downspouts, Bldgs 240 & 244 | $ 26.0 | 100% | MN | BS | 8A |
| FY01-6 | ACJP990114 | Renovate Prof Dev Center, B130 | $ 40.0 | 100% | MN | BS | SABER |
| FY00-21 | ACJP009882 | Repair Duct Work, B219 | $ 484.0 | 100% | MN | BS | 8A |
| FY00-35 | HHEK998709 | Install Parking Lot Lights, B37 | $ 39.0 | 100% | MN | BS | 8A |
| | ACJP001134 | Clean HVAC Ducts, B115 | $ 70.0 | 0% | MN | BS | IDIQ |
| | ACJP001135 | Clean HVAC Ducts, B120 | $ 70.0 | 0% | MN | BS | IDIQ |
| | ACJP001136 | Clean HVAC Ducts, B125 | $ 70.0 | 0% | MN | BS | IDIQ |
| | ACJP001137 | Clean HVAC Ducts, B130 | $ 70.0 | 0% | MN | BS | IDIQ |
| | HHEK998402 | Renovate Basement, B410 | $ 720.0 | 100% | MN | BS | IFB |
| | ACJP019012 | Repair Stairwell, B212 | $ 15.0 | 0% | MN | BS | 8A |
| FY01-27 | ACJP011535 | Install Curbs & Gutters, Area B | $ 154.0 | 100% | MN | BS | IDIQ |
| FY01-13 | ACJP011521 | Restore Landscape, B220 | $ 15.0 | CANX | MN | BS | SABER |
| | ACJP998204 | Install Restrooms Facilities, B240 | $ 90.0 | CANX | MN | BS | CANX |
| | | TOTAL | **$ 4,346.0** | | | | |

# *SMC Facilities Requirements Board - 01 Dec 00*

## FY 01 (722) MFH Program

| Previous FRB Priority | Project No | Project Title | ($000) | Design | FIM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| | HHEK996414 | Paint Townhouses Ft Mac (Phase 5) | $ 101.0 | 100% | MIN | CS | IDIQ |
| | HHEK960014B | Housing Upgrades, Phase 3A | $ 200.0 | 100% | DEG | MS | IDIQ |
| FY00-3 | HHEK014232 | Replace Stairs & Rails, Qrts #19B | $ 36.0 | 100% | CRI | BS | SABER |
| FY00-6 | HHEK014422 | Replace MFH Transformers | $ 125.0 | 100% | DEG | MS | 8A |
| FY00-9 | HHEK993406 | Repair Family Room, Qtrs #1 | $ 86.0 | 5% | MIN | CS | IFB |
| FY00-2 | HHEK004171 | Qrts #2 Patio | $ 7.3 | 100% | MIN | BS | 8A |
| FY00-2 | HHEK014362 | Repair Lawn Sprinklers System Qrts #2 | $ 6.9 | 95% | MIN | BS | 8A |
| FY00-10 | HHEK990015A | Upgrade Officer Road Park (Pavement), BSI | $ 50.0 | 100% | MIN | CS | SABER |
| FY00-17 | HHEK950041A | Repave Fort Mac, Qrty Ctr/MFH | $ 183.0 | 5% | MIN | MS | COE |
| FY00-19 | HHEK004195A1 | Replacement Carpet, Ft Mac, 40 Units | $ 200.0 | 100% | MIN | CS | GSA |
| FY01-7 | HHEK950001 | Slurry Seal Pavement, Ft Mac | $ 115.0 | 10% | MIN | BS | COE |
| FY00-13 | HHEK990404 | Renovate Guard Shack, PC | $ 120.0 | 100% | MIN | MS | SABER |
| | | SUB-TOTAL | $ 1,230.2 | | | | |
| | HHEK951010B | Waterline Repairs, 82/85 Housing, Phase 3 | $ 350.0 | 100% | MIN | CS | IDIQ |
| FY00-21 | HHEK014465 | Install Smallwood Fence | $ 20.1 | 100% | MIN | CS | SABER |
| | HHEK996414 | Paint Townhouses Ft Mac (Phases 7 & 9) | $ 180.0 | 100% | MIN | CS | IDIQ |

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## FY 01 (722) MFH Program

| Previous FRB Priority | Project No | Project Title | ($000) | Design | FIM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| | HHEK960014B | Housing Upgrades, Phase 3 | $ 500.0 | 100% | DEG | MS | IDIQ |
| FY00-15 | HHEK014402 | Repair Utility Entr, Multi | $ 45.0 | 100% | MIN | CS | SABER |
| FY00-8 | HHEK014025 | Repair Qrts 10A Bedroom | $ 10.0 | 80% | MIN | BS | 8A |
| | HHEK001100 | Renovate Qtrs 9A | $ 12.0 | 0% | MIN | BS | 8A |
| FY00-19 | HHEK004195A2 | Replacement Carpet, Ft Mac, 40 Units | $ 200.0 | 100% | MIN | CS | GSA |
| | HHEK997700A | Repave Fort MacArthur Road (Quartermaster Road), Phase 1 | $ 315.0 | 0% | DEG | BS | IDIQ |
| | HHEK997700B | Repave Fort MacArthur Road (Old Fort Road), Phase 2 | $ 300.0 | 0% | DEG | BS | IDIQ |
| | HHEK931051 | Renovate Fence West Side, PCH | $ 25.0 | 50% | MIN | BS | IFB |
| FY00-14 | HHEK004202 | Replace Trash Enclosures | $ 160.0 | 100% | MIN | CS | SABER |
| | HHEK995415 | Paint Ext Historical Units, B51, 53, & 55 | $ 83.0 | 100% | PML | CS | IDIQ |
| FY01-15 | HHEK950040 | Repave CE Area Ft. Mac | $ 325.0 | 0% | PML | BS | IDIQ |
| FY00-11 | HHEK990005 | Demo Qtrs #18 | $ 30.0 | 10% | MIN | BS | 8A |
| FY00-7 | HHEK998406 | Seal Basements, Ft Mac | $ 60.0 | 0% | MIN | CS | 8A |
| | | TOTAL | $ 3,845.3 | | | | |

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# SMC Facilities Requirements Board - 01 Dec 00

## FY 01 NAF Program

| Previous FRB Priority | Project No | Project Title | ($000) | Design | FIM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| ***FY00-4*** | ***ACJP001141*** | ***Remove Bar Officers Lounge, B120*** | ***$ 12.0*** | ***100%*** | ***MIN*** | ***CS*** | ***SABER*** |
| FY00-5 | HHEK019412 | Repair Kitchen Floor, B403 | $ 154.8 | 100% | MIN | CS | SABER |
| | | TOTAL | $ 166.8 | | | | |

Note Bold and Italicized Projects have been funded

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## FY 01 Medical Program

| FRB Priority | Project No | Project Title | ($000) | Design | FIM | MA | Method of Accmp |
|---|---|---|---|---|---|---|---|
| | ***HHEK001222*** | ***Repair Handicapped Sidewalk and Install Handrail, B30*** | ***$ 5.5*** | ***100%*** | ***MIN*** | ***BS*** | ***IDIQ*** |
| | | Total | $ 5.5 | | | | |

Note Bold and Italicized Projects have been funded

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# SMC Facilities Requirements Board - 01 Dec 00

## FY00 Demolition Program

| Task Name | Start |  |
|---|---|---|
| **AAFES Base Exchange** | Mon 2/25/02 | AAFES DEMO |
| Demo B243 (Thrift Shop/Source Selection/OSI vault) | Mon 2/25/02 | |
| Construct Parking Lot in 243 space | Wed 5/1/02 | |
| Demo Current Parking Lot | Mon 8/3/02 | |
| Demo B244 (Current AFFES BX / HAWC / NAF) | Mon 10/21/02 | |
| Demo 242 (Current Fitness Center/ NAF) | Mon 10/21/02 | |
| **SAMS Consolidation Project** | Mon 7/1/02 | |
| Demo B235 (Gas Station/ SAMS ) | Mon 7/1/02 | SAMS #1 |
| Demo B240 (Logistics and Supply/ SAMS) | Mon 7/1/02 | #1 |
| Demo B241 (SFS/ SAMS) | Mon 7/1/02 | #1 |
| Demo B215 (Auto Hobby Shop/ SAMS) | Mon 9/1/03 | #1 |
| Demo B207 (CDC/SAMS) | Mon 9/1/03 | #2 |
| Demo B208 (CDC/SAMS) | Mon 9/1/03 | #2 |
| Demo B219 (2/3) (HQ 61 ABG/ SAMS) | Mon 9/1/03 | #2 |
| Demo B215 (Partial) (Auto Hobby Shop/ SAMS) | Mon 9/1/03 | #2 |

Timeline: Qtr 2, Qtr 3, Qtr 4; 2002: Qtr 1, Qtr 2, Qtr 3, Qtr 4; 2003: Qtr 1, Qtr 2, Qtr 3, Qtr 4; 2004: Qtr 1



## FY00 Demolition Program

| Task Name | Start |  |
|---|---|---|
| **ABG Consolidation and CE/LG Warehouse** | Mon 5/3/04 | |
| Demo B212 (Contracting/ SAMS) | Mon 5/3/04 | ABG consolidation |
| Demo B219 (61 ABG HQ/SAMS) | Mon 5/3/04 | ABG consolidation |
| Demo 220 (MWR/SAMS) | Mon 5/3/04 | ABG consolidation |
| Demo B229 (Civil Engineering/ SAMS) | Thu 8/26/04 | CE/LG Warehouse |

Timeline: Qtr 3, Qtr 4; 2003: Qtr 1, Qtr 2, Qtr 3, Qtr 4; 2004: Qtr 1, Qtr 2, Qtr 3, Qtr 4; 2005: Qtr 1, Qtr 2

# Energy Conservation

- **Utilities Privatization**
  - Letter submitted to HQ AFMC/CE requesting suspending program for LAAFB until base consolidation completed
  - HQ AFMC/EC modified letter and forwarded to Air Staff in November
- **Energy Saving Performance Contract (ESPC)**
  - Honeywell Corporation concluded Phase I study of LAAFB
  - Letter requesting moving program into Phase II submitted
  - Phase II kickoff meeting scheduled for 7 December 2000
  - Bulk of energy projects will focus on Fort MacArthur and housing areas
- **HQ AFMC Energy Assistance Team completed survey in May**
  - Final report with project descriptions and economic analysis received 6 October 2000
  - Low cost projects identified from final report, ongoing development of project Work Orders



# Energy Conservation (cont)

- **Recycled Water Project**
  - Project 80% designed as of 27 November 2000
  - Design review meeting held on 27 October 2000
  - Project ground breaking scheduled for December 2000
- **Energy Consumption**
  - Electrical usage elevated 7% from FY99
  - Gas usage reduced 52% from FY99
  - Energy costs elevated 3.8%; $82.3K from FY99
  - Consumption trend down for September 2000
- **Water Consumption**
  - Water consumption elevated 13.75% from FY99
  - Water costs elevated 15.9%; $27.6K from FY99

# SMC Facilities Requirements Board - 01 Dec 00

## Space Allocation

| Requester | Current Bldg/Space | Proposed Space | Current Occupant | Recommendation |
|---|---|---|---|---|
| 61 SFS UNION | Bldg 241 | 2-3 Offices | N/A | Pending location of space |
| LG SATO | Bldg 219 | Bldg 130 | N/A | Pending location of space |
| 61 SFE Law Enforcement Desk | Bldg 120, Rm 234 | Bldg 120, Rm 515 | 61 CS | Approval - awaiting construction |
| CZ | Bldg 120 | Bldg 130 | CZ | Bldg 130, Rms 2457, 2458, 2281, 2532 |
| GAO | Bldg 120 | Bldg 120 | GAO | Remain in Bldg 120 |
| AFAA | Bldg 120 | Bldg 120 | AFAA | Remain in Bldg 120 |
| Navel Reserve, Det 1 | Off Base | Bldg 130 | 61 CS | Bldg 130, Rms 2257 A, B, C |
| Career Center | Bldg 130 | Bldg 130 | 61 CS | Bldg 130, Rm 2444D |
| Chaplain Office | Bldg 120 | Bldg 105 | N/A | First floor office space |

- **Single Facility/Building Manager**
  - Most facility square footage



## *Recommendations*

- **Approve FY 01 Projects/Priority**
- **Approve Space Re-allocations Decision**
- **Approve Single Facility/Building Manager Concept**

## Mission Areas

- **Primary Mission (PM)**
  - Facilities and infrastructure integral to the installation's primary mission.
  - Ex: SPO buildings and infrastructures within them
- **Mission Support (MS)**
  - Facilities directly supporting the installation's primary mission.
  - Ex: Base Comm Center, Security Forces, Electrical Distribution System
- **Base Support (BS)**
  - Facilities not integral to the primary mission but necessary to keep the installation functioning properly.
  - Ex: Gym, Administrative Offices, CE, dormitories
- **Community Support (CS)**
  - Facilities supporting the base community, base personnel, or do not fall within the other mission areas.
  - Ex: Commissary, BX, Youth Center, family housing



## Energy Conservation Project List

- **Energy Conservation Projects Developed from Air Force Audit Report**
  - **Proposed for Contract Accomplishment**
  - Ultrasonic motion sensors in basement hall ways in Area A
  - Building 120, install utility meters on "The Club" utility source points
  - Buildings 30, 403, 418, and 425, install utility meters on utility source points
  - Buildings 220, 201, 202, 209, 214, 220, 235, and 244, install utility meters on utility source points
  - Building 219, install pipe insulation on all domestic hot water lines
  - Area A buildings, install time clocks on water heater circulation pumps

## Energy Conservation Project List

- **Energy Conservation Projects Identified by Honeywell**
  - Fort MacArthur, retrofit lighting with T-8 lamps
  - Fort MacArthur, retrofit landscape irrigation system
  - Fort MacArthur, domestic water system upgrades
  - Fort MacArthur, pool cover retrofit
  - Fort MacArthur, pool controls
  - Fort MacArthur, domestic hot water controls
  - Fort MacArthur, HVAC controls for A/C and boiler systems
  - Area A and B, retrofit lighting with T-8 lamps

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## Building Mangers Listing

### Area - A

| Building # | Building Manager | Grade | Customer/ Commander |
|---|---|---|---|
| 100 | Darity, Jim | E-5 | SMC |
| 105 | Tumsek, K | E-4 | SMC |
| 107 | Bandy, Scott | E-6 | MDS |
| 110 | Mopar, Florante | E-8 | SMC |
| 111 | Bandy, Scott | E-6 | 61 MDS |
| 115 | Thomas, Leon | E-6 | SMC |
| 120 | Pitre, Latanya | E-4 | SMC |
| 125 | Baker, Christopher G. | E-3 | SMC |
| 130 | Hernandez, Jerry | E-6 | 61 MDS |
| 131 | Bandy, Scott | E-6 | 61 MDS |

### Area - B

| Building # | Building Manager | Grade | Customer/ Commander |
|---|---|---|---|
| 200 | Brandon, Sara | CIV | 61 MDS |
| 201 | Brandon, Sara | CIV | 61 MDS |
| 202 | Brandon, Sara | CIV | 61 MDS |

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# SMC Facilities Requirements Board - 01 Dec 00

## Building Mangers Listing

**Fort MacArthur**

| Building # | Building Manager | Grade | Customer/ Commander |
|---|---|---|---|
| 40 | Falco, John | CIV | 61 ABG |
| 41 | Russ, Kelvin | E-6 | 61 ABG |
| 56 | Craddock, Andrew | CIV | 61 ABG |
| 64 | Nobles, Robert | CIV | 61 ABG |
| 65 | Nobles, Robert | CIV | 61 ABG |
| 72 | Nobles, Robert | CIV | 61 ABG |
| 74 | Nobles, Robert | CIV | 61 ABG |
| 75 | Nobles, Robert | CIV | 61 ABG |
| 78 | Nobles, Robert | CIV | 61 ABG |
| 400 | Durtschi, Roy | CIV | 61 ABG |
| 401 | Durtschi, Roy | CIV | 61 ABG |
| 403 | Brown, Patricia | CIV | 61 ABG |
| 410 | Parsons, Robert | O-4 | SMC |
| 411 | Bandy, Scott | E-6 | 61 MDS |
| 417 | Brining, Anita | CIV | 61 ABG |
| 422 | Bandy, Scott | E-6 | 61 MDS |
| 425 | Brown, Patricia | CIV | 61 ABG |
| 428 | House, William | E-5 | 61 ABG |
| 451 | Brown, Patricia | CIV | 61 ABG |
| 1200 | Bandy, Scott | E-6 | 61 MDS |
| 1300 | Bandy, Scott | E-6 | 61 MDS |

