



MARINE CORPS SYSTEMS COMMAND
HOME OF THE MARINE CORPS ACQUISITION PROFESSIONAL

United States Marine Corps ATS

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Weapon System
Secrep
Components



Application
Program Set HW
and SW Interface



Automated Test
System





- **Reducing maintenance cost**
 - Utilizing trained MOS Marines vs. contractor support
 - Enabling systems to be tested/ repaired as far forward as possible
 - Providing a screening capability for UUT's to eliminate NEOFs and ensure Code A condition
 - Reducing shipping cost
 - Reducing GPETE
 - Providing one General Purpose ATE solution vs. multiple platform testers
- **Reducing maintenance repair time**
 - Repair vs. evacuate
 - Dynamic testing to rapidly isolate fault
- **Reducing foot print**
 - General Purpose ATE platform to support multiple Weapon System Platforms vs. multiple special purpose test equipment
- **Commonality across the USMC and within DOD**
 - Marine maintainers will operate & maintain common test platform across entire maintenance community
 - Adhering to DOD ATS guidelines for automated test programs



TETS/VIPER-T → GPATS --- Large ATS
GRMATS --- Small ATS (Comm)
EMSS --- Small ATS (Weapon Sys)

Goals :

- Develop Commonality across each ATS platform
 - Common Instrument Controller
 - Upgradeable
 - Manage IA requirements
 - Common Software (meets IA requirements)
 - Operating System
 - Test Program Runtime/Development Environment
 - Allows for:
 - Hardware cost and integration savings
 - Reuse of software/Test Program Code
 - User familiarity
 - Improved Configuration Management
- Modular Design configurable to support specific user requirements
 - Test Resources fielded based on support requirements



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Today 1990's Technology



USB Interface

PCI MXI-2 Controller

PCI Serial Interface

PCI Ethernet Interface

PCI Card GPIB Interface

VXI Counter Timer

VXI Medium Frequency Switches

Sunset

VXI PCI to MXI-2 Interface

PCI-to-PCI Expansion

VXI High Frequency Switches

VXI Arbitrary Function Generator

PCI Card 1553 Interface

VXI Multi-purpose Switches

VXI Digital Test System

DMM

PCI-PCM Carrier

VXI Local Oscillator

Windows XP Operating System

VXI Microwave Synthesizer

VXI Oscilloscope

VXI Radio Frequency Down Converter Power Meter

VXI Electronic Digitizer

Power Sensor

PCI Analog Video Capture

IC Controller Docking Station

Instrument Controller Laptop

32 bit PCI Expansion Backplane

End of Life



Large System Platform has Major Obsolescence issues

How do we
mitigate the issues?



**Replace and/or Tech
Refresh**



The periodic replacement of Commercial Off-The-Shelf (COTS) components within a DoD system to assure continued supportability during the system life cycle.

- **Technology upgrades, refreshers, and insertions?**
- **“Modernization through Spares”**
- **Technical obsolescence risk strategy**
- **Replacement of DoD Software development tools with the latest tools**
- **Parts obsolescence strategy**
- **Procurement strategy**



