

2023 WEAPONS SYSTEM MODERNIZATION
PRIORITIES BOOK



AIR NATIONAL
GUARD

FOREWORD



Our Nation requires a strong, modernized, well-equipped Air National Guard (ANG) that is **Ready Today**. Multiple nation-state threats, and global terrorism, continue their efforts to subvert the free and open international order. The ANG is an essential component of the Joint Force that will deter and, if necessary, defeat their efforts. In this drive to defend the values of the United States and with our allies and partners, the ANG provides a fight tonight capability, builds the future force, and, most importantly, **Defends the Homeland**.

The Air Reserve Component's Weapons and Tactics Conference (WEPTAC) brings together war-fighting experts in every major weapon system and industry leaders to develop innovative approaches to modernization and implement off-the-shelf solutions to some of the Joint Force's most pressing challenges.

First, National Guard and Reserve Equipment Account (NGREA) funding ensures the ANG is **Ready Today** by enabling ANG weapon systems to address high-priority requirements and capability gaps, increasing the lethality and survivability of our Airmen and their equipment. Second, NGREA ensures the Air Force is **Stronger Tomorrow** to address future threats and outpace our competitors. This guarantees our Airmen the strongest capabilities to win in conflict if deterrence fails to prevail. Finally, the National Guard has a close connection to the #1 NDS priority: **Defend the Homeland**. NGREA enables us to bolster defenses against kinetic and non-kinetic peer threats as well as manmade or natural disasters, ensuring the safety and security of every American.

The innovative warrior Airmen and industry leaders that collaborate annually at WEPTAC are a testament to the tremendous value of the Citizen-Airmen model of the ANG. Our Airmen will ensure our competitive advantage over any authoritarian challenger. This book distills the creative collaboration that is our competitive advantage into specific requirements that will ensure your ANG is Ready Today and Stronger Tomorrow. I look forward to transitioning these requirements into capability in the hands of our warfighters.

Your ANG – Always Ready, Always There

A handwritten signature in black ink, appearing to read 'M. A. Loh'.

MICHAEL A. LOH
Lieutenant General, USAF
Director, Air National Guard

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Introduction



The 2023 Air National Guard (ANG) Weapons Systems Modernization Priorities Book documents capability priorities identified during the October 2022 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 2023 WEPTAC Book is organized into eight sections identified by its appropriate Service Core Function or functional category.

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

The 2023 WEPTAC Book is further organized into 23 tabs. 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:

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 2022



State Matrix

Weapons System Reference Table by State (01 Dec 2022)

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

	A-10	B-2	C-17	C-130H/J	Special Mission C-130	C-32B, F-8C, C-40	F-15	F-35	F-16	F-22	HH-60	KC-135	KC-46	MQ-9	AOC, BCC, CRC	Cyber, Space	DCGS, MC-12W,	GA / ST / TACP	Range
AK			•	H	HC						•	•			BCC	Space		GA	
AL									•			•					DCGS		
AR				H										•		Cyber	DCGS		
AZ									•			•		•			RC-26B		
CA				J	HC		•				•			•		CY/SP(2)	DCGS	GA	
CO									•							Space(3)			Range
CT				H											CRC				
DC						C-40			•										
DE				H												Cyber			
FL							•								AOC	Space			
GA				H											CRC		DCGS	TACP	
GU																Space			
HI			•							•		•			AOC/BCC	Space	DCGS		
IA												•		•	CRC	Cyber	DCGS		DMO
ID	•															Cyber		TACP	
IL				H								•			AOC			TACP	
IN		•															DCGS	TACP	Range
KS												•			CRC	Cyber(3)	DCGS	TACP	Range
KY				H														ST	
LA							•											TACP	
MA							•										DCGS		
MD	•			H												Cyber(3)			
ME												•							
MI		•										•		•	AOC	Cyber			
MN				H					•										
MO		•		H											AOC				Range
MS			•									•			AOC/CRC			TACP	Range
MT				H															
NC			•	H														TACP	
ND														•			DCGS		
NE												•							
NH													•						
NJ						C-32B			•			•				Cyber		TACP	Range
NM					HC/MC						•						DCGS		
NV				H													DCGS		
NY			•		HC/LC						•			•	AOC/BCC	Space		GA/TACP	Range
OH				H					•			•		•	CRC				
OK									•								MC-12W	TACP	
OR							•								CRC			ST	
PA												•		•	AOC	Cyber		TACP	Range
PR				H											CRC				
RI				J												Cyber			
SC									•										
SD									•										
TN			•									•		•		Cyber	DCGS		
TX				H					•					•		Cyber		TACP	Range
UT												•			CRC		DCGS		
VA										•						Cyber	DCGS		
VI																			
VT							•	•								Cyber			
WA												•			BCC	Cyber(2)		TACP	
WI									•			•			CRC				Range
WV			•	H															
WY				H															

F-16

- **Interdiction/Precision Strike/Counter-Air/Counter-Sea**
- **Close Air Support Suppression/Destruction of Enemy Air Defenses**
- **Homeland Defense**
- **ANG F-16 Units Provide 35% of the Total Fleet**

ANG F-16s are engaged around the globe answering our nations call supporting operations, including NOBLE EAGLE and INHERENT RESOLVE. Since 2001, ANG F-16Cs have provided 56% of our nation's Aerospace Control Alert (ACA) force and fulfilled CENTCOM's vital need for precision strike, special operations, close air support (CAS) and extensive defensive counter-air.



The ANG operates 295 Block 30/32/40/42/50/52 F-16C/Ds. F-16s are the Combatant Commanders' most versatile and affordable fighter. The ANG has aggressively pursued value-oriented modernization efforts, to include retrofitting Active Electronically Scanned Array (AESA) radars, the fielding of advanced external targeting pods, and integration with 5th generation assets.

AESA radars (APG-83), secure line-of-sight and satellite communication suites with 3-Dimensional audio, advanced helmet-mounted target cueing, enhanced Electronic Warfare central computer, and advanced radar/electro-optical/infrared targeting pods all represent current ANG acquisition efforts.



F-16

FY 2023 Weapons and Tactics Conference

Critical Capabilities List

F-16C+/CM (Block 30/32/40/42/50/52)

- Rapidly reprogrammable digital radio frequency modulation (DRFM) electronic attack (EA) pod and advanced wide-band decoy
- Radio frequency (RF) compatible electronic warfare suite with advanced processing, digital radar warning receiver (RWR), and missile warning system (MWS)
- High power, open architecture processor capable of hosting advanced processing/fusion/correlation algorithms enabling 4th, 5th, and 6th generation interoperability as well as cooperative pairing and semi-autonomous operations
- Digital infrared search and track system (IRST) capable of completing a multispectral beyond-visual-range (BVR) passive kill chain
- Low latency, high bandwidth, resilient, secure, advanced datalink capability connected via wide band apertures with advanced processing for waveform generation

Essential Capabilities List

- Increased weapon carriage capability with “Common Flexible Weapons Interface”
- Carriage capability for advanced infrared (IR) and radio frequency (RF) expendable countermeasures
- Continued advanced targeting pod (ATP) development to enable

- increased target identification at range
- Tactical autopilot with auto-throttle, and an advanced flight control computer capable of supporting weapons delivery against both air and ground target(s)
- Reliable digital standby attitude and heading reference system

Desired Capabilities List

- Integrated Viper Electronic Warfare Suite (IVEWS)
- Expedite fielding of lightweight, color, night compatible helmet mounted display with 3-D audio
- Podded directed energy weapon for counter cruise missiles
- Modernized aircraft boresight enhancement program
- Certified area navigation approach capability
- P6 pod (ACMI) architecture to deliver blended live, virtual, constructive training

F-16: RAPIDLY REPROGRAMMABLE DIGITAL RADIO FREQUENCY MODULATION (DRFM) ELECTRONIC ATTACK (EA) POD AND ADVANCED WIDE-BAND DECOY

1. Background. All ANG F-16 aircraft require an immediate electronic protection/deception/attack capability in the form of both a rapidly reprogrammable digital radio frequency modulation (DRFM) pod and advanced wide-band decoy. Currently fielded defensive capabilities (ALQ-131, ALQ-184 & ALE-50) inadequately address present-day advanced threats. HAF plans for advanced electronic warfare (EW) Integrated Viper Electronic Warfare Suite will not be fully fielded until well after 2030; therefore, immediate acquisition of a proven electronic attack pod and active electronic decoy will bridge current capability gaps.

2. Program Details.

Quantity	Unit Cost	Program Cost
EA Pod Non-Recurring Engineering	N/A	\$3,000,000
72 EA DRFM Pods	\$1,500,000	\$108,000,000
Advanced Wide-Band Decoy Non-Recurring Engineering	N/A	\$5,000,000
Advanced Wide-Band Decoy(s)	N/A	50,000,000
Total		\$166,000,000

F-16: RADIO FREQUENCY (RF) COMPATIBLE ELECTRONIC WARFARE (EW) SUITE WITH ADVANCED PROCESSING, DIGITAL RADAR WARNING RECEIVER (RWR), AND MISSILE WARNING SYSTEM (MWS)

1. Background. ANG F-16 aircraft require a robust integrated EW suite to detect and react to current threats. Current ANG F-16s equipped with EW hardware designed in the 1980s are incapable of providing adequate defensive situational awareness against present-day threats and face significant sustainment issues. Upgrading to a digital RWR enables wide-band RF detection, while the MWS will provide awareness of missile launches, and the ALQ-213 will enable the synchronization of all elements within this advanced EW Suite. The advanced ALQ-213 serves as the foundational backbone for follow-on Integrated Viper Electronic Warfare Suite (IVEWS) upgrades. To avoid conflicting development with IVEWS, the advanced RWR will only focus on Blk 30/32/40/42, while the advanced ALQ-213 and MWS will be sought for all ANG F-16s.

2. Program Details.

Quantity	Unit Cost	Program Cost
Sensor Integration Unit Non-Recurring Engineering	N/A	\$4,020,000
72 SIU Kits	\$250,000	\$18,000,000
ALR-69A Non-Recurring Engineering	N/A	\$3,000,000
135 ALR-69A Upgrades	\$600,000	\$81,000,000
ALQ-213 Non-Recurring Engineering	N/A	\$5,000,000
200 Advanced ALQ-213 Kits	\$300,000	\$60,000,000
MWS Non-Recurring Engineering	N/A	\$10,000,000
104 MWS Sets	\$1,100,000	\$114,400,000
Total		\$295,420,000

F-16: HIGH POWER, OPEN ARCHITECTURE PROCESSOR CAPABLE OF HOSTING ADVANCED PROCESSING/FUSION/CORRELATION ALGORITHMS ENABLING 4TH, 5TH, AND 6TH GEN INTEROPERABILITY AS WELL AS COOPERATIVE PAIRING AND SEMI-AUTONOMOUS OPERATIONS.

1. Background. ANG F-16s require the ability to integrate with 5th and 6th generation platforms. The F-16 processor needs to be faster and more capable to integrate with more advanced platforms, sensors and datalinks. Currently ANG F-16s use parallel integrated processing (FCC, CDU and ALQ-213) that is already overextended. This effort provides rapid modernization while allowing progress via the Advanced Combat Fleet initiative. All ANG F-16s require a modernized open architecture processor and associated hardware and software.

2. Program Details.

Quantity	Unit Cost	Program Cost
FCC/MMC Non-Recurring Engineering	N/A	\$1,000,000
FCC/MMC Optimization Kits	Masked	Masked
Processor Display Generator Non-Recurring Engineering	N/A	N/A
72 PDG Kits	\$125,000	\$9,000,000
CDU Processor Non-Recurring Engineering	N/A	\$3,000,000
200 CDU Processor Kits	\$80,000	\$16,000,000
Total		+\$29,000,000

F-16: DIGITAL INFRARED SEARCH AND TRACK SYSTEM (IRST) CAPABLE OF COMPLETING A MULTISPECTRAL BEYOND-VISUAL-RANGE (BVR) PASSIVE KILL CHAIN

1. Background. ANG F-16 aircraft require an IRST to execute defensive counter air (DCA), cruise missile defense, and offensive counter air missions in a radio frequency denied environment. IRST systems provide an additional method of target location, tracking, and identification of airborne threats regardless of radar cross section and presence of electronic attack. An IRST will provide an improved capability for ANG F-16s to meet combatant commander requirements in homeland defense and DCA missions. All ANG F-16 squadrons require eight IRST kits along with spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
IRST Non-Recurring Engineering	N/A	\$10,000,000
72 IRST Kits	\$1,500,000	\$108,000,000
Total		\$118,000,000

**F-16: LOW LATENCY, HIGH BANDWIDTH, RESILIENT, SECURE, ADVANCED
 DATALINK CONNECTED VIA WIDE-BAND APERTURES WITH ADVANCED
 PROCESSING FOR WAVEFORM GENERATION**

1. Background. ANG F-16s require secure, high-speed, two-way data passage to operate in challenged/austere remote areas. Reception of off-board targeting, real-time threat information, mission assignment changes, air tasking orders, mission data files, and the sharing of aircraft sensor data is necessary for future operations. A low latency, high bandwidth, resilient data line-of-sight and beyond line-of-sight pathway for information passage will increase the F-16s ability to operate in joint, multi-generation aircraft package while maximizing situational awareness and allowing real-time dynamic targeting.

2. Program Details.

Quantity	Unit Cost	Program Cost
TTNT Non-Recurring Engineering	N/A	\$10,000,000
205 ARC-210 Gen 6 Radios with TTNT	\$500,000	\$102,500,000
Celestial Comm Non-Recurring Engineering	N/A	\$20,000,000
92 Celestial Comm Kits	\$2,000,000	\$184,000,000
Total		\$316,500,000

F-22

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

The ANG flies and maintains F-22s at all three F-22 basing locations. The ANG has two F-22 classic associate units and one operational F-22 squadron. Aerospace Control Alert (ACA) support is provided by F-22s flying out of Alaska and Hawaii. For the past 5 consecutive years, ANG 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, ANG 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 technological advances made by near peer competitors. Enhancements in fuel and communication systems will allow F-22s to maintain air dominance at longer ranges from support assets. Improved GPS capabilities and a helmet-mounted display will increase the F-22's distinct first-shot, first-kill advantage.

F-22

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Critical Capabilities List

- Helmet-Mounted Display
- Cockpit Global Positioning System Signal Repeater
- Data Link Improvements
- Agile Combat Cockpit Stowable Ladder, Chocks & -21 Kits
- ACES II 5th Gen Seat Kit Modernization

Essential Capabilities List

- Improved Simulator Capabilities
- Accurate Training Platforms for Peer Threats
- Combat Identification Improvements
- Common Countermeasure Dispensers and Controllers for F-22 and F-35 Aircraft
- External Multi-Communication Node and Beyond-Line-of-Sight Communications

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: 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 to within-visual-range engagements, the HMD also substantially increases friend and foe situational awareness during beyond-visual-range intercepts. HMD technology provides the capability to cue and verify high-off-boresight (HOBS) 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, unmanned systems, and cruise missiles. 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 less capable aircraft. The acquisition of an HMD for each ANG F-22 aircraft 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	N/A	\$41,000,000
50 Helmet Mounted Displays*	\$300,000	\$15,000,000
Total		\$56,000,000

* Includes 10% spares

F-22: COCKPIT GLOBAL POSITIONING SYSTEM SIGNAL REPEATER

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, especially considering the recent loss of Mode 4. 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. 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 21 ANG F-22 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
23 GPS Repeater Kits*	\$5,000	\$115,000
Total		\$115,000

* Includes 10% spares

F-22: DATA LINK IMPROVEMENTS

1. Background. ANG F-22s require improvements to data link infrastructure to improve interoperability with differing platforms. The F-22 has a very capable intra-flight data link system. The F-35 also has a very capable, but incompatible intra-flight data link system. In the future, both aircraft will be able to transmit and receive a Link-16 data link. However, a majority of the high-quality data available within F-22/F-35 formations will not be passed over Link-16. Upgrading the F-22 data link will allow more F-22 formation members to receive high-quality data and will allow for more F-22/F-35 data link interoperability. All 21 ANG F-22s require an updated data link capability.

2. Program Details.

Quantity	Unit Cost	Program Cost
Data Link Hardware Non-Recurring Engineering	N/A	\$69,000,000
23 Data Link Kits*	\$2,000,000	\$46,000,000
Total		\$115,000,000

* Includes 10% spares

F-22: AGILE COMBAT COCKPIT STOWABLE LADDER, CHOCKS & -21 KITS

1. Background. The F-22 currently lacks the capability for a pilot to exit the cockpit, safely chock the aircraft, unchock the jet, reenter the cockpit and launch without an F-22 specific ladder shipped from home station or a B-stand provided by a forward deployed airfield support team. Furthermore, the chocks are cumbersome, heavy and take up almost an entire 463L pallet for six aircraft. The ladders do not break-down, nor can they be carried on the jet. The ladders are aluminum and take up an entire pallet position for six jets. The cockpit stowable ladder and chocks enable agile combat employment in austere, agile tactics and self-sufficient aircrew. The chock solution should be usable by most, if not all, USAF fighter aircraft. The composite, collapsible ladder discussion may not apply to current fighter aircraft with internal ladders built in (e.g., F-15C, F-18, F-35), but it is influencing the NGAD fighter austere ladder requirements/capabilities. This tactical improvement provides operational and strategic capability enabling F-22 aircrew to forward deploy, land and bed down the aircraft with no external support. Additionally, the pilots can redeploy from the same location with no external support after collapsing the chocks, climbing the ladder and breaking the ladder down in the cockpit. These products are a vital, agile portion of the Agile Combat Employment the Air Force is grasping to solve.

2. Program Details.

Quantity	Unit Cost	Program Cost
24 Agile Combat Cockpit Stowable Ladder, Chocks and -21 Kits	\$100,000	\$2,400,000
Total		\$2,400,000

* Includes 10% spares

F-22: ACES II 5TH GEN SEAT KIT MODERNIZATION

1. Background. The F-22 currently uses a seat-kit that was designed to support 72 hour isolating events. Over the past two decades this served as an adequate requirement due to the Personnel Recovery (PR) coverage and availability of assets within the Area of Operations (AO) capable of conducting Combat Search and Rescue (CSAR). In fact, the average time of an isolating event within Afghanistan and Iraq was just over two hours, resulting in very little usage of the survival and evasion equipment found within the seat-kit. The USAF will not have the PR coverage nor the ability to penetrate near-peer Integrated Air Defense Systems (IADS) with our current CSAR assets. This will result in much longer isolating events, and ultimately require isolated persons (IPs) to rely greatly on their survival and evasion equipment to stay alive and avoid capture while isolated. This is especially true when we look at the 5th Generation airframes and the specific risks associated with their mission set. Due to the nature of their capabilities, 5th Gen aircrew members who find themselves behind enemy lines will undoubtedly be well outside the reach of any traditional Combat Search and Rescue Task Force. With that in mind, the current legacy survival and evasion equipment found within the seat-kit will not meet expected long term survival needs. 5th Generation airframe seat-kits need to be equipped to keep an IP alive for a minimum of 14 days while taking into consideration their basic survivor needs: IP signature management, IP sustenance requirements, IP power management, IP evasion requirements, IP personal protection requirements, IP medical requirements, IP signaling requirements, IP communication requirements, and IP recovery requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$23,000,000
23 BLOS Communication Hardware Kits*	\$2,000,000	\$46,000,000
Total		\$69,000,000

* Includes 10% spares

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 to the Combatant Commander and Homeland Defense. 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.

Continued full data link interoperability gives F-15C/Ds the required capability to combat the advanced threat, providing combatant commanders essential air superiority and homeland defense options.

Within , ANG F-15s deployed overseas and CONUS locations on Theater Security Packages in support of Combatant Commander taskings, ensuring continued American air dominance presence in contested airspace throughout the areas of responsibility. Finally, ANG F-15C squadrons also took part in joint & international exercises including Checkered Flag, Vigilant Shield, Neptune Hawk, Northern Edge, Valley Thunder, 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 improving aircraft capabilities for both overseas contingency operations and homeland defense. These upgrades recapitalize and repair long-range air superiority kill chains, while drastically increasing survivability in contested environments. These programs include the BU2 data link, new Air-to-Air weapons integration, multi-spectral search and track technologies, high-fidelity simulator upgrades and a modern integrated communications suite.

F-15

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Critical Capabilities List

- Data Link Interoperability
- Emerging Air-to-Air Weapons Integration
- Multi-Spectral Search/Track/Identification/Target with Advanced Data Link
- Rapid Updateable System Integration
- Capability to Develop Tactical Experts

Essential Capabilities List

- High-Fidelity Distributed Mission Operations-Capable Simulators with Modern Threat Replication
- Modernized Communications Suite Upgrade
- Modernized Range and Airspace / Threat Training System
- Modular Self Protection / Electronic Warfare System with Fiber Optic Towed Decoy

F-15: DATA LINK INTEROPERABILITY

1. Background. ANG F-15s require full secure data link interoperability to ensure safety-of-flight, continued lethality during combat operations, and effective command and control specifically during homeland defense missions. Legacy Link-16 crypto expired January 1, 2022 per National Security Agency mandates. When this occurred, any aircraft equipped with a legacy Link-16 terminal and outdated, unusable crypto no longer had fighter data link (FDL). FDL is a key enabler of United States airpower and is a mandatory equipment item for Combatant Command employment in any Area of Responsibility worldwide. Link-16 age-out (without replacement) is a significant DoD-wide capability gap. For the F-15C in particular, only a certain subset of designated “Platinum” or long-term Eagles are slated to receive the Advanced Data Core Processor-II (ADCP-II) or central computer upgrade. That modification also comes with the modern Multifunctional Information Distribution System – Joint Tactical Radio System (MIDS-JTRS). The MIDS-JTRS terminal replaces the legacy FDL line-replaceable unit. Due to ADCP-II program funding reductions and modification delays, there is uncertainty on total number of F-15Cs being capable of datalink interoperability to retain combat effectiveness. All of these aircraft reside or will reside in ANG squadrons. To ensure that all long-term “Platinum” Eagles are fully combat-capable, the remaining F-15C/D’s, which are not allocated a MIDS-J/ADCP-II kit, must receive a Block Upgrade 2 (BU2) Link-16 terminal to allow the use of modern crypto. This would also immediately re-enable these aircraft to utilize their inherent Infrared Search and Track, a capability that ADCP-II aircraft will not have until CY23. 45 ANG F-15s require BU2 Terminal Conversion Kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
51 F-15C BU2 Terminal Conversion Kits*	\$92,000	\$4,692,000
Total		\$4,692,000

* Includes 10% spares

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: EMERGING AIR-TO-AIR WEAPONS INTEGRATION

1. Background. The rapid advancement in enemy threat weapons has degraded the F-15C's ability to retain first launch and first kill opportunities. Therefore, air dominance F-15C aircraft require the ability to carry and employ the latest air-to-air weaponry to remain viable in today's high-end fight and to protect the homeland. To accomplish this, the F-15C's Operational Flight Program must be amended to support the latest air-to-air weapons. Lastly, hardware must be procured to allow carriage of new weapons that do not conform to legacy weapons stations. Weapons systems identified for divestment will focus on safety of flight and timeline-focused modernization programs.

2. Program Details.

Quantity	Unit	Program Cost
New Air-To-Air Weapons Non-Recurring Engineering	N/A	\$10,000,000
128 Missile Launchers	\$1,000,000	\$128,000,000
Total		\$138,000,000

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

**F-15: MULTI-SPECTRAL SEARCH/TRACK/IDENTIFICATION/TARGET WITH
ADVANCED DATA LINK**

1. Background. ANG F-15Cs require multi-spectral search/track/identification/target systems with advanced data link on all 128 “Platinum” Eagles. 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 F-15Cs 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.

2. Program Details.

Quantity	Unit	Program Cost
IRST Pod Non-Recurring Engineering	N/A	\$10,000,000
100 IRST Pods	\$3,500,000	\$350,000,000
Total		\$360,000,000

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: RAPID UPDATEABLE SYSTEM INTEGRATION

1. Background. The rapid advancement in enemy threat weapons has degraded the F-15Cs ability to retain first launch and first kill opportunities. Therefore, air dominance F-15C aircraft require the ability to carry and employ the latest Air-To-Air weaponry to remain viable in today's high-end fight as well as protect the homeland. To accomplish this, the F-15Cs Operational Flight Program (OFP) must be amended to support the latest Air-To-Air weapons. Lastly, updating software capability to tie into the open system of the Eagle is required to provide modern software.

2. Program Details.

Quantity	Unit Cost	Program Cost
Writing Software Capability	1	\$700,000
Total		\$700,000

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-15: CAPABILITY TO DEVELOP TACTICAL EXPERTS

1. Background. ANG F-15C/Ds are presently projected to divest in 3 years. This forecast prompted the F-15C Weapons Instructor Course (WIC) to cease producing graduates starting in FY21. The F-15C is currently being employed and is projected to be around past initial divestment plans. This has created a WIC graduate shortage in a community that demands a tactical subject matter experts. There is a significant need for Weapon Officers or the ability to produce tactical leaders who will lead the remaining 6 guard squadrons tactically until divestment. F-15C Weapon Officers are required until 2027. The F-15C Weapon School needs to be replaced by producing tactical experts in-house by mimicking a weapons school syllabus. To validate in-house Weapons School training, future Weapon Officers need to travel Nellis AFB for one month during integration training for 5-6 jets, 1-2 students and 3-4 instructor pilots.

2. Program Details.

Quantity	Unit Cost	Program Cost
In-House WIC Syllabus Training	6	\$500,000
Total		\$3,000,000

As a weapon system identified for divestment, modernization efforts will focus solely on safety of flight and near-term sustainment requirements.

F-35A

- **Offensive Counter Air (SEAD / Escort)**
- **Defensive Counter Air**
- **ARC F-35 Units Will Provide 30% of CAF Fleet in 2025**



The F-35A Lightning II (aka “Panther”) will be the backbone of American airpower for the foreseeable future under ACC’s fighter roadmap model. Combatant Commanders globally send continuous demand signals for F-35 presence as an instrument of strategic messaging and credible combat capability. Although the ARC currently has only 20 F-35A, all located in South Burlington, Vermont, over the next 36 months, 18 PAA squadrons will be fielded in Madison, Montgomery, Jacksonville and Fort Worth (24).

In 2022, ANG F-35s rapidly deployed to EUCOM on short notice crisis fulfilling a Combatant Commander’s Fifth Generation aircraft requirement. This agile voluntary deployment demonstrated ARC manpower readiness and an ability to satisfy COCOM intent. It also encapsulated an efficient two year conversion which featured joint & international exercises including a Red Flag, Checkered Flag, Northern Lightning, and WSEP.



Despite a relatively young aircraft fleet, modernization is already a critical priority in the rapidly changing landscape of software defined combat capabilities. Although the F-35’s external low observable design will remain formidable in a large capacity force, it’s ability to evolve and modernize internally will be the key to success. These modernization efforts should include relevant and rapid Mission Data File reprogramming via Crowd Sourced Flight Data across multi level security domains, beyond line of sight communications,

and advanced tactical datalinks to leverage multi domain common operating pictures and future Collaborative Combat Aircraft (CCA). Additionally F-35s require omni-directional electronic attack and protection throughout a broader scope of the electromagnetic spectrum and better access to multi-static and passive long range kill chains.

