



KEY AIR FORCE
PROGRAMS

SPACE

Advanced EHF



Acquisition Status

- **Program Status:** System Development and Demonstration (SDD)
 - Milestone B and approval to enter SDD in October 2001
 - SDD Contract: 16 Nov 01; definitized 15 August 02
- **Satellites on Orbit:** 0
 - First Launch Dec 06
- **Satellites in Development:** 2
- **Contractors:**
 - **Sys Def:** National Team (LM, Northrop Grumman, Boeing)
 - **SDD:** Contractor Team (LM & Northrop Grumman)
- **Future Upgrades:** Transformational Satellite (TSAT) System
- **Purchase Requirements:** 3 - 5 (TBD per Transformational Communications Decisions)

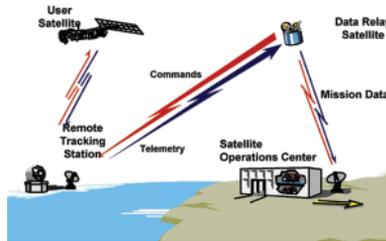
Capabilities/Profile

- **Key Performance Parameters**
 - **Anti-Jam Protection:** Support users exposed to fixed, transportable and mobile jammers
 - **Nuclear Protection:** Provide assured communications for networks supporting critical functions
 - **Access and Control:** Provide users ability to plan, control and reconfigure resources
 - **Interoperability:** Backwards compatible with Milstar; Support joint warfighter

Functions/Performance Parameters

- **Mission Statement:** Replenishes capability currently provided by the Milstar system with additional capability
 - Provides more capacity than Milstar
 - Provides more coverage/communications options than Milstar
 - Will launch on EELV
- **Mission Parameters:**
 - Low Probability of Intercept (LPI)
 - Low Probability of Detect (LPD)
 - Data Rate increases from Milstar rate of 1.5 Mbps to 8 Mbps
 - Throughput increases to ~12x Milstar capability in MTW scenario

Air Force Satellite Control Network



Acquisition Status

- **Program Status:** Operational/development
- **Unit Assignment:** AF Space Command
- **Current Inventory:**
 - 8 Remote Tracking Stations (RTSs)
 - 22 Antennas: 15 at the RTSs, 4 Data Link Terminals, 1 Check-out Facility, 2 Transportables
 - 2 Operations Control Centers
 - Centralized Command and Control
- **Projected Inventory:**
 - 8 RTSs
 - 21-24 Antennas: 16 at the RTSs, 2-3 Data Link Terminals, 1 Check-out Facility, 2-4 Transportables
 - 2 Operations Control Centers
 - Distributed Command and Control
- **Contractors:**
 - Honeywell Technical Services, Colorado
- **Current Upgrades:**
 - Remote Tracking Station Block Change to replace unsustainable, aging antennas and 1960's electronics
 - Orbital Analysis Station Follow/on to replace unsustainable mainframe computer-based command and control system to perform satellite collision avoidance mission

- Network Ops improvements—automating scheduling, resource management, and orbit analysis system upgrade; interoperability with commercial and civil networks
- **Future Upgrades:** Automation, increased capacity, interoperability with other satellite networks, and improved reliability through modernization

Capabilities/Profile

- **Global system of control centers, remote tracking stations and communication links**
 - 2 Control Centers (CONUS)
 - 10 Antenna locations (worldwide)
- **World's only high-power, 24/7, global network designed to operate DoD, National, Civil, and Allied satellites in any orbit**
 - Required for all DoD launch and early orbit operations and first satellite contact after launch
 - Telemetry, Tracking, and Commanding (TT&C)
 - Real-time low data rate mission data transfer for critical missions
 - US Government's best option for anomaly resolution and satellite emergencies

- Critical for meeting warfighter real-time and near real-time weather, missile warning, navigation, surveillance, and communications requirements

Functions/Performance Parameters

- **Mission Statement:** Deploy, checkout, and fly operational USAF, National, Allied and R&D satellites
 - TT&C operations, relay mission data and communications and provide end-of-life disposal support
 - Provide launch & early orbit tracking operations support for US and allied launches
 - Augment other satellite control networks with additional on-orbit operations reach
 - Provides accurate satellite positioning data for avoiding collisions and radio frequency interference
 - Resolve operating emergencies with high-power uplink—averages 1 satellite rescue/month saving the US economy up to \$2B/rescue
- **Performance Parameters:**
 - Over 150 satellites supported
 - Over 162,000 contacts per yr
 - 100% support of all major US (DoD and NASA) launches

Combat Survivor Evader Locator (CSEL)



Acquisition Status

- **Program Status:** Engineering and Manufacturing Development (EMD)—completing Block 1 development and testing
- **Production:** Full Rate Production begins in FY04
- **Current CSEL radio inventory:** 288
- **Purchase Requirements:** 17,800 radios for the Air Force; 53,000 total for all services, four UHF Base Stations, and Joint Search and Rescue Center workstations
- **Future Upgrades:** Block II Demand Assigned Multiple Access (DAMA) and DoD Information Infrastructure Common Operating Environment Level 7 capabilities; 2-way secure line-of-sight data links to rescue forces; M-Code GPS

Capabilities/Profile

- **Precision military GPS positioning/navigation**
 - Jam-resistant operations
- **Over-the-horizon (OTH) 2-way secure data transmission**
- **OTH Low Probability of Intercept/Low Probability of Detection**
- **Line-of-sight voice to rescue forces**
- **Global coverage**
- **Time from transmit to Joint Search & Rescue Center (JSRC) receive:** ≤ 5 min
- **Battery lifetime:** 4-day threshold / 21-day objective requirement
- **Radio dimensions:**
 - 3 1/4 Inches (Width)
 - 8 Inches (Length)
 - 1 3/4 Inches (Depth)
- **Weight:** 30.7 ounces

