# TABLE OF CONTENTS

## SESSION 1A4: NET-CENTIRC SOLUTIONS

- **Vehicle Embedded Health Monitoring and Diagnostic System** ................................................................. 1
  - Mark Zachos
- **Creating Multicomputer Test Systems Using PCI and PCI Express** .......................................................... 7
  - Lee Mohrmann, Jason Tongen, Matthew Friedman, Mark Wetzel
- **Remote Intelligent Diagnostics for Electronic Systems (RIDES)** ............................................................. 10
  - Michael Stora, Patrick Kalgren
- **Advanced Architecture for Achieving True Vertical Testability in Next Generation ATE** ....................... 16
  - David Droste, Gary Guilbeaux

## SESSION 1B4: TEST PROGRAM SET DESIGN & REHOST

- **Re-Host Factors and a Method to Maintain the Integrity of a Test** .......................................................... 23
  - Larry Kirkland
- **Test Program Set (TPS) Migration** ........................................................................................................... 28
  - Robert Peet
- **Mission Assurance through Test Program Set Analysis** ............................................................................. 33
  - Yonet Eracar, Teresa Lopes
- **Using PAWS® CIIl Emulation Modules to Rehost Test Program Sets Written in the Abbreviated Test Language for All Systems (ATLAS)** ................................................................. 39
  - Daniel Zimmermann

## SESSION 1C4: ATE INSTRUMENTATION

- **The Most Flexible System Component – High Speed Digital Oscilloscope** ........................................... 45
  - Mark Lombardi
- **Generating Higher Output Power Signals for Today’s Test Applications** ............................................... 50
  - John Hansen
- **Safety Considerations for Configuring LXI-Based ATE Systems When IP Addresses Become Logical Addresses** .................................................................................................................... 54
  - William J. Headrick, Kendall Correll, Tom Sarfi
- **An Innovative Approach in the Design of Fast-Switching Microwave Synthesizers** ......................... 59
  - Alexander Chenakin, Suresh Ojha, Iqbal Sihra

## SESSION 1D4: ATML PANEL

- **New Direction for the DoD ATS Framework** ............................................................................................. 63
  - Mike Malesich

## SESSION 2A1: SOFTWARE APPLICATIONS

- **Applying Software Engineering Practices to Produce Reliable, High-Quality and Accurate Automated Test Systems** .................................................................................................................. 68
  - Elijah Kerry, Santiago Delgado
- **Radio Frequency Identification Tag Design for Automated Data Acquisition** ..................................... 71
  - Gregory Mitchell, Marvin Conn, James Huffman

## SESSION 2B1: PROGNOSTICS & HEALTH MONITORING

- **Stirling Cryocooler Prognostics And Health Management (PHM)** .......................................................... 76
  - Paul Barton
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research of UAV Fault and State Forecast Technology Based on Particle Filter</td>
<td>80</td>
</tr>
<tr>
<td>Li Baoan, Liu Zhihua, Li Shufen</td>
<td></td>
</tr>
<tr>
<td>Remote Vehicle State of Health Monitoring and Its Application to Vehicle No-Start Prediction</td>
<td>86</td>
</tr>
<tr>
<td>Yilu Zhang, Mutasim Salman, Halasya Siva Subramania, Ryan Edwards, John Correia, Gary W. Gant Jr, Mark Rychlinksi, Jemaine Stanford</td>
<td></td>
</tr>
<tr>
<td>Information Support for Integrative Analytical Approaches for Health Management Application Development and Maturation</td>
<td>92</td>
</tr>
<tr>
<td>Timothy Wilmering, David A. Van Rossum</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 2C1: COST-EFFECTIVE SOLUTIONS**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powering Intelligent Instruments with Lua Scripting</td>
<td>99</td>
</tr>
<tr>
<td>David Clark</td>
<td></td>
</tr>
<tr>
<td>Interface Test Adapter Development &amp; Maintenance Using a Continuity/Insulation Automatic Test Station In Large Scale Test Systems</td>
<td>105</td>
</tr>
<tr>
<td>Randall Lemon, Bruce Coulter, Steve Archibald, Chau Nguyen</td>
<td></td>
</tr>
<tr>
<td>Issues with Ethernet Parametric Testing in a Production Environment</td>
<td>111</td>
</tr>
<tr>
<td>Philip Ridl</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 2D1: DIGITAL APPLICATIONS**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Deep Serial Memory for Large Block Data Transfers</td>
<td>114</td>
</tr>
<tr>
<td>Tarra Epstein, Stephen Allen</td>
<td></td>
</tr>
<tr>
<td>Higher-Level Development and COTS Hardware Expand FPGA Boundaries</td>
<td>119</td>
</tr>
<tr>
<td>Jamie Brettle, Adri Kruger</td>
<td></td>
</tr>
<tr>
<td>Implementing Serial Bus Interfaces with General Purpose Digital Instrumentation</td>
<td>123</td>
</tr>
<tr>
<td>Dale Johnson</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 2A2: HARDWARE/SOFTWARE SOLUTIONS (1)**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managing Evolving Hardware and Software Requirements</td>
<td>128</td>
</tr>
<tr>
<td>Steven O'Donnell, Antonio Zarcone</td>
<td></td>
</tr>
<tr>
<td>Integration of Software Technologies into a Test System</td>
<td>134</td>
</tr>
<tr>
<td>Ron Yazma</td>
<td></td>
</tr>
<tr>
<td>FPGA Implementation of a Configurable Viterbi Decoder for Software Radio Receiver</td>
<td>138</td>
</tr>
<tr>
<td>Sherif Shaker, Salwa Elramly, Khaled Shehata</td>
<td></td>
</tr>
<tr>
<td>Area Efficient Vector Multiplication for IDDT Test Calibration</td>
<td>143</td>
</tr>
<tr>
<td>Mikhail Itskovich</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 2B2: TEST PROGRAM SET TECHNIQUES**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research on the TPS Development Based on SOA</td>
<td>149</td>
</tr>
<tr>
<td>Zhao Xin, Xiao Mingqiang, Yue-Wen Zhou</td>
<td></td>
</tr>
<tr>
<td>TPS Data Collection and Data Mining</td>
<td>153</td>
</tr>
<tr>
<td>Ian Williams, Susan Moran</td>
<td></td>
</tr>
<tr>
<td>Achieving Test Program Set Transportability through Interface Design</td>
<td>159</td>
</tr>
<tr>
<td>Joseph Eckersley, William Adams, Jr.</td>
<td></td>
</tr>
<tr>
<td>The Simplified TPS Encoding Process</td>
<td>162</td>
</tr>
<tr>
<td>Ngai Nguyen, Jacob Spencer, Mark Ohlander, Nicholas Herbert, Casey Bynum</td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 2C2: DESIGN FOR TESTABILITY (1)**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built in Test - Coverage and Diagnostics, You Can’t Do One without the Other If You Want to Be Successful</td>
<td>167</td>
</tr>
<tr>
<td>Jeff Smith, Duane Lowenstein</td>
<td></td>
</tr>
<tr>
<td>Efficient Techniques for Reducing Error Latency in On-Line Periodic BIST</td>
<td>171</td>
</tr>
<tr>
<td>Hussain Al-Asaad</td>
<td></td>
</tr>
</tbody>
</table>
A Lean Approach to Designing for Software Testability