F-35A

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Critical Capabilities List

- Relevant and Rapid Electronic Warfare Mission Data Reprogramming, Enabled by Multi-Domain CSFD; Mitigate Multi-Level Security Barriers
- Beyond Line-of-Sight Communication
- Advanced Tactical Datalink to Leverage Multi-Domain Common Operating Picture and Future Collaborative Combat Aircraft (CCA)
- Omni-Directional Electronic Attack/Protection Throughout Expanded Frequency Range
- Develop and Enable Multi-Static and Passive Long Range Kill Chains

Essential Capabilities List

- Modernized Training Ranges and Airspace with Low-Cost, High-Density Emitters and High-Fidelity Surrogates Integrated with High Fidelity Offboard Tracking, Synthetic/Embedded Threats, and Secure Communication with RTO
- 8-ship Home-Station Simulator (Software Concurrent with Advanced Threat Environment) Training to Meet Ready Aircrew Program Tasking Message

F-35: RELEVANT AND RAPID ELECTRONIC WARFARE MISSION DATA REPROGRAMMING, ENABLED BY MULTI-DOMAIN CROWD SOURCE FLIGHT DATA; MITIGATE MULTI-LEVEL SECURITY BARRIERS

1. Background. As a software defined aircraft, all F-35s required accurate Mission Data File (MDF) programming to maximize organic sensor capabilities to kill and survive in the modern battlespace. Programming is a constantly moving target because threats evolve quickly, intelligence information is imperfect, and government induced multi-level security barriers often prevent end-users from receiving timely, accurate and reliable information. Current processes must be streamlined, and new software tools should be procured to leverage currently fielded Crowd Source Flight Data being delivered via Quick Reaction Instrumentation Package (QRIP) to the MDF reprogramming lab at USRL. With multiple information sources available from the F-35 and other channels of the Intelligence Community, the first key obstacle to overcome is multi-level security barriers. The second key is supplying more automated and intelligent software tools to analyze information and implement relevant changes to MDFs.

2. Program Details.

Quantity	Unit Cost	Program Cost
MDF Non-Recurring Engineering	N/A	\$20,000,000
Total		\$20,000,000

F-35: BEYOND LINE-OF-SIGHT COMMUNICATIONS

1. Background. The F-35 currently has no fielded beyond line-of-sight (BLOS) Communication capability. When considering kill chains which extend beyond a few hundred miles, this presents an obvious obstacle in connecting multi-domain sensors to shooters at the tactical edge.

2. Program Details.

Quantity	Unit	Program Cost
BLOS Non-Recurring Engineering	N/A	\$12,000,000
20 BLOS Kits	\$2,500,000	\$30,000,000
Total		\$42,000,000

**F-35: ADVANCED TACTICAL DATALINK TO LEVERAGE MULTI-DOMAIN
COMMON OPERATING PICTURE AND FUTURE COLLABORATIVE
COMBAT AIRCRAFT**

1. Background. ANG F-35s require more advanced tactical datalink capabilities to leverage multi-domain common operating pictures and future Collaborative Combat Aircraft. In addition to Link 16, the F-35 currently uses Multifunction Advanced Data Link to transmit a variety of threat detection, identification, tracking and weapons information. Although it is a robust network, it remains disconnected from many important sensors and ISR platforms which would be critical links in executing long range kill chains. F-35 software defined Communications, Navigation and Identification systems architecture provide programming opportunities for an improved integrated yet distributed force structure.

2. Program Details.

Quantity	Unit	Program Cost
Datalink Radio Non-Recurring Engineering	N/A	\$10,000,000
20 Datalink Radios	\$1,000,000	\$20,000,000
Total		\$30,000,000

**F-35: OMNI-DIRECTIONAL ELECTRONIC ATTACK/PROTECTION
THROUGHOUT EXPANDED FREQUENCY RANGE**

1. Background. ANG F-35s require additional non-kinetic effects in the electromagnetic spectrum. Hardware and software modifications are required to enhance lethality and survivability throughout the spectrum.

2. Program Details.

Quantity	Unit Cost	Program Cost
Electronic Attack System Non-Recurring Engineering	N/A	\$25,000,000
20 Electronic Attack Kits	\$3,000,000	\$60,000,000
Total		\$85,000,000

**F-35: DEVELOP AND ENABLE MULTI-STATIC AND PASSIVE LONG RANGE
KILL CHAINS**

1. Background. ANG F-35s must develop and enable participation in multi-static and passive long range kill chains. Dynamic targeting processes are traditionally described by several key phases — find, fix, track, target, engage, and assess. Each phase has significant challenges and requirements to be effective. Succeeding in multi-domain battles with dispersed friendly and adversary sensors, battle managers and shooters will require better technological integration for F-35s, as a primary MDS in the air domain.

2. Program Details.

Quantity	Unit Cost	Program Cost
Multi-Static System Non-Recurring Engineering	N/A	\$20,000,000
20 Multi-Static System Kits	\$2,000,000	\$40,000,000
Total		\$60,000,000

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 can 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 provide flexibility beyond that of other fixed-wing Air Force close air support assets. Its extensive loiter time and advanced targeting pod capabilities provide superior support for ground forces in its Forward Air Controller-Airborne role.



The ANG operates 84 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 missions.



Current A-10 modernization priorities include a high-definition tablet, which allows pilots to see the high-definition picture provided by targeting pods. Display upgrades improve an 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-canceling a three-dimensional cockpit audio system, and an anti-jam embedded Global Positioning System.

A-10

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Critical Capabilities List

- Carriage and Integration of Advanced Weapons to Support 5th/6th Generation Operations in a Contested, Degraded, and Operationally Limited Environments
- Automated, Digital Electronic Warfare Suite
- Digital High-Definition Targeting Pod, Interface, Display, and Recording
- Find, Fix, and Target Within a Contested, Degraded, and Operationally Limited Environment
- Upgrade Communications Systems to Function within Contested, Degraded, and Operationally Limited Environments

Essential Capabilities List

- Open Systems Architecture Computing System with Increased Processing Capacity
- Integrate Fire and Forget Autonomous Targeting and Sorting Anti-Armor Weapon Capable of Standoff from Modern Threat Systems from All Altitudes in a Contested, Degraded, and Operationally Limited Environment
- Counter-Unmanned Aircraft Systems (UAS)/Small Unmanned Aircraft System (SUAS) and Counter-Cruise Missile Engagement Capability
- Rapid and Agile Hardware Integration Capability
- Digital Suspension Equipment Integration (1760/Ethernet to All Stations)

Desired Capabilities List

- Multi-Domain, Multi-Spectrum Electronic Attack Capability
- Standardized Squadron Deployable Communications and Mission Planning Suite
- Ability to Receive and Display the Common Integrated Broadcast (CIB)

**A-10: CARRIAGE AND INTEGRATION OF ADVANCED WEAPONS TO SUPPORT
5TH / 6TH GENERATION OPERATIONS**

1. Background. ANG A-10s require an enhanced ability to support operations in high-threat areas of operation by integrating additional standoff munition capabilities. These capabilities provide combatant commanders the flexibility to integrate ANG A-10s into operations that directly support 5th / 6th generation operations while augmenting 4th generation operations by freeing up valuable weapons stations on F-16, F-15E, F-18, B-1, and B-52 aircraft. Standoff munitions integration can initially be accomplished through the employment of ADM-160, while future standoff munitions integration should include AGM-158. Additionally, integration and carriage of AIM-9X as well as AIM-120 is also required. The ability of the A-10 to forward deploy to austere locations, combined with a robust combat radius, offers combatant commanders, and their planners, a remarkable upgrade to options available in highly contested areas of operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
ADM-160 Integration Non-Recurring Engineering	N/A	\$1,000,000
AGM-158 Integration Non-Recurring Engineering	N/A	\$11,000,000
Single Rail Launcher capable of AIM 9X/AIM 120 Carriage Integration Non-Recurring Engineering	N/A	\$10,000,000
Integration and Carriage of AIM-9X Non-Recurring Engineering	N/A	\$7,000,000
Integration and Carriage of AIM-120 Non-Recurring Engineering	N/A	\$10,000,000
Total		\$39,000,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

A-10: AUTOMATED DIGITAL ELECTRONIC WARFARE (EW) SUITE

1. Background. The A-10 EW suite requires considerable modernization to keep pace with surface-to-air threat technology advancements and proliferation. The Air Force identified these vulnerabilities in the 2012 A-10 Operational Viability and Sustainment Gap Analysis Report. A-10 EW modernization requires a focus on several critical capabilities in the radio frequency spectrum: radar warning receiver (RWR) modernization and improved countermeasures program development. The A-10 fleet has a legacy analog electronic attack (EA) Pod (ALQ-184). All require replacements that are digital-based. A-10 vulnerabilities in the infrared (IR) spectrum must also be addressed through the development of IR countermeasures (IRCM) which effectively decoy modern IR threats by replacing the AAR-47 with a missile warning system capable of detecting those threats more reliably and at greater distances. Modernized EW suite subsystems, architecture, and countermeasures will allow the A-10 to conduct full-spectrum combat operations in most contested environments. Each of the 84 ANG A-10s require an ALR-69A kit and advanced IRCM system as well as a new EA pod.

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A RWR Non-Recurring Engineering	N/A	\$5,000,000
93 ALR-69A Upgrades*	\$800,000	\$74,400,000
Advanced IRCM System Non-Recurring Engineering	N/A	\$10,000,000
93 Advanced IRCM Systems*	\$500,000	\$46,500,000
Advanced Countermeasures Integration	N/A	\$5,000,000
EA Pod Non-Recurring Engineering	N/A	\$10,000,000
89 EA Pod Replacement	\$2,000,000	\$178,000,000
Total		\$328,900,000

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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

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 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-definition displays in the A-10 enable full utilization of targeting pod color improvements. A modern digital camera and video recorder capable of recording high-definition video of Heads-Up Display and forward pilot view as well as the high-definition display in full resolution is required. This modification will fulfill classified recording and data storage requirements of the current Digital Video Air Data Recorder system and comply with cybersecurity mandates regarding classified data storage and removable media. Each of the 84 ANG A-10s require an upgraded high-definition display, a second Gigabit Ethernet switch as well as video recorders and data servers.

2. Program Details.

Quantity	Unit Cost	Program Cost
High-Definition Display Non-Recurring Engineering	N/A	\$9,000,000
93 High-Definition Displays*	\$420,000	\$39,060,000
93 2nd Gigabit Ethernet Switches*	\$27,100	\$2,520,300
Video Recorder and Data Server Non-Recurring Engineering	N/A	\$1,000,000
93 Video Recorder and Data Server*	\$131,260	\$12,207,180
Ground Equipment	\$325,000	1,300,000
Total		\$65,087,480

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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. 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 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 84 ANG A-10s require an anti-jam EGI. Adding a Synthetic Aperture Radar (SAR) pod enables an all-weather targeting advantage.

2. Program Details.

Quantity	Unit Cost	Program Cost
Anti-Jam EGI Non-Recurring Engineering	N/A	\$15,500,000
93 Anti-Jam Kits*	\$225,000	\$20,925,000
SAR Pod Integration Non-Recurring Integration	N/A	\$10,000,000
Total		\$46,425,000

* Includes 10% spares

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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 three-dimensional (3D) audio, enhanced data link and associated equipment. Two ARC-210 Generation (Gen) 6, Mobile User Objective System (MUOS) multi-mode digital radios, meet the need for simultaneous beyond-line-of-sight and secure line-of-sight communications. The integration of noise-canceling 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 Helmet Mounted Cueing System (HMCS). Spatial separation and reduction in ambient noise significantly increase the pilot's ability to process information simultaneously arriving from multiple radios and warning systems. Legacy Situational Awareness Data Link (SADL) equipment has proven inadequate due to a lack of currently fielded support infrastructure, frequency band constraints, and Joint Interface Control Cell support. The transition of A-10 aircraft to Link 16 will allow seamless deployment, connectivity, and interoperability with the entire A-10 fleet. All ANG A-10s require growth in data link equipment due to the future mandates that will eliminate current SADL communications equipment.

2. Program Details.

Quantity	Unit Cost	Program Cost
ARC-210 Gen 6 MUOS Capable Radios Non-Recurring Engineering	N/A	\$3,000,000
186 ARC-210 Gen 6 MUOS Radios* **	\$100,000	\$18,600,000
Directional Audio Non-Recurring Engineering	N/A	\$5,000,000
93 Directional Audio Kits*	\$80,000	\$7,440,000
200 Directional Audio Pilot Equipment*	\$7,000	\$1,400,000
12 Unit Test Equipment*	\$45,000	\$540,000
Data Link (Link 16) Non-Recurring Engineering	N/A	\$3,000,000
84 Data Link Upgrades	\$600,000	\$50,400,000
Total		\$89,380,000

* Includes 10% spares

** Two radios per aircraft

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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 primary 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

- C-17 Self-Protection
- Common Mobility Air Forces Mission Computer
- Extended Range Modification
- Common Maintenance Computer
- Ground Operations Communication System Modernization

Essential Capabilities List

- Automated-Hardened Position, Navigation, and Timing Solution
- Aircraft Crew Rest Enhancement
- Objective Area Situational Awareness Imaging Sensors
- Improved Defensive System Control
- Universal Shoring Kit

Desired Capabilities List

- External View System
- Light Emitting Diode Lights
- Internal Power Solutions
- Enhanced Flight Vision System in Heads-Up Display
- Cockpit Security Enhancement and Storage

Rapid Global Mobility
C-17: C-17 SELF-PROTECTION

1. Background. ANG C-17s require self-defense capabilities to detect and defeat enemy threats designed to target large Mobility Air Forces aircraft. To detect these threats, C-17s require an open mission system digital backbone capable of processing at the forward edge, and integrating the platform into Advanced Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, C-17s require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. The ANG C-17 fleet requires a common carry pod with open-architecture that is capable of quick modifications to address ever-changing contested environments. To increase survivability, 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. Modular defensive systems provide a method for low-cost, simplified improvements to infrared detection and suppression capabilities, and degrading the enemy's ability to engage C-17 aircraft. 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. Hardware for this digital backbone on the ANG C-17 fleet can be installed via a mission design series-specific aircraft-to-pylon interface for a mobility air forces common hardpoint. All 50 ANG C-17s require RWR, power and data to the hardpoints, and 12 common carry pods.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering	N/A	\$12,000,000
50 RWR Group A Kits	\$250,000	\$12,500,000
50 RWR Group B Kits	\$500,000	\$25,000,000
50 Hard-Point Kits	\$500,000	\$25,000,000
12 Mobility Air Forces Common Carry Pods)	\$2,500,000	\$30,000,000
Total		\$104,500,000

Rapid Global Mobility

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) nodes, and ground-based forces via line-of-sight and beyond-line-of-sight means. 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 nodes the ability to track mission progress and facilitate rapid decisions and adjustments during mission execution. C-17s operating across vast geographic areas can provide C2 reach-back capabilities to mitigate Electromagnetic (EM) spectrum degradation in a contested environment. Next-generation military ultra-high frequency (UHF) satellite communication (SATCOM) radios and Ku/Ka radios provide both data and voice using satellites operating outside of traditional data link bandwidths. Inflight access to secure and unsecure high-speed internet data is a foundational capability upon which beyond-line-of-sight tactical datalink can be built. This enables the crew to receive real-time updates for weather, departure, and landing information, as well as provides C2 reach-back capability and can serve as a critical node for Joint All Domain Command and Control. Integrated secure 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 as well as display tactical information. ANG C-17s require one set of installation components for each of the 50 airframes and tactical display emulator software at each base to effectively employ data link tactics, techniques, and procedures as well as integration into existing aircrew simulators.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non Recurring Engineering	N/A	\$15,000,000
55 C-17 Group A Kits*	\$100,000	\$5,500,000
55 C-17 Group B Kits*	\$750,000	\$41,250,000
55 C-17 Data Link Processors*	\$100,000	\$5,500,000
55 Electronic Flight Bags*	\$240,000	\$13,200,000
55 UHF SATCOM Kits*	\$475,000	\$26,125,000
Emulator Software	\$4,000,000	\$4,000,000
50 High-Speed Data Systems	\$1,500,000	\$75,000,000
Total		\$185,575,000

* Includes 10% spares

Rapid Global Mobility

C-17: EXTENDED RANGE MODIFICATION

1. Background. ANG C-17As will continue to play an important role supporting United States Transportation Command missions, especially in the USINDOPACOM area of operation. The C-17A, with Extended Range (ER) fuel tanks installed, has the capability to carry an additional 65,000 pounds of fuel and fly an additional 1,800 NM (empty aircraft) when compared to non-ER C-17As. This added capability reduces the need for fuel stops, enables faster cargo delivery and results in less wear and tear on the aircraft due to eliminating landing and takeoff cycles and reduces the fuel required at forward operating bases. ER fuel tanks also reduce the need for air-to-air refueling, freeing up critical airborne tanker assets for other operational requirements. 19 remaining ANG C-17As require extended range fuel tank modification.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 Extended Range Fuel Tanks	\$12,000,000	\$228,000,000
Total		\$228,000,000

Rapid Global Mobility

C-17: COMMON MAINTENANCE COMPUTER

1. Background. ANG C-17s require a maintenance computer to monitor, record, and share aircraft data bus information to enable Conditions-Based Maintenance and provide interface with tactical datalink systems. This capability improves fleet-wide mission capable rates, decreases enroute downtimes, and preserves long-term health of the fleet. ANG C-17s have limited ability to capture aircraft system fault data, requiring reactive maintenance actions at main operating bases and while in austere enroute locations. To allow real-time proactive troubleshooting and positioning of repair parts and personnel, the maintenance computer should record all aircraft databus parameters at native rates and be able to transmit over beyond-line-of-sight links inflight and on the ground. The system should also provide interface for tactical datalink solutions to extract aircraft parameters for integration with Joint All Domain Command and Control architectures. Flight data should be available for post-flight aircrew debriefs to improve training value and reduce future training requirements. Data will also be available for fleet-wide safety trend analysis and fuel savings optimization.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$1,000,000
50 Maintenance Computers	\$100,000	\$5,000,000
Total		\$6,000,000

Rapid Global Mobility

C-17: GROUND OPERATIONS COMMUNICATION SYSTEM MODERNIZATION

1. Background. During C-17 ground operations, it is imperative to minimize the ground time in hostile locations to maximize aircrew and aircraft protection. C-17 loadmasters and maintenance personnel are only equipped with cord-based communication systems that limit both freedom of movement and flexibility in communication locations. Additionally, corded communication systems make it difficult for loadmasters to interact with ground and cargo loading personnel due to the finite cord length. A wireless communication system will provide significant enhancement for loadmaster and ground personnel operations. The optimal wireless communication configuration would include a slim, user-friendly, noise-cancelling platform, which provides ear protection, freedom of movement, constant and reliable communication between the aircrew and ground personnel, extended range (100 meters from aircraft fuselage), and extended battery life. Direct benefits of such a system include more efficient ground times, safer loading and unloading conditions, added lookout and security options, and reduced permanent damage to air and ground crew hearing. Indirect benefits include better crew resource management and integration with supported and supporting personnel including Ravens, Flying Crew Chiefs, Jumpmasters, Medical Crew Directors, and fueling crews for Specialized Fuel Operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$2,000,000
150 Wireless Communication Systems	\$4,000	\$600,000
Total		\$2,600,000

Rapid Global Mobility

C-130 H/J

- **Tactical Airlift**
- **ANG C-130 Units Provide 48% of the Total Fleet**

With a legacy lasting over 63 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, fuel efficiency, 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

- Common MAF Mission System
- C-130H Self-Protection
- Increased Fuel Capacity and Delivery
- Propulsion System Upgrades
- Updated Avionics/Instrumentation and Associated Training Devices

C-130J

- Common MAF Mission System
- C-130J Self-Protection
- Increased Fuel Capacity and Delivery
- Enhanced Flight Vision System
- Secure Global High-Speed Data

Essential Capabilities List

C-130H

- Secure Global High-Speed Data
- Radar Replacement
- Enhanced Cargo Compartment
- Self-Contained Contested Training Suite
- LED Landing Lights

C-130J

- Radar Replacement
- Tactical Plot Suite
- Enhanced Cargo Compartment
- Self-Contained Contested Training Suite
- Hardened Precision Navigation and Timing

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

C-130H: COMMON MAF MISSION SYSTEM

1. Background. The ANG C-130H fleet requires scalable, reliable, comprehensive, and networked battlespace awareness. The real-time information in the cockpit (RTIC) system allows C-130 aircraft to participate in multiple data link networks using technologies fielded on other DoD assets. The system must be upgraded to support Joint Range Extension Application Protocol-C and Mobile User Objective Systems through the installation of a new ARC-210 Gen 6 radio. In addition, the system needs the Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) and ultimately a Tactical Targeting Network Technology (TTNT) with self-healing, jam resistance capabilities. 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 geolocation, route replanning, 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. A Special Mission Processor enables integration of third-party software and hardware allowing the C-130H to rapidly and effectively innovate solutions at the speed of modern combat. All 101 C/LC-130H aircraft need common adaptable mission systems with integrated AIECS.

2. Program Details.

Quantity	Unit Cost	Program Cost
AIECS Non-Recurring Engineering	N/A	\$5,000,000
91 AIECS Kits	\$150,000	\$13,650,000
91 ALR-69A Gen 6	\$145,000	\$13,195,000
91 MIDS-JTRS Terminals	\$130,000	\$11,830,000
91 Special Mission Processors	\$150,000	\$13,650,000
Total		\$57,325,000

C-130H: SELF-PROTECTION

1. Background. The ANG C-130H fleet requires self-defense capabilities to detect, deny and defeat modern factor threats specifically designed to target large Mobility Air Forces aircraft. To detect these threats, C-130Hs require an open mission system compliant digital backbone executing processing at the forward edge and connecting the platform to Air Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, C-130Hs require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. To survive in modern combat, C-130J aircraft require a digital Radar Warning Receiver (RWR) capable of providing situational awareness on millimeter wavelength systems in addition to legacy systems, with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment. The ability to dispense active expendable RF countermeasures is necessary to the C-130Hs survival against peer threats. To defeat advanced threats in the IR spectrum, C-130Hs require an Infrared Suppression System (IRSS) capable of reducing the aircraft’s heat signature from engine exhaust in all aspects. Updated LED landing lights would significantly reduce the RF signature during the critical landing phase. Additionally, Block 30 or Block 35 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) system will improve detection against advanced man-portable air defense systems threats, while degrading the enemy’s ability to engage and replacing an ageing and obsolete LAIRCM systems. Many of these solutions can be accomplished utilizing a common carry open-architecture mission pod capable of supporting the current and future networked architecture, and flexible enough to be quickly altered to address contested environments. The open-architecture mission system will provide additional capacity for electronic attack/electronic protection. The open-architecture pod requires hard-points for 91 unmodified C-130Hs, 34 common carry pods, 91 LAIRCM Group A kits and Group B kits, 91 RF Group A and 91 Group B Kits, and 24 digital RWR kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
91 C-130H Next-Generation RF Group A Kits	\$120,000	\$10,920,000
91 C-130H Next-Generation RF Group B Kits	\$775,000	\$70,525,000
24 C-130H ALR-69As	\$500,000	\$12,000,000
IRSS Non-Recurring Engineering	N/A	\$5,000,000
91 IRSS Kits	\$1,000,000	\$91,000,000
91 LED Landing Lights Kits	\$60,000	\$5,460,000
91 C-130H LAIRCM Group A Kits	\$1,500,000	\$136,500,000
91 C-130H LAIRCM Group B Kits	\$3,000,000	\$273,000,000
34 Active Expendable Countermeasures	\$300,000	\$10,200,000
34 MAF Common Carry Pods	\$2,000,000	\$68,000,000
91 Hard-Point Installations	\$330,000	\$30,030,000
Total		\$712,635,000

C-130H: INCREASED FUEL CAPACITY AND DELIVERY

1. Background. The C-130H fleet requires an increase in fuel capacity and delivery capability to provide aerial delivery in large and geographically dispersed theaters of operation such as the INDOPACOM theater. The C-130H requires Increased Wing Fuel (IWF) to increase fuel capacity by more than 4,000 pounds and 300 nautical miles in range by reconfiguring wing tank plumbing and valves. IWF enables transportation of more fuel for Agile Combat Employment specialized fueling operations. Transporting fuel and performing fueling operations for Combat Air Forces aircraft is a critical role for the C-130H. IWF reduces fuel stops, increases loiter time and extends the C-130H's combat range. All C-130Hs require IWF to increase fuel efficiency and range.

2. Program Details.

Quantity	Unit Cost	Program
IWF Non-Recurring Engineering	N/A	\$5,000,000
91 IWF Kits and Installs	\$175,000	\$15,925,000
Total		\$20,925,000

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. Additional upgrades are needed to address NP2000 spinner and blade de-icing capability to ensure optimal performance in icing conditions. Each NP2000 kit contains four nacelle kits and each T-56 3.5 kit contains four-engine upgrades. All 91 ANG C-130H models require propulsion system upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
91 NP2000 Kits and Installs	\$3,200,000	\$291,200,000
91 T-56 3.5 Modified Engines and Installs	\$4,200,000	\$382,200,000
Total		\$673,400,000

C-130H: UPDATED 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. Additionally, tactical night operations continue to suffer from non-night vision imaging system (NVIS) compliant lighting. To eliminate critical sustainment issues due to diminishing manufacturing sources, this modernized cockpit will include: a multifunction engine instrument display system, NVIS compatibility, and a modern flight management system with a global positioning system approach and polar navigation capabilities. An NVIS-compatible and modernized glass cockpit, to include digital overhead panel, reduces crew workload, lowers maintenance costs, and increases capability and sustainability to operate safely at night. The integration of a noise-canceling, three-dimensional (3D) enhanced, voice activated transmit intercom system increases situational awareness through directional audio correlated to the most significant factor threat. Additionally, this system will reduce excess aircraft noise, eliminate the push-to-talk requirement of the current system, and ultimately reduce crew fatigue while increasing crew resource management. Mobile User Objective Systems (MUOS) and Second Generation Anti-jam Tactical UHF Radio for NATO (SATURN) Beyond-Line-of-Sight radios must be integrated to make the C-130H viable in the future fight. The C-130 requires secure global high-speed data access to realize Air Battle Management System and access the common operating picture that will be vital to any future conflict. It is imperative that infrastructure for future capability upgrades must be installed while the cockpit undergoes this significant modification. All 114 C/LC-130H models require updated avionics kits, digital overhead panels, and NVIS compatibility kits, 3D audio kits, and an ARC-210 Gen 6 radio. All Weapons Systems Trainers require conversion to the same modernized cockpit suite, all 12 units require access to Distributed Mission Operations Capable, level 6 or higher.

