TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

SPONSORED BY
INTERNATIONAL FOUNDATION FOR TELEMETERING

Spring 2011
TSCC Meeting
Vandenberg AFB

March 2, 2011

Marriott Hotel

Santa Ynez Valley

Agenda

1700	**Call to Order**	**Nicolo**
1715	**Attendance and determination of Quorum**	**Grebe**
1725	**Review and Approve Agenda**	**Nicolo**
1730	**Officer Reports**	
	Chair	**Nicolo**
	Secretary-Treasurer	**Grebe**
	Approval and review of last Minutes	
	Financial Status	
	Action Item Review	**Nicolo**

Agenda

1800   Committee Reports

        Nominating Committee   **Horan**

            New nominations/follow-up on members

            Changes since Last meeting

        Radio Frequency   **Brierley**

        Data Multiplex   **Fleury**

        Networking and Protocols   **TBD**

        Transducers   **Eccles**

        Coding/Data Compression   **Horan**

        Recorder / Reproducer   **Klein**

        ETSC Report   **Mayer**

19:20 Break

19:30 Old Business   **Nicolo**

        Fall Meeting 2010: How did joint session go?

        Best Paper Award

Agenda

20:00 New Business **All**
       iNet
       Fall special Session at the ITC 2011 (C-Band, Bit Sync
                Standards...)
       Best Paper Award

21:00 Adjourn **All**

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Call to Order and Attendance

March 2, 2011
Marriott Hotel
Santa Ynez Valley

Members and Alternates

Members		Alternate	
Last	**First**	**Last**	**First**
Bender	Mark		
Brierley	Scott	McNatt	William
Eccles	Lee	Grant	Robert
Klein	Wayne		
Horan	Sheila	Marcellin	Michael
Kazz	Greg	Greenberg	Edward
Klein	Lorin	Buckley	Mark
Corry	Diarmuid		
Macias	Filiberto	Balizan	Ernesto
Mayer	Gerhard	Freaud	Gilles
Nicolo	Steve	Carlson	John
Moodie	Myron	Abbott	Ben
Skelley	Dan	Malatesta	William
Weaver	Charles		
Fleury	Brad	Trepa	Rob
Telles	Teresa		
Rymer	Bill		
MacMedan	Merv		
Straehley	Erwin		

Attendance & Quorum Determination

- Meeting called to order at 17:00
- Attendees were

    Mark Bender (m)
    Scott Brierley (m)
    Lee Eccles(m)
    Brad Fleury (m)
    Edward Greenberg (a for G. Katz)
    Sheila Horan (m)
    Greg Kazz (m)
    Lorin Klein(m)
    Wayne Klein (a for D. Grebe)
    Filiberto Macias (m)
    Myron Moodie (m)
    Steve Nicolo (m)
    Chuck Weaver (m)
    Teresa Telles (RCC TG-Chair)

Legend:
(m) Is a member
(a) Is an alternate
(*) Invited Guest/past member

A quorum of members was present.

Significant Activity

- No standards reviews since ITC

- Best telemetry standards paper was awarded at ITC 2010

- Web Master Resigned

- Two meetings of the TSCC were held - 2010
  - (Spring) April 20 in Newport News/Hampton VA.
  - (Fall) October 25th in San Diego in conjunction with ITC

Significant Activity

- Special Session was held at ITC 2010 (Joint TSCC/RCC)
  - TSCC Portion (iNet Standards Implementation-3 different views)
    - Three TSCC members presented information about their connection with and application of Draft iNET standards.
    - TSCC volunteers: Lorin Klein, Lee Eccles, and Dan Skelley. James Yates moderated the session
    - This session has been created to stimulate dissemination of information and discussion about future telemetry standards.
  - RCC Portion
    - Presented RCC Reports

Current TSCC Focus Areas

- New Telemetry Standards – iNET
- Membership recruiting
- Web Site : New Web Master
- Fall meeting will be at Bally's in Las Vegas, NV Oct 24-27 – date of meeting not set; may coordinate with CCSDS and ITC.
- Best paper Award

Open Actions

- All members need to look at and comment on iNET standards

- Need to look at Fall special Session – what do we want to do?

- Diversity of membership to replace James

- Alternates needed for Macias, Weaver, Fluery, Bender

- Vice-Chair needed

Treasurer Report
for the Period 10/22/10 thru 2/24/11

- INCOME
  - Funding Received, IFT $0.00

- EXPENDITURES
  - Web Hosting $ 0.00

- Net Increase (Decrease) in Cash $ 0.00

- Beginning Cash Balance $ 1,445.22

- Ending Cash Balance $1,445.22

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.

