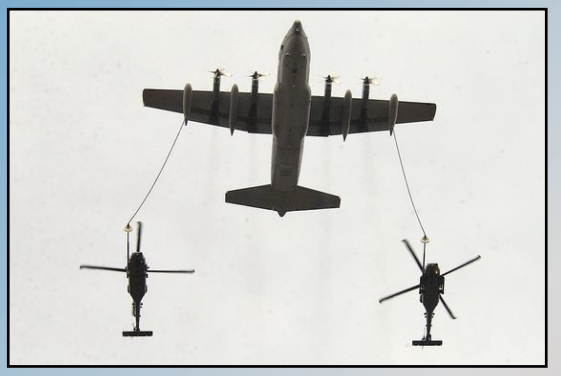
WEAPONS SYSTEMS MODERNIZATION

PRIORITIES 2019



AIR NATIONAL GUARD

FOREWORD

The Air National Guard must recapitalize and modernize our equipment concurrently and in balance with the growth of Air Force missions. We will focus our efforts on gaining maximum lethality for every dollar invested. To that end, the Air Reserve Component's Weapons and Tactics Council brings together experts from every weapon system to create a field driven, prioritized list of required modifications. This book contains the results of their intense deliberations. We owe it to our Airmen and our Nation to execute as many of the programs outlined as possible.

The Air National Guard will continue to innovate our acquisition process to modernize our equipment at the speed of relevance. We will build on previous year's modernization successes to find efficiencies and capitalize on synergies with the Active Duty Air Force. We will coordinate with our industry partners to leverage cost effective, off the shelf equipment into our weapons systems.

Our success will be judged by how efficiently we provide the warfighter capability to serve the "54" and secure the security of our Nation. I look forward to working with our Airmen and industry partners to translate the requirements in this book into capability in the field.

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

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Introduction

The 2019 Air National Guard (ANG) Weapons Systems Modernization Priorities Book documents capability priorities identified during the October 2018 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 2019 WEPTAC Book is organized into 21 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, three-year funding
3840 – ANG Operations and Maintenance, one-year funding
3010 – Aircraft Procurement, three-year funding
3600 – Research and Development, two-year funding
3080 – Other Procurement, three-year funding
(NOTE: In most cases, Non-Recurring Engineering (NRE) costs are paid for with 3600 Research, Development, Test and Engineering (RDT&E) money, but in some cases they can be paid for with 3010, 3080, or 0350 procurement money.)

The State Matrix, found on the next page, identifies ANG weapons systems locations by state/territory. These depictions reflect the force structure as of 01 Dec 2018.

State Matrix

Weapons System Reference Table by State (01 Dec 2018)

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	E-8C, C-32B, C-40	F-15	F-16	F-22	HH-60	KC-135	MQ-9	AOC, BCC, CRC	Cyber, Space	DCGS, MC-12W, RC-26B	GA / ST / TACP	Range
AK			•	H	HC					•	•		BCC	Space		GA	
AL								•			•				RC-26B /DCGS		
AR				H								•		Cyber	DCGS		Range
AZ								•			•	•			RC-26B		
CA				J	HC		•			•		•		CY/SP(2)	RC-26 / DCGS	GA	
CO								•						Space(3)			Range
CT				H									CRC				
DC						C-40		•									
DE				H										Cyber			
FL							•						AOC	Space			
GA				H		E-8C							CRC		DCGS	TACP	
GU																	
HI			•						•		•		AOC/BCC		DCGS		
IA											•	•	CRC	Cyber	DCGS / RC-26		DMO
ID	•													Cyber		TACP	
IL				H							•		AOC			TACP	
IN	•														DCGS	TACP	Range
KS											•		CRC	Cyber(3)	DCGS	TACP	Range
KY				H												ST	
LA							•									TACP	
MA							•								DCGS		
MD	•			H										Cyber(3)			
ME											•						
MI	•										•	•	AOC	Cyber			Range
MN				H				•									
MO		•		H									AOC				
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	Cyber		TACP	Range
PR				H									CRC				
RI				J										Cyber			
SC								•									
SD								•									
TN			•								•	•		Cyber	DCGS		
TX				H				•				•		Cyber	RC-26B	TACP	Range
UT											•		CRC		DCGS		
VA									•					Cyber	DCGS		
VI																	
VT								•						Cyber			
WA											•		BCC	Cyber(2)	RC-26B	TACP	
WI								•			•		CRC		RC-26B		Range
WV			•	H											RC-26B		
WY				H										Space			

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2019 Weapons System Modernization Book Edited by NGB/A5XS

A-10

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

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

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

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

A-10
2018 Weapons and Tactics Conference

Critical Capabilities List

- Digital high-definition targeting pod, interface, and display
- Lightweight, color, night-compatible helmet-mounted cueing system
- Find, fix, and target within a contested, degraded, and operationally limited environment
- Ability to tactically deploy to (and operate from) austere airfields
- Upgraded communications systems which function within contested, degraded, and operationally limited environments

Essential Capabilities List

- Improved electronic attack, self-protection, and full-spectrum countermeasure systems
- Operational flight program integration
- Sensor system multi-spectral and system development
- Airframe sustainment and propulsion improvement
- Digital suspension equipment integration (1760/Ethernet to all stations)

Desired Capabilities List

- Full AIM-9X integration
- Advanced laser eye protection
- Long-range, precision-guided munition integration
- Improved survivor defense/concealment/communication
- Improved head-up display with high-definition recording capability

A-10: DIGITAL HIGH-DEFINITION TARGETING POD, INTERFACE, AND DISPLAY

1. Background. ANG A-10s require improved Positive Identification (PID), intelligence, surveillance, reconnaissance, and battle-tracking capabilities. Friendly forces and enemy combatant PID are crucial in any conflict. Advanced Targeting Pod (ATP) digital output upgrades with color video provide high-resolution feeds, coupled with high-definition displays, and enable visual identification of friendly and enemy forces from greatly increased standoff ranges. High-resolution displays in the A-10 enable full utilization of targeting pod improvements. ARC-210 connection refinements allow pilots to securely share data, including any ATP imagery, with Joint Terminal Attack Controllers. These actions reduce the likelihood of fratricide and collateral damage. Coupling high resolution displays with broadband uplink will allow aircrew to broadcast high-definition real-time data enabling decision makers to expedite the kill chain. Each of the 85 ANG A-10s requires an upgraded high resolution display system.

2. Program Details.

Quantity	Unit Cost	Quantity
High Resolution Display Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
94 High Resolution Displays (3010) *	**$420,000**	**$39,480,000**
196 Targeting Pod Upgrades (3010) *** ****	**$250,000**	**$49,000,000**
Total		**$97,480,000**

* Includes 10% spares

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

A-10: LIGHTWEIGHT, COLOR, NIGHT-COMPATIBLE HELMET-MOUNTED CUEING SYSTEM

1. Background. ANG A-10s require modern Helmet Mounted Cueing Systems (HMCS) that are compatible with night vision devices. A-10 pilots are limited by the inability to rapidly cue sensors, build battlespace awareness, and safely operate in a night environment. Currently, pilots must choose between cueing or night vision. Helmet solutions combining these capabilities are required to fight near-peer adversaries in the modern battlespace. A modern HMCS should also include a multi-color capability, display a large volume of symbols, and utilize a reliable spatial tracking system. Additionally, the helmet should be lightweight and ergonomic with a neutral center of gravity that reduces strain on the pilot's neck and back. One Hybrid Optical-based Inertial Tracker (HObIT) kit is required for each of the ANG's 85 A-10s.

2. Program Details.

Quantity	Unit Cost	Quantity
HObIT Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
85 HObIT Kits (3010)	**$84,000**	**$7,140,000**
Total		**$16,140,000**

A-10: FIND, FIX, AND TARGET WITHIN A CONTESTED, DEGRADED, AND OPERATIONALLY LIMITED ENVIRONMENT

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

2. Program Details.

Quantity	Unit Cost	Quantity
Anti-Jam EGI Non-Recurring Engineering (3010)	**N/A**	**$15,500,000**
94 Anti-Jam Kits (3010) *****	**$225,000**	**$21,150,000**
Total		**$36,650,000**

* Includes 10% spares

A-10: ABILITY TO TACTICALLY DEPLOY TO (AND OPERATE FROM) AUSTERE AIRFIELDS

1. Background. ANG A-10s require an enhanced ability to operate from austere airfields with fewer maintenance and logistics personnel. These capabilities provide Combatant Commanders the flexibility to pre-deploy A-10s closer to the battlespace, and enables rapid response during close air support, forward air controller-airborne, and combat search-and-rescue sorties. Conversion fuel tanks provide additional endurance and minimize the need for additional refueling operations. Smart triple ejector rack (TER) modifications permit carriage of additional Global Positioning System-guided munitions. Maintenance personnel at each of the four units require specialized equipment to support aircraft at austere locations. This equipment includes Night Vision Goggles (NVG), NVG storage cases, infrared headlamps, integrated helmet and headsets with noise cancelling boom microphones and wireless intercom system, and secure-capable tactical radios. Each of the 85 ANG A-10s requires two smart TERs. Each of the four ANG A-10 squadrons requires 32 fuel tanks and one austere airfield maintenance kit.

2. Program Details.

Quantity	Unit Cost	Quantity
Conversion Fuel Tank Non-Recurring Engineering (NRE) (3010)	**N/A**	**$1,000,000**
128 Conversion Fuel Tanks (3010)	**$81,515**	**$10,433,920**
Smart TER NRE (3010)	**N/A**	**$2,000,000**
4 Austere Airfield Maintenance Kits (3010)	**$1,500,000**	**$6,000,000**
Total		**$19,433,920**

A-10: UPGRADED COMMUNICATIONS SYSTEMS FOR CONTESTED, DEGRADED, AND OPERATIONALLY LIMITED ENVIRONMENTS

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

2. Program Details.

Quantity	Unit Cost	Quantity
Directional Audio Non-Recurring Engineering (NRE) (3010)	**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 (3010)	**N/A**	**$1,800,000**
94 SATURN Radio Upgrades (3010) *	**$1,000**	**$94,000**
SINGARS SA Waveform Retrofit NRE (3010)	**N/A**	**$2,000,000**
94 SINGARS SA Waveform Retrofit Kits (3010) *	**$50,000**	**$4,700,000**
ARC-210 Gen 6 MUOS Capable Radios NRE (3010)	**N/A**	**$3,000,000**
94 ARC-210 Gen 6 MUOS Radios (3010) *	**$850,000**	**$79,900,000**
LINK 16 NRE (3010)	**N/A**	**$10,000,000**
94 LINK 16 Kits (3010) *	**$425,000**	**$39,950,000**
Total		**$155,904,000**

* Includes 10% spares

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Command and Control

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

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

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

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

Command and Control
2018 Weapons and Tactics Conference

Critical Capabilities List

AOC

- Weapon System Modernization
- Data Link Training Tool
- Secure Voice Capability
- Single Pane of Glass Display Capability

BCC

- Integrated Fire Control
- National Capital Region Camera Modernization
- Sector Survivability
- Tactical-to-Tactical Communication Modernization
- Live, Virtual, Constructive 5th Generation Training Suite (See Tab Q)

CRC

- Remote Radar and Radio Access
- Highly Mobile, Medium-Range Active Electronically Scanned Array Radar with Combat Identification
- Integrated Mode 5/Automatic Dependent Surveillance-Broadcast Sensor Suite
- Electronic Attack Training Suite (See Tab Q)
- In-Garrison Operations Facility

Essential Capabilities List

AOC

- Increased Bandwidth Capability
- Dual-Use Coalition / Collateral Network
- Joint Worldwide Intelligence Communications System Connectivity
- Cross-Domain Common Operating Picture/Common Intelligence Picture
- Weapon System Mission Defense Team Toolkit

BCC

- Counter Unmanned Aircraft System Detect/Track/Identify
- Dynamic Sector Survivability
- Advanced Intelligence Feeds
- Artificial Intelligence and Machine Learning for Find/Fix/Track and Target/Engage
- Battle Management Aids

CRC

- Environmental Control Unit Standardization
- Advanced Intelligence and Fire Control Interoperability Feeds
- Data Cross-Domain Solution Incorporating Chat
- 5th-to-4th Generation Gateway
- Protection Level Security Upgrades

Desired Capabilities List

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

AOC: WEAPON SYSTEM MODERNIZATION

1. Background. ANG Air Operations Center (AOC) units require the modernized Block 20 Falconer Weapon System to maintain readiness with the impending termination of the current 10.1 Weapon System. The Kessel Run/Pathfinder initiative is revolutionizing the way the Air Force develops, tests, employs, and updates AOC mission software, making it accessible by the Block 20 Weapon System through the cloud. To ensure redundant capability and connectivity, especially in a degraded mission environment, Pivotal Cloud Foundry (PCF) server racks hosting the Block 20 Weapon System will also be based at nine different geographic nodes [e.g. 603rd AOC in Unites States Air Forces in Europe (USAFE)]; however, the current plan does not include fielding PCF server racks for ANG units. Instead, ANG units are expected to access the weapon system through the cloud without local hardware. This poses a potential mission degradation challenge for ANG AOC units accessing the cloud in a conflict where the cyber-enabled environment is contested and/or degraded. This upgrade will be for seven ANG AOCs which support active component AOCs located outside of the Continental United States.

2. Program Details.

Quantity	Unit Cost	Program Cost
7 PCF Servers / Block 20 Weapon System (3080)	**$2,500,000**	**$17,500,000**
Total		**$17,500,000**

AOC: DATA LINK TRAINING TOOL

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

2. Program Details.

Quantity	Unit Cost	Program Cost
High Resolution Display Non-Recurring Engineering (3080)	**N/A**	**$432,000**
6 Training Systems (3080)	**$1,200,000**	**$7,200,000**
Total		**$7,632,000**

AOC: SECURE VOICE CAPABILITY

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

2. Program Details.

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

AOC: SINGLE PANE OF GLASS DISPLAY CAPABILITY

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

2. Program Details.

Quantity	Unit Cost	Program Cost
6 CDS (3080)	**$1,000,000**	**$6,000,000**
Total		**$6,000,000**

BCC: INTERGRATED FIRE CONTROL

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

2. Program Details.

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

BCC: NATIONAL CAPITAL REGION CAMERA MODERNIZATION

1. Background. ANG Battle Control Centers (BCC) require a modernized Enhanced Regional Situational Awareness (ERSA) System at the Joint Air Defense Operation Center (JADOC) to provide continuous support of the BCC mission. This system includes: all-weather, high definition (HD) electro-optical (EO)/infrared (IR) sensors; a network architecture that transmits HD sensor imagery in its native format; and an improved ERSA user interface. Additionally, the network architecture from the EO/IR sensors to the ERSA user interface must be updated. Without an updated architecture, new sensors cannot provide true HD imagery to the warfighter. A modernized user interface enables the operator to effectively acquire and track aircraft. The ANG National Capital Region camera system, consisting of eight HD visual warning system (VWS) cameras, 11 HD cameras, HD supported bandwidth architecture, hardware installation packages, and a modernized ERSA user interface software are required at the JADOC.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 HD VWS Cameras (3080)	**$800,000**	**$6,400,000**
11 HD Cameras (3080)	**$200,000**	**$2,200,000**
1 HD Supported Bandwidth Architecture (3080)	**$1,900,000**	**$1,900,000**
1 Hardware Installation Package (3080)	**$1,000,000**	**$1,000,000**
1 ERSA User Interface Software (3080)	**$1,500,000**	**$1,500,000**
Total		**$13,000,000**

BCC: SECTOR SURVIVABILITY

1. Background. The 169th Pacific Air Defense Squadron (169 PADS) requires a Continuity of Operations (COOP) capability. This Battle Control Center (BCC) executes Home Land Defense (HLD) operations for the Indo-Pacific Command region. This includes Long Range Aviation, Operation NOBLE EAGLE, and domestic operations support. The interim COOP capability should ensure a seamless transfer of operations in case of system failure at the primary site while providing a full range of weapons control and air surveillance capabilities to execute HLD operations. The interim COOP capability should have, but not be limited to; Ultra High Frequency, Very High Frequency, Tactical Data Link, Joint Range Extension, Satellite Communications (with auto acquire), and Tactical Display Framework capabilities. The interim COOP should have the ability to infuse primary radar data from the Hawaiian Air Defense Region and Guam Air Defense Region into a modernized operational mission system. The 169 PADS requires one COOP HLD command and control suite.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 COOP HLD Suite (3080)	**$2,000,000**	**$2,000,000**
Total		**$2,000,000**

BCC: TACTICAL-TO-TACTICAL COMMUNICATION MODERNIZATION

1. Background. Battle Control Centers (BCC) require modernized tactical data link and enhanced communications capabilities to meet evolving mission requirements. New High Frequency (HF) radios are needed to support air defense Command and Control mission requirements using beyond line-of-sight (BLOS) HF Link 11 as the primary means of data transfer. A cross domain solution, which includes hardware and software upgrades, is required to integrate tactical data links, provide functional redundancy to the Air Event Information Sharing Service (AEISS), integrate joint service tactical data links, and facilitate defense support to civil authorities through the Situational Awareness Geospatial Enterprise application. The ANG requires two Multifunctional Information Distribution System (MIDS) Radio Systems at the Hawaii BCC, two each Joint Range Extensions (JRE) gateways at the Hawaii and Western Air Defense Sector (WADS) BCCs, four HF radios at the Hawaii BCC, one each HF Global Terminal at the Hawaii, Eastern Air Defense Sector (EADS), and WADS BCCs, and one Firewall Hardware/Software package at each BCC location to meet mission requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 MIDS Radio System (3080)	**$500,000**	**$1,000,000**
4 JRE Gateways (EADS, WADS) (3080)	**$200,000**	**$800,000**
4 HF Radios (HI) (3080)	**$50,000**	**$200,000**
3 HF Global Terminals (HI, EADS, WADS) (3080)	**$500,000**	**$1,500,000**
4 Firewall Hardware / Software Packages (3080)	**$500,000**	**$2,000,000**
Total		**$5,500,000**

CRC: REMOTE RADAR AND RADIO ACCESS

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

2. Program Details.

Quantity	Unit Cost	Program Cost
10 RRVC Suites (3080)	**$275,000**	**$2,750,000**
Total		**$2,750,000**

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

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

2. Program Details.

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

CRC: INTEGRATED MODE 5 / AUTOMATIC DEPENDENT SURVEILLANCE-BROADCAST SENSOR SUITE

1. Background. ANG Control and Reporting Centers (CRCs) require the capability to interrogate Mode 5 and access Automatic Dependent Surveillance-Broadcast (ADS-B) data to complete an identification matrix organically. By fiscal year 2020, the United States Air Force will transition to use of Mode 5 in accordance with Defense Security Cooperation Agency Memorandum dated 7 March 2018. In order to complete the command and control mission, the CRC needs the capability to interrogate Mode 5 and access ADS-B data. One sensor suite is required for each of the 10 CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Integrated Mode 5 / ADS-B Suites (3080)	**1,100,000**	**$11,000,000**
Total		**$11,000,000**

CRC: IN-GARRISON OPERATIONS FACILITY

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

2. Program Details.

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

C-17

- **Strategic Airlift**
- **Outsized and Oversized Cargo Airlift**
- **Aeromedical Evacuation Missions**
- **ANG C-17 Units Provide 23% of the Total Fleet**

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

The ANG operates 50 C-17 aircraft assigned to five wings and two associate units. The fully-equipped aircraft carries combat-ready military units to any point in the world on short notice, and provides critical field support to sustain the fighting force.

