



U N I T E D S T A T E S M A R I N E C O R P S

# **U.S. Marine Corps (Ground) Liaison Report**

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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
  - Testing of multiple handheld and weapon-mounted optics and laser devices.
    - Thermal Devices
    - Image-Intensified ( $I^2$ ) 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



HAND-HELD PROGRAMMER-MONITOR  
(HHPM)



ENCODER-TRANSMITTER UNIT - II  
(ETU-II)



SIGNATURE DATA RECORDER - II  
(SDR-II)



IMAGER-II



RT-1847 RADIO REPEATER

# GPATS

## 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**
- **Consists of a core test system with a separately managed EO subsystem**
- **Supports testing of multiple EO devices:**
  - Infrared (IR) and Image-Intensified (I<sup>2</sup>) night vision devices
  - Laser designators, illuminators, laser aiming devices, and laser range finders.
- **(75) total EO systems deployed for USMC users**





# GPATS

- 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
    - 258 production CICs delivered
  - Transition to MS Windows 10
    - Integration complete by USMC Albany
  - Graphical User Interface (GUI) Update
  - EO Modularization
    - Field calibration capability
    - Downsized EO capability



# GPATS

- 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
    - Integration effort currently in process
  - 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
    - Procuring (11) additional GPATS and EO subsystems to support contingency operations

# EMSS

## 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

# Vehicle Automated Diagnostic System (VADS)

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.



B70002B Analyzer Set, Vehicular



D70002B Analyzer Set, Vehicular



E70002B Analyzer Set, Vehicular



# 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



# VADS



# Circuit Card Assembly (CCA) Test Station

- Provides the capability to capture, digitize, and store signatures of known good CCA components, and to use those signatures to perform comparative testing on components of CCAs determined to be faulty.
  - Static test capability – used to narrow down ambiguity groups identified through diagnostic (dynamic) testing via ATE/ TPS.
- The CCA Test Station consists of a Huntron Pro-Track Tester, PC controller, and accessories
- Tech refresh of controllers to Win10 compliant laptops is underway
- Upgrade of legacy Huntron Testers to the Model 32 (AN/USM-726) will be executed in FY 20



**CCA Test Station –  
AN/USM-726 (new)**



# GRMATS

## Ground Radio Maintenance Automatic Test System (GRMATS)

- **AN/USM-718A**
- **Used as a diagnostic tool for software defined radio testing**
- **Primarily used at intermediate level maintenance activities**
- **Systems upgraded with new I7 processors in FY18**
- **Currently exploring options for replacing legacy GRMATS systems**



AN/USM-718A (GRMATS 7200)



# GRMATS Application Program Sets

- Currently Fielded GRMATS Application Program Sets
  - AN/PSM-127 – Ground Radio Application Program Set (GRAPS) – Multiple Software-Defined Radio System Components
  - AN/TSM-221 – Tactical Radio Intermediate Maintenance Activity Application Program Set (TRIAPS) – AN/PRC-117G Radio and Vehicle Amplifier Unit (VAU)
  - AN/PSM-131 – Tactical Remote Sensor System (TRSS) LRU Diagnostics

# 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
  - Tests PRC-152, PRC-150, PRC-148, PRC-117F and vehicle amplifiers



# GRMATS Application Program Sets

- TRIAPS (Tactical Radio IMA Application Program Set)
  - Used only at intermediate level
  - Pure COTS solution for PRC-117G and vehicle amplifier
  - Will expand to test future NSA crypto-compliant, software radios
  - Includes laptop, power supply, RF attenuators, power sensor, interface cables



# GPATS Application Program Sets

- Currently Fielded GPATS Application Program Sets
  - 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-125 - Very Small Aperture Terminal 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)
  - AN/TSM-223 - LAV-Anti Tank LRU Diagnostics



# GPATS Application Program Sets

- Current TPS Efforts in Progress
  - AN/PSM-119 Lightweight 155 Howitzer Digital Fire Control System (DFCS) LRU APS
    - TPS upgrades in progress at ATSD Picatinny Arsenal, NJ
  - AN/PSM-120 - LAV Instrument Panels/ Heads-Up Display Diagnostic Upgrade
    - In response to LAV platform upgrade
  - AN/PSM-123 LAV-25 LRU Diagnostic Upgrade
    - In response to LAV platform upgrade
  - AN/PSM-117 Handheld and Weapon-Mounted Optics/ Laser Devices - (Additional TPSs)
    - Effort underway to develop TPS 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 vehicle electronic and electro-optical components.
  - Handheld Radio Test Set Replacement
    - RFI (Sources Sought) released Sept 2018 requesting Industry feedback on the purchase description for the replacement solution for the legacy 3515N Handheld Radio Test Set. Responses were received and are under evaluation.
  - Stand-Alone Controller for Electro-Optic Testing
    - RFI (Sources Sought) released Sept 2018 requesting Industry feedback on a stand-alone solution to support USMC EO test requirements. Responses were received and evaluated.

# Foreign Military Sales (FMS)

- LAV 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, (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
      - 4 VIPER/T systems completed/delivered Feb 2019
      - Planned fielding/training during Spring 2019
    - Completed development of (17) new test programs for the LAV-Anti-Tank Guided Missile (LAV-ATGM) weapon system. Full rate production of TPS hardware is in progress.
    - Effort underway to develop and implement a dual-language user interface capability for FMS VIPER/T and associated TPSs
    - Task order awarded to procure additional spare parts for VIPER/T and TPS sustainment

Thank You!

**Questions?**