Functions/Performance Parameters

- **Mission Statement:** An Air Force-led joint program to provide enhanced Combat Search and Rescue (CSAR) communication and location capabilities by replacing antiquated PRC-90/-112 survivor radios with a new over-the-horizon (OTH) end-to-end system. CSEL provides assured OTH two-way secure satellite communications eliminating the line-of-sight requirement.
- **Performance Parameters:** CSEL uses precise GPS positioning and advanced anti-spoofing technologies to provide a reliable and accurate survivor location, an optimized waveform to reduce detectability and increased probability of collection by national assets. In addition, CSEL utilizes the international search and rescue satellite system (SARSAT) for polar-area OTH data communications. With these new capabilities, CSEL will increase rescue force success rates in on-going contingency operations, providing rapid and accurate location and authentication of survivor/evaders in minutes vice what could take days today.

Counterspace Systems



Acquisition Status

• **Program Status:** Counter Communications demonstrator delivered in FY 2001.

Acquisition program new start in FY 2002. IOC projected for 2004.

- Counter Surveillance/Reconnaissance system acquisition new start in FY 2002.
- Rapid Attack Identification Detection and Reporting System completed Analysis of Alternatives (AoA) in FY 2002 and system acquisition new start is scheduled for FY 2003.
- **Projected Inventory:**
 - Counter Communications Systems — 3
 - Counter Surveillance Reconnaissance Systems — 5
- **Contractors:**
 - Mission Area Primary Integrating Contractor — TRW
 - Counter Communications Developing Contract — Harris
 - Counter Surveillance Reconnaissance Concept Definition Contract — TBD

Capabilities/Profile

• Air Force's primary source for acquisition, architecture development, and procurement of current and emerging offensive and defensive counterspace capabilities. Provides system development of counterspace capabilities in response to warfighter requirements

- Current Offensive Counterspace Projects:
 - Counter communications
 - Counter surveillance/reconnaissance
- Current Defensive Counterspace Project
 - Rapid Attack Identification and Reporting System

Functions/Performance Parameters

• Mission Statement:

Develop technology, perform engineering and manufacturing development, integrate and procure both offensive and defensive counterspace systems in support of the Space Control mission

• Performance Parameters:

- Offensive Counterspace currently emphasizes terrestrial-based, small, transportable systems which deny the enemy the use of satellite communications and surveillance/reconnaissance systems. Systems that produce reversible effects are currently being developed as the first priority.
- Defensive Counterspace emphasis is on providing responsive space system attack warning, threat identification and characterization, and rapid mission impact assessment.

Defense Meteorological Satellite Program (DMSP)



Acquisition Status

- **Program Status:** Operational Sustainment
- **Production:** FY83-FY99
- **Satellites on Orbit:** 2 primary, 2 residuals
- **Satellites to be launched:** 5
- **Contractors:**
 - Lockheed Martin (Prime-Spacecraft)
 - Northrop Grumman (Prime-Sensors)
- **Future Upgrades:** Mini-Inertial Measurement Units for DMSPs F-17 through F-20 provide required redundancy in attitude control system.
- **Purchase Requirements:** None

** The DMSP program will cease operations early next decade at the end of the final DMSP satellite's life. Thereafter, DoD's requirements will be fulfilled by the joint DoD/DOC/NASA National Polar-orbiting Operational Environmental Satellite System (NPOESS).*

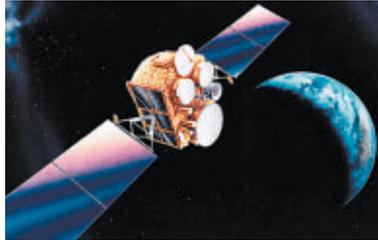
Capabilities/Profile

<u>KPPs</u>	<u>Threshold/ Baseline</u>	<u>Actual</u>
Satellite Mean Mission Duration	30 mos	45 mos
Primary Sensor Global Resolution	1.5 km	1.5 km
Theater Resolution	0.3 km	0.3km

Functions/Performance Parameters

- **Mission Statement:** The mission of DMSP is to provide an enduring and survivable capability, through all levels of conflict, to collect and disseminate global visible and infrared cloud data and other specialized meteorological, oceanographic, and space environment data required to support worldwide DoD operations and high-priority national programs.
- **Performance Parameters:** DMSP utilizes sensors that measure surface and atmospheric radiation in the visible, infrared, and microwave bands. In addition, DMSP flies sensors that measure space environmental parameters. Critical regional data is broadcast directly to user terminals in theater to support tactical missions. Global data is downloaded to processing centers to support both tactical and strategic missions.

Defense Satellite Communications System (DSCS) III



Acquisition Status

- **Program Status:** Fielding/Deployment & Operational Support
- **Satellites on Orbit:** 5 primary, 5 residual
- **Satellites in Development:** 2
- **Contractors:** Lockheed Martin (Missile and Space), Sunnyvale, CA
- **Purchase Requirements:** 14 purchased; no additional satellites required
- **Future Upgrades:**
 - Wideband Gapfiller Satellites

Capabilities/Profile

Key Performance Parameters	
<u>Requirement</u>	<u>Actual</u>
30 Channels on 5 primary satellites	30 Channels on 5 primary satellites

Functions/Performance Parameters

- **Mission Statement:** Provides worldwide, responsive wideband and anti-jam satellite communications supporting strategic and tactical C3I requirements.
- **Mission Parameters:**
 - Backbone of the MILSATCOM system providing secure and high data rate SHF
 - Users include National and Senior Leadership, Defense Information System Network, Diplomatic Telecommunications Service, White House, Air Force Satellite Control Network, and Service ground mobile forces.