C-17
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Critical Capabilities List

- Mobility Air Forces Common Carry Radio Frequency / Infrared Self-Protection
- Common Mobility Air Forces Mission Computer
- Secure High-Speed Global Data
- Full-Motion Video
- Synthetic Head-Up Display

Essential Capabilities List

- Improved Aircrew/Aircraft Protection
- Internal Secure Global Positioning System
- Three-Dimensional Audio Capability
- Enhanced Wind Shear
- Single-Pass Precision Airdrop

Desired Capabilities List

- High-Definition Night Vision Goggles
- Light-Emitting Diode Landing Lights
- Common Maintenance Computer
- Fifth Mission Computer Display in Center Pedestal
- Ramp Toe Modification to Eliminate Shoring

C-17: MOBILITY AIR FORCES COMMON CARRY RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. The ANG C-17 fleet requires a common carry open-architecture mission pod capable of producing mission enhancement effects in ever-changing contested environments. The C-17 fleet does not currently have an on-board capability to detect or defend against electronic threats. The majority of missions flown by ANG C-17s are in areas posing a significant electronic threat with no dedicated off-board assets to provide detection or protection. To survive in modern combat, C-17 aircraft require a radar warning receiver (RWR) capable of processing signals in a dense radio frequency environment that automatically directs countermeasures to defeat those threats. This capability enables C-17s to detect and defend against electronic threats in the likely scenario in which the aircraft is operating independently. C-17 aircraft have inadequate missile-launch detection capabilities, nor the ability to detect, degrade and defeat the current generation of infrared (IR) man-portable air defense systems. Modular defensive systems provide a method for low-cost, simplified improvements to IR detection and suppression capabilities, degrading the enemy's ability to engage C-17 aircraft. The open-architecture mission pod will provide capacity for electronic attack/electronic protection, standoff acquisition and objective area assessment through the use of the AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM). 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. Additionally, the C-17 fleet requires hard-points to carry two MAF common carry pods. All 50 ANG C-17s require LAIRCM and RWR Group A and B kits. Each ANG C-17 unit requires two common carry pods.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$12,000,000**
50 LAIRCM Group A Kits (3010)	**$2,100,000**	**$105,000,000**
50 LAIRCM Group B Kits (3010)	**$3,000,000**	**$150,000,000**
50 RWR Group A Kits (3010)	**$250,000**	**$12,500,000**
50 RWR Group B Kits (3010)	**$500,000**	**$25,000,000**
50 Hard-Point Kits (3010)	**$500,000**	**$25,000,000**
12 Mobility Air Forces Common Carry Pods (3010)	**$2,500,000**	**$30,000,000**
Total		**$359,500,000**

C-17: COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG C-17s require secure airborne data communications with other aircraft, command and control (C2) agencies, and ground-based forces. The Mobility Air Forces mission computer data link and data transfer capabilities provide aircrew the ability to report and receive battlespace information such as the position of other aircraft, weather, threat, mission events, mission status, task completion, and resource status. This increased situational awareness allows C2 agencies the ability to track mission progress and facilitate rapid decisions and adjustments during mission execution. Next generation military ultra-high frequency (UHF) satellite communication (SATCOM) radios provide both data and voice using satellites operating outside of traditional data link bandwidths. This enables the crew to receive real-time updates for weather, departure and landing information, as well as provides C2 reach-back capability. Electronic flight bags can store and retrieve documents required for flight operations such as technical orders, Air Force Instructions, flight operations manuals, minimum equipment lists, and the most current flight information publications. To reduce crew workload, these solutions require integration with other aircraft systems. ANG C-17s require one set of installation components for each of the 50 airframes.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$10,000,000**
55 C-17 Group A Kits* (3010)	**$100,000**	**$5,500,000**
55 C-17 Group B Kits* (3010)	**$750,000**	**$41,250,000**
55 C-17 Data Link Processors* (3010)	**$100,000**	**$5,500,000**
55 Electronic Flight Bags* (3010)	**$240,000**	**$13,200,000**
55 UHF SATCOM Kits* (3010)	**$475,000**	**$26,125,000**
Total		**$101,575,000**

* Includes 10% spares

C-17: SECURE HIGH-SPEED GLOBAL DATA

1. Background. ANG C-17 aircraft require an onboard capability to access secure and unsecure internet data. The C-17 operates globally, presenting a unique challenge where crews need both tactical and strategic situational awareness. Missions can originate thousands of miles and 12-16 hours from the objective area. Crews require the ability to access unsecure networks to assess weather, surface conditions, and support capabilities. Additionally, secure data provides the ability to maintain an updated perspective on the tactical environment allowing the crew to make early decisions that can have a profound impact on mission success. ANG C-17s require one high speed data system for each of the 50 airframes.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$5,000,000**
50 High Speed Data Systems (3010)	**$1,500,000**	**$75,000,000**
Total		**$80,000,000**

C-17: FULL-MOTION VIDEO

1. Background. ANG C-17s require an Electro-Optical/Infrared sensor to accurately identify and track both friendly and enemy forces, properly identify and clear drop zone and landing zone areas, and transmit this imagery to other integrated users to improve battlespace awareness for users and supporting forces as needed. The solution requires high-definition imagery to locate and track a point, provide high-fidelity coordinates for points of interests to all members of a task force, and illuminate and designate points of interest with a laser to draw other assets awareness for support. The combination of these capabilities will enable the C-17 to precisely locate and identify ground threats and provide immediate intelligence updates to disembarking and supporting forces. Two podded systems are required for each of the six ANG C-17 operating locations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$15,000,000**
12 Targeting Pods (3010)	**$3,000,000**	**$36,000,000**
Total		**$51,000,000**

C-17: SYNTHETIC HEAD-UP DISPLAY

1. Background. ANG C-17s require a synthetic vision capability in the head-up display (HUD) to increase the tactical advantage of the C-17 during periods of night and instrument conditions. Synthetic vision imagery projected into the HUD would give C-17 aircrews the outside picture to avoid terrain and obstacles. This would permit crews to fly lower at night and during times of inclement weather. This capability would allow C-17s more flexibility in avoiding radio frequency surface-to-air missiles and reduce exposure time to small arms, air defense artillery, and man-portable surface-to-air missiles. All 50 ANG C-17s require synthetic HUDs at each pilot station.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$10,000,000**
100 Synthetic HUDs (3010)	**$600,000**	**$60,000,000**
Total		**$70,000,000**

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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

- Mobility Air Forces Common Carry Radio Frequency / Infrared Self-Protection
- Integrated Defensive Systems for Common Mobility Air Forces Mission Computer
- Propulsion System Upgrades
- Global Airspace Compliant Avionics/Instrumentation and Associated Training Devices
- Single-Pass Precision Airdrop

C-130J

- Mobility Air Forces Common Carry Radio Frequency / Infrared Self-Protection
- Integrated Defensive Systems for Common Mobility Air Forces Mission Computer
- Self-Contained Contested Training Suite
- Updated Avionics Suite for Global Airspace Access
- Single-Pass Precision Airdrop

Essential Capabilities List

C-130H

- Hard-Kill Self-Protection
- High-Speed Ramp/Door
- Space Jam 2 Go for Contested, Degraded, and Operationally Limited Environment Training
- Modernized and Standardized Flight Engineer's Panel
- Improved Dual-Mode External Light-Emitting Diode Lighting

C-130J

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

Desired Capabilities List

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

C-130H: MOBILITY AIR FORCES COMMON CARRY RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. The ANG C-130H fleet requires a common carry open-architecture mission pod capable of producing mission enhancement effects in contested environments. Mobility Air Forces (MAF) C-130H aircraft have inadequate missile-launch detection and ability to detect, degrade and defeat infrared (IR) man-portable air defense systems (MANPADS). The Block 30 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) system improves detection against advanced MANPADS threats, while degrading the enemy's ability to engage C-130H aircraft. To survive in modern combat, C-130H aircraft require a radar warning receiver (RWR), with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment that automatically directs countermeasures to defeat those threats. The open-architecture mission system will provide additional capacity for electronic attack/electronic protection, standoff acquisition and assessment of drop zones / landing zones, and beyond line of sight communication with ground force commanders. 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 fleet without this capability. The MAF common carry active RF/IR self-protection open-architecture pod requires hard-points for the 119 unmodified C-130Hs (five are already modified with hard-points), 38 common carry pods, 134 LAIRCM Group A kits, 67 LAIRCM Group B kits, 134 RF Group A kits, 67 RF Group B kits and 122 ALR-69A kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
38 C-130H MAF Common Carry System (3010)	**$2,000,000**	**$76,000,000**
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-69As (3010)	**$1,000,000**	**$122,000,000**
119 Hard-Point Installations (3010)	**$330,000**	**$39,270,000**
Total		**$841,275,000**

C-130H: INTEGRATED DEFENSIVE SYSTEMS FOR COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. The ANG C-130H fleet requires comprehensive and networked battle space awareness. The Real-Time Information in the Cockpit (RTIC) system allows C-130 aircraft to participate on multiple data link networks using technologies fielded on other Department of Defense assets. The system must provide growth capability for future tactical data link networks. Upgrades to the C-130 RTIC system increases the overarching network capability and provides 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) software provides the capability for on-board and off-board threat correlations, data sharing, on-board radar threat system geo-location, route re-planning, and automated countermeasures. Combining the control and outputs of multiple systems into one common graphical interface reduces crew workload, decreases "heads-down" time, and provides improved decision support for aircrews operating in the tactical environment. Lastly, the integration of noise-cancelling and three-dimensional (3D) audio in the cockpit increases situational awareness by spatially separating aural warning and radio signals, such as angular threat information or terrain awareness cues. All 134 C-130H aircraft need RTIC systems with integrated AIECS.

2. Program Details.

Quantity	Unit Cost	Program Cost
AIECS Non Recurring Engineering (NRE) (3010)	**N/A**	**$10,000,000**
134 AIECS Kits (3010)	**$150,000**	**$20,100,000**
Directional Audio NRE (3010)	**N/A**	**$5,000,000**
134 3D Audio Kits (3010)	**$50,000**	**$6,700,000**
Total		**$41,800,000**

C-130H: PROPULSION SYSTEM UPGRADES

1. Background. The ANG C-130H fleet requires a comprehensive propulsion upgrade for increased performance, efficiency, and reliability. Incorporating modular propeller blade technology (NP2000), and an Electronic Propeller Control System (EPCS) provide increased performance and reliability. The T-56 3.5 engine upgrade, with redesigned compressors and turbines decreases engine life-cycle costs, improves fuel economy, increases reliability, and improves aircraft availability. The modular design of NP2000 eight-bladed propellers decreases 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, decreasing maintenance costs. Each NP2000 kit contains four nacelle kits and each T-56 3.5 kit contains four engine upgrades. All 134 ANG C/LC-130H models require propulsion system upgrades. Twenty-eight ANG C/LC-130Hs are funded for NP2000 and 3.5 upgrades. All 134 ANG C/LC-130Hs are funded for EPCS.

2. Program Details.

Quantity	Unit Cost	Program Cost
106 NP2000 Kits (3010)	**$3,000,000**	**$318,000,000**
106 T-56 3.5 Modified Engines (3010)	**$6,000,000**	**$636,000,000**
Total		**$954,000,000**

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

1. Background. The ANG C-130H fleet requires avionics modernization. The C-130H faces severe sustainment challenges with current avionics and cockpit instrumentation, and will be out of compliance with the Communications, Navigation and Surveillance/Air Traffic Management 2020 mandate if not modernized. The lack of C-130H improved communications and avionics technology prohibits operating in European airspace. Additionally, tactical night operations continue to suffer with non-Night Vision Imaging System (NVIS) compliant lighting. In order to eliminate critical sustainment issues due to Diminishing Manufacturing Sources (DMS), and to meet required mandates and Air Force Instructions, this modernized cockpit will include: a multifunction Engine Instrument Display System (EIDS), Automatic Dependent Surveillance-Broadcast (ADS-B), NVIS compatibility, and a modern flight management system with Global Positioning System approach and polar navigation capabilities. An NVIS-compatible and modernized glass cockpit reduces crew workload, lowers maintenance costs and increases capability and sustainability to operate safely at night. Additionally, C-130H1 aircraft are unable to monitor or transmit on two separate Very High Frequency (VHF) channels simultaneously. This forces aircrews to go "off frequency" with Air Traffic Control to receive weather updates in congested airspace. Adding a second VHF antenna to the ANG C-130H1 aircraft will eliminate the need to go "off frequency" and enable aircrews to monitor/transmit on two VHF channels simultaneously. All 134 C/LC-130H models require updated avionics kits and NVIS compatibility kits. To facilitate conversions to a modernized cockpit suite, all 12 units require access to Distributed Mission Operations capable, level 6 or higher, aircrew training devices. All 24 ANG C-130H1 aircraft require a second VHF radio antenna.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**N/A**	**$50,000,000**
134 Avionics Kits (3010)	**$5,700,000**	**$763,800,000**
134 NVIS Compatibility Kits (3010)	**$465,000**	**$62,310,000**
12 Aircrew Training Devices (3010)	**$14,000,000**	**$168,000,000**
24 VHF Radio Antennas (3010)	**$50,000**	**$1,200,000**
Total		**$1,045,310,000**

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

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

2. Program Details.

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

C-130J: MOBILITY AIR FORCES COMMON CARRY RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. The ANG C-130J fleet requires a common carry open-architecture mission pod capable of producing mission enhancement effects in contested environments. Mobility Air Forces (MAF) C-130J aircraft have inadequate missile-launch detection and ability to detect, degrade and defeat infrared (IR) Man-Portable Air Defense Systems (MANPADS). The Block 30 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) system improves detection against advanced MANPADS threats, while degrading the enemy's ability to engage C-130J aircraft. To survive in modern combat, C-130J aircraft require a radar warning receiver (RWR), with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment that automatically directs countermeasures to defeat those threats. The open-architecture mission pod will provide additional capacity for electronic attack/electronic protection, standoff acquisition and assessment of drop zones / landing zones, and beyond line of sight communication with ground force commanders. Increased situational awareness is needed to correlate on-board and off-board threat detection, terrain masking, and optimized dynamic rerouting capabilities to minimize exposure to threats. All 16 ANG C-130Js need to be wired with LAIRCM and Next Generation RF Group A kits. Group B kits will be procured for half of the ANG C-130J fleet. Two common carry pods are required at each of the two ANG C-130J units.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**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**
4 C-130J MAF Common Carry Pods (3010)	**$2,000,000**	**$8,000,000**
Total		**$92,640,000**

C-130J: INTEGRATED DEFENSIVE SYSTEMS FOR COMMON MOBILITY AIR FORCES MISSION COMPUTER

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

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering (3010)	**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: SELF-CONTAINED CONTESTED TRAINING SUITE

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

2. Program Details.

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

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

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

2. Program Details.

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

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C-130 Special Mission

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

C-130 Special Mission aircraft include:

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

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

LC-130H - The LC-130H 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
2018 Weapons and Tactics Conference

Critical Capabilities List

EC-130J

- Distributed Mission Operations Simulator (See Tab Q)
- Multi-Mission Payload – Internal
- Multi-Mission Payload – External
- Federated Defensive System Unit
- Link 16

HC-130J

- Distributed Mission Operations Simulator (See Tab Q)
- Modernized Joint Tactical Data Link
- On-board Secure Global Networked Connectivity
- Precision Geolocation and Identification of Isolated Personnel
- Increased Survivability in Contested Environments

LC-130H

- Propulsion System Upgrades
- Global Airspace Compliant Avionics/Instrumentation and Associated Training Devices
- Common Mobility Air Forces Computer
- Hardwired Iridium Flight Deck Communications
- Retractable External Arm with Compatible Sonobuoy Ejector

Essential Capabilities List

EC-130J

- "Slick" Modification to Multi-Mission Payload – Heavy
- Multi-Mission Payload – Internal for Slick Aircraft
- Multi-Mission Payload – External for Slick Aircraft
- Multi-Mission Payload – Heavy Diagnostic Equipment for All Seven Aircraft
- Airborne Mission Networking – Permanent Modification

HC-130J

- Ground Moving Target Indicator/Synthetic Aperture Radar
- Electronic, Signals, and Communications Intelligence Collection Systems
- Terrain Following/Terrain Avoidance
- Improved Radio Frequency Countermeasures
- Enhanced Visibility in Scanner Positions

LC-130H

- Center Wing Box Replacement Program
- High Frequency Radios with Selective Calling
- Whiteout Condition Weather-Penetrating Visual Enhancement
- High-speed door
- Mobile User Objective System 6th Generation Satellite Communications Radio

Desired Capabilities List

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

EC-130J: MULTI-MISSION PAYLOAD – INTERNAL

1. Background. The EC-130Js require a Multi-Mission Payload – Internal (MMP-I) in order to meet the Combatant Commanders' Information Operations (IO) needs. MMP-I will bridge the gap between analog and digital television allowing a broader range of IO campaigns to be carried out. MMP-I will add to current EC-130J IO capabilities and carry the platform into the next generation of IO. Once the MMP-I is fully operational, the legacy components will need to be upgraded. For full mission effectiveness, a Systems Integration Lab is required for maintenance of the system. Additionally, a Part Task Trainer (PTT) for ground based training and three MMP-I units are needed to homogenize the fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 MMP-I Upgrades (3010)	**$1,000,000**	**$1,000,000**
1 Systems Integration Lab (3010)	**$1,000,000**	**$1,000,000**
1 MMP-I PTT (3010)	**$1,500,000**	**$1,500,000**
3 MMP-I (3010)	**$2,100,000**	**$6,300,000**
Total		**$9,800,000**

EC-130J: MULTI-MISSION PAYLOAD – EXTERNAL

1. Background. The EC-130J requires a Multi-Mission Payload – External (MMP-E) Communication Electronic Attack with Surveillance and Reconnaissance (CEASAR) pod. This device will expand the current EC-130J capabilities. EC-130Js do not currently meet the electronic warfare (EW) needs of the Combatant Commanders. MMP-E will bridge the gap between current Commando Solo capabilities and future EW needs. The 193 Special Operations Wing requires six CEASAR pods for the three Commando Solo aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 CEASAR Pods (3010)	**$1,000,000**	**$6,000,000**
Total		**$6,000,000**

EC-130J: FEDERATED DEFENSIVE SYSTEM UNIT

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

2. Program Details.

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

EC-130J: LINK 16

1. Background. The ANG EC-130J requires a tactical data link to be interoperable with the active duty Air Force. Air Force Special Operations Command (AFSOC) aircraft operate under the legacy Situation Awareness Data Link system while the conventional Air Force operates utilizing Link 16. This disconnect between systems causes a lack of a Common Operating Picture (COP). Additionally, AFSOC required that all Special Operation Forces aircraft have Link 16 capabilities by August 2018. EC-130J aircraft do not meet this requirement. Link 16 will provide EC-130J aircraft full integration with the rest of the Air Force, providing a COP and safer passage in active battlespace. The 193 Special Operations Wing requires 12 Link 16 systems to outfit the entire fleet, including seven aircraft, two trainers, two spares, and one for the Systems Integration Lab.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,600,000**
12 Link 16 Radios (3010)	**$325,000**	**$3,900,000**
Total		**$6,500,000**

HC-130J: MODERNIZED JOINT TACTICAL DATA LINK

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

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
13 Software Definable Radio Suites* (3010)	**$250,000**	**$3,250,000**
13 Moving Map Display Group A Kits* (3010)	**$150,000**	**$1,950,000**
13 Moving Map Display Group B Kits* (3010)	**$1,000,000**	**$13,000,000**
13 BFT 2 Systems* (3010)	**$100,000**	**$1,300,000**
13 Link 16 Systems* (3010)	**$250,000**	**$3,250,000**
13 ADS-B Systems* (3010)	**$30,000**	**$390,000**
Total		**$32,140,000**

* Includes 10% spares.

HC-130J: ON-BOARD SECURE GLOBAL NETWORKED CONNECTIVITY

1. Background. ANG HC-130Js require secure, continuous, on-board connectivity over a wide-band beyond-line-of-site (BLOS) system. As the Combat Search and Rescue Coordinator role is advancing as an HC-130J capability, the requirement to digitally communicate securely BLOS with multiple assets is critical. Currently, the HC-130J must rely on BLOS voice communication to receive and pass critical survivor information from command and control sources, delaying the recovery effort. Information flow to the Combat Search and Rescue Task Force (CSARTF) is severely limited and needs to be upgraded to fulfil the CSARTF's role in information superiority. In order for rescue forces to fully support information superiority operations, they require the ability to utilize internet while on board the aircraft. During domestic operations, the HC-130J needs to develop situational awareness among civilian agencies with an on-board unclassified internet capability. The integration of both organic unencrypted and encrypted internet on-board allows for efficient information sharing across a digital network using Multi-User Internet Relay Chat, Secret Internet Protocol Router, and Non-Classified Internet Protocol Router architectures. One of each system is required for the 12 HC-130Js in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$9,000,000**
13 Software Definable Radio Suite* (3010)	**$250,000**	**$3,250,000**
13 Full Motion Video* (3010)	**$200,000**	**$2,600,000**
13 Internet On-Board* (3010)	**$300,000**	**$3,900,000**
Totals		**$18,750,000**

* Includes 10% spares.

HC-130J: PRECISION GEOLOCATION AND IDENTIFICATION OF ISOLATED PERSONNEL

1. Background. ANG HC-130Js require the ability to carry mission-specific stores including weapon, data link, sensor, communications, and electronic warfare payloads on aircraft wing hard points without detrimental effects to baseline aircraft capabilities, specifically aerial refueling. The Outer Wing Station 430 (OWS 430) modification puts two additional stores positions on the HC-130J wings. This, in addition to a retractable external arm, will allow for the carriage of a diverse number of aircraft payloads without impacting HC-130J cargo, transport, or aerial refueling mission sets. Additionally, an open architecture, reconfigurable pod is needed to quickly add capability to the HC-130J. One system is required for each of the 12 HC-130Js in the ANG. Each of the 12 ANG HC-130Js require the OWS 430 modification and two retractable arms are needed for each of the three units. Additionally, twelve pods and a spare is needed for the HC-130J community.

2. Program Details.

Quantity	Unit Cost	Program Cost
13 Full Motion Video Systems* (3010)	**$200,000**	**$2,600,000**
Non-Recurring Engineering (NRE) Open Architecture Pod (3010)	**N/A**	**$5,000,000**
13 Open Architecture Pods* (3010)	**$2,000,000**	**$26,000,000**
Outer Wing Station 430 NRE (3010)	**N/A**	**$10,000,000**
12 sets Outer Wing Station 430 (3010)	**$2,000,000**	**$24,000,000**
6 Retractable External Arm Modifications (3010)	**$1,000,000**	**$6,000,000**
Total		**$73,600,000**

* Includes 10% spares.

HC-130J: INCREASED SURVIVABILITY IN CONTESTED ENVIRONMENTS

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

2. Program Details.

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

* Includes 10% spares.