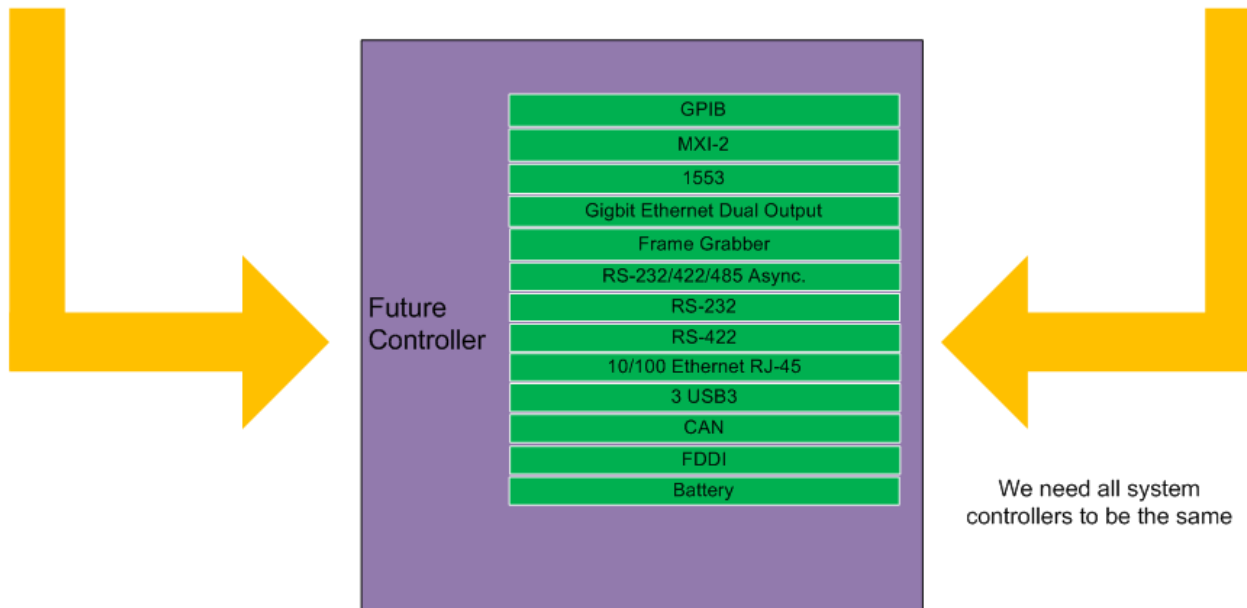
Current



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IC REPLACEMENT



We need all system controllers to be the same

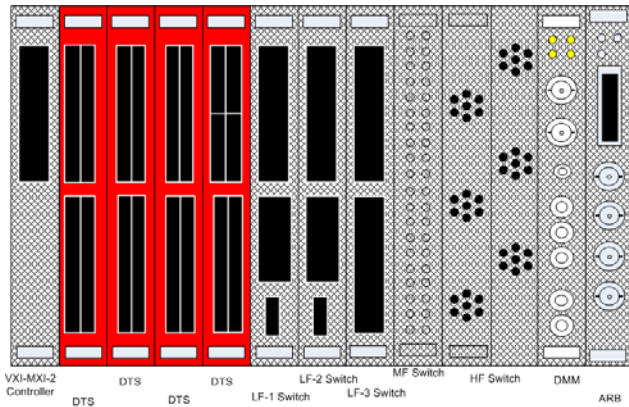


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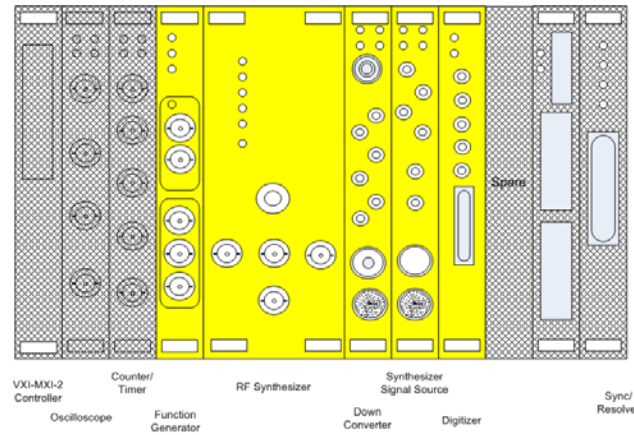
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IC REPLACEMENT

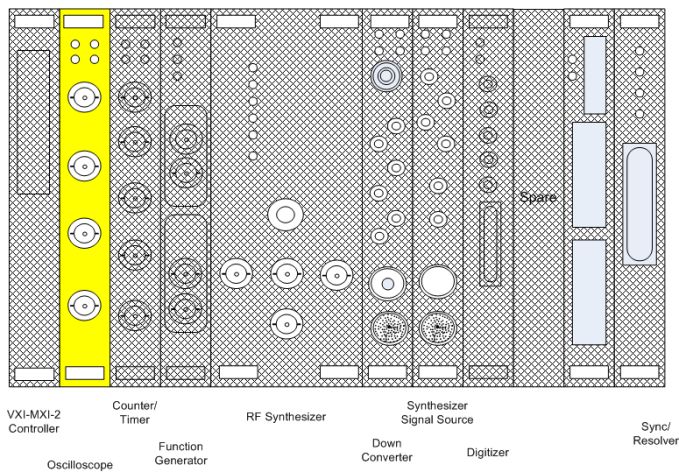
Digital Test System



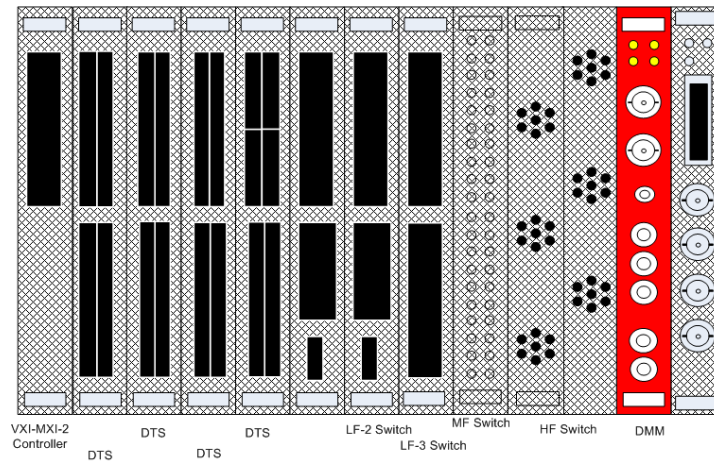
RF Replacement



Oscilloscope Replacement



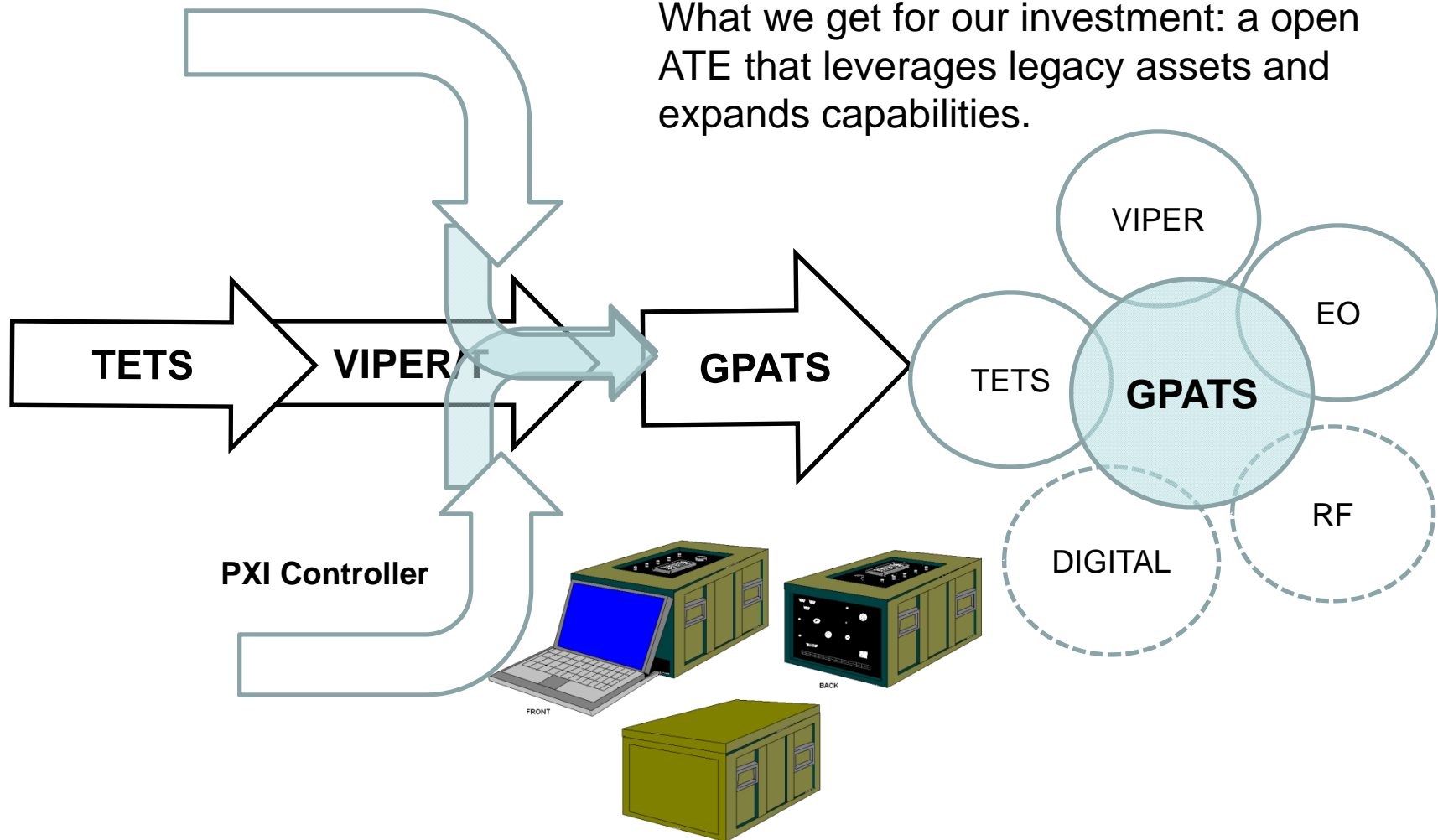
Digital Multimeter Replacement





PXI Standalone EO

What we get for our investment: a open ATE that leverages legacy assets and expands capabilities.



GPATS is the direct result of upgrades to the TETS/VIPER IC. It can stand on its own as ATE or act as a control for VIPER, TETS, EO and or any future ATE testers.

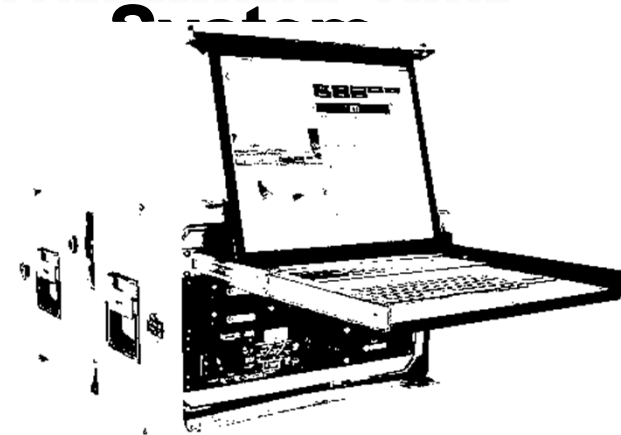


Third Echelon Test System



TETS

General Purpose Automatic Test System



GPATS



PROBLEM:

Technological advances in weapon system design and performance, coupled with impending obsolescence of fielded instrumentation, dictate that a next-generation test solution must be identified and employed in order to meet the demands of future combat systems.

BACKGROUND:

The Marine Corps Automatic Test Equipment Set (MCATES) Family of Systems (FoS) Analysis of Alternatives (AoA) identified a Hybrid tester using new technologies along with existing test assets as both an effective and affordable replacement to the existing MCATES. The current TETS and VIPER/T systems are based on late 1980s technology and are becoming increasingly difficult to support. By addressing obsolescence within the legacy systems with the proposed PXI technology, the Marine Corps will be capable of providing the required support to existing and future weapons systems.

PRODUCT / SOLUTION:

Build a modular test solution that can use the latest COTS standards while leveraging existing GOTS test assets



