WEAPONS SYSTEMS MODERNIZATION PRIORITIES 2017

FOREWORD

Each year, expert airmen from across the Air National Guard (ANG) come together at the Air Reserve Component Weapons and Tactics (WEPTAC) conference to identify capability gaps and solutions. This book documents the equipping and modernization capabilities as determined by the conference working groups. The ANG will work with industry partners to harness off-the-shelf capability to equip our warfighters as well as resources will permit.

The capabilities identified in this book are essential to the ANG for the accomplishment of both its overseas and domestic missions. ANG units stand ready to support their states and country when disaster strikes making it vital to field modernized, relevant equipment to ensure all missions are supported both at home and abroad. Fielding capabilities from previous versions of this book has been critical in building the reliable and ready force of today. The priorities listed here will continue to improve readiness and modernize ANG capabilities to meet future security challenges of our nation..

We are the Air National Guard, and we stand ready to support the 54 states, territories, and the District of Columbia collectively.

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

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Introduction

The 2017 Air National Guard (ANG) Weapons Systems Modernization Priorities Book documents capability priorities identified during the Oct 2015 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 2017 Book is organized into 18 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 Procurement money.)

The State Matrix on each Tab page identifies ANG weapons systems locations by state/territory. These depictions reflect the force structure as of 01 Dec 2016.

State Matrix

Weapons System Reference Table by State (01 Dec 2016)

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-21A	F-15	F-16	F-22	HH-60	KC-135	MQ-1/9	AOC, BCC, CRC	Cyber, Space	DCGS, MC-12W, RC-26B	GA / ST / TACP	DMO LVC Range
AK			•	H	HC					•	•		BCC	Space		GA	
AL								•			•				RC-26B /DCGS		
AR				H								•			DCGS		Range
AZ								•			•	•			RC-26B		
CA				J	HC		•			•		•		CY/SP	RC-26 / DCGS	GA	
CO						C-21A		•						Space			Range
CT				H									CRC				
DC								•									
DE				H													
FL							•						AOC	Space			
GA				H		E-8C							CRC		DCGS	TACP	Range
GU																	
HI			•						•				AOC/BCC		DCGS		
IA											•	•	CRC	Cyber	DCGS / RC-26		DMO
ID	•															TACP	
IL				H							•		AOC			TACP	
IN	•														DCGS	TACP	Range
KS											•		CRC	CY/SP	DCGS	TACP	Range
KY				H												ST	
LA							•									TACP	
MA							•								DCGS		
MD	•													CY (3)			
ME											•						
MI	•											•	AOC				Range
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		TACP	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			TACP	Range
PR				H									CRC				
RI				J										Cyber			
SC								•									
SD								•									
TN			•								•	•		Cyber	DCGS		
TX				H				•				•		Cyber	RC-26B	TACP	Range
UT											•		CRC		DCGS		
VA									•						DCGS		
VI																	
VT								•						Cyber			
WA											•		BCC	CY (2)	RC-26B	TACP	
WI								•			•		CRC		RC-26B		Range
WV			•	H											RC-26B		
WY				H										Space			

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2017 Weapons System Modernization Book Edited by NGB/A5X

A-10

- **Close Air Support (CAS)**
- **Forward Air Controller – Airborne**
- **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 (OCO). 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 capabilities for ground forces in its forward air controller-airborne (FAC-A) role.

The ANG operates 72 A-10s at Boise AP, Boise, ID; Selfridge ANGB, MI; Ft. Wayne IAP, IN; and Martin State AP, MD. ANG aircraft have the helmet-mounted integrated targeting modification, drastically reducing the time required to acquire targets. This ultimately increases both survivability and lethality. The ANG A-10 aircraft are equipped with two ARC-210 radios, giving them a unique capability to simultaneously communicate via secure line of sight (SLOS) and beyond line of sight (BLOS), 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.

A-10
2016 Weapons and Tactics Conference

Critical Capabilities List

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

Essential Capabilities List

- Operational Flight Program Upgrade
- Targeting Pod Development
- Smart Triple Ejector Rack
- Ability to Find / Fix Targets Through the Weather
- Improved Survivor Defense / Concealment

Desired Capabilities List

- Electronic Flight Bag
- 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. The A-10 requires improved Positive Identification (PID), intelligence, surveillance, and reconnaissance, and battle tracking capabilities. Friendly forces and enemy combatant PID is crucial in any conflict. Currently, three capabilities can immediately help A-10 pilots improve PID. The first capability is an improved HMCS. HMCS reduces the time to acquire targets with aircraft sensors from minutes to seconds, and allows pilots to quickly and accurately locate the position of friendly ground forces. The next component is the ability to generate and display high-resolution video. Advanced Targeting Pod (ATP) digital output upgrades with color video provide high-resolution feeds, coupled with high definition displays, enable visual identification of friendly and enemy forces from greatly increased standoff ranges. The additional situational awareness afforded to pilots provides a more accurate three-dimensional picture of the battlefield, thereby lowering risk to friendly forces, civilian personnel, and property. Finally, installation of high-resolution displays in the A-10 enables full utilization of targeting pod improvements. Refinements, through ARC-210 connections, to the display system allow pilots to securely share data, including any ATP imagery, with Joint Tactical Air Controllers. These actions lesson the likelihood of fratricide or collateral damage.

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**	**$38,480,000**
196 Targeting Pod Upgrades (3010) *** ****	**$250,000**	**$49,000,000**
Total		**$99,480,000**

* Includes 10% spares

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

A-10 IMPROVED ELECTRONIC ATTACK / PROTECTION AND FULL-SPECTRUM COUNTERMEASURE SYSTEMS

1. Background. The A-10 Electronic Warfare (EW) suite requires considerable modernization to keep pace with surface-to-air threat technology advancements and proliferation. Modernized EW suite subsystems, architecture, and countermeasures will allow the A-10 to conduct full spectrum combat operations in the vast majority of today's contested environments. The Air Force identified these vulnerabilities in the 2012 A-10C Operational Viability and Sustainment Gap Analysis Report, but due to continuing budget battles over retiring the aircraft, very little has been done to address them. Accordingly, A-10 EW modernization needs to focus on several critical capabilities in the Radio Frequency (RF) spectrum: radar warning receiver (RWR) modernization, improved chaff program development, integration with Digital Radio Frequency Memory (DRFM) 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 IR countermeasures which reliably decoy modern IR threats, as well as by replacing the AAR-47 with a missile warning system capable of detecting those threats more reliably and at greater distances.

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 add a spares asterisk if applicable

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

1. Background. The A-10 lacks interconnectivity and security with many fielded communication and data link variants. 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 multi-band and multi-mode digital radios with SATCOM capability meet the need for simultaneous Beyond Line-of-Sight (BLOS) and Secure Line-of-Sight (SLOS) 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 (CSAR) or Close Air Support (CAS) 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. Continued advancements in data link architecture and the proliferation of data link systems to multiple aircraft and ground parties requires the A-10 to upgrade its data link system to include Link 16 capability.

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 Mobile User Objective System (MUOS) Capable Radios NRE (3010)	**N/A**	**$3,000,000**
94 ARC-210 Gen 6 MUOS Radios (3010) *	**$850,000**	**$79,900,000**
Total		**$109,760,000**

* Includes 10% spares add a spares asterisk if applicable

A-10 IMPROVED ABILITY TO OPERATE IN A DEGRADED / DENIED GLOBAL POSITIONING SYSTEM ENVIRONMENT

1. Background. Virtually every system on the A-10 depends on the highly accurate timing, position, orientation, and velocity data the Embedded Global Positioning System (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 (CRPA), coupled with a Digital Antenna Electronics (DAE) unit, to nullify the effects of jamming systems. The integration of Selective Availability Anti-Spoofing Modules (SASSM) reduces the impacts of jamming and protects GPS' civil Standard Positioning Service and military Precise Positioning Service accuracies. Additionally, current Federal Aviation Administration (FAA) regulations mandate compliance with Automatic Dependent Surveillance-Broadcast (ADS-B) Out by 2020. The A-10 needs greater surveillance precision and reliability in order to comply with the national aerospace system's transition to the satellite-based air traffic control system. Upgrading the A-10's current EGI supports the FAA mandate and provides increased capability to preserve GPS integrity in a contested or degraded electromagnetic environment.

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. The A-10 is the only fighter aircraft in the Air Force inventory with the ability to land at austere, unimproved airfields. Emerging capabilities will improve the A-10's ability to operate from these airfields by reducing the number of maintenance and logistics personnel required to support operations. These capabilities provide Combatant Commanders flexibility to pre-deploy A-10s closer to the expected battlespace, and enables rapid response during close air support, forward air controller-airborne, and combat search-and-rescue sorties. Combat 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 allows 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 modifications permit carriage of additional Global Positioning System-guided munitions. Maintenance personnel 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
Combat Fuel Tank Non-Recurring Engineering (NRE) (3600)	**N/A**	**$1,000,000**
94 Combat Fuel Tanks (3010) *****	**$111,000**	**$10,434,000**
OBOGS NRE (3010)	**N/A**	**$2,500,000**
94 OBOGS (3010) *****	**$225,000**	**$21,150,000**
Parking Brake NRE (3600)	**N/A**	**$2,000,000**
94 Parking Brake Kits (3010) *****	**$25,000**	**$2,350,000**
Triple Ejector Rack NRE (3600)	**N/A**	**$2,000,000**
179 Smart Triple Ejector Racks (3010) *****	**$100,000**	**$12,600,000**
4 Austere Airfield Maintenance Kits (3010) *****	**$1,500,000**	**$6,000,000**
Total		**$60,034,000**

*Includes 10% spares

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Command and Control

- **Air Surveillance and Defense for North America**
- **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. AOC personnel are organized as divisions specializing in integrated / distributive C2 processes / products. The AFFOR staff is organized as special / functional directorates that provide planning teams to the Commander, Air Force Forces (COMAFFOR), in support of a Joint Forces Commander or Combatant Commander.

Battle Control Center (BCC) – The BCC operations force includes four ARC operations groups and squadrons in WA, NY, AK, and HI, as well as one Active Component unit in the Republic of Korea. BCCs support North American Aerospace Defense (NORAD)/Northern Command (NORTHCOM) as part of the homeland defense mission, defense support to civil authorities and search and rescue. BCCs provide 24/7 aerospace surveillance, warning, control, and maritime warning in the defense of North America. In the last year, four ARC BCCs have tracked over 4,000 tracks of interest and taken over 1000 tactical actions in defense of North America.

Control and Reporting Center (CRC) – The CRC, at 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.

Command and Control
2016 Weapons and Tactics Conference

Critical Capabilities List

AOC

- Weapon System Upgrade to Recurring Event 15
- AOC Secure Voice Capability
- Data Links Training Tool (See Tab P)
- Cross Domain Network Capability
- Distributed Mission Operations and Training Capabilities (See Tab P)

BCC

- Live, Virtual, Constructive (LVC) 4th & 5th Generation Training System (See Tab P)
- MVP Upgrade w/Redundancy Intra-Enterprise Red
- Data (A/V) Collection Mission Training Recording/Debrief Platform
- Tactical-to-Tactical Data Link Modernization
- BCC Mission System Modernization

CRC

- Highly-Mobile, Medium Range AESA Radar
- In Garrison Operations Facility
- Simulator Technical Refresh (See Tab P)
- Electronic Attack Training Suite

Combat Identification Capability

Essential Capabilities List

AOC

- Redundant AOC NIPR/SIPR Circuit
- Cross Domain Network Capability Phase 2
- Dual Use Collateral/Coalition Network

BCC

- Mobile BCC/COOP Capability
- Joint Engagement Zone (JEZ) Battle Management C2 Systems.
- Pocket J Link 16 Software Upgrade

CRC

- Integrated Mode5/ Automatic Dependent Surveillance – Broadcast (ADS-B) Sensor Suite
- Decoy System
- Advanced Intelligence Feeds
- Deployed Radar (DR) Site Redundant C2 Engine
- Naval Integrated Fire Control (IFC) Interoperability

Desired Capabilities List

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

AOC: WEAPONS SYSTEM UPGRADE TO RECURRING EVENT 15 UPGRADE

1. Background. The ANG Air Operations Centers (AOCs) require the AN/USQ-163 Falconer Weapon System Recurring Events (RE) 15 upgrade. The RE 15 upgrade consists of a major platform change, and a core equipment upgrade. RE 15 provides critical security updates required to support recertification and corrects vulnerabilities identified in the underlying applications and subsystems for previous upgrades. RE 15 will be installed in all geographic AOCs, however ANG Air Operations Groups have not been funded for this upgrade. Program Action Directive 10-2, paragraph 5.6.5 directs the ANG train to the same standard with whom they are aligned. This direction requires that Active Component and ANG systems align to ensure operational and training standardization. ANG AOC's lack a suitable training suite and utilize their unit's weapons system to provide training. Request upgrades at five of the eight ANG AOCs which use AN/USQ-163 Falconer Weapon System.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 RE 15 Upgrades (3080)	**$1,000,000.00**	**$5,000,000**
Total		**$5,000,000**

AOC: DIRECT OPERATIONAL SECURE VOICE COMMUNICATION

1. Background. ANG Air Operations Centers (AOCs) continue to use Radio Frequency (RF) to communicate with joint services, allies, partner nations, aircraft platforms, associate units and emergency response agencies for domestic response coordination. AOCs lack the capability to communicate directly via radio frequency with supported Commanders, fielded units, and state emergency agencies. AOC units must train and operate on the same systems as the aligned active component AOCs they support. ANG AOCs need a modernized secure communications package that consist of at least one Mobile User Objective System (MUOS) Tactical Satellite (TACSAT) compatible radio, one High Frequency (HF) radio, antenna systems, radio to Internet Protocol (IP) Bridge and Communications Security (COMSEC) equipment A radio-to-Internet Protocol (IP) bridge provides digital voice communications that route live radio voice traffic between multiple sites over local and wide area data networks and provide real-time training between multiple in-state units during domestic response events. An IP Bridge can be used by ANG AOCs to simulate and train realistic Tactical Air Control System procedures, participate in real-world events, conduct distributed operations, and interface with aligned units increasing readiness.

2. Program Details.

Units Required	Unit Cost	Program Cost
8 TACSAT Radios (3080)	**$40,000**	**$320,000**
8 HF Radios (3080)	**$35,000**	**$280,000**
8 IP Bridges (3080)	**$10,000**	**$80,000**
8 COMSEC Packages (3080)	**$15,000**	**$120,000**
Total		**$800,000**

AOC: CROSS DOMAIN NETWORK CAPABILITY

1. Background. Air Operations Center (AOC) operators and Air Force (AF) 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 Servers (3080)	**$100,000**	**$800,000**
8 Hardware Clients(3080)	**$40,000**	**$320,000**
8 Software Licenses (3080)	**$250,000**	**$2,000,000**
8 Installation and Certification (3080)	**$150,000**	**$1,200,000**
Total		**$4,320,000**

BCC: MISSION VOICE PLATFORM COMMUNICATION SUITE INTERAGENCY REDUNDANCY UPGRADE

1. Background. The four Battle Control Center's (BCC) Mission Voice Platform (MVP) communications systems need a backup capability and connection of a classified (red) net to provide BCC to BCC coordination. The MVP system is the console consisting of hardware and software that supports the BCC operator's interactive radios, telephone, and other point-to-point voice communication nets. BCCs are currently limited to Secure Telephone Equipment (STE) or Voice Over Internet Protocol (VOIP) for secure communication. The MVP upgrade groups hardware into two independent systems, referred to as Side A and Side B, each providing communication services to the operators.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Mission Voice Platform Software Upgrades (3080)	**$375,000**	**$1,500,000**
4 Red Net Connectivity Upgrades (3080)	**$250,000**	**$1,000,000**
Total		**$2,500,000**

BCC: MISSION DATA COLLECTION AND TRAINING DEBRIEF CAPABILITY

1. Background. The ANG Battle Control Centers (BCC) need a mission debrief, recording and reconstruction capability. 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 (TTP). The BCC Debrief Recording System (BDRS) needs to record data and voice transmissions from the Battle Controlled System-Fixed display, secure and non-secure telephones, intercoms, Domestic Event Network communication and internal BCC communications. The BDRS should allow multiple operators to access playback and manipulate recorded feeds. The recorded file should be exportable/playable to any Windows desktop and organically playable in Windows Media Player. The program should provide speech to text capability with analytics providing detailed information on operator inputs.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 BCC Brief/Debrief Recording System (3080)	**$250,000**	**$1,000,000**
Total		**$1,000,000**

BCC: TACTICAL-TO-TACTICAL DATA LINK MODERNIZATION

1. Background. ANG Battle Control Centers (BCCs) need modernized tactical to tactical data link hardware and software to meet mission requirements. New High Frequency (HF) radios are required to support air defense Command and Control (C2) mission requirements because BCCs share information with assigned tactical assets, higher headquarters and between other BCCs using Beyond Line-of-Sight (BLOS) HF Link-11 (L-11) as the primary means of data transfer. This solution is reached with the integration of a Cross Domain Solution (CDS) and BLOS HF L-11 capability. The proposed solution includes two additional Joint Range Extensions (JREs) and upgraded HF radios in each Continental United States (CONUS) BCC providing continuity of operations for information exchange within the North American Aerospace Defense (NORAD) Command. The Hawaii BCC requires two Multifunctional Information Distribution System (MIDS) terminals, a 3G Joint Range Extension Gateway (JRE-GW) and new HF radios to meet mission requirements. The CDS 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 (SAGE) application. Modernizing the tactical to tactical datalink connectivity at all BCCs is essential to ensure future homeland defense operations success.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 MIDS LVT 2 (3080)	**$500,000**	**$1,000,000**
6 Joint Range Extension Gateway (3080)	**$180,000**	**$1,080,000**
4 High Frequency Radios (3080)	**$50,000**	**$200,000**
4 Firewall Hardware / Software Packages (3080)	**$500,000**	**$2,000,000**
Total		**$4,280,000**

BCC: BATTLE CONTROL CENTER AND CONTROL REPORTING CENTER MISSION SYSTEM MODERNIZATION

1. Background. Currently Control and Reporting Center (CRC) and Battle Control Centers (BCC) lack a common mission system. A common mission system would allow the interchangeability of missions, manpower, and tactics techniques and procedures across weapons systems. CRCs are increasingly integrating with BCCs, creating the need for a common mission system which provides standardized training between both mission systems. Request four common mission systems for the four CRCs.

2. Program Details.

Units Required	Unit Cost	Program Cost
4 Common Mission Systems	**$1,000,000**	**$4,000,000**
Total		**$4,000,000**

CRC: HIGHLY-MOBILE, MEDIUM-RANGE ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

1. Background. The Control and Reporting Center (CRC) needs to augment its 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/TPY-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, multiple beam/multiple waveform flexibility and high target update rate. 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.

2. Program Details.

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

CRC: IN GARRISON OPERATIONS FACILITY

1. Background. The Control and Reporting Center (CRC) needs a 1300 sq. ft. climate controlled relocatable shelter to house the Tactical Operations Center (TOC) 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. Request one operations shelter for each of the 10 CRCs.

2. Program Details.

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

CRC: ELECTRONIC ATTACK TRAINING SUITE

1. Background. Control and Reporting Centers (CRCs) need the ability to conduct live jamming training in the radar shelter and the tactical operations center. Currently there is a no capability to simulate electronic attack against the CRC leaving crews untrained to face a capable adversary. The CRC needs a low power ground based jammer to train to the effects of Electronic Attack (EA). The jammer must provide: barrage / spot / Doppler noise, velocity gate pull off, range-gate pull off, multiple false targets, and Digital Radio Frequency Memory (DRFM) generated EA waveforms against the AN/TPS-75 Radar. A live jamming system prepares crews for emerging threats which improves the effectiveness and survivability of the CRC and defended assets.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Electronic attack training Suite (3080)	**$250,000**	**$2,500,000**
Total		**$2,500,000**

CRC: COMBAT IDENTIFICATION CAPABILITY

1. Background. Control and Reporting Centers (CRCs) must be able to quickly obtain accurate object identification information for decision makers and shooters. Once an object is detected, operators must be able to quickly and positively identify the contact with the fidelity and confidence required to direct shooters to act on the information. The CRC requires non-cooperative passive Combat Identification (CID) system to positively identify enemy contacts. The CID system would provide full threat band frequency coverage, instantaneous azimuth coverage, and has an on-line library of emitter types for rapid combat identification. The system must enable long ranges decisions to orient shooters and allow them to engage beyond visual range. One system is needed for each of the ten CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 CID Systems (3080)	**$1,500,000**	**$15,000,000**
Total		**$15,000,000**

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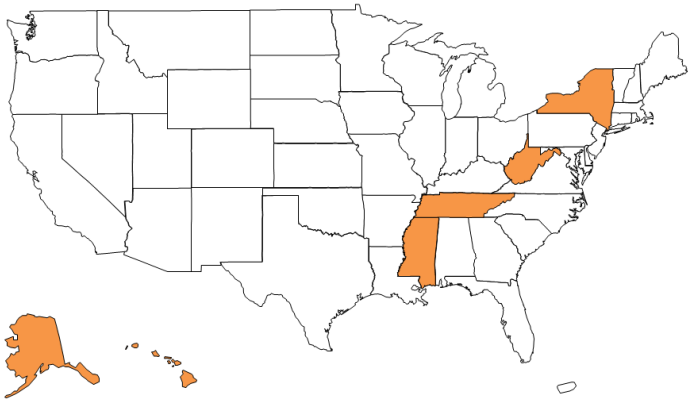
C-17

- **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 (AMC) 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 the 105 AW, Stewart ANGB, NY; 164 AW, Memphis IAP, TN; 167 AW, Eastern WV RAP; 145 AW Charlotte, NC; and the 172 AW in Jackson, MS. The 154 AW at Hickam AFB, HI and the 176 WG at Elmendorf AFB, AK are ANG 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
- Digital Radar Warning Receiver
- Forward Air Refueling Point (FARP) Carts and Equipment
- Laser-Resistant Windscreen Film

Essential Capabilities List

- Single Pass Precision Airdrop Targeting Pod.
- Cockpit Electronic Flight Bag (EFB) Power Adapter.
- Improved High Definition Night Vision Goggles.
- Improved Aircraft Seat Armor.
- High Bandwidth Inflight Internet.

Desired Capabilities List

- Active Noise Reduction.
- Fifth Mission Computer Display.
- Wireless Global Positioning System Receiver for EFB Integration.
- Aviator's Night Vision Information System-Compatible EFB Filters.

C-17 COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. Current information-based dynamic battlespace environments need secure airborne data communications with other aircraft, command and control (C2) agencies, and ground-based forces. The Mobility Air Forces (MAF) Mission Computer's data link and data transfer capabilities provide aircrews the ability to report and receive battlespace information such as position of other aircraft, weather, threat, mission events, mission status, task completion, resource status, etc. 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 UHF satellite communication radios provide both data and voice using satellites operating outside of traditional data link bandwidths. This enables the crew to get real-time updates for weather, departure and landing information, as well as provides C2 reach-back capability. Electronic flight bags can electronically 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. Request 38 of each set of components to equip the entire ANG fleet including ten percent spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
38C-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 COUNTERMEASURES

1. Background. ANG C-17s operate worldwide in environments where Man-Portable Air Defense Systems (MANPADS) proliferate, requiring a robust self-defense capability. MANPADS represent a significant threat during takeoff and landing phases of flight because many are designed to defeat flare-based defensive systems. The Block 30 Large Aircraft Infrared Countermeasures (LAIRCM) system provides the most effective countermeasures against MANPADS. C-17s transferring to the ANG may not arrive with LAIRCM installed, while those that do usually require upgrade to the Block 30 version. LAIRCM and its sensors are a prerequisite to having 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.

