U.S. Marine Corps (Ground) Liaison Report

16 September 2018

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USMC ATE/TPS Overview

• General Purpose Automatic Test Systems (GPATS)
• Electronic Maintenance Support System (EMSS)
• Vehicle Automated Diagnostic System (VADS)
• Circuit Card Assembly (CCA) Test Station
• Ground Radio Maintenance Automatic Test System (GRMATS)
• Application Program Sets (APS)
• Planned and Ongoing Efforts
Systems Supported by GPATS

- **LAV-25A2**
  - Eight-wheeled amphibious armored reconnaissance vehicle built by GDLS Canada
  - Electric-Drive turret
  - US and FMS
  - Items tested: Turret electronics

- **LAV-ATA2**
  - LAV with Anti-Tank Weapon System
  - Items tested: Turret and missile electronics

- **M1A4 Saber**
  - Improved Target Acquisition System (ITAS)
  - Anti-tank missile system
  - Replacement for legacy TOW2
  - Items tested: Target Acquisition Subsystem, Fire Control Subsystem, TOW Interface Unit, Position/ Attitude Determination System, Vehicle and A/C power units, cables.
Systems Supported by GPATS

- AN/TSC-181B Very Small Aperture Terminal (VSAT)
  - Integrated Commercial Off-the-Shelf (COTS) satellite communication (SATCOM) system
  - Operates in Ka, Ku and X-Band
  - Fielded in Small, Medium and Large variants
  - Items tested: 21 total LRUs across all variants

- Lightweight M777 155mm Howitzer
  - USMCs primary indirect fire weapon system
  - Utilizes a Digital Fire-Control System
  - Items tested: All DFCS LRUs
Systems Supported by GPATS

• Electro Optics
    ▪ Thermal Devices
    ▪ Image-Intensified (I²) Devices Enhanced Night Vision Goggles
    ▪ Laser designators, illuminators and aiming devices
    ▪ Laser Rangefinders
    ▪ Non-lethal devices (i.e. dazzlers)

UUT Examples:
  ▪ AN/PAS-22 Long Range Thermal Imager
  ▪ AN/PAS-13D Heavy Weapon Thermal Sight
  ▪ AN/PAS-28 Medium Range Thermal Bi-ocular
  ▪ AN/PVS-24A Individual Weapons Sight Image Intensifier
Systems Supported by GRMATS

- **USMC Tactical Radios**
  - PRC-117F/G Harris Multiband Manpack
  - PRC-150 Harris Falcon II Manpack
  - PRC-148 Thales Multiband Inter/Intra Team Radio (MBITR)
  - PRC-152A Harris Falcon III SDR

- **Tactical Remote Sensor System**
  - Provides ground surveillance for continuous, unattended, remote, all-weather detection, location determination, and monitoring of enemy activity
  - Originally supported by a variant of the GRM-122
  - Items tested: RCVR/XMTRs, Imager, Signature Data Recorder, VHF Preamp
GPATS Radio Frequency (RF) Variant

- AN/USM-717(V)2
  - VIPER/T (Astronics) RF Variant
- AN/USM-657B(V)2 RF
  - TETS (ManTech) RF Variant
- Systems are form, fit, functionally the same
- Support Test Program Sets that require RF capabilities in addition to analog/digital
- (134) systems deployed for USMC users
GPATS

GPATS Electro-Optic (EO) Variant

- AN/USM-717(V)3
  - 76 systems deployed
- Consists of a core test system with a separately managed EO subsystem
- Supports testing of multiple EO devices:
  - Infrared (IR) and Image-Intensified (I2) night vision devices
  - Laser designators, illuminators, laser aiming devices, and laser range finders.
- (75) total EO systems deployed for USMC users
GPATS Modernization Program

