

VHM Impacts to ATE

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NDIA ATC 6/15/2010

The Task




AUTOMATIC TEST SYSTEMS EXECUTIVE DIRECTORATE

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From: DoD ATS Executive Directorate
To: Chairman, National Defense Industrial Association Automatic Testing Committee
Subj: Request for Study and Recommendations Relative to the Impact on Automatic Test Equipment of Enterprise Health Management Approaches

1. "Ten years ago many industry pundits were forecasting the disappearance of ATE, to be replaced with redundant, self-repairing systems, smart diagnostics, prognostics and extensive built-in-test. As predicted, all of these technologies have advanced enormously, but survive today as true partners with traditional ATE augmenting its functions, focusing its applications and working in Harmony to achieve the common goal of maximizing prime systems availability." (Mike Ellis, Technical Program Chair AUTOTESTCON 2009)
2. These improvements to the Health Management Enterprise are indeed contributing to weapon system availability. However, they are being interpreted by some DoD Program Managers and senior leadership as an opportunity to eliminate at-system and off-system ATE.
3. It is requested that the NDIA Automatic Testing Committee perform a study to determine (1) where diagnostics, prognostics or any other elements of Enterprise Health Management have been introduced into a complex platform, and (2) the effects of this introduction on weapon system support, including weapon system availability and ownership costs, as well as any impact to the weapon system's ATE over the life cycle.
4. Please direct questions to the undersigned at (301) 757-6907 (e-mail william.ross@navy.mil) or to Jay Romania at (973)724-5832 (email jay.romania@us.army.mil).


W. A. ROSS
Assistant Director

The Task - Continued

- NDIA Automatic Testing Committee perform a study
 - Where diagnostics, prognostics or any other elements of Enterprise Health Management have been introduced into a complex platform
 - The effects of this introduction on weapon system support,
 - including weapon system availability and
 - ownership costs, as well as
 - any impact to the weapon system's ATE over the life cycle

Participants/Interested Parties List

- Anthony Sedberry
- Bill Ross
- Bruce Scott
- Chris Reisig
- Clark Harmon
- David Carey
- David Droste
- Dennis Hecht
- Derek Marston
- Gene Morin
- Grady Johnson
- Greg Simpson
- Howard Savage
- Jaime Olivas
- Jay Romania
- Jeff Olsen
- Jim Westphalen
- Joe Stanco
- John Hutchins
- John Stratton
- Kevin Walters
- Les Orlidge
- Lisa Pollack
- Mark Holtzer
- Mike Heilman
- Mike Stora
- Mukund Modi
- R. (Wade) Lowdermilk
- Rick Freeman
- Ron Newman
- Scott Brown
- Steve Butcher
- Steve Karlovic
- Tim Fountain
- Tom Sarfi
- William Birurakis

Activities to Date

- December '09 Meeting Introduced Task
 - D. Droste Identified as Lead
 - Renamed Task to VHM Instead of EHM Impacts to ATE
- Held Web Meeting 1/20/10
 - Provided Survey Form and Requested Comments and Data Input
 - Added Several New Interested Parties Since Initial Call for Participation

Activities to Date – Cont.

- Held Web Meeting 2/24/10
 - Status of Data Collection
- Held Meeting 3/25/10
 - Presented/Discussed Preliminary Information
- Provided Draft Report (Strawman) 4/29/10
 - Draft/Interim/Incomplete

Near Term Actions

- Platform and ATE Developers Provide Input
 - Survey Form as a Guide
 - Previous Public Domain Papers
 - Other Source Material
- Meeting
 - Late July / Early August ?
 - Review Draft Report and Finalize

Results (to Date)