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 DIGITAL RADAR WARNING RECEIVER

1. Background. C-17 missions into Radio Frequency (RF) based threat areas drive a need for RF threat awareness and avoidance. For threat awareness, current operations rely heavily on off-board assets and command and control. ANG C-17s have no onboard Radar Warning Receiver (RWR) and therefore, lack onboard RF threat detection capability. A digital RWR is critical for C-17 missions into advanced/contested RF emitting threat areas.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
34 RWR Systems (3010)	**$700,000**	**$23,800,000**
Total		**$33,800,000**

C-17 FORWARD AREA REFUELING POINT CARTS

1. Background. Forward Area Refueling Point (FARP) carts provide ground vehicles and aircraft the ability to fuel directly from a C-17 on the ground. The carts can be airlifted by a C-17. This new capability gives the combatant commander or incident commander an ability to respond to warfighter demands to include major natural disasters, humanitarian events, and other needs that the ANG is uniquely tasked to support. This capability is critical in an anti-access, area denial environments. Fighters, helicopters, and other vehicles that use fuel increase their operational radius through the use of FARP carts. With fuel provided directly from the C-17, aircraft and support vehicles operate from austere locations without the problems associated with conventional over the road fuel delivery. Each C-17 Wing in the ANG will receive one FARP cart.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Forward Area Refueling Carts (3010)	**$2,200,000**	**$11,000,000**
Total		**$11,000,000**

C-17 LASER-RESISTANT WINDSCREEN FILM

1. Background. ANG C-17s operate worldwide in regions where lasing events have caused significant issues, from minor distractions to permanent retina damage. Lasing events do not only encompass contingency operations abroad, but are a viable threat to operations in the United States. Currently, C-17 aircrews are issued Aircrew Laser Eye Protection (ALEP) in specific locations during contingency missions. Due to the unpredictable nature of lasing events, laser-resistant windscreen film is needed to provide protection for the aircrew during all phases of flight without the requirement to wear ALEPs.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$120,000**
34 Laser-Resistant Windscreen Film Kits (3010)	**$133,000**	**$4,522,000**
Total		**$4,642,000**

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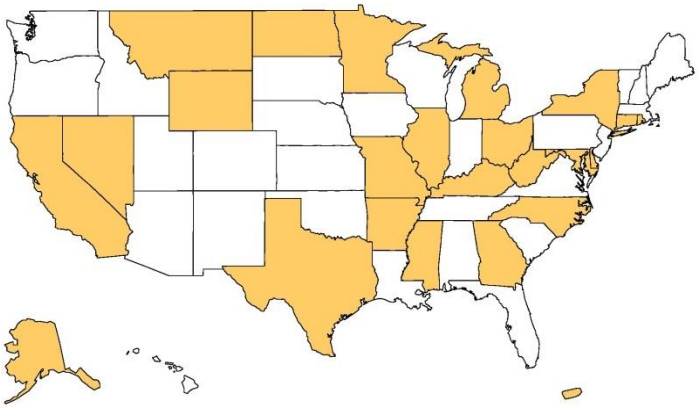
C-130 H/J

- **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

- Global Airspace Compliant Avionics/Instrumentation
- Improved Radio Frequency (RF)/Infrared (IR) Self-Protection
- Single-Pass Precision Airdrop
- Data Link with Integrated Defensive Systems
- Propulsion System Upgrades

C-130J

- Common Mobility Air Force Mission Computer with Data Link
- Single-Pass Precision Airdrop
- Improved RF/IR Self-Protection Suite
- Tactical Plot Suite
- Global Airspace Compliant Avionics

Essential Capabilities List

C-130H

- C-130 Multi-Mission Cockpit Trainers with Integrated Tactical Data Link
- Improved Dual-Mode External Light-Emitting Diode Lighting
- Enhanced Beyond Line-of-Sight Voice
- Hard-Kill Self-Protection
- Active RF Protection System

C-130J

- Data Link Capability for Weapons System Trainer/Multi-Mission Cockpit Trainers
- Improved Head-Up Display Readability During Night Vision Instrument System Mode
- Virtual Electronic Combat Training System (VECTS)
- GPS Jam-Resistant Embedded GPS/Inertial Navigation System (EGI) and Streamlined Notification
- Cargo Compartment Camera

Desired Capabilities List

C-130H

- Hostile Fire Indicator with Geographical-Reference Capability
- Permanent 115 Volt Alternating Current, 60 Hertz Flight Deck
- Wireless Fidelity Systems
- Military Secure Precision Global Position System (GPS) Tightly Coupled With Inertial Navigation System and Jamming Notification
- Cargo Compartment Modernization
- Helmet Mounted Display/Cueing
- Back-Up Camera
- Real-Time Weather Sampling and Modeling
- Improved Intercommunication System

C-130J

- Wireless Fidelity Systems
- Mission Recording and Reconstruction Capability
- Vertical Situation Awareness

C-130H UPDATED AVIONICS SUITE PROVIDING GLOBAL ACCESS AND MODERNIZED COCKPIT INSTRUMENTATION

1. Background. The C-130H fleet faces 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 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. Any further delay of the Avionics Modernization Program (AMP) will result in ARC C-130H 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) Out capability, NVIS compatibility and a modern Flight Management System (FMS) 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.

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 (3010)	**$465,000**	**$62,310,000**
Total		**$876,110,000**

C-130H IMPROVED RADIO FREQUENCY AND INFRARED SELF-PROTECTION

1. Background. C-130H aircraft operate within range of infrared (IR) Man-Portable Air Defense Systems (MANPADS). ANG C-130Hs have inadequate missile launch detection. Air Mobility Command (AMC) is fielding all of its combat aircraft (i.e., C-17, C-5, KC-135, and C-130J) with a baseline of Large Aircraft Infrared Countermeasures (LAIRCM) Block 30 to improve missile warning and defense; no plan exists to upgrade the C-130H beyond its current configuration. To remain relevant the C-130H must be able to better detect, degrade and defeat IR MANPADS. The AN/AAQ-24 LAIRCM Block 30 system improves detection against advanced MANPADS threats, while the Block 30's IR suppression system would degrade the 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. C-130H aircraft can expect to face or operate near RF-based threats. Most ANG C-130H aircraft have limited or no RF detection capability. 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.

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/J SINGLE PASS PRECISION AIRDROP

1. Background. The ANG C-130H/J fleet have several shortfalls in their 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 threat) for atmospheric calculations before dropping loads. 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. Software and hardware upgrades to the APN-241 radar provide synthetic aperture radar to meet these requirements in IMC airdrops. Radar upgrades coupled with targeting pods and off-board cueing provide a highly accurate all-weather single-pass airdrop capability that can be used to support domestic and contingency operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Targeting Pod Non Recurring Engineering (NRE) (3600)	**N/A**	**$16,000,000**
APN-241 Radar Upgrade NRE (3600)	**N/A**	**$3,000,000**
77 Targeting Pods (3010)	**$2,000,000**	**$154,000,000**
Total		**$173,000,000**

C-130H INTEGRATED DATA LINK AND DEFENSIVE SYSTEMS SUITE

1. Background. Combat operations have highlighted the need for comprehensive and networked battle space awareness for C-130s. The C-130 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 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/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.

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-130H PROPULSION SYSTEM UPGRADES

1. Background. The C-130H fleet's missions require 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.

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**	**$110,055,000**
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		**$1,299,533,000**

C-130J COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. Global mobility operations highlight the need for integrated battlespace awareness. Air Mobility Command (AMC) implemented the current C-130J data link system, named Dynamic Re-tasking Capability (DRC), to address an urgent operational need, but did not field this solution for all of the C-130Js. Only one-half of ARC C-130Js were modified with the DRC A-kits and, due to limited B-kit availability and sustainment issues, less than one quarter of the ARC aircraft are equipped to simultaneously employ with data link capability. Real-Time Information in the Cockpit (RTIC) is an existing ARC solution for global data link communications, providing secure beyond line-of-sight and line-of sight capabilities. An RTIC-type solution is acceptable for the C-130J as it 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 (AEP), which offers a federated mission computer capability. The government-owned software used to manage the AEP is the Tactical Airlift Mission Software Suite (TAMSS). TAMSS is a Mobility Air Forces (MAF) 1067 approved software program for the C-130H and provides an open architecture to implement mission needs not tied to the C-130J Block Upgrade cycle. Examples of emerging capabilities processed by TAMSS include global data link, Single Pass Precision Airdrop, and airdrop damage estimation. The ANG employs 16 C-130J aircraft. In order to ensure units are able to effectively train, operate and deploy with secure global data link capability, all aircraft should be modified with RTIC utilizing the TAMSS software suite.

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. C-130J aircraft perform demanding missions within the range of Man-Portable Air Defense Systems (MANPADS) and Radio Frequency (RF) threats. Combatant Command plans rely heavily on C-130s for logistical support to front-line troops and to operate closer to adversary tactical surface-to-air missile systems. The AN/AAQ-24 Large Aircraft Infrared Countermeasures (LAIRCM) Block 30 system provides the most capable countermeasures against MANPADS threats with the latest infrared sensors. The Block 30 configuration, being fielded on Air Mobility Command (AMC) C-17 aircraft, delivers greater warning, lower false alarm rates and higher reliability. At present, USAF C-130Js have no RF geolocation capability, which limits their ability to avoid the threat. Increased situational awareness is needed to correlate on-board and off-board threat detection, terrain masking, and optimized dynamic rerouting capabilities to avoid the threat. An advanced Radar Warning Receiver (RWR) is critical for C-130J aircraft to effectively employ near these threats. All 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 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**

C-130J TACTICAL PLOT SUITE

1. Background. The C-130J's software suite permits the use of only 10 Tactical Plots (TAC PLOT), which are limited to a circular shape only. The 10 circular TAC PLOTS are not adequate to display the robust tactical airspace picture where killbox/keypads, political borders, restricted operating zones and departure and arrival corridors exist. Aircrews currently use these TAC PLOTs to display factor airspace and threats "under the glass" on the C-130J Digital Map, the Navigation Radar Display, the Terrain Awareness Warning System display, and Coordinated Aircraft Position / Station Keeping Equipment. A TAC PLOT software suite meeting this capability exists for the C-5M, which uses the same hardware components as the C-130J. This software can be easily interfaced with the C-130J Mission Computer, Communication Navigation Interface-Management Unit and heads-down displays. This TAC PLOT suite allows the plotting of accurate killbox/keypads, arrival and departure sectors, and zone plotting where pilots can use multiple waypoints to draw uniquely structured airspace. Lastly, this software allows 50 entries of each type of TAC PLOT.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$4,000,000**
16 TAC PLOT Suite Software Updates (3010)	**$62,500**	**$1,000,000**
Total		**$5,000,000**

C-130J UPDATED AVIONICS SUITE FOR GLOBAL AIRSPACE ACCESS

1. Background. The delay of the C-130J Block Cycle Update for Block 7.0/8.1 means that ARC C-130J aircraft will not meet the 2020 deadline for international Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) mandates established by Federal Aviation Administration Directive Order 260B, and by the International Civil Aviation Organization. Also, with this delay, Block 6.0 C-130Js will not meet Precision and Area Navigation and Automatic Dependent Surveillance-Broadcast (ADS-B) Out requirements to operate worldwide beyond 1 June 2020. Updated avionics with ADS-B Out will address CNS/ATM mandates and increase operational effectiveness and efficiency by opening up 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$30,000,000**
16 C-130J Updated Avionics /ADS-B Out Group A Kits (3010)	**$1,300,000**	**$20,800,000**
16 C-130J Updated Avionics/ADS-B Out 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 H/MC-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. This year, efforts included supporting secure line-of-sight and beyond line-of-sight capabilities and radio communication upgrades.

HC/MC-130 - ANG HC/MC-130 units continue to deploy in support of overseas contingency operations and provide emergency rescue and relief support during domestic operations. Modernization efforts for the ANG HC/MC-130 fleet include loadmaster crashworthy seats, aircrew flight equipment racks, external arm mounts and heavy equipment airdrop capability.

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
2016 Weapons and Tactics Conference

Critical Capabilities List

LC-130

- Propulsion Modernization
- Avionics Obsolescence Solution
- Enhanced Situational Awareness
- Flight Deck Communications Upgrade
- Retractable External Arm and Ice Sensors

EC-130

- EC-130J Weapons System Trainer (WST) (See Tab P)
- Federated Defensive Systems Unit (DSU)
- Special Airborne Mission Installation and Response (SABIR) System Arms
- Emergency Equipment Storage Bins
- Special Operations Forces Air Mission Suite Enhanced Situational Awareness (SAMS-ESA) Interim Contract Support

HC-130

- Combat Search and Rescue (CSAR) Penetrator Suite
- Optimized Defensive Systems
- Interoperable Personnel Recovery Situational Awareness (PRSA)
- Electro-Optical/Infrared (EO/IR) Sensor Modernization
- Weapon System Trainer (WST) with Distributed Mission Operations (DMO) (See Tab P)

Essential Capabilities List

LC-130

- Mission Specific Simulator

EC-130

- Electro-Optical/Infrared (EO / IR) sensor
- Ku Band Spread Spectrum (KuSS) Units
- Removable Airborne Military Information Support Operations System (RAMS) Units

HC-130

- Internal Palletized Fuel Tank
- Electronic Flight Bag with Automatic Dependent Surveillance – Broadcast (ADS-B)
- Computer Navigation Surveillance/Air Traffic Management (CNS/ATM) and Required Navigation Performance (RNP)/Area Navigation (RNAV) Compliant Avionics
- Internet On Board (IOB)
- Moving Target Indicator (MTI) integrated in EO/IR sensor

Desired Capabilities List

In an effort to save space, the desired capabilities list has not been included. It is available upon request from NGB/A5.

LC-130 PROPULSION MODERIZATION

1. Background. ANG LC-130Hs have ski-equipped landing gear to enable landings and takeoffs on snow and ice. The C-130H fleet requires increased performance, efficiency, and reliability from a comprehensive propulsion upgrade. 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 C-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 C-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. If these propulsion upgrades are not funded for the LC-130H, the resulting loss of capability seriously reduces polar operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
NP2000 NRE (3600)	**N/A**	**$5,000,000**
10 NP2000 Kits(3010)	**$2,000,000**	**$20,000,000**
40 3.5 Engine Upgrades	**$1,400,000**	**$56,000,000**
10 IPBS Installs	**$550,000**	**$5,500,000**
Total		**$86,500,000**

LC-130 AVIONICS OBSOLESCENCE SOLUTION

1. Background. The LC-130 fleet faces 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, Automatic Dependent Surveillance-Broadcast ADS-B) Out capability, NVIS compatibility and a modern Flight Management System (FMS) 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.

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		**$136,650,000**

LC-130 ENHANCED SITUATIONAL AWARENESS

1. Background. Because of the nature of the ANG LC-130s mission they require an enhanced situational awareness to reduce risk during polar operations. As the only ski-equipped large transport aircraft in the DoD inventory, the LC-130's unique capabilities are required to support military and National Science Foundation 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) provides data link capability, onboard/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. Without tactical data link upgrades, LC-130 aircrews continue to lack the flexibility to operate efficiently with military and civilian organizations in dynamic situations.

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 FLIGHT DECK COMMUNICATIONS UPGRADE

1. Background. 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. A permanently installed Iridium voice and data solution with an external flush-mount antenna, capable of secure communication is required. Remote LC-130H operating locations, especially polar mission support, require long-range beyond-line-of-sight communications. Satellite communication is limited at polar high 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 communications (voice and text) 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. Without this upgrade the LC-130Hs are subject to safety issues and operational concerns associated with the short term fix currently in place for the Iridium radio and the inconsistent performance of HF communication.

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 AND ICE SENSOR

1. Background. The LC-130 requires the ability to survey large areas for hazards and to identify areas where it is safe to land 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) with survivability enhancements, polar search and rescue, and airborne sensing. 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 flexible external articulating arm. More effort is required to establish the retractable external arm as a permanent modification in the LC-130H fleet.

2. Program Details.

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

EC-130J FEDERATED DEFENSIVE SYSTEM UNIT

1. Background. ANG EC-130J aircraft need a federated Defensive Systems Unit (DSU) capable of aligning with updated Operation Flight Programs (OFP), 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 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. The 193rd Special Operations Wing needs 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**

SPECIAL AIRBORNE MISSION INSTALLATION AND RESPONSE SYSTEM ARMS

1. Background. ANG EC-130J aircraft require a Special Airborne Mission Installation and Response System (SABIR) Arm to meet Military Information Support Operations (MISO) broadcast requirements. The SABIR Arm is used to mount broadcast antennas and/or pods capable of simultaneous omnidirectional and directional broadcasting from the EC-130J. Each aircraft will need two SABIR Arms to meet this fundamental capability. The EC-130J community currently has four SABIR Arms and needs four additional SABIR Arms to ensure that four aircraft have two SABIR Arms each.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 SABIR Arms (3010**)**	**$1,225,000**	**$4,900,000**
Total		**$4,900,000**

EC-130J EMERGENCY EQUIPMENT STORAGE BINS

1. Background. 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/Off-Load (ERO) operations. The 193rd Special Operations Wing requires eight emergency equipment storage bins (two per aircraft) to ensure all four EC-130J (SJ) aircraft are capable of maximizing efficiency and aircraft payload.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	**N/A**	**$20,000**
8 Emergency Equipment Bins (3010)	**$96,000**	**$768,000**
Total		**$789,000**

EC-130J THE SPECIAL OPERATIONS FORCES AIR MISSION SUITE ENHANCED SITUATIONAL AWARENESS INTERIM CONTRACTOR SUPPORT

1. Background. EC-130J aircraft will be unable to meet mission requirements due to lack of funding for critical contractor support of the Special Operations Forces Air Mission Suite Enhanced Situational Awareness (SAMS-ESA) system. ANG EC-130J aircraft require CONUS/OCONUS Integrated Computer Systems 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 mod that necessitates constant contractor support for both training and operational flying.

2. Program Details.

Quantity	Unit Cost	Program Cost
SAMS ESA Contractor Sustainment (3840)	**$1,900,000**	**$1,900,000**
Total		**$1,900,000**

HC-130J COMBAT SEARCH AND RESCUE PENETRATOR SUITE

1. Background. ANG HC-130J aircraft are unprepared to survive a combat rescue in a peer-on-peer conflict due to its inability to counter radar threats. The HC-130J operates in environments of increasing levels of threat and lethality and needs a robust self-defense capability. The HC-130J needs a radio frequency (RF) jammer, improved radar detection capability (Digital RWR), a terrain following and terrain avoidance (TFTA) radar system, and an upgraded chaff system. The Digital RWR provides more sensitivity and improved range and accuracy on radar threat type and location. An RF jammer allows the combat search and rescue task force to perform rescues in an elevated radar threat environment. Additionally, penetration of an elevated threat environment requires TFTA radar to maximize terrain masking in all-weather conditions by navigating at low altitude to avoid and defeat radar threats. One system is required for each of the 12 HC-130Js in the ANG and one spare.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 RF Jammer Non-Recurring Engineering (3600)	**$5,000,000**	**$5,000,000**
13 RF Jammer (3010)	**$5,000,000**	**$65,000,000**
1 Digital RWR Non-Recurring Engineering (3600)	**$2,000,000**	**$2,000,000**
13 Digital RWR (3010)	**$1,300,000**	**$16,900,000**
1 TFTA Non-Recurring Engineering (3600)	**$5,000,000**	**$5,000,000**
13 TFTA (3010)	**$3,000,000**	**$39,000,000**
Total		**$132,900,000**

HC-130J OPTIMIZED DEFENSIVE SYSTEMS

1. Background. ANG HC-130J aircraft need a federated Defensive Systems Unit (DSU) capable of aligning with updated Operation Flight Programs, and the ability to rapidly dispense chaff and flares with an increased flare capacity. The DSU will allow the Combat Systems Officer 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 HC-130J aircrews operational risk while increasing 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, Radar Warning Receiver, with communication and mission equipment. 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 one spare.

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2. Program Details.

Quantity	Unit Cost	Program Cost
Federated Defensive System Panel Non-Recurring Engineering (3600)	**N/A**	**$2,500,000**
13 Federated Defensive System Panel (3010)	**$799,000**	**$10,387,000**
13 ALQ-213 w/3D Audio Kits (3010)	**$234,000**	**$3,042,000**
Total		**$15,929,000**

HC-130J INTEROPERABLE PERSONNEL RECOVERY SITUATIONAL AWARENESS

1. Background. HC-130 crews do not have an interoperable communications system allowing for efficient processing of information while conducting Combat Search and Rescue (CSAR) missions. The pilots, Combat Systems Officer (CSO) and Combat Rescue Officer (CRO) need a system comprised of uniform communication platform software, software definable radio payloads, and a moving map display to increase situational awareness by allowing communication between all CSAR assets including civil authorities. The system should integrate with Situational Awareness Datalink (SADL), Link-16, Lightweight Airborne Recovery System, Air Force Tactical Receive Segment-Ruggedized (AFTRS-R), Blue Force Tracker 2 (BFT2), Full Motion Video (FMV), Automatic Dependent Surveillance- Broadcast (ADS-B) In/Out, and include organic encrypted and unencrypted internet One system is requested for each of the ANG HC-130J's.

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**	**$2,400,000**
12 Moving Map Display Group B Kits (3010)	**$1,000,000**	**$16,000,000**
12 Full Motion Video (3010)	**$200,000**	**$2,400,000**
12 Blue Force Tracker-2 (3010)	**$100,000**	**$1,200,000**
12 Link-16 (3010)	**$120,000**	**$14,400,000**
12 ADS-B In/Out (3010)	**$30,000**	**$360,000**
12 Internet-on-Board (3010)	**$300,000**	**$3,600,000**
Totals		**$52,360,000**

HC-130 ELECTRO-OPTICAL INFRARED SENSOR MODERNIZATION

1. Background. The HC-130 needs 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 convergence of these capabilities will enhance the ability of the HC-130 to locate and identify an isolated personnel with precision. Providing accurate information to the other members of the CSARTF for a suitable DZ or LZ 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 one spare.

2. Program Details.

Quantity	Unit Cost	Program Cost
NRE EO/IR Sensor (3600)	**N/A**	**$5,000,000**
13 EO/IR Sensor (3010)	**$2,000,000**	**$26,000,000**
Total		**$31,000,000**

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E-8C, C-32B and C-21A

- **Robust "Sensor-To-Shooter" C2 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 (JSTARS) 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 116 ACW at Robins AFB, GA is home to 16 E-8C's and the only E-8(T)C. They have accrued more than 100,000 combat hours and 12,500 combat sorties over Kosovo, Iraq, Afghanistan, and Libya. The E-8C has been deployed continuously, 24 hours per day, 365 days per year, for 15 years, providing simultaneous battle management, command and control, and intelligence, surveillance, and reconnaissance, supporting all six combatant commanders. As an Active Association, there are approximately 750 full-time and 350 traditional ANG personnel within the 116 ACW (ANG) host unit, and over 1,300 active duty airmen, soldiers and individual mobilization augmenters within the 461 ACW associate unit.

C-32: 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. The 150 SOS of the New Jersey ANG operates the C-32B from Joint Base McGuire-Dix-Lakehurst, NJ.

C-21A: The C-21A provides secure priority airlift for Defense Department civilian and military leadership throughout the world. In addition to passenger airlift, the unit also provides cargo airlift and is capable of transporting one litter or five ambulatory patients during aeromedical evacuations. The 200 AS of the Colorado ANG operates the C-21 from Peterson AFB, CO.

