

TELEMETERING STANDARDS COORDINATION COMMITTEE



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INTERNATIONAL FOUNDATION FOR TELEMETERING

TSCC Spring 2012 Chairman's Report

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Significant Activity

- Congratulations Lee Eccles was awarded the Pioneer Award Last Year
- TSCC Web Site is up to date: [Need new web master.](#)
- Best telemetry standards paper was awarded at ITC 2011
 - Brad Fleury lead the selection effort.
 - Winner: "DESIGN CONSIDERATIONS FOR XML-BASED T&E STANDARDS". Authors: Tim Darr (Lead), John Hamilton & Ronald Fernandes (Knowledge Based Systems, Inc) and Charles H. Jones (EAFB)
- Two meetings of the TSCC in 2011
 - Spring 2011: March 2 in Santa Ynez Valley (Vandenberg) in conjunction with RCC meeting
 - Fall 2011: October 24th Bally's Las Vegas in conjunction with ITC
- S. Nicolo reported TSCC status at ETSC meeting at the ETTC Show in Toulouse France.

Significant Activity

- ITC2011: Special Session held Wednesday Oct 26: Session 8 C-Band Special Session set up for ITC2011 -Joint session with TSCC & C-band working group (STANDING ROOM ONLY). Presentations posted on TSCC web site
 - 8:30 Intro/Agenda Review (TSCC) (Steve Nicolo)
 - 8:35 Opening Remarks - Test Resource Management Center (Gerald Christeson)
 - 8:45 C-Band Spectrum Regulatory Status- AFSMO (Fred Moorefield)
 - 8:55 C-Band Working Group (DoD) (Patrick Feeley)
 - 9:00 C-Band Channel Characteristics (Dr Michael Rice)
 -
 - 9:20 State of C-Band Standards (TSCC) (Scott Brierley)
 - 9:30 BREAK
 - 9:40 Open Floor Discussion (ALL)
 - 10:00 C-Band Hardware Overview (Vendors Presenting)
 - Transmitters: Antennas: Receivers:
 - 10:00 TCS:(Michel Roy)
 - 10:10 Quasonix:(Terry Hill)
 - 10:20 Semco(Doug O’Cull)
 - 10:30 ViaSat:(Ed Payne)
 - 10:40 L-3: (Mark Kukawski)
 - 10:50 TTC: (Paul Cook)
 - 11:00 Lumistar: (Kalyan Farrington)
 - 11:10 Orbit: (Yosi Avraham)
 - 11:20 Ktech (Chris Patscheck)

Significant Activity

■ Standards Reviewed:

- Draft document review of IRIG 118, *Test Methods for Telemetry Systems and Subsystems, Volume I* and focuses on Chapter 5 "Test Procedures for Telemetry transmitters."
- CCSDS 123 Red Book : "Lossless Multispectral & Hyperspectral Image Compression"
- CCSDS 121.0-P-1.1: Lossless Data Compression
- CCSDS 131.2-R-2 Red Book: Flexible Advanced Coding and Modulation Scheme for High Rate Telemetry Applications

Current TSCC Focus Areas

- New Telemetry Standards – i-net
 - iNet Com Link Std Section 4.5 (Comments by end of March)
 - Implementation Guidance for TmNS Radio FIPS PUB 140-2 Compliance (Comments by end of March)
- CCSDS 352.0-R-1: Cryptographic Algorithms (Comments by April)
- 1 Year Plaques for New TSCC Members

