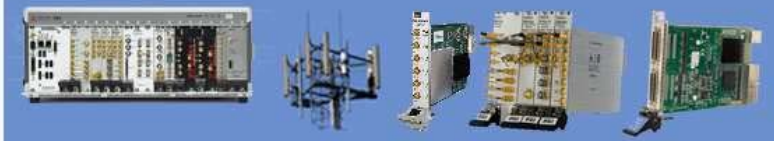
MARVIN TEST SOLUTIONS

PXI GROUP



Journée Technique PXI / PXI Express

17 Mars 2016 - NOVOTEL MASSY-PALAISEAU

La Simulation matériel et logiciel dans un système de test automatique

Victor Fernandes

Marvin Test Solutions

European Manager

The Marvin Group

MARVIN TEST SOLUTIONS

MLS MARVIN LAND SYSTEMS

FLYER DEFENSE

Le Groupe Marvin

Aircraft Armament Equipment

- Bomb Racks
- Ejector Racks
- Missile Rail Launchers
- Multiple Carriage Systems
- Pylons

Test & Support Systems

- Armament and munition Test Sets
- SMS Test Sets
- Flightline, I-level, and depot-level testers
- Production test equipment

Land Systems

- Mission Critical Equipment Trailers and Shelters
- Vehicle Environmental Systems
- Auxiliary Power Units
- Weapons Stations

Tactical Vehicles

- Light Strike Armored or Unarmored
- Rescue and Personnel Recovery
- Reconnaissance
- Anti-tank

Machining Tooling Prototype

- Armored Personnel Carriers
- MRAP
- Abrams
- Bradley
- FMTV
- JLTV
- Stryker

Total Solutions & Support Capabilities including repair, overhaul, upgrades, maintenance & training

Les clients

Military

U.S. Armed Forces and our allies

Aerospace

U.S. and Foreign Aerospace Firms

Manufacturing

Industrial and Semiconductor

Nos Solutions

- Solutions de Test Flightline

MTS-3060 SmartCan™	MT1888	MT3045 IRIS	AN/TMS-205
			

- F-16
- F-15
- F-35
- F-22
- A-10
- TA-50
- AH-64
- AH-1
- UH-60
- Tigre

- Solutions de Test Niveau intermédiaire

MTS-916	MTS-206	MTS-209	MTS-235
			

- F-16
- F-15
- F-35
- Supporte autres avions et munitions

Nos Solutions (cont.)

- Solutions de Test Dépôt

TS-376

TS-217

TS-201

- F-16
- F-15
- F-35
- Supporte autres avions et munitions

- Solutions de Test pour l'industrie

GBATS

GENASYS

TS-900

- Avionique, Défense , Semi-conducteurs et autres applications de test fonctionnel

Full Spectrum Product Portfolio

Supporting our customers with innovative products & systems

Hardware Building Blocks

Software Building Blocks

ATEasy

DIOEasy

WaveEasy

CalEasy™

ICEasy

Preconfigured Systems & Subsystems

Vertical Integration Offers a Range of Test Solutions

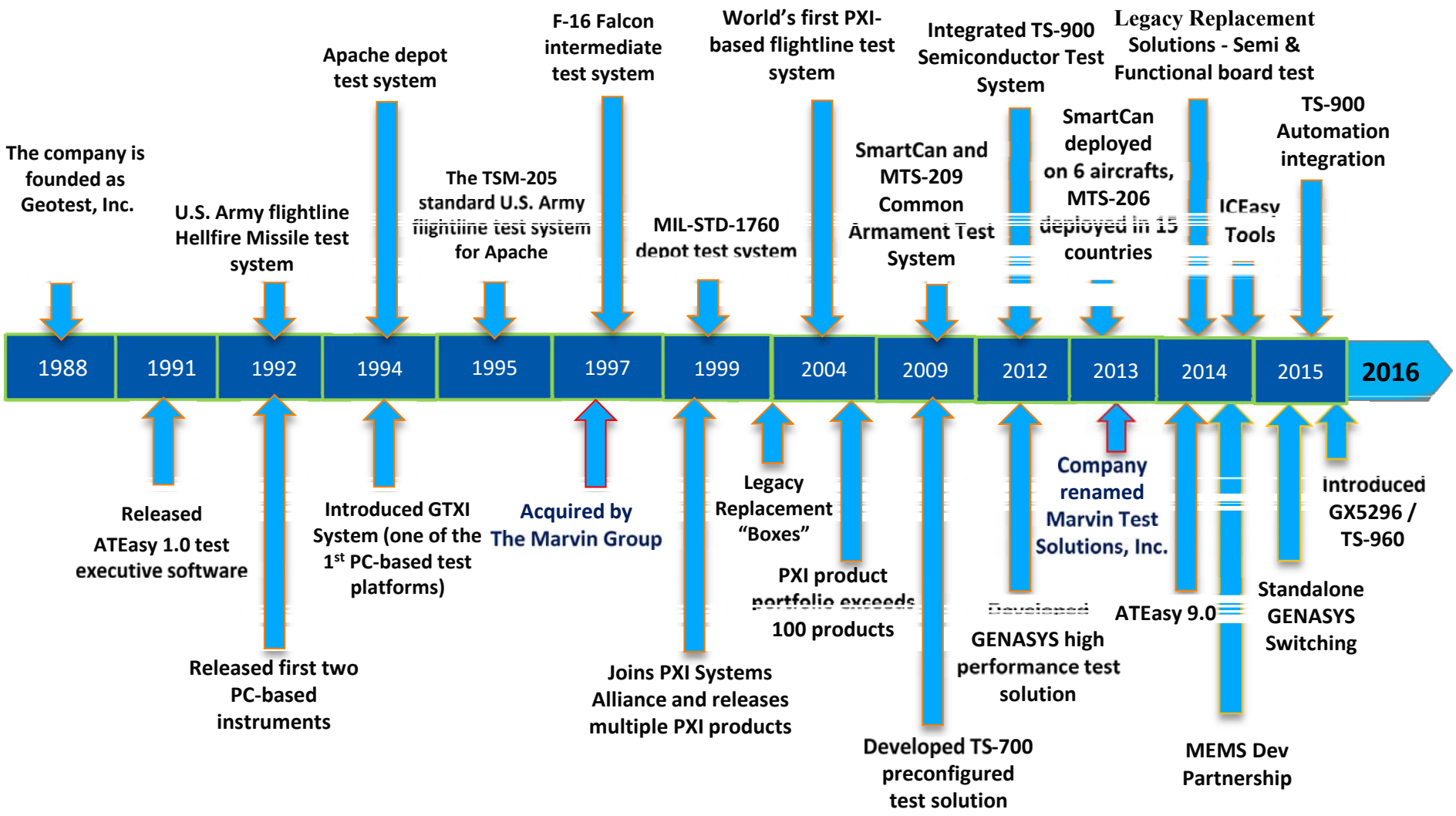
Supporting our customers with innovative Turn-Key test solutions

