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Lessons from Past Rapid Acquisition Programs

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- **During the nearly two decades that the U.S. has been actively engaged in combat, the Department of Defense has fielded many systems rapidly in response to warfighters' needs**
- **Programs from all services have been fielded rapidly within the past 20 years**
- **Case study approach**

- **DoD can field systems rapidly**
- **Initial testing prior to fielding is informative**
- **Combining tests with non-conflicting objectives into one event can maximize efficiency**
- **System development can continue after initial fielding**
- **Reviewing past testing on similar systems is worthwhile**
- **Rapid acquisition strategies may not always lead to rapidly fielded systems**

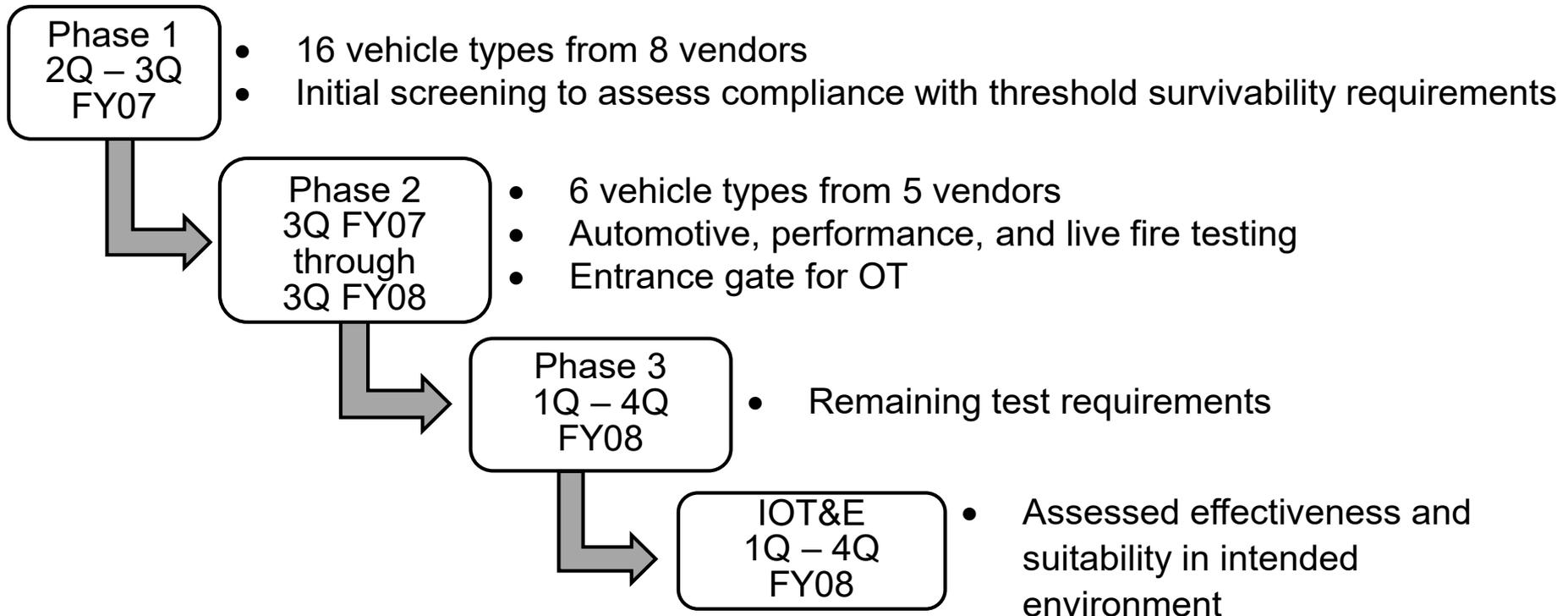
DoD can field systems rapidly

- **The MRAP family of vehicles was developed to provide crew protection and vehicle survivability against battlefield threats, predominantly IEDs and other roadside bombs, in Iraq and Afghanistan**
 - Response to a Joint Urgent Operational Needs Statement issued in October 2006
 - The first vehicles were delivered in theater in April 2007
- **Highest priority effort for the DoD and awarded highest industrial priority**
- **By 2009, the MRAP program had grown to be worth over \$22 billion and over 15,000 MRAP vehicles had been purchased**



IDA MRAP Vehicle Test Design Supported Rapid Fielding

- The MRAP test design supported rapid identification of multiple viable solutions
 - Structured in phases
 - Tailored to the initial theater of operations and expected mission types



IDA Some MRAP Problems Were Identified Too Late to Inform Design Changes

- **The first vehicles were delivered in theater roughly 6 months after the JUONS was issued**
- **Much of the testing was conducted too late to inform design changes for the first vehicles being fielded to Iraq and Afghanistan**
 - Testing prior to fielding primarily consisted of verifying that the threshold survivability requirements had been met
 - Subsequent test phases involved underbody blast testing with threats beyond threshold-level, automotive and performance testing, and operational testing
- **Fielding some vehicles quickly came at the cost of retrofits and future design changes to address problems identified in the later phases of testing**

**Initial testing prior to fielding is
informative**

IDA Undersea Warfare Programs Adapted to UONS Quickly

- **The Navy's Fifth Fleet issued a UONS in March 2010 to address an emerging submarine threat**
 - Two programs already under development and slated for operational testing (OT) were adapted to address the UONS
- **Mk 48 Mod 7 Heavyweight Torpedo**
 - QRA from January to February 2011
 - EFR March 2011
 - OT continued until early FY13
- **Mk 54 Mod 0 Lightweight Torpedo**
 - QRA from August to September 2011
 - Subsequent QRA in November 2011
 - EFR January 2012
 - OT continued through FY14



IDA Both Torpedoes Were Fielded Early to Help Address an Emerging Threat

- **Quick Reaction Assessment (QRA) testing included:**
 - Limited testing using torpedo hardware-in-the-loop modeling and simulation (M&S)
 - In-water firings against surrogate targets
- **The Navy identified a software problem on the Mk 54 torpedo during the initial QRA that could not have been identified with M&S**
 - The Navy revised the software and conducted an additional phase of in-water testing
- **Inadequate surrogates of the UONS threat limited the evaluation**
 - The torpedoes showed a limited capability against the UONS threat under certain operational conditions

Combining tests with non-conflicting objectives into one event can maximize efficiency

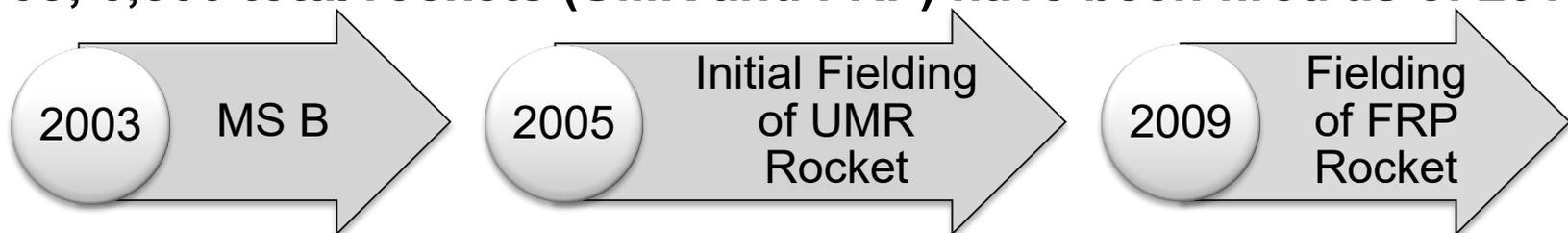
- **ATACMS is a family of surface-to-surface long-range precision missiles**
- **Long-range area weapon capability gap created by an aging ATACMS stockpile**
 - Army will fully fill gap with Precision Strike Missile in 2022-2023
- **In the interim, the Army plans to use ATACMS SLEP and ATACMS MOD to fill this capability gap**
 - ATACMS Service Life Extension Program (SLEP) converts ATACMS Block I and IA (bomblets) to ATACMS Unitary
 - The Army's ATACMS Modification program adds a proximity sensor on the ATACMS SLEP to provide an airburst capability without the risk of unexploded ordnance
- **The test program maximized the data from each missile by adding additional targets to each event**
 - This test design can be used on similar systems in the future



