TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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INTERNATIONAL FOUNDATION FOR TELEMETERING

TSCC Fall 2015 Meeting

Oct 26, 2015 (Monday) – 13:00 **PST**

Ballys Resort and Casino

Las Vegas, NV

(ITC)

Agenda

- **Officer Reports**
  - Chair   **D. Corry**
  - Secretary-Treasurer   **W. Klein**
  - Action Item Review   **D. Corry**
- **Committee Reports**
  - Nominating Committee   **B. Fleury**
  - Radio Frequency   **S. Brierley**
  - Data Multiplex   **B. Fleury**
  - Networking and Protocols   **D. Corry**
  - Transducers   **L. Eccles**
  - Coding/Data Compression   **S. Nicolo**
  - Recorder / Reproducer   **M. Buckley**
  - ETSC Report   **G. Mayer**
- **Break**
- **Website status**   **D. Corry**
- **Old Business**   **D. Corry**
- **New Business**   **All**

Welcome

- Confirmation of Quorum
- Diarmuid Corry is chair.

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Committee Reports

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TSCC Fall 2014
Nominating Subcommittee Report

Nominating Sub-Committee Membership

- Current Nominating Subcommittee Membership
  - Brad Fleury (chair) – Edge Consulting
  - Stephen Nicolo – GDP Space Systems
  - Scott Brierley - United Launch Alliance
  - Wayne Klein – Apogee Labs

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

- The TSCC shall have 16 members.
- 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 (1/3) of the regular TSCC Membership
- The remaining one-third (1/3)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.

- No current members are at the end of their terms
  - Formal vote on Scott Brierley required

TSCC Makeup

- The TSCC currently full membership of 13 Members
  - 2 academic organization members
  - 3 government entity members
  - 8 commercial entity members
- Members from commercial entities belong in two different groups:
  - Telemetry equipment suppliers
  - Telemetry equipment users

TSCC Membership

- **Academia (2)**
  - Gerhard Mayer
  - Dr. Michael Marcellin

- **Government (3)**
  - Mark Bender
  - Filiberto Macias
  - Myron Moodie

- **Industry (8)**
  - Scott Brierley
  - Diarmuid Corry
  - Lee Eccles
  - Brad Fleury
  - Wayne Klein
  - Steve Nicolo
  - Sergio Penna
  - Joe Sulewski

- **Ex-Officios**
  - Teresa Telles (TG chair)
  - Cliff Aggen (IFT Rep)

- **Members Emeritus**
  - Merv MacMedan
  - Erwin (Terry) Straehley

TSCC Membership

- The Aerospace Corporation
- United Launch Alliance
- Curtiss-Wright Controls Avionics & Electronics
- Boeing Commercial Airplane Co.
- Edge Consulting
- GDP Space Systems
- Embraer

TSCC Membership

- L3 Communications
- USAF
- Apogee Labs, Inc.
- White Sands Missile Range
- GVM-Consulting/AIRBUS
- Southwest Research Institute
- NAVAIR
- EMBRAER
- University of Arizona
- New Mexico State University

Open Membership Slots

- 3 open membership slots. We have 13 full members

- New members need to be Gov't or academic

- Gerhard Mayer may want to swap positions with his alternate Gilles Freaud (Airbus)

New Membership Vote

- Voting on Alternates:
  - None

- Alternates still needed for:
  - Mark Bender

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 up December 31, 2016**
- Current Officers:
  - Chair – Diarmuid Corry
  - Vice-Chair - *OPEN*
  - Secretary-Treasurer – Wayne Klein
- Subcommittee Chairs
  - All positions full

Open Actions

- Update Website
  - Correct subcommittee leads and members (CLOSED)
  - Add reports from previous meetings (CLOSED)
- Fill Vice-Chair position
- Fill government vacancies
  - Tab Wilcox (Yuma) indicated interest

Treasurer Report
for the Period 3/10/15 thru 10/26/15

- INCOME
  - Funding from IFT (Received Sept 2015) $ 1000.00

- EXPENDITURES
  - Awards Plaques $ (438.42)

- Net Increase (Decrease) in Cash $ 561.58

- Beginning Cash Balance $ 1626.87

- Ending Cash Balance $ 2188.45

Membership

- ## Scott Brierley, Chair - ULA
  - Mark Bender
  - John Carlson
  - Mark Dapore
  - Brad Fleury
  - Lloyd Lautzenhiser
  - Eugene Law
  - Fil Macias
  - Warren Martin
  - Bill McNatt
  - Rich Siegal
  - Brad Oney
  - James Carwell

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

- RFI out for Spectrum Efficient Airborne Transmitter

- The RFI has the following description:
  - "Spectrum Efficient Airborne Transmitter (SEAT) that provides for multi-band, multi-modes (shaped offset quadrature phase shift keying [SOQPSK-TG], Advanced Range Telemetry [ARTM]-continuous phase modulation [CPM]), local/remote command/control, discrete inputs, and compliance with the IRIG 106-15 Chapter 2 Space-Time Code (STC) and Low Density Parity Check (LDPC) forward error correction required in support of airborne instrumentation requirements. The SEAT will employ LDPC and STC individually and in combination, and only with SOQPSK-TG modulation."