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# APPENDIX F

# BUDGET

UNCLASSIFIED

SPACE-RELATED FUNDING

AS OF DATE: 07/05/01

AF SPACE BUDGET - FY02 PB

| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COMMUNICATIONS | | | | | | | | | | | | | | | |
| PE 33110F | DEF SATELLITE COMM SY | APPN 14 | MISSILE PROCUREM | 1 | 81405 | 27573 | 28612 | 22561 | 27004 | 23003 | 11922 | 4497 | 0 | 0 | 226,577 |
| PE 33110F | DEF SATELLITE COMM SY | APPN 28 | RDT&E - AF | 1 | 9118 | 10141 | 3456 | 7261 | 3895 | 2051 | 1194 | 1282 | 0 | 0 | 38,398 |
| PE 33600F | WIDEBAND GAPFILLER SY | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 0 | 25500 | 390956 | 189815 | 18604 | 12358 | 14605 | 14789 | 666,627 |
| PE 33600F | WIDEBAND GAPFILLER SY | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 0 | 0 | 5429 | 21835 | 40802 | 2222 | 0 | 0 | 70,288 |
| PE 33601F | MILSATCOM TERMINALS | APPN 10 | AIRCRAFT PROCURE | 1 | 15501 | 13094 | 23669 | 26523 | 45951 | 42417 | 39505 | 31487 | 21893 | 43933 | 303,973 |
| PE 33601F | MILSATCOM TERMINALS | APPN 16 | OTHER PROCUREME | 1 | 24736 | 32995 | 33579 | 40231 | 20811 | 28611 | 51193 | 59198 | 65881 | 49401 | 406,636 |
| PE 33601F | MILSATCOM TERMINALS | APPN 28 | RDT&E - AF | 1 | 15319 | 6036 | 7572 | 17634 | 41763 | 57601 | 98275 | 81748 | 68438 | 30738 | 425,124 |
| PE 33601F | MILSATCOM TERMINALS | APPN 30 | OPERATION AND MA | 1 | 739 | 183 | 0 | 0 | 38095 | 34202 | 32672 | 34027 | 35483 | 36145 | 211,546 |
| PE 33601F | MILSATCOM TERMINALS | APPN 32 | MILITARY PERSONN | 1 | 0 | 0 | 0 | 0 | 11076 | 24258 | 25814 | 26726 | 28161 | 29075 | 145,110 |
| PE 33602F | ADVANCED WIDEBAND SY | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12200 | 89382 | 467513 | 569,095 |
| PE 33604F | ADVANCED EHF MILSTAT | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 0 | 0 | 0 | 334936 | 277673 | 267974 | 9820 | 6773 | 897,176 |
| PE 33605F | SATELLITE COMMUNICAT | APPN 30 | OPERATION AND MA | 1 | 49837 | 58228 | 62134 | 84124 | 54390 | 51113 | 112627 | 128820 | 140031 | 142264 | 883,568 |
| PE 33605F | SATELLITE COMMUNICAT | APPN 32 | MILITARY PERSONN | 1 | 36673 | 34964 | 34326 | 38362 | 37352 | 27437 | 28250 | 29190 | 30394 | 31466 | 328,414 |
| PE 33606F | UHF SATELLITE COMMUN | APPN 32 | MILITARY PERSONN | 1 | 544 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 544 |
| PE 33610F | MILSATCOM TELEPORT S | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 0 | 0 | 2000 | 2100 | 2100 | 2200 | 2200 | 10,600 |
| PE 35903F | CINC'S MOBILE CMD CON | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 4050 | 1547 | 8062 | 9537 | 8009 | 6721 | 8786 | 10654 | 57,366 |
| PE 35903F | CINC'S MOBILE CMD CON | APPN 24 | MILITARY CONSTRU | 1 | 0 | 0 | 0 | 10200 | 0 | 0 | 0 | 0 | 0 | 0 | 10,200 |
| PE 35903F | CINC'S MOBILE CMD CON | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 6650 | 9108 | 15541 | 15115 | 17757 | 18396 | 19140 | 19425 | 121,132 |
| PE 35903F | CINC'S MOBILE CMD CON | APPN 32 | MILITARY PERSONN | 1 | 0 | 0 | 0 | 1298 | 2885 | 3075 | 3172 | 3247 | 3390 | 3505 | 20,572 |
| PE 63430F | ADVANCED EHF MILSTAT | APPN 28 | RDT&E - AF | 1 | 35313 | 54617 | 89824 | 244135 | 548398 | 516866 | 345019 | 274653 | 161493 | 72095 | 2,342,413 |
| PE 63432F | POLAR MILSTATCOM (SPA | APPN 28 | RDT&E - AF | 1 | 14415 | 36207 | 37555 | 25829 | 18724 | 9588 | 5724 | 981 | 0 | 0 | 149,023 |
| PE 63840F | GLOBAL BROADCAST SER | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 0 | 0 | 34544 | 25472 | 16916 | 15661 | 21009 | 7009 | 120,611 |
| PE 63845F | ADVANCED WIDEBAND SY | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 31534 | 257337 | 387189 | 174735 | 850,795 |
| PE 63854F | WIDEBAND GAPFILLER SY | APPN 28 | RDT&E - AF | 1 | 70224 | 65152 | 45570 | 121661 | 96670 | 26670 | 48623 | 28077 | 0 | 0 | 502,647 |
| PE 64479F | MILSTAR LDR/MDR SAT C | APPN 28 | RDT&E - AF | 1 | 610774 | 515772 | 345590 | 235164 | 232084 | 110363 | 1424 | 1421 | 0 | 0 | 2,052,592 |
| | **Subtotal - Communications** | | | | **964,598** | **854,962** | **722,587** | **911,138** | **1,633,630** | **1,555,965** | **1,218,809** | **1,300,323** | **1,107,295** | **1,141,720** | **11,411,027** |
| NAVIGATION | | | | | | | | | | | | | | | |
| PE 35164F | NAVSTAR GLO POS SYS(U | APPN 10 | AIRCRAFT PROCURE | 1 | 42421 | 35626 | 35320 | 38931 | 29659 | 27894 | 50963 | 68255 | 79208 | 71000 | 479,277 |
| PE 35164F | NAVSTAR GLO POS SYS(U | APPN 16 | OTHER PROCUREME | 1 | 1495 | 3321 | 2335 | 1637 | 4384 | 4393 | 4758 | 4380 | 4771 | 1061 | 32,535 |
| PE 35164F | NAVSTAR GLO POS SYS(U | APPN 28 | RDT&E - AF | 1 | 43139 | 36898 | 39004 | 66360 | 53093 | 57035 | 50629 | 50814 | 54982 | 59552 | 511,506 |
| PE 35164F | NAVSTAR GLO POS SYS(U | APPN 30 | OPERATION AND MA | 1 | 765 | 2122 | 1444 | 1951 | 2078 | 1940 | 6344 | 6311 | 6567 | 6615 | 36,137 |
| PE 35165F | NAVSTAR GPS (SPACE) | APPN 14 | MISSILE PROCUREM | 1 | 162626 | 87827 | 107498 | 173434 | 201479 | 236103 | 223445 | 261769 | 161877 | 425158 | 2,041,216 |
| PE 35165F | NAVSTAR GPS (SPACE) | APPN 16 | OTHER PROCUREME | 1 | 10665 | 7619 | 13511 | 7812 | 7989 | 7125 | 8811 | 9918 | 14231 | 26326 | 114,007 |
| PE 35165F | NAVSTAR GPS (SPACE) | APPN 28 | RDT&E - AF | 1 | 27648 | 24626 | 106849 | 258592 | 186459 | 206960 | 72760 | 60135 | 59667 | 51003 | 1,054,699 |
| PE 35165F | NAVSTAR GPS (SPACE) | APPN 30 | OPERATION AND MA | 1 | 24992 | 25323 | 34669 | 54116 | 51992 | 56488 | 59089 | 57634 | 59863 | 62841 | 487,007 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SPACE-RELATED FUNDING | | | | | | | | | |
| | AS OF DATE: 07/05/01 | | | | | AF SPACE BUDGET - FY02 PB | | | | | | | | | |
| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
| PE 35165F | NAVSTAR GPS (SPACE) | APPN 32 | MILITARY PERSONN | 1 | 7670 | 6257 | 6716 | 9067 | 12556 | 13319 | 13667 | 14047 | 14604 | 15118 | 113,021 |
| PE 63421F | NAVSTAR GLOBAL POSITI | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 0 | 0 | 78358 | 100575 | 185119 | 188838 | 227900 | 224516 | 1,005,306 |
| PE 64480F | GLOBAL POSITION SYS-BL | APPN 28 | RDT&E - AF | 1 | 69151 | 76872 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 146,023 |
| | Subtotal - Navigation | | | | 390,572 | 306,491 | 347,346 | 611,900 | 628,047 | 711,832 | 675,585 | 722,101 | 683,670 | 943,190 | 6,020,734 |
| GROUND SUPPORT | | | | | | | | | | | | | | | |
| PE 35110F | SATELLITE CONTROL NET | APPN 16 | OTHER PROCUREME | 1 | 21471 | 23466 | 27958 | 38160 | 31301 | 54611 | 51636 | 51406 | 39441 | 37740 | 377,190 |
| PE 35110F | SATELLITE CONTROL NET | APPN 28 | RDT&E - AF | 1 | 58555 | 45205 | 54731 | 58105 | 56349 | 23531 | 23068 | 23001 | 37502 | 34494 | 414,541 |
| PE 35110F | SATELLITE CONTROL NET | APPN 30 | OPERATION AND MA | 1 | 80630 | 69884 | 64535 | 61251 | 10010 | 15527 | 16179 | 13608 | 17311 | 17743 | 366,678 |
| PE 35110F | SATELLITE CONTROL NET | APPN 32 | MILITARY PERSONN | 1 | 8080 | 8274 | 8787 | 8735 | 9256 | 9392 | 9585 | 9898 | 10241 | 10619 | 92,867 |
| PE 35130F | AFSCN OPERATIONS | APPN 16 | OTHER PROCUREME | 1 | 0 | 483 | 0 | 20 | 0 | 0 | 0 | 0 | 0 | 0 | 503 |
| PE 35130F | AFSCN OPERATIONS | APPN 30 | OPERATION AND MA | 1 | 129532 | 125418 | 121905 | 147404 | 209604 | 176379 | 188114 | 198902 | 205017 | 214171 | 1,716,446 |
| PE 35130F | AFSCN OPERATIONS | APPN 32 | MILITARY PERSONN | 1 | 48767 | 47969 | 53436 | 37213 | 18562 | 19653 | 20193 | 20735 | 21575 | 22328 | 310,431 |
| PE 35151F | SATELLITE CONTROL NET | APPN 30 | OPERATION AND MA | 1 | 15818 | 22326 | 19638 | 19862 | 33544 | 33944 | 35623 | 36635 | 38673 | 34475 | 290,538 |
| PE 35151F | SATELLITE CONTROL NET | APPN 32 | MILITARY PERSONN | 1 | 12451 | 9304 | 7158 | 8685 | 12177 | 12871 | 13267 | 13585 | 14176 | 14656 | 118,330 |
| PE 35173F | SPACE & MISSILE TEST & | APPN 16 | OTHER PROCUREME | 1 | 0 | 175 | 190 | 200 | 234 | 234 | 239 | 244 | 249 | 255 | 2,020 |
| PE 35173F | SPACE & MISSILE TEST & | APPN 30 | OPERATION AND MA | 1 | 19192 | 17633 | 17605 | 20086 | 22390 | 20719 | 19312 | 19087 | 20610 | 20404 | 197,038 |
| PE 35173F | SPACE & MISSILE TEST & | APPN 32 | MILITARY PERSONN | 1 | 3265 | 3357 | 3586 | 3610 | 4063 | 4289 | 4394 | 4523 | 4695 | 4862 | 40,644 |
| PE 35181F | WESTERN SPACELIFT RA | APPN 16 | OTHER PROCUREME | 1 | 24743 | 27133 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 51,876 |
| PE 35181F | WESTERN SPACELIFT RA | APPN 24 | MILITARY CONSTRU | 1 | 26876 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 26,876 |
| PE 35181F | WESTERN SPACELIFT RA | APPN 30 | OPERATION AND MA | 1 | 67452 | 67363 | 64862 | 71101 | 77026 | 80272 | 84336 | 89528 | 93694 | 95720 | 791,354 |
| PE 35181F | WESTERN SPACELIFT RA | APPN 32 | MILITARY PERSONN | 1 | 17954 | 19982 | 21560 | 21278 | 23955 | 25520 | 26315 | 26936 | 28116 | 29067 | 240,683 |
| PE 35182F | SPACELIFT RANGE SYSTE | APPN 16 | OTHER PROCUREME | 1 | 54143 | 71665 | 90586 | 94049 | 135064 | 118537 | 134808 | 150210 | 171482 | 170829 | 1,191,373 |
| PE 35182F | SPACELIFT RANGE SYSTE | APPN 28 | RDT&E - AF | 1 | 35522 | 27578 | 48303 | 84373 | 65097 | 74898 | 69924 | 66628 | 72430 | 72520 | 617,273 |
| PE 35182F | SPACELIFT RANGE SYSTE | APPN 30 | OPERATION AND MA | 1 | 164169 | 153809 | 165408 | 185959 | 198726 | 183132 | 191056 | 200810 | 211129 | 212781 | 1,866,979 |
| PE 35182F | SPACELIFT RANGE SYSTE | APPN 32 | MILITARY PERSONN | 1 | 8806 | 9015 | 9794 | 10132 | 11203 | 11913 | 12207 | 12564 | 13043 | 13509 | 112,186 |
| PE 35904F | SPACE DEF INTERFACE N | APPN 30 | OPERATION AND MA | 1 | 203 | 401 | 370 | 629 | 653 | 634 | 667 | 679 | 707 | 717 | 5,660 |
| PE 35904F | SPACE DEF INTERFACE N | APPN 32 | MILITARY PERSONN | 1 | 245 | 254 | 154 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 653 |
| PE 35910F | SPACETRACK(SPACE) | APPN 16 | OTHER PROCUREME | 1 | 7489 | 2259 | 2632 | 9191 | 8812 | 3046 | 317 | 27 | 0 | 0 | 33,773 |
| PE 35910F | SPACETRACK(SPACE) | APPN 28 | RDT&E - AF | 1 | 37977 | 42330 | 58170 | 2529 | 32591 | 6494 | 9321 | 18410 | 21457 | 107406 | 336,685 |
| PE 35910F | SPACETRACK(SPACE) | APPN 30 | OPERATION AND MA | 1 | 41950 | 49412 | 48891 | 53670 | 65774 | 58715 | 61951 | 65970 | 63118 | 64777 | 574,228 |
| PE 35910F | SPACETRACK(SPACE) | APPN 32 | MILITARY PERSONN | 1 | 8450 | 8760 | 9341 | 10240 | 13285 | 15234 | 15660 | 16071 | 16732 | 17314 | 131,087 |
| PE 35998F | MGT HEADQUARTERS - S | APPN 30 | OPERATION AND MA | 1 | 23109 | 27558 | 30343 | 25185 | 28928 | 31262 | 32469 | 33510 | 35496 | 36532 | 304,392 |
| PE 35998F | MGT HEADQUARTERS - S | APPN 32 | MILITARY PERSONN | 1 | 41343 | 41663 | 43377 | 48364 | 52997 | 56416 | 58222 | 60005 | 62204 | 64458 | 529,049 |
| | Subtotal - Ground Support | | | | 958,192 | 922,676 | 973,320 | 1,020,031 | 1,121,601 | 1,037,223 | 1,078,863 | 1,132,972 | 1,199,098 | 1,297,377 | 10,741,353 |
| LAUNCH | | | | | | | | | | | | | | | |

| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | SPACE-RELATED FUNDING | | | | | | | | | | |
| | AS OF DATE: 07/05/01 | | | | AF SPACE BUDGET - FY02 PB | | | | | | | | | | |
| PE 35119F | MEDIUM LAUNCH VEHICLE | APPN 14 | MISSILE PROCUREM | 1 | 195550 | 172268 | 60590 | 42685 | 42355 | 47059 | 42267 | 37245 | 31183 | 0 | 671,202 |
| PE 35119F | MEDIUM LAUNCH VEHICLE | APPN 28 | RDT&E - AF | 1 | 1999 | 3195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5,194 |
| PE 35119F | MEDIUM LAUNCH VEHICLE | APPN 30 | OPERATION AND MA | 1 | 24415 | 29925 | 31641 | 34397 | 32117 | 30720 | 20588 | 17581 | 20958 | 18693 | 261,035 |
| PE 35119F | MEDIUM LAUNCH VEHICLE | APPN 32 | MILITARY PERSONNI | 1 | 5970 | 6093 | 6542 | 6621 | 9145 | 11635 | 11902 | 12265 | 12719 | 13178 | 96,070 |
| PE 35138F | INERT UPPER STAGE (IUS | APPN 14 | MISSILE PROCUREM | 1 | 35222 | 42962 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 78,184 |
| PE 35138F | INERT UPPER STAGE (IUS | APPN 28 | RDT&E - AF | 1 | 10 | 551 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 561 |
| PE 35138F | INERT UPPER STAGE (IUS | APPN 30 | OPERATION AND MA | 1 | 4321 | 4363 | 4208 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12,892 |
| PE 35144F | TITAN SPACE LAUNCH VE | APPN 14 | MISSILE PROCUREM | 1 | 418110 | 535612 | 399434 | 406047 | 385298 | 237121 | 7988 | 6856 | 0 | 0 | 2,396,466 |
| PE 35144F | TITAN SPACE LAUNCH VE | APPN 28 | RDT&E - AF | 1 | 62401 | 67814 | 30824 | 25578 | 21293 | 0 | 0 | 0 | 0 | 0 | 207,910 |
| PE 35144F | TITAN SPACE LAUNCH VE | APPN 30 | OPERATION AND MA | 1 | 64005 | 72220 | 65321 | 78515 | 85239 | 65864 | 1611 | 1670 | 1753 | 1914 | 438,112 |
| PE 35144F | TITAN SPACE LAUNCH VE | APPN 32 | MILITARY PERSONNI | 1 | 9252 | 9273 | 9212 | 8861 | 9737 | 10290 | 10558 | 10853 | 11281 | 11678 | 100,995 |
| PE 35171F | SPACE SHUTTLE OPERAT | APPN 30 | OPERATION AND MA | 1 | 1508 | 1327 | 1535 | 1503 | 1578 | 1599 | 1651 | 1691 | 1790 | 1826 | 16,008 |
| PE 35171F | SPACE SHUTTLE OPERAT | APPN 32 | MILITARY PERSONNI | 1 | 2162 | 2052 | 2064 | 2056 | 2281 | 2392 | 2444 | 2522 | 2610 | 2707 | 23,290 |
| PE 35953F | EVOLVED EXPENDABLE L | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 68127 | 280397 | 98007 | 569081 | 358791 | 657453 | 812078 | 706887 | 3,550,821 |
| PE 35953F | EVOLVED EXPENDABLE L | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 6309 | 9442 | 28576 | 29034 | 42665 | 54012 | 56182 | 57003 | 283,223 |
| PE 63853F | EELV D/V (SPACE) | APPN 28 | RDT&E - AF | 1 | 63904 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 63,904 |
| PE 64853F | EVOLVED EXP LAUNCH VE | APPN 28 | RDT&E - AF | 1 | 23252 | 241973 | 321969 | 329897 | 320321 | 39862 | 0 | 0 | 0 | 0 | 1,277,274 |
| PE 65860F | RSLP (SPACE) | APPN 28 | RDT&E - AF | 1 | 26163 | 14447 | 7288 | 7834 | 8538 | 8186 | 8355 | 8530 | 9132 | 9554 | 108,027 |
| | **Subtotal - Launch** | | | | **938,244** | **1,204,075** | **1,015,064** | **1,233,833** | **1,044,485** | **1,052,843** | **508,820** | **810,678** | **959,686** | **823,440** | **9,591,168** |
| **METEOROLOGY** | | | | | | | | | | | | | | | |
| PE 35160F | DEF METEOROLOGICAL S | APPN 14 | MISSILE PROCUREM | 1 | 35183 | 40607 | 39694 | 67952 | 47580 | 62058 | 52235 | 52576 | 47610 | 48359 | 493,854 |
| PE 35160F | DEF METEOROLOGICAL S | APPN 16 | OTHER PROCUREME | 1 | 11722 | 12215 | 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25,928 |
| PE 35160F | DEF METEOROLOGICAL S | APPN 28 | RDT&E - AF | 1 | 12284 | 19971 | 20339 | 25139 | 12259 | 7892 | 8716 | 7843 | 7974 | 8997 | 131,414 |
| PE 35160F | DEF METEOROLOGICAL S | APPN 30 | OPERATION AND MA | 1 | 13909 | 16260 | 15542 | 8197 | 9212 | 8876 | 9326 | 9516 | 9952 | 10084 | 110,874 |
| PE 35160F | DEF METEOROLOGICAL S | APPN 32 | MILITARY PERSONNI | 1 | 10904 | 6723 | 2942 | 2988 | 3217 | 3330 | 3404 | 3510 | 3637 | 3770 | 44,425 |
| PE 35162F | DEF METEOROLOG SAT P | APPN 30 | OPERATION AND MA | 1 | 2753 | 2470 | 2077 | 2125 | 2168 | 2024 | 2132 | 2173 | 2399 | 2432 | 22,753 |
| PE 35178F | NATL POLAR-ORBITING O | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 33984 | 0 | 167230 | 201,214 |
| PE 63434F | NPOESS (SPACE) | APPN 28 | RDT&E - AF | 1 | 31221 | 61967 | 56380 | 75950 | 157394 | 238038 | 308784 | 261918 | 242803 | 163995 | 1,598,450 |
| | **Subtotal - Meteorology** | | | | **117,976** | **160,213** | **138,965** | **182,351** | **231,830** | **322,218** | **384,597** | **371,520** | **314,375** | **404,867** | **2,628,912** |
| **SCIENCE AND TECHNOLOGY** | | | | | | | | | | | | | | | |
| PE 62601F | SPACE TECHNOLOGY | APPN 28 | RDT&E - AF | 1 | 112939 | 122404 | 141083 | 68850 | 61086 | 56479 | 62222 | 69153 | 71107 | 73263 | 838,586 |
| PE 62601F | SPACE TECHNOLOGY | APPN 32 | MILITARY PERSONNI | 1 | 30216 | 30180 | 31712 | 30013 | 22324 | 14836 | 15058 | 15486 | 16137 | 16784 | 222,746 |
| PE 63302F | SPACE & MSL ROCKET PR | APPN 28 | RDT&E - AF | 1 | 15398 | 21946 | 16097 | 27776 | 0 | 0 | 0 | 0 | 0 | 0 | 81,217 |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | SPACE-RELATED FUNDING | | | | | | | | | |
| | AS OF DATE: 07/05/01 | | | | | AF SPACE BUDGET - FY02 PB | | | | | | | | | |
| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
| PE 63401F | ADVANCED SPACECRAFT | APPN 28 | RDT&E - AF | 1 | 91754 | 57557 | 102511 | 63019 | 54528 | 50373 | 54115 | 55254 | 63021 | 64352 | 656,484 |
| PE 63402F | SPACE TEST PROGRAM (S | APPN 28 | RDT&E - AF | 1 | 35841 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 35,841 |
| PE 63410F | SPACE SYS ENVIRON INTE | APPN 28 | RDT&E - AF | 1 | 2819 | 3215 | 3312 | 3381 | 0 | 0 | 0 | 0 | 0 | 0 | 12,727 |
| PE 63438F | SPACE CONTROL TECHNO | APPN 28 | RDT&E - AF | 1 | 0 | 7212 | 12258 | 7897 | 33022 | 9764 | 9753 | 9742 | 9946 | 10156 | 109,750 |
| PE 63444F | MAUI SPACE SURVEILLAN | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 0 | 19445 | 6484 | 6488 | 6491 | 6492 | 6592 | 6695 | 58,687 |
| PE 63605F | ADVANCED WEAPONS TE | APPN 28 | RDT&E - AF | 0.4 | 20,701 | 20,576 | 20,934 | 17,189 | 17,503 | 15,098 | 16,784 | 18,298 | 18,682 | 19,077 | 184,842 |
| PE 65864F | SPACE TEST PROGRAM | APPN 28 | RDT&E - AF | 1 | 0 | 40284 | 44769 | 46050 | 50523 | 54663 | 54247 | 55881 | 57018 | 58229 | 461,664 |
| | **Subtotal - Science and Technology** | | | | **309,668** | **303,374** | **372,676** | **283,620** | **245,470** | **207,701** | **218,670** | **230,306** | **242,503** | **248,556** | **2,662,544** |
| **TACTICAL WARNING/ATTACK ASSESSMENT** | | | | | | | | | | | | | | | |
| PE 35902F | BALLISTIC MSL TAC WNG/ | APPN 30 | OPERATION AND MA | 1 | 3870 | 3839 | 3876 | 4418 | 4630 | 4474 | 4666 | 4715 | 4965 | 4987 | 44,440 |
| PE 35902F | BALLISTIC MSL TAC WNG/ | APPN 32 | MILITARY PERSONN | 1 | 396 | 162 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 558 |
| PE 35905F | SPACE SYSTEM SUPPORT | APPN 30 | OPERATION AND MA | 1 | 2171 | 3510 | 3130 | 2360 | 2216 | 2376 | 2362 | 2291 | 2610 | 2471 | 25,497 |
| PE 35906F | NCMC-TW/AA SYSTEMS | APPN 16 | OTHER PROCUREME | 1 | 8758 | 12380 | 12203 | 17147 | 27734 | 14569 | 14885 | 15171 | 15472 | 15817 | 154,136 |
| PE 35906F | NCMC-TW/AA SYSTEMS | APPN 28 | RDT&E - AF | 1 | 6678 | 17498 | 13566 | 19132 | 15797 | 15694 | 18159 | 18225 | 18585 | 18979 | 162,313 |
| PE 35906F | NCMC-TW/AA SYSTEMS | APPN 30 | OPERATION AND MA | 1 | 94920 | 84319 | 59860 | 80421 | 93944 | 91599 | 94211 | 76364 | 80206 | 81952 | 837,796 |
| PE 35906F | NCMC-TW/AA SYSTEMS | APPN 32 | MILITARY PERSONN | 1 | 38804 | 40316 | 40878 | 31080 | 25340 | 26576 | 26997 | 27737 | 28845 | 29857 | 316,430 |
| PE 35908F | TW/AA INTERFACE NETW | APPN 16 | OTHER PROCUREME | 1 | 258 | 443 | 489 | 597 | 605 | 673 | 687 | 701 | 727 | 744 | 5,924 |
| PE 35908F | TW/AA INTERFACE NETW | APPN 30 | OPERATION AND MA | 1 | 5651 | 6815 | 5583 | 3059 | 3054 | 2953 | 3108 | 3168 | 3471 | 3487 | 40,349 |
| PE 35908F | TW/AA INTERFACE NETW | APPN 32 | MILITARY PERSONN | 1 | 69 | 72 | 77 | 79 | 44 | 0 | 0 | 0 | 0 | 54 | 395 |
| PE 35909F | BALLISTIC MSL EARLY WN | APPN 16 | OTHER PROCUREME | 1 | 10283 | 21684 | 21130 | 13886 | 23471 | 19766 | 4115 | 0 | 0 | 0 | 114,335 |
| PE 35909F | BALLISTIC MSL EARLY WN | APPN 24 | MILITARY CONSTRU | 1 | 46784 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46,784 |
| PE 35909F | BALLISTIC MSL EARLY WN | APPN 30 | OPERATION AND MA | 1 | 70880 | 70168 | 79899 | 54422 | 82096 | 44637 | 47914 | 50781 | 52839 | 53642 | 607,278 |
| PE 35909F | BALLISTIC MSL EARLY WN | APPN 32 | MILITARY PERSONN | 1 | 6174 | 6566 | 7017 | 6756 | 7188 | 7657 | 7894 | 8082 | 8436 | 8721 | 74,491 |
| PE 35911F | DEFENSE SUPPORT PROG | APPN 14 | MISSILE PROCUREM | 1 | 85805 | 86964 | 100469 | 105380 | 112456 | 99309 | 30338 | 35725 | 34009 | 34867 | 725,322 |
| PE 35911F | DEFENSE SUPPORT PROG | APPN 16 | OTHER PROCUREME | 1 | 181 | 202 | 14 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 403 |
| PE 35911F | DEFENSE SUPPORT PROG | APPN 28 | RDT&E - AF | 1 | 17624 | 13966 | 7708 | 9374 | 6363 | 6639 | 0 | 0 | 0 | 0 | 61,674 |
| PE 35911F | DEFENSE SUPPORT PROG | APPN 30 | OPERATION AND MA | 1 | 45935 | 48312 | 53278 | 47454 | 65157 | 23898 | 21442 | 23372 | 24264 | 24635 | 377,747 |
| PE 35911F | DEFENSE SUPPORT PROG | APPN 32 | MILITARY PERSONN | 1 | 37262 | 37991 | 21809 | 2045 | 272 | 289 | 299 | 306 | 319 | 330 | 100,922 |
| PE 35912F | SLBM RADAR WARNING S | APPN 16 | OTHER PROCUREME | 1 | 3174 | 223 | 127 | 11668 | 15229 | 4102 | 3785 | 3859 | 4100 | 4208 | 50,475 |
| PE 35912F | SLBM RADAR WARNING S | APPN 30 | OPERATION AND MA | 1 | 24714 | 26288 | 23329 | 22728 | 35008 | 22396 | 26473 | 28195 | 29481 | 29901 | 268,513 |
| PE 35912F | SLBM RADAR WARNING S | APPN 32 | MILITARY PERSONN | 1 | 12027 | 12334 | 13483 | 14048 | 15297 | 16245 | 16717 | 17141 | 17861 | 18474 | 153,627 |
| PE 35913F | NUDET DETECTION SYST | APPN 14 | MISSILE PROCUREM | 1 | 954 | 2780 | 1470 | 1465 | 0 | 0 | 0 | 0 | 0 | 0 | 6,669 |
| PE 35913F | NUDET DETECTION SYST | APPN 16 | OTHER PROCUREME | 1 | 7792 | 1265 | 3454 | 2649 | 8470 | 7990 | 12735 | 11946 | 12412 | 12748 | 81,461 |
| PE 35913F | NUDET DETECTION SYST | APPN 28 | RDT&E - AF | 1 | 12878 | 12745 | 13497 | 11977 | 18823 | 20002 | 24878 | 23406 | 24413 | 25166 | 187,785 |
| PE 35913F | NUDET DETECTION SYST | APPN 30 | OPERATION AND MA | 1 | 5067 | 5355 | 6694 | 7880 | 9437 | 8238 | 8078 | 8958 | 9317 | 9455 | 78,479 |
| PE 35913F | NUDET DETECTION SYST | APPN 32 | MILITARY PERSONN | 1 | 1499 | 1547 | 1647 | 1681 | 1861 | 1980 | 2040 | 2088 | 2180 | 2255 | 18,778 |
| PE 35915F | SPACE-BASED INFRARED | APPN 14 | MISSILE PROCUREM | 1 | 0 | 0 | 0 | 0 | 93752 | 481020 | 0 | 6968 | 15652 | 17262 | 614,654 |

