Aviation Networks and Mission Planning  
By Mr. Scott Caruso

January 2009 saw the creation of the Aviation Networks and Mission Planning (ANMP) Product Directorate. Previously an assistant product manager within the Aviation Mission Planning (AMPS), to an office of seven major efforts with the addition of the Degraded Visual Environment (DVE) team and the three-prong Aviation Data Systems Family of Systems.

ANMP has grown from three main efforts, Aviation Mission Planning Software (AMPS), Centralized Flight Records Systems (CAFRS), and the Improved Data Modem (IDM), to an office of seven major efforts with the addition of the Degraded Visual Environment (DVE) team and the three-prong Aviation Data Systems Family of Systems.

Degraded Visual Environment

You are on short final.

The before landing checks are complete, your intended touchdown point is in sight.

Just as you arrive at the position where you are committed to land you lose all visual reference outside the aircraft.

So you continue to feel your way to the ground, keeping the wings level and the cyclic centered, hoping this will be another successful landing to record.

Rotary wing flight operations in DVE are a constant threat for our aircrews both in theater and abroad. During the execution of combat and training missions Army aircrews often encounter flight conditions that severely restrict visibility due to brownout, whiteout, or other atmospheric obscurants. These common mission profiles often place the aircrew in close proximity to obstacles and hazards, natural and man-made, which are not known or detected by the aircrew, often resulting in loss of personnel or damage to the aircraft.

To compensate for the lack of visual acuity when DVE is encountered, aircrews develop tactics, techniques and procedures (TTPs) to mitigate the risks and complete the mission. However, DVE continues to remain a challenge to our aviators resulting in the loss of personnel, equipment and combat effectiveness.

In response to this continuing threat, which generated an Operational Needs Statement (ONS) requesting development of a system to address DVE for aircrews in combat, the Program Executive Office (PEO) Aviation is proceeding forward with the establishment of a formal acquisition program to mature obscurant penetration sensor technologies.

These technologies will provide Army aircrews with real-time visual indication of the terrain and obstacles encountered during the various phases of flight.

The immediate objective of the DVE team is to analyze potential systems which will enhance situational awareness, improve aircraft safety, and increase combat effectiveness.

To meet these objectives we are working to leverage the initiatives from a number of organizations including the Project Manager Air Warrior; the U.S. Army Aviation and Missile Research, Development and Engineering Center; the Night Vision and Electronic Sensors Directorate of the U.S. Army Communications-Electronics Research, Development and Engineering Center; the U.S. Air Force Research Laboratory, the Naval Air Warfare Center-Aircraft Division, and the Defense Advanced Research Projects Agency.

Potential DVE solutions may include a combination of both active and passive sensor technologies accompanied with the integration of advanced flight symbology.

A key component of any future DVE system architecture is the ability to accommodate a wide variety of sensors. As sensor technologies mature, a plug-and-play capability with a standard common interface will ensure the most effective sensor or suite of sensors are fused with current terrain data and existing sensors to provide the aircrew with real-time imagery for flight operations.
Improved Data Modem

The IDM is the common solution for digitizing Army Aviation. It performs as an internet controller and gateway to the Tactical Internet and Fire Support Internet for Aviation platforms.

The IDM has its roots in the Enhanced Airborne Target Handover System (EATHS) product designed to meet a 1991 requirement for short range data communication for close air support and subsequent Army unique requirements of the Army Aviation Command and Control System (A2C2S) and Aviation Tactical Operations Center.

The requirements for the exchange of command and control (C2) and situational awareness (SA) data have evolved considerably since the days of EATHS. The IDM is a dynamically evolving product to facilitate a digital transmission network for the sharing of situational awareness, sensor and tactical data among our digitized Army, joint, and coalition aviation partners.

The IDM serves as the crucial interface between platform mission computers and radios, supporting legacy very high frequency (VHF) and ultra high frequency (UHF) radios and the Blue Force Tracker system.

Efforts are underway to enable future support of Blue Force Tracker 2.