E-8C, C-32B and C-21A
2016 Weapons and Tactics Conference

Critical Capabilities List

E-8C

- Signals Intelligence Target and Threat Identification
- Access to Joint Worldwide Intelligence Communications System Top Secret/Sensitive Compartmented Information Internet and Chat on Aircraft
- Increased Beyond Line-of-Sight Bandwidth
- Integrated Broadcast Service Modernization
- Personnel Recovery-Compatible Interrogation Radio

C-32B

- Enhanced Flight Vision System

C-21A

- Avionics Modernization
- Commercial Wideband

Essential Capabilities List

E-8C

- Special Operations Forces Integrated Situational Awareness Data Link Gateway
- Secure Voice Over Internet Protocol Telephone Capability
- Electro-Optical/Infrared/Imaging Synthetic Aperture Radar Target Classification
- Bridge/Relay Dissimilar Defense Support of Civil Authorities/Department of Homeland Security Voice and Data Networks
- Global Positioning System Time of Day for HAVEQUICK

C-32B

- Galley Replacement

C-21A

- None

Desired Capabilities List

E-8C

- Deployable Trailer Mounted Support System
- Blue Force Tracker 2/Joint Battle Command-Platform
- Net-Enabled Weapons
- Common Data Link
- Self-Defense Suite

C-32B

- None

C-21A

- None

E-8C SIGNALS INTELLIGENCE TARGET AND THREAT IDENTIFICATION

1. Background. The E-8C Joint Surveillance Target Attack Radar System (JSTARS) lacks the capability to positively identify objects of interest detected by onboard sensors. This is especially true with Unmanned Aircraft Systems (UAS). Adding a Signals Intelligence (SIGINT) system capable of detecting UAS emissions will provide an organic capability to aid in the detection and identification of UAS-type targets in a contested, degraded environment. This capability also 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. An on-board combat identification system increases the lethality of other weapons systems by reducing the length of the sensor-to-shooter kill chain. A SIGINT system could also be used to cue other sensors for faster acquisition of target information. This integrated capability will aid in target recognition, threat awareness, and informed command and control of the battlespace.

2. Program Details.

Quantity	Unit Cost	Program Cost
SIGINT ID System Non-Recurring Engineering (NRE) (3010)	**N/A**	**$20,000,000**
16 SIGINT Kits (3010)	**$15,000,000**	**$240,000,000**
3 SIGINT Kits for Training Systems (3010)	**$5,000,000**	**$15,000,000**
Total		**$275,000,000**

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

1. Background. The E-8C needs 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 Joint Surveillance Target Attack Radar System (JSTARS).

2. Program Details.

Quantity	Unit Cost	Program Cost
JWICS System Non-Recurring Engineering (NRE) (3010)	**N/A**	**$5,000,000**
16 JWICS Terminals (3010)	**$200,000**	**$3,200,000**
3 JWICS for Training Systems (3010)	**$200,000**	**$600,000**
Total		**$8,800,000**

E-8C INCREASED BEYOND LINE OF SIGHT BANDWIDTH

1. Background. Due to ever increasing beyond line-of-sight (BLOS) requirements, the E-8C Joint Surveillance Target Attack Radar System (JSTARS) is rapidly running out of available onboard communications bandwidth. This forces the aircrew to reduce or shutdown some communication channels in order to ensure others remain sustainable. Increasing the onboard BLOS bandwidth solves these challenges and allows the aircrew to continuously exploit multi-intelligence fusion tools, remotely piloted aircraft feeds, and satellite communications networks, expediting the kill chain. An increase in bandwidth upload and download speed enhances the organic capabilities of the aircrew to detect patterns of life and anomalies within large volumes of geospatial data. This will save aircrew time by helping to organize complex mission data into cohesive products quickly. Expanding connectivity throughput will also enable aircrew to overlay hundreds of analyst intelligence layers onto a single operating picture.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
16 BLOS Kits (3010)	**$200,000**	**$3,200,000**
3 BLOS Kits for Training Systems (3010)	**$200,000**	**$600,000**
Total		**$6,800,000**

E-8C INTEGRATED BROADCAST SERVICE MODERNIZATION

1. Background. Integrated broadcast service (IBS) is the primary threat warning system on the E-8C Joint Surveillance Target Attack Radar System (JSTARS) aircraft and a key distribution network for critical battlefield information. Additionally, IBS provides reports of electronic intelligence, signals intelligence, and human intelligence for fusion with local sensor information to support a single operating picture for target nomination and identification. The legacy IBS system (Commander's Tactical Terminal/Hybrid - Receive Only (CTT/H-R) terminal) is no longer produced and cannot be repaired. The current interim capability uses a commercial satellite to garner the information and thus is more susceptible to adversary interference. The required cryptographic capability requires replacement with a modernization program compliant device and algorithm. Air Force tactical receiver system-ruggedized (AFTRS-R) terminals are fully capable of supporting IBS requirements as functional replacements for CTT/H-R terminals. AFTRS-R National Security Agency certified Block II terminals are readily available for JSTARS; however, these assets require integration and test with the aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
IBS Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
16 IBS Wiring Kits (3010) *	**$10,000**	**$160,000**
3 IBS for Training Systems (3010)	**$400,000**	**$1,200,000**
Total		**$6,360,000**

E-8C PERSONNEL RECOVERY COMPATIBLE INTERROGATION RADIO

1. Background. The E-8C Joint Surveillance Target Attack Radar System (JSTARS) supports Combat Search and Rescue (CSAR) by providing over-watch of potential hostile extraction areas, guiding isolated personnel and extraction teams via secure messaging, and providing command and control (C2) to strike assets when needed to support extraction operations. JSTARS has an operational requirement to support CSAR operations using a personnel recovery (PR) compatible radio capable of interrogating isolated personnel. The overall objective of the PR program is to provide isolated personnel and extraction teams with enhanced surveillance, connectivity, and security through interoperability with the E-8C via the secure PR data link. JSTARS, with PR capability, provides a persistent airborne C2, intelligence, surveillance, and reconnaissance node to support isolated personnel and extraction teams. A fully integrated PR system offers interoperability with all US and many North Atlantic Treaty Organization deployed combat survival radios, to include the PRC-112B/G, PRC-434, and PRQ-7 Combat Survivor Evader Locater (CSEL) and is the preferred solution for an E-8C Personnel Recovery Compatible Interrogation Radio. While not as capable, a non-integrated carry-on system, similar to QUICKDRAW, that is interoperable with the PRQ-7 and is able to receive and transmit text messages to the survivor in the same manner as the QUICKDRAW interoperates with the PRC-112B/G and PRC-434, improves on the current capability, and is an acceptable alternative.

2. Program Details.

Quantity	Unit Cost	Program Cost
PR Integrated Radio Non-Recurring Engineering (NRE) (3010)	**N/A**	**$5,000,000**
16 PR Integrated Radios (3010)	**$200,000**	**$3,200,000**
3 Integrated Radios for Training Systems (3010)	**$200,000**	**$600,000**
16 Non-Integrated CSEL PR Interrogation Unit Kits (3010)	**$20,000**	**$320,000**
Total		**$9,120,000**

C-32B GATE KEEPER ENHANCED FLIGHT VISION SYSTEM

1. Background. The ANG C-32B mission requires rapid response airlift to worldwide locations with little to no warning. Enhanced Flight Vision System (EFVS) technology enables the flight crew to operate with reduced weather minimums. The EFVS increases situation awareness and safety. 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. The EVS, fused to the information displayed on the HUD, provides increased situational awareness especially in low / no visibility conditions. 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	**$5,500,000**	**$11,000,000**
Spare Parts	**$1,200,000**	**$1,200,000**
Total		**$12,200,000**

C-21A AVIONICS MODERNIZATION

1. Background. The C-21A requires modernized avionics to include is not equipped to meet the FAA's 2020 Automatic Dependent Surveillance-Broadcast (ADS-B) Out, Wide Area Augmentation System (WAAS), and the capability to conduct Global Positioning System (GPS) approaches. ADS-B Out provides the capability to take advantage of the Federal Aviation Administration's Next Generation airspace initiatives. ADS-B enhances safety by making an aircraft visible to Air Traffic Control (ATC) and to other appropriately equipped aircraft. Without ADS-B Out, the C-21A fleet faces operational restrictions or outright airspace denial in the Continental United States (CONUS). In Europe, the C-21A will be subject to lengthy takeoff delays and lower priority routing if this mandate is not complied with. An additional needed capability. In addition, the C-21A requires the capability is the ability to interface with Wide Area Augmentation System (WAAS). This system, which augments the aircraft's Global Positioning System (GPS) by improving its accuracy, integrity and availability, allows the aircraft to utilize GPS for guidance during precision approaches. The C-21A also needs the capability to conduct precision GPS approaches to Localizer Performance with Vertical (LPV) Guidance minimums. These capabilities improve passenger safety, comfort and operational performance.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$3,000,000**
2 Avionics Kits (3010)	**$2,500,000**	**$5,000,000**
Total		**$8,000,000**

C-21A COMMERCIAL WIDEBAND

1. Background. The C-21A requires a commercial wideband data capability which will address two critical C-21A safety issues and enhance senior leader airborne connectivity capabilities. The C-21A weather radar has contributed to two Class A safety events in the Active Component fleet. Commercial wideband will address the C-21A safety issue by delivering near real-time weather data to the flight crew via the current electronic flight bag. The capability to utilize ground-and-satellite based weather data on the flight deck gives the aircrew the capability to avoid potentially hazardous weather and improves the safety of the passengers and aircraft. A low-bandwidth satellite-based capability gives distinguished visitors and senior leaders the ability to conduct routine communication in-flight. Request two commercial wideband kits for the ANG C-21A's.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$500,000**
2 Commercial Wideband Kits (3010)	**$200,000**	**$400,000**
Total		**$900,000**

F-15

- **Air Dominance**
- **Homeland Defense**
- **ANG F-15 Units provide 58% of the Total Combat 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 (ACA) assets, spanning five alert sites in the continental United States (CONUS). These alert sites provide 24-hour homeland defense. Active Electronically Scanned Array (AESA) radars on ANG F-15C/Ds provide combatant commanders (COCOMs) essential updated air superiority and homeland defense capability.

In FY16, ANG F-15s deployed overseas in support of multiple European Theater Security Package (TSP) taskings, as well as Operation Atlantic Resolve, enhancing advanced tactical interoperability with our NATO allies and ensuring a 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, 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 (F-15C & F-22) available for air expeditionary forces (AEF) commitments and ACA tasking. The ANG also operates the USAF's only F-15C formal flying training unit at the 173 FW, Klamath Falls IAP, OR where all Active and Reserve Component Eagle Drivers are trained.

Modernization and sustainment programs are vital to improve aircraft capabilities for both overseas contingency operations and homeland defense. Without these upgrades, the ability for F-15s to survive and thrive in Anti-Access Area Denial (A2AD) environments is severely diminished, endangering our Eagle Drivers and degrading our nation's air dominance. These programs include the AESA radar, a modern electronic warfare and self-protection suite, multi-spectral search and track, persistent air dominance-enabling technologies, and a modern, integrated cockpit.

F-15
2016 Weapons and Tactics Conference

Critical Capabilities List

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

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 System

F-15 ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

1. Background. Active Electronically Scanned Array (AESA) radar technology increases detection and track ranges of airborne targets and improves identification capability. AESA radar gives the F-15C multi-target track and attack capability, and vastly increases capabilities against advanced electronic attack from enemy systems. AESA radars are critical for Homeland Defense missions because the system enables pilots to locate a target of interest in a saturated air traffic environment, as well as detect and track small, asymmetric threats. The 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. The AESA's high reliability represents a drastic reduction in future sustainment costs, allowing for direct reinvestment in additional game-changing air dominance technologies such as the new F-15 mission computer. In late 2019, the USAF will begin fielding the Advanced Display Core Processor (ADCP-II) on all F-15 models (C/D/E). ADCP-II replaces the existing central computer in the F-15C/D/E 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. ADCP-II is, however, incompatible with the APG-63(v)0 due to both physical space and Operation Flight Programs limitations. Therefore, any F-15 with a mechanically-scanned array radar and a legacy central computer will be rendered non-combat-capable as well as inadequate for effective combat training, as the ADCP-II upgrade represents the largest pilot-vehicle-interface (PVI) paradigm shift in the history of the F-15C/D. The long-term cost-effective, full-spectrum solution is to outfit each F-15C/D aircraft with a (v)3 AESA radar ahead of scheduled ADCP-II modification to properly phase in this capability, in parallel with a very robust conversion training plan for Eagle pilots. There are 30 ANG F-15C/D aircraft that still require the AESA upgrade but do not have production funding allocated.

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 FULL SPECTRUM ELECTRONIC WARFARE

1. Background. The F-15 needs modern Electronic Warfare (EW) and self-protection systems for current and emerging threats. Interim solutions and Eagle Passive Active Warning Survivability System (EPAWSS) provide adequate defensive measures, but the F-15C/D also requires an offensive EW system and radar cross section (RCS) reduction initiatives. These upgrades should include: internal or external (podded) digital radio frequency memory (DRFM) electronic attack, digital radar warning receiver, ALE-58 back of launcher (BOL) countermeasure dispensers, Proactive/Directed Jammer System, and advanced fiber-optic towed decoys. Interim capability of 12 proactive/directed jammer systems, 24 towed decoy systems, and 48 BOL-IR systems per ANG combat-coded location are adequate in the near-term. RCS reduction initiatives will further enable interoperability with 5th generation aircraft in Anti-Access Area Denial (A2/AD).

2. Program Details.

Quantity	Unit Cost	Program Cost
F-15 Proactive/Directed Jammer Non-Recurring Engineering (3600)	**N/A**	**$50,000,000**
60 F-15 Proactive/Directed Jammers (3010)	**$2,000,000**	**$120,000,000**
105 F-15 Digital Radar Warning Receivers (3010)	**$500,000**	**$52,500,000**
200 F-15 BOL-IR (3010)*	**$75,000**	**$15,000,000**
F-15 RCS Reduction Non-Recurring Engineering (3600)	**N/A**	**$100,000,000**
105 F-15 RCS Reduction Kits (3010)	**$1,000,000**	**$105,000,000**
F-15 Towed Decoy Non-Recurring Engineering (3600)	**N/A**	**$5,500,000**
120 F-15 Towed Decoy Systems (3010)	**$500,000**	**$60,000,000**
Total		**$508,000,000**

* Includes 10% spares

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

1. Background. Adversary aircraft and integrated air defense networks employ sophisticated detection and electronic attack (EA) methods that complicate F-15C employment and leave the F-15 vulnerable to attack. Exploitation of less- contested or degraded sections of the electromagnetic spectrum enhances operational effectiveness. Multi-spectral search/track/target systems and enhanced Electronic Warfare Warning Set (EWWS) on all 105 combat-coded F-15s must be procured to 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. Incorporating features such as an infrared search and track (IRST) capability initially on 10 airframes at each combat-coded ANG F-15 location (supporting both Homeland Defense and COCOM taskings) ensures system track files are maintained in any contested or degraded EA operating environment.

2. Program Details.

Quantity	Unit Cost	Program Cost
Infrared Search and Track System Non-Recurring Engineering (3600)	**N/A**	**$10,000,000**
50 Infrared Search and Track Systems (3010)	**$3,500,000**	**$175,000,000**
Electronic Warfare Warning Set Non-Recurring Engineering (3600)	**N/A**	**$50,000,000**
105 Electronic Warfare Warning Sets (3010)	**$500,000**	**$52,500,000**
Total		**$287,500,000**

F-15 PERSISTENT AIR DOMINANCE ENABLER

1. Background. Integrating conformal fuel tanks (CFTs) and additional weapons stations to all 105 combat-coded ANG F-15s effectively and immediately increases the combat radius, loiter time, and firepower critical to gathering offensive mass required to achieve air dominance against the numerically superior threat in the battlespace of tomorrow. Additional weapon stations mounted on CFTs or Multi-Rail Missile Launchers (2 per aircraft, 210 total) installed in place of previously necessary external fuel tanks, are modular and can be used for a variety of advanced air-to-air weapons, multi-spectrum search/track/targeting pods, and updated electronic & infrared countermeasures. The standardized weapons communication terminals in advanced CFTs will also help streamline weapons development and integration among all versions of the F-15, and allow Combatant Commanders to quickly exploit the advantages of a common fleet when all aircraft (with common central processors, weapons buses, and racks/launchers) can readily accommodate advanced weapons or off-the-shelf defensive countermeasure upgrades, such as pylon-mounted fiber-optic towed decoys.

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)	**$250,000**	**$52,500,000**
Total		**$441,000,000**

F-15 MODERNIZED COCKPIT

1. Background. The current displays and communication/navigation functionality in the F-15C cockpit are based on outdated 1970s technology. Eagles have experienced steady growth in capability and lethality in their 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. However, fully utilizing these enhancements requires a complex pilot-vehicle-interface, 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, outdated technology, and minimal audio integration. Replacement of legacy displays in all F-15C/Ds (130 total) with larger high-resolution color displays or a single high-resolution large-area smart color display system increases ANG F-15C lethality by displaying offensive and defensive data more intuitively to the pilot and enables additional mission sets to be executed by a single pilot. Current Joint Helmet-Mounted Cueing System (JHMCS) limitations cause pilots to choose between a standard helmet modified with the JHMCS Display Unit and accompanying visor, or Night Vision Goggles (NVGs). NVGs obscure the pilot's view of the cockpit, increase neck strain due to extended moment arm making long sorties overly fatiguing, frequently make contact with the interior of the canopy, and have been cited as a contributing factor to multiple Class-A mishaps. An updated helmet mounted cueing system should utilize one helmet with integrated on-demand wide-angle night vision via an embedded high-definition camera to facilitate true seamless day to night transition missions, and decrease pilot fatigue by lowering the system weight. The F-15 needs an integrated radio controller to allow for more efficient control of its three radios. The addition of three-dimensional (3D) audio separation allows the pilot to spatially separate and process all three radio frequencies in addition to directional self-protection warning tones. The central hub of communication/navigation information throughput and control should be a single integrated radio controller or up-front controller that minimizes pilot workload and "heads down" time. These upgrades enhance flight safety in training and wartime environments by increasing a pilot's 3D situational awareness of the battlespace.

2. Program Details.

Quantity	Unit Cost	Program Cost
F-15 Display Upgrade Non-Recurring Engineering (3600)	**N/A**	**$5,000,000**
130 F-15 Display Upgrades (3010)	**$90,000**	**$11,700,000**
130 F-15 Integrated Radio Controller (3010)	**$90,000**	**$11,700,000**
Total		**$28,400,000**

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F-22

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

The ARC flies and maintains F-22s at all current F-22 basing locations. The ANG has two F-22 classic associate units: Joint Base (JB) Langley-Eustis, VA and Tyndall AFB, FL. Additionally, the Hawaii ANG based at Joint Base Pearl Harbor-Hickam, HI, is the only operational ANG F-22 squadron. AFRC operates F-22s at Tyndall AFB, Nellis AFB, and Elmendorf AFB. Aerospace Control Alert (ACA) support is provided by ARC F-22s flying out of Elmendorf, Hawaii, and Virginia. In 2016, ANG F-22s flew in combat operations in support of Operation Inherent Resolve as well as participated in several major exercises. In additional 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 RTU.

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 both air and surface threats. Situational awareness and communication upgrades, including LINK 16 transmit, improved GPS capabilities, and a helmet-mounted display will enable the F-22 to efficiently and effectively accomplish alert and combatant command tasks.

F-22
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Critical Capabilities List

- GPS Improvements
- Adaptive Basing Enablers
- Link 16 Enhancements
- Helmet-Mounted Display
- Survivability Advancements

Essential Capabilities List

- Improved Air and Surface Threat Replicators
- Multi-Spectral Sensor Capabilities
- Munitions Improvements for Air-to-Air and Air-to-Ground
- Combat Identification Software and Hardware Improvements
- External Carriage for Fuel, Weapons, Sensors

Desired Capabilities List

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

F-22 GPS IMPROVEMENTS

1. Background. The current Global Positioning System (GPS) on the F-22 requires modernization to ensure precise navigation and timing in Anti-Access/Area Denial theaters. Exercises and real-world deployments have identified critical limitations in the current GPS system design. Advanced GPS antennas, along with other hardware and software improvements, would ensure the F-22 is capable of navigating and delivering precision weapons in contested environments. In addition to GPS hardening, the F-22 can experience numerous electrical malfunctions that severely limit the ability to navigate, especially at night or in instrument conditions. A GPS repeater in the cockpit would allow the pilot access to a global data base of flight publications, reducing the amount of paper charts, approach books, and numerous other publications currently required to be carried during long distance flights. The 'Adaptive Basing' concept of operations and 'Rapid Raptor' are two concepts which these GPS improvements would support.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 GPS repeater (3010)	**$5,000**	**$110,000**
20 GPS Antenna NRE (3600)	**N/A**	**$20,000,000**
20 GPS Antenna (3010)	**$1,000,000**	**$20,000,000**
Total		**$40,110,000**

F-22 ADAPTIVE BASING ENABLERS

1. Background. Adaptive basing has numerous advantages in an Anti-Access/Area Denial (A2AD) theater. Three key upgrade areas would allow the F-22 to operate within the adaptive basing concept of operations: Beyond Line of Sight (BLOS) communications, austere mission planning capability, and an Electronic Flight Bag (EFB). A BLOS radio would allow the F-22 to communicate to command centers for important tasking information without a large communication footprint. A deployable, secure mission planning kit with SATCOM communication capability would enable the F-22 to deploy to and operate from remote locations on complex missions. EFB is a low-cost, commercial off-the-shelf solution for accessing and maintaining current worldwide flight information publications. EFB, coupled with an in-cockpit GPS repeater, would allow the F-22 to navigate and fly instrument approaches anywhere in the world.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
20 BLOS Radios (3010)	**$175,000**	**$3,500,000**
Austere Mission Planning Kit NRE (3600)	**N/A**	**$5,000,000**
10 Austere Mission Planning Kits (3010)	**$50,000**	**$500,000**
EFB Non Recurring Engineering (3600)	**N/A**	**$2,000,000**
20 EFBs (3010)	**$800**	**$16,000**
Total		**$20,516,000**

F-22 LINK 16 ENHANCEMENTS

1. Background. The F-22 currently has the ability to receive information in the primary datalink network Link-16. As the nation's first 5th generation fighter, the F-22 was designed with the most advanced sensor capabilities. Unfortunately, due to the inability for the F-22 to transmit on Link-16 none of the data is passed to any other assets. The ability to share high fidelity data of air and surface tracks from an F-22 significantly increases the combat capability of every asset that is Link-16 capable. In addition, all Air Operations Centers (AOC) use Link-16 information to maintain battlespace situational awareness. Link-16 has been proven to increase lethality in the air to air environment allowing fighters to have positional information on friendly forces. An F-22 that is not passing positional information on Link-16 degrades other fighter's capability to employ weapons on enemy forces without first identifying F-22 position by means of multiple radio calls. This problem is compounded by the inability with other fighters to track the F-22 with their own sensors. One of the core missions for the F-22 is fighter integration, which has been demonstrated as most effective for advanced adversary threats. Link-16 transmitters on the F-22 would vastly improve fighter integration. A Link-16 transmitter on the F-22 that has the capability to revert to receive-only mode allows all the increased information flow for all assets without any degraded capabilities.

2. Program Details.

Quantity	Unit Cost	Program
Link-16 Transmit NRE (3600)	**N/A**	**$10,000,000**
20 Link-16 Transmit Modules (3010)	**$175,000**	**$3,500,000**
Total		**$13,500,000**

F-22 HELMET-MOUNTED DISPLAY

1. Background. F-22 pilots need a night vision goggle compatible, color Helmet-Mounted Display (HMD). Multiple simulations and an operational utility assessment conducted by the 422nd Test and Evaluation Squadron demonstrated that using a HMD provides a distinct first-shot, first-kill advantage. This advantage applies primarily to within visual range engagements, but 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 zone symbology 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
HMD Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
30 HMDs(3010)	**$200,000**	**$6,000,000**
Total		**$16,000,000**

F-22 SURVIVABILITY ADVANCEMENTS

1. **Background.** The F-22 is the nation's most technologically advanced air superiority fighter, but it requires constant evaluation and development of off-board countermeasures in conjunction with non-kinetic effects to defeat evolving threats. The F-22 needs strategically located simulation technologies and diverse lab facilities to evaluate countermeasure and non-kinetic solutions earlier in the development cycle. Request simulation and threat labs to analyze potential solutions immediately following operational test events.

