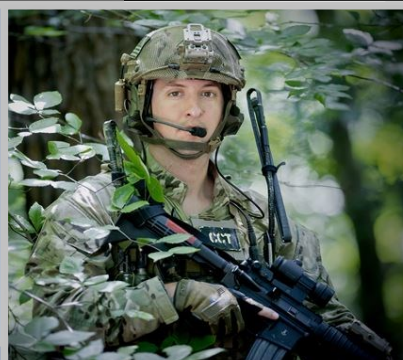


2018



WEAPONS SYSTEMS MODERNIZATION PRIORITIES



**AIR NATIONAL
GUARD**

FOREWORD



Upholding the spirit of “Defend the Homeland-Global Warfighters”, modernizing Air National Guard (ANG) assets is more critical today than it has ever been to supporting our dual-use force. The necessity to continuously improve our aging assets is evidenced by simultaneous responses on U.S. soil during multiple rescue and recovery operations, while concurrently supporting deployments overseas to supplement Air Force Major Commands with combat-ready contingency forces in every corner of the world. The ANG is not only a National force, but a global force.

At the heart of the modernization process is the Air Reserve Component’s Weapons and Tactics Conference (WEPTAC), where deliberation amongst the experts in every major weapon system leads to industry engagement and implementation of off-the-shelf capabilities, directly influencing weapon system transformation.

The priorities identified in this book will continue to improve readiness and prepare the ANG to meet the future challenges of our Nation, both locally and globally.

A handwritten signature in black ink, reading "L. Scott Rice".

L. SCOTT RICE
Lieutenant General, USAF
Director, Air National Guard

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Introduction



The 2018 Air National Guard (ANG) Weapons Systems Modernization Priorities Book documents capability priorities identified during the October 2017 Air Reserve Component Weapons and Tactics (WEPTAC) Conference. WEPTAC hosted representatives from all ANG and Air Force Reserve (AFR) units, as well as representation from the active component.

The 2018 WEPTAC Book is organized into 19 weapon system mission sets. Each Tab begins with a summary page of capabilities identified at WEPTAC, categorized as Critical (Crucial - within the next one to three years), Essential (Vital - within the next three to five years), or Desired (Enhances mission success in the five-year timeframe).

For each Critical capability identified, an information paper is included within the weapon system Tab. A header within each information paper identifies its appropriate Service Core Function or functional category as one of the following:

Air Superiority / Global Precision Attack
Rapid Global Mobility
Space Superiority / Cyberspace Superiority
Command and Control
Global Integrated ISR
Special Operations / Personnel Recovery
Simulation and Distributed Mission Operations
Agile Combat Support

Applicable Funding Appropriation Definitions

0350 – National Guard and Reserve Equipment Account
3840 – ANG Operations and Maintenance, one-year funding
3010 – Aircraft Procurement, three-year funding
3600 – Research and Development, two-year funding
3080 – Other Procurement, three-year funding
(NOTE: In most cases, Non-Recurring Engineering (NRE) costs are paid for with 3600 Research, Development, Test and Engineering (RDT&E) money, but in some cases they can be paid for with 3010, 3080, or 0350 procurement money.)

The State Matrix, found on the next page, identifies ANG weapons systems locations by state/territory. These depictions reflect the force structure as of 01 Dec 2017.



State Matrix



Weapons System Reference Table by State (01 Dec 2017)

Refer to Weapon System Tabs for Specific Information (Classic Associate Units are shown in red.)

	A-10	B-2	C-17	C-130H/J	Special Mission C-130	C-32B, E-8C, C-40	F-15	F-16	F-22	HH-60	KC-135	MQ-9	AOC, BCC, CRC	Cyber, Space	DCGS, MC-12W, RC-26B	GA/ST/TACP	Range
AK			•	H	HC					•	•		BCC	Space		GA	
AL								•			•				RC-26B/DCGS		
AR				H								•		Cyber	DCGS		
AZ								•			•	•			RC-26B		
CA				J	HC		•			•		•		CY/SP(2)	RC-26/DCGS	GA	
CO								•						Space(3)			Range
CT				H									CRC				
DC						C-40		•									
DE				H										Cyber			
FL							•						AOC	Space			
GA				H		E-8C							CRC		DCGS	TACP	
GU																	
HI			•								•		AOC/BCC		DCGS		
IA											•	•	CRC	Cyber	DCGS/RC-26		DMO
ID	•													Cyber			TACP
IL				H							•		AOC				TACP
IN		•													DCGS	TACP	Range
KS											•		CRC	Cyber(3)	DCGS	TACP	Range
KY				H													ST
LA							•										TACP
MA							•								DCGS		
MD	•			H										Cyber(3)			
ME											•						
MI		•									•	•	AOC	Cyber			
MN				H				•									
MO		•		H									AOC				Range
MS			•								•		AOC/CRC		RC-26B	TACP	Range
MT				H													
NC			•	H													TACP
ND												•			DCGS		
NE											•						
NH											•						
NJ						C-32B		•			•			Cyber			Range
NM					HC/MC					•					RC-26B/DCGS		
NV				H											DCGS		
NY			•		HC/LC					•		•	AOC/BCC	Space		GA/TACP	Range
OH				H				•			•	•	CRC				
OK								•							MC-12W	TACP	
OR							•						CRC			ST	
PA					EC-130J						•	•	AOC	Cyber			Range
PR				H									CRC				
RI				J										Cyber			
SC								•									
SD								•									
TN			•								•	•		Cyber	DCGS		
TX				H				•						Cyber	RC-26B	TACP	Range
UT											•		CRC		DCGS		
VA									•					Cyber	DCGS		
VI																	
VT								•						Cyber			
WA											•		BCC	Cyber(2)	RC-26B	TACP	
WI								•			•		CRC		RC-26B		Range
WV			•	H											RC-26B		
WY				H										Space			



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A-10

- **Close Air Support (CAS)**
- **Forward Air Controller – Airborne (FAC-A)**
- **Combat Search and Rescue**
- **ANG Units Provide 40% of the Total Fleet**

The A-10 is well-suited to execute current and future Overseas Contingency Operations. With eleven weapons stations, the A-10 is able to engage any target with a wide variety of general purpose and precision munitions, including its 30-millimeter cannon. The A-10's combat survivability, wide combat radius, and ability to land at and operate from austere airfields provides flexibility beyond that of other fixed-wing Air Force CAS assets. Its extensive loiter time and advanced targeting pod capabilities provide superior support for ground forces in its FAC-A role.



The ANG operates 85 A-10s in four squadrons. ANG aircraft have the helmet-mounted integrated targeting modification, drastically reducing the time required to acquire targets. This ultimately increases both survivability and lethality. ANG A-10 aircraft are equipped with two ARC-210 radios, giving them a unique capability to simultaneously communicate via secure line-of-sight and beyond-line-of-sight, extensively contributing toward successful combat search and rescue mission success.

Current A-10 modernization priorities include a high-resolution center display, which allows pilots to see the high-definition picture provided by targeting pods. Display upgrades improve A-10 pilots' ability to positively identify friendly forces while aiding in the search, identification, surveillance, and tracking of enemy personnel. Additional upgrades include an integrated noise-cancelling, three-dimensional cockpit audio system, and an anti-jam embedded Global Positioning System (GPS).

A-10

2017 Weapons and Tactics Conference

Critical Capabilities List

- High Resolution Displays and Increased Helmet-Mounted Cueing System Accuracy
- Improved Electronic Attack, Self-Protection, and Full-Spectrum Countermeasure Systems
- Upgraded Communications Systems Which Function During Contested, Degraded, and Operationally Limited Environment
- Operate in Degraded / Deceived / Denied Global Positioning System Environment
- Improve Capability to Operate and Employ from Austere Airfields

Essential Capabilities List

- Operational Flight Program Upgrade
- Targeting Pod Development
- Ability to Find / Fix Targets Through the Weather
- Improved Survivor Defense / Concealment
- Electronic Flight Bag

Desired Capabilities List

- Advanced Laser Eye Protection
- Airframe Sustainment and Propulsion Improvement
- Full AIM-9 Integration
- Instrument Flight Rules Head-Up Display
- Long-Range, Precision-Guided Munition

A-10: HIGH-RESOLUTION DISPLAYS AND INCREASED HELMET-MOUNTED CUEING SYSTEM ACCURACY

1. Background. ANG A-10s require improved Positive Identification (PID), intelligence, surveillance, reconnaissance, and battle-tracking capabilities. Friendly forces and enemy combatant PID are crucial in any conflict. An improved Helmet-Mounted Cueing System (HMCS) will reduce the time to acquire targets with aircraft sensors, and allow pilots to quickly and accurately locate friendly ground forces. Advanced Targeting Pod (ATP) digital output upgrades with color video provide high-resolution feeds, coupled with high-definition displays, and enable visual identification of friendly and enemy forces from greatly increased standoff ranges. High-resolution displays in the A-10 enable full utilization of targeting pod improvements. ARC-210 connection refinements allow pilots to securely share data, including any ATP imagery, with Joint Terminal Attack Controllers. These actions reduce the likelihood of fratricide or collateral damage. Each of the 85 ANG A-10s requires an upgraded high resolution display system.

2. Program Details.

Quantity	Unit Cost	Program Cost
HMCS Improvements (3010)	N/A	\$3,000,000
High Resolution Display Non-Recurring Engineering (3600)	N/A	\$9,000,000
94 High Resolution Displays (3010) *	\$420,000	\$39,480,000
196 Targeting Pod Upgrades (3010) * **	\$250,000	\$49,000,000
Total		\$100,480,000

* Includes 10% spares

** Quantities and Program Costs are shared with F-16s (see F-16 Information Paper)

A-10: IMPROVED ELECTRONIC ATTACK, SELF-PROTECTION, AND FULL-SPECTRUM COUNTERMEASURE SYSTEMS

1. Background. ANG A-10s require Electronic Warfare (EW) suite modernization to keep pace with surface-to-air threat technology advancements and proliferation. The Air Force identified vulnerabilities in the 2012 A-10C Operational Viability and Sustainment Gap Analysis Report but, due to continuing budget battles over retiring the aircraft, modernization is not complete. Modernized EW suite subsystems, architecture, and countermeasures will allow the A-10 to conduct full-spectrum combat operations in contested environments. A-10 EW modernization needs to focus on several critical capabilities in the radio frequency spectrum: Radar Warning Receiver (RWR) modernization, improved chaff program development, integration with digital radio frequency memory jamming pods, ability to record and playback aircraft EW information, and the expansion of the aircraft ethernet architecture to allow rapid EW reprogramming and communication with advanced pods. A-10 vulnerabilities in the infrared (IR) spectrum must also be addressed through the development of countermeasures which reliably decoy modern IR threats. Each of the 85 ANG A-10s requires EW suite modernization, along with 40 electronic attack pods for the enterprise.

2. Program Details.

Quantity	Unit Cost	Program Cost
Electronic Warfare (EW) Architecture Non-Recurring Engineering (NRE) (3600)	N/A	\$2,000,000
94 EW Architecture Kits (3010) *	\$50,000	\$4,700,000
ALR-69A RWR NRE (3600)	N/A	\$5,000,000
94 ALR-69 RWRs (3010) *	\$600,000	\$56,400,000
40 ALQ-131A Electronic Attack Pods (3010) *	\$1,000,000	\$40,000,000
Advanced Infrared Countermeasures (IRCM) System NRE (3600)	N/A	\$10,000,000
94 Advanced IRCM Systems (3010) *	\$600,000	\$56,400,000
Total		\$174,500,000

* Includes 10% spares

A-10: UPGRADED COMMUNICATIONS SYSTEMS WHICH FUNCTION DURING CONTESTED, DEGRADED, OR OPERATIONALLY LIMITED ENVIRONMENT

1. Background. ANG A-10s require an improved communications suite due to the lack of interconnectivity and security compatibility with many fielded communication and data link systems. An improved A-10 communication suite consists of Satellite Communications (SATCOM), Three-Dimensional (3-D) audio, enhanced data link, and the Single-Channel Ground and Airborne Radio System (SINCGARS) Situational Awareness (SA) waveform. Two ARC-210 Generation (Gen) 6, Mobile User Objective System (MUOS) multi-mode digital radios with SATCOM capability meet the need for simultaneous beyond-line-of-sight and secure line-of-sight communications. Integration of the SINCGARS SA waveform allows Global Positioning System data, transmitted by existing tactical radios, to be displayed on the A-10 Tactical Awareness Display, the targeting pod field of view, and within the Helmet-Mounted Cueing System (HMCS) display. Utilization of the SA waveform capability reduces the risk of fratricide in Combat Search and Rescue or Close Air Support scenarios by providing immediate and constant awareness of friendly positions. The integration of noise-cancelling and 3-D audio in the cockpit increases situational awareness by spatially separating aural warning and radio signals and providing angular cueing to ground and air threats when used in conjunction with a HMCS. Spatial separation and reduction in ambient noise significantly increases the pilot’s ability to process information simultaneously arriving from multiple radios and warning systems. Technological advances in data link architecture and increased reliance on these systems by multiple aircraft and ground parties require the A-10 to upgrade its current capabilities to include Link 16.

2. Program Details.

Quantity	Unit Cost	Program Cost
Directional Audio Non-Recurring Engineering (NRE) (3600)	N/A	\$5,000,000
94 Directional Audio Kits (3010) *	\$80,000	\$7,520,000
200 Directional Audio Pilot Equipment (3010) *	\$7,000	\$1,400,000
12 Unit Test Equipment (3010) *	\$45,000	\$540,000
Second generation Anti-jam Tactical UHF Radio for NATO (SATURN) Upgrade NRE (3600)	N/A	\$1,800,000
94 SATURN Radio Upgrades (3010) *	\$1,000	\$94,000
SINCGARS SA Waveform Retrofit NRE (3600)	N/A	\$2,000,000
94 SINCGARS SA Waveform Retrofit Kits (3010) *	\$50,000	\$4,700,000
ARC-210 Gen 6 MUOS Capable Radios NRE (3010)	N/A	\$3,000,000
94 ARC-210 Gen 6 MUOS Radios (3010) *	\$850,000	\$79,900,000
Link 16 NRE (3600)	N/A	\$10,000,000
94 Link 16 Kits (3010)*	\$250,000	\$23,500,000
Total		\$139,454,000

* Includes 10% spares

A-10: OPERATE IN DEGRADED / DECEIVED / DENIED GLOBAL POSITIONING SYSTEM ENVIRONMENT

1. Background. The A-10 requires the ability to operate in a Global Positioning System (GPS) degraded environment and to meet the Federal Aviation Administration Automatic Dependent Surveillance-Broadcast mandate by 2020. Virtually every system on the A-10 depends on the highly accurate timing, position, orientation, and velocity data the Embedded GPS / Inertial Navigation System (INS) [EGI] provides. Adversary attempts to deny GPS capability may degrade or limit the precision of A-10 navigation solutions, decreasing positional awareness and weapons employment accuracy. The first step to counter or minimize this threat is the installation of a controlled reception pattern antenna, coupled with a digital antenna electronics unit, to nullify the effects of jamming systems. The integration of selective availability anti-spoofing modules reduces the impact of jamming and protects GPS military precise positioning service accuracies. The A-10 needs greater precision and reliability in order to comply with the national airspace system transition to satellite-based air traffic control. Upgrading the A-10 EGI supports the FAA mandate and provides increased capability to preserve GPS integrity in a contested or degraded electromagnetic environment. Each of the 85 ANG A-10s requires an anti-jam EGI.

2. Program Details.

Quantity	Unit Cost	Program Cost
Anti-Jam EGI Non-Recurring Engineering (NRE) (3600)	N/A	\$9,000,000
94 Anti-Jam EGI Kits (3010) *	\$225,000	\$21,150,000
Total		\$30,150,000

* Includes 10% spares

A-10: IMPROVED CAPABILITY TO OPERATE AND EMPLOY FROM AUSTERE AIRFIELDS

1. Background. ANG A-10s require an enhanced ability to operate from austere airfields with fewer maintenance and logistics personnel. These capabilities provide Combatant Commanders the flexibility to pre-deploy A-10s closer to the battlespace, and enables rapid response during close air support, forward air controller-airborne, and combat search-and-rescue sorties. Conversion fuel tanks provide additional endurance and minimize the need for additional refueling operations. On-Board Oxygen Generating System (OBOGS) eliminates liquid oxygen refill and reduces maintenance requirements between missions. A parking brake will allow pilots to remain in the aircraft during prolonged ground operations without the need for additional personnel to place and remove wheel chocks. Smart triple ejector rack (TER) modifications permit carriage of additional Global Positioning System-guided munitions. Maintenance personnel at each of the four units require specialized equipment to support aircraft at austere locations. This equipment includes Night Vision Goggles (NVG), NVG storage cases, infrared headlamps, integrated helmet and headsets with noise cancelling boom microphones and wireless intercom system, and secure-capable tactical radios. Each of the 85 ANG A-10s requires OBOGS, a Parking Brake, and two smart TERs. Each of the ANG A-10 squadrons requires 29 fuel tanks and one austere airfield maintenance kit.

2. Program Details.

Quantity	Unit Cost	Program Cost
Conversion Fuel Tank Non-Recurring Engineering (NRE) (3600)	N/A	\$1,000,000
128 Conversion Fuel Tanks (3010) *	\$81,515	\$10,433,920
OBOGS NRE (3010)	N/A	\$2,500,000
94 OBOGS (3010) *	\$225,000	\$21,150,000
Parking Brake NRE (3600)	N/A	\$2,500,000
94 Parking Brake Kits (3010) *	\$25,000	\$2,350,000
TER NRE (3600)	N/A	\$2,000,000
187 Smart TERs (3010) *	\$100,000	\$18,700,000
4 Austere Airfield Maintenance Kits (3010) *	\$1,500,000	\$6,000,000
Total		\$66,633,920

*Includes 10% spares

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Command and Control

- **Air Surveillance and Defense for North America and Hawaii**
- **Air Battle Management**
- **C-NAF Integration/Augmentation**
- **Military Range Control**
- **Ground Controlled Intercept**
- **Flight Safety Monitoring**



Air Operations Center (AOC) The AOC weapon system is employed by the Joint Forces Air Component Commander (JFACC), facilitating operational control and direction of theater air, space and cyber forces. Air National Guard AOC and Air Force Forces (AFFOR) staffs are comprised of personnel and facilities postured to support Homeland Defense, Overseas Contingency Operations and Defense Support of Civil Authorities (DSCA). AOC personnel are organized as divisions specializing in integrated, distributive Command and Control processes and products. The AFFOR staff is organized as special and functional directorates which provide planning teams to the Commander Air Force Forces in support of the JFACC.



Battle Control Center (BCC) The BCC operations force includes four ARC operations groups and squadrons. BCCs support North American Aerospace Defense and Northern Command as part of the homeland defense mission, DSCA, and search and rescue. BCCs provide 24/7 aerospace surveillance, warning, control, and maritime warning in the defense of North America.

Control and Reporting Center (CRC) The CRC, at the operational and tactical level, provides surveillance, tactical communications, data links, and combat-related air battle management of joint air operations with real-time networked situational awareness. There are 10 CRC units across the enterprise that support both Active Duty and ANG missions.



Command and Control

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Critical Capabilities List

AOC

- Weapon System Modernization
- Collaborative Operational-Level Training Capability (See Tab P)
- Operational-Level Data Link Training Tool
- Secure Voice Capability
- Cross-Domain Network Display Capability

BCC

- Integrated Fire Control
- Advanced Intel Feeds
- Mission Forensic and Training Debrief System
- Tactical to Tactical Communication Modernization
- Live, Virtual, Constructive 4th & 5th Generation Training System (See Tab P)

CRC

- Highly-Mobile, Medium-Range Active Electronically-Scanned Array Radar with Combat Identification and Passive Detection Capability
- Remote Voice Communications
- Electronic Attack Training Suite
- In-Garrison Operations Facility
- Simulator Technical Refresh (See Tab P)

Essential Capabilities List

AOC

- Redundant Non-Secure Internet Protocol Router/Secure Internet Protocol Router Circuit
- Dual-Use Coalition / Collateral Network
- Joint Worldwide Intelligence Communications System Connectivity
- Backup / Mobile Weapons System Training Suite

BCC

- Mission Voice Program Modernization
- Mission System Modernization
- Mobile Continuity of Operations Capability
- Pocket J Link 16 Upgrade

CRC

- Integrated Mode 5 / Automatic Dependent Surveillance-Broadcast Sensor Suite
- Decoy System Capable of Replicating Organic Radar Parameters to Increase Sensor Survivability
- Advanced Intelligence and Fire Control Interoperability Feeds
- Deployed Radar Site Redundant Command and Control Engine
- 5th-to-4th Generation Gateway

Desired Capabilities List

In an effort to save space, desired lists can be obtained upon request from NGB/A5.

AOC: WEAPON SYSTEM MODERNIZATION

1. Background. ANG Air Operations Groups (AOG) require funding for the AN/USQ-163 Falconer Weapon System (WS) Recurring Event (RE)-15 upgrade. Active component Air Operations Centers (AOC) were funded to upgrade to RE-15 for CY18. The lack of identical mission systems will cause a loss of connectivity for real-world contingency and training in support of AOCs. RE-15 represents a considerable change to previous REs consisting of major platform enhancements and core equipment upgrades. Additionally, RE-15 provides critical security updates required to support recertification and corrects vulnerabilities identified in the underlying applications and subsystems for previous REs and out-of-cycle upgrades. In the absence of an RE-15 upgrade, units will become non-compliant with information assurance standards and risk losing the authority to operate. This will significantly affect training, standardization, and ultimately prevent ARC units from meeting higher headquarters guidance. The lack of a common AOC WS configuration will result in significant training and operational differences between the ANG AOGs and their supported active component AOCs. This upgrade will be for the six ANG AOCs that support their active component AOCs located outside of the Continental United States.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Mission System Upgrades (3080)	\$1,000,000	\$6,000,000
Total		\$6,000,000

AOC: OPERATIONAL-LEVEL DATA LINK TRAINING TOOL

1. Background. ANG requires an operational level data link training tool to allow the Joint Interface Control Cell (JICC) operators to conduct training on a significant number of Air Combat Command (ACC) mandated training task list items outlined in Air Force Instruction 13-1 Volume 3 ACC/A3. Unlike the active component, ANG units cannot consistently accomplish data link training using a “live” architecture from home station. The data link training tool needs to interface with the Joint Range Extension or Air Defense Systems Integrator to allow the JICC operators to setup and manage a simulated data link architecture. The data link training tool needs a database that incorporates current & future Army, Navy, Marine and Air Force assets. The training tool will allow an operator to manipulate Department of Defense assets in a three-dimensional environment, add/remove net time reference, accurate line-of-sight calculations between airborne, ground and surface assets and allow operators to identify data loops and lag situations. Lastly, these requirements will allow for the transmission and reception of J-Series message traffic anomalies. These requirements allow the JICC to simulate and manage a real-world architecture and inject link problems that would require operator input to correct. This upgrade will be for nine of the ANG AOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Data Link Training Suites (3080)	\$70,000	\$630,000
Total		\$630,000

Command and Control

AOC: SECURE VOICE CAPABILITY

1. Background. ANG Air Operations Center (AOC) units require the capability to communicate directly via radio frequency to supported commanders, fielded units, and state emergency agencies. ANG AOCs need a modernized secure Core Radio Package (CRP) that consist of at least one Mobile User Objective System Tactical Satellite-compatible radio, one High Frequency (HF) radio, antenna systems, radio-to-Internet Protocol (IP) bridge and communications security equipment. AOC units must train and operate on the same systems as their supported active component AOCs. Without these capabilities, units cannot train or execute to full mission requirements. The CRPs are required for the five remaining ANG AOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 CRPs (3080)	\$130,000	\$650,000
5 HF Radios (3080)	\$40,000	\$200,000
5 IP Bridges (3080)	\$300,000	\$1,500,000
Total		\$2,350,000

AOC: CROSS-DOMAIN NETWORK DISPLAY CAPABILITY

1. Background. ANG Air Operations Center (AOC) operators and Air Force contingency planners need a Single Pane of Glass (SPG) Cross Domain Solution (CDS) at the AOC to conduct operations and training. The SPG CDS provides simultaneous views of multiple classified and unclassified domains on a single client, and protects the transfer of information between different security domains allowing direct exchange of information between Top Secret/Sensitive Compartmented Information, Secret Collateral systems, and unclassified systems. An SPG CDS is vital to modernizing AOC operations, bringing enhanced capability to the operator for more effective and efficient mission execution. This capability is required for six of the nine AOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 CDS (3080)	\$400,000	\$2,400,000
6 SPG Solutions (3080)	\$600,000	\$3,600,000
Total		\$6,000,000

Command and Control

BCC: INTERGRATED FIRE CONTROL

1. Background. ANG Battle Control Center's (BCC) require a remote capability to enable the engagement of enemy aircraft and cruise missiles in a sensor saturated environment. Integrated Fire Control (IFC) technology, derived from the fusion of advanced sensors at the BCC, increases the combat capability of the joint force to execute the joint engagement sequence. This facilitates the BCC's ability to take advantage of advanced sensor fusion to generate a weapons quality track and forward it to airborne or ground assets executing the homeland defense mission. The solution is to outfit each of the four ANG BCCs with an IFC capability that aligns it with parallel IFC development of the other command and control weapons systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 IFC Systems (3080)	\$1,500,000	\$6,000,000
Total		\$6,000,000

Command and Control

BCC: ADVANCED INTEL FEEDS

1. Background. ANG Battle Control Centers (BCC) require the ability to fuse multiple advanced data feeds. National technical means combine collection sources that disseminate advanced data feeds through multiple channels, including data links and user interface applications, at multiple classification levels. Data fusion at the BCC will enhance battlespace situational awareness and enable dissemination of a common operating picture at the operational and tactical levels. Modernizing each of the four ANG BCCs to have the capability to fuse multiple advanced data feeds will improve operational execution timelines resulting in enhanced and more efficient mission execution.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 BCC Advanced Intel Fusion System (3080)	\$500,000	\$2,000,000
Total		\$2,000,000

BCC: MISSION FORENSIC AND TRAINING DEBRIEF PLATFORM

1. Background. ANG Battle Control Centers (BCCs) need stand-alone mission debrief, recording, and forensic capabilities to meet mission requirements. BCCs lack the ability to reconstruct training and real-world missions, degrading the ability to capture lessons learned and inhibiting refinement and development of tactics, techniques, and procedures. The BCC Debrief Recording System (BDRS) should record data and voice transmission on secure and non-secure telephone, radio, intercom, and domestic events network communications. The BDRS will allow multiple operators to access recordings for playback. The recorded file should be exportable and playable on any Windows desktop. The program will provide speech-to-text capability with analytics and provide detailed comparison to Multi-Command Manual 3-1.1 brevity standards and operator inputs. The BDRS will allow the operator’s screen and communications to be compared during debrief. ANG requires one BDRS for each of four BCCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 BDRS Systems (3080)	\$1,000,000	\$4,000,000
Total		\$4,000,000

BCC: TACTICAL TO TACTICAL COMMUNICATION MODERNIZATION

1. Background. Battle Control Centers (BCCs) require modernized tactical data link and enhanced communications capability to meet evolving mission requirements. New High Frequency (HF) radios are needed to support air defense Command and Control mission requirements using Beyond Line-of-Sight (BLOS) HF Link-11 as the primary means of data transfer. A cross domain solution, which includes hardware and software upgrades, is required to integrate tactical data links, provide functional redundancy to the Air Event Information Sharing Service (AEISS), integrated joint service tactical data links, and facilitate defense support to civil authorities through the Situational Awareness Geospatial Enterprise application. Headsets for the BCC's Mission Voice Platform communications suite need to be replaced because they do not support 3D spatial audio capability. Modernizing the tactical-to-tactical datalink connectivity is required at all four ANG BCCs. The North American Aerospace Defense Command requires two additional Joint Range Extensions (JRE) gateways at each of three BCCs and upgraded HF radios to provide continuity of operations for information exchange. The Hawaii BCC requires two Multifunctional Information Distribution System (MIDS) terminals, a new HF antenna, and new HF radios to meet mission requirements. ANG requires 225 3D headsets for each of the four ANG BCCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 MIDS Joint Tactical Radio Ssystem (3080)	\$500,000	\$1,000,000
6 JRE Gateways (HI, EADS, WADS) (3080)	\$200,000	\$1,200,000
4 HF Radios (HI) (3080)	\$50,000	\$200,000
1 HF Antenna Upgrade (HI) (3080)	\$500,000	\$500,000
3 HF Global Terminals (HI, EADS, WADS) (3080)	\$500,000	\$1,500,000
4 Firewall Hardware / Software Packages (3080)	\$500,000	\$2,000,000
900 3D Headsets (225 per BCC) (3080)	\$600	\$540,000
Total		\$6,940,000

Command and Control

**CRC: HIGHLY-MOBILE, MEDIUM-RANGE ACTIVE ELECTRONICALLY-SCANNED
ARRAY RADAR WITH COMBAT IDENTIFICATION AND PASSIVE DETECTION
CAPABILITY**

1. Background. ANG Control and Reporting Centers (CRC) need to augment their primary radar with a highly mobile Active Electronically-Scanned Array (AESA) radar that provides 360-degree coverage and the capability of detecting low observable threats, unmanned aerial systems and cruise missiles. It will need to be frequency diverse from the AN/TPS-75 to provide redundancy and survivability to the CRC and its defended assets. A mobile system with AESA technology provides high target sensitivity, large elevation angle coverage, high target update rate, and multiple beam and waveform flexibility. The system will provide the CRC the ability to generate target quality data that can be distributed real-time through links to key decision-makers and weapons platforms throughout the area of operations expediting the prosecution of threats. One AESA radar is required for each of the 10 ANG CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Highly-Mobile AESA Radars (3080)	1,200,000	\$12,000,000
Total		\$12,000,000

Command and Control

CRC: REMOTE VOICE COMMUNICATIONS

1. Background. ANG Control and Reporting Centers (CRC) require a Remote Voice Communications (RVC) integration package to execute specialized live-fly missions. This capability is required to maintain proficiency and remain Combat Mission Ready (CMR). The RVC capability would provide a first time capability to control various types of live-fly missions remotely from each CRC unit, resulting in a significant reduction of personnel travel costs to maintain CMR. Each of the 10 ANG CRCs require an RVC capability to access the Federal Aviation Administration communication and radar feeds in order to control missions remotely. One RVC integration package is required for each of the 10 ANG CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 RVC Suites (3080)	\$250,000	\$2,500,000
Total		\$2,500,000

CRC: ELECTRONIC ATTACK TRAINING SUITE

1. Background. ANG Control and Reporting Centers (CRC) require the capability to simulate Electronic Attack (EA) against the CRC radar during real-world training. This lack of training results in crews being unprepared to mitigate real world radar degradation due to the effects of EA. The CRC needs a low-power, ground-based jammer that provides barrage, spot, and Doppler noise, velocity-gate-pull-off, range-gate-pull-off, multiple false targets, and digital radio frequency memory generated EA waveforms against the AN/TPS-75 radar. A live jamming system prepares operational crews for emerging threats which improves the effectiveness and survivability of the CRC and defended assets. Each of the 10 ANG CRCs require an EA training suite.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 EA training Suite (3080)	\$250,000	\$2,500,000
Total		\$2,500,000

Command and Control

CRC: IN-GARRISON OPERATIONS FACILITY

1. Background. ANG Control and Reporting Centers (CRC) require a 1,300 square foot, hard-sided, climate-controlled, relocatable shelter to house the tactical operations center, along with 18 operator consoles for in-garrison training. The fabric tents currently utilized are not intended for long-term use and do not provide a climate-controlled environment for personnel and equipment. Each of the 10 ANG CRCs requires one operations shelter.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Operation Shelters (3080)	\$600,000	\$6,000,000
Total		\$6,000,000

C-17

- **Strategic Airlift**
- **Outsized and Oversized Cargo Airlift**
- **Aeromedical Evacuation Missions**
- **ANG C-17 Units Provide 16% of the Total Fleet**

The C-17 Globemaster III is the nation's newest strategic military airlifter and continues to excel in a wide-range of operational mission scenarios. It supports both inter- and intra-theater missions and allows Air Mobility Command to significantly improve throughput during contingency operations. Using C-17s as an intra-theater airlift platform provides relief to the C-130 fleet and reduces ground forces' dependence on vehicle convoys.