UNCLASSIFIED

SPACE-RELATED FUNDING

AS OF DATE: 07/05/01

AF SPACE BUDGET - FY02 PB

| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE 35915F | SPACE-BASED INFRARED | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 0 | 0 | 54347 | 0 | 0 | 0 | 0 | 0 | 54,347 |
| PE 35915F | SPACE-BASED INFRARED | APPN 30 | OPERATION AND MA | 1 | 10387 | 17019 | 23569 | 55261 | 54343 | 60009 | 68537 | 69671 | 72487 | 73258 | 504,541 |
| PE 35915F | SPACE-BASED INFRARED | APPN 32 | MILITARY PERSONNI | 1 | 1165 | 4662 | 25945 | 41462 | 41333 | 43993 | 45366 | 46543 | 48583 | 50225 | 349,277 |
| PE 38699F | SHARED EARLY WARNING | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 0 | 0 | 200 | 1700 | 200 | 300 | 1600 | 300 | 4,300 |
| PE 38699F | SHARED EARLY WARNING | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 11113 | 4180 | 3697 | 4041 | 3343 | 3450 | 3521 | 3581 | 36,926 |
| PE 38699F | SHARED EARLY WARNING | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 0 | 7979 | 8224 | 8362 | 8760 | 8855 | 9327 | 51,507 |
| PE 63441F | SPACE-BASED IR ARCHI(S | APPN 28 | RDT&E - AF | 1 | 210016 | 144898 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 354,914 |
| PE 63876F | SPACE-BASED LASER | APPN 28 | RDT&E - AF | 1 | 0 | 32550 | 68926 | 72544 | 371 | 425 | 490 | 561 | 1331 | 2217 | 179,415 |
| PE 64251F | SPACE-BASED RADAR EM | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 0 | 0 | 50000 | 0 | 0 | 0 | 0 | 0 | 50,000 |
| PE 64441F | SPACE BASED IR SYS(SBI | APPN 24 | MILITARY CONSTRU | 1 | 14000 | 0 | 0 | 2750 | 19000 | 6900 | 0 | 0 | 0 | 0 | 42,650 |
| PE 64441F | SPACE BASED IR SYS(SBI | APPN 28 | RDT&E - AF | 1 | 337858 | 507554 | 400348 | 563967 | 405229 | 334753 | 270531 | 197390 | 246625 | 228855 | 3,493,110 |
| PE 64442F | SPACE BASED INFRARED | APPN 28 | RDT&E - AF | 1 | 0 | 36601 | 218088 | 238810 | 0 | 0 | 0 | 0 | 0 | 0 | 493,499 |
| | | | | | | | | | | | | | | | |
| | **Subtotal - Tactical Warning/Attack Assessmet** | | | | **1,124,034** | **1,261,028** | **1,242,676** | **1,450,686** | **1,304,743** | **1,383,127** | **768,612** | **695,874** | **773,166** | **767,775** | **10,771,721** |
| | | | | | | | | | | | | | | | |
| **GENERAL SUPPORT** | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| PE 13122F | SERVICE SPT TO NORAD / | APPN 30 | OPERATION AND MA | 1 | 549 | 550 | 1003 | 1145 | 1011 | 1033 | 1049 | 1067 | 1127 | 1142 | 9,676 |
| PE 13122F | SERVICE SPT TO NORAD / | APPN 32 | MILITARY PERSONNI | 1 | 4432 | 4639 | 4905 | 4994 | 5387 | 5543 | 5636 | 5795 | 6022 | 6234 | 53,587 |
| PE 13190F | SERVICE SPT TO COMBAT | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 990 | 1046 | 1091 | 1138 | 1191 | 1246 | 1306 | 8,008 |
| PE 13190F | SERVICE SPT TO COMBAT | APPN 32 | MILITARY PERSONNI | 1 | 0 | 0 | 3656 | 3715 | 8113 | 8526 | 8720 | 8988 | 9316 | 9654 | 60,688 |
| PE 13198F | MGMT HQ (U.S. ELEMENT | APPN 30 | OPERATION AND MA | 1 | 3138 | 2611 | 2917 | 4814 | 3106 | 3066 | 3027 | 2803 | 3199 | 3004 | 31,685 |
| PE 13198F | MGMT HQ (U.S. ELEMENT | APPN 32 | MILITARY PERSONNI | 1 | 5938 | 5888 | 3086 | 3088 | 0 | 0 | 0 | 0 | 0 | 0 | 18,000 |
| PE 13298F | MGMT HQ (U.S. SPACE CO | APPN 32 | MILITARY PERSONNI | 1 | 79 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 79 |
| PE 15690F | SERVICE SPT COMBATAN | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 0 | 0 | 16017 | 1510 | 0 | 0 | 0 | 0 | 17,527 |
| PE 15690F | SERVICE SPT COMBATAN | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 5616 | 12714 | 13570 | 13284 | 13866 | 14465 | 14932 | 88,447 |
| PE 15690F | SERVICE SPT COMBATAN | APPN 32 | MILITARY PERSONNI | 1 | 0 | 0 | 5751 | 5880 | 12420 | 12405 | 12479 | 12865 | 13334 | 13817 | 88,951 |
| PE 15921F | SERVICE SPT TO SPACEC | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 1519 | 3683 | 6307 | 6581 | 7010 | 7341 | 7685 | 40,126 |
| PE 15921F | SERVICE SPT TO SPACEC | APPN 32 | MILITARY PERSONNI | 1 | 0 | 0 | 4041 | 8306 | 10173 | 11650 | 11928 | 12285 | 12745 | 13202 | 84,330 |
| PE 27247F | AIR FORCE TENCAP | APPN 16 | OTHER PROCUREME | 1 | 143 | 190 | 192 | 195 | 198 | 197 | 201 | 205 | 209 | 213 | 1,943 |
| PE 27247F | AIR FORCE TENCAP | APPN 28 | RDT&E - AF | 1 | 13485 | 5992 | 14704 | 13699 | 10811 | 10534 | 10751 | 10975 | 11200 | 11437 | 113,588 |
| PE 27247F | AIR FORCE TENCAP | APPN 30 | OPERATION AND MA | 1 | 6664 | 5526 | 6980 | 7752 | 12161 | 7961 | 8372 | 8556 | 8908 | 9066 | 81,946 |
| PE 27247F | AIR FORCE TENCAP | APPN 32 | MILITARY PERSONNI | 1 | 3991 | 3810 | 4826 | 5870 | 4446 | 2746 | 2802 | 2893 | 2993 | 3104 | 37,481 |
| PE 33185F | SERVICE SPT GLOBAL CM | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 122 | 130 | 135 | 141 | 147 | 154 | 161 | 990 |
| PE 33185F | SERVICE SPT GLOBAL CM | APPN 32 | MILITARY PERSONNI | 1 | 0 | 0 | 201 | 325 | 317 | 337 | 299 | 306 | 319 | 330 | 2,434 |
| PE 35159F | DEFENSE RECONN SUPP( | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 7827 | 8902 | 6829 | 6739 | 14651 | 14966 | 15266 | 15602 | 90,782 |
| PE 35159F | DEFENSE RECONN SUPP( | APPN 28 | RDT&E - AF | 1 | 0 | 0 | 36491 | 41218 | 46578 | 42178 | 46029 | 46933 | 47925 | 48938 | 356,290 |
| PE 35174F | SPACE WARFARE CENTE | APPN 16 | OTHER PROCUREME | 1 | 679 | 1247 | 770 | 774 | 778 | 756 | 773 | 788 | 804 | 822 | 8,191 |
| PE 35174F | SPACE WARFARE CENTE | APPN 30 | OPERATION AND MA | 1 | 16882 | 19082 | 19302 | 19036 | 24136 | 16999 | 17516 | 17613 | 18978 | 18923 | 188,467 |
| PE 35174F | SPACE WARFARE CENTE | APPN 32 | MILITARY PERSONNI | 1 | 10793 | 12950 | 15133 | 15459 | 17078 | 17873 | 18299 | 18845 | 19551 | 20255 | 166,236 |

UNCLASSIFIED

| | | | | | | SPACE-RELATED FUNDING | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | AS OF DATE: 07/05/01 | | | | | AF SPACE BUDGET - FY02 PB | | | | | | | | | | |
| PE # | PROGRAM TITLE | | APPN | Factor | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 | FY05 | FY06 | FY07 | FY98-07 |
| PE 35698F | MANAGEMENT HQ, U.S. SI | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 7346 | 12512 | 0 | 0 | 0 | 0 | 0 | 0 | 19,858 |
| PE 35698F | MANAGEMENT HQ, U.S. SI | APPN 24 | MILITARY CONSTRU | 1 | 0 | 0 | 33000 | 6826 | 0 | 0 | 0 | 0 | 0 | 0 | 39,826 |
| PE 35698F | MANAGEMENT HQ, U.S. SI | APPN 30 | OPERATION AND MA | 1 | 9454 | 9831 | 11226 | 13215 | 12180 | 8889 | 8576 | 8072 | 9533 | 8773 | 99,749 |
| PE 35698F | MANAGEMENT HQ, U.S. SI | APPN 32 | MILITARY PERSONN | 1 | 10648 | 10726 | 5614 | 3965 | 0 | 0 | 0 | 0 | 0 | 0 | 30,953 |
| PE 35890F | VISUAL INFO ACTIVITIES-S | APPN 16 | OTHER PROCUREME | 1 | 3077 | 3162 | 3175 | 1897 | 3275 | 3281 | 3355 | 3421 | 3489 | 3566 | 31,698 |
| PE 35890F | VISUAL INFO ACTIVITIES-S | APPN 30 | OPERATION AND MA | 1 | 5822 | 5189 | 4776 | 8703 | 9552 | 9758 | 10554 | 11170 | 11622 | 12032 | 89,178 |
| PE 35890F | VISUAL INFO ACTIVITIES-S | APPN 32 | MILITARY PERSONN | 1 | 5398 | 5453 | 4264 | 3534 | 4922 | 5134 | 4674 | 4270 | 4471 | 4617 | 46,737 |
| PE 35893F | DEMOLITION/DISP EXCES | APPN 30 | OPERATION AND MA | 1 | 677 | 1195 | 1091 | 1435 | 2354 | 1748 | 497 | 0 | 0 | 0 | 8,997 |
| PE 35896F | BASE OPERATIONS-OTHE | APPN 16 | OTHER PROCUREME | 1 | 850 | 500 | 477 | 1177 | 1638 | 467 | 478 | 487 | 497 | 508 | 7,079 |
| PE 35896F | BASE OPERATIONS-OTHE | APPN 30 | OPERATION AND MA | 1 | 107416 | 100665 | 95866 | 128958 | 151754 | 154332 | 159989 | 156440 | 159029 | 160773 | 1,375,222 |
| PE 35896F | BASE OPERATIONS-OTHE | APPN 32 | MILITARY PERSONN | 1 | 71117 | 69505 | 67417 | 59998 | 66195 | 72562 | 74941 | 76659 | 79860 | 82311 | 720,565 |
| PE 35907F | SPACE SYSTEMS TRAININ | APPN 30 | OPERATION AND MA | 1 | 1815 | 1606 | 1559 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4,980 |
| PE 35914F | ENGINEERING INST SUPT | APPN 16 | OTHER PROCUREME | 1 | 0 | 0 | 0 | 119 | 796 | 665 | 767 | 859 | 877 | 896 | 4,979 |
| PE 35914F | ENGINEERING INST SUPT | APPN 30 | OPERATION AND MA | 1 | 0 | 6099 | 2854 | 4390 | 4603 | 4356 | 4534 | 4598 | 4788 | 4858 | 41,080 |
| PE 35917F | SPACE ARCHITECT | APPN 28 | RDT&E - AF | 1 | 13408 | 12873 | 10696 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 36,977 |
| PE 35917F | SPACE ARCHITECT | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 420 | 530 | 559 | 584 | 610 | 637 | 667 | 698 | 4,705 |
| PE 35917F | SPACE ARCHITECT | APPN 32 | MILITARY PERSONN | 1 | 544 | 999 | 1071 | 1086 | 1185 | 1243 | 1271 | 1311 | 1358 | 1407 | 11,475 |
| PE 35921F | SPACE COMM COMBAT OI | APPN 30 | OPERATION AND MA | 1 | 4121 | 4358 | 7285 | 8914 | 18335 | 15192 | 16096 | 15620 | 16547 | 16539 | 123,007 |
| PE 35921F | SPACE COMM COMBAT OI | APPN 32 | MILITARY PERSONN | 1 | 7175 | 7082 | 3829 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18,086 |
| PE 35925F | OPERATIONAL HQ - SPAC | APPN 30 | OPERATION AND MA | 1 | 5430 | 4326 | 4211 | 6038 | 5855 | 5945 | 6362 | 6610 | 6903 | 6989 | 58,669 |
| PE 35925F | OPERATIONAL HQ - SPAC | APPN 32 | MILITARY PERSONN | 1 | 8867 | 7112 | 5068 | 6823 | 9796 | 10329 | 10615 | 10899 | 11342 | 11738 | 92,589 |
| PE 35935F | SPACE CONTROL | APPN 30 | OPERATION AND MA | 1 | 0 | 0 | 0 | 0 | 20050 | 0 | 0 | 0 | 0 | 0 | 20,050 |
| PE 35996F | BASE OPERATIONS - SPAC | APPN 24 | MILITARY CONSTRU | 1 | 46135 | 27001 | 49150 | 61429 | 45200 | 12800 | 37820 | 59498 | 0 | 0 | 339,033 |
| PE 53116F | SPACE/SURVEILLANCE OF | APPN 55 | OPERATION AND MA | 1 | 7635 | 9017 | 8647 | 11523 | 14504 | 14826 | 15371 | 13633 | 14081 | 14655 | 123,892 |
| PE 53116F | SPACE/SURVEILLANCE OF | APPN 56 | NATIONAL GUARD P | 1 | 4208 | 4838 | 8264 | 12505 | 12959 | 12365 | 12620 | 13124 | 13630 | 14137 | 108,650 |
| PE 53121F | SPACE SQUADRON - AFR | APPN 50 | RESERVE PERSONN | 1 | 2162 | 3307 | 4199 | 8595 | 12110 | 12762 | 12265 | 12679 | 13265 | 13674 | 95,018 |
| PE 53121F | SPACE SQUADRON - AFR | APPN 52 | OPERATION AND MA | 1 | 406 | 748 | 799 | 801 | 721 | 733 | 753 | 772 | 797 | 817 | 7,347 |
| PE 63856F | AIR FORCE/NAT PGM COO | APPN 28 | RDT&E - AF | 1 | 0 | 16900 | 0 | 2348 | 4433 | 8860 | 3348 | 0 | 1865 | 1904 | 39,658 |
| PE 63856F | AIR FORCE/NAT PGM COO | APPN 32 | MILITARY PERSONN | 1 | 0 | 0 | 174 | 352 | 383 | 401 | 409 | 422 | 437 | 453 | 3,031 |
| PE 84735F | UNDERGRADUATE SPACE | APPN 24 | MILITARY CONSTRU | 1 | 0 | 9209 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9,209 |
| PE 84735F | UNDERGRADUATE SPACE | APPN 30 | OPERATION AND MA | 1 | 3933 | 3288 | 3638 | 7888 | 7777 | 7874 | 8203 | 8435 | 8847 | 9087 | 68,970 |
| PE 84735F | UNDERGRADUATE SPACE | APPN 32 | MILITARY PERSONN | 1 | 30471 | 32579 | 35026 | 35362 | 41553 | 44017 | 45088 | 46417 | 48172 | 49898 | 408,583 |
| | **Subtotal - General Support** | | | | **417,542** | **420,053** | **512,927** | **564,342** | **649,821** | **580,279** | **622,872** | **644,130** | **607,179** | **620,157** | **5,639,302** |
| | **All Space Missions Total (U)** | | | | **5,220,826** | **5,432,872** | **5,325,561** | **6,257,901** | **6,859,627** | **6,851,188** | **5,476,828** | **5,907,904** | **5,886,972** | **6,247,082** | **59,466,761** |