2. Program Details.

Quantity	Unit Cost	Program Cost
Simulation Development (3600)	**N/A**	**$10,000,000**
Threat Lab Development (3600)	**N/A**	**$10,000,000**
Total		**$20,000,000**

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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 336 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)

- Active Electronically Scanned Array Radar
- High Resolution Display
- Night Helmet Mounted Display
- Integrated Electronic Warfare Suite
- Secure Line-of-Sight and Beyond-Line-of-Sight with 3-D Audio Communication

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

- Active Electronically Scanned Array Radar
- Link 16 5th to 4th Generation Datalink Interoperability
- Integrated Electronic Warfare Suite
- Jam-Resistant Navigation System
- Secure Line-of-Sight and Beyond-Line-of-Sight with 3-D Audio Communication

Essential Capabilities List

- Proliferation and Sustainment of High Fidelity Ready Aircrew Program (RAP) Quality Simulators
- Improved, Sustainable Electronic Warfare Systems Capable of Precision Geolocation of RF Threats
- High-Speed, Multimode, Standoff Precision Weapon Capable of Targeting RF 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.

Desired Capabilities List

- Boresight Program Enhancement
- Certified Area Navigation Approach Capability
- Live Virtual Constructive Training Facilitator
- Reliable, Hi-Fidelity Recording and Debrief Systems
- Data Transfer Cartridge/Digital Video Recorder Storage and Capability Enhancement.

F-16 ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

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-16's 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, 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. AESA radars have been listed on the F-16 Critical Requirements every year since 2007, and identified by First Air Force (1AF) as a Joint Urgent Operational Need (JUON) in 2015.

2. Program Details.

Quantity	Unit Cost	Program Cost
Radar Non Recurring Engineering (3600)	**N/A**	**$40,000,000**
336 Radar Upgrades (3010)	**$3,500,000**	**$1,176,000,000**
Total		**$1,326,000,000**

F-16 HIGH RESOLUTION 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
CDU Non Recurring Engineering (3600)	**N/A**	**$15,000,000**
143 CDU Kits* (3010)	**$400,000**	**$57,200,000**
Total		**$72,200,000**

* Includes 10% spares.

F-16 NIGHT HELMET MOUNTED DISPLAY

1. Background. Current F-16 Block 40/42/50/52 Helmet Mounted Displays (HMD) are incompatible with Night Vision Devices (NVD). F-16 pilots are extremely 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 (~5,000), 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
Helmet Mounted Display Non Recurring Engineering (3600)	**N/A**	**$9,000,000**
160 Helmet Mounted Display Kits* (3010)	**$90,000**	**$14,400,000**
Total		**$23,400,000**

* Includes 10% spares.

F-16 INTEGRATED ELECTRONIC WARFARE SUITE

1. Background. 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. A robust integrated electronic attack suite will enable all F-16 blocks to counter current and future radars. 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 all F-16 Block 40/42/50/52 aircraft. 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 commanders' requirements

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69 Non Recurring Engineering (3600)	**N/A**	**$22,840,000**
336 ALR-69 Upgrades (3010)	**$820,000**	**$275,520,000**
EA Pod Non Recurring Engineering (3600)	**N/A**	**$31,000,000**
60 EA Pod Upgrades (3010)	**$1,320,000**	**$79,200,000**
ALQ-213 Non Recurring Engineering (3600)	**N/A**	**$28,000,000**
110 ALQ-213 Kits (3010)	**$160,000**	**$17,600,000**
MWS Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
70 MWS Sets (3010)	**$1,100,000**	**$77,000,000**
Total		**$541,160,000**

F-16 SECURE-LINE-OF-SIGHT AND BEYOND-LINE-OF-SIGHT WITH 3D AUDIO COMMUNICATION

1. Background. Current upgrades to all ANG F-16s provide Secured-Line-of-Sight (SLOS) and Beyond-Line-of-Sight (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 permits 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 (HD) 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 HD missions.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non Recurring Engineering (3600)	**N/A**	**$5,000,000**
336 BLOS Radios (3010)	**$150,000**	**$50,400,000**
Three Dimensional Audio Non Recurring Engineering (3600)	**N/A**	**$6,000,000**
336 Three Dimensional Audio Upgrades (3010)	**$125,000**	**$42,000,000**
Total		**$103,400,000**

F-16 LINK-16 AND 5TH TO 4TH GENERATION DATALINK INTEROPERABILITY

1. Background. All ANG F-16 aircraft require Link16 datalink capability to effectively employ in the current operational environment. Legacy Situational Awareness Data Link equipment has proven inadequate due to lack of currently fielded support infrastructure, frequency band constraints, and Joint Interface Control Cell support. The transition of F-16 Block 25/30/32 aircraft to Link16 will allow seamless deployment, connectivity and interoperability of the entire F-16 fleet. All ANG F-16's (Block 25/30/32/40/42/50/52) require growth potential 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 F-16's 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**
193 Data Link Upgrades (3010)	**$275,000**	**$53,075,000**
Total		**$63,075,000**

INCREASED JAM RESISTANT NAVIGATIONAL SYSTEMS

1. Background. ANG F-16 Block 25/30/32 aircraft require an update to the Embedded Global Positioning System and Inertial Navigation System (EGI) to provide increased Anti-Jam and Selective Availability Anti-Spoofing Module capability. The navigation equipment in the F-16 needs to operate with Global Positioning System (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. Available GPS signal processing technology has made great improvements, enabled by increased speed, memory and computer processing, along with corresponding improvements to GPS signal processing software algorithms. The demonstrated results of these advances provide order of magnitude improvement in rejection capability and will provide an increased navigational performance in the GPS denied environment. Current F-16 mission assignments require GPS tracking during all phases of the mission.

2. Program Details.

Quantity	Unit Cost	Program Cost
Jam Resistant Navigational System Non Recurring Engineering (3600)	**N/A**	**$5,500,000**
193 Jam Resistant Navigational Systems (3010)	**$155,000**	**$29,915,000**
Total		**$35,415,000**

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HH-60G

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

Air National Guard (ANG) Personnel Recovery (PR) helicopters and aircrews play a critical role in support of overseas contingency operations while responding to an increasingly high demand for domestic operations. These ANG PR helicopters are located in Alaska, California, and New York. There is also a PR training unit collocated with an active duty unit in New Mexico.

In 2016, ANG PR units deployed in support of Combined Joint Task Force- Horn of Africa (CJTF-HOA). While not deployed overseas, these units supported their respective states. The 101 RQS in New York worked with Air Force units in support of their pre-deployment training. The 129 RQS from California flew numerous counterdrug missions. The 210 RQS held 24-hour state-wide, rescue alert in Alaska resulting in multiple lives saved. In New Mexico, the 188 RQS supported aircrew training for the 58 Special Operations Wing and provided personnel in support of CJTF-HOA.

The HH-60G modernization priorities included improvements to the smart multi-functional color display and the acquisition of multiple datalinks. Additional upgrades completed in FY16 focused on the modernization of the aircraft communication systems.

HH-60G
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Critical Capabilities List

- Advanced Electronic Warfare Penetrator System
- Modernized Integrated Defensive System Suite/Advanced Threat Protection
- Integrated Flight Deck
- Degraded Visual Environment Solution Via Helmet-Mounted Head-Up Display (HUD)
- Aircraft Weapons Modernization

Essential Capabilities List

- Distributed Mission Operations-Capable HH-60G Aircraft Simulator
- Mobile Ad Hoc Network-Like Technology
- Helicopter Underwater Egress Lighting
- Federal Aviation Administration Global Positioning System-Certified Aircraft
- Maritime Ship Locator/Information

Desired Capabilities List

- Improved Aircraft Generators
- Aircrew Flight Equipment Enhancements
- Electronic Flight Bag
- Instrumentation Upgrade
- Wireless Intercom
- Helicopter Hovering Inflight Refueling
- Improved Aircraft Hoist
- Command, Control, Communications, Computers, and Intelligence (C4I) Decision Making Software that Incorporates Multiple Data Streams into a Single Source
- Rotor Brake

HH-60G ADVANCED ELECTRONIC WARFARE PENETRATOR SYSTEM

1. Background. HH-60G helicopters and crews are tasked to recover personnel in a contested environment. The HH-60G does not have a defensive system with the ability to penetrate into modern missile envelopes and safely recover an isolated person. The APR-39Bv2 Radar Warning Receiver presently installed on the HH-60G is an analog system with limited processing capability. This system is not capable of displaying radio frequency (RF) threats without ambiguity. HH-60G crews may need to operate within the RF threat engagement zones to recover an isolated person. In order to operate in the RF threat environment, an integrated RF jammer is needed to increase survivability. The HH-60G requires a precise, integrated defensive system that detects, jams and defeats RF guided weapons. Crews also require training software integrated into the Electronic Warfare Suite to effectively train for combat scenarios. Test Equipment is needed for all three units for maintenance personnel to maintain the equipment. The ANG requires one Radar Warning Receiver with an integrated jammer for each of its 18 HH-60G helicopters.

2. Program Details.

Quantity	Unit Cost	Program Cost
Defensive System Non Recurring Engineering (3600)	**N/A**	**$2,000,000**
3 Unit Test Equipment (3080)	**$58,400**	**$175,200**
18 Radar Warning Receivers (3010)	**$1,240,000**	**$22,320,000**
Total		**$24,495,200**

HH-60G MODERNIZED INTEGRATED DEFENSIVE SYSTEM SUITE

1. Background. HH-60G helicopters and crews have been lost while performing combat rescue operations due to their inability to detect and react to hostile enemy fire. The HH-60G requires a precise, hostile fire indicator integrated defensive system that detects and defeats current and future threat systems such as small arms fire, Rocket Propelled Grenades (RPGs), and Man-Portable Air Defense Systems (MANPADs). The current method employed to detect RPGs and small arms fire is visual detection or radio notification from a ground party that does not provide crews the required time to react and defeat enemy threats. The ANG requires one Hostile Fire Indicator and an ALQ-213 with 3D audio capability for each of its 18 HH-60G helicopters. Three dimensional (3D) audio capability is required to integrate the audio warnings from a Missile Warning System, hostile fire indicator, or Radar Warning Receiver, 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. 108 3D audio kits are required to provide a device to all six personnel on the 18 ANG HH-60Gs. Aircrews require an embedded training capability utilizing the currently fielded Virtual Electronic Combat Training System (VECTS) to prepare for combat. Each of the 18 ANG HH-60Gs require VECTS.

2. Program Details.

Quantity	Unit Cost	Program Cost
Defensive System Non Recurring Engineering (3600)	**N/A**	**$2,000,000**
18 Hostile Fire Indicators (3010)	**$270,000**	**$4,860,000**
Directional Audio Non Recurring Engineering (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 Non Recurring Engineering (3600)	**N/A**	**$2,000,000**
18 VECTS (3010)	**$1,300,000**	**$16,900,000**
Total		**$36,903,200**

HH-60G INTEGRATED FLIGHT DECK

1. Background. Combat and domestic operations require HH-60G crews to process information from many sources quickly. Uniform Communications Platform software with software definable radios enable previously stove-piped communications channels to operate with varied Combat Search and Rescue (CSAR) responders including civil response forces via cellular communication. To manage this information, the current Smart Multi-Function Color Display installed on ARC HH-60Gs need to be fully integrated with Situational Awareness Datalink (SADL), Lightweight Airborne Recovery System Version 12, Air Force Tactical Receive Segment-Ruggedized, Blue Force Tracker 2 (BFT2), Full Motion Video (FMV), Automatic Dependent Surveillance- Broadcast (ADS-B) In/Out, and Link-16. The capability to quickly access mission essential data from one centralized display will enable HH-60G aircrews to reduce "heads down" improving situational awareness. Secure Internet Protocol data will enable aircrews to receive Near Real-Time BFT2 data and text messaging from the battlefield. BFT2 is a modernized joint tracking system which is cooperative with SADL and Link-16 and provides Beyond Line of Site interactive data communication between aviation assets and Command and Control. ADS-B In/Out 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. This also increases the CSAR capability by filling an existing secure radio shortfall. The ANG requires one device for each of its 18 HH-60Gs.

2. Program Details

Quantity	Unit Cost	Program Cost
18 Software Definable Radio Suites (3010)	**$250,000**	**$4,500,000**
18 FMV (3010)	**$200,000**	**$3,600,000**
18 Blue Force Tracker - 2 (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 SRW(3010)	**$15,000**	**$270,000**
Total		**$12,870,000**

HH-60G DEGRADED VISUAL ENVIRONMENT SOLUTION

1. Background. The addition of day and night, helmet mounted heads-up display (HHUD) capability in the HH-60G would significantly increase aircrew Situational Awareness (SA) and weapons employment capability, enhance terminal area search and rescue operations, increase efficiency of internal communication utilizing electronic displays , and enable crews to safely land a helicopter in a degraded visual environment. 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 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 must also be available at night without the use of NVGs. Information must be selectable (i.e., video feed, aircraft flight information, SADL display, etc.) per individual. One kit is needed for the 18 aircraft in the ANG. 40 helmet kits 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 and three spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
HMCS Non Recurring Engineering (3010)	**N/A**	**$6,000,000**
18 HMCS Aircraft Kits (3010)	**$335,294**	**$6,035,292**
120 HMCS Helmet Kits (3010)	**$87,843**	**$10,541,160**
Q-29A Upgrade Non Recurring Engineering (3600)	**N/A**	**$10,000,000**
21 Q-29A Upgrade Systems (3010)	**$750,000**	**$15,750,000**
Total		**$48,326,452**

HH-60G AIRCRAFT WEAPONS MODERNIZATION

1. Background. The HH-60G has a requirement to provide reliable defensive firepower to support various combat mission operations. The HH-60G is currently fielded with the GAU-2B weapons system. Since the HH-60G routinely operates at maximum allowable gross weight, it is necessary to find weight savings whenever possible. The M134D-H mini-gun is an upgrade to the GAU-2B weapon system that will provide overall weight savings. Improved weapons components include an ergonomic designed grip, safe sector housing cover, 3,000-round firing trigger, direct current drive motor with battery and cable set, low-drag ammo feed chute, titanium rotor assembly, rigid expended brass link chute, and a barrel clamp safety retainer. These upgraded components provide increased corrosion protection, which is vital based on the geographic location of ARC HH-60G squadrons. Two guns are required for each of the 18 ANG HH-60G aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
36 M134D-H Minigun Components (3010)	**$30,000**	**$1,080,000**
36 M134D-H Miniguns (3010)	**$60,000**	**$2,160,000**
Totals		**$3,240,000**

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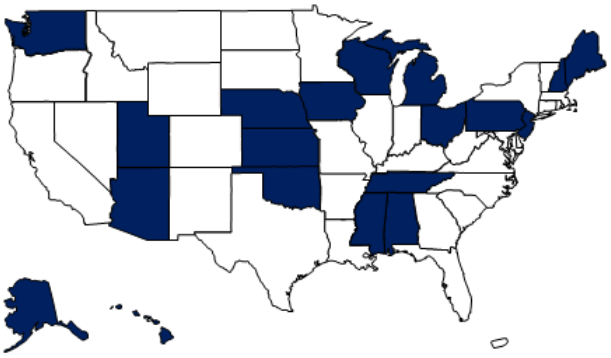
KC-135

- **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.



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Critical Capabilities List

- Advanced Infrared Countermeasures Defensive Systems
- Common Mobility Air Force Mission Computer
- External Overt/Covert Lighting
- Aircraft Ground Cooling Capability
- Jam-Resistant Global Positioning System

Essential Capabilities List

- Quick Reaction Handbook
- KC-135 Multi-Mission Crew Trainer
- Fuel Tank Fire Explosion Protection
- Digital Radar Warning Receiver
- Advanced Radio Frequency Countermeasures Defensive System

Desired Capabilities List

- Soft Basket Quick Connect Boom Drogue Adapter
- Auto-Throttles
- Secure High Frequency Radio

KC-135 ADVANCED INFRARED COUNTERMEASURES DEFENSIVE SYSTEMS

1. Background. Missions such as low altitude refueling and forward positioning subject the KC-135 to increasingly hostile environments. These threat environments are widely populated with shoulder-fired, infrared (IR) based man-portable air defenses (MANPADs) which are a significant threat during takeoffs, landings, and low-altitude refueling missions. As a refueling platform, the KC-135 requires an IR countermeasures system that does not rely on pyrotechnic expendables to counter MANPAD threats. 180 Group A kits are needed to wire all of the 180 KC-135 aircraft in the ANG fleet. The IR countermeasures will be a podded solution capable of being moved between aircraft. Therefore, 42 Group B kits are being requested for the 17 ANG KC-135 units including 8 spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
180 Group A Kits (3010)	**$500,00**	**$90,000,000**
42 Group B Kits (3010)	**$3,000,000**	**$126,000,000**
Total		**$216,000,000**

COMMON MOBILITY AIR FORCE MISSION COMPUTER

1. Background. Recent combat operations highlighted the need for comprehensive, networked command and control (C2) throughout all theaters of operation. A robust, secure, tactical data link (TDL) provides this C2 link and maximizes KC-135 aircrew situational awareness with beyond line-of sight and line-of-sight capabilities. TDL 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. The capability is needed for all 180 ANG aircraft and 198 radios includes spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering(3600)	**N/A**	**$9,000,000**
180 Group A Kits (3010)	**$120,000**	**$21,600,000**
198 TDL Radios and Processors* (3010)	**$380,000**	**$75,240,000**
Total		**$105,840,000**

*Includes 10% spares

KC-135 EXTERNAL OVERT/COVERT LIGHTING

1. Background. Current KC-135 exterior lighting does not meet military specification illumination standards, and it has been highlighted during ground testing conducted by the Air Force Research Lab. By replacing the existing incandescent lighting with updated Light Emitting Diode (LED) lighting, the KC-135 combat and peacetime operations benefit in three areas: safety, survivability, and sustainability. LED lighting increases safety by making the aircraft easier to see during ground and airborne operations. The covert mode enables KC-135 crews to operate in accordance with operational requirements. Covert lighting drastically reduces the potential of a mid-air collision, which has been highlighted as a safety concern during night combat missions. The upgraded lighting increases mean time between failures from 40 to 60 hours for incandescent bulbs to over 10,000 hours with LEDs. This reduces supply costs and decreases maintenance requirements. 198 external overt/covert light kits are required to install on all 180 ANG KC-135s and provide one spare kit at each ANG KC-135 base.

2. Program Details.

Quantity	Unit Cost	Program Cost
198 LED Light Kits* (3010)	**$70,000**	**$13,860,000**
Total		**$13,860,000**

*Includes 10% spares

KC-135 AIRCRAFT GROUND COOLING CAPABILITY

1. Background. KC-135 aircraft have no cockpit or cabin cooling when below 2,000 feet above ground level, which is the point at which the cockpit becomes pressurized and cooling systems become effective. 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. 107 aircraft ground cooling kits are required to provide a cooling capability for 60 percent of the ANG KC-135 fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
107 Ground Cooling Units (3010)	**$40,000**	**$4,280,000**
Total		**$4,280,000**

KC-135 JAM-RESISTANT GLOBAL POSITIONING SYSTEM

1. Background. Forward positioning, forward air refueling and other missions subject the KC-135 to increasingly hostile operational environments. Precise navigation is essential and ensures the KC-135 remains within designated safe areas of operation. ANG KC-135 aircraft rely on Global Positioning System (GPS) processors for primary navigation and need a jam-resistant processor to operate in GPS denied environments. To equip all ANG KC-135s each aircraft requires two GPS antennas and two electronic units. There are currently 180 KC-135s in the ANG inventory located at 17 locations, therefore 377 GPS antennas and electronic units are required for the fleet with 17 spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$1,000,000**
377 GPS Antennas* (3010)	**$34,878**	**$13,149,006**
377 Electronic Units* (3010)	**$30,139**	**$11,362,403**
Total		**$24,511,409**

*Includes spares

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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.

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Critical Capabilities List

Support Equipment

- KC-135 FAA Approved Toilet
- C-130 Engine Removal Device
- Portable Lightweight Maintenance Stands
- RADOME for AN/TPS-75 Radar System
- Isochronal Inspection Stands for C-17 and KC-135
- MJ-1E Electric Bomb Lift
- Articulating Boom Lift
- Towbarless Tow Equipment

Test Equipment

- Pneumatic/Portable Cabin Pressure Tester
- PC4F Digital Engine Test Cell for F-15
- Remote Engine Trim Test Set
- Targeting Pod External Power Test Set
- Multi-MDS Active Bus Tester
- Quad Band SATCOM Test Set

Essential Capabilities List

Support Equipment

- Electric Scissor Lift
- Improved Fall Restraint
- 72kw Flightline Generator
- Laser Corrosion Removal Equipment
- Modernized Programmable Tubing Bender

Test Equipment

- Multi-MDS Improved Armament/Smart Weapons Pre-Load Tester
- ADTS-415 Pitot Static Tester
- C-17 Central Management Computer

Desired Capabilities List

Support Equipment

- RPA Quick Reaction Expeditionary Launch and Recovery Element Equipment
- Vertical Tank Storage Equipment
- Synthetic Crash Recovery Lift Sling

Test Equipment

- IAIS Enhanced Backshop Equipment
- Flight Line Data Suite
- Multi-MDS Automatic Wire Test

KC-135 FAA APPROVED TOILET

1. Background. 180 ANG KC-135s have toilets that do not meet mission requirements based on capacity, structural integrity and/or intrinsically safe operation. The capacity level for the original legacy suitcase style toilets are inadequate, and are an overflow hazard when passengers are carried on long duration flights. These toilets are susceptible to leakage causing corrosion. The upgraded toilet must fit within the current allotted area; have a large capacity of waste to accommodate passenger transport, provide sanitary/low Biohazard risks to accommodate aero medical missions at a manageable cost. The desired toilet must meet FAA and engineering standards. Recommend 180 toilets, one each for all ANG KC-135 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
FAA approved toilet Non Recurring Engineering	**N/A**	**$15,000**
180 FAA approved toilet assemblies	**$15,000**	**$2,700,000**
Total		**$2,715,000**

C-130 ENGINE REMOVAL DEVICE

1. Background. C-130 maintenance personnel need a modernized equipment for engine removal and installation which increases efficiency. The current process requires propeller removal prior to engine removal, increasing man-hours and movement of heavy equipment in close proximity to aircraft. Additionally, internal prop components cannot be exposed to precipitation requiring aircraft be hangered to perform maintenance. The device would be technical order compliant and compatible for 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 ANG C-130 units receive one device per wing at the 14 wings still needing the device.

2. Program Details.

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

PORTABLE LIGHTWEIGHT MAINTENANCE STANDS

1. Background. Aircraft maintenance personnel need deployable self-supporting maintenance platforms that are towable, easily transportable, and incorporate fall protection measures. To meet the needs of multiple airframes, the maintenance stands must be adjustable to accommodate uneven floors and different deck heights. The minimum load bearing of the stand should be 1000 pounds at all working heights. The stand's maintenance platform should be accessible via built-in stairs throughout the entire range of height adjustment on this system and permit maintenance personnel to transport components and tools without hoisting or overhead lifting. Current maintenance stands do not meet Occupational Safety and Health Administration (OSHA), or American National Standards Institute (ANSI) standards for Fall Restraint when the stand is elevated above four feet from ground level. Recommend each ANG flying wing receive 6 maintenance stands.