The ANG operates 34 C-17 aircraft assigned to five wings and two associate units. The fully-equipped aircraft carries combat-ready military units to any point in the world on short notice, and provides critical field support to sustain the fighting force.

C-17

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Critical Capabilities List

- Common Mobility Air Force Mission Computer
- Large Aircraft Infrared Countermeasure System
- Forward Air Refueling Point Carts and Equipment
- Engineered Loading Ramp Modification
- Active Noise Reduction Headsets

Essential Capabilities List

- Digital Radar Warning Receiver
- LITENING Targeting Pod
- Wireless Broadband Internet
- High-Definition Night Vision Goggles
- Fifth Mission Computer Display in Center Pedestal

Desired Capabilities List

- Electronic Flight Bag Night Vision Goggle Filter
- Light-Emitting Diode Landing Lights
- Auxiliary Crew Member Floor Plate Armor
- Digital-Automatic Terminal Information Service Capability
- C-17 Common Maintenance Computer

C-17: COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG C-17s require secure airborne data communications with other aircraft, command and control (C2) agencies, and ground-based forces. The Mobility Air Forces (MAF) mission computer data link and data transfer capabilities provide aircrew the ability to report and receive battlespace information such as the position of other aircraft, weather, threat, mission events, mission status, task completion, and resource status. This increased situational awareness allows C2 agencies the ability to track mission progress and facilitate rapid decisions and adjustments during mission execution. Next generation military ultra-high frequency (UHF) satellite communication (SATCOM) radios provide both data and voice using satellites operating outside of traditional data link bandwidths. This enables the crew to receive real-time updates for weather, departure and landing information, as well as provides C2 reach-back capability. Electronic flight bags can store and retrieve documents required for flight operations such as technical orders, Air Force Instructions, flight operations manuals, minimum equipment lists, and the most current flight information publications. To reduce crew workload, these solutions require integration with other aircraft systems. ANG C-17s require one set of installation components for each of the 34 airframes.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$10,000,000
38 C-17 Group A Kits* (3010)	\$100,000	\$3,800,000
38 C-17 Group B Kits* (3010)	\$380,000	\$14,440,000
38 C-17 Data Link Processors* (3010)	\$100,000	\$3,800,000
38 Electronic Flight Bags* (3010)	\$240,000	\$9,120,000
38 UHF SATCOM Kits* (3010)	\$475,000	\$18,050,000
Total		\$59,210,000

*Includes 10% spares

C-17: LARGE AIRCRAFT INFRARED COUNTERMEASURE SYSTEM

1. Background. ANG C-17s require Block 30 Large Aircraft Infrared Countermeasure (LAIRCM) system to provide an effective countermeasure against Man-Portable Air Defense Systems, which present a significant threat during takeoff and landing phases of flight. The Block 30 LAIRCM includes the next-generation AAR-54 missile launch detector. The upgraded AAR-54 provides better infrared (IR) threat detection and significantly increases flare and LAIRCM effectiveness. New sensors allow high-fidelity detection of IR missile engagements as well as detection of small arms fire. This system also aids low-visibility ground operations and provides better references during low-visibility approaches. All ANG C-17s require the Block 30 LAIRCM upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$12,000,000
34 LAIRCM Group A Kits (3010)	\$2,100,000	\$71,400,000
34 LAIRCM Group B Kits (3010)	\$3,000,000	\$102,000,000
Total		\$185,400,000

C-17: FORWARD AIR REFUELING POINT CARTS AND EQUIPMENT

1. Background. ANG C-17s require Forward Area Refueling Point (FARP) carts to fuel aircraft and vehicles at forward operating locations, enabling joint forcible entry and adaptive basing operations. This gives combatant commanders or incident commanders the ability to more effectively respond during contingency operations, major natural disasters, and humanitarian events. With fuel provided directly from a C-17, aircraft and support vehicles can operate from austere locations without the logistical challenges associated with conventional, over-the-road fuel delivery. Each of the six ANG C-17 wings requires one FARP cart.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Forward Area Refueling Carts (3010)	\$2,200,000	\$13,200,000
Total		\$13,200,000

C-17: ENGINEERED LOADING RAMP MODIFICATION

1. Background. ANG C-17 units require a ramp modification kit to expedite the loading and unloading of rotary-wing aircraft and joint-vehicular assets. Loading takes over two hours, which is well beyond planned engine running onload and offload times. Attachment to the ramp toes using a quick connect and disconnect design will reduce onload and offload times. ANG requires two Special Operations Loading Ramp modification kits for each of its six C-17 wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Special Operations Loading Ramps (3010)	\$120,000	\$1,440,000
Total		\$1,440,000

C-17: ACTIVE NOISE REDUCTION HEADSETS

1. Background. ANG C-17 aircrew require high impedance Active Noise Reduction (ANR) headsets. C-17 aircrew duty days can be as long as 24 hours. High decibel levels in the C-17 increase aircrew fatigue and reduce situational awareness. High impedance ANR headsets will mitigate fatigue and improve situational awareness. ANG C-17s require 450 ANR headsets to equip all assigned operators.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$100,000
450 ANR Headsets* (3010)	\$1,000	\$450,000
Total		\$550,000

*Includes 10% spares

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C-130 H/J

- **Tactical Airlift**
- **ANG C-130 Units Provide 49% of the Total Fleet**

With a legacy lasting over 62 years, the C-130 Hercules still remains the U.S. Military's primary combat delivery aircraft. In addition to its primary role in tactical airlift, ANG C-130s support humanitarian, peacekeeping, and disaster relief operations. Procurement efforts continue to address needed updates to the avionics suites, propulsion modernization, improved self-protection, single-pass precision airdrop, and enhanced situational awareness.

These improvements ensure that the ANG C-130 fleet remains capable of safely and effectively executing its missions globally and maintains relevancy in tomorrow's fight.



C-130 H/J

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Critical Capabilities List

C-130H

- Propulsion System Upgrades
- Global Airspace Compliant Avionics / Instrumentation and Associated Training Devices
- Single-Pass Precision Airdrop
- Improved Radio Frequency /Infrared Self-Protection
- Data Link with Integrated Defensive Systems

C-130J

- Common Mobility Air Force Mission Computer
- Improved Radio Frequency / Infrared Self-Protection Suite
- Self-Contained Contested Training Suite
- Updated Avionics Suite for Global Airspace Access
- Single-Pass Precision Airdrop

Essential Capabilities List

C-130H

- C-130 Multi-Mission Cockpit Trainers with Integrated Tactical Data Link
- Tailorable Mission Pod
- Space Jam 2 Go for Contested Degraded Operations Training
- Modernized and Standardized Flight Engineer's Panel
- Improved Dual-Mode External Light-Emitting Diode Lighting

C-130J

- Data Link Capability for Weapons System Trainer / Multi-Mission Cockpit Trainers
- Tactical Plot Suite
- Built-in Iridium Phone
- Global Positioning System Jam-Resistant Embedded Global Positioning System / Inertial Navigation System and Streamlined Notification
- Cargo Compartment Camera / Backup Camera

Desired Capabilities List

In an effort to save space, desired lists can be obtained upon request from NGB/A5.

C-130H: PROPULSION SYSTEM UPGRADES

1. Background. The ANG C-130H fleet requires a comprehensive propulsion upgrade for increased performance, efficiency, and reliability. Incorporating modular propeller blade technology (NP2000), an Electronic Propeller Control System (EPCS), and In-flight Propeller Balancing System (IPBS) provide increased performance and reliability. The Rolls Royce 3.5 engine upgrade, to include a necessary Oil Cooler Augmentation (OCA), results in significant fuel savings and reliability improvements. The modular design of NP2000 eight-bladed propellers decrease propeller maintenance time, increases airlift efficiency during transportation by taking up less pallet space, and increases operational performance. EPCS improves safety by accelerating response time when throttles are rapidly advanced, an issue in previous mishaps. EPCS increases propeller system reliability by 50 percent, thereby decreasing maintenance costs. IPBS eliminates the need for regular maintenance as the propeller is continuously balanced during flight operations. As a result, it virtually eliminates propeller balance-induced vibration, which equates to reduced noise, less airframe stress, and improved aircraft availability. Upgrading the T-56 engine with the 3.5 modification, with redesigned compressors and turbines, increases engine life-cycle, improves fuel economy, and improves aircraft availability. All C-130H models require propulsion system upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
EPCS/IPBS Non Recurring Engineering (3600)	N/A	\$8,000,000
134 NP2000 Kits (3010)	\$2,000,000	\$268,000,000
134 EPCS Kits (3010)	\$825,000	\$110,550,000
134 IPBS Kits (3010)	\$550,000	\$73,700,000
536 T-56 3.5 Modified Engines (3010)	\$1,400,000	\$750,400,000
134 OCA Kits (3010)	\$667,000	\$89,378,000
Total		\$1,300,028,000

C-130H: GLOBAL AIRSPACE COMPLIANT AVIONICS / INSTRUMENTATION AND ASSOCIATED TRAINING DEVICES

1. Background. The ANG C-130H fleet requires avionics modernization. The C-130H faces severe sustainment challenges with current avionics and cockpit instrumentation, and will be out of compliance with the Communications, Navigation and Surveillance/Air Traffic Management 2020 mandate if not modernized. The lack of C-130H improved communications and avionics technology prohibits operating in European airspace. Additionally, tactical night operations continue to suffer with non- Night Vision Imaging System (NVIS) compliant lighting. In order to eliminate critical sustainment issues due to Diminishing Manufacturing Sources (DMS), and to meet required mandates and Air Force Instructions, this modernized cockpit will include: a multifunction Engine Instrument Display System (EIDS), Automatic Dependent Surveillance-Broadcast (ADS-B), NVIS compatibility, and a modern flight management system with Global Positioning System approach and polar navigation capabilities. An NVIS-compatible and modernized glass cockpit reduces crew workload, lowers maintenance costs and increases capability and sustainability to operate safely at night. All C-130H models require updated avionics kits. To facilitate conversions to a modernized cockpit suite, all 12 units require access to distributed mission operations, level 6 or higher, aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$50,000,000
134 Avionics Kits (3010)	\$5,700,000	\$763,800,000
134 NVIS Compatibility Kits (3010)	\$465,000	\$62,310,000
12 Aircrew Training Devices (3010)	\$14,000,000	\$168,000,000
Total		\$1,044,110,000

C-130H/J: SINGLE-PASS PRECISION AIRDROP

1. Background. The ANG C-130H/J fleet requires the ability to accurately deliver airdrop loads in combat in both Instrument and Visual Meteorological Conditions (IMC/VMC). The U.S. Army’s objective for airdrop accuracy is 50 meters circular error average, but traditional methods only provide 300-meter accuracy. Current Precision Airdrop (PAD) methods require multiple passes over the drop zone, increasing exposure to threats. Effective PAD operations require early identification of the drop zone by the flight crew, real-time airdrop damage estimates, real-time wind sensing (altitude to surface), displayed continuously computed impact point and launch acceptability region, and post-drop assessment. Targeting pods with light detection and ranging provide the necessary capabilities during VMC operations; other technologies need to be leveraged to meet these requirements for IMC airdrops as well. ANG C-130H/J aircraft require aircraft upgrades coupled with 77 rotatable targeting pods and off-board cueing to provide a highly-accurate all-weather single-pass airdrop capability to support domestic and contingency operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
77 Targeting Pods (3010)	\$2,000,000	\$154,000,000
Total		\$154,000,000

C-130H: IMPROVED RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. The ANG C-130H fleet requires the ability to better detect, degrade and defeat infrared (IR) Man-Portable Air Defense Systems (MANPADS). C-130Hs have inadequate missile launch detection. The Block 30 AN/AAQ-24 Large Aircraft IR Countermeasure (LAIRCM) system improves detection against advanced MANPADS threats, while the Block 30's IR suppression system would degrade the enemy's ability to engage C-130H aircraft. Future conflicts will include a wide spectrum of Radio Frequency (RF) threats, in addition to a robust IR threat from man-portable and vehicle-borne systems. To survive, C-130H aircraft require a geo-locating radar warning receiver capable of processing signals in a dense RF environment and automatically direct countermeasures to defeat those threats. Increased situational awareness is needed to correlate onboard and off-board threat detection, terrain masking, and optimized dynamic rerouting capabilities to minimize exposure to threats. Only 24 C-130H1 aircraft have ALR-69A installed, leaving the remainder of the H-model fleet without this needed capability. All C-130Hs will be wired with Group A kits for LAIRCM and Next Generation RF Kits. Group B kits will be procured for half of the C-130H fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
134 C-130H LAIRCM Group A Kits (3010)	\$1,500,000	\$201,000,000
67 C-130H LAIRCM Group B Kits (3010)	\$4,400,000	\$294,800,000
134 C-130H Next Generation RF Group A Kits (3010)	\$420,000	\$56,280,000
67 C-130H Next Generation RF Group B Kits (3010)	\$775,000	\$51,925,000
122 C-130H ALR-69A* (3010)	\$1,000,000	\$122,000,000
Total		\$726,005,000

* Includes 10% spares.

C-130H: DATA LINK WITH INTEGRATED DEFENSIVE SYSTEMS

1. Background. The ANG C-130H fleet requires comprehensive and networked battle space awareness. The Real-Time Information in the Cockpit (RTIC) system allows C-130 aircraft to participate on multiple data link networks using technologies already fielded on other Department of Defense (DoD) assets. The system must provide growth capability for future tactical data link networks. Upgrades to the C-130 RTIC system increase the overarching network capability and provide a common processing and display platform for previously federated systems, resulting in a consolidated situational awareness picture. Integration with the Advanced Integrated Electronic Combat System (AIECS) provides the capability for on-board and off board threat correlations, data sharing, on-board radar threat system geo-location, route re-planning, and automated countermeasures. Combining the control and outputs of multiple systems into one common graphical interface reduces crew workload, decreases “heads-down” time, and provides improved decision support for aircrews operating in the tactical environment. Lack of this capability creates a detriment to safety due to shortfalls in situational awareness, such as the lack of a terrain awareness warning system and electronic takeoff and landing data systems. Lastly, the integration of noise-cancelling and three-dimensional audio in the cockpit increases situational awareness by spatially separating aural warning and radio signals, such as angular threat information or terrain awareness cues. All C-130H aircraft need RTIC systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
AIECS Non Recurring Engineering (NRE) (3600)	N/A	\$10,000,000
134 AIECS Kits (3010)	\$150,000	\$20,100,000
Directional Audio NRE (3600)	N/A	\$5,000,000
134 Directional Audio Kits (3010)	\$50,000	\$6,700,000
Total		\$41,800,000

C-130J: COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG C-130Js require integrated battlespace awareness. Real-Time Information in the Cockpit (RTIC) will provide global data link communications, secure beyond line-of-sight and line-of sight capabilities. RTIC offers a permanent modification to the aircraft and has the ability to change data link radios as mission needs arise. RTIC also includes an airborne executive processor, which offers a federated mission computer capability. In order to ensure units are able to effectively train, operate and deploy with secure global data link capability, all 16 ANG C-130J aircraft require this modification.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$5,000,000
16 C-130J RTIC Group A Kits (3010)	\$150,000	\$2,400,000
16 C-130J RTIC Group B Kits (3010)	\$1,000,000	\$16,000,000
Total		\$23,400,000

C-130J: IMPROVED RADIO FREQUENCY AND INFRARED SELF-PROTECTION SUITE

1. Background. ANG C-130Js require the ability to better detect, degrade and defeat infrared (IR) Man-Portable Air Defense Systems (MANPADS). ANG C-130Js have inadequate missile launch detection. The AN/AAQ-24 Large Aircraft IR Countermeasure (LAIRCM) Block 30 system improves detection against advanced MANPADS, while the Block 30 IR suppression system would degrade the enemy’s ability to engage C-130J aircraft. Future conflicts will include a wide spectrum of radio frequency (RF) threats, in addition to a robust IR threat from man-portable and vehicle-borne systems. To survive, C-130J aircraft require a geo-locating radar warning receiver capable of processing signals in a dense RF environment and automatically direct countermeasures to defeat those threats. Increased situational awareness is needed to correlate onboard and off-board threat detection, terrain masking, and optimized dynamic rerouting capabilities to minimize exposure to threats. All ANG C-130Js will be wired with Group A kits for LAIRCM and Next Generation RF Kits. Group B kits will be procured for half of the ANG C-130J fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$5,000,000
16 C-130J ALR-69A (3010)	\$1,000,000	\$16,000,000
16 C-130J LAIRCM Group A Kits (3010)	\$970,000	\$15,520,000
8 C-130J LAIRCM Group B Kits (3010)	\$4,400,000	\$35,200,000
16 C-130J Next Generation RF Group A Kits (3010)	\$420,000	\$6,720,000
8 C-130J Next Generation RF Group B Kits (3010)	\$775,000	\$6,200,000
Total		\$84,640,000

Rapid Global Mobility

C-130J: SELF-CONTAINED CONTESTED TRAINING SUITE

1. Background. ANG C-130J aircrews require the ability to train in a Global Positioning System (GPS) degraded environment and a simulated jamming scenario. A deception-based GPS jamming option is required to accurately reflect scenarios that are not simply GPS on/off scenarios. This system must allow user input to train aircrews prior to encountering operational situations. The system also needs to account for aircraft position with respect to terrain in order to accurately simulate line-of-sight based threats. One self-contained contested training suite is required at each of the C-130J units.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$1,500,000
2 Self-Contained Contested Training Suites (3010)	\$75,000	\$150,000
Total		\$1,650,000

C-130J: UPDATED AVIONICS SUITE FOR GLOBAL AIRSPACE ACCESS

1. Background. ANG C-130Js require updated avionics to meet the deadline for international Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) 2020 mandate established by Federal Aviation Administration. Updated avionics with Automatic Dependent Surveillance Broadcast (ADS-B) will address CNS/ATM mandates increased operational effectiveness and efficiency by allowing access to airspace that requires more stringent navigational requirements. If this critical item is not met by the 2020 mandate, the result could be denial of airspace access for C-130J aircraft. All 16 ANG C-130Js require this modification.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$30,000,000
16 C-130J Updated Avionics /ADS-B Group A Kits (3010)	\$1,300,000	\$20,800,000
16 C-130J Updated Avionics/ADS-B Group B Kits (3010)	\$1,200,000	\$19,200,000
Total		\$70,000,000

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C-130 Special Mission

- **Commando Solo**
- **Special Operations Forces/Combat Search and Rescue (SOF/CSAR)**
- **Special Mission (Airborne Firefighting, Antarctic Logistics)**
- **ANG Commando Solos Provide 100% of the Total Fleet**
- **ANG CSAR HC-130 Units Provide 38% of the Total Fleet**
- **ANG LC-130s Provide 100% of the Total Fleet**

C-130 Special Mission aircraft include:

EC-130J - The EC-130J “Commando Solo” conducts information operations, psychological operations, and civil affairs broadcasts. The EC-130J is pursuing a roll-on and roll-off “Commando Solo” capability.



HC-130 - ANG HC-130

units continue to deploy in support of overseas contingency operations and provide emergency rescue and relief support during domestic operations. The ANG is currently recapitalizing the HC-130 fleet and transitioning to the HC-130J.

LC-130 - The LC-130 operates on snowfields in remote

areas of the Polar Regions in support of the National Science Foundation (NSF). In order to keep the aircraft up-to-date, several modification efforts are underway including eight bladed propellers and T-56 3.5 engine modification. The ANG is working with the NSF to support a pod-based scientific payload capability.



C-130 Special Mission 2017 Weapons and Tactics Conference

Critical Capabilities List

LC-130

- Propulsion Modernization
- Avionics Obsolescence Solution
- Enhanced Situational Awareness
- Hardwired Iridium Flight Deck Communications
- Retractable External Arm with Compatible Sonobuoy Ejector

EC-130

- Weapons System Trainer (See Tab P)
- Removable Airborne Military Information Support Operations System
- Special Operations Forces Air Mobility Suite-Enhanced Situational Awareness Ground Training Hardware and Interim Contract Support
- Federated Defensive Systems Unit
- Emergency Equipment Storage Bins

HC-130

- Joint Interoperable Command, Control, Communications, Computers, and Intelligence Network.
- Enhanced Combat Search and Rescue Sensor
- Improved Defensive Systems
- External Stores Position
- HC-130J Weapon System Trainer with Distributed Mission Operations (See Tab P)

Essential Capabilities List

LC-130

- Center Wing Box Replacement Program
- Single-Pass Precision Airdrop
- Penetrating Visual Enhancement for Whiteout Weather Conditions
- Night Vision Goggle-Compatible Cockpit Lighting

EC-130

- Number 1 Radio Very High Frequency Modification
- Electro-Optical / Infrared Sensor
- Airborne Mission Networking Permanent Modification
- Four Sets of Additional Special Airborne Mission Installation and Response Arms
- Three Additional Ku Spread Spectrum Units

HC-130

- Internal Palletized Fuel Tank
- Joint Helmet-Mounted Cueing System
- Enhanced Visibility in Scanner Positions
- High-Definition Mission Debrief System
- Aircrew Flight Equipment Rescue Equipment Storage.

Desired Capabilities List

In an effort to save space, desired lists can be obtained upon request from NGB/A5.

LC-130: PROPULSION MODERNIZATION

1. Background. ANG LC-130Hs require increased performance, efficiency, and reliability. The LC-130H fleet has ski-equipped landing gear to enable landings and takeoffs on snow and ice. The present method to takeoff from deep snow field runways requires Jet Assisted Take-Off (JATO) rocket motors, which are no longer produced. Current operations require increased performance, efficiency, and reliability which highlight the need for a comprehensive propulsion upgrade to the LC-130H fleet. Incorporating NP2000 modular blade technology, electronic propeller control system (EPCS), in-flight propeller balancing system (IPBS), and the T-56 3.5 engine upgrade provides the increased performance and reliability. The NP2000/EPCS is an eight-bladed, composite propeller and improved synchronization system that increases thrust 20 percent over the current LC-130 engine during takeoff. The benefits of the eight-bladed propeller are additional power, reduced vibration, and reduced JATO use. IPBS reduces routine maintenance because the propeller is continuously balanced inflight. As a result, it nearly eliminates propeller balance-induced vibration, which equates to lower noise, less vibration damage, and improved aircraft availability. Upgrading the T-56 engine with the Rolls Royce 3.5 modification, with redesigned compressors and turbines, increases engine life-cycle, improves fuel economy, and improves aircraft availability. All 10 ANG LC-130H aircraft require propulsion modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 NP2000 Kits (3010)	\$2,700,000	\$27,000,000
40 3.5 Engine Installs (3010)	\$375,000	\$15,000,000
10 IPBS Installs (3010)	\$750,000	\$7,500,000
Total		\$34,500,000

LC-130: AVIONICS OBSOLESCENCE SOLUTION

1. Background. The ANG LC-130 fleet requires updated avionics to ensure continued global airspace access. LC-130s face severe sustainment challenges with current avionics and cockpit instrumentation, and will be out of compliance with Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) mandates if not modernized. The lack of LC-130 improved communications and avionics technology, including 8.33 kHz frequency spacing capability, prohibits operating in European airspace. Additionally, tactical night operations continue to suffer with non-Night Vision Imaging System (NVIS) compliant lighting. Any further delay of the Avionics Modernization Program will result in ANG LC-130 models failure to meet the 2020 deadline for international CNS/ATM mandates. In order to eliminate critical sustainment issues due to Diminishing Manufacturing Sources (DMS), and to meet required mandates and Air Force Instructions, this modernized cockpit will include: a multifunction Engine Instrument Display System (EIDS), Automatic Dependent Surveillance-Broadcast (ADS-B) capability, NVIS compatibility, and a modern flight management system with Global Positioning System (GPS) approach and polar navigation capabilities. Updated avionics address CNS/ATM mandates and increase operational efficiency by opening up airspace routes with stringent navigational requirements and allow the use of GPS approaches. An NVIS-compatible and modernized glass cockpit reduces crew workload, lowers maintenance costs and increases capability and sustainability to operate safely at night. All 10 ANG LC-130 aircraft require avionics upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$50,000,000
10 Avionics Kit (3010)	\$5,700,000	\$57,000,000
10 NVIS Kits (3010)	\$465,000	\$4,650,000
Total		\$111,650,000

LC-130: ENHANCED SITUATIONAL AWARENESS

1. Background. ANG LC-130s require enhanced situational awareness tools to reduce risk during polar operations. As the only ski-equipped large transport aircraft in the Department of Defense inventory, the LC-130's unique capabilities are required to support military and National Science Foundation (NSF) operations in the polar regions. Recent operations have highlighted the need for comprehensive, networked command and control awareness, and integration of aircraft systems. The LC-130 Real-Time Information in the Cockpit (RTIC) system provides data link capability, on-board and off-board data sharing, and performs re-routing functions improving situational awareness. RTIC reduces communication transmission time and provides aircrew with the information necessary to adjust mission profiles in accordance with changing conditions and commander's guidance. All 10 ANG LC-130s require RTIC.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$350,000
10 RTIC Hardware Installation (3010)	\$560,000	\$5,600,000
Total		\$5,950,000

LC-130: HARDWIRED FLIGHT DECK COMMUNICATIONS

1. Background. ANG LC-130s require a hard-wired Iridium voice and data system with an external flush-mount antenna, capable of secure communication. The LC-130H uses a portable Iridium-based phone system that is functional but lacks the robustness and reliability necessary to operate in extreme environments. Remote LC-130H operating locations, especially polar mission support, require long-range beyond-line-of-sight communications. Satellite communication is limited at extreme latitudes and High Frequency (HF) radios are unreliable during periods of high solar flare activity. A communication system such as the Iridium network is necessary for weather, air traffic control, and command and control voice and text communications to increase safety of flight. The current configuration of suction cup window-mounted antennas have poor reception and the sextant port antenna needs to be frequently removed for celestial navigation. All 10 ANG LC-130Hs require flight deck communications upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$1,000,000
10 Flight Deck Communications Upgrade (3010)	\$220,000	\$2,200,000
Total		\$3,200,000

**LC-130: RETRACTABLE EXTERNAL ARM WITH COMPATIBLE SONOBUOY
EJECTOR**

1. Background. ANG LC-130s require the ability to survey large areas for hazards to identify safe landing areas on large ice sheets. Over the last four decades, numerous LC-130H aircraft have sustained damage after landing on ice and snow-covered areas that were not thoroughly surveyed. Current methods to identify hazards using national imaging assets entail long lead-times and are often unreliable. LC-130 aircraft require Crevasse Detection Radar (CDR) to enhance survivability, airborne sensing, and polar search and rescue. ANG evaluated and fielded an X-band radar, but additional modifications are required to improve the CDR performance. In addition, the CDR is mounted on the aircraft using a Special Airborne Mission Installation and Response (SABIR) arm with a dropsonde ejector assembly. More effort is required to establish the retractable external arm as a permanent modification to the LC-130H fleet. ANG LC-130s require one ice survey radar and one SABIR arm modification for execution of operational testing.

2. Program Details.

Quantity	Unit Cost	Program Cost
Ice Survey Radar (3010)	N/A	\$1,000,000
SABIR Arm Modifications (3010)	N/A	\$1,000,000
Total		\$2,000,000

EC-130J: REMOVABLE AIRBORNE MILITARY INFORMATION SUPPORT OPERATIONS SYSTEM

1. Background. ANG EC-130Js require a Removable Airborne Military Information Support Operations (MISO) System (RAMS) to continue to meet combatant commander electronic warfare requirements. The ANG is rehosting EC-130J Commando Solo capabilities onto MC-130J using RAMS, which is a palletized, roll-on and roll-off system that transmits its mission payload through antennas in pods carried by the Special Airborne Mission Installation and Response (SABIR) arms. These aircraft cannot perform MISO without this new system. In order to execute these modifications, ANG EC-130Js require a Systems Integration Lab for maintenance of the system; a Partial Task Trainer (PTT) for ground based training; four additional RAMS and four additional sets of SABIR arms to standardize the fleet and allow for spares. Additionally, spare parts are needed to complete RAMS integration.

2. Program Details.

Quantity	Unit Cost	Program Cost
Systems Integration Lab (3010)	\$1,000,000	\$1,000,000
RAMS PTT (3010)	\$1,500,000	\$1,500,000
4 RAMS (3010)	\$1,500,000	\$6,000,000
4 SABIR Arm Sets (3010)	\$1,225,000	\$4,900,000
Spare Parts (3010)	\$3,000,000	\$3,000,000
Total		\$16,400,000

EC-130: SPECIAL OPERATIONS FORCES AIR MOBILITY SUITE-ENHANCED SITUATIONAL AWARENESS GROUND TRAINING HARDWARE AND INTERIM CONTRACT SUPPORT

1. Background. ANG EC-130J aircraft require the Special Operations Forces Air Mission Suite Enhanced Situational Awareness (SAMS-ESA) system. Additionally, a SAMS-ESA G-2 Kit is required to conduct operational training at home station. EC-130J aircraft require interim contract support to sustain the SAMS-ESA system for real-time airborne mission management. Support includes: systems maintenance; software updates; and pre-flight set-up. SAMS-ESA is a temporary modification which necessitates constant contractor support for training and operational flying. The G-2 Kit consists of a full SAMS-ESA system including: Vortex; SADL; two PRC-117Gs; as well as all required laptops, antennas, and power supplies.