LC-130H: PROPULSION SYSTEM UPGRADES

1. Background. ANG LC-130Hs require increased performance, efficiency, and reliability. The LC-130H fleet has ski-equipped landing gear to enable landings and takeoffs on snow and ice. The present method to takeoff from deep snow field runways requires Jet Assisted Take-Off (JATO) rocket motors, which are no longer produced. Current operations require increased performance, efficiency, and reliability which highlight the need for a comprehensive propulsion upgrade to the LC-130H fleet. Incorporating NP2000 modular blade technology and the T-56 3.5 engine upgrade provides increased performance and reliability. The NP2000 is an eight-bladed, composite propeller and improved synchronization system that increases thrust 20 percent over the current LC-130 propeller during takeoff. The benefits of the eight-bladed propeller are additional power, reduced JATO use, 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. Each NP2000 kit contains four nacelle kits and each T-56 3.5 kit contains four engine upgrades. All 10 ANG LC-130H aircraft require propulsion modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 NP2000 Kits (3010)	**$3,000,000**	**$30,000,000**
10 3.5 Engine Installs (3010)	**$6,000,000**	**$60,000,000**
Total		**$90,000,000**

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

1. Background. The ANG LC-130H fleet requires updated avionics to ensure continued global airspace access. LC-130Hs face severe sustainment challenges with current avionics and cockpit instrumentation, and will be out of compliance with Communications, Navigation and Surveillance/Air Traffic Management (CNS/ATM) mandates if not modernized. The lack of LC-130H 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-130H models failure to meet the 2020 deadline for international CNS/ATM mandates. In order to eliminate critical sustainment issues due to Diminishing Manufacturing Sources, and to meet required mandates and Air Force Instructions, this modernized cockpit will include: a multifunction Engine Instrument Display System, Automatic Dependent Surveillance-Broadcast capability, NVIS compatibility, and a modern flight management system with Global Positioning System (GPS) approach and polar navigation capabilities. Updated avionics address CNS/ATM mandates and increase operational efficiency by opening up airspace routes with stringent navigational requirements and allow the use of GPS approaches. An NVIS-compatible and modernized glass cockpit reduces crew workload, lowers maintenance costs and increases capability and sustainability to operate safely at night. All 10 ANG LC-130H aircraft require avionics upgrades.

2. Program Details.

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

LC-130H: COMMON MOBILITY AIR FORCES COMPUTER

1. Background. ANG LC-130Hs require a robust, secure Tactical Data Link (TDL). TDL provides a command and control link and maximizes aircrew situational awareness with beyond line-of-sight capabilities. TDL also provides critical Real-Time Information in the Cockpit (RTIC) to the LC-130H aircrews such as friendly aircraft position, weather conditions, and hostile threat locations. This increases the LC-130H's ability to effectively participate in the present day network-centric battlespace and prepare for the future. Recent operations have highlighted the need for comprehensive, networked command and control awareness, and integration of aircraft systems. Due to routine operations in the Polar Regions the LC-130H will need to upgrade the RTIC solution to include ARC-210 with voice capability and Generation 6 Mobile User Objective System satellite communication radios. A common Mobility Air Forces mission computer will reduce communication transmission time and provide aircrew with the information necessary to adjust mission profiles in accordance with changing conditions and commander's guidance. All 10 ANG LC-130Hs require RTIC.

2. Program Details.

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

LC-130H: HARDWIRED IRIDIUM FLIGHT DECK COMMUNICATIONS

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

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Flight Deck Communications Upgrade (3010)	**$220,000**	**$2,200,000**
Total		**$2,200,000**

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

1. Background. ANG LC-130Hs are routinely tasked with conducting missions that require a pod to be mounted to the aircraft for scientific research. This pod is mounted to the aircraft using a Special Airborne Mission Installation and Response (SABIR) arm with a sonobuoy ejector assembly. The SABIR arm, in conjunction with the extended visibility paratroop door and the ejector, allows for multiple mission sets for the LC-130H that could be accomplished by a podded solution. More effort is required to establish the retractable external arm as a permanent modification to the LC-130H fleet. ANG LC-130Hs require the certification of both the sonobuoy and SABIR arm to make these permanent modifications.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Sonobuoy Program (3010)	**N/A**	**$1,000,000**
1 SABIR Arm Modifications (3010)	**N/A**	**$1,000,000**
Total		**$2,000,000**

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

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

E-8C: The E-8C Joint Surveillance Target Attack Radar System is the world's premier wide-area surveillance moving target indicator, airborne, manned battle management command and control aircraft. It brings a unique combination of robust communication and real-time surveillance to air, ground, and surface domains. The aircraft's capability to find, fix, track, and orient shooters to air, ground, and surface targets of interest allows friendly forces to respond rapidly to a changing battlefield environment. Through continued investment in modernization, the E-8C will remain vital to joint force combat operations well into the future.

The ANG operates and maintains 16 E-8C's and one E-8(T)C. They have accrued more than 130,000 combat hours over Kosovo, Iraq, Afghanistan, and Libya. The E-8C has been deployed continuously, 24 hours per day, 365 days per year, for 17 years, providing simultaneous battle management, command and control, and intelligence, surveillance, and reconnaissance, supporting all six combatant commanders.

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

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

E-8C, C-32B, and C-40C
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Critical Capabilities List

E-8C

- Counter-Unmanned Aircraft Systems Cueing and Identification
- Fifth-to-Fourth Generation Communications Gateway
- Command and Control Enterprise Common Battle Management Suite
- Increased Commercial / Military Beyond Line-of-Sight Internet Bandwidth Capability
- Special Operations Forces-Integrated Situation Awareness Data Link

C-32B

- Satellite-Based Augmentation System
- Enhanced Flight Vision System

C-40C

- High-Speed Data Upgrade
- Cabin Refurbishment

Essential Capabilities List

E-8C

- Joint Worldwide Intelligence Communications System Top Secret/Sensitive Compartmented Information Internet and Chat Central Computer and Console Integration
- Global Positioning System Time Of Day, Auto Time Of Day, and Second Generation Anti-Jam Tactical Ultra High Frequency Radio for North Atlantic Treaty Organization Upgrade for HAVEQUICK
- Radar System Modernization
- Moving Target Indicator Classification Device and Machine-Aided Radar Target Identification
- E-8C Simulator Realistic Electronic Attack / Electronic Protection Modernization

C-32B

- None

C-40C

- None

Desired Capabilities List

E-8C

- Self-Defense Suite
- Bridge / Relay / Civilian Support
- Blue Force Tracker 2
- Secure Voice Over Internet Protocol
- Concurrent Multi-Netting / Link 16 Enhanced Throughput

C-32B

- None

C-40C

- None

E-8C: COUNTER-UNMANNED AIRCRAFT SYSTEM CUEING AND IDENTIFICATION

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

2. Program Details.

Quantity	Unit Cost	Program Cost
ELINT ID System Non-Recurring Engineering (NRE) (3010)	**N/A**	**$6,250,000**
18 ELINT Kits* (3010)	**$1,000,000**	**$18,000,000**
3 Simulated ELINT Kits for Training Systems (3010)	**$250,000**	**$750,000**
Total		**$25,000,000**

* Includes 10% spare

E-8C: FIFTH-TO-FOURTH GENERATION COMMUNICATIONS GATEWAY

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

2. Program Details.

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

* Includes 10% spare

E-8C: COMMAND AND CONTROL ENTERPRISE COMMON BATTLE MANAGEMENT SUITE

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) requires a common, with the command and control (C2) enterprise, battle management suite. The E-3 Airborne Warning and Control System, Control and Reporting Center, and Battle Control Center Theater Air Control System (TACS) platforms have transitioned or initiated transition to this common C2 software suite. This will increase crew efficiency on board the JSTARS weapon system through rapid target prioritization and enhanced defensive threat awareness. The suite will also fall in line with the open architecture initiative, yielding a universal programing language for all future software and hardware integration. Additionally, this will decrease transition training timelines for members migrating within the TACS community. Each of the 116th Air Control Wing's 16 E-8C aircraft requires the common battle management suite. In addition, it needs to be incorporated into each of the three associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
C2 Battle Management Suite Non-Recurring Engineering (3010)	**N/A**	**$10,500,000**
16 C2 Battle Management Suites (3010)	**$250,000**	**$4,000,000**
3 C2 Battle Management Suites for Training Systems (3010)	**$100,000**	**$300,000**
Total		**$14,800,000**

E-8C: INCREASED COMMERCIAL / MILITARY BEYOND LINE-OF-SIGHT INTERNET BANDWIDTH CAPABILITY

1. Background. ANG E-8C Joint Surveillance Target Attack Radar System (JSTARS) aircraft require increased beyond line-of-sight (BLOS) bandwidth on available commercial and military networks. The E-8C JSTARS is rapidly running out of available on-board communications capacity. This forces the aircrew to reduce or shutdown 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. 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. Each of the 116th Air Control Wing's 16 E-8C aircraft requires increased bandwidth. In addition, it needs to be incorporated into each of the three associated aircrew training devices.

2. Program Details.

Quantity	Unit Cost	Program Cost
BLOS Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
18 BLOS Kits* (3010)	**$300,000**	**$5,400,000**
3 BLOS Kits for Training Systems (3010)	**$200,000**	**$600,000**
Total		**$11,000,000**

* Includes 10% spare

E-8C: SPECIAL OPERATIONS FORCES – INTEGRATED SITUATIONAL AWARENESS DATA LINK

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

2. Program Details.

Quantity	Unit Cost	Program Cost
SADL Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
18 SADL Kits* (3010)	**$375,000**	**$6,750,000**
3 Simulated SADL Kits for Training Systems (3010)	**$50,000**	**$150,000**
Total		**$11,900,000**

* Includes 10% spare

C-32B: SATELLITE-BASED AUGMENTATION SYSTEM

1. Background. The ANG C-32B mission requires a Satellite Based Augmentation System (SBAS) to increase the reliability and accuracy of GPS operations. SBAS enables satellite based approaches to precision minimums and ensures full compliance with Automatic Dependent Surveillance-Broadcast mandates for global operations by 2020. In addition, this system will reduce the C-32B's reliance on ground based navigational aids for terminal area guidance. 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
Non-Recurring Engineering (3010)	**N/A**	**$4,500,000**
2 SBAS Kits (3010)	**$4,500,000**	**$9,000,000**
Spare Parts (3010)	**$500,000**	**$500,000**
Total		**$14,000,000**

C-32B: ENHANCED FLIGHT VISION SYSTEM

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

2. Program Details.

Quantity	Unit Cost	Program Cost
2 EFVS Kits (3010)	**$5,500,000**	**$11,000,000**
Spare Parts (3010)	**$1,000,000**	**$1,000,000**
Total		**$12,000,000**

C-40C: HIGH-SPEED DATA UPGRADE

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

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,000,000**
3 Upgraded High-Speed Data Systems (3010)	**$2,000,000**	**$6,000,000**
Total		**$8,000,000**

C-40C: CABIN REFURBISHMENT

1. Background. ANG C-40Cs require a cabin interior refurbishment. ANG C-40s were delivered in the early 2000s and are in need of refurbishment. The custom seats are no longer produced and are not supported by the original manufacturer. 201st Maintenance is no longer able to repair every seat and aircraft have been dispatching on missions with inoperative seats. Additionally, the carpets, bulkheads, sidewalls, and bathrooms are in need of an updated Supplemental Type Certificate (STC). A cabin refresh with a new or amended STC is required across the C-40C fleet. This will enable the C-40C fleet to meet time-critical and persistent passenger mission requirements. All three ANG C-40s require a cabin interior refresh.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Interior Cabin Refurbishments (3010)	**$4,500,000**	**$13,500,000**
Total		**$13,500,000**

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F-15

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

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

In FY18, ANG F-15s deployed overseas on multiple European Theater Security Package taskings in support of Operation Atlantic Resolve and Baltic air policing, enhancing advanced tactical interoperability with our NATO allies, and ensuring continued American air dominance presence in contested airspace throughout the European theater. ANG F-15s also took part in joint & international exercises including Checkered Flag, Red Flag, Vigilant Shield, Frisian Flag, Thracian Star, Sentry Aloha, and Sentry Savannah.

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

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

F-15
2018 Weapons and Tactics Conference

Critical Capabilities List

- Active Electronically Scanned Array Radar
- Multi-Spectral Search / Track / Identification / Target
- Full-Spectrum Electronic Warfare
- Modernized Cockpit
- Next Generation Air-to-Air Weapon

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
- Crypto Loading Port Relocation
- Simulation Training Device Upgrade
- Beyond-Line-of-Sight Data Transfer Station

F-15: ACTIVE ELECTRONICALLY SCANNED ARRAY RADAR

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

2. Program Details.

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

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

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

2. Program Details.

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

F-15: FULL-SPECTRUM ELECTRONIC WARFARE

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

2. Program Details.

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

* Includes 10% spares

F-15: MODERNIZED COCKPIT

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

2. Program Details.

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

* Includes 10% spares

F-15: NEXT GENERATION AIR-TO-AIR WEAPON

1. Background. ANG F-15s require the replacement of legacy air-to-air weapons to maintain the tactical advantage of our air superiority fleet. Operational analysis suggests the adversarial investments in electronic attack (EA), advanced radars, long range weapons technology, and early generation stealth platforms has decreased combat survivability. The next generation air-to-air weapon, when combined with advanced radar systems and multi-spectral targeting, will allow the F-15 to engage advanced threats and airborne systems which are otherwise unable to be targeted. The current kill-chain against these advanced targets will end with the tracking capability since, without an advanced long range weapon the F-15 will be unable to provide air superiority. Current missile development is underway but integration on the F-15 is not programmed. This effort will ensure integration efforts are executed in future software upgrades of the F-15 in the form of operational flight programs and will include the implementation of this critical weapon needed to provide monopolization of the aerial battlespace.

2. Program Details.

Quantity	Unit Cost	Program Cost
Next Generation Air-to-Air Weapon Non-Recurring Engineering (3010)	**N/A**	**$50,000,000**
Next Generation Air-to-Air Weapons (3010)	**$500,000**	**$345,000,000**
Total		**$395,000,000**

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F-22

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

The Air National Guard (ANG) has two F-22 classic associate units and one operational F-22 squadron. Aerospace Control Alert (ACA) support is provided by ARC F-22s flying out of Alaska, Hawaii, and Virginia. For the past 3 consecutive years, ARC F-22 pilots, maintainers, and aircraft have participated in combat operations in support of Operation INHERENT RESOLVE as well as participated in several major exercises. In addition to combat and exercise operations, ARC F-22s play an essential role in Operational Test (OT) and training future F-22 pilots at the F-22 Formal Training Unit (FTU).

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

F-22
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Critical Capabilities List

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

Essential Capabilities List

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

Desired Capabilities List

- Leverage F-35 Capabilities and Technologies
- New Integrated Forebody and Radar Improvements
- Engine Upgrades
- Common Configuration
- Low-Observable Reduction and Sustainment Improvements

F-22: MULTI-SPECTRAL SENSOR CAPABILITIES

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

2. Program Details.

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

* Includes 10% spare

F-22: SURVIVABILITY ENHANCEMENTS

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

2. Program Details.

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

* Includes 10% spares

F-22: HELMET-MOUNTED DISPLAY

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

2. Program Details.

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

* Includes 10% spares

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

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

2. Program Details.

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

* Includes 10% spares

F-22: GLOBAL POSITIONING SYSTEM IMPROVEMENTS

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

2. Program Details.

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

* Includes 10% spares

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F-16

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

ANG F-16s are engaged around the globe in operations including NOBLE EAGLE, IRAQI FREEDOM, INHERENT RESOLVE, ENDURING FREEDOM, and NEW DAWN. Since 2003, ANG F-16Cs have fulfilled many of Allied Air Command's precision-guided munitions and close air support (CAS) tasking's, including convoy escort, dedicated infrastructure defense, border patrol, and raid support. The ANG operates 333 Block 25/30/32/40/42/50/52 F-16C/Ds. The ANG F-16 aircraft makeup 56% of the nation's Aerospace Control Alert (ACA) fighter force and provide a near-constant presence in operational theaters conducting CAS and armed reconnaissance. Capability enhancements to the Block 40/42 and Block 50/52 aircraft make them the Air Force's only suppression of enemy air defenses (SEAD)-capable aircraft.

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

F-16
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Critical Capabilities List

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

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

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

- Radar Providing Low-Observable Detection, Air-to-Air and Air-to-Ground Electronic Protection / Electronic Attack, and Combat Identification Capability
- Automated, Digital Electronic Warfare Suite Capable of Detection, Protecting From, and Attack of Modern Radio Frequency and Infrared Threats
- Link 16 Capability with Growth for Fifth to Fourth Generation Interoperability
- Navigation System Capable of Operating in a Global Positioning System Denied Environment
- Multiple User Objective System Beyond Line-Of-Sight Radio with Three-Dimensional Audio

Essential Capabilities List

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

Desired Capabilities List

- Rapid Integration of Emerging Technology and Weapons Outside the Operational Flight Program Cycle
- Tactical Autopilot Capable of Integrating with Weapons Deliveries
- Advanced Wide-Band Decoy
- Increased Weapon Carriage Capacity
- Terminal Guidance Capability for Weapons Post-Launch in all Weather

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

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

2. Program Details.

Quantity	Unit Cost	Program Cost
Radar Phase II and III Non-Recurring Engineering (3010)	**N/A**	**$30,000,000**
261 Radar Upgrades (3010)	**$2,114,943**	**$552,000,000**
Total		**$582,000,000**

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

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

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A Non-Recurring Engineering (3600)	**N/A**	**$22,840,000**
333 ALR-69A Upgrades (3010)	**$600,000**	**$199,800,000**
EA Pod Non-Recurring Engineering (3600)	**N/A**	**$10,000,000**
70 EA Pod Upgrades (3010)	**$1,320,000**	**$92,400,000**
ALQ-213 Non-Recurring Engineering (3600)	**N/A**	**$15,000,000**
117 ALQ-213 Kits (3010)	**$160,000**	**$18,720,000**
MWS Non-Recurring Engineering (3600)	**N/A**	**$10,000,000**
70 MWS Sets (3010)	**$1,100,000**	**$77,000,000**
Total		**$445,760,000**

F-16CM: DIGITAL HIGH-DEFINITION TARGETING POD, INTERFACE, AND 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. One hundred kits remain to outfit the complete ANG fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
CDU Non-Recurring Engineering (3600)	**N/A**	**$5,000,000**
100 CDU Kits (3010)	**$400,000**	**$40,000,000**
Total		**$45,000,000**

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

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

2. Program Details.

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

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

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

2. Program Details.

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

F-16C: LINK 16 CAPABILITY WITH GROWTH FOR FIFTH TO FOURTH GENERATION INTEROPERABILITY

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

2. Program Details.

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

F-16C: NAVIGATION SYSTEM CAPABLE OF OPERATING IN A GLOBAL POSITIONING SYSTEM DENIED ENVIRONMENT

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

2. Program Details.

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

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HH-60G

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

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

In 2018, all three ANG Rescue Squadrons (RQS) deployed in support of Operation Inherent Resolve. The 129 RQS worked with several agencies to fight fires in Northern California. In addition to this, HH-60Gs conducted numerous counter-drug missions throughout the state and supported search and rescue operations following hurricanes Florence and Maria.

The 101 RQS performed multiple missions in support of both overseas and domestic operations. The 210 RQS held 24-hour state-wide, rescue alert in Alaska resulting in 55 lives saved. The 188 RQS supported aircrew training for the 58 Special Operations Wing.

The HH-60G modernization priorities included smart multi-functional color display improvements and acquisition of multiple datalinks. Additional upgrades completed in FY18 focused on modernization of aircraft communication systems and integration of a helmet mounted head-up display.

HH-60G
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Critical Capabilities List

- Modernized Integrated Defensive Suite
- Integrated Flight Deck with Handheld Device Interoperability
- Degraded Visual Environment-Capable Helmet-Mounted Display
- Distributed Mission Operations Simulator (See Tab Q)
- Aircraft Weapons Modernization to Enable Self-Escort

Essential Capabilities List

- Helicopter Underwater Egress Lighting
- Performance Based Navigation Certified Area Navigation
- Improved Tactical Situation Display Artificial Intelligence / Machine Learning
- Agile Combat Search and Rescue Basing Capability
- HH-60G Direction Finding Capability

Desired Capabilities List

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

HH-60G: MODERNIZED INTEGRATED DEFENSIVE SUITE

1. Background. ANG HH-60Gs require an integrated defensive suite that is capable of defeating infrared (IR) threats while providing aircrew with accurate and precise indications of radio frequency (RF) threat systems with an associated audio warning. The HH-60G requires the AAR-45 Distributed Aperture Infrared Countermeasure (DAIRCM) system to augment their limited IR expendables. To remain combat relevant, the HH-60G needs a digital radar warning receiver (RWR) with considerable processing power that can limit ambiguities and provide growth potential for geolocation or jamming of threats. Three-Dimensional (3D) audio capability is also required to integrate the audio warnings from a missile warning system, hostile fire indicator, or RWR, with communication and mission equipment. The 3D audio equipment will permit crews to rapidly return precise and immediate defensive fire, effectively suppressing or destroying the enemy threat, and will also provide the ability to quickly and correctly react to enemy RF threats to maximize survivability. Aircrew require training software integrated into the electronic warfare suite to prepare for combat. Including embedded training capability utilizing the currently fielded Virtual Electronic Combat Training System (VECTS) will allow crews to prepare for combat missions in a virtual threat overlay during a flight; providing the highest fidelity training possible. In total, the ANG requires one DAIRCM system, one RWR, and an ALQ-213 with 3D audio capability for each of its 18 HH-60G helicopters. All six personnel on each of the ANG's 18 HH-60Gs require a 3D audio kit. All ANG HH-60Gs require VECTS.