2. Program Details.

Quantity	Unit Cost	Program Cost
Avionics Upgrade Non-Recurring Engineering	N/A	\$50,000,000
114 Avionics Kits	\$2,800,000	\$319,200,000
114 NVIS Compatibility Kits	\$465,000	\$53,010,000
12 Aircrew Training Devices	\$14,000,000	\$168,000,000
114 Digital Overhead Panels	\$150,000	\$17,100,000
Directional Audio NRE	N/A	\$5,000,000
114 Intercom Kits	\$50,000	\$5,700,000
114 MUOS/SATURN BLOS Radios	\$130,000	\$14,820,000
Total		\$632,830,000

Rapid Global Mobility

C-130J: COMMON MAF MISSION SYSTEM

1. Background. ANG C-130Js require integrated battlespace awareness. Real-time information in the cockpit (RTIC) and Multifunctional Information Distribution System Joint Tactical Radio System (MIDS-JTRS) provide global data link communications, secure beyond-line-of-sight, and line-of-sight capabilities. RTIC and MIDS-JTRS offer a permanent modification to the aircraft and provides the capability to integrate with the advanced integrated electronic combat system (AIECS). AIECS provides capabilities for onboard and off-board threat correlations, data sharing, on-board radar threat system geolocation, and route re-planning. To ensure units can effectively train, operate, and deploy with secure global data link capability, all 40 ANG C-130J aircraft require these capabilities.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$5,000,000
48 C-130J RTIC Group A Kits	\$150,000	\$7,200,000
48 C-130J RTIC Group B Kits	\$1,000,000	\$48,000,000
Total		\$60,200,000

C-130J: SELF-PROTECTION

1. Background. The ANG C-130J fleet requires self-defense capabilities to detect, deny and defeat modern factor threats specifically designed to target large Mobility Air Forces aircraft. To detect these threats, C-130Js require an open mission system compliant digital backbone executing processing at the forward edge and connecting the platform to Air Battle Management System and Joint All Domain Command and Control architectures. To defeat these threats, C-130Js require onboard and/or off-board threat jamming, decoys, and kinetic and non-kinetic defense measures. To survive in modern combat, C-130J aircraft require a digital Radar Warning Receiver (RWR) capable of providing situational awareness on millimeter wavelength systems in addition to legacy systems, with geolocation ability, capable of processing signals in a dense radio frequency (RF) environment. The ability to dispense active expendable RF countermeasures is necessary to the C-130Js survival against near-peer threats. To defeat advanced threats in the IR spectrum, C-130Js require an Infrared Suppression System (IRSS) capable of reducing the aircraft’s heat signature from engine exhaust in all aspects. Additionally, Block 30 or Block 35 AN/AAQ-24 Large Aircraft IR Countermeasures (LAIRCM) system will improve detection against advanced man-portable air defense systems threats, while degrading the enemy’s ability to engage and replacing an aging and obsolete LAIRCM systems. Many of these solutions can be accomplished utilizing a common carry open-architecture mission pod capable of supporting the current and future networked architecture, and flexible enough to be quickly altered to address the contested environments. The open-architecture mission system will provide additional capacity for electronic attack/electronic protection. The open-architecture pod requires 24 common carry pods, 48 LAIRCM Group A kits, 48 LAIRCM Group B kits, and 48 digital RWR kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
ALR-69A Non-Recurring Engineering	N/A	\$5,000,000
48 C-130J ALR-69A	\$500,000	\$24,000,000
48 C-130J IRSS Kits and Installs	\$1,200,000	\$57,600,000
48 C-130J LAIRCM Group A Kits	\$970,000	\$46,560,000
24 C-130J LAIRCM Group B Kits	\$3,000,000	\$72,000,000
48 C-130J Next-Generation RF Group A Kits	\$420,000	\$20,160,000
24 C-130J Next-Generation RF Group B Kits	\$775,000	\$18,600,000
24 MAF Common Carry Pods	\$2,000,000	\$48,000,000
Total		\$291,920,000

C-130J: INCREASED FUEL CAPACITY

1. Background. The C-130J fleet requires an increase in fuel capacity and delivery capability to provide aerial delivery in large and geographically dispersed theaters of operation such as the INDOPACOM theater. The C-130J requires Increased Wing Fuel (IWF) to increase fuel capacity by more than 4,000 pounds and 300 nautical miles in range by reconfiguring wing tank plumbing and valves. IWF enables transportation of more fuel for Agile Combat Employment specialized fueling operations. Transporting fuel and performing fueling operations for Combat Air Forces aircraft is a critical role for the C-130J. IWF reduces fuel stops, increases loiter time and extends the C-130J's combat range. Complimentary to this effort, the addition of external tanks on the C-130J will provide extended range and capacity for fuel or payload delivery in support of combat sortie generation. All C-130Js require IWF and external fuel tanks to increase fuel capacity and delivery capability.

2. Program Details.

Quantity	Unit Cost	Program
IWF Non-Recurring Engineering	NA	\$6,500,000
48 IWF Kits and Installs	\$800,000	\$38,400,000
Total		\$44,900,000

C-130J: ENHANCED FLIGHT VISION SYSTEM

1. Background. The ANG C-130J mission requires an Enhanced Flight Vision System (EFVS) to execute operations in obscured environments, marginalized airfields, and poor weather conditions. EFVS significantly increases situational awareness and safety margins during operations in smoke, dust, and weather-induced periods of low visibility. C-130J missions include firefighting and domestic operations in natural disaster response environments that require vision enhancements to execute these ever-increasing operations with increased efficiency and safety margins. EFVS will also enable updated techniques and procedures to operate more effectively during combat operations. Agile Combat Employment requirements will be met with improvement to visual navigation and objective area acquisition with passive EFVS sensors. Mission effectiveness will be improved in global theaters while increasing the success rate of traditional and self-contained instrument approaches, including approaches to austere, unlit airfields at night. The EFVS package includes two digital heads-up displays (D-HUD) fused with an enhanced vision system. The D-HUD is currently approved as a primary flight display on the C-130J and is serving as a replacement to the analog HUD on production C-130Js. Installation of D-HUD will be an offset to future retrofit expense. All ANG C-130Js require EFVS.

2. Program Details.

Quantity	Unit Cost	Program Cost
EFVS Non-Recurring Engineering	N/A	\$15,000,000
48 EVS Systems	\$1,000,000	\$48,000,000
Total		\$63,000,000

C-130J: SECURE GLOBAL HIGH-SPEED DATA

1. Background. ANG C-130Js require secure high-speed data (HSD) system for reliable, worldwide beyond line sight (BLOS) communications and secure internet connectivity. This will enable the C-130J fleet to use existing onboard infrastructure to connect the force as an airborne node within a Joint All Domain Command and Control environment. C-130J BLOS data speed and connectivity is limited by a lack of service and equipment that will not meet operational needs for conducting pertinent, timely, secure data transfer while airborne. All ANG C-130Js require HSD to access the common operating picture that will be vital to any future conflict.

2. Program Details.

Quantity	Unit Cost	Program Cost
HSD Non-Recurring Engineering	N/A	\$10,000,000
48 HSD Kits and Installations	\$2,000,000	\$96,000,000
Total		\$106,000,000

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

- Common MAF Mission System
- KC-135 Self-Protection
- Portable, Aircraft-Powered Ground Transfer Fuel Pump
- Aircraft/Aircrew Ground Cooling Capability
- Portable, Secure Connectivity for Operations Ground Support for Agile Combat Employment (ACE).

Essential Capabilities List

- Directed energy capabilities to jam and destroy threats
- Common roll-on/roll-off (RORO) interface for integration of third-party equipment into aircraft and federated mission system, not limited to: Air Defense Systems Integrator (ADSI), tactical operations center light (TOC-L), edge processing, etc.
- Boom nozzle to soft-basket adapter, capable of contingency jettison.
- Organic cargo lift/loading system
- Automated, hardened position, navigation, and timing (PNT).

Desired Capabilities List

- Updated/modernized aircraft electrical system/wiring.
- Free space optics for communication.
- Winglets, increased fuel efficiency, mounting points for advanced sensors and/or defensive systems.
- Electromagnetic pulse (EMP) hardened, in-flight capable, auxiliary power unit (APU).
- Targeted, secure communications.

KC-135: COMMON MAF MISSION SYSTEM

1. Background. ANG KC-135s require a robust, secure tactical data link (TDL) with visualized situational awareness (SA). Recent combat operations highlighted the need for comprehensive, networked command and control (C2) throughout all operational theaters. TDL provides near-real-time monitoring of mission events, mission status, task completion, resource status, and enhances all participant’s SA. TDL provides a C2 link and maximizes aircrew SA with beyond-line-of-sight (BLOS) and line-of-sight (LOS), military and commercial capabilities. TDL provides critical real-time information to KC-135 aircrews, such as friendly aircraft position, weather conditions, and hostile threat locations. Coupled with remote radio relay, the KC-135 can act as a node between BLOS coordination and LOS players via secure protocols (e.g. Joint Range Extension Application Protocol-C). Reach back capability is extended by global high-speed data and the ability for secure, wireless data transfer. Additionally, to complement the MAF Mission System and to decrease aircrew workload, a comprehensive Quick Reaction Handbook is required to address the aircraft’s normal and abnormal operations. All 166 ANG KC-135s require TDL radios, processors, gateway functionality, and a Quick Reaction Handbook.

2. Program Details.

Quantity	Unit Cost	Program Cost
166 Group A Kits	\$120,000	\$19,920,000
183 TDL Radios and Processors*	\$700,000	\$128,100,000
Quick Reaction Handbook	\$600,000	\$600,000
Total		\$148,620,000

* Includes 10% spares

KC-135 SELF-PROTECTION

1. Background. ANG KC-135s require self-defense capabilities to detect and defeat modern threats specifically designed to target large high-value airborne assets (HVAA). To survive HVAA threats, KC-135s require an open mission system compliant digital and physical backbone to execute processing at the forward edge by connecting the platform to joint all domain command and control architectures. KC-135s require onboard/off-board threat jamming, decoys, and defense measures to defeat modern threats through destructive or non-destructive means. A model, simulation, and analysis of the KC-135 incorporating Air Mobility Command Pacing Threats will determine which systems drive mission failure and/or survivability. In accordance with National Defense Strategy defined competitors, modernization must ensure overmatch including but not limited to radio frequency (RF), infrared (IR) self-protection systems, expendables, jammers, and signals intelligence/electronic intelligence detection capability and data. Routine operations 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 cue/direct countermeasures to degrade or defeat threats. Multi-modal Advanced Electronically Scanned Array radar capability increases survivability with an increased number of sensors available to the common operating picture. The KC-135s require 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 RF and IR countermeasures should be capable of being moved between aircraft; therefore, all 166 ANG KC-135s require digital RWR Group A kits, RF/IR Group A kits, and Large Aircraft Infrared Countermeasures (LAIRCM) Group A kits. ANG KC-135s require 38 modular LAIRCM Group B-kits to equip the 17 ANG KC-135 units, including four spares

2. Program Details.

Quantity	Unit Cost	Program Cost
HVAA Non-Recurring Engineering	N/A	\$15,000,000
166 LAIRCM Group A Kits	\$500,000	\$83,000,000
38 LAIRCM Group B Kits	\$3,000,000	\$114,000,000
166 Digital RWR Group A Kits	\$800,000	\$132,800,000
38 Digital RWR Group B Kits	\$500,000	\$19,000,000
Total		\$363,800,000

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

1. Background. ANG KC-135s require portable, aircraft-powered, ground transfer fuel pumps to onload/offload fuel for agile combat employment, post-nuclear recovery locations, or forward deployed environments where ground support is unavailable. This capability provides combatant commanders with greater flexibility in staging KC-135s during conventional or nuclear contingency operations, natural disasters, and humanitarian support operations. Aircrews can fuel/defuel KC-135s to support participating aircraft in austere locations without the logistical challenges associated with conventional, over-the-road fuel delivery. All 166 ANG KC-135s require portable, aircraft-powered, ground transfer fuel pumps.

2. Program Details.

Quantity	Unit Cost	Program Cost
166 Ground Fuel Transfer Pumps	\$80,000	\$13,280,000
Total		\$13,280,000

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 before 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 the ground cooling capability, personnel water cooling systems are needed for KC-135 aircrews. These systems regulate aircrew body temperature by distributing cooled fluid through a combat thermal shirt. This system provides improved mission performance, decreases fatigue, and increases situational awareness. 102 aircraft ground cooling kits are required to provide a cooling capability for 60 percent of the ANG KC-135 fleet. Additionally, 1020 personnel water cooling systems are required to equip all aircrew members.

2. Program Details.

Quantity	Unit Cost	Program Cost
102 Ground Cooling Units	\$140,000	\$14,280,000
1020 Personnel Water Cooling Systems	\$3,000	\$3,060,000
Total		\$17,340,000

**KC-135: PORTABLE, SECURE CONNECTIVITY FOR SUPPORT TO AGILE
COMBAT EMPLOYMENT OPERATIONS**

1. Background. ANG KC-135s require portable, secure connectivity for support to agile combat employment (ACE) operations. This connectivity should be sufficient to support a mission generation force element (4x KC-135s) package to include operations (mission planning, flight planning, scheduling, tasking), maintenance and logistics (sortie generation/aircraft maintenance coordination), and command and control connectivity. The system must support 10-20 users. This solution should be agnostic of internet service provider, mobile broadband service 3G/4G/5G, or local broadband internet. It must incorporate the appropriate high assurance internet protocol encryptor (HAIPE) for secure connections. This system should be expandable in terms of number of users and in terms additional security for higher classification systems. Each ANG KC-135 wing should have 1 device/solution per 4 assigned aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
34 HAIPE Devices	\$6,000	\$204,000
34 Communication Kits	\$15,000	\$510,000
Total		\$714,000

Aeromedical Evacuation (AE)

- **Universally Qualified (C-130, KC-135, C-17)**
- **Opportune Aircraft (KC-46, C-5, C-21)**
- **Specialty Team Support (CCATT, Burn)**
- **En Route Patient Staging System Integration**

The primary mission of Aeromedical Evacuation AE is to transport casualties from within the Joint Operations Area to the appropriate role of care provided in or out of theater. During the past decade, it has become increasingly important for the AE system to continue to develop its capability to integrate with components of our Nations allies. The rapid evacuation of patients during contingencies is necessary to prevent undue suffering and preserve military strength. AE provides time sensitive en route care of regulated and unregulated casualties to and between medical treatment facilities using organic and/or contracted aircraft with medical crew trained



explicitly for the mission. AE forces can operate as far forward as aircraft are able to conduct air operations, across the full range of military operation, and in all operating environments. Specialty trained medical teams may be assigned to work with the aeromedical evacuation crewmembers to support patients requiring intensive care in flight.



Aeromedical Evacuation FY2023 Weapons and Tactics Conference

Critical Capabilities List

- Communication Kits
- Tactical Combat Casualty Care Kits

AE: COMMUNICATION KITS

1. Background: ANG Aeromedical Evacuation (AE) units require additional Communication Kits used during AE Missions. The ANG requires AE communications in a degraded environment to safely move critical patients. During mass evacuations, the ANG is tasked with supporting the air transport. In contested environments, AE crews will be required to leave the aircraft to assess patients and communicate with ground personnel. It is vital the crew members on and off the aircraft can communicate. Immediate mission changes can be relayed to help ensure no one is left behind. A Communication Kit consisting of a Ballistic helmet, Pelator headset and wireless intercom system transceiver improves a patient's chances of survival during transport. AE crews are required for all patient movement missions including the care of critically ill patients. One AE Communication kit will be required for each aeromedical evacuation crewmember in every AE Squadron.

2. Program Details.

Quantity	Unit Cost	Program Cost
674 Wireless Intercom System	\$3,000	\$2,022,000
674 Pelator Headsets	\$805	\$542,570
674 Ballistic Helmets	\$665	\$448,210
Total		\$3,012,780

AE: TACTICAL COMBAT CASUALTY CARE KITS

1. Background In February 2021, Tactical Combat Casualty Care (TCCC) replaced Self Aid Buddy Care as the Air Force standard of care for first responders (medical and non-medical; Tiers (1-4)). All personnel will require initial TCCC training before deployment. The Air Force Medical Service will also require more in-depth, role-based (clinical/non-clinical) courses. The Defense Health Agency (DHA) is responsible for developing the standardized, role based TCCC curricula, and the Services are responsible for the implementation. DHA will provide the necessary educational infrastructure to increase the quality of TCCC training in the DoD and, as a result, improve the outcome for our nation's combat wounded. The ANG does not currently possess the equipment needed for all members to be instructed in TCCC. Four TCCC Medical Kits are required at each of the ten Wings with Aeromedical Evacuation Squadrons

2. Program Details.

Quantity	Unit Cost	Program Cost
40 TCCC Course Materials (NREMT)	\$12,700	\$508,000
40 TMK – IFAK Pouch & Insert Supplies	\$9,000	\$360,000
40 Medical Supplies	\$19,250	\$770,000
40 Manikin Kits	\$135,000	\$5,400,000
Total		\$7,038,000

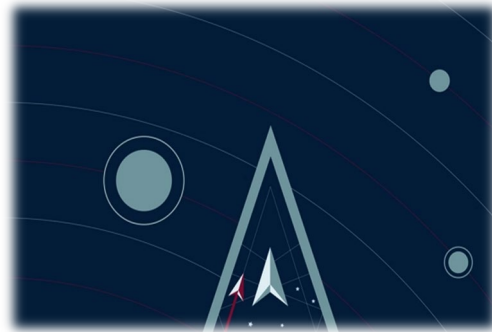
Space Operations

- **ANG Space Units Provide 60%+ of Space Electronic Warfare Operations**
- **40% Military Satellite Communication & C2**
- **Unique Mobile and Fixed Missile Warning Missions**
- **Commercial & State Partnerships providing Space Domain awareness**

The ANG contribution to United States Space Force (USSF) missions includes over 1,100 personnel within nine 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, space intelligence, satellite communications, 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, space intelligence, and offensive and defensive space electronic warfare to support exercises and contingency operations. Execution of these activities occurs from the home station and deployed locations.



Space

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Critical Capabilities List

- Electronic Support Collection and Analysis System Enabling Multi-Domain Operations
- Electronic Warfare Operations Enhancement
- Electromagnetic Warfare Training
- Digital Service Integration
- Multi-Domain Battle Management Toolkit

Essential Capabilities List

- Electromagnetic Protection Low Earth Orbit Satellite Communications Enhancement
- Small Form Factor Electronic Attack Capacity Expansion
- Proliferated Flock-Based Pocket Satellite Enhancements
- Fully Remote Operations Capabilities Across Core Mission Platforms

Desired Capabilities List

- Multi-Aperture Multi-Band, Multi-Orbital Regime Electromagnetic Operations Enhancements Across All Mission Platforms
- Machine to Machine Communications Capabilities Across All Mission Platforms

**SPACE: ELECTRONIC SUPPORT COLLECTION AND ANALYSIS SYSTEM
ENABLING MULTI-DOMAIN OPERATIONS**

1. **Background:** The ANG requires modern configurable electronic support kits to conduct multi-domain operational Radio Frequency (RF) spectrum over-watch for homeland defense and overseas contingency operations. The Electronic Support Collection and Analysis System Enabling Multi-Domain Operations capability must be highly mobile with a subset of remote-capable components to support diverse geographic coverage and mission sets. The mobile workstations will be used to locally manage the endpoint and require a dedicated ethernet port for remote operations. All of this will be self-contained and ready for rapid worldwide deployment in a dedicated dustproof, waterproof, HVAC controlled rugged protective case. Additionally, a tactical version is required that operates off the same common hardware and software baseline. These systems will perform automated satellite communication RF surveys and automated cyber network mapping with searchable packet capture software applications to provide rapid RF and network mapping functions for Space, support ISR, SOF, and Cyber unit objectives. This will enhance spectrum awareness, protection, and troubleshooting for both domestic operations and overseas contingency deployments across multiple domains. The electronic support kit will be highly configurable and can be adapted to suit each unit’s (space, ISR, cyber, air and special tactics) unique mission requirements, current equipment inventory, and specific operations parameters.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 Deathwatch Systems	\$1,000,000	\$2,000,000
2 Deathwatch Lite Systems	\$400,000	\$800,000
SCEPTRE Integration	\$1,000,000	\$1,000,000
2 Monarch Three-Screen + Laptop Systems	\$400,000	\$800,000
Automatic RF Spectrum Survey Software Application Addon	\$150,000	\$150,000
Automatic Cyber Network Survey and Mapping Software Application Integration	\$150,000	\$150,000
Cyber Network Packet Capture and Searchable Database Software Application Integration	\$150,000	\$150,000
4 Fly-Away Dual Pol/Multiband Antennas	\$2,000,000	\$8,000,000
2 Fly-Away High-Gain UHF Antennas	\$5,000	\$10,000
2 Fly-Away Tactical SHF Antennas	\$200,000	\$400,000
2 Fly-Away Tactical UHF Antennas	\$5,000	\$10,000
2 Honey Badger RF Training Kit Integrations	\$800,000	\$1,600,000
Total		\$15,070,000

SPACE: ELECTROMAGETIC WARFARE OPERATIONS ENHANCEMENT

1. **Background:** ANG units require multi-domain small form factor electromagnetic warfare systems. The current hardware footprint, logistics tail, legacy software applications on the Counter Communication System (CCS) and Bounty Hunter system cannot be effectively utilized in a near-peer fight focused on Agile Combat Employment. These systems each operate on different hardware baselines, lack the ability to rapidly integrate new antennas, utilize legacy software delivery practices, and are not developed to common application programming interfaces (APIs). Additionally, this increases integration timelines, cost, and results in parallel development efforts across a variety of air, space, and cyber weapon systems reducing interoperability and limiting total number of systems available to meet peer and near peer threats. Accordingly, the ANG requires Darksaber electromagnetic warfare toolkits, photonics enhancements for electronic attack and electronic protection payloads, and the ability to counter near-peer proliferated weapon systems across the electromagnetic spectrum within and through multiple orbital regimes. Finally, these systems must be small form factor, antenna agnostic, utilize multiple vendors, developed to common API standards, and have applications capable of being rapidly cross ported between hardware platforms.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Darksaber Electromagnetic Warfare Toolkits	\$1,000,000	\$6,000,000
2 Electromagnetic Warfare Photonics Enhancements	\$2,000,000	\$4,000,000
2 Agile Targeting Counter-Proliferation Toolkits	\$5,000,000	\$10,000,000
Total		\$20,000,000

SPACE: ELECTROMAGETIC WARFARE TRAINING

1. **Background:** ANG units require the ability to conduct electromagnetic warfare advanced training scenarios in a live, virtual, and constructive (LVC) environment from multiple distributed locations. Currently, the electromagnetic warfare community has limited ability to conduct basic continuation training and cannot interface across multiple units for enterprise level scenarios. A multi-domain LVC environment will help meet the mission-critical requirement to provide realistic threat-based training that integrates multiple electronic attack and protection units, allows flexible scheduling, remote hardware/software control and provides significantly increased throughput to meet requirements. The solution must be capable of hybrid remote and local operations, utilize small form factor technology, be developed to open application programming interface (API) standards, be weapon system agnostic, and allow for electronic attack, electronic protection, training, range, and cyber capabilities to be easily cross ported across hardware platforms. The next block of this project will evolve beyond hub-and-spoke and local operations to create a true mesh network of interconnected systems that enable the multi-domain fight and support forward deployed Agile Combat Employment (ACE) against peer and near-peer adversaries.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 Darksaber Range Integrations	\$250,000	\$500,000
2 Deathwatch Range Integrations	\$250,000	\$500,000
2 Midgard Range Block III Enhancements	\$2,000,000	\$4,000,000
2 Honey Badger RF Training Lab Toolkits	\$600,000	\$1,200,000
7 Honey Badger Software Defined Radio Toolkits	\$200,000	\$1,400,000
7 Honey Badger Instructor Stations	\$100,000	\$700,000
7 Honey Badger Digital Video Encoder Toolkits	\$100,000	\$700,000
Total		\$9,000,000

SPACE: DIGITAL SERVICE INTEGRATION

1. **Background:** Despite operating technologically advanced weapons, ANG units aligned to the Space Electromagnetic Warfare, Space Battle Management, and Military Intelligence Space Power Disciplines are reliant on time consuming and outdated methods such as binders, hardcopy checklists, whiteboard-based planning, spreadsheet-based mission management and possess limited mission playback, system scheduling, and post-analysis tools. Creating a robust kit of digital data tools and capabilities will enable the integration of digital checklists, job aids, mission procedures, and scheduling systems with electronically available operations, battle management, and intelligence tasking products. These toolkits enable smooth and repeatable mission execution, enhance debrief, and allow for enterprise scheduling of crews, equipment, and layered non-kinetic effects thus saving time, improving crew coordination, corporate learning and saving resources while improving accuracy. As space operations become multi-domain focused, integrated digital toolkits allow cooperative campaign planning amongst multiple weapon systems across joint integrated theaters of battle. Finally, the ability to integrate adaptative language translators and synthetic configuration technology into digital tools facilitates the rapid sharing of information across multiple partner nations, reduces the cognitive load of digital equipment, and facilitates multi-domain Agile Combat Employment operations against peer & near peer adversaries.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Digital Checklist Integrations	\$250,000	\$750,000
Digital Range Scheduling Toolkit	\$500,000	\$500,000
Digital Crew Scheduling Enhancement	\$500,000	\$500,000
Digital Sync Matrix Integration	\$500,000	\$500,000
Enhanced Digital Planning Toolkit	\$500,000	\$500,000
Adaptive Universal Translator Toolkit	\$250,000	\$250,000
3 Synthetic Adaptive-Network Configuration Kits	\$500,000	\$1,500,000
Total		\$4,500,000

SPACE: MULTI-DOMAIN BATTLE MANAGEMENT TOOLKIT

1. **Background:** ANG units require advanced Space Battle Management, cyber operations, multi-domain electronic warfare, air operations, Space Domain Awareness (SDA), military intelligence and target development toolkits to ingest, model, and manipulate high fidelity, accurate non-kinetic, orbital, air, and cyber related effects across the electromagnetic spectrum, display them in near real time, and push/pull this information to and from Unified Data Libraries. The implementation of commercial space and military focused multi-domain capabilities require vendor agnostic environments to integrate, fuse data, display common visualization software, utilize hybrid cloud-based analysis kits and data sharing hardware and software solutions. These kits require modules that support a wide variety of mission sets and possess the ability to store, organize, access, and disseminate commercial space, targeting, electronic warfare, and all-source data across multiple warfighting platforms and functions. Finally, these toolkits require integration into the Asgard Battle Management & Orbital Warfare ranges to enable cross-connectivity to the larger National Space Test & Training Complex enterprise.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Multi-Domain Battle Management Toolkits	\$200,000	\$1,000,000
5 Multi-Domain Military Intelligence Toolkits	\$200,000	\$1,000,000
5 Commercial SDA Toolkits	\$200,000	\$1,000,000
5 Multi-Domain Electronic Warfare Toolkits	\$200,000	\$1,000,000
4 Data Lake Toolkit Integrations	\$100,000	\$400,000
2 Multi-Domain Battle Management Labs	\$200,000	\$400,000
2 Asgard Battle Management Range Integrations	\$1,000,000	\$2,000,000
Total		\$6,800,000

Cyberspace Warfare 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, 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,



focusing on 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 and 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 occur from home station and national facilities through distributed operations.