O-Level (Flight-Line)

I-Level (Back-Shop)

D-Level & Manufacturing

Over 25 Years of Innovative Test Systems



PXI Products

“Integrated” PXI Test Systems

TS-700 Series

Bench-top PXI-based testers for digital, avionics and mixed-signal test applications

TS-323 GENASYS

High performance mixed signal functional test system for production and depot applications

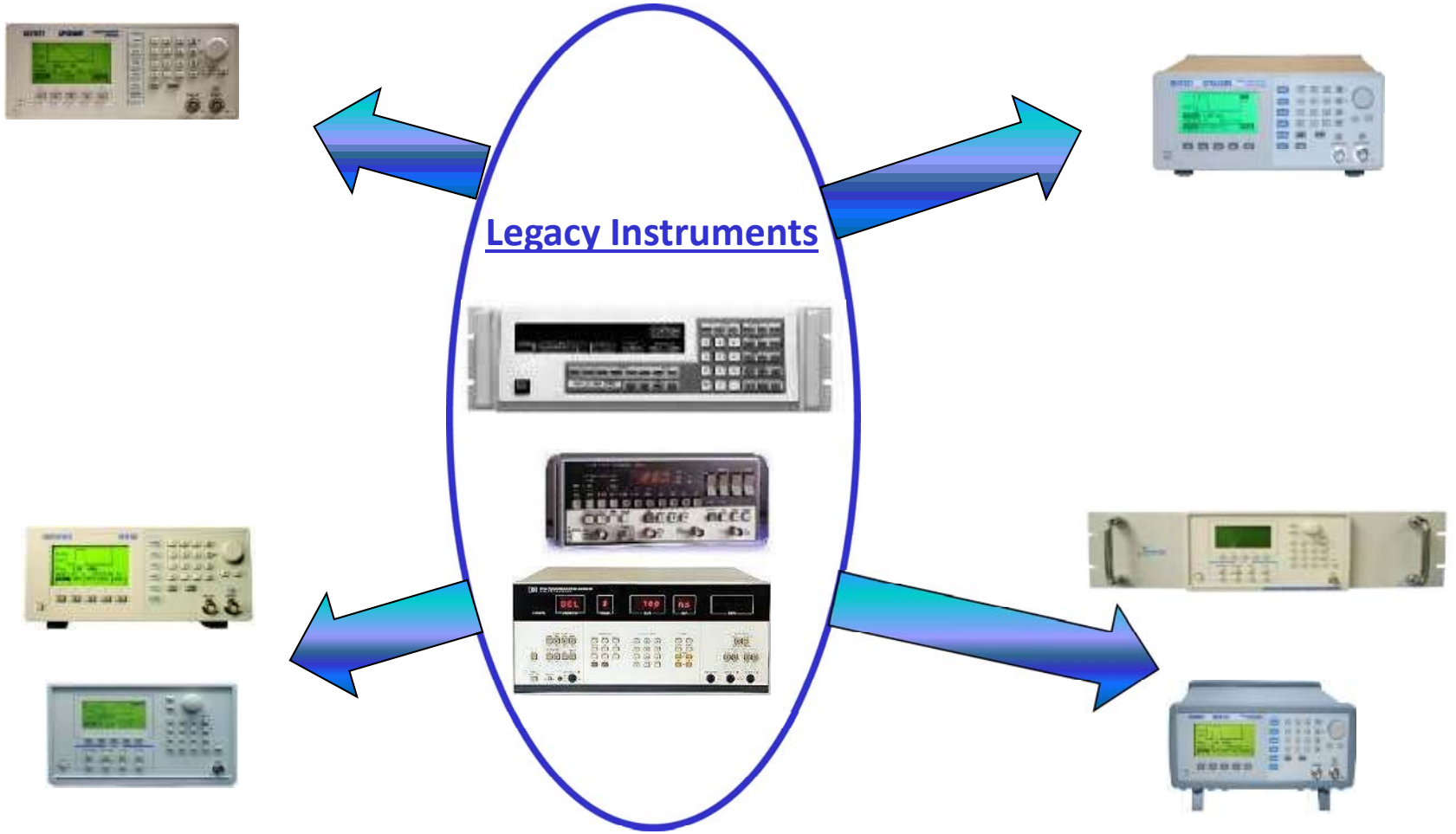
MTS-207 Platform

Ultra-rugged PXI platform for demanding field and flightline applications

TS-900 Series

High-performance semiconductor test system

Legacy Replacement Products



Software Tools Make A.T.E. Easy

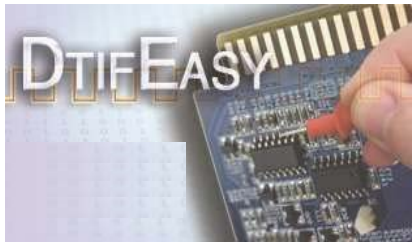
An analog waveform development tool

A digital vector editor for all MTS' high-performance digital I/O products

An integrated, open-architecture Test Executive and Development Suite for test applications deployed since 1991