2. Program Details.

Quantity	Unit Cost	Program Cost
444 Multi-MDS Portable Aircraft Maintenance Stand (3080)	**$110,000**	**$48,840,000**
Total		**$48,840,000**

RADOME FOR AN/TPS-75 RADAR SET

1. Background. ANG Control and Reporting Centers require a means of enclosing and protecting the AN/TPS-75 Radar System. A radome is a weatherproof, electromagnetic transparent dome that is fabricated to protect the radar antenna from environmental impacts. The AN/TPS-75 Radar is degraded by exposure to environmental conditions. A radome will protect the radar and increase operational capability for real world missions and training opportunities. This capability affects nine combat coded Control and Reporting Centers.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Radomes for AN/TPS-75 Radar Set (3080)	**$187,500**	**$1,687,500**
Total		**$1,687,500**

ISOCHRONAL INSPECTION STANDS FOR C-17 AND KC-135

1. Background. The ANG does not possess C-17 home station check (HSC) inspection stands. C-17 aircraft maintenance is accomplished 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 isochronal (ISO) inspection stands no longer meet AFOSH or OSHA standards, since many are over 40 years old and require frequent maintenance actions and numerous man-hours to maintain their serviceability. Additionally, no standard KC-135 ISO stand exists in the Air Force inventory. Stand sets for the C-17 and KC-135 are critical to accomplishing periodic inspection requirements, since C-17 maintenance workarounds and KC-135 stand maintenance delay completion of inspection requirements. Full wing and engine stands and platforms are critical for C-17 HSCs, and full wing, nose, and cargo door platforms are critical to accomplishing KC-135 ISOs. Inspection platforms and stands provide the capability to perform maintenance actions in conjunction with the inspection process. The stands must be safe, incorporate enhanced fall protection measures, and allow maintainers to complete aircraft specific tasks more efficiently; stands incorporate 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**	**$12,000,000**
9 KC-135 Platforms and Stands (3080)	**$975,000**	**$8,775,000**
Total		**$20,775,000**

MJ-1E ELECTRIC BOMB LIFT

1. Background. Combat Air Forces (CAF) load crew exposure to the munitions jammer (MJ- 1B/C) diesel engine emissions can cause headaches and dizziness leading to long-term health-related issues. Procurement of updated equipment enhances maintenance efficiency and safety while improving aircraft availability. Each unit will have a mix of electric and diesel powered bomb lift trucks to support their Wing's missions. Use of the MJ-1E bomb lift eliminates the exhaust fumes from the diesel jammers and reduces the noise, which enhances communication and safety among load crew members. Two to three MJ-1E electric bomb lift trucks are needed to safely support load crew training and operational needs at each CAF unit in the ANG.

2. Program Details:

Remaining Quantity Required	Unit Cost	Program Cost
62 Munitions Loaders MJ-1E (3080)	**$140,000**	**$8,680,000**
Total		**$8,680,000**

ARTICULATING BOOM LIFT

1. Background. Current maintenance operations depend upon equipment with outdated technology or inadequate safety devices. Current maintenance man 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. The Mobility Air Force fleet has working height requirements that exceed existing maintenance man lift capabilities for activities such as life raft changes, emergency locator transmitter maintenance, aircraft structural integrity program inspections, and additional work above the wing. Maintenance activities currently use man lifts with no fall protection capability while performing maintenance activities outside hangars and/or flightline maintenance operations that exceed 38 feet in height. Man 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 ANG wing with heavy aircraft.

2. Program Details.

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

TOWBARLESS TOWING EQUIPMENT

1. Background. ANG maintainers need towing equipment capable of maneuvering aircraft in confined areas. Currently, aircraft positioning is accomplished by utilizing a full-size MB-4 tow tractor or similar model and a long tow bar. ANG units need compact towing equipment not requiring a tow bar for maneuvering aircraft in areas with limited space. Recommend two sets of towbarless aircraft towing equipment per ANG flying wing.

2. Program Details.

Quantity	Unit Cost	Program Cost
148 Towbarless Aircraft Towing Sets (3080)	**$200,000**	**$29,600,000**
Total		**$29,600,000**

PNUEMATIC/PORTABLE CABIN PRESSURE TESTER

1. Background. ANG A-10 and F-16 aircraft require a portable cabin pressure tester to provide a more reliable and easily deployable option to perform cabin pressurization and operational tests following maintenance actions. The existing legacy equipment is difficult to repair and calibrate. The replacement must be quiet (<100db within 10'), not require external power, operate using shop air or portable air compressor, and be completely contained in a ruggedized case. The portable cabin pressure tester should meet or exceed current tester capabilities. Recommend two testers per ANG A-10 and F-16 units.

2. Program Details.

Quantity	Unit Cost	Program Cost
42 Portable Cabin Pressure Tester (3080)	**$13,500**	**$567,000**
Total		**$567,000**

PACER COMET 4 DIGITAL ENGINE TEST CELL FOR F-15

1. Background. 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-16. There are six engine test systems in need of replacement due to lack of parts supportability and obsolescence. The ANG would like to move forward with the PC4F solution at the 6 ANG F-15 locations. This capability is necessary to ensure the continued precision and accuracy of engine testing.

2. Program Details:

Quantity	Unit Cost	Program Cost
6 Engine test systems (PC4F) F-15 units (3080)	**$1,600,000**	**$9,600,000**
Total		**$9,600,000**

REMOTE ENGINE TRIM TEST SET

1. Background. ANG KC-135 and E-8 aircraft maintainers need the capability to perform engine trim procedures in a safe and efficient manner. The current engine trim equipment has become unreliable and unserviceable due to parts obsolescence. The lack of a serviceable remote trim system has forced field users to resort to manual power trim adjustment of the Main Engine Control (MEC), which is inefficient, increases stress on engines and related components, and presents a safety risk to personnel. An improved remote trim system would be more efficient, safe and accurate. Recommend one engine trim tool per KC-135 and E-8C wing in the ANG for a total of 18.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Remote Engine Trim Tools (3080)	**$9,000**	**$162,000**
Total		**$162,000**

TARGETING POD EXTERNAL POWER TEST SET

1. Background. ANG units flying variants of the LITENING Targeting Pod (TGP) need the capability to trouble-shoot, load software, perform Initiated Built in Test (IBIT), 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 trouble-shooting, repair, and testing can be delayed due to aircraft availability. Request two external power test sets per LITENING TGP equipped unit in the ANG.

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**

*Includes 10% spares

MULTI-MISSION DESIGN SERIES (MDS) ACTIVE BUS TESTER

1. Background. The Bus Characterization and Integrity Toolset (BCIT) tester provides 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-1153 data bus network. The software toolset maps any MIL-STD-1153 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 BUS's. 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 BUS. The TDR function provides guidance to maintenance personnel to within six inches of a fault in wiring. The ANG is working with Air Force Research Labs to acquire these bus testers on existing ANG airframes that utilize the 1553 bus. The Joint Surveillance Target Attack Radar System (JSTARS) system program office 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 and HH-60 aircraft. The ANG is leading an effort to test the BCIT on additional mission and design series aircraft. Recommend two BCITs per KC-135, C-130 and HH-60 Aircraft Maintenance Group in the ANG.

2. Program Details

Quantity	Unit Cost	Program Cost
42 BCIT Bus Testers (3080)	**$70,000**	**$5,180,000**
Non Recurring Engineering (3080)	**N/A**	**$600,000**
Total		**$5,780,000**

QUAD-BAND SATCOM TEST SET

1. Background. The ANG Control and Reporting Centers need the ability to validate the mission capability of the AN/TSC-179 Ground Multi-Band Terminal. The Satellite Quad-Band Maintenance Test Set is a ruggedized/weatherproof Maintenance Test Set that will allow technicians to analyze and adjust antenna tracking, uplink power, and signal reception without requiring access to an active satellite. This capability will ensure the Ground Multi-Band Terminal is fully mission capable and ensure technician proficiency on critical mission tasks. To meet this requirement, a satellite access request is required 90 days in advance to gain access to the high demand bandwidth on the Ground Mobile Force's satellite. Recommend all nine control and reporting centers and nine combat communication squadrons in the ANG be provided this test set.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Quad-Band Maintenance Test Sets (3080)	**$103,000**	**$1,854,000**
Total		**$1,854,000**

Intelligence, Surveillance, and Reconnaissance

RC-26B Condor - The RC-26B provides manned Intelligence, Surveillance, and Reconnaissance (ISR) and Incident Awareness and Assessment (IAA) capability with 13 aircraft, operating out of 10 different states for maximum CONUS coverage. 11 are in two mission configurations – 5 Block 20 aircraft, 6 Block 25R aircraft – and 2 C-26s that are in the process of being brought up to the mission configuration. The Block 25R+ and Avionics efforts will bring the entire fleet to a common configuration and will include modern avionics, an upgraded EO/IR sensor, beyond line-of-sight communication, an optimized communications and data-link suite, and a new mission management system. ANG RC-26s supports a broad range of missions in both COCOM overseas contingency operations and Title-10 CONUS missions as well as domestic IAA requirements for disaster response, national special security events, counter-drug, and border operations.

MC-12W – Nine aircraft, along with training, communications, and intelligence support, are based out of Will Rogers IAP, Oklahoma City, OK under the 137th Special Operation Wing (SOW). The 9 aircraft were delivered in the Block 3.1 configuration, to include Extended Range (ER) fuel tanks, day/night full motion video (FMV), Line-of-Sight (LOS) and Beyond-Light-of-Sight (BLOS) video data links (VDL), and digitally integrated radios and mission management systems. This configuration was designed and built to support Operation Iraqi Freedom and Operation Enduring Freedom. As these operations draw to close, the 137SOW, under the auspices of SOCOM and AFSOC will be employed in expanding roles and mission sets in multiple Areas of Operation (AOR). Future modifications will allow a modular ISR capability, air-to-air data links, and self-protection systems conforming to combatant command requirements, along with enabling future domestic IAA operations.

Distributed Common Ground System (DCGS) - The AF DCGS, designated the AN/GSQ-272 Sentinel, is the primary ISR processing, exploitation, and dissemination system. The DCGS provides all source intelligence derived from ISR platforms to Combatant Commands (COCOMs), component numbered air forces (C-NAF), and national command authorities worldwide 24 hours a day, 7 days a week. Spread across the globe, DCGS personnel enable the AF to engage in multiple, simultaneous military operations worldwide.

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Critical Capabilities List

DCGS

- High Performance Workstations For Multi-INT Fusion Tools
- Distributed Ground Station Network Modernization
- Targeting Product Dissemination Tools to Enable Timely Distribution to Warfighter
- Redundant Power Supply for Targeting Units
- Reliable Access for MQ-1/9 Units to SOF Baseline Networks

MC-12W

- Airborne Mission Networking Modernization
- Modular SIGINT Array
- IMINT Sensor Improvement
- SIGINT Workstation Full-Spectrum Enhancement
- Anti-Jam GPS Antennas for Contested / Degraded Ops

RC-26B

- Avionics Modernization
- Block 25R+ Common Fleet Configuration
- Interoperable BLOS Data Link
- Optimized Communications/Antenna Suite
- Full Crew Distributed Mission Simulator (See Tab P)

Essential Capabilities List

DCGS

- Scalable Targeting Processors
- Cyber and Other Non-Kinetic Target Modeling Solutions
- MQ-1/9 Intelligence Position Simulator
- Algorithmic Target Recognition (ATR) for Rapid Analysis of Electro-Optical, Infrared, and Synthetic Aperture Radar (SAR) Imagery and Full Motion Video (FMV)
- 24/7 Operations Floor Upgrades to Enhance Circadian Rhythms for DCGS, MQ-1/9, and Targeting Operators

MC-12W

- 5-Bladed Propellers for Improved Performance, Fuel Burn, and Acoustics
- Cockpit Angle of Attack (AoA) Gauge for Fuel Savings
- Semi-Prepared Airfield Kits and Takeoff and Landing Data (TOLD) Package
- Modular Synthetic Aperture Radar (SAR)/Ground Moving Target Indicator (GMTI)
- ADS-B IN/OUT Capable Civilian Transponder with Cockpit Avionics Integration

RC-26B

- Aircraft Performance Upgrade
- SAR/MTI High-Resolution Radar
- Full Spectrum Battlespace Awareness Link
- Weather Radar With Mission Capabilities
- Airborne Mobile Ad Hoc Network

Desired Capabilities List

In an effort to conserve space, desired lists for ISR are available upon request from NGB/A5.

DCGS: HIGH PERFORMANCE WORKSTATIONS FOR MULTIPLE-INTELLIGENCE FUSION TOOLS

1. Background. The ANG Intelligence Surveillance and Reconnaissance (ISR) enterprise needs more processing power to effectively fuse multiple-intelligence (multi-INT) data. The current workstations available to the ANG ISR enterprise do not have the capacity to run available Government Off-The-Shelf (GOTS) applications without significantly slowing down or completely freezing the system. One examples of the GOTS tools is the Fusion Analysis Development Effort (FADE). The FADE application includes activity trending, entity tracking, target development, advanced analytics, and activity alerting. Thick client workstations will allow units to fully utilize the FADE application and has capacity for future growth. Request thick client workstations and graphic processing units (GPUs) for ANG Remotely Piloted Aircraft, Distributed Common Ground System, targeting, cyber, ISR, and wing level intelligence units.

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 10% spares

DCGS: DISTRIBUTED GROUND STATION NETWORK MODERNIZATION

1. Background. Air Force Distributed Common Ground System (AFDCGS) units in the ANG need routine network system upgrades to enable uninterrupted, 24/7 processing, exploitation and dissemination of theater level geospatial intelligence and signals intelligence collection. Three of the stand-alone ANG AFDCGS units need cross domain servers and border routers for their local area networks as well as campus area networks. These sites have been operating on the current communications equipment which is well beyond the intended shelf life of the hardware. Continuous use of the existing equipment over the past 8 years has put a significant strain on the outdated network equipment, increasing potential for total system failure and jeopardizing continued support to combat operations. Additionally, continuing to maintain these outdated communications network equipment has increased routine repair costs as many components are no longer supported by industry.

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**

DCGS: TARGETING PRODUCT DISSEMINATION TOOLS TO ENABLE TIMELY DISTRIBUTION TO WARFIGHTER

1. Background. Targeting units need an autonomous capability to transfer targeting materials between separate classified networks. A cross-domain system is needed to transfer materials from higher classification networks down to a lower level network. This is required for both intermediate and advanced target development produced by the ANG targeting enterprise daily. The addition of this capability will reduce the time required to process information required to prosecute targets from seven days to less than an hour. The system would be fielded at all 6 ANG targeting units.

2. Program Details.

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

DCGS: REDUNDANT POWER SUPPLY FOR TARGETING UNITS

1. Background. ANG targeting units do not have back-up power generators to allow for uninterrupted operations in the event of electrical power failure. The power back-ups currently used are uninterruptible power supplies which provide approximately 10 minutes of battery power to the servers and do not support climate control units putting server components at risk. To meet the power requirements of the servers and the climate control units at least a 750KW generator is needed at all six ANG targeting units.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 750KW Generators (3080)	**$150,000**	**$900,000**
Total		**$900,000**

DCGS: RELIABLE ACCESS FOR MQ-1/9 UNITS TO SPECIAL OPERATIONS FORCES BASELINE NETWORKS

1. Background. ANG Remotely Piloted Aircraft (RPA) require rack-mounted client workstations to fully support Special Operations Forces (SOF) during combat operations. ANG RPA units are tasked to support SOF combat operations in multiple areas of responsibility but are not fully integrated due to slow access to closed SOF information systems. SOF organizations use a closed network with standalone information systems for intelligence research and dissemination, mission planning, real-time cross-cueing, and voice/data communication between forward elements. Rack mounted client workstations are integrated and would provide the needed computing power enhancing squadron intelligence interoperability and integration with SOF entities. This would improve ANG RPA crew's situational awareness and effectiveness when conducting SOF missions. This system would field five rack mounted client workstations to be utilized at Mission Crew Commander, Intelligence Operations Supervisor, Mission Intelligence Coordinator, and Mission Support Analyst workstations at the 11 ANG RPA units.

2. Program Details.

Quantity	Unit Cost	Program Cost
55 rack-mounted client workstations (3080)	**$35,000**	**$1,925,000**
Total		**$1,925,000**

MC-12W: AIRBORNE MISSION NETWORKING MODERNIZATION

1. Background. The MC-12W needs a Line-of-Sight (LOS) and Beyond Line of Sight (BLOS) Tactical Data Link (TDL) and a Mobile Ad Hoc Networking (MANET) airborne node to interface with Air Force Special Operations Command (AFSOC) Airborne Mission Network (AbMN) construct. MC-12W aircrews need to share aircraft position, targeting data, sensor point of interest, cursor-on-target, and target track information using AbMN. An AbMN will also reduce fratricide and collateral damage through more precise battlefield situational awareness. A LOS/BLOS TDL capability is required for the MC-12W compatible with Situational Awareness Data Link (SADL), Link-16 and gateway software. The AbMN system, for all 9 Air National Guard (ANG) MC-12W aircraft, must have open architecture to accommodate growth and advances in AbMN technology.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-recurring engineering (3600)	**$750,000**	**$750,000**
9 Link-16 radios (3010)	**$350,000**	**$3,150,000**
9 SADL radios (3010)	**$42,000**	**$378,000**
9 MANET airborne nodes (3010)	**$20,000**	**$180,000**
Total		**$4,458,000**

MC-12W: MODULAR SIGNALS INTELLIGENCE ARRAY

1. Background. The Signals Intelligence (SIGINT) capabilities currently onboard the MC-12W need to be modernized. The antennae on the aircraft are still in the original configuration and no longer provide the capability currently needed. This upgrade will remove the fixed canoe antenna array to make room for a rapid roll-on/roll-off (RORO) modular antenna bay with connections to the Technical Systems Operator (TSO) workstation. Additionally, the below wing antennae need to be moved to a position on the airframe to optimize performance. Currently, these two wing antennae cause severe masking of the MX-15DiD laser designator during critical combat mission operations. A full spectrum, higher powered antenna set would enable the current system to fully exploit the available spectrum. This overall effort, on all 9 aircraft, will provide for rapid plug-and-play SIGINT systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-recurring engineering (3600)	**$700,000**	**$700,0000**
9 RORO modular antenna bays (3010)	**$35,000**	**$315,000**
9 full-spectrum high power antennas (3010)	**$75,000**	**$675,000**
Total		**$1,690,000**

MC-12W: IMAGERY INTELLIGENCE SENSOR IMPROVEMENT

1. Background. The MC-12W visual sensor includes high definition (HD) electro-optical wide and narrow cameras but only a standard definition (SD) infrared (IR) camera. HD full motion video is now the Special Operations Command minimum requirement for tactical intelligence, surveillance, and reconnaissance applications, allowing both the aircrew operator and ground command and control personnel to view a picture with over twice the resolution of SD. An HD camera facilitates positive identification of threats or hostile intent and an improved target description for follow, reacquisition, and targeting at longer aircraft ranges. An HD IR camera will show disturbed earth and trip wires leading to improvised explosive devices more readily. Eight aircraft are receiving this upgrade to replace the current SD IR camera with an HD version, which includes upgrades to the lens and the short-wave infrared camera. One more IR sensor upgrade will complete the fielding for all MC-12W aircraft assigned to the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 HD IR camera (3010)	**$600,000**	**$600,000**
Total		**$600,000**

MC-12W: SIGNAL INTELLIGENCE WORK STATION FULL-SPECTRUM ENHANCEMENT

1. Background. The Tactical Systems Operator (TSO) equipment rack needs modernization to enable employment within various areas of responsibility, and to adapt to enemy Tactics, Technique, and Procedures changes. During normal operations the TSO needs to work on multiple classified networks. The current workstation displays only one network at a time requiring the operator to switch between classified networks, reducing situational awareness and needlessly complicating crew resource management. The upgraded configuration needs to include multiple display monitors to simultaneously access and display multiple networks without any delay or loss of situational awareness. The improved station should also include a slide-out table to accommodate the carry-on laptop, and it should include a mounting location with standard modular connections for power, antennae, networks and GPS input. Request one work station for each of the nine ANG MC-12W aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3600)	**$300,000**	**$300,000**
9 TSO Work Station Upgrades (3010)	**$300,000**	**$2,700,000**
Total		**$3,000,000**

MC-12W: ANTI-JAM GPS ANTENNAS FOR CONTESTED / DEGRADED OPS

1. Background. MC-12W aircrews cannot adequately accomplish their mission in areas of denied or degraded Global Positioning System (GPS) signals. The design of the original commercial GPS antenna and receiver subsystem did not consider the threat of GPS jamming or GPS spoofing. Subsequently, its performance is insufficient during contested or degraded operations. MC-12W aircraft require an anti-jam and Selective Availability Anti-Spoofing Module (SAASM) capability with signal splitters for the aircraft navigation system and embedded mission equipment. In order to have full SAASM capability, this system must include an anti-jam Advanced Digital Antenna Production (ADAP) kit with a Controlled Reception Pattern Antenna (CRPA), the associated Antenna Electronics (AE), a low noise amplifier, and by-pass filters. The protected positioning data this system provides will be available to all of the aircraft mission and navigational systems to ensure reliable and accurate navigation and mission performance. This system will allow MC-12W aircrews to continue to employ and provided accurate information to the supported units using the military Precise Position Service P(Y) and M coded signals while in a GPS compromised area. This modification will be applied to all nine aircraft in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-recurring engineering (3600)	**N/A**	**$500,000**
9 ADAP (CPRA + AE) GPS Antennas (3010)	**$5,000**	**$65,000**
9 SAASM and Signal Splitters (3010)	**$5,000**	**$65,000**
Total		**$630,000**

RC-26B: AVIONICS MODERNIZATION

1. Background. A modernization of the entire cockpit is needed to deploy worldwide and operate in the National Airspace System. Honeywell Bendix, the manufacturer of the RC-26 Flight Management System (FMS) KNS-660 stopped supporting navigational data updates to the outdated system in December 2015, rendering the fleet capable of only basic Very High Frequency (VHF) Omni directional Radio (VOR) to VOR navigation operations. Additionally, the Global Positioning System (GPS), electronic flight information system displays, FMS, as well as the navigation and communication radios need to be modernized, in part, to comply with the Federal Aviation Administration (FAA) 2020 NextGen and the International Civil Aviation Organization (ICAO) Communication, Navigation, and Surveillance / Air Traffic Management mandates. The navigations 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. The communication radios do not meet the frequency spacing required for operation in the Europe. 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. The upgrade will be applied to all 13 ANG RC-26B aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**$1,000,000**	**$1,000,000**
13 Avionics Shipsets (3010)	**$1,550,000**	**$20,150,000**
Total		**$21,150,000**

RC-26B: BLOCK 25R+ COMMON FLEET CONFIGURATION

1. Background. The RC-26B needs a common fleet hardware and software configuration. Tasked for both domestic and overseas missions, the RC-26B is a fleet of 13 aircraft in three different configurations: 6 Block 25R, 5 Block 20, and 2 C-26As that have yet to have mission equipment installed. 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 (LD), Electro-Optical / Infrared (EO/IR) High Definition (HD) full-motion video sensor, expanded Integrated Communications System (ICS), Link-16, upgraded antennas. Open Mission System architecture will also be integrated to ensure lasting relevance through the ability to rapidly integrated new systems and sensors. Of the 13 aircraft, 7 require full Block 25R+ modernization, while only 6 of the LD sensors are needed for deployment purposes.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**$2,000,000**	**$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**
13 Link-16 Terminals (3010)	**$275,000**	**$3,575,000**
7 MMS (3010)	**$200,000**	**$1,400,000**
13 Optimized/Upgraded ICSs (3010)	**$200,000**	**$1,400,000**
7 Self Protection Systems (3010)	**$300,000**	**$2,100,000**
13 Optimized Antenna Suites (3010)	**$75,000**	**$975,000**
Total		**$27,950,000**

RC-26B: INTEROPERABLE BEYOND LINE-OF-SIGHT DATA LINK

1. Background. The RC-26B needs a high bandwidth Beyond Line-of-Sight (BLOS) data link capability. The intelligence community utilizes real-time, seamless interoperable communication architectures in a network-centric battlespace, the standard for airborne Intelligence, Surveillance, and Reconnaissance (ISR) assets. The RC-26B has no capability to interact with the global information grid using broadband BLOS technology or to communicate within a common data link (CDL) environment. In addition, the supported warfighter on the ground is increasingly operating in remote locations where the ability to exchange real-time data and transmit Full Motion Video (FMV) solely via line-of-sight is a severe restriction. BLOS CDL and high definition (HD) FMV downlink capability to Command and Control (C2) nodes and ground forces are critical capabilities for all airborne ISR platforms. The proposed upgrade to the RC-26B with a high-bandwidth BLOS kit antenna, antenna bubble, aircraft wiring and integration gives the aircraft a wideband data link providing both intelligence data and streaming HD FMV to BLOS users and customers. This modification enables the enhancement of operational situational awareness for intelligence gatherers and ground elements in any areas of operation. It also permits platform-to-platform and platform-to-C2 data exchange and sensor slewing. These upgrade kits will also provide a vast amount of HD awareness and assessment imagery for domestic operations. All 13 ANG RC-26Bs need the high bandwidth BLOS data link. Four kits have already been procured.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$1,000,000**
9 BLOS Antenna and Installation Kits (3010)	**$1,000,000**	**$9,000,000**
Total		**$10,000,000**

RC-26B: OPTIMIZED COMMUNICATION / ANTENNA SUITE

1. Background. ANG RC-26B aircraft need an improvement to their Line of Sight (LOS) and Beyond Line of Sight (BLOS) communications capability. The mission set requires the crew to simultaneously monitor and transmit on multiple radios, datalinks, and internal networks. The current configuration includes limited antenna options and legacy mission radios that have been surpassed by newer software-defined radios and are no longer supported by the original equipment manufacturer. The replacement of legacy PRC-117F, ARC-231, and Wulfsberg radios with modernized versions interfaced with a modern communications management suite will reduce weight, increase waveform flexibility, and improve the aircrew's ability to manage multiple radios simultaneously. The current LOS, BLOS, and data link antennas are limited to single frequency bands while multi-band replacements exist. The replacement of current antennas with real-time selectable multi-band antennas supporting LOS, BLOS, Global Positioning System, Link-16, TACAN, and wideband transmission and reception capability will allow the RC-26B aircrew to select the best antenna and waveform. Improvements to antenna placement, combined with low-profile antennas, will increase aircraft performance allowing for greater endurance on station. The inclusion of three dimensional audio to the existing intercommunication system will improve the aircrew's ability to differentiate between radios and audible signals improving safety of flight and mission effectiveness. The current internal network setup impedes the ability to train multiple crew positions simultaneously. Multiple internal communication networks are needed to separately instruct pilots, mission system operators, and other aircrew on the new mission systems. This modification would be applied to all 13 ANG RC-26B aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**$500,000**	**$500,000**
52 Software Defined Mission Radios (3010)	**$50,000**	**$2,600,000**
26 BLOS Communications Antenna (3010)	**$50,000**	**$1,300,000**
39 LOS Communications Antennas (3010)	**$30,000**	**$1,700,000**
52 Data Link Antennas (3010)	**$1,000**	**$52,000**
13 Spatial Audio Shipsets (3010)	**$1,000,000**	**$3,250,000**
Total		**$8,820,000**

Guardian Angel, Special Tactics, 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 which consists 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 SOF 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.

