

TELEMETERING STANDARDS COORDINATION COMMITTEE



**SPONSORED BY
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Fall 2009 Meeting Las Vegas, NV

October 26, 2009

Agenda

- | | | |
|-------------|---|--------------|
| 800 | Call to Order | Horan |
| 810 | Attendance and determination of Quorum | Grebe |
| 815 | Review and Approve Agenda
change order | Horan |
| 0830 | Officer Reports | Horan |
| | Chair | Grebe |
| | Secretary-Treasurer | |
| | Approval and review of last Minutes | |
| | Financial Status | |

Agenda

0900 Committee Reports

Nominating Committee
Radio Frequency
Data Multiplex
Networking and Protocols
Transducers
Coding/Data Compression
Recorder / Reproducer
ETSC Report
iNET report

Yates
Brierley
Nicolo
Yates
Eccles
Horan
Klein
Mayer
Skelley

1100 Old Business
Joint panel and session

Horan

1130 New Business
Action Items

All

1200 Adjourn

All

TELEMETERING STANDARDS COORDINATION COMMITTEE



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Chairman's Report

October 26, 2009

Significant Activity (2009)

- Standards from i-net – release soon – report to follow at this meeting.
- Best telemetry standards paper will be awarded at ITC 2009 (Key Components of the iNET Test Article Standard by Grace, Kenney, Moodie, and Abbott)
- 2 meetings of the TSCC were held - 2009
 - (Spring) March 11th joint TSCC/RCC/TG /iNET meeting in San Antonio, TX.
 - (Fall) October 26th in Las Vegas in conjunction with ITC

Current TSCC Focus Areas

- New Telemetry Standards – i-net
- Membership recruiting – non active members
- Web improvements
- Best paper and special sessions for ITC (Panel at ITC)

Treasurer Report

for the Period 10/25/08 thru 10/26/09

■ INCOME	
• Funding Received, IFT	\$1,000.00
■ EXPENDITURES	
• Award Plaques-2008	\$365.30
• Award Plaques-2009	\$534.90
• Spring Meeting Luncheon	\$ 80.65
• Web Hosting (past 30 months!)	\$598.50
• Domain name thru 2015-01-03	\$114.95
■ Net Increase (Decrease) in Cash	(\$694.30)
■ Beginning Cash Balance	\$1979.76
■ Ending Cash Balance	\$1285.46

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2009
*Nominating
Sub-Committee Report*

October 26, 2009
The Riviera Hotel
Las Vegas, NV

Membership

- James Yates - L-3 Communications
- Scott Brierley - United Launch Alliance
- Lee Eccles - Boeing

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 Makeup

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

Two Open Membership Slots

- There are two open membership slots in the TSCC
 - Previously had three open slots
 - George Manz resigned and provided a second open slot
 - Russ Jedlicka's slot is open
- We could use some more academia or another industry slot

TSCC Membership

** as of October 2009*

- Academia
 - Sheila Horan, PhD
 - Gerhard Mayer
- Government
 - Loren Klein
 - Greg J. Kazz
 - Filiberto Macias
 - Dan Skelley
 - Myron Moodie
 - Mark Bender
- Industry
 - Scott Brierley
 - Lee Eccles
 - David Grebe
 - John Kolb
 - Steve Nicolo
 - James A. Yates

New Membership

- Possible new members
 - Chuck Weaver (CBW Technologies) has approached the committee and offered up himself for an open slot

TSCC Chair

- TSCC Chair Term will expire after the 2010 Fall meeting
 - 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

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.
- Two Membership slots expire this year
 - The TSCC year begins immediately following the TSCC Annual Meeting, held in conjunction with the International Telemetry Conference.
 - Eccles, Mayer

TSCC Membership Terms

TSCC Members					
2009	2010	2011	2012	2013	2014
TBD	TBD	Scott Brierley	Loren Klein	Filiberto	Mark Bender
Lee Eccles	Greg J. Kazz	James A. Yates	David Grebe	Macias	Myron Moodie
Gerhard Mayer	Steve Nicolo	Dan Skelley	John Kolb	Sheila Horan	

