

# U.S. Army AMCOM, G-4 E-Team

## Environmental Excellence in Weapon System Acquisition

### INTRODUCTION

From FY 2008 – 2009, the U.S. Army Aviation and Missile Command (AMCOM) G-4 Environmental Team (G-4 E-Team) excelled in incorporating environment, safety and occupational health (ESOH) requirements into their supported weapon systems' decision-making processes.

The G-4 E-Team consistently demonstrated sustained superior performance in assisting and providing guidance to AMCOM Program Executive Offices (PEO) and Program, Project and Product Managers in reducing, or eliminating altogether, their use of hazardous materials (HAZMAT). These efforts ultimately led to corresponding reductions in the hazardous waste (HAZWASTE) generation and disposal from the various manufacturing, sustainment and repair operations.

The G-4 E-Team's single focus is to ensure that AMCOM systems and equipment are manufactured, maintained and repaired in the safest and most environmentally sound manner possible while increasing system affordability and maintainability, thereby improving Warfighter readiness.

*On this page: A Blackhawk UH-60 shown in flight. The G-4 E-Team's single focus is to ensure that U.S. Army Aviation and Missile Command systems and equipment are manufactured, maintained and repaired in the safest and most environmentally sound manner possible.*



### JUDGING CRITERIA

-  Program Management
-  Orientation to Mission
-  Technical Merit
-  Transferability
-  Stakeholder Interaction

## BACKGROUND

The AMCOM G-4 E-Team's success is due to the contribution and capabilities of its team members. Team members and their respective positions during FY 2008 – 2009 are as follows:

- Dr. David Branham – Chief, AMCOM G-4
- Mr. Ronald Hagler – Chief, Environmental Division
- Ms. Sandy Olinger – Team Lead, Acquisition and Compliance Team
- Mr. Kerry Blankenship – Engineer, Acquisition and Compliance Team
- Mr. Glenn Williams – Team Lead, Technology Integration Team
- Ms. Kim Granger – Engineer, Technology Integration Team
- Mr. Frank Showalter – Contract Lead, Stanley, Inc.

“AMCOM’s team has tackled the big problems, like hexavalent chrome and industrial solvents, and has come up with solutions. They’re focused on maintaining safety and exposure, issues that Program Managers should be most concerned about.”

- Dave Koehler, Chairman,  
SECARMY EEWSA Selection Team

## POSITION DESCRIPTION

Dr. Branham serves as the executive manager for AMCOM G-4. He reports directly through the AMCOM Command Group and provides overall direction and strategic management for all AMCOM G-4 personnel. Mr. Hagler serves as the manager for all Environmental Division personnel. He directed each of the Team Leads in FY 2008 – 2009 in support of the project management and support facility operations. Ms. Olinger led the project management support effort at AMCOM G-4 during FY 2008 – 2009. Her group provided direct acquisition ESOH support to AMCOM and AMCOM-supported weapon systems. Milestone review documentation, Programmatic ESOH Evaluation (PESHE) preparation, National Environmental Policy Act (NEPA) documentation preparation/review and materiel release requirements were primary functions of

her group. Mr. Blankenship provided engineering support to the weapon system acquisition effort in FY 2008 – 2009. His efforts primarily revolved around HAZMAT substitution and Class I Ozone-Depleting Chemical (ODC) elimination. Mr. Williams and Ms. Granger, as team lead and engineer, respectively, for the Technology Integration team, reviewed and evaluated Engineering Change Proposals, maintained a database of existing material technologies and monitored emerging technologies. Mr. Showalter leads a substantial contracting team which performs work at all levels for AMCOM G-4. Other participating companies include NeXolve Corporation and Teledyne Solutions, Inc.

## AWARDS AND SERVICES

- Dr. Branham is a member of The Alabama Planning Commission; the Huntsville, Ala. Board of Zoning Adjustment; the Alabama River Alliance Board of Directors and Leadership of Huntsville/Madison County; he received performance awards in 2008 and 2009 for execution of position requirements.
- Mr. Blankenship received performance awards in 2008 and 2009 for execution of position requirements.
- Multiple members (Dr. Branham, Ms. Olinger, Mr. Williams and Mr. Blankenship) are members of the Army Acquisition Corps.
- Dr. Branham and Mr. Williams are members of the Society of American Military Engineers.
- Ms. Granger and Mr. Blankenship are members of the Army Aviation Association of America.



