MARVIN TEST SOLUTIONS

A tradition of excellence

The Future Direction of Test, Maintenance, and Instrumentation – A Supplier's Perspective

AUTOTESTCON 2016

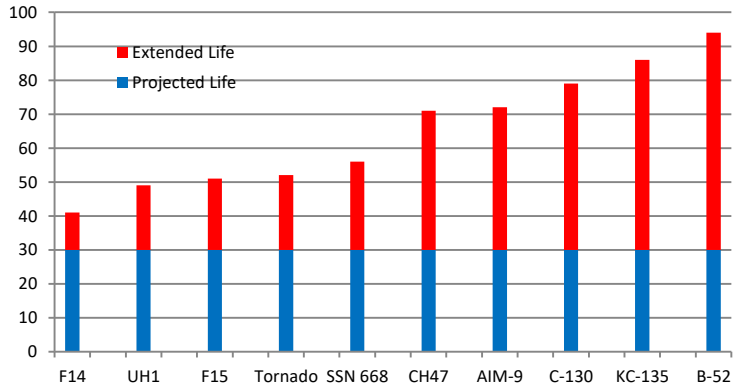
Executive Plenary Panel
Michael Dewey
Director of Marketing, MTS

Agenda

- Future direction of test (ATE):
  - Market forces / challenges
  - Test system architecture / hardware / software
- Maintenance trends in the M-A marketplace
- Instrumentation trends
  - Market trends
  - Technology enablers

ATE Trends & Challenges

- Long product life cycles & associated maintainability of test systems
  - Commitment on the part of suppliers to support products long term
  - Make compatibility a priority for next gen hardware and software products



- Cost of test, better use of test system capital, accelerate time to test
  - Adoption of scalable, common core test solutions – changes the paradigm from “one system does all” to “one scalable system does all”
  - Move from a singular solution to “right sizing” test solutions
  - Software tools & architecture: test executive, system simulation, ATML, XML, enterprise-wide standardization of tools and methods

ATE Trends & Challenges

- Complexity / technology of electronic products drives new test methods / techniques
  - BIT & JTAG continue to augment functional test
  - Increasing use of “user defined” test instrumentation based on FPGAs and user defined signal processing software
- ATE software:
  - How does the evolving cyber security requirements impact ATE systems and software?
  - Increasing interest in non-Windows based OS – primarily Linux & open source tools

Presidio Gen 2 Block IV/V automated test architecture represents a breakthrough in testing automation for production of Raytheon's SM-3 missile – *Military Aerospace Electronics, 8/18/16*