**System development can continue after
initial fielding**

Development of GMLRS Continued After Initial Fielding

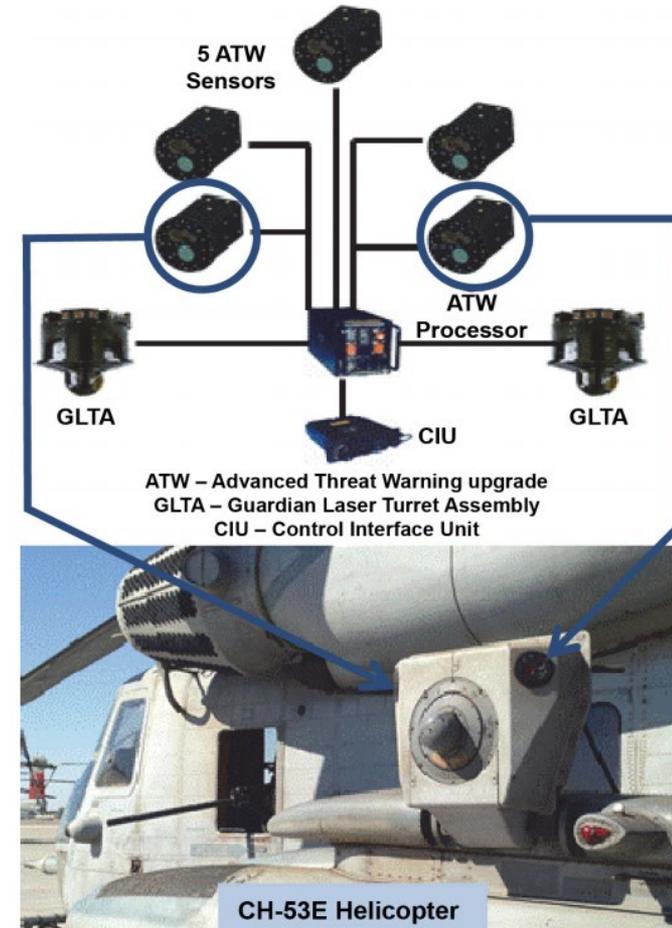
- **Guided Multiple Launch Rocket System (GMLRS) Unitary** was designed as a supplement to GMLRS DPICM when collateral damage was a concern
- **Incremental changes enabled rapid fielding of an initial solution and subsequent fielding of an improved solution**
 - The Urgent Materiel Release (UMR) rocket had a point detonating fuze and a delay fuze
 - The Full Rate Production (FRP) rocket added an airburst fuze
- **Over 1,000 UMR rockets had been fired in combat as of December 2008; 6,500 total rockets (UMR and FRP) have been fired as of 2017**



Reviewing past testing on similar systems is worthwhile

DoN LAIRCM with ATW Upgrade Background

- The Department of the Navy Large Aircraft Infrared Countermeasures (DoN LAIRCM) Advanced Threat Warner (ATW) is an aircraft system designed to defend against surface-to-air infrared missile threats
- DoN LAIRCM ATW initially tested during the FOT&E of the DoN LAIRCM program on CH-53E, which was completed in March 2015
- In March 2015, U.S. Special Operations Command issued a JUONS, prompting services to plan to add DoN LAIRCM ATW to a variety of aircraft
 - AH-64E (Army)



DOT&E Helped the Army Leverage Past Testing on the DoN LAIRCM ATW System

- **The Army planned to integrate DoN LAIRCM ATW on the AH-64E as a stopgap measure until Army countermeasure systems became available**
 - The Army installed DoN LAIRCM ATW on the AH-64E as an add-on system



- **DOT&E helped the Army design a test plan that was specific to the integration on the AH-64E platform**
- **The DoN LAIRCM ATW integration on the Army AH-64E Apache was completed within 2 years of the Joint Urgent Operational Needs Statement (JUONS)**

Rapid acquisition strategies may not always lead to rapidly fielded systems

IDA DoN LAIRCM ATW System Integration on MV-22 Was Problematic

- **The Marine Corps began planning to add the DoN LAIRCM ATW system to the MV-22 in 2013**
 - The Marine Corps wanted to fully integrate the DoN LAIRCM ATW system with the mission system software on the MV-22
- **In Spring 2014, the Marine Corps issued an Urgent Universal Needs Statement (UUNS) to rapidly field the DoN LAIRCM ATW on the MV-22 within a two-year period**
 - It took nearly four years for the Marine Corps to complete the UUNS because of integration issues, two years longer than the Army took on the AH-64E integration
 - The Army fielded the DoN LAIRCM ATW without integrating with the AH-64E software
 - Although the Army solution was simpler, Soldiers were provided with a limited capability more quickly



- **Initial testing provides valuable information prior to fielding**
- **Easier to test and rapidly field off-the-shelf systems with limited mission scope**
- **Frequently, testing should continue after initial fielding to fully understand the capability**
- **Issuing equipment does not necessarily solve the problem**
- **In some cases, fielding a system rapidly may require sacrifices in the initial system capabilities**