Second Nominating Committee Member Required

- The Nominating sub-committee shall consist of three members of the TSCC of any category
- The membership shall consist of:
 - the immediate past Chair (or the most recent prior chair if the immediate past chair is unable to serve) who shall chair the sub-committee, and
 - Two Members at Large elected by the TSCC membership

Open Actions

Nominating Committee Motions and Action Items:

- Two open membership slots
- Motion made & carried : To Accept Myron Moodie from SWRI as a TSCC member. He will be in the Class of 2014.
- Sheila reported that she has tried unsuccessfully to contact Mike Pizzutti and due to his nonattendance, she has decided to vacate his membership. Myron Moodie will fill his slot, leaving two positions still open. The desire is to fill these with Government members, perhaps from EAFB and NASA for balance.
- Sheila reported that she will follow up with the WSMR members who have moved on to other responsibilities and may not wish to continue membership.
- ACTION ITEM : Marj will need to reflect the two changes on the web site.

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2009 RF Subcommittee Report

October 26, 2009
The Riviera Hotel
Las Vegas, NV

Membership

- Scott Brierley
 - Mark Bender
 - Mark Dapore
 - 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

- No standards reviewed since the Spring meeting

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2009

Data Multiplex Subcommittee

Report

October 26, 2009
The Riviera Hotel
Las Vegas, NV

Membership

- Steve Nicolo
 - Howard Eckstien
 - Alain Hackstaff
 - Bill Rymer
 - Dave Sniffin
 - Erwin Straehley
 - Duane Weaton

Sub-Committee Focus

- Current standards
 - IRIG-106
 - Part 1: Telemetry Standards
 - Chapter 3: FM Data Standards
 - Chapter 4: PCM Data Standards
 - Chapter 8: Bus Data Formatting Standards
 - Chapter 9: TMATS
 - Part 2: Telemetry Networks
 - Chapter 4: Packet Telemetry Standards
 - RCC IRIG-118: Test Methods
 - RCC IRIG-119: Telemetry App's Handbook

Significant Activity

- Joint RCC/TSCC Meeting March 2009
- RCC Completed, Distributed and Reviewed Pink Sheets (Oct 2008)
 - Chapter 9 Changes
 - Message Data Attributes New
 - DDML 3.1 Changes
 - Appendix O Changes
 - Derived Parameter English New
- TMATS
 - RCC Work Continues on TMATS Handbook
 - RCC Agreed to Provide Early TMATS Handbook to TSCC Data Multiplex Committee
- Looking for Additional Subcommittee Members (With TMATS Experience to Support TMATS Handbook Review)

Open Actions

■ New Work Tasks

- Support RCC ongoing effort to keep TMATS IRIG 106 Chapter 9 and XML Scheme Current
- Find additional TSCC Subcommittee Members to Support TMATS Handbook Review
- Explore possible related INET activities

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2009

Networking & Protocol Sub-Committee Report

October 26, 2009
The Riviera Hotel
Las Vegas, NV

Membership

- James Yates, L-3 Communications Telemetry & RF Products
 - Mark McMillan – CEO Amergint (former CEO and founder of RT Logic)
 - David Grebe – Apogee labs
 - Ken Fischer – L-3 Communications Nova
 - John Kolb – (Diarmid is alternate)
 - Looking for recommendations from other TSCC members

*No reviews have been sent out to sub-committee members this year

Subcommittee Focus

Focus area 1 - iNet

- RCC IRIG-106 Part 2 (future)
 - A planned mid-year industry day for the iNet was cancelled and this has thrown the standards development schedule into an unknown timeframe
 - Recently working groups have restarted
 - TASWG Test Article Standard is now at *Proposed version 0.7.4 - October 8, 2009*
 - SMWG – released Component Interfaces Standard - Proposed version 0.1 - October 9, 2009