Cyber Warfare Operations FY 2023 Weapons and Tactics Conference

Critical Capabilities List

Offensive Cyber Operations

- Tactics Observable Model Part Task Trainer
- Senior Capability Developer Kits
- Cyber Decision – Determining Objective Operator Resiliency System

Defensive Cyber Operations

- Cloud Cyber Operations Platform
- Multi-Classification Cross Platform Information Collaboration System
- Operational Technology Training Network Environment

Department of Defense Information Network

- Agile Combat Employment Kit
- Radio Frequency Emitter Detection Package
- Commander’s Readiness Assessment Platform

Essential Capabilities List

Offensive Cyber Operations

- Multi Domain Signal Collection and Analysis Suite

Defensive Cyber Operations

- Linux/Solaris Endpoint Detection and Response
- Automated Collaboration and Execution System (ACES)
- Part Task Trainer - TTP Observable Model
- Reserve DCO Cyber Kit
- JWICS Connection Kits

Department of Defense Information Network

- Cloud Cyber Operations Platform
- Expanded Virtual Interconnected Training Environment

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5

OCO: TACTICS OBSERVABLE MODEL PART TASK TRAINER (TOM-PTT)

1. Background. The operators and analysts supporting Offensive Cyberspace Operations (OCO) provide effects in and through cyberspace and the electromagnetic spectrum to service component and combatant commanders. To fulfill those effects, units are required to gain and maintain proficiency in cyber warfare tactics, techniques, and procedures (TTP). The domains of knowledge that these Airmen must master include networking, applied operating system internals for Windows and Unix, exploitation techniques, and tactics identified in the MITRE ATT&CK matrix. Commanders requires the ability to measure, assess, and report the proficiency of their assigned forces. The Tactics Observable Model Part Task Trainer (TOM-PTT) is an interoperable connected system that provides the training lessons, virtual systems, and metric capabilities required to organize, train, and equip these units. The TOM-PTT provides Airmen with training from the basic to master proficiency levels. It is accessible on standalone networks and via the Internet on a 24/7/365 timeframe. It implements a learning management system that integrates with existing range capabilities such as the VITE and reporting mechanisms such as Joint Cyber Command and Control. The system must not require a recurring licensing or subscription fee to operate. One TOM-PTT is required for each of the OCO squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 TOM-PTTs	\$350,000	\$1,400,000
Total		\$1,400,000

OCO: SENIOR CAPABILITY DEVELOPER KIT

1. Background. Offensive Cyberspace Operations (OCO) units require training to fulfill software development missions in support of cyber effects capabilities. These units do not currently have the training material nor workstations to move from basic to senior Cyber Capability Developer (CCD). Each Senior Capability Developer Kit (SCDK) will include a data repository for developed tools and hardware and software to conduct advanced training in developing OCO toolkits via the development networks located on JWICS and NSANet. The SCDK system supports loading of additional software through industry-common package management solutions and accredited for TS/SCI environments. SCDK hardware modules include workstations with compute, memory, storage, and networking. SCDK software modules include code versioning and repository software, integrated development environments, software debugging and reverse engineering, and representative adversary environments in which to test code. SCDK training modules include the development of weapons, sensors, and payloads. Weapons implement initial access, command execution, and exploitation tactics. Sensors implement collection, credential access, discovery, and defense evasion tactics. Payloads implement command and control, exfiltration, and impact tactics. SCDK interconnects with the Virtual Interconnected Training Environment platform, enabling CCD participation in exercises. One SCDK is required for each of the OCO and development squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 SCDK (3080)	\$400,000	\$2,000,000
18 JWICS Nodes	\$220,000	\$3,960,000
2 NSANet Nodes	\$220,000	\$440,000
Total		\$6,400,000

OCO: CYBER DECISION - DETERMINING OBJECTIVE OPERATOR RESILIENCY SYSTEM (CYDE-DOORS)

1. Background. Offensive Cyberspace Operations (OCO) units require the ability to retain expertise and talent within the cyberspace operations career field. Cyber Decision – Determining Objective Operator Resiliency System (CYDE-DOORS) requires a tool that uses biometric and cognitive/psychometric information to address the mental, physical, and emotional performance of airmen to identify stressors and avoid burnout. The system must focus on mental and physical energy, confidence, focus, engagement, and anxiety. CYDE-DOORS is a data-driven method to support operators’ management of stress and exhaustion. Commanders, leaders, and personnel can use the tool to address burnout symptoms in order to achieve and sustain the expected high level of performance. Five CYDE-DOORS are required for all OCO squadrons.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 CYDE-DOORS	\$750,000	\$3,750,000
Total		\$3,750,000

DCO: CLOUD CYBER OPERATIONS PLATFORM

1. Background. ANG defensive cyberspace operations (DCO) units are currently using a large server rack of equipment for both on-and-off Department of Defense information network (DODIN) vulnerability assessment and hunt operations. This pallet of equipment is expensive to ship, requires power, cooling, and space from the mission partner, and can be lost if the mission partner doesn't agree to allow for its reuse in future operations. Furthermore, this physical equipment requires substantial resources (time and manpower) to configure and employ to execute remote operations. These limitations prevent DCO units from conducting timely Hunt & Incident Response Team (HIRT) operations. DCO requires an agile, minimal footprint, on-and-off DODIN cloud based HIRT capability for executing Federal and State missions for both cloud-based, on premise, and hybrid-based mission partners. Cloud-based operations will prevent low density, high demand cyber operations hardware from being “burned”, near-instant software deployments to mission partner environments, and reduced operations and maintenance costs. Cloud-based systems are agile and allow adversary engagement from geographically separated locations while maintaining collaboration between operators and analysts. The cloud-based solution will implement enhanced operational security utilizing secure connections or similar National Institute of Standards and Technology approved secure technologies. The solution is required to be cloud service provider agnostic to allow for maximum scalability, provide persistent collaboration solutions between cyber operations units, and provide rapid deployment and reconstitution in less than 30 minutes. A single Cloud Cyber Operations Platform can simultaneously support a single mission element, or all 16 ANG Cyber Protection Team aligned squadrons, which is not currently possible with existing hardware.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 CCOP	\$19,000,000	\$19,000,000
Total		\$19,000,000

**DCO: MULTI-CLASSIFICATION CROSS PLATFORM INFORMATION
COLLABORATION SYSTEM**

1. Background. ANG cyberspace operations (CO) units require the ability to ensure internally developed capabilities and products (e.g. scripts, signatures, guides, procedures) that contribute to continuity of operations are stored within a repository using an industry standard version control system. This capability will be centrally managed in a community repository and made available to the community. The capability must support a workflow that is capable of cloning repositories for offline use on the Cyberspace Vulnerability Assessment/Hunter weapon system. It must also offer the ability to quickly review changes and additions made during the plan, brief, execute and debrief (PBED) process before being merged back into the community repository. To the maximum extent possible, it will have access to and the ability to contribute to the same set of shared capabilities and products in the community repository to collectively improve the effectiveness of subsequent mobilizations. The system should leverage a collaboration software suite to include solutions for chat, task tracking, wiki, and blogs to encourage sharing of real time sharing and collaboration. The repository must be web accessible from NIPRNet and commercial internet providers, while also supporting storage of controlled unclassified information and ability to operate at higher classification levels. This requirement represents a vital advance in standardization and collaboration for cyberspace operations to eliminate redundant efforts and as such requires additional funding. Without this capability, technical collaboration and standardization among CO units will remain cumbersome and ineffective. A single Multi-Classification Cross Platform Collaboration Sharing System (MCPICS) can simultaneously support all 20 ANG cyber operations units which is not currently possible with existing hardware.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 MCPICS	\$11,273,321	\$11,273,321
Total		\$11,273,321

DCO: OPERATIONAL TECHNOLOGY TRAINING NETWORK ENVIRONMENT (OT-TNE)

1. Background. ANG cyberspace operations (CO) units are required to understand industrial control systems (ICS) architecture and how to hunt for adversary activity these systems. The OT-TNE system is a cost-effective training solution that allows CO and maintenance personnel to familiarize themselves with mission particular tasks, weapons systems operations, and ICS. It will provide hands-on training for critical skills required to operate in a team environment and support CO in carrying out ICS missions. The OT-TNE should replicate operational ICS environments and will introduce cyber operators to programmable logic controller (PLC) operation, human machine interface (HMI), ladder-logic, function block programming, ICS protocols (modbus, DNP3, BACnet, etc.), ICS network traffic analysis, common ICS security flaws, and how to enable hardening on ICS networks. It should provide the ability to train on all common ICS vendor equipment. The OT-TNE should train CO units on how to interact with PLCs to retrieve and validate firmware, files, and other artifacts for baselining. The OT-TNE should contain a database of known vendor hashes to compare baseline artifacts. The OT-TNE provides an individual training and skills assessment suite allowing personnel to train on specific tasks and identify areas needing improvement. The system is maintained locally, allowing personnel to connect to the OT-TNE, and is managed through an intuitive administration page. The system must not require a recurring licensing or subscription fee to operate. It must integrate with the current Virtual Interconnected Training Environments (VITE) already resident within the ANG units. It will focus on preparing personnel to execute in a team construct within the VITE and during operational missions. One OT-TNE is required for each of the 19 ANG cyber operations squadrons and requires a VITE integration module.

2. Program Details.

Quantity	Unit Cost	Program Cost
19 OT-TNE	\$168,452	\$3,200,588
1 VITE Integration	\$1,473,282	\$1,473,282
2 VITE (2 New Units)	\$885,780	\$1,771,560
Total		\$6,445,430

DODIN: AGILE COMBAT EMPLOYMENT KIT

1. Background. ANG Department of Defense Information Network (DoDIN) units require Agile Combat Employment (ACE) equipment for its Fixed Communications Units to support the Air Force-Force Generation model and ACE Air Operations. Without this capability, our forces are not capable of providing Combatant Commanders the equipment and forces to execute agile air operations in an austere and/or communications degraded environment. The equipment required per ANG Wing includes two Agile Comm Package with deployable JWICS. It must support greater than ten users and three Fly Away Comm Terminals, supporting 2-3 users are required per kit. The solution will also provide for the ability to implement and maintain C2 capability during domestic operations, homeland defense, and homeland security events. These systems are considered unit equipped and Air Force funded, however they have not been funded to date.

2. Program Details.

Quantity	Unit Cost	Program Cost
89 ACE Kits	\$5,520,000	\$491,280,000
Total		\$491,280,000

DODIN: RADIO FREQUENCY EMITTER DETECTION PACKAGE

1. Background. ANG Engineering and Installation units have been tasked to support forward operating bases that ensure aircraft can take off and land safely, while allowing ground forces to communicate without interruption. The Radio Frequency Emitter Detection Package (RFEDP) allows for the detection and identification of radio frequency emission sources tied to jamming interfaces within the HF, VHF, UHF, and SHF electromagnetic spectrum. This capability deciphers location, source, and frequency of adversarial RF attacks. These systems are considered unit equipped and Air Force funded, however they have not been funded to date.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 RFEDP	\$585,812	\$1,757,459
Total		\$1,757,459

**DODIN: COMMANDERS AWARENESS READINESS EVALUATION SYSTEM
(CARES)**

1. Background. ARC cyberspace operations units are required to maintain comprehensive readiness reporting system that would "measure in an objective, accurate, and timely manner" the capability of the U.S. military to carry out the National Security Strategy, Defense Planning Guidance, and the National Military Strategy. Current systems do not provide collective readiness and support answering Defense Readiness Reporting System requirements. CARES must utilize artificial intelligence, automated design and predictive analytics and address readiness, force status, assess risk, respond to deficiencies, and be mission focused. Information must be shared through a single dashboard with collaborative tools in near real time and build in identification of mitigation strategies through an iterative process. CARES will display force availability, organizational construct, force presentation for Weap mobilization, and include availability of installations, facilities and ranges. The system must provide alternative courses of actions based on readiness availability. Data must be available online and offline with on-premise secure systems and allow a minimum of 800 users to be tracked annually. System must not require a recurring license.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 CARES	\$2,404,837	\$2,404,837
Total		\$2,404,837

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, and 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 into multiple squadrons and flights. Each unit specializes 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.



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Critical Capabilities List

AOC

- Weapon System Modernization
- Virtual Application Desktop Delivery
- Secure Voice Capability – Wideband HF
- Agile Operations Center
- Mission Assurance & Cyber Security Toolkit

BCC

- Agile Operations Center
- Mission Assurance and Cyber Security Toolkit
- Homeland Defense Communications Modernization
- Agile Combat Employment for Homeland Defense
- Enhanced Regional Situational Awareness Camera Modernization

CRC

- Mode 5 Suite to supplement TPS-75
- Crypto-Modernization Radio Frequency Link 16 Capability
- Small Form Factor/Software Definable Internet Protocol Based Radios with Plain Text and Data Capability
- Secure Communications Reach Back Capability
- Single Human Interface Device for Local and Remote Internet Protocol Based Radios

Essential Capabilities List

AOC

- Targeting Application Workstation (TAW) High Performance Monitors
- Infrastructure for Warfighting Networks (IWN)
- JWICS Targeting Application Workstation (JTAW) & TS/SCI Targeting Tools
- Full Motion Video ISR Integration Applications and Hardware
- T-SCIF & SAR Toolkit (SAP/STO)

BCC

- Tactical Command and Control Debrief Software Solution
- Cyber Protection, Response, and Recovery Software
- Advanced Sensors for Homeland Defended Assets
- BCC Continuity of Operations Capability

CRC

- EA Training Suite
- Secure Terminal Equipment Replacement for Voice/Tactical Data Link
- Advanced Intelligence FC Interoperability
- Data Cross-Domain Solution Special Access Program/Top Secret/Secret

Desired Capabilities List.

AOC: WEAPON SYSTEM MODERNIZATION

1. Background. AOCs require Block 20 Lite Hardware and Block 20 Weapons Systems. The AOC Falconer weapon system is rapidly approaching a major upgrade from legacy 10.1 to modern Block 20 technology necessary to secure and enable Joint All Domain Command and Control (JADC2) of air, space, and cyberspace. The absence of an ARC Block 20 AOC weapon system fielding plan on par with the Active Component, if unresolved, will significantly detriment the ANG’s ability to provide the support aligned AOCs depend on for proficiency, combat mission ready (CMR) manning and distributed JADC2. AOCs operate with reduced manning levels and increasing operational requirements. AOCs increasingly depend on augmentation, distributed operations and continuity of operations capabilities. A critical enabler to this operational capability provided by the ANG is the AOC Falconer Lite weapon suite installed at Air Operations Groups (AOGs) and specifically the system’s ability to support CMR training and standalone operations in Contested, Degraded and Operationally limited (CDO) environments. The current Block 20 plan does not include fielding hardware to ANG AOGs. Instead, ANG units are expected to access the weapon system solely through a cloud environment with considerations for external network outages scoped only to potential multiple network paths. This approach presents multiple challenges to ARC AOGs combat mission readiness/operational training, ongoing distributed operations, and effective reach-back capability for aligned geographic AOCs. It presents a risk to the mission when a unit’s sole access to their weapon system that resides in a cloud environment is through a cyber enabled environment that is actively contested and/or degraded, or simply a network outage. The current plan to field Block-20 hardware only to active-component AOCs is inconsistent with Program Action Directive 102, presenting a risk to readiness and potential risk to mission during operations necessitating Distributed Operations, Split Operations, Reach-Back, and Continuity of Operations. The six ANG AOCs require one Block-20 Lite AOC-Weapons System, or interim weapon system, each consisting of scaled down hardware and software to directly support aligned AOC requirements for CMR augmentation and distributed operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Block-20 Lite Hardware/Block 20 Weapon System	\$3,000,000	\$18,000,000
Total		\$18,000,000

AOC: VIRTUAL APPLICATION DESKTOP DELIVERY

1. Background. AOCs require Virtual Application Desktop Delivery replacement, commonly known as NetScalers. NetScalers is a virtual desktop application used for distributed operational training and technical support. The currently fielded NetScalers reached end of life on 1 January 2021 and are no longer supported by the vendor. A replacement NetScaler is currently being fielded by the AOC Systems Program Office (SPO) for the active component. There is no plan to fund the ANG. Each of the five ANG AOC locations require two NetScalers concurrent with their aligned AOC.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 x NetScaler Application Delivery Controllers	\$150,000	\$1,500,000
Total		\$1,500,000

AOC: SECURE VOICE CAPABILITY – WIDEBAND HF

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 (MUOS) tactical satellite-compatible radio, a wideband high-frequency (HF) radio for contested communication operations, antenna systems, and 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 Wideband HF Radios (3080)	\$40,000	\$200,000
5 IP Bridges (3080)	\$300,000	\$1,500,000
Total		\$2,350,000

AOG/AOC: AGILE OPERATIONS CENTER

1. **Background.** ANG Air Operation Groups (AOG) require modernization of their operation center infrastructures to increase operator efficiency, expedite decision making and accommodate the Joint All Domain Command and Control and Advanced Battle Management Systems. The Agile Operations Center accomplishes this using a video matrix fusion engine solving multi-classification issues on the operations floor. The purpose of this technology is to classify agnostic data, enabling potential future higher classification levels and eliminates multi-classification-level equipment separation requirements between systems on operation floors. The Agile Operations Center covers all front-end information technology to include passive infrastructure, integrated furnishings systems, audio, visual, keyboard, video, and mouse switch, telephony, video matrix, and video teleconference technology as site requirements. Additional items include backend active infrastructure. Agile Operations Center technology delivers continuous infrastructure and human factors for homeland defense performance at the speed of relevance that are not possible with the current infrastructure. The current infrastructure and user interface requires exponential improvements to reduce task timelines from minutes to seconds for AOG teams. ANG AOGs/AOCs require 6 Agile Operations Centers.

2. **Program Details.**

Quantity	Unit Cost	Program Cost
6 Agile Operations Centers (3080)	\$12,000,000	\$72,000,000
Total		\$72,000,000

AOC: MISSION ASSURANCE & CYBER SECURITY TOOLKIT

1. Background: ANG AOGs require upgraded mission assurance and cyber security capabilities. Under the new Air Combat Command (ACC) 2022 Prime Mission Defense Team (MDT) construct, no Air National Guard (ANG) MDTs were selected by ACC. This has left a capability gap for ANG AOGs to provide mission assurance and cyber security capabilities to supported commanders who leverage AOG capabilities. MDTs who continue to operate after losing support are required to find and procure local solutions to continue to provide mission assurance and cyber security. Specialized tools are required to provide mission assurance and cyber security on assigned key-terrain cyber (KT-C). To ensure interoperability, ANG cyber defenders should use the same tools to facilitate collaboration and troubleshooting. All the tools in this proposal already exists in a DoD approved weapon system – the Army DSCS kit. This allows us to establish an Authority to Operate (ATO) using reciprocity. Use of these tools have been pre-coordinated and approved by the AOC Weapon System Program Office, who was supportive of this solution given the reciprocity and similarities between Security Onion and the Cyber Vulnerability Assessment/Hunter. Failure to address this need will result in the inability of ANG cyber defenders to provide mission assurance and cyber security on ANG AOC weapon systems. Note: BCCs & CRCs have a similar requirement. ANG AOGs require one mission assurance and cyber security toolkit, with the 101 ACOMS unit requiring 4 kits.

2. Program Details:

Quantity	Unit Cost	Program Cost
9 Mission Assurance and Cyber Security Toolkits	\$230,000	\$2,070,000
Total		\$2,070,000

Command and Control

BCC: AGILE OPERATIONS CENTER

1. Background. ANG Battle Control Centers (BCC) require the modernization of the operation center infrastructure at Eastern Air Defense Sector (EADS), Western Air Defense Sector (WADS), Alaskan Air Defense Sector (AADS), and Pacific Air Defense Sector (PADS), to increase operator efficiency, expedite decision making and accommodate the Joint All Domain Command and Control and Advance Battle Management Systems. The Agile Operations Center accomplishes this using a video matrix fusion engine, solving multi-classification issues on operation floors. The Agile Operations Center covers front-end information technology to include passive infrastructure, integrated furnishings systems, audio, visual, keyboard, video, and mouse switch, telephony, and video matrix technology. Additional items include backend active infrastructure. Agile Operations Center technology delivers continuous infrastructure and enhances decision making for homeland defense performance at the speed of relevance that are not possible with the current infrastructure. All ANG BCCs require upgraded Agile Operations Centers to detect, identify, track, and decide to alert/scramble intercept aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
EADS Agile Operations Center (4832 Sq Ft)	\$10,600,000	\$10,600,000
WADS Agile Operations Center (5575 Sq Ft)	\$10,000,000	\$10,000,000
AADS Agile Operations Center (3736 Sq Ft)	\$10,000,000	\$10,000,000
PADS Agile Operations Center (4730 Sq Ft)	\$9,000,000	\$9,000,000
Total		\$39,600,000

BCC: MISSION ASSURANCE AND CYBER SECURITY TOOLKIT

1. Background. ANG Battle Control Centers require Homeland Defense Cyber Toolkits to maintain readiness support and protect local weapons systems from compromise by adversaries in a contested environment. These toolkits enable local network defenders to defend critical homeland terrain. Homeland Defense is a no-fail mission, requiring BCC mission systems to have a high level of confidentiality, integrity, and availability for accurate and timely decision-making while conducting distributed operations. As new systems and capabilities evolve to assure operators have the right information at the right time, new threat-vectors in the cyber domain become apparent. Local network defenders are the first-line responders to cyber threats that can keep the mission sustained through heavily contested operations. Enabling these defenders with the right tools will assure BCC's meet the four Air Force information dominance strategic goals. This capability is required for each of the BCCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
8 Mission Defense Team Toolkits	\$230,000	\$1,840,000
Application Based Encryption at 424 sites	\$1,000	\$424,000
Total		\$2,264,000

BCC: HOMELAND DEFENSE COMMUNICATIONS MODERNIZATION

1. Background. Air Defense Sectors and Squadrons require modernized communications in several mission areas: radios with modern capabilities, radios accessible from distributed and non-traditional operating locations, and the ability to manipulate and control voice communications. Established radio sites across Alaska, Hawaii and CONUS should include a combination of radios that are tunable across both the VHF and UHF spectrum, remotely switched in/out of Anti-Jam mode, remotely tuned, remotely rekeyable Communications Security (COMSEC), and remotely switched between secure and non-secure modes while being accessible through Mission Voice Platform. Air Defense Squadrons require the ability to control radios in other sectors' AORs as well as from distributed operating locations. Radio over internet protocol (RoIP) provided by the RM-12 suite meets this demand. RoIP push-to-talk capabilities provide resilient communications using internet connections, satellite, long term evolution, or private networks that can be controlled from fixed or distributed locations. The system is scalable to meet current and future needs, to include continuity of operations requirements. RoIP improves interoperability with joint forces and facilitates effective Battle Management Command and Control. A datalink training lab would enable Interface Control Technicians to integrate the dynamic datalink requirements that would emerge from the newfound communications capabilities.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 RM-12 Suite Option	\$220,000	\$1,100,000
50 Secure/Anti-Jam Radio Site Upgrade	\$9,700	\$485,000
2 Mission Voice Platform Upgrade	\$200,000	\$400,000
4 Ground TDL System	\$100,000	\$400,000
4 Halo Satellite Communications Simulator	\$70,000	\$280,000
Total		\$2,665,000

BCC: AGILE COMBAT EMPLOYMENT FOR HOMELAND DEFENSE COMMAND AND CONTROL

1. **Background.** ANG Battle Control Centers (BCC) require the ability to extend Tactical Data-Link (TDL) coverage to locations that are not covered by persistent capabilities or do not provide the necessary low-level coverage to perform tasked missions. TDL coverage reduces time to intercept, shortens the kill chain, increases flight safety, improves situational awareness in congested airspace, and provides a secure and jam resistant method of communication. BCCs are currently not organically equipped to provide this capability. Additionally, the equipment currently relied upon does not include Link 16 as part of the delivered configuration and will not meet the Joint Staff mandated Link 16 crypto modernization deadline. Since 1 Jan 2022, this equipment has not been available to help cover the capability gap. Move-out Jump Off kits and Theater Operationally Resilient Command and Control upgraded laptops provide the ability for tactical C2 to fill this gap. These commercially available packages provide the necessary TDL capability while being a modern, supported, crypto modernization compliant capability that would not only gap-fill for Link 16, but provide a rapidly deployable option to include secure and jam resistant voice communication over satellite, Very High Frequency, Ultra High Frequency, 5th generation mobile communications, and commercial internet, further extending the BCCs capability to perform their mission. BCCs require TDL kits and deployable laptop servers.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Transportable TDL Kits	\$558,000	\$5,580,000
14 Deployable Laptop Servers	\$50,000	\$700,000
Total		\$6,280,000

BCC: ENHANCED REGIONAL SITUATIONAL AWARENESS (ERSA) CAMERA MODERNIZATION

1. Background: Continental United States (CONUS) based ANG BCCs require the modernization of 29 obsolete and failing Electro-Optical/Infrared cameras for the ERSA system at the Joint Air Defense Operation Center to provide continuous support of the BCC mission. The demand on the ERSA system as a part of the National Capital Region Integrated Air Defense System (NCR-IADS) has vastly increased since initial fielding. These cameras are used in validating radar reports as actual targets as well as visual identification of manned, small unmanned aircraft systems and cruise missiles. If ERSA cameras are not replaced or modernized, failure rates of the present camera systems will render ERSA ineffective starting in 2023. ERSA failure prevents target correlation and de-confliction in many parts of the Special Flight Rules Area (SFRA) increasing risk in the protection of the defended assets. As a result, unnecessary White House and Capitol Building evacuation/lockdowns would likely increase. The modernized production solution provides high-resolution/high-definition electro-optical and infrared cameras with integrated laser rangefinders that enable positive identification of manned aircraft, cruise missiles and unmanned aerial systems throughout the SFRA and Flight Restricted Zone. The Eastern Air Defense Sector and Western Air Defense Sector require 21 operational and 8 spare cameras.

2. Program Details:

Quantity	Unit Cost	Program Cost
29 ERSA Camera Replacements	\$1,460,000	\$42,340,000
Total		\$42,340,000

Command and Control

CRC: MODE 5 SUITE TO SUPPLEMENT TPS-75

1. Background. The AN/TPS-75 surveillance radar does not have the capability to interrogate Mode 5/S or access Automatic Dependent Surveillance-Broadcast (ADS-B) data to complete an identification matrix. The DoD has already transitioned to the use of Mode 5 in accordance with Defense Security Cooperation Agency Memorandum dated 7 March 2018. The Control and Reporting Center (CRC) requires the capability to interrogate Mode 5 and access ADS-B data to complete the surveillance and command and control mission. One sensor suite is required for each of the 10 ANG CRCs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Mode 5/S/ADS-B Suite	\$2,300,000	\$23,000,000
Total		\$23,000,000

CRC: CRYPTO-MOD RADIO FREQUENCY (RF) LINK-16 CAPABILITY

1. Background. ANG CRCs require anti-jam Tactical Data Link (TDL) coverage capability both in-garrison and to locations that are not covered by persistent capabilities or do not provide the necessary low-level coverage to perform tasked missions. TDL coverage is critical to reduce time to intercept, shorten the kill chain, increase flight safety, help with management of congested airspace during domestic and combat operations, and provide a secure and jam resistant method of communication. ANG CRCs require ten transportable anti-jam TDLs.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Crypto-Mod RF Link-16	\$610,000	\$6,100,000
Total		\$6,100,000

CRC: SMALL FORM FACTOR/SOFTWARE DEFINABLE INTERNET PROTOCOL (IP) BASED RADIOS WITH PLAIN TEXT AND DATA CAPABILITY

1. Background. ANG CRCs require the capability of small, form factor & software definable radios with voice and data capability to replace legacy, serial-based, large radio-sets. Smaller radios will enable the CRCs to operate with a minimized footprint and enable Agile Combat Employment operations in support of Homeland Defense and combat operations abroad. Radios will require ultra-high frequency, very-high frequency transmit and receive capability, and Multi-User Objective System firmware. Each ANG CRC requires two small form factor IP based radios per squadron.

2. Program Details.

Quantity	Unit Cost	Program Cost
20 Small Form Factor IP Based Radios	\$150,000	\$3,000,000
Total		\$3,000,000

Command and Control

CRC: SECURE COMMUNICATIONS REACH BACK CAPABILITY

1. Background. ANG CRCs require the capability of secure-voice communication while in-garrison and during training/exercises/operations. This requirement includes voice and data capability by use of voice over internet protocol-secure (VOSIP) and/or analog means.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 VOSIP Devices	\$3,000	\$30,000
Total		\$30,000

CRC: SINGLE HUMAN INTERFACE DEVICE FOR LOCAL AND REMOTE INTERNET PROTOCOL (IP) BASED RADIOS

1. Background. ANG CRCs require radio over internet protocol (RoIP) capability to directly access remote multi-function, secure, anti-jam, beyond line-of-sight and line-of-sight radios, internet protocol phones, and land mobile radios from multiple locations to meet evolving mission requirements. RoIP push-to-talk capabilities provide resilient communications using internet connections, satellite, long term evolution or private networks that can be controlled from fixed or distributed locations. The system is scalable to meet current and future needs, to include, contingency operations solutions. RoIP improves interoperability with joint forces and facilitates effective Battle Management Command and Control. Communicating by voice and data link with joint air and integrated air and missile defense assets enables CRCs to effectively orient shooters, pair shooters, solve problems, speed decisions, and bring order to the battlespace during operations and training. This capability is critical to training for CRC command and control operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 RM-12 Suite Option	\$110,000	\$1,100,000
Total		\$1,100,000

Airborne Intelligence, Surveillance, and Reconnaissance

MC-12W – The MC-12W is 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, manned intelligence, surveillance, and reconnaissance (ISR), and fires.



