### REPORT DOCUMENTATION PAGE

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<th>1. REPORT DATE</th>
<th>2. REPORT TYPE</th>
<th>3. DATES COVERED</th>
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<td>ITC Intro Brief (Viewgraphs)</td>
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<th>6. AUTHOR(S)</th>
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<tr>
<td>Sid Jones</td>
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<tr>
<td>Naval Air Warfare Center Aircraft Division</td>
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<tr>
<td>22347 Cedar Point Road, Unit #6</td>
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<tr>
<td>Patuxent River, Maryland 20670-1161</td>
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<td>Naval Air Systems Command</td>
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<th>19a. NAME OF RESPONSIBLE PERSON</th>
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<td>(301) 342-1601</td>
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Standard Form 298 (Rev. 8-98)
Pursuant to ANSI Std. 239-18
Vehicular Instrumentation into the 21st Century

Dan Skelley
Deputy Director, Test Article Preparation, US Navy

Instrumentation System Topologies
Centralized Data Systems

- n Transducers/Avionics taps
- Varying sizes of wire bundles

Instrumentation System Unit
Interface to data signals
Formatted data output to:
Recorders, Transmitters, etc.
Instrumentation System Topologies
Distributed Data Systems

- n Transducers/Avionics taps
- Varying sizes of wire bundles
- Communications Bus

Instrumentation Control Unit
Formatted data output to:
Recorders, Transmitters, etc.

Transducer Interface Units
Interface data signals onto the bus at the
request of the control unit

Current System Limitations

- Unable to meet data rate requirements
- Aging technology
- Closed architecture
- Network incompatibilities
DoD Policy Trends

- Acquisition Reform
- Decreasing budgets
- Shorter cycle times
- Open architecture and COTS

Commercial Technology Trends

- Growth of the Internet
- Proliferation of PC and LAN technology
  - Price/performance ratios are plummeting
- Data packets are the universal data structure
**Future Instr. Systems Must:**

- Have open architecture
- Utilize COTS hardware/software
- Easily interface with global network infrastructure
- Leverage commercial standards
- Meet exponential growth in data requirements
- Easily incorporate leading edge technology

**Data Acquisition Networks**

- Network based instrumentation system
- Data is formatted and moved in packets
- Compatible with network infrastructure
- Open architecture based on Commercial standards
Leading the Way

- Next Generation Instrumentation Bus
  - Vehicular Data Acquisition Network
  - High Speed
  - Conforms to OSI Communications Model to facilitate technology insertion
- Air Force SBIR AF99-302
  - Fibre Channel bridge to legacy instrumentation standards
  - Demonstrate CAIS to Fibre Channel bridge

The Challenges

- Non-standard packet structures
- Leading industry
- Bandwidth concerns (RF and recorder)
Bandwidth Concerns

- RF Bandwidth
  - Reduced RF spectrum available
  - Data requirements keep increasing
- Recorder Bandwidth
  - NexGenBus will have a data rate of 800 Mbps
  - Large recorders are currently at 240 / 107 Mbps
  - Smaller formats are trying to achieve 32 Mbps

Conclusion

- Data acquisition networks are coming
- Challenges are being addressed
- A new era in instrumentation affordability, capability, and complexity will be born.