- Greg Kazz's term expired Fall 2010 – we decided to postpone the vote until the spring. Greg has indicated that he would like to continue, and we recommend that his term be extended for another 5 years.
  - This Fall 2011 Brierley, and Skelley will have reached the end of their terms. Nominating committee will ascertain if they are willing to serve and we will vote at the fall meeting.

TSCC Makeup

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

TSCC Membership

*as of October 2010

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
- Diarmuid Corry
- Steve Nicolo
- *James A. Yates
- Brad Fleury
- Chuck Weaver

Ex-Officios
- Robert Givens
- Bill Rymer

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.

Two Open Membership Slots

- With the resignation of David Grebe and James Yates There are two open membership slots in the TSCC

- Nominating committee Recommends that Wayne Klein be voted in as a full member to replace David.

- Nominating Committee also recommends that Wayne Klein take over as Secretary/Treasurer

New Membership

- Possible new members
  - One new member needed – wireless/satellite area?
  - Currently searching for nominees
- Voting on Alternates:
  - Bob Dison alt for Chuck Weaver
  - Rob Trepa alt for Brad Fleury
  - Hyong Yi alt for Diarmuid Corry
  - Chris Braun alt for Fil Macias

TSCC Chair

- TSCC Chair Term expired 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

- Steve Nicolo has taken over as Chair of the TSCC
- Vice-Chair seat is still open
- All Committee Chairs are currently filled

Open Actions

Nominating Committee Motions and Action Items:

- One open membership slot
- One Vice-Chair position open.
- One alternate position open – Mark Bender

Membership

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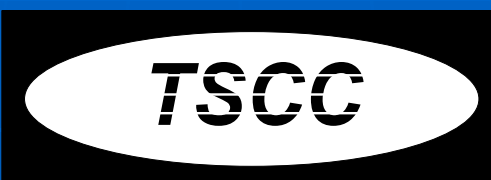 - Warren Martin
  - Bill McNatt
  - Rich Siegal

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

- No standards reviewed since the Fall meeting

Membership

- Brad Fleury – New Data Multiplex committee chair.

- 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 (NEW)
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 – still in the process of figuring out how much work this will require

  - Amergint (Mark McMillen, or member of his team)
  - L-3 Communications – James Yates, Kevin Ireland (or member of the L-3 team)
  - Measurement specialties – Danny Uehara

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

- TMATS Handbook – Significant amount of work has gone into the handbook over the last year.

- TMATS XML Schema

- Chapter 10 recorder standards as it relates to TMATS

- Best Source Selection (BSS) Standards

  - Continued pushing need for standard for BSS. RCC to start discussions in March 2011

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
- Explore possible related INET activities

James Yates left the TSCC. We are working on getting new chair for this subcommittee.

Membership

- **Lee Eccles, Chair – Boeing Test & Evaluation**
  - No list maintained

Subcommittee Focus

- Transducer Standards
- Current Standards
  - IEEE 1451 Family

Significant Activity

- IEEE 1451.2
- Point to Point Digital Transducer Standard
  - UART Interface Standard
  - SPI Interface Standard
- This revised standard is approaching the balloting stage
- The Ballot invitations have been released.

Significant Activity

- IEEE 1451.4

- TEDS associated with an analog Transducer

- This standard is being revised

- The balloting closed March 1

- The committee needs to review the ballots to decide whether to change it or submit it to IEEE for approval & Publication

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

Significant Activity

- CCSDS

  - CCSDS 353.O-R-1 Symmectric Encryption reviews were due 2009

  - CCDSD 131.0-P-1.2 TM Synchrous Channel coding – reviews due by 4/19/2011

Significant Activity

- CCSDS - MULTISPECRAL HYPERSPECTRAL DATA COMPRESSION WORKING GROUP (SLS-MHDC)
  - Preparing the promotion to Red Book and agency review of CCSDS 123 "Lossless Multispectral & Hyperspectral Image Compression" this year
  - Will start looking at a possible lossy compression scheme

Significant Activity

- CCSDS- SPACE LINK CODING & SYNCHRONIZATION WORKING GROUP - work in progress

Update TM channel coding Blue book with LDPC codes	Blue
Update TM channel coding green book	Green – Info. report
Revision of space link protocol – coding & sync sublayer	Blue
Produce Blue book for SCC Codes	Blue