Subcommittee Focus

Focus area 1 - CCSDS

- Recently completed reviews

Document #	Document Name	Type	Date	Issue	Comments Due By
CCSDS 735.1-R-2	Asynchronous Message Service	Red Book	06/2009	2	9/25/2009
CCSDS 505.0-R-2	XML Specification for Navigation Data Messages	Red Book	06/2009	2	9/1/2009
CCSDS 871.0-R-2, 871.1-R-2, 872.0-R-2	Spacecraft Onboard Interface Services-- Application Support Services	Red Book	06/2009	2	8/7/2009
CCSDS 851.0-R-1, 852.0-R-1, 853.0-R-1, 854.0-R-1, 855.0-R-1	Spacecraft Onboard Interface Services-- Subnetwork	Red Book	05/2009	2	7/15/2009
CCSDS 506.0-R-1	Delta-Differential One Way Ranging (Delta-DOR) Operations	Red Book	04/2009	1	6/30/2009

Subcommittee Focus

Focus area 1 - CCSDS

- Currently in review

Document #	Document Name	Type	Date	Issue	Comments Due By
CCSDS 650.0-P-1.1	Reference Model for an Open Archival Information System (OAIS)	Pink Book	08/2009	1.1	11/13/2009
CCSDS 521.0-R-2	Mission Operations Message Abstraction Layer	Red Book	09/2009	2	12/1/2009
CCSDS 520.1-R-1	Mission Operations Reference Model	Red Book	10/2009	1	12/11/2009
CCSDS 652.0-R-1	Audit and Certification of Trustworthy Digital Repositories	Red Book	10/2009	1	12/16/2009

Subcommittee Focus

- **IEEE-1588**

- **Status (no change)**

- The IEEE 1588-2008 (version 2) was approved by the IEEE Standards Board Review Committee as an IEEE standard at their March 27, 2008 meeting. The standard was published on July 24, 2008.

Significant Activity

- No real significant activity since the spring meeting
- Hopefully with the restart of iNet working groups TmNs standards will start to go to the RCC-TG

Open Actions

- None

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Transducer Subcommittee

October 26, 2009

Membership

- Lee Eccles, Chair – Boeing Test & Evaluation
 - None

Subcommittee Focus

- Transducers
- Current Standards
 - IEEE 1451.0
 - IEEE 1451.2 - Currently being revised to support USB & RS-232...
 - IEEE 1451.3 – Not Viable
 - IEEE 1451.4 – No Change
 - IEEE 1451.5 _ Wireless – No change
 - IEEE 1451.6 – Intrinsically safe _No change
 - IEEE 1451.7 RF ID Tag Interface - Released

Significant Activity

- Release of IEEE 1451.7

Open Actions

- None

TELEMETERING STANDARDS COORDINATION COMMITTEE



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Coding and Data Compression Subcommittee

Status Report
October 26, 2009

Membership

- Sheila Horan, Chair - NMSU
 - Michael Marcellin, Alternate - Univ. of Arizona
 - 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

Open Actions

This week, CCSDS will meet in the Netherlands:

the meeting of the CCSDS Multispectral and Hyperspectral Data Compression working group. Our primary objective at the meeting is to select from the two proposals for standardization of a lossless compressor (intended primarily for use onboard spacecraft)

Open Actions

- Complete information table for website
- Find new Chair

TELEMETERING STANDARDS COORDINATION COMMITTEE



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“TSCC Fall 2009 Committee Reports”

October 26, 2009
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Membership

- Lorin Klein (AAC, Eglin AFB, FL, USA), Chairman
- Mark Buckley (JDA Associates, Concord, CA, USA)
Alternate Chairman
 - Balázs Bagó (Heim Systems GmbH, Bergisch Gladbach, Germany)
 - Bob Baggerman (Georgia Tech Research Institute, Atlanta, GA, USA)
 - Tim Chalfant (AFFTC, Edwards AFB, CA, USA)
 - Tim Gatton (Wyle Laboratories, California, Maryland, USA)
 - Mike Lockhard (EMC Corp, Irvine, California, USA)
 - Barbara Wood (QinetiQ Boscombe Down, Salisbury, Wiltshire, UK)

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)
<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 IRIG 106-09 released

Changes effect:

- Chapter 10 (Solid State Recorders),
 - Revised Recorder Configuration File Section
 - Added Telnet to Ground Recorder Interface Protocols
 - Packet Header Version Changed to Data Type Version
 - Revisions to 16PP194, Analog, Computer Generated Data Packets
 - Revisions to Recorder Discrete Controls
 - Revisions to Declassification
 - Revisions to RMM and Added RMM Commands for Declassification
 - Revisions to Data Interoperability

Significant Activity (cont.)