2. Program Details.

Quantity	Unit Cost	Program Cost
SAMS ESA Contractor Support (3080)	\$1,900,000	\$1,900,000
SAMS ESA G-2 Kit (3080)	\$1,290,000	\$1,290,000
Total		\$3,190,000

EC-130J: FEDERATED DEFENSIVE SYSTEM UNIT

1. Background. ANG EC-130Js require a federated Defensive Systems Unit (DSU) capable of aligning with updated Operation Flight Programs (OFPs), and the ability to rapidly dispense chaff and flares with an increased flare capacity. The DSU will allow the Combat Systems Officer (CSO) to dispense chaff, flare, or both with a single button push without the need to switch settings on the defensive systems master panel. The federated DSU will decrease EC-130J aircrews operational risk while increasing Crew Resource Management (CRM) and enhancing overall mission success. The proposed DSU aligns the EC-130J with the AC/MC-130J fleet configuration, maximizing the interoperability between active component and ANG aircrews within Air Force Special Operations Command (AFSOC). The 193rd Special Operations Wing requires seven federated DSUs including two nose flare dispensers per aircraft to outfit the entire fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$2,500,000
7 Federated Defensive System Panel (3010)	\$799,000	\$5,593,000
Total		\$8,093,000

EC-130J: EMERGENCY EQUIPMENT STORAGE BINS

1. Background. ANG EC-130Js require emergency equipment storage bins. The location of life support equipment on EC-130J aircraft creates undue wear and-tear on equipment, affects passenger carrying capabilities, and timeliness of Engine Running On-Load and Off-Load (ERO) operations. The 193rd Special Operations Wing requires eight emergency equipment storage bins (two per aircraft) to ensure all four EC-130J aircraft are capable of maximizing efficiency and aircraft payload.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 Emergency Equipment Bins (3010)	\$100,000	\$800,000
Total		\$800,000

HC-130J: JOINT INTEROPERABLE COMMAND, CONTROL, COMMUNICATIONS, COMPUTERS, AND INTELLIGENCE NETWORK

1. Background. ANG HC-130Js require the integration of multiple radios, datalinks, rescue devices, and defensive systems to keep the primary focus on safe and successful mission accomplishment and not electronic management. Multiple efforts in technological advancement have resulted in a task saturated workload for HC-130 aircrews because those multiple efforts were accomplished independently. HC-130, HH-60 and Guardian Angel do not share a common operating picture due to the diverging nature of their respective situational awareness enhancement technology. These systems provide line of sight and beyond line of sight interactive data communications between combat search and rescue task force assets across the range of military operations. This network should include, but is not limited to, Blue Force Tracker 2 (BFT 2), Link 16, and Automatic Dependent Surveillance-Broadcast (ADS-B) In combined into a single operating picture. In order for rescue forces to fully support information superiority operations, Secure Internet Protocol Relay, Non-Secure Internet Protocol Relay, and wireless internet is required. One of each system is required for the 12 HC-130s in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$9,000,000
12 Software Definable Radio Suite (3010)	\$250,000	\$3,000,000
12 Moving Map Display Group A Kits (3010)	\$150,000	\$1,800,000
12 Moving Map Display Group B Kits (3010)	\$1,000,000	\$12,000,000
12 BFT 2 Systems (3010)	\$100,000	\$1,200,000
12 Link 16 Systems (3010)	\$120,000	\$14,400,000
12 ADS-B Systems (3010)	\$30,000	\$360,000
12 Internet-on-Board Systems (3010)	\$300,000	\$3,600,000
Totals		\$45,360,000

HC-130: ENHANCED COMBAT SEARCH AND RESCUE SENSOR

1. Background. ANG HC-130s require an Electro-Optical Infrared (EO/IR) sensor to accurately identify and track both friendly and enemy forces, properly identify Drop Zone (DZ) and Landing Zone (LZ) areas, and transmit this imagery to the Combat Search and Rescue Task Forces (CSARTF) enhancing situational awareness. The solution should include high-definition imagery to locate and track a survivor, provide high-fidelity coordinates for points of interests to all the members of the CSARTF and illuminate and designate points of interest with a laser. The combination of these capabilities will enhance the ability of the HC-130 to precisely locate and identify isolated personnel. Providing accurate information to the other members of the CSARTF for a suitable DZ or LZ through Full Motion Video capability will allow safe insertion and exfiltration of rescue forces and isolated personnel. One system is required for each of the 12 HC-130Js in the ANG and spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
NRE EO/IR Sensors (3600)	N/A	\$5,000,000
13 EO/IR Sensors* (3010)	\$2,000,000	\$26,000,000
13 Full Motion Video Systems* (3010)	\$200,000	\$2,600,000
Total		\$33,600,000

* Includes 10% spares.

HC-130J: IMPROVED DEFENSIVE SYSTEMS

1. Background. ANG HC-130Js require a robust self-defense capability to perform combat rescue in a hostile environment in a peer-on-peer conflict. In order to operate in a high threat environment, the HC-130J requires a radio frequency (RF) jammer, digital radar warning receiver for improved radar detection capability, a terrain-following and terrain-avoidance (TFTA) radar system, and must leverage improving technology to incorporate the newest chaff expendables to defend against a radar guided threat. A federated defensive system, with pilot, co-pilot, and Combat System Officer (CSO) dispense switches, will decrease HC-130J operational risk while improving crew resource management and enhancing overall mission success. Three dimensional (3D) audio capability is required to integrate the audio warnings from a missile warning system, hostile fire indicator and radar warning receiver with communication and mission equipment. Integrating the Virtual Electronic Combat Training System (VECTS) allows crews to prepare for combat missions using a virtual threat overlay during flight. These capabilities will immediately improve crew and aircraft safety and survivability through enhanced situational awareness and improved training. One system is required for each of the 12 HC-130Js in the ANG and spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
RF Jammer Non-Recurring Engineering (NRE) (3600)	N/A	\$5,000,000
13 RF Jammers (3010)	\$5,000,000	\$65,000,000
ALR-69A NRE (3600)	N/A	\$2,000,000
13 ALR-69A* (3010)	\$1,300,000	\$16,900,000
TFTA NRE (3600)	N/A	\$5,000,000
13 TFTA Systems* (3010)	\$3,000,000	\$39,000,000
Upgraded Chaff NRE (3600)	N/A	\$2,000,000
13 Pilot/CSO Rapid Dispense Kits* (3010)	\$5,000,000	\$65,000,000
3D Audio NRE (3600)	N/A	\$2,000,000
13 VECTS* (3010)	\$1,300,000	\$16,900,000
Total		\$218,800,000

* Includes 10% spares.

HC-130J: EXTERNAL STORES POSITION

1. Background. ANG HC-130Js require the ability to carry mission-specific stores including weapon, datalink, sensor, communications, and electronic warfare payloads on aircraft wing hard points without detrimental effects to baseline aircraft capabilities, specifically aerial refueling. The Outer Wing Station 430 (OWS 430) modification puts two additional stores positions on the HC-130J wings. This addition will allow for the carriage of a diverse number of aircraft payloads without impacting HC-130J cargo, transport, or aerial refueling mission sets. The OWS 430 modification is expected to take five years to field. In the interim, a retractable external arm is required to fill this capability gap. Each of the 12 ANG HC-130s require the OWS 430 modification and two retractable arms are needed for each of the three units.

2. Program Details.

Quantity	Unit Cost	Program Cost
Outer Wing Station 430 NRE (3600)	N/A	\$10,000,000
12 sets Outer Wing Station 430 (3010)	\$2,000,000	\$24,000,000
6 Retractable External Arm Modifications (3010)	\$1,000,000	\$6,000,000
Total		\$40,000,000

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E-8C, C-32B, and C-40C

- **Robust "Sensor-To-Shooter" Command and Control Battle Management**
- **Wide-Area Ground, Littoral, and Maritime Surveillance/Tracking**
- **ANG E-8 Unit Provides 100% of the Total Fleet**



E-8C: The E-8C Joint Surveillance Target Attack Radar System is the world's premier wide-area surveillance moving target indicator, airborne, manned battle management command and control aircraft. It brings a unique combination of robust communication and real-time surveillance to air, ground, and surface domains.

The aircraft's capability to find, fix, track, and orient shooters to air, ground, and surface targets of interest allows friendly forces to respond rapidly to a changing battlefield environment. Through continued investment in modernization, the E-8C will remain vital to joint force combat operations well into the future.

The ANG operates and maintains 16 E-8C's and one E-8(T)C. They have accrued more than 108,000 combat hours and 12,600 combat sorties over Kosovo, Iraq, Afghanistan, and Libya. The E-8C has been deployed continuously, 24 hours per day, 365 days per year, for 16 years, providing simultaneous battle management, command and control, and intelligence, surveillance, and reconnaissance, supporting all six combatant commanders.

C-32B: The C-32B provides dedicated rapid response worldwide airlift to the Commander, United States Special Operations Command, in support of the US Government domestic and overseas crisis response activities.

C-40C: The C-40C provides worldwide distinguished visitor transportation for Congressional, Department of Defense, Air Force and National Guard missions. The primary mission of the C-40 is to ensure passenger safety and comfort while providing the utmost in reliability.



E-8C, C-32B, and C-40C

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Critical Capabilities List

E-8C

- Counter-Unmanned Aerial System Electronic Intelligence Locate and Identify
- Fifth to Fourth Generation Gateway
- Situational Awareness Data Link Tactical Gateway
- Central Computer Modernization
- Joint Worldwide Intelligence Communications System Top Secret / Sensitive Compartmented Information Internet and Chat

C-32B

- Enhanced Flight Vision System Improving Situational Awareness, Safety, and Operational Access with Reduced Weather Minimums

C-40C

- Upgraded High-Speed Data System

Essential Capabilities List

E-8C

- Personnel Recovery Compatible Interrogation Radio
- Block 40, Global Imagery Server and Automatic Identification Service Upgrade for Final Two Aircraft

- Increased Beyond Line-of-Sight Bandwidth
- Aided Radar Target Classification
- Global Positioning System Time of Day, Auto Time of Day, Second Generation Anti-Jam Tactical Ultra High Frequency Radio for North Atlantic Treaty Organization Upgrade for HAVE QUICK

C-32B

- None

C-40C

- None

Desired Capabilities List

E-8C

- Bridge / Relay / Civilian Support
- Blue Force Tracker 2 (Joint Battle Command-Platform)
- Secure Voice Over Internet Protocol
- Concurrent Multi-Netting / Link 16 Enhanced Throughput (i.e., Network-Enabled Weapons)
- Self-Defense Suite

C-32B

- None

C-40C

- None

**E-8C: COUNTER-UNMANNED AERIAL SYSTEM ELECTRONIC INTELLIGENCE
LOCATE AND IDENTIFY**

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires an Electronic Intelligence (ELINT) system capable of detecting emissions from Unmanned Aircraft Systems (UAS), to include both the aircraft and the remote controllers. This system will provide an organic capability to aid in the detection and identification of UAS-type targets in a contested, degraded environment. The E-8C lacks the capability to positively identify objects of interest detected by onboard sensors. This ELINT capability enables an accurate characterization of detected objects in the joint battlespace and provides decision quality data to the operator for the timely application of military options. It will be used to cue other sensors for faster acquisition of target information. This integrated capability will also aid in target recognition, threat awareness, and informed command and control of the battlespace. Each of the 116th Air Control Wing's 16 E-8C aircraft requires an ELINT ID system. In addition, it needs to be incorporated into each of the three associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
ELINT ID System Non-Recurring Engineering (NRE) (3600)	N/A	\$20,000,000
18 ELINT Kits (3010) *	\$5,000,000	\$90,000,000
3 Simulated ELINT Kits for Training Systems (3010)	\$1,000,000	\$3,000,000
Total		\$113,000,000

* Includes 10% spares

E-8C: FIFTH TO FOURTH GENERATION GATEWAY

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires the capability to act as a communications gateway, bridging the 5th to 4th Generation (Gen) fighter data link interoperability gaps. Current 4th Gen datalink participants, to include fighters, bombers, and attack aircraft, cannot receive information from 5th Gen fighters, which forces the aircraft to perform combat operations without essential information and lacking situational awareness. By collecting and disseminating F-22 In-Flight Data Link (IFDL) and F-35 Multi-function Advanced Data Link (MADL) information through an E-8C “524” communications gateway, which would convert the 5th Gen data to 4th Gen Link 16 messages, all Link 16-enabled aircraft will be able to utilize data received from 5th Gen aircraft, creating a significantly more accurate common operating picture. In addition, improved situational awareness will greatly increase the efficiency of E-8C JSTARS battle management, target prioritization/cross-cueing, and improve accountability within their command and control area of responsibility. Each of the 116th Air Control Wing’s 16 E-8C aircraft requires a “524” gateway, which also needs to be incorporated into each of the associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
“524” Gateway Non-Recurring Engineering (NRE) (3600)	N/A	\$15,500,000
18 “524” Gateways (3010) *	\$2,000,000	\$36,000,000
3 Simulated “524” Gateways for Training Systems (3010)	\$100,000	\$300,000
Total		\$51,800,000

* Includes 10% spares

E-8C: SITUATIONAL AWARENESS DATA LINK TACTICAL GATEWAY

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires the capability to provide a Situational Awareness Data Link (SADL) gateway for USAF, ANG, and other SADL equipped users. In many E-8C areas of responsibility, no SADL gateway is available, which prevents SADL users from receiving critical information broadcast over Link 16. SADL is an integral part of ANG F-16 and A-10 digital communications capabilities and is key to execution of multiple counter-air and counter-land missions. In order to better integrate close air support, dynamic interdiction, and non-traditional intelligence, surveillance, and reconnaissance aircraft, gateways are needed to provide a conduit for data and information sharing, enabling battle space visualization between Link 16 and SADL participants for air-to-surface and air-to-air missions. In addition, the SADL gateway will increase the efficiency of E-8C JSTARS battle management and enhance accountability within areas of responsibility. Each of the 116th Air Control Wing’s 16 E-8C aircraft requires a SADL gateway. In addition, it needs to be incorporated into each of the three associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
SADL Non-Recurring Engineering (3600)	N/A	\$5,000,000
18 SADL Kits (3010) *	\$250,000	\$4,500,000
3 Simulated SADL Kits for Training Systems (3010)	\$50,000	\$150,000
Total		\$9,650,000

* Includes 10% spares

E-8C: CENTRAL COMPUTER MODERNIZATION

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires a Central Computer (CC) with a modern open architecture design and significant processor and memory capacity. Almost all future capability improvements to the E-8C weapon system will require a new CC, directly affecting improvements to battle management, sensor fusion, and operator work station functionality. A modern CC allows the aircrew to continuously exploit multi-intelligence fusion tools, remotely-piloted aircraft feeds, and satellite communications networks, thus expediting the kill chain. Its processing speed and memory throughput will enhance E-8C organic sensor capabilities by better enabling detection of patterns-of-life and anomalies within large volumes of geospatial data, and allow the operator to overlay hundreds of analytical intelligence layers onto a single operating picture. Each of the 116th Air Control Wing's 16 E-8C aircraft requires a modern CC. In addition, it needs to be incorporated into each of the three associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
CC Non-Recurring Engineering (3600)	N/A	\$9,500,000
18 CC Kits (3010) *	\$500,000	\$9,000,000
3 CCs for Training Systems (3010)	\$100,000	\$300,000
Total		\$18,800,000

* Includes 10% spares

E-8C: JOINT WORLDWIDE INTELLIGENCE COMMUNICATIONS SYSTEM TOP SECRET / SENSITIVE COMPARTMENTED INFORMATION INTERNET AND CHAT

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires an onboard capability to access Top Secret/Sensitive Compartmented Information (TS/SCI). TS/SCI material provides the most accurate and timely intelligence data which can be used for target identification, threat awareness, and sensor cueing. The Joint Worldwide Intelligence Communications System (JWICS) provides near real-time access to TS/SCI information. Providing JWICS network access onboard the E-8C will increase battle management lethality through target prioritization and defensive threat awareness, closing the gap with the 5th generation mission. An onboard JWICS terminal will provide connectivity to networks run by the United States' Defense Intelligence Agency as well as those across the Department of Defense, Department of State, and Department of Homeland Security to access sensitive classified information. This tailored, time-sensitive information is a valuable asset for mission planning, battlefield forensics, enhanced threat awareness, and filling the information needs of the Battle Management Command and Control functions of JSTARS. Each of the 116th Air Control Wing's 16 E-8C aircraft requires a JWICS terminal.

2. Program Details.

Quantity	Unit Cost	Program Cost
JWICS System Non-Recurring Engineering (NRE) (3600)	N/A	\$5,650,000
16 JWICS Terminals (3010)	\$212,000	\$3,392,000
JWICS Related Equipment (3010)	N/A	\$458,000
Total		\$9,500,000

C-32B: ENHANCED FLIGHT VISION SYSTEM IMPROVING SITUATIONAL AWARENESS, SAFETY, AND OPERATIONAL ACCESS WITH REDUCED WEATHER MINIMUMS

1. Background. The ANG C-32B mission requires an Enhanced Flight Vision System (EFVS) to enable the flight crew to operate with reduced weather minimums. The EFVS increases situation awareness and safety during operations in weather and periods of low visibility. The EFVS package includes a Heads-Up Display (HUD) fused with an Enhanced Vision System (EVS). The HUD is a means to provide all primary flight display information increasing pilot situational awareness and decreasing workload. This technology is commercially available and approved by the Federal Aviation Administration in a Supplemental Type Certificate for Boeing 757 installation and operation. One system is required for each of the two C-32Bs as well as spare parts for the system.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 EFVS Kits (3010)	\$5,500,000	\$11,000,000
Total		\$11,000,000

* Includes 10% spares.

Global Integrated Intelligence, Surveillance and Reconnaissance (ISR)

C-40C: UPGRADED HIGH-SPEED DATA SYSTEM

1. Background. ANG C-40Cs require a high-speed data system for seamless, worldwide satellite-based communications and internet connectivity. This will enable the C-40C fleet to meet time-critical and persistent passenger mission requirements. All 3 ANG C-40s require upgraded high-speed data systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (NRE) (3600)	N/A	\$2,000,000
3 Upgraded High-Speed Data Systems (3010)	\$1,600,000	\$4,800,000
Total		\$6,800,000

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F-15

- **Air Dominance**
- **Homeland Defense**
- **ANG F-15 Units Provide 58% of the Total Fleet**

The F-15C Eagle has been the backbone of our nation's Air Superiority fleet for over 30 years and will continue to be a key asset. ANG F-15C units provide 31 percent of the nation's aerospace control alert fighters, spanning five alert sites in the continental United States. These alert sites provide 24-hour homeland defense. Active electronically scanned array radars on ANG F-15C/Ds provide combatant commanders essential updated air superiority and homeland defense capability.



In FY17, ANG F-15s deployed overseas on multiple European Theater Security Package taskings in support of Operation Atlantic Resolve and Baltic air policing, enhancing advanced tactical interoperability with our NATO allies and ensuring continued American air dominance presence in contested airspace throughout the European theater. ANG F-15s also took part in joint & international exercises including Red Flag, Vigilant Shield, Frisian Flag, Sentry Aloha, and Sentry Savannah.

Over half of USAF F-15C combat capability resides within the Air National Guard, which possesses 39% of all air superiority assets available for Air Expeditionary Forces (AEF) commitments and ACA tasking. The ANG also operates the USAF's only F-15C formal flying training unit, where all active and reserve component F-15C pilots are trained.

Modernization and sustainment programs are vital to improve aircraft capabilities for both overseas contingency operations and homeland defense. These upgrades recapitalize and repair long-range combat identification and air superiority kill chains, while drastically increasing survivability in contested environments. These programs include the AESA radar, multi-spectral search and track technologies, electronic warfare and self-protection, a modern integrated cockpit, and persistent air dominance-enabling technologies.

F-15

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Critical Capabilities List

- Active Electronically Scanned Array Radar
- Multi-Spectral Search / Track / Target
- Full-Spectrum Electronic Warfare
- Modernized Cockpit
- Persistent Air Dominance Enabler

Essential Capabilities List

- Realistic Training Opportunities
- Agile Operational Flight Program Development
- High Fidelity Networked Simulators at Air National Guard Bases
- Program Support for Joint Mission Planning System and Common Mission Debrief Program

Desired Capabilities List

- Air-Launched Hit-to-Kill Munition
- Next Generation Air-to-Air Weapon
- Crypto Loading Port Relocation
- Beyond-Line-of-Sight Data Transfer Station

F-15: ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

1. Background. ANG F-15 aircraft require Active Electronically Scanned Array (AESA) radar to increase detection and track ranges of airborne targets and to improve identification capability. AESA radars give the F-15C/D multi-target track and attack capability, and vastly increase protection against advanced electronic attack from enemy systems. AESA radars are critical for Homeland Defense missions, enabling pilots to locate a target of interest in a saturated air traffic environment, as well as detect and track small, asymmetric threats. The currently-fielded APG-63(v)3 AESA meets or exceeds performance capabilities in these environments and, with no moving parts, has demonstrated a mean time between failure over 30 times greater than the APG-63(v)0. AESA is required prior to the fielding of Advanced Display Core Processor (ADCP-II). ADCP-II replaces the existing central computer in the F-15C/D aircraft, placing all F-15s on a single, common operating system with enough processing power and software agility to enable the next generation of advanced offensive and defensive systems such as the Eagle Passive Attack Warning Survivability System (EPAWSS), and advanced joint data link systems. 30 ANG F-15C/D aircraft still require the AESA upgrade.

2. Program Details.

Quantity	Unit Cost	Program Cost
16 F-15C(v)0 to (v)3 Conversion Kits (3010)	\$9,000,000	\$144,000,000
5 F-15D (v)0 to (v)3 Conversion Kits (3010)	\$9,000,000	\$45,000,000
9 F-15D (v)1 to (v)3 Conversion Kits (3010)	\$5,000,000	\$45,000,000
Total		\$234,000,000

F-15: MULTI-SPECTRAL SEARCH / TRACK / TARGET

1. Background. ANG F-15s require multi-spectral search / track / target systems and a functional, enhanced AN/ALQ-128 Electronic Warfare Warning Set (EWWS) on all 105 combat coded aircraft. These capabilities will supplement on-board threat detection, identification, and tracking as part of a time-synchronized, integrated function of the existing sensor systems for detection and weapons cueing. Adversary aircraft and integrated air defense networks employ sophisticated detection and electronic attack methods that complicate F-15C employment and leave the Eagle vulnerable to attack. Infrared Search and Track (IRST) capabilities for forward-deployed and homeland defense missions require 20 pods at each of the five ANG combat-coded squadrons. Due to Tactical Electronic Warfare System (TEWS) sustainment cancellation, funding to update the ALQ-128 with modernized software and hardware interfaces was not initiated to ensure ALQ-128 compatibility with Active Electronically Scanned Array (AESA)-equipped aircraft. This oversight resulted in a major degradation of the F-15 kill-chain that will not be corrected with Eagle Passive Active Warning Survivability System (EPAWSS) installation. System functional capability must be immediately incorporated into all 105 ANG combat-coded F-15Cs in order to restore vital combat identification capabilities.

2. Program Details.

Quantity	Unit	Program Cost
IRST Pod Non-Recurring Engineering (3600)	N/A	\$10,000,000
100 IRST Pods (3010)	\$3,500,000	\$350,000,000
ALQ-128 Non-Recurring Engineering (3600)	N/A	\$50,000,000
105 ALQ-128 EWWS (3010)	\$500,000	\$52,500,000
Total		\$462,500,000

F-15: FULL-SPECTRUM ELECTRONIC WARFARE

1. Background. ANG F-15s require the Eagle Passive Active Warning Survivability System (EPAWSS) which will replace the functionally obsolete and unsupported Tactical Electronic Warfare System (TEWS) to enhance weapon system situational awareness and survivability against enemy threats. The proliferation of advanced adversary aircraft, sophisticated anti-aircraft missile systems, and other integrated air defense systems pose a significant threat to F-15 survivability. This upgrade will significantly improve the F-15’s capability to autonomously and automatically detect, identify, and locate radio frequency (RF) threats, as well as provide the ability to deny, degrade, deceive, disrupt, and defeat RF, electro-optical, and infrared threat systems in highly-contested environments through 2040. Due to an EPAWSS procurement funding reduction and prolonged installation schedule, multiple individual interim EW systems are immediately required in order to enhance F-15 survivability in the short-term. These interim solutions should include: integrated digital Radar Warning Receiver (RWR); internal or external podded Digital Radio Frequency Memory (DRFM) Electronic Attack (EA); advanced Fiber-Optic Towed Decoy (FOTD) systems; and advanced expendables such as ALE-58 Back-of-Launcher (BOL) countermeasure dispensers. Interim EW initiatives require a digital RWR on all 135 F-15C/D aircraft. Internal DRFM upgrades would be for all 105 combat-coded aircraft; external DRFM EA pods would only require 40 rotatable assets. All 105 ANG combat-coded Eagles must be equipped with re-usable FOTD systems. Each ANG combat-coded squadron requires four BOL countermeasure missile rails for each of its 18 deployable aircraft. ANG has procured 242 BOL rails.

2. Program Details.

Quantity	Unit Cost	Program Cost
F-15 EPAWSS Non-Recurring Engineering (3600)	N/A	\$416,000,000
105 F-15 EPAWSS (3010)	\$8,000,000	\$840,000,000
150 F-15 Digital RWR (3010)*	\$1,000,000	\$150,000,000
115 F-15 Internal DRFM EA (3010)*	\$1,000,000	\$115,000,000
40 F-15 DRFM EA Pods (3010)*	\$2,000,000	\$80,000,000
F-15 FOTD Non-Recurring Engineering (3600)	N/A	\$5,500,000
115 F-15 FOTD Systems (3010)*	\$100,000	\$11,500,000
120 F-15 BOL Rails (3010)	\$50,000	\$6,000,000
Total		\$1,624,000,000

* Includes 10% spares

F-15: MODERNIZED COCKPIT

1. Background. ANG F-15s require replacement of legacy displays and controls. The current displays and communication/navigation functionality in the F-15C cockpit are based on outdated 1970s technology. The F-15C/D has experienced steady growth in capability and lethality in its 30+ years of combat-proven service due to the modernization of radars, weapons, and sensors, as well as the addition of data link and helmet-mounted cuing systems. Fully utilizing these enhancements requires a complex Pilot Vehicle Interface (PVI), imposing a demanding workload on the pilot. With current and required future mission system upgrades, F-15C/D legacy displays and communication architecture are inadequate due to display size and resolution, outdated technology, and minimal audio integration. A 2007 Northern Command Joint Urgent Operational Need (JUON) for satellite communication (SATCOM) capability on Aerospace Control Alert (ACA) aircraft led to the hasty installation of the ARC-210 Generation 5 radio. The original intent was for this radio to be installed with a complementary single up-front control adjacent to the head-up display line-of-sight to avoid the degrading PVI related to three radio controls disbursed in three distinct cockpit locations. With the forthcoming Department of Defense-driven Multiple User Objective System (MUOS)-compatible SATCOM radio upgrade program for all ACA legacy fighters, the F-15 requires an up-front integrated radio controller to allow for more efficient control of its three or more radios. This integrated radio controller could be further integrated into the aircraft Operational Flight Program (OFP) in order to also control navigation, identification friend or foe, datalink, and selected mission data information such as fuel management and time, distance, and endurance calculations. The addition of three-dimensional (3-D) audio separation would allow the pilot to spatially separate and process multiple radio frequencies in addition to directional self-protection warning tones. These upgrades enhance flight safety in training and real-world environments by increasing a pilot's 3-D situational awareness of the battlespace. ANG requires one attack display upgrade for 25 F-15Cs and two for 14 F-15Ds. ANG requires one large area display for each F-15, and two displays for each of the 14 F-15Ds. ANG requires one integrated radio controller for each F-15 and one 3-D audio system for F-15C/D each seat.

2. Program Details.

Quantity	Unit Cost	Program Cost
60 F-15 Attack Display Upgrades (3010)*	\$90,000	\$5,400,000
164 F-15 Large Area Display (3010)*	\$400,000	\$65,600,000
150 F-15 Integrated Radio Controller (3010)*	\$90,000	\$13,500,000
164 F-15 3-D Audio (3010)*	\$100,000	\$16,400,000
Total		\$100,900,000

* Includes 10% spares

F-15: PERSISTENT AIR DOMINANCE ENABLER

1. Background. ANG F-15s require conformal fuel tanks (CFT) and additional weapons stations on all 105 combat-coded aircraft to effectively increase the combat radius, loiter time, and firepower critical to gathering offensive mass in order to achieve air dominance. Additional weapon stations mounted on CFTs or multi-rail missile launchers, installed in place of previously necessary external fuel tanks, are modular and can be used for a variety of advanced air-to-air and air-to-surface weapons including Advanced Medium Range Air-to-Air Missiles (AMRAAM), Joint Direct Attack Munitions (JDAM), Small Diameter Bombs (SDB), and Miniature Air-Launched Decoys (MALD). CFTs also enable additional carriage options for wing pylon stations 2 and 8, which could be utilized for multi-spectral search / track / targeting pods, electronic warfare pods, and a variety of advanced radio frequency and infrared countermeasures. The standardized weapon communication terminals in advanced CFTs will streamline weapons development and integration among all versions of the F-15, and allow combatant commanders increased capacity and utilization options with the advantage of a common F-15 fleet. ANG requires one shipset of CFTs and two multi-rail missile launchers for each of the 105 combat-coded F-15.

2. Program Details.

Quantity	Unit Cost	Program Cost
105 F-15 Conformal Fuel Tank Shipsets (3010)	\$3,700,000	\$388,500,000
210 Multi-Rail Missile Launcher (3010)	\$100,000	\$21,000,000
Total		\$409,500,000

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F-22

- **Air Dominance**
- **Homeland Defense**
- **ANG F-22 Units Provide 11% of the Total Fleet**



The Air Reserve Component (ARC) flies and maintains F-22s at all F-22 basing locations. The ANG has two F-22 classic associate units and one operational F-22 squadron. Aerospace Control Alert (ACA) support is provided by ARC F-22s flying out of Alaska, Hawaii, and Virginia. For the past 3 consecutive years, ARC F-22 pilots, maintainers, and aircraft have participated in combat operations in support of Operation INHERENT RESOLVE as well as participated in several major exercises. In

addition to combat and exercise operations, ARC F-22s play an essential role in Operational Test (OT) and training future F-22 pilots at the F-22 Formal Training Unit (FTU).