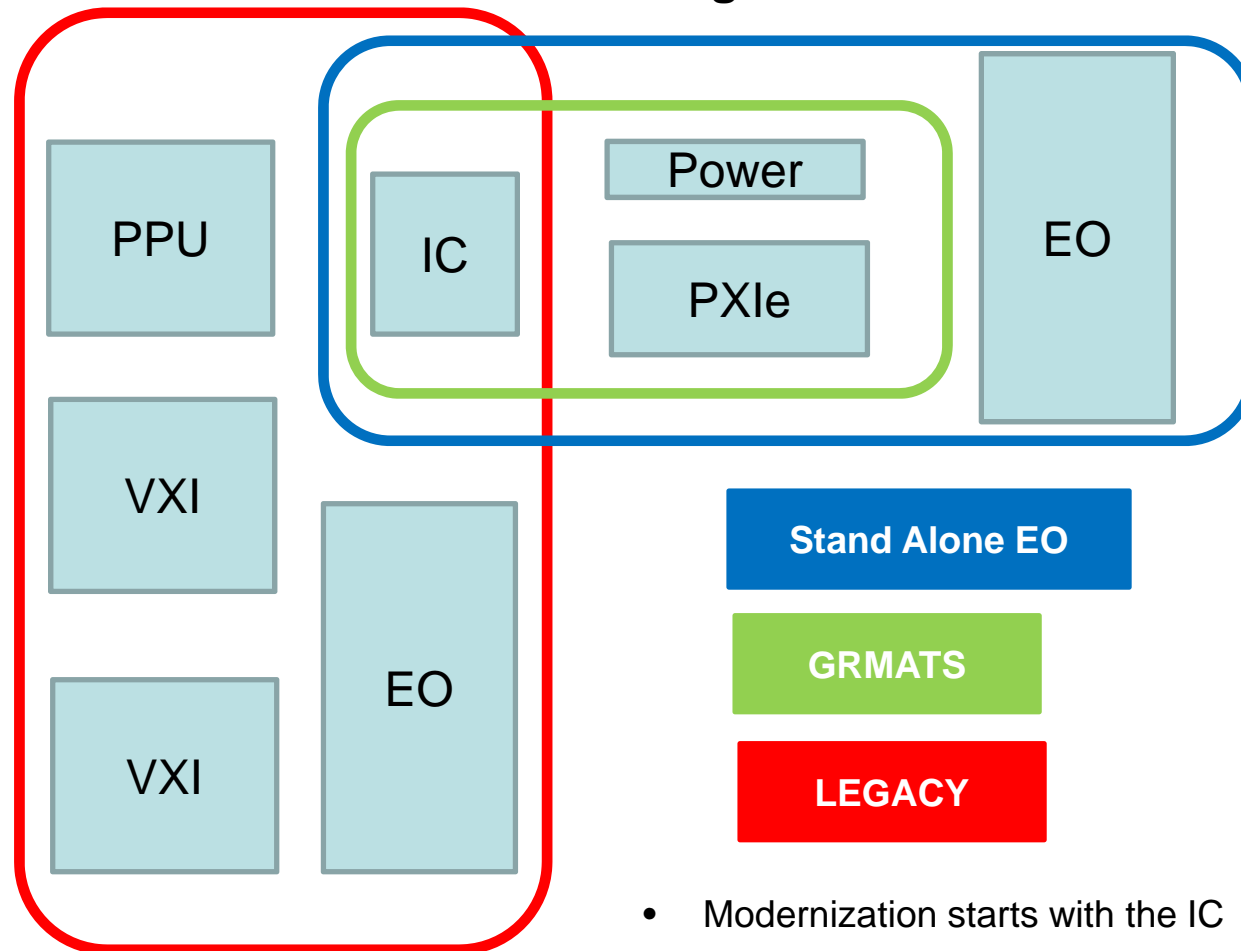
Approach:

- Procure an updated VIPER/T to meet LAV requirements
- Establish a future technology test bed
- Satisfy forward optics testing requirements through a stand alone Electro-Optic capability
- Implement alternative testing languages
- Address multiple operating systems



Future Test Activities

GPATS Configurations





PROBLEM:

An Operational need for a smaller footprint and additional assets to repair as far forward as possible.



BACKGROUND:

USMC TMDE Program Office determined from meetings with the EO community that a complete VIPER/T suite, strictly being used to support EO testing was an undue burden. A smaller test and optical control suite will provide additional testing capability.

Minimum capabilities needed to support a VEO-2 are:

Power supply to provide 28 VDC and 15 VDC to VEO-2

- Ruggedized laptop
- Timer/Counter card for laser measurements (currently supported in VIPER/T)
- Oscilloscope card for laser measurements (currently supported in VIPER/T)
- RS-170 video frame grabber (currently supported in VIPER/T)
- Programmable power supply for UUT power

PRODUCT / SOLUTION:

- Design and build of a Stand Alone controller and power supply for the VIPER and TETS/EO.
- Target is hand held optics, range finders and sights
- Smaller footprint will allow the capability to move to additional units.