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Critical Capabilities List

MC-12W

- Airborne Mission Network
- Steerable SIGINT Antenna
- Modular foreword Refueling System
- Waveform/Mobile Ad-Hoc Network Integration
- Second Full motion Video Sensor

Essential Capabilities List

MC-12W

- Combat LST hardware Module to Provide the Capability to the MX-15 Sensor Ball.
- Combat Systems Officer / Tactical Systems Operator Aircraft Oxygen System Integration.
- Combat System Officer / Tactical Systems Operator Aircraft Intercom Integration for Traffic and Ground Collision Avoidance Systems.
Selective Availability Anti-Spoofing Module Global Positioning System

Desired Capabilities List

MC-12W

- Improved Ku Spread Spectrum Antenna
- Cockpit Voice Recorder Cutout Adjustment
- Left Pilot Mission System Access
- Improved Right Pilot Mission System Controls

MC-12W: AIRBORNE MISSION NETWORK

1. Background. ANG MC-12W aircraft require a carry-on 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 deconfliction risk with other aircraft. Lack of direct information sharing with other TDL participants degrades overall situational awareness. The MC-12W requires a handheld system that is capable of interfacing with multiple airborne platforms with LINK-16. The system must be lightweight, J-Voice capable, and able to interface with situational awareness kits. In addition, the MC-12W will require a lightweight android-based end user device to display mission critical data. This complete Digitally Assisted Close Air Support (DACAS) system must have all required plug-ins, licenses, and cables to ensure interoperability between the end user device and the radio. Finally, MC-12Ws utilizing this DACAS system require a server to facilitate a common operating picture and information sharing. Each of the 13 ANG MC-12W aircraft require one fully integrated TDL kit.

2. Program Details.

Quantity	Unit Cost	Program Cost
13 Multi-Function Displays w/ Case and Cables	\$14,000	\$182,000
13 Hand-Held Link-16 Radios	\$35,000	\$455,000
1 Server	\$50,000	\$50,000
1 Enterprise Link-16 Hosting License	\$4,000,000	\$4,000,000
Total		\$4,687,000.00

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: STEERABLE SIGNALS INTELLEGENCE (SIGINT) ANTENNA

1. Background. ANG MC-12W aircrews cannot meet the full scope of deployment SIGINT taskings with current approved equipment on their aircraft. A 2.4/5GHz steerable antenna is required and would be limited to only aircraft actively deployed. This would allow the antenna spot beam to be directed out of aircraft orbit or off-axis. This solution would concentrate the antennas spot beam on a specific location (both in and out of orbit). There are typically two types of steerable antennas, gimbal and Electronically Steerable Array (ESA). The gimbal would be preferable as it can be RF locked to a signal, geo-locked to a grid, or set to perform raster scans of an area. Another benefit is that it is steerable in both the transmit and receive versus ESA (Receive only). A steerable antenna solution on a MC-12W would represent a generational leap in SIGINT capability as well as afford unforeseen opportunities with active targeting.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 2.45GHz Steerable Antenna	\$30,000	\$60,000
Total		\$60,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: MODULAR FORWARD REFUELING SYSTEM

1. Background. ANG MC-12Ws cannot refuel at an austere location due to a lack of forward deployable fuel tanks and kits. Mission Readiness Teams (MRT) deploy and train with MC-12W aircrew but do not possess the required components to refuel the aircraft. Four modular suppression tanks along with rapid ground refueling kits enable austere site operations and the associated training.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Modular Suppression Tanks	\$300,000	\$1,200,000
2 Rapid Ground Refueling Kits	\$25,000	\$50,000
Total		\$1,250,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: WAVEFORM/MOBILE AD-HOC NETWORK INTEGRATION

1. Background. ANG MC-12Ws require a mobile, scalable and maneuverable communications systems to meet the demands within Agile Combat Employment, while providing a robust and resilient command and control (C2) node for the Joint force. The equipment should meet the needs of echelons from the tactical edge to the highest levels of C2 that enables Joint All Domain Command and Control. MC-12W support teams use waveforms are not currently supported by the aircraft. Common waveform equipment enables data transfer as a force multiplier to the supported ground user. This capability provides Combatant Commanders with an agile, highly mobile, scalable, resilient, and durable command and control, precision strike and joint integration capability at the tactical edge to execute the kill chain in contested environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
13 Tactical C2 Box	\$109,000	\$1,417,000
1 Lower Echelon Network System	\$2,800,000	\$2,800,000
2 Edge Compute Solutions	\$28,000	\$56,000
Total		\$4,273,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

MC-12W: SECOND FULL MOTION VIDEO SENSOR

1. Background. ANG MC-12Ws require a more capable optical sensor to bring the MC-12W to the SOCOM manned platform standard. The additional full motion video system will double the imagery intelligence capability for MC-12W crews and provide a substantial increase of situational awareness to the commanders on the battlefield. By extension, this capability will greatly enhance the ability of MC-12W crews to provide collateral damage estimates and scans for kinetic strike and close air support situations, positively identify enemy combatants, and protect the ground force with added defensive scans. Increased fidelity enable the MC-12W to fly higher, mitigate surface-to-air threats, identify more details of high value targets, and identify hostile intent by detecting armed personnel. All 13 ANG MC-12Ws require a second sensor with more capability than the MX-15DiD sensor.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$2,500,000
13 Electro Optical/Infrared Sensors	\$1,500,000	\$19,500,000
Total		\$22,000,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment

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, DCGS 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 – Nine squadrons at six locations provide federated intermediate and advanced target development, battle damage assessments, collateral damage estimates, and analytical assessment 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.

Unit Level Intelligence - Supports 23 Mission Design Series weapons systems across 143 ANG units and imbeds with other mission sets to tailor intelligence for Air Tasking Order execution and integration.

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Critical Capabilities List

- Unit-Level Intelligence Scenario Generator
- Unit-Level Intelligence Multi-Domain Network Communications Kit
- Multi-Sensor, Platform Agnostic Artificial Intelligence
- Electromagnetic Spectrum Collection and Analysis System
- Intelligence Augmented Reality for Full Motion Video

Essential Capabilities List

- Domain Switching Solution for Stereoscopic Imagery Exploitation and Point Mensuration
- Advanced Geospatial Information Systems (GIS) Suite for Targeting Workflow
- Scalable, Portable GEOINT Storage Capability Enabling Targeting Operations in Steady-State and Contested, Degraded Environments
- Scenario-driven Virtual Environment that Facilitates SIGINT and Cyber Training

Desired Capabilities List

- Virtual Target Modeling for Enabling Offensive Cyber Operations and Other Non-Lethal Fires
- Redundant Power Supplies for Targeting Units
- Multi-National Information Sharing Cross-Domain Integration - Mission Partner Environment
- Cognitive Performance Training Tool

INTELLIGENCE: UNIT-LEVEL INTELLIGENCE SCENARIO GENERATOR

1. Background. ANG intelligence analysts require synthetic training data to be integrated with Distributed Mission Operations (DMO) for readiness, training, and wargaming purposes. This system must be able to project synthetic target signature data onto commonly used intelligence systems. This data should also be backward compatible to enable scenario development from real-world missions. This capability supports rapid target discovery, analysis and reporting by analysts supporting sensor-to-shooter linkages within the Joint All-Domain Command and Control operating construct. This system must have minimal latency and tie into existing tools and databases to ensure that Intelligence, Surveillance, and Reconnaissance functions are realistically represented in various DMO networks. System intelligence training requirements with other operational platforms and capabilities enable kinetic and non-kinetic fires, tailor intelligence support to Operational Imperatives, and meet the intent of the National Defense Strategy.

2. Program Details.

Quantity	Unit Cost	Total Cost
Scenario Generator Non-Recurring Engineering	N/A	\$5,000,000
Total		\$5,000,000

INTELLIGENCE: MULTI-DOMAIN NETWORK COMMUNICATIONS KIT

1. Background. ANG personnel recovery/combat search and rescue and tactical airlift unit-level intelligence (ULI) organizations lack the ability to independently access multi-domain intelligence to provide decision-enabling information to the warfighter for agile combat employment (ACE) operations in contested and degraded environments. ULI requires a multi-domain network communications kit to meet both ACE style taskings and fighting on Joint Worldwide Intelligence Communications System initiatives, while aligning with the distributed intelligence combat element concept of operations. This kit must also have primary, alternate, contingency, and emergency communication mediums and a standalone power capability with redundant backup. It must have a high volume beyond-line-of-sight satellite communications, simultaneous secure high-frequency/very high-frequency (HF/VHF) voice and data, tactical data link integration, and cellular voice and data. Changes to tactical combat environments, the unpredictability of operating locations, and mission taskings are driving ULI organizations to operate in remote locations with minimal infrastructure. ANG units require five kits to be used as a proof of concept before being fielded to all organizations.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Equipment Chassis	\$230,000	\$1,150,000
5 Secure Voice and Data Encryption Devices	\$40,000	\$200,000
5 Ka/Ku/X-Band SATCOM Dishes	\$300,000	\$1,500,000
5 HF/VHF Radios	\$30,000	\$150,000
5 Link-16 Radios	\$50,000	\$250,000
5 IBS Radios	\$32,000	\$160,000
5 LTE Router	\$1,000	\$5,000
60 High-Powered Solid-State Laptops	\$5,000	\$300,000
5 Solar, Battery, Generator Power Solutions	\$20,000	\$100,000
Total		\$3,815,000

**INTELLIGENCE: OPEN ARCHITECTURE ARTIFICIAL INTELLIGENCE (AI)
ADVANCED BATTLE MANAGEMENT SYSTEM (ABMS)**

1. Background. ANG intelligence analysts require a multi-layered common operating picture (COP) with advanced AI capabilities to converge effects across multi-domain boundaries through globally integrated operations in accordance with the United States Air Force ABMS Campaign Plan, the Next Generation Intelligence Surveillance and Reconnaissance Dominance Flight Plan, and the National Defense Strategy. This COP will allow improved operational readiness and is essential for allowing intelligence units to contribute to ABMS. The COP must feature a two-way communication link paired with advanced analytic tools and human-to-machine interfacing to compress multiple processes (e.g., mission planning, find-fix-target-track-engage-assess, and processing, exploitation, and dissemination). Additionally, this COP should feature cutting edge AI processes that allow for near-real-time collaboration, automated data storage and retrieval, link analysis, automated target recognition, predictive assessment of selectors, digital terrain and elevation data (DTED) analysis and assessment, and multi-intelligence integration. Lastly, the COP must be automated into a cross-domain solution for NIPR, SIPR, and JWICS, while remaining interoperable with the Distributed Common Ground Station Open Architecture enterprise, the Air Operations Centers, and other mission partners.

2. Program Details.

Quantity	Unit Cost	Total Cost
Multilayer Interoperable Cloud-Based COP	N/A	\$7,500,000
Total		\$7,500,000

INTELLIGENCE: ELECTRONIC SUPPORT COLLECTION & ANALYSIS SYSTEM

1. **Background:** The ANG requires modern configurable electromagnetic spectrum support (EMSO) kits to conduct multi-domain Radio-Frequency (RF) spectrum surveys for homeland defense and overseas operations. The Electronic Support Collection and Analysis System enables Multi-Domain Operations capability and must be highly mobile with a subset of remote-capable components to support diverse geographic coverage and mission sets. The mobile system can be used for Satellite Communication (SATCOM) signals intelligence exploitation, RF spectrum mapping, vulnerability analysis, pattern of life development, baseband network mapping of any devices connected to the SATCOM modems, and geolocation of the SATCOM terminals for tipping/queuing of other collection assets during contingency operations. The mobile workstations will be used to locally manage endpoints and require dedicated RF switching capabilities with ethernet ports for remote operations and transmission of collected data. All workstations will be self-contained and ready for rapid worldwide deployment in a dedicated dustproof, waterproof, HVAC-controlled, and rugged protective case. Additionally, a tactical version is required that operates off the same common hardware and software baseline. These systems will perform SATCOM automated RF surveys and automated cyber network mapping with searchable packet capture software applications to provide rapid RF and network mapping functions for Space, ISR, SOF, and Cyber units. This will enhance intelligence preparation of the battlespace, RF spectrum awareness, pattern of life development, vulnerability analysis, and troubleshooting for both domestic and overseas contingency operations. The EMSO kit will be highly configurable and can be adapted to suit each unit's unique mission requirements, current equipment inventory, and specific operations parameters.

2. Program Details.

Quantity	Unit Cost	Program Cost
Deathwatch System	N/A	\$1,000,000
Deathwatch Lite System	N/A	\$400,000
SCEPTRE Integration	N/A	\$150,000
Monarch Three-Screen + Laptop	N/A	\$250,000
Monarch Laptop	N/A	\$150,000
Automatic RF Spectrum Survey Software Application Addon	N/A	\$150,000
Automatic Cyber Network Survey and Mapping Software Application Addon	N/A	\$150,000
Cyber Network Packet Capture and Searchable Database Software Application Addon	N/A	\$150,000
4 Fly-Away Dual Pol/Multiband Antennas	\$500,000	\$2,000,000
Fly-Away High-Gain UHF Antenna	N/A	\$5,000
Fly-Away Tactical SHF Antenna	N/A	\$200,000
Fly-Away Tactical UHF Antenna	N/A	\$5,000
Honey Badger RF Trainer Kit	N/A	\$600,000
Total		\$5,210,000

INTELLIGENCE: AUGMENTED REALITY OVER FULL MOTION VIDEO

1. Background. Remotely piloted aircraft (RPA) intelligence requires augmented reality to overlay threat and situational awareness data to crew members. Intelligence operators working in RPA squadron operations centers do not currently have a capability to overlay threat or situational awareness data on the pilot or sensor operator's heads up displays. This results in lengthy and confusing threat and target identification efforts for pilots and sensor operators. Augmented reality allows for increased situational awareness to RPA aircrew and customers, increasing survivability by providing real-time threat information overlaid onto the full-motion video feeds. This capability also provides increased situational awareness on targets, reducing the find, fix, track, target, engage, and assess timeline to increase lethality for the RPA enterprise. This matching of human and machine interface is in line with the Next-Generation ISR Dominance Flight Plan and the National Defense Strategy. The ANG requires one kit for each of the 35 ground control stations.

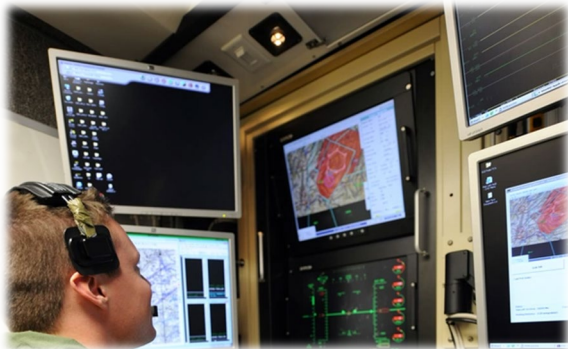
2. Program Details.

Quantity	Unit Cost	Total Cost
35 RPA Kits	\$100,000	\$3,500,000
Total		\$3,500,000

MQ-9

- **Persistent Attack and Long Endurance Battlespace Awareness**
- **ANG MQ-9 Units Execute 50% of All Conventional MQ-9 Combat Lines**
- **ANG MQ-9 aircraft comprise 8% of all Total Force MQ-9 Aircraft**

The MQ-9 remotely piloted aircraft (RPA) comprises 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. Due to the robust weapons payload capacity and long-endurance, the MQ-9 is able to prosecute time-sensitive targets through precision targeting. The aircraft employs up to eight laser-guided AGM-114 Hellfire missiles and/or four GBU-12 / GBU-38 / GBU-49 / GBU-54 500-pound precision-guided bombs. Additionally, the MQ-9's long-endurance makes it the ideal platform to provide intelligence, surveillance, and reconnaissance by 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 flight training operations at two locations and supports test and evaluation at a third. Five launch and recovery element sites can support continuation training and support

to domestic operations over the continental United States. In 2022, the ANG flew eight MQ-9 flight hours in support of search and rescue operations, and approximately 2,000 MQ-9 flight hours of continuation training for Air Combat Command, Air National Guard, and the United States Marine Corps.

MQ-9

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Critical Capabilities List

- Command and Control (C2) Resiliency
- Ground and Air Based Detect and Avoid Systems
- Multi-Spectral Targeting System (MTS) Resolution and Computing Improvements
- MQ-9 Multi-Domain Operations (M2DO) Program of Record Equipment Alignment
- Long Endurance Stand-In Electronic Warfare Capabilities for Joint Force Survivability

Essential Capabilities List

- Joint Service Procurement of Broad-Spectrum All-Domain Sensors
- Distributed Unit-Based Multi-Intelligence Fusion and Processing Centers at Each MQ-9 Site
- Platform AI/ML Solutions for Improved Sensor Autonomy, Tracking, PED, and Resilience
- Multi-Classification Cross-Domain Sensing Grid to Feed Coalition Kill-Web
- Multi-Aircraft Control Capability to Decrease Crew Requirements and Maximize Sensors

Desired Capabilities List

- Mixed Reality Control Station Improvements to Decrease Crew Size and Improve HMI
- Directed Energy Payload to Counter Airborne Threats and Defend High Value Assets
- Arctic Environmental Hardening for Ground Operations, Takeoff, Landing, and Operation
- Class 1-3 Unmanned Aircraft System Launch, Optional Recovery, Command, and Control
- Instrument Flight Rules (IFR) Certified Flight Management System (FMS) and Equipment

MQ-9: COMMAND AND CONTROL (C2) RESILIENCY

1. Background. ANG MQ-9 aircraft require an upgrade to the existing satellite communications (SATCOM) equipment used for command and control (C2) and payload dissemination. The current SATCOM configuration does not allow the MQ-9 to continue to provide the effects required by the Joint Force. Transitioning C2 and payload dissemination to satellites in Low Earth Orbit (LEO), will provide the increased resiliency and data throughput to drastically change the way MQ-9s are employed. Additional beyond line-of-sight connections and capabilities, to include mesh networks, minimum latency datalinks, and Manned-Unmanned Teaming will provide further resiliency for command and control and allow the MQ-9 to be an edge node for connecting other players within the larger Joint Force communications network. 24 ANG MQ-9 aircraft will require upgraded C2 communications equipment. In addition, five spare kits are required for continuity of mission operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$9,000,000
29 LEO C2 SATCOM Kits	\$200,000	\$5,800,000
Total		\$14,800,000

MQ-9: GROUND AND AIR BASED DETECT AND AVOID SYSTEMS

1. Background. ANG MQ-9 units require both a ground-based and air-based detect and avoid radar solution to meet international airspace due regard rules and host nation restrictions. Additionally, these systems will fulfill Federal Aviation Administration requirements to safely operate within the National Airspace System alongside civilian aircraft. Currently, the lack of these capabilities is a barrier to entry to many regions in the world where MQ-9 operations are requested and needed. The ANG requires one mobile ground-based systems to enable Agile Combat Employment and 27 airborne Detect and Avoid Systems for ANG MQ-9 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$5,000,000
1 Mobile Ground Based Detect and Avoid Sites	\$3,200,000	\$3,200,000
27 Airborne-based Detect and Avoid Systems	\$3,800,000	\$102,600,000
Total		\$110,800,000

MQ-9: MULTI-SPECTRAL TARGETING SYSTEM RESOLUTION AND COMPUTING IMPROVEMENTS

1. Background. ANG MQ-9s require an upgrade to the Multi-Spectral Targeting System (MTS) for deep-look, find, and fix effects. The current electronics unit (EU) for the MTS is outdated and is the limiting factor in improving the capabilities of the MTS. The intelligent electronics unit (iEU), using Sensor Open Systems Architecture compliant hardware, provides the computational power to dramatically improve combat identification and enable artificial intelligence/machine learning algorithms to run on the sensor data inside the MTS. This iEU upgrade provides a significant improvement in the MQ-9s passive find/fix capability, filling one of the Combat Air Force’s critical capability gaps in that area. Militarized systems in emission control or highly mobile systems executing emit-and-move tactics are still susceptible to passive find/fix tactics utilized by the MQ-9 MTS. ANG MQ-9 aircraft will require 23 iEUs.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$5,000,000
23 MTS Intelligent Electronic Units	\$400,000	\$9,200,000
Total		\$14,200,000

**MQ-9: MQ-9 MULTI DOMAIN OPERATIONS (M2DO) PROGRAM OF RECORD
EQUIPMENT ALIGNMENT**

1. Background. ANG MQ-9 fleet is not programmed to receive the Air Combat Command (ACC) Program of Record's latest Block 5 M2DO configuration. Failure to adopt the Block 5 M2DO configuration will make future ACC and United States Marine Corps (USMC) sensors and components incompatible with the ANG MQ-9 fleet. The Block 5 M2DO configuration expands on the previous ANG Ghost Reaper initiative and ANG C2 Resiliency efforts by adding components that improve onboard power generation, power distribution, networking, GPS resiliency, and open-mission systems. Procuring the missing pieces of the Block 5 M2DO configuration will ensure ANG MQ-9 aircraft are ready for worldwide deployment with the latest hardware and capabilities available to the Joint Force. ANG MQ-9 requires 29 Block 5-25 (M2DO Enabler) Retrofit kits, Link 16 kits, and Open Mission Systems (OMS) Stellar Relay kits. Additionally, ANG MQ-9 must complete integration on the previously purchased Multi-Intelligence Signals Processing kits to enable full M2DO data dissemination capabilities.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$4,000,000
29 Block 5-25 (M2DO Enabler) Retrofit Kits	\$1,000,000	\$29,000,000
29 Link 16 Kits	\$500,000	\$14,500,000
29 OMS Stellar Relay Kits	\$500,000	\$14,500,000
Total		\$62,000,000

**MQ-9: LONG ENDURANCE, STAND-IN ELECTRONIC WARFARE (EW)
CAPABILITIES FOR JOINT FORCE SURVIVABILITY**

1. Background. By leveraging the remotely piloted nature of MQ-9 as an EW platform, Combatant Commanders are afforded an EW asset that can operate at increased levels of acceptable risk and increase survivability for joint force stand-off munitions and manned assets. MQ-9's inherently long-endurance ensures it can perform persistent EW and alleviate demand on low density assets like the EA-18G Growler. What MQ-9 lacks in output power can be compensated for by operating in mass on multiple axis with multiple techniques. By promulgating EW systems on MQ-9 throughout an area of contest, joint forces can be made aware of changes in an adversary's Electronic Order of Battle and ensure appropriate adjustments are made on manned defensive systems. ANG MQ-9s require 10 EW pods.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$5,000,000
10 Electronic Warfare Pods	\$2,100,000	\$21,000,000
Total		\$26,000,000

C-130 Special Mission

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

C-130 Special Mission aircraft include:



HC-130J Combat King II - HC-130Js operate as the Department of Defense's only dedicated fixed-wing Personnel Recovery (PR) and Combat Search and Rescue (CSAR) platform. HC-130J crews provide frontline expertise in the execution of CSAR in dynamic and contested threat environments. HC-130J crews leverage unique onboard tracking equipment, communication systems,

training, and a comprehensive understanding of tasking supporting assets on a battlefield. This short notice response and expertise maximizes the survivability of an isolated personnel (IP) in enemy territory before an adversary can capture and exploit the IP for information or the degradation of U.S. forces morale. Domestic activations of the HC-130J allow for contingency and crisis response through the HC-130Js medical evacuation, refueling, airdrop, and transport capabilities. HC-130J crews accomplish their mission under the CSAR motto "*These things I do, that others may live.*"

LC-130H - The LC-130H operates on snowfields in remote areas of the Polar Regions in support of the National Science Foundation (NSF). 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 FY 2022 Weapons and Tactics Conference

Critical Capabilities List

HC-130J

- Combat Search and Rescue Mission Management Suite
- Countermeasures Modernization
- On-Board Secure Global Networking
- Precision Geolocation and Authentication of Isolated Personnel
- Intercommunication System Update

LC-130H

- Self-Protection Capability
- Propulsion System Upgrades
- Updated Avionics/Instrumentation and Associated Training Devices
- Common Mobility Air Forces Mission Computer
- Polar Construction Skiway Team Equipment/Gear

Essential Capabilities List

HC-130J

- Synthetic Aperture RADAR /Ground Moving Target Indicator to Locate Unique Survivor Signatures and Organic Threat Identification within the Battle Space.
- Electronic, Signals, and Communications Intelligence Collection Systems
- Increased Survivability for Anti-Access/Area Denial Environments through Radio Frequency Countermeasures
- Distributed Mission Operations Simulators to Enhance Combat Search and Rescue Coordinator Training for Major Combat Operations
- Integrated Second-Generation 406 MHz Personnel Locator Beacon Interrogator.

LC-130H

- Digital Audio Interphone Communication System
- High-Speed Ramp and Door
- Center Wing Box Replacement Program
- High-Frequency Radios with SELCAL
- Radar Upgrade

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

Special Operations/Personnel Recovery

HC-130J: COMBAT SEARCH AND RESCUE MISSION MANAGEMENT SUITE

1. Background. The HC-130J requires an integrated mission management suite utilizing a modular open systems approach to integrate and manage combat search and rescue data across multiple domains. Aircrew must have the ability to manage, sort and prioritize isolated personnel data to direct multiple recovery missions in a peer contested environment. The software-definable requirements for this integrated tactical mission suite must allow HC-130 aircrew to add, remove and modify multiple joint force standard payloads interfacing with open architecture podded solutions. This suite must meet HAF requirements for Joint All Domain Command & Control (JADC2) and seamlessly integrate into the Advanced Battle Management System requirements and capabilities. Additionally, the interface must provide aircrew with a common operating picture to maximize the capability to coordinate the Combat Search and Rescue mission. One suite is required for each of the 12 HC-130J aircraft in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$10,000,000
13 Software Definable Radio Suites*	\$250,000	\$3,250,000
13 Moving Map Display Group A Kits*	\$150,000	\$1,950,000
COP Engineering	N/A	5,000,000
Total		\$20,200,000

* Includes 10% spares.

HC-130J: COUNTERMEASURES MODERNIZATION

1. Background. The HC-130J requires an update to its defensive systems to make it survivable in peer operating environments. Upgrades to the ALQ-253 software are needed to ensure it can meet system capabilities and enable the ALQ-253 to integrate into evolving defensive systems to include jamming systems, updated expendable munitions (chaff and flares), increase in dispense buckets, and expanded pattern programming. The defensive systems need to be updated to allow aircrew the ability to fly against training profiles in realistic threat scenarios developed and executed by the Virtual Electronic Countermeasure Training System (VECTS) and maximized the defensive capability using Threat Response Processing (TRP) programming offered in parallel to the VECTS software.

1. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$9,000,000
12 VECTS Kits	\$250,000	\$3,000,000
12 TRP Kits	\$150,000	\$1,800,000
12 Pilot/CSO Dispense Switch Kits	\$1,000,000	\$12,000,000
12 ALE-47 Bucket Additions (MC-130J) Kits	\$300,000	\$3,600,000
Total		\$29,400,000

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

1. Background. ANG HC-130Js require secure, continuous, on-board connectivity over wide-band beyond-line-of-site (BLOS) systems. The requirement to communicate and disseminate information securely via BLOS with multiple assets and agencies is critical to the HC-130Js ability to execute its doctrinal role of combat search and rescue coordinator (CSAR-C). Currently, the HC-130J relies on an outdated BLOS voice communication radio to exchange critical survivor information from command and control sources, delaying the isolated personnel recovery effort. The existing satellite constellation has reached end-of-life and must be replaced with Mobile User Objective System (MUOS)-capable radios to ensure BLOS capability. The limited voice-only BLOS capability hinders the CSAR-C’s ability to gather information in a timely manner and severely limits data flow during CSAR operations. The HC-130J needs the ability to utilize secure internet while on board the aircraft for rescue forces to fully support information superiority operations. Furthermore, the HC-130J requires enhanced situational awareness during domestic support operations with on-board unclassified internet capability for civil agency data and video interoperability. The integration of an organic digital network for unencrypted/encrypted internet on-board delivers efficient information sharing across Multi-User Internet Relay Chat (MIRC) , Secret Internet Protocol Router (SIPR) , Joint Worldwide Intelligence Communications System (JWICS) , and Non-Classified Internet Protocol Router (NIPR) architectures. One of each system and two ARC-210 Gen 6 radios are required for each of the 12 HC-130Js in the ANG.

2. Program Details.

Quantity	Unit Cost	Program Cost
ARC-210 Non-Recurring Engineering (NRE)	N/A	\$3,800,000
30 ARC-210 GEN 6 Radios	\$220,000	\$6,600,000
Software Definable Radio NRE	N/A	\$9,000,000
13 Software Definable Radio Suite*	\$250,000	\$3,250,000
13 Full Motion Video*	\$200,000	\$2,600,000
13 Internet On-Board*	\$300,000	\$3,900,000
Totals		\$29,150,000

* Includes 10% spares.