Defense Support Program



Acquisition Status

- **Program Status:** Operational
- **Unit Assignment:** USSTRATCOM
- **Current Inventory:** On-orbit inventory plus 2 satellites awaiting launch
- **Contractors:**
 - Northrop Grumman
- **Current Upgrades:**
 - Under the Space Based Infrared System (SBIRS) program Increment 1, all DSP mission processing was consolidated at a single CONUS location; IOC declared 18 Dec 01, allowing the closure of overseas bases following a transition period.
- **Future Upgrades:** Transition to SBIRS space constellation begins in FY07.

Capabilities/Profile

- **Satellites:** Classified number of geosynchronous earth orbit satellites.
- **Dimensions:** The current DSP-1 satellite is 28 feet long stowed and 32 feet long with solar panels deployed; 13 feet in diameter stowed; and generates 1275 watts of solar power.
- **Weight:** 5250 pounds weight

Functions/Performance Parameters

- **Mission Statement:** The Defense Support Program is a space based infrared satellite system providing global coverage and warning of ballistic missile launches, nuclear detonations, and other events.
- **Performance Parameters:** DSP provides:
 - Near-real time detection and reporting of missile launches against US and/or Allied forces, interests, and assets worldwide.
 - Near-real time detection and reporting of endoatmospheric (0-50km), exoatmospheric (50-300km), and deep space (>300km) nuclear detonations worldwide.

Evolved Expendable Launch Vehicle (EELV)

Boeing
Delta IV



Lockheed Martin
Atlas V

Acquisition Status

• Program Status:

- Two \$500M Other Transaction Agreements (OTA) for Development to Boeing and Lockheed Martin
- Two Firm Fixed Price contracts for Initial Launch Services (ILS) FY02-06 for 26 launches
 - Boeing - 19 launches for \$1.5B
 - Lockheed Martin - 7 launches for \$506M
- Program is on schedule, cost and performance
 - Both systems completed final development reviews
 - First commercial Atlas V launched 21 Aug 02
 - First commercial Delta IV launched 20 Nov 02
 - First Government Delta IV (DSCS) Mar 03
 - First heavy launch on Delta IV (Demo) Sep 03

Capabilities/Profile

	<u>Threshold</u>	<u>Objective</u>
• Standardization		
• Launch Pad	Single Pad	Single Pad
• Payload interface	Std by Class	Std for all
• Mass to Orbit		
• Semi-Sync	2,500-4,725	+15%
• GTO	6,100-8,500	+15%
• Polar-LEO	41,000	+5%
• GEO	13,500	+5%
• Reliability	98%	>98%

Functions/Performance Parameters

- Mission: Partner with industry to develop a national launch capability that satisfies medium and heavy lift requirements for DoD, National, and civil user.
 - Replaces current Delta, Atlas, and Titan space launch vehicles (FY02-20)
 - Expected savings of more than 50% exceeds 25%-50% ORD goal
 - Equates to \$12B savings through 2020
 - Purchasing firm fixed priced commercial launch services (CLS), not hardware
 - Competition for life of program
- Enhances U.S. industrial base, poises two competitive launch vehicle families to capture increased domestic and international commercial market share.

Global Broadcast System (GBS)



Acquisition Status

• Program Status:

- GBS Phase 2 passed Milestone II in Nov 1997
- Program re-baselined to establish:
 - Spiral development
 - 3 incremental IOCs (versus single IOC)
 - IOC 1 expected 4QFY03

• **Payloads on Orbit:** 3 GBS Phase 2 payloads on UHF Follow-on (UFO) satellites

• **Contractors:** Raytheon

• Future Upgrades:

- Equivalent Phase 2 capability being designed into Wideband Gapfiller System
- Future transition to internet protocol (IP) technology for greater flexibility and capability expansion

• Purchase Requirements (Phase 2):

- 3 primary injection facilities to upload data to satellites
- 96 receive terminals (initial buy)
- Services will purchase additional receive terminals (1085 units currently planned)

Capabilities/Profile

- GBS Phase 2 Key Performance Parameters

Requirement	Threshold	Objective
Coverage	65S - 65N	5S - 65N
Spot Beams (per Sat.)	2 500NM; 1 2000NM	2 500NM; 1 2000NM
Simultaneous Uplinks	1 PIP; 1 TIP	1 PIP; 3 TIP
Security	unclas - TS/SCI	unclas - TS/SCI
Terminal Ops	F/T GRT; SRT & SSRT	F/T GRT; SRT & SSRT

Definitions

F/T GRT - Ground Receive Terminal

SRT - Ship Receive Terminal

SSRT - Submersible Ship Receive Terminal

PIP - Primary Injection Point

TIP - Theatre Injection Point

Functions/Performance Parameters

• Mission Statement:

- **GBS Phase 2:** Provide efficient high data rate broadcast capability between many distributed information sources simultaneously to warfighters using small, inexpensive terminals

• Mission/Performance Parameters:

GBS Phase 2 satellite provide:

- 96 Mbps capacity (max)
- 4 channels (max of 24 Mbps each)
- 2 spot beams and 1 wide area beam
- Providing 0.9 Terabytes of critical bandwidth to the warfighter in Operation Enduring Freedom

Global Positioning System (GPS)



Acquisition Status

- **Program Status:** Operational
 - Next IIR Launch - Mar 03, Jul 03
 - First IIF Launch - CY 06
- **Unit Assignment:** 2nd Satellite Operations Squadron (2SOPS), Shriever AFB, CO
- **Production:** Ongoing
- **Current Inventory:** 27 operational satellites; 24 required
- **Contractors:**
 - Block II/IIA - Boeing
 - Block IIR/IIR-M - LMMS
 - Block IIF - Boeing
 - Block III – LMMS, Boeing & Spectrum Astro (concept exploration studies)
- **Future Upgrades:** Control and Space Segment Modernization, New Military and Civil Signals, User equipment upgrades, Navigation Warfare (Navwar); Block III addressing system-wide architectural concepts; Flexible Power on Blocks IIR & IIF will deliver higher power and anti-jam to the warfighter starting in 2004

Capabilities/Profile

- 24 Satellite constellation
- 6 Orbital Planes
- Altitude: ~10,898 miles
- 12 Hour Orbit
- 3 Segments:
 - Space
 - Control
 - User
- Secondary Mission
 - Nuclear Detonation (NUDET) Detection System (NDS)

Functions/Performance Parameters

- **Mission Statement:** Provides highly accurate time and three-dimensional position and velocity information to an unlimited number of users anywhere on or above the surface of the earth, in any weather.
- **Performance Parameters:**
 - Constellation Sustainment: 24 satellites
- **Accuracy***
 - Standard Positioning Service (SPS): 10-50 meters
 - Precise Positioning Service (PPS): 16 meters or better
 - Timing: +25 nanoseconds

** User accuracy is dependent on receiver type and number of satellites acquired*

Integrated Tactical Warning/Attack Assessment (ITW/AA)



Acquisition Status

• Program Status:

Sustainment, Evolutionary Acquisition

• Units of Assignment:

USSTRATCOM, NORAD, NORTHCOM

- NORAD Cheyenne Mountain Complex (NMC), ICBM Radars (BMEWS), SLBM Radars (PAVE PAWS), Mobile Consolidated Command Centers (MCCCs), Alternate Missile Warning Center (AMWC), SPACEAF AOC

• Current Inventory: 3

BMEWS, 2 PAVE PAWS, 1 Perimeter Acquisition Radar Characterization System (PARCS)

- Space Systems: Defense Support Program (DSP) performs ITW/AA and Space Based Infrared System (SBIRS) High will replace DSP in the future.

• **Contractors:** Lockheed Martin Mission Systems (LMMS)

• Planned Upgrades:

- Combatant Commanders Integrated Command and Control System (CCIC2S)
- Service Life Extension Program (SLEP).

Capabilities/Profile

• **Radar:** 5 Solid State Phased Array Radars and 1 Perimeter Acquisition Radar Attack Characterization System

• **Command Centers:** 2 fixed, 2 mobile

• **Range:** Worldwide

• **Dimensions:** Varies by site

Functions/Performance Parameters

• **Mission Statement:** The Integrated Tactical Warning/Attack Assessment (ITW/AA) system integrates and correlates missile launch, space object orbit, and air surveillance information to assess the nature of an enemy attack and issue warnings to the President of the United States, the Prime Minister of Canada, United States Secretary of Defense and warfighting Combatant Commanders

• Performance Parameters:

- Cheyenne Mountain Complex (CMC) is the C⁴ heart of the ITW/AA system
- Cheyenne Mountain Upgrade declared fully operational on 29 Oct 98
- MCCCs provide C2 continuity to Combatant Commanders in event of primary facility incapacitation. Under CCIC2S, the acquisition strategy involves an evolutionary approach to enhance the operational architecture to become more robust and interoperable.

Launch & Test Range System (LTRS)



Acquisition Status

- **Program Status:** Engineering and Manufacturing Development (EMD) and procurement
- **Production:** Ongoing
- **Current Inventory:** Eastern and Western Ranges
- **Contractors:**
 - Lockheed Martin, ITT Industries
- **Future Upgrades:** GPS Metric Tracking; Command Destruct; Communications; Telemetry

Capabilities/Profile

- Launch & Test Range System (LTRS), formerly called the Spacelift Range System, comprised of:
 - Western Range at Vandenberg AFB, CA
 - Eastern Range at Cape Canaveral AFS/Patrick AFB, FL
- Current LTRS assets are based on 1950s/1960s technology
 - Outdated, unreliable, inefficient, and increasingly unsupportable equipment
 - Costly to operate and maintain, with manpower intensive architecture
- LTRS modernization program upgrades multiple range operational capabilities, improving responsiveness, reliability, and supportability

Key Performance Parameters

- **Mission Statement:** Provide responsive, reliable, and cost effective launch scheduling, communications, tracking, telemetry, flight analysis, and emergency termination for DoD, civil, and commercial space launches, ballistic missile tests, and guided weapons and aeronautical tests; also supports space surveillance mission
- **Performance (DoD launches only):**
 - Launch Coverage: ER: 34-112°; WR: 153-281°
 - Atlas II: 12/12 = 100%

Medium Launch Vehicles



Acquisition Status

- **Program Status:** Operational. Launch vehicle production complete.
- **Production:** Last launch scheduled for FY06
- **Inventory:**
 - One Atlas IIAS mission and one Atlas III mission remain through FY04 (both National Reconnaissance Office satellites).
 - 14 Delta II missions remain through FY06 (all Global Positioning System satellites).
- **Contractors:**
 - Atlas II/III: Lockheed Martin, Denver, CO
 - Delta II: Boeing - Huntington Beach, CA
- **Future Upgrades:** None planned.
- **Purchase Requirements:** All USAF vehicles (Delta II) have been manufactured and are being stored. Launch operations remain.