- Acquisition program initiated to address current and anticipated obsolescence for GPATS (TETS and VIPER/T)
- Common Instrument Controller (CIC) Upgrade
  - Replace current controller (laptop/docking station) with a modern solution
  - Contract wrapping up to provide two first article units and 258 production CICs
    - 230 units delivered with remainder by month end Sep
- Transition to MS Windows 10
  - Integration effort in progress by USMC Albany
- Graphical User Interface (GUI) Update
- EO Modularization
  - Field calibration capability
  - Downsized EO capability
• GPATS Modernization Program (Cont’d)
  – Radio Frequency subsystem capability enhancement
    • R&D effort underway to externalize the RF subsystem
    • Increase RF test capability to 40GHz range
    • RFP released through Picatinny for integration effort
  – PDU Replacement
    ▪ Reduce size and weight
    ▪ Power system using 120VAC 20A circuit
    ▪ Address safety concerns
  – Eliminate Secondary Chassis
    • VXI Carrier Card Insert
    • PXI instruments
  – GPATS Additional Systems
Electronic Maintenance Support System (EMSS)

- Program Description: EMSS provides a rugged, lightweight, one-man portable maintenance aid designed to enhance combat service support to MAGTF forces in both deployed and garrison environments. EMSS provides the maintainer with networked tools and electronic information which enables sustained performance and readiness of weapons systems. EMSS provides diagnostic capabilities, access to technical information, and access to GCSS-MC when connected to the MCEN-N.

**CURRENT CAPABILITY:**
- One-Man Portable Maintenance Aid
- External Equipment Hardware Interfaces
- Test and Diagnostics
- Displays Technical Data
- Support Maintenance Mentoring
- Network Connectivity

**FUTURE CAPABILITY:**
- Software Update Service
- CBM+ Enabler
- Integrate software to replace the Vehicle Automated Diagnostic System

**SUPPORTED OCCFLDS:**
EMSS serves as an At-Platform maintenance aid for the following MOSs:

**Current (legacy):** Fielded 2300
- 2141 AAV Mechanics
- 2147 LAV Mechanics
- 2146 Tank Mechanics
- 2171 Electro-Optical Maintenance Repair
- 3521 MT Mechanics

**(New Program Of Record) – ACAT IV(M): Add MOSs:**

**Total fielding of 10,000**
- 11XX (Utilities Maintenance) in FY21
- 13XX (Engineer Maintenance) in FY21
- 28XX (Ground Electronics Maintenance) TBD
- 59XX (Electronics Maintenance) TBD
VADS is a lightweight, portable diagnostic system of modular design that is used to perform intrusive diagnostics on diesel engines, transmissions, central tire inflation, anti-lock braking, and other vehicle data bus systems. The vehicle communication interface is called the Test Adapter Vehicle (TAV) that is interfaced with an instrument controller with available USB port, DVD drive, Diagnostic Software and Windows based operating system. This is combined with a complete set of interconnect cables and transducers/adapters in one weather resistant transit case.
### VADS
Weapon Families/ Weapon Systems Supported

- **“E” TAMCN ORDNANCE PLATFORMS**
  - LAV
  - AAV
  - M88 TRACKED RECOVERY VEHICLE
  - HIMARS

- **“B” TAMCN ENGINEER PLATFORMS**
  - ATC / MAC 50
  - MCT
  - TRAM
  - 120M GRADER
  - WTS SCRAPER
  - STREET SWEEPER
  - BHL
  - MMV
  - BUFFALO
  - MTL
  - HUSKY
  - HYEX
  - AMC
  - M9 ACE
  - AMMPS GENERATORS

- **“D” TAMCN MOTOR TRANSPORT PLATFORMS**
  - MTVR
  - LVSR
  - COUGAR
  - MATV
  - JLTV
  - P19R
  - MTVR WRECKER
  - LVSR WRECKER
  - HMMWV
System Description and Capabilities

The CCA Test Station features a variable range parameters resulting in hundreds of voltage, source resistance and frequency combinations. The CCA Test Station uses a color, touch screen LCD for control of features such as range configuration, front panel pin selection and Channel A/B settings. The CCA Test Station LCD provides a very fast screen refresh rate for quick screening of component pins and display the A and B channel signatures at the same time (A+B mode). The built-in Pulse Generator enables technicians to dynamically test gated devices such as SCRs, TRIACs and relays. The system is employed by MOS 21XX, 28XX, and 59XX maintenance communities.