ACTION ITEM SUMMARY

- Person Action
- Steve Nicolo
 - Coordinate Spring 2012 TSCC Meeting with RCC at PAFB (Tuesday March 6, 2012)
 - Request "Letter" to IFT for (\$1000) from Steve N. (Coordinated with Bill R.)
 - Contact ICTS to see what mutual beneficial area can be coordinated.
 - ICTS verification of "White Space" standards.
 - Fix Spelling on TSCC.ORG web site of Wayne Klein (Secretary-Treasurer)
 - Put TENA-SDA.org as link on TSCC website & obtain TSCC access (PWD).
 - Special session presentations to be put on TSCC Web site.
 - Distribute name of new web host site and costs for future budgets
- Sheila Horan
 - Sheila Horan/Steve Nicolo: Review and make sure all alternates are on a sub-committee
 - Contact Thomas Grace and Bruce Lipe to verify what type of input is needed to review iNET
- Wayne Klein
 - Get alternate representative in place
- Myron Moodie
 - Contact Thomas Grace/Bruce Lipe to see what plans are to access public released standards.
 - RCC would be a reasonable suppository for reference documents?
- Dan Skelley
 - Contact Thomas Grace to see how to best access to iNet documents.
- All Committee Members
 - Feedback on IRIG 118 by 11/10/11
 - Names can be on but the not the associated government sponsor (Up to each member to decide if they need letter signed by commander (taken up through JAG).
-

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Spring 2012 Treasurer Report”

March 6, 2012
Radisson Hotel
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Treasurer Report

for the Period 10/25/11 thru 3/6/12

■ INCOME	
• Funding Received, IFT	\$ 1000.00
■ EXPENDITURES	
• None	\$ 0.00
■ Net Increase (Decrease) in Cash	\$ 1,000.00
■ Beginning Cash Balance	\$ 418.13
■ Ending Cash Balance	\$ 1418.13

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Spring 2012
Nominating
Sub-Committee Report

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Membership

- Sheila Horan – NMSU/ODU
- Scott Brierley - United Launch Alliance
- Chuck Weaver - Dynetics, Inc.

Sub-Committee Focus

- **The nominating sub-committee shall propose TSCC members and officers for approval by the membership.**
- **Prospective TSCC members and officers can be nominated by the TSCC membership or by a nominating subcommittee.**
- **All nominations must be approved by a membership vote.**

TSCC Membership Rules

- Adequate representation shall always exist from the diverse groups constituting the telemetry community
- Representatives of government and commercial entities shall each constitute a minimum of one-third of the regular TSCC Membership
- The remaining one-third may include, but is not limited to those in commercial, governmental, and academic organizations
- Membership by representatives of non-US entities shall not exceed 25% of the total regular membership

TSCC Group Definitions

- Government entities are defined to include agencies of the United States Government, foreign governments, and not-for-profit organizations under contract to them
- Commercial entities are defined as manufacturers or vendors of equipment, software, or systems, for-profit companies that use telemetry equipment, and suppliers of telemetry-related services, such as consulting, on a for-profit basis.

TSCC Membership Terms

- TSCC Membership Terms are for five years
 - Terms are staggered so that the terms of 20% (rounded to the nearest integer) of the regular membership end each year
 - Members may be re-nominated for additional terms by the nominating sub-committee.
- This Fall 2012 Klein, W., Klein, L., and Corry will have reached the end of their terms.
 - Nominating Committee Chair will check with each member as to their wanting to continue for another 5 years.

TSCC Makeup

- The TSCC currently consists of
 - 2 academic organization members
 - 6 government entity members
 - 7 commercial entity members
- Members from commercial entities belong in two different groups:
 - Telemetry equipment suppliers
 - Telemetry equipment users

TSCC Membership

■ Academia

- Sheila Horan, PhD
- Gerhard Mayer

■ Government

- Mark Bender
- Greg J. Kazz
- Lorin Klein
- Filiberto Macias
- Myron Moodie
- Dan Skelley

■ Industry

- Scott Brierley
- Diarmuid Corry
- Lee Eccles
- Brad Fleury
- Wayne Klein
- Steve Nicolo
- Chuck Weaver

■ Ex-Officios

- Teresa Telles (TG chair)
- Bill Rymer (IFT Rep)

■ Members Emeritus

- Merv MacMedan
- Erwin (Terry) Straehley

TSCC Membership

- The Aerospace Corporation
- United Launch Alliance
- ACRA Control, Inc.
- Boeing Commercial Airplane Co.
- Edge Consulting
- Apogee Labs, Inc.
- New Mexico State University

TSCC Membership

- NASA- Jet Propulsion Laboratory
- USAF
- White Sands Missile Range
- GVM-Consulting/AIRBUS
- Southwest Research Institute
- GDP Space Systems
- NAVAIR
- Dynetics, Inc.