Significant Activity

- CCSDS- SPACE LINK CODING & SYNCHRONIZATION WORKING GROUP - work in progress

Produce Blue book for DVB-S2 codes	Blue
TM Channel coding & applications profiles	Magenta – best current practice
Erasure correcting codes for Near-earth & Deep space com	Orange - Experimental specification

Significant Activity

- iNet: Online files for System Management Standard, RF Network element Standard, iNet Com Link Standard, Test Article Standard, and Metadata Standard were reviewed. Sections relating to this committee are:

  - iNet Com Link Stnd section 4.5

  - RF Network Element Standard – Section 11 on Encryption

Open Actions

- Complete information table for website

- Update membership

- Review iNet documents

- Request input from committee on CCDSD 131.0-P-1.2 TM Synchrous Channel coding

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)

Subcommittee 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 re-designation 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
  - Completed Pink Sheet review of IRIG 106-11 and will be published during the summer of 2011.

- STANAG 4575, AEDP-3, AEDP-6

Significant Activity

RCC Document 118-10 Test Methods
August 2010 Pink Sheet Summary

- Title Change: Document 118 Volume IV -TEST METHOD FOR DIGITAL RECORDER/REPODUCER SYSTEMS AND RECORDER MEMORY MODULES –Completely new document describing how to test digital recorders and RMMs.

- Specifies test methods for RCC Document 106-09 with subsequent releases trailing each release of 106 by 2 years

- Only the basic packet types covered by the METS-231 are included in this release

- Future interoperability workshop will produce a set of "Golden Files" for potential incorporation

Significant Activity
RCC Document 106-11 Ch 9
Telemetry Attributes Transfer Standard (TMATS)
August 2010 Pink Sheet Summary

- Provided guidance on case sensitivity and blanks
- Added new group relationships involving the "R" (Recorder/Reproducer) Group
- Recorder/Reproducer (R) Group Attributes added:
  - Increased field size for Manufacturer and Model
  - User Defined Data Packets and Channel ID
  - Recording Events Channel ID
  - Event Data Processing Enabled
  - Event processing
  - Recording Index Channel ID
  - Input Stream De-randomization
- Added new TSPI/CTS data type

Significant Activity
RCC Document 106-11 Ch 10 Pink Sheet
August 2010 Pink Sheet Summary

The Committee is using a Change Request (CR) protocol to manage the activities under the -11 Update Release task.

- CR 11 –Added note clarifying bit settings with one channel (Section 10.6.5.2)

- CR 19 -Added new data type TSPI/CTS (Time-Space-Position Information and Combat Training System) data type (Section 10.6.16)

- CR 32 –Added and refined definitions of Reproduction and Reconstruction (Section 10.2 and 10.6)

Significant Activity
RCC Document 106-11 Ch 10 Pink Sheet
August 2010 Pink Sheet Summary (cont.)

- CR 33 -Changed "can not" to "shall not " in "Packets *shall not contain only filler or shall not be idle or empty. All packets that are generated shall contain data.*" (Section 10.6.1.e.); *included a note for duplicated text from STANAG 4575 variations, updated the Table of Contents, and corrected other minor errors*

- CR 37 –Updated Directory Block Format (Section 10.5.2.c)

- CR 38 -Removed the statement: "The TMATS file identifies the number of samples contained within each packet" (Section 10.6.5.2.b)

Significant Activity
RCC Document 106-11 Ch 10 Pink Sheet
August 2010 Pink Sheet Summary (cont.)

- CR 40 –Specifies the "Discrete Packet Channel Specific Data Word" length to be 32 bits (Section 10.6.6.2.a)

- CR 41 –Clarified PCM format and removed redundant language in Section 10.6.2.2

Significant Activity
STANAG 4575
From 16 Sep 2010 Custodial Support Team Meeting Minutes

- **Current Status**
  - Latest version is Edition 3, 8 May 2009
  - Defense IT Standards Registry (DISR)
    - AEDP-3 (Allied Engineering Documentation Publication) Advanced Data Storage Technology Memory Systems Sanitization Guide –No changes
    - AEDP-6 NATO Advanced Data Storage Interface (NADSI) Implementation Guide -Change 1 approved in Jan 2010

Significant Activity
STANAG 4575 Technical Considerations

- **Technical Considerations**
  - Partitioning (segmenting) of RMM –CST issued an Action item to solicit recommended approaches to segmenting future RMMs including supporting download.
  - Desire for a low cost alternate RMM physical interface; begin looking at next generation download interface (NADSI after Fibre-Channel; or, NADSI II)

Significant Activity
STANAG 4575 Technical Considerations (cont)

- RMM Power Issues –Need was highlighted to reevaluate current technology and trends. --expect call for recommendations from users and manufacturers
- Given current issues with partitioning, physical interface, power, future STANAG 4575 activity will be HIGH.