Anthony Alwardt, Nathan Mikeska, Richard Pandorf, Philip Tarpley

Advanced Testing and Prognostics of Ball Grid Array (BGA) Components with a Stand-Alone Monitor IC

Anuj Bhatia, James P. Hofmeister, Douglas L. Goodman, Justin B. Judkins

SESSION 2D2: ATML APPLICATIONS

Automatic ATML Test Description Translation to a COTS Test Executive

Anand Jain, Santiago Delgado

A Knowledge-Based Test Program Following the ATML Standard

Anton Pirker-Frühaufl

Optimization Test Mission Scheduling Strategy Study Based on ATML

Xiang Gao, Lei Wang, Lei Song

SESSION 2A3: TEST SYSTEM APPROACHES (1)

Development of Fast Test Platform for the MicroSatellite

Peng Yu

PXI-Based Flight Line Test Sets

Loofie Gutterman

Bridge the Gap between Simulation and Test: An OSA-Compliant Virtual Test Environment

Ping Lu, Daniel Glaser, Guerkan Uygur, Susanne Weichslgartner, Klaus Helmreich, Armin Lechner

Missim - the 3-in-1 Electronic Warfare System Tester

Mathias Pfeiffer

SESSION 2B3: LEGACY SYSTEM SOLUTIONS

Reverse Engineering for Board Test

Kris Carlson, Bernd Hauptmann

How to Mitigate Hardware Obsolescence in Next-Generation Test Systems

Nathan Tacha, Alex McCarthy, Brian Powell, Arun Veeramani

Instrument Design that Solves the Challenges of Both Legacy and Emerging Test Requirements

Carl Heide, David Kaushansky

SESSION 2D3: IEEE 1641

IEEE Std 1641 – A Revised Signal & Test Definition Standard

Chris Gorringe

A TPS Integrated Development Environment Implementing IEEE1641 and ATML

Qiao Li-Yan, Liu Zhaoqing, Peng Yu, Xiyuan Peng

Managing the Transition to IEEE 1641, via ATLAS Based Test Systems

Ashley Hulme

Implementing IEEE 1641 - Amplifier Characterisation on Multiple Test Platforms

Matt Cornish, Malcolm Brown, Johannes Ganzert

SESSION 2A4: TEST SYSTEM APPROACHES (2)

Handheld Radar Simulator: The Future of RF Testing

Stephen Preiss, Andrea Roderick

Advanced Waveform Generation Techniques for ATE

Christopher Ziomek, Emily Jones

RF Channel Simulators Enhance Communication System Quality and Decrease Costs

Steve Williams

SESSION 2C4: DESIGN FOR TESTABILITY (2)
A Framework for Testability Metrics Across Hierarchical Levels of Assembly ........................................... 278
Scott Davidson, Louis Ungar