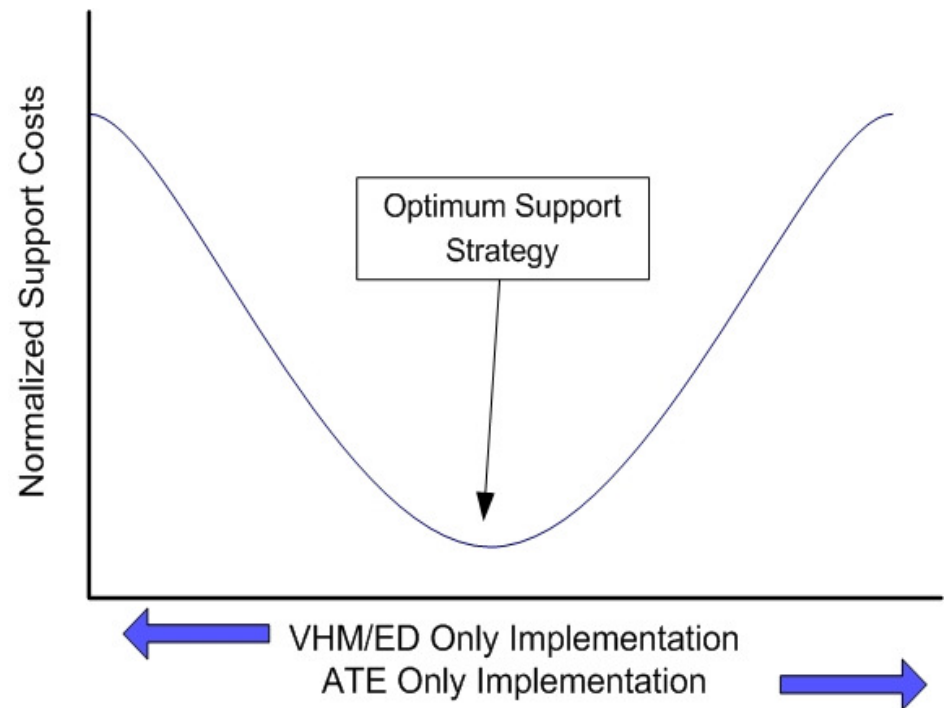
- VHM has Provided Significant Benefit
 - On and At-Platform Diagnostic Labor < 50%
 - Time to Diagnose <30%
 - Ambiguity Size Reduction (Variable, but Exists)
 - Minor Reduction of NEOF on ATS (Not Quantified)

Results (to Date)

- ATS Still Required
 - Verify Failures and/or Repairs
 - Avoid Using the Weapon Systems as a “Hot Mockup” to Verify Repair or VHM Results
 - Some Testing Not Practical On-Platform due to Accessibility and Size/Weight/Power (SWAP)
- Slightly Reduced ATS Workload (Variable)
 - Not Really Quantifiable Due to Diversity of Factors

Results (to Date)

- The Use of VHM and ATS needs to take a Balanced Approach
- The Optimum Balance Depends on a Number of Variables
 - Design of the Platform and Effectiveness of VHM
 - Deployed Location and ATS Availability
 - Design Complexity/Technology of Platform
 - Etc.



Summary

- With Current Technology/Capability ED/VHM Requires Repairs to be Verified Off-Platform
- Studies Indicate Costs to Eliminate Off-Platform ATE and a Totally Comprehensive VHM Would
 - Add Prohibitive Size, Weight and Power (SWAP) to Platforms
 - Ultimately Be Unsuccessful Due to Accessibility of Signals While (LRU and SRU) Installed on Platform

Backup

Survey Form

- **Background**
 - POC/Company
 - VHM Target System (Description)
- **VHM Characteristics**
 - Embedded Diagnostics (Implementation)
 - VHM (Beyond just Diagnostics)
 - Include Prognostics
 - Upgrade to Legacy Implementation
 - New design VHM
 - Requirement for Enterprise Connectivity?
 - VHM Separate from Platform Development
 - Describe Weapon System I/F for ED/VHM (Bus, Test Connector, Etc.)
 - Other Comments Relative to VHM System Characteristics (System Complexity, Meas. Accuracy, etc.)

Survey Form - Cont

- **At-Platform Results/Impacts**
 - Operational Availability
 - Maintainer Skill Level (Requirement)
 - Improved Diagnostic Time on Platform
 - Improved Ownership Costs
 - Improved on-Platform Diagnostics
 - IA Issues for Enterprise Connection
- **Off-Platform Results/Impacts**
 - Number of Associated Off-Platform TPSs
 - Diagnostic Resolution (Ambiguity Group Size) Change
 - Diagnostic Time
 - Change to # of Maintenance Levels
 - Change to Fielding (# of) ATE