Significant Activity
Next STANAG CST Meeting

- **Next STANAG 4575 Custodial Support Team (CST) meeting 30 March 2011, Dynetics, Inc. Corporate Headquarters, 1002 Explorer Blvd. NW, Huntsville, Alabama, USA.**

  - Custodian, Ms Jennifer Hart (Jennifer.Hart@pentagon.af.mil)

  - Tom Canniere, 610-992-8765, (Cell) 484-686-4820 Cannieret@saic.com

Open Actions

- RCC publication of RCC Document 118-10 and IRIG 106-11 Summer of 2011

- STANAG CST —30 March, 2011
  - Upcoming request for recommended approach for segmenting (partitioning) of RMM with "use case" and ground station implementation
  - Strong consideration for substantive update to 4575 in the near future.

"Heads-up" to the user and vendor communities!"

Membership

- **Committee Chair**

  Gerhard Mayer , Gilles Freaud (A)

- **Subcommitee 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(1)

- SC-1 (RF Spectrum):Spectrum availability & efficient techniques, data integrity in the transmission channel

- Current Standards
  - IRIG 106-09, 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 Acq):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(3)

- SC-3 (Data Recording): Info collection & dissemination on recording system and techniques

- Current Standards
  - IRIG 106-09, Chapter 10
  - XidML 3.0

Significant Activity

- ETSC open meeting at the ETC 2010

- Reviewing RF classical modulation standards, comparison with OFDM-based techniques

- Review and comments on IRIG 106-Ch.10

Open Actions

- "WRC`07" C-band for AMT, RF standards
- IEEE 802.n and UWB as a basic standard for wireless intra-aircraft RDA-networking
- Track emerging standards Cognitive Radio Systems, IEEE 801.15&22, IEEE1900
- New Subcommittee on iNet (SC.4), call for officers & nomination
- ETTC 2011: ETSC Open Meeting
  (*Venue: Toulouse Centre de Congrès*
  16 June, 2011)

ETSC Open Meeting
ETTC 2011, Toulouse, 16 June 2011, 11 am

Preliminary Agenda

- Committee Reports: *ETSC, RCC TG, TSCC, CCSDS*

- Round Table Discussion:

Standardization of future measurement systems, configuration file format & interfaces

Old Business

- Review/vote on support letters and alternates.

- Joint session TSCC/RCC ITC

- 2010 ITC Special Session

- 2010 Best Standards Paper Award

Old Business

- Best Telemetry Standards Award was presented at ITC 2010: IHAL and WEB Service Interfaces to Vendor Configuration Engines

- Two meetings of the TSCC were held - 2010
  - (Spring) April 20 in Newport News/Hampton VA.
  - (Fall) October 25th in San Diego in conjunction with ITC

Old Business

- Special Session was held at ITC 2010 (Joint TSCC/RCC)
  - TSCC Portion - iNet Standards Forum - iNet Standards Implementation- (Views from 3 different TSCC members on the application of the Draft Specifications)
    - Dan Skelley: prospective from a TSCC member of iNET
    - Lee Eccles: discussed a like system in use (Boeing)
    - Lorin Klein: Eglin's perspective on iNET
    - This session was created to stimulate dissemination of information and discussion about future telemetry standards.

New Business

- New Telemetry Standards – iNET
- Membership recruiting (1 Additional Member)
- Fall meeting will be at ITC - Bally's in Las Vegas, NV Oct 24-27 –
  - 8:00 AM to Noon on Monday
- TSCC Web Master Retired. Must re-host TSCC Site and get new Web Master
- Best ITC Standards Based Paper Award
- Presentation at EETC in France

New Business

- Proposed Special TSCC Session at ITC 2011
  - C-Band Open Forum
    - Presentations
      - Antenna's
      - Receivers
      - Transmitter
      - Physics of C-Band
      - What the working group is doing?
    - Open Forum
      - Q & A Session
      - Open discussion with the panel