Significant Activity

- New C-Band Telemetry Band
  - C-Band standards expected to be added to the IRIG standards

Committee Members

- Brad Fleury – Director Edge consulting and sales

- Alternate – Rob Trepa, Director Edge Consulting and Sales

Sub-Committee Standards

- Current standards
  - IRIG-106 -15 INET Updates to commanding standards
  - Collecting industry comments. No comments from my team
  - Telemetry App's Handbook. TMATS use cases, complete but updates are made as needed

Sub Committee Membership

Jon Morgan - EAFB
Joe Sulewski – L-3 Communications
Rob Trepa
Howard Eckstien (TBD)
Jack Sheldon
Erwin Straehley
Duane Wheaton

Action: Find some new sub committee members

Sub-Committee Focus

- IRIG-106 – 15 work ongoing
- Telecons replacing face to face
- INET Updates Commanding standards
  - "Chapter 7" recording impacts to TMATS being discussed
- RCC Pink sheets planned to be released for final review

Open Actions

- Support RCC ongoing efforts:
  - TMATS Handbook releases
  - IRIG standards
- Support RCC –TG Datamultiplex telecons

Sub Committee Membership

- **Diarmuid Corry, Chair – Curtiss-Wright Controls, Avionics and Electronics**
    - Ben Abbot, 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
    - Hyong Yi, Curtiss-Wright Controls, Avionics and Electronics
    - Robert Weaver, Apogee Labs
    - Chris Dehmelt, L3 Telemetry – East
    - Joe Sulewski, L3 Telemetry
    - Malcolm Weir, Ampex

Sub-Committee Focus I

- Standards Activity:
  - iNET Suite:
    - Radio Access Network Standard (RANS), Test Article Standard (TAS), System Management Standard (SMS), Metadata Standard (MDS)
      - Set of developmental flight testing complete.
      - Some issues (as expected)
      - More flights planned for Fall to test RF network
      - Other issues can be resolved in lab
      - More testing on F-18 in Spring 2016
    - Working to move the INET standards into IRIG 106 Part2
      - We are hoping to get pink sheets out within a year
      - Target is prior to August RCC meeting.
    - There are MDL items that still need to be addressed based on current implementations
      - iNET team working to have an MDL summit of sorts in the next handful months to present a path forward for MDL based current usage.
- iNET Special Session at this ITC will have more information

Sub-Committee Focus II

- Standards Activity:
  - IRIG106-Ch7
    - IP over PCM
  - IRIG106-Pt2
    - Carl Reinwald has been working on a task to define the table of contents for Part II
      - Restructuring of the draft standards developed by iNET working groups
      - A structure has been proposed as follows:
        - Ch 22 – Base Protocol Suite
          - 22.1 – Network Access Layer
          - 22.2 – Internet Layer
          - 22.3 – Transport Layer
          - 22.4 – Application Layer
          - 22.5 – Supporting Technologies

Sub-Committee Focus III

- Standards Activity:
  - IEEE1588 (PTPv3)
    - Working group kicked off April 2013.
    - Monthly telecons taking place
    - Seems to be good progress
    - Draft release in 2016

Sub-Committee Focus IV

- Have not been notified of significant activity on any of the following standards of interest:
  - TMoIP (RCC 218)
    - No progress on suggestion that TSCC take control of RCC218
  - SCPS, CCSDS
  - RTP, TCP, UDP, SNMP, FTP, IGMP, etc. etc.

Open Actions

- None

Membership

- **Stephen Nicolo, Chair – (NEW CHAIR)**

NOTE: The following names are all previous committee members from previous chair. They must be contacted to confirm that they are still willing to serve on this committee.

- Michael Marcellin- Univ. of Arizona
- Greg Kazz – JPL;
- Chuck Creusere – 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;

Sub-Committee Focus

- Data Compression and Coding
- Current standards – updates

Significant Activity

- IRIG 106-15:
  - LDPC Codes were added in Appendix R
    - Codes were CCSDS LDPC Codes

Open Actions

- Currently out for Review:
  - Work on Committee Membership
    - Validate current members
    - Find new members as necessary
  - Review iNet documents for applicable activity
  - Review CCSDS Documents for applicable activity

Sub Committee Membership

- Mark Buckley (Telspan Data), