

The Army Munitions Survivability Program

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I. Abstract

Analyses conducted by the U.S. Army indicate that the military munitions logistics system is severely vulnerable to disruption during initial buildup in wartime operations due to enemy or terrorist attack. Historical data indicates that explosive propagation between munitions stacks is likely, leading to severe critical munitions shortages and the potential for loss of the foothold by the U.S. early entry forces. The U.S. Army is pursuing a Munitions Survivability Program with three major components which work together to address this issue: (1) the Ammo Provider Program will develop technology to improve survivability of the munitions logistics system by protecting ammo storage areas and increasing the velocity of munitions distribution. (2) the Munitions Survivability Integration Program will make the munitions themselves less sensitive and more survivable through survivable munitions packaging, improved munitions design, and less sensitive energetics (addresses MIL-STD-2105B). (3) The Hazards from Electromagnetic Radiation to Ordnance (HERO) Certification Program will assess the susceptibility of Army munitions to the electromagnetic radiation environment present during Army and joint operations. The combination of these three programs provides a comprehensive and low cost approach to protect decisive munitions and ensure our ability to quickly project lethal and survivable combat power across the range of military operations around the globe.

II. Basis of Program

A series of analyses completed in Nov 94 by the Army Materiel Systems Analysis Activity (AMSAA), Army Research Laboratory (ARL), and the Army Armament Research Development and Engineering Center (ARDEC) concluded that the munitions logistics system is severely vulnerable to disruption during initial buildup in wartime operations due to enemy attack. Munitions logistics nodes are large, difficult to hide, and difficult to protect. Their destruction can cripple warfighting capability by creating severe munitions shortages, cause the potential for a loss of foothold by early entry forces, and critically impact operational planning and execution.

Logistics nodes such as ports, airheads, and ammunition storage areas are key targets for enemy attack. This was most recently demonstrated by U.S. attacks on ammo storage sites in Bosnia-Herzegovina as well as Israeli attacks on terrorist ammo storage sites in Lebanon. In wartime operations, large quantities of munitions create a visible and vulnerable target. During Operation Desert Shield, the U.S. Central Command 22nd Support Command reported a continuous presence of 30,000 short tons of ammunition at the port of Al Jabayl. The potential

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destruction radius from this ammunition stockpile stretched for nearly 3/4 of a mile and jeopardized many key warfighting assets and thousands of troops. The potential for a munitions disaster during the build-up was so visible that it was highlighted by the CBS news program “60 Minutes”.

Munitions storage areas are especially valuable and unique targets. Because of sympathetic detonation reactions and firebrands, one easy-to-inflict hostile act can initiate an explosive event or fire which can quickly propagate to other munitions stacks. The result can be loss of the entire munitions storage area. An enormous collection of data validates that this has occurred on numerous occasions throughout U.S. military history.

The threats to munitions logistics nodes are many. They include relatively simple small arms, mortars and terrorist devices, sophisticated long range ballistic missiles and artillery projectiles, and electromagnetic hazards. Today, increasingly accurate ballistic missiles are proliferating into the hands of potential adversaries. Due to their large physical size, munitions storage areas are difficult to defend, whether the threat is a Scud missile, or a dedicated terrorist willing to sacrifice himself. In addition to the risk of enemy-inflicted destruction, munitions storage areas can also be destroyed by accidents. During Desert Storm, a heater fire in an artillery resupply vehicle led to an accident which nearly decimated an entire Army battalion (over 150 vehicles lost) and resulted in a \$40M loss.

The destruction of a munitions storage area can quickly lead to munitions shortages due to changes in DOD logistics strategy from large “just in case” quantities of munitions to smaller “just in time” quantities. The situation is exacerbated by dramatically reduced prepositioned supplies and a significantly smaller stockpile. Warfighting CINC Operational Plans now rely on small supplies of “preferred” critical munitions. However, only limited quantities of these expensive munitions are available in the war reserve stockpile. Compounding the problem, total Army munitions requirements have decreased from 2500K stons to 540K stons (78% decrease) from Program Objective Memorandum (POM) 92 to POM 97, resulting in a colder industrial base and significantly longer resupply times.

An additional significant threat to munitions survivability is Hazards of Electromagnetic Radiation to Ordnance (HERO). Many fielded Army munitions have not been certified to determine their susceptibility to Electromagnetic Environmental Effects (E3). Lack of this certification creates unacceptable operational restrictions and the potential for a catastrophe during Army and joint operations. This is because uncertified munitions which are exposed to electromagnetic radiation could unintentionally actuate. Many munitions such as propulsion system, mines, demolition items, fuzes, and primers use electro-explosive devices (EEDS) which are potentially vulnerable if deployed in a harsh electromagnetic environment. During Operation Restore Democracy (Haiti), the DOD recognized that the presence of uncertified Army munitions on the aircraft carrier USS America created the potential for a catastrophic accident. An electromagnetic incident of this type, as occurred on the USS Forrestal in 1967, is capable of destroying billions of dollars in war fighting assets, results in enormous loss of life, and places the entire military operation in jeopardy. To prevent exposure of uncertified munitions to shipboard electromagnetic radiation, the USS America had to shut down critical ship radar and communication equipment, creating severe operational and vulnerability issues. In addition,

some uncertified Army ordnance items were unable to be used due to unknown susceptibility to electromagnetic environmental effects.