Calibration and Verification software

A LASAR post-processor test and troubleshooting tool



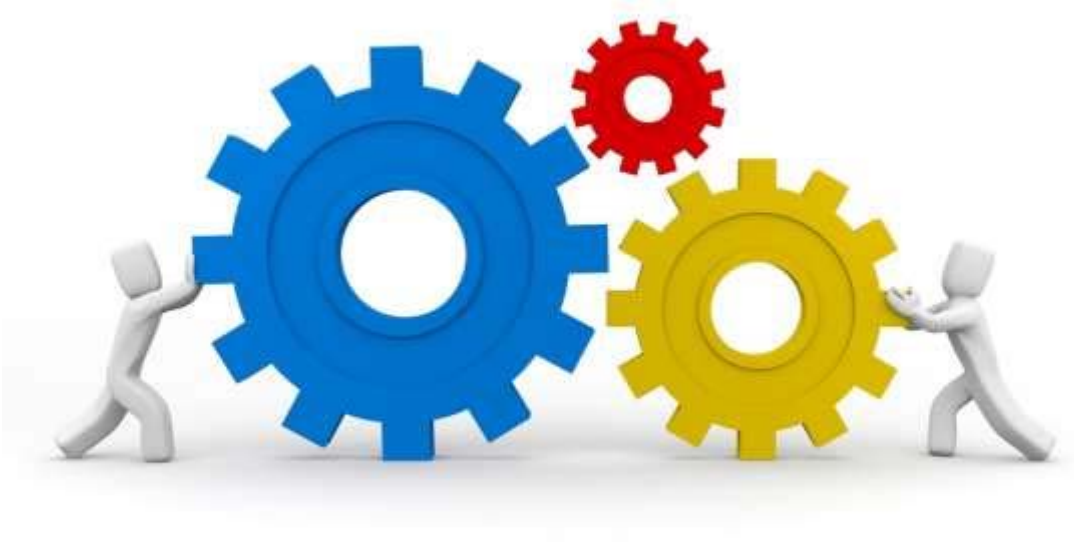
La Simulation matériel et logiciel dans un système de test automatique

La simulation nécessite l'exécution de l'application avec un sous-ensemble de l'instrumentation ou sans instrumentation et avec ou sans l'unité sous test (UUT

La solution présentée expose en détail la mise en œuvre d'un système de simulation qui est créé par l'amélioration du moteur d'exécution de l'application qui fait partie d'un environnement logiciel de développement d'applications de test automatique ATEasy

What is Test System Simulation?

Simulation is the imitation of the operation of a test system over time, including the system instruments, the test system test application and the UUT.



Why do we need to simulate?

- Develop, Debug and Run, Test your application on your desktop with no hardware (Instruments or UUT)
  - System time, Better resource utilization
  - Engineering time – faster development and debugging cycles
  - Short time to market
- Code and application robustness
  - Create test/use cases, debug code and create more robust app
  - Trace and analyze performance

Features Required for Successful Simulation

- Run your application with or without instruments
- Run your application without UUT
- Run you application with or without hardware interface (i.e. GPIB, VXI, LXI, USB, PXI, RS232, etc)
- Redirect Procedures to Simulation Code
- Minimal Code changes because of simulation
- Access and Perform Everything:
  - Get/Set Parameters/Return Value, Call Stack, variables, tests, etc.
  - Execute code

What Currently Available?

- IVI Simulation
  - Pretty limited in Scope – only Driver
  - No UUT, software, UUT simulation
  - Only IVI Driver, Driver Vendor must supply Simulation driver to support it
- Other…
  - Custom implementation ...

….. AND……

ATEasy

- *ATEasy* is a full test development solution that includes a test executive and software application development environment, all in one application suite

- *ATEasy* is a development environment that combines the structure of ATLAS, the ease of Microsoft Visual Basic with the flexibility of Microsoft Visual C++ into one easy-to-use integrated package

TEST OF TIME FINALIST 2010

BEST IN TEST Test&Measurement WORLD 2001

ATEasy's Key Product Features

1. Framework driven:

- Streamline, Placeholder for everything
- Defined process for editing, running, debugging

2. A Test Engineer's Language:

- Test Technicians, Programmers and EE
- Instrument and Interface Interchangeability
- Self Documented, TRD oriented and easy to read (Commands)

3. Open Architecture

- Integrates with software standards and tools (DLL, DDE, Com/ActiveX, .NET, C, Function Panel drivers/LabWindows CVi, IVI & VISA, LabView , HTML, Source Control, ATML…)
- Supports for all standard control interfaces: (Serial, GPIB, VXI, USB, PC/PXI, TCP/IP, LXI…)

ATEasy's Key Product Features (cont'd)

4. Backwards compatibility

- Any ATEasy version can open and use v1.0 files – programs, systems, and drivers
- Expandable File Format for drivers, system, programs; project format has not changed since v4.0

5. RAD (Rapid Application Development) tool

- DoIt!, TestIt!, TaskIt!, FormIt!, LoopIt!, ProgramIt!
- Shortens development cycle for editing, compiling running, debugging