Special Operations/Personnel Recovery

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

1. Background. ANG HC-130Js require the ability to carry theater/mission-specific capabilities of electro-optical sensors, Search and Rescue/Ground Moving Target Indicator (SAR/GMTI), and electronic intelligence (ELINT) payloads mounted on external hard points without detrimental effects to baseline aircraft capabilities, specifically aerial refueling. This would allow a tailored capability to geolocate and authenticate isolated personnel through low probability of intercept/low probability of exploitation or passive means. The sensors listed are joint force standard payloads capable of being integrated into a podded solution set. 12 ANG HC-130Js require an agile pod with one spare for each location (15 total) to outfit the HC-130J community. Additionally, two of each sensor type listed are required for each ANG HC-130J location.

2. Program Details.

Quantity	Unit Cost	Program Cost
RF Jammer Non-Recurring Engineering (NRE)	N/A	\$5,000,000
6 SAR/GMTI*	\$5,000,000	\$30,000,000
SAR/GMTI NRE	N/A	\$5,000,000
6 ELINT Payloads*	\$700,000	\$4,200,000
10 Pods**	\$900,000	\$9,000,000
Total		\$53,200,000

* Includes 10% spares.

** ANG owns 5

HC-130J: INTERCOMMUNICATION SYSTEM UPDATE

1. Background. ANG HC-130Js require an update to the Intercommunication System (ICS) on board the current and future Block aircraft. This update to the ICS is critical in allowing the aircrew correct setting of radios and onboard communication channels enabling rapid response to CSAR situations and supporting assets and maintaining flight safety. This system will update the ICS panel at each crew station to precisely control radio transmissions, volume and incorporate 3D audio software. This software allows unique usage of a crewmember's headset to assigned a audio location for radio monitoring. The system will update the ICS transmit function at the crew stations to transmit on multiple radios without having to switch the selected radio each time at the main ICS panel.

2. Program Details.

Quantity	Unit Cost	Program Cost
12 Digital ICS Panel Upgrade	\$300,000	\$3,600,000
12 Pilot/Crewmember Transmit Switch Updates	\$750,000	\$9,000,000
12 Software & Controller 3D Audio	\$900,000	\$8,000,000
Total		\$20,600,000

LC-130: SELF PROTECTION CAPABILITY

1. Background. ANG LC-130Hs require an ability to operate in a contested environment, especially as our mission set refocuses towards the resurgent Arctic. The aircraft is devoid of the traditional defensive systems that all other C-130s have. As the MAF prepares to meet the pacing challenges of China and Russia, it is imperative that we are suitably equipped to survive in the high-end fight. A podded, MAF common-carry solution would represent the most ‘bang-for-the-buck’ given the current capability gap. Furthermore, such a modular solution would be ideal to pivot from wartime mission to peacetime science support. However, certain baseline functions would need to be installed to meet this capability, including an ALR-69A radar warning receiver (or equivalent), ALE-40/47 countermeasures dispensing system (or equivalent), and power + MIL-STD 1553 Bus to the outboard pylon positions for any podded solution. All ten ANG LC-130s require self-protection systems.

2. Program Details

Quantity	Unit Cost	Program Cost
10 RWR installations	\$500,000	\$5,000,000
10 Common Pod installations	\$2,000,000	\$20,000,000
10 Hardpoint power/data installations	\$330,000	\$3,300,000
10 modular, mission-tailored self-protection pods	\$1,000,000	\$10,000,000
Total		\$38,300,000

LC-130: 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 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. The LC-130s have already received the NP2000 modification, however it has become apparent that the NP2000 propeller lacks a robust de-icing system that is comparable to the 54H60 propeller. This has caused one class B mishap and two Aviation Safety Action Program reports due to damage caused by ice shedding in moderate ice. This system needs improvement to prevent future mishaps. The LC-130s still require the 3.5 engine modification to complete the propulsion upgrade. Upgrading the T-56 engine with the Rolls Royce 3.5 modification, with redesigned compressors and turbines, increases engine life cycle, improves fuel economy, and improves aircraft availability. All 10 ANG LC-130H aircraft require this final phase of the propulsion modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
3.5 Engine Upgrades at Component Repair Facility	\$1,500,000	\$1,500,000
NP2000 De-Ice System Development	\$10,000,000	\$10,000,000
10 NP2000 De-Ice system development	\$1,000,000	\$10,000,000
40 3.5 Engine Installs	\$1,200,000	\$48,000,000
Total		\$69,500,000

LC130: GLOBAL AIRSPACE COMPLIANT AVIONICS / INSTRUMENTATION, ASSOCIATED TRAINING DEVICES, AND ON-BOARD SECURE CONNECTIVITY

1. Background. The ANG LC-130H fleet requires updated avionics to ensure continued global airspace access. LC130Hs 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. 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, 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. In order to produce a fully NVIS compliant aircraft, all L1 (H2) and L1A (H2.5) aircraft must receive the NVIS baseline Time Compliance Technical Orders (TCTOs)- that modify the side panels and center console. There are 6 LC-130H aircraft that need these TCTOs completed. Lastly, due to communications limitations imposed by polar operations, LC-130Hs require a hard-wired satellite voice/data connectivity with the ability to call both secure and unsecure cell phones, landlines, and tied into the intercom system. Currently, the only solution to this is the Iridium constellation for high-latitude satellite communications. All 10 ANG LC-130H aircraft require avionics and communication system upgrades.

2. Program Details.

Quantity	Unit Cost	Program Cost
Avionics Upgrade Non-Recurring Engineering	N/A	\$50,000,000
10 Avionics Kit	\$5,700,000	\$57,000,000
6 NVIS TCTO Kits	\$50,000	\$300,000
10 NVIS Kits	\$465,000	\$4,650,000
Non-Recurring Engineering Communications Upgrade	N/A	\$1,000,000
10 Flight Deck Communications Upgrade	\$220,000	\$2,200,000
Total		\$115,150,000

LC-130: COMMON MOBILITY AIR FORCES MISSION COMPUTER

1. Background. ANG LC-130Hs require a robust, secure tactical data link (TDL). TDL provides a command and control (C2) link and maximizes aircrew situational awareness with beyond line-of-sight capabilities. TDL also provides critical real-time information to the LC-130H aircrews such as friendly aircraft position, weather conditions, and hostile threat locations, as well as allowing integration through podded solutions. This increases the LC-130H's ability to effectively participate in the network-centric battlespace. Recent operations have highlighted the need for comprehensive, networked C2 awareness, and integration of aircraft systems. Due to routine operations in the polar regions, the LC-130H will need to upgrade to ARC-210 with voice capability and Generation 6 Mobile User Objective System satellite communications radios. A common MAF 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 the common MAF mission computer.

2. Program Details.

Quantity	Unit Cost	Program Cost
MAF Mission Computer Non-Recurring Engineering	N/A	\$400,000
10 RTIC Hardware Kits	\$560,000	\$5,600,000
10 ARC-210 Gen 6 Radios	\$220,000	\$2,200,000
Total		\$8,200,000

LC-130: POLAR CONSTRUCTION SKIWAY TEAM EQUIPMENT / GEAR

1. Background. ANG LC-130Hs require equipment for the polar construction skiway team (PCST) and the ski landing area control officer (SLACO) team. These teams are required to forward deploy to remote areas, establish a forward operating base, and construct a skiway to support LC-130H operations. The PCST is subject to harsh arctic conditions and requires specialized gear for survival. Additionally, specialized equipment is required to prepare the landing surface, on ice or snow, for a ski equipped aircraft. Extreme cold weather life sustaining gear such as cold weather tents, clothes, generators, heaters, cooking equipment, and communications equipment are required for the survival of the team. The team consists of 20 personnel, any member of the 109AW could be tasked with supporting the PCST. This requires all crew members and maintenance personnel to be issued the same highly specialized extreme cold weather clothing. To be able to successfully build a skiway, equipment such as snowmobiles, groomers, flagging, ice/snow measuring tools, general hand tools, overt/covert lights, and remote refueling operations equipment are needed. Finally, an LC-130-loadable extreme cold weather tractor is required for skiway grooming, heavy lifting, aircraft maintenance, and aircraft towing. A formal sustainment program needs to be established to maintain all gear and equipment in good working order.

2. Program Details.

Quantity	Unit Cost	Program Cost
Grooming tractor	\$300,000	\$300,000
PCST Equipment	N/A	\$300,000
210 Extreme Cold Weather Clothing Kits	\$2,000	\$420,000
SLACO Equipment	N/A	\$200,000
50 Extreme Cold Weather Clothing Sustainment Kits	\$2,000	\$100,000
Total		\$1,320,000

C-32B and C-40C

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.



C-32B, and C-40C FY 2023 Weapons and Tactics Conference

Critical Capabilities List

C-32B

- Satellite Based Augmentation System
- Enhanced Flight Vision System

C-40C

- Aircraft Communication Addressing and Reporting System and Controller-Pilot Data Link Communications Avionics Upgrade
- Large Aircraft Infrared Countermeasure System Replacement
- Satellite-Based Augmentation System
- Interior Tech Refresh
- Upgraded Weather Radar

Essential Capabilities List

C-32B

- None

C-40C

- Modernized In Flight Entertainment System
- Enhanced Flight Vision System
- Carbon Brake Retrofit

Desired Capabilities List

C-32B

- None

C-40C

- Galley Refresh

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. Additionally, 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
SBAS Non-Recurring Engineering	N/A	\$4,500,000
2 SBAS Kits	\$4,500,000	\$9,000,000
Spare Parts	\$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 execute operations with reduced weather minimums. The EFVS increases situational awareness and safety during operations in severe 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	\$5,500,000	\$11,000,000
Spare Parts	\$1,000,000	\$1,000,000
Total		\$12,000,000

**C-40C: AIRCRAFT COMMUNICATION ADDRESSING AND REPORTING SYSTEM
AND CONTROLLER PILOT DATA LINK COMMUNICATIONS**

1. Background. ANG C-40Cs require upgraded Aircraft Communication Addressing and Reporting System (ACARS) and Controller Pilot Data Link Communications (CPDLC) for data link systems which sends messages between an aircraft and an operator's ground-base through various radio links. The current C-40C ACARS Communication Management Unit (CMU) and Very High Frequency (VHF) transmitter require software upgrades. The FAA has mandated required avionics for aircraft using US Domestic Enroute CPDLC services. Currently, the C-40C does not meet these requirements. The aircraft's Communications Management Unit and Digital Radio software must be updated to align with current FAA requirements. If not satisfied, the aircraft will not be allowed to fly in congested airspace, no longer report via ACARS, lose beyond-line-of-sight capability, and lose command and control capability. Furthermore, aircraft will be limited to flying below Flight Level 290. This will decrease safety margins as aircraft are forced to fly lower than optimal altitudes, which increases fuel cost and creates more enroute fuel stops. The ANG requires a CMU and VHF software update for each airframe in addition to updating any spare components.

2. Program Details.

Quantity	Unit Cost	Program Cost
ACARS/CPDLC Non-Recurring Engineering	N/A	\$5,000,000
3 Upgraded ACARS/CPDLC Systems	\$2,000,000	\$6,000,000
Total		\$11,000,000

**C-40C: LARGE AIRCRAFT INFRARED COUNTERMEASURE SYSTEM
REPLACEMENT**

1. Background. ANG C-40Cs require upgraded Large Aircraft Infrared Countermeasure Systems (LAIRCM). C-40Cs rely on the LAIRCM system for self-defense in contested airspace. The current LAIRCM system requires replacement due to component obsolescence by 2025. Current Concept of Operations (CONOPS) and aircraft minimum equipment listings require a functional LAIRCM system. Without an upgraded LAIRCM system, the C-40C will not be capable to perform its primary mission of safely transporting required distinguished visitors around the world. All ANG C-40Cs require an updated LAIRCM system and supply chain.

2. Program Details.

Quantity	Unit Cost	Program Cost
LAIRCM Non-Recurring Engineering	N/A	\$12,000,000
3 Upgraded LAIRCM Systems	\$2,000,000	\$6,000,000
Total		\$18,000,000

C-40C: SATELLITE BASED AUGMENTATION SYSTEM

1. Background. ANG C-40Cs require a satellite-based augmentation system (SBAS) to ensure travel anywhere in the world at any time. The C-40 currently has limited RNAV RNP approval and certification. This capability must be expanded to keep pace with the aviation industry. Wide Area Augmentation System/Localizer Performance with Vertical Guidance (WAAS/LPV) increases safety with tighter navigation tolerances and increased capabilities including lower approach minima. WAAS provides a SBAS which increases availability and accuracy in position reporting in all phases of flight. WAAS/LPV enables aircraft to fly precision approaches into airports that do not have an instrument landing system (ILS). The US has already decommissioned a large number of ILSs in favor of the more cost-efficient LPV. More countries are acquiring LPV capabilities including European Nations, China, Japan, India, and Russia. The WAAS service is interoperable with other regional SBAS services including those operated by Japan, Europe, and India. ANG C-40Cs require three SBAS for the fleet.

2. Program Details.

Quantity	Unit Cost	Program Cost
SBAS Non-Recurring Engineering	\$1,500,000	\$1,500,000
3 SBAS	\$3,000,000	\$9,000,000
Total		\$10,500,000

Special Operations/Personnel Recovery

C-40C: INTERIOR TECH REFRESH

1. Background. ANG C-40Cs are now being equipped with a high-speed data system for seamless, worldwide satellite-based communications, and internet connectivity. This interior tech refresh will equip the C-40C fleet with VOSIP phones allowing DVs to meet time-critical and persistent mission requirements. Users from the highest levels of US government and military routinely travel via the C-40C and have limited on-board handset phones to conduct time-critical business. The current interior communication equipment does not meet current technological needs for conducting business while airborne. All three ANG C-40s require upgraded interior high-speed data VOSIP systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering (3010)	N/A	\$5,000,000
3 Upgraded Interior Data Systems (3010)	\$5,000,000	\$15,000,000
Total		\$20,000,000

C-40C: WEATHER RADAR UPGRADE

1. Background. ANG C-40Cs require an upgraded multi-scan radar that will standardize symbology and flight information on the flight displays, provide at-a-glance situational awareness of convective weather, detection and analysis of thunderstorm threats. This will provide automatic tracking of weather which will significantly reduce flight deck workload and greatly improve safety. All three ANG C-40Cs require upgraded weather radars.

2. Program Details.

Quantity	Unit Cost	Program Cost
Non-Recurring Engineering	N/A	\$3,000,000
3 Upgraded Weather Radars	\$1,000,000	\$3,000,000
Total		\$6,000,000

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 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 2022, ANG Rescue Squadrons (RQS's) deployed in support of multiple contingency operations. The 129 RQS worked with multiple agencies to fight fires in Northern California. Additionally, HH-60Gs conducted numerous counter-drug missions throughout the state and supported search and rescue operations including a long-range recovery in the Pacific Ocean.

The 101 RQS performed multiple missions in support of both overseas and domestic operations. The 210 RQS held a 24-hour state-wide, rescue alert in Alaska resulting in many lives saved.

The 188 RQS supported aircrew training for the 58 Special Operations Wing.



The HH-60G modernization priorities include a carry-on container for emergent technologies, expendable/federated RF countermeasures, training tools for contested environments, improvements to aircraft weapons systems, and carry on situational awareness devices.

HH-60G

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Critical Capabilities List

- Carry-On Container to Rapidly Employ Emergent Technologies
- Expendable, Federated Radio Frequency Countermeasures
- In-Flight Simulations for Contested Degraded Operations Training Tasks
- Weapons Lethality Enhancements to Mounts, Targeting System, and Configuration
- Carry-On Shared Situational Awareness Suite

Essential Capabilities List

- Mission System Software Upgrades
- Improved Generators
- Integrated Mission Debrief Capability
- Virtual Reality Training Devices at Every Air Reserve Component Base
- Defensive Systems Upgrades

Desired Capabilities List

- Performance Based Navigation Certified Area Navigation
- Agile Combat Search and Rescue Basing Capability
- Aircrew Flight Equipment Enhancements
- Instrumentation Upgrade
- Helicopter Hovering In-Flight Refueling

HH-60G: CARRY-ON CONTAINER TO RAPIDLY EMPLOY EMERGENT TECHNOLOGIES

1. Background. ANG HH-60Gs require a container that can house and employ new and emergent technologies, on a rapid timeline, in support of CSAR missions. Because the HH-60G does not have hard points to mount mission specific pods, the HH-60G requires a container that can be secured in the helicopter cabin to house a broad spectrum of mission and defensive systems. There are operational systems available for advanced survivor geolocation, increased battlefield situational awareness via tactical data link, and electronic attack/radar frequency defensive systems. These systems typically require power from the aircraft, a GPS location from the aircraft, and an optimized antenna allocation. The Zealous Rooster container is water resistant, temperature regulated, and has a sensor open systems architecture/open mission systems (OMS) backbone to facilitate integration and employment of new/multiple payloads. The container receives power from the aircraft, a GPS signal, and has an external connector panel to allow for multiple antenna connections. The container is securable to the cabin floor on top of the cargo hook door and has weight bearing capacity. The cargo hook door can be removed, and cabling can be routed for bottom mounted antenna's. All ANG HH-60Gs require an OMS container.

2. Program Details.

Quantity	Unit Cost	Program Cost
9 Zealous Rooster OMS Container	\$50,000	\$450,000
9 Sandia Labs Radio Electronics Assembly	\$1,000	\$9,000
9 Small Tactical Terminal Link 16 Radios	\$25,000	\$225,000
9 Situational Awareness Data Link Radios	\$10,000	\$90,000
Total		\$774,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: EXPENDABLE, FEDERATED RADIO FREQUENCY COUNTERMEASURES

1. Background. HH-60G requires effective radio frequency countermeasures (RFCM) to operate in a contested environment. Current HH-60s rely on a legacy APR-39B(V)2 and RR-180 chaff for the task. As technology has matured, smaller, lighter, cheaper means of expendable RFCM have become available. As a bridge, and potential continuation to HH-60W, the USAF HH-60G community is seeking a suite of federated and/or expendable RFCM. First, improved chaff must present a larger radar cross section (RCS), delivered in factor bands to include millimeter wave, achieving sufficient RCS blooming within the beamwidth of factor RF threats. Modeling and simulation (M&S) must be conducted to maximize the dispense location, direction, and timing of chaff. Second, active expendable decoys which present an actively emitting radar signature, that enhance survivability through decoy and/or jamming and employ techniques such as digital RF memory (DRFM) are needed. Active expendables can be dispensed via existing ALE-47 architecture or manually by the crew. Active expendables must be persistent enough to enable an escape from the missile engagement zone and must render themselves unclassified upon completion of their task. Third, HH-60Gs are pursuing means of deploying small unmanned aerial systems (SUAS) that conduct an RFCM or electronic attack (EA) effect. SUAS may be carried internally and deployed airborne from the cabin or from the ground by crew or a man-portable launcher. SUAS should be small, lightweight, affordable, and expendable while providing a layered, coordinated, potentially teamed effect. SUAS must also render themselves unclassified upon completion of their task. Finally, HH-60 will consider other means of readily available expendable RFCM, to include towed, or temporarily mounted systems.

2. Program Details.

Quantity	Unit Cost	Program Cost
RFCM Effectiveness M&S	\$2,000,000	\$2,000,000
1,200 ALE-47 Active Expendable Decoys	\$4,000	\$4,800,000
240 EA SUAS	\$10,000	\$2,400,000
Total		\$9,200,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

**HH-60G: IN-FLIGHT SIMULATIONS FOR CONTESTED DEGRADED OPERATIONS
TRAINING TASKS**

1. Background. ANG HH-60Gs require training software integrated into the electronic warfare and navigation suite to prepare for combat. Training for a GPS denied/degraded environment and against radar threats is difficult. Range schedules, cost, and threat simulator availability are all significant constraints to achieving the tasked quantity of training. Restricting training to range airspace and against only available threat simulators does not prepare aircrew for realistic combat engagements. To meet training requirements in both quantity and quality, on-board threat emulation is required. This includes radar warning receiver (RWR) training modes and threat representation such as the currently fielded Virtual Electronic Combat Training System (VECTS) and in-line navigation degradation such as Air Force Research Lab's Space Jam. RWR training modes must support pre-planned threat environments. It also must support real time simple threat injects by an on-board instructor through an easy-to-use handheld device. For navigation degradation, threat simulators shall operate in-line with no external emissions. Training systems should be software-based. No hardware modifications should be planned to existing systems. All ANG HH-60G units require VECTS and Space Jam.

2. Program Details.

Quantity	Unit Cost	Program Cost
VECTS Non-Recurring Engineering	N/A	\$2,000,000
18 VECTS	\$1,300,000	\$23,400,000
6 SPACE JAM Systems	\$50,000	\$300,000
Total		\$25,700,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: WEAPONS LETHALITY ENHANCEMENTS TO MOUNTS, TARGETING SYSTEM, AND CONFIGURATION

1. Background. ANG HH-60Gs require enhanced lethality from currently fielded weapons systems to ensure crew survivability and mission accomplishment in a contested environment. These weapons enhancements ensure HH-60Gs can suppress enroute and terminal area threats when force-packaged aircraft are not available or are unable to identify the threat. The enhancements enable rapid configuration changes and flexibility. The enhancements include refurbishing all existing GAU-18 weapons cradles, installing a holographic sight which displays a continuously calculated impact point, and cabin floor mounts for additional weapons carriage. All ANG GAU-18 cradles require refurbishment by the manufacturer to replace worn parts and an inspection of wear points to ensure the mounts meet specifications. The holographic sight accounts for aircraft movement through the air mass and continuously calculates and displays the bullet impact point based on external ballistics. Two cabin floor mounts are required to carry additional crew-served weapons to exploit the advantages of flexible, side-fire weapons while still maintaining a forward firing weapon. This design allows the GAU-2s to be mounted fixed forward on the existing external gun mount system with GAU-18s mounted in the cabin for reactive side fires. All 18 ANG HH-60G will also require two holographic sights and two floor gun mounts per aircraft plus 10% spares.

2. Program Details.

Quantity	Unit Cost	Program Cost
40 GAU-18 Cradle Refurbishment	\$17,000	\$680,000
40 Weapons Sights	\$10,000	\$400,000
Cabin Floor Weapons Mounts Non-Recurring Engineering	N/A	\$45,000
40 Cabin Floor Weapons Mounts	\$1,000	\$40,000
Total		\$1,165,000

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

HH-60G: CARRY-ON SHARED SITUATIONAL AWARENESS SUITE

1. Background. ANG HH-60G aircrews require shared situational awareness (SA) systems to quickly understand the common operating picture. The entire suite of systems will be carry-on/carry-off and airframe agnostic. The independent systems will send and receive information from well-established combat protocols that fuse data onto a portable Android Tactical Assault Kit (ATAK) hub. The hub will share information to individual nodes carried on by individual crewmembers. Each crewmember shall interface with the shared SA suite via a handheld ATAK and/or a AN/AVS-6/9-compatible clip-on imager. The clip-on imager enhances the spectral response of the ANV-6/9 to include shortwave infrared or thermal and display compatible tactical information such as waypoints, route, and datalink tracks on the eyepiece. Airframe interaction will be via temporary internal antenna mounts and temporarily secured cables. The ability to interface with already-owned military electronic flight bags, Foreflight, and automated dependent surveillance-broadcast is desired. Finally, the ATAK hub and modular nature of the shared SA Suite will inherently support rapid integration of emerging technologies, theater-specific applications, and rapid modernization.

2. Program Details.

Quantity	Unit Cost	Program Cost
72 Clip-on Imagers	\$20,000	\$1,440,000
72 ATAK Tablets	\$1,000	\$72,000
18 Mounting Brackets, Cable Kits	\$100	\$1,800
18 GPS Antennas	\$100	\$1,800
18 Portable Remotely Operated Video Enhanced Receivers	\$60,000	\$1,080,000
18 Modular Radio Carrying Case With Power	\$70,000	\$1,260,000
18 Handheld Link 16	\$25,000	\$450,000
Total		\$4,305,600

Note: As a weapon system identified for possible divestment, modernization efforts will focus on safety of flight, near-term sustainment requirements and integration of transferrable equipment.

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 Air Support Operations Units Provide 38% of the Total Force**

Special Warfare is made up of the following three squadron types:



Guardian Angel (GA) - The ANG has three squadrons consisting of combat rescue officers and pararescue. Their mission is to execute personnel recovery of downed and injured aircrew members by providing recovery and emergency medical treatment necessary to stabilize and evacuate injured personnel.

Special Tactics (ST) - The ANG has two Special Tactics squadrons that are uniquely organized, trained, and equipped to conduct joint special operations and sensitive recovery missions. Special Tactics combat controllers, pararescue, and special reconnaissance provide quick-reaction global access to include austere airfield operations, command and control, close air support (CAS), and casualty recovery.



Air Support Operations

Squadrons (ASOS) - The ANG has 16 squadrons under two operations groups providing airspace integration and terminal attack control of CAS firepower against enemy ground targets. ASOS units are composed of tactical air control party specialists (TACP) and primarily embedded with Army 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

- Combat Survivability Suite
- Austere Airfield Operations Kit
- Human Performance Optimization
- Maritime Operations Modernization
- Cold Weather Search and Rescue Warfare Package

Special Tactics

- Contested Command Control Package
- Extreme Cold Weather Package
- AO Indo-Pacific Command Modernization
- Survey Data Collection Modification
- Spectrum Battlefield Identification Broad

Air Support Operations Squadron

- Mobile Communications Package
- Mission Planning and Debrief System
- Spectrum Unmanned Aerial System
- EMS Awareness and Attack Suite
- Ground Radio Optimization

Essential Capabilities List

Guardian Angel

- Marksmanship Trainer
- Mountain Warfare Equipment
- Small Arms/Indirect Fire Enhancement
- Fixed-Wing Recovery System
- Battlespace Mobility

Special Tactics

- Find, Fix, Target, Track Capability Modernization Suite
- Information Share Server Suite
- Diver's Underwater Navigation and Sonar Modernization
- Portable, Airframe Agnostic Equipment and Personnel Infil/Exfil Equipment
- Common GCS and user interface for fielded SUAS

Air Support Operations Squadron

- Short Wave Infra-Red/Laser Range Finder/Target designator
- Smart Hub
- Human Performance Optimization Program
- CBRNE Gas Mask Suitable for JTAC
- Scalable Power Solution

Desired Capabilities List

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

GA: COMBAT SURVIVABILITY SUITE

1. Background. ANG Guardian Angel (GA) units require modernization of the combat survivability suite, which includes signature reducing uniforms, neutral buoyant body armor, next-generation helmet systems, updated Chemical, Biological, Radiological Nuclear and Explosives (CBRNE) suits, sUAS (small-unmanned aircraft system), and Electronic Warfare (EW) equipment. Those items will assist in access, survivability, and protecting GPS/Radio communications in A2/AD (anti-access/area denial) environments. Neutral buoyant body armor is needed for missions in the maritime environment; current armor systems are not maritime-compliant. CBRNE suits in the AF inventory are obsolete and not mission capable for ground recovery operations. Commercial sUAS are needed to reduce time on ground by aiding in locating personnel and sensitive items. GPS counter-jamming and consistent radio communications systems are needed in Contested and Degraded Operations (CDO) environments to keep GA teams effective and secure.