# APPENDIX G

# AWARDS

| AWARD TITLE | TITLE CATEGORY | DATES | NAME | ORGANIZATION |
|---|---|---|---|---|
| SMC Quarterly Award Winners | Senior Company Grade Officer | Oct - Dec 1997 | Capt Ann Wong-Jiru | |
| SMC Quarterly Award Winners | Junior Company Grade Officer | Oct - Dec 1997 | 1st Lt Richard A. Contreras | |
| SMC Quarterly Award Winners | Senior Noncommisssioned Officer | Oct - Dec 1997 | Sr Master Sgt Andrew Shigg Jr. | 61 Communications Squadron |
| SMC Quarterly Award Winners | Noncommissioned Officer | Oct - Dec 1997 | Staff Sgt Warren G. Conrow | |
| SMC Quarterly Award Winners | Airman | Oct - Dec 1997 | Senior Airman James G. Suggs Jr. | |
| SMC Quarterly Award Winners | Senior-level Civilian | Oct - Dec 1997 | Chau M. Phan | |
| SMC Quarterly Award Winners | Mid-level Civilian | Oct - Dec 1997 | Anita C. Ferber | |
| SMC Quarterly Award Winners | Junior-level Civilian | Oct - Dec 1997 | Willie May | |
| | | | | |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Linda Drum | SMC/AX |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Sunila Narain | SMC/CI |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Gregg Kraver | Det 8 |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Jane Dziedzic | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Chau M. Phan | SMC/MT |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Anita Hadorn | SMC/TE |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Ramesh Chaubey | SMC/XR |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | Oct - Dec 1997 | Timothy Bellings | 61 CS |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Budget Analyst of the Quarter | Oct - Dec 1997 | Thomas Moss | SMC/TM |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Notable Achievement | Oct - Dec 1997 | Tony Riccio | SMC/FM |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Notable Achievement | Oct - Dec 1997 | Irma Torres | SMC/FM |

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|---|---|---|---|---|
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Alie Rodriquez | Det 8 |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Ken Bernard | SMC/CZ |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Noami Dejesa | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Susan Seute | SMC/MT |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Audrey Campbell | SMC/PK |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Nancy Lingo | SMC/TE |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | Oct - Dec 1997 | Sylvia Montemayor | 61 CS |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Lavivian Robinson | SMC/CL |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Robin Warren | SMC/CW |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Judy Bantz | SMC/CZ |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Dorothy Mehta | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Barbara Wilkerson | SMC/MT |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Theresa Contreras | SMC/PK |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Vanessa Aragon | SMC/TE |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | Oct - Dec 1997 | Michael Rappaport | SMC/XR |
| | | | | |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | David Graham | SMC/AX |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Bill Trombetta | SMC/CI |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Gregg Kraver | SMC/CL |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Warren Carlson | SMC/CZ |

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|---|---|---|---|---|
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Kathy Higgins | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Kim Vu | SMC/MT |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Sallie Grubbs | SMC/PK |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Senior Level | FY 1997 | Anita Hadorn | SMC/TE |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Carlos Rodrigues | SMC/CI |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | David Eaton | Det 8 |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Nancy Andrews | SMC/CW |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Majonka Carbajal | SMC/CZ |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | John Hamilton | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Serefino Silva | SMC/MT |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Anita Ferber | SMC/PK |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Mid Level | FY 1997 | Nancy Lingo | SMC/TE |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Susan Bretherton | SMC/AX |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Ann Fujii | SMC/CI |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Lakisha Jefferson | SMC/CL |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Dena Houston | SMC/CW |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Clair Garcia | SMC/CZ |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Yvette Rico | SMC/MC |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Phuc Murphy | SMC/MT |

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|---|---|---|---|---|
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Yolanda Spears | SMC/MV |
| SMC Senior Civilian Advisory Group Civilian Award Winners | Junior Level | FY 1997 | Allison Flanagan | SMC/PK |
| | | | | |
| Air Force Association Award Winners | General Bernard A. Schriever Award | FY 1997 | Rocket Systems Launch Programs | RSLP/Kirtland AFB |
| | | | | |
| SMC Annual Award Winners | Senior Company Grade Officer | FY 1997 | Capt Steven P. Whitney | SBIRS Program Office |
| SMC Annual Award Winners | Junior Company Grade Officer | FY 1997 | 1st Lt Woodrow Am Meeks | Advanced Systems Directorate |
| SMC Annual Award Winners | Senior Noncommisssioned Officer | FY 1997 | Sr Master Sgt Andrew Shigg Jr. | 61 Communications Squadron |
| SMC Annual Award Winners | Senior Noncommisssioned Officer | FY 1997 | Master Sgt Ronnie D. Blankinship | VAFB, Det 9 |
| SMC Annual Award Winners | Noncommissioned Officer | FY 1997 | Staff Sgt Angela D. Smith | Comptrollers Office |
| SMC Annual Award Winners | Noncommissioned Officer | FY 1997 | Staff Sgt Edward A. Hayes | VAFB, Det 9 |
| SMC Annual Award Winners | Airman | FY 1997 | Sr Airman Barbara J. Baker | Advanced Systems Directorate |
| SMC Annual Award Winners | Senior-level Civilian | FY 1997 | Warren A. Carlson | NAVSTAR GPS Program Office |
| SMC Annual Award Winners | Mid-level Civilian | FY 1997 | Carlos Rodrigues | DMSP Program Office |
| SMC Annual Award Winners | Junior-level Civilian | FY 1997 | Anna R. Fuji | DMSP Program Office |
| | | | | |
| JPO People's Choice Award | | FY 1997 | Darrel Weaver | SMC/CZ |
| AFMC Social Actions Chief of the Year | | FY 1997 | Capt Lisa A. Day | 61 ABG |
| AFMS Social Actions Technician of the Year | | FY 1997 | Staff Sgt Ramona David | 61 ABG |
| SMC Senior Noncommissioned Officer Security Forces of the Year | | FY 1997 | Master Sgt George A. Johnson | 61 ABG |

| | | | | |
|---|---|---|---|---|
| SMC Noncommissioned Officer Security Forces of the Year | | FY 1997 | TSgt James H. Luellen | 61 ABG |
| AFMC Communication and Information Professionalism Award | | FY 1997 | Capt Darrell J. Clark | 61 ABG |
| AFMC Outstanding Communication Computer Systems Managers of the Year | | FY 1997 | SMSgt Andrew Shigg | 61 ABG |
| AFMC Outstanding Communication Computer Systems Managers of the Year | | FY 1997 | TSgt Luis Gomes | 61 ABG |
| AFMC Visual Information Manager of the Year | | FY 1997 | Sr Airman Jefrey Clapper | 61 ABG |
| AFMC Commitment to Service | | FY 1997 | Lt Col Gregory L. Parish | 61 MSS |
| AFMC Field Grade Nurse of the Year | | FY 1997 | Lt Col Jane E. Cozier | 61 MSS |
| AFMC Outstanding Dental Junior Officer of the Year | | FY 1997 | Maj Roy C. Marlow | 61 MSS |
| AFMC Outstanding Dental NCO of the Year | | FY 1997 | SSgt Stephania A. Gilkey | 61 MSS |
| AFMC Bioenvironmental Engineering Outstanding Technician of the Year | | FY 1997 | Sgt Brian P. Whitehouse | 61 MSS |
| AFMC Outstanding Production, Manufacturing and Quality Assurance Award | | FY 1997 | Lyn K. Lecompte | Acquisition Directorate |
| | | | | |
| Air Force Achievement Award | | FY 1997 | Tech Sgt Gerald D. Jones | 61 ABG |
| Air Force Achievement Award | | FY 1997 | Tech Sgt Terry Q. Sulton | 61 ABG |
| Air Force Achievement Award | | FY 1997 | Staff Sgt William House | 61 ABG |
| Air Force Achievement Award | | FY 1997 | Staff Sgt Barry J. Kennett | 61 ABG |
| Air Force Achievement Award | | FY 1997 | Staff Sgt Ronnell B. Ramos | 61 ABG |
| | | | | |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Eric Shulman | SMC/AX |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Candice Gill | SMC/MC |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Teh-Fuh Oh | SMC/MT |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Ray Gallagher | SMC/PK |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Timothy H. Prescott | SMC/SC |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Geleta Smith | SMC/TE |

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| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | Hamed G. Khozaim | SMC/XR |
| LAAFB Civilian Quarterly Awards | Senior Level | Jan-Mar 1998 | JoAnn M. White | SMC/CL |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Marco N. Rodriguez | SMC/AX |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Noreen M. Miles | SMC/CCP |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Patricia Mahoney | SMC/CI |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | John R. Peterson | SMC/CL |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Ernestine R. Reed | SMC/CZ |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | James Batchelor | SMC/MC |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Donia Keys | SMC/MT |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Inex Canady | SMC/TE |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Barbara A. Neal | SMC/XR |
| LAAFB Civilian Quarterly Awards | Mid Level | Jan-Mar 1998 | Debra E. Thumser | 61 MDS |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Laverne Williams | SMC/CL |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Mary V. Davis | SMC/CZ |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Janice M. Nicol | SMC/DP |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Kathleen Miller | SMC/MC |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Pamela Johnson | SMC/PK |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Johathan Leibert | SMC/TE |
| LAAFB Civilian Quarterly Awards | Junior Level | Jan-Mar 1998 | Stephanie C. Kidd | SMC/XR |
| LAAFB Civilian Quarterly Awards | Senior Company Grade Officer | Jan-Mar 1998 | Capt Cheryl R. Farrer | |
| LAAFB Civilian Quarterly Awards | Junior Company Grade Officer | Jan-Mar 1998 | 1st Lt Thomas C. O'Malley | |
| LAAFB Civilian Quarterly Awards | Annual Volunteer Excellence Award | Jan-Mar 1998 | Lin S. Jensen | SMC/PK |
| LAAFB Civilian Quarterly Awards | Distinguished Public Service Award | Jan-Mar 1998 | Lin S. Jensen | SMC/PK |
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| LAAFB Quarterly Awards | Senior Company Grade Officer | April-June 1998 | Capt Mark A. Baird | SMC/ADE |
| LAAFB Quarterly Awards | Junior Company Grade Officer | April-June 1998 | 2nd Lt Katrina L. Compton | 61 ABG/CEE |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | April-June 1998 | Master Sgt Brent Carter | SMC/XRS |
| LAAFB Quarterly Awards | Noncommissioned Officer | April-June 1998 | Tech Sgt Oren K. Lizana | 61 MDS/SGS |
| LAAFB Quarterly Awards | Airman | April-June 1998 | Airman 1st Class Verna L. McQueeney | 61 MDS/SGSAL |
| LAAFB Quarterly Awards | Airman | April-June 1998 | Sr Airman John P. Mere | 61 MSS/CCQ |
| LAAFB Quarterly Awards | Senior-level Civilian | April-June 1998 | Bobbie J. Aikels | SMC/PKX |
| LAAFB Quarterly Awards | Mid-level Civilian | April-June 1998 | Melissa a. Duong | SMC/MCK |
| LAAFB Quarterly Awards | Junior-level Civilian | April-June 1998 | Olga L. Chachere | SMC/CIK |

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| LAAFB Quarterly Awards | Senior Company Grade Officer | April-June 1998 | Capt Mark A. Baird | SMC/ADE |
| LAAFB Quarterly Awards | Junior Company Grade Officer | April-June 1998 | 2nd Lt Katrina L. Campton | 61 ABG/CEE |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | April-June 1998 | MSgt Brent Carter | SMC/XRS |
| LAAFB Quarterly Awards | Noncommissioned Officer | April-June 1998 | TSgt Oren K. Lizana | 61 MDS/SGS |
| LAAFB Quarterly Awards | Airman | April-June 1998 | Airman 1st Class Verna L. McQueeney | 61 MDS/SGSAL |
| LAAFB Quarterly Awards | Airman | April-June 1998 | Senior Airman John P. Mere | 61 MSSCCQ |
| LAAFB Quarterly Awards | Senior-level Civilian | April-June 1998 | Bobbie J. Aikels | SMC/PKX |
| LAAFB Quarterly Awards | Mid-level Civilian | April-June 1998 | Melissa A. Duong | SMC/MCK |
| LAAFB Quarterly Awards | Junior-level Civilian | April-June 1998 | Olga L. Chachere | SMC/CIK |
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| LAAFB Quarterly Awards | Honor Guard Member of the Quarter | Oct - Dec 1998 | Capt Daniel McCutchon | SBIRS Program Office |
| LAAFB Quarterly Awards | Senior Company Grade Officer | Oct - Dec 1998 | Capt Dawn M. Coley | 61 MSS |
| LAAFB Quarterly Awards | Junior Company Grade Officer | Oct - Dec 1998 | 1st Lt Allan A. Carreiro | MILSATCOM Program Office |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | Oct - Dec 1998 | MSgt Stuart A. Gray | 61 ABG |
| LAAFB Quarterly Awards | Noncommissioned Officer | Oct - Dec 1998 | SSgt Frank J. Baldus Jr. | SMC/CC (NCOIC) |
| LAAFB Quarterly Awards | Airman | Oct - Dec 1998 | Airman 1st Class Aaron M. Malek | |
| LAAFB Quarterly Awards | Mid-level Civilian | Oct - Dec 1998 | Jean Williams | Contracting Directorate |
| LAAFB Quarterly Awards | Junior-level Civilian | Oct - Dec 1998 | David Toler | Developmental Planning Directorate |
| LAAFB Quarterly Awards | Clerical-level Civilian | Oct - Dec 1998 | Marla P. Jordan | GPS Joint Program Office |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Irma Gonzales | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | William Trombetta | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Steve Brennan | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Mary Quain | SMC/CW |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | John Ruggiero | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Judy Thiele | SMC/DP |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Milly Radakovich | SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | James Gill | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Loretta Umetsu | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Bobbie Aikels | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Maria Aurora Vigil | SMC/TE |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | April-June 1998 | Donald Gasner | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Della Hinesley | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Renee Stenborg | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Christine Suttles | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Melissa Duong | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Janice McFarland | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Judy Parnock | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Arlene Dudley | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Mary Kruelskie | SMC/TE |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Paula Provost | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Thomas Sanders | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | April-June 1998 | Harold Robertson | 61 ABG |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Susan Bretherton | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Jones Kim | SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Lina Litonjua | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Yolanda Spears | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Olga Chachere | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Irene Hernandez | SMC/TE |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Donna Whitman | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Doreen Robinson | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Esperanza Connor | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | April-June 1998 | Cheryl Scott | 61 CS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | April-June 1998 | Donna Picard | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Audrey Fox | Interest Penalty Payments IPT, SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Resa Fredericks | Interest Penalty Payments IPT, SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Robert Kato | Interest Penalty Payments IPT, SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Shenell Cooper | Interest Penalty Payments IPT, SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Dennis Hass | Interest Penalty Payments IPT, SMC/FM |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Team of the Quarter | April-June 1998 | Deborah Taylor | Interest Penalty Payments IPT, SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Star Quality Award | April-June 1998 | Daniel Rodriguez | SMC/MO |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Naomi DeJesa | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Priscilla Duernberger | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Jackie J. Farley | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Michel M. Guthrie | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Sharon M. Lolanowski | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Rafael M. Martinez | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Rosalinda McCormick | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Karen L. Ross | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Level | Jul-Sep 1998 | Robert Wilson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Marie Burden | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Linnea L. Burris | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Robert E. Donald | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Alice M. Johnson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Nancy C. Lingo | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Dorothy Mehta | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Mary E. Proctoer | |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Aaron L. Renenger | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jul-Sep 1998 | Marta E. Villa | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Bev Campbell | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Marlon O. Coronado | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Cara J. Elder | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Maria Garcia | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Ruby A. Hawkins | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Arminda Lewis | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Leffrey G. Moline | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jul-Sep 1998 | Chrishon Tiffith | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Robert M. Cappasola | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Catherine c. Dozier | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Cheryl R. Johnson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Jan R. Krueger | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Fred H Lyles | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Margarite McDermott | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Cal M. Morioka | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Mark D. Schubert | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Marianne F. Traylor | |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Tom K. Watson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Notable Achievement Award | Jul-Sep 1998 | Fernnelia D. Wilson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Special Act Award | Jul-Sep 1998 | Mary V. Davis | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Senior Budget Analyst of the Quarter | Jul-Sep 1998 | Linda Jung | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level Performer | Jul-Sep 1998 | Irma J. Torres | |
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| SMC Fourth Quarter Award Winners | Senior Company Grade Officer | Oct - Dec 1998 | Capt Davil A. Searle | DMSP Program Office |
| SMC Fourth Quarter Award Winners | Junior Company Grade Officer | Oct - Dec 1998 | 1st Lt Daniel R. Shingledecker | SMC Contracting Directorate |
| SMC Fourth Quarter Award Winners | Senior Noncommisssioned Officer | Oct - Dec 1998 | MSgt Timothy D. Daron | 61 MSS |
| SMC Fourth Quarter Award Winners | Noncommissioned Officer | Oct - Dec 1998 | SSgt Jerome A. Nash | 61 MDS |
| SMC Fourth Quarter Award Winners | Airman | Oct - Dec 1998 | Senior Airman Raminah I. Hartke | SMC Launch Programs Directorate |
| SMC Fourth Quarter Award Winners | Honor Guard Member of the Quarter | Oct - Dec 1998 | TSgt Allen C. Cromer Jr. | SMC Advanced Systems Directorate |
| SMC Fourth Quarter Award Winners | Mid-level Civilian | Oct - Dec 1998 | Charles J. Briggs | DMSP Program Office |
| SMC Fourth Quarter Award Winners | Junior-level Civilian | Oct - Dec 1998 | Dorothy A. Mehta | MILSATCOM Program Office |
| SMC Fourth Quarter Award Winners | Clerical-level Civilian | Oct - Dec 1998 | Marlon O. Coronado | 61 MDS |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | John R. Peterson | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | Jimmie Thornton | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | Donna M. Kimball | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | Michael J. Zellmer | SMC/MT |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | Ronea L. Alger | SMC/PA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | Jean Williams | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | David O. Best | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1998 | David J. Wiggins | 61 CS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Linda Meza-Perez | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Wanda Oden Meyers | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Ariel Tonnu | SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Florentina R. Way | SMC/JA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Yolanda A. Spears | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | David R. Toler | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1998 | Scott D. Kowalski | 61 SFS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1998 | Marla Jordan | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1998 | Wendy L. Marshall | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1998 | Willie L. Gourley | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1998 | Iliana Briseno | 61 MDS |
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| SMC Annual Award Winners | Senior Company Grade Officer | FY 1998 | Capt Donald J. Cothern | MILSATCOM Program Office |
| SMC Annual Award Winners | Junior Company Grade Officer | FY 1998 | 2nd Lt Michelle R. Brunswick | Satellite and Launch Control Systems Programs Office |
| SMC Annual Award Winners | Senior Noncommisssioned Officer | FY 1998 | MSgt Robin L. Williams | 61 MDS |