Program Description

- Due to obsolescence issues, the fielded legacy CCA Test Station (TAMCN A7501; Model AN/USM-674) is no longer supportable
- PfM LCES, PM SMS intends to execute an AAP to replace one for one the AAO of legacy CCA Test Station and field the replacement system (Model AN/USM-726) under MARCORSYSCOM Order 5000.4 “Modification to Systems” dtd 26 Sep 17
- The Navy is the PICA, and the USMC is the SICA for the CCA Test Station procurement
- PM SMS intends to procure off the Navy contract for the replacement system by FY20; the FFP IDIQ contract is to be awarded by 4QFY18
- Total cost of the program for PM SMS will be ~$4.8M to replace the AAO of ~146 (131) with a unit cost of ~$19K

Draft Program Schedule

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
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<tbody>
<tr>
<td>Program Initiation (Proposed AAP)</td>
<td>4QFY18</td>
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<tr>
<td>MS C</td>
<td>2QFY19</td>
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<tr>
<td>Full Rate Production (FRP)</td>
<td>3QFY19</td>
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<td>Fielding Decision</td>
<td>4QFY19</td>
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<tr>
<td>IOC</td>
<td>2QFY20</td>
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<tr>
<td>FOC</td>
<td>2QFY21</td>
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**Program Documentation**

- Requirements Documents:
  - SON Letter of Revalidation (LOR) dtd 12 Jun 18
  - Tools and Test Equipment CDD dtd 2 Mar 17
  - Statement of Need (SON) dtd 25 Mar 08
- Program Description: The Circuit Card Assembly (CCA) Test Station is a shelter mountable unit that provides the capability to capture, digitize, and store signatures of known good components for reference in the test of similar CCAs and electronic modules for out of tolerance, deteriorating, or defective components on a wide variety of weapon systems.
- The CCA Test Station consists of a Huntron Pro-Track Tester, PC controller (Win 10), and accessories

**Program Status**

- ACAT & Date of Designation: AAP
- MDA: PIM, LCES
- Date of most recent APB: To be completed prior to MS C
- IOC Date/FOC Date: 2Q FY20/ 2Q FY21 (PM Estimates)
- Approved Acquisition Objective (AAO):
  - Quantity: 131
  - Funded to: 131
- Accomplishments:
  - None
- Issues:
  - None

**Program Schedule**

![Program Schedule Table]

Last Update: 16 Aug 2018 / Funding IAW NC-20
Ground Radio Maintenance Automatic Test System (GRMATS)

- AN/USM-718A
- AAO reduction (562 to 335) in order to align systems primarily with intermediate level maintenance activities
- Hardware upgrade to I7 processor and SSD in FY18
- SW upgrade in FY18
• Currently Fielded GRMATS Application Program Sets
  – AN/PSM-127 – Ground Radio Application Program Set (GRAPS) – Multiple Software-Defined Radio System Components
GRMATS Application Program Sets

- **Ground Radio Application Programs Sets (GRAPS)**
  - GRAPS are essentially TPS kits used in conjunction with AN/USM-718A GRMATS for testing USMC tactical radios
  - AAO reduction to 224
  - Tests PRC-152, PRC-150, PRC-148, PRC-117F and vehicle amplifiers
• TRIAPS (Tactical Radio IMA Application Program Set
  – AAO of 61 only at intermediate level
  – Fielded as COTS solution for PRC-117G and vehicle amplifier
  – Configuration upgrade in FY18 to streamline testing and hardware
  – Eventual AAO to match GRMATS as replacement for GRAPS as new radios are fielded
  – Expandable for testing of other radios
  – Includes laptop, power supply, RF attenuators, power sensor, various interface cables
Currently Fielded GPATS Application Program Sets