Tactical Air Control Party (TACP) 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 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, Tactical Air Control Party 2016 Weapons and Tactics Conference

Critical Capabilities List

Guardian Angel

- Combat Survivability System Modernization
- GA Tactical Ground Mobility Vehicle
- Digital Integration System
- GA Aircraft Interoperability System
- Medical Modernization

Special Tactics

- Tactical Low-Visibility Vehicles
- High-Angle Simulation Towers (See Tab P)
- Tactical Assault Kit (TAK) Enterprise Communications Suite
- All-Terrain Tactical Vehicles
- Modernized Aerial Delivery Suite

Tactical Air Control Party

- Lightweight Personal Protection System
- Full-spectrum Operations SA Kit with Portable Next Generation Power Management
- Modern NVG's and Infrared Target Marking
- Dismounted Audio and Video Mission Recording and Debrief System
- TACP Lightweight Dismounted Sensor and Targeting System

Essential Capabilities List

Guardian Angel

- Search Enhancement
- Terminal Area Simulator
- Signature Management Capabilities
- Single Pass Precision Airdrop

Special Tactics

- Sensitive Items Tracking System
- Sensitive Items Storage
- Reconnaissance Suite Upgrades
- Small Unmanned Aerial System Flight Authorizations

Tactical Air Control Party

- ANG Advanced Joint Terminal Attack Controller Training Simulator
- Handheld Link16 Terminal
- Shortwave Infrared NVGs
- Multichannel Radios
- Low Profile Vehicle and Dismount Antennas

Desired Capabilities List

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

GUARDIAN ANGEL COMBAT SURVIVABILITY SYSTEM MODERNIZATION

1. Background. Guardian Angels (GA) need modernization of the combat survivability suite with upgraded weapons accessories, thermal imagery for night vision devices and handheld devices, buoyant body armor, and modern communications upgrades. Critical small arm weapon accessories modernization is required to bring the GA arsenal up to current standards. Thermal imagery optics are needed in both handheld versions as well as clip-on imagers for night vision devices to give GAs the ability to see at night in areas of reduced visibility. Hydrophobic body armor is needed for missions in the maritime environment. Modern communications devices capable of clear communication between team members in all environments is also needed. The GA combat survivability system modernization should include: 30 (10 per unit) Enhanced-Clip-On Thermal Imagers (E-COTI), 18 (6 per unit) lightweight multi-purpose target locators, 165 (one per person) hydrophobic plate carrier & neutral buoyancy plates, 165 (one per person) modern communication devices, and 165 (one per person) weapons accessory modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
30 E-COTI (3080)	**$10,000**	**$300,000**
18 Lightweight Target Locator (3080)	**$40,000**	**$720,000**
165 Modern Communication Devices (3080)	**$8,000**	**$1,320,000**
165 Hydrophobic Plate Carrier (3080)	**$1500**	**$247,500**
165 Neutral Buoyancy Plates (3080)	**$2000**	**$330,000**
165 Weapons SOPMOD (3080)	**$1,062,203**	**$3,186,609**
Total		**$6,104,109**

GUARDIAN ANGEL TACTICAL GROUND MOBILITY VEHICLE

1. Background. Guardian Angels (GA) lack the ability to move personnel and equipment from point of insertion to incident site and out of harm's way. GA's need a mid-size all-terrain ground mobility platform capable of transporting four personnel and two casualties simultaneously with a small to medium, turret-mounted, point defense weapon. This mid-size tactical rescue platform should have a 100 mile unrefueled range and be capable of being inserted via helicopter sling load or loaded in a CV-22 aircraft. The platform needs to be equipped with an integrated navigation and tactical communication suite capable of line of sight and beyond line of sight communications with isolated personnel. Guardian Angels request 4 vehicles per rescue squadron for a total of 12.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Tactical Ground Mobility Vehicles (3080)	**$120,000**	**$1,440,000**
Total		**$1,440,000**

GUARDIAN ANGEL DIGITAL INTEGRATION

1. Background. Guardian Angels (GA) lack a situational awareness system capable of identifying friendly forces and air assets across an increasingly complex battlespace. Guardian Angels need a lightweight, wearable system capable of identifying friendly forces, holding large map data, receive full motion video and include a jumpmaster feature to provide enroute mission planning. The solution should be network agnostic and capable of standalone operations with the ability to connect to datalink receivers and radios currently carried by operators. It is recommended Guardian Angels receive 50 Android Tactical Assault Kits (ATAK) and 55 modular chest mounts for each of the 3 ANG rescue squadrons for a total of 150 and 165 respectively.

2. Program Details.

Quantity	Unit Cost	Program Cost
150 ATAK Kits (3080)	**$6,250**	**$937,500**
165 Modular ATAK Chest Mounts (3080)	**$637**	**$105,105**
Total		**$1,042,605**

GUARDIAN ANGEL AIRCRAFT INTEROPERABILITY SYSTEM

1. Background. Guardian Angel (GA) operators are tasked to perform mission and aircrew duties aboard legacy Air Force rescue C-130s, HH-60G as well as Joint and Coalition aircraft. The replacements for legacy rescue aircraft do not possess the mission planning/situational awareness stations possessed by legacy aircraft which are necessary when conducting combat search and rescue operations. GA's need a modular system capable of storing required maps, mission profile displays for enroute team briefing, and the ability to communicate with ground and operations center personnel. The fielded solution should be capable of integrating with HC-130J and HH-60W aircraft and interface with GA Android Tactical Assault Kit systems. Guardian Angels request 3 Mission Planning/Situation Awareness Stations for each of the 3 rescue squadrons for a total of 9.

2. Program Details.

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

GUARDIAN ANGEL MEDICAL MODERNIZATION SYSTEM

1. Background. ANG Guardian Angels (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. A ruggedized data management kit with a computer, monitor screens, camera, microphone, and case will allow operators to interact with healthcare professionals while treating patients and 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 hot spot. Recommend Guardian Angel Medical Modernization System receive 40 cardiac resuscitation devices (10 per rescue squadron, five per special tactics squadron), 32 Ventilators (8 per rescue squadron, four per special tactics squadron), 10 Data Management Kits (two per rescue squadron and special tactics squadron), 24 ECGs (6 per rescue squadron, three per special tactics squadron), 24 satellite based WiFi hot spots (six per rescue squadron, three per special tactics squadron) and (55 Capnographs, 15 per rescue squadron, five per special tactics squadron).

2. Program Details

Quantity	Unit Cost	Program Cost
40 Cardiac Resuscitation Device (3080)	**$30,000**	**$1,200,000**
32 Ventilator (3080)	**$6,100**	**$195,200**
10 Data Management Kit (3080)	**$180,000**	**$1,800,000**
24 ECG Monitors (3080)	**$15,000**	**$360,000**
24 Satellite Based Hot Spot (3080)	**$900**	**$21,600**
55 Capnograph Monitor (3080)	**$1,300**	**$71,500**
Total		**$3,648,300**

SPECIAL TACTICS AND GUARDIAN ANGEL TACTICAL LOW-VISIBILITY VEHICLES

1. Background. Special Tactics Squadrons (STS) consist of Special Tactics Teams (STT) made up of combat control, guardian angel (GA), and special operations weather team (SOWT) operators who need 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 mobility airlift aircraft. Request one vehicle for each of the 18 STT's (nine teams per STS) and two vehicles for each of the three ANG rescue squadrons totaling 24 TLV's.

2. Program Details.

Quantity	Unit Cost	Program Cost
24 Tactical Low-visibility Vehicles (3080)	**$200,000**	**$4,800,000**
Total		**$4,800,000**

SPECIAL TACTICS AND GUARDIAN ANGEL TACTICAL ASSAULT KIT ENTERPRISE SUITE

1. Background. Special Tactics (ST) and Guardian Angel (GA) units lack an effective peer-to-peer communications system. The current communications suite lacks robust situational awareness (SA), system integration, bandwidth requirements, and architecture for current mission sets. ST warfare operations require increasing capabilities of wideband networking across large geographic areas. ST requires peer-to-peer mobile ad-hoc wideband networking radios with streaming video encoding/decoding capable of interfacing with Android-based technologies employed by U.S. Special Operations Command entities. In order to fully exploit the capabilities of existing hardware, ST and GA units require a communications backbone consisting of secure server space, video engine, and Virtual Private Network (VPN). Request one Tactical Assault Kit (TAK) Enterprise suite comprised of server space, video engine and VPN as well as 30 UHF/VHF mobile networking devices, 15 MANET Radios and four MANET Base Stations for each of the two ANG special tactics squadrons and three ANG rescue squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
Server Space (3080)	**$10,000**	**$10,000**
Video Engine (3080)	**$3,000**	**$3,000**
VPN (3080)	**$20,000**	**$20,000**
150 UHF/VHF Mobile Networking Devices (3080)	**$500**	**$75,000**
75 MANET Radio (3080)	**$10,000**	**$750,000**
20 MANET Base Station(3080)	**$40,000**	**$800,000**
Total		**$1,658,000**

SPECIAL TACTICS ALL-TERRAIN TACTICAL VEHICLE

1. Background. Special Tactics (ST) missions need the use of medium-sized tactical vehicles to carry ST personnel and their equipment over long distances for extended periods of time. The current ST tactical vehicle fleet does not support all mission requirements. ST needs a vehicle capable of supporting all three mission capabilities they are currently tasked with: global access, precision strike, and personnel recovery. This vehicle must be capable of carrying a minimum of four combat-outfitted ST operators with a total payload capability of no less than 2,500 pounds and fit inside of a CH-47 helicopter. The vehicle must be four wheel drive and capable of traversing unimproved terrain with the ability to mount crew-served weapons up to a M2 heavy machine gun and configurable to carry a litter for personnel recovery. Request four All-Terrain Tactical Vehicles per STS for a total of eight vehicles.

2. Program Details.

Quantity	Unit Cost	Program Cost
Eight All-Terrain Tactical Vehicles (3080)	**$250,000**	**$2,000,000**
Total		**$2,000,000**

SPECIAL TACTICS MODERNIZED AERIAL DELIVERY SYSTEMS

1. Background. Special Tactics Teams (STT) lack the capability to effectively insert into a wide range of combat zones via aerial delivery methods with the equipment they currently possess. Teams need the following equipment to execute air-drop and airborne operations safely, precisely and efficiently: ten person oxygen consoles, modernized night vision goggles, and Joint Precision Air Delivery System (JPADS). Ten-person oxygen consoles will allow STT to field a higher number of military freefall jumpers while reducing the number of consoles required. JPADS provides accurate aerial delivery of equipment to a specific location in varying weather conditions. For low-light jump operations, ground panoramic night vision goggles (GPNVG) provide an increased field of view by 80 degrees, improved depth perception, and greater situational awareness through all stages of a mission. Recommend eight, ten person oxygen consoles, eight JPADS 2K devices and 20 GPNVG's for the 123 and 125 Special Tactics Squadrons. STS.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 Ten Person Oxygen Console (3080)	**$80,000**	**$640,000**
8 JPADS 2K Devices (3080)	**$40,000**	**$320,000**
20 Ground Panoramic NVG (3080)	**$40,000**	**$800,000**
Total		**$1,760,000**

TACTICAL AIR CONTROL PARTY PERSONAL PROTECTIVE SYSTEM

1. Background. Dismounted Joint Terminal Attack Controllers (JTACs) lack a lightweight modern personal protective system that is compatible with multiple mission sets. JTACs require a protective system for dismounted, long offset missions capable of being configured for a mounted mission in environments that require maximum armor. The protective system should have soft armor that is level two rated and hard armor that is level four rated. Replacing the personal protective systems currently used by JTACs will decrease fatigue and injuries to JTACs by reducing the amount of weight and improving armor capability. Recommend Tactical Air Control Party personnel receive 50 systems for each of the 14 squadrons and 20 systems for each of the two groups, for a total of 740 kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
740 Protective Carriers (3080)	**$1,200**	**$888,000**
740 Soft Armor Sets (3080)	**$350**	**$259,000**
740 Hard Armor Sets (3080)	**$700**	**$518,000**
740 Helmets (3080)	**$1000**	**$740,000**
Total		**$2,405,000**

TACTICAL AIR CONTROL PARTY SITUATIONAL AWARENESS KIT WITH PORTABLE NEXT GENERATION POWER MANAGEMENT

1. Background. Tactical Air Control Party (TACP) and Special Tactics (ST) dismounted Joint Terminal Attack Controllers (JTACs) lack a lightweight situational awareness kit with portable power storage and management solutions for man-portable and handheld radios. The batteries currently fielded are not re-chargeable and do not meet FAA requirements for transport. The re-chargeable battery options available are subject to catastrophic failure and pose a threat to personnel safety and mission success. JTAC's require an FAA approved re-chargeable battery capable of extended use with the ability to be re-charged from a variety of sources. JTAC's 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 carried by JTAC's. TACPs require 44 kits per squadron and 10 kits per group, for a total of 636 kits. ST requires 20 kits per squadron, for a total of 40 kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
676 PRC-117G Portable Power (3080)	**$10,149**	**$6,860,724**
676 PRC-148/152 Radio Batteries (3080)	**$5,440**	**$3,677,440**
676 SA Kit w/Case	**$1,500**	**$1,014,000**
676 Power Management System	**$4,583**	**$3,098,108**
Total		**$14,650,272**

TACTICAL AIR CONTROL PARTY MODERN NIGHT VISION GOGGLES AND INFRARED POINTER

1. Background. Tactical Air Control Party (TACP) Joint Terminal Attack Controllers (JTAC's) need modernized night vision goggles (NVGs) to decrease fatigue and infrared pointers to efficiently identify targets. JTAC's need modernized NVG's that are lightweight with white phosphorus tubes to reduce eye and neck fatigue. Wide Field of View (WFOV) NVG's with a minimum field of view of 95 degrees are required for mounted operations. JTAC's need a lightweight Infrared (IR) pointer to quickly identify targets for airborne assets. This will replace bulky and antiquated equipment. TACP's are requesting 460 lightweight NVG's (30 per squadron, 20 per group), 196 WFOV NVG's (14 per squadron) and 600 Infrared Pointers (40 per squadron and 20 per group).

2. Program Details.

Quantity	Unit Cost	Program Cost
460 Lightweight NVGs	**$10,500**	**$4,830,000**
196 WFOV NVGs	**$28,000**	**$5,488,000**
600 Infrared Pointers	**$5,099**	**$3,059,400**
Total		**$13,065,420**

TACTICAL AIR CONTROL PARTY DISMOUNTED AUDIO/VIDEO MISSION RECORDING AND DEBRIEF SYSTEM

1. Background. Joint Terminal Attack Controllers (JTACs) within the Tactical Air Control Party (TACP) and Special Tactics Squadrons (STS) lack an adequate system to debrief training events. A lightweight, wearable recording device will provide a high fidelity after action tool for instructors to provide valuable feedback to students. The system should be able to record transmissions from two radios and ambient sound while also providing a day/night heads up display video with a timestamp function. The recorded audio and video should be capable of being played back synchronously for accurate analysis of training events. Recommend 10 JTAC Mission Recording and Debrief Systems for each of the 14 air support operation squadrons and four for each of the two special tactics squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
148 JTAC Mission Recording and Debrief System (3080)	**$5,000**	**$740,000**
Total		**$740,000**

TACTICAL AIR CONTROL PARTY LIGHTWEIGHT DISMOUNTED SENSOR AND TARGETING SYSTEM

1. Background. Joint Terminal Attack Controllers (JTACs) are required to carry multiple single use function devices to provide target ranging, covert marking, designating, and detection. Simultaneous use of these devices is prohibitive due to their capability, weight, size, and power limitations. JTACs need a combined Laser Target Marker (LTM)/Laser Target Designator (LTD)/Laser Range Finder (LRF) weighing less than five pounds with the ability to mark a target at three kilometers or greater and identify and designate a tank-sized target at distances greater than two kilometers. The LRF function should have integrated eye-safe magnified optics, capable of target identification at five kilometers for day and one kilometer for night while generating CAT II coordinates. JTACs also lack the ability to visually determine the location of pulse-coded frequency lasers used by aircraft to confirm target accuracy prior to engagement. A Day/Night Spot Tracker allows JTACs to accurately identify targets and should weigh 1lb or less while being able to acquire a spot out to two km during the day and three km at night. Recommend JTACs receive six Lightweight Range Mark Designators and Day/Night Spot Trackers for each of the 14 air support operation squadrons in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
88 Day/Night Spot Trackers (3080)	**$22,000**	**$1,936,000**
88 Lightweight Range Mark Designator (3080)	**$120,000**	**$10,560,000**
Total		**$12,496,000**

MQ-1 and MQ-9

The MQ-1 and MQ-9 remotely piloted aircraft makeup the largest major weapons system and Formal Training Unit (FTU) community in the Air Force. The MQ-1 Predator is a medium-altitude, long endurance, remotely piloted system. The MQ-1's primary mission is to act as an Intelligence, Surveillance, and Reconnaissance (ISR) asset, employing sensors to provide real-time data to commanders and intelligence specialists at all levels. The MQ-1 conducts armed reconnaissance and employs two laser-guided AGM-114 Hellfire missiles. The MQ-9 Reaper is a medium-to-high altitude, long endurance, remotely piloted system. Because of its robust weapons payload capacity, long endurance, and on-station times, the MQ-9's primary mission is hunter-killer operations against emerging targets. The aircraft employs up to four laser-guided AGM-114 Hellfire missiles and/or four GBU-12 500 pound laser-guided bombs. The MQ-9's secondary mission is to act as an ISR asset, employing sensors to provide real-time data to commanders and intelligence specialists at all levels. It is larger, faster, and more lethal than the MQ-1 Predator and is designed to prosecute time-sensitive targets using precision targeting and long endurance capability to find, fix, and destroy or disable those targets.

In addition to supporting their individual state requirements, ANG units in TX, AR, AZ, CA, IA, MI, ND, NE, NY, NV, OH, PA, and TN fly combat missions 24 hours a day, 365 days a year in every major US combat theater. The ANG also manages FTU operations at two locations and supports test and evaluation at a third. In 2016, ANG units flew the first ever MQ-1/9 sorties in the Baltic region supporting the European Reassurance Initiative (top right). Additionally, ANG MQ-9 crews, equipment and maintenance personnel developed new platform capabilities by successfully employing AGM-114 Hellfire missiles against maritime targets at Eglin Air Force Base supporting the COMBAT HAMMER program.

MQ-1/9
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Critical Capabilities List

- MQ-9 software expansion for GBU-38/54
- Minimal latency tactical data link
- Communications suite with improved interface
- Next generation tactical situation display
- Improved maritime Find/Fix/Target/Track/Engage/Assess (F2T2EA) capability

Essential Capabilities List

- Stand Alone DMO Simulator
- Deployable Launch and Recovery Element
- Enhanced survivability in contested environments – Electronic Warfare, Ku, Global Positioning System (GPS)
- Airborne sense and avoid
- Targeting Pod with Directed Energy Counter Measures

Desired Capabilities List

- Isolated personnel locator
- Near real-time in flight weather update capability
- Mobile Sensitive Compartmented Information Facility (SCIF)
- Weapon simulate mode
- Auto takeoff land

MQ-9 SOFTWARE EXPANSION FOR GBU-38/54

1. Background. The ANG requires a dual purpose, all-weather, laser guided weapon for the Block 1 MQ-9, which is currently capable of employing only the GBU-12 and AGM-114 laser-guided air-to-ground munitions. Air Force Special Operations Command is integrating the GBU-38 Joint Direct Attack Munition (JDAM) all-weather, Global Positioning System (GPS) guided bomb through their 2406 Operational Flight Program (2406 OFP) Medium Altitude Long Endurance Tactical development. The 2406 OFP GBU-38 capability can be used to integrate the GBU-54 Laser JDAM on the MQ-9. The GBU-54 is a combat proven weapon allowing dual-purpose, all-weather guidance by GPS, laser, or a combination of both. The ability to carry the GBU-54 will dramatically increase combat capability across the ANG MQ-9 fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$850,000**
Technical and Training Documentation (3010)	**N/A**	**$550,000**
Total		**$1,400,000**

MINIMAL LATENCY TACTICAL DATA LINK

1. Background. An onboard line-of-sight Tactical Data Link (TDL) radio is needed, with associated hardware and antennas, to adequately employ across multiple Areas Of Responsibility (AOR) in the current operational environment. MQ-9 aircraft 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 issue with regard to aircraft position and airspace de-confliction. This lack of direct information sharing with other TDL participants degrades overall situational awareness in all operations utilizing TDL information and networks. Current MQ-9 TDL communication and information transfers are not routed directly through the existing airborne TDL network but, instead, are routed through multiple ground-based servers outside of the MQ-9 architecture. This method of TDL data routing limits data link communication with end-user agencies and TDL participants, causing significant delays of critical information, such as aircraft position and targeting data. The system must be compatible with all current data link architectures in both domestic and combat AORs, to include Situational Awareness Data Link (SADL) and Link-16 with gateway capable software. All tracks, icons and messages must be integrated into current and future MQ-9 tactical situation displays. It must also have the ability to receive, transmit, and relay variable message format data. This TDL system must include provisions for consistent, reliable, timely, and unrestricted TDL communications, and have open architecture for growth and advances in the TDL technology. In order to be a stand-alone TDL platform, each of the 36 ANG assigned MQ-9 aircraft will require a TDL installation suite.