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| SMC Annual Award Winners | Noncommissioned Officer | FY 1998 | TSgt Oren K. Lizana | 61 MDS |
| SMC Annual Award Winners | Airman | FY 1998 | Senior Airman Jeffrey W. Clapper | 61 CS |
| SMC Annual Award Winners | Honor Guard Member of the Quarter | FY 1998 | SSgt Peter R. S. Carreon | Advanced Systems Directorate |
| SMC Annual Award Winners | Mid-level Civilian | FY 1998 | Robert T. Wilson | MILSATCOM Program Office |
| SMC Annual Award Winners | Junior-level Civilian | FY 1998 | Barbara A. Neal | Developmental Planning Directorate |
| SMC Annual Award Winners | Administrative Support Level | FY 1998 | Marlon O. Coronado | 61 MSS |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Gracie A. Wantland | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Patricia Mahoney | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Norma F. Jackson | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Jimmie Thornton | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Jackie J. Farley | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Robert Wilson | SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Melissa Duong | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Naomi DeJesa | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Aaron L. Renenger | SMC/PA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Dennis A. Hass | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | David O. Best | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Dina Williams | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1998 | Anthony Walker | 61 CS |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Susan A. Bretherton | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Linda Meza-Perez | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Wanda Oden Meyers | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Ariel Tonnu | SMC/FM |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Marie Burden | SMC/JA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Dorothy Mehta | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Yolanda A. Spears | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Barbara A. Neal | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1998 | Robert E. Donald | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | FY 1998 | Laverne Williams | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | FY 1998 | Trina M. Scott | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | FY 1998 | Nina M. Smith | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | FY 1998 | Marlon O. Coronado | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | FY 1998 | Iliana Briseno | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Cost Civilian of the Year | FY 1998 | Cal M. Morioka | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Analysis Civilian of the Year | FY 1998 | Loretta N. Umetsu | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Mary H. Alverio | GPS Modernization Program Office Estimate Team |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Kim A. Holman | |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Cal M. Morioka | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Phu-Phuong Nguyen | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Darlene P. Thompson | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Management Organization of the Year | FY 1998 | Darrell L. Weaver | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Analysis Office of the Year | FY 1998 | Loretta N. Umetsu | Evolved Expendable Launch Vehicle |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Analysis Office of the Year | FY 1998 | Patricia J. Boatman | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Financial Analysis Office of the Year | FY 1998 | Naomi Dejesa | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Special Acts and Services | FY 1998 | Carla F. Parnell | Financial Management Plans and Management Division |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Fiscal 1998 Special Acts and Services | FY 1998 | Tony Riccio | Financial Management Plans and Management Division |
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| Special Act or Service Award | | FY 1998 | Harriet R. Fuller | |
| Notable Achievement Award | | FY 1998 | Gregory A. Kane | |
| Notable Achievement Award | | FY 1998 | Phuc T. Murphy | |
| Notable Achievement Award | | FY 1998 | Michael J. Tolliver | |
| Notable Achievement Award | | FY 1998 | Kim Vu | |
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| Air Force, Best in the Air Force for 1998 | Public Affairs Community Relations Office | FY 1998 | SMC/PA | |
| Air Force Award | Air Force Civilian Personnel Specialist of the Year | FY 1998 | Colette Alvarez | 61 MSS |
| Air Force Award | Special Acts and Services Award | FY 1998 | Carla F. Parnell | SMC/FM, CCAR/ABSS Integration Team |

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| Air Force Award | Special Acts and Services Award | FY 1998 | Tony Riccio | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | Jerry Murray | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | Dwayne Jones | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | Zonia Smith | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | David Wang | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | Nickolay Reymers | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | SSgt Terrance Smith | SMC/FM, CCAR/ABSS Integration Team |
| Air Force Award | Special Acts and Services Award | FY 1998 | SSgt David Thompson | SMC/FM, CCAR/ABSS Integration Team |
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| AFMC Awards | AFMC Best Internal Division in AFMC (Media Contest) | FY 1998 | SMC/PA | |
| AFMC Awards | AFMC Best Community Relations Division in AFMC | FY 1998 | SMC/PA | |
| AFMC Awards | AFMC Best Commander Support in AFMC | FY 1998 | SMC/PA | |
| AFMC Awards | AFMC Best Commercial Newspaper in its class in AFMC | FY 1998 | SMC/PA | |
| AFMC Awards | AFMC Best Planned Single Event for POW/MIA Day | FY 1998 | SMC/PA | |
| AFMC Awards | AFMC Best Television News Program | FY 1998 | 61 CS Video Services | |
| AFMC Awards | AFMC Best Television Feature Program | FY 1998 | 61 CS Video Services | |

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| AFMC Awards | AFMC Best Television Sports Program | FY 1998 | 61 CS Video Services | |
| AFMC Awards | AFMC Best Television Information Program | FY 1998 | 61 CS Video Services | |
| AFMC Award | Air Force Materiel Command Personnel Specialist | FY 1998 | Colette Alvarez | 61 MSS |
| AFMC Award | AFMC Civilian Program Manager of the Year | FY 1998 | Lorett Umetsu | EELV Program Office |
| AFMC Award | Best in AFMC | FY 1998 | Social Actions Office/Military Equal Opportunity Office | |
| AFMC Team Excellence Award | | FY 1998 | Launch Systems Environmental Team | Launch Programs System Program Office |
| AFMC Personnel Specialist of the Year | | FY 1998 | Colette Alvarez | DPC |
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| Combined Federal Campaign Bronze and Ruby Awards | | FY 1998 | SMC | |
| Rotary National Award for Space Achievement | | FY 1998 | Capt Jim R. Hunter | Developmental Planning Office |
| Federal Executive Board Distinguished Public Service Awards | Outstanding Individual Accomplishments | FY 1998 | Gerald Verduft | |
| Federal Executive Board Distinguished Public Service Awards | Outstanding Individual Accomplishments | FY 1998 | Yolanda Spears | |
| Federal Executive Board Distinguished Public Service Awards | Self Development Award | FY 1998 | Chau M. Phan | |
| Federal Executive Board Distinguished Public Service Awards | Outstanding Team Accomplishment | FY 1998 | EELV Systems Program Office | |
| Federal Executive Board Distinguished Public Service Awards | Certificates of Merit | FY 1998 | Sallie Grubs | |
| Federal Executive Board Distinguished Public Service Awards | Certificates of Merit | FY 1998 | Saul Ortigoza | |
| Federal Executive Board Distinguished Public Service Awards | Certificates of Merit | FY 1998 | Warren Carlson | |
| Federal Executive Board Distinguished Public Service Awards | Certificates of Merit | FY 1998 | Joyce Mullenback | |
| Federal Executive Board Distinguished Public Service Awards | Certificates of Merit | FY 1998 | 5th Annual Run for Good Times Planning Committee | |

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| SMC Team Excellence Award | | Spring 1998 | Advanced Systems Directorate's Space Application Project Office 2000 Division Team | |
| SMC Team Excellence Award | | Spring 1998 | 377th Air Base Wing's Manpower and Quality Team | |
| Diamond Sharp Award | | FY 1998 | Staff Sgt Jerome A. Nash | |
| Ronald McDonald Fun Run Commander's Challenge | | FY 1998 | SBIRS Program Office | |
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| Air Force Association Awards | Senior Officer of the Year | FY 1998 | Col Michael J. Dunn | |
| Air Force Association Awards | Officer of the Year | FY 1998 | Lt Col Gary A. Kyle | |
| Air Force Association Awards | EELV Program Office Award of Excellence | FY 1998 | Sr Master Sgt Jay R. Mackey | Det 8 |
| Air Force Association Awards | Unit of the Year | FY 1998 | Launch Programs Systems Program Office | |
| Air Force Association Awards | Civilian of the Year | FY 1998 | Warren A. Carlson | MILSATCOM Program Office |
| Air Force Association Awards | Senior Company Grade Officer of the Year | FY 1998 | Capt Mark A. Baird | Advanced Systems Directorate, Contracting Division |
| Air Force Association Awards | Junior Company Grade Officer of the Year | FY 1998 | 1st Lt Nikole L. Wilson | Det 8 Launch Programs Office |
| Air Force Association Awards | Senior Noncommissioned Officer of the Year | FY 1998 | Master Sgt Lisa M. Camp | Det 8 CLNPE |
| Air Force Association Awards | Noncommissioned Officer of the Year | FY 1998 | Tech Sgt Duane C. Sorgaard | Advanced Systems Directorate |
| Air Force Association Awards | Airman of the Year | FY 1998 | Sr Airman Jason A. Tuia | Launch Programs Office |
| Air Force Association Awards | Scientist/Engineer of the Year | FY 1998 | Maj Bryan L. Kelchner | ABL Systems Program Office, Kirtland AFB |

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| Air Force Association Awards | Support Person of the Year | FY 1998 | Capt James D. McCreary | NAVSTAR GPS Program Office |
| Air Force Association Awards | Manager of the Year | FY 1998 | Lt Col Gregory D. Glover | MILSATCOM Program Office |
| General Bernard A. Schriever Award | | FY 1998 | Darleen Druyun | Principal Deputy Assistant Secretary of the Air Force For Acquisition and Management |
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| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Maj Betty Bennett | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Steve Cobb | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Noble Dowling | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dave Eidson | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Jon Francine | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dr. Michael Jemiola | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Norm Keegan | LAAFB Launch Programs Environmental Systems Team |

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| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Capt Bill Kempf | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Theresa Kinzer-Varin | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Capt Brian Laine | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Margaret Lonning | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dr. Gary Loper | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dr. Bart Lundblad | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Leslie Meyers | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dr. Marty Ross | LAAFB Launch Programs Environmental Systems Team |
| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Andrea Ryan | LAAFB Launch Programs Environmental Systems Team |

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| Air Force Chief of Staff Team Excellence Award | | FY 1998 | Dr. Phil Thorson | LAAFB Launch Programs Environmental Systems Team |
| Federal Executive Board Distinguished Public Service Awards | | April-June 1998 | Chau M. Phan | |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Arthur Welton | Advanced Systems Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Phyllis Meyers | Directorate of Systems Acquisition |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Alan Wall | DMSP Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Roslyn Woods | Launch Programs Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Jackie J. Farley | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Phillip Sanchez | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Susan Moody | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Aaron L. Renenger | SMC/PA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Dung Do | Directorate of Developmental Planning |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Jeraldine Herbert | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 1999 | Todd Goldsmith | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Tasha Mason | Directorate of Systems Acquisition |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Debra McNeil | Launch Programs Directorate |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Carol Laechelt | Satellite and Launch Control Systems Programs Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Jennifer Grigsby | Comptrollers Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Bobra Wilkerson | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Carla Walker | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Carlen Capenos | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 1999 | Federico Agcaoili | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Jan-Mar 1999 | Cathy Eppright | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Jan-Mar 1999 | Robert Boudrot | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Jan-Mar 1999 | Jill Martin | 61 MDS |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Joanne Russell | Systems Acquisition Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Debra Brooks | Comptrollers Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Edwin Perez | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Naomi DeJesa | EELV Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Stanley Wheeler | Contracting Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Dung Do | Developmental Planning Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Delores Lowe | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 1999 | Marcie Stevens | 61 CS |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 1999 | Susan Bretherton | Systems Acquisition Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 1999 | Olga Chachere | DMSP Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 1999 | Brenda Young | DMSP Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 1999 | Cheryl Cobbs | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 1999 | Terri Mathis | 61 CS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Apr-June 1999 | Roberto Saldana | SMC/XP |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Apr-June 1999 | Gerardo Fernandez | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Apr-June 1999 | Kandie Morgan | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Apr-June 1999 | Marlon O. Coronado | 61 MSS |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Gracie A. Wantland | Directorate of Systems Acquisition |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Sally Petersen | DMSP Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Robert Graham | Launch Programs Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Pam Vilhauer | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Donna M. Kimball | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Ann Fujii | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Patricia Boatman | EELV Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Delores Duncan | SMC/XP |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Joan Kunkler | Developmental Planning Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Douglas Balhorn | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 1999 | Jim Tisdale | Directorate of Contracting |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Diana Lutter | Advanced Systems Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Mark Alexander | Directorate of Systems Acquisition |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Mary Davis | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Joel Perrine | Directorate of Contracting |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Jonnette Sadiq | 61 CS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 1999 | Bonnie Adkins | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Isidora Taitano | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Mary Barnes | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Tamara Jones | Directorate of Contracting |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Rasheedah Young | SMC/XP |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Darlene Fretwell | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Iliana Briseno | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Level | Oct - Dec 1999 | Glenn Hooks | 61 MSS |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Arthur Welton | Advanced Systems Directorate |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Thomas Huynh | Systems Acquisition Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Ching Shelton | Launch Programs Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Stanley Wheeler | Satellite and Launch Control Systems Programs Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | James Crawford | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Linda Ramirez | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | John McIvers | Contracting Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Edwin Perez | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Virginia Callanan | Developmental Planning Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 1999 | Douglas Balhorn | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Shenell Gipson-Cooper | Advanced Systems Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Susan Bretherton | Systems Acquisition Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Brenda Young | Launch Programs Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Mary Davis | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Bobra Wilkerson | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Karen Duong | EELV Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Joel Perrine | Contracting Directorate |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | David Toler | Developmental Planning Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Judy Seballos | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 1999 | Bonnie Adkins | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Remona McNelton | Advanced Systems Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Harriet Colder | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Isidora Taitano | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Chire Tolbert | SBIRS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Rasheedah Young | Plans and Programs Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Nancy Feist | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 1999 | Jill Martin | 61 MSS |
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| LAAFB Quarterly Awards | Honor Guard Member of the Quarter | Jan-Mar 1999 | 1st Lt Linda Wilson | DMSP Program Office |
| LAAFB Quarterly Awards | Senior Company Grade Officer | Jan-Mar 1999 | Capt Jeffery B. Morris | MILSATCOM Program Office |
| LAAFB Quarterly Awards | Junior Company Grade Officer | Jan-Mar 1999 | 2nd Lt Jason J. Rafferty | SBIRS Program Office |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | Jan-Mar 1999 | MSgt Michael R. Douglas | Systems Acquisition Directorate |
| LAAFB Quarterly Awards | Noncommissioned Officer | Jan-Mar 1999 | SSgt Karen E. Fabian | Chief Master Sergeant's Office |
| LAAFB Quarterly Awards | Airman | Jan-Mar 1999 | Senior Airman Eumir C. Arceo | 61 CS |
| LAAFB Quarterly Awards | Mid-level Civilian | Jan-Mar 1999 | Arthur L. Welton | Contracting Directorate |
| LAAFB Quarterly Awards | Junior-level Civilian | Jan-Mar 1999 | Jennifer Grigsby | SMC/FM |

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| LAAFB Quarterly Awards | Administrative-level Civilian | Jan-Mar 1999 | Jill Martin | 61 MDS |
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| LAAFB Quarterly Awards | Senior Company Grade Officer | Jul-Sep 1999 | Capt Yvette Marquis | 61 MDS |
| LAAFB Quarterly Awards | Junior Company Grade Officer | Jul-Sep 1999 | 2nd Lt Kevin Eckerley | 61 MDS |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | Jul-Sep 1999 | MSgt Paula Harris | EELV Program Office |
| LAAFB Quarterly Awards | Noncommissioned Officer | Jul-Sep 1999 | TSgt Joseph Oliver | 61 MDS |
| LAAFB Quarterly Awards | Airman | Jul-Sep 1999 | Airman 1st Class Amy Browne | 61 MDS |
| LAAFB Quarterly Awards | Mid-level Civilian | Jul-Sep 1999 | Ann Fujii | SMC/MT |
| LAAFB Quarterly Awards | Junior-level Civilian | Jul-Sep 1999 | Joel Perrine | Contracting Directorate |
| LAAFB Quarterly Awards | Administrative-level Civilian | Jul-Sep 1999 | Iliana Briseno | 61 MDS |
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| SMC Annual Award Winners | Company Grade Officer of the Year | FY 1999 | 1st Lt Christopher Burner | Det 9 |
| SMC Annual Award Winners | Senior Noncommissioned Officer of the Year | FY 1999 | MSgt Mark Hall | Airborne Laser Program Office |
| SMC Annual Award Winners | Noncommissioned Officer of the Year | FY 1999 | TSt John Goodson | Det 9 |
| SMC Annual Award Winners | Airman of the Year | FY 1999 | Senior Airman Emuir Arceo | 61 CS |
| SMC Annual Award Winners | First Sergeant of the Year | FY 1999 | MSgt Harry Seballos | 61 MSS |
| SMC Annual Award Winners | Individual Mobilization Augmentee of the Year | FY 1999 | Lt Col John Capulli | Developmental Planning Directorate |
| SMC Annual Award Winners | Mid-Level Civilian of the Year | FY 1999 | Bobbie Blount | Airborne Laser Program Office |
| SMC Annual Award Winners | Junior-Level Civilian of the Year | FY 1999 | Susan Moore | Testing and Evaluation Directorate |
| SMC Annual Award Winners | Administrative Support Level Civilian of the Year | FY 1999 | Rasheedah Young | Plans and Programs Office |
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| Air Force Award | Missile Safety Award | FY 1999 | Det 9 | Vandenberg AFB |
| Air Force Award | Organizational Excellence Award | May 1997-April 1999 | Advanced Systems Directorate | |
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| Air Force Association Awards | Lt Gen John W. O'Neill Outstanding Program Office Director | FY 1999 | Col Richard W. McKinney | EELV Program Office |

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| Air Force Association Awards | Lt Gen Kenneth W. Schultz Award for Outstanding Program Manager | FY 1999 | Col Robert K. Saxer | SMC/MV |
| Air Force Association Awards | Lt Gen Richard C. Henry Leadership Award for Outstanding Officer or Senior Noncommissioned Officer | FY 1999 | Capt James B. Smith | SMC Contracting Directorate |
| Air Force Association Awards | Dr. Alfred Rockefeller, Jr. Award for Outstanding Civilian | FY 1999 | Patricia J. Dean | SMC/TM |
| Air Force Association Awards | Lt Gen Forrest S. McCartney Award for Outstanding Company Grade Project Officer | FY 1999 | Capt Andrew L. Boyd | MTAG |
| Air Force Association Awards | General Samuel C. Phillips Award for Outstanding Young Engineer/Scientist | FY 1999 | Capt Jon M. Anderson | SMC/CZE |
| Air Force Association Awards | General Bernard A. Schriever Award | FY 1999 | Secretary of the Air Force Whitten Peters | |
| Air Force Association Awards | Senior Officer of the Year | FY 1999 | Col Robert Cox | |
| Air Force Association Awards | Officer of the Year | FY 1999 | Maj Charles Kastenholz | |
| Air Force Association Awards | Award of Excellence | FY 1999 | Capt Bruce Wilder | |
| Air Force Association Awards | Unit of the Year | FY 1999 | Developmental Planning Directorate | |
| Air Force Association Awards | Civilian of the Year | FY 1999 | Deborah Westphal | |
| Air Force Association Awards | Company Grade Officer of the Year (over 4 years) | FY 1999 | Capt Donald Cothern | |
| Air Force Association Awards | Company Grade Officer of the Year (4 years or under) | FY 1999 | 2nd Lt Jason Rafferty | |
| Air Force Association Awards | Senior Noncommissioned Officer of the Year | FY 1999 | MSgt Harry Seballos | |
| Air Force Association Awards | Noncommissioned Officer of the Year | FY 1999 | SSgt Brett Boyum | |
| Air Force Association Awards | Airman of the Year | FY 1999 | Senior Airman Raminah I. Hartke | |
| Air Force Association Awards | Scientist/Engineer of the Year | FY 1999 | Mark Fagan | |
| Air Force Association Awards | Support Person of the Year | FY 1999 | Capt George Unsinger | |
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| Air Force Association Awards | Manager of the Year | FY 1999 | Lt Col Kenneth Robinson | |
| Outstanding Civilian Career Service Award | | FY 1999 | Gerald L. Verduft | |