- RCC IRIG 106-09 Changes (cont.)
 - Chapter 9 (Telemetry Attributes Transfer Standard–TMATS), and
 - Chapter 6 (Digital Cassette Helical Scan Recorder/Reproducer, Multiplexer/Demultiplexer, Tape Cassette, and Recorder Control and Command Mnemonics Standards)
 - Clarify States and Commands (Arguments and Returns)
 - Add Mil-Std-1553 Command and Control Protocol
 - Add Ethernet Command and Control Protocol

Significant Activity (cont.)

■ RCC IRIG 106-09 Changes (cont.)

- Chapter 10 and Chapter 6 Configuration Management Systems Instituted

■ STANAG 4575 Edition 3, 8 May 09

- Increases RMM transfer rate to 2 Gb/s from 1 Gb/s – copper Fibre Channel (FC)
- Limited power supply cable length to 3 meters
- Eliminated the term “recommended” for some optional commands
- Clarifies FC cable wiring/connection and control priority when installed in aircraft
- A COTS portable download station w/ cables is in use in NATO and available as COTS

Open Actions

- RCC TG Addressing Ground TM Recorders
 - IRIG 106 Chapter 7 -- "Ground Based Digital Recording Standard (Solid State and Disk Systems)"
- RCC TG preparing updates for IRIG 106-11 Chapter 10 Release
- Update to IRIG 118
 - IRIG 106 Ch 10 format validation techniques

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ETSC Report

October 26, 2009

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)

(A)...Alternate

Subcommittee Focus

- SC-1: Spectrum availability & efficient use, data integrity in the transmission channel
- Current Standards
 - IRIG 106-09, Chapter 2
 - (IEEE 802.11n/15.3/15.4)
 - DVB-T & OFDM derived industry standards (ETSI EN300 744 V1.6.1)

Subcommittee Focus

- SC-2: 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 106-09, Chapter 3
 - IRIG 218-07 (TMoIP)

Subcommittee Focus

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

Significant Activity

- ETSC meeting at the ETTC 2009, addressing the storage media evolution (*Pascal Morel, Zodiac Aerospace*)
- ETSC round table (ETTC session 12) „Towards a common Ethernet Data Format for Instrumentation“ (*chair Gilles Freaud, Airbus*)
- Reviewing RF classic modulation standards comparison with OFDM-based techniques
- Review and comments on IRIG 106-Ch.10 to RCC-TG

Open Actions

- “WRC Bands” Telemetry Issues:
C-Band Systems&Standards, tracking algorithms& systems
- Investigate potential of existing standards for wireless (e.g. intra-aircraft)RDAU-networking
(IEEE 802.11n and UWB),coop.with ITU-WP 5B
- *New Subcommittee on iNET proposed*
- Next ETSC- Meeting
*Venue: Hamburg Congress Center,
May 17 - 20, ETC 2010, Hamburg /Germany*

NEW Business

- Review/vote on support letters and alternates

TSCC Program for 2009 – 2010

- Standards Paper Award – Tuesday
- Special Session – Tuesday afternoon
- Follow-up on i-net Standards
- Review any standards requested
- Spring meeting

ITC Special Session for 2009

This session has been created to allow a panel of experts to share their perception of the current state of the frequency spectrum they use, issues or concerns in the usage and what impacts they see based on current legislation. Input from the audience is expected.

ITC Special Session for 2009

The last hour of the meeting will be briefings/presentations on on-going task efforts being undertaken by the RCC-TG, including progress to date, expected results, interesting findings and expected completions.

ITC Special Session for 2009

Panel:

Howard McDonald from the Office of
spectrum Management

Clinton Robbins from RCC-FM

Other New Business 2009

- Reporting response to standard reviews (subcommittee reports, and entire group responds)
- Other issues/concerns/ideas?

Action Item Review

Spring Meeting: RCC or iNET or IFT meetings

iNET access – chair, Dan Skelley

T-MATS - all

Request funding – chair

Fall meeting – special session

Adjourn