One Open Membership Slots

- Mark Geoghegan has needed to decline his membership. There is open membership slot in the TSCC
 - Recommendations for the position:

New Membership

- Voting on Alternates:
 - Alternate for Greg Kazz: Scott Burleigh
- Alternates still needed for:
 - Mark Bender
 - Wayne Klein
 - Fil Macias

TSCC Officers

- Officers shall serve for a two year term of office
 - The term of office shall begin at the start of the TSCC Year in even calendar years
 - Traditionally the Vice-Chair succeeds to the Chair's position to fulfill a two year term as Chair
 - The Secretary-Treasurer may be re-elected
 - Officer Terms come due this Fall 2012
- Current Officers:
 - Chair – Steve Nicolo
 - Vice-Chair - Brad Fleury
 - Secretary-Treasurer – Wayne Klein
- Committee Chairs – all full

Open Actions

Nominating Committee Motions and Action Items:

- One open membership slot
- Four alternate positions open
- Officer slots?

Open Actions

Committee Memberships:

- TSCC members and alternates shall be appointed to sub-committees by the TSCC Chair.
- The Alternate shall be kept informed of the committee activities and will be expected to actively serve on a sub-committee
 - All but one alternate is on a committee
 - All members are serving on a committee

Open Actions

Members			Alternate		
Last	First	Committee	Last	First	committee
Bender	Mark	radio Freq			
Brierley	Scott	radio Freq/transd	McNatt	William	radiofreq
Eccles	Lee	Transducers	Grant	Robert	
Klein	Wayne	Network&Protocol			
Horan	Sheila	data comp/Nom	Marcellin	Michael	datacomp
Kazz	Greg	data comp	Burleigh	Scott	
Klein	Lorin	Recorder/reproducer	Buckley	Mark	rec/rep
Corry	Diarmuid	Network&Protocol	Yi	Hyong	N&P
Macias	Filiberto	radio Freq/N&P			
Mayer	Gerhard	ETSC	Freaud	Gilles	ETSC
Niccolo	Steve	Data multiplex/data comp	Carlson	John	radiofreq
Moodie	Myron	Network&Protocol	Abbott	Ben	N&P
Skelley	Dan	Network&Protocol	Malatesta	William	N&P
Weaver	Charles	Data multiplex	Dison	Bob	data multi
Fleury	Brad	Data multiplex & RF	Rob Trep	Edge	rec/rep;data multi

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Spring 2012 RF Subcommittee Reports”

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Membership

■ Scott Brierley, Chair - ULA

- Mark Bender
- Mark Dapore
- Brad Fleury
- Lloyd Lautzenhiser
- Eugene Law
- Warren Martin
- Bill McNatt
- Rich Siegal

Subcommittee Focus

- RF Subcommittee reviews standards dealing with the Radio Frequency (RF) telemetry link
- Current standards
 - RCC IRIG-106
 - RCC IRIG-118
 - RCC RF Handbook
 - CCSDS-401
 - CCSDS-411
 - SGLS
 - STDN
 - 1451.5

Significant Activity

- Reviewed IRIG (RCC) 118 Chapter 5 Pink Sheets
 - IRIG 118 Chapter 5 is Test Procedures for Telemetry Transmitters
- Changes to the document were mainly editorial and cleanup
 - Example: The test method for the center frequency and frequency stability test gives options for the modulation input, but the next paragraph, test procedure states the input should be shorted to ground
- No comments submitted from the RF subcommittee to the pink sheets

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Spring 2012 Data Multiplex”

Brad Fleury
March 6, 2012
Radisson Hotel

Membership

- Brad Fleury – Director Edge consulting and sales
- Alternate – Rob Trepa, Director Edge Consulting and Sales

Sometimes both of us will attend, but at least one will attend.