## ACCOMPLISHMENTS

### Weapons System Acquisition Program

Part of the G-4 E-Team's mission is to serve as AMCOM's point of contact and subject matter expert for weapon system environmental support throughout the entire acquisition life cycle, from early development and fielding until ultimate disposal.

The G-4 E-Team functions as an element of the PEO's or project manager's staff and provides technical assistance and system documentation reviews to identify the environmental requirements and



issues for both Continental United States (CONUS) and Outside CONUS aspects of weapon system acquisition.

The G-4 E-Team maintains environmental support contracts to provide the PEOs and project managers with any requested environmental support, including preparation/review of NEPA documentation. During the design process, HAZMAT contained in systems are documented to support the system's demilitarization and safe disposal. The AMCOM G-4 E-Team assists the weapon systems project manager in determination of these materials by reviewing prime contractor Hazardous Material Management Program (HMMP) reports. These reports are contractually binding by requiring Contract Deliverable Requirements Lists (CDRL) in the contract statement of work (SOW). The CDRLs require prime contractors submit all end item hazardous constituents. AMCOM G-4 provides occupational health support and works closely with the AMCOM Safety Office in providing system safety support via Military Standard (MIL STD)-882D, "Standard Practice for System Safety."

G-4 E-Team members were very proactive in their approach to the systems engineering and program management processes. They integrated themselves into the development process and worked closely with the PEO and project manager personnel early in the design phase of program modifications. G-4 E-Team engineers assisted project manager personnel in identifying HAZMAT requirements, minimizing their use, evaluating alternatives, recommending substitute materials and implementing substitutes for aviation maintenance and operation. By doing so, they helped green the environment, eliminate HAZMAT handling requirements and saved on disposal costs.

For example, the G-4 E-Team has helped minimize the use of Halon 1301, a gaseous flooding agent used in fire suppression, restricting its use to only critical operational requirements. Team personnel also tracked the issue of product availability from the Army Ozone Depleting Substances Reserve to ensure that Halon remains available for use in Army aviation until a suitable alternative is tested and approved. The G-4 E-Team has continued research into new fire suppression agents and new delivery systems.



*The G-4 E-Team provides ESOH oversight for the recertification of Army Tactical Missile System. The G-4 E-Team is responsible for and influences all ESOH facets of Army aviation and missile acquisition, sustainment and disposal.*

## Incorporating ESOH Integration into Systems Engineering

The G-4 E-Team's matrixed and integrated personnel support includes analyses of program documentation and assistance in the interpretation of all of the environmental requirements under DoDI 5000.2/5000.02, *Operation of the Defense Acquisition System*; Army Regulation (AR) 70-1, *Army Acquisition Policy*; 32 CFR Part 651, *Environmental Analysis of Army Actions*; AR 700-142, *Type Classification, Materiel Release, Fielding, and Transfer* and Presidential Executive Orders (E.O.). This responsibility includes Acquisition Strategies, Integrated Program Summaries, Integrated Logistic Support Plans, Supportability Strategies, contract requirements packages, pollution prevention plans, HMMP plans/reports, PESHE preparation, SOW ESOH language and materiel release statements.

The G-4 E-Team regularly attends weapon system Integrated Product Team (IPT) meetings ensuring ESOH considerations are included in the systems engineering process. During FY 2008 – FY 2009, they attended more than 50 meetings, primarily in the safety, test or logistics arenas.

G-4 E-Team personnel ensured that HMMP SOW language was included in more than 150 contract



packages. This practice continued the precedent that any HAZMATs contained in end items or used in the manufacturing process would be identified. In this manner, multiple groups within the G-4 organization were better able to identify HAZMATs and recommend suitable replacements. This specific SOW language serves as risk management for demilitarization and disposal requirements at the end of the system's life cycle.

The G-4 E-Team reviews aviation and missile HMMP reports and technical maintenance documentation to identify requirements for the use of ODCs and HAZMATs, and where possible, recommends suitable environmentally friendly replacements in keeping with the established material compatibility requirements. These change recommendations are provided to the Army Materiel Command Research, Development and Engineering Command, the AMCOM Life Cycle Management Command Safety Office and the Integrated Materiel Management Center for concurrence and implementation.



*The G-4 E-Team provides ESOH oversight for the recertification of Army Tactical Missile Systems at the Letterkenny Munitions Center. Where possible, the team recommends suitable environmentally friendly replacements.*

The team prioritizes research and development (R&D) projects based upon life cycle cost assessments and cost benefit analyses which are performed based on best business practices and maximizing cost efficiency.