6. Complete, integrated environment

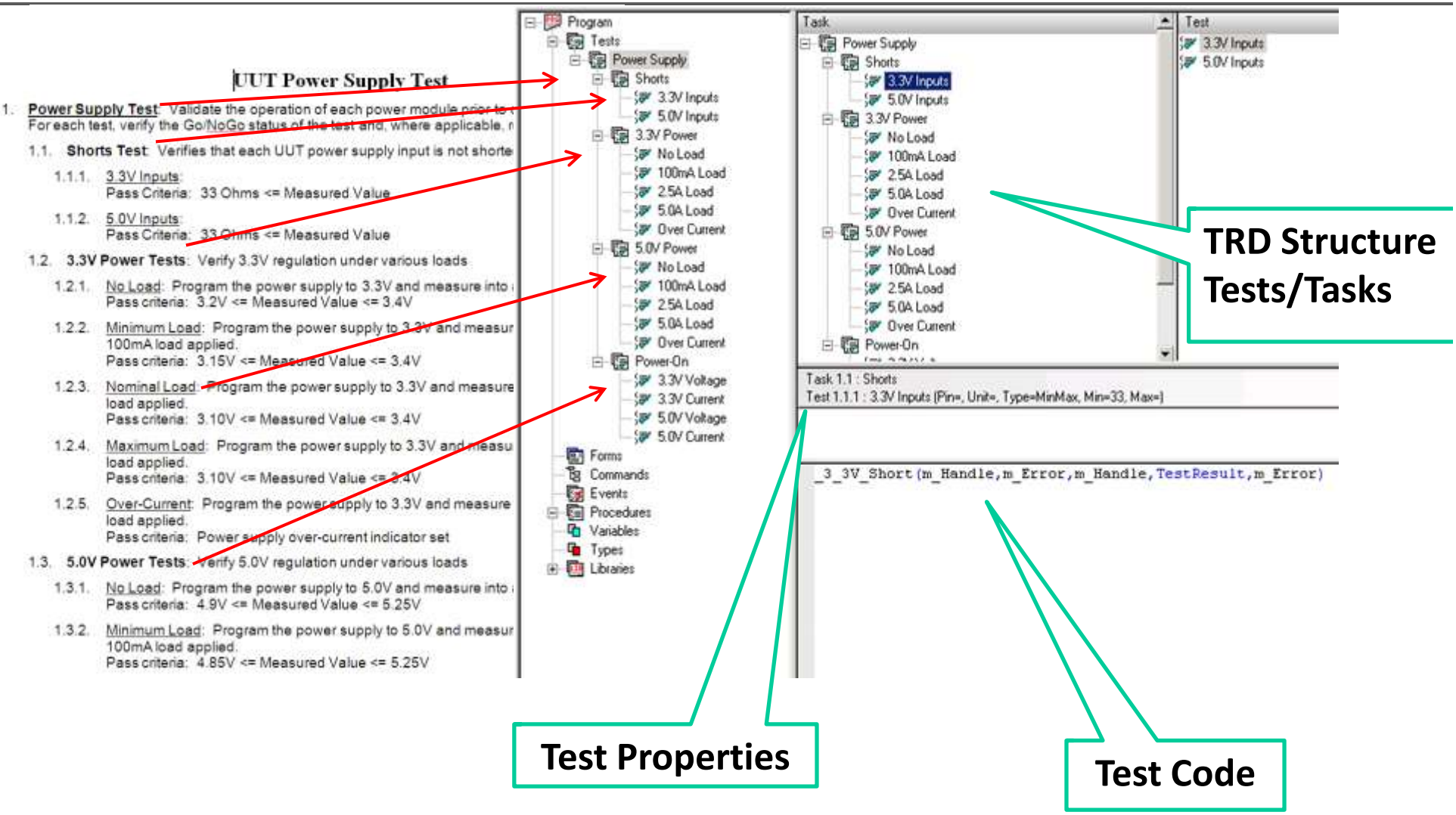
- Test Executive integrated into the development environment
- Minimal external tools required, simplifies setup and deployment

7. Built-in Application Builder generates Royalty-Free run-time executables (.EXE files) and libraries (.DLL)

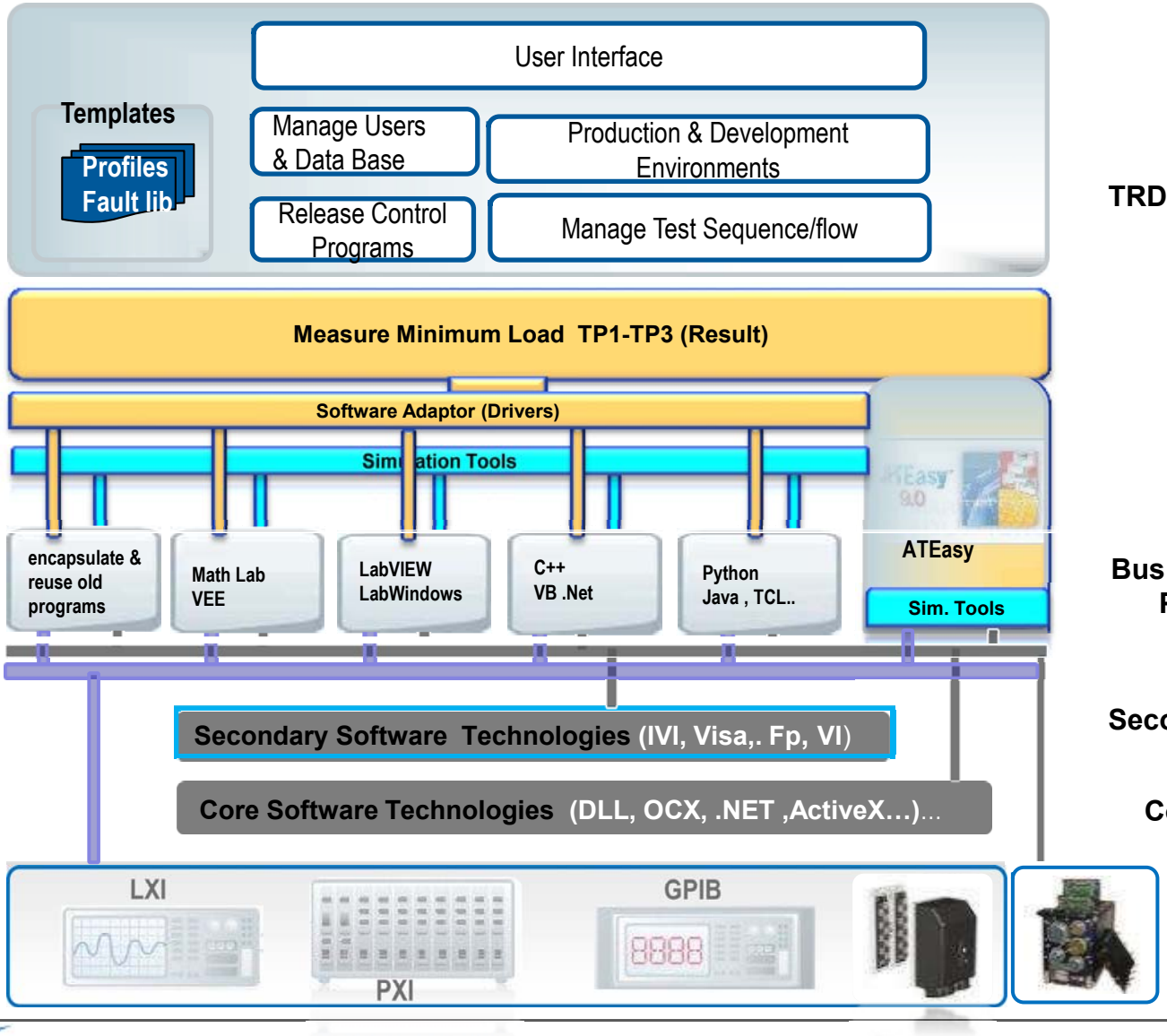
ATEasy's Key Product Features (cont'd)