2. Program Details.

Quantity	Unit Cost	Program Cost
Defensive System Non-Recurring Engineering (NRE) (3010)	**N/A**	**$2,000,000**
18 5-Sensor DAIRCM (3010)	**$1,465,536**	**$26,379,648**
18 RWR (3010)	**$1,240,000**	**$22,320,000**
Directional Audio NRE (3010)	**N/A**	**$6,000,000**
108 3D Audio Kits (3010)	**$7,000**	**$756,000**
3 Unit Test Equipment (3010)	**$58,400**	**$175,200**
18 ALQ-213 w/3D Audio Kits (3010)	**$234,000**	**$4,212,000**
VECTS NRE (3010)	**N/A**	**$2,000,000**
18 VECTS (3010)	**$1,300,000**	**$23,400,000**
Total		**$87,242,848**

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

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

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Software Definable Radio Suites (3010)	**$250,000**	**$4,500,000**
18 Full Motion Video Kits (3010)	**$200,000**	**$3,600,000**
18 BFT2 Kits (3010)	**$100,000**	**$1,800,000**
18 Link 16 Kits (3010)	**$120,000**	**$2,160,000**
18 ADS-B In/Out Kits (3010)	**$30,000**	**$540,000**
18 HHD NRE (3010)	**N/A**	**$200,000**
18 Wifi HHD Interfaces (3010)	**$10,000**	**$180,000**
18 Universal Serial Bus HHD Interfaces (3010)	**$5,000**	**$90,000**
Total		**$13,070,000**

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

1. Background. ANG HH-60Gs require day and night, helmet-mounted heads-up display capability to significantly increase aircrew situational awareness (SA) and weapons employment, enhance terminal area search and rescue operations, speed overall internal communications during critical mission phases, and enable crews to safely land a helicopter in a degraded visual environment. Helmet mounted cuing system (HMCS) will allow all crewmembers to quickly build SA without the need for voice communication. Sensor and datalink symbols are visible on the helmet mounted display superimposed over the geographic location of friendly, hostile, and survivor positions. Additionally, the ability to display sensor pictures, hazards, terrain and datalink information while maintaining a heads-up posture will greatly enhance safety while flying in the low-level (<500ft) environment. The system should be NVG-compatible. One kit is needed for each of the 18 aircraft in the ANG, plus spares. 40 helmet kits, plus spares, are needed for each of the three HH-60G rescue squadrons. In addition to the helmets, a modern electro-optical/infrared (EO/IR) sensor is needed on the HH-60G to provide crews a better ability to operate in fog, snow, and dust while providing the capabilities for laser designation/spot track and IR pointer capability. An upgraded sensor is needed for each of the 18 HH-60Gs in the ANG as well as three spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 HMCS Aircraft Kits* (3010)	**$335,294**	**$6,705,880**
132 HMCS Helmet Kits* (3010)	**$87,843**	**$11,595,276**
Modern EO/IR Sensor Non-Recurring Engineering (3010)	**N/A**	**$35,000,000**
21 Modern EO/IR Systems (3010)	**$1,000,000**	**$21,000,000**
Total		**$74,301,156**

* Includes 10% spares

HH-60G: AIRCRAFT WEAPONS MODERNIZATION TO ENABLE SELF-ESCORT

1. Background. ANG HH-60Gs require weapons modernization to provide reliable defensive firepower to support various combat mission operations. The fielded systems have no capability for target marking, concealment, or battlefield illumination. To reduce the cost of combat search and rescue, the HH-60G needs a lightweight, precision and non-precision standoff weapons capability. The LAU-68 F/A Extended-Length Launcher (ELL) is a lightweight 7-shot rocket pod allowing employment of precision guided munitions such as the Advanced Precision Kill Weapons System. This system is capable of delivering precision and non-precision guided rockets armed with anti-armor, high explosive, or anti-personnel warheads as well as non-lethal smoke or battlefield illumination payloads. Two LAU-68 F/A ELL pods can be installed on an HH-60G aircraft using the current weapons mount configuration without removal or significant degradation of the crew-served GAU-2B or GAU-18. One mount kit and two pods are required for all 18 ANG HH-60G aircraft. In addition, a modern electro-optical/infrared (EO/IR) sensor is needed on the HH-60G to provide laser designation/spot track, coordinate generation and IR pointer capability. An upgraded sensor is needed for each of the 18 HH-60Gs in the ANG as well as three spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
Precision Weapon Non-Recurring Engineering (NRE) (3010)	**N/A**	**$1,000,000**
18 External Stores Mount Kits (3010)	**$100,000**	**$1,800,000**
36 LAU-68 A/F ELL Pods (3010)	**$15,000**	**$540,000**
Modern EO/IR Sensor NRE (3010)	**N/A**	**$35,000,000**
21 Modern EO/IR Systems (3010)	**$1,000,000**	**$21,000,000**
Totals		**$59,340,000**

KC-135

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

The KC-135 Stratotanker is Air Mobility Command's primary air refueling platform providing approximately 87 percent of air refueling in support of US, allied, and coalition military aircraft. The KC-135 supports deployment, employment, sustainment, and redeployment of joint forces across the full range of military operations including nuclear warfare, routine military activities and irregular warfare. The KC-135 is tasked to operate close to high-threat areas. Defensive systems are necessary to prevent shoulder-fired surface-to-air missile systems from destroying aircraft during takeoff, landing, and in low altitude flight over mountainous terrain. Tactical data link technologies and situational awareness displays that bring real-time threat information, as well as secure radio capability, greatly enhance KC-135 air refueling, airlift, and aeromedical evacuation missions.

KC-135
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Critical Capabilities List

- Mobility Air Forces Common Carry Radio Frequency / Infrared Self-Protection
- Common Mobility Air Forces Mission Computer
- Automated Hardened Celestial Navigation
- Manned, Portable, Aircraft-Powered Ground Transfer Fuel Pump
- Aircraft / Aircrew Ground Cooling Capability

Essential Capabilities List

- Multi-Mission Cockpit Trainer
- Low Probability of Intercept / Low Probability of Detection Directional Communications and Station Keeping Equipment
- New Boom Pallet
- Large Consolidated Pilot Displays
- Jam-Resistant Global Positioning System

Desired Capabilities List

- Soft Basket Quick Connect Boom Drogue Adapter
- Passive Active Electronically Scanned Array Radar
- Multi-Layer Electronic Engine Instrument Displays
- Autothrottles
- Fuel Tank Fire Explosion Protection

KC-135: MOBILITY AIR FORCES COMMON CARRY RADIO FREQUENCY / INFRARED SELF-PROTECTION

1. Background. ANG KC-135s require a common carry open architecture mission system capable of producing mission enhancement effects in ever-changing contested environments. These mission enhancements include radio frequency (RF) and infrared (IR) self-protection systems. Current and future areas of responsibility include a wide variety of RF and IR threats. Missions such as low-altitude refueling and forward positioning subject the KC-135 to increasingly hostile environments. To survive, KC-135s require a digital radar warning receiver (RWR) capable of processing signals in a dense RF environment and automatically direct countermeasures to defeat those threats. As a refueling platform, the KC-135 also requires an IR countermeasure system that does not rely on pyrotechnic expendables to counter widely-proliferated shoulder-fired IR man-portable air defense systems and other IR-guided weapons. The IR and RF countermeasures should be capable of being moved between aircraft; therefore, all 170 ANG KC-135s require digital RWR Group A-kit modifications and Large Aircraft Infrared Countermeasures (LAIRCM) Group A kits. ANG requires 38 modular, rotatable, digital RWR Group B-kits and 38 LAIRCM Group B kits to equip the 17 ANG KC-135 units, including four spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
170 LAIRCM Group A Kits (3010)	**$500,000**	**$85,000,000**
38 LAIRCM Group B Kits* (3010)	**$3,000,000**	**$114,000,000**
170 Digital RWR Group A Kits (3010)	**$800,000**	**$136,000,000**
38 Digital RWR Group B Kits* (3010)	**$1,000,000**	**$38,000,000**
Total		**$373,000,000**

KC-135: COMMON MOBILITY AIR FORCES MISSION COMPUTER

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

2. Program Details.

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

* Includes 10% spares

KC-135: AUTOMATED HARDENED CELESTIAL NAVIGATION

1. Background. ANG KC-135s require an automated hardened celestial navigation (CELNAV) system integrated into the existing navigation equipment. ANG KC-135s fulfill almost 70% of the nuclear refueling mission. KC-135s require the ability to navigate oceanic airspace in a post-strike environment where traditional navigation aids and satellites would not be available. Astro-inertial navigation systems provide the greatest accuracy and a bounded position error over an extended use-time and distance. These systems are autonomous, passive, non-jammable, and automatic. All 170 ANG KC-135s require automated, hardened CELNAV systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
170 CELNAV Kits (3010)	**$200,000**	**$34,000,000**
Total		**$37,000,000**

KC-135: MANNED, PORTABLE, AIRCRAFT-POWERED GROUND TRANSFER FUEL PUMP

1. Background. ANG KC-135s require manned, portable aircraft-powered ground transfer fuel pumps to onload/offload fuel in an adaptive basing scenario or forward deployed environment where ground support is unavailable. This capability provides combatant commanders with greater flexibility staging KC-135s during contingency operations, natural disasters, and humanitarian support operations. Aircrews can fuel/defuel aircraft to support participating aircraft and vehicles in an austere locations without the logistical challenges associated with conventional, over-the-road fuel delivery. All 170 ANG KC-135s require manned, portable aircraft-powered ground transfer fuel pumps.

2. Program Details.

Quantity	Unit Cost	Program Cost
170 Ground Fuel Transfer Pumps (3010)	**$80,000**	**$13,600,000**
Total		**$13,600,000**

KC-135: AIRCRAFT / AIRCREW GROUND COOLING CAPABILITY

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

2. Program Details.

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

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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 or has surpassed 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 (SE)

- Higher Capacity Federal Aviation Administration Approved Latrine (KC-135/C-130)
- Engine Removal Device (C-130)
- Occupational Safety and Health Administration Compliant Corrosion Control / Paint Booths
- Isochronal Inspection Maintenance Stands (Mobility Air Forces)
- Phase Dock Maintenance Stands (Combat Air Forces)
- S1000D / Connected Flightline Data Suite (Multiple Aircraft)

Test Equipment (TE)

- Improved Bus Diagnostics (Multiple Aircraft)
- Pacer Comet-4 Digital Engine Test Cell (Multiple Aircraft)
- Advanced Identification Friend or Foe Test Couplers (Multiple Aircraft)
- Armament Tester (Multiple Aircraft)

Essential Capabilities List

- Improved Avionics Intermediate Shop Modernization for Line-Replacement Units (A-10)
- Light Emitting Diode External Lighting (KC-135)
- Central Maintenance Computer (C-17)
- Towbarless Towing Equipment (Multiple Aircraft)
- Electric Scissor Lift (C-130)
- Deployable Polyalphaolefin Solution (F-22)
- Improved Blade Folding Equipment (HH-60)
- Wash Rack (Multiple Aircraft)
- Virtual Maintenance Trainer / Virtual Reality Technical Order (Multiple Aircraft)
- Targeting Pod External Power (LITENING pod)

Desired Capabilities List

- Vertical Tank Storage (Combat Air Forces)
- Laser Corrosion Removal (Multiple Aircraft)
- Wireless Rekey (F-22)
- Diesel Tester/Analyzer for Aerospace Ground Equipment (Multiple Aircraft)
- Portable Lightweight Stands (Multiple Aircraft)
- Borescope Manual Rotators (Multiple Aircraft)
- Personal Cooling System (KC-135)
- MHU-83 Electric Bomb Lift / Heavy Munitions Lift (Multiple Aircraft)

SE: KC-135/C-130 HIGHER CAPACITY LATRINE

1. Background. ANG KC-135 and C-130 aircraft require a toilet that meets mission requirements based on capacity, structural integrity and/or intrinsically safe operation. The capacity level for the original legacy suitcase style toilets is inadequate, and presents an overflow hazard when passengers are on long-duration flights. These toilets are susceptible to corrosion-causing leakage. The upgraded toilet must fit within the current allotted area, have a large waste capacity, and provide sanitary/low biohazard risks to accommodate aero medical missions at a manageable cost. Higher capacity toilets are required for all 171 KC-135 and 150 C-130 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Higher Capacity Toilet Non-Recurring Engineering (3010)	**N/A**	**$15,000**
171 KC-135 Higher Capacity Toilet Assemblies (3010)	**$15,000**	**$2,565,000**
150 C-130 Higher Capacity Toilet Assemblies (3010)	**$15,000**	**$2,250,000**
Total		**$4,830,000**

SE: C-130 ENGINE REMOVAL DEVICE

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

2. Program Details.

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

SE: OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION-COMPLIANT CORROSION CONTROL / PAINT BOOTHS

1. Background. ANG aircraft maintenance units require modernized corrosion control equipment to replace outdated and non-compliant equipment. Current equipment is non-compliant by Occupational Safety and Health Administration and Air Force standards. Modern corrosion control equipment must comply with current federal and Air Force regulations. Current directives and limitations condemned corrosion control equipment at multiple locations resulting in work-stoppages and mission readiness degradation. Compliant corrosion control units must combine the three elements of a paint booth, paint mixing/contaminated "dirty" workspace, and decontamination/transition workspace. Recommend one corrosion control unit at each ANG wing.

2. Program Details.

Quantity	Unit Cost	Program Cost
90 Corrosion Control Units (3080)	**$950,000**	**$85,500,000**
Total		**$85,500,000**

SE: ISOCHRONAL INSPECTION MAINTENANCE STANDS

1. Background. The ANG requires C-17, KC-135, C-40C, C-130J and E-8C isochronal (ISO) inspection stands. Aircraft maintenance is currently accomplished by using a mix of ladders and B-series stands. These maintenance workaround activities do not meet Air Force Occupational Safety and Health Administration (AFOSH) or Occupational Safety and Health Administration (OSHA) standards. Current KC-135 ISO inspection stands require frequent maintenance actions and numerous man- hours to maintain their serviceability, many are over 40 years old and no longer meet AFOSH or OSHA standards. Additionally, standardized KC-135 ISO stands do not exist in the USAF inventory. Stand sets for the C-17, KC-135, C-40C, C-130J and E-8C are critical to accomplishing periodic inspection requirements, since current maintenance practices are time consuming for the completion of inspection requirements. Full wing platforms and engine stands are critical to accomplishing efficient inspections. Inspection platforms and stands provide the capability to perform maintenance actions in conjunction with the inspection process. The stands incorporate enhanced fall protection measures, and allow maintainers to complete aircraft specific tasks more efficiently; stands incorporate electric power, lighting, and pneumatics to the point of use, enabling maintainers to more effectively complete inspections and maintenance in a reduced time frame, leading to increased aircraft availability and enhanced mission effectiveness. By standardizing stands for maintenance activities, a smaller, more efficient supply chain with common parts and stock numbers can be established.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 C-17 Platforms and Stands (3080)	**$1,200,000**	**$7,200,000**
9 KC-135 Platforms and Stands (3080)	**$975,000**	**$8,775,000**
C-40C Platform and Stand (3080)	**$1,100,000**	**$1,100,000**
E-8C Platform and Stand (3080)	**$1,400,000**	**$1,400,000**
4 C-130J Platforms and Stand (3080)	**$1,200,000**	**$4,800,000**
Total		**$23,275,000**

SE: PHASE DOCK MAINTENANCE STANDS

1. Background. The ANG requires A-10, F-15, F-16, and F-22 phase inspection stands. Aircraft maintenance is currently 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 inspection stands require frequent maintenance actions and numerous man- hours to maintain their serviceability. Additionally, standardized A-10, F-15, F-16 and F-22 phase inspection stands do not exist in the USAF inventory. Stand sets for the A-10, F-15, F-16 and F-22 are critical to accomplishing periodic inspection requirements. Inspection platforms and stands provide the capability to perform maintenance actions in conjunction with the inspection process. The stands incorporate enhanced fall protection measures, and allow maintainers to complete aircraft specific tasks more efficiently; stands incorporate electric power, lighting, and pneumatics to the point of use, enabling maintainers to more effectively complete inspections and maintenance in a reduced time frame, leading to increased aircraft availability and enhanced mission effectiveness. By standardizing stands for maintenance activities, a smaller, more efficient supply chain with common parts and stock numbers can be established. Four A-10, six F-15, 12 F-16, and one F-22 platform and stands are requested.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 A-10 Platforms and Stands (3080)	**$900,000**	**$3,600,000**
5 F-15 Platforms and Stands (3080)	**$900,000**	**$4,500,000**
13 F-16 Platforms and Stands (3080)	**$900,000**	**$11,700,000**
1 F-22 Platform and Stand (3080)	**$900,000**	**$900,000**
Total		**$20,700,000**

SE: S1000D / CONNECTED FLIGHTLINE DATA SUITE

1. Background. The ANG requires conversion of technical manuals to extensible markup language format using the AF-recognized S1000D standard. Conversion to S1000D is the necessary first milestone to enable interactive and innovative technical manuals. The majority of technical manual publications currently fall into "Type I," which includes paper-based publications and electronic technical manuals (ETM). "Type II" publications are anything beyond that to include Interactive ETMs (IETM) and IETMs plus electronic infrastructure (the ability to interlink with other maintenance systems). Once converted, the capabilities are open to a substantial marketplace of interactive toolsets to include "Connected Flightline" and virtual trainers tailored to all 90 ANG wings. S1000D supports multiple interfaces, with multiple vendors, while delivering paper based publications.

2. Program Details.

Quantity	Unit Cost	Program Cost
Connected Flightline Data Suite Non-Recurring Engineering (3080)	**$400,000**	**$400,000**
90 Connected Flight Data Suites (3080)	**$100,000**	**$9,000,000**
Total		**$9,400,000**

TE: IMPROVED BUS DIAGNOSTICS

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

2. Program Details.

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

TE: PACER COMET-4 DIGITAL ENGINE TEST CELL

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

2. Program Details.

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

TE: ADVANCED IDENTIFICATION FRIEND OR FOE ANTENNA TEST COUPLERS

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

2. Program Details.

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

TE: ARMAMENT TESTER

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

2. Program Details.

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

Airborne Intelligence, Surveillance, and Reconnaissance

MC-12W – The MC-12W is assigned to the 137th Special Operations Wing and tasked to support U.S. Special Operations Command directed missions. The MC-12W aircrews are specifically trained to support special operations ground forces through the Find, Fix, Finish, Exploit, and Analyze model. Aircrews train, brief, support, advise, and assist Special Operations Forces (SOF) elements from the ground assaulter to SOF Commanders while executing across the full spectrum of SOF mission sets, ISR, and fires.