Primary ANG F-22 modernization focuses on common configuration and modernization to counter advancing adversaries. Enhancements in offensive and defensive systems will allow the F-22 to maintain air dominance versus air and surface threats. Situational awareness and communication upgrades, including beyond line-of-sight communication, improved GPS capabilities, and a helmet-mounted display that will enable the F-22 to efficiently and effectively accomplish alert and combatant command tasks.



F-22

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Critical Capabilities List

- Multi-Spectral Sensor Capabilities
- Survivability Enhancements
- Helmet-Mounted Display
- Beyond-Line-of-Sight Communications
- Global Positioning System Improvements

Essential Capabilities List

- Combat Identification Improvements
- Accurate Training for Peer Threats
- Low Drag Pylons
- Improved Simulator Capabilities
- Improved Debrief Capabilities

Desired Capabilities List

- Leverage F-35 Capabilities and Technologies for F-22
- New Integrated Forebody and Radar Improvements
- Engine Upgrades (Adaptive Engine Transition Program for Improved Range and Economy Benefits)
- Common Configuration
- Low Observable Reduction and Sustainment Improvements

F-22: MULTI-SPECTRAL SENSOR CAPABILITIES

1. Background. ANG F-22s require a multi-spectral sensor upgrade. The current sensor suite is optimized to search, detect, track, identify, engage, and survive against threats operating within a specific band of the radio frequency spectrum. A multi-spectral sensor system exploits a target’s signature across the entire electromagnetic spectrum, providing alternative means outside the currently exploited spectrum to detect and track adversaries. Multi-spectral systems provide alternatives that are less susceptible to electronic attack or other advanced sensor countermeasures. The F-22 needs to implement out-of-band multi-spectral sensor suites to increase lethality and survivability against peer and emerging threats. A multi-spectral sensor capability, combined with the current F-22 sensor suite, will allow the F-22 to maintain an advantage over peer adversaries. All 20 ANG F-22s require this upgrade.

2. Program Details.

Quantity	Unit Cost	Program Cost
Multi-Spectral Sensors Non-Recurring Engineering (3600)	N/A	\$201,000,000
22 Multi-Spectral Sensors (3010)*	\$10,000,000	\$220,000,000
Total		\$421,000,000

*Includes 10% spares.

F-22: SURVIVABILITY ENHANCEMENTS

1. Background. ANG F-22s require the ability to defeat evolving threats by rapidly modernizing ownship countermeasures. The F-22 is the nation’s most technologically advanced air superiority fighter, yet the threat is advancing faster than current modernization efforts. Advanced, affordable, and more reliable countermeasures would facilitate the F-22 remains survivable against advanced threats currently being produced and proliferated around the world. Current F-22 infrared countermeasures are expensive and unreliable. The specific details of F-22 countermeasures are classified; however, there are proven, tested technologies in existence that can be rapidly procured and implemented to enhance the survivability and lethality of the F-22. All 20 ANG F-22s require survivability enhancements.

2. Program Details.

Quantity	Unit Cost	Program Cost
22 Advanced Countermeasure Systems (3010)*	\$10,000,000	\$220,000,000
22 Advanced Expendables (3010)*	\$2,000,000	\$44,000,000
Total		\$264,000,000

*Includes 10% spares.

F-22: HELMET-MOUNTED DISPLAY

1. Background. ANG F-22 pilots require a night vision compatible, color helmet-mounted display (HMD). Multiple simulations and an operational utility assessment conducted by the 422nd Test and Evaluation Squadron demonstrated that using an HMD provides a distinct first-shot, first-kill advantage. Although this advantage applies primarily to within-visual-range engagements, the HMD also substantially increases situational awareness during beyond-visual-range intercepts. HMD technology provides the capability to cue and verify off-boresight sensor and weapon information through the display of weapons employment zones and visual cues of target and friendly aircraft locations. Originally conceived as a weapons cueing system, the HMD has evolved into a force multiplier because of its ability to enhance situational awareness during all phases of flight and across all mission sets. For example, the HMD provides threat information visual cues while the pilot is "eyes-out" of the cockpit, warning of dangers and providing critical information to allow the pilot to maneuver the aircraft away from terrain or threats. Similarly, F-22s tasked with identifying targets of interest during homeland defense missions would be better able to quickly and efficiently visually locate and identify small aircraft or unmanned systems. Lack of an HMD limits the lethality of the F-22, and puts the aircraft at a disadvantage in certain situations against less formidable and capable aircraft. The acquisition of an HMD for each ANG F-22 pilot will greatly increase the lethality and survivability of the F-22.

2. Program Details.

Quantity	Unit Cost	Program Cost
Helmet Mounted Display Non-Recurring Engineering (3600)	N/A	\$10,000,000
50 Helmet Mounted Displays (3010)*	\$200,000	\$10,000,000
Total		\$20,000,000

*Includes 10% spares.

F-22: BEYOND-LINE-OF-SIGHT COMMUNICATIONS

1. Background. ANG F-22s require a Beyond-Line-of-Sight (BLOS) radio to facilitate communication to command centers for important tasking information, both in the homeland defense role and during combat operations. The ability to communicate BLOS through voice communications is currently restricted to Ultra-High Frequency (UHF) and Very-High Frequency (VHF) radios. Several mission sets, including North American Aerospace Defense (NORAD) Aerospace Control Alert (ACA) missions, require the F-22 to “reach back” to command and control facilities due to the distances involved in long-range intercepts. The increased distance from front-line fighter aircraft to airborne tactical command and control is putting a strain on current line-of-sight restricted communications. The BLOS radio must be jam-resistant, secured with adequate encryption, and utilize low probability of intercept / low probability of detect waveforms to counter the emerging threat. BLOS radios are required on all 20 ANG F-22 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non-Recurring Engineering (3600)	N/A	\$10,000,000
22 BLOS Radios (3010)*	\$175,000	\$3,850,000
Total		\$13,850,000

*Includes 10% spares.

F-22: GLOBAL POSITIONING SYSTEM IMPROVEMENTS

1. Background. ANG F-22s require Global Positioning System (GPS) cockpit repeater kits as a backup means of GPS-based navigation. Various tactical aircraft are already utilizing Electronic Flight Bag (EFB) tablets in the Central Command area of responsibility under local commander authority for use during combat sorties. USAF F-15E and U.S. Navy F/A-18E/Fs use these tablets for navigational situational awareness but also for blue force tracking; often this tablet technology is the only tool available to discriminate between friendly and hostile locations during dynamic targeting scenarios. Air Combat Command is currently resourcing EFBs for use in F-22 aircraft; however, the F-22 cannot receive GPS signals in the cockpit due to proprietary canopy characteristics. A lack of GPS signal reception in the cockpit limits the EFB to usage as a digital repository of flight information publications. In order to utilize the EFB as a backup means of GPS-based navigation and in cases of various electrical failures, the F-22 requires a simple repeater of the aircraft's received GPS signal in the cockpit for all 20 ANG F-22 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
22 GPS Repeater Kits (3010)*	\$5,000	\$110,000
Total		\$110,000

* Includes 10% spares.

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F-16

- **Close Air Support / Interdiction / Precision Strike**
- **Suppression / Destruction of Enemy Air Defense**
- **Homeland Defense**
- **ANG F-16 Units Provide 37% of the Total Fleet**

ANG F-16s are engaged around the globe in operations including NOBLE EAGLE, IRAQI FREEDOM, INHERENT RESOLVE, ENDURING FREEDOM, and NEW DAWN. Since 2003 ANG F-16Cs have fulfilled many of Allied Air Command's precision-guided munitions and close air support (CAS) tasking's, including convoy escort, dedicated infrastructure defense, border patrol, and raid support. The ANG operates 333 Block 25/30/32/40/42/50/52



F-16C/Ds. The ANG F-16 aircraft makeup 56% of the nation's aerospace control alert (ACA) fighter force and provide a near-constant presence in operational theaters conducting CAS and armed reconnaissance. Capability enhancements to the Block 40/42 and Block 50/52 aircraft make them the Air Force's only suppression of enemy air defenses (SEAD)-capable aircraft.

Modernization efforts are underway to improve ANG F-16s by fielding affordable systems with secure line-of-sight and beyond line-of-sight communication suites, smart displays with data processing capability, advanced helmet-mounted target cueing for air and ground weapons employment, enhanced self-protection suites, and improved radar performance and reliability.

F-16

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Critical Capabilities List

F-16 (Block 40/42/50/52)

- Radar Providing Low-Observable Detection, Air-to-Air and Air-to-Ground Electronic Protection / Electronic Attack, and Combat Identification Capability
- Targeting Pod with Digital High-Definition Display
- Lightweight, Color, Night-Compatible Helmet-Mounted Display
- Automated, Digital Electronic Warfare Suite Capable of Detection, Protection from, and Attack of Modern Radio Frequency and Infrared Threats
- Multi-Band, Secure Line-Of-Sight Radios / Beyond Line-of-Sight with Three Dimensional Audio

F-16C+ (Block 25/30/32)

- Radar Providing Low-Observable Detection, Air-to-Air and Air-to-Ground Electronic Protection / Electronic Attack, and Combat Identification Capability
- Link 16 Capability with Growth for 5th to 4th Generation Interoperability
- Digital Electronic Warfare Suite Capable of Detecting and Protecting from Radio Frequency and Infrared Threats
- Jam-Resistant Navigation System
- Multiple User Objective System Beyond Line-Of-Sight Radio with Three Dimensional Audio

Essential Capabilities List

- Proliferation and Sustainment of Concurrent High Fidelity Ready Aircrew Program Quality Simulators
- Improved, Sustainable, Electronic Warfare Systems Capable of Precision Geolocation of Radio Frequency Threats
- Advanced Data Link Capability with Fifth Generation Fighter Interoperability to Include Broadband Uplink
- Ability to Search and Track Airborne Targets Without Losing Targeting Pod Capabilities
- Ability to Find / Fix Isolated Personnel Via Secure Communications and Data Transfers that Enables Coordination of Personnel Recovery Assets in Combat Search and Rescue Operations

Desired Capabilities List

- Boresight Program Enhancement
- Certified Area Navigation Approach Capability
- Live Virtual Constructive Training Facilitator
- Reliable, Hi-Fidelity Recording and Debrief System
- Data Transfer Cartridge / Digital Video Recorder Storage and Capability Enhancement
- Tactical Autopilot Capable of Integrating with Weapons Deliveries
- Advanced Wide-Band Decoy
- Increased Air-to-Air Weapon Carriage Capacity

F-16: RADAR PROVIDING LOW-OBSERVABLE DETECTION, AIR-TO-AIR AND AIR-TO-GROUND ELECTRONIC PROTECTION ELECTRONIC ATTACK, AND COMBAT IDENTIFICATION CAPABILITY

1. Background. All ANG F-16 aircraft require Active Electronically Scanned Array (AESA) radar to effectively execute tasked missions. AESA radars provide the capability to detect and track multiple airborne targets of interest in dense civilian air traffic environments. AESA radars will improve the capability of ANG F-16s to perform close air support, surface attack, and defensive counter-air. AESA radars can perform detection, tracking, communication, and jamming functions in multiple directions simultaneously. Additionally, AESA radars eliminate several components associated with mechanical radars, significantly improving reliability and maintainability costs. The survivability and lethality of the F-16 will diminish without the inherent capability and reliability of an AESA radar. There are 261 remaining ANG F-16s that require an AESA radar.

2. Program Details.

Quantity	Unit Cost	Program Cost
Radar Phase II and III Non Recurring Engineering (3600)	N/A	\$30,000,000
261 Radar Upgrades (3010)	\$2,000,000	\$522,000,000
Total		\$552,000,000

F-16: TARGETING POD WITH HIGH-DEFINITION DISPLAY

1. Background. All ANG F-16 aircraft require a Center Display Unit (CDU) to transfer imagery with ground controllers, fully utilize advanced targeting pod image quality, improve available processing power, and replace aging flight instruments. The ability to transfer data and exploit digital targeting pod video is critical throughout the broad spectrum of F-16 missions including Close Air Support, Time Sensitive Targeting, and homeland defense. Coupling CDU with the ability to broadband uplink information will allow aircrew to broadcast high-definition real-time data to enable decision makers and expedite the kill chain. Furthermore, the CDU contains additional processing capacity that allows for the manipulation of data external to the aircraft Operational Flight Program (OFP). This additional processing capacity provides pilots with the ability to insert mission planning data pre-mission, while opening low-cost pathways for the integration of new capabilities without the costly and time-consuming process of changing the aircraft OFP software. Pilot-selectable display options will provide electronic primary instrument flight displays (attitude, performance, and navigation) when required. 155 kits remain to outfit the complete ANG fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
CDU Non Recurring Engineering (3600)	N/A	\$15,000,000
155 CDU Kits* (3010)	\$400,000	\$62,000,000
Total		\$77,000,000

* Includes 10% spares.

F-16: LIGHTWEIGHT, COLOR, NIGHT-COMPATIBLE HELMET-MOUNTED DISPLAY

1. Background. ANG F-16 Block 40/42/50/52 require modern Helmet Mounted Displays (HMD) that are compatible with night vision devices. F-16 pilots are limited by the inability to rapidly cue sensors, build battlespace awareness, and safely operate in a night environment. Currently, pilots must choose between cueing or night vision. Helmet solutions combining these capabilities are required to fight near-peer adversaries in the modern battlespace. A modern HMD should also include a multi-color capability, display a large volume of symbols, and utilize a reliable spatial tracking system. Additionally, the helmet should be lightweight and ergonomic with a neutral center of gravity that reduces strain on the pilot's neck and back. 155 kits remain to outfit the complete fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Helmet Mounted Display Non Recurring Engineering (3600)	N/A	\$9,000,000
155 Helmet Mounted Display Kits* (3010)	\$90,000	\$13,950,000
Total		\$22,950,000

* Includes 10% spares.

F-16: AUTOMATED, DIGITAL ELECTRONIC WARFARE SUITE CAPABLE OF DETECTION, PROTECTION FROM, AND ATTACK OF MODERN RADIO FREQUENCY AND INFRARED THREATS

1. Background. ANG F-16 aircraft require a robust integrated electronic attack suite to counter current and future radars. All ANG F-16 aircraft Electronic Warfare (EW) suites are comprised of a series of EW equipment designed in the 1980s which are incapable of providing adequate defensive situational awareness and countermeasures against some present and most future radar systems. Today, both systems suffer from sustainment issues and have significant capability issues against modern threat systems. The attributes of this integrated suite shall incorporate an upgraded Radar Warning Receiver (RWR), a digital radio frequency memory upgraded Electronic Attack (EA) pod, a pylon Missile Warning System (MWS) and the ALQ-213 legacy Electronic Combat (EC) integration system. The F-16 fleet has two legacy analog RWRs (ALR-69 and ALR-56M) and two legacy analog EA pods (ALQ-131 and ALQ-184). All require sustainment as well as digital-based performance upgrades. The ALQ-213 EC integration system is installed on all F-16 Block 30/32 aircraft, but it must be installed on the remaining 117 F-16 Block 40/42/50/52. F-16s will remain at risk to many current and all advanced threat systems resulting in areas of denied access, significantly impacting the pilot’s ability to survive, accomplish assigned missions, and meet combatant commander requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A Non Recurring Engineering (3600)	N/A	\$22,840,000
333 ALR-69A Upgrades (3010)	\$820,000	\$273,060,000
EA Pod Non Recurring Engineering (3600)	N/A	\$10,000,000
70 EA Pod Upgrades (3010)	\$1,320,000	\$92,400,000
ALQ-213 Non Recurring Engineering (3600)	N/A	\$15,000,000
117 ALQ-213 Kits (3010)	\$160,000	\$18,720,000
MWS Non Recurring Engineering (3600)	N/A	\$10,000,000
70 MWS Sets (3010)	\$1,100,000	\$77,000,000
Total		\$519,020,000

**F-16: MULTI-BAND, SECURE LINE-OF-SIGHT AND BEYOND LINE-OF-SIGHT
RADIOS WITH THREE-DIMENSIONAL AUDIO**

1. Background. ANG F-16s require simultaneous Secure Line-of-Sight (SLOS) and Beyond Line-of-Sight (BLOS) communications incorporating Three Dimensional (3D) audio. Current upgrades to all ANG F-16s provide SLOS and BLOS communications through the installation of one ARC-210 radio. The ARC-210 modification provides an improved ability to securely communicate with ground forces and Command and Control (C2) nodes, but does not allow simultaneous operations on SLOS/BLOS frequencies. Aerospace Control Alert (ACA) and combat theater operations require simultaneous SLOS/BLOS communications to concurrently maintain contact with both C2 nodes and friendly forces. A second ARC-210 allows growth to extended data and image transfer when linked to an advanced display. The combination of two ARC-210s plus a legacy radio (three radios total) allows in-theater communications on a C2 frequency, a secure tactical frequency with ground forces, and an intra-flight frequency. In the Homeland Defense (HLD) mission, this radio configuration enables monitoring C2, air traffic control, and intra-flight frequencies simultaneously. The integration of noise-cancelling and directional (3D) audio simplifies interpretation of simultaneous radio calls by spatially separating aural warning and radio signals and provides angular cueing to ground and air threats when used in conjunction with a helmet mounted cueing system. These capabilities are critical to operations in remote areas, dense threat environments, and dynamic HLD missions. All 333 ANG F-16 aircraft require these modifications.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non Recurring Engineering (3600)	N/A	\$5,000,000
333 BLOS Radios (3010)	\$150,000	\$49,950,000
3D Audio Non Recurring Engineering (3600)	N/A	\$6,000,000
333 3D Audio Upgrades (3010)	\$125,000	\$41,625,000
Total		\$102,575,000

F-16: LINK 16 CAPABILITY WITH GROWTH FOR 5TH TO 4TH GENERATION INTEROPERABILITY

1. Background. All ANG F-16 aircraft require Link 16 datalink capability to effectively employ in the current operational environment. Legacy Situational Awareness Data Link (SADL) equipment has proven inadequate due to lack of currently fielded support infrastructure, frequency band constraints, and Joint Interface Control Cell (JICC) support. The transition of F-16 Block 25/30/32 aircraft to Link 16 will allow seamless deployment, connectivity and interoperability with the entire F-16 fleet. All ANG F-16s (Block 25/30/32/40/42/50/52) require growth in datalink equipment to foster 5th to 4th generation aircraft datalink communications. This current deficiency directly affects the combat capability and mission effectiveness of the five Block 30 units currently manning Aerospace Control Alert. All ANG pre-block F-16s need to be postured to interact with 5th generation aircraft through the acquisition of new datalink equipment or force package combat capability will be significantly degraded.

2. Program Details.

Quantity	Unit Cost	Program Cost
Data Link Non Recurring Engineering (3600)	N/A	\$10,000,000
192 Data Link Upgrades (3010)	\$275,000	\$52,800,000
Total		\$62,800,000

F-16: JAM RESISTANT NAVIGATION SYSTEM

1. Background. ANG F-16 Block 25/30/32 aircraft require an update to the Embedded Global Positioning System (GPS) and Inertial Navigation System (EGI) to provide increased anti-jam and selective availability anti-spoofing module capability during all phases of the mission. The navigation equipment in the F-16 needs to operate with GPS accuracy in an increasingly contested electro-magnetic environment. The design and operation of the current F-16 Block 30 EGI did not anticipate the current threat environment and its continued performance at the required operational level is at serious risk. EGI modernization is required on 192 Block 25/30/32 F-16s.

2. Program Details.

Quantity	Unit Cost	Program Cost
Jam Resistant Navigational System Non Recurring Engineering (3600)	N/A	\$5,500,000
192 Jam Resistant Navigational Systems (3010)	\$155,000	\$29,760,000
Total		\$35,260,000

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HH-60G

- **Combat Search and Rescue**
- **ANG HH-60 Units Provide 18% of the Total Fleet**

ANG Personnel Recovery (PR) helicopters and aircrew play a critical role in support of overseas contingency operations while responding to an increasingly high demand for domestic operations. There are three ANG PR helicopter units and one ANG PR training unit associated with an active duty unit.



In 2017, ANG PR units deployed in support of multiple natural disasters. The 129 Rescue Squadron (RQS) worked with several agencies to fight fires in Northern California. In addition to this, they conducted numerous counter-drug missions throughout the state and supported search and rescue operations in Texas following hurricane Harvey.



The 101 RQS supported hurricane relief operations in Texas, the U.S. Virgin Islands, and Puerto Rico. The 210 RQS held 24-hour state-wide, rescue alert in Alaska resulting in multiple lives saved. The 188 RQS supported aircrew training for the 58 Special Operations Wing.

The HH-60G modernization priorities included improvements to the smart multi-functional color display and the acquisition of multiple datalinks. Additional upgrades completed in FY17 focused on the modernization of the aircraft communication systems.

HH-60G

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Critical Capabilities List

- Modernized Integrated Defensive Suite
- Integrated Flight Deck with Handheld Device Interoperability
- Degraded Visual Environment-Capable, Helmet-Mounted Display
- Aircraft Weapons Modernization Including Advanced Precision Kill Weapons System
- Distributed Mission Operations Simulators (See Tab P)

Essential Capabilities List

- Mobile Ad-Hoc Network Technology
- Helicopter Underwater Egress Lighting
- Federal Aviation Administration Global Positioning System-Certified Aircraft
- Maritime Vessel Locator / Interoperability
- Command, Control, Communications, Computers, and Intelligence Decision Software that Incorporates Multiple Data Streams into a Single Source

Desired Capabilities List

- Wireless Intercom System
- Improved Aircraft Generators
- Aircrew Flight Equipment Enhancements
- Instrumentation Upgrade
- Helicopter Hovering In-Flight Refueling
- Improved Aircraft Hoist

HH-60G: MODERNIZED INTEGRATED DEFENSIVE SYSTEM SUITE

1. Background. ANG HH-60Gs require an integrated defensive suite that can detect and provide aircrew with accurate and precise indications of ground fire and Radio Frequency (RF) threat systems on a single display with an associated audio warning. The current detection method for rocket propelled grenades and small arms fire is visual or radio notification from a ground party that does not provide crews the required time to react and defeat enemy threats. The APR-39Bv2 Radar Warning Receiver (RWR) is an analog system with limited processing capability, is not capable of displaying RF threats without ambiguity, and has no jamming capability. Three-Dimensional (3D) audio capability is required to integrate the audio warnings from a Missile Warning System, hostile fire indicator, or RWR, with communication and mission equipment. 3D audio equipment will permit crews to rapidly return precise and immediate defensive fire, effectively suppressing or destroying the enemy threat, and will also provide the ability to quickly and correctly react to enemy RF threats to maximize survivability. Aircrew require training software integrated into the electronic warfare suite to prepare for combat. Including embedded training capability utilizing the currently fielded Virtual Electronic Combat Training System (VECTS) will allow crews to prepare for combat missions in a virtual threat overlay during a flight; providing the highest fidelity training possible. The ANG requires one hostile fire indicator, one RWR, and an ALQ-213 with (3D) audio capability for each of its 18 HH-60G helicopters. 108 3D audio kits are required to provide a device to all six personnel on each of the 18 ANG HH-60Gs. All 18 ANG HH-60Gs require VECTS.

2. Program Details.

Quantity	Unit Cost	Program Cost
Defensive System Non-Recurring Engineering (NRE) (3600)	N/A	\$2,000,000
18 Hostile Fire Indicators (3010)	\$270,000	\$4,860,000
18 Radar Warning Receivers (3010)	\$1,240,000	\$22,320,000
Directional Audio NRE (3600)	N/A	\$6,000,000
108 3D Audio Kits (3010)	\$7,000	\$756,000
3 Unit Test Equipment (3080)	\$58,400	\$175,200
18 ALQ-213 w/3D Audio Kits (3010)	\$234,000	\$4,212,000
VECTS NRE (3600)	N/A	\$2,000,000
18 VECTS (3010)	\$1,300,000	\$23,400,000
Total		\$65,723,200

**HH-60G: INTEGRATED FLIGHT DECK WITH HANDHELD DEVICE
INTEROPERABILITY**

1. Background. ANG HH-60G aircrew require an integrated flight deck with wireless handheld device interoperability to fuse information from multiple sources into a common operating picture. To enable cross-platform communication, upgraded software definable radios will enable previously stove-piped communications channels to interoperate with various Combat Search and Rescue (CSAR) weapon systems. This cross waveform communications tool, to include cellular, ties civil response forces into traditional CSAR communications channels. To manage this information, the current Smart Multi-Function Color Display (SMFCD) installed on ANG HH-60Gs needs to be fully integrated with multiple data feeds and devices. The capability to quickly access mission essential data from one centralized display will enable HH-60G aircrews to reduce “heads down” time and vastly improve situational awareness. Secure internet protocol network data will enable aircrews to receive near real-time Blue Force Tracker 2 (BFT2) data and text messaging from the battlefield. BFT2 is a modernized joint tracking system, which is compatible with Situational Awareness Data Link (SADL), Link 16, and provides beyond line-of-sight interactive data communication between aviation assets and command and control. Automatic Dependent Surveillance-Broadcast (ADS-B) is a cooperative surveillance technology which determines aircraft position, surrounding weather, and flight information. Link 16 is a tactical data link which enables digital situational awareness sharing. A securable multi-spectrum radio capable of supporting Soldier Radio Waveform (SRW) ensures military and civil command authorities that rescue helicopters will be ready for any and all relief operations. The ANG requires one of each device for each of the 18 HH-60Gs.

2. Program Details

Quantity	Unit Cost	Program Cost
18 Software Definable Radio Suite (3010)	\$250,000	\$4,500,000
18 Full Motion Video (3010)	\$200,000	\$3,600,000
18 BFT2 (3010)	\$100,000	\$1,800,000
18 Link 16 (3010)	\$120,000	\$2,160,000
18 ADS-B In/Out (3010)	\$30,000	\$540,000
18 Heads Down Display (HDD) NRE (3600)	N/A	\$200,000
18 Wifi HDD Interface (3010)	\$10,000	\$180,000
18 Universal Serial Bus HDD Interface (3010)	\$5,000	\$90,000
18 SRW Radios (3010)	\$15,000	\$270,000
Total		\$13,340,000

HH-60G: DEGRADED VISUAL ENVIRONMENT-CAPABLE, HELMET-MOUNTED DISPLAY

1. Background. ANG HH-60Gs require day and night, helmet-mounted heads-up display capability to significantly increase aircrew Situational Awareness (SA) and weapons employment, enhance terminal area search and rescue operations, speed overall internal communication during critical mission phases, and enable crews to safely land a helicopter in a degraded visual environment. This will allow all crewmembers to quickly build SA without the need for voice communication. Sensor and datalink symbols are visible on the helmet mounted display superimposed over the geographic location of friendly, hostile, and survivor positions. Additionally, the ability to display sensor pictures and datalink information while maintaining a heads-up posture will greatly enhance safety while flying in the low-level (<500ft) environment. Since the majority of the HH-60G mission employment occurs at night, this capability must be compatible with Night Vision Goggles (NVGs). The display also must also be available at night without the use of NVGs. Information must be selectable (i.e., video feed, aircraft flight information, situational awareness data link display, etc) per individual. One kit is needed for each of the 18 aircraft in the ANG plus spares. 40 helmet kits, plus spares, are needed for each of the three HH-60G rescue squadrons. In addition to the helmets, an upgrade to the Q-29A sensor on the HH-60G will give the crews a better ability to operate in fog, snow, and dust. An upgraded Q-29A sensor is needed for each of the 18 HH-60Gs in the ANG as well as three spares.

2. Program Details

Quantity	Unit Cost	Program Cost
20 HMCS Aircraft Kits* (3010)	\$335,294	\$6,705,880
132 HMCS Helmet Kits* (3010)	\$87,843	\$11,595,276
Q-29A Upgrade NRE (3600)	N/A	\$35,000,000
21 Q-29A Upgrade Systems (3010)	\$750,000	\$15,750,000
Total		\$69,051,156

* Includes 10% spares.

HH-60G: AIRCRAFT WEAPONS MODERNIZATION INCLUDING ADVANCED PRECISION KILL WEAPONS SYSTEM

1. Background. ANG HH-60Gs require weapons modernization to provide reliable defensive firepower to support various combat mission operations. The fielded systems have no capability for target marking, concealment, or battlefield illumination. The HH-60 relies on scarce, heavily armed support assets to provide terminal area fires support against enemy vehicles and ground threats, along with on-call illumination or marking effects. The LAU-68 F/A Extended-Length Launcher (ELL) is a lightweight 7-shot rocket pod allowing employment of the Advanced Precision Kill Weapons System (APKWS). This system is capable of delivering precision-guided rockets armed with anti-armor, high explosive, or anti-personnel warheads as well as non-lethal smoke or battlefield illumination payloads. Two LAU-68 F/A ELL pods can be installed on an HH-60G aircraft using the current weapons mount configuration, allowing APKWS employment without removal or degradation of the crew-served GAU-2B or GAU-18. One mount kit and two pods are required for all 18 ANG HH-60G aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
APKWS Non-Recurring Engineering (3600)	N/A	\$1,000,000
18 External Stores Mount Kits (3010)	\$100,000	\$1,800,000
36 LAU-68 F/A ELL Pods (3010)	\$15,000	\$540,000
Total		\$3,340,000

KC-135

- **Air Refueling**
- **Aeromedical Evacuation**
- **Airlift**
- **ANG KC-135 Units Provide 44% of the Total Fleet**

The KC-135 Stratotanker is Air Mobility Command's primary air refueling platform providing approximately 87 percent of air refueling in support of US, allied, and coalition military aircraft. The KC-135 supports deployment, employment, sustainment, and redeployment of joint forces across the full range of military operations including nuclear warfare, routine military activities and irregular warfare. The KC-135 is tasked to operate close to high-threat areas. Defensive systems are necessary to prevent shoulder-fired surface-to-air missile systems from destroying aircraft during takeoff, landing, and in low altitude flight over



mountainous terrain. Tactical data link technologies and situational awareness displays that bring real-time threat information, as well as secure radio capability, greatly enhance KC-135 air refueling, airlift, and aeromedical evacuation missions.