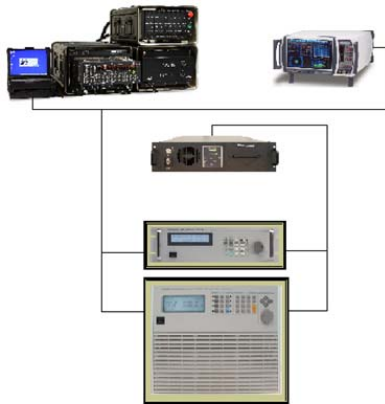
APPROACH:

- Contract to build prototypes for analysis and testing
- Design interface with full up VIPER system
- Verify functionality of current test programs.
- Define system location objective and workload



PROBLEM:

An Operational need for a capability to test and perform diagnostics on system power supplies



BACKGROUND:

USMC TMDE Program Office for ATE has determined a need to create a Power supply test capability that will support system Power Supplies, Uninterruptable Power Supplies (UPS), and Power Conditioners. This should be a modular test capability that is upgradeable with new hardware technology and flexible software options for easy programming of new power supplies, UPSs, and power conditioners.

PRODUCT / SOLUTION:

- Design and build of a power supply test module that can be integrated with our current and Future ATS systems .
- The Power Supply Test Module will consist primarily of a Programmable Power supply and a Programmable Load and will interface with the Core ATE systems for control , measurements, and diagnostics .

APPROACH:

- Contract to build prototypes for analysis and testing
- Design interface with VIPER ,GPATS, and EMSS systems
- Verify functionality of current test programs.
- Define system location objective and workload



Ground Radio Maintenance Automated Test System (GRMATS)

**2000's Technology
Small System Platform
for Communications**



- PXI Bridge
- PXI Synthesized LO
- LCD Display
- PXI DMM
- LXI
- PXI O-Scope
- PXI chassis
- PXI RF Receiver
- Linux OS
- Ethernet Interface
- Touch Sensor Screen
- Serial Rapid I/O (sRIO)
- Open Multimedia Application Platform (OMAP)
- Optional SATA Hard Drive
- Micro-TCA busses
- PCI Express (PCIe)
- Python language
- PXI RF Generator
- CORBA (Common Object Request Broker Architecture)