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

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Critical Capabilities List

MC-12W

- Second Full-Motion Video Sensor
- Tactical Datalink Integration
- Distributed Mission Operations Simulator (See Tab Q)
- Enhanced Short-Field Takeoff and Landing Performance
- Improved High-Resolution Displays with Direct Sensor Input

RC-26B

- Avionics Modernization
- Common Mission System Configuration
- Full Spectrum Video / Data Communication Distribution
- All-Weather Wide-Area Imagery and Moving Target Indicator
- Enhanced Short-Field Takeoff and Landing Performance

Essential Capabilities List

MC-12W

- Selective Availability Anti-Spoofing Module Global Positioning System / Controlled Reception Pattern Antenna
- Improved Internal Navigation Solution
- Combat Systems Officer / Tactical Systems Operator Oxygen System Mask Integration
- Traffic Collision Avoidance System / Ground Collision Avoidance System Alerts to be Broadcast Over Combat Systems Officer / Tactical Systems Operator Intercom
- MX-15 Advanced Video Tracker Gate Improvements

RC-26B

- Block 20 Technical Refresh
- Next Generation Electro-Optical / Infrared System
- Modernized Signals Intelligence A-Kit
- Full Crew Distributed Mission Simulator
- Dragoon Technical Refresh

Desired Capabilities List

MC-12W

- Improved Ku Spread Spectrum Antenna
- Cockpit Voice Recorder Cutout Adjustment
- Left Pilot Mission Management System Access
- Improved Right Pilot Keyboard and Mouse
- Infrared Suppression System

RC-26B

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

MC-12W: SECOND FULL MOTION VIDEO SENSOR

1. Background. ANG MC-12W units require an additional electro-optical/infrared (EO/IR) sensor to meet the highly-demanding intelligence, surveillance, and reconnaissance (ISR) tasks required by combatant and task force commanders. The ANG MC-12W mission heavily relies on the ability of the crews to see the smallest details on the ground from miles away. Currently, the MC-12W is outfitted with a single MX-15DiD sensor on each aircraft. While this allows the MC-12W to complete a wide range of ISR tasks, it is extremely limited in fidelity and flexibility. An added system will double the amount of area to be seen by MC-12W crews and provide a substantial amount of situational awareness to the commanders on the battlefield. ANG MC-12Ws require a second roll-on/roll-off capable sensor for 13 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,500,000**
13 EO/IR Sensors (3010)	**$1,500,000**	**$19,500,000**
Total		**$22,000,000**

MC-12W: TACTICAL DATA LINK INTEGRATION

1. Background. ANG MC-12W aircraft require an onboard tactical data link (TDL) radio, with associated hardware and antennas, to employ across multiple areas of responsibility. MC-12Ws 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 onboard TDL slows the kill chain, delays effects for supported commanders, and poses a safety risk with regard to aircraft position and airspace deconfliction. Lack of direct information sharing with other TDL participants degrades overall situational awareness. The system must be roll-on / roll-off capable. Each of the 13 ANG MC-12W aircraft require one Link 16 radio.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
13 Link 16 Radio A-Kits (3010)	**$100,000**	**$1,300,000**
13 Link 16 Radio B-Kits (3010)	**$250,000**	**$3,250,000**
Total		**$7,550,000**

MC-12W: ENHANCED SHORT-FIELD TAKEOFF AND LANDING PERFORMANCE

1. Background. ANG U.S. Special Operations Command MC-12W aircraft require propulsion modernization. MC-12Ws need a five bladed propeller to increase basic aircraft performance, increase on-station time, lower acoustical signature to enemy forces, and increase aircrew survivability. The five bladed propeller is expected to increase aircraft performance by approximately 5% to 8%. Test data verifies the five bladed composite design is quieter than the currently fielded propeller system. Six sets of five bladed propellers are required for the MC-12Ws.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,000,000**
6 Sets Five Bladed Props (3010)	**$200,000**	**$1,200,000**
Total		**$3,200,000**

MC-12W: IMPROVED HIGH-RESOLUTION DISPLAYS WITH DIRECT SENSOR INPUT

1. Background. ANG MC-12W requires an electro-optical/infrared sensor to provide aircrews with actionable intelligence. The system needs to be capable of sending high-resolution images to each of the four crew positions while simultaneously forwarding images to combatant and task force commanders. Providing upgraded displays will maximize the capability of current and future sensors allowing the MC-12W to fly higher, mitigate more surface-to-air threats, identify more details of high value targets, and identify hostile intent by detecting armed personnel. The MC-12W requires four displays for each of the 13 aircraft assigned to the 137th Special Operations Wing.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$5,000,000**
52 High Resolution Displays (3010)	**$50,000**	**$2,600,000**
Total		**$7,600,000**

RC-26B: AVIONICS MODERNIZATION

1. Background. ANG RC-26s require cockpit modernization in order to deploy worldwide and operate in the National Airspace System. It is estimated the ANG's RC-26 aircraft may start grounding in FY19 due to non-availability of parts and diminished manufacturing supply. Global Positioning System (GPS), electronic flight information system displays, Flight Management System (FMS), as well as the navigation and communication radios need to be modernized to comply with Federal Aviation Administration (FAA) 2020 NextGen and the International Civil Aviation Organization (ICAO) Communication, Navigation, and Surveillance / Air Traffic Management mandates. The navigation radios do not have frequency modulation immunity, leaving the aircraft vulnerable to congestion and potentially unsafe aircraft operations when flying terminal area approaches and departures. Modern avionics, to include a new FMS, modern displays, an updated and certified GPS system, night vision goggle compatibility, and upgraded radios are necessary to enable the aircraft to operate within all foreign and domestic airspace safely, and to comply with FAA/ICAO mandated navigation/communication requirements. All 11 ANG RC-26B aircraft require avionics modernization.

2. Program Details.

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

RC-26B: COMMON MISSION SYSTEM CONFIGURATION

1. Background. ANG RC-26Bs require a common fleet hardware and software configuration. The 11 RC-26B aircraft operate in two different configurations: six Block 25R and five Block 20s which lack common mission equipment. Split configurations create inefficient aircraft and manpower utilization in addition to the training and planning difficulties brought about by the acute capability differences between aircraft. A common Mission Management System (MMS) with expanded Integrated Communications System (ICS), high frequency radio with upgraded antennas, and a self-protection system will bring the RC-26B Block 20 to a common configuration with Block 25R capable of all potential mission sets.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,000,000**
5 Block 25R Shipsets (3010)	**$1,500,000**	**$10,500,000**
5 MMS (3010)	**$200,000**	**$1,400,000**
5 Self Protection Systems (3010)	**$300,000**	**$2,100,000**
Total		**$28,050,000**

RC-26B: FULL SPECTRUM VIDEO / DATA COMMUNICATION DISTRIBUTION

1. Background. ANG RC-26Bs require the ability to off-board high definition, full motion video (FMV), and data beyond line-of sight (BLOS). The utilization of current relay antenna systems coupled with a BLOS data connection would allow the RC-26B to be the conduit to connect the disconnected user to the command element. Modernizing the RC-26B fleet of 11 aircraft with this capability will allow the aircraft to provide data connectivity and FMV to the most remote user in both domestic response and contingency operations.

2. Program Details.

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

RC-26B: ALL-WEATHER WIDE-AREA IMAGERY AND MOVING TARGET INDICATOR

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

2. Program Details.

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

RC-26B: ENHANCED SHORT-FIELD TAKEOFF AND LANDING PERFORMANCE

1. Background. ANG RC-26s require improved short-field takeoff and landing performance. Upgrading from the existing four bladed propellers to a five bladed propeller solution will enhance the RC-26 short-field takeoff and landing performance while optimizing climb/cruise performance. New propellers will also increase fuel performance along with noise reduction and vibration dampening characteristics to reduce prolonged fatigue on aircrew. Eleven (11) sets of five bladed propellers are required for the RC-26 fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$2,000,000**
11 Sets of Five Bladed Propellers (3010)	**$200,000**	**$2,200,000**
Total		**$4,200,000**

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Global Integrated Intelligence, Surveillance, and Reconnaissance

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

Distributed Common Ground System (DCGS) - With seven locations, DGCS sites process, exploit, and disseminate near real time intelligence derived from U-2, RQ-4, and MQ-9 sensors for combatant commands, component numbered air forces and national command authorities.

Targeting – Cells at six locations provide federated intermediate and advanced target development, battle damage assessments, collateral damage estimates for steady-state planning and contingency operations.

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

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

Intelligence
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Critical Capabilities List

- High-Performance Workstations
- Secure Multi-Domain Voice and Data Communications Capability
- Battle Control Center Joint Worldwide Intelligence Communications System Temporary-Sensitive Compartmented Information Facility
- Publicly Available Information Toolkit Access
- Atmospheric Sensing and Analysis Software

Essential Capabilities List

- Dedicated Processors for Complex Targets and Rapid Targeting Model Simulation Capabilities at Targeting Units
- Air Force Special Operations Command Expeditionary Processing Exploitation and Dissemination Capability for Intelligence Personnel Supporting MC-12
- Network Modernization for Distributed Common Ground Station and Communications Infrastructure Past End of Life
- Environmental Fatigue Mitigation Techniques for MQ-9 / Distributed Common Ground Station Units
- Mobile Situational Awareness Tool and Communications Suite for Fielded Intelligence, Surveillance, and Reconnaissance Units

Desired Capabilities List

- Multi-National Information Sharing Cross Domain Transfer Systems for Worldwide Targeting Mission Integration
- Distributed Training Operations Center Servers to Enable Realistic Mission Training
- Virtual Reality-Enabled and Glasses/Headset-Free Three-Dimensional Visualization Solution for Direct and Registration Methods of Precise Point Mensuration and Target Modeling
- Redundant Power Supply for Targeting Units
- Cyber and Other Non-Kinetic Target Modeling Solutions

INTELLIGENCE: HIGH-PERFORMANCE WORKSTATIONS

1. Background. The ANG intelligence surveillance and reconnaissance (ISR) enterprise requires more processing power to effectively fuse multiple-intelligence data. The current workstations available to the ANG ISR enterprise do not have the capacity to run available government off-the-shelf applications without significantly slowing down and/or freezing the system. Thick client workstations and graphic processing units (GPUs) will allow units to fully utilize applications and capacity for future growth for remotely piloted aircraft. 140 unit level intelligence organizations require two workstations/GPUs and the 65 ISR organizations require four workstations/GPUs each.

2. Program Details.

Quantity	Unit Cost	Program Cost
540 Thick Client Workstations with GPU (3080)	**$5,000**	**$2,700,000**
Total		**$2,700,000**

INTELLIGENCE: SECURE MULTI-DOMAIN VOICE AND DATA COMMUNICATIONS CAPABILITY

1. Background. ANG personnel recovery (PR) / combat search and rescue (CSAR) and tactical airlift unit-level intelligence organizations require the means of simultaneous secure Non-Classified Internet Protocol Router, Secret Internet Protocol Router, Joint Worldwide Intelligence Communications System voice and data beyond line of sight communications capability across the electromagnetic spectrum in isolated environments. Units are unable to adequately conduct operations with current equipment. Changes to the tactical combat environment, unpredictability in an operating location, and mission tasking are driving PR/CSAR and tactical airlift to operate in remote locations with minimal communications infrastructure. Secure voice and data communications enable intelligence units to independently provide accurate decision-enabling intelligence from multiple levels of classification. Each of the 33 PR/CSAR and tactical airlift unit-level intelligence organizations require one remote secure communications suite to include high frequency (HF)/very high frequency (VHF) radios and fourth generation long term evolution (4G LTE) routers.

2. Program Details.

Quantity	Unit Cost	Program Cost
33 Portable Secure Voice and Data Communication Systems (3080)	**$375,000**	**$12,375,000**
33 Ka/Ku-Band Satellite Dishes (3080)	**$200,000**	**$6,600,000**
33 HF/VHF Ground Based Radios (3080)	**$30,000**	**$990,000**
33 4G LTE Routers (3080)	**$1,000**	**$33,000**
33 Solar Panel and Battery Solutions (3080)	**$5,000**	**$165,000**
Total		**$20,163,000**

INTELLIGENCE: BATTLE CONTROL CENTER JOINT WORLDWIDE INTELLIGENCE COMMUNICATIONS SYSTEM TEMPORARY-SENSITIVE COMPARTMENTED INFORMATION FACILITY

1. Background. The 169th Pacific Air Defense Sector Intelligence Operators require a Joint Worldwide Intelligence Communications System Temporary-Secure Compartmented Information Facility (T-SCIF) to provide top secret and special access program security level data feeds in support of the homeland defense mission for the Indo-Pacific Command. The T-SCIF will act as a classroom and evaluation/briefing center in support of the Battle Control Center (BCC). The rapid acquisition of National Security Agency-certified T-SCIF will give the BCC Intelligence operators the ability to update commanders on real world homeland defense operations in a timely manner in order to meet critical mission requirements. The BCC requires one JWICS T-SCIF.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 T-SCIF (3080)	**$1,000,000**	**$1,000,000**
Total		**$1,000,000**

INTELLIGENCE: PUBLICLY AVAILABLE INFORMATION TOOLKIT ACCESS

1. Background. ANG Distributed Common Ground Stations (DCGS) and targeting units require publicly available information (PAI) toolkit access. DCGS and targeting units do not have access to open source intelligence (OSINT) produced from PAI. OSINT facilitates every phrase of intelligence, surveillance and reconnaissance regardless of unit mission. In order to enhance target discovery and development capabilities, it is essential that OSINT be incorporated into conventional targeting and fusion processes. The proper use of PAI can be leveraged against geospatial intelligence, signals intelligence, and human intelligence to amplify existing data to facilitate proper intelligence action. PAI is an important piece of target discovery and development, but does not provide all required information for kinetic effects, therefore it is vital to incorporate PAI with other intelligence disciplines. All 51 DCGS and targeting units require a PAI toolkit.

2. Program Details.

Quantity	Unit Cost	Program Cost
51 PAI Toolkits (3080)	**$50,000**	**$2,550,000**
Total		**$2,550,000**

INTELLIGENCE: ATMOSPHERIC SENSING AND ANALYSIS SOFTWARE

1. Background. ANG Intelligence personnel require accurate real-time indications and near real-time situational awareness of evolving weather conditions for the operational environment. Remotely piloted aircraft (RPA) have a historical record of being forced off target and forced to employ sensors in less than optimal ways due to weather. Sensors on RPA are not optimized to detect subtle changes in temperature, relative humidity, and air pressure and are therefore unable to provide effective full motion video for intelligence sensory planning and employment. The intelligence community requires a solution that provides high-fidelity atmospheric models to provide near real time weather data to build a highly accurate picture of the weather conditions surrounding an RPA. ANG intelligence personnel require a web-enabled weather software system that will be available to all intelligence units.

2. Program Details.

Quantity	Unit Cost	Program Cost
Weather System Customization, Implementation, and Training (3080)	**N/A**	**$1,985,000**
Weather System Maintenance and Enhancements and System Support (3080)	**N/A**	**$770,000**
Non-Recurring Engineering (3080)	**N/A**	**$545,000**
Total		**$3,300,000**

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Special Warfare

- **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 38% of the Total Force**

Special Warfare is a new nomenclature, replacing Battlefield Airmen. Special Warfare refers to the following three mission design series and will result in structural changes to those squadrons over the next three years.

The ANG has three Guardian Angel squadrons consisting of Combat Rescue Officers and Pararescue Jumpers. Their mission is to execute personnel recovery of downed and injured aircrew members in permissive and denied environments. Pararescue personnel provide recovery and emergency medical treatment necessary to stabilize and evacuate injured personnel.

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

The ANG has 16 Tactical Air Control Party (TACP) squadrons in two operations groups. TACPs provide airspace integration and terminal attack control of CAS firepower onto enemy ground targets. TACPs also provide the planning and employment of assets, in full spectrum combat, in support of the U.S. Army ground combat units. They establish and maintain command, control, and communications of all combat air assets, including the integration of surface-to-surface and air-to-surface fires.

Special Warfare
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Critical Capabilities List

Guardian Angel

- Maritime Operations Modernization
- Battlespace Mobility
- Combat Survivability System Modernization
- Digital Integration System
- Human Performance Optimization Modernization

Special Tactics

- Tactical Low-Visibility Vehicles
- Modernized Aerial Cargo Delivery
- Extreme Cold Weather Package
- Tactical Communications Suite
- Austere Airfield Operations Kit

Tactical Air Control Party

- Fully Integrated Situational Awareness
- Broad Spectrum Battlefield Identification
- Small Arms Weapons Modernization
- Light Tactical Battlefield Vehicular Equipment
- Mobile Communications Package

Essential Capabilities List

Guardian Angel

- Maritime Support Package
- Mountain Warfare Equipment
- High-Altitude High-Opening Equipment Modernization
- Portable Satellite Communications Suite
- Fixed-Wing Recovery System

Special Tactics

- Reconnaissance Modernization Suite
- Information Share Server Suite
- Diver's Underwater Navigation and Sonar Modernization
- Mobile/Deployable Preservation of the Family and Force Suite
- CONEX Deployable Diver Decompression Chamber

Tactical Air Control Party

- Human Performance Optimization Program Establishment
- ANG Advanced Joint Terminal Attack Controller Training Simulator
- Low-Profile Vehicle and Dismount Antennas
- Handheld Radio Amplifier
- Mid-wave Infrared Night Vision Goggles

Desired Capabilities List

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

GA: MARITIME OPERATIONS MODERNIZATION

1. Background. ANG Guardian Angel (GA) and Special Tactics (ST) personnel require open ocean maritime operations equipment. GA needs a hard hulled (HHB) or rigid hulled inflatable boat (RHIB), air-droppable by C-130s, capable of supporting up to 4 litter patients and 6-8 operators, propeller driven, compatible with GA communications equipment, and equipped with forward-looking infrared, sonar, and radar. Existing Joint and GA maritime equipment does not meet current combatant command (COCOM) requirements for the personnel recovery (PR) mission, presenting a significant risk to the mission and friendly forces. Current unit type code-tasked maritime mobility is primarily filled by inflatable boats with significant limitations. Modernization requirements include rapidly-deployable, air-droppable, defensible, hard-hulled watercraft that are open-ocean and littoral-capable to support PR training and operations. Current mission sets require GA to operate in the open ocean in extreme environmental conditions without direct support for several days. COCOM requirements also require GA to have organic defensive capability. This platform requires a modular mounting system capable of supporting crew served weapons and other accessories. Each of the three GA squadrons require three HHB/RHIB boats, three delivery platforms, and associated equipment parachutes. Both ST squadrons require one HHB/RHIB boat, one delivery platform, and associated equipment parachutes.

2. Program Details.

Quantity	Unit Cost	Program Cost
11 HHB/RHIB with Trailers (3080)	**$500,000**	**$5,500,000**
11 Aerial Delivery Platforms (3080)	**$250,000**	**$2,750,000**
11 Equipment Parachute Packages (3080)	**$76,000**	**$836,000**
Total		**$9,086,000**

GA: BATTLESPACE MOBILITY

1. Background. ANG Guardian Angel (GA) and Special Tactics (ST) teams require an air-droppable Light Tactical All-Terrain Vehicle (LTATV) class system that can be deployed with operators on board straight into powered canopy flight. GA and ST teams currently have the ability to air-drop vehicles and equipment, but are significantly limited by current air-drop methods and equipment, and inhibited by the capability of currently fielded vehicles once on the ground. The system must be deployable from existing military aircraft without the need for a separate pallet and without modification to the aircraft. The vehicle must be able to be reset for airdrop in the field and be able to transport one or more litter patients. It must be able to transition repeatedly between powered flight and driving. The system must support employment of a mounted automatic weapon and team organic weapons both in-flight and on the ground. It must be able to change canopies in the field to facilitate varied flight performance parameters based on mission requirements. The system should be modular to facilitate changing equipment and payloads in the field to meet mission requirements. This modular equipment may include navigation aids, communications, situational awareness, automated flight controls, and visual augmentation equipment including electro-optical (EO) / infrared (IR) sensors. These tactical systems should have reduced noise and visual signatures and be field maintainable at the operator level. Each of the three GA units requires three LTATVs, six reusable airdrop kits, and six non-airdrop canopies, and three EO/IR sensors. Both ST units require two LTATVs, four reusable airdrop kits, and four non-airdrop canopies, and two EO/IR sensors.

2. Program Details.

Quantity	Unit Cost	Program Cost
13 Air-Droppable LTATVs Capable of Powered Canopy Flight (3080)	**$400,000**	**$5,200,000**
26 Reusable Airdrop Kits (3080)	**$300,000**	**$7,800,000**
26 Non-Airdrop Canopies (3080)	**$20,000**	**$520,000**
13 EO/IR Sensors (3080)	**$100,000**	**$1,300,000**
Total		**$14,820,000**

GA: COMBAT SURVIVABILITY SYSTEM MODERNIZATION

1. Background. ANG Guardian Angel (GA) requires modernization of the combat survivability suite which includes a target enhancement suite, buoyant body armor, modern water communications upgrades, and next generation helmet systems. Hydrophobic plate carriers are needed for missions in the maritime environment; current armor systems are not maritime-compliant. Modern water communications devices capable of clear communication between team members in all maritime environments are also needed. One GA combat survivability system; including one hydrophobic plate carrier, one neutral buoyancy plate set, modern water communication devices, and a next generation modular helmet; are necessary for each of the 200 ANG GAs.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 Modern Water Communication Devices (3080)	**$5,000**	**$1,000,000**
200 Hydrophobic Plate Carriers (3080)	**$1,500**	**$300,000**
200 Neutral Buoyancy Plate Sets (3080)	**$2,000**	**$400,000**
200 Next Generation Modular Helmets (3080)	**$2,000**	**$400,000**
Total		**$2,100,000**

GA: DIGITAL INTEGRATION SYSTEM

1. Background. ANG Guardian Angel (GA) requires a mobile gateway system capable of integrating Situational Awareness Data Link, Cursor on Target (CoT), Key-Length-Value, Combat Survivor Evader Locator, very-high frequency/ultra-high frequency, and Link 16 into a Common Operating Picture (COP). GA requires CoT platforms and End User Devices (EUD) to utilize mobile and stationary mission analysis and situational awareness software. This mobile system will be capable of relay all different CoT transmissions to all aircraft and key ground force elements in an area of operations. Operators are tasked to perform mission and aircrew duties aboard Air Force rescue HC-130s and HH-60Gs, as well as joint and coalition aircraft and tactical wheeled vehicles. Rescue aircraft do not provide situational awareness to fully integrate GA with joint forces, air assets, and isolated personnel within a COP. Each of the three ANG GA squadrons requires 6 mission planning workstations, 6 mobile mission planning workstations, six portable gateways, 12 tactical radio application extensions, 38 Android-compatible tactical situational awareness application extensions, 12 detailed imagery analysis mission planning suites, 225 pocket-sized EUDs with Android Operating System (OS), three handheld Link 16 radios, and six digital sandtable stations.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Mission Planning Workstations (3080)	**$11,000**	**$198,000**
18 Mobile Mission Planning Workstations (3080)	**$11,000**	**$198,000**
18 Portable Gateways (3080)	**$375,000**	**$6,750,000**
36 Tactical Radio Application Extensions (3080)	**$29,250**	**$1,053,000**
114 Android-Compatible Tactical Situational Awareness Application Extensions (3080)	**$10,400**	**$1,185,600**
36 Detailed Imagery Analysis Mission Planning Suites (3080)	**$18,000**	**$648,000**
675 Pocket sized EUDs with Android OS (3080)	**$6,000**	**$4,050,000**
9 Link 16 Handheld Radios (3080)	**$39,820**	**$358,380**
18 Digital Sandtable Stations (3080)	**$8,450**	**$152,100**
Total		**$14,593,080**