- AN/PSM-112 - LAV-AT (Legacy) LRU Diagnostics
- AN/PSM-115 - AAV MSQ-115 Diagnostics
- AN/PSM-117 - Handheld and Weapon-Mounted Optics/ Laser Devices
- AN/PSM-118 - LAV-25 Chain Gun Functional Test
- AN/PSM-119 - LW 155 LRU Diagnostics
- AN/PSM-123 - LAV-25A2 LRU Screening/ Diagnostics
- AN/PSM-120 - LAV Instrument Panels/ Heads-Up Display Diagnostics
- AN/PSM-129 - Saber Anti-Tank Weapon System LRU Diagnostics
- AN/PSM-130 - LAV-25A2 CCA Diagnostics
- AN/TSM-220 - Power Systems (Power Supplies, Conditioners, Chargers)
Current Efforts in Progress

– AN/PSM-126 Very Small Aperture Terminal (VSAT) LRU APS
  - 21 new TPSs
  - Full-rate production in progress (58 units)
  - Equipment fielding underway
– AN/PSM-119 Lightweight 155 Howitzer Digital Fire Control System (DFCS) LRU APS
  - TPS upgrades in progress at ATSD Picatinny Arsenal, NJ
– AN/TSM-223 Light Armored Vehicle – Anti-Tank Weapon System (LAV-ATWS)
  - 15 new TPSs
  - Full-rate production in progress (21 units)
  - Fielding planned for Mar 2019
Current Efforts in Progress (Cont’d)

- AN/PSM-117 Handheld and Weapon-Mounted Optics/ Laser Devices - (Additional TPSs )
  - Effort underway to develop TPSs for the AN/PAS-13G with ballistic capability and the STORM Laser Range Finder (LRF). Both components of the Shoulder-Mounted Anti-Tank Weapon (SMAW) Mod 2
  - Effort underway to develop TPSs for the Scout/Squad Sniper Laser Range Finder
Planned and Ongoing ATS Efforts

• Planned ATS Efforts
  – Advanced Combat Vehicle (ACV)
    ▪ Working with the ACV Program Office to identify test requirements for electronic and electro-optical components.
  – LAV Driver’s Instrument Panel and Slip Ring Upgrades
    ▪ Executing ECPs to add new TPSs to existing AN/PSM-120 and PSM-123 APSs to support obsolescence upgrades to legacy LAV platforms.
  – Wi-Fi Application Module (WAM)
    ▪ At-system test capability for system fault isolation
  – Handheld Radio Test Set Replacement
    ▪ RFI (Sources Sought) to be released in Sept 2018 requesting Industry feedback on the purchase description for the replacement solution for the legacy 3515N Handheld Radio Test Set
  – RF-7800I Intercom System and AN/PRC-158 Radio System Support
    ▪ Conducting research to identify viable organic test solutions.
  – Stand-Alone Controller for Electro-Optic Testing
    ▪ RFI (Sources Sought) to be released in Sept 2018 requesting Industry feedback on a stand-alone solution to support USMC EO test requirements.
Planned and Ongoing ATS Efforts

- **LAV Foreign Military Sales (FMS) Support**
  - Providing acquisition, technical and logistical support for the procurement of multiple ATS solutions to support FMS Light Armored Vehicle Platforms
    - (2) First Article Test (FAT) VIPER/T units, and (4) production VIPER/T units, and (4) LAV-25A2 APS units procured/delivered
    - Fielded initial VIPER/T and APS units to FMS customer during Sep 2017
    - Production of (13) additional build-to-print VIPER/T units is in progress
    - Completed development of (17) new test programs for the LAV-Anti-Tank Guided Missile (LAV-ATGM) weapon system at ATSD, Picatinny. Full rate production of TPS hardware is in progress.
    - Contract awarded to develop and implement a dual-language user interface capability for FMS VIPER/T and associated TPSs

- **PMO is developing an ATS portfolio life cycle management plan and road map for FY 2020 through FY 2035**
  - Completed a Business Case Analysis (BCA) to identify and compare potential courses of action.
  - Developing required JCIDS requirements documents
  - Identifying and mapping requirements for the next generation of Marine Corps Automatic Test Systems
Questions?