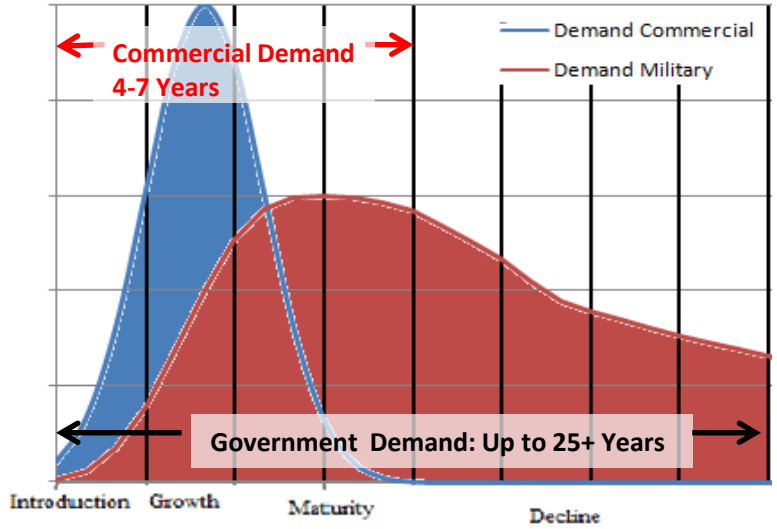
XILINX

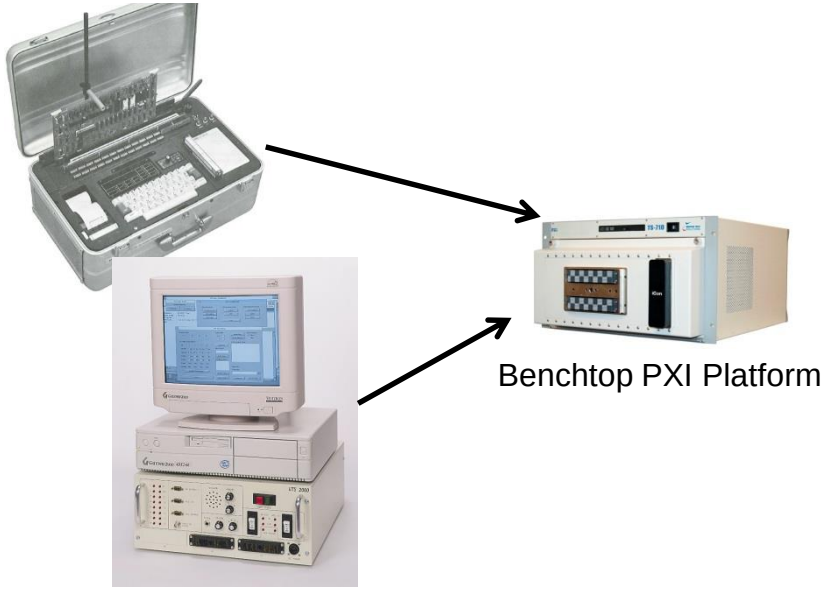
ALTERA

Linux

Maintenance Trends

- The need for long product life cycles continues to drive the requirement for repair of legacy products – maintaining or upgrading legacy test systems
- High cost of repair & obsolescence drives demand for more cost-effective depot and MRO test solutions
  - Adoption of alternate test platforms in place of obsolete and the mega-tester platforms
  - Software tools to facilitate test program migration
- Diagnostics continue to be a challenge for SRU level components



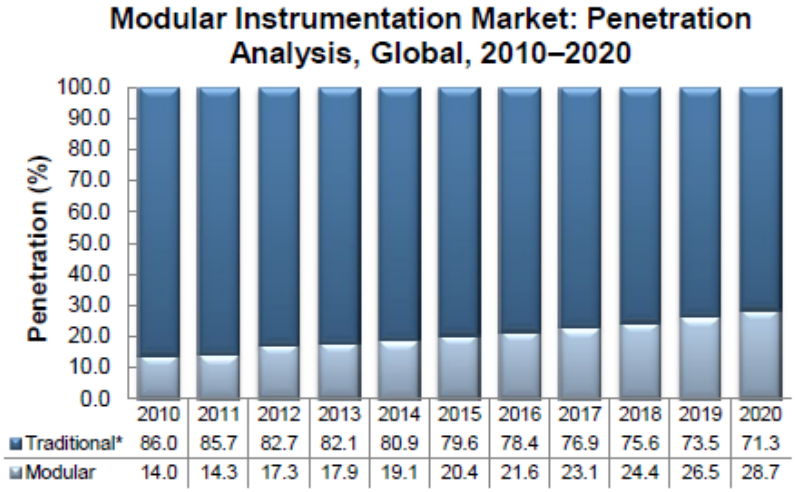


Maintenance Trends

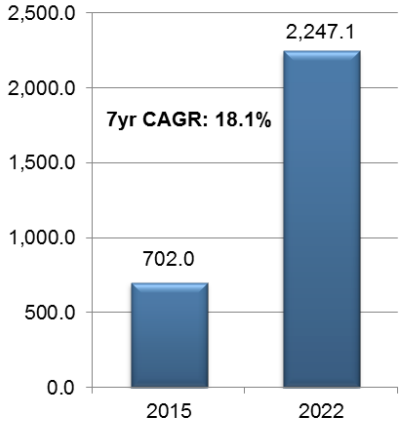
- Emergence of common test solutions / cross platform support at all levels of maintenance
  - BAT program – support 3 airframes with one test solution
  - Common solutions for weapon systems and multiple airframes
- More sophisticated electronics
  - I-level like test capabilities moving to the O-level; yielding better diagnostics, lower incidence of NFF, improved readiness
  - Increasing reliance on BIT with augmentation by “smart” test systems

Instrumentation Trends

- Modular instrumentation will continue to grow and take share from the "box" business
  - Complementary to the idea of a "scalable" test architecture
  - PXI platform still experiencing market growth of > 15% CAGR, $702M in 2015
  - Non power, DC – RF being addressed by card modular architectures
- Growth of LXI & USB for "box" applications
- Competitive market for modular instrumentation drives innovation and gives customers choices



Frost & Sullivan, 2016



PXI Sales, F & S, Aug. 2016

Enablers / Trends in Instrumentation

- Enablers:
  - High performance backplanes / infrastructure - e.g. PXIe, LXI, AXI, ATCA, multi-core processors, multi-computing
  - Performance FPGAs replacing ASICSs
  - Advanced / integrated components for RF and analog, software configurable instrumentation
- Value & Performance ↑
- Functional density (features / sq in) ↑
- Power & footprint ↓
- Desire by customers to adopt Linux or other non-Windows environments – vendor independent

Summary

- Offer test solutions that offer scalability for addressing simple to complex test applications
- Continue to innovate and expand modular instrumentation's capabilities based on end users' test needs
- Invest in software tools and capabilities that accelerate the time to test as well as facilitate support / migration for legacy test platforms
- Commitment to supporting long life cycles for software and hardware products

Thank You!