## ESOH Risk Management

During FY 2008 – 2009, MIL STD 882-D was used as a template for evaluating environmental risk; safety risk assessment categories were rigorously subjected to MIL STD 882-D by the AMCOM Safety Office. Safety and human health issues at the weapon system level were addressed by the AMCOM Safety Office with input to the PESHE via the G-4 E-Team.



The G-4 E-Team provided direct support to more than 20 weapon system PEO acquisition milestones and Army System Acquisition Review Council (ASARC) reviews during FY 2008 – 2009. One of the primary goals in supporting weapon system acquisition is the successful completion of acquisition milestone reviews by weapon system customers. Aspects of the G-4 E-Team's matrixed ESOH support include using DoD Instruction (I) 5000.2/5000.02 as a broad mandate to the weapon system project manager for tracking hazardous materials, maintaining a NEPA schedule, maintaining a PESHE, and planning for eventual system demilitarization and disposal. The G-4 E-Team and their supported weapon system jointly used the PESHE, IPTs and frequent interaction to identify and track ESOH risks. Attendance of multiple IPTs ensured a total systems approach by identifying any pertinent ESOH risks to various disciplines within the Project Office (PO).

The G-4 E-Team provided NEPA oversight for more than 20 AMCOM G-4-supported Project Offices. Creating and maintaining a NEPA schedule is a DoDI 5000.2/5000.02 requirement. Further, NEPA is a statutory requirement for all federal actions, including weapon system development. Although the team's matrix support for weapon system acquisition and development does not usually involve site-specific NEPA analyses, the team served as a liaison between its weapon system customers and future test/training/support facilities. Preparation of NEPA schedules for G-4 E-Team customers involved interaction with multiple divisions within the PO such as Test and Evaluation, Logistics and Production. Additionally, it involved the team's interaction with NEPA compliance personnel at specific facility locations and federal, state and local agencies, as required. Key risks identified included multiple



test locations, which required additional NEPA analyses prior to testing. In most instances, mission completion delays were averted due to preemptive action to resolve NEPA requirement concerns.

The G-4 E-Team prepared or provided oversight for more than 20 PESHE documents during FY 2008 – 2009 for missile systems, aviation systems and ground support equipment. Risk was evaluated in the general areas of Environmental Compliance, NEPA Compliance, HAZMAT and Waste Management and Safety. MIL STD-882D was used as the risk assessment template when evaluating risk factors within these PESHE documents. Also, guidance from the *System Safety – ESOH Management Evaluation Criteria for DoD Acquisition, January 2007*, was used for PESHE preparation and review. Although the G-4 E-Team did not directly perform the system safety risk analysis, they worked closely with the AMCOM Safety Office in including this information in the PESHEs.

As a guideline, G-4 E-Team stipulates to all supported systems receiving a materiel release statement that DoD Directive 5000.1, The Defense Acquisition System, and DoDI 5000.2/5000.02 requirements must be followed. As the environmental materiel release authority for AMCOM, the G-4 E-Team evaluated weapon system ESOH status (compliance, NEPA and HMMP) prior to preparing a materiel release statement. The actual statement represents weapon system coherence to current DoD ESOH requirements. System safety materiel release statements were supplied by the AMCOM Safety Office.

The G-4 E-Team identified and evaluated key risks, implemented mitigation measures and met success in reducing risks using the total systems approach. For example, in the area of HAZMAT tracking, they worked directly with project manager technical and contract management personnel to ensure SOW

language was not diluted or omitted. They directly interfaced with original equipment manufacturers at IPTs, to accelerate and simplify the process of HAZMAT reporting, as well as reviewing HMMP Plans/Reports and submitting comments to project managers. Additionally, the G-4 E-Team maintained a universal definition of what constitutes a HAZMAT for HMMP reporting purposes.



Recertification of Guided Multiple Launch Rocket Systems is completed at the Letterkenny Munitions Center, located at Letterkenny Army Depot in Chambersburg, Pa.

The G-4 E-Team prepared more than five materiel release statements for AMCOM-supported weapon systems during this award period. AR 700-142 stipulates environmental requirements must be fulfilled in order to obtain a full materiel release.



This Blackhawk UH-60 is being overhauled in Hangar 43 Corpus Christi Army Depot, Corpus Christi, Texas.

The G-4 E-Team addressed pollution prevention requirements through recommended and justified actions which minimized and/or eliminated the use of hexavalent chromium conversion coatings and minimized the use of Halon 1301, restricting its use to only critical operational requirements. They coordinated assignment of national stock numbers with the General Services Administration for new products and prepared documentation to authorize the use of these products on Army aviation assets. They also maintained direct support with weapon system project offices as well as other agencies such as the U.S. Army Environmental Support Office, Naval Air Systems Command, National Defense Center for Energy and Environment (NDCEE), Strategic Environmental Research and Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP).