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| AFMC Award | AFMC Team Quality Award | Jul-Sep 1999 | MILSATCOM, Advanced EHF Program Office Estimate Team | |
| John L. Levitow, Commandant's and Academic Achievement Award | | FY 1999 | Senior Airman Daniel Cockrell | |
| Department of Defense David Packard Excellence in Acquisition Award | | FY 1999 | EELV Systems Program Office | |
| John L. Levitow, Commandant's and Academic Award | | FY 1999 | TSgt Scott A. Gregg | 369th Recruiting Squadron |
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| Spirit Award | | FY 1999 | 61 MDS | |
| Angel Award | | FY 1999 | 1st Lt Stephen Hill | MILSATCOM Program Office |
| Angel Award | | FY 1999 | Maj Jeffrey Joyce | EELV Program Office |
| Angel Award | | FY 1999 | Sheryl Karle | NAVSTAR GPS Program Office |
| Angel Award | | FY 1999 | 1st Lt Jason Martini | NAVSTAR GPS Program Office |
| Angel Award | | FY 1999 | 1st Lt Tara McLaren | Directorate of Developmental Planning |
| Angel Award | | FY 1999 | Janet Miller | 61 MDS |
| Angel Award | | FY 1999 | Lorraine Ornelas | 61 MDS |
| Angel Award | | FY 1999 | Harry Demiere | 61 MDS |
| Angel Award | | FY 1999 | William Taylor | 61 MDS |
| Angel Award | | FY 1999 | Ray Friend | 61 MDS |
| Volunteer Excellence Award | | FY 1999 | David Brookfield | Staff Judge Advocate Office |
| Volunteer Excellence Award | | FY 1999 | Edward Maissian | Equal Employment Opportunity Office |
| Volunteer Excellence Award | | FY 1999 | Rick McGilton | Equal Employment Opportunity Office |

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| Volunteer Excellence Award | | FY 1999 | Fielding Watson | Equal Employment Opportunity Office |
| SMC Team Excellence Award | | FY 1999 | NAVSTAR GPS Joint Program Office | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Dahlia Acosta | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Barbara Arrant | Satellite and Launch Control Systems Programs Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | James Crawford | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Jeraldine Herbert | 61 CE |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Norma Jackson | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Ian Martin | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Sue Stratton | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Jan-Mar 2000 | Gloria Watkins | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Thelma Daniels | 61 SVS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Ann Frenzel | DMSP Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Diana Gilbert | NAVSTAR GPS Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Carol Laechelt | Developmental Planning Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Linda Meza-Perez | Launch Programs Directorate |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Gary Morheiser | SMC/AX |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Judith Solorzano | MILSATCOM Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Marcia Solski | 61 SFS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Jan-Mar 2000 | Yolanda Spears | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Jan-Mar 2000 | Jeanette Bangi | 61 SVS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Jan-Mar 2000 | Sherl Price | EELV Program Office |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Jan-Mar 2000 | Donielle Wilt | Directorate of Systems Acquisition |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | Kimberly Dandridge-Drennon | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | William Desmond | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | Lauren Fleishman | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | Sharon Kolanowski | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | Elfriede Orr | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Apr-June 2000 | Ariel Tonnu | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 2000 | Clarena Chambers | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 2000 | Joyce Howard | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 2000 | Joel Perrine | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 2000 | Mary Smith | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Apr-June 2000 | Larry Stewart | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Apr-June 2000 | Michelle Castleman | |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Apr-June 2000 | Catherine Eppright | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Apr-June 2000 | Remona McNelton | |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Apr-June 2000 | Lloyd Wills | |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Cathy Butler | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Gerald Crafton | SMC/AD |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | William Githens | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Thomas Huynh | SMC/AX |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Rafael Martinez | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Daniel McGilvray | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Dennis Nyman | 61 MSS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Sally Petersen | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Tanya Schoon | SMC/CZ |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | Oct - Dec 2000 | Arthur Welton | SMC/TL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 2000 | Lisa Caracoza | 61 SFS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 2000 | Mary Dew | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 2000 | Tamara Jones | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 2000 | Rosalinda Meza-Perez | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | Oct - Dec 2000 | Dorothy Mehta | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Lina Litonjua | SMC/MT |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Vernissa McLeod | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Delia Ortiz | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Lavivian Robinson | SMC/TL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Kelly Rusticelli | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Elizabeth Tua'au | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Nathaly Santin | SMC/JA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | Oct - Dec 2000 | Laverne Williams | SMC/CL |
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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | William Desmond | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Juanita Edwards | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Sarah Handy | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Rafael Martinez | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Daniel McGilvray | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Sally Petersen | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Mid Level | FY 2000 | Arthur Welton | SMC/TL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Allison Flanagan | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Karen Ho | SMC/MV |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Scot Kowalski | 61 SFS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Rosie Manning | 61 MDS |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Wendy L. Marshall | SMC/CZ |

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| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Remona McNelton | SMC/TL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Dorothy Mehta | SMC/MC |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Rosalinda Meza-Perez | SMC/CL |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Mary Smith | SMC/CI |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Marta Villa | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Junior Level | FY 2000 | Sherryl Williams | SMC/JA |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Michelle Castleman | 61 ABG |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Marzella Colter | SMC/XR |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Jeraline Louis | SMC/MT |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Vernissa McLeod | SMC/CW |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Della Ortiz | SMC/PK |
| SMC Senior Civilian Advisory Group Quarterly Awards Winners | Administrative Support Level | FY 2000 | Laverne Williams | SMC/CL |
| | Administrative Support Level | FY 2000 | Lloyd Wills | SMC/CZ |
| SMC Quarterly Award Winners | Senior Company Grade Officer | Apr-June 2000 | Capt Mark T. Skosich | |
| SMC Quarterly Award Winners | Junior Company Grade Officer | Apr-June 2000 | 2nd Lt Michelle G. Bernhard | |
| SMC Quarterly Award Winners | Senior Noncommisssioned Officer | Apr-June 2000 | MSgt Anthony G. Wood | |
| SMC Quarterly Award Winners | Noncommissioned Officer | Apr-June 2000 | SSgt Joseph G. Streets | |
| SMC Quarterly Award Winners | Airman | Apr-June 2000 | Senior Airman Christopher J. McGiveney | |
| SMC Quarterly Award Winners | Mid-level Civilian | Apr-June 2000 | Silliam W. Desmond | |
| SMC Quarterly Award Winners | Junior-level Civilian | Apr-June 2000 | Joel L. Perrine | |

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| SMC Quarterly Award Winners | Administrative-level Civilian | Apr-June 2000 | Michelle D. Castleman | |
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| Air Force Association Awards | Gen Bernard A. Schriever Award | FY 2000 | Gen Lester L. Lyles | AFMC Commander |
| Air Force Association Awards | Outstanding Program Director | FY 2000 | Col Douglas Loverro | SMC/CZ |
| Air Force Association Awards | Outstanding Field Grade Officer | FY 2000 | Col Peter Hoene | SMC/CZ |
| Air Force Association Awards | Lt Gen Richard C. Henry Leadership Award | FY 2000 | Lt Col Joseph Hollett | SMC/IN |
| Air Force Association Awards | Chapter Award of Excellence | FY 2000 | Lt Col Jane Robinson | SMC/MV |
| Air Force Association Awards | Outstanding Program Manager | FY 2000 | Lot Col Peter Vaccaro | SMC/CZ |
| Air Force Association Awards | Outstanding Young Engineer/Scientist | FY 2000 | Capt Kevin Carrow | |
| Air Force Association Awards | Outstanding CGO Project Officer | FY 2000 | Capt Jay Schatz | SMC/MC |
| Air Force Association Awards | 61st Medical Squadron COG of the Year | FY 2000 | 1st Lt Kevin Eckerley | 61 MSS |
| Air Force Association Awards | Outstanding Civilian | FY 2000 | George Pace | SMC/TE |
| Air Force Association Awards | Outstanidng NCO | FY 2000 | TSgt Packtrick Britton | SMC/XP |
| Air Force Association Awards | Outstanding Airman | FY 2000 | SSgt Raminah Hartke | SMC/CL |
| Air Force Association Awards | Unit of the Year | FY 2000 | SMC/TE | |
| Special Act or Service Award | | FY 2000 | Dolores D. Batiste | |
| 2000 SMC Team Winner | | FY 2000 | IN Recharged Intelligence Performance Improvement Team (RIP-IT) | |
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| Air Force Awards | Outstanding Unit Award | FY 2000 | 61 ABG | |
| Air Force Awards | Organizational Excellence Award | FY 2000 | MILSATCOM Program Office | |
| Air Force Awards | Organizational Excellence Award | FY 2000 | DMSP | |
| Air Force Awards | Organizational Excellence Award | FY 2000 | DoD Space Test Program | |
| Air Force Award | Organizational Excellence Award | FY 2000 | MILSATCOM Program Office | |
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| AFMC Award | Gen Jack Thomas Award | FY 2000 | Lt Col Joseph Hollett | Intelligence Directorate |

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| AFMC Award | Athlete of the Year | FY 2000 | Capt Valerie Manning | Onizuka AFS |
| AFMC Award | Best Small Base Health Promotion Program in 2000 | FY 2000 | LAAFB Health and Wellness Center | |
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| Volunteer Excellence Award | | FY 2000 | Dorothy Brown | |
| Volunteer Excellence Award | | FY 2000 | Kathleen M. Hall | |
| Volunteer Excellence Award | | FY 2000 | Barry Hash | |
| Volunteer Excellence Award | | FY 2000 | Norma Jackson | |
| Angel Award | | FY 2000 | Patrick E. Britton | |
| Angel Award | | FY 2000 | Edward d. Maissian | |
| Angel Award | | FY 2000 | Amy Miller | |
| Angel Award | | FY 2000 | Lt Col James Rosa | |
| Angel Award | | FY 2000 | Maj Raymond F. Warriner | |
| Angel Award | | FY 2000 | Rita Decelles | |
| SMC Award | Spring 2000 Team Excellence Award Winner | Spring 2000 | Directorate of Intelligence | |
| Diamond Award (Rideshare) | | FY 2000 | LAAFB | |
| Ellis Island Medal of Honor | | FY 2000 | Edward M. Salem | XP Deputy Director |
| | | | | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | Maj Mark Powers | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | Capt Thomas Miller | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | 1st Lt Keith Fisher | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | SMSgt Brent Carter | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | David Unangst | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | Joe Cooper | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | Joe Cooper Jr. | |
| "Duke" Kane Award | The Blue Room Team | FY 2000 | Ron English | |
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| SMC Quarterly Award Winners | SMC ABG/Staff Agency Category Team Award | Jul-Sep 2001 | 61 Air Base Defense Team | |
| SMC Quarterly Award Winners | SMC System Program Office Category Team Award | Jul-Sep 2001 | SMC/MC-Advanced Extremely High Frequency Negotiation Team | |
| SMC Quarterly Award Winners | Honor Guard Member of the Quarter | Jul-Sep 2001 | 1st Lt Anthony B. Paulson | |

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| SMC Quarterly Award Winners | Civilian of the Quarter, Mid Level | Jul-Sep 2001 | James Culpepper | DMSP Program Office |
| SMC Quarterly Award Winners | Civilian of the Quarter, Junior Level | Jul-Sep 2001 | Huston Walker | 61 SFS |
| SMC Quarterly Award Winners | Civilian of the Quarter, Admin Level | Jul-Sep 2001 | Tenesha Webb | 61 CS |
| SMC Quarterly Award Winners | Senior Company Grade Officer | Jul-Sep 2001 | Capt Ronnie V. Devlin | EELV Program Office |
| SMC Quarterly Award Winners | Junior Company Grade Officer | Jul-Sep 2001 | 2nd Lt Dick Wong | MILSATCOM Program Office |
| SMC Quarterly Award Winners | Senior Noncommissioned Officer | Jul-Sep 2001 | MSgt Hugh Bonmar | |
| SMC Quarterly Award Winners | Noncommissioned Officer | Jul-Sep 2001 | TSgt Jim C. Darity | |
| SMC Quarterly Award Winners | Airman | Jul-Sep 2001 | Senior Airman Alethea S. Keaton | |
| SMC Quarterly Award Winners | Team Los Angeles Spirit Award | Jul-Sep 2001 | 61 CS | |
| SMC Quarterly Award Winners | First Sergeant's Diamond Award | Jul-Sep 2001 | SSgt Rebecca Barnett | 61 MSS |
| SMC Quarterly Award Winners | First Sergeant's Diamond Award | Jul-Sep 2001 | SSgt Doug Fritts | 61 MDS |
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| LAAFB Quarterly Awards | Senior Company Grade Officer | Jan - Mar 2001 | Capt Michael Lee | 61 MDS |
| LAAFB Quarterly Awards | Junior Company Grade Officer | Jan - Mar 2001 | 1Lt Martine Detro | SMC/AD |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | Jan - Mar 2001 | MSgt George Johnson | SMC/AX |
| LAAFB Quarterly Awards | Noncommissioned Officer | Jan - Mar 2001 | TSgt Joseph Oliver | 61 MDS |
| LAAFB Quarterly Awards | Airman | Jan - Mar 2001 | SrA Carlos Ochoa | 61 ABG/CE |
| LAAFB Quarterly Awards | Mid-level Civilian | Jan - Mar 2001 | Dahlia Mauricio | SMC/CI |
| LAAFB Quarterly Awards | Junior-level Civilian | Jan - Mar 2001 | Trisha Middleton | SMC/PK |
| LAAFB Quarterly Awards | Administrative-level Civilian | Jan - Mar 2001 | Elizabeth Tua'Au | SMC/CI |
| | | | | |
| LAAFB Quarterly Awards | Senior Company Grade Officer | Apr - Jun 2001 | Capt Michael Guetlein | SMC/MT |
| LAAFB Quarterly Awards | Junior Company Grade Officer | Apr - Jun 2001 | Lt Robert Lyons III | SMC/MT |
| LAAFB Quarterly Awards | Senior Noncommisssioned Officer | Apr - Jun 2001 | MSgt Edwin Cotto | 61 CS/CSB |
| LAAFB Quarterly Awards | Noncommissioned Officer | Apr - Jun 2001 | SSgt Eumir Arceo | 61 CS/CSB |
| LAAFB Quarterly Awards | Airman | Apr - Jun 2001 | Amn Tisha Amerson | 61 CS/CSB |
| LAAFB Quarterly Awards | Mid-level Civilian | Apr - Jun 2001 | Patrick Garel | SMC/MT |
| LAAFB Quarterly Awards | Junior-level Civilian | Apr - Jun 2001 | Carlton Tucker | 61 CS/SCB |
| LAAFB Quarterly Awards | Administrative-level Civilian | Apr - Jun 2001 | Diane Huerte-Lomeli | SMC/MT |
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# APPENDIX H

# INSPECTOR GENERAL VISITS

# IG Visits

19 Mar 98, Acquisition management review conducted by AF/IG on GPS, SBIRS

1 April 99, Eagle look on Human system integration in AF acquisition conducted by AF inspection agency (AFIA) on Det 11 and SMC /TM

4 Aug 99, Eagle look on Program management administration funding conducted by AFIA on SMC AX/CL/CW/FM/MC/XP

29 Jan 5 Feb 2001, Unit compliance inspection and limited operational readiness inspections conducted by AFMC/IG on SMC (ALL)