Capabilities/Profile

- **Lift capability:**
 - Atlas II/IIA/IIAS — capable of lifting between 4,900 - 8,150 lbs to geosynchronous transfer orbit
 - Delta II—capable of lifting over 4,010 lbs to geosynchronous transfer orbit
- **Launch Sites:**
 - Atlas—Launch Complex 36 A/B, Cape Canaveral, FL and Space Launch Complex 3E, Vandenberg AFB, CA
 - Delta II—Launch Complex 17 A/B, Cape Canaveral, FL and Space Launch Complex 2W, Vandenberg AFB, CA

Key Performance Parameters

- **Mission Statement:**
 - The Atlas space launch vehicles provide launch capability for National Reconnaissance Office payloads.
 - The Delta II launch vehicle provides a medium space lift capability to support the Global Positioning System constellation.
- **Performance (DoD launches only):**
 - Delta II: 41/42 = 98%
 - Atlas II: 12/12 = 100%

MILSATCOM Terminals



DSCS

GBS Receive Suite

Spitfire

GMT

SMART-T

Acquisition Status

• Program Status:

Development, procurement, upgrade and sustainment efforts:

- Produce & field UHF Demand Assigned Multiple Access (DAMA) air & ground (Airborne Integrated Terminal (AIT and Multi-Band Multi-Mode Radio (MBMMR) and Spitfires).
- Develop, produce & field Ground Multi-band Terminals (GMT).
- Develop, produce & field Secure Mobile Anti-Jam Reliable Tactical - Terminal (SMART-T).
- Develop, produce & field Family of Advanced Beyond Line-of-Sight Terminal (FAB-T).
- Sustain Single-Channel Anti-Jam Man Portable (SCAMP) and Air Force Command Post Terminals.
- Upgrade Defense Satellite Communications System (DSCS) Terminals.
- **Emerging Development**
 - Laser Communications Terminal.
 - High Data Rate (HDR) Terminals to support Transformational Communications (TC).

• **Current Inventory:** Includes ground, fixed, transportable and airborne:

- Narrowband/UHF (AIT, MBMMR, Spitfire) - 677
- Wideband/SHF (DSCS, GBS, GMT, Lasercom, Airborne (FAB-T HDR) and Ground (GMT HDR) HDR terminals) - 48 Air Force and 96 Joint Service
- Protected/EHF(SCAMP, SMART-T, FAB-T (non-HDR)- 96
- **Contractors:** Multiple Primes—Boeing (CA); Raytheon (MA, FL, IN, VA); Harris (FL); Rockwell (IA)

Capabilities/Profile

Satellite communications terminals for:

- **UHF DAMA air & ground**
 - Airborne Integrated Terminal
 - Multi-Band Multi-Mission Radio
 - Spitfire
- **Wideband SHF Connectivity**
 - Global Broadcast Service (GBS) receive suites (RS) and Theater Injection Points (TIP)
 - Ground Multiband Terminal (GMT)
 - Defense Satellite Comm System (DSCS)
- **Protected EHF (and AEHF) Connectivity**
 - Family of Advanced Beyond line-of-sight Terminals (FAB-T)
 - Army developed Secure Mobile Anti-jam Reliable Tactical Terminal (SMART-T)
- **Transformational Communications**
 - Laser Communication Terminal (Lasercom)
 - High Data Rate (HDR) Terminals—derivatives of FAB-T and GMT to support Intelligence, Surveillance, and Reconnaissance (ISR) community

MILSATCOM Terminals, cont.

Functions/Performance Parameters

- **Mission Statement:** Develop, procure, deploy, and sustain multi-band SATCOM terminals utilized by Air & Space Expeditionary Forces (AEF), SIOP, Combatant Commanders, and other users to communicate over current and emerging military and commercial satellite systems.

- **Performance Parameters:** Communications connectivity in the following frequency bands:

- Narrowband/UHF- Secure, mobile, DAMA
- Wideband/SHF- Secure, long-haul, tactical and strategic
- Protected/EHF- Secure, nuclear hardened, Anti-Jam / Anti-Scintillation, Low Probability of Intercept, tactical and strategic
- Terminals will support the Transformational Communications Architecture

Milstar



Acquisition Status

- **Program Status:** Engineering & Manufacturing Development (EMD)
- **Satellites on Orbit: 4**
2 Block I satellites with Low Data Rate (LDR), 2 Block II satellites with both Low and Medium Data Rate (LDR/MDR)
- **Satellites to be Launched:** 1 Block II
- **Contractors:**
 - Lockheed Martin, Missiles & Space (Prime)
 - Boeing, Northrop Grumman (Major Subs)
- **Future Upgrades:** Advanced EHF communications satellites will replenish Milstar satellites with first launch in FY07.
- **Purchase Requirements:** N/A