8. **Test Executive, Profile** offers full control of test execution, sequencing, test conditions, and data logging
9. **Integral Fault Analysis**
10. **Multiple UUT Testing** (Parallel or Sequential)
11. **Users & Groups based privileges** - Can be customized without writing additional code, menus, toolbar, options, debugging level
12. **Visual Basic-like forms**, menus and controls.
13. Connectivity with many **Source Controls Providers** and built in configuration management tools
14. **Simulation** – ATEasy offers full support for simulation: Instrument (no hardware), Software, UUT, and more

ATEasy TRD Structure



Incorporation of multiple Software technologies



Test Executive

TRD /Signal description System commands

Development Tools
Bus Trace & debug / simulation
Program documentation

Secondary Software Technologies

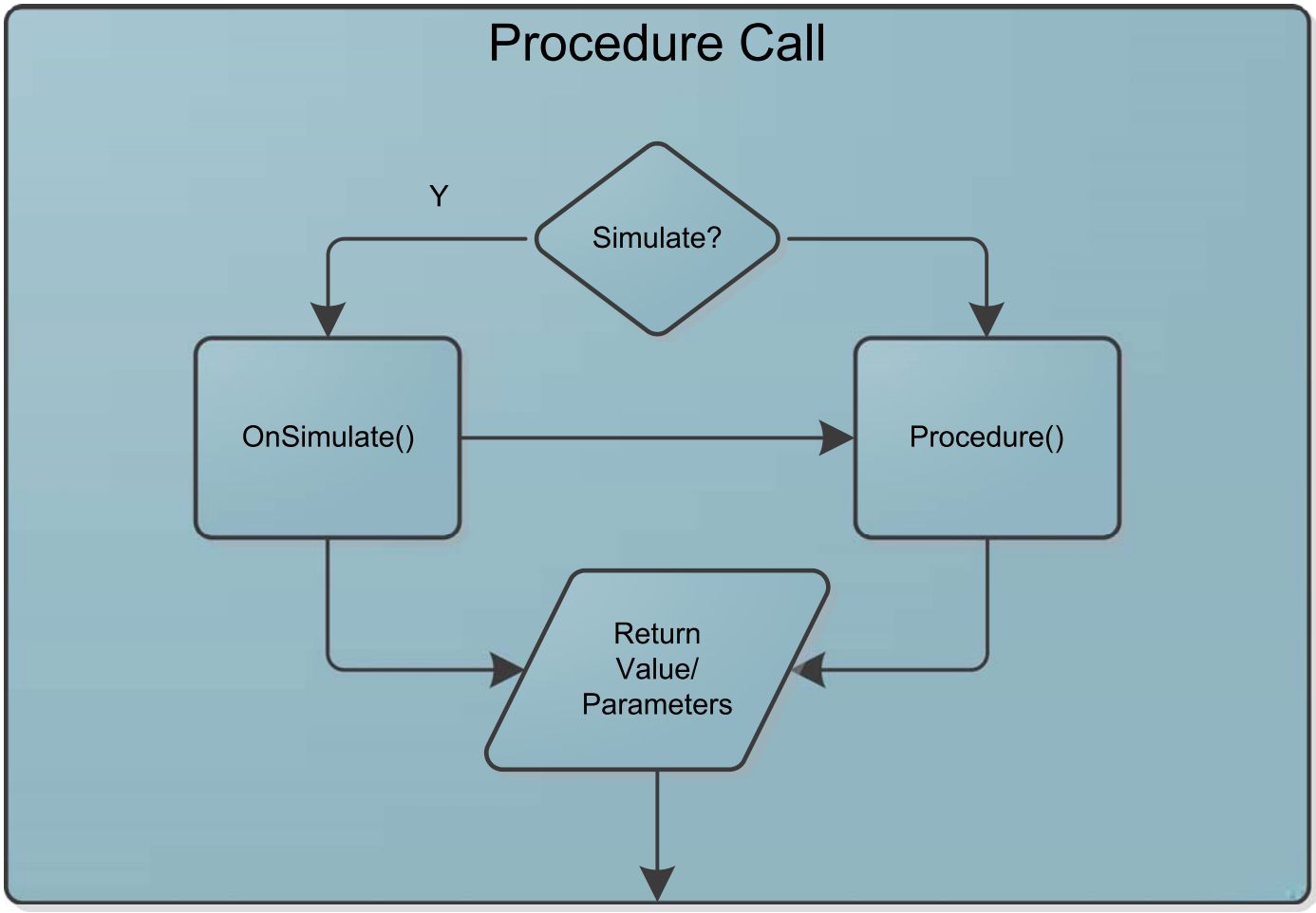
Core Software Technologies

UUT

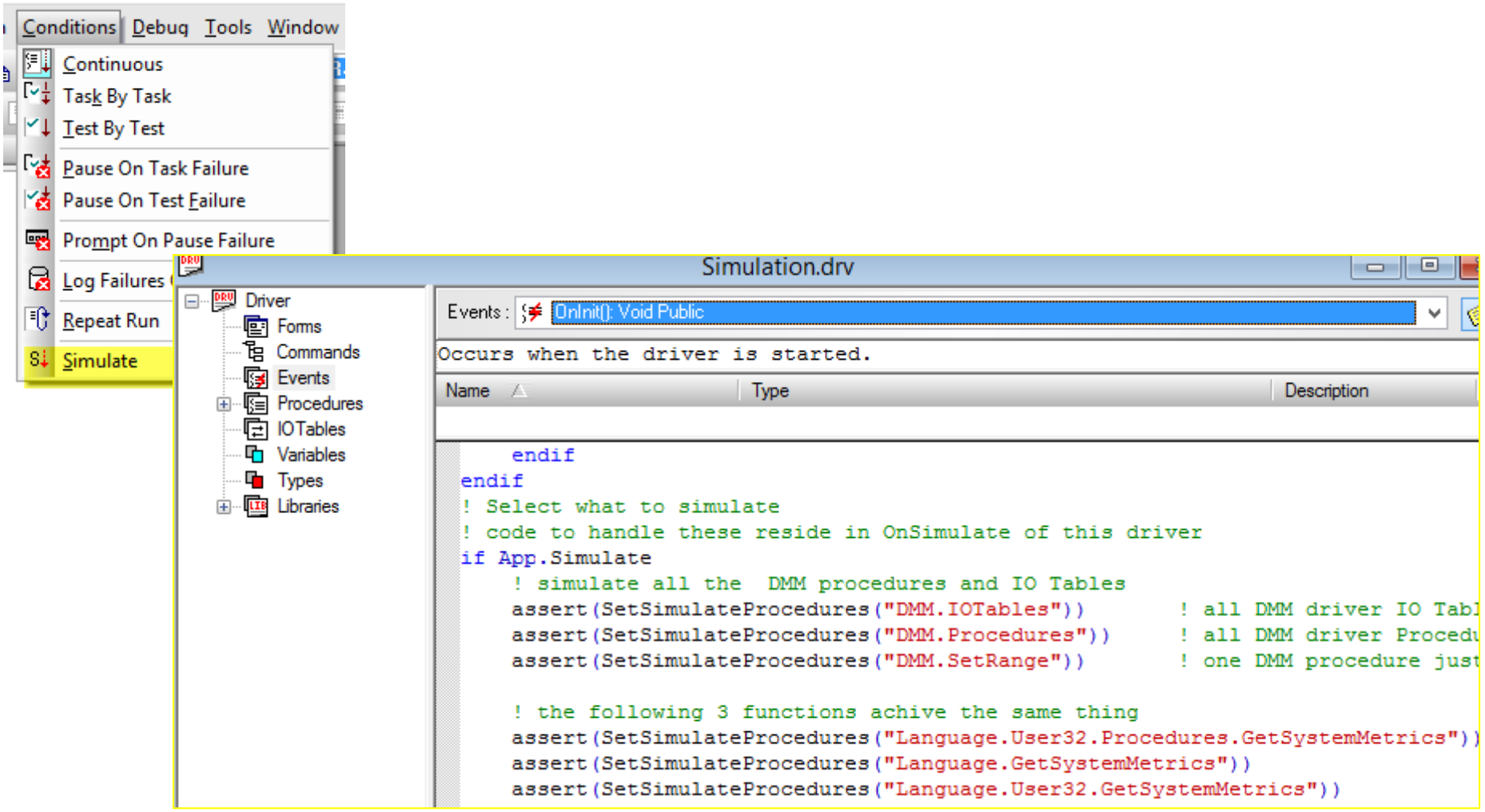
How we Did It? (ATEasy Implementation)

- Set Simulation mode:
  - App.Simulate=True, Command line,
- Select Procedure to Simulate:
  - SetSimulateProcedures():
    - module, sub-module, wildcard, individual
    - Procedure, IOTable, DLL
  - GetSimulateParameters(), GetCaller(), Test
- Event occurs when simulated procedure is called
  - OnSimulate(sModule, proc, penReturn): Any