USB 2 Interface

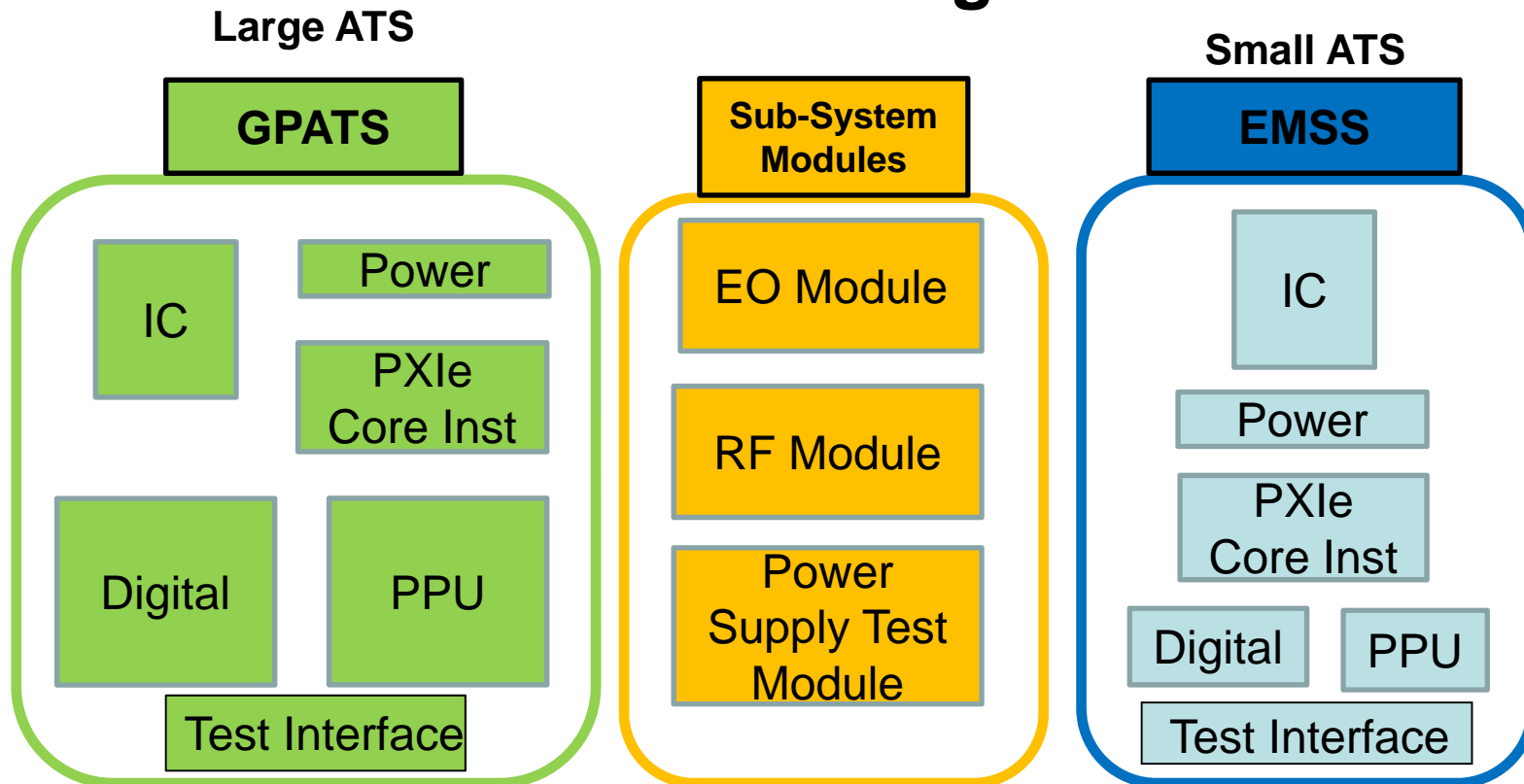
SBC (Single Board Computer)
PCBSBC

Sunset

**End of
Life**



GPATS Configuration



- Modernization starts with the IC
- Modular Sub-systems can be controlled by Large or Small Tester based on Application requirements



Electronic Maintenance Support System (EMSS)

- Currently 2000 Devices fielded with Interactive Electronic Technical Manuals (IETMs).
- Concept is to develop an At-System Test Capability designed to support field level maintenance, troubleshooting, and diagnostics.
- Test capability and diagnostics can be integrated with the IETMs
- Portable and Configurable to support multiple weapon systems to enhance readiness through system operational and functional testing.
- Can be connected to the Net to upload data and download updates.
- Concept is to evolve with the GPATS Framework