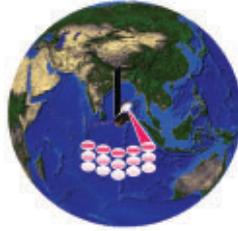
Capabilities/Profile

- **Key Performance Parameters**
 - **Capacity:**
 - **LDR:** 75 to 2400 bits per second (bps); EHF at 2 GHz bandwidth; SHF downlink frequency at 1GHz bandwidth
 - **MDR:** 4.8 to 1544 Kbps; EHF at 2 GHz bandwidth; Downlink freq. SHF at 1GHz bandwidth
 - **Protection:**
 - Low Probability of Intercept/Detection (LPI/D)
 - Anti-Jam (AJ)
 - Anti-Scintillation (AS)

Functions/Performance Parameters

- **Mission Statement:** Provides the President, Secretary of Defense, and Combatant Commanders with assured, worldwide command and control (C2) for tactical and strategic forces.
 - Program will specifically:
 - Maintain operations support for satellites 1, 2, 4 & 5 (#3 did not achieve useful orbit).
 - Complete launch of satellite 6 in FY03.
- **Mission Parameters:** Low Probability of Intercept/Detection (LPI/D), Anti-Jam (AJ), and Anti-Scintillation (AS) protected communications at low and medium data rates (LDR and MDR).

National Polar-orbiting Operational Environmental Satellite System (NPOESS)



Acquisition Status

- **Program Status:** Acquisition & Operations phase
- **Production:** FY02-FY15
- **Current Inventory:** None
- **Projected Inventory:** Six total
- **Contractors:**
 - Northrup Grumman (Prime)
 - Raytheon, Boeing Satellite Systems, Ball Aerospace, ITT, and Saab Ericsson (Instruments)
- **Future Upgrades:** TBD

Capabilities/Profile

KPPs	Threshold
Vertical Moisture	> of 20% or 0.2g/kgclear/cloudy
Temperature Profile	300mb +/- 1.6K/km
Clear/Cloudy	700mb +/-2.5K/km
Imagery refresh	≤ 4 hrs avg, ≤ 6hrs max
Sea Surface Temp	+/- 0.5 deg C
Sea Surface Winds	> of 2m/s or 10%
Soil Moisture	Skin Layer -0.1cm
Data Access	capable of selective denial
Interoperability	100% of top-level IERs designated critical

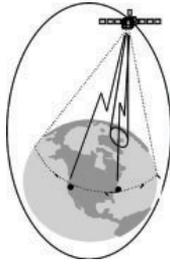
Schedule

Milestone I: Mar 97
Key Decision Point (KDP) C: Aug 02

Functions/Performance Parameters

- **Mission Statement:** NPOESS is a tri-agency program (DoD, DOC, and NASA) that will provide military commanders and civilian leaders assured timely, high quality environmental information to effectively employ weapon systems and protect national resources (safety, life, and property). The converged program will be the nation's primary source of global weather and environmental data for operational military and civil use for a period of at least 10 years.
- **Performance Parameters:** NPOESS will fly a suite of instruments that will provide visible and infrared cloud-cover imagery and other atmospheric, oceanographic, terrestrial, and space environmental information. In all, NPOESS will measure 55 distinct environmental parameters such as soil moisture, cloud levels, sea ice, ozone, ionospheric scintillation, and more.

Polar MILSATCOM



Acquisition Status

- **Program Status:** Interim Polar Program is in the Engineering & Manufacturing Development (EMD) phase. Design, test, and launch of last two packages.
- **Satellites on Orbit:** 1
- **Satellites in Development:** 2
- **Contractors:** Classified
- **Future Upgrades:** Next generation capability to be satisfied by Advanced Polar System (APS). Preacquisition, system definition, and risk reduction starts FY04.

Capabilities/Profile

- **Coverage:** North polar region. 24 hours/day required (takes two satellites).
- **Compatibility:** Milstar compatible Low Data Rate (LDR) service. (Milstar terminals require software modification for Doppler effect).
- **Integration:** EHF packages on three classified host satellites. Polar 1 added to earlier generation host, launched CY 97. Polars 2 and 3 being integrated into design of new generation host available in FY04 and FY06, respectively.

Functions/Performance Parameters

- **Mission Statement:** Provides secure, survivable, communications connectivity supporting peacetime, contingency, and wartime operations in the north polar region. Supports Independent Submarine Operations & Maritime Task Force Operations, Special Operations Forces, Intelligence Collection/Dissemination Activities, and in the future, Strategic Bombers.
- **Mission Parameters:** Same as Milstar LDR connectivity: 75-2400 bps data rates with Low Probability of Intercept/Detection (LPI/D), Anti-Jam (AJ), and Anti-Scintillation (AS) protection.

Rocket Systems Launch Program (RSLP)



Acquisition Status

- **Inventory:** Over 1,250 stored motors
- **Contractors:**
 - **Orbital/Suborbital (Long-range):**
 - Orbital Sciences (Phoenix, AZ)
 - **Sounding Rocket:**
 - Coleman Research (Orlando, FL)
 - Lockheed Martin (Denver, CO)
 - Orbital Sciences (Phoenix, AZ)
 - Space Vector (Chatsworth, CA)
 - **Advisory & Assistance:**
 - TRW (Albuquerque, NM)

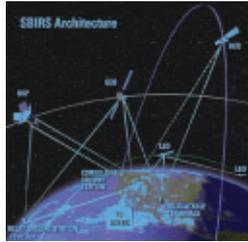
Capabilities/Profile

- **Store Deactivated ICBM Motors:**
 - \$3 Billion (\$FY02) in Launch Assets
- **Perform Aging Surveillance on stored motors**
- **Provide Cost Reimbursable Launch Services for DoD Flight Tests:**
 - Provide Payload Integration Services
 - Refurbish and Transport Motors/Boosters
 - Conduct Launch

Functions/Performance Parameters

- RSLP will maintain active control and management of Air Force excess ballistic missile assets and will provide, on a cost reimbursable basis, flight test support and operations for national R&D requirements.
- Over 600 launches since 1962.
- Does \$75 Million (\$FY02) in reimbursable launch business per year - represents about \$40 million in launch cost-avoidance for our customers.