2. Program Details.

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

COMMUNICATION SUITE WITH IMPROVED INTERFACE

1. Background. The MQ-1 and MQ-9 (MQ-1/9) require a flexible, tactical voice system that interconnects all mission participants. The MQ-1/9 functions across multiple domains and mission sets simultaneously. Tasks often involve intelligence, surveillance and reconnaissance, strike, special operations, and Command & Control (C2). Recent conflicts have reinforced the need for the MQ-1/9 to execute across the full range of military operations, in both contested and uncontested environments with multiple mission players. An improved communications suite should be an Internet Protocol-based communications solution that integrates intercom, Line-of-Sight (LOS) radios, and telephone systems into a single headset with three dimensional audio. The system should feature an intuitive interface that does not increase aircrew workload through additional buttons, switches, or actuators. Any user should be able to talk directly to any other user on the system. Furthermore, the system should allow the use of in-theater LOS repeater towers via the push of a button. This system would be ideal for MQ-1/9 crews who are limited by a single LOS radio on the aircraft, a single point of failure that suffers from poor reception and up to a two-second satellite relay delay. In order to effectively fulfill its cross-domain role as a C2 node, MQ-1/9s require access to multiple in-theater radios and direct voice access to key C2 participants. Additionally, this integrated suite would give MQ-1/9 crews what is standard across the rest of the Air Force fleet, the ability to monitor several LOS radio frequencies simultaneously. Lastly, as MQ-1/9s are increasingly tasked to perform multi-ship tactics, the system would allow any Ground Control Station (GCS) to talk directly to other geographically separated GCSs, improving combat capabilities and situational awareness. A central server is needed to control the system, either one per unit, or a large central server for the enterprise hosted at one unit, with a back-up hosted at another. Operator stations are needed in each GCS, one each for the pilot and sensor operator, plus nine additional operator stations in each Squadron Operations Center (SOC).

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**$1,000,000**	**$1,000,000**
36 GCS Operator Stations (3080)	**$150,000**	**$5,400,000**
12 Central Servers (3080)	**$250,000**	**$3,000,000**
108 SOC Operator Stations (3080)	**$150,000**	**$16,200,000**
Total		**$25,600,000**

NEXT GENERATION TACTICAL SITUATION DISPLAY

1. Background. The ANG Ground Control Stations (GCS) supporting MQ-1 and MQ-9 (MQ-1/9) operations need a next generation tactical situation display. The ANG MQ-1/9 Common Operating Picture (COP) provides a web-based framework enabling a collaborative, fused framework that effectively supports the warfighter. The fusion, synchronization and simultaneous access of real-time communications, video and data it offers are often the difference between mission success and failure. The awkward and inefficient human machine interfaces in the current MQ-1/9 GCS limits aircrew ability to fly the aircraft and manage the mission with maximum efficiency and effectiveness. The MQ-1/9 GCS is fed information from the Squadron Operations Cell (SOC), which is connected to multiple sources of information and programs running on separate networks. The COP resides in the SOC and needs further integration with the cockpit to increase the efficiency of the current work flow. This will reduce redundant manual inputs and present information in an intuitive way for the operator so it can be effectively acted upon. Enhancements to the full-motion video will include the ability to share drawings on video, extract Target Location Error level-1 coordinates from the video and map, and depict synthetic mission participant's own ship data inside the video, friendly and enemy locations, and other critical information. There is also a need for integration with a cross-domain solution to enable participants on different classification levels the ability to view, share, and transfer mission-critical data. Lastly, there is a need to integrate several critical applications that are currently stove-piped. These improvements will save thousands of man-hours and provide significant combat capabilities.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Tactical Application Plug-Ins (3080)	**$150,000**	**$1,950,000**
12 Sensor Application Plug-Ins (3080)	**$500,000**	**$6,500,000**
Total		**$8,450,000**

IMPROVED MARITIME FIND/FIX/TARGET/TRACK/ENGAGE/ASSESS CAPABILITY

1. Background. The MQ-9 needs the capability to successfully Find, Fix, Track, Target, Engage, and Assess (F2T2EA) maritime targets. Combatant Commanders are demanding the ability to locate and track maritime targets within a large area of responsibility that cannot be sufficiently covered with the limited field-of-view of the current MQ-9 targeting systems. While the Block 20A MQ-9 Synthetic Aperture Radar (SAR) provides a good wide area imaging over land, it lacks the capability to accurately detect and track vessels on the water. A software improvement, compatible with the operational flight program and Block 20A SAR will provide this capability. Additional features need to include: the ability to reduce littoral blanking to pick out maritime targets near the coastline; capability to cross-cue targets to the MQ-9 targeting pod; integrate with a Link-16 and Automatic Identification System (AIS) picture; enable maritime automatic target detection; and, utilize sea clutter cancelling technology to return reliable targets to the user interface. In order to utilize the SAR software upgrade, an improved human-machine interface modification to the Ground Control Stations (GCS) is needed. 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.

2. Program Details.

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

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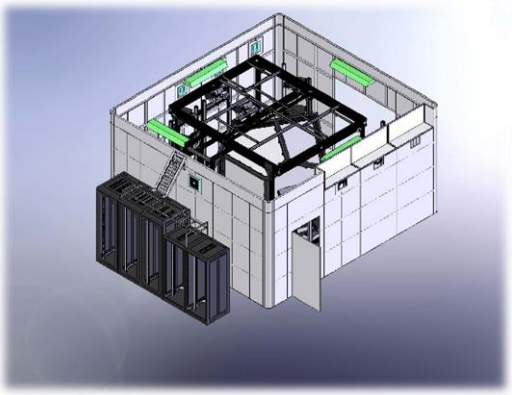
Simulation, Distributed Mission Operations, & Range Instrumentation

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

This Tab supports three components of the Simulation Portfolio. The first 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.



Live, Virtual, Constructive Operational Training (LVC-OT), the second Tab component, is a key facet of readiness training. The Distributed Training Operations Center (DTOC), located at the 132 WG in Des Moines, IA, provides persistent networks, modeling and simulation expertise, and operational support for daily Distributed Mission Operations (DMO) by linking a wide array of simulators at Guard, Reserve, and Active AF units. In 2015, DTOC began supporting live-fly exercises with manned-constructive forces, and will continue to grow live training support at capable ranges and airspaces as infrastructure is established. DMO capability is a threshold requirement for all ANG simulator programs.

Lastly, the ANG Operational Training Enterprise require realistic static, multispectral target surrogates to replicate real-world complex target sets, realistic simulators to replicate an Integrated Air Defense (IADS) environment, standardized, full spectrum, and immersive electronic training environments that include appropriate levels of communications and data link systems, and the Joint Advanced Weapon Scoring System (JAWSS) upgrades to the Tactical Ordnance Scoring System (TOSS) providing night and laser scoring capabilities to support all current weapons systems. Further evolution of this enterprise will adapt to the Live, Virtual and Constructive environment through the DMO construct.

Simulation, Live, Virtual Constructive / Distributed Mission Operations, and Range Instrumentation 2016 Weapons and Tactics Conference

Critical Capabilities List

Simulation

- Air Operations Center Data Links Training Tool
- Air Operations Center Distributed Mission Operations and Training Capabilities
- Battle Control Center Live-Virtual-Constructive 4th and 5th Generation Training Suite
- Control and Reporting Center Simulator Technical Refresh
- C/EC/HC-130J Weapon System Trainer with Distributed Mission Operations
- HH-60 Multi-Mission Crew Trainer
- RC-26B Full Crew Distributed Mission Simulator
- Special Tactics High-Angle Simulation Towers
- Cyberspace Virtual Interconnected Training Environment
- Security Forces Use-of-Force Simulators

Live, Virtual Constructive / Distributed Mission Operations

- Acquire Network Nodes for Joint Connectivity
- Cross Domain Solutions to Allow Persistent, Integrated Distributed Mission Operations Training Across Security Levels
- Enhanced Live-Fly with Virtual Constructive Representation and Radio Using Existing Technology
- Live Radar Feed and Two-Way Radio Connection to ARCNet-Connected Systems
- Training Aid Workstations to Provide Relevant Man-in-the-Loop Virtual Training

Range Instrumentation:

- Ranges Communication Data Link Architecture
- Ranges Mobile High Fidelity Electronic Warfare Threat Emitters
- Ranges Joint Advanced Weapon Scoring System
- Ranges High and Medium Fidelity Surrogate Targets

Essential Capabilities List

Simulation

- Space Terminal Emulation Simulator
- Tactical Air Control Party Joint Terminal Attack Controller Training Simulator
- KC-135 Multi-Mission Crew Trainer
- Explosive Ordnance Disposal Advanced Improvised Explosive Training Devices
- F-15C High fidelity Networked Simulators at Air National Guard Bases
- Remotely Piloted Aircraft Stand-alone Distributed Mission Operations Simulator
- C-130H Multi-Mission Cockpit Trainers with Integrated Tactical Data Link

- F-16C Proliferation and Sustainment of High Fidelity Ready Aircrew Program Quality Simulators
- Air Operations Centers Cross Domain Network Capability Phase 2
- Guardian Angel Terminal Area Simulator
- Global Integrated Intelligence, Surveillance, Reconnaissance MQ-1/9 intelligence Position Simulator
- HH-60G Distributed Mission Operations-capable HH-60G Aircraft Simulator

Live-Virtual-Constructive / Distributed Mission Operations:

- Range Instrumentation to Support Live-Virtual-Constructive-Operational Testing at Cold Regions Test Center and Primary Range / Airspace Complexes
- Environment Generation Capability at Distributed Training Operations Center to Support Fifth Generation Distributed Mission Operations
- Enhanced Live-Fly With Virtual-Constructive Representation and Radio Using Existing Technology
- Live-Virtual-Constructive Operational Training and Cybersecurity Support Personnel at each Unit with Distributed Mission Operations-Capable Trainers / Simulation Systems
- Training Aid Workstations to Provide Relevant Man-in-the-Loop Virtual Training
- Virtual-Constructive Representation in Live Weapons System Displays
- Joint Information Operations Range Node at Distributed Training Operations Center

Range Instrumentation:

- None

Desired Capabilities List

In an effort to save space, desired lists are available upon request from NGB/A5.

SIMULATION: AIR OPERATIONS CENTER DATA LINKS TRAINING TOOL

1. Background. ANG Air Operations Centers (AOC) need a training simulation capability. Unlike Active Component units, ANG AOCs cannot consistently accomplish training using live data. A Joint-Range Extension (JRE) and a link training tool are needed to operate the software systems associated with JRE in a non-operational environment. Currently, the standard training system for the AOC is the Theater Battle Management Core System Part Task Trainer, which does not support this critical link training requirement. AOCs require a system which will support daily and weekly link training, allowing operators to remain current, qualified and proficient in link management systems. All seven ANG AOCs require a JRE and Link Training Tool system.

2. Program Details.

Quantity	Unit Cost	Program Cost
7 Simulation Systems (3080)	**$40,000**	**$280,000**
7 Help Desk Support (3840)	**$11,600**	**$81,200**
Total		**$361,200**

SIMULATION: AIR OPERATIONS CENTER DISTRIBUTED MISSION OPERATIONS TRAINING CAPABILITY

1. Background. ANG Air Operation Centers (AOC) need Distributed Mission Operations (DMO) training capabilities to ensure combat mission ready personnel. AOCs can best meet this requirement through increased joint integrated training opportunities and distributed operations. DMO training can be accomplished via two methods: gaining access to a dedicated training network, or by the addition of a network device to leverage existing cloud computing technology. Each of the nine ANG AOCs require one DMO training suite.

2. Program Details.

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

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.

2. Program Details.

Quantity	Unit Cost	Total
4 BCC Simulator Training Systems (3080)	**$1,300,000**	**$5,200,000**
4 RSS (3080)	**$625,000**	**$1,875,000**
Total		**$7,075,000**

SIMULATION: CONTROL REPORTING CENTER SIMULATOR TECHNICAL REFRESH

1. Background. The Control Reporting Center (CRC) Simulation Program (CSP) requires a 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, but the current CSP no longer supports CRC training requirements due to hardware limitations. 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: C/EC/HC-130J WEAPON SYSTEM TRAINER WITH DISTRIBUTED MISSION OPERATIONS

1. Background. Given the broad spectrum of C-130J mission sets and flight deck configurations, 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 a high fidelity flight simulator to support aircrew training. The Reconfigurable Weapon System Trainer (RWST) will allow one unit to host an RWST yet provide Air Force Instruction 11-series Volume 1 training capability for other ANG C-130J units, regardless of version. To meet its C/EC/HC-130J training needs, the ANG needs one West Coast RWST to support two rescue wings and one airlift wing and two East Coast RWSTs to support two airlift, one rescue and one special mission wing.

2. Program Details.

Quantity	Unit Cost	Total
3 C/HC/EC-130J RWST (3010)	**$23,023,023**	**$69,069,069**
Total		**$69,069,069**

SIMULATION: HH-60G MULTI-MISSION CREW TRAINER

1. Background. The ANG HH-60G weapon system requires a full-crew Distributed Mission Operations capable simulator to complete initial and continuation training objectives that cannot be accomplished with available training resources. This Multi-Mission Crew Trainer (MMCT) will enable training for both pilots, special mission aircrew, and pararescue and intelligence personnel. It will also simultaneously allow individual skills instruction and full mission crew training. The MMCT will be delivered to the 150th Special Operations Wing for formal course training and to support the three ANG combat rescue wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3600)	**N/A**	**$150,000**
1 Full Crew MMCT (3010)	**$2,000,000**	**$2,000,000**
Total		**$2,150,000**

SIMULATION: RC-26B FULL-CREW DISTRIBUTED MISSION SIMULATOR

1. Background. The ANG RC-26B aircrews require a full-crew Distributed Mission Operations (DMO) capable simulator to complete training objectives that cannot be accomplished with available resources. Because no full-crew simulator exists for the RC-26B, all initial full-aircrew training is accomplished in-flight and only one crew member may be under instruction at any given time due to safety of flight constraints. A RC-26B simulator will allow individual skills instruction and full mission crew training for pilots, Mission System Operators and other mission-specific personnel. The ANG requires one simulator to meet initial, mission, and continuation training requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-recurring Engineering (3600)	**N/A**	**$500,000**
1 Full Crew DMO Sim (3010)	**$9,400,000**	**$9,400,000**
Total		**$9,900,000**

SIMULATION: SPECIAL TACTICS HIGH ANGLE SIMULATION TOWER

1. Background. The 123rd Special Tactics Squadron requires a home station training system to train Combat Control Team, Pararescue, and Special Operations Weather Team operators tasked with high-angle rescue, confined space, and alternate insertion and extraction operations. To meet combatant command tasking, the training system should be capable of full mission profile mock-ups and include a minimum of a 75-foot multi-level tower with a mixed angle climbing wall, a rappel platform with anchors, a Fast Rope Insertion / Extraction System (FRIES) bar, helicopter mock-up with floor anchors and a FRIES bar, and a confined space extraction area.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 High-Angle Training System (3080)	**$750,000**	**$750,000**
1 Upgrade and Repair (3080)	**$250,000**	**$250,000**
Total		**$1,000,000**

SIMULATION: CYBERSPACE OPERATIONS 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. VITE provides a persistent training environment supporting implementation of the cyber mission force construct and permits distributed training for integrated warfighter operations in both kinetics and non-kinetics. The VITE operates as a standalone training environment and connects to the information operations ranges, the Distributed Training Operations Center, or any other distributed environment. Three hubs will be needed to connect each of 20 VITE systems and 20 industrial control system modules. The ANG has procured 9 of 20 VITEs, 1 of 3 Cyber Training Internet Simulator Hubs, 1 of 20 Industrial Control System Modules to date. Additionally, the Pico node hardware and connection fees will allow each site to connect the VITE to the internet for distributed training operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 Cyber Training Internet Simulator Hubs (3080)	**$452,000**	**$904,000**
11 VITE Systems (3080)	**$430,000**	**$4,730,000**
19 Industrial Control System Modules (3080)	**$25,000**	**$475,000**
20 Information Operation Range Pico Nodes (3080)	**$125,000**	**$2,500,000**
20 Initial Interconnection Fees (3080)	**$72,000**	**$1,440,000**
20 Initial Interconnection Fees (3840)	**$20,000**	**$400,000**
Total		**$9,153,000**

SIMULATION: SECURITY FORCES USE-OF-FORCE SIMULATIONS

1. Background. Due to the increase in active shooter and other security incidents, Security Forces (SF) need simulator systems that provide realistic, interactive training environments with force options and escalation of force scenarios. These interactive simulation systems will be used to train single or multiple personnel in every aspect of defensive and judgmental immediate-threat discrimination decision making. These systems will also enhance each installation's integrated home-station training capability. The need exists for 16 ANG Advanced Joint Terminal Attack Controller (JTAC) Training Systems (AAJTS), modified with an added capability to meet SF training requirements. Additionally, there is a need for 10 regional simulators for dedicated, specialized immersive training. Finally, a low cost, portable and expandable system is needed for the remaining 65 SF units. The ANG's Relocatable Simulator Shelter (RSS) program provides a purpose-built shelter to house simulators where on-base facilities are not available.

2. Program Details.

Quantity	Unit Cost	Program Cost
16 AAJTS Modifications (3080)	**$165,000**	**$1,980,000**
10 SF Simulator Systems (3080**)**	**$1,000,000**	**$10,000,000**
65 Portable Simulator Systems (3080**)**	**$75,000**	**$4,875,000**
5 RSS (3080)	**$375,000**	**$1,850,000**
Total		**$18,705,000**

DISTRIBUTED MISION OPERATIONS: ACQUIRE NETWORK NODES FOR JOINT CONNECTIVITY

1. Background. ANG Distributed Training Operations Center (DTOC) needs network nodes to connect to the Navy Continuous Training Environment (NCTE) and Marine Aviation Distributed Virtual Training Environment (ADVTE). Various services, and groups within services, have developed their own unique training networks. Network nodes are critical to joining warfighters utilizing these disparate networks into the same operational training environment. Network nodes will be hosted at the DTOC to ensure Distributed Mission Operations (DMO) training is available to the ANG and as many services and groups as necessary.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Navy NCTE Node (3080)	**$350,000**	**$350,000**
1 Marine ADVTE Node (3080)	**$350,000**	**$350,000**
Total		**$700,000**

DISTRIBUTED MISSION OPERATIONS: CROSS DOMAIN SOLUTIONS TO ALLOW PERSISTENT, INTEGRATED DISTRIBUTED MISSION OPERATIONS TRAINING ACROSS SECURITY LEVELS

1. Background. ANG requires a Cross Domain Solution (CDS) that will facilitate information exchange between domains with differing classification levels in Live, Virtual and Constructive (LVC) environments. A CDS is defined as an information assurance solution that provides the ability to access and transfer data between two or more differing security domains. Warfighters that employ together in combat must train together in both live and virtual environments. Each simulator connecting to LVC networks must have a CDS solution and rule set tailored specifically for it. The CDS 1 will allow exchanges between simulators running at the Secret level and simulators running at the Unclassified level. The CDS 2 will allow exchanges between simulators running at the Secret and Secret Releasable levels. The CDS 3 will allow simulators running at higher classification levels to connect to simulators running at the unclassified level. The CDS solutions will be hosted at the ANG's Distributed Training Operations Center (DTOC).

2. Program Details.

Quantity	Unit Cost	Program Cost
DTOC CDS 1 (3080)	**$650,000**	**$650,000**
DTOC CDS 2 (3080)	**$650,000**	**$650,000**
DTOC CDS 3 (3080)	**$650,000**	**$650,000**
Fighter Integration (3080)	**$1,500,000**	**$1,500,000**
Air Defense Sector Integration (3080)	**$250,000**	**$250,000**
Total		**$3,700,000**

DISTRIBUTED MISSION OPERATIONS: ENHANCED LIVE-FLY WITH LIVE-VIRTUAL CONSTRUCTIVE REPRESENTATION AND RADIO USING EXISTING TECHNOLOGY

1. Background. ANG training construct needs the ability to connect virtual or manned-constructive assets to the live-fly environment to create a realistic picture in training airspaces. Advanced threat environments and improved aircraft capabilities have made realistic and robust training difficult to achieve with live aircraft, existing equipment, and existing airspace. As 4th generation fighter capabilities advance and the demand for 5th generation integration increases, Live-Virtual-Constructive (LVC) capability is essential to meet training needs. This capability benefits any Link 16 or situational awareness data link capable aircraft, as well as Command, Control, Intelligence, Surveillance and Reconnaissance (C2ISR) platforms and agencies needing enhanced live fly capabilities. The gateway racks will allow units to connect to the Air Reserve Component Networks (ARCNET) for Distributed Mission Operations (DMO). The LVC systems will allow the Combat Readiness Training Centers (CRTC) to train in the LVC environment by integrating their systems with LVC systems. The Live-Constructive Gateway Systems for non-CRTCs will give the units the ability to inject constructive entities in the live environment.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Live-Constructive Gateway Systems for non-CRTCs * (3080)	**$500,000**	**$2,000,000**
4 Integrated LVC Systems for CRTCs (3080)	**1,800,000**	**$7,200,000**
8 ARCNET Gateway Racks (3080)	**$25,000**	**$200,000**
Total		**$9,400,000**

* Battlefield Operational Support System, or equivalent, plus Multifunction Information Distribution System terminal or Enhanced Position Location Reporting System radios and connection components

DISTRIBUTED MISSION OPERATIONS: LIVE RADAR FEED AND TWO-WAY RADIO CONNECTION TO ARCNET-CONNECTED SYSTEMS

1. Background. ANG training construct needs the assets for realistic force packaging and integrated operations for multi-domain effects utilizing combinations of live and virtual participants in regular training. This requires the addition of live radar feeds into the virtual environment, as well as live datalink messaging and two-way radio communications between live and virtual entities. Each of the four ANG Consolidated Regional Training Centers needs a radar feed and three radio bridges to distribute information within the Distributed Training Operations Center (DTOC) networked units.

2. Program Details.

Quantity	Unit Cost	Program
12 Radio Bridge Solutions (3080)	**$50,000**	**$600,000**
4 Radar System Interface Units & Track Correlators (3080)	**$550,000**	**$2,200,000**
Total		**$2,800,000**

DISTRIBUTED MISION OPERATIONS: TRAINING AID WORKSTATIONS TO PROVIDE RELEVANT MAN-IN-THE-LOOP VIRTUAL TRAINING

1. Background. ANG Distributed Training Operations Center (DTOC) needs man-in-the-loop virtual surrogate fighter Training Aid Workstations (TAWs). The ANG's Distributed Mission Operations (DMO) training has been constrained to using constructive entities as adversaries or blue-air training aides. The TAWs will allow pilot Subject Matter Experts (SME) to take control of various constructive entities at critical points in any engagement to enhance training effectiveness. This allows efficient use of limited white force SMEs by providing control of multiple aircraft through a few TAWs in support of 4th and 5th generation fighters, Joint Terminal Attack Controllers, boom operators utilizing the Boom Operator Simulation System, and any other virtual entities within the DMO training environment. The DTOC needs four TAWs to provide scheduling flexibility to support ARC training.

2. Program Details.

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

RANGES: COMMUNICATIONS DATA LINK ARCHITECTURE

1. Background. To meet ready aircrew program tasking requirements, the ANG's Operational Training Enterprise (OTE) requires realistic, standardized, full spectrum, and immersive electronic training environments that include appropriate levels of communications and data link systems. The ANG continues to have shortfalls in realistic communications and data link immersive environments at the critical nodes in the range training infrastructure. The OTE consists of the primary training ranges, regional training centers, and forward operating locations. Acquisition of Link 16 and range radios, Battlefield Operational Support Systems (BOSS), and Joint Range Extension (JRE) systems will provide ANG units the ability to accomplish realistic full-spectrum training. Air Combat Command had started fielding these in concert with their enterprise range plan but ANG needs the systems listed below to meet its remaining requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Link-16 Radios (3080)	**$360,000**	**$2,160,000**
1 BOSS (3840)	**$297,000**	**$297,000**
6 JRE Systems (3840)	**$132,000**	**$792,000**
6 Range Radio Systems (3080)	**$150,000**	**$750,000**
Total		**$3,999,000**

RANGES: MOBILE HIGH-FIDELITY THREAT SIMULATORS

1. Background. To meet ready aircrew program tasking requirements, the ANG Operational Training Enterprise (OTE) needs 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. The OTE consists of the primary training ranges, regional training centers, and forward operating locations, which have the airspace, real-estate and infrastructure necessary to fully utilize EW assets. The EW simulators will consist of three major components: upgraded Joint Threat Emitters (JTE); fixed and mobile Control Threat Units (CTU) to provide regional support in moving JTEs within the OTE; and, Identification Friend or Foe (IFF) tracking radar systems to provide tracking for the JTE. Air Combat Command had started fielding these in concert with their enterprise range plan but ANG needs the systems listed below to meet its remaining requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Mobile CTU (3080)	**$2,600,000**	**$2,600,000**
4 EW Emitters (3080)	**$6,500,000**	**$26,000,000**
2 IFF Tracking Systems (3080)	**$1,500,000**	**$3,000,000**
Total		**$31,600,000**

RANGES: JOINT ADVANCED WEAPON SCORING SYSTEM

1. Background. ANG needs to upgrade the Tactical Ordnance Scoring System (TOSS). The TOSS system in place at ANG ranges no longer supports the expanding gamut of ANG training requirements. The Joint Advanced Weapon Scoring System (JAWSS) provides greater accuracy, night and day scoring capabilities, laser scoring, and strafe scoring capabilities. JAWSS also provides virtual reality Imaging Weapons Training System (IWTS), no-drop weapon scoring, and automated remote feedback for home-station debrief. JAWSS consists of five systems: weapon impact scoring system; laser evaluation system-mobile; large scale target sensor system; remote strafe scoring system; and, the IWTS. Each of the ANG's 14 ranges will require the JAWSS.