Current

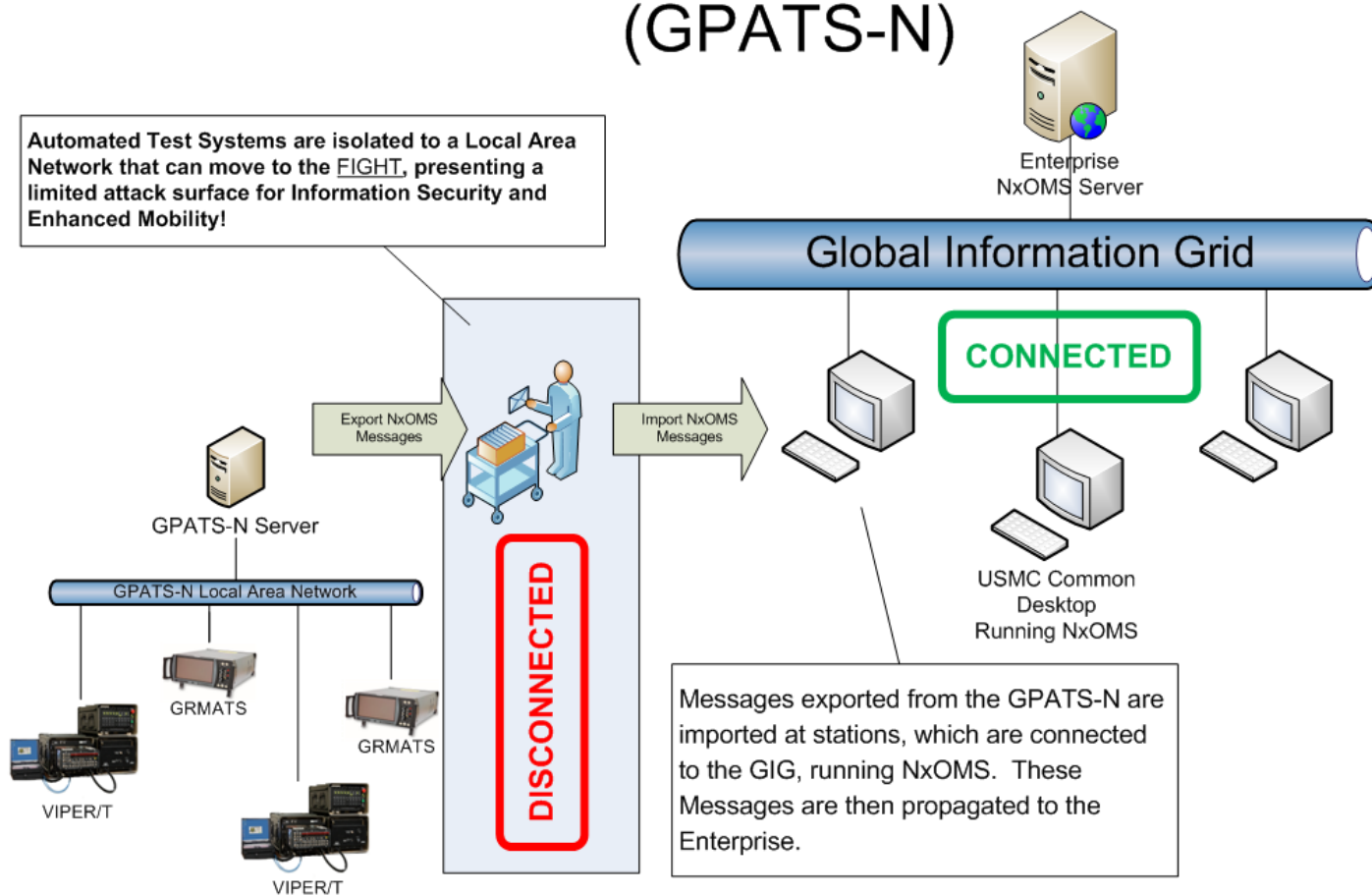


Concepts with
Test resource
modules



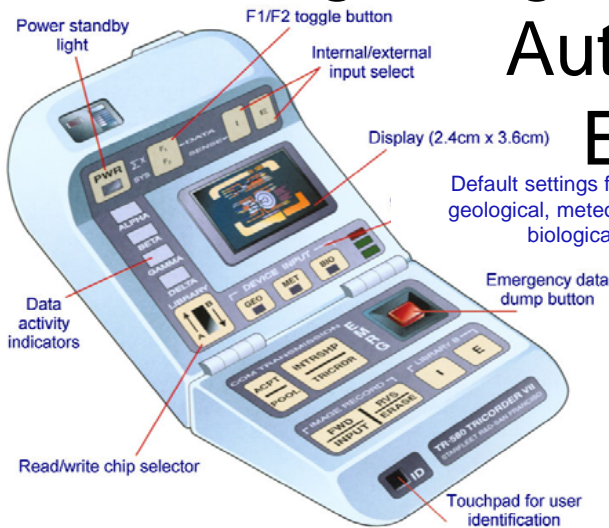


GENERAL PURPOSE AUTOMATIC TEST SYSTEMS – NETWORK (GPATS-N)





Long Range Future Marine Corps Automatic Test Equipment





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Questions ?