KC-135

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Critical Capabilities List

- Radio Frequency / Infrared Self-Protection
- Common Mobility Air Force Mission Computer
- Quick Reaction Handbook
- Aircraft / Aircrew Ground Cooling Capability
- Multi-Mission Crew Trainer (See Tab P)

Essential Capabilities List

- Jam-Resistant Global Positioning System
- Celestial Navigation
- External Overt / Covert Lighting
- Global Secure Communications Suite
- Fuel Tank Fire Explosion Protection

Desired Capabilities List

- Soft Basket Quick Connect Boom Drogue Adapter
- Helmet-Mounted Display
- Autothrottle

KC-135: RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. ANG KC-135s require radio frequency (RF) and infrared (IR) self-protection systems. Current and future areas of responsibility include a wide variety of RF and IR threats. Missions such as low-altitude refueling and forward positioning subject the KC-135 to increasingly hostile environments. To survive, KC-135s require a digital radar warning receiver (RWR) capable of processing signals in a dense RF environment and automatically direct countermeasures to defeat those threats. As a refueling platform, the KC-135 also requires an Infrared (IR) countermeasure system that does not rely on pyrotechnic expendables to counter widely-proliferated shoulder-fired IR Man-Portable Air Defense Systems (MANPADS) and other IR-guided weapons. The IR and RF countermeasures will be podded solutions capable of being moved between aircraft. Therefore, all ANG KC-135s require digital RWR A-kit modifications and 42 modular, rotatable, digital RWR B-kits. All ANG KC-135s also require Large Aircraft Infrared Counter Measure (LAIRCM) A kits and 42 LAIRCM Group B kits to equip the 17 ANG KC-135 units, including eight spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
170 Group A LAIRCM Kits (3010)	\$500,000	\$85,000,000
42 Group B LAIRCM Kits (3010)	\$3,000,000	\$126,000,000
170 Group A Digital RWR Kits (3010)	\$800,000	\$136,000,000
42 Group B Digital RWR Kits (3010)	\$1,000,000	\$42,000,000
Total		\$389,000,000

KC-135: COMMON MOBILITY AIR FORCE MISSION COMPUTER

1. Background. ANG KC-135s require a robust, secure Tactical Data Link (TDL). Recent combat operations highlighted the need for comprehensive, networked Command and Control (C2) throughout all theaters of operation. TDL provides a C2 link and maximizes KC-135 aircrew situational awareness with beyond line-of-sight and line-of-sight capabilities. TDL also provides critical real-time information to KC-135 aircrews such as friendly aircraft position, weather conditions, and hostile threat locations. This increases the KC-135's ability to effectively participate in the present-day network-centric battlespace. TDL provides near-real-time monitoring of mission events, mission status, task completion, and resource status. It also enhances the situational awareness of all participant aircraft, including tanker aircraft, receiver aircraft, and coalition network participants. All 170 ANG KC-135s require TDL radios and processors.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$14,000,000
170 Group A Kits (3010)	\$120,000	\$20,400,000
187 TDL Radios and Processors* (3010)	\$700,000	\$130,900,000
Total		\$165,300,000

*Includes 10% spares

KC-135: QUICK REACTION HANDBOOK

1. Background. ANG KC-135s require a well-designed Quick Reaction Handbook (QRH) that guides the aircrew through the diagnostic process ensuring the correct selection of the emergency procedure which reduces error and cockpit workload during execution, and mitigates the dependency on aircrew experience. Aircrew emergency procedures require substantial diagnostic evaluation by the aircrew resulting in slower response times and significant error in selecting the correct procedure. All 340 ANG KC-135 aircrews require a validated paper and electronic QRH.

2. Program Details.

Quantity	Unit Cost	Program Cost
QRH Non-Recurring Engineering (3600)	N/A	\$600,000
340 QRH Checklists (3010)	\$200	\$68,000
Total		\$668,000

KC-135: AIRCRAFT / AIRCREW GROUND COOLING CAPABILITY

1. Background. ANG KC-135s require cockpit and cabin cooling during ground and low-level operations. Temperatures at deployed locations routinely result in cockpit temperatures of 140° F and cargo compartment temperatures of 170° F. Aircrews generally spend greater than one hour in these conditions, which is not conducive to mission accomplishment. Ground cooling carts are the primary method for temperature reduction. Ground cooling carts are removed prior to engine start and are not usable if mission delays occur. Roll-on/roll-off vapor cycle air conditioning units placed onboard can provide ground cooling. This system provides crews and aircraft a more robust operating capability, reduces crew fatigue, and minimizes unsafe temperature conditions. To further enhance ground cooling capability, personnel water cooling systems are needed for KC-135 aircrews. These systems regulate aircrew body temperature by distributing cooled fluid through a combat thermal shirt. This system provides improved mission performance, decreases fatigue, and increases situational awareness. 102 aircraft ground cooling kits are required to provide a cooling capability for 60 percent of the ANG KC-135 fleet. Additionally, 1020 personnel water cooling systems are required to equip all aircrew members.

2. Program Details.

Quantity	Unit Cost	Program Cost
102 Ground Cooling Units (3080)	\$40,000	\$4,080,000
1020 Personnel Water Cooling Systems (3080)	\$3,000	\$3,060,000
Total		\$7,140,000

Logistics

Logistics activity supports every Air National Guard mission area, and it ranges from aircraft maintenance and inventory management, to traffic management and petroleum, oils, and lubricants management. Logisticians in the 54 states, territories, and the District of Columbia prepare for and execute worldwide contingency deployments and domestic emergency response. The logistics team is key to getting people and supplies where and when they need to be.



The ANG operates and maintains the oldest aircraft in the Air Force inventory. Aircraft support and test equipment is critical to daily maintenance operations at all ANG flying units. Much of the equipment used in testing aircraft systems is nearing the end of its designed useful life, and is increasingly difficult to sustain and expensive to repair. The ANG functions at a prolonged high operations tempo, driving the need for efficient maintenance processes and robust supply chains.



Logisticians strive to reduce product lifecycle costs and the costs of logistics processes. Devices enhancing maintenance efficiency and safety, while improving capabilities, also improve aircraft availability, reduce operating costs, and enhance agile combat support. Equipment such as the maintenance inspection platforms and digital test equipment reduce aircraft downtime, allow logistics personnel to maintain a high rate of sortie generation, and ensure the longevity, relevance, reliability, and responsiveness of the aging fleet.

Logistics

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Critical Capabilities List

Support Equipment (SE)

- Higher Capacity Latrine (KC-135)
- Engine Removal Device (C-130)
- Isochronal Inspection Stands (C-17, KC-135, C-40, and E-8C)
- High-Reach Maintenance Stands (Multi-Mission Design Series [MDS])

Test Equipment (SE)

- LITENING Targeting Pod External Power Test Set (Multi-MDS)
- Improved Bus Diagnostics (Multi-MDS)
- Pacer Comet-4 Digital Engine Test Cell (Multi-MDS)
- Advanced Identification Friend or Foe Antenna Test Couplers (Multi-MDS)
- Armament Tester (Multi-MDS)
- Diesel Tester (Multi-MDS)

Essential Capabilities List

- Improved Avionics Intermediate Shop Tester Modernization for Line Replaceable Units (A-10)

- Wheel and Tire Auto Torque (Multi-MDS)
- Central Maintenance Computer (C-17)
- Laser Corrosion Removal (Multi-MDS)
- Portable Lightweight Stands (Multi-MDS)
- Towbar-Less Towing Equipment (Multi-MDS)
- Electric Scissor Lift (C-130)
- Deployable Polyalphaolefin Solution (F-22)
- Wireless Rekey (F-22)
- Vibration Reduction Software (HH-60)
- Improved Blade Folding Equipment (HH-60)
- Wash Rack (C-40)
- Virtual Maintenance Trainer (C-40)
- Remote Engine Trim (KC-135 / E-8C)

Desired Capabilities List

- Improved Fall Restraint (Multi-MDS)
- Quick Reaction Expeditionary Launch and Recovery Element (MQ-9)
- Vertical Tank Storage (Combat Air Forces)

SE: KC-135 HIGHER CAPACITY LATRINE

1. Background. ANG KC-135s require a toilet that meets mission requirements based on capacity, structural integrity and/or intrinsically safe operation. The capacity level for the original legacy suitcase style toilets is inadequate, and presents an overflow hazard when passengers are on long-duration flights. These toilets are susceptible to corrosion-causing leakage. The upgraded toilet must fit within the current allotted area; have a large waste capacity, and provide sanitary/low biohazard risks to accommodate aero medical missions at a manageable cost. Higher capacity toilets are required for all 170 KC-135 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Higher Capacity Toilet Non Recurring Engineering (3600)	N/A	\$15,000
170 Higher Capacity Toilet Assemblies (3080)	\$15,000	\$2,550,000
Total		\$2,565,000

SE: C-130 ENGINE REMOVAL DEVICE

1. Background. ANG C-130 maintenance personnel require modernized equipment for engine removal and installation. The current process requires propeller removal prior to engine removal, and increases man-hours and movement of heavy equipment in close proximity to aircraft. Additionally, internal propeller components cannot be exposed to precipitation, requiring aircraft be hangered to perform maintenance. This device would be technical order-compliant and compatible with both C-130J and C-130H aircraft, to include future propulsion modernization. Aging engine components and increased flight hours are causing higher frequency of engine removals and installations. Recommend one engine removal device for 14 ANG C-130 units; 3 ANG C-130 units have a similar capability that was recently acquired.

2. Program Details.

Quantity	Unit Cost	Program Cost
14 C-130 Engine Removal Devices (3080)	\$200,000	\$2,800,000
Total		\$2,800,000

SE: ISOCHRONAL INSPECTION STANDS FOR C-17, KC-135, C-40C and E-8C

1. Background. The ANG requires C-17, KC-135, C-40C, and E-8C isochronal (ISO) inspection stands. Aircraft maintenance is currently accomplished by using a mix of ladders and B-series stands. These maintenance workaround activities do not meet Air Force Occupational Safety and Health Administration (AFOSH) or Occupational Safety and Health Administration (OSHA) standards. Current KC-135 ISO inspection stands require frequent maintenance actions and numerous man- hours to maintain their serviceability, many are over 40 years old and no longer meet AFOSH or OSHA standards. Additionally, standardized KC-135 ISO stands do not exist in the USAF inventory. Stand sets for the C-17, KC-135, C-40C and E-8C are critical to accomplishing periodic inspection requirements, since current maintenance practices are time consuming for the completion of inspection requirements. Full wing platforms and engine stands are critical to accomplishing efficient inspections. Inspection platforms and stands provide the capability to perform maintenance actions in conjunction with the inspection process. The stands incorporate enhanced fall protection measures, and allow maintainers to complete aircraft specific tasks more efficiently; stands incorporate electric power, lighting, and pneumatics to the point of use, enabling maintainers to more effectively complete inspections and maintenance in a reduced time frame, leading to increased aircraft availability and enhanced mission effectiveness. By standardizing stands for maintenance activities, a smaller, more efficient supply chain with common parts and stock numbers can be established.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 C-17 Platforms and Stands (3080)	\$1,200,000	\$7,200,000
9 KC-135 Platforms and Stands (3080)	\$975,000	\$8,775,000
C-40C Platform and Stand (3080)	\$1,100,000	\$1,100,000
E-8C Platform and Stand (3080)	\$1,400,000	\$1,400,000
Total		\$18,475,000

SE: HIGH-REACH MAINTENANCE STANDS FOR MULTI-MDS

1. Background. The ANG Mobility Air Force (MAF) fleet requires maintenance stands with higher reach capability for activities such as life raft changes, emergency locator transmitter maintenance, and aircraft structural integrity program inspections. Maintenance boom lift equipment exceeds 20 years of age, and no longer meets Air Force Occupational Safety and Health Administration (AFOSH), Occupational Safety and Health Administration (OSHA), or American National Standards Institute (ANSI) standards. Maintenance activities use boom lifts with no fall protection capability while performing maintenance activities outside hangars and/or flight line maintenance operations that exceed 38 feet in height. Boom lift must have certified built-in fall protection, meet AFOSH, OSHA, and ANSI Standards, as well as all requirements spelled out in AFI 91-203. Recommend one lift at each of the 47 ANG wings with MAF aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
47 High Reach Maintainer Lift (3080)	\$200,000	\$9,400,000
Total		\$9,400,000

TE: LITENING TARGETING POD EXTERNAL POWER TEST SET FOR MULTI-MDS

1. Background. ANG units flying variants of the LITENING Targeting Pod (TGP) require the capability to troubleshoot, load software, perform initiated built in test, and operationally evaluate LITENING TGPs using an external power source. An external power test set would eliminate the need to repeatedly mount the LITENING TGP to the aircraft saving 3-4 man hours per mounting cycle. LITENING TGP troubleshooting, repair, and testing can be delayed due to aircraft availability. Request two external power test sets per 19 Mobility Air Force (MAF) LITENING TGP equipped units in the ANG. One set will be for use at deployed locations and the second will be a spare for home station use.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	\$100,000	\$100,000
38 External Power Test Set (3080)	\$25,000	\$950,000
Total		\$1,050,000

TE: IMPROVED BUS DIAGNOSTICS FOR MULTI-MDS

1. Background. ANG requires the Bus Characterization and Integrity Toolset (BCIT) tester to provide the capability to rapidly and accurately troubleshoot aircraft 1553 bus issues while the aircraft systems are powered. It is a portable, ruggedized analyzer designed to test, analyze cables, and monitor operations of a MIL-STD-1553 data bus network. The software toolset maps any MIL-STD-1553 data bus network and can act as a bus controller. The BCIT can also be used as a Time Domain Reflectometry (TDR) to find the distance to wiring faults (opens or shorts). The BCIT’s software is customizable within the Windows operating system, permitting future integration of additional MIL-STD 1553 Buses. The tester’s embedded software enables users to save and recall bus topology, test data, and historical references that can be used later for preventative maintenance and prognostics of an airframe’s 1553 bus. The TDR function provides guidance to maintenance personnel to within six inches of a wiring fault. The System Program Office (SPO) for the Joint Surveillance Target Attack Radar System (JSTARS) approved this device on the E-8C, and the ANG plans to adapt the capability to other airframes such as the KC-135, C-130, C-17, and HH-60 aircraft. ANG requires two BCITs per KC-135, C-130, C-17, and HH-60 aircraft maintenance group in the ANG.

2. Program Details

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3080)	N/A	\$600,000
42 BCIT Bus Testers (3080)	\$70,000	\$2,940,000
Total		\$3,540,000

TE: PACER COMET-4 DIGITAL ENGINE TEST CELL FOR MULTI-MDS

1. Background. The ANG requires digital engine test cell systems. Current systems are in need of replacement due to lack of parts supportability and obsolescence. The current engine test system utilized across the ANG to test the flightworthiness of uninstalled engines is the Engine Data Acquisition System. The Pacer Comet 4 Field (PC4F) is an ANG-owned system in use on the F-15 and F-16. This capability is necessary to ensure the continued precision and accuracy of engine testing. The ANG requires the PC4F solution at six locations.

2. Program Details:

Quantity	Unit Cost	Program Cost
6 Engine Test Systems (PC4F) (3080)	\$1,600,000	\$9,600,000
Total		\$9,600,000

TE: ADVANCED IDENTIFICATION FRIEND OR FOE ANTENNA TEST COUPLERS FOR MULTI-MDS

1. Background: ANG requires antenna couplers compatible with F-15 and F-16 Advanced Identification of Friend or Foe (AIFF). This will eliminate pre-authorization requirements for testing over the air. It will also test the full antenna path of the Mode 5 system as well as reducing the number of steps required to test all IFF modes by 50%. The current operational check for the AIFF system for each aircraft is approximately 350 steps and requires the user to bypass the antenna path for Mode 5 by directly plugging into the Line Replaceable Unit (LRU) to avoid unwanted interrogations over-the-air. The Federal Aviation Administration (FAA) has restricted IFF over-the-air testing. The ANG requires 2 coupler sets per F-15 and F-16 wing, for a total of 84 antenna test couplers.

2. Program Details.

Quantity	Unit Cost	Program Cost
84 AIFF Test Couplers (3080)	\$45,000	\$3,780,000
Total		\$3,780,000

TE: ARMAMENT TESTER FOR MULTI-MDS

1. Background. The ANG requires a common armament tester to replace existing equivalents that are obsolete and costly to repair. A modernized model will retain basic test capabilities, provide complete interaction with the aircraft weapons bus, and perform operational checks of multiple breeches simultaneously. A modernized tester will provide capabilities to emulate smart weapons on stations and test advancements in modern missiles. This equipment will be used to troubleshoot and maintain stores, tanks, racks, adapters, and pylons. This hand-held tester will provide capability to verify the condition of critical aircraft circuitry in a non-energized state. The tester shall have the capability to perform tests and display the test results through a digital display. The improved armament tester shall contain all MDS-specific accessories necessary to perform all the functions listed as system requirements on the aircraft. A total of 575 armament testers are required to support all ANG fighter aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
575 Armament Circuit Preload Test Set (3080)	\$30,000	\$17,250,000
Total		\$17,250,000

TE: DIESEL TESTER FOR MULTI-MDS

1. Background: ANG Aerospace Ground Equipment (AGE) shops require the ability to access engine control units to perform diesel engine analysis and troubleshooting on fielded equipment. This lack of capability prevents field maintainers from using modern technology now available to improve critical AGE availability. Fielding this new capability will allow maintainers to quickly identify engine malfunctions through the analysis of fault codes and also to utilize advanced diagnostic programs to quickly and accurately pinpoint malfunctions. 85 ANG AGE shops require a single diesel engine scanner with software and accessories capable of analyzing diesel engines from multiple manufacturers.

2. Program Details:

Quantity	Unit Cost	Program Cost
85 Diesel Tester (3080)	\$15,000	\$1,275,000
Total		\$1,275,000

Intelligence, Surveillance, and Reconnaissance

Intelligence – Intelligence, Surveillance, and Reconnaissance (ISR) production centers are the analytical engines behind timely environment characterization and in-the-moment awareness to enable decisions and action. ANG production enterprises include the following:



Distributed Common Ground System (DCGS) - With seven locations, DCGS sites process, exploit, and disseminate near real time intelligence derived from U-2, RQ-4, and MQ- sensor for combatant commands, component numbered air forces and national command authorities.

Targeting – Cells at six locations provide federated intermediate and advanced target development, battle damage assessments, collateral

damage estimates for steady-state planning and contingency operations.



Cyber ISR – Enables operations across air, space and cyber domains. Seven sites across the country create all-source products derived from digital network intelligence.

ISR Integration - Unit level intelligence supports 23 Mission Design Series weapons across 143 ANG units and imbeds with other mission sets to tailor intelligence for Air Tasking Order execution and integration.

RC-26B Condor – The RC-26B provides manned ISR and Incident Awareness and Assessment (IAA) capability with 11 aircraft, operating out of 10 different states for maximum continental United States coverage.



MC-12W – The MC-12W is assigned to the 137th Special Operations Wing and tasked to support U.S. Special Operations Command directed missions. The MC-12W aircrews are specifically trained to support special operations ground forces through the Find, Fix, Finish,

Exploit, and Analyze model. Aircrews train, brief, support, advise, and assist Special Operations Forces (SOF) elements from the ground assaulter to SOF Commanders while executing across the full spectrum of SOF mission sets, ISR, and Fires.

Intelligence, Surveillance, and Reconnaissance 2017 Weapons and Tactics Conference

Critical Capabilities List

Intelligence

- Atmospheric Sensing and Prediction System for Accurate In-Flight Weather Sensing and Threat Awareness
- Open Mission Execution Network Enabling Shared Situational Awareness Through a Common Operational Picture with Enhanced Analytical Tools
- Network Modernization to Maintain Compatibility with MQ-9 Feed Distribution Requirements Resulting in Greater Data Transfer Speed and Redundancy at Dramatically Reduced Cost
- Distributed Common Ground Station Open Architecture to Provide Modular Hardware and Software Components that are Adaptable to the Evolving Threat Picture
- High Performance Workstations to Run the Graphics Intensive Exploitation and Multi-Intelligence Fusion Tools Used by Distributed Common Ground Station Analysts
- Targeting Product Dissemination Tools to Enable Timely Distribution to Warfighter
- Classified Voice Communications for Intelligence Facilities
- Dedicated Processors for Complex Targets
- Industry Standard Geographic Information Systems Tool Suite for Target Production
- Managed Attribution Systems for ANG Intelligence Production

MC-12W

- Propulsion Modernization
- Second Electro-Optical / Infrared Sensor
- Slim-Fast Modification
- Integrated Angle-of-Attack Indicator
- Improved and Short-Field Takeoff and Landing Data

RC-26B

- Avionics Modernization
- Common Configuration
- Full-Spectrum Video / Data Distribution
- Synthetic Aperture Radar / Moving Target Indicator High-Resolution Radar
- Weather / Mission Radar

Essential Capabilities List

Intelligence

- Android Tactical Assault Kit Secure Scalable Information Management Back End That Coordinates Collaboration and Enterprise Integration for Tactical Air Control Party and Intelligence Surveillance and Reconnaissance Liaison Officers
- High Performance Workstations for Multi-Intelligence Fusion Tools
- Redundant Power Supply for Targeting Units
- Cyber and Other Non-Kinetic Target Modeling Solutions
- Automatic Image Recognition for Rapid Analysis of Electro-Optical, Infrared, and Synthetic Aperture Radar Imagery and Full Motion Video
- National Security Agency Network Connectivity and Thin-Client Workstations for Continuity of Operations

MC-12W

- Beyond Line-of-Sight Ka Band and Satellite System Connection Capability for Increased Data Transfer
- Variable Payload Common Launch Canister for Precision Strike Capability
- Paint Aircraft In Air Force Special Operations Command Defined Civilian Paint Scheme to Reduce Operations Signature
- Airborne Mission Networking Modernization
- Aircraft Communications Modernization for Increased Capability and Reduced Weight

RC-26B

- Next-Generation Electro-Optical / Infrared Sensor
- Aircraft Performance Upgrade
- Optimized Communication / Antenna Suite
- Modernized Signals Intelligence A-Kit
- Full Crew Distributed Mission Operations Simulator

Desired Capabilities List

Intelligence

- Open-Source Mind-Mapping Tools to Visualize Target Profiles and Nodal Relationships
- Virtual Reality Enabled and Glasses / Headset-Free Three-Dimensional Visualization Solution For Direct & Registration Methods Of Precise Point Mensuration And Target Modelling

- Deployable, Self-Contained, Theater Agnostic Secure Internet Protocol Router Network Approved, Intelligence Mission Planning Suite For Agile Combat Employment Operations Outside Of Assigned Major Command
- Automated System For Processing And Distributing Weapons System Video

MC-12W

- Add Mission Computer for the Left Seat Pilot for Increased Mission / Crew Resource Management Effectiveness
- Add Flare Dispense Switch at the Combat System Operator Crew Position
- Anti-Jam Capability for Contested, Degraded, and Operationally Limited Environment (CDO)
- Automatic Dependent Surveillance Broadcast Transponder Integrated Into Avionics
- Tactical Systems Operator Crew Position Full-Spectrum Modular Connect Upgrade

RC-26B

- Ability to Operate in Contested, Degraded, and Operationally Limited Environment
- Helmet-Mounted Visual Cueing Integration with Mission Management System
- Three-Dimensional Audio System
- Auxiliary Fuel Tanks

INTELLIGENCE: ATMOSPHERIC SENSING AND PREDICTION SYSTEM FOR ACCURATE IN-FLIGHT WEATHER SENSING AND THREAT AWARENESS

1. Background. Intelligence personnel require accurate real-time indications and near real-time situational awareness of evolving weather conditions for the operational environment. Remotely piloted aircraft have a historical record of being forced off target and forced to employ sensors in less than optimal ways due to weather. Sensors on Remotely Piloted Aircraft (RPA) are not optimized to detect subtle changes in temperature, relative humidity, and air pressure and unable to provide effective full motion video for intelligence sensory planning and employment. The intelligence community requires a light weight, self-contained, flexible, cost-effective solution that provides high-fidelity atmospheric models to provide near real time weather data to build a highly accurate picture of the weather conditions immediately surrounding an RPA. ANG ISR requires 36 Atmospheric Sensing and Prediction Systems (ASAPS) for MQ-9 remotely piloted aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
36 ASAPS (3010)	\$42,500	\$1,530,000
Total		\$1,530,000

INTELLIGENCE: OPEN MISSION EXECUTION NETWORK ENABLING SHARED SITUATIONAL AWARENESS THROUGH A COMMON OPERATING PICTURE WITH ENHANCED ANALYTICAL TOOLS

1. Background. ANG Intelligence personnel supporting MQ-9 missions require a server-based system that enables users across multiple platforms, including those using third party applications, to share situational awareness through a common operational picture. The result is a shared mental model of the immediate and near-term battlespace that includes not only aircraft telemetry and sensor point of interest data, but also data feeds from multiple sources from across the intelligence community. A shared mental model is key to reducing the cumbersome communications required for effectively prosecuting both static and dynamic targets as a single ship or in a multi-ship formation. ANG Intelligence personnel require four workstations across all twelve Distributive Common Ground Station (DCGS) sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
48 Licenses (3080)	\$157,600	\$7,291,200
Total		\$7,291,200

INTELLIGENCE: NETWORK MODERNIZATION TO MAINTAIN COMPATIBILITY WITH MQ-9 FEED DISTRIBUTION REQUIREMENTS RESULTING IN GREATER DATA TRANSFER SPEED AND REDUNDANCY AT DRAMATICALLY REDUCED COST

1. Background. ANG Distributed Common Ground System (DCGS) units require routine network system upgrades to enable uninterrupted, 24/7 processing, exploitation and dissemination of theater level geospatial intelligence and signals intelligence collection. Three DCGS sites operate on communications equipment that is well beyond the intended shelf life of the hardware. Outdated network equipment increases the potential for total system failure and jeopardizes continued support to combat operations. ANG DCGS units require cross domain servers and border routers for their local area networks as well as campus area networks.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Cross domain servers w/ installation hardware & software (3080)	\$375,000	\$1,125,000
3 Border routers w/ installation hardware & software (3080)	\$160,000	\$480,000
Total		\$1,605,000

INTELLIGENCE: DISTRIBUTED COMMON GROUND STATION OPEN ARCHITECTURE TO PROVIDE MODULAR HARDWARE AND SOFTWARE COMPONENTS THAT ARE ADAPTABLE TO THE EVOLVING THREAT PICTURE

1. Background. The ANG Distributed Common Ground System (DCGS) units require updated hardware workstations and server equipment. The current workstation is outdated, cumbersome to maintain, and unable to field new operational requirements in a timely manner. The DCGS is a coalition sharing environment for intelligence, surveillance, and reconnaissance data, consisting of a series of ground sites to enable the distribution of multi-intelligence mission data. The ANG intelligence community is forced to rely on aging, beyond end-of-life, no longer vendor supported equipment that puts mission capability at risk. ANG DCGS sites will not receive upgrades until late FY21 and introduces a multi-year parity gap. Three DCGS sites require two stacks each and the other four DCGS sites require one stack each. The number of workstations required are based on the requirements and operational floor layouts of each site.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Operating Software Stacks (3080)	\$6,200,000	\$62,000,000
420 Common Workstation (3080)	\$40,000	\$16,800,000
Total		\$78,800,000

Global Integrated Intelligence, Surveillance and Reconnaissance (ISR)

INTELLIGENCE: HIGH PERFORMANCE WORKSTATIONS TO RUN THE GRAPHICS INTENSIVE EXPLOITATION AND MULTI-INTELLIGENCE FUSION TOOLS USED BY DISTRIBUTED COMMON GROUND SYSTEM ANALYSTS

1. Background. The ANG Intelligence Surveillance and Reconnaissance (ISR) enterprise requires more processing power to effectively fuse multiple-intelligence data. The current workstations available to the ANG ISR enterprise do not have the capacity to run available Government Off-The-Shelf applications without significantly slowing down and/or freezing the system. Thick client workstations and Graphic Processing Units (GPUs) will allow units to fully utilize applications and capacity for future growth for Remotely Piloted Aircraft (RPA). 140 unit level intelligence units require two workstations/GPUs and the 65 ISR units require four workstations/GPUs each along with spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
566 Thick Client Workstations (3080) *	\$1,200	\$679,200
566 GPUs (3080) *	\$1,300	\$735,800
Total		\$1,415,000

* Includes 4% spares

**INTELLIGENCE: TARGETING PRODUCT DISSEMINATION TOOLS TO ENABLE
TIMELY DISTRIBUTION TO WARFIGHTER**

1. Background. Targeting units require an autonomous capability to transfer targeting materials between separate classified networks. A cross-domain system is required to transfer materials from higher classification networks to lower level networks. This capability is necessary for daily intermediate and advanced target development produced by the ANG targeting enterprise. The addition of this capability will reduce the time to process information required to prosecute targets from seven days to less than an hour. All six ANG targeting units require servers, hardware, and software kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 cross domain servers (3080)	\$100,000	\$600,000
6 installation hardware and software kits (3080)	\$80,000	\$480,000
Total		\$1,080,000

INTELLIGENCE: CLASSIFIED VOICE COMMUNICATIONS FOR INTELLIGENCE FACILITIES

1. Background. ANG unit-level intelligence organizations require compatible means of secure communication to provide effective mission planning and coordination. Units are supplied with secure terminal equipment phones and can only place calls over the Defense Switched Network with like-equipment, limiting the ability of these units to conduct voice-based classified coordination without similarly equipped locations. Voice over secure Internet Protocol (VoSIP) is the most common means of classified voice communication used in current operations. The VoSIP service provides a cost-effective, reliable, and secure means of classified voice communications, secret only, for Command and Control (C2) and non-C2 customers with the capability to communicate directly using point-to-point or conference calling. All 116 intelligence units require four phones per unit.

2. Program Details.

Quantity	Unit Cost	Program Cost
480 VOSIP Phones (3080)*	\$500	\$240,000
Total		\$240,000

*includes 3% spares

INTELLIGENCE: DEDICATED PROCESSORS FOR COMPLEX TARGETS

1. Background. Targeting units require a processing server capable of handling high computation loads to provide enhanced weaponeering solutions for combatant commands. Integrated Munitions Effects Assessment (IMEA) scenarios are computationally intensive, often causing computer crashes, overheating, and lengthy processing times on standard targeting application workstations. The built-in distributed computing features of IMEA are insufficient to reliably produce results. ANG targeting units use IMEA for producing weaponeering solutions by modeling the effects of specified munitions, fusing, and impact options against a target to deliver a probability of desired effects. Each of the ANG’s six targeting units require an updated processing server.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Processing Servers (3080)	\$93,000	\$558,000
Total		\$558,000

**INTELLIGENCE: INDUSTRY STANDARD GEOGRAPHIC INFORMATION SYSTEMS
TOOL SUITE FOR TARGET PRODUCTION**

1. Background. ANG targeting units require Geographic Information System (GIS)-related software capable of information layer creation and management, exploitation of imagery and elevation data files, and supporting automated imagery recognition. Targeting systems provide read-only access to Geospatially Enabled Target Materials (GETM) and analysts have limited ability to manipulate the materials for analytical purposes. Targeting analysts require access to the same tools used throughout the National System for Geospatial (NSG) Intelligence. The ability of analysts to collaborate with other NSG entities is limited by having access to the same toolsets. GIS software allow for Web Mapping Services (WMS) for full integration with inter-agency GETM producing agencies. GIS software will need to be utilized on ANG Secure Internet Protocol Routing (SIPR) and Joint Worldwide Intelligence Communications System (JWICS) networks and approved Spiral Targeting Application Workstations (STAW). Each of the eight operational ANG unit requires 15 available licenses on each network to support operational requirements. Licenses will be stored and accessible at each site via data server storage.