Membership

Membership – Current list

Bob Downing
Howard Eckstien (TBD)
Alain Hackstaff (TBD)
Bill Rymer
Jack Sheldon (NEW)
Dave Sniffin
Erwin Straehley
Duane Wheaton
Chuck Weaver

I am in the process of adding new members

Membership - Continued

- I am in the process of inviting members
 - Amergint (Mark McMillen, or member of his team)
 - L-3 Communications – James Yates, Kevin Ireland (or member of the L-3 team)

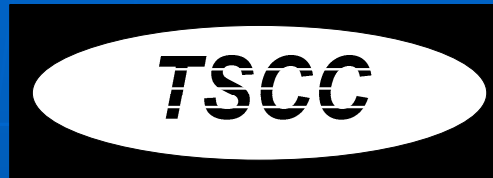
Sub-Committee Focus

- Current standards
 - IRIG-106 -13
 - Many telecons completed
 - Pink sheets will go out soon
 - Joint meeting with recorder committee
 - Telemetry App's Handbook (complete)
 - Pink sheet changes released

Open Actions

- **Action – Finalize subcommittee members and get agreement to participate**
- Support RCC ongoing efforts on future TMATS Handbook releases
- Support RCC ongoing effort to keep TMATS IRIG 106 Chapter 9 and XML Scheme Current

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Spring 2012 Networking and Protocols Subcommittee Report”

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Membership

- Diarmuid Corry, Chair – Curtiss-Wright Controls, Avionics and Electronics
 - Ben Abbott, Southwest Research Institute
 - Myron Moodie, Southwest Research Institute
 - Wayne Klein, Apogee Labs
 - Fil Macias, White Sands Missile Range
 - William Malatesta, NAVAIR
 - Steve Nicolo, GDP Space Systems
 - Dan Skelley, NAVAIR
 - Hyong Yi, Curtiss-Wright Controls, Avionics and Electronics

Subcommittee Focus

- iNET
- Current Standards
 - Test Article Standard v0.8.2
 - System Management Standard v0.8.3

Significant Activity

- None as yet

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Spring 2012 Coding and Data Compression Sub-committee Report

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
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Membership

- Sheila Horan, Chair - NMSU
 - Michael Marcellin, Alternate - Univ. of Arizona
 - Greg Kazz – JPL;
 - Chuck Creusere – NMSU;
 - Stephen Horan – NMSU;
 - Aaron Kiely – JPL;
 - Matt Klimesh – JPL;
 - M. MacMedan – emeritus;

Membership - Continued

- George Nelson - Delta Information System;
- Jimmie Perkins – Raytheon;
- Khalid Sayood - Univ. of Nebraska – Lincoln;
- Pen-Shu Yeh - NASA – Goddard;
- Gary Thom - Delta Information System;
- Steve Nicolo - GDP Space Systems

Sub-Committee Focus

- Data Compression and Coding
- Current standards – updates

Significant Activity

TSCC Website

- Updated website
 - Shows current reviews
 - Shows links for further information for coding standards
- Need to delete part of the website that was a place holder

Significant Activity

ETSI

- REN/JTC-DVB-301 Digital Video Broadcasting
- This document specifies a transmission system for hybrid satellite and terrestrial digital television broadcasting to mobile terminals
- The purpose of the DVB-SH standard is to provide an efficient transmission system using frequencies below 3 GHz suitable for Satellite Services to Handheld devices, in terms of reception threshold and resistance to mobile satellite channel impairments.
- Missed the deadline of 12/7/2011

Significant Activity

CCSDS Lossless Data Compression CCSDS 121.0-P-1.1 - Updates

- *This Recommendation defines a source-coding data-compression algorithm and specifies how data compressed using the algorithm are inserted into source packets for retrieval and decoding.*
- Committee had no additional recommendations for this document.
Review complete

Significant Activity

CCSDS Flexible Advanced Coding and Modulation Scheme for High rate telemetry Applications CCSDS 131.2-R-2 - Red

- This draft Recommended Standard defines a Serially Concatenated Convolutional turbo Coding (SCCC) scheme for telemetry applications. The current issue reflects comments resulting from review of the original issue.
- Review complete

Significant Activity

CCSDS Lossless Multispectral Image
Compression - Red

CCSDS 123.0-R-1

- Committee made comments last year.
Review complete
- CCSDS committee plans to begin work
on a lossy compression scheme.

Significant Activity

CCSDS Cryptographic Algorithms, proposed draft standard - Red

CCSDS 352.0-R-1

- This draft Recommended Standard provides the basis for standard CCSDS security algorithms. The document recommends a single symmetric block-cipher encryption algorithm and several authentication algorithms.
- Considering sending out to committee, review needed by April

Significant Activity

iNet: Seeking any input at all

- iNet Com Link Stnd section 4.5
 - Have sent out to committee for review – comments due end of March
- Implementation Guidance for TmNS Radio FIPS PUB 140-2 Compliance
 - This system provides link layer encryption. In addition, a second Type 1 network encryption system is used to protect communications between the enclave on the test article and the enclave on the ground.
 - Have sent out to committee for review – comments due end of March

Open Actions

- Sent out for Review; Comments due back the end of March:
 - Review iNet documents
 - REN/JTC-DVB-301 Digital Video Broadcasting
- Update TSCC website

TELEMETERING STANDARDS COORDINATION COMMITTEE



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**“TSCC Spring 2012
Recorder / Reproducer
Committee Report”**

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Membership

- Lorin Klein, Chairman
- Mark Buckley (JDA Systems, Concord, CA, USA)
Alternate Chairman
 - Balázs Bagó (Heim Systems GmbH, Bergisch Gladbach, Germany)
 - Bob Baggerman (Georgia Tech Research Institute, Atlanta, GA, USA)
 - Tim Chalfant
 - Tim Gatton (Wyle Laboratories, California, Maryland, USA)
 - Mike Lockhard (EMC Corp, Irvine, California, USA)
 - Rob Tropa (Edge Consulting and Sales USA)
 - Bob Dison (Dynetics)

Sub-Committee Focus

- Data Recorders, Ground and Airborne
- Standards in Place

- IRIG 106-09 -- Range Commanders Council (RCC) Telemetry Standards

<http://www.irig106.org/docs/106-09/>

- STANAG 4575 – North Atlantic Treaty Organization (NATO) Standard Agreement (STANAG) – NATO Advanced Data Storage Interface (NADSI) Allied Engineering Documentation Publication (AEDP)

<http://www.nato.int/STRUCTUR/AC/224/standard/4575/4575.htm>

- ANSI INCITS 175-1999 (R2004) 19mm Type ID-1 Recorded Instrumentation Digital Cassette Tape Format (revision and redesignation of ANSI X3.175-1990 (R1995))
- MIL-STD-2179 – Helical Digital Recording Format For 19-MM Magnetic Tape Cassette Recorders/Recorders

Significant Activity

- RCC Telemetry Group Recorder Reproducer Committee
 - IRIG 106-13 is in Change Request (CR) process for upcoming Pink Sheet cycle leading to 2013 release.
- STANAG 4575, Custodial Standards Team (CST)

Significant Activity

IRIG 106-13 Ch 10

■ CRs under consideration:

- High speed imagery format
- Higher fidelity Relative Time Clock (RTC) for increased time stamping accuracy of high speed data (10 to 100 MHz RTC)
- Implement Ethernet interface for RMM's
- Addition of Event Condition of Capture Mode
- Data Transport Streaming Using TCP/IP
- New serial interface recorder commands to facilitate existing data security and handling CONOPS.
- PCM Word Level Filtering (SECURITY REQUIREMENT)
- Addition of Cyclic Redundancy Check (CRC) Detection in Ethernet Packets

Significant Activity

STANAG 4575

- Upcoming 18th CST meeting, 18-19 April, Hotel Europa, Le Spezia, Italy
- Changes Under Consideration
 - Ethernet w/ 1000BaseT- minimum as alternate download protocol – maintain Fibre Channel
 - New Protocol – iSCSI and/or dynamic IP addressing for multiple memory systems
 - Revised cable/connector requirements, power – maintain Fibre Channel compatibility with ground stations
 - Shells for Ethernet should be MIL twist lock type
 - One power input is all that will be allowed
 - RMMs should allow for Ethernet or Fibre Channel

Open Actions

- Pink Sheet of IRIG 106-13
- 18th CST for STANAG 4575
 - E-mail Custodian Ms. Kay Beigh Kay.Beigh@pentagon.af.mil, and Thomas A. Canniere, THOMAS.A.CANNIERE@saic.com
 - Detailed agenda is forthcoming.
 - Primary topic: Review the updated STANAG (including AEDP-6) that incorporates Ethernet as an alternative download protocol to Fibre Channel

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Spring 2012 ETSC Committee Report”

March 6, 2012
Radisson Hotel
Cape Canaveral, FL
(PAFB)

Membership

- **Committee Chair**

Gerhard Mayer , Gilles Freaud (A)

- **Subcommittee Chair**

- **SC-1: RF Spectrum & Frequ. M´nt**

Jean-Claude Ghnassia, Jean Isnard (A)

- **SC-2: Data Acquisiton & Processing**

Werner Lange, Christian Herbepin (A)

- **SC-3: Data Recording & Storage**

Steve Lyons , Balasz Bagó (A)

- **SC-4: Network Telemetry**

Eckhard Schulze

(A)...Alternate

Subcommittee Focus(1)

- **SC-1: RF Spectrum & Frequ.**
M´nt: Spectrum availability & efficient techniques, data integrity in the transmission channel
- **Current Standards**
 - **IRIG 106-11, Chapter 2+Annex A&M**
 - IEEE 802.11n/15.3/15.4
 - DVB-T & OFDM derived industry standards (ETSI EN300 744 V1.6.1)

Subcommittee Focus(2)

- **SC-2: Data Acquisition & Processing** :Ensure acquisition and time tagging in high-rate data streams
- **Current Standards**
 - IEEE 1451
 - IEEE 1588
 - IEEE 802.11.n/15.1/3/4
 - **IRIG 106-11, Chapter 4**
 - IRIG 218-07 (TMoIP)

Subcommittee Focus(3)

- **SC-3: Data Recording & Storage:**
Info collection & dissemination
on recording system and techniques
- **Current Standards**
 - **IRIG 106-09, Chapter 10**
 - **XidML 3.0**

Subcommittee Focus (4)

- **SC-4: Network Telemetry:** Info collection & dissemination on network telemetry systems

- Current standards:

IEEE803.3 (Ethernet 100-Tx), basis for long range WLAN functionality

iNet Metadata standard

Significant Activity

- Preparation of the „ETSC Open Meeting“ as part of the ETC 2012, 12 – 14 June, 2012 in Munich
- New Subcommittee on Network Telemetry (SC.4), call for members, defining scope of work

Open Actions

- “WRC`07” C-band: upcoming RF standards
- IEEE 802.n and UWB as a basic standard for wireless intra-aircraft RDA-networking
- Track emerging standards of Cognitive Radio Systems, IEEE 801.15&22, IEEE1900.1/2/4
- ETSI TR102 802/803, ITU-R (WP 1B) AI 1.13 of the WRC-12

ETSC Open Meeting, ETC 2012

Munich, 14 June, 2012

Preliminary Agenda

1. Committee Reports:

ETSC	<i>Gerhard Mayer, GVM-Consultants</i>
RCC TG	<i>Michael Golackson, Edwards AFB</i>
TSCC	<i>Steve Nicolo, GDP Space Systems</i>
CCSDS	<i>Rob Ritter, RT Logic</i>

2. ETSC Round Table Discussion:

"Standards on wire-bound and wireless transducer buses and impact to data acquisition systems"