GA: HUMAN PERFORMANCE OPTIMIZATION MODERNIZATION

1. Background. ANG Guardian Angel (GA) and Tactical Air Control Party (TACP) requires rehabilitation and recovery equipment to support emerging human performance optimization (HPO) programs and associated trainers. Special Warfare airmen have long lacked progressive methods of fitness, rest, and rehabilitation of injuries and combat fatigue sustained while executing or training for missions consistent with other special operations forces weapon systems. Injuries and combat fatigue negatively impact the health and readiness of the BA weapon systems and result in excessive and unnecessary lost work-days and subsequently impact mission-ready status. The current medical system does not provide a detailed initial medical screening for special operations operators, nor does it address past injuries and structural concerns. Each of the three GA squadrons requires 2 sensory deprivation pods, 3 cranial electrotherapy devices, 1 infrared recovery unit, 1 anti-gravity cardio rehabilitation unit, 1 athlete data management software system, and 1 low-impact cardio unit. Each of the 14 TACP squadrons requires 60 tailored Human Performance Programs, 60 vital sign monitoring systems, 60 vital fluid monitoring systems, and 60 full body performance kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Sensory Deprivation Pods (3080)	**$30,000**	**$180,000**
9 Cranial Electrotherapy (3080)	**$1,100**	**$9,900**
3 Infrared Saunas (3080)	**$4,820**	**$14,460**
3 Anti-Gravity Rehabilitation Treadmills (3080)	**$100,000**	**$300,000**
3 Athlete Data Management Software Packages (3080)	**$15,000**	**$45,000**
3 Rotating Stairmill Systems (3080)	**$10,000**	**$30,000**
840 HPO Programs (3080)	**$315**	**$264,600**
840 Vital Sign Monitoring Systems (3080)	**$3,600**	**$3,024,000**
840 Vital Fluid Monitoring Systems (3080)	**$7,500**	**$6,300,000**
840 Full Body Performance Kits (3080)	**$995**	**$835,800**
Total		**$11,003,760**

ST: TACTICAL LOW-VISIBILITY VEHICLES

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

2. Program Details.

Quantity	Unit Cost	Program Cost
15 TLVs (3080)	**$200,000**	**$3,000,000**
Total		**$3,000,000**

ST: MODERNIZED AERIAL CARGO DELIVERY

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) squadrons require aerial delivery equipment and parachutes as well as personal parachutes. Containers and parachutes for equipment and parachute equipment release assemblies need to be updated to fit the vast scope of mission sets. High-mount equipment conversion for military free fall (MFF) harnesses need to be accomplished on both new and existing MFF parachute systems to create transparency in training and improve safety on equipment jumps. Panoramic night vision devices (NVD) provide greater field of view and improve depth perception. Short-wave infrared (SWIR) clip-on systems should be utilized in conjunction with NVDs to view SWIR strobes on jumpers. Jumpmaster-specific tablets are a vital need to building situational awareness for the Jumpmaster and the team executing the mission by providing moving map, real time position to jumper release point. Both of the ANG ST squadrons and all three ANG GA squadrons each require 40 T-10 disposable parachutes, 20 G-12 disposable parachutes, 12 sets of panoramic night vision goggles, an 8-ring equipment conversion for MFF harnesses, 12 SWIR clip-on devices, a parachute equipment release assembly, four aerial cargo delivery systems, six Android Tactical Assault Kit (ATAK) tablets, and 100 SWIR strobes.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 T-10 Disposable Parachutes (3080)	**$200**	**$40,000**
100 G-12 Disposable Parachutes (3080)	**$1,800**	**$180,000**
60 Panoramic Night Vision Devices (3080)	**$40,000**	**$2,400,000**
5 8-Ring Equipment Conversion for MFF Harnesses (3080)	**$400,000**	**$2,000,000**
60 SWIR, Clip-On Devices (3080)	**$14,750**	**$885,000**
5 Parachute Equipment Release Assemblies (3080)	**$50,000**	**$250,000**
20 Aerial Cargo Delivery Systems (3080)	**$20,000**	**$400,000**
30 ATAK Tablets (3080)	**$800**	**$24,000**
500 SWIR Strobes (3080)	**$400**	**$200,000**
Total		**$6,379,000**

ST: EXTREME COLD WEATHER PACKAGE

1. Background. ANG Special Tactics (ST) and Guardian Angel (GA) units require vehicles and protective equipment to operate in extreme cold weather environments. This modernized equipment includes shelters and sustainment for up to 36 personnel, mobility platforms capable of carrying one to four personnel, and tools required to establish and maintain ski landing areas. Over the past decades, ST's ability to conduct global access, personnel recovery, and precision strike missions in the arctic has severely atrophied. Modernized equipment and training is required to revive ST and GA's arctic capability. Both ANG ST units and all three ANG GA squadrons require a mobility platform, a sustainment package, and a personal performance equipment package.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Mobility Platforms (3080)	**$90,000**	**$450,000**
5 Sustainment Packages (3080)	**$81,000**	**$405,000**
5 Personal Performance Equipment Packages (3080)	**$152,000**	**$760,000**
Total		**$1,615,000**

ST: TACTICAL COMMUNICATIONS SUITE

1. Background. ANG Special Tactics (ST) squadrons require communication kits for current and emerging wartime operations. As commercial communications continue to improve faster than military technology, constant modernization of end-user devices, cabling, and integration solutions are needed to remain compatible with the battlefield. Integration of battle-tracking technology is needed to be modular through all vehicle types (aircraft, tactical vehicle, and watercraft) to allow the warfighter to travel through and integrate with any transportation medium. Communication kits consist of radios, antennae, push-to-talks, headsets, power and data management hubs, and a small light-weight, high-capacity power solution. Communication kits must meet waterproof requirements while being ruggedized, dirt/dust proof, and meet electromagnetic and security requirements. This must also be scalable and upgradeable to keep up with morphing technology. An individual must be able to communicate from aircraft, tactical vehicle, and maritime vehicles, transitioning in minimal time with minimal burden for quick-action. Each of the two ST squadrons requires 130 communications operations kits and 20 transportable communications kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
260 Communication Operations Kits (3080)	**$13,000**	**$3,380,000**
40 Transportable Communication Kits (3080)	**$44,500**	**$1,780,000**
Total		**$5,160,000**

ST: AUSTERE AIRFIELD OPERATIONS KIT

1. Background. ANG Special Tactics (ST) squadrons require light-weight, quiet, compact, and durable assault zone equipment. The Federal Aviation Administration mandates Automated Dependent Surveillance-Broadcast (ADS-B) compliance by January 1, 2020. An ADS-B transponder receiver is required to assure safety of flight and aircraft deconfliction in austere circumstances. A man-portable cellular network bubble can guarantee connectivity and data sharing in an assault zone environment. Lastly, accurate measuring equipment that can function in a global positioning system (GPS) denied environment can complement existing ST equipment. Access teams lack the ability to autonomously survey, secure, surveille, maintain and defend their operational area. Both ST squadrons require 100 assault zone marking panels, four ADS-B transponder receivers, five electric assisted bicycles with trailers, two man-portable cellular towers, three short-wave infrared (SWIR) spectrum assault zone marker kits, three automated compact light guns, two ground density measurement equipment sets, two category 1 (Cat 1) coordinate derivation devices, 100 day SWIR/thermal heads-up eyepieces, and three survey data collection equipment sets.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 Assault Zone Marking Panels (3080)	**$250**	**$50,000**
8 ADS-B Transponder Receivers (3080)	**$500**	**$4,000**
10 Electric Assisted Bicycles and Trailers (3080)	**$5,500**	**$55,000**
4 Man-Portable Cellular Towers (3080)	**$200,000**	**$800,000**
6 SWIR Spectrum Assault Zone Marker Kits (3080)	**$20,000**	**$120,000**
6 Automated, Compact Light Guns (3080)	**$10,000**	**$60,000**
4 Ground Density Measurement Equipment (3080)	**$150,000**	**$600,000**
4 Cat 1 Coordiante Derivation Devices (3080)	**$40,000**	**$160,000**
200 Day SWIR/Thermal Heads-Up Eyepieces (3080)	**$750**	**$150,000**
6 Survey Data Collection Equipment Sets (3080)	**$300,000**	**$1,800,000**
Total		**$3,799,000**

TACP: FULLY INTEGRATED SITUATIONAL AWARENESS

1. Background. Tactical Air Control Party (TACP) dismounted Joint Terminal Attack Controllers (JTAC) require a system to conduct digitally aided close air support (DACAS) with low probability of intercept and low probability of detection (LPI/LPD). To do this, JTACs require a handheld system that is capable of interfacing with multiple airborne platforms through Link 16. The system must be lightweight, J-Voice capable, and able to interface with situational awareness kits. In order to interface with the Link 16 radio, JTACs require a lightweight android-based end user device to display mission critical data during dismounted operations. This complete DACAS system must have all required plug-ins and cables to ensure interoperability between the end user device and the Link 16 radio. Finally, JTACs utilizing this DACAS system require a server to facilitate a common operating picture and information sharing. ANG has previously procured 16 situational awareness kits and four handheld Link 16 radios for each of the 14 operational squadrons. ANG TACPs require an additional 13 situational awareness kits, 13 handheld Link 16 radios, and one server for each of the 14 operational squadrons. Additionally, enterprise licensing for Link 16 host software is required for system interoperability.

2. Program Details.

Quantity	Unit Cost	Program Cost
182 High Definition Displays w/Case & Cables (3080)	**$8,000**	**$1,456,000**
182 Handheld Link 16 Radios (3080)	**$35,000**	**$6,370,000**
14 Servers (3080)	**$50,000**	**$700,000**
1 Enterprise Link 16 Host Licensing (3080)	**$4,000,000**	**$4,000,000**
Total		**$12,526,000**

TACP: BROAD SPECTRUM BATTLEFIELD IDENTIFICATION

1. Background. ANG Tactical Air Control Party (TACP) Joint Terminal Attack Controllers (JTAC) require target acquisition/marking devices that operate in multiple spectrums outside of near infrared (IR). JTACs require the ability to acquire targets in electro optical, forward looking IR, short-wave infrared (SWIR) spectrums day/night and generate a location out to 12 kilometers (km). JTACs must have the ability to determine target location day/night out to 5 km in a small lightweight device that can be integrated in situational awareness kits. JTACs must be able to simultaneously see multiple 1064 nanometer (nm) coded lasers out to 6 km and determine the pulse repetition frequency code for target correlation. Additionally, JTACs require the ability to mark a target with non-pulsed 1064 nm and 1550 nm lasers. Finally, JTACs need the ability to mark friendly locations with strobes in the SWIR and mid-wave infrared (MWIR) spectrums to prevent fratricide as targeting transitions to these emerging spectra. Each of the 14 operational TACP squadrons requires 21 non-pulse SWIR pointers, 21 MWIR strobes, 21 SWIR strobes, 15 SWIR acquisition devices, 21 small light weight laser range finders, and 21 long range multi-spectrum laser range finders.

2. Program Details.

Quantity	Unit Cost	Program Cost
210 SWIR Acquisition Devices (3080)	**$31,000**	**$6,510,000**
294 SWIR Pointers (3080)	**$5,100**	**$1,499,400**
294 MWIR Strobes (3080)	**$3,000**	**$882,000**
294 SWIR Strobes (3080)	**$1,500**	**$441,000**
294 Range Finder (3080)	**$5,000**	**$1,470,000**
294 Long Range Multi-Spectrum Laser Range Finder (3080)	**$15,000**	**$4,410,000**
Total		**$15,212,400**

TACP: SMALL ARMS WEAPONS MODERNIZATION

1. Background. ANG Special Warfare (SW) operators require modernized rifles, pistols, and accessories. Due to current and future expanded roles within mission sets, the current weapon systems (M4 and M9) are not sufficient to accomplish the needs and missions SW operators undertake. SW operators require rifles that have a more durable and accurate barrel, a free-floating extended handguard, a 1-8x optic with non-ammunition specific reticle, a modular and ergonomic aiming laser, a suppressor, and more reliable trigger. They require pistols with a modular and scalable grip, a rail for a flashlight, and a red dot sight for use under night vision. SW operators also require weapon systems capable of engaging personnel and material targets out to 1,900 meters when conducting mounted and dismounted operations. ANG SW operators require: 65 rifles, pistols, and associated accessories; eight long range multi-caliber precision rifle systems; eight long range semi auto rifle systems; and eight heavy caliber precision rifle systems for each of the 14 Air Support Operations Squadrons. ANG SW operators require 20 rifles, pistols, and associated accessories for each of the two Air Support Operations Centers and 15 rifles, pistols, and associated accessories for each of two Air Support Operations Groups. Additionally, 127 rifles, pistols, and associated accessories and 90 long range semi auto rifle systems for each of two Special Tactics Squadrons, as well as 54 rifles, pistols, and associated accessories and 18 long range semi auto rifle systems for each of the three Guardian Angel Squadrons are required.

2. Program Details.

Quantity	Unit Cost	Program Cost
1,396 Optimized Upper Receiver Groups (3080)	**$700**	**$977,200**
1,396 1-8x MIL/MIL Scopes (3080)	**$1,200**	**$1,675,200**
1,396 Modern Aiming IR Lasers (3080)	**$2,200**	**$3,071,200**
1,396 M4 Suppressors (3080)	**$900**	**$1,256,400**
1,396 SOCOM Triggers (3080)	**$149**	**$208,004**
1,396 Modern Red Dot Capable Pistols (3080)	**$196**	**$273,616**
1,396 Red Dot Aiming Pistol Sights (3080)	**$480**	**$670,080**
1,396 Pistol Suppressors (3080)	**$600**	**$837,600**
112 Long Range Multi-Caliber Precision Rifle Systems (3080)	**$14,000**	**$1,568,000**
454 Long Range Semi Auto Rifle Systems (3080)	**$8,000**	**$3,632,000**
112 Heavy Caliber Precision Rifle Systems (3080)	**$9,000**	**$1,008,000**
624 Long range first focal plane MIL/MIL Scopes (3080)	**$2,500**	**$1,560,000**
Total		**$16,737,300**

TACP: LIGHT TACTICAL BATTLEFIELD VEHICULAR EQUIPMENT

1. Background. Special Warfare (SW) operators require ultra-light tactical vehicles to conduct highly mobile maneuvers within an urban and extreme off-road environment. SW requires the ability to rapidly traverse adverse terrain to support movements for air-to-ground support and personnel recovery. This requires an ultra-light tactical vehicle that can transport four personnel, maneuver in small urban streets, and overcome blocking debris. These vehicles must use diesel fuel and have the ability to mount crew-served weapons. Ultra-light tactical vehicles are in the process of being fielded in every echelon on the battlefield with sister services, requiring ANG SW to be equipped with and trained on this vehicle. Eight systems for each of the 14 Air Support Operations Squadrons, four systems for both Special Tactics Squadrons, six for each of the three Guardian Angel Squadrons, and two for the 138th Combat Training Flight are required.

2. Program Details.

Quantity	Unit Cost	Program Cost
140 Ultra-Light Tactical Vehicles (3080)	**$100,000**	**$14,000,000**
Total		**$14,000,000**

TACP: MOBILE COMMUNICATIONS PACKAGE

1. Background. ANG Tactical Air Control Party (TACP) members require an effective and efficient command and control communications capability. TACPs at all echelons currently lack the ability to reach necessary networks during combat operations. In order to enable this capability, Air Support Operations Centers (ASOC) require two network systems with upgraded hardware and software and two mission application packages at each of the two locations. To connect to the ASOCs, the 14 Air Support Operations Squadrons require two rapidly deployable gateway systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Tactical Network Systems (3080)	**$369,000**	**$1,476,000**
4 Mission Application Package (3080)	**$305,000**	**$1,220,000**
28 Data Link Network Gateways (3080)	**$219,000**	**$6,132,000**
Total		**$8,828,000**

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MQ-9

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

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

In addition to supporting their individual state requirements, ANG units fly combat missions 24 hours a day, 365 days a year in every major combat theater. The ANG manages flying training unit operations at two locations and supports test and evaluation at a third. Five launch and recovery element sites are capable of supporting continuation training and support to Domestic Operations over the continental United States. In 2018, the Reaper flew over 500 hours in support of wildfire fighting operations. ANG MQ-9 crews, equipment and maintenance personnel were credited with saving two California towns from wildfires by detecting and real-time reporting unanticipated wildfire movements.

MQ-9
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Critical Capabilities List

- Minimal Latency Tactical Data Link and Communications Pod
- Tactical Situation Weapon and Threat Weapon Engagement Zone Upgrades
- Edge Processing for Artificial Intelligence / Machine Learning
- Distributed Mission Operations Simulator (See Tab Q)
- Open Mission Systems-Compliant Hardware and Software

Essential Capabilities List

- Communications Suite
- Deployable Launch and Recovery Element / Squadron Operations Center with Multi-Intelligence Smart Processing
- Launch and Recovery Element Aircraft Simulator
- Targeting Pod Directed Energy Counter-Countermeasures
- Debrief System

Desired Capabilities List

- Airborne Sense and Avoid
- Link to Heads-Up Display Augmented Reality Integration
- Weather Tolerance and Situational Awareness
- Infrared, Radio Frequency and Laser Threat Awareness / Self-Protection
- Contested, Degraded, and Operationally Limited Environment Survivability / Enabler with Miniature Air Launched Decoy

MQ-9: MINIMAL LATENCY TACTICAL DATA LINK AND COMMUNICATIONS POD

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

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
36 Link 16 Radios (3010)	**$150,000**	**$5,400,000**
36 ELPRS/SADL Radios (3010)	**$50,000**	**$1,800,000**
36 Pods (3010)	**$100,000**	**$3,600,000**
Total		**$13,800,000**

MQ-9: TACTICAL SITUATION WEAPON AND THREAT WEAPON ENGAGEMENT ZONE UPGRADES

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

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Tactical Application Plug-Ins (3010)	**$150,000**	**$1,800,000**
12 Sensor Application Plug-Ins (3010)	**$500,000**	**$6,000,000**
Total		**$7,800,000**

MQ-9: EDGE PROCESSING FOR ARTIFICIAL INTELLIGENCE / MACHINE LEARNING

1. Background. ANG MQ-9 aircrew require the ability to quickly locate, identify and distribute targets in a contested or denied environment. This limitation creates follow on effects for the entire kill chain when trying to rapidly find, fix and engage targets in a high threat environment. Due to advances in machine learning and edge computing, the ability exists to automate target identification by correlating multiple onboard sources of information such as the targeting pod and synthetic aperture radar, then distributing those targets via the datalink architecture to Squadron Operations Centers (SOCs). This technology not only enhances the MQ-9s capabilities on the battlefield, it also accelerates the rest of the forces' ability to identify and engage targets in one of the most dynamic and difficult environments. The ANG MQ-9 community requires 20 artificial intelligence / machine learning computers, one for each of the 17 SOCs and an additional 3 for podded capabilities to demonstrate airborne processing and automated functions. These computers are required to meet size weight and power constraints of being carried in podded systems onboard the aircraft and must provide processing power capable of hosting artificial intelligence cognitive functions. In addition, the ANG requires 17 installation hardware kits, 12 for combat and 5 for unclassified SOCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$3,000,000**
20 Artificial Intelligence / Machine Learning Computers (3010)	**$30,000**	**$600,000**
17 Installation Hardware Kits (3010)	**$100,000**	**$1,700,000**
Total		**$5,300,000**

MQ-9: OPEN MISSION SYSTEMS-COMPLIANT HARDWARE AND SOFTWARE

1. Background. ANG MQ-9 aircraft require Open Architecture Mission Control Modules (OAMCM) to enable third-party middleware-controlled onboard network connections for all sensors and aircraft payloads. The OAMCM enables rapid fielding of emerging sensor technologies, machine learning integration, and commercial off-the-shelf / government off-the-shelf payload integration. This OAMCM must allow high-bandwidth internet protocol based communication between the ground control station, aircraft and aircraft station to other aircraft stations. The OAMCM must allow for communication, command and control outside of the operational flight program. One OAMCM and associated hardware is desired for 32 ANG MQ-9s.