2. Program Details.

Quantity	Unit Cost	Program Cost
120 SIPR GIS Software for GETM (3080)	\$8,000	\$960,000
120 JWICS GIS Software for GETM (3080)	\$8,000	\$960,000
Total		\$1,920,000

INTELLIGENCE: MANAGED ATTRIBUTION SYSTEMS FOR ANG INTELLIGENCE PRODUCTION

1. Background. ANG cyber Intelligence, Surveillance, and Reconnaissance (ISR) units and targeting intelligence units require managed attribution thin-clients/computers and software applications to perform open-source research to accomplish mission taskings and objectives. The specific purpose and results of this request is classified and validated by NGB/A2/3/6/10. This proposal would fulfill requirements for seven squadrons. One intelligence flight requires two workstations and one spare, seven intelligence squadrons require four clients/computers and 2 spares per squadron, and five ISR groups require eight clients/computers and 4 spares per group.

2. Program Details.

Quantity	Unit Cost	Program Cost
105 Rack-Mounted Client Workstations (3080)*	\$35,000	\$3,675,000
Total		\$3,675,000

*Spares included.

MC-12W: PROPULSION MODERNIZATION

1. Background. The Air National Guard / U.S. Special Operations Command MC-12W mission requires a propulsion modernization in the form of a 5 bladed propeller and more powerful engine to increase basic aircraft performance, increase on-station time, lower acoustical signature to enemy forces, and increase aircrew survivability. The 5 bladed propeller is expected to increase aircraft performance approximately 5% to 8%. Each blade on the propeller can be changed individually in the field if they are damaged. Additionally, test data has verified that the 5 bladed composite design is quieter than the currently fielded Hartzell propeller system. The -60 engine was designed mainly for the lighter King Air’s 200/300/350 which are all significantly lighter than the MC-12W which is a King Air 350 Extended Range. The new engine and propeller requires FAA Standard Type Certificate (STC) which will approve a 1000 pound increase in gross takeoff weight. This STC will enable the full capacity of fuel to be loaded which will result in a 100% increase in on-station time. Nine sets of five bladed propellers and nine sets of new engines are required for the MC-12W.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-recurring engineering (3600)	N/A	\$2,000,000
9 sets five bladed propellers (3010)	\$200,000	\$1,800,000
9 sets new engines (3010)	\$1,800,000	\$16,200,000
Total		\$20,000,000

MC-12W: SECOND ELECTRO-OPTICAL / INFRARED SENSOR

1. Background. The MC-12W requires an additional Electro-Optical / Infrared (EO/IR) sensor to meet the highly-demanding Intelligence, Surveillance, and Reconnaissance (ISR) tasks required by combatant and task force commanders. The ANG MC-12W mission heavily relies on the ability of the crews to see the smallest details on the ground from miles away. Currently, the MC-12W is outfitted with a single MX-15DiD sensor on each aircraft. While this allows the MC-12W to complete a wide range of ISR tasks, it is extremely limited when it comes to fidelity and flexibility. This added system will double the amount of area to be seen by MC-12W crews and provide a substantial amount of situational awareness to the commanders on the battlefield. ANG MC-12Ws require a second sensor that is roll-on/roll-off capable.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$2,500,000
9 EO/IR Sensors (3010)	\$1,500,000	\$13,500,000
Total		\$16,000,000

MC-12W: SLIM-FAST MODIFICATION

1. Background. ANG MC-12Ws require redesign of the current network, video, power, and communications architectures to reduce overall aircraft weight. The MC-12W is severely weight-limited which impacts aircraft performance, reduces sortie durations, and does not allow for additional aircraft weight to be added through future modifications. The communications system should be consolidated onto a single mission rack instead of the multiple mission systems racks that are currently installed. This would reduce the need for material for the racks and reduce the displacement of mission equipment by putting them closer together. Nine ANG MC-12Ws require these transferrable modifications.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$2,000,000
9 Weight Reduction Modifications (3010)	\$2,000,000	\$18,000,000
Total		\$20,000,000

MC-12W: INTEGRATED ANGLE-OF-ATTACK INDICATOR

1. Background. ANG MC-12Ws require an integrated angle-of-attack indicator for short-field operations. Aircrew often operate the MC-12W from remote locations at high aircraft weights, high density altitudes, and short-field operations. To best maximize aircraft performance in the most dangerous of flight regimes, the aircrew require the information provided by an integrated angle-of-attack indicator. Nine ANG MC-12Ws require integrated angle-of-attack indicators.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$1,000,000
9 Indicators (3010)	\$100,000	\$900,000
Total		\$1,900,000

MC-12W: IMPROVED AND SHORT-FIELD TAKEOFF AND LANDING DATA

1. Background. ANG MC-12Ws require the ability to effectively calculate the proper takeoff and landing characteristics for a semi-prepared airfield. The MC-12W supports operations in austere locations where paved runways are limited. In order to be closer to operations and, thus, increase loiter time over the objective, the MC-12W requires takeoff and landing data to be updated for semi-prepared airfields.

2. Program Details.

Quantity	Unit Cost	Program Cost
Updated Data Package (3840)	N/A	\$1,000,000
Total		\$1,000,000

RC-26: AVIONICS MODERNIZATION

1. Background. ANG RC-26s require cockpit modernization in order to deploy worldwide and operate in the National Airspace System (NAS). It is estimated the ANG’s RC-26 aircraft may start grounding in FY18 due to unavailability of parts and diminished manufacturing supply. Global Positioning System (GPS), electronic flight information system displays, Flight Management System (FMS), as well as the navigation and communication radios need to be modernized to comply with Federal Aviation Administration (FAA) 2020 NextGen and the International Civil Aviation Organization (ICAO) Communication, Navigation, and Surveillance / Air Traffic Management (CNSATM) mandates. The navigation radios do not have frequency modulation immunity, leaving the aircraft vulnerable to congestion and potentially unsafe aircraft operations when flying terminal area approaches and departures. Modern avionics, to include a new FMS, modern displays, an updated and certified GPS system, night vision goggle compatibility, and upgraded radios are necessary to enable the aircraft to operate within all foreign and domestic airspace safely, and to comply with FAA/ICAO mandated navigation/communication requirements. All 11 ANG RC-26B aircraft require avionics modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$1,000,000
11 Avionics Shipsets (3010)	\$1,550,000	\$17,050,000
Total		\$18,050,000

RC-26: COMMON CONFIGURATION

1. Background. ANG RC-26Bs require a common fleet hardware and software configuration. The 11 RC-26B aircraft operate in three different configurations: six Block 25R, five Block 20, and two C-26As which lack mission equipment. Split configurations create inefficient aircraft and manpower utilization in addition to the training and planning difficulties brought about by the acute capability differences between aircraft. An optimized Mission Management System (MMS) with a Laser Designator, Electro-Optical / Infrared (EO/IR) High Definition (HD) full-motion video sensor, expanded Integrated Communications System (ICS), Link 16, and a high frequency radio with upgraded antennas will bring the RC-26B to a common configuration capable of all potential mission sets. 11 ANG RC-26B aircraft require common configuration modifications.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$2,000,000
7 Block 25R Shipsets (3010)	\$1,500,000	\$10,500,000
6 LD EO/IR HD Sensors (3010)	\$1,000,000	\$6,000,000
11 Link 16 Terminals (3010)	\$275,000	\$3,025,000
7 MMS (3010)	\$200,000	\$1,400,000
11 Optimized/Upgraded ICSs (3010)	\$200,000	\$2,200,000
7 Self Protection Systems (3010)	\$300,000	\$2,100,000
11 Optimized Antenna Suites (3010)	\$75,000	\$825,000
Total		\$28,050,000

RC-26: FULL-SPECTRUM VIDEO / DATA DISTRIBUTION

1. Background. ANG RC-26Bs require the ability to off-board High Definition (HD), Full Motion Video (FMV), and data Beyond Line-of Sight (BLOS). The utilization of current relay antenna systems coupled with a BLOS data connection would allow the RC-26B to be the conduit to connect the disconnected user to the command element. Modernizing the RC-26B fleet of 11 aircraft with this capability will allow the aircraft to provide data connectivity and FMV to the most remote user in both domestic response and contingency operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$1,000,000
11 BLOS Antenna and Installation Kits (3010)	\$1,000,000	\$11,000,000
Total		\$12,000,000

RC-26: SYNTHETIC APERTURE RADAR / MOVING TARGET INDICATOR HIGH RESOLUTION RADAR

1. Background. ANG RC-26s require a Synthetic Aperture Radar (SAR) for ground moving target indication, dismounted moving target indication, coherent change detection, and maritime search capabilities. A moving target indicator will greatly enhance the RC-26B's ability to find and fix personnel and vehicles. This capability would be especially beneficial during border operations, maritime interdiction, and search and rescue missions. It will also enable operations in low-visibility where a traditional Electro-Optical/Infrared (EO/IR) sensor would be ineffective. The SAR must allow cross-cueing between an EO/IR sensor and generated targets, ideally utilizing the Block 25R mission management system. Each of the 11 ANG RC-26s require this upgrade.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$10,000,000
11 Synthetic Aperture Radars (3010)	\$2,000,000	\$22,000,000
Total		\$32,000,000

RC-26: WEATHER / MISSION RADAR

1. Background. ANG RC-26s require an Active Electronically Scanned Array (AESA) radar system capable of synthetic aperture radar mapping, moving target indicating, and tracking/targeting. The existing nose-mounted RC-26 weather radar has reached obsolescence and provides no mission capability. An AESA radar will provide an air-to-air detection capability for the RC-26. Additionally, this capability can be used to detect and track targets for intercept, providing a critical air-bridge denial capability throughout Northern and Southern Command. Utilizing an AESA radar for air-to-ground operations will enhance the RC-26B's ability to self-cue when finding and fixing targets. This solution will provide the 11 ANG RC-26B aircraft with a unique mission capability no other manned tactical intelligence surveillance and reconnaissance aircraft possesses.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	N/A	\$20,000,000
11 AESA Radars (3010)	\$2,000,000	\$22,000,000
Total		\$42,000,000

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Guardian Angel, Special Tactics, and Tactical Air Control Party

- **Combat Search and Rescue**
- **Special Operations**
- **ANG Guardian Angel Units Provide 30% of the Total Force**
- **ANG Special Tactics Units Provide 25% of the Total Force**
- **ANG Tactical Air Control Party Units Provide 35% of the Total Force**



The ANG has three Guardian Angel squadrons consisting of combat rescue officers and pararescue jumpers. Their mission is to execute personnel recovery of downed and injured aircrew members in permissive and denied environments. Pararescue personnel provide recovery and emergency medical treatment necessary to stabilize and evacuate injured personnel.

The ANG has two special tactics squadrons comprised of special tactics teams which are quick-reaction, deployable special operations units, uniquely organized, trained, and equipped to conduct joint special operations and sensitive recovery missions. Special tactics personnel, including combat controllers, pararescue jumpers, and special operations weathermen, provide quick-reaction command and control, Close Air Support (CAS), and casualty recovery.



The ANG has 16 Tactical Air Control Party (TACP) squadrons in two operations groups.



TACPs provide airspace integration and terminal attack control of CAS firepower onto enemy ground targets. TACPs also provide the planning and employment of assets, in full spectrum combat, in support of the U.S. Army ground combat units. They establish and maintain command, control, and communications of all combat air assets, including the integration of surface-to-surface and air-to-surface fires.

Guardian Angel, Special Tactics, and Tactical Air Control Party 2017 Weapons and Tactics Conference

Critical Capabilities List

Guardian Angel

- Combat Survivability System Modernization
- Aircraft Interoperability Systems
- Medical Modernization
- Full-Spectrum Battlespace Mobility
- Maritime Operations Modernization

Special Tactics

- Unit Type Code Vehicle Requirement
- Reconnaissance Suite Modernization
- Information Share Server Suite
- Tactical Low-Visibility Vehicles
- Modernized Aerial Delivery Suite

Tactical Air Control Party

- Lightweight Personal Protection System
- Full-Spectrum Operations Situational Awareness Kit with Portable Next-Generation Power Management
- Modern Night Vision Goggles and Infrared Target Marking and Acquisition
- Low Probability of Intercept / Low Probability of Detection Handheld Data Link System
- Line-of-Sight / Beyond-Line-of-Sight Radio Modernization

Essential Capabilities List

Guardian Angel

- Digital Integration System to Update Android Tactical Assault Kit Devices

- Search Enhancement to Reduce Risk in High Threat Environments
- Terminal Area Simulator for Training
- Signature Management Capabilities to Reduce Risk to Force
- Single Pass Precision Airdrop to Minimize Risk During Infiltration

Special Tactics

- High-Angle Simulation Tower
- Sensitive Items Storage and Accountability Solution
- Multi-Band Handheld Mobile Ad-Hoc Network Radio System
- Amphibious Recovery Modernization System
- Temporary, Large-Scale Equipment Storage Solution Based on Projected Growth and Current Square Footage Shortfall

Tactical Air Control Party

- Light Tactical Vehicle
- ANG Advanced Joint Terminal Attack Controller Training Simulator
- Mid-Wavelength Infrared Radiation Night Vision Goggles and Target Markers
- Low Profile Vehicle and Dismount Antennas
- Joint Terminal Attack Controller Targeting Pod

Desired Capabilities List

In an effort to save space, desired lists can be obtained upon request from NGB/A5.

GA: COMBAT SURVIVABILITY SYSTEM MODERNIZATION

1. Background. ANG Guardian Angels (GA) require modernization of the combat survivability suite; which includes a target enhancement suite, buoyant body armor, modern communications upgrades, and next generation helmet systems. Thermal-imagery optics for handheld and weapons rail systems will give GA the ability to see at night and in reduced visibility. Hydrophobic plate carriers are needed for missions in the maritime environment; current armor systems are not maritime-compliant. Modern communications devices capable of clear communication between team members in all environments are also needed. The GA combat survivability system modernization should include: 12 handheld and Picatinny rail clip-on thermal devices, wind ballistic calculators, and lightweight multi-purpose target laser range finders which are required for each of the three GA rescue squadrons. Additionally, one hydrophobic plate carrier, one neutral buoyancy plate set, modern communication devices, and a next generation modular helmet are necessary for each of the 165 ANG GAs.

2. Program Details.

Quantity	Unit Cost	Program Cost
36 Target Enhancement Suites (3080)	\$25,000	\$900,000
165 Modern Communication Devices (3080)	\$8,000	\$1,320,000
165 Hydrophobic Plate Carriers (3080)	\$1,500	\$247,500
165 Neutral Buoyancy Plates (3080)	\$2,000	\$330,000
165 Next Generation Modular Helmets (3080)	\$2,000	\$330,000
Total		\$3,127,500

GA: AIRCRAFT INTEROPERABILITY SYSTEMS

1. Background. ANG Guardian Angels (GA) require a modular system capable of storing maps, mission profile displays for enroute team briefing, and the ability to communicate with ground and operations center personnel. Operators are tasked to perform mission and aircrew duties aboard Air Force rescue HC-130s and HH-60Gs, as well as joint and coalition aircraft. Rescue aircraft do not possess GA-specific mission planning and situational awareness stations necessary to conduct combat search and rescue operations. A fielded solution should be capable of integrating with any aircraft and interfacing with GA Android Tactical Assault Kit (ATAK) systems. Three mission planning and situation awareness stations are required for each of the three GA rescue squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Mission Planning / Situational Awareness Stations (3080)	\$150,000	\$1,350,000
Total		\$1,350,000

GA: MEDICAL MODERNIZATION

1. Background. ANG Guardian Angels (GA) require modernization of multiple, deployable medical systems at GA and Special Tactics (ST) squadrons. GA lack modern medical real time telemetry and data management preventing interaction with medical professionals while operating from remote or austere locations. GAs need aviation-approved cardiac resuscitation devices, lightweight electrocardiogram (ECG) monitors, and ventilators with a compatible capnograph to properly monitor and treat patients during transport. Operators require a ruggedized data management kit with a computer, multiple monitor screens, camera, microphone, video laryngoscope, portable power generator, and case to interact with healthcare professionals while treating patients. Modernized equipment will allow advanced medical care teams to receive real-time status of incoming patients. The above systems should be capable of connecting to a standard WiFi network provided by a satellite-based hotspot. ANG GA require: 10 cardiac resuscitation devices per GA and five per ST squadron; two portable power generators per GA and ST squadron; eight ventilators per GA and four per ST squadron; three video laryngoscope devices per GA and ST squadron; two data management kits per GA and ST squadron; six ECGs per GA and three per ST squadron, six satellite based WiFi hot spots per GA and three per ST squadron; and 15 capnographs per GA and five per ST squadron.

2. Program Details

Quantity	Unit Cost	Program Cost
40 Cardiac Resuscitation Devices (3080)	\$30,000	\$1,200,000
10 Portable Power Generators (3080)	\$3,000	\$30,000
32 Ventilators (3080)	\$6,100	\$195,200
15 Video Laryngoscope Devices (3080)	\$5,000	\$75,000
10 Data Management Kits (3080)	\$180,000	\$1,800,000
24 ECG Monitors (3080)	\$15,000	\$360,000
24 Satellite Based Hotspots (3080)	\$900	\$21,600
55 Capnograph Monitors (3080)	\$1,300	\$71,500
Total		\$3,753,300

GA: FULL SPECTRUM BATTLESPACE MOBILITY

1. Background. ANG Guardian Angels (GA) require motorcycles and All-Terrain Vehicles (ATV) with powered parachute kits to enable tasked mission sets. Currently GA has unit type code-tasked quad ATVs and motorcycles to add flexibility in employment. These vehicles require replacement to compliment the recently purchased tactical ground mobility vehicles and add flexibility in tactics, techniques, and procedures, including scouting and mutually supporting movement. Vehicles must be able to employ from fixed-wing aircraft via airdrop and ramp capable vertical lift airframes. These tactical vehicles should offer reduced noise and visual signatures, be able to support team organic weapons, and navigate adverse terrain. They must also be capable of rapidly moving to and from an objective area in order to facilitate personnel recovery actions on the objective. ANG requires seven motorcycles and one powered parachute ATV per GA rescue squadron.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Motorcycles (3080)	\$12,000	\$252,000
3 Powered Parachute ATVs (3080)	\$165,000	\$495,000
Total		\$747,000

GA: MARITIME OPERATIONS MODERNIZATION

1. Background. ANG Guardian Angels (GA) require enhancements to current maritime operations equipment. Lessons learned show that in prosecution of the GA mission, the currently-fielded boats, motors, and related mission equipment are not optimized for the Personnel Recovery (PR) mission and present a significant risk to the mission and friendly forces. Current unit type code-tasked maritime mobility is primarily filled by inflatable boats, with significant limitations. Modernization requirements include rapidly-deployable, air-droppable, defensible, hard-hulled watercraft that are open-ocean and littoral-capable to support PR training and operations. Current mission sets require GA to operate in the open ocean without direct support for several days. Combatant command requirements also require GA to have better organic defensive capability than can be supported with inflatable boats. Individual underwater propulsion will allow divers and rescue swimmers to more efficiently move through swift currents, after departing the boat. Recent operations also reinforced the need for a more effective waterproof headset. Similarly, outfitting individual team members with improved maritime Personal Protective Equipment (PPE) is critical for risk-reduction. ANG requires one hard-hulled boat and six underwater propulsion systems per GA and ST squadron, and one waterproof headset and maritime PPE ensemble per GA operator.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Hard-Hulled Boats (3080)	\$400,000	\$2,000,000
165 Waterproof Headsets (3080)	\$1,000	\$165,000
30 Individual Underwater Propulsion Kits (3080)	\$5,000	\$150,000
165 Maritime PPE Ensemble (3080)	\$6,000	\$990,000
Total		\$3,305,000

ST: UNIT TYPE CODE VEHICLE REQUIREMENT

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) squadrons require trucks capable of towing heavy trailers and hauling large amounts of individual operator tactical equipment. Operators are expected to train at remote ranges where off-road and fording capability is required for safety and ground mobility. The heavy-duty diesel 4x4 crew cab pickup will provide ST and GA units with the capability to fill the unit type code requirement 81E18. The trucks will be modified for off-road, night vision device, special equipment storage, and fording mission requirements. ANG requires three trucks for each of its two ST squadrons and two for each of its three GA squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Heavy Duty Diesel Crew Cab 4x4 Trucks (3080)	\$100,000	\$1,200,000
Total		\$1,200,000

ST: RECONNAISSANCE SUITE MODERNIZATION

1. Background. ANG Special Tactics (ST) squadrons require long range, low visibility, traditional, and asymmetric reconnaissance equipment. Fielded ST equipment is outdated and does not meet Joint Publication 3-05, Air Force Policy Directive 10-35, *Battlefield Airmen* requirements. Full-motion, still, leave-behind, and remotely piloted camera systems are required to meet these mission requirements. All camera systems should be day and night-capable, and have the ability to transmit recorded information through a wide spectrum of data transmission devices. Low Probability of Intercept / Low Probability of Detection (LPI/LPD) data transmission devices must be able to transmit collected data by various military and non-military networks in order to ensure mission accomplishment in a wide range of operational environments. Camouflaging solutions are required for both personnel and vehicles used while conducting reconnaissance missions. Each ANG ST unit requires two full motion cameras, two still cameras, eight leave behind camera systems, two remotely piloted camera systems, two complete camouflage systems, and four LPI/LPD radio systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Full Motion Cameras (3080)	\$30,000	\$120,000
4 Still Cameras (3080)	\$20,000	\$80,000
16 Leave Behind Camera Systems (3080)	\$10,000	\$160,000
16 Data Transmission and Support Systems (3080)	\$10,000	\$160,000
4 Remotely Piloted Camera Systems (3080)	\$500,000	\$2,000,000
4 Complete Camouflage Systems (3080)	\$50,000	\$200,000
8 LPI/LPD Radio Systems (3080)	\$30,000	\$240,000
Total		\$2,960,000

ST: INFORMATION SHARE SERVER SUITE

1. Background. ANG Special Tactics (ST) squadrons require an effective remote access server suite to provide a secure connection to accurate, frequently-updated information and documentation to support contingency operations. The web-based server information-sharing suite will store critical standard operating procedures, Air Force Instructions, forms, and documentation on a remote server that can be updated to the most current format. The system will be accessible through multiple end user devices enabled by proper permissions and authentication. The web-based server will require dedicated Virtual Private Network (VPN) access, end user devices for unit personnel, and a civilian internet service provider. An application-based option will inform users when applicable updates have been implemented. The ANG requires one server for the ST enterprise and one end user device for each of the 260 ST operators.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Server with VPN Access (3080)	\$40,000	\$40,000
260 End User Devices (3080)	\$2,000	\$520,000
Total		\$560,000

ST: TACTICAL LOW-VISIBILITY VEHICLES

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) squadrons require unique mobility platforms to execute missions in permissive and low-visibility environments where standard military vehicles would compromise mission success. The Tactical Low-Visibility Vehicle (TLV) is a 4x4 van modified with a communications suite capable of providing real-time video data links to command and control elements, seating for six to eight personnel, discrete antennas and blackout infrared lighting. The modified vans will be equipped with air-load tie downs and certified by the Air Transportability Test Loading Agency for transport by airlift aircraft. The ANG requires one vehicle for each of its 18 ST teams and two vehicles for each of its three ANG GA squadrons. Nine vehicles have already been procured.

2. Program Details.

Quantity	Unit Cost	Program Cost
15 Tactical Low-Visibility Vehicles (3080)	\$200,000	\$3,000,000
Total		\$3,000,000

ST: MODERNIZED AERIAL DELIVERY SUITE

1. Background. ANG Special Tactics (ST) squadrons require the capability to accurately insert, into a wide range of combat zones via aerial delivery with required operational equipment. Teams require the Joint Precision Airdrop System’s (JPADS) automated aerial delivery capability to execute heavy equipment, precision-offset, long-range airdrop operations. Remote aerial delivery will help ensure efficiency and safety in future ST airdrop operations. The ANG requires four JPADS 2K devices and four JPADS 10K devices for each ST squadron.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 JPADS 10K Devices (3080)	\$55,000	\$440,000
8 JPADS 2K Devices (3080)	\$40,000	\$320,000
Total		\$760,000

TACP: LIGHTWEIGHT PERSONAL PROTECTION SYSTEM

1. Background. Dismounted Joint Terminal Attack Controllers (JTACs) require a lightweight, modern personal protective system that is compatible with multiple mission sets. JTACs require a protective system for dismounted, extended-duration missions capable of being configured for a mounted mission in environments that require maximum armor. The protective system should have soft and hard armor that is appropriately rated. Replacing personal protective systems will decrease fatigue and injuries to JTACs by reducing the amount of weight and improving armor performance. Each system consists of a scalable carrier, soft armor, hard armor, and helmet. ANG Tactical Air Control Party (TACP) personnel requirements include: 70 systems for each of the 14 squadrons; 27 systems for each of the two Air Support Operations Centers; 25 systems for each of the two Air Support Operations Groups; and 12 systems for the 138th Combat Training Flight; for a total of 1,096 kits to equip all deployable TACP personnel.

2. Program Details.

Quantity	Unit Cost	Program Cost
1,096 Scalable Carriers (3080)	\$1,000	\$1,096,000
1,096 Soft Armor Sets (3080)	\$350	\$383,600
1,096 Hard Armor Sets (3080)	\$3,000	\$3,288,000
1,096 Helmets (3080)	\$1,000	\$1,096,000
Total		\$5,863,600

TACP: FULL-SPECTRUM OPERATIONS SITUATIONAL AWARENESS KIT WITH PORTABLE NEXT GENERATION POWER MANAGEMENT

1. Background. ANG Tactical Air Control Party (TACP) dismounted Joint Terminal Attack Controllers (JTACs) require a lightweight situational awareness kit with portable power storage and management solutions for man-portable and handheld radios. Fielded batteries are not rechargeable and do not meet Department of Transportation (DOT) requirements for transport. Available rechargeable batteries are subject to catastrophic failure and pose a threat to personnel safety and mission success. JTACs require a DOT-approved rechargeable battery capable of extended use, rechargeable from a variety of sources. JTACs also require a Situational Awareness (SA) kit capable of integrating with different data link sources to provide battlespace awareness and a lightweight display for overall power management. The SA kit should be ruggedized, wearable, capable of being powered by the battery solution and able to transmit and receive through existing radios. The kit includes a battery system, high definition display with protective case, and a power management cable system that allows the battery to be connected to the high definition display and all applicable radio devices. In addition, servers with licenses are needed to fully integrate the capabilities of the SA kits. ANG TACPs require 45 kits for 14 squadrons; 5 kits for two groups; 12 kits for the 138th Combat Training Flight; and one server for each of the 14 states with TACP units.

2. Program Details.

Quantity	Unit Cost	Program Cost
652 Rechargeable Battery Systems (3080)	\$5,600	\$3,651,200
652 High Definition Displays w/Cases (3080)	\$1,500	\$978,000
652 Power Management Cable Systems (3080)	\$4,583	\$2,988,116
14 Servers (3080)	\$10,000	\$140,000
Total		\$7,757,316

TACP: MODERN NIGHT VISION GOGGLES AND INFRARED TARGET MARKING AND ACQUISITION

1. Background. ANG Tactical Air Control Party (TACP) Joint Terminal Attack Controllers (JTACs) require modernized personal equipment. They require Night Vision Goggles (NVGs), to increase situational awareness, as well as Mid-Wave Infrared (MWIR) strobes and Near Infrared (NIR) pointers, to efficiently identify friendly forces and targets. JTACs need Wide Field of View (WFOV) NVGs for urban and mounted operations, a lightweight NIR pointer to quickly identify targets for airborne assets, and MWIR strobes to mark friendly positions for airborne assets. JTACs also need a lightweight short-wave infrared (SWIR) acquisition device capable of acquiring coded laser energy during day and night operations. This device needs to interface with NVGs and situational awareness devices. ANG TACPs require: 20 WFOV NVGs for each of the 14 squadrons; 45 infrared pointers per squadron and 12 for the 138 Combat Training Flight (CTF); 20 MWIR strobes per squadron and 12 for the 138 CTF; and 20 SWIR Acquisition and SA devices per squadron and 12 for the 138 CTF.

2. Program Details.

Quantity	Unit Cost	Program Cost
280 WFOV NVGs	\$28,000	\$7,840,000
642 Infrared Pointers	\$5,100	\$3,274,200
292 MWIR Strobes	\$3,000	\$876,000
292 SWIR Acquisition and SA Devices	\$31,000	\$9,052,000
Total		\$21,042,200

**TACP: LOW PROBABILITY OF INTERCEPT / LOW PROBABILITY OF DETECTION
HANDHELD DATA LINK SYSTEM**

1. Background. ANG Tactical Air Control Party (TACP) Joint Terminal Attack Controllers (JTACs) require an adequate system to conduct digitally-aided close air support with low probability of intercept and low probability of detection. This includes handheld systems that are capable of interfacing with multiple airborne platforms through Link 16. The system must be lightweight, J-Voice capable, and able to interface with situational awareness kits. This allows TACPs to conduct operations in contested environments. ANG TACPs are requesting 45 handheld Link 16 radios for each of the 14 squadrons, one for each assigned JTAC, and 12 for the 138 Combat Training Flight.

2. Program Details.

Quantity	Unit Cost	Program Cost
642 Handheld Link 16 System (3080)	\$35,000	\$22,470,000
Total		\$22,470,000

**TACP: LINE-OF-SIGHT / BEYOND-LINE-OF-SIGHT
RADIO MODERNIZATION**

1. Background. ANG Tactical Air Control Party (TACP) Joint Terminal Attack Controllers (JTACs) require handheld radios and man-portable, dual-channel radios capable of Adaptive Networking Wideband Waveform (ANW2) operations. These radios will be compatible with Mobile User Objective System (MUOS) satellite communications, provide advanced capabilities, and decrease operational weight. ANG TACPs require: 90 ANW2-capable handheld radios for each of the 14 squadrons; 20 for the two groups; and 24 for the 138th Combat Training Flight (138 CTF); as well as 45 man-portable, dual-channel radios per squadron, and 12 for the 138 CTF.