Electromagnetic hazards are not limited to Naval Operations. On the Army's future Force XXI digitized battlefield, the electromagnetic environment will continue to grow harsher as more data is transmitted electronically. In addition to safety concerns, a severe electromagnetic environment has the potential to seriously degrade ordnance performance and adversely affect mission effectiveness as munitions "dud" and weapon systems malfunction.

III. Program Overview:

The U.S. Army is pursuing a Munitions Survivability Program with three major components which work together to address this issue: (1) the Ammo Provider Program will develop technology to improve survivability of the munitions logistics system by protecting ammo storage areas and increasing the velocity of munitions distribution. (2) The Munitions Survivability Integration Program will make the munitions themselves less sensitive and more survivable through improved munitions design, survivable munitions packaging, and less sensitive energetics (addresses MIL-STD-2105B). (3) The Hazards from Electromagnetic Radiation to Ordnance (HERO) Certification Program will assess the susceptibility of Army munitions to the electromagnetic radiation environment present during joint operations. The combination of these three programs provides a comprehensive and low cost approach to protect decisive munitions and ensure our ability to quickly project lethal and survivable combat power across the range or military operations around the globe.

Ammo Provider Program

The Ammo Provider Program will provide a survivable, flexible, responsive, and mobile munitions logistics system for our power projection force. The program has two thrusts to improve the survivability of munitions at ports, airheads, and ammo storage areas: (1) Protecting munitions supplies while they await delivery to combat forces and (2) Ensuring that munitions supplies keep moving.

The Survivable Ammo Storage Area thrust will protect munitions storage areas using rapid barricades, fire retardant camouflage blankets, and smart computer software to help soldiers construct survivable and more efficient ammo storage areas. This will improve ammo area survivability from all threats, reduce ammo storage area footprint, and provide improved ammo unit capability.

The Munitions Distribution Enhancements Equipment thrust will increase munitions distribution velocity through insertion of strategic configured load enabling technologies and commercial efficiencies in transportation, materials handling equipment, aircraft loading/unloading, teleoperation, and containers. These technologies will prevent munitions build-up at logistics nodes, improve logistics response time, provide seamless logistics operations, increase theater throughput, and provide the capability to conduct operations under chemical, biological, or sniper threat.

Ammo Provider is strongly supported by the U.S. Army Combined Arms Support Command, the Commander in Chief, U.S. Pacific Command (USCINCPAC) Director of Logistics-Security Assistance (J-4), the U.S. Army XVIII Airborne Corps, the Deputy Undersecretary of Defense (Logistics), the OSD Office of Munitions, the Army Deputy Assistant Secretary for Research and Technology, the Army Assistant Deputy Chief of Staff for Logistics, the Army Director of Requirements, Office of the Deputy Chief of Staff for Operations and Plans, several Army Battle labs, and the Marine Corps Systems Command.

Munitions Survivability Integration Program

The Munitions Survivability Integration Program is a proposed new start demonstration validation program which will make the munitions themselves less sensitive and more survivable. The program will take proven and available technologies, and in conjunction with Project Managers, item developers, and the user, apply them to high value, decisive munitions. Technologies to be demonstrated include survivable munitions design, survivable packaging, and less sensitive explosives and propellants. Application to munitions will prevent sympathetic detonation, explosions from munitions exposure to fuel, wood and propellant fires, and explosions that would normally result from fragment impacts. The overall benefit of providing “built in” survivability improvements will prevent destructive reactions within logistics nodes, transportation systems, and combat vehicles.

Hazards from Electromagnetic Radiation to Ordnance (HERO) Certification Program

This program will provide Army support to a Joint Ordnance Commanders Group and DOD Joint Spectrum Center effort to: (1) determine a joint uniform test criteria for ordnance electromagnetic environmental effects (E3) testing, (2) develop a joint service manual to provide field commanders with the E3 ordnance information necessary to effectively plan and conduct joint operations, and (3) certify already fielded “critical” Army ordnance for susceptibility to E3. This includes U.S. Army ARDEC and Missile Command (MICOM) developed munitions and weapon system components. Test data on already tested Army ordnance will be assembled from ARDEC and Test and Evaluation Command’s (TECOM) Redstone Technical Test Center and White Sands Missile Range for inclusion in a joint service manual being developed by the JOCG. This manual will provide critical guidance to field commanders for future operations. In addition, the U.S. Army ARDEC and TECOM will screen and classify warfighter designated “critical” Army ordnance to determine each item’s susceptibility to E3. Each critical ordnance item will be assessed to determine if there is a safety or performance impact. For each impact, a correction plan with recommended design changes will be developed to ensure the ordnance will perform effectively in a severe electromagnetic environment. Certification testing will be performed to determine the E3 susceptibility of “critical” ordnance items which are expected to meet the joint uniform ordnance E3 test criteria..

IV. Summary

The U.S. Army Defense Ammunition Logistics Activity has developed a comprehensive Army Munitions Survivability Program to help protect critical warfighting assets. Extensive studies conducted by the Army verify that this program will help ensure the successful execution of

future early entry operations and Major Regional Conflicts. The program is a multi step approach to address user needs and provide low risk, cost effective survivability solutions. The Munitions Survivability Program has three major components to significantly reduce losses to personnel, critical munitions, combat systems, and logistics assets. The Ammo Provider Program will develop and demonstrate innovative technology solutions to protect munitions storage areas and improve the velocity of munitions distribution. The Munitions Survivability Integration Program will support the development of survivable munitions. The Army HERO Certification Program will help ensure safety, survivability, and interoperability during joint operations. When combined, these programs work together to ensure Army and Joint Force munitions survivability.