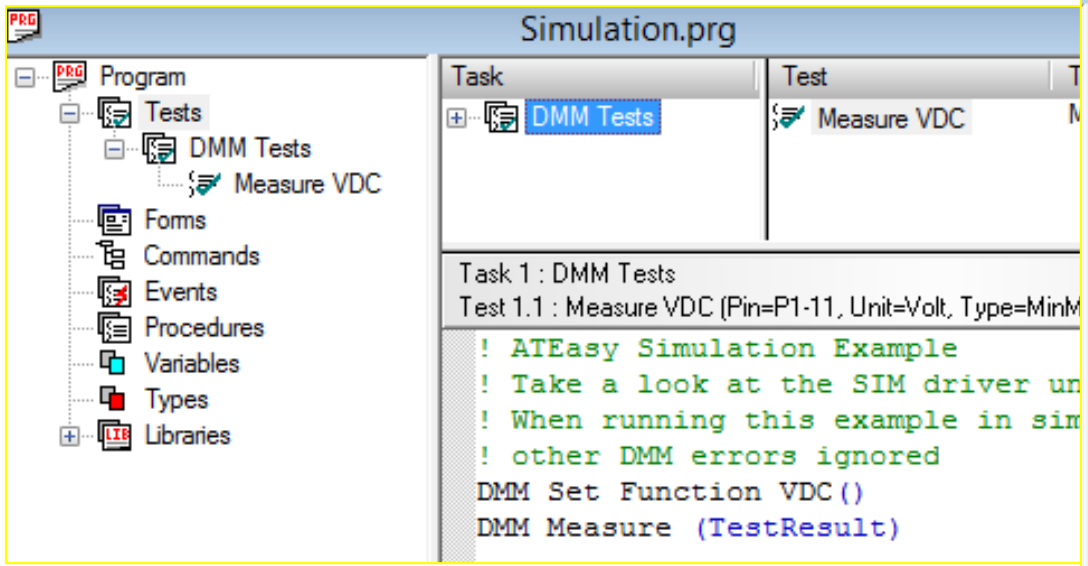
Simulation Procedure Call

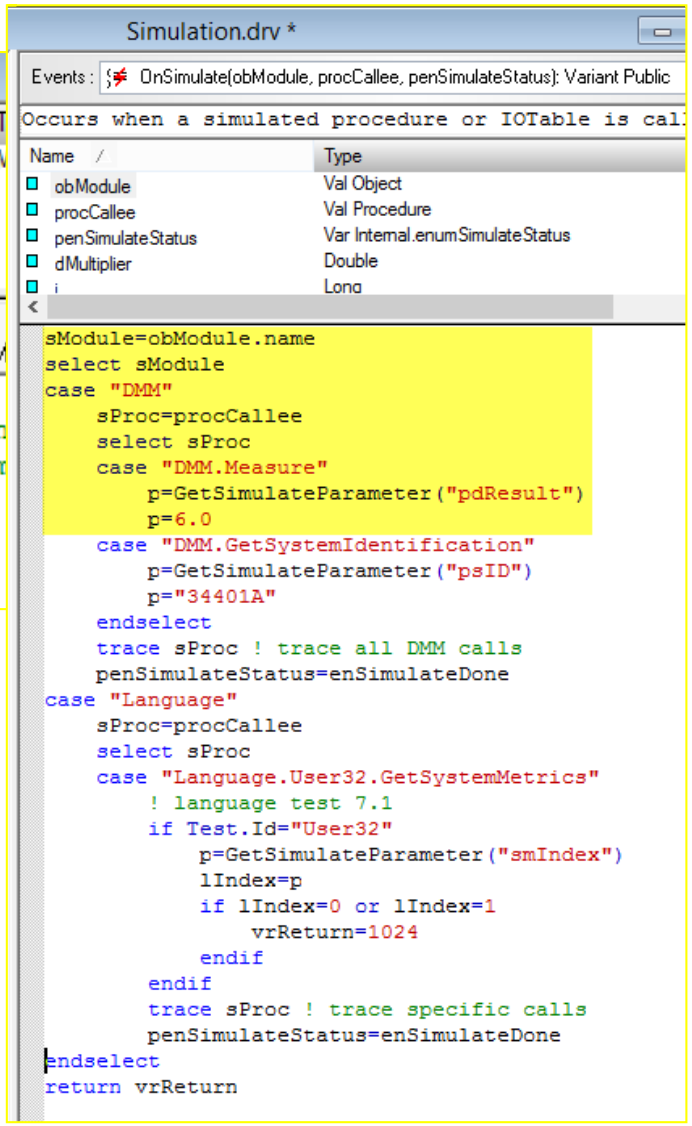


Simulation in Action - Setup



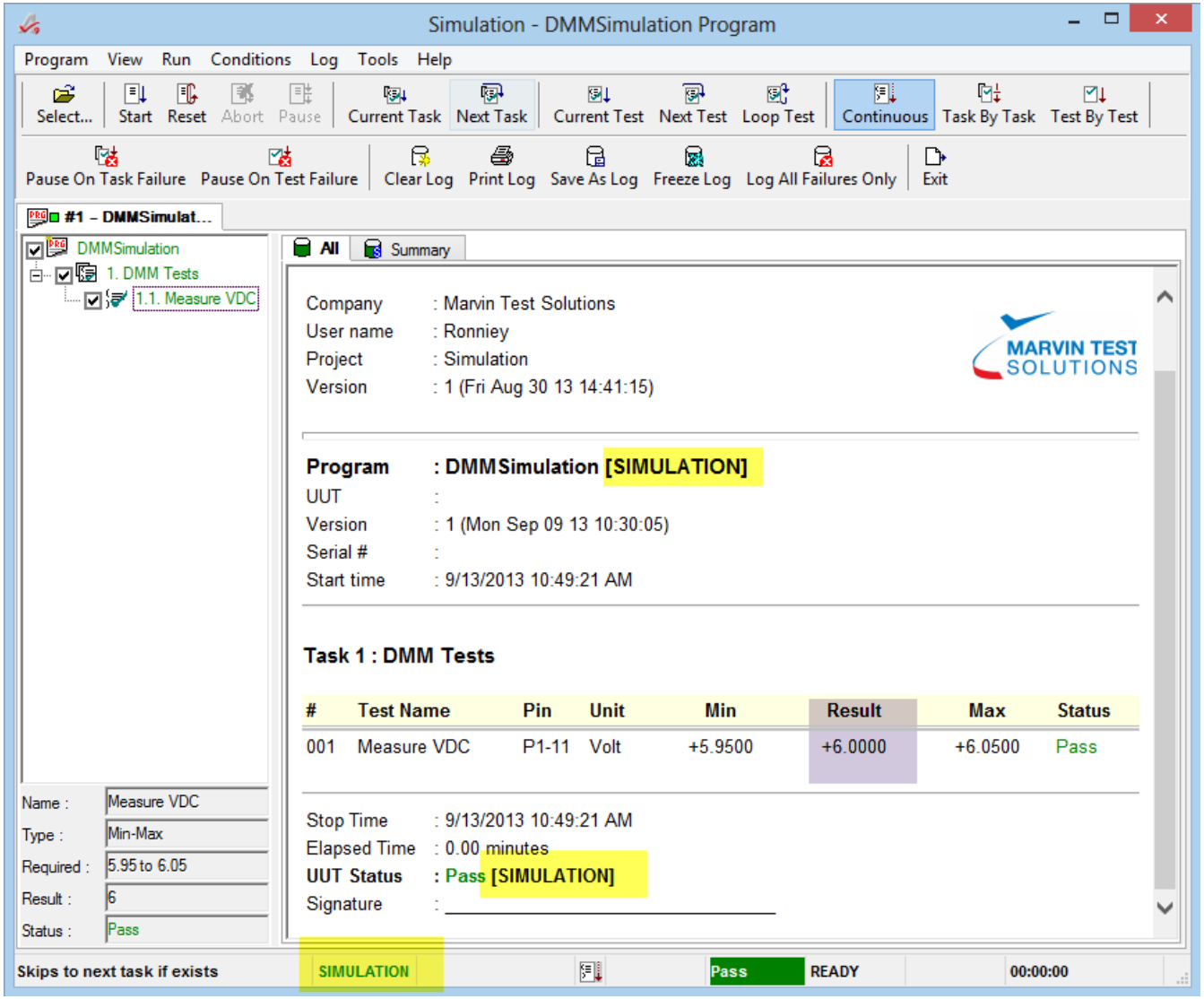
Simulation In Action - Implementation



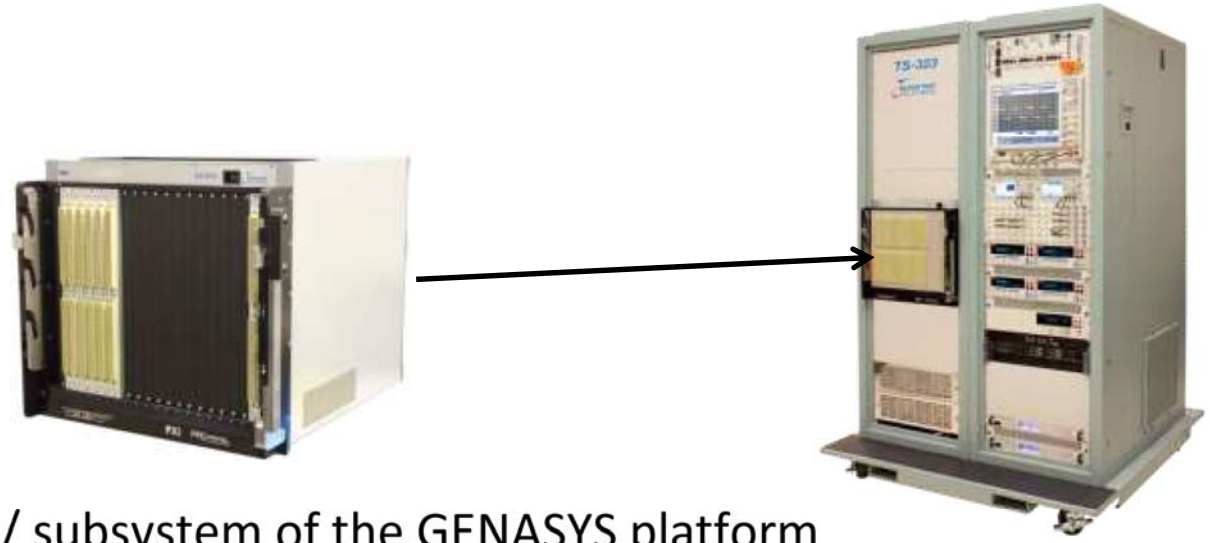



```
sModule=obModule.name
select sModule
case "DMM"
    sProc=procCallee
    select sProc
    case "DMM.Measure"
        p=GetSimulateParameter("pdResult")
        p=6.0
```

Simulation In Action – Test Executive



GENASYS Switching Subsystem



- Key component / subsystem of the GENASYS platform
- Innovative switching subsystem provides a hybrid-pin and “any resource to any pin” architecture
- Scalable system supports a minimum of 128 multiplexed hybrid pins, can be configured to support over 4500 interface pins
- Direct connect implementation interfaces all switching cards directly to the receiver interface, eliminating thousands of wires

GENASYS Switching Subsystem

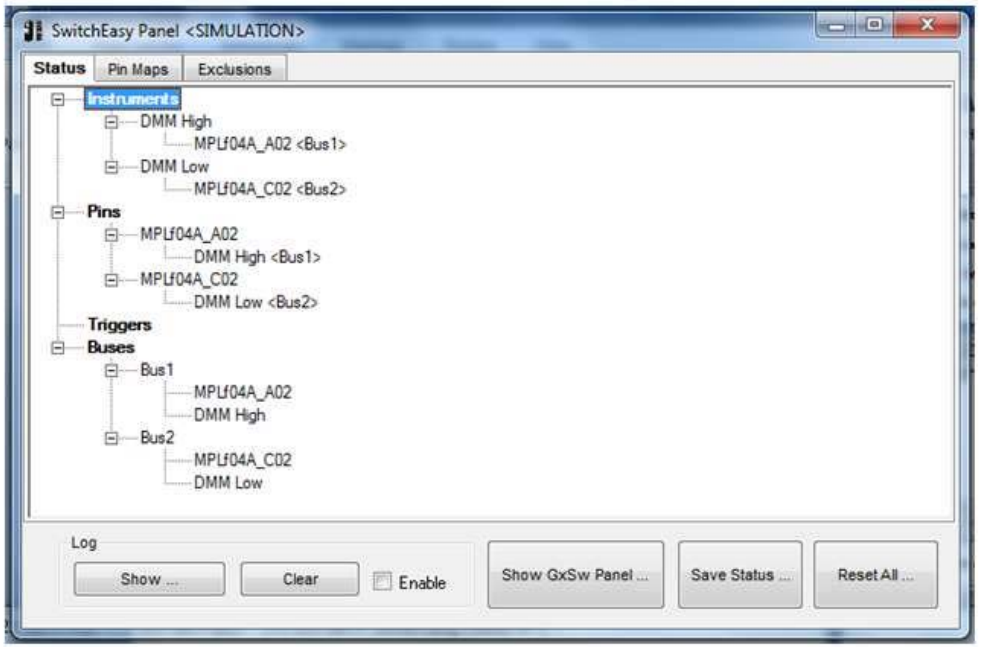
- GX7016 switching chassis with integrated MacPanel Scout receiver
  - 20 slot PXI chassis
  - Scout receiver & switch routing infrastructure
- Accommodates up to 18 “direct connect” switch cards
  - High density connection interface with no cabling
  - Internal, 16 wire analog bus with switch fabric to minimize stubbing
  - Compatible with a wide range of digital and analog resources

GX7016 Switching Chassis

GENASYS Switch Card

GENASYS Switching Software - SwitchEasy

- Signal routing management tool
  - End to end signal routing with deterministic switching and switch path management
  - Simplifies programming with Resource-to-Receiver Pin and Resource-To-UUT Pin commands
- Seamless integration with ATEasy test development / test executive software
- Reports total number of relay operations for all switching cards (values are stored in non-volatile memory on each card)



Summary

- Simulation is a powerful testing, debugging and analysis tool
- Simulation increase productivity of test engineers and system resource
- Need for a Run-Time access to implement simulation
- Simple design encourage usage and improve quality