2. Program Details.

Quantity	Unit Cost	Program Cost
1,324 ANW2-Capable Handheld Radios (3080)	\$12,650	\$16,748,600
642 Man-Portable Dual-Channel Radios (3080)	\$53,630	\$34,430,460
Total		\$51,179,060

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MQ-9

- **Persistent Attack**
- **ANG MQ-9 Units Provide 13% of the Total Fleet**
- **ANG MQ-9 Units Support 54% of Theater Combat Air Patrol Missions**

The MQ-9 Remotely Piloted Aircraft (RPA) comprise the largest Major Weapons System community in the Air Force. The MQ-9 Reaper is a medium-to-high altitude, long endurance, remotely piloted system. Because of its robust weapons payload capacity and long endurance, the MQ-9's primary mission is to prosecute time-sensitive targets using precision targeting to find, fix, and destroy or disable those targets. The aircraft employs up to four laser-guided AGM-114 Hellfire missiles and/or four GBU-12 / GBU-38 / GBU-49 / GBU-54 500 pound precision guided bombs. The MQ-9's secondary mission is to act as an intelligence, surveillance, and reconnaissance asset, employing multiple sensors to provide real-time data to commanders and intelligence specialists at all levels.



As of December 2017, all 13 ANG RPA units have completed transition from the MQ-1 Predator to the MQ-9 Reaper. In addition to supporting their individual state requirements, ANG units fly combat missions 24 hours a day, 365 days a year in every major combat theater. The ANG manages flying training unit operations at two locations and supports test and evaluation at a third. Five launch and recovery element sites are capable of supporting continuation training and support to Domestic Operations over the continental United States. In 2017, ANG MQ-9 crews, equipment and maintenance personnel

developed new platform capabilities by successfully employing AGM-114 Hellfire missiles and GBU-12/GBU-38 precision guided bombs against land and maritime targets at Eglin Air Force Base supporting the COMBAT HAMMER program.

MQ-9

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Critical Capabilities List

- Minimal Latency Tactical Data Link
- Communication Suite with Improved Interface
- Next-Generation Tactical Situation Display
- Improved Maritime Find / Fix / Target / Track / Engage / Assess Capability
- MQ-9 Simulator Upgrades (See Tab P)

Essential Capabilities List

- High Definition-Capable Block 25 Ground Control Station
- Deployable Launch and Recovery Element with Squadron Operations Cell
- Organic Capability to Generate Category 1 Coordinates
- Airborne Sense and Avoid
- Targeting Pod with Directed Energy Counter-Countermeasures

Desired Capabilities List

- Open Architecture Mission Pod
- Integrated Near Real-Time In-Flight Weather Update Capability
- Mobile Sensitive Compartmented Information Facility
- High-Speed Data Processing / Artificial Intelligence / Machine Learning / Target Recognition
- Automatic Takeoff / Land Capability

MQ-9: MINIMAL LATENCY TACTICAL DATA LINK

1. Background. ANG MQ-9 aircraft require an onboard Tactical Data Link (TDL) radio, with associated hardware and antennas, to employ across multiple Areas of Responsibility (AOR). MQ-9s lack the means to establish and maintain direct TDL communications with command and control, tactical agencies, and other TDL users. TDLs are used to share aircraft position, targeting data, sensor points of interest, cursor-on-target data, and target-track information derived from various intelligence sources via an airborne network. The lack of a TDL capability onboard the aircraft slows the kill chain, delays effects for supported commanders, and poses a safety risk with regard to aircraft position and airspace deconfliction. Lack of direct information-sharing with other TDL participants degrades overall situational awareness. A new system must be compatible with all current data link architectures in both domestic and combat AORs, to include Enhanced Position Location Reporting System (EPLRS), Situational Awareness Data Link (SADL), and Link 16 with gateway capable software. Each of the 36 ANG MQ-9 aircraft will require one Link 16 radio, SADL radio, and TDL installation kit.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$3,000,000
36 Link 16 Radios (3010)	\$150,000	\$5,400,000
36 EPLRS/SADL Radios (3010)	\$50,000	\$1,800,000
36 Installation Hardware Kits (3010)	\$100,000	\$3,600,000
Total		\$13,800,000

MQ-9: COMMUNICATION SUITE WITH IMPROVED INTERFACE

1. Background. ANG MQ-9 aircraft require an improved Internet Protocol-based communications suite that integrates intercom, Line-of-Sight (LOS) radios, and telephone systems into a single headset with three-dimensional audio. The MQ-9 is limited by a single LOS radio that suffers from poor reception and a satellite relay delay. The current MQ-9 communications suite is composed of multiple landline phones and headsets at the operator console; this is cumbersome and negatively impacts mission coordination. The MQ-9 operates simultaneously across multiple domains and mission sets and requires a flexible, tactical voice system that interconnects all mission participants. Tasks involve intelligence, surveillance and reconnaissance, strike, special operations, and Command & Control (C2). Recent conflicts reinforced the need for the MQ-9 to execute across the full range of military operations, in both contested and uncontested environments with multiple mission players. The system should feature an intuitive interface that reduces aircrew workload and avoids additional buttons, switches, or actuators and allow the use of in-theater LOS repeater towers. In order to effectively fulfill its cross-domain role as a C2 node, MQ-9s require access to multiple in-theater radios and direct voice access to key C2 participants. This integrated suite would give MQ-9 crews the ability to monitor several LOS radio frequencies simultaneously. The system would also enhance multi-ship tactics by allowing direct communication between geographically separated Ground Control Stations (GCS). Interaction between mission enablers, such as weather, intelligence, mission commanders, and operations supervisors, and the aircrew is critical for effective C2. A central server is needed to control the system in each of the 14 Squadron Operations Centers (SOC). Three operator stations are needed in each of the 38 GCSs; a station for the pilot, sensor operator and intelligence personnel. Four additional operator stations are required for mission enablers in each of the 14 SOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	N/A	\$1,000,000
114 GCS Operator Stations (3080)	\$150,000	\$17,100,000
14 Central Servers (3080)	\$250,000	\$3,500,000
56 SOC Operator Stations (3080)	\$150,000	\$8,400,000
Total		\$30,000,000

MQ-9: NEXT-GENERATION TACTICAL SITUATION DISPLAY

1. Background. ANG MQ-9 Ground Control Stations (GCS) require an improved next-generation tactical situation display (TACSIT) that utilizes mission-enhancing plug-ins. The current MQ-9 tactical situation display uses awkward and inefficient Human Machine Interfaces (HMI), which limit aircrew ability to fly the aircraft and manage the mission with maximum efficiency and effectiveness. Basic functions require excessive operator input and are not intuitively organized. HMI improvements to the TACSIT include: the ability to share drawings on full motion video; extract Target Location Error level-1 coordinates from the video and map; depict synthetic mission participants' ownship data inside the video; real-time weather display and forecasting; friendly and enemy locations; and Link 16 messaging. Integration with a cross-domain solution is required to enable participants, on different classification levels, to view, share, and transfer mission-critical data. Critical application plug-ins must be integrated and displayed on the TACSIT. These plug-ins include visual representations of ownship and adversary weapons employment zones, and a maneuvering tool to enable precision weapons employment. ANG requires one tactical and one sensor plug-in for each of the 12 MQ-9 combat units and one for each of the two flight training units.

2. Program Details.

Quantity	Unit Cost	Program Cost
14 Tactical Application Plug-Ins (3080)	\$150,000	\$2,100,000
14 Sensor Application Plug-Ins (3080)	\$500,000	\$7,000,000
Total		\$9,100,000

MQ-9: IMPROVED MARITIME FIND / FIX / TRACK / TARGET / ENGAGE / ASSESS CAPABILITY

1. Background. The MQ-9 requires improved capability to Find, Fix, Track, Target, Engage, and Assess (F2T2EA) maritime targets utilizing a Maritime Wide Area Surveillance (MWAS) upgrade to the existing multi-mode Synthetic Aperture Radar (SAR). Current MQ-9 targeting systems lack the ability to sufficiently locate and track maritime targets within a large area of responsibility and subsequently are unable to meet Combatant Commander requests. While the Block 20A MQ-9 SAR provides adequate wide area imaging over land, it lacks the capability to accurately detect and track vessels on the water. Hardware and software improvements, compatible with the operational flight program and Block 20A SAR, will provide this capability. Additional features need to include: reducing littoral blanking to pick out maritime targets near the coastline; cross-cuing targets to the MQ-9 targeting pod; integrating with a Link 16 and Automatic Identification System (AIS) picture; enabling maritime automatic target detection; and utilizing sea clutter-cancelling technology to return reliable targets to the user interface. A modification to the SAR Human-Machine Interface (HMI) in the Ground Control Stations (GCS) is needed to utilize the MWAS upgrade. These improvements to all 36 ANG MQ-9 aircraft and GCS will dramatically increase the capability to F2T2EA maritime targets while supporting combat missions and domestic requirements. The ANG requires one MWAS kit per airframe as well as non-recurring engineering investment to integrate associated software upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
HMI Non Recurring Engineering (3600)	N/A	\$700,000
1 Block 20A Maritime Software Upgrade (3080)	\$2,000,000	\$2,000,000
36 Hardware/Software Installation Kits (3010)	\$100,000	\$3,600,000
Total		\$6,300,000

Simulation, Operational Training Infrastructure, and Range Instrumentation

- **Advanced Simulator Development**
- **Operational Training Environments**

This tab supports three components of the simulation portfolio. The first tab component provides squadron-level simulators for ANG warfighters to meet specific warfighting mission requirements. The ANG's five year simulator plan will deliver over 85 training devices to our warfighters. The devices span the entire spectrum from immersive high-fidelity full flight simulators to medium-fidelity trainers.



Operational Training Infrastructure (OTI), the second tab component formerly known as Live-Virtual-Constructive (LVC), is a key facet of readiness training.

The ANG's Distributed Training Operations Center (DTOC) provides persistent networks, modeling and simulation expertise, and operational support for daily Distributed Mission Operations (DMO) training by linking a wide array of simulators at ANG, Air Force Reserve, and Active Component units. In 2015, the DTOC began supporting live-fly exercises with manned constructive forces, and will continue to grow live training support at tactical ranges and airspaces as infrastructure is established. DMO capability is a baseline requirement for all ANG simulator programs.



Air Combat Command has released its Enterprise Range Plan, the third tab component. As part of this plan, the ANG's OTI requires realistic, static, multispectral target surrogates to replicate real-world complex target sets, realistic simulators to replicate an Integrated Air Defense System (IADS) environment, standardized, full spectrum, immersive electronic training environments, a Digital Radio Management System (DRMS), Link 16 and range radios, and a training data link management system.

Simulation, Operational Training Infrastructure, and Range Instrumentation 2017 Weapons and Tactics Conference

Critical Capabilities List

Simulation

- Air Operations Center Collaborative Operational-Level Training Capability
- Battle Control Center Live-Virtual-Constructive 4th and 5th Generation Training Suite
- C/EC/HC-130J Weapon System Trainer
- Control and Reporting Center Simulator Technical Refresh
- Cyberspace Virtual Interconnected Training Environment
- Cyberspace Part Task Trainer
- HH-60G Distributed Mission Operations Simulators
- KC-135R Multi-Mission Crew Trainer
- MQ-9 Simulator Upgrades
- Security Forces Portable Use-of-Force Training System
- Space Emulation Suite

Operational Training Infrastructure

- Persistent Training Data Link Network and Radio Frequency Communications Suite for Enhanced Live-Fly Training
- Cross-Domain Solutions to Allow Persistent, Integrated Distributed Mission Operations Training
- Synthetic Training Environments that are Compatible with all Weapons Systems
- Man-in-the-Loop Virtual Training Aid Workstations

- Debrief System for Distributed Live and Synthetic Missions

Range Instrumentation

- Persistent Training Data Link Network and Radio Frequency Communications Suite for Enhanced Live-Fly Training
- Full Emitted Radiated Power and Low Emitted Radiated Power (Wide Band) Threat Emitters

Essential Capabilities List

Simulation

- C-130H Multi-Mission Cockpit Trainers with Integrated Tactical Data Link
- C-130J Data Link Capability for Weapons System Trainer / Multi-Mission Cockpit Trainers
- C-40C Virtual Maintenance Trainer
- F-15 High Fidelity Networked Simulators at Air National Guard Bases
- F-16C Proliferation and Sustainment of Concurrent High Fidelity Ready Aircrew Program Quality Simulators
- F-22A Improved Simulator Capabilities
- GA Terminal Area Simulator for Training
- Homeland Defense /Aerospace Control Alert Develop Live Virtual Constructive Cruise Missile Defense Training Opportunities at all Aerospace Control Alert Sites
- RC-26 Full Crew Distributed Mission Operations Simulator
- ST High Angle Simulation Tower

- TACP Air National Guard Advanced Joint Terminal Attack Controller Training Simulator

Operational Training Infrastructure

- Man-in-the-Loop Synthetic Entity Interaction with Live Weapons System Sensors and Embedded Training Systems Integrated into the Synthetic Environment
- Live-Virtual-Constructive Operations, Technical, and Security Support Personnel at Each Unit with Distributed Mission Operations Certified Trainers and Simulation Systems
- Modular Contested, Degraded, and Operations Add-ons for Synthetic Environment Generators to Inject Realistic Contested, Degraded, and Operations Events into the Synthetic Environment
- Joint Information Operations Range Node at Distributed Training Operations Center
- Network Nodes that Facilitate Integration of Joint and Multinational Weapons Systems

Range Instrumentation

- High Fidelity Targets
- Spiral Upgrades to Fielded Weapons Scoring System

Desired Capabilities List

Simulation

- EC-130J Ku Spread Spectrum System Trainer
- F-16C Live, Virtual, Constructive Training Facilitator
- TACP Modular Shooting Range and Close Quarters Battle Trainer

Operational Training Infrastructure

- Virtualization of Training Center Event Control Centers for Maximum Security, Capacity, and Flexibility
- Top Secret / Sensitive Compartmented Information Distributed Mission Operations Training Network
- Augmented Reality Technologies for Battlefield Airmen and Other Weapon Systems that Provide Visual Representation of Virtual and Constructive Entities to Live Assets
- Persistent Live Radar with the Virtual World
- Advanced Threat Systems and High Fidelity Target Sets for Air Reserve Component Combat Readiness Training Centers

Range Instrumentation

- Moving Targets
- Instrumentation

SIMULATION: AIR OPERATIONS CENTER COLLABORATIVE OPERATIONAL-LEVEL TRAINING CAPABILITY

1. **Background.** ANG Air Operations Groups (AOG) require realistic collaborative operational and strategic-level training capabilities to meet readiness and proficiency requirements. Providing highly-qualified and combat mission ready personnel to Active Duty Air Operations Centers (AOC) is best met through increasing integrated, joint, and collaborative training opportunities beyond the current model which involves travel to geographic AOC major exercises. These exercises provide training for each of the divisions within the AOC, providing diverse scenario training products to replicate guidance from the Combined Force Air Component Commander (CFACC) and a large theater simulation, improving collaboration throughout the Theater Air Control System (TACS). A Distributed Mission Operations (DMO) suite capability is needed to execute this required training. DMO allows for a single entity to provide a live, virtual, or constructive environment for the execution of geographic AOC-level exercises. The distributed network managed by the 132nd Wing Detachment 1 - Distributed Training Operations Center (DTC) can provide this connection capability and potentially some of the required products and scenario support. Air Reserve Component AOGs need the hardware suite required to maintain a persistent connection to the DTC in support of DMO operations. Nine of the AOCs that support their geographic active duty component require a DMO training suite.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Training Suites (3080)	\$60,000	\$540,000
Total		\$540,000

Simulation, OTI, & Range Instrumentation

SIMULATION: BATTLE CONTROL CENTER LIVE-VIRTUAL-CONSTRUCTIVE 4TH AND 5TH GENERATION TRAINING SUITE

1. Background. The Battle Control Centers (BCC) require a simulator training system that produces a virtual environment enabling 4th and 5th generation fighter integration, and allows control of the direction, de-confliction, and employment of ground, surface, and air assets. The BCCs provide surveillance, identification, Command and Control (C2), and engagement to defend North America, but lack a realistic simulator training suite for critical Homeland Defense training. The simulator training system will provide integrated battle management with other tactical engagement platforms, integrating all fighter, C2 nodes, and future platforms. The training system will be housed in an Intelligence Community Directive 705-compliant Relocatable Simulation Shelter (RSS) until permanent facilities are procured via military construction. The Eastern Air Defense Sector, Western Air Defense Sector, Alaskan Air Defense Sector and Hawaiian Air Defense Sector each require one simulator training system. Two systems have been procured.

2. Program Details.

Quantity	Unit Cost	Total
2 BCC Simulator Training Systems (3080)	\$1,300,000	\$2,600,000
2 RSS (3080)	\$625,000	\$1,250,000
Total		\$3,850,000

Simulation, OTI, & Range Instrumentation

SIMULATION: C/EC/HC-130J WEAPON SYSTEM TRAINER

1. Background. The ANG needs a reconfigurable simulator to meet multi-command training requirements. The ANG will operate C-130J aircraft in three versions including airlift (C), rescue (HC) and Military Information Support Operations (EC), yet does not have dedicated high-fidelity flight simulators to support special mission aircrew training. The Reconfigurable Weapon System Trainer (RWST) will allow one unit to host a RWST yet provide Air Force Instruction 11-series Volume 1 training capability for other ANG C-130J units, regardless of version. The ANG has purchased one Block 6 C-130J RWST, but to meet Block 8.1 upgrades and special mission EC/HC-130J training needs, the ANG needs two additional RWSTs, one West Coast RWST to support two rescue wings and one East Coast RWST to support one rescue and one special operations wing.

2. Program Details.

Quantity	Unit Cost	Total
2 EC/HC-130J RWST (3010)	\$27,500,000	\$55,000,000
Total		\$55,000,000

Simulation, OTI, & Range Instrumentation

**SIMULATION: CONTROL AND REPORTING CENTER SIMULATOR TECHNICAL
REFRESH**

1. Background. The Control and Reporting Center (CRC) Simulation Program (CSP) requires technical hardware and software system modernization and risk management framework migration for cybersecurity accreditation to sustain future cybersecurity system requirements. The CRC relies on CSP for 60% of all operational training events and is required to connect combatant command, major command and joint live-virtual-constructive-operational training distributed mission operations exercises. Each of the ANG's ten CRCs requires 11 computer processing units, 47 24-inch monitors, and 11 software and accessory kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
110 Computer Processing Units (3080)	\$4,000	\$440,000
470 24-Inch Monitors (3080)	\$460	\$216,200
110 Software & Accessories Kits (3080)	\$105	\$11,550
Total		\$667,750

SIMULATION: CYBERSPACE PART TASK TRAINER

1. Background. ANG Cyberspace Operations (CO) units require the ability to train individual members on cyberspace tasks associated with Initial Qualification Training (IQT) and remedial training. The Part Task Trainer-Cyber (PTT-C) system is a cost effective training solution that allows cyber operators and maintenance personnel to familiarize themselves with particular tasks associated with the mission or weapons system without having to use the actual weapons system or the Virtual Interconnected Training Environment (VITE) cyber simulator. The PTT-C provides hands-on training for critical skills required to operate in a team environment and support cyberspace operations. The PTT-C provides an individual training and skills assessment suite allowing personnel to train on specific tasks and identify areas needing improvement. Additionally, the system is used to identify qualified candidates and their readiness to integrate into the cyber mission force. The PPT-C uses pre-defined individual challenges and events to limit potential compromise of scenarios in a “capture-the-flag” and “hacker” jeopardy environment allowing for automated storyline, registration, scoring, system hints, and back-end reporting on progress and completion. The system is maintained locally, allows for up to 48 personnel to connect to the PTT-C system at any time via virtual private network or other secure means, and is managed through an intuitive administration page. The system must not require a recurring licensing or subscription fee to operate, and will focus on Air Force Space Command and work role training requirements prepping personnel to execute in the team construct within VITE and during operational missions. Each of the ANG’s 10 cyber units requires two PTT-C systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 Part Task Trainer-Cyber (3080)	\$275,000	\$5,500,000
Total		\$5,500,000

SIMULATION: CYBERSPACE VIRTUAL INTERCONNECTED TRAINING ENVIRONMENT

1. Background. ANG Cyberspace Operations (CO) units require a Virtual Interconnected Training Environment (VITE) to support Tier 1, 2, and 3 exercises, conduct training, and maintain combat mission ready proficiency as required by 24th Air Force. VITE provides a persistent training environment supporting implementation of the Cyber Mission Force construct and permits distributed training for integrated warfighter operations in both kinetic and non-kinetic effects. VITE is a scalable capability configurable to any cyber environment, allows import and export of large virtual training environments, and has the ability to provide a debrief function. It provides realistic network environments with the ability to simulate adaptive opposing forces and threats. It simulates the internet-based critical infrastructure and key resources with add-on modules to provide more realistic cyberspace threats, targets, and terrain. VITE provides simulation for commercial and government networks. This includes the Non-secure Internet Protocol Router Network (NIPRNet), Secret Internet Protocol Router Network (SIPRNet), and Joint Worldwide Intelligence Communications System (JWICS), representing a wide variety of Department of Defense information network environments. VITE operates as a standalone training environment and connects to the information operations ranges, the Distributed Training Operations Center (DTOC), or any other distributed environment. VITE hosts a wide variety of software and integrates with other weapon system training environments without additional licensing costs. Three hubs will be needed to connect each of 20 VITE systems and 20 industrial control system modules. The range node hardware and connection fees will allow each site to connect the VITE to the internet for distributed training operations. The ANG needs one Air Force Cyber Defense version of VITE for its training unit.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 VITE System (3080)	\$430,000	\$430,000
20 Information Operation Range Nodes (3080)	\$125,000	\$2,500,000
20 Initial Interconnection Fees (3840)	\$72,000	\$1,440,000
20 Recurring Interconnection Annual Fees (3840)	\$20,000	\$400,000
Total		\$4,770,000

SIMULATION: HH-60G DISTRIBUTED MISSION OPERATIONS SIMULATORS

1. Background. ANG HH-60G units require a co-located Multi-Mission Crew Trainer (MMCT). MMCT enables around the clock training for crews. This trainer includes immersive displays, full crew capability, operating replica GAU-2 and GAU-18 machine guns, hoist, and dynamic motion seats. Additionally, the MMCT provides realistic threat engagements, night vision goggle operations, and systems identical to the actual airframe. With distributed mission operations capabilities, the crew can enter a virtual environment and fly missions with other platforms at other bases in real-world mission scenarios. MMCT will enable consistent aircrew training whenever necessary. This capability will ensure proficient, mission-ready airmen for short-notice deployments. Two MMCTs are required for each of the three ANG combat rescue wings equipped with HH-60Gs.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 HH-60G MMCT (3010)	\$2,100,000	\$12,600,000
Total		\$12,600,000

Simulation, OTI, & Range Instrumentation

SIMULATION: KC-135R MULTI-MISSION CREW TRAINER

1. Background. ANG KC-135R flying units require a co-located Multi-Mission Crew Trainer (MMCT) to supplement their current Operational Flight Trainers (OFTs). Only 6 of 18 ANG KC-135R air refueling wings have an OFT or are scheduled to receive one. The MMCT will provide advanced crew resource management training for threat awareness training, emergency procedures training, mission rehearsal and distributed mission operations. The MMCT consists of an adaptable family of weapon system trainers that have replica flight controls with electronic control loading, high fidelity aerodynamic modeling, out-the-window visual displays and functioning touch screen representations of all cockpit switches and displays. The MMCT will be networked locally with the KC-135 Boom Operator Simulation System (BOSS). Some of the MMCT training systems will be housed in Relocatable Simulation Shelters (RSS) until permanent facilities are procured via military construction. The 12 ANG air refueling wings, without on-base simulators, require an MMCT.

2. Program Details.

Quantity	Unit Cost	Total
12 KC-135R MMCT (3010)	\$600,000	\$7,200,000
6 RSS (3080)	\$625,000	\$3,750,000
Total		\$10,950,000

Simulation, OTI, & Range Instrumentation

SIMULATION: MQ-9 SIMULATOR UPGRADES

1. Background. ANG MQ-9 units require upgraded training devices. The MQ-9 weapons system lacks a certified simulator/trainer with Distributed Mission Operations (DMO) and high definition capability, in conjunction with an effective debriefing system. ANG MQ-9 combat and formal training units use any one of four mission training systems to execute initial qualification training, mission qualification training, instructor pilot upgrade, and continuation training. ANG MQ-9 units require upgrades for their training systems which better replicate MQ-9 combat mission sets, accelerate Block 30 and Block 50 ground control station training device production, and provide additional capabilities such as DMO, high definition, and debriefing systems. The ANG has 13 MQ-9 units, 11 operational and 2 training. Two trainer upgrades are needed for each of the operational units and four are needed for each of the training units for a total of 30. Air Combat Command has procured 18 upgrades for the ANG. This means the ANG needs 16 additional trainer upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
16 MQ-9 Trainer Upgrades (3010)	\$250,000	\$4,000,000
Total		\$4,000,000

SIMULATION: SECURITY FORCES PORTABLE USE-OF-FORCE TRAINING SYSTEM

1. Background. ANG Security Forces (SF) need a portable use-of-force interactive training system that can increase team and individual training efficiency within a reduced time-line. Unpredictable use-of-force incidents force split-second decisions, driving a need to train personnel in defensive and immediate threat discrimination decision-making. The portable use-of-force training system must be able to recognize and respond to trainees’ verbal commands and use-of-force responses immediately without instructor input. These simulator systems will allow SF to utilize force options to include verbal commands, Oleoresin Capsicum spray, taser, expandable baton, handgun, rifle, and shotgun. Included conversion kits will allow the use of individual duty weapons, allowing members to keep their assigned weapons configurations. This portable training platform will provide SF the ability to create specific scenarios tailored to unit requirements without contractor support. This system will allow high-quality training utilizing minimal space and manpower by allowing rapid, ad-hoc setup and takedown in office-sized, non-dedicated training spaces. Each of the 94 ANG SF units require one portable use-of-force training system.

2. Program Details.

Quantity	Unit Cost	Program Cost
94 Portable Simulator Systems (3080)	\$80,000	\$7,520,000
Total		\$7,520,000

Simulation, OTI, & Range Instrumentation

SIMULATION: SPACE EMULATION SUITE

1. Background. ANG Space Control Squadrons (SCS) require a Satellite Emulation Suite (SES) in order to maintain combat mission ready certification to include training, evaluation, and proficiency. SES will support development and operational test events, as well as service and joint exercise events. The space control units have no ability to generate targets and threat environments for operator training. SCS support domestic operations, theater, and global space control campaigns. The SES must be able to connect to multiple space and intelligence weapons systems while supporting connectivity to live and virtual test and training ranges. The SES must be transportable to support deployed weapons systems when tasked to participate in contingency operations and joint exercises. Each of the three ANG SCS requires one SES.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 SESs (3080)	\$1,500,000	\$4,500,000
Total		\$4,500,000

OTI: PERSISTENT TRAINING DATA LINK NETWORK AND RADIO FREQUENCY COMMUNICATIONS SUITE FOR ENHANCED LIVE-FLY TRAINING

1. Background. The ANG Operational Training Infrastructure (OTI) requires realistic, standardized, full spectrum, and immersive electronic training environments that include appropriate levels of communications and data link systems to meet Ready Aircrew Program (RAP) tasking requirements. Units require associated training airspaces with appropriate communications infrastructure required to enable Live-Virtual-Constructive (LVC) capabilities. Introducing synthetic entities, whether virtual or manned-constructive, into the live environment allows warfighters to train in more realistic scenarios, overcome training airspace limitations, and overcome integration limitations associated with live asset availability. Realizing these opportunities requires outfitting ANG units and associated training airspaces with appropriate communications infrastructure to enable LVC capabilities. This communications infrastructure must include radios with bridge solutions, data link solutions, Multi-Source Correlator Trackers (MSCT), and Federal Aviation Administration (FAA) live radar feeds creating blended live-synthetic common operating pictures via Attached Resource Computer Network (ARCNet) connectivity nodes. Radios with associated bridge solutions establish two-way communications between the live and synthetic training audiences, enabling the realistic and safe accomplishment of training events. Data link solutions allow the representation of constructive and virtual entities to live data link-equipped assets resulting in more robust training scenarios. Regional blended live-synthetic common operating pictures, achieved through multi-source correlation trackers with live FAA radar feeds, allow the accurate depiction of the live environment to synthetic training audiences. Finally, ARCNet portals are required to connect virtual and constructive participants to the blended live and synthetic training environment. Fulfilling this critical priority will provide airmen the opportunity for daily LVC operational training with combinations of live, virtual, and constructive entities. Each of the four ANG Combat Readiness Training Centers (CRTC) requires a communications suite and ARCNet gateway racks. Four ANG training ranges require radio suites and data link solutions. ANG CRTC and four training ranges require radio bridge solutions. MSCT are required for the four CRTC and the Distributed Training Operations Center.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 CRTC Communication Suites (3080)	\$480,000	\$1,920,000
4 Radio Suites (3080)	\$480,000	\$1,920,000
8 Radio Bridge Solutions (3080)	\$50,000	\$400,000
4 Data Link Solutions (3080)	\$660,000	\$2,640,000
5 MSCT with Live Radar Feed (3080)	\$550,000	\$2,750,000
8 ARCNet Gateway Racks (3080)	\$25,000	\$200,000
Total		\$9,830,000

**OTI: CROSS-DOMAIN SOLUTIONS TO ALLOW PERSISTENT, INTEGRATED
DISTRIBUTED MISSION OPERATIONS TRAINING**

1. Background. ANG warfighters require Cross-Domain Solutions (CDS) that allow systems at incompatible classification levels to connect to a common Live-Virtual-Constructive (LVC) training architecture. Simulators and constructive entity generators are unable to integrate across security classification levels without technological solutions that prevent the spillage of sensitive information and capabilities onto systems that lack the proper accreditation. These assets must be networked together in order to reinforce the integration skills needed to overcome the challenges of modern threat environments. CDS allow systems at incompatible classification levels to connect to a common LVC training architecture. Each LVC network must have a CDS that facilitates the flow of data across classification boundaries. As the host of the Air Reserve Component (ARC) networks, the Distributed Training Operations Center (DTOC) is uniquely equipped and manned to host these CDS technologies. This critical priority addresses the ANG LVC vision line of effort to connect ARC units to secure Distributed Mission Operations (DMO) networks that facilitate relevant LVC training with USAF, joint, multinational, and interagency partners. This priority also addresses the Air Force Operational Training Infrastructure (OTI) 2035 Flight Plan line of effort to enable a cross-domain training architecture.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Fighter Integration CDS (3080)	\$1,500,000	\$1,500,000
1 REL NATO CDS (3080)	\$650,000	\$650,000
1 UNCLASS CDS (3080)	\$650,000	\$650,000
1 REL FVEY CDS (3080)	\$650,000	\$650,000
1 Air Defense Sector CDS (3080)	\$250,000	\$250,000
Total		\$3,700,000