Space Based Infrared System High (SBIRS High)



Acquisition Status

- **Program Status:** SBIRS High is in System Development and Demonstration (SDD).
- **Unit Assignment:** USSTRATCOM
- **Projected Inventory:**
 - SBIRS High consists of 4 Geosynchronous Earth Orbit (GEO) Satellites and 2 Sensors in Highly Elliptical Orbit (HEO); a fifth GEO satellite (spare), plus ground elements.
- **Contractors:**
 - Lockheed Martin Space Systems (prime)
 - Northrop Grumman (subcontractor)

Capabilities/Profile

- **Mission Areas:**
 - Missile Warning- North America & Theater
 - Ballistic Missile Defense
 - Battlespace Characterization
 - Technical Intelligence
- **Key Performance Parameters:**
 - Coverage
 - Minimum Threat
 - Report Time
 - Probability of Warning
 - Data Availability

Functions/Performance Parameters

- **Mission Statement:** SBIRS consolidates the national and DoD's infrared detection systems into a single overarching architecture that fulfills the nation's security needs in the areas of missile warning, missile defense, technical intelligence, and battlespace characterization.
- **Performance Parameters:** SBIRS enables global, simultaneous surveillance, tracking and targeting of multiple targets in multiple areas of responsibility (AORs) and surveillance of infrared sources of operational, intelligence, or national significance.

Space Based Radar



Acquisition Status

• **Program Status:** Concept and Technology Development:

- Mission Need Statement approved by Air Force and Joint Requirements Oversight Councils (AFROC, Oct 01; JROC, Apr 02).
- System (draft) Concept of Operations (CONOPS) updated in Feb 02.
- OSD SBR Roadmap published in Feb 02.
- Ground Moving Target Indication (GMTI) Analysis of Alternatives (AoA) began in Oct 01, interim results were reported in Nov 02. Completion expected in Nov 03.
- Joint USAF/USA GMTI Capstone Requirements Document (CRD) updated.
- Initial Capabilities Document (ICD) development began in Feb 03. Prior to KDP B, a Capabilities Development Document (CDD) will be developed using GMTI AoA results to determine KPPs and measures of effectiveness (MOEs).

• **Initial Launch Capability:** FY 2012

• Contractors:

- Electronically Scanned Array (ESA) Technology Contracts: Northrop Grumman, Raytheon
 - Contracts/On-board Processing Contracts: Harris, Northrop Grumman, Raytheon
 - Analysis of Alternatives (AoA) Contract: Booz, Allen, and Hamilton
 - Concept Development Contracts: Boeing, Lockheed Martin, Northrop Grumman, Raytheon, Spectrum Astro
 - Support Contractors: Aerospace, MITRE, CSC
- **Schedule:** Key Decision Point (KDP) A currently planned for 3rd Qtr FY03.

Capabilities/Profile

- **Payload:** Satellites equipped with Electronically Scanned Array (ESA) to provide:
 - Ground Moving Target Indication (GMTI)
 - Synthetic Aperture Radar (SAR) Imagery
 - High Resolution Terrain Information (HRTI)
- **Tasking, Collection Processing, Exploitation, Dissemination:** Direct downlink,

designed for theater-based tasking & data processing compliant with communications links and imagery processing standards

Functions/Performance Parameters

• **Mission Statement:** Space Based Radar will provide rapid Battlespace Dominance and Operational Decision Superiority through:

- Day/night, near continuous surveillance with Ground Moving Target Indication (GMTI) and Synthetic Aperture Radar imaging from space.
- Deep-look, wide area surveillance of denied areas allowing for responsive, precision targeting for the warfighter.

• **Performance Parameters:** Exact surveillance capabilities and numbers of spacecraft are subject to technical tradespace considerations. These considerations will be evaluated as part of the ongoing Analysis of Alternatives effort.

Space Surveillance Network (SSN)



Acquisition Status

- **Program Status:** Operational
- **Unit Assignment:** USSTRATCOM
- **Current Inventory:** 7 dedicated sensors (1 space-based), 8 collateral sensors, and 14 contributing sensors
- **Projected Inventory:** 8 dedicated, 8 collateral sensors (with addition of the Globus II radar for deep space tracking), and 14 contributing sensors
- **Contractors:**
 - Raytheon (Sudbury, MA)
 - Northrop Grumman (Colorado Springs, CO)
- **Current Upgrades:**
 - Globus II radar in Norway for deep space tracking
 - GEODSS charge coupled device (CCD) camera; replacement of telescope and dome controllers (TDC).
- **Future Upgrades:**
 - Space-Based Space Surveillance (SBSS) System
 - Eglin Service Life Extension Program (SLEP)
 - Haystack Ultra-wideband Satellite Imaging Radar (HUSIR) Upgrade

Capabilities/Profile

- **Ground Sensors (dedicated):** 4 Optical and 2 Radar
- **Ground Sensors (other):** 8 collateral; 14 contributing sensors
- **Satellites (dedicated):** 1 Midcourse Space Experiment/Space-Based Visible (MSX/SBV)
- **Range:** Near Earth object tracking to 3000 nm, deep space tracking to 22,000 nm from ground-based sensors
- **Dimensions:** Varies by sensor/site

