2011 IEEE Avionics, Fiber-Optics and Photonics Technology Conference

(AVFOP 2011)

San Diego, California, USA
4 – 6 October 2011
## TABLE OF CONTENTS

**Tuesday, October 4, 2011**

<table>
<thead>
<tr>
<th>TuA</th>
<th>AVFOP Overview</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TuA1</td>
<td>Developing Aircraft Photonic Networks - An Overview of the European DAPHNE Project</td>
<td>1</td>
</tr>
<tr>
<td>TuA2</td>
<td>Fiber Optics for Use in Air and Space Harsh Environments</td>
<td>3</td>
</tr>
<tr>
<td>TuA3</td>
<td>Advances in Optical Networking for Aerospace Platform Applications</td>
<td>5</td>
</tr>
<tr>
<td>TuA4</td>
<td>RF Photonics: Status, Challenges and Opportunities</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TuB</th>
<th>Avionics Networking Architecture, Modeling and Standardization</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TuB1</td>
<td>WDM LAN Network Management and Control</td>
<td>9</td>
</tr>
<tr>
<td>TuB2</td>
<td>WDM LAN Node Design and Test Bed</td>
<td>11</td>
</tr>
<tr>
<td>TuB3</td>
<td>Monte Carlo WDM Network Identification and Evaluation Tool</td>
<td>13</td>
</tr>
<tr>
<td>TuB4</td>
<td>Wavelength and Fiber Assignment Problems on Avionic Networks</td>
<td>15</td>
</tr>
<tr>
<td>TuB5</td>
<td>Satellite Optical Backplane</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TuC</th>
<th>Fiber Optic Transmitters/Receivers for Digital Avionics Networks</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TuC1</td>
<td>Harsh Environment Transceivers for the Post-Module Era</td>
<td>19</td>
</tr>
<tr>
<td>TuC2</td>
<td>PCIe Optical Interconnects</td>
<td>21</td>
</tr>
<tr>
<td>TuC3</td>
<td>Widely Tunable Optical Transceiver for Avionic WDM Networks</td>
<td>23</td>
</tr>
<tr>
<td>TuC4</td>
<td>Coarse Wavelength Division Multiplexed Multimode Transceiver Technology for Avionics Applications</td>
<td>25</td>
</tr>
<tr>
<td>TuC5</td>
<td>High Speed Vertical Cavity Surface Emitting Lasers for Harsh Environment Applications</td>
<td>27</td>
</tr>
<tr>
<td>TuC6</td>
<td>High-Speed Electro-Absorption Modulator Based on SiGe HBT</td>
<td>29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TuD</th>
<th>RF Photonics - Signal Processing I</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TuD1</td>
<td>High-Efficiency Optical Mixers: Principle, Design and Implications for Signal Processing</td>
<td>31</td>
</tr>
<tr>
<td>TuD2</td>
<td>Characterization of a Compressively Sampled Photonic Link</td>
<td>33</td>
</tr>
<tr>
<td>TuD3</td>
<td>Optical Under-Sampling for High Resolution Analog-to-Digital Conversion</td>
<td>35</td>
</tr>
<tr>
<td>TuD4</td>
<td>Simultaneous Optical Phase and Intensity ModulationFor Analog Signal Processing</td>
<td>37</td>
</tr>
</tbody>
</table>

**Wednesday, October 5, 2011**

| WA    | Photonic Sub-Systems Demonstrations and Concepts                                |
WA1  Optical Functions for Microwave Signals in Airborne Radar and Communication Systems  39
WA2  Development of an Integrated Photonic Beamformer for Electronically-Steered Ku-Band Phased Array Antenna  41
WA3  Feasibility of Airborne Large Baseline Antennas  43
WA4  Fiber Delivery of High Power Nanosecond Pulses for Ignition in Aerospace Engines  45
WA5  Optical Frequency Domain Reflectometry for High-Resolution Distributed Strain Sensing  47
WA6  Characterization of Fiber Wave Retarders for Interferometric Fiber-Optic Current Sensors  49