Estimating Accuracy and Confidence Interval of an Intelligent Diagnostic Reasoner System ................................ 284
Sreerupa Das, Michelle Harris

Simplified Metrics for Evaluating Designs for Testability .................................................................................. 288
Louis Ungar, Scott Davidson

SESSION 2D4: IEEE 1641 (2)

ATML Completed Status – What Happens Next .............................................................................................. 294
Chris Gorringe, Michael Seavey, Teresa Lopes

Digital Signals in IEEE 1641 and ATML – Fact or Fiction ............................................................................. 300
Chris Gorringe, Malcolm Brown, Teresa Lopes

Physical Signals, Events and Digital Streams - Their Relationship and How They Affect Signal Functions in IEEE 1641 ............................................................ 306
Ashley Hulme

Implementing IEEE 1641 - Compilation Techniques (to IVI Driver Code) ......................................................... 312
Matt Cornish

SESSION 3A1: DOD ATS FRAMEWORK (1)

ATML Demonstration - Readiness For Use ......................................................................................................... 317
Chris Gorringe, Ion Neag, Ron Taylor

Test Diagram Generation: A Practical Application of the ATML Standards ..................................................... 322
Ron Taylor

Demonstrating the Capabilities of IEEE P1636.2 MAI in Support of the DoD ATS Framework ......................... 327
Mukund Modi, Joseph Stanco

Lessons Learned in Implementing a Net-Centric Diagnostic Solution for the F/A-18 Maintenance Environment ........................................................................................................... 332
Russell Shannon, Thomas Richardson, Craig Koepping, Anthony Alwardt

SESSION 3B1: DIAGNOSTIC METHODS

Pre-Determining Comparative Tests and Utilizing Signal Levels to Perform Accurate Diagnostics ........................ 337
Larry Kirkland

A Wavelet Packets and PCA Based Method for Testing of Analog Circuits .................................................... 342
Chaojie Zhang, Shuhai Liang, Guo He, Xiaowei Yan

A Hierarchical Framework for Fault Propagation Analysis in Complex Systems .............................................. 347
Manzar Abbas, George Vachtsevanos

SESSION 3C1: SYNTHETIC INSTRUMENTS

Synthetic Instrumentation: The Road Ahead ...................................................................................................... 353
Michael Granieri, Robert Lowdermilk

Wide Spectral Span Spectrum Analysis with an Analog Step and Dwell Translation Pre-Processor to a High Dynamic Range FFT Based Spectrum Analyzer ...................................................... 359
Robert Lowdermilk, Fred Harris

Proper Frequency Planning in a Synthetic Instrument RF System ................................................................... 363
Anthony Estrada

Design of a Software Defined, FPGA-Based Reconfigurable RF Measuring Receiver ...................................... 368
Matthew Hunter, Achilles Kourtellis, Wasfy Mikhael

SESSION 3D1: MANAGEMENT TOPICS

Doomsday ATE to Distributed Measurement Blocks - A Toyota Production System Model for the DoD ....................... 374
Duane Lowenstein
SESSION 3A2: DOD ATS FRAMEWORK (2)

Standard Diagnostic Services for the ATS Framework
John Sheppard, Stephyn Butcher, Patrick Donnelly
Common SENCE Maintenance
Simon Jessop
Acquisition Decision Factors and the Resource Adapter Information Framework Element
Hugh Pritchett

SESSION 3B2: ADVANCED ATE TECHNOLOGY

The Future of Automatic Test System (ATS) Brought by Cloud Computing
Hu Leigang, Xiao Mingqing
Adaptation of Thermal Testing for Real-Time Testing in Both the Factory and Depot
Duane Lowenstein
Networked Autonomous Smart Sensors and Dynamic Reconfigurable Application Development Tool for Online Monitoring Systems
Jiangbin Zhao, Shi Tielin, Wu Jiankang, Jianping Xuan

SESSION 3C2: COST-EFFECTIVE SOLUTIONS (2)

Reporting, Visualisation and Analysis of Fleet Life Management Information: Integration of Weapon System Databases and Tools
Harald Tijink, Bert Schultheiss
To Upgrade My ATE or Not to Upgrade - That is the Question, New Approaches to Migrating ATE
Joe LaGrotta, Duane Lowenstein
Key Considerations in the Design of an Integrated Diagnostics Test Facility
Matthew Morgan, Danny DiBartolomeo
Using Virtualization to Reduce the Cost of Test
Casey Weltzin, Santiago Delgado

SESSION 3D2: TOPICS IN TEST ASSET OPTIMIZATION

Digital Runtime
Teresa Lopes, Yonet Eracar
Optimization of Test Engineering Utilizing Evolutionary Computation
Joseph Engler
An IEEE-1445 (DTIF) Based Digital Test Solution
Ron Yazma, Albert Quan
Modular Interconnect Packaging for Scalable Systems (MIPSS) for ATE – IEEE-P1693 Standard
Michael Stora, Steve Mann

Author Index