Functions/Performance Parameters

- **Mission Statement:** Maintain space situation awareness by detecting, tracking, identifying, characterizing, and monitoring all man-made objects in Earth orbit. The SSN operates a worldwide network of dedicated, collateral, and contributing electro-optical and radar sensor systems integrated with required C2, data processing, and analysis functions.
- **Performance Parameters:** Provides awareness of all space events and activities such as:
 - Satellite attack warnings and satellite overhead threat warnings

- New foreign launches and space treaty monitoring
- Space object break-ups or decays
- Satellite maneuvers
- Space object identification/mission payload assessment (SOI/MPA)
- Supports DoD, NRO and NASA space operations.
 - The space object catalog contains over 9000 objects. Approximately 80% are near Earth objects; 20% deep space. Much of this data is shared with the United Nations, NASA, U.S. allies, and foreign launch agencies.

Space Test Program (STP)



Acquisition Status

- Coriolis mission on Titan II in Jan 03: Risk reduction effort for NPOESS environmental sensor
- Communication/Navigation Outage Forecasting System (C/NOFS) mission on Pegasus in FY04: Forecast ionospheric scintillations that degrade communication, navigation and surveillance systems
- STP-EELV mission with first Evolved Expendable Launch Vehicle (EELV): Secondary Payload Adapter (ESPA) in FY06

Capabilities/Profile

- Conducts space missions for DoD space research community
- Approx \$50M RDT&E program
- Flight test new space system technologies
- Improve operational capabilities by characterizing environment, sensor physics
- Perform risk reduction through direct flight test of prototype components
- Develop and test advanced launch vehicle technologies and capabilities

Functions/Performance Parameters

- Conducts mission design, procures launches and spacecraft
- Functions as single DoD liaison for military payloads on Shuttle and International Space Station
- Conducts on-orbit operations
- R&D Experiments selected annually via the DoD Space Experiments Review Board (SERB)
- 20% of payloads fly as secondary payloads
- 50% fly on the Shuttle
- 30% fly on dedicated freeflying satellites

Titan Space Launch Vehicles Program



Acquisition Status

- **Program Status:** Active. Flyout and program closeout activities remain.
- **Production:** Factory Line began shutdown in FY99
- **Inventory:**
 - Titan IV - 5 launch vehicles remain
 - Titan II - 1 launch vehicles remain
 - Inertial Upper Stage - one remains (for DSP-22)
- **Contractors:**
 - **Titan IV/II:** Lockheed Martin, Denver, CO
 - **IUS:** Boeing, Huntington Beach, CA
- **Future Upgrades:** None planned
- **Purchase Requirements:** Launch services remain until flyout. Last USAF launch scheduled for FY04. Final Titan launch scheduled for FY05.

Capabilities/Profile

- **Lift capability:**
 - Titan IVB capable of lifting 12,700 lbs to geosynchronous orbit; 47,800 lbs to polar low earth orbit
 - Titan II capable of lifting over 4,200 lbs to polar low earth orbit
- **Launch Sites:**
 - Titan IVB - Launch Complex 40 Cape Canaveral, FL and Space Launch Complex 4E Vandenberg AFB, CA
 - Titan II - Space Launch Complex 4W, Vandenberg AFB, CA

Functions/Performance Parameters

- **Mission Statement:**
 - Titan IV provides heavy lift capability to deliver the Nation's highest priority satellites into orbit from Cape Canaveral Air Station, FL, and Vandenberg AFB, CA. Remaining payloads include Defense Support Program, Milstar, and National Reconnaissance Office.
 - Titan II provides medium lift capability from Vandenberg AFB using refurbished Titan II ICBMs. Remaining payloads include Defense Meteorological Support Program, National Oceanic and Atmospheric Administration, and Space Test Program.
- **Performance:**
 - Titan IVA/B: $31/34^* = 91\%$
 - Titan II: $12/12 = 100\%$

** Does not include 4th failure due to IUS malfunction*

Wideband Gapfiller System (WGS)



Acquisition Status

- **Program Status:** Production
 - Satellite 1 launch in Oct 04 (Satellite available for Jun 04 launch)
 - Satellite 2 launch in Feb 04 (Satellite available for Nov 03 launch)
 - Satellite 3 launch in Sep 05
- **Satellites on Orbit:** 0
- **Satellites in Development:** 3
- **Contractors:** Boeing
 - Contract Awarded Jan 01
 - Sole Source, FAR Part 12
 - Development & Production
- **Future Upgrades:** Advanced Wideband System
- **Purchase Requirements:** 3 Satellites currently. A contract option may be exercised for 3 additional satellites, if required in conjunction with Transformational Communications.

Capabilities/Profile

WGS Key Performance Parameters:

- **Coverage:** 24 hours between 65 degrees North & South
- **Capacity:**
 - Threshold: 1.2 Gbps
 - Objective: 3.6 Gbps
- **Access & Control:** Control from Launch and Early Orbit operations through disposal
- **Interoperability:** Interoperable with legacy terminals

Functions/Performance Parameters

- **Mission Statement:** High data rate satellite broadcast system meant to bridge gap between current systems (DSCS & GBS and Transformational Communications)

• Mission/Performance Parameters:

- Wideband communications at X and Ka Band frequencies
- Two-way X Band
 - New two-way Ka Band
 - Ka broadcast
 - ~12x throughput capacity of DSCS III satellite