WB  RF Photonics - Links
WB1  Microwave Photonic Link Architectures  51
WB2  Frequency Modulated Microwave Photonic Links for High Dynamic-Range Antenna Remoting Systems  53
WB3  Optical Fiber Induced Noise in RF-Photonic Links  55
WB4  A Compact, Unamplified RF Photonic Transmitter with High Efficiency and High Optical Power  57
WB5  Assessment of Noise Impact on UWB Signals in R-EAM Based Optical Links  59

WC  Next Generation Networks
WC1  Terabit Optical Ethernet for Avionics  61
WC2  Next Generation Space Interconnect Standard (NGSIS)  63
WC3  Utilization of Route Diversity in Free-Space Optical Networks  65

WD  Test and Measurement
WD1  Lightwave Component Analysis for Balanced and On-Wafer Measurement of Opto-Electronic Components for 100GB/S Transmission and RF-Over-Optics  67
WD2  Mode Conditioner and Portable High-Resolution Reflectometer for Maintenance and Diagnostics of Single and Multi-Mode Avionic Fiber Networks  69
WD3  Power Budget and System Performance Analysis of the POF Link for Future Avionic Applications  71

WE  Optical Device Technology for Avionics
WE1  Semiconductor Optical Amplifiers in Avionics  73
WE2  Chip-Scale Photonic Routing Fabrics for Avionic And Satellite Applications  75
WE3  Performance Modeling and Analytical Verification of POF Transmissive Star Couplers for Avionics System Applications  77
WE4  Polymer Cladding Materials Under High Temperatures  79
WE5  Nanomaterials Enabled Fiber Optic Networks  81
# Thursday, October 6, 2011

**ThA**  
**Harsh Environment Systems and Components; COTS Insertion**
- ThA1  
  Optical Component/Hardware Insertion into Tactical/Sensor Systems: Risks and Lessons Learned  
- ThA2  
  Leveraging COTS Opto-Electronics for Military Use  
- ThA3  
  Progress on a Hermetic Pigtailed Transceiver Package and Uniferrule  
- ThA4  
  Highly Hermetic Fiber Pigtailed Electro-Optics Components for High-Reliability Avionics Applications

**ThB**  
**Photodetectors for Analog Applications; Transmitters for Sensing Applications**
- ThB1  
  Photodetectors for Analog Applications  
- ThB2  
  Discussion of Resonant Enhancements of the Output IP3 in High Power Photodetectors  
- ThB3  
  High-Power Linear Balanced INP Photodetectors for Coherent Analog Optical Links  
- ThB4  
  All-Fiber Widely-Tunable Transmitter for Remote Sensing in Short-Wave Infrared Band

**ThC**  
**Fiber, Connector, Terminus, Cable and Splice Solutions for Harsh Environments**
- ThC1  
  Durable Fiber Optic Mating Surface with Integrated Lens  
- ThC2  
  Harsh Environment Fiber Optic Connector Selection  
- ThC3  
  Wiring Replacement, Access and Aggregation Interfaces and WDM Networking  
- ThC4  
  Aerospace Cable Repair via Field-Portable Fiber Optic Tip Shaping and Permanent Mechanical Splice Technology  
- ThC5  
  Single Mode Connector Options for Sensor Networks

**ThD**  
**RF Photonics - Signal Processing II**
- ThD1  
  Photonic Methods for RF Phase Shifting  
- ThD2  
  Practical Silicon Photonics True-Time-Delay Devices for Phased Array Systems  
- ThD3  
  New Advances in RF Photonic Applications Based on Optical Whispering Gallery Mode Resonators  
- ThD4  
  Photonic Frequency Conversion for Wideband RF-to-IF Down-Conversion and Digitization  
- ThD5  
  Laser Noise Considerations For Phase Modulated Links