# APPENDIX I

# CONTRACTS ISSUED

| Contract No. | Contractor | Program Name | Buyer | PK Ofc | PCO | Face Value ($) | Award Date | Expiration Date |
|---|---|---|---|---|---|---|---|---|
| F0470198C0207 | TEXTRON SYSTEMS CORP | CMB RV | VALDEZ,YOL | PKUO | ROSS,KAREN | $ 24,917,664.00 | 9/9/1998 | 2/28/2000 |
| F0470198C0012 | MCDONNELL DOUGLAS CORP | DELTA II | GRAHAM,ROB | PKVZ | QUINN,CATH | $ 48,000,000.00 | 6/23/1998 | 6/2/2001 |
| F0470198C0101 | SVS R&D SYSTEMS, INC. | DEV OF SMALL INERTIAL ATTITUDE | ARIAS,CIA | PKB | PEARSON,MEL | $ 94,552.00 | 4/21/1998 | 3/31/1999 |
| F0470198C0101 | SVS R&D SYSTEMS, INC. | DEV OF SMALL INERTIAL ATTITUDE | ARIAS,CIA | PKB | PEARSON,MEL | $ 94,552.00 | 4/21/1998 | 3/31/1999 |
| F0470198C0019 | AIREX CORP | DMSP | SMITH,CHER | PKT | MITCHELL,M | $ 749,825.00 | 6/23/1998 | 12/31/2002 |
| F0470198C0018 | FOSTER-MILLER INC | DMSP | SMITH,CHER | PKT | HARRISON,N | $ 399,998.00 | 6/23/1998 | 12/31/2000 |
| F0470198D0102 | MUNIZ ENGINEERING INC | DPSC | VIGIL,AURO | PKUL | DENMAN,ODE | $ 3,777,111.00 | 6/2/1998 | 6/1/2003 |
| F0470198C0039 | RAYTHEON COMPANY | FMS - EORUNAV | KIMBALL,DO | PKG | WATSON,CHA | $ 170,000.00 | 9/1/1998 | 10/22/1998 |
| F0470198C0001 | ROCKWELL COLLINS INC | FMS - NAVSTAR GPS | KIM,NAM H. | PKG | MCCREARY,J | $ 345,000.00 | 1/6/1998 | 1/6/1999 |
| F0470198D0010 | TRIMBLE NAVIGATION LTD | FMS NAVSTAR GPS | MARSHALL,W | PKG | BROWN,GREG | $ - | 4/1/1998 | 9/30/1999 |
| F0470198C0002 | BOEING NORTH AMERICAN INC | GPA BLOCK IIA FOLLOW-ON SUST | SCHOON,TAN | PKG | SMITH,DAVI | $ 3,948,127.00 | 1/21/1998 | 12/31/2003 |
| F0470198C0032 | ROCKWELL COLLINS, INC | GPS | PARR,ANDRE | CZK | WRIGHT,DAL | $ 6,440,073.00 | 8/7/1998 | 3/31/2003 |
| F0470198C0035 | ALLEN OSBORNE ASSOCIATES, INC. | GPS JPO | TOMM,MICHA | PKG | WRIGHT,DAL | $ 3,561,373.00 | 7/23/1998 | 3/31/2003 |
| F0470198C0034 | INTERSTATE ELECTRONICS CORP | GPS JPO | MARSHALL,W | PKG | TROMBETTA, | $ 3,735,854.00 | 7/23/1998 | 3/31/2003 |
| F0470198C0033 | INTERSTATE ELECTRONICS CORP | GPS JPO | RIPPENBAUM | PKG | WRIGHT,DAL | $ 9,999,232.00 | 7/31/1998 | 3/21/2003 |
| F0470198C0031 | TRIMBLE NAVIGATION, LIMITED | GPS JPO | MARSHALL,W | PKG | WRIGHT,DAL | $ 4,148,549.00 | 7/31/1998 | 3/31/2003 |
| F0470198C0030 | DYNAMICS RESEARCH CORPORATION | GPS JPO | MARSHALL,W | PKG | TRADER,ART | $ 2,435,000.00 | 8/20/1998 | 11/30/2001 |
| F0470198C0036 | RAYTHEON COMPANY | GPS JPO | RIPPENBAUM | PKG | TRADER,ART | $ 4,044,528.00 | 9/8/1998 | 10/31/2000 |
| F0470198C0014 | GALAXY SCIENTIFIC CORP | INFO TECHNOLOGY SERVICE SUP | FLEISHMAN, | PKR | MITCHELL,M | $ 825,000.00 | 9/30/1998 | 11/30/2000 |
| F0470198C0005 | LOCKHEED MARTIN ASTRONAUTICS | LAUNCH PROGRAM | ESCOE,BLAI | PKV | PACHECO,MA | $ 290,438,661.00 | 10/1/1997 | 9/30/2003 |
| F0470198C0005 | LOCKHEED MARTIN ASTRONAUTICS | LAUNCH PROGRAM | ESCOE,BLAI | PKV | PACHECO,MA | $ 290,438,661.00 | 10/1/1997 | 9/30/2003 |
| F0470198C0201 | ENSIGN-BICKFORD CO THE | LINEAR SHAPED CHARGES (SRDS) | BURNS,ROBE | PKUB | SEARLE,DAV | $ 1,144,618.00 | 7/30/1998 | 9/21/1999 |
| F0470198C0006 | AEROJET ELECTROSYSTEMS CO | RFP | CULPEPPER, | PKW | BROWN,GREG | $ 2,249,373.00 | 5/4/1998 | 4/30/2003 |
| F0470198C0103 | CSA ENGINEERING INC | SBIR AF98-071 | BLOUNT, B. | PK8B | JACKSON,MA | $ 100,000.00 | 4/20/1998 | 3/31/1999 |
| F0470198C0200 | GD, GOVT SYSTEMS CORP | STEC | MAUSS,GARY | PKUO | MANN,M. (D | $ 664,288.00 | 7/13/1998 | 9/30/2003 |
| F0470198C0017 | VIASAT INC | TINY TACTICAL WEATHER TERMINAL | SMITH,CHER | PKT | HARRISON,N | $ 749,999.00 | 7/28/1998 | 10/31/2000 |
| F0470199C0301 | SOUTH WEST RESEARCH INST | ANALYSIS & TEST OF ROBOTS | SMITH,CHER | PKT | HARRISON,N | $ 749,676.00 | 6/3/1999 | 11/22/2002 |
| F0470199C8001 | MCCORMICK SELPH INC | AODS | FIRTH,MIRA | TEKB | WEST,KENNE | $ 942,670.00 | 7/21/1999 | 7/21/2003 |
| F0470199C0205 | LOCKHEED MARTIN CORP | BACKUP TARGETS DELIVERY SYSTEM | ROSS,KAREN | PKUB | BONTLY,GLE | $ 7,632,294.00 | 2/11/1999 | 11/30/2000 |
| F3361599C3800 | PHYSICAL ACOUSTICS CORP | CONTINUOUS HEALTH MONITORING | NEMMERS, V | VAK | QUINN,CATH | $ 358,826.00 | 9/29/1999 | 4/30/2002 |
| F3361599C3801 | TETRA TECH DATA SYSTEMS | FIBER OPTIC SENSOR | WALKER,JES | PKV | UCCIARDI,B | $ 740,000.00 | 9/30/1999 | 1/30/2004 |
| F0470199C0021 | TRIMBLE NAVIGATION LTD | GONDOLA/STEL | MARSHALL,W | PKG | WATSON,CHA | $ 410,900.00 | 5/28/1999 | 1/30/2000 |
| F0470199C0024 | TRIMBLE NAVIGATION LTD | GONDOLA/STEL | MARSHALL,W | PKG | WATSON,CHA | $ 410,250.00 | 6/1/1999 | 2/3/2000 |
| F0470199C0023 | TRIMBLE NAVIGATION LTD | GONDOLA/STEL | MARSHALL,W | PKG | WATSON,CHA | $ 262,500.00 | 6/1/1999 | 2/3/2000 |
| F0470199C0022 | TRIMBLE NAVIGATION LTD | GONDOLA/STEL | MARSHALL,W | PKG | WATSON,CHA | $ 411,650.00 | 6/1/1999 | 2/3/2000 |
| F0470199C0051 | ROCKWELL COLLINS INC | GPS | TORTORELLA | PKG | BROWN,GREG | $ 5,357,370.00 | 6/16/1999 | 3/21/2003 |
| F0470198C0046 | TITAN SYSTEMS CORPORATION DBA | MILSTAR | THOMAS,NIC | PKJ | BRIGGS,CHA | $ 12,174,439.00 | 2/3/1999 | 12/1/2003 |
| F0470198C0046 | TITAN SYSTEMS CORPORATION DBA | MILSTAR | THOMAS,NIC | PKJ | BRIGGS,CHA | $ 12,174,439.00 | 2/3/1999 | 12/1/2003 |

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|---|---|---|---|---|---|---|---|---|---|
| F0470199C0317 | UNIVERSITY OF SOUTH FLORIDA | MOBILE ROBOTS | SMITH,CHER | PKT | HARRISON,N | $ | 561,957.00 | 9/24/1999 | 9/30/2004 |
| F0470199C0016 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | TOMM,MICHA | PKG | WATSON,CHA | $ | 407,460.00 | 8/6/1999 | 7/26/2001 |
| F0470199C0057 | ROCKWELL COLLINS INC | NAVSTAR GPS/FMS | MARSHALL,W | PKG | VANDERPOOT | $ | 480,000.00 | 8/30/1999 | 4/30/2001 |
| F0470199C0056 | ROCKWELL COLLINS INC | NAVSTAR GPS/FMS | MARSHALL,W | PKG | WATSON,CHA | $ | 480,000.00 | 8/30/1999 | 12/31/2002 |
| F0470199C0055 | ROCKWELL COLLINS INC | NAVSTAR GPS/FMS | RIPPENBAUM | PKG | WATSON,CHA | $ | 456,800.00 | 8/30/1999 | 3/21/2003 |
| F0470199C0052 | ROCKWELL COLLINS INC | NAVSTAR GPS/FMS | MARSHALL,W | PKG | WATSON,CHA | $ | 384,000.00 | 8/30/1999 | 12/31/2001 |
| F0470199C0050 | ROCKWELL COLLINS INC | NAVSTAR GPS/FMS | RIPPENBAUM | PKG | WATSON,CHA | $ | 455,800.00 | 8/30/1999 | 3/21/2003 |
| F0470199C0061 | ITT CORPORATION | NPOESS CRIS PHASE II | UPAH,KEITH | PKW | DEDRICK,JE | $ | 73,000,376.00 | 8/30/1999 | 8/31/2007 |
| F0470199C0044 | BALL AEROSPACE CORPORATION | NPOESS OMPS PHASE II | UPAH,KEITH | PKW | DEDRICK,JE | $ | 65,169,489.00 | 5/14/1999 | 9/30/2009 |
| F0470199C0311 | SAAB-ERICCSON SPACE AB | NPOESS PHASE II | DEDRICK,JE | PKW | DEDRICK,JE | $ | 6,699,895.00 | 8/27/1999 | 6/13/2003 |
| F0470199C0048 | SPECTRUM ASTRO | SBIRS LOW | HYNSON,LAT | PKZ | HYNSON,LAT | $ | 275,000,000.00 | 8/16/1999 | 2/27/2005 |
| F0470199C0047 | TRW INCOPORATED/SPC&ELEC GRP | SBIRS LOW | HYNSON,LAT | PKZ | HYNSON,LAT | $ | 275,000,000.00 | 8/16/1999 | 10/15/2004 |
| F0470199C0026 | TEAM SBL IFX | SBLINTEGRATED FLIGHT EXPERIME | BRYANT,PAU | PKL | APPLEBAUM, | $ | 125,000,000.00 | 2/11/1999 | 3/31/2003 |
| F0470199C0030 | LOCKHEED MARTIN CORP | SPACE BASED LASER | WELTON,ART | PKA | TANIGUCHI, | $ | 17,741,742.00 | 4/6/1999 | 12/31/1999 |
| F0470100C0001 | NORTHROP GRUMMANN | DMSP | SWAIN,HOUS | PKW | GRAHAM,ROB | $ | 4,970,893.00 | 5/3/2000 | 9/30/2003 |
| F0470100C0002 | LOCKHEED MARTIN | DSCS III | SCRUGGS,C. | PKJ | HARBIN,SAM | $ | 7,464,135.00 | 2/1/2000 | 7/31/2001 |
| F0470100C8029 | SCIENCE APPLICATIONS INTL CORP | EADD II | LAECHELT,C | PKT | ALINDUGAN, | $ | 566,809.00 | 8/21/2000 | 8/17/2003 |
| F0470100C8030 | CSC | EADD II | LAECHELT,C | PKT | KIBBY,DARW | $ | 652,389.00 | 8/31/2000 | 8/31/2003 |
| F0470100D0204 | TRUAX ENGINEERING INC | EXCALIBUR | HENDERSON, | PKUB | WEST,KENNE | $ | 6,554,227.00 | 9/12/2000 | 12/31/2001 |
| F0470100C0006 | LMMS | IIR MODERNIZATION | SCHOON,TAN | PKG | SMITH,DAVI | $ | 53,000,000.00 | 8/18/2000 | 11/1/2004 |
| F1962899C0078 | RAYTHEON SYSTEMS | MILSTAR | KIMBALL,DO | PKJ | BARNARD,LI | $ | 11,235,000.00 | 2/29/2000 | 2/28/2003 |
| F0470100C0005 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | RIPPENBAUM | PKG | BROWN,GREG | $ | 430,960.00 | 3/20/2000 | 3/21/2003 |
| F0470100C0007 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | RIPPENBAUM | PKG | BROWN,GREG | $ | 120,630.00 | 8/11/2000 | 3/21/2003 |
| F0470100C0501 | LOCKHEED MISSILES & SPACE CO | NPOESS | UPAH,KEITH | PKW | DEDRICK,JE | $ | 20,650,000.00 | 12/14/1999 | 4/30/2002 |
| F0470100C0500 | TRW SPACE & ELECTRONICS GROUP | NPOESS | UPAH,KEITH | PKW | DEDRICK,JE | $ | 20,650,000.00 | 12/14/1999 | 3/30/2002 |
| F0470100C0008 | COMPUTER SCIENCES RAYTHEON | SLRSC | MAK,ALAN R | PKSC | ANDREWS,NA | $ | 7,538,240.00 | 5/15/2000 | 4/30/2001 |
| F0470101C0203 | SPECTRUM ASTRO S | C/NOFS | MILBURN,J. | PKUL | DENMAN,ODE | $ | 50,863,391.00 | 2/22/2001 | 11/29/2004 |
| F0470101C0012 | INTEGRAL SYSTEMS INC. | CCSC | RIZZA,ROSE | PKJ | COUNTEE,HE | $ | 3,400,000.00 | 2/7/2001 | 4/30/2006 |
| F0470101C0015 | TRW | CCSC | RIZZA,ROSE | PKJ | STENBORG,R | $ | 3,400,000.00 | 2/7/2001 | 11/8/2002 |
| F0470100C8028 | SPARTA INC | EADD II | HARRISON,N | PKR | KIBBY,DARW | $ | 355,908.00 | 12/4/2000 | 12/31/2003 |
| F0470100C0211 | LOCKHEED MARTIN MISSIN SYSTEMS | EDS | VANDERFORD | PKUO | COX,WILEY | $ | 3,027,915.00 | 12/15/2000 | 10/2/2028 |
| F0470101C0019 | ROCKWELL COLLINS INC | GPS FOREIGN MILITARY SALES | RIPPENBAUM | PKG | SCHLEIFER, | $ | 691,422.00 | 5/9/2001 | 3/21/2003 |
| F0470101C0006 | ALLEN OSBORNE ASSOC | GPS GROUND RECEIVER | SKELTON,RO | PKG | SMITH,DAVI | $ | 2,192,778.00 | 1/26/2001 | 3/26/2002 |
| F0470101C0007 | INTERSTATE ELECTRONICS CORP | GPS GROUND RECEIVER | SKELTON,RO | PKG | SMITH,DAVI | $ | 2,168,531.00 | 1/26/2001 | 3/26/2002 |
| F0470101C0005 | RAYTHEON SYSTEMS | GPS GROUND RECEIVER | SKELTON,RO | PKG | SMITH,DAVI | $ | 6,862,207.00 | 1/26/2001 | 3/21/2003 |
| F0470101C0004 | ROCKWELL COLLINS | GPS GROUND RECEIVERS | SKELTON,RO | PKG | SMITH,DAVI | $ | 6,770,864.00 | 1/26/2001 | 3/26/2002 |
| F0470101C0010 | THE BOEING COMPANY | GPS III ARCHITECTURE STUDIES | SCHOON,TAN | PKG | SCHOON,TAN | $ | 16,000,000.00 | 11/9/2000 | 3/21/2003 |
| F0470101C0008 | LOCKHEED MARTIN CORP | NAVSTAR GPS | SCHOON,TAN | PKG | SCHOON,TAN | $ | 16,000,000.00 | 11/9/2000 | 3/21/2003 |
| F0470100C0010 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | MARSHALL,W | PKG | FUJII,ANN | $ | 99,266.00 | 10/30/2000 | 9/30/2003 |
| F0470101C0016 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | RIPPENBAUM | PKG | BROWN,GREG | $ | 575,060.00 | 3/23/2001 | 3/21/2003 |
| F0470101C0020 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | MARSHALL,W | PKG | FUJII,ANN | $ | 136,548.00 | 8/6/2001 | 12/31/2002 |
| F0470101C0020 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | MARSHALL,W | PKG | FUJII,ANN | $ | 136,548.00 | 8/6/2001 | 12/31/2002 |

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|---|---|---|---|---|---|---|---|---|---|
| F0470101C0020 | ROCKWELL COLLINS INC | NAVSTAR GPS / FMS | MARSHALL,W | PKG | FUJII,ANN | $ | 136,548.00 | 8/6/2001 | 12/31/2002 |
| F0470101C0500 | RAYTHEON COMPANY-ELECTRONIC SY | NPOESS | UPAH,KEITH | PKW | DEDRICK,JE | $ | 133,291,624.00 | 11/20/2000 | 12/15/2007 |
| F0470101C0502 | BOEING SATELLITE SYSTEMS, INC. | NPOESS | UPAH,KEITH | PKW | INMAN,JOHN | $ | 130,794,882.00 | 7/30/2001 | 9/30/2007 |
| F0470101C0001 | ITT INDUSTRIES, SYSTEMS DIV | SPACELIFT RANGE SYSTEMS | SUTTLES, C | PKSE | EDWARDS,A. | $ | 81,244,339.00 | 11/3/2000 | 10/31/2006 |
| F0470100D0206 | SPACE VECTOR CORP | SRP-2 | SEAMON,JOH | PKUB | WEST,KENNE | $ | - | 12/4/2000 | |
| F0470101C0205 | AEROASTRO CORPORATION | STPSAT-1 | VIGIL,AURO | PKUL | DENMAN,ODE | $ | 11,166,676.00 | 9/11/2001 | 11/30/2005 |
| F0470101C0018 | IROBOT | TMR PHASE II | SMITH,CHER | PKR | MITCHELL,M | $ | 7,997,053.00 | 3/20/2001 | 8/31/2003 |
| F0470100C0011 | BOEING SATELLITE SYSTEM | WIDEBAND GAPFILLER SATELLITE | JAMAR,JANI | PKJ | SANCHEZ,PH | $ | 156,500,000.00 | 1/2/2001 | 12/27/2010 |

# GLOSSARY

# GLOSSARY

| | |
|---|---|
| **#'s** | |
| 4SOPS | 4th Space Operations Squadron |
| **A** | |
| A&O | Acquisition and Operations |
| ABG | Air Base Group |
| ABL | Airborne Laser |
| ABW | Air Base Wing |
| ACMS | Automated Communication Management System |
| ACTD | Advanced Concept Technology Demonstration |
| ADM | Acquisition Decision Memorandum |
| AEHF | Advanced Extremely High Frequency |
| AEP | Architecture Evolution Plan |
| AFAA | Air Force Audit Agency |
| AFB | Air Force Base |
| AFCA | Air Force Communications Agency |
| AFCCP | Award Fee and Corporate Commitment Plan |
| AFGWC | Air Force Global Weather Central |
| AFMC | Air Force Materiel Command |
| AFOTEC | Air Force Operational Test and Evaluation Center |
| AFRL | Air Force Research Laboratory |
| AFS | Air Force Station |
| AFSATCOM | Air Force Satellite Communications System |
| AFSCN | Air Force Satellite Control Network |
| AFSPACECOM | Air Force Space Command, old acronym |
| AFSPC | Air Force Space Command, new acronym |
| AFWA | Air Force Weather Agency |
| AII | Accuracy Improvement Initiative |
| ALC | Air Logistics Center |
| ALERT | Attack and Launch Early Reporting to Theater |
| ALERT | Attack and Launch Early Reporting to Theater |
| AMARC | Aerospace Maintenance and Regeneration Center |
| AMCS | Alternate Master Control Station |
| AOC | Aerospace Operations Center |
| APB | Acquisition Program Baseline |
| APS | Aerosol Polarimeter Sensor |
| APT | Automatic Picture Transmission |
| ART | Airborne Receive Suite |
| AS | Air Station |
| ASC | Aeronautical Systems Center |
| ASC (C3I) | Command Control, Communications, and Intelligence |
| ASMCS | AEHF Satellite Mission Control Subsystem |
| ASOC | Atlas Spaceflight Operations Center |
| ASP | Acquisition Strategy Panel |
| ATK | Alliant Technologies |
| ATMS | Advanced Technology Microwave Sounder |
| AWS | Advanced Wideband System |
| **B** | |
| BAR | Broad Area Review |
| BC2A | Bosnia Command and Control Augmentation |
| BES | Budget Estimate Submission |
| BES | Budget Estimate Submission |
| BMDP | Ballistic Missile Defense Program (earlier known as Strategic Defense Initiative) |

| | |
|---|---|
| Bps | Bits Per Second |
| BRAC | Base Realignment and Closure Commission |
| BSS | Boeing Satellite System |
| **C** | |
| C&S | Control & Status |
| C/A | Coarse Acquisition |
| C3 | Capability-3 |
| C4I | Command, Control, Communications, Computer, and Intelligence |
| C4ISP | Command, Control, Communications, Computers, and Intelligence Support Plan |
| CACS | Command and Control Squadron |
| CAD | Component Advanced Development |
| CAIV | Cost as an Independent Variable |
| CBC | Common Booster Core |
| CC&M | Centralized Control and Monitor |
| CCAFS | Cape Canaveral Air Force Station |
| CCP | Contract Change Proposal |
| CCS | Constellation Control Stations |
| CCSC | Command and Control Sustainment Contract |
| CCS-C | Command and Control System-Consolidated |
| CDFS | Cloud Depiction and Forecast System |
| CDSEG | Control and Display Segment |
| CECOM | Communications and Electronics Command |
| CFON | Cape Fiber Optic Network |
| CGS | Continental U.S. Ground Station |
| CINC | Commander in Chief |
| CIU | Controls Interface Unit |
| CMIS | Conical-Scanning Microwave Imager Sounder |
| CMNS | Combat Mission Need Statement |
| CMOC | Cheyenne Mountain Operations Center |
| CNN | Cable News Network |
| CONOPS | Concept of Operations |
| CONUS | Continental United States |
| COOP | Continuity of Operations Plan |
| COTS | Commercial, Off-The-Shelf |
| CPP | Cooperative Program Personnel |
| CPT | Command Post Terminal |
| CrIs | Cross-Track Infrared Sounder |
| CSAF | Chief of Staff of the Air Force |
| CSEL | Combat Survivor Evader Locator |
| CSOC | Consolidated Space Operations Center |
| CTPE | Central Tactical Processing Element |
| CTPS | Centralized Telemetry Processing System |
| **D** | |
| D1 | Device 1 |
| D2 | Device 2 |
| DAB | Defense Acquisition Board |
| DAC | Designated Acquisition Commander |
| DAE | Defense Acquisition Executive |
| DAGR | Defense Advanced GPS Receiver |
| DAMA-C | Demand Assignment Multiple Access Compatibility |
| DARPA | Defense Advanced Research Projects Agency |
| DCMC | Defense Contract and Management College |
| DII COE | Defense Information Infrastructure Common Operating Environment |
| DISA | Defense Information Systems Agency |
| DISIS | Defense Satellite Communications System/Satellite Control Facility Interface |