2. Program Details.

Quantity	Unit Cost	Program Cost
14 Replacement WISS Systems (3840)	**$500,000**	**$7,000,000**
14 Site Communications Infrastructure (3840)	**$250,000**	**$3,500,000**
14 JAWSS Spare/Upgrade (3840)	**$200,000**	**$2,800,000**
Total		**$13,300,000**

RANGES: HIGH AND MEDIUM FIDELITY SURROGATE TARGETS

1. Background. To meet ready aircrew program tasking requirements, the ANG operational training enterprise requires realistic static, multispectral target surrogates to replicate real-world complex target sets. The ANG has shortfalls in realistic target acquisition and identification training. High-value complex target arrays are needed to mimic unique vehicles, tanks, mobile communication equipment and other targets, and require the same physical characteristics as the actual entity to include visual footprint, density, and heat signatures to simulate the real systems to multispectral sensors. Each of the ANG's 14 training ranges needs a combination of medium and high fidelity targets with specific numbers based on range size.

2. Program Details.

Quantity	Unit Cost	Program Cost
16 High-Fidelity Targets (3080)	**$150,000**	**$2,400,000**
250 Medium-Fidelity Targets (3080)	**$18,000**	**$3,000,000**
Total		**$5,400,000**

Space and Cyber Operations

- **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 seven squadrons located in CO, CA, NY, AK, FL, and WY. Space capabilities support federal- and state-level agencies, the Air Force, nuclear command and control community, and combatant commands. Space units provide missile warning, space situational awareness, satellite communications, and defensive space control capability to support operational, exercise and planning activities along with other space support as requested. 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 40 percent of the Military Strategic and Tactical Relay (MILSTAR) satellite constellation in support of both exercises and operations. Execution of these activities occurs from home station and deployed locations.

Cyber Operations -The ANG cyber operations force includes three cyber operations groups in MD, KS and CA and twenty units in VT, RI, NJ, PA, DE, MD, VA, TN, AR, KS, IA, MI, TX, CA, and ID. Cyber capabilities support federal- and state-level agencies, the Air Force, and combatant commands. Cyber units provide cyberspace offensive and defensive 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.

Space and Cyber Operations
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Critical Capabilities List

Space

- Space Control Satellite Emulation Suite
- Advanced Collaboration System
- Deployable Equipment Shelters
- Secure Wireless Headset Based Crew Communications System
- Semi-Tractor Fleet Modernization

Cyber

- Virtual Interconnected Training Environment (VITE) (See Tab P)
- Cyber Threat Intelligence Appliance (CTIA)
- Airborne Cyberspace Interactive Platform (ACIP)
- Secure Infrastructure and Collaborative Capability (SIC2)
- Cyber Combat Maneuvering Instrumentation (CCMI)
- Small Communications Package (SCP)

Essential Capabilities List

Space

- Secure Hardened Tablets
- Security Checkpoint Shelter
- Mobile Personnel and Equipment Shelters
- CBRNE Decontamination Systems and Radiation Detectors
- Defense Red Switched Network Phones
- Terminal Emulation Simulator

Cyber

- Cyber Threat Emulator System (CTES)
- Portable SCIF
- Mission Mapping Tool
- Deployable Cyber Defense System
- Trusted Workstations

Desired Capabilities List

Space

- Mobile Advanced Collaboration System (ACES)
- Deployable Medical Services Vehicle

Cyber

- *None*

SPACE: SATELLITE EMULATION SUITE

1. Background. The 114th and 216th Space Control Squadrons support domestic operations, global and theater space control campaigns. The space control units have no ability to generate targets and threat environments for operators to train against. These units need a Satellite Emulation Suite (SES) in order to maintain combat mission ready certification (to include training, evaluation, and proficiency), to support development and operational test events, and to support both service and joint exercise events. The system must be able to connect to multiple space and intelligence weapons systems while also supporting connectivity to live and virtual test and training ranges. The system must be ground mobile to allow transportability to support deployable weapons systems when tasked to participate in service and joint exercises.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 SESs (3080)	**$1,500,000**	**$3,000,000**
Total		**$3,000,000**

SPACE: ADVANCED COLLABORATION SYSTEM

1. Background. The 222nd Command and Control Squadron (222 CACS) needs 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 at the National Reconnaissance Office (NRO). The Office of the Director of National Intelligence's mandate to enhance collaboration operations across the intelligence community, and federal, state and local agencies, has led to advanced technologies and capabilities across the enterprise. The rapid acquisition of Advanced Collaboration Enterprise Services (ACES) will allow the 222 CACS to connect directly with NRO operations centers, joint collaboration cells and the Joint Space Operations Center, maintain proficiency and certification in collaboration operations, while providing direct customer support for a host of real-world and exercise related activities. Through the use of the ACES capability, the 222 CACS will significantly enhance integration, collaboration and synchronization across multiple tactical display processors, technical analysis tools and decision support tools, both internally and externally across multiple operations centers. This system will result in the capability to share critical information in real-time from any position within the ops floor and instantly display that information on the dynamic operating environment data wall utilized to maintain situational awareness, monitor status of blue forces, support the crisis action team and senior leader decision making.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Non Recurring Engineering (3080)	**$60,000**	**$60,000**
1 ACES (3080)	**$529,213**	**$529,213**
Total		**$589,213**

SPACE: DEPLOYABLE EQUIPMENT SHELTERS

1. Background. The 114th and 216th Space Control Squadrons, and the 137th Space Warning Squadron need storage for palletized equipment during set-up, teardown and movement for deployments. These 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. Additionally, they will be used to support domestic operations. Each of the three squadrons need eight storage units.

2. Program Details.

Quantity	Unit Cost	Program Cost
24 Storage Units (3080)	**$12,000**	**$288,000**
Total		**$288,000**

SPACE: SECURE WIRELESS HEADSET COMMUNICATION SYSTEMS

1. Background. The 114th and 216th Space Control Squadrons, and the 137th Space Warning Squadron require secure wireless headsets with passive or active noise cancelling features in order to securely exchange tasking orders and crew coordination in a high decibel operating environment. Secure wireless headsets will ensure accurate communication between crew positions, space units and their respective command and control agencies while reducing the risk of miscommunication while increasing communications security in a contested environment. Finally, a secure wireless headset communication system will improve training, evaluation, and exercise events by allowing event coordinators to communicate between themselves and trainees. Each squadron requires two wireless intercom systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Secure Wireless Intercom Systems (3080)	**$100,000**	**$600,000**
Total		**$600,000**

SPACE: SEMI-TRACTOR FLEET MODERNIZATION

1. Background. The 233d Space Group (233 SG) needs 20 new fuel-efficient semi-tractor units, with sleeper cabs, to support the Mobile Ground Station mission. The 233 SG is the nation's only survivable and sustainable missile warning and nuclear detonation detection weapon system. The weapon system has six independent teams that deploy worldwide during a time of crisis or war. Each team is comprised of two mission semi-tractor trailer combinations (Air Force Space Command owned) and four support semi-tractor trailer combos (ANG owned). 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.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 Semi-Tractor Units (3080)	**$145,000**	**$2,900,000**
Total		**$2,900,000**

CYBER: THREAT INTELLIGENCE APPLIANCE

1. Background. ANG Cyberspace Operations (CO) units require a near real-time commercial cyber threat appliance for the Defensive Cyberspace Operations weapon system. The system is essential to increasing the defensive posture of our ANG cyberspace units by providing the ability to utilize actionable intelligence about malicious activity sources, emerging threats, and vulnerabilities to execute Cyber Protection Team (CPT) missions. The appliance is DoD accredited and secured through technical means to ensure system integrity. 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 hours by allowing for a quick triage of anomalous activity in the network. The ANG enterprise needs the ability to have cyber threat intelligence feeds to allow teams to precisely identify threats or malicious activity, which will increase mission effectiveness and support to the operations. Recommend ANG CO units receive three systems per mission. Currently this would be for six systems and one shared license across all ANG CPT units.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Host Data Reputation Applications	**$1,000,000**	**$6,000,000**
6 Network Data Reputation Applications	**$1,000,000**	**$6,000,000**
1 Adversary TTP License	**$100,000**	**$100,000**
Total		**$12,100,000**

CYBER: AIRBORNE CYBER INTERACTION PLATFORM

1. Background. ANG Cyberspace Operations (CO) units need the ability to obtain a multi-platform, reduced form factor cyberspace capability that can be used for CO in austere and off-network environments on airborne weapon systems. This cyber platform would interact with internet protocol devices for delivering cyber effects near real-time and beyond line-of-sight. The size, weight, and power must be compatible across various Air Force airborne systems. The platform will provide an integrated system for command and control of the platform to include beyond line of sight, tactical data links or standalone systems. The platform will provide two way communications for transmitting and receiving data packets to target devices and receiving updates to provide battle damage indicators. This platform will allow the addition of a cyberspace capability in theater or wherever ANG aircraft are deployed. This capability would allow access to previously unreachable target sets while identifying previously unknown targets in either a permissive or non-permissive flying environment. One Airborne Cyber Interaction Platform (ACIP) system would be provided to each cyber unit that has an integrated airborne mission.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 ACIP Systems	**$500,000**	**$10,000,000**
Total		**$10,000,000**

CYBER: SECURE INFRASTRUCTURE COLLABORATIVE CAPABILITY

1. Background. ANG Cyber Operations squadrons and cyber groups operate from locations that are distant from military and national cyber locations. The majority of planning, operations activities and cyber warfare information sharing, occur in classified, collaborative environments, primarily through the Joint Worldwide Intelligence Communication System and National Security Agency-Network infrastructure. ANG units lack the capability to access the secure, classified, real-time communications and networks used by the Air Force and US Cyber Command for collaboration, as well as threat and unique cyber situational awareness. The Secure Infrastructure Collaborative Capability (SIC2) provides system headsets, visualization, and systems to provide a shared situational awareness in a secure collaborative interactive environment and common operations picture to support near real-time full spectrum cyberspace operations and training opportunities. The SIC2 will result in travel and manpower cost reduction, while providing a system to conduct briefings, debriefings, and information sharing in a collaborative environment that is distributed amongst all cyber mission areas in the ANG. One SIC2 system is required for each of the 20 units.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 SIC2 Systems (3080)	**$50,000**	**$1,000,000**
Total		**$1,000,000**

CYBER: CYBER COMBAT MANEUVERING INSTRUMENTATION

1. Background. ANG Cyberspace Operations (CO) are conducted in a team environment where multiple operators sit on an operations floor working in tandem to accomplish their mission. Each operator works off an individual computer with little situational awareness of what is going on outside his or her individual screens. Additionally, little data is available to visually represent the cyberspace environment and the network traffic moving through it. ANG CO units require the ability to visualize the cyber battlespace at the tactical and operational levels through the presentation of information via a live feed to an operational display (data wall). This capability will enable training, planning, debrief, and Cyber Combat Maneuvering Instrumentation (CCMI) [like Air Combat Maneuvering Instrumentation but for cyber]. The CCMI software will provide the following capabilities: playback and/or real time situational awareness, ability to ingest external cyber telemetry data from multiple sources, display (aka. data wall), mission analysis modeling/display, shot validation, dependency based planning, kill-chain visualization, and operational and tactical display/instrumentation. The solution will work at the unclassified, secret, and top secret levels of classification. Of the 20 cyber units, 18 have an operational requirement for the display and visualization system, while only 15 require the dependency modeling software. This system is currently utilized by U. S. Cyber Command during large scale exercises and events.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Operations Center Displays (3010)	**$342,000**	**$6,156,000**
15 Dependency Modeling Software (3010)	**$577,000**	**$8,650,000**
18 Cyber Tactical Visualizations (3010)	**$75,000**	**$1,350,000**
Total		**$16,156,000**

CYBER: SMALL COMMUNICATIONS PACKAGE

1. Background. ANG Combat Communications Squadrons (CBCSs) require a small communications package capability. ANG CBCSs are postured to provide medium and large communications packages which yield large logistical footprints. Air support operational squadrons are dependent on CBCS to provide a very small, agile communications package to meet their mission requirements. The Small Communications Package (SCP) uses standard commercial power and provides tri-band reach back capability supporting up to 40 users with Non-secure Internet Protocol, Secure Internet Protocol, Voice-over Internet Protocol, and Voice-over Secure Internet Protocol services in addition to providing a coalition network capability. This SCP provides an agile combat communications capability to ASOS, contingency response forces, and other expeditionary missions while maintaining a small logistical footprint. The small SCP manpower footprint reduces the CBCS's mobility-to-dwell ratio, which exceeds Air Force standards. Four SCP systems have already been procured and the remaining 15 would equip the other combat communication units.

2. Program Details.

Quantity	Unit Cost	Program Cost
11 SCP Systems (3080)	**$500,000**	**$5,500,000**
Total		**$5,500,000**

Security Forces

- **Integrated Base Defense**
- **Combat Arms Support**
- **Law Enforcement**

Air National Guard security forces comprise over 7,500 defenders from 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 and active shooter response.

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Critical Capabilities List

- Modular Small Arms Ranges
- Use of Force Simulator (See Tab P)
- Helmet System Modernization
- Portable Adaptable Training Shelters
- Precision Engagement and Assessment Sensors

Essential Capabilities List

- Counter Small Unmanned Aerial Surveillance System
- Modernized Handgun and Designated Marksman Rifle
- Asset Tracking and Management System
- Duty Gear Modernization
- Fire Retardant Ensemble

Desired Capabilities List

- Elevated Defense Position
- Portable Intrusion Detection System
- Squad-Based Drones
- Combat Casualty System
- Land Mobile Radio System

MODULAR CONTAINERIZED 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 will receive weapons qualification training in a timely and cost efficient manner. Additionally, the MICR will support personnel deploying for contingency operations needing "just-in-time" weapons qualifications (all Airmen who deploy). The ANG has 28 installations with a small-arms range, of which only three are compliant with the Engineering Technical Letter (ETL) 11-18: Small Arms Range Design and Construction. The need for an MICR is multiplied because of the remaining 25 ranges, eight are permanently closed and 17 other are in a state of degraded operations, requiring waivers. 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 members, while also incurring a substantial cost for travel and/or range time. Currently there are three employed modular small arms ranges, 12 additional ranges would allow for weapons qualifications to continue while base Civil Engineers can program for new ranges to be constructed using Military Construction (MILCON). Once MILCON is procured the modular small arms range would then be rotated to other installations that are in need of major range repairs.

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 the items are older than 15 years. Based on the diverse mission sets which include 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. This helmet system must be compatible with the current inventory of mandible guards and visor systems. The helmet modernization initiative provides the ability to adequately protect SF members while responding domestically and globally across the threat spectrum. Additionally, current inventory of helmets from unit to unit are inconsistent in style, design and age across the SF enterprise.

2. Program Details.

Quantity	Unit Cost	Program Cost
7649 Viper A1 Ballistic Helmet (3080)	**$500**	**$3,824,500**
7649 APEL Approved Goggle (3080)	**$60**	**$458,940**
7649 Goggle Swivel Kit (3080)	**$25**	**$191,225**
7649 Night Vision Goggle Front Mount (3080)	**$50**	**$382,450**
7649 Interlocking Long Side Rails (3080)	**$50**	**$382,450**
7649 Modular Suspension System (3080)	**$85**	**$650,165**
7649 Premium Helmet Cover (3080)	**$25**	**$191,225**
7649 Arc Headset Rail Adapter Attachment (3080)	**$65**	**$497,185**
Total		**$6,578,140**

SECURITY FORCES PORTABLE ADAPTABLE TRAINING SHELTER (PATS)

1. Background. ANG Security Forces (SF) is seeking a mobile, re-configurable training capability that allows for a multitude of different floor plans that provide a dynamic environment with modifiable walls, doors, windows and a roof. This capability will ensure that each evolution of training keeps members focused on performance objectives instead of floor plan memorization. This type of equipment must be compatible with night vision goggles to simulate the low light challenges that occur in real world situations. Additionally, a system with malleable material will allow for the use of sim rounds without damaging the equipment. Fixed floorplan shoot houses are difficult to maintain, count against authorized square footage, and are easily memorized by SF personnel. The portable and adaptable option make training more efficient and effective. One Security Forces Portable Adaptable Training Shelter (Pats) will be required for each ANG SF squadron.

2. Program Details

Quantity	Unit Cost	Program Cost
93 PATS (3080)	**$50,000**	**$4,650,000**
Total		**$4,650,000**

SECURITY FORCES PRECISION ENGAGEMENT AND ASSESSMENT SUITE

1. Background. ANG Security Forces (SF) Designated Marksmen and Advanced Designated Marksmen require enhanced target detection, observation, and precision engagement capabilities to support both contingency and domestic operations. SF marksmen deliver long-range precision rifle fire, enhanced observation, and reporting to ensure unhindered operations in all environments. Lessons learned in recent operations have illustrated the commander's need for improved situational awareness and precise fires to defeat adversaries. The SF precision engagement and assessment suite improves marksmen's ability to detect, report, monitor, and mitigate threats before they cause harm to personnel and resources. These improvements will close the gap between the mechanical capability of a weapon system and extended distances that the adversary presents themselves on today's battlefield. One suite per SF squadron is required.

2. Program Details.

Quantity	Unit Cost	Program Cost
139 Long Range Thermal Imager	**$80,000**	**$11,120,000**
325 Designated Marksman Rifle Optic	**$2,600**	**$845,000**
325 Mil-Dot Binoculars	**$550**	**$178,750**
325 Multi Use Tripod	**$400**	**$92,800**
325 Laser Range Finder	**$8000**	**$2,600,000**
186 Spotting Scope	**$1600**	**$297,600**
46 PVS-30 Night Vision Weapon Sight	**$8500**	**$391,000**
46 PVS 30 Spotting Scope Adapters	**$500**	**$23,000**
Total		**$15,548,150**

Explosive Ordnance Disposal

The Air National Guard (ANG) has seventeen 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 (UXOs), 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 one of the most dangerous missions in the military and have adapted their equipment and technology to meet the ever-changing tactics of their adversaries. This varied mission set places a unique equipment burden on EOD flights. Units must 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 System
- Short Range Situational Awareness Sensor
- Improvised Explosive Device/Weapons of Mass Destruction Assessment and Defeat Toolkit
- Lightweight Integrated Portable Secure Tactical Communication Kit
- Visual Augmentation Gear

Essential Capabilities List

- Next Generation Light Weight Bomb Suit
- Integrated Wireless Tactical Tablet
- Advanced Improvised Explosive Training Devices
- Personal Blast Overpressure Gauge/Dose Meter
- Human Augmentation Exoskeleton

Desired Capabilities List

- None

EXPLOSIVE ORDNANCE DISPOSAL HIGH RESOLUTION DIGITAL RADIOGRAPHY SYSTEM

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, remote environments in support of contingency operations. Currently fielded radiography systems are too cumbersome for field use 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). In recent years, multiple commercial-off-the-shelf products have bridged this gap and are capable of providing the EOD technician with a man-portable, high resolution, digital radiography system that enables exploitation of suspicious devices, IEDs, WMDs, as well as unexploded ordnance. ANG EOD will require 19 total systems: 17 for the ANG EOD Flights and 2 to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 High Resolution Digital Radiography System (3080)	**$70,000**	**$1,330,000**
Total		**$1,330,000**

EXPLOSIVE ORDNANCE DISPOSAL SHORT RANGE SITUATIONAL AWARENESS SENSOR

1. Background. In accordance with the Explosive Ordnance Disposal (EOD) concept of operations and 60-series technical orders, ANG EOD technicians require an enhanced capability to conduct short range situational awareness assessments of critical mission targets prior to sending a team into a hazardous area. Currently, the use of short and medium range optics and cameras limit a team to viewing a threat from a single line of sight, and prevents the team from obtaining a complete picture. A lightweight, compact, airborne sensor capable of achieving a 360 degree visual picture, day or night, will provide EOD technicians the situational awareness they are currently lacking. This capability will affect all 40 ANG teams within 17 EOD flights and 2 regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
40 Short Range Situational Assessment Sensor (3080)	**$68,580**	**$2,743,200**
Total		**$2,743,200**

EXPLOSIVE ORDNANCE DISPOSAL IMPROVISED EXPLOSIVE DEVICE ASSESSMENT AND DEFEAT KIT

1. Background. ANG Explosive Ordnance Disposal (EOD) flights require the capability to defeat advanced Improvised Explosive Device (IEDs) and Weapons of Mass Destruction (WMDs). EOD 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, all while maintaining situational awareness and communicating actions back to the command and control element. Primarily, they need an access and disablement tool kit, with instructions on how to incorporate and employ the kit in a combat environment. Advanced technologies, programmable microcircuits, and internet and social media have given IED manufacturers in even the most remote locations the ability to create devices capable of inflicting great harm on deployed personnel, including the use of WMDs. One kit is required at each of the 17 ANG EOD flights and one for each of the two ANG EOD regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 IED/WMD Access, Visual Inspection, Analysis, and Defeat Kit (3080)	**$101,000**	**$1,919,000**
Total		**$1,919,000**

EXPLOSIVE ORDNANCE DISPOSAL LIGHTWEIGHT INTEGRATED PORTABLE SECURE TACTICAL COMMUNICATIONS KIT

1. Background. ANG Explosive Ordnance Disposal (EOD) technicians require the capability to access Non-secure Internet Protocol Router (NIPR), Secure Internet Protocol Router (SIPR), Voice Over Internet Protocol (VOIP), and Secure Voice Over Internet Protocol (SVOIP) communications while conducting full spectrum operations in permissive and non-permissive environments. To meet this requirement, ANG EOD technicians need a lightweight, compact, and flexible communications system capable of delivering voice and high-speed data in both line-of-sight and over-the-horizon situations, while the operator is on the move. The dynamic nature of EOD operations makes access to current intelligence, tactics, techniques and procedures, and other operational information critical for team safety and mission accomplishment. One kit is required at each of the 17 ANG EOD flights and one for each of the two ANG EOD regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Lightweight Portable Secure Tactical Communications Kit (3080)	**$120,000**	**$2,280,000**
Total		**$2,280,000**

THERMAL IMAGING VIDEO THREAT DETECTION SYSTEM

1. Background. ANG Explosive Ordnance Disposal (EOD) teams need the capability to detect threats and mark targets at distances up to 7,000 meters. The currently fielded AN/PVS-31 Binocular Night Vision Device does not meet these needs. An enhanced thermal imaging video threat detection system, capable of accurately identifying improvised explosive devices and enemy personnel in day, night, and low light conditions, is required. It must include a laser range finder with a Global Positioning System capable of marking a 10 digit target grid coordinate. Additionally, it should be able to wirelessly integrate with other EOD tools such as a laptop or tablet. One system is required at each of the 17 ANG EOD flights and one for each of the two ANG EOD regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Thermal Imaging Video Threat Detection System (3080)	**$85,000**	**$1,615,000**
Total		**$1,615,000**