2. Program Details.

Quantity	Unit Cost	Program Cost
200 Signature Reducing Camouflage Uniforms	\$1,800	\$360,000
200 Signature Reducing Poncho	\$900	\$180,000
200 Hydrophobic Plate Carriers	\$1,500	\$300,000
200 Neutral Buoyancy Plate Sets	\$2,000	\$400,000
200 Next-Generation Modular Helmets	\$2,000	\$400,000
200 Enhanced CBRNE Suits	\$1,000	\$200,000
200 PAPR Mask/Blower Sets	\$1,600	\$320,000
200 Enhanced CBRNE Training Suits	\$500	\$100,000
6 Quadcopters	\$14,000	\$84,000
3 GPS Counter Jamming Systems	\$200,000	600,000\$
3 UHF/VHF Through Jamming Communications	\$100,000	300,000\$
Total		\$3,244,000

GA: AUSTERE AIRFIELD OPERATIONS KIT

1. Background. ANG Rescue Squadrons (RQS) require the addition of fixed and rotary wing tactical assessment and survey collection capabilities for unit-assigned Combat Controllers operating in the USNORTHCOM and USINDOPACOM environments. Acquisition of existing Commercial Off-the-Shelf (COTS) systems enabling the assessment, establishment and control of austere landing zones will bolster fixed-wing force projection in support of both Personnel Recovery (PR) and Agile Combat Employment (ACE) mission sets in domestic and warfighting environments. Additionally, this kit will enhance drop zone (DZ), helicopter zone (HLZ), and forward area rearming and refueling point (FARRP) capabilities in direct support of both ACE and PR mission-sets. The ability to maneuver in the unique environments of USINDOPACOM and USNORTHCOM will be a force multiplier in providing forward-reaching PR capabilities and global access. One of the challenges of surveying remote airfields and landing zones is the ability to move equipment and personnel efficiently around the various zones. Our current capabilities do not allow this. An offroad vehicle capable of providing efficient and safe transportation is necessary. Given the amount of equipment, personnel, and rough terrain, a six PAX and three PAX off trail vehicle (OTV) with a six-foot bed capable of transporting large amounts of gear and two littered patients is critical to operating in this environment. ANG RQS currently need an individual solution to permit expedient mobility on airfields. An alternate solution is a foldable, all-terrain, electric dirt bike with multiple COTS options available. The bike can be inserted via Military Free-Fall with minimal additional training. The e-dirt bike has an extended range via replaceable batteries than currently fielded gas-powered options and is far lighter for small-platform infiltration payload requirements. Also, an open-source cloud-based unit collaboration software system needed for relaying remote data to home station is a necessity. The cloud-based capability will pass real-time data sets for enhanced mission execution.

2. Program Details.

Quantity	Unit Cost	Program Cost
3 Austere Airfield Operations Kit	\$250,000	\$750,000
6x6 PAX OTV	\$32,000	\$96,000
6x3 PAX OTV	\$32,000	\$96,000
6 Electric Dirt Bike	\$10,000	\$60,000
3 Cloud Based Software System	\$10,000	\$30,000
6 Laser Range Finder	\$10,000	\$60,000
Total		\$1,092,000

GA: HUMAN PERFORMANCE OPTIMIZATION

1. Background. ANG Guardian Angel (GA) and Tactical Air Control Party (TACP) units require 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. Injuries and combat fatigue negatively impact the health and readiness of our Battlefield Airmen and result in excessive and unnecessary lost workdays impacting mission-ready status. The current medical system does not provide a detailed initial medical screening for special operators, nor does it address past injuries and structural concerns. Each of the three GA squadrons require two sensory deprivation pods, three cranial electrotherapy devices, one infrared recovery unit, one anti-gravity cardio rehabilitation unit, one athlete data management software system, and one low-impact cardio unit. Each of the 16 TACP squadrons require 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	\$30,000	\$180,000
9 Cranial Electrotherapy	\$1,100	\$9,900
3 Infrared Saunas	\$4,820	\$14,460
3 Anti-Gravity Rehabilitation Treadmills	\$100,000	\$300,000
3 Athlete Data Management Software Packages	\$15,000	\$45,000
3 Rotating Stair mill Systems	\$10,000	\$30,000
840 HPO Programs	\$315	\$264,600
840 Vital Sign Monitoring Systems	\$3,600	\$3,024,000
840 Vital Fluid Monitoring Systems	\$7,500	\$6,300,000
840 Full Body Performance Kits	\$995	\$835,800
6 GLOBUS EMS	\$1300	\$7,800
15 Firefly Recovery Device	\$100	\$15,000
15 Echo Bikes	\$950	\$14,250
Total		\$11,040,810

GA/ST: 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 boat (HHB) or rigid-hulled inflatable boat (RHIB), air-droppable by C-130s. Boats capable of supporting up to four 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 the current combatant command 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 range and protection limitations. Current wartime 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. Combatant Command requirements also include GA units to have organic passive and active defensive capability. This platform requires a modular mounting system capable of supporting crew-served weapons and other accessories. Additionally, the boat should be cloaked to reduce the IR and visual signature and be outfitted with environmental protection for the craft and personnel. Each of the three GA squadrons require three HHB/RHIB boat delivery platforms, and associated equipment parachutes. Both ST squadrons require one HHB/RHIB boat delivery platform, and associated equipment parachutes.

2. Program Details.

Quantity	Unit Cost	Program Cost
11 Aerial Delivery Platforms	\$250,000	\$2,750,000
11 Equipment Parachute Packages	\$76,000	\$836,000
6 Advanced Rescue Craft	\$20,000	\$120,000
6 Towable Support Inflatables	\$7,500	\$45,000
6 Medical Accessories	\$20,000	\$120,000
15 Protection Accessories	\$25,000	\$375,000
6 Cold weather protection	\$20,000	\$120,000
6 Comm Accessories	\$15,000	\$90,000
6 Self-Righting System	\$15,000	\$90,000
6 Deployment Kit	\$75,000	\$450,000
3 Engine Run Up Kit	\$10,000	\$30,000
600 PECIS	\$500	\$30,000
Total		\$5,056,000

GA: COLD WEATHER SEARCH AND RESCUE WARFARE PACKAGE

Background. ANG Guardian Angel (GA) units require vehicles and protective equipment to operate in extreme cold weather environments. The outdated system was for an 18-man team and was non-air-droppable. USNORTHCOM mission analysis showed that GA needs an air-droppable system for a two-person GA team and four Isolated Personnel (IP). This modernized air-droppable kit equipment includes shelters and sustainment for a two-person GA team, four IPs, and tools required to establish critical extended field care. Over the past decade, GA's ability to perform personnel recovery in the arctic has atrophied. Modernized equipment and training are required to revive GA arctic capability. All three ANG GA squadrons require a mobility platform, a sustainment package, and a personal performance equipment package. Near-peer competitors have developed extreme cold weather ground transportation far exceeding US capabilities. ANG GA units require an all-terrain vehicle that can operate in deep snow and carry up to 4 operators and equipment for each mission support site. ANG GA requires the ability to transport a troop size element on a long patrol in extreme cold weather. ANG GA squadrons require a modernized personal equipment load-out specific to extreme cold weather operations and their current equipment is not designed to do so. GA units require durable personal equipment tested in extreme cold weather for multi-day operations to increase survivability.

1. Program Details.

Quantity	Unit Cost	Program Cost
180 GA Extreme Cold Weather Clothing	\$5,000	\$900,000
180 Survival Rucks	\$4,200	\$756,000
6 IP Sustainment Airdroppable Package	\$45,000	\$270,000
6 Arctic All-Terrain Vehicle	\$170,000	1,020,000
Total		\$2,946,000

ST: CONTESTED COMMAND AND CONTROL (C2) PACKAGE

1. Background. To keep pace with current threats, ANG Special Tactics (ST) units require scalable, lightweight, Internet Protocol (IP) based communications capabilities that are compatible to existing programs of record and resilient in contested, degraded environments. Special Tactics C2 requires two non-radio frequency (RF), anti-jam, high throughput, IP based, full-duplex optical communications links (two receivers/two transmitters) to facilitate RF Electromagnetic Emission Control (EMCON) C2. The optical communications devices should act as a layer 2 / layer 3 switching device to allow for integration with existing ST communication devices. The optical communication links should provide at least 100MBps connectivity and have 2 or more kilometers of range. The optical communication device should have some form of auto tracking of the distant end to allow for minor deviations of the transmission path. These devices must be man portable, allow for one-man setup, rated for outdoor usage, support AC and DC power inputs, and come with necessary mounting and sighting accessories. C2 requires two Communication Satellite (COMSAT) multi-Internet Service Provider (ISP) antennas. Antennas should provide automated failover to additional Low-Earth Orbit/Medium Earth Orbit/Geostationary Earth Orbit (LEO/MEO/GEO) high-throughput COMSAT ISP providers. Antennas should additionally support 4G/5G SIM card connectivity. The COMSAT antennas should provide some form of beam forming towards in use satellites constellations. The COMSAT antennas should provide beam nulling towards interference/jamming. Special Tactics C2 requires 10x high throughput, IP based, full-duplex, non-type 1 communications Mobile Ad-Hoc Network (MANET) radios capable of operating at negative levels of signal-to-noise ratio for leave behind device integration. Radios should be capable of at least -3db SNR link with an interference mitigation feature and interference avoidance functionality. They should be capable of automatically negating more than one interference source and have beamforming and beam nulling functionality. Additionally, the radios need networking functions as a layer 2 / layer 3 device and provide enough bandwidth to support multiple video streams. Transmission power should be low enough to intentionally operate in the noise and the radios need all necessary cabling and tools for leave behind network integration, portable usage, and austere operations. Functional integration with existing drone platforms is also required. The electronic warfare/electromagnetic attack (EW/EA) system should be a man portable, non-digital radio frequency memory system capable of denying/disrupting/defeating frequency agile, defeating variable Pulse Repetition Frequency/Pulse Repetition Interval surveillance, and defeating acquisitions, tracking, and synthetic aperture radars. This system must be scalable to facilitate s-UAS integration, remote operations, and system synchronous teaming and complementary effects. It must be simple to select or change effects with coherent characteristics. This system must also include the ability to collect and analyze signals to enable multi-domain operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
1 Optical Comm System	\$100,000	\$200,000
1 COMSAT System	\$230,000	\$460,000
1 Negative SNR MANET	\$250,000	\$500,000
1 EW/EA System	\$80,000	\$320,000
TOTAL	\$660,000	\$1,480,000

ST: EXTREME COLD WEATHER PACKAGE

1. Background. ANG Special Tactics (ST) units require vehicles and protective equipment to operate in extreme cold weather environments. Each modernized sustainment package includes shelters and sustainment for up to 36 personnel, mobility platforms capable of carrying one to four personnel, and tools required to establish a Mission Support Site (MSS) to conduct ST missions. Over the past decades, ST's ability to conduct global access, personnel recovery, and precision strike missions in the arctic has severely diminished. Modernized equipment and training are required to revive ST's arctic capability. Both ANG ST squadrons require a mobility package, a sustainment package, and a personal performance equipment package. ST units require durable personal equipment that is proven to increase survivability in extreme cold weather during prolonged combat operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
2 Mobility Packages	\$370,000	\$740,000
2 Sustainment Packages	\$85,000	\$170,000
2 Personal Performance Equipment Packages	\$225,200	\$450,400
Total		\$1,360,400

ST: AO INDOPACOM MODERNIZATION

1. Background. ANG ST global fighting capabilities and equipment have been substantially degraded due to our previous focus on the USCENTCOM Area of Responsibility. ST requires environment-specific individual equipment to operate within maritime, jungle, tropical and sub-tropical environments to provide capability from infiltration, through actions on the objective, to exfiltration. ST requires improved maritime capabilities including fins, mask, snorkel, wearable dive pouches for radios, adequate thermal protection for 65–80-degree water and waterproof dive packs capable of holding 60 and 120 liters. ST also requires an underwater precision navigation device to ensure arrival within 30 meters of an intended beach landing site and Night Vision Device (NVD)/thermal optics capable of dive operations to 66 feet and useable at the surface to clear threats prior to exiting the water. Operations against existing threats requires multi-spectral emission mitigation capability at the individual, vehicle, operational location, and mission support site levels. Individual equipment requirements include lightweight, breathable, water-shedding, and quick drying uniforms and load bearing equipment. Load bearing equipment includes assault vests, tailorable/modular ruck sacks sufficient to support 96-hour operations and waterproof stuff sacks to protect sensitive electronic devices. Operators also need an integrated sleep system including a jungle hammock, bivy sack, insect netting and rain protection.

2. Program Details.

Quantity	Unit Cost	Program Cost
160X Fins	\$120	\$19,200
160X Thermal Protection	\$300	\$48,000
160X Mask/Snorkel	\$150	\$24,000
28X Underwater Navigation Device	\$1500	\$42,000
24X Waterproof NVD/Thermal	\$15,000	\$360,000
180X Maritime Waterproof Radio Pouch	\$150	\$27,000
180X Waterproof Dive Bag 60L & 120L	\$1200	\$216,000
210X Multi-Spectral Emission Mitigation	\$3800	\$798,000
160X Jungle Uniform	\$500	\$80,000
160X Sleep System	\$450	\$72,000
160X Jungle Ruck	\$400	\$64,000
180X Load Bearing Equipment	\$650	\$117,000
160X Waterproof Stuff Sack	\$120	\$19,200
Total	\$24,340	\$1,886,400

ST: SURVEY DATA COLLECTION MODIFICATION

1. Background. Current equipment for airfield assessment is antiquated and requires extended periods of exposure for personnel as well as large logistics and manning requirements. ANG Special Tactics (ST) squadrons require modernization of survey data collection capabilities in both the geometric and surface/subsurface domains via airborne and ground employment options. For geometric collections, a “bolt on” drone-based solution coupled with geometric data collection software can provide expeditious survey data collection and significantly reduce soil sample reading time. ST must modernize from the dynamic cone penetrometer (DCP) to a more holistic and expeditious interpretation of airfield capacity such as a ground penetrating radar (GPR) type system. GPR technology has the potential to provide a broad-spectrum assessment of the entire aircraft movement area sub-surface while reducing operator time on location and improving the ability to find critical subsurface failure areas unsuitable for aircraft operations. Geometric collection data needs to include glideslope (to include obstacle distance and height measurements), airfield length and width measurements, as well as longitudinal and transverse gradient measurements. Baseline data collection of a 3,500’ airfield needs to be no more than 1 hour with a ground user capable/initiated processing time of no more than 1 hour post collection. ST needs a foldable, all terrain, electric mountain bike to reduce noise signature on/around the objective area. These must be capable of airborne delivery, with minimal additional training, carry reduced maintenance requirements, and remain lightweight (less than 150lbs) for small-platform infiltration payload requirements. This platform needs a carrying capacity of 300lbs or greater, equipped with flat resistant tires, powered by an exchangeable and rechargeable power source, with a range of at least 50 miles at a sustained 35mph rate of speed.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Survey Drones	\$172,000	\$688,000
2 Automated DCP	\$50,000	\$100,000
2 GPR Systems	\$180,000	\$360,000
20 Foldable Electric Mountain Bikes	\$2,000	\$40,000
20 ADS-B In Receivers	\$500	\$10,000
4 Data Processing Equipment	\$2500	\$10,000
6 Short Wave Infrared Assault Zone Maker Systems	\$20,000	\$120,000
TOTAL	\$427,000	\$1,328,000

ST/TACP: SPECTRUM BATTLEFIELD IDENTIFICATION BROAD

1. Background. ANG Tactical Air Control Party (TACP) and Special Tactics (ST) require supplemental capability to conduct Close Air Support and deep battlefield reconnaissance/surveillance in support of Joint Intelligence Preparation of the Operational Environment efforts. Additionally, ANG TACP and ST must be fully equipped with a diverse menu of advanced sensors to integrate with the Joint All-Domain Command and Control infrastructure. ANG TACP and ST require a tripod mounted laser range finding (LRF) device to acquire long range targets at distances greater than 10km under day/night conditions and capable of generating target locations, accurate within 0-6 meters (Category 1 Target Location Error), to accommodate static operations in the overwatch position. This system must be able to be controlled remotely from dislocated positions with full functionality and a Pan/Tilt/Zoom (PTZ) capability. The LRF device must be interoperable with the Special Warfare Assault Kit (SWAK) and must overcome GPS jamming and spoofing as well as have a true north finding capability in a degraded environment. ANG TACP and ST require the capability to observe multiple 1064 nanometer (nm) coded lasers out to 6 km simultaneously, in a small form factor, that can be stowed, rail mounted, or handheld with the ability to determine pulse repetition frequency code. ANG TACP units require the ability to perform night operations using interoperable night vision goggle (NVG) and Shortwave Infrared (SWIR) viewing devices. For dismounted operations, ANG TACP units require the ability to mark a target with non-pulsed 1064 nm and 1550 nm lasers (integrated with a camera) in a small form factor for dismounted operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
336 NVG Mountable SWIR Viewer	\$18,000	\$6,048,000
20 Compact Infrared / Coded Laser Camera	\$38,000	\$760,000
192 Combined Laser Designator / Coded Laser Camera	\$193,000	\$37,056,000
192 Long Range multi-spectrum Laser Range Finder	\$98,000	\$18,816,000
192 Advanced Anti-Jam / Spoof Tripod	\$69,300	\$13,305,600
76 Remote PTZ Kit	\$40,000	\$3,040,000
Total		\$79,025,600

TACP: COMMAND AND CONTROL MOBILE COMMUNICATIONS PACKAGES

1. Background. ANG ASOS require highly mobile, scalable and maneuverable communications systems to meet the demands associated with Agile Combat Employment operations while providing a robust and resilient Command and Control (C2) node for the Joint Force. The equipment must be designed to meet the needs of echelons from the tactical edge to the highest levels of TACP Command and Control (TACP C2) enabling Joint All Domain Command and Control systems. The suite must be scalable to address the future needs of the TACP weapon system as a customer agnostic force and their enduring mission of direct support to the US Army with C2, Strike, and Integration. Each of the 20 Brigade TACP UTCs require 12 Tactical C2 Boxes and 6 Edge Computer Solutions. Each of the 8 TACP C2 UTCs require 2 Lower Echelon Network Systems. This combined capability will provide Combatant Commanders with an agile, highly mobile, scalable, resilient, and durable command and control, precision strike and joint integration capability to execute the kill chain (web) in highly contested and degraded environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
184 Tactical C2 Box	\$109,000	\$20,560,000
13 Lower Echelon Network Systems	\$2,800,000	\$36,400,000
120 Edge Compute Solution	\$28,000	\$3,360,000
Total		\$60,320,000

TACP: MISSION PLANNING AND DEBRIEF SYSTEM

1. Background. ANG Tactical Air Control Party (TACP) units require a mission planning and debrief capability for garrison and combat operations. This allows TACPs to maximize training value and build proficiency in Command and Control, Precision Strike, and TACP Integration mission sets. The system will be used for mission planning and must be compatible with the TACP's radios and peripheral device suite. The system should be able to build, distribute, and store tactical mission plans, key hardware support files, and software. The TACP Mission Planning and Debrief System (T-MPDS) must be fully compatible with Special Warfare Assault Kit (SWAK), and Android Tactical Assault Kit (ATAK) software. It must aid in the development of mission products for SWAK and ATAK as well as physical copies of mission products. The T-MPDS must be able to provide a log of all actions during the mission and a single file that synchronizes video and audio to facilitate debriefs. The TACP Weapons System requires the ability to access SIPR websites while conducting field training exercises. Additionally, TACP's need the SIPR terminal to access video over internet protocol full motion video feeds pushed by Intelligence, Surveillance, Reconnaissance assets, Internet Relay Chat, and Radio Over Internet Protocol.

2. Program Details.

Quantity	Unit Cost	Program Cost
32 Garrison Mission Planning/Debrief Systems	\$5,700	\$182,400
883 JTAC Mission Recording Systems	\$1,500	\$1,324,500
32 SIPR Travel Kit	\$2,000	\$64,000
Total		\$1,570,900

TACP: SPECTRUM SMALL UMANNED AERIAL SYSTEM (SUAS)

1. Background. ANG Tactical Air Control Party (TACP) require a family of Small Unmanned Aerial Systems to conduct deep battlefield reconnaissance/surveillance, Close Air Support (CAS), and command and control (C2). The short and long-range reconnaissance (SRR/LRR) drones must have an Android Tactical Assault Kit (ATAK) User Interface (UI) and must have the ability to be launched offset of the operator at distances of up to 1km. Both drones must be packable, modular, and weigh no more than 3lbs. Additionally, both drones must have the ability to execute user defined flight plans autonomously without operator input. The SRR/LRR drones must provide electro-optical (EO) / infrared (IR) full motion video during day/night conditions to include the ability to operate in inclement weather conditions at altitudes of up to 1K ft. The SRR drone must have a tactical range of up to 2.5 km with no less than 50 minutes of endurance while the LRR drone must have a tactical range up to 10 km with no less than 2 hours of endurance. The SRR/LRR drones will not require tools to be assembled/disassembled to accommodate field conditions. The LRR drone must have modular payload options outside of EO/IR to include terrain mapping and electronic attack. ANG TACP also requires a tetherable C2 drone to increase the HQ’s ability to track friendly forces and push/pull data via Mobile ADHOC Network (MANET) extensions. The C2 drone must have 24 hours of endurance and capable of operating at altitudes up to 2K ft. during inclement weather. The C2 drone must also operate on an ATAK based UI and provide EO/IR full motion video. Finally, the C2 drone will have the ability to laser designate/mark to enhance target ID and provide terminal guidance for laser guided weapons. Each ANG TACP ASOS requires 4 SRR drones, 4 LRR drones, 2 tetherable C2 drones/laser target designator payloads, and 6 operator training events.

2. Program Details.

Quantity	Unit	Program Cost
56 Short Range Reconnaissance Drones	\$14,000	\$784,000
56 Long Range Reconnaissance Drones	\$30,000	\$1,680,000
28 Tetherable Drones	\$235,000	\$6,580,000
28 Laser Target Designator Payloads	\$180,000	\$5,040,000
6 Training Events	\$25,000	\$150,000
Total		\$14,234,000

ASOS: ELECTROMAGNETIC SYSTEM (EMS) AWARENESS AND ATTACK SUITE

1. Background. ANG ASOS units require a cloud-based server to Team Awareness Kit (TAK) Server for training and Domestic Operations. The cloud-based server configuration must support dual layer authentication using virtual private network and secure sockets layer. Tactical Air Control Party (TACP) units must have the capability to pull TAK data, share Cursor on Target data, stream and share video, and provide server federation. The server must have a web browser interface and fully support remote management that can be accessed by either TACP or combat mission support personnel from home station or a deployed location. TACP's require a portable single board computing server solution that can be deployed in vehicle and dismounted situations to extend TAK server capability into environments with limited to no broadband connectivity. TACPs need a lightweight satellite hotspot that can provide server connectivity in austere environments. TACP members require an effective and efficient command and control communications capability. The ASOS require overall hardware for their lightweight, transportable, tactical network suite capable of linking JTACs, aircrews, and senior echelons.

2. Program Details.

Quantity	Unit Cost	Program Cost
34 EMS Awareness and Attack Suites	\$267,610	\$9,098,740
Total		\$9,098,740

ASOS: GROUND RADIO OPTIMIZATION

1. Background. ANG ASOS units require upgraded peripherals for their ground radios to adapt to next-generation waveforms and agile-redundant communications. Each of the 16 squadrons require Special Warfare Assault Kit (SWAK) upgraded kits, PRC-117G upgrade kits, PRC-163 upgrade kits, and PRC-161 upgrade kits.

2. Program Details.

Quantity	Unit Cost	Program Cost
168 SWAK Upgrade Kits	\$13,300	\$2,234,400
56 PRC 117G/160 Upgrade Kits	\$1,800	\$100,800
280 PRC 163 Upgrade Kits	\$1,800	\$504,000
280 PRC 161 Upgrade Kits	\$1,800	\$504,000
210 TSM Banded Antenna Kits	\$1,500	\$315,000
56 PTS Expeditionary Antenna Kits	\$15,000	\$840,000
56 Dedicated TSM Radios	\$12,000	\$672,000
56 TSM Repeaters	\$6,500	\$364,000
28 SUAS TSM Repeaters	\$10,000	\$140,000
56 Dedicated Standalone	\$2,600	\$145,000
28 Automated Test Equipment	\$80,000	\$2,240,000
168 BASIC Conversion Kits	\$5,000	\$840,000
270 Waveform Optimization	\$10,000	\$2,700,000
Total		\$11,599,800

Operational Training Infrastructure and Ranges

- **Operational Training Environments**
- **Range Infrastructure**

This tab supports two components: Operational Training Infrastructure (OTI) and Ranges. The first tab component is a key facet of readiness training. Operational Training Infrastructure (OTI) elements such as the ANG's Distributed Training Operations Center (DTOC) provide persistent networks, modeling and simulation expertise, and operational support for daily Distributed Mission Operations (DMO) training. DMO links a wide array of simulators at ANG, Air Force Reserve, Active Component units, and other Services, preparing warfighters for combat in joint and coalition environments.



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

This portfolio effectively exposes our forces to realistic, sufficiently dense, and advanced threat capability live training environments while protecting our 5th generation weapon systems' capabilities and tactics.



Operational Training Infrastructure and Ranges FY 2023 Weapons and Tactics Conference

Critical Capabilities List

Operational Training Infrastructure

- Air Reserve Component Network Connectivity Across the Air Reserve Components
- Air National Guard Operating Location
- DTOC All Domain Command and Control Capability

Ranges

- Air Combat Maneuvering Instrumentation
- Frequency Communications Suite for Enhanced Live-Fly Training
- High-Fidelity Surrogate Targets
- Realistic Integrated Electronic Warfare Threat Emitters
- Joint Advanced Weapon Scoring System

Essential Capabilities List

Operational Training Infrastructure

- Distributed Training Center Virtual Air Threat Capability

Ranges

- Ground-based Electronic Attack System Compatible with Currently Fielded Threat Emitters
- Night Vision Goggles

Desired Capabilities List

To save space, desired lists can be obtained upon request from NGB/A5.

**OPERATIONAL TRAINING INFRASTRUCTURE: AIR RESERVE COMPONENT
NETWORK CONNECTIVITY ACROSS THE AIR RESERVE COMPONENTS**

1. Background. As ANG combat training continues to transition from live training with live weapon systems to synthetic training with simulated weapons systems additional units need connection to the distributed training community. This requires additional Air Reserve Component Network (ARCNet) portal fielding and upgrades to existing portals in the field to take advantage of emerging hardware technologies. Currently, there are approximately 45 units connected to the ARCNet, however, there are still airmen in ANG Mission Design Series training devices that require distributed training to maintain Combat Mission Ready training requirements, in addition, fielded portals need technology upgrades. Adding additional connectivity for units, not only allows members to maintain their annual Ready Aircrew Program and Ready Intelligence Program requirements, but also provides more training partnerships within the ANG, but also the Total Force and Joint communities. ARCNet portals must be acquired and placed at each unit by the Distributed Training Operations Center (DTOC) to provide this much needed capability.

2. Program Details.

Quantity	Unit Cost	Program Cost
5 Portals	\$40,000	\$200,000
40 Sites Upgraded	\$8,750	\$350,000
Total		\$550,000

OPERATIONAL TRAINING AND TEST INFRASTRUCTURE: ANG OPERATING LOCATION

1. Background. The ANG's Distributed Training Operations Center (DTOC) requires upgraded technology to its ANG Operating Location (AOL) Synthetic Training Environment (STE). The DTOC denies events and decreases event sizes based on the limiting factor of availability of STE resources. Denial and decreased event sizes means that the ANG units are not receiving their distributed operational training needed to complete their annual training requirements. The AOL requires major technology upgrades to meet and mitigate current cybersecurity threats while not causing additional disconnects in training opportunities.

2. Program Details.

Quantity	Unit Cost	Program Cost
ANG Operating Location	\$300,000	\$300,000
Total		\$300,000

**OPERATIONAL TRAINING AND TEST INFRASTRUCTURE: DTOC ALL DOMAIN
COMMAND AND CONTROL CAPABILITY**

1. Background. The ANG's Distributed Training Operations Center (DTOC) requires an All-Domain Command and Control Program of Record capability with the ability to share mission critical sensor and data link information. The capability requires modular and open architecture for flexible use and deployment to meet the demands of distributed operational training on two different distinct Local Area Networks. The capability requires four operators to work simultaneously on the network providing accurate effects to emulate the current capability of the Control and Reporting Center (CRC). The capability would increase realism into the simulation for the ANG warfighter by providing real-time man in the loop tactics. It will also provide regional training site capabilities for all ANG CRC crew members with fighter platforms.