| | |
|---|---|
| | System |
| DMSP | Defense Meteorological Satellite Program |
| DNRO | Director of the National Reconnaissance Organization |
| DOCS | DSCS Operations Control System |
| DoD | Department of Defense |
| DOT&E | Director of Operational Test and Evaluation |
| DSC II | Depot Support Contract |
| DSCS | Defense Satellite Communications System |
| DSCSOC | DSCS Operations Center |
| DSP | Defense Support Program |
| DSP | Defense Support Program |
| DTRs | Digital Tape Recorders |
| **E** | |
| EAC | Estimate at Completion |
| EELV | Evolved Expendable Launch Vehicle |
| EGI | Embedded GPS Inertial |
| EGS | European Ground Station |
| EHF | Extremely High Frequencies |
| EM | Engineering Model |
| EMD | Engineering and Manufacturing Development |
| EOW | End-of-Week |
| EPLGR | Enhanced PLGR |
| ESC | Electronic Systems Center |
| ESC/MC | Office Symbol Electronic Systems Center |
| ESC/MCG | Office symbol for GBS JPO |
| ESTAR | Early Scheduling Toolkit for Automated Ranges |
| EUMETSAT | European Organization for Exploitation of Meteorological Satellites |
| Eutelsat | European Telecommunications Satellite Organization |
| **F** | |
| FAB-T | Family of Beyond Line of Sight Terminals |
| FAR | Federal Acquisition Regulation |
| FDS | Flight Demonstration System |
| FFR | Forward Facing Radiator |
| FFRDC | Federally Funded Research and Development Center? |
| FGRS | Fixed Ground Receive Suites |
| FLTSATCOM | Fleet Satellite Communications |
| FMS | Foreign Military Sales |
| FNOC | Fleet Numerical Oceanography Center |
| FOC | Full Operational Capability |
| FRP | Full-Rate Production |
| FSOC | Fairchild Satellite Operations Center |
| FW | Fighter Wing |
| **G** | |
| GAO | General Accounting Office |
| GBI | Ground-Based Interceptor |
| GBS | Global Broadcast Service |
| GBU | Guided Bomb Unit |
| GCCS-M | Global Command and Control System - Maritime |
| GDP | Ground Demonstration Program |
| GEMs | Graphite-Epoxy Motors |
| GEO | Geosynchronous Earth Orbit |
| GeoLITE | Geosynchronous Lightweight Technology Experiment |
| GNDCPT | Ground Command Post Terminals |
| GOSC | GPS OCS Support Contract |
| GPS | Global Positioning System |

| | |
|---|---|
| GPS | Global Positioning System |
| GPSOS | Global Positioning System Occultation Sensor |
| GRAM | GPS Receiver Application Module |
| GSCCE | Gapfiller Satellite Configuration Control Element |
| GTO | Geosynchronous Transfer Orbit |
| **H** | |
| HEO | Highly Elliptical Orbit |
| HgCdTe | Mercury Cadmium Teluride |
| HIF | Horizontal Integration Facility |
| HMMWV | High Mobility Multipurpose Wheeled Vehicle |
| HSC | Hughes Space and Communications |
| H-STT | High Resolution STT |
| HVAC | Heating, Ventilation and Air Conditioning |
| **I** | |
| ICD | Interface Control Document |
| ICE | Independent Cost Estimate |
| IDCSP | Initial Defense Communications Satellite Program |
| IGEB | Interagency GPS Executive Board |
| IMCSB | Interim MCS Backup |
| IMU | Inertial Measurement Unit |
| INS | Inertial Navigation System |
| INSEG | Instrumentation Segment |
| IOC | Initial Operational Capability |
| IOT&E | Initial Operational Test and Evaluation |
| IOT&E | Integrated Operational Test and Evaluation |
| IP | International Partner |
| IPACS | Integrated Polar Acquisition and Control Subsystem |
| IPO | Integrated Program Office |
| IPT | Integrated Product Team |
| IPT | Integrated Product Team |
| IQT | Initial Qualification Training |
| ISOON | Improved Solar Observing Optical Network |
| IUS | Inertial Upper Stage |
| IUS | Inertial Upper Stage |
| IWIN 64 | Integrated Weather Information Nephanalysis 64th Mesh |
| **J** | |
| JBS | Joint Broadcast Service |
| JCSC | Joint Chief of Staff Commander |
| JET | Joint Estimation Team |
| JPO | Joint Program Office |
| JRB | Joint Requirements Board |
| JROC | Joint Requirements Oversight Council |
| JROC | Joint Requirements Oversight Council |
| JROCM | Joint Requirements Oversight Council Memo |
| JSRC | Joint Search and Rescue Centers |
| JSSMO | Joint Service System Management Office |
| JTA | Joint Technical Architecture |
| JTAGS | Joint Tactical Ground Station |
| JTFST | Joint Task Force Satellite Terminal |
| **K** | |
| Kbps | Kilo-bits per second |
| KSC | Kennedy Space Center |
| **L** | |
| LADO | Launch and Early Orbit, Anomaly Resolution and Disposal Operations |
| LADS | Low Altitude Demonstration System |

| | |
|---|---|
| LC | Launch Complex |
| LDR | Low Data Rate |
| LEO | Low Earth Orbit |
| LMMS | Lockheed Martin Mission Systems |
| LMMS | Lockheed Martin Missiles and Space Company |
| LON | Launch on Need |
| LRIP-2 | Low Rate of Initial Production |
| LSA | Logistics Support Analysis |
| LSAR | Logistics Support Analysis Record |
| L-STTs | Lightweight STTs |
| **M** | |
| MAGR | Miniaturized Airborne GPS Receiver |
| MASC | Milstar Auxiliary Support Center |
| Mbps | Megabits per second |
| M-Code | Military Code |
| MCS | Mission Control Segment |
| MCS | Master Control Station |
| MCS | Mission Control Station |
| MDR | Medium Data Rate |
| MGS | Mobile Ground System |
| MILSATCOM | Military Satellite Communications |
| Milstar | Military Strategic and Tactical Relay |
| MJPO | MILSATCOM Joint Program Office |
| MLP | Mobile Launch Platform |
| MLV | Medium Launch Vehicle |
| MMCCS | Milstar Mobile Constellation Control Station |
| MNS | Mission Need Statement |
| MOA | Memorandum of Agreement |
| MOB | Mobile Ground System Operating Base |
| MOC | Mission Operations Center |
| MOPS | Mission Operations Subsystem |
| MOS/PIM | Multi-Orbit Satellite/Performance Improvement Modification |
| MOS/PIM | Multi-Orbit Satellite/Performance Improvement Modification |
| MOT&E | Multi-Service Operational Test and Evaluation |
| MOU | Memorandum of Understanding |
| MPE | Mission Planning Element |
| MPSOC | Multi-Purpose Satellite Operations Center |
| MRT | Manpack Receive Suite |
| MSOC | Milstar Satellite Operations Center |
| MSRE | Monitor Station Receiver Element |
| MST | Mobile Service Tower |
| MWIR | Medium Wave Infrared |
| MWSSS | Missile Warning Space Surveillance Sensors |
| **N** | |
| NASA | National Aeronautics and Space Administration |
| NATO | North Atlantic Treaty Organization |
| NCO | Noncommissioned Officer |
| NDAA | National Defense Authorization Act |
| NDS | Nuclear Detonation Detection System |
| NESP | Navy EHF SATCOM Program |
| NETSEG | Network Segment |
| NIC | Network Integration Contract |
| NMD | National Missile Defense |
| NOAA | National Oceanic and Atmospheric Organization |
| NOUC | Network Operations Upgrades Contract |

| | |
|---|---|
| NPOES | National Polar-orbiting Operational Environmental Satellite |
| NPOESS | National Polar-orbiting Operational Environmental Satellite System |
| NPP | NPOESS Preparatory Project |
| NRE | Non-Recurring Engineer |
| NRO | National Reconnaissance Office |
| NSA | National Security Agency |
| NTSC | National Television System Committee |
| NUDET | Nuclear Detonation |
| **O** | |
| OA2 | Operational Assessment Two |
| OAS | Orbital Analysis System |
| OCN | Operational Control Nodes |
| OCS | Operational Control Segment |
| ODOC | Objective DSCS Operating Center |
| OGS | Overseas Ground Station |
| OLS | Operational Linescan System |
| OMPS | Ozone Mapping and Profiler Suite |
| ORD | Operational Requirements Document |
| ORD | Operational Requirements Document |
| ORD | Operational Requirement |
| OSD | Office of the Secretary of Defense |
| OSR | Operational Switch Replacement |
| OSSE | Operations Sustainment and Support Element |
| OTB | Over Target Baseline |
| OTH | Over-the-Horizon |
| OUE | Operational Utility and Effectiveness |
| **P** | |
| PbS | Lead Sulfide |
| PCM | Phase Change Material Canister |
| PD | Program Definition |
| PDR | Preliminary Design Review |
| PDRR | Program Definition and Risk Reduction |
| PDRR | Program Definition and Risk Reduction |
| PEO | Program Executive Officer |
| PIM | Performance Improvement Modification |
| PITF | Payload Integration and Test Facility |
| PLGR | Precision Lightweight GPS Receiver |
| PMP | Program Management Plan |
| POES | Polar-orbiting Operational Environmental Satellite |
| POESS | Polar-orbiting Operational Environmental Satellite System |
| PPS | Precise Positioning Service |
| PVT | Position/Velocity/Timing |
| **Q** | |
| QT&E | Qualification Test and Evaluation |
| **R** | |
| RAD | Requirements Allocation Document |
| RADEC | Advanced Radiation Detection Capability |
| RBC | RTS Block Change |
| RBM | Receive Broadcast Manager |
| RC3M | Range and Communications Centralized Control and Monitor |
| RCC | Resource Control Center |
| RCDC | Range and Communication Development Contract |
| RDS | Real-time Data Smooth |
| RDSMO | Research and Development Space and Missile Operations |
| RDT&E | Research and Development Test and Evaluation |

| | |
|---|---|
| RFI | Request for Information |
| RFP | Request For Proposal |
| RGS-P1 | Relay Ground Station Pacific 1 |
| RSA | Range Standardization and Automation |
| RSI | Request for Statements of Interest |
| RSLP | Rocket Systems Launch Program |
| RTS | Remote Tracking Station |
| **S** | |
| SA | Selective Availability |
| SAASM | Selective Availability Anti-Spoofing Module |
| SABRS | Space and Atmospheric Burst Reporting System |
| SAF/AQ | Secretary of the Air Force for Acquisition |
| SAF/AQ | Secretary of the Air Force for Acquisition and Management |
| SAF/IA | Secretary of the Air Force International Affairs |
| SAMP | Single Acquisition Management Plan |
| SAMS | Systems Acquisition Management Support |
| SAR | Selected Acquisition Report |
| SARD | System Architecture and Requirements Definition |
| SATCOM | Satellite Communications |
| SAWS | Solar Analyst Work Station |
| SBIRS | Space-Based Infrared System |
| SBIRS High | Space Based Infrared Systems High |
| SBIRS Low | Space Based Infrared Systems Low |
| SBL | Space-Based Laser |
| SBM | Satellite Broadcast Manager |
| SBS 6 | Satellite Business Systems 6 |
| SCA | Satellite Control Authority |
| SCAMP | Single Channel Anti-Jam Man-Portable |
| SCNC | SCN Contract |
| SCR | Software Change Requests |
| SCSR | Station Computer System Replacement |
| SCT | Single Channel Transponder |
| SDIO | SDI Organization |
| SDR | System Design Review |
| SECAF | Secretary of the Air Force |
| SECDEF | Secretary of Defense |
| SEON | Solar Electro-Optical Network |
| SEP | System Enhancement Program |
| SERD | Support Equipment Recommendation Data |
| SESS | Space Environment Support System |
| SFIR | Swept Frequency Interferometric Radiometer |
| SHF | Super High Frequencies |
| SLC | Space Launch Complex |
| SLCSPO | SMC Satellite and Launch Control Systems Program Office |
| SLEP | Service Life Enhancement Program |
| SLGR | Small Lightweight GPS Receiver |
| SLOC | Software Lines Of Code |
| SLR | Space Launch Range |
| SLRS | Spacelift Range System |
| SLSRC | Spacelift Range System Contract |
| SMART-T | Secure Mobile Anti-Jam Reliable Tactical-Terminal |
| SMC | Space and Missile Systems Center |
| SMC/MC | Office Symbol for MILSATCOM |
| SMC/MCM | Office Symbol for SMC MJPO Milstar Program Office |
| SMC/MCW | Office Symbol WGS Program Office |
| SMC/MCX | Office Symbol Advanced Programs Division |

| | |
|---|---|
| SMCS | Satellite Mission Control Subsystem |
| SMTS | Space and Missile Tracking System |
| SOC | Satellite Operations Center |
| SOC | Space Operations Center |
| SOCC | Satellite Operations Control Center |
| SOO | Statement of Objectives |
| SOPS | Space Operations Squadron |
| SoS | System-of-Systems |
| Space AE | Space Acquisition Executive |
| SPAWAR | Space and Naval Warfare Systems |
| SPD | System Program Director |
| SPO | System Program Office |
| SPS | Standard Positioning Service |
| SRBL | Solar Radio Burst Locator |
| SRBs | Solid Rocket Boosters |
| SRMs | Solid Rocket Motors |
| SRMU | Solid-Rocket Motor Upgrade |
| SRS | Shipboard Receive Suites |
| SSM | System Support Manager |
| SSRS | Subsurface Receive Suites |
| SSRs | Solid State Recorders |
| SSSG | Space Systems Support Group |
| SSTS | Space Surveillance and Tracking System |
| STEP | Space Test and Experimentation Program |
| STP | Space Test Program |
| STS | Space Transportation System |
| STT | Small Tactical Terminal |
| SWAFS | Space Weather Analysis and Forecast System |
| SWarF | Senior Warfighters' Forum |
| SWIR | Short Wave Infrared |
| **T** | |
| T3 | Tiny Tactical Terminal |
| TBMCS | Theater Battle Management Core System |
| TEMP | Test and Evaluation Master Plan |
| TENCAP | Tactical Exploitation of National Capabilities |
| TGRS | Transportable Ground Receive Suites |
| TIP | Theater Injection Point |
| TRD | Technical Requirements Document |
| TSBM | Transportable SBM |
| TSPR | Total System Program Responsibility |
| TT&C | Tracking, Telemetry and Commanding |
| TTSE | Test, Training and Simulation Element |
| TVCF-E | Transportable Vehicle Checkout Facility East |
| **U** | |
| UAV | Unmanned Aerial Vehicle |
| UBC | Uniform Building Code |
| UBS | UHF Base Stations |
| UE | User Equipment |
| UFO | Ultra High Frequency Follow-On |
| UG | Upgrade |
| UHF | Ultra High Frequency |
| UPIF | Unified Payload Integration Follow-on |
| UQT | Unit Qualification Training |
| USAFE | U.S. Air Forces in Europe |
| USC | United States Code |

| | |
|---|---|
| USD (AT&L) | Under Secretary of Defense (Acquisition, Technology and Logistics) |
| USS | United States Ship |
| **V** | |
| VIF | Vertical Integration Facility |
| VIIRS | Visible/Infrared Imager Radiometer Suite |
| VTS | Vandenberg Tracking Station |
| **W** | |
| WANIU | Wide Area Network Interface Unit |
| WEFAX | Weather Facsimile |
| WGS | Wideband Gapfiller Satellite |
| WR | Warner Robins |
| W-STTs | Workstation STTs |
| **X** | |
| XDR | Extended Data Rate |
| **Y** | |
| Y2K | Year 2000 |

# SUPPORTING DOCUMENTS
# CHAPTER 1

**Supporting Documents for Chapter 1**

| | |
|---|---|
| Doc 1-1 | Publication, SMC/MQ, "Organization and Mission Chart Book," October 1998, |
| Doc 1-2 | E-mail, SMC/CCX CC's Action Office to multiple addressees, "SMC Unit Mission Description," 24 December 1998 |
| Doc 1-3 | Internet Document, SMC/PA, "Our Mission," 8 February 2000, http://www.losangeles.af.mil/SMC/PA/mission.htm |
| Doc 1-4 | Fact Sheet, AFMC, "Air Force Material Command," printed 23 June 2000, http://www.af.mil/news/Air_Force_Material_Command.html |
| Doc 1-5 | Robert Mulcahy, "Los Angeles Air Force Base," Private Pilot Magazine, February 2000, pp. 84-85, 89 |
| Doc 1-6 | Document, William Evans (SMC/AXRX), "SMC Acquisition Programs," December 1997 |
| Doc 1-7 | Organization Chart, SMC/MQ, "Space and Missile Systems Center Directory," October 1997 |
| Doc 1-8 | Organization Chart, "Space and Missile Systems Center Directory," October 2001 |
| Doc 1-9 | Organization Chart, "61 Air Base Group Organization Chart," October 2001 |
| Doc 1-10 | Memo, AFMC/CV to HQ USAF/XP, "Los Angeles AFB Security Forces Contract," Faxed 15 October 1997 |
| Doc 1-11 | Memo, SMC/CC to AFMC/CV, "Los Angeles AFB Security Forces Contract (HQ AFMC/XP SSS, 10 Oct 1997)," 17 Oct 1997 |
| Doc 1-12 | Memo, SMC/CC to HQ AFMC et al., "Request for Law Enforcement Officer (LEO) Coverage and Special Pay Pursuant to the Federal Law Enforcement Pay Reform Act of 1990," 18 May 1998 |
| Doc 1-13 | John Ryan, "Los Angeles AFB to reactivate 61st Security Forces Squadron July 1," Astro News, 19 July 1998, p. 1 |
| Doc 1-14 | Special Order, HQ AFMC, "Special Order GA-7," 30 June 1998 |

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| Doc 1-15 | Organization Chart, "Space and Missile Systems Center Directory," January 1999 |
| Doc 1-16 | No author, "XP becomes two-letter" Astro News, 15 January 1999, p. 3 |
| Doc 1-17 | Staff Summary Sheet, SMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate," 19 March 1999, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Establishment of SMC Plans and Programs Directorate (SMC/XP)," 6 September 2000 |
| Doc 1-18 | Memo, HQ AFMC/XPM to SMC/CC, "Establishment of SMC Plans and Programs Directorate (SMC/XP) (Your Memorandum, 6 Sep 00)," 25 September 2000 |
| Doc 1-19 | E-mail, Alicia Hale (SMC/XPM) to Robert Mulcahy (SMC/HO), "History Report FY00," 24 January 2002 |
| Doc 1-20 | Organization Chart, "Space and Missile Systems Center Directory," July 1999 |
| Doc 1-21 | Staff Summary Sheet, SMC/XPM to SMC/CC, "Establish a Space Based Laser (SBL) Project Management Office," no date, with attachment Memo, SMC/XPM to HQ AFMC/XPM, "Establish a Space Based Laser (SBL) Project Management Office," 25 January 2000 |
| Doc 1-22 | No author, "SMC/TL, new 2-letter, stands up May 1," Astro News, 31 March 2000, p. 3 |
| Doc 1-23 | Memo, HQ AFMC/XPM to SMC/CC, "Establishment of HR at SMC (Your Memorandum, 15 May 00)," 6 June 2000, with attachment Memo, SMC/CC to HQ AFMC/XPM, "Organization Change Request – Establishment of Human Resources Office (SMC/HR)," 15 May 2000 |
| Doc 1-24 | No author, "SMC to realign under AFSPC," Astro News, 18 May 2001, pp. 1 and 3 |
| Doc 1-25 | E-mail, Donna Jay (SMC/XPM) to distribution, "Special Orders for SMC realignment to AFSPC," 6 September 2001, with attachments Orders, HQ USAF to AFMC/CC and AFSPC/CC, "Reassignment of Certain Air Force Material Command Units," 16 August 2001, and Special Order, HQ AFSPC, "Special Order GD-019," 22 August 2001 |
| Doc 1-26 | Peggy Hodge, "'It's official!' AFSPC welcomes SMC into family," Astro News, 5 October 2001, p. 1 |
| Doc 1-27 | Special Order, HQ AFMC, "Special Order GA-2," 29 October 1997 |

Doc 1-28 Staff Summary Sheet, HQ AFMC/DRS to SMC/CC, "Space Systems Support Group (SSSG) Inactivation," 8 April 1998

Doc 1-29 Special Order, HQ AFMC, "Special Order GA-5," 20 April 1998

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# CHAPTER 9

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