As a single line replaceable unit (LRU) which performs communication modulation/demodulation, database processing, and message processing functions for the aforementioned aviation team members, the IDM presents a multi-path approach to C2 in the tactical environment.

As the digitized Army Aviation’s integrated C2 and SA solution, the IDM hosts Force Battle Command Brigade and Below-Air (FBCB2-Air) and processes Air Force Applications Program Development (AFAPD), Variable Message Format (VMF), and Advanced Field Artillery Tactical Data System (AFATDS) messages.

These capabilities further enhance Aviation’s combat multiplicative effect and help prevent fratricide on the battlefield by providing timely target data to the Warfighter and control measures and situational awareness to battlefield commanders.

Currently, the IDM program activities are focused on developing the Open Systems Architecture (OSA) effort, a complete software and hardware re-architecture. This new architecture includes the IDM-401 and IDM software version 10, designed for Common Operating Environment (COE) compliance via Future Airborne Capability Environment (FACE) standards conformance.

Aviation Mission Planning System

The Aviation Mission Planning System (AMPS) provides Army aviation a state-of-the-art interoperability and mission planning tool that enhances aviator SA, C2, and safety. This mission planning and battle synchronization tool automates aviation mission planning tasks including tactical C2, rehearsal, and flight planning.

Interoperable with Army Mission Command Systems (AMCS) and associated networks, AMPS furnishes the aviation commander with continuous situational awareness, allowing for rapid adjustment and dissemination of mission plans.

AMPS products enable communication, navigation, situational awareness, and weapons systems use on a multitude of Army aircraft from the D and E model Apache, to the L and M model MEDEVAC Blackhawk and unmanned aircraft systems (UAS).

AMPS is currently conducting a hardware refresh expanding the performance and internal data storage capacity for aviation users.

The new hardware, known as the VT Miltope RLC-3G will provide a 15.4” display, a 2.53 GHz Intel® Core 2 Duo processor, 4GB of RAM, and an ATI Radeon® 512 MB video card. Additionally, two 640GB eSATA internal hard drives will facilitate classified and unclassified operations and negate the need for an external hard drive.

AMPS hosts the Army Portable Flight Planning Software (PFPS), which allows Warfighters to load the aircraft with navigation, environmental, performance, and threat data.

In fiscal year 2014 a significantly updated version of PFPS, called Execution Planner (X-Plan), will be fielded which will provide PFPS capabilities with improved workflow and integration while providing a Microsoft Office 10 look and feel.

A collaborative developmental effort between PEO Aviation, the U.S. Special Operations Command, and the USAF, X-Plan will expand the planning capabilities available to users across the Department of Defense.

This capability will greatly increase the value of AMPS as an air, ground, and maritime planning tool and will leverage the Tactical Terrain Visualization System that provides users a realistic three-dimensional view of their proposed route.

Centralized Aviation Flight Records (CAFRS)

The Centralized Aviation Flight Records System (CAFRS) software is part of the AMPS program. CAFRS is fielded to manned and unmanned Army aviation units to automate flight records management.

There are two versions of CAFRS: the Training and Doctrine Command (TRADOC) version which provides student management functionality and other functions needed to support installations that conduct flight training, and the Forces Command (FORSCOM) version which supports the National Guard, the Reserve, and the Active Component.
Aviation units are able to synchronize with the CAFRS Central Database (CCDB) which allows them to permanent change of station (PCS) a crewmember’s Individual Flight Records Folder (IFRF) between losing and gaining units via the CCDB.

Units connected to the CCDB are also able to PCS an IFRF for individuals attending a course at a TRADOC site. Once the crewmember has completed the course, the school performs a closeout and PCS’s the record back to the CCDB from which the unit flight operations can bring it back into their database.

The next phase of CAFRS will integrate the Individual Aircrew Training Folder (IATF). Functionality will exist between the IFRF and IATF to allow data flow between the two, reducing the work load of standardization and flight operations personnel.