To comply with NEPA, the G-4 E-Team worked closely with test and evaluation, production and logistics within the project offices in order to more accurately track activities which might qualify for NEPA documentation. They communicated directly with test sites and depots to discuss upcoming weapon system activities and potential NEPA implications. They also interfaced with ESOH points of contact within the project offices in order to clarify NEPA funding and documentation needs.

In meeting weapon system milestone review completion requirements, the G-4 E-Team maintained both a HAZMAT tracking system and NEPA schedules. They prepared and reviewed PESHEs for their weapon system customers to ascertain DoDI 5000.2/5000.02, *Defense Acquisition Guidebook* and *System Safety – ESOH Management Evaluation Criteria for DoD Acquisition* stipulations were incorporated. The G-4 E-Team also worked directly with the U.S. Army Environmental Command (USAEC) and the Deputy Under Secretary of Defense (Installations and Environment) to ensure timely completion of appropriate ESOH acquisition documentation.



The G-4 E-Team also developed a new Environmental Life Cycle Support Team to expand the evaluation of all AMCOM G-4 facilities.

## Hazardous Materials Management and Pollution Prevention

The G-4 E-Team reviewed more than 80 HMMP Reports to identify safer, less toxic and more environmentally-compliant alternatives, determined if the alternatives had been evaluated and approved, and if so, provided the data necessary for their implementation. This included HAZMATs used in manufacturing processes and residual HAZMAT contained in delivered equipment. Demilitarization/disposal plans can effectively use this data. Likewise, life cycle costs for disposal, design and process changes should be resultant. Pollution factors such as effluents, emissions, discharges and noise were incorporated within either life cycle, programmatic or site-specific environmental assessments.



Over the last two years, G-4 E-Team engineers assisted in the development of more than eight test programs to evaluate alternative materials to replace HAZMAT and assessed the results from these and other test efforts to determine applicability of the new materials. They also worked closely with other Army, DoD and federal government offices, such as the USAEC ASARC reviews as well as commercial industries, to identify promising technologies and evaluate these new technologies as potential substitute materials.

The G-4 E-Team applied a “cradle to grave” approach in their assessments, considering not only sustainment but also, ultimately, demilitarization and disposal.

## External Coordination

At the request of the project managers and depot personnel, the G-4 E-Team participated in the review and evaluation of the Engineering Change Proposals as well as draft revisions and newly published draft documents. To support this function, the engineers and scientists maintained a knowledge base of existing materials technologies and monitored and evaluated emerging technologies. The evaluation of emerging technologies requires the identification of the applicable technologies for R&D followed by the funding justification process for qualification and validation testing. R&D projects are coordinated with multiple services programs such as the NDCEE, SERDP and ESTCP.



## CONCLUSION

Over the last two years, the AMCOM G-4 E Team provided Army Aviation and Missile PEOs and project managers a single, cohesive focal point for ESOH support. They consistently supplied superior technical and management support to all AMCOM-managed weapon systems and reduced or eliminated a significant amount of HAZMAT in the manufacturing, operation, sustainment and disposal processes. The team's results fully incorporated the spirit and intent of E.O.s and Army policy, and used the federal, state and local regulatory requirements as a framework to accomplish these goals.

All of these actions, when fully implemented, ensure AMCOM systems and equipment are able to satisfy all aspects of their designed operational requirements with minimal ESOH impacts. Many of

these actions will result in long-term cost savings and cost avoidance, and ultimately eliminate the potential for facility violations of state and federal environmental regulations.

The AMCOM G-4 E-Team is responsible for and influences all ESOH facets of Army aviation and missile acquisition, sustainment and disposal. The G-4 E-Team significantly reduced the presence of HAZMAT throughout all life cycle phases of these weapon systems. The initiatives of the past two years represent a proactive approach with continuous, focused efforts providing PEOs and project managers, depots and Warfighters with tools for effective HAZMAT/HAZWASTE reduction/elimination, now and in the future, while reducing overall life cycle system requirements and costs, and increasing mission readiness and reliability.



*An OH-58D is being serviced at Fort Hood, Texas. The G-4 E-Team successfully tested, evaluated and gained approval for transition to a non-hexavalent chromium coating system for Army aviation systems and equipment.*