OTI: SYNTHETIC TRAINING ENVIRONMENTS THAT ARE COMPATIBLE WITH ALL WEAPONS SYSTEMS

1. Background. The ANG requires non-proprietary Environment Generators (EG) compatible with all weapons system training devices, Distributed Mission Operations (DMO) networks, and with each other. ANG units currently utilize 26 different EG for virtual and constructive training scenarios. Many EGs lack the fidelity to adequately stimulate weapon system and training device sensors, and accurately model threat capabilities and behaviors, particularly for 5th generation aircraft and homeland defense-tasks units. This is compounded by the proprietary nature of most current EGs, each of which model threats differently; this can slow the addition of new and emerging threats. Many EGs also lack sufficient terrain databases and environmental effects to allow units to train in their areas of interest in realistic weather conditions, as well as accurate red, blue, and grey weapon flyout models. Finally, current EGs lack seamless interoperability, resulting in different threat representations, as seen from different weapon system platforms. This fact severely degrades the ability to provide realistic and effective training to warfighters in a DMO-integrated scenario. The ANG needs non-proprietary DMO-capable EGs, with a spiral development program, that achieve the following characteristics:

- Compliant with DMO standards
- Standardized geodetic and weapons models
- Interoperable between weapons systems
- Tailorable to meet unit needs
- Lifelike human behavior modeling
- Update rates that keep pace with emerging threats and scenarios
- Realistic weather and environmental modeling
- Provides accurate flyout models for red, blue, and grey weapons

This critical priority is aligned with the ANG Live-Virtual-Constructive (LVC) Flight Plan simulators and trainers line of effort. The ANG requires spiral development of its current EGs and a future end state of a complete LVC EG solution.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Spiral Development Phases (3840)	\$700,000	\$2,100,000
Total		\$2,100,000

OTI: MAN-IN-THE-LOOP VIRTUAL TRAINING AID WORKSTATIONS

1. Background. The ANG 132nd Wing, Detachment 1, Distributed Training Operations Center (DTOC) requires man-in-the-loop virtual surrogate fighter Training Aid Workstations (TAW). ANG Distributed Mission Operations (DMO) training has been limited to using mostly scripted constructive entities as adversaries or blue air training aids, e.g. red air adversaries for 5th generation fighter offensive counter air training, blue air receivers for KC-135R Boom Operator Simulation Systems (BOSS) during air-to-air refueling training, or close air support aircraft for Joint Terminal Attack Controller (JTAC) training. DTOC TAWs allow pilot Subject Matter Experts (SMEs) to take control of various constructive entities at critical points in the engagement to provide much more realistic behaviors, and then return the entities to constructive control when finished. This allows more efficient use of DTOC white force SMEs by controlling multiple aircraft through a few TAWs. The DTOC needs four TAWs to provide scheduling flexibility to support virtual training.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 TAWs (3080)	\$950,000	\$3,800,000
Total		\$3,800,000

OTI: DEBRIEF SYSTEM FOR DISTRIBUTED LIVE AND SYNTHETIC MISSIONS

1. Background. ANG personnel participating in Distributed Mission Operations (DMO) training require a debrief system capable of mission recording and distributed playback to participating sites across the network. The debrief is the most valuable phase of both live and synthetic training missions. Mission playback facilitates the debrief, where errors and deviations are noted, instruction is given, and lessons learned are captured. A classified debrief system, dedicated to ANG DMO, allows the capture of live, virtual, and constructive video sources for live viewing and mission playback. The 132nd Wing, Detachment 1, Distributed Training Operations Center (DTOC), requires a video teleconference capability to facilitate briefing and debriefing among geographically distributed training audiences. Finally, the debrief system should be compatible with the DMO network and Air Reserve Component (ARC) network. The DTOC requires three debriefing systems for scheduling flexibility and mission continuity.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Debrief Systems (3080)	\$200,000	\$600,000
Total		\$600,000

Simulation, OTI, & Range Instrumentation

**RANGES: PERSISTENT TRAINING DATA LINK NETWORK AND RADIO
FREQUENCY COMMUNICATIONS SUITE FOR ENHANCED LIVE-FLY TRAINING**

1. Background. The ANG Operational Training Enterprise (OTE) requires realistic, standardized, full spectrum, and immersive data link and radio communication systems. The ANG continues to have shortfalls in standardized communication and data link systems at the critical nodes in the range training infrastructure. The OTE consists of the flying squadrons, primary training ranges, live mission operations centers, training centers, and forward operating locations. Acquisition of the Digital Radio Management System (DRMS), Link 16, range radios, and a training data link management system with man-in-the-loop data input capability will enhance ANG units' ability to accomplish realistic full-spectrum training. ACC is fielding these in concert with their Enterprise Range Plan but will not fully fund all ANG ranges. ANG requires communication upgrades for its four Combat Readiness Training Centers (CRTCs), seven primary training ranges, and 23 fighter wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
34 Link 16 Radios (3080)	\$360,000	\$12,240,000
34 Data Link Management Systems (3840)	\$297,000	\$10,098,000
34 Range Radio Systems (3840)	\$150,000	\$5,100,000
34 DRMS (3080)	\$480,000	\$16,320,000
Total		\$43,758,000

Simulation, OTI, & Range Instrumentation

RANGES: FULL EMITTED RADIATED POWER AND LOW EMITTED RADIATED POWER (WIDE BAND) THREAT EMITTERS

1. Background. The ANG Operational Training Enterprise (OTE) requires realistic Electronic Warfare (EW) simulators to replicate an Integrated Air Defense System (IADS) environment. The ANG has shortfalls in realistic IADS simulation in the range training infrastructure. To handle this shortfall, Emitted Radiated Power (ERP) emitters are needed to replicate SA-6, SA-11, SA-15 and wideband systems. ACC is fielding EW threat emitters in concert with their Enterprise Range Plan but will not fully fund all ANG ranges. ANG requires three full ERP SA-6, SA-11, and SA-15s and six low ERP wideband devices to fully equip all three ranges.

2. Program Details.

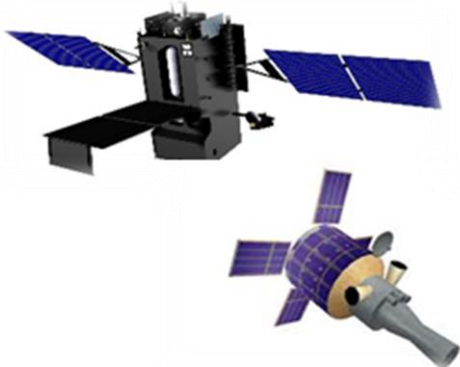
Quantity	Unit Cost	Program Cost
3 Full ERP SA-6 (3080)	\$3,000,000	\$9,000,000
3 Full ERP SA-11 (3080)	\$4,000,000	\$12,000,000
3 Full ERP SA-15 (3080)	\$4,000,000	\$12,000,000
6 Low ERP Wideband (3080)	\$1,000,000	\$6,000,000
Total		\$39,000,000

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Space Operations

- **ANG Space Units Provide 40% of Satellite Command and Control**
- **Missile Warning, Satellite Control, and Launch Operations**
- **Network Warfare and Information Operations**

Space Operations - The ANG contribution to Air Force Space Command missions includes over 900 personnel within eight squadrons. Space capabilities support federal- and state-level agencies, USAF, the nuclear command and control community, and combatant commands. Space units provide missile warning, space situational awareness, satellite communications,



and offensive space control capability to support operational, exercise and planning activities along with other space support as requested. Air National Guardsmen participating in these missions draw upon skills from their related civilian careers. Specific missions assigned to ANG units include mobile, survivable missile warning and command and control of military strategic and tactical relay satellite constellation in support of both exercises and operations. Execution of these activities occurs from home station and deployed locations.



Space Operations

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Critical Capabilities List

- Space Emulation Suite (See Tab P)
- Advanced Collaboration System
- Semi-Tractor Fleet Modernization
- Space Control Environmental Protection Radome
- Temporary Sensitive Compartmented Information Facility with Support Shelters and Storage Containers

Essential Capabilities List

- International Maritime Satellite Phone Capability
- Integrated Broadcast System Antenna
- Fiber Fusion Splicer Kits
- Portable Spectrum Analyzers
- Modular Operations Shelter Flooring

Desired Capabilities List

- Secure Headset Intercommunication System
- Standard Space Trainer Integration Capability
- Standard Space Trainer Integrated Voice Communications System

SPACE: ADVANCED COLLABORATION SYSTEM

1. Background. The 222nd Command and Control Squadron (222 CACS) requires an integrated collaboration and display system to support current and future mission requirements. The 222 CACS supports global space control operations (Defensive Space Control and Space Situational Awareness mission sets) and global collaboration operations for the National Reconnaissance Office (NRO). The Office of the Director of National Intelligence’s mandate to enhance collaboration across the intelligence community, along with other federal, state, and local agencies, has led to advanced technologies and capabilities across the enterprise. The rapid acquisition of an advanced collaboration system will allow the 222 CACS to connect directly with NRO operations centers, joint collaboration cells, and the Joint Space Operations Center (JSOC). This will enable the 222 CACS to maintain proficiency and certification in collaboration operations, while providing direct customer support for a host of real-world and exercise-related activities. The collaboration system will significantly enhance integration and synchronization across multiple tactical display processors, technical analysis tools, and decision support tools, both internally and externally across multiple operations centers. ANG requires one collaboration system at the 222 CACS.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Non Recurring Engineering (3600)	N/A	\$60,000
1 Collaboration System (3080)	\$529,213	\$529,213
Total		\$589,213

SPACE: SEMI-TRACTOR FLEET MODERNIZATION

1. Background. The 233rd Space Group (233 SG) and 153rd Airlift Wing (153 AW) each need 20 new fuel-efficient semi-tractor units, with sleeper cabs, to support the mobile ground station mission. The present fleet has five different tractor makes and models, which complicates the unit’s ability to stock the correct critical spare parts required to ensure the unit can meet its required timeline for survivability. The 233 SG is the nation’s only survivable and sustainable missile warning and nuclear detonation detection weapon system. The weapon system has five independent teams that deploy worldwide during a time of crisis or war. Each team is comprised of two Air Force Space Command-owned mission semi-tractor trailer combinations and four ANG-owned support semi-tractor trailer combinations. The 153 AW provides a survivable and sustainable command and control capability. Each of the ANG units require 20 support semi-tractor trailer combinations.

2. Program Details.

Quantity	Unit Cost	Program Cost
40 Semi-Tractor Units (3080)	\$175,000	\$7,000,000
Total		\$7,000,000

SPACE: CONTROL ENVIRONMENTAL PROTECTION RADOME

1. Background. ANG space control squadrons require radomes to protect antennas needed to support domestic operations, global, and theater space campaigns. These antennas are continuously exposed to corrosive environments and undergo a water rinse and application of anti-corrosion compound, which does not fully mitigate all weathering effects. This process adds approximately 64 man-hours of labor every month because the antennas have to be transported to a wash rack with an oil and water separator. Each movement causes undue stress on antenna components as they have to be de-cabled and re-cabled. The addition of radomes will enhance ANG space superiority by significantly reducing wear and tear on antennas, and reducing squadron maintenance labor costs. Each of the two ANG space control squadrons require two large and two small radomes.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Large Radomes (3080)	\$1,000,000	\$4,000,000
4 Small Radomes (3080)	\$100,000	\$400,000
Total		\$4,400,000

**SPACE: TEMPORARY SENSITIVE COMPARTMENTED INFORMATION FACILITY
WITH SUPPORT SHELTERS AND STORAGE CONTAINERS**

1. Background. ANG space control squadrons require mobile, temporary shelters that act as classrooms, evaluation centers, and deployed operations centers. Shelters will house mission activities up to top secret and special access program security levels. Rapid acquisition of portable structures will allow space units to continue upgrade, conversion, and training activities to achieve initial operational capability and permit on-time delivery of mission employment to supported combatant commands and joint planning cells. The space control squadrons need storage for palletized equipment during set-up, teardown and movement for deployments. The storage containers will ensure the equipment is protected from damage during transit and will be used as secure storage at both deployment locations and home station. Each of the three ANG space control squadrons require one temporary sensitive compartmented information facility (TSCIF) with a hard-sided shelter and eight storage units.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 TSCIFs with Shelters (3080)	\$1,000,000	\$3,000,000
24 Storage Containers (3080)	\$12,000	\$288,000
Total		\$3,288,000

Cyberspace Operations

- **ANG Cyberspace Units Provide 15% of Cyber Mission Force Teams**
- **Network Warfare and Information Operations**
- **Defend DoD Networks, Systems, and Information**
- **Defend U.S. Homeland and National Interests Against Cyberattacks**
- **Provide Cyber Support to Military Operational and Contingency Plans**



The United States relies on the Internet and the systems and data of cyberspace for a wide range of critical services. Modern weapon systems, such as aircraft and satellites, have evolved into computers with wings and computers in orbit. They are filled with 4th and 5th generation technology and relies on the cyberspace domain to function. This reliance leaves the U.S. vulnerable in the face of dangerous cyber threats, as state and non-state actors plan to conduct disruptive and destructive cyberattacks on the networks of our critical infrastructure and steal U.S.

intellectual property to undercut our technological and military advantage. ANG cyber operations units are postured for cyber deterrence and cyber defense, with a focus of building cyber capabilities to defend warfighting capability and homeland/national interests against cyberattacks.

The ANG cyber operations force includes three cyber operations groups and twenty units. Cyber capabilities support federal- and state-level agencies, the Air Force, and combatant commands. Cyber units provide offensive and defensive cyberspace capability to support operational and planning activities along with other cyberspace support as requested.

Guardsmen participating in these missions draw upon skills from their related civilian careers.

Specific missions assigned to ANG units include network vulnerability assessments, digital media and network analysis, and full-spectrum cyber warfare support in both exercises and operations. Execution of these activities occurs from home station and national facilities through distributed operations.



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Critical Capabilities List

- Virtual Interconnected Training Environment (See Tab P)
- Cyber Threat Intelligence Appliance
- Part Task Trainer-Cyber (See Tab P)
- Secure Infrastructure and Collaborative Capability
- Cross Domain Solution

Essential Capabilities List

- Airborne Cyberspace Interactive Platform
- Cyber Combat Maneuvering Instrumentation
- Portable / Temporary Sensitive Compartmented Information Facilities for all Air National Guard Cyberspace Units
- Mission Mapping Tool to Enhance Cyber Protection Team Capabilities
- Standardization of Cyber Protection Team and National Mission Team Facilities, Equipment, and Systems in Order to Improve Operational Readiness

Desired Capabilities List

- None

CYBERSPACE: THREAT INTELLIGENCE APPLIANCE

1. Background. ANG Cyberspace Operations (CO) units require a Cyberspace Threat Intelligence Appliance (CTIA) to provide near real-time threat intelligence for Defensive Cyberspace Operations (DCO). A CTIA consists of private cloud-maintained file reputation databases for malware identification and research that scale to the appropriate classification level of the tasked mission network or weapon system. The system is essential to increase the defensive capability of ANG cyberspace units by providing actionable intelligence on malicious activity sources, emerging threats, and vulnerabilities to execute cyber protection team missions. DCO operations require data reputation sources to allow embedded analysts to validate files on the tasked system. Private cloud-based data allows for rapid targeting of malicious actors and provides protection where traditional file-based reputation security measures cannot be run on the system. The appliance provides the team and leadership with accurate and timely research tools encompassing vulnerabilities, malware, indicators of compromise, adversary tactics, techniques and procedures, and adversary profiles by integrating commercial cyber threat intelligence. The system alleviates time-consuming work and enhances a timely cyber intelligence processing-exploitation-dissemination process due to quick triage of anomalous activity in the network. One system is required for each of the three ANG CO groups.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 CTIA Systems (3080)	\$2,170,000	\$6,510,000
Total		\$6,510,000

CYBERSPACE: SECURE INFRASTRUCTURE AND COLLABORATIVE CAPABILITY

1. Background. ANG Cyberspace Operations (CO) units require Secure Infrastructure Collaborative Capability (SIC2) to provide shared situational awareness in a secure collaborative interactive environment and common operational picture to support near real-time, full-spectrum cyberspace operations and training opportunities. The majority of planning, operations activities, and cyber warfare information-sharing occur in classified, collaborative environments, primarily through the Joint Worldwide Intelligence Communication System (JWICS) and National Security Agency-Network infrastructure. ANG units need the capability to access in real-time the networks used by United States Cyber Command and the USAF for collaboration. The SIC2 will reduce travel and manpower costs, while providing a system to conduct briefings, debriefings, and information-sharing in a collaborative environment that is distributed to all ANG cyber mission areas. A SIC2 system is required for each of the 20 ANG CO units.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 SIC2 Systems (3080)	\$75,000	\$1,500,000
Total		\$1,500,000

CYBERSPACE: CROSS DOMAIN SOLUTION

1. Background. ANG Cyberspace Operations (CO) units require the capability to expand collaboration, security and interconnectivity with different network classifications through a Cross Domain Solution (CDS). The CDS protects data at different classification levels, while allowing maximum information-sharing between systems based on signatures and rule sets. The system is designed to allow maximum interoperability, multiple channels with multiple levels and sub-level or compartments within each channel, while still meeting Federal Information Processing Standard 140 (Suite B) encryption, National Security Agency Type 1 and Suite A encryption for classified systems. The Department of Defense accredited system supports all classification levels and allows bi-directional communication. The CDS is scalable, allows keys to be loaded remotely or locally, and enables local administrators to update rule sets which are vendor-agnostic. Additionally, system information passes through an end cryptographic unit and CDS to ensure confidentiality and integrity. The system must integrate into existing training systems, operational networks, and cyber weapon systems. One CDS is required for each of the 20 ANG CO units and one for the Distributed Training Operations Center (DTOC).

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Cross Domain Solutions (3080)	\$150,000	\$3,150,000
Total		\$3,150,000

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Security Forces

- **ANG Security Forces Units Provide 7% of the Total Force**
- **Integrated Base Defense**
- **Combat Arms Support**
- **Law Enforcement**

Air National Guard security forces include over 7,500 defenders from all wings in each of the 54 states and territories. Security forces protect and support worldwide contingencies and home-station installations.



The security forces missions include: installation access control, asset security, suspect apprehension and detention, high-risk vehicle inspections, heavy weapons support with military operations in urban terrain, mounted and dismounted individual and team patrols, convoy operations, detainee movement operations, personal security details, fly-away security, raven tasking, close precision engagement teams, active shooter response, and weapons qualifications through combat arms.



Security Forces 2017 Weapons and Tactics Conference

Critical Capabilities List

- Modular Small Arms Ranges
- Portable Use of Force Training System (See Tab P)
- Helmet System Modernization
- Modular Handgun System
- Duty Gear Modernization

Essential Capabilities List

- Counter Small Unmanned Aerial Surveillance System
- Precision Engagement and Assessment Suite
- Asset Tracking and Management System
- Portable Adaptable Training Shelter
- Fire Retardant Ensemble

Desired Capabilities List

- Elevated Defense Position
- Portable Intrusion Detection System
- Squad-Based Drones
- Combat Casualty System
- Radio Integration Package

SECURITY FORCES: MODULAR SMALL ARMS RANGES

1. Background. ANG Combat Arms (CA) personnel need a Modular Indoor Containerized Range (MICR) that will provide a fully enclosed zero surface danger zone and vertical danger zone environment allowing personnel to train and qualify safely 365 days a year, day and night regardless of external environmental conditions. With the MICR, CA personnel will be able to ensure all of the Air Force’s assigned combat personnel, an average of over 250 personnel per installation, will receive weapons qualification training in a timely and cost-efficient manner. Additionally, personnel assigned to a deployable Unit Type Code must qualify once every three years to meet Category B requirements, resulting in a minimum 33 percent increase in personnel requiring scheduled weapons qualification. The ANG has 28 installations with a small-arms range and only three are compliant with the Air Force Engineering Technical Letter (ETL) 11-18: Small Arms Range Design and Construction. The need for a modular small arms range is magnified because of the remaining 25 ranges, eight are permanently closed and 17 other are in a state of degraded operations. Those degraded ranges are currently operating with waivers, until repairs become too costly or waivers are withdrawn and they will be closed. Due to significant health and safety concerns, the ETL prohibits major or component repairs of an existing range if it will cost more than 50 percent of the estimated replacement cost. In the event that repairs will cost more than 50 percent of the replacement cost, the entire range facility must be upgraded to comply with the ETL. The ETL identifies and authorizes only one replacement option that will meet a majority of ANG bases capability. The remaining installations lack organic range capability and must find offsite locations to train and qualify. For most ANG wings, this involves lengthy preparation and travel time for both CA personnel and other members of ANG wings, while also incurring a substantial cost for travel and/or range time. Currently there are three employed modular small arms ranges; 12 additional ranges will allow for weapons qualifications to continue while base Civil Engineers program for new ranges to be constructed using Military Construction (MILCON).

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Small Arms Ranges (3080)	\$4,500,000	\$54,000,000
Total		\$54,000,000

SECURITY FORCES: HELMET SYSTEM MODERNIZATION

1. Background. ANG Security Forces (SF) need a modernized helmet system to provide SF personnel the capability to adapt to multiservice communication and mission requirements. ANG SF have utilized the current Advanced Combat Helmet (ACH) beyond its intended capability. In order to extend the ACH’s capability, various modular enhancements were made that fail to meet current mission requirements. Current helmet configurations have exceeded their life cycle and in many cases are more than 15 years old. Based on diverse mission sets including: Raven; Tactical Security Element; National Guard Response Force; Fly-Away Security Teams; Protective Service Detail; Special Reaction Team; Tactical Response Force; Detainee Mission Operations; and active shooter responses, a multi-use helmet system is required. The helmet system must be compatible with the current inventory of mandible guards and visor systems. Additionally, current inventory of helmets from unit to unit are inconsistent in style, design and age across the SF enterprise and need to be consistent across the ANG. With new helmets, protective eyewear and communications adapters that are compatible with the selected helmet are needed. One helmet system, one set of protective eyewear, and one headset communication adapter is required for each ANG SF airman.

2. Program Details.

Quantity	Unit Cost	Program Cost
7422 Viper P4 Ballistic Helmets (3080)	\$500	\$3,711,000
7422 Authorized Protected Eyewear List Goggles (3080)	\$60	\$445,320
7422 Headset Communication Adapters (3080)	\$300	\$2,226,600
Total		\$6,382,920

SECURITY FORCES: MODULAR HANDGUN SYSTEM

1. Background. ANG Security Forces (SF) require a modern handgun system to conduct operations at home station and overseas. Current handgun configurations do not allow for low light use, adaptability, and shooter size versatility. The Army’s M18 modular component system provides warfighters a light, compact, accurate handgun with grip versatility and scalable options including a military specification rail system. The Army Acquisition Corps, along with the Air Force Security Forces Center, have approved the system for use in current and future military operations. The ANG requires 10,555 M18 Modular Handgun Systems to modernize all SF duty weapons (7,422) and Combat Arms qualification (3,133) inventory.

2. Program Details.

Quantity	Unit Cost	Program Cost
10,555 M18 Modular Handgun System (3080)	\$200	\$2,111,000
Total		\$2,111,000

SECURITY FORCES: DUTY GEAR MODERNIZATION

1. Background. ANG Security Forces (SF) require modern, multifunctional duty gear that is adaptable to constantly changing threat environments. The current fielded duty gear is not well-suited to meet the multiple mission sets that SF conduct at home station and while deployed. SF requires a modular and scalable ballistic armor vest that offers increased mobility, agility, and intuitive use while providing threat coverage consistent with theater requirements. SF also requires an improved load carrying system to carry and manage loads in a more effective and practical manner when paired with an improved ballistic vest. SF requires a holster system and tactical light adapter that will allow the user to carry the M18 pistol in multiple configurations. One set of duty gear is required for each ANG SF airman.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,422 Ballistic Body Armor Kits (3080)	\$500	\$3,711,000
7,422 Load Bearing Kits (3080)	\$910	\$6,754,020
7,422 M18 Compact Holster Systems (3080)	\$200	\$1,484,400
7,422 Tactical Light Adapters (3080)	\$550	\$4,082,100
Total		\$16,031,520

Explosive Ordnance Disposal

The ANG has 17 Explosive Ordnance Disposal (EOD) flights. These units are uniquely trained and equipped to facilitate explosive operations during joint wartime missions. In the deployed environment, EOD operators routinely defeat Improvised Explosive Devices (IEDs), render safe Unexploded Ordnance (UXO), perform route clearance operations, conduct post-blast analysis, evidence collection, and embed with special operations forces. Furthermore, EOD technicians must also be prepared to respond to incidents involving chemical/biological weapons, Weapons of Mass Destruction (WMDs), and nuclear weapons.



EOD technicians perform an extremely dangerous military mission and must continually adapt their equipment and technology to meet the ever-changing tactics of their adversaries. The breadth and variety of IEDs/UXOs/WMDs encountered by EOD technicians in the field forces units to maintain many single purpose items while simultaneously staying at the forefront of technology. Technological advancement within the EOD program is imperative in order to match the advancements of our enemies.

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Critical Capabilities List

- High Resolution Digital Radiography X-Ray System for Dismounted Operations
- Medium Sized Robot for Improvised Explosive Device Defeat with Multiple Sensor Integration
- Multifunctional Remote Firing Devices to Replace Legacy Systems
- Advanced Access, Assessment, and Defeat Toolkit
- Fully Integrated Team Power Management Solution

Essential Capabilities List

- Lightweight Integrated Portable Secure Tactical Communication Kit
- Tactical Integrated Tablet System for Integration with Tactical Assault Kit
- Chemical, Biological, Radiological, and Nuclear Initial Detection and Identification Capability
- Short Range Situational Awareness Airborne Sensor Platform
- Render Safe Procedure Explosion Containment Toolkit

Desired Capabilities List

- Advanced Trauma Medical Support Training Devices for Explosive Ordnance Disposal Regional Training Sites
- Universal Translator Capable of Operating Offline to Support State Partnership Program Missions
- Homemade Explosive Universal Desensitizer
- Updated Unexploded Ordnance and Unit Committed Munitions Listing Training Aids
- Blended Infrared Capability for PVS-31 Binocular Night Vision Device
- Next-Generation Lightweight Bomb Suit
- Human Augmentation Exoskeleton
- Personal Blast Overpressure Gauge / Dosimeter

EOD: HIGH RESOLUTION DIGITAL RADIOGRAPHY X-RAY SYSTEM FOR DISMOUNTED OPERATIONS

1. Background. ANG Explosive Ordnance Disposal (EOD) requires the capability to employ modern digital radiography technology to produce high quality X-Ray images in austere and remote environments in support of contingency operations. Fielded radiography systems are cumbersome and utilize outdated technology that yields low resolution imagery. This makes it extremely difficult for EOD technicians to effectively interrogate military ordnance, sophisticated Improvised Explosive Devices (IEDs) and Weapons of Mass Destruction (WMDs). EOD technicians require a man-portable, high resolution, digital radiography system that enables exploitation of suspicious devices, IEDs, WMDs, as well as unexploded ordnance, both foreign and domestic. ANG requires 21 total systems, one for each of the 17 ANG EOD flights and 4 to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 High Resolution Digital Radiography Systems (3080)	\$70,000	\$1,470,000
Total		\$1,470,000

**EOD: MEDIUM SIZED ROBOT FOR IMPROVISED EXPLOSIVE DEVICE DEFEAT
WITH MULTIPLE SENSOR INTEGRATION**

1. Background. ANG Explosive Ordnance Disposal (EOD) requires a medium-sized robot with Chemical, Biological, Radiological, and Nuclear (CBRN) sensor integration, disruptor capability, day/night high resolution optics, stair-traversing capability, and digital radio communications capability. The system currently employed is too heavy, has proven to be unreliable, and lacks proper access capabilities. ANG requires 21 total systems, one for each of the 17 ANG EOD flights and four to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Medium Sized Robots (3080)	\$230,000	\$4,830,000
Total		\$4,830,000

EOD: MULTIFUNCTIONAL REMOTE FIRING DEVICES TO REPLACE LEGACY SYSTEMS

1. Background. ANG Explosive Ordnance Disposal (EOD) requires a portable, multiple-function, remote firing device capable of detonating both electric and non-electric initiators. This system must provide ANG EOD units with a two-way communication capability between multiple transmitters and receivers which is field configurable to optimize safety. Systems must be compatible with currently fielded night vision optics, and meet basic MIL-STD-810G requirements for high/low temperature, vibration, and shock. The ANG EOD enterprise lacks standardized systems. Current inventory is comprised of a mix between a legacy system that is incapable of functioning non-electric initiators and a newer system no longer supported by the manufacturer. ANG EOD needs to acquire a common solution for all flights to bridge this gap. ANG requires 21 total systems, one for each of the 17 ANG EOD flights and four to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Multi-Function Remote Firing Devices (3080)	\$22,500	\$472,500
Total		\$472,500

EOD: ADVANCED ACCESS, ASSESSMENT, AND DEFEAT TOOLKIT

1. Background. ANG Explosive Ordnance Disposal (EOD) flights require advanced tools to access, assess, and defeat advanced Improvised Explosive Devices (IED) and Weapons of Mass Destruction (WMD). Advanced technologies, programmable microcircuits, and the ubiquity of internet sources and social media have given IED builders the ability to create devices capable of inflicting great harm on personnel to include the use of WMD. Teams must be prepared to engage any device in any environment. There is currently no fielded access, assessment, and disablement toolkit. Teams must be able to access any type of package or casing, visualize the component threats, analyze and trace circuits, detect and mitigate triggers, take and analyze radiographs, and ultimately defeat the firing circuit. The toolkit must be accompanied by manufacturer training to educate the end user on safe and effective implementation of the kits. To maintain this skill set, units also require reusable training devices to exercise this critical skill set on a routine basis. ANG requires 185 individual kits (one for each EOD member) and 21 total team systems, one for each of the 17 ANG EOD flights and four to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
185 IED/WMD Access, Visual Inspection, Analysis, and Defeat Kits (3080)	\$1,800	\$333,000
21 Team Detect, Access, and Disable Kits with Reusable Training Aids (3080)	\$115,000	\$2,415,000
Total		\$2,748,000

EOD: FULLY INTEGRATED TEAM POWER MANAGEMENT SOLUTION

1. Background. ANG Explosive Ordnance Disposal (EOD) teams require a power management system to support various mission sets and equipment configurations. EOD teams rely on a myriad of different batteries with each power source requiring various charging equipment. This forces teams to bring an excessive amount of batteries and chargers on each mission. ANG EOD needs a universal, adaptive charger and a field power management solution for all flights to bridge this gap. This capability will allow units to reduce weight and harvest power from various sources to enhance mission effectiveness, maximize energy usage, and provide power where and when it is needed. ANG requires 38 total systems, two for each of the 17 ANG EOD flights and four to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
38 Adaptive Battery Chargers (3080)	\$9,000	\$342,000
38 Field Power Management Systems (3080)	\$4,500	\$171,000
Total		\$513,000