For additional information on the CAFRS program, and insight into the role the program is playing in the lives of our veteran aviators, see the article titled “Vietnam War Veteran Elated to Receive Missing Flight Record” in this edition of ARMY AVIATION.

Aviation Data Systems

In the 4th quarter, 2014, the Army will begin fielding the Aviation Data Exploitation Capability (ADEC), the Aircraft Notebook (ACN), and the Aviation Logistics Enterprise-Platform (ALE-P), jointly referred to as the Aviation Data System Family of Systems (FoS). These systems will replace the legacy Standard Army Management Information System (STAMIS) capabilities and enhance and simplify how Army aviation performs maintenance and logistics functions through highly integrated and improved processes, providing an intuitive, modernized user experience.

This FoS will replace the Unit Level Logistics System-Aviation (Enhanced) (ULLS-A(E)), and merge with the unmanned capabilities provided by the Unmanned Aircraft Systems-Initiative (UAS-I) to provide a single aviation baseline that meets the needs of manned and unmanned aviation platforms.

The aviation FoS will implement Military Flight Operations Quality Assurance (MFOQA), enhance Condition Based Maintenance (CBM) within the Aviation unit community, provide a single point, integrated aircraft logbook, and provide the bridge between the aviation domain and other enterprise systems including the Global Combat Support System-Army (GCSS-Army). The ADEC system will provide an MFOQA capability similar to commercial aviation’s Flight Operations Quality Assurance, but with a focus on how Army aviation trains and fights.

ADEC flight visualization will provide a visual representation of the actual flight tasks, analysis, and highlighted events thereby allowing constructive aircrew debriefs and after action reviews (AAR), to include multi-ship missions. ADEC will also automate the flight scheduling and mission briefing processes, to include the unit’s risk assessment worksheet and the crewmember reading file.

Integration with CAFRS will provide decision makers ready access to crewmember data during the risk assessment and mission approval process. A customizable dashboard will provide unit personnel with pertinent maintenance, operations, safety and
training data, and a kiosk capability will provide situational awareness of current flight operations in real time.

This system will leverage current and future network architectures and infrastructure as much as possible and provide an integrated battalion server capability to reduce the server footprint within the unit.

In addition, ADEC will host an Aviation System Portal at the enterprise level that provides connectivity between the battalion, brigade and the aviation enterprise.

The ACN is a laptop computer that serves as the single point, at-aircraft system with aircraft forms, records software, and platform specific installed applications. This ‘tool kit’ of software is necessary for completing maintenance on Army aircraft through an electronic, automated, fully-integrated solution. The ACN will facilitate recording maintenance actions and supply requests, provide and leverage reference material from maintenance manuals, and operate in a disconnected mode.

In addition, the ACN software will integrate the aircraft Interactive Electronic Technical Manuals (IETM) and on-board digital source collector ground station functionality. This integration will provide a task based maintenance approach for recording maintenance, significantly reducing user input required to complete associated maintenance forms and enhancing the fleet manager’s knowledge of what maintenance tasks are being performed and the associated faults.

ALE-P will provide an automated ability to enter and track required maintenance functions. The ALE-P system is an integrated production control (PC) shop, quality control (QC) shop, technical supply, armament, and phase team capability, and will work seamlessly with the ACN and ADEC systems to automate the requirements of Department of the Army Pamphlet 738-751, The Army Maintenance Management System-Aviation.

As with the ACN software, ALE-P will reduce the keystroke entries required by the user through integration with other systems and associated data, context sensitive search features, and use of bar code scanners with marked parts.

The ALE-P architecture will support the Army’s two-level maintenance system (field and sustainment), and will interface with GCSS-Army, the Maintenance Consolidated Database System (MCDS) and other enterprise level systems.

The ANMP team is dedicated to both aircrew safety and reducing their workload. The DVE program will save many lives at home and abroad, reduce the loss of aircraft and provide commanders with increased force projection on the battlefield.

AMPS will remain a vital mission planning and rehearsal tool for Army Aviation platforms, and the ADEC/ACN/ALE-P FoS will usher in a new era of Army Aviation maintenance tracking.

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