2. Program Details.

Quantity	Unit Cost	Program Cost
BC3 (Collateral)	\$310,000	\$310,000
BC3 (SAP Environment)	\$310,000	\$310,000
Total		\$620,000

RANGES: AIR COMBAT MANEUVERING INSTRUMENTATION

1. Background. The ANG ranges require expanded instrumentation training opportunities in the live environment to provide tracking data for threat emitter systems and record 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 used at 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. Additionally, the ANG requires a standard configuration of software and hardware to provide a common architecture for live training ranges to improve training and centralize modernization and sustainment. This configuration would provide a shared arrangement of range training systems and applications that is a central component of ACC's Enterprise Range Plan. It is composed of networks, servers, and workstations that consolidate training systems and software.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 RRUs	\$400,000	\$7,200,000
14 RTO Systems	\$50,000	\$700,000
34 AAR Systems	\$10,000	\$340,000
44 P5CTS Pods	\$180,000	\$7,920,000
4 Regional Level Control Suites	\$750,000	\$3,000,000
23 Unit Level Control Suites	\$300,000	\$6,900,000
Total		\$26,060,000

RANGES: 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 secure voice communication systems. The ANG continues to have shortfalls in standardized communication and data link systems at the critical nodes of the range training infrastructure. The OTI enterprise consists of the flying squadrons, primary training ranges, live mission operations capability centers, training centers, and forward operating locations. Acquisition of advanced radio over internet protocol management systems, Link 16, situational advanced data link (SADL), secure range communications, 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 (CRTC's), 11 Primary Training Ranges (4 co-located with CRTC's), and 23 fighter wings.

2. Program Details.

Quantity	Unit Cost	Program Cost
34 Link 16 Radios	\$360,000	\$12,240,000
34 SADL Radios	\$30,000	\$1,020,000
34 Data Link Management Systems	\$297,000	\$10,098,000
34 Range Radio Systems	\$150,000	\$5,100,000
34 DRMS	\$480,000	\$16,320,000
Total		\$44,778,000

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
58 High-Fidelity Targets	\$190,966	\$11,076,027
Total		\$11,076,027

**RANGES: REALISTIC INTEGRATED ELECTRONIC WARFARE THREAT
EMITTERS**

1. Background. ANG Operational Training Enterprise (OTE) 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 is fielding EW threat emitters in concert with their Enterprise Range Plan (ERP) but will not fully fund the ANG OTE. 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 linkage to the ranges with relevant simulations for the new threat systems. The threat emitter system version 2 is integrated into the EW Server but still requires relevant flyout simulations. Air Combat Command is fielding these in concert with their ERP but will not fully fund all ANG ranges. Additionally, the ANG requires four advanced threat systems compatible with training requirements for both 4th and 5th generation aircraft, four EW servers and 10 weapons flyout simulations to fully equip all four ANG EW ranges.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 Advanced Threat Systems	\$30,000,000	\$120,000,000
10 Weapons Flyout Simulations	\$1,000,000	\$10,000,000
4 EW Servers	\$100,000	\$400,000
Total		\$130,400,000

RANGES: JOINT ADVANCED WEAPON SCORING SYSTEM

1. Background. ANG requires an upgrade to the tactical ordnance scoring system (TOSS). The TOSS system in place at ANG ranges no longer supports the expanding gamut of ANG training requirements. The Joint Advanced Weapon Scoring System (JAWSS) provides greater accuracy, night and day scoring capabilities, laser scoring, and strafe scoring capabilities. JAWSS also provides virtual reality imaging weapons training system (IWTS), no-drop weapon scoring, and automated remote feedback for home-station debrief. JAWSS consists of five systems: weapon impact scoring system; laser evaluation system-mobile; large-scale target sensor system; remote strafe scoring system and the IWTS. Each of the ANG's 11 ranges will require one JAWSS capability and two laser/target displays. Five are currently funded through Air Combat Command. All range radios have been upgraded.

2. Program Details.

Quantity	Unit Cost	Program Cost
6 Replacement WISS Systems	\$750,000	\$4,500,000
11 JAWSS Spare/Upgrade	\$200,000	\$2,200,000
22 Laser/Target Scope and Display	\$50,000	\$1,100,000
Total		\$7,800,000

Logistics

Logistics activities support every ANG 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 operations. 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 are 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.



Logistics

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Critical Capabilities List

Support Equipment (SE)

- AGE Modernization (Non-Powered) (ISO/Phase Stands/)
- Towbarless Towing Equipment (Multi-MDS)
- AGE Modernization (Powered) (Cabin Pressure Tester/Mobile Nitrogen Backpacks)
- Corrosion Control Modernization
- High-Capacity Federal Aviation Administration-Approved Toilet (MAF)

Test Equipment (TE)

- Smart Weapons Armament Tester (Multi-MDS)
- Video Data Link Tester (Multi-MDS)
- Enhanced Wire Testing Capability (Multi-MDS)
- Thermal Imaging (Multi-MDS)
- Avionics back-shop modernization (F-15/F-16)

Essential Capabilities List

- Link 16 Multi-MDS Enhanced IAIS Capability/ Communication Fly-Away Kits
- Advanced Engine Borescope
- Aircrew Flight Equipment Tester
- Structural Repair Equipment
- Data Systems Exploitation

Desired Capabilities List

- Onboard Oxygen Generation System
- Agile Combat Employment Support
- Operational Flight Plan Testers
- Metals Tech/Software Standardization
- Corrosion Control Facilities Modernization

SE: AGE MODERNIZATION (Non-Powered)

1. Background. The ANG requires F-15/F-16, F-22, C-130J ISO/phase inspection stands. Aircraft maintenance is currently accomplished using a mix of antiquated inspection platforms, ladders, and B-series stands. These maintenance workaround activities do not meet Air Force Occupational Safety and Health Administration or Occupational Safety and Health Administration standards. Current inspection stands require frequent maintenance actions and numerous man-hours to maintain their serviceability. Modernized stands incorporate electric power, lighting, and pneumatics to the point of use. These stands enable maintainers to complete inspections and maintenance more effectively 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. The ANG requires F-15, F-16, F-22 and C-130J stands.

Fabric Tent Solution for Eielson AFB, Eielson experiences extreme winter weather conditions. The average annual snowfall is 65 inches and winter temperatures range from -66°F to 50°F (Oct-Apr). Periods of heavy snowfall or drifting snow due to high winds create additional hazards. Snow buildup on the fuselage and wings often outpaces our ability to keep surfaces clear. When heating the aircraft, the snow melts and freezes which creates thick ice on flight surfaces, driving the need to rotate jets into hangars to thaw prior to flight

2. Program Details.

Quantity	Unit Cost	Program Cost
10 F-16 Phase Stands	\$500,000	\$5,000,000
10 F-15 Phase Stands	\$500,000	\$5,000,000
4 F-22 Phase Stands	\$500,000	\$2,000,000
10 C-130J ISO Stands	\$1,200,000	\$12,000,000
1 KC-135 Aircraft Fabric Tent (AK)	\$2,300,000	\$2,300,000
Total		\$26,300,000

SE: TOWBARLESS TOWING EQUIPMENT (MULTI-MDS)

1. Background. ANG flying wings require towbarless towing equipment capable of maneuvering aircraft in and out of hangars and/or hardened aircraft structures with “on the spot” turning capability. Aircraft positioning is currently accomplished by utilizing a full-size MB-4 tow tractor, or similar model, and a long tow bar that results in a high turn radius. Current equipment limitations do not allow for maximum hangar utilization when sheltering aircraft during severe weather events. ANG units need compact towing equipment, not requiring a tow bar for maneuvering aircraft in areas with limited space. The ANG requires towbarless aircraft towing equipment for each of the 78 flying wings with cost broken out over multiple years for both MAF and CAF requirements.

2. Program Details.

Quantity	Unit Cost	Program Cost
60 (Initial) Towbarless Aircraft Towing Sets	\$200,000	\$12,000,000
Total		\$12,000,000

AGE MODERNIZATION (POWERED)

1. **Background.** ANG maintainers need more versatile/portable nitrogen servicing equipment designed to operate in a mixed service environment and easily transported to a forward and remote area. An aircraft nitrogen source with a reduced deployable footprint compared to traditional servicing equipment enhances aircraft Preflight, Thru flight, and Major/Minor Inspection. ANG units need adaptable nitrogen servicing equipment for operating in a constrained maintenance environment in austere locations where resources are limited for increased efficiency and aircraft availability.. Need a minimum of one set of nitrogen servicing equipment per ANG flying wing.

Cabin Pressure Testers, The Aircrew tester integrates with all AFE oxygen and communication related equipment to include anti-gravity suits and aircrew mounted regulators. The tester will be used to troubleshoot, test equipment performance, and fit of all oxygen masks to include the Combined Advanced Technology Enhanced Design "G" Ensemble (COMBAT EDGE). It is also used to leak test G-Suits, aircraft oxygen connectors, hoses, and fittings. The Aircrew tester performs "Listen/Talk" checks on issued headsets and microphones used with the aircraft communications systems. It also has the capability to test continuity on all the above equipment and related communication cords as a means of fault isolation.

Secure Communications Equipment. Upcoming KC-135R communications platform upgrades of the Real Time Information in the Cockpit (RTIC) system creates airborne network capabilities and provides aircrew with current situational awareness and a secure communications link. There is no current equipment in use to receive and transmit information to Ground based activities to use these advanced C2 capabilities. Maintenance can use this new C2 in Agile Combat Employment environments to receive aircraft mission capabilities statuses prior to aircraft landings. This provides faster maintenance turnaround times by allowing maintainers to gather pertinent troubleshooting tasks and required parts to improve aircraft mission readiness . Current SATCOM abilities are not nearly as dependable as a communication medium.

2. Program Details.

Quantity	Unit Cost	Program Cost
30 Cabin Pressure Testers	\$75,000	\$2,250,000
75 Mobile Nitrogen Generation Backpacks	\$50,000	\$3,750,000
Air Crew Flight Equipment Testers	\$78,000	\$5,616,000
18 Secure Communications Systems for Ground Maintainers	\$400,000	\$7,200,00
Total		\$18,816,000

SE: CORROSION CONTROL MODERNIZATION

1. Background. Combat Search and Rescue Guard units in a “severe” environment as defined in Technical Order 1-1-691 are required to receive a clear water rinse (CWR) after the last flight of the day or every 15 days if flying below 3,000 feet and stationed within 1.25 miles of salt water. Accordingly, CWR operations demand up to 2,000 man-hours annually with costs amounting to approximately \$5 million dollars per year. Affected units lack the manpower to properly sustain robust flying operations while simultaneously facilitating these daily rinse requirements. Modernizing CWR capabilities will not only increase aircraft availability for operations but will also mitigate risks of injury to personnel or damage to aircraft during towing operations.

Dry Ice Blasting (DIB) is a surface preparation method which uses small pellets of solid carbon dioxide (CO₂) as the cleaning agents which immediately disappear upon impact and return to their natural state in the atmosphere. The CO₂ used as blasting media does not contribute to global warming, since it is either a by-product of the chemical industry or derived from natural sources. With the use of a DIB system, the waste volume is limited to the material removed, resulting in dramatic reductions in cleanup and disposal costs.

2. Program Details

Quantity	Unit Cost	Program Cost
2 Clear Water Rinse Systems	\$6,000,000	\$12,000,000
75 Dry Ice Blasters	\$105,000	\$7,875,000
Total		\$19,875,000

**SE: HIGH-CAPACITY FEDERAL AVIATION ADMINISTRATION-APPROVED
TOILET (MAF)**

1. Background. ANG KC-135 aircraft require a toilet with increased capacity and structural integrity in order to meet the full range of anticipated flying operations. The original legacy suitcase-style toilet's capacity level is inadequate and presents an overflow hazard when passengers are on long-duration flights. Moreover, 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 aeromedical missions at a manageable cost. Higher capacity toilets are required for all 164 KC-135 aircraft.

2. Program Details.

Quantity	Unit Cost	Program Cost
164 KC-135 Higher Capacity Toilet Assemblies	\$60,000	\$9,840,000
Total		\$9,840,000

TE: SMART WEAPONS ARMAMENT TESTER (MULTI-MDS)

1. Background. The ANG requires a common armament tester to replace existing equipment that is 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 breaches 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 the capability to verify the condition of critical aircraft circuitry in an energized state. The tester shall have the capability to perform active and automated tests that exercise the full weapons launch/release functionality, provide visual cues of aircraft response, 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 5 armament testers remain required to support ANG fighter operations.

2. Program Details.

Quantity	Unit Cost	Program Cost
10 Armament Circuit Preload Test Sets	\$180,000	\$1,800,000
Total		\$1,800,000

TE: VIDEO DATA LINK TESTER (MULTI-MDS)

1. Background. ANG A-10 and F-16 wings require video data link (VDL) testers. Currently, A-10 and F-16 avionics specialists do not have the capability to verify the operation of the targeting pod (TGP) VDL. The need for VDL test equipment is critical to ensure 100% mission capability/reliability of the TGP VDL. ANG A-10 and F-16 maintenance personnel require VDL link testers to allow maintainers to accurately and effectively troubleshoot and repair all TGP and VDL systems. The ANG requires one VDL tester for each A-10 and F-16 wing.

2. Program Details.

Quantity	Unit Cost	Program Cost
4 ANG A-10 Video Data Link	\$40,000	\$160,000
12 ANG F-16 Video Data Link	\$40,000	\$480,000
Total		\$640,000

TE: ENHANCED WIRE TESTING CAPABILITY (MULTI-MDS)

1. Background. ANG requires modernized wire analysis capability to rapidly and accurately troubleshoot aircraft wiring while the systems are active. The requirement is for a portable, ruggedized analyzer designed to test/analyze cables and monitor system signals while in an active state to identify signal loss or degradation. Additionally, the device should be capable of placing a load on the system under test to identify partial shorts or opens in the signal path. The tester's embedded software must enable 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 numerous wiring systems. Device software should also measure signal strength, determine line loss, and find the distance to the fault. The required system should be useable on all ANG platforms after proper integration. The ANG initially requires two testers at each of its 78 flying wings. (156 vs. 120 analyzers?)

2. Program Details.

Quantity	Unit Cost	Program Cost
120 Wire System Analyzers	\$245,000	\$29,400,000
Total		\$29,400,00

TE: THERMAL IMAGING (MULTI-MDS)

1. Background. ANG aircraft maintenance units require thermal imaging devices to facilitate improved diagnostic capabilities for aircraft environmental, electrical, and mechanical systems. Current testers measure system functionality at either the input or output with no ability to identify faults occurring in valves, relays, ducting, pumps, or other transition points. Thermal imaging provides the capability to observe valves and relays opening and closing, identify leaks occurring in submerged or hard to reach ducts and lines, and monitor pump functionality during operation. Additionally, thermal imaging reduces aircraft downtime by reducing the maintenance actions typically required to remove components for bench or pressure checks. There are currently numerous commercial off-the-shelf solutions that can be used across multiple mission design series and maintenance functional areas.

2. Program Details.

Quantity	Unit Cost	Program Cost
96 Thermal Imaging Devices	\$75,000	\$7,200,000
Total		\$7,200,000

SE: AVIONICS BACKSHOP MODERNIZATION

1. Background: Placing an on-site Avionics Backshop with equipment at each Air National Guard unit is the preferred option, as Line Replaceable Units (LRUs) suspected to be faulty can be sent directly from the flight line to the I-Level repair location. This option also allows for face-to-face communication between various levels of maintenance personnel, facilitating troubleshooting efficacy. On site facilities would retain the ability to directly support avionics repair by taking advantage of Cannot Duplicate (CND), adjustments, and (Cannibalization (CANN) action repairs to save time and replace critical LRUs for the warfighter.

2. Program Details:

Quantity	Unit Cost	Program Cost
5 F-15C/D/EX Avionics Systems Packages	\$5,000,000	\$25,000,000
Total		\$25,000,000

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 7,755 defenders from all wings in each of the 54 States, Territories, and the District of Columbia. Security forces protect and support worldwide contingencies and home station installations.

The security forces missions include: installation access control, base defense, 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 to maintain combat readiness.



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Critical Capabilities List

- Modular Small Arms Ranges
- Improved Modular Ballistic Protection System
- M18 Block II Kit (Optical Sighting System, Illuminator, and Holster)
- Enhanced Explosive Detection System
- Security Forces Climate Clothing System

Essential Capabilities List

- Enhanced Communications and Hearing Protection System
- Portable Intrusion Detection System and Alarm Annunciator
- Security Forces Individual / Squad Tracking and Awareness
- Installation Breach Mitigation System
- Lightweight Personal Renewable Power Source

Desired Capabilities List

- Lite, Lean, Lethal Defender Integration Kit
- Enhanced BDOC Integrated Base Defense Sensor Fusion and Analytics System
- PVS-31C Night Vision Optic and Accessory Kit
- Rapid Situational Awareness and Confirmations System
- Vehicle Payload Undercarriage Inspection System

SECURITY FORCES: MODULAR SMALL ARMS RANGES

1. Background. ANG Combat Arms (CA) personnel need a Modular Indoor Containerized Range (MICR) that will provide a fully enclosed zero surface danger zone and vertical danger zone environment allowing personnel to train and qualify safely 365 days a year, day and night regardless of external environmental conditions. With the MICR, CA personnel will be able to ensure all of the Air Force’s assigned combat personnel (an average of over 250 personnel per installation) will receive weapons qualification training in a timely and cost-efficient manner. Additionally, personnel assigned to a deployable Unit Type Code must qualify once every three years to meet Category B requirements, resulting in a minimum 33 percent increase in personnel requiring scheduled weapons qualification. The ANG has 28 installations with a small-arms range and only three are compliant with the Air Force Engineering Technical Letter (ETL) 11-18: Small Arms Range Design and Construction. 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. Currently there are nine employed modular small arms ranges; 14 additional ranges will allow for weapons qualifications to continue while base Civil Engineers program for new ranges to be constructed using Military Construction funding.

2. Program Details.

Quantity	Unit Cost	Program Cost
14 Small Arms Ranges	\$5,500,000	\$77,000,000
Total		\$77,000,000

SECURITY FORCES: IMPROVED MODULAR BALLISTIC PROTECTION SYSTEM

1. Background. ANG Security Forces (SF) require modernized body armor to provide SF personnel the capability to improve Defender survivability as well as reduce chronic fatigue and injury. To preserve and maintain the currently strained manpower in the SF field, armor must integrate with currently fielded SF duty gear at a lighter and more effective overall weight. These semi-rigid panels are intended to support the current duty gear as well as distribute weight more evenly across the Defender. As these panels (no greater than 0.80 pounds per square foot in density) are to be required in combination with hard plates issued in theater, they must meet or exceed National Institute of Justice (NIJ) Level IIIA, MilStd 662f, and MilStd 3027 (V50, fragmentation, etc.), while maintaining standard (SAPI) sizing.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Hard Armor (Front/Rear) Sets	\$1200	\$9,120,000
7,600 Hard Armor (Side Plate) Sets	\$600	\$4,560,000
7,600 Semi-Rigid Panel (Front/Rear) Sets	\$375	\$2,850,000
7,600 Semi-Rigid Panel (Side) Sets	\$200	\$1,520,000
7,600 Individual ANG SFLCS Cummerbund Sets	\$120	\$912,000
Total	\$2,495	\$18,962,000

Agile Combat Support
**SECURITY FORCES: M18 Block II KIT (OPTICAL SIGHTING SYSTEM,
ILLUMINATOR, AND HOLSTER)**

1. Background. ANG Security Forces (SF) personnel require a modernized pistol mounted optic to provide SF personnel the capability to improve rapid target acquisition and multi-threat engagement in low light environments. An illuminated “dot” reflex sight would allow for detecting and engaging multiple targets with greater accuracy at greater distances. Having the ability to superimpose an illuminated dot on a suspect increases situational awareness by allowing SF personnel to focus on the individual and the surrounding area. This optic must be night vision compatible, have adjustable brightness levels to include manual on/off setting, windage and elevation capabilities. Tritium suppressor height front sights and optic plate-integrated rear sights are required for a co-witness sight picture in the case of optic failure. Additionally, SF personnel require a pistol mounted flashlight to increase the ability to positively identify and accurately engage targets in a limited visibility environment. SF personnel require a durable, quick detachable, 1000 lumen LED light source with a minimum of 10,000 candela in order to illuminate common indoor and outdoor environments. The product must have an ambidextrous on-off switch and at least momentary-on and constant-on modes. With the upgraded light attachment, the holster will also need to be updated.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Reflex Sight with Mounting Plate/Sight Set	\$675.00	\$5,130,000
7,600 Pistol Mounted Flashlight	\$150.00	\$1,140,000
7,600 Optic and Light Compatible Holster	\$170.00	\$1,292,000
Total	\$995.00	\$7,562,000

SECURITY FORCES: ENHANCED EXPLOSIVE DETECTION SYSTEM

1. Background. ANG Security Forces (SF) personnel must conduct inspections of commercial transport and delivery vehicles requesting to access ANG installations IAW DAFI 31-101 Integrated Defense, 3.6.8.2. An Enhanced Explosives Detection system is required for all Large Vehicle Inspection Points and Installation Entry Control Points. The ANG SF’s current capability is phasing out of production with end-of-life anticipated in FY24. The system design must increase the overall capability to detect explosives across the threat spectrum as outlined in AFH 10-2401 *Vehicle Bomb Mitigation Guide*. The system must be on the approved MEMORANDUM FOR ALMAJCOM-FOA-DRU, AFSFC/CC, *Mandatory Use Policy for Security Forces’ Explosive Detection Equipment Purchases*. Each of the ANG SF units require a minimum of two systems, training and extended warranty.

2. Program Details.

Quantity	Unit Cost	Program Cost
152 Enhanced Explosive Detection Systems	\$30,000	\$4,560,000
Total		\$4,560,000

SECURITY FORCES: CLIMATE CLOTHING SYSTEM

1. Background. ANG Security Forces (SF) personnel require a modernized duty specific all-weather layered climate clothing system ensuring our Defenders can perform and survive in a variety of environments. This requirement narrows a capability gap that presently exists and does not afford Defenders proper protection to their entire body, such as head, torso, lower body, and extremities. These systems must provide Defenders dexterity, mobility, and accessibility to required duty equipment. A multi-component and scalable climate clothing system allows Defenders to be equipped for current mission sets while adapting to future operational environments.

2. Program Details.

Quantity	Unit Cost	Program Cost
7,600 Layered Climate Clothing Systems	\$4,400	\$33,440,000
Total		\$33,440,000

Explosive Ordnance Disposal

The ANG has 18 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 our adversaries' ever-changing tactics. 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 to match the advancements of our enemies.



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Critical Capabilities List

- Dual Arm Manipulator Robotic Attachment
- Enhanced Night Vision Device
- Tactical Assault Kit Communications Interface Suite
- Standardized Unexploded Ordnance Response Truck
- Chemical Warfare Personal Protective Equipment Modernization

Essential Capabilities List

- Versatile Lightweight Multi-Threat Disruptor
- F6A Replacement
- Augmented Reality Unexploded Ordnance (UXO) Simulators
- EOD M4A1 Modernization
- Portable Sensitive Compartmented Information Facility

Desired Capabilities List

- Short-range EOD Aerial Recon Platform
- Modernized Tactical GPR Sub-surface Threat Locator
- State-of-the-Art High Mobility EOD Robot
- Multi-modal Agile Respiratory PPE
- Advanced UXO Field Exploitation Tools

EOD: DUAL ARM MANIPULATOR ROBOTIC ATTACHMENT

1. Background. ANG explosive ordnance disposal (EOD) units require a robotic arm attachment with more precise manipulation capability to better replicate human dexterity. While the safest method is to remain remote, current robotic limitations require the EOD Operator to get close to an improvised explosive device (IED) to perform delicate or complicated actions. Current remote platform manipulators can make gross movements and lift relatively heavy loads. A dual arm manipulator robotic attachment will allow the robot operator to perform previously not achievable actions. Access to such a platform will greatly increase the safety and efficiency of any ANG EOD team during reconnaissance and execution of IED operations. ANG requires 21 total systems, one for each of the 18 ANG EOD flights and three to support regional training sites.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 Dual Arm Manipulator Attachments	\$250,000	\$5,250,000
Total		\$5,250,000

EOD: ENHANCED NIGHT VISION DEVICES

1. Background. ANG explosive ordnance disposal (EOD) personnel require a modernized visual enhancement device for tactical low-light operations. Currently, EOD Flights are using legacy night vision devices that are a generation behind the DoD standard. EOD personnel require an upgraded system capable of integrating with current situational awareness systems. This device must enhance ability to operate in contested environments where infrared discipline is paramount, and function in all domains with minimal ambient illumination. ANG EOD requires 220 kits, distributed across 18 EOD units, for one kit per EOD professional.

2. Program Details.

Quantity	Unit Cost	Program Cost
220 Enhanced Night Vision Devices	\$20,000	\$4,400,000
Total		\$4,400,000

EOD: TACTICAL ASSAULT KIT (TAK) COMMUNICATIONS INTERFACE SUITE

1. Background. ANG Explosive Ordnance Disposal (EOD) technicians require a communications platform that can facilitate the use of multiple communication devices and provide a mobile server for each TAK. Currently, EOD teams have TAK end user devices, but no way to connect to a server or communicate beyond line of sight. To increase situational awareness, a plug-and-play communications interface that enables EOD teams to utilize available communications devices (i.e., existing radios, SATCOM, LTE, etc.) to network TAK devices and bridge normally incompatible communication devices during EOD multi-agency responses. Additionally, EOD teams require a backhaul capability to reach EOD Command Centers beyond line of sight. Each of the 18 EOD flights and three regional training sites require one system.

2. Program Details.

Quantity	Unit Cost	Program Cost
21 TAK Communications Interface Suites	\$100,000	\$2,100,000
Total		\$2,100,000

EOD: STANDARDIZED UNEXPLODED ORDNANCE (UXO) RESPONSE TRUCK

1. Background. The ANG Explosive Ordnance Disposal (EOD) requires a six-passenger vehicle fleet with an enclosed utility cargo body to effectively store, move, and protect required emergency response equipment and explosives in adverse environmental conditions. Currently, EOD UXO response vehicles are grossly outdated and unreliable, with little standardized organization or environmental protection. The current fleet of UXO response trucks is incapable of towing the Total Containment Vessel, which places an unnecessary risk when transporting UXOs to safe disposal sites. The acquisition of an updated fleet will ensure EOD technicians have a safe and efficient transportation system that can safely transport explosives and UXOs to remote ranges for destruction. Each of the ANG's 18 EOD flights needs a standardized UXO Response Truck.

2. Program Details.

Quantity	Unit Cost	Program Cost
18 Standardized UXO Response Truck	\$85,000	\$1,530,000
Total		\$1,530,000

**EOD: CHEMICAL WARFARE PERSONAL PROTECTIVE EQUIPMENT (PPE)
MODERNIZATION**

1. Background. ANG Explosive Ordnance Disposal (EOD) teams require updated PPE that protects against current and emergent chemical warfare agents (CWA). Current PPE is not effective against all CWAs and impedes the ability of EOD teams to conduct successful operations. The chemical warfare modernization kit should afford protection against all current CWAs, not require third-party additions to afford gross contamination protection, feature a reduced thermal burden on the wearer, and allow for wear for extended periods of time even while contaminated. Additionally, scalability is desired to allow EOD teams to wear PPE during full range of combat operations and avoid current undesirable tradeoffs (e.g., having to wear thick over boots and gloves that reduce dexterity and mobility). The kit includes a full PPE system without a field protective mask that satisfies all levels of Mission Oriented Protective Posture. ANG EOD teams require two kits consisting of training and operational ensembles per all operational personnel UTCs for all 18 flights.

2. Program Details.

Quantity	Unit Cost	Program Cost
440 Chemical Warfare PPE Kits	\$5,350	\$2,354,000
Total		\$2,354,000