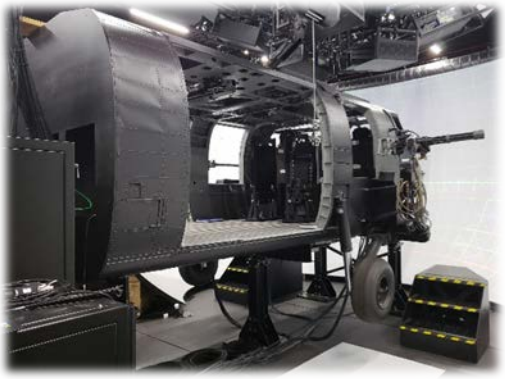
2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	**N/A**	**$6,000,000**
32 Open Architecture Mission Control Modules (3010)	**$250,000**	**$8,000,000**
32 Installation Hardware Kits (3010)	**$150,000**	**$4,800,000**
Total		**$18,800,000**

Simulation, Operational Training Infrastructure, and Ranges

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

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



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

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

Simulation, Operational Training Infrastructure, and Ranges
2018 Weapons and Tactics Conference

Critical Capabilities List

Simulation

- Battle Control Center Live, Virtual and Constructive Fifth Generation Training Suite
- Control and Reporting Center Electronic Attack Training Suite
- Cyber Part Task Trainer - Cyber
- EC-130J Distributed Mission Operations Simulator
- HC-130J Distributed Mission Operations Simulator
- HH-60G Distributed Mission Operations Simulator
- MC-12W Distributed Mission Operations Simulator
- MQ-9 Distributed Mission Operations Simulator
- Space Electronic Warfare Training Equipment Modernization
- Space Standard Space Training Hardware Modernization

Operational Training Infrastructure

- Networked Communications Suite at Select Air Reserve Component Training Locations
- Network Nodes that Facilitate Integrated Training with Joint Weapons Systems
- Cross-Domain Solutions for Distributed Mission Operations Across Different Security Levels
- Training Aid Workstations to Provide Realistic Man-in-the-Loop Virtual Training
- A Common Debrief System for Distributed Live and Synthetic Mission Operations

Ranges

- Persistent Training Data Link Network and Radio Frequency Communications Suite for Enhanced Live-Fly Training
- Realistic Integrated Electronic Warfare Threat Emitters
- Air Combat Maneuvering Instrumentation
- High-Fidelity Surrogate Targets

Essential Capabilities List

Simulation

- C-130J Data Link Capability for Weapon System Trainer / Multi-Mission Cockpit Trainers
- Control and Reporting Center Develop Live, Virtual and Constructive Cruise Mission Defense Training Opportunities at All Aerospace Control Alert Sites
- E-8C Simulator Realistic Electronic Attack / Electronic Protection Modernization
- Explosive Ordnance Disposal Battlefield Simulators and Aids
- Explosive Ordnance Disposal Advanced Trauma Medical Training Devices for Regional Training Sites
- Explosive Ordnance Disposal Augmented Reality Training Simulation

- F-15 High Fidelity Networked Simulators at Air National Guard Bases
- F-16C Proliferation and Sustainment of Concurrent High-Fidelity Ready Aircrew Program Quality Simulators
- F-22 Improved Simulator Capabilities
- KC-135R Multi-Mission Crew Trainer
- Logistics Virtual Maintenance Trainer / Virtual Reality Technical Order
- MQ-9 Launch and Recovery Element Aircraft Simulator
- RC-26B Full Crew Distributed Mission Operations Simulator
- Tactical Air Control Party Air National Guard Advanced Joint Terminal Attack Controller Training Simulator

Operational Training Infrastructure
- Synthetic Entity Interaction with Live Weapons System Sensors and Systems Integrated into the Blended Live and Synthetic Training Environment
- Live, Virtual, Constructive-Operational Training Operations, Security, and Information Assurance Support Personnel at Each Unit with Distributed Mission Operations-Certified Trainers and Simulation Systems
- Modular Contested and Degraded Operations Add-Ons for Synthetic Environment Generators
- Live and Synthetic Training Environment Common Operating Picture Displaying Fused Information from Multiple Sources and Protocols
- Virtualization of Training Site Event Control Centers for Maximum Security, Capacity, and Flexibility

Ranges
- None.

Desired Capabilities List

Simulation
- Air Operations Center Fully Integrated Distributed Mission Operations Training Capability
- F-15C Simulation Training Device Upgrade
- Guardian Angel Terminal Area Simulator for Training
- Global Integrated Intelligence, Surveillance, and Reconnaissance Distributed Training Operations Center Servers to Enable Realistic Mission Training

Operational Training Infrastructure
- Operational Training Infrastructure Network Portals at All Air Reserve Component Locations Conducting Live, Virtual, Constructive-Operational Training
- Modify Mission Design Series Operation Flight Programs that Realistically Interact with the Synthetic Training Environment
- Synthetic Training Environments Compatible with All Weapons Systems
- Networked Threat Systems on Air Reserve Component Combat Readiness Training Centers and Ranges Connected to Blended Live and Synthetic Training Networks and Real-Time Controllable by Scenario Managers
- Augmented Reality Technologies for Battlefield Airmen and Other Weapon Systems that Provide Visual Representation of Virtual and Constructive Entities to Live Assets

Ranges
- None

SIMULATION: BATTLE CONTROL CENTER LIVE, VIRTUAL AND CONSTRUCTIVE FIFTH GENERATION TRAINING SUITE

1. Background. The ANG 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 Simulator Shelter (RSS) until permanent facilities are procured via military construction. The Eastern Air Defense Sector, Western Air Defense Sector, Alaskan Air Defense Sector and Hawaiian Air Defense Sector each require one simulator training system. Two systems have been procured through FY18.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 BCC Training Systems (3080)	**$1,800,000**	**$3,600,000**
2 RSS (3080)	**$675,000**	**$1,350,000**
Total		**$4,950,000**

SIMULATION: CONTROL AND REPORTING CENTER ELECTRONIC ATTACK TRAINING SUITE

1. Background. ANG Control and Reporting Centers (CRC) require the capability to simulate electronic attack (EA) against the CRC radar during real-world training. CRCs do not have the capability to train against an EA-equipped threat and this lack of training results in crews being unprepared to mitigate real world radar degradation due to the effects of EA. The CRC needs a system that provides barrage, spot, and Doppler noise; velocity-gate-pull-off, range-gate-pull-off, multiple false targets; and digital radio frequency memory generated EA waveforms against the AN/TPS-75 radar. This system will prepare operational crews for emerging threats, which improves the effectiveness and survivability of the CRC and defended assets. Each of the ten ANG CRCs requires an EA training suite.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 EA Training Suites (3080)	**$250,000**	**$2,500,000**
Total		**$2,500,000**

SIMULATION: CYBER PART TASK TRAINER - CYBER

1. Background. ANG Cyberspace Operations (CO) units require the ability to train individual members on cyberspace tasks associated with initial qualification training (IQT) and remedial training. The Part Task Trainer-Cyber (PTT-C) system is a cost effective training solution that allows CO and maintenance personnel to familiarize themselves with mission particular tasks, weapons systems operations or industrial control systems (ICS). The PTT-C provides hands-on training for critical skills required to operate in a team environment and support CO. The PTT-C provides an individual training and skills assessment suite allowing personnel to train on specific tasks and identify areas needing improvement. Additionally, the system integrates a cognitive learning assessment that is used to identify qualified candidates and their readiness to integrate into the cyber mission force. The PTT-C uses pre-defined individual challenges and events to limit potential compromise of scenarios in a training environment. The system is maintained locally, allows for personnel to connect to the PTT-C and is managed through an intuitive administration page. The system must not require a recurring licensing or subscription fee to operate, and will focus on work role training requirements and ICS readiness; prepping personnel to execute in the team construct within the Virtual Interconnected Training Environment (VITE) and during operational missions. One Cognitive Learning System is required for the cyber enterprise as well as one PTT-C and one ICS for each of the 20 CO units.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Cognitive Learning System (3080)	**$2,000,000**	**$2,000,000**
20 Part Task Trainers – Cyber (3080)	**$275,000**	**$5,500,000**
20 Part Task Trainer Industrial Control Systems (3080)	**$200,000**	**$4,000,000**
Total		**$11,500,000**

SIMULATION: EC-130J DISTRIBUTED MISSION OPERATIONS SIMULATOR

1. Background. The ANG EC-130J community requires a co-located EC/MC-130J Weapons Systems Trainer (WST) flight deck simulator with Distributed Mission Operations capability. Without these devices, all currency, proficiency and mission qualification training must be accomplished in the aircraft. Additionally, the EC/MC-130J WST will provide training that can only be conducted in a simulator device, such as emergency procedures (EP) training, realistic threat defense, and deployment preparation route rehearsal. Currently, crews are required to travel to other units for EP training, thereby reducing crew availability and incurring significant travel cost. Combat Systems Officers are on a waiver due to lack of training resources. The 193rd Special Operations Wing requires one EC/MC-130J WST.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 EC/MC-130J WST (3080)	**$30,261,000**	**$30,261,000**
Total		**$30,261,000**

SIMULATION: HC-130J DISTRIBUTED MISSION OPERATIONS SIMULATOR

1. Background. ANG Rescue Wings located in New York, California, and Alaska require a dedicated high-fidelity HC-130J Distributed Mission Operations (DMO) flight simulator to support special mission aircrew training. There are no Weapon System Trainers (WST) provided, planned or funded at operational ANG rescue wings. The WST will provide Air Force Instruction 11-series Volume 1 training capability regardless of weather or aircraft availability facilitating a high level of aircrew readiness. Three HC-130J DMO simulators are required to meet the demands of the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 HC-130J WSTs (3010)	**$27,500,000**	**$82,500,000**
3 MILCON Projects (3830)	**$8,500,000**	**$25,500,000**
Total		**$108,000,000**

SIMULATION: HH-60G DISTRIBUTED MISSION OPERATIONS SIMULATOR

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

2. Program Details.

Quantity	Unit Cost	Program Cost
6 HH-60G MMCTs (3010)	**$2,600,000**	**$15,600,000**
Total		**$15,600,000**

SIMULATION: MC-12W DISTRIBUTED MISSION OPERATIONS SIMULATOR

1. Background. The ANG MC-12W community requires a co-located MC-12W Mission Systems Trainer (MST) with Distributed Mission Operations capability. Without this device, all currency, proficiency and mission qualification training must be accomplished in the aircraft or off-station. Additionally, the MC-12W MST will provide training that can only be conducted in a simulator device, such as emergency procedures (EP) training, realistic threat defense, and deployment preparation route rehearsal. Currently, crews are required to travel to other units for EP training, thereby reducing crew availability and incurring significant travel cost. The 137th Special Operations Wing requires one MC-12W MST.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 MC-12W MST (3010)	**$1,600,000**	**$1,600,000**
Total		**$1,600,000**

SIMULATION: MQ-9 DISTRIBUTED MISSION OPERATIONS SIMULATOR

1. Background. The ANG MQ-9 units require upgraded training devices. The MQ-9 weapons system lacks a certified simulator/trainer with Distributed Mission Operations (DMO) and high definition capability, in conjunction with an effective debriefing system. ANG MQ-9 combat and formal training units use any one of four mission training systems to execute initial qualification training, mission qualification training, instructor pilot upgrade, and continuation training. ANG MQ-9 units require upgrades for their training systems which better replicate MQ-9 combat mission sets, accelerate Block 30 and Block 50 ground control station training device production, and provide additional capabilities such as DMO, high definition, and debriefing systems. The ANG has 13 MQ-9 units, 11 operational and 2 training. Two trainer upgrades are needed for each of the operational units and four are needed for each of the training units for a total of 30. Air Combat Command has procured 18 upgrades for the ANG. The ANG requires 12 additional trainer upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 MQ-9 Trainer Upgrades (3080)	**$250,000**	**$3,000,000**
Total		**$3,000,000**

SIMULATION: SPACE ELECTRONIC WARFARE TRAINING EQUIPMENT MODERNIZATION

1. Background. ANG Space Control Squadrons require adequate training equipment to meet Combatant Commanders' taskings. Without a signal environment that is offline from real world assets, space control operators do not obtain sufficient training and knowledge of mission operations. Current systems do not accurately convey the real world operational threat environment the warfighter faces. The three space control squadrons require eight environment presentation assemblies, eight combined advanced network emulators, three joint information operations range nodes and two spectrum analyzers.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 Environment Presentation Assemblies (3080)	**$300,000**	**$2,400,000**
8 Combined Advanced Network Emulators (3080)	**$2,000,000**	**$16,000,000**
3 Joint Information Operations Range Nodes (3080)	**$70,000**	**$210,000**
2 Spectrum Analyzers (3080)	**$39,679**	**$79,358**
Total		**$18,689,358**

SIMULATION: SPACE STANDARD SPACE TRAINING HARDWARE MODERNIZATION

1. Background. ANG Space Squadrons require Standard Space Training (SST) capable of training multi-force package mission essential tasks. SST offers realistic missile warning site reporting training. The SST is the simulator that will provide the training environment for the new survivable and endurable SMGS for both missile warning and nuclear detonation detection weapons systems. To provide a realistic training environment, the SST requires Mission Specific Vendor Plug-In (MSVP) software to enable a multi-force package configuration and a voice communications suite. The 137th Space Warning Squadron (137 SWS) cannot currently train critical mission tasks in the SST and will have to compete with operations, depot maintenance, and testing for limited resources to effectively train core tasks. The 137 SWS requires one MSVP with voice communication.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 MSVP (3080)	**$8,300,000**	**$8,300,000**
1 Voice Communication Suite (3080)	**$2,600,000**	**$2,600,000**
Total		**$10,900,000**

OPERATIONAL TRAINING INFRASTRUCTURE: NETWORKED COMMUNICATIONS SUITE AT SELECT TRAINING LOCATIONS

1. Background. ANG's Operational Training Infrastructure (OTI) requires a networked communications suite for Live, Virtual and Constructive (LVC) training. One of the 13 lines-of-effort in the Air Force OTI 2035 Flight Plan is the fielding of a synthetic-to-live/live-to-synthetic training capability at live training ranges, Distributed Training Centers, and operational units. This infrastructure is only located at select Combat Readiness Training Centers (CRTC) and is used for large-scale exercises. The Air Combat Command Range Enterprise Plan seeks to outfit/equip 23 fighter wings, 11 primary training ranges, and four CRTCs with LVC-OTI. There is no existing capability to network between the ANG Distributed Training Operations Center (DTOC) and the operational units. In order to connect, the ANG needs to procure software to enable datalink, radios, Air Combat Maneuvering Instrumentation (ACMI), and live-radar with multi-source correlator tracker applications for the ANG DTOC.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Datalink Application (3080)	**$300,000**	**$300,000**
2 Radio Applications (3080)	**$50,000**	**$100,000**
1 ACMI Application (3080)	**$50,000**	**$50,000**
2 Live Radar Applications (3080)	**$550,000**	**$1,100,000**
Total		**$1,550,000**

OPERATIONAL TRAINING INFRASTRUCTURE: NETWORK NODES THAT FACILITATE INTEGRATED TRAINING WITH JOINT WEAPONS SYSTEMS

1. Background. The ANG requires network nodes that facilitate integrated training with joint partners' weapons systems. ANG units lack the ability to train virtually with some joint partners and multi-domain enablers. This prevents warfighters from conducting integrated virtual training events that reinforce the skills needed for successful joint and multi-domain operations. Acquiring and installing the requested network nodes at the ANG's Distributed Training Operations Center (DTOC) will provide networked training audiences access to joint and multi-domain virtual warfighters. The DTOC requires one Air Distributed Virtual Training Environment (ADVTE), one Joint Information Operations Range (JIOR) and one Nellis Mission Operations Network (NMON) Node.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 ADVTE Node (3080)	**$40,000**	**$40,000**
1 JIOR Node (3080)	**$50,000**	**$50,000**
1 NMON Node (3080)	**$50,000**	**$50,000**
Total		**$140,000**

OPERATIONAL TRAINING INFRASTRUCTURE: CROSS-DOMAIN SOLUTIONS FOR DISTRIBUTED MISSION OPERATIONS ACROSS DIFFERENT SECURITY LEVELS

1. Background. ANG warfighters require cross-domain solutions (CDS) that allow systems at incompatible classification levels to connect to a common Live, Virtual and Constructive (LVC) training architecture. Simulators and constructive entity generators must be networked together to reinforce the integration skills needed to overcome the challenges of modern threat environments. CDS allow systems at incompatible classification levels to connect to a common LVC training architecture. The Distributed Training Operations Center (DTOC) is uniquely equipped to host these CDS technologies. This initiative addresses the ANG LVC vision line of effort to connect ANG units to secure Distributed Mission Operations (DMO) networks that facilitate relevant LVC training with USAF, joint, multinational, and interagency partners. One Fighter Integration CDS, one releasable (REL) to North Atlantic Treaty Organization (NATO) CDS, one unclassified (UNCLASS) CDS, and one REL Five Eyes (FVEY) CDS applications are required.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Fighter Integration CDS (3080)	**$1,500,000**	**$1,500,000**
1 REL NATO CDS (3080)	**$650,000**	**$650,000**
1 UNCLASS CDS (3080)	**$650,000**	**$650,000**
1 REL FVEY CDS (3080)	**$650,000**	**$650,000**
Total		**$3,450,000**

OPERATIONAL TRAINING INFRASTRUCTURE: TRAINING AID WORKSTATIONS TO PROVIDE REALISTIC MAN-IN-THE-LOOP VIRTUAL TRAINING

1. Background. The ANG's Distributed Training Operations Center (DTOC) requires man-in-the-loop virtual surrogate fighter Training Aid Workstations (TAW). ANG Distributed Mission Operations (DMO) training is limited to using mostly scripted constructive entities. DTOC TAWs allow pilot subject matter experts (SMEs) to take control of various constructive entities at critical points in the engagement to provide much more realistic behaviors. This allows more efficient use of DTOC white force SMEs by controlling multiple aircraft through a few TAWs. The DTOC needs four TAWs to provide scheduling flexibility to support virtual training.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 TAWs (3080)	**$500,000**	**$2,000,000**
Total		**$2,000,000**

OPERATIONAL TRAINING INFRASTRUCTURE: A COMMON DEBRIEF SYSTEM FOR DISTRIBUTED LIVE AND SYNTHETIC MISSION OPERATIONS

1. Background. The ANG Distributed Training Operations Center (DTOC) requires the ability to brief and debrief geographically separate units via a video teleconference system capable of mission recording and distributed playback. The debrief is the most valuable phase of both live and synthetic training missions. Mission playback facilitates debriefing, where errors and deviations are noted, instruction is given, and lessons learned are captured. A classified debrief system, dedicated to ANG Distributed Mission Operation (DMO), allows the capture of live, virtual and constructive video sources for live viewing and mission playback. Finally, the debrief system should be compatible with the DMO network and Air Reserve Component Network. The DTOC requires three debriefing systems for scheduling flexibility and mission continuity.

2. Program Details.

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

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

1. Background. The ANG Operational Training Infrastructure (OTI) enterprise requires realistic, standardized, full spectrum, and immersive data link and radio communication systems. The ANG continues to have shortfalls in standardized communication and data link systems at the critical nodes in the range training infrastructure. The OTI enterprise consists of the flying squadrons, primary training ranges, Live Mission Operations Centers, training centers, and forward operating locations. Acquisition of the Digital Radio Management System (DRMS), Link 16, Situational Advanced Data Link (SADL), range radios, and a training data link management system with man-in-the-loop data input capability will enhance ANG units' ability to accomplish realistic full-spectrum, multi-domain training. The ANG requires communication upgrades for four Combat Readiness Training Centers, 11 Primary Training Ranges, and 23 fighter wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
38 Link 16 Radios (3080)	**$360,000**	**$13,680,000**
38 SADL Radios (3080)	**$30,000**	**$1,140,000**
38 Data Link Management Systems (3080)	**$297,000**	**$11,286,000**
38 Range Radio Systems (3080)	**$150,000**	**$5,700,000**
38 DRMS (3080)	**$480,000**	**$18,240,000**
Total		**$50,046,000**

RANGES: REALISTIC INTEGRATED ELECTRONIC WARFARE THREAT EMITTERS

1. Background. ANG Operational Training Infrastructure (OTI) enterprise requires realistic electronic warfare (EW) simulators to replicate an integrated air defense system (IADS) environment. High fidelity range emitters are needed to replicate an array of threat representative surface-to-air missile and anti-aircraft artillery systems in an IADS. Air Combat Command (ACC) is fielding EW threat emitters in concert with their Enterprise Range Plan (ERP) but will not fully fund the ANG OTI enterprise. The EW Server, which acts as the Range Training Officer's link between the P5 Air Combat Training System and the threat systems, must be replaced to incorporate full duplex Joint Threat Emitter (JTE) linkage to the ranges with relevant simulations for the new threat systems. The Threat Emitter System version 2 (TRESv2) is integrated into the EW Server but still requires relevant flyout simulations. ACC is fielding these in concert with their ERP but will not fully fund all ANG ranges. The ANG requires 6 TRESv2, 6 JTE wideband, 10 weapons flyout simulations, and 4 EW servers to fully equip all four ANG EW ranges.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 TRESv2 (3080)	**$4,000,000**	**$24,000,000**
6 JTE Widebands (3080)	**$7,000,000**	**$42,000,000**
10 Weapons Flyout Simulations (3080)	**$1,000,000**	**$10,000,000**
4 EW Servers (3080)	**$100,000**	**$400,000**
Total		**$76,400,000**

RANGES: AIR COMBAT MANEUVERING INSTRUMENTATION

1. Background. The ANG requires expanded instrumented training opportunities in the live environment that provide tracking data for threat emitter systems, as well as recording air and ground system interactions to provide after action reviews (AAR). The P5 Combat Training System (P5CTS) is composed of a Remote Range Unit (RRU), a live monitor system utilized at the Range Training Officer (RTO) location, and an AAR system utilized at the squadron debriefing locations and training centers. The P5CTS has been deployed to less than half of the ANG locations that require the capability. To complete fielding to the remaining wings and training ranges, the ANG requires 18 RRUs, 14 RTO Systems, 34 AAR systems and 44 additional P5CTS Pods.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 RRUs (3080)	**$400,000**	**$7,200,000**
14 RTO Systems (3080)	**$50,000**	**$700,000**
34 AAR Systems (3080)	**$10,000**	**$340,000**
44 P5CTS Pods (3080)	**$180,000**	**$7,920,000**
Total		**$16,160,000**

RANGES: HIGH-FIDELITY SURROGATE TARGETS

1. Background. To meet Ready Aircrew Program tasking requirements, the ANG Operational Training Infrastructure enterprise requires realistic, multispectral target surrogates to replicate real-world complex target sets. The ANG currently employs a variety of high and medium fidelity surrogate targets, but still has shortfalls in realistic target acquisition and identification training. High-value complex target arrays are needed to mimic specific surface-to-air missile and anti-aircraft artillery sites and associated equipment. These arrays require the same characteristics as the actual entity to include visual footprint, density, and heat signatures. The ANG's four electronic warfare (EW) training ranges require fifteen high fidelity targets each to be associated with specific EW threat emitters.

2. Program Details.

Quantity	Unit Cost	Program Cost
60 High-Fidelity Targets (3080)	**$500,000**	**$30,000,000**
Total		**$30,000,000**

Space Operations

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

Space Operations - The ANG contribution to Air Force Space Command missions includes over 900 personnel within eight squadrons. Space capabilities support federal- and state-level agencies, USAF, the nuclear command and control community, and combatant commands.

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

Space Operations
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Critical Capabilities List

- Electronic Warfare Training Equipment Modernization (See Tab Q)
- Electronic Warfare Operational Equipment Modernization
- Standard Space Training Hardware Modernization (See Tab Q)
- Remote Secure Communications
- Semi-Tractor Fleet Modernization

Essential Capabilities List

- Space Control Open Architecture
- Big Top Satellite Link Emulator
- Space Control Technique Development

Desired Capabilities List

- Small Communications Satellite and/or Communications Ride Share Payload Used for Space Control Training

SPACE: ELECTRONIC WARFARE OPERATIONAL EQUIPMENT MODERNIZATION

1. Background. ANG Space Control Squadrons require Counter Communication System (CCS) hardware and software modifications to rapidly deploy electronic warfare support equipment. The current CCS is not compact or able to perform to Combatant Commanders' wartime standards. Hardware footprint reduction would include a photonic hardware upgrade coupled with a software upgrade to allow additional antennas to be utilized with the CCS system. Additional software upgrades are also required to allow automated signal detection, characterization and electronic positive identification for signals of interest. The three ANG Space Control Squadrons each require one CCS hardware and software upgrade and two photonic antenna upgrades. Two photonic antennae are also required for training.

2. Program Details.

Quantity	Unit Cost	Program Cost
Common Platform Graphics User Interface Upgrade Non-Recurring Engineering (NRE) (3080)	**N/A**	**$1,655,000**
Signal Characterization NRE (3080)	**N/A**	**$6,000,000**
8 Photonics/Antennas (3080)	**$2,510,000**	**$20,080,000**
3 Hardware Case Footprint Reductions (3080)	**$7,000,000**	**$21,000,000**
3 Upgraded Modems (3080)	**$1,675,000**	**$5,025,000**
Mission Automation NRE (3080)	**N/A**	**$5,544,000**
Total		**$59,304,000**

SPACE: REMOTE SECURE COMMUNICATIONS

1. Background. ANG Space Control Squadrons and the 153rd Command and Control Squadron (CACS) require remote secure communications. The units rely on shore power and communication from host bases. Host bases routinely lose power resulting in a loss of secure communication during critical missions. Without access to secure communications, the unit would not be able to connect with proper authorities to deliver time critical information. Remote secure communications would improve the survivability and readiness of ongoing electronic warfare missions in order to complete theater objectives. Each of the three space control squadrons requires two secure communication packages and the 153 CACS requires one secure communication packages.

2. Program Details.

Quantity	Unit Cost	Program Cost
7 Secure Communication Packages (3080)	**$1,000,000**	**$7,000,000**
Total		**$7,000,000**

SPACE: SEMI-TRACTOR FLEET MODERNIZATION

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

2. Program Details.

Quantity	Unit Cost	Program Cost
20 Semi-Tractor Units (3080)	**$175,000**	**$3,500,000**
Total		**$3,500,000**

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Cyberspace Operations

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

The United States relies on the Internet and the systems and data of cyberspace for a wide range of critical services. Modern weapon systems, such as aircraft and satellites, have evolved into computers with wings and computers in orbit. They are filled with 4th and 5th generation technology and rely on the cyberspace domain to function. This reliance leaves the U.S. vulnerable in the face of dangerous cyber threats, as state and non-state actors plan to conduct disruptive and destructive cyberattacks on the networks of our critical infrastructure and steal U.S. intellectual property to undercut our technological and military advantage. ANG cyber operations units are postured for cyber deterrence and cyber defense, with a focus of building cyber capabilities to defend warfighting capability and homeland/national interests against cyberattacks.

The ANG cyber operations force includes three cyber operations groups and twenty units. Cyber capabilities support federal- and state-level agencies, the Air Force, and combatant commands.

Cyber units provide offensive and defensive cyberspace capability to support operational and planning activities along with other cyberspace support as requested. Guardsmen participating in these missions draw upon skills from their related civilian careers. Specific missions assigned to ANG units include network vulnerability assessments, digital media and network analysis, and full-spectrum cyber warfare support in both exercises and operations. Execution of these activities occurs from home station and national facilities through distributed operations.

Cyberspace Operations
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Critical Capabilities List

- Part Task Trainer - Cyber (See Tab Q)
- Automated Collaboration and Execution System
- Advanced Cyber Forensics Toolkit
- Airborne Cyber Intercept Platform
- Cyber Mission Rehearsal System

Essential Capabilities List

- Advanced Persistent Threat Automated System
- Alternate Reality / Virtual Reality Simulator
- Cyber Heads Up Display

Desired Capabilities List

- None

CYBER: AUTOMATED COLLABORATION AND EXECUTION SYSTEM

1. Background. ANG Cyberspace Operations (CO) units require an automated collaboration and execution system to aid in cyber planning, briefing, execution, and debriefing (PBED). This system automates the PBED process and information sharing. During the planning phase, the collaboration and execution system will ingest all of the governing operational documents, cyber terrain, and threat environments. This information is synthesized into a heads-up display that is used to develop a plan during the briefing and execution phases. For execution, this system captures the activity that an operator performs and allows for significant events to be highlighted and reviewed. Machine learning is used to identify and link actions taken in response to events that occur during a cyber operation. The system's artificial intelligence presents or executes a playbook of actions based on the defined tactics, techniques, and procedures (TTPs) to augment and assist the operator's workflow. The Automated Collaboration and Execution System (ACES) provides a way to review collected actions so operators can identify additional cyber TTPs to be reviewed during a mission debrief. These TTPs can be saved into the system for future reference. Each of the 20 CO units needs an automated collaboration and execution system.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 ACES (3080)	**$250,000**	**$5,000,000**
Total		**$5,000,000**

CYBER: ADVANCED CYBER FORENSICS TOOLKIT

1. Background. ANG Cyberspace Operations (CO) units require the ability to conduct rapid cyber forensics. Each Advanced Cyber Forensics Toolkit (ACFT) will include hardware and software to conduct forensics on a variety of equipment, including but not limited to all types of storage devices, network equipment, mobile devices, and hardware. The toolkit must: support mobile devices and computer systems; provide a faraday isolation capability; target storage; write blocker; software/hardware to acquire and process digital evidence and password recovery; and must be easily transportable to support off-site operations. This capability will allow CO units to conduct investigative analysis and attribute malicious cyber activity to support threat advisories. The goal of the ACFT is to examine any digital medium in a forensically sound manner, with the aim to identify, preserve, recover, analyze and report/present evidence about the digital information. This system must provide training, be compatible and have the flexibility to interoperate with existing mission systems. One system is required for each of the 20 CO units.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 ACFTs (3080)	**$65,000**	**$1,300,000**
Total		**$1,300,000**

CYBER: AIRBORNE CYBER INTERCEPT PLATFORM

1. Background. ANG Cyberspace Operations (CO) units require a multi-platform, reduced form-factor cyberspace capability for CO in austere and off-network environments on airborne weapon systems. This system should be integrated into ground based systems. This cyber platform will 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 system will provide an integrated capability for command and control of the platform including beyond line of sight, tactical data links, or standalone systems. It will provide two-way communications for transmitting and receiving data packets to target devices and receiving updates to provide battle damage indicators. This system will allow the addition of a cyberspace capability in theater or wherever ANG aircraft are deployed. This capability will allow access to previously unreachable target sets while identifying previously unknown targets in either a permissive or non-permissive flying environment. One Airborne Cyber Interceptor Platform (ACIP) system is required for each of the 20 Cyber units.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 ACIPs (3080)	**$500,000**	**$10,000,000**
Total		**$10,000,000**

CYBER: CYBER MISSION REHEARSAL SYSTEM

1. Background. ANG Cyberspace Operations (CO) units need the ability to conduct mission rehearsal of complex systems. The Cyber Mission Rehearsal System (CyMRS) is highly adaptive and able to replicate multiple types of networks and environments. This capability provides the flexibility to rapidly change from one environment to another, and allow for hardware in the loop. It is deployed within a temporary sensitive compartmented information facility (SCIF) or up to the highest classification required for the CO units. CyMRS is required to be integrated at Nellis AFB, NV to enable mission rehearsal in multiple domains. The system is integrated into a kinetic and non-kinetic Operational Training Infrastructure environment ensuring cyber effects are meeting the objectives through multiple rehearsal of concept drills without compromising current on-net mission infrastructure. The system will provide visualization for commanders and decision makers to determine if objectives are met. Additionally, CyMRS allows for testing and utilizing classified tactics, techniques and procedures and tools not allowed in other Department of Defense and government environments. The CyMRS must be fully accredited and meet all Risk Management Framework requirements to operate up to TOP SECRET. The system must not require a license/subscription fee or internet connectivity to function. Each of the 20 Cyberspace Operations Units require one CyMRS, plus one system to be installed at the Air Force Cyber Weapons Instructor Course in the required Temporary SCIF.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 CyMRS (3080)	**$400,000**	**$8,400,000**
1 Temporary SCIF (3080)	**$1,500,000**	**$1,500,000**
Total		**$9,900,000**

Security Forces

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

Air National Guard security forces include over 7,400 defenders from all wings in each of the 54 states and territories. Security forces protect and support worldwide contingencies and home-station installations.

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

Security Forces
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Critical Capabilities List

- Counter-Small Unmanned Aircraft System Defense Platform
- Modular Small Arms Ranges
- Helmet System Modernization
- First Responder Seven-Level Ensemble
- Duty Gear Modernization

Essential Capabilities List

- Enhanced / Modular Ballistic Protection Capable Of Teaming with Proposed Plate Carrier System
- Upgraded Individual Night Vision Imaging System with Capabilities Consistent with PVS-31A To Include White Phosphorous Imaging
- Improved M4 Carbine Consistent with Project Improved Modular Rifle Blue Characteristics
- Bone Conducting Communications Interoperability Capable Of Teaming Multiple Devices To Include Common Cell Phones
- Improved Carbine-Mounted Lighting System

Desired Capabilities List

- Squad Operated Base Defense Against Small Unmanned Aircraft Systems
- Portable Modular Training Shelters
- Explosives and Narcotics Detection System
- Directed-Radiation Less-Than-Lethal Device
- Remote Electromagnetic Pulse-Based Vehicle Disabling System

SECURITY FORCES: COUNTER-SMALL UNMANNED AIRCRAFT SYSTEM DEFENSE PLATFORM

1. Background. ANG Security Forces (SF) require implementation of a counter-small unmanned aircraft system (C-sUAS) to defend combat assets and personnel on installations from hostile small unmanned aerial system threats. Recent actions by hostile forces overseas have illustrated capability and intent to employ such attacks against friendly forces driving the need for integration of such technology. A system is required that is capable of detecting the sUAS once it enters the pre-determined monitored area, identifying the type of system being employed, pinpointing the location of the ground control station, and then defeating/overriding control of the hostile sUAS. The system will operate via identification of sUAS electronic signatures and/or radar, and be upgradable as new sUAS platforms are produced. As policy and technology matures, the system must be capable of integrating with future components for detection and neutralizing threats, regardless of the manufacturer. A C-sUAS system is required at all 95 ANG locations (including geographically separated units).

2. Program Details.

Quantity	Unit Cost	Program Cost
95 C-sUAS Platforms (3080)	**$400,000**	**$38,000,000**
Total		**$38,000,000**

SECURITY FORCES: MODULAR SMALL ARMS RANGES

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

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 capacity. In order to extend the ACH's capability, various modular enhancements were made that fail to meet current mission requirements. Current helmet configurations have exceeded their life cycle and in many cases are more than 15 years old. Based on diverse mission sets including: Phoenix Raven; Tactical Security Element; National Guard Response Force; Fly-Away Security Teams; Protective Service Detail; Special Reaction Team; Tactical Response Force; Detainee Mission Operations; and active shooter responses, a multi-use helmet system is required. The helmet system must be compatible with the current inventory of mandible guards and visor systems. The current inventory of helmets from unit to unit varies in style, design and age across the SF enterprise, but needs to be consistent across the ANG. Along with new helmets, protective eyewear and communications adapters that are compatible with the selected helmet are also needed. One helmet system, that includes one set of protective eyewear, and one headset communications adapter, is required for each of the 7,462 ANG SF airman.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,500 High Cut Ballistic Helmet Systems* (3080)	**$710**	**$5,325,000**
Total		**$5,325,000**

* Includes 1% spare

SECURITY FORCES: FIRST RESPONDER SEVEN-LEVEL ENSEMBLE

1. Background. ANG Security Forces (SF) defenders require a flame resistant (FR) all weather ensemble to provide SF Airmen an enhanced ability to adapt to the demands of austere, unpredictable, and contested battlespaces. SF Airmen deploy to hostile environments that demand an FR system that is adaptable to a wide range of weather conditions and climates. The all-weather ensemble needs to provide proper protection from incendiary contacts such as improvised explosive devices (IED) and vehicle-borne IED encounters, direct fire attacks, and other enemy actions involving combustible-based weaponry. Each of the ANG's 7,462 SF Airmen requires a multi-component and scalable personal protective equipment system.

2. Program Details.

Quantity	Unit Cost	Program Cost
15,000 FR Combat Shirts (summer)* (3080)	**$450**	**$6,750,000**
15,000 FR Combat Shirts (winter)* (3080)	**$700**	**$10,500,000**
7,500 FR Wind/Rain Gear (pants/jacket)* (3080)	**$500**	**$3,750,000**
7,500 FR Fleece (pants/jacket)* (3080)	**$700**	**$5,250,000**
7,500 FR Soft Shells (pants/jacket)* (3080)	**$800**	**$6,000,000**
7,500 FR Cold Weather Parkas (pants/jacket)* (3080)	**$700**	**$5,250,000**
Total		**$37,500,000**

* Includes 1% spare

SECURITY FORCES: DUTY GEAR MODERNIZATION

1. Background. ANG Security Forces (SF) require modern, multifunctional duty gear that is adaptable to constantly changing threat environments. The current fielded duty gear is not well-suited to meet the multiple mission sets that SF conduct at home station and while deployed. SF requires a modular and scalable ballistic armor vest that offers increased mobility, agility, and intuitive use while providing threat coverage consistent with theater requirements. SF also requires an improved load carrying system to transport and manage loads in a more effective and practical manner when paired with an improved ballistic vest. SF requires a holster system and tactical light adapter that will allow the user to carry the M18 pistol in multiple configurations. One set of duty gear is required for each of the 7,462 ANG SF Airman.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,500 Ballistic Body Armor Kits* (3080)	**$500**	**$3,750,000**
7,500 Load Bearing Kits* (3080)	**$910**	**$6,825,000**
7,500 M18 Compact Holster Systems* (3080)	**$200**	**$1,500,000**
7,500 Tactical Light Adapters* (3080)	**$550**	**$4,125,000**
Total		**$16,200,000**

* Includes 1% spare

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Explosive Ordnance Disposal

The ANG has 17 explosive ordnance disposal (EOD) flights. These units are uniquely trained and equipped to facilitate explosive operations during joint wartime missions. In the deployed environment, EOD operators routinely defeat improvised explosive devices (IED), render safe unexploded ordnance (UXO), perform route clearance operations, conduct post-blast analysis, evidence collection, and embed with special operations forces. Furthermore, EOD technicians must also be prepared to respond to incidents involving chemical/biological weapons, weapons of mass destruction (WMD), and nuclear weapons.

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

Explosive Ordnance Disposal
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Critical Capabilities List

- Digital Ordnance Scanning System
- Multi-Frequency Portable Secured Local Network
- Enhanced Team Situation Awareness System
- Short-Range Reconnaissance Kit
- Medium-Sized Robot

Essential Capabilities List

- Battlefield Simulators and Aids
- Integrated Team Power Management
- Modernized Pioneering / Hoisting Equipment for Ordnance Recovery
- Advanced Trauma Medical Training Devices for Explosive Ordnance Disposal Regional Training Sites
- Augmented Reality Training Simulation

Desired Capabilities List

- Improved Individual Blast Protective Equipment to Mitigate Traumatic Brain Injury / Chronic Traumatic Encephalopathy
- Lightweight Dual Sensor (Ground Penetrating Radar / Metal Detection) Mine Detector
- Chemical, Biological, Radiological, and Nuclear Initial Detection and Identification Capability
- Multi-Threat Scalable Blast Containment System
- Sustained Chemical Operations Support Equipment

EOD: DIGITAL ORDNANCE SCANNING SYSTEM

1. Background. ANG explosive ordnance disposal (EOD) teams require the ability to safely identify and dispose of unexploded ordnance (UXOs). In order the meet the emerging threats from near peer adversaries, ANG EOD needs to leverage existing technology to integrate a digital scanning tool that can rapidly produce and accurately measure three-dimensional models of ordnance encountered in a field environment. The system will integrate with current digital x-ray technology to produce detailed analysis of newly encountered munitions. This will help EOD technicians identify UXOs and drastically improve the ability to exploit first seen UXOs in the battlespace. ANG EOD requires 19 total systems, one for each of the 17 ANG EOD flights and two to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 UXO Reconnaissance Scanning Systems (3080)	**$25,000**	**$475,000**
Total		**$475,000**

EOD: MULTI-FREQUENCY PORTABLE SECURED LOCAL NETWORK

1. Background. ANG explosive ordnance disposal (EOD) technicians require the ability to access secure and non-secure network communications while conducting operations. EOD technicians need to create local, private cellular, and Wi-Fi communication networks to facilitate enhanced communications of teams and equipment during operations. ANG EOD technicians need a lightweight, compact, transportable and flexible communications system capable of delivering voice and data to support video in line-of-sight and near range situations. The dynamic nature of EOD operations makes access to current intelligence, tactics, techniques and procedures critical for team safety and mission effectiveness. One kit is required at each of the 17 ANG EOD flights.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Multi- Frequency Network Kits* (3080)	**$150,000**	**$2,850,000**
Total		**$2,850,000**

* Includes 10% spare

EOD: ENHANCED TEAM SITUATION AWARENESS SYSTEM

1. Background. ANG explosive ordnance disposal (EOD) teams require a lightweight situational awareness system with portable power storage and power management solutions. Current mission environments and locations limit the range and capability of existing devices to communicate with other echelons beyond line-of-sight. The fielded batteries needed for EOD and command and control operations vary in type and are not rechargeable nor easily replaceable under field conditions. The situational awareness system should be ruggedized, wearable, powered by a single power management solution, and able to transmit and receive through existing radios. A mobile ad-hoc network integrated with the system increases the range and operability of teams independently. The system includes a battery management system, high definition display with protective case, and a cable system that allows the power management system to be connected to multiple mission critical devices. ANG EOD teams require eight kits and one ad-hoc antenna set for each of the 17 flights.

2. Program Details.

Quantity	Unit Cost	Program Cost
136 Situational Awareness Devices (3080)	**$25,000**	**$3,400,000**
17 Ad-Hoc Mesh Network Antenna Sets (3080)	**$25,000**	**$425,000**
Total		**$3,825,000**

EOD: SHORT-RANGE RECONNAISSANCE KIT

1. Background. ANG explosive ordnance disposal (EOD) technicians require an enhanced capability to conduct short range situational awareness assessments of critical mission targets prior to sending a team into a potentially hazardous area. The use of short and medium-range optics and cameras limit the team to viewing a threat from a single line-of-sight, preventing a complete picture for a comprehensive risk analysis. To increase situational awareness, a lightweight, compact, airborne sensor capable of creating a day or night 360 degree picture of the incident site is required. Each of the 17 EOD flights and two regional training sites will need one system.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Short Range Reconnaissance Tools (3080)	**$70,000**	**$1,330,000**
Total		**$1,330,000**

EOD: MEDIUM-SIZED ROBOT

1. Background. ANG explosive ordnance disposal (EOD) requires a medium-sized robot with chemical, biological, radiological, and nuclear sensor integration, disruptor capability, day/night high resolution optics, stair-traversing abilities, and a digital radio communications capability. The system currently employed is too heavy, has proven to be unreliable, and lacks proper access capabilities. ANG requires 21 total systems, one for each of the 17 ANG EOD flights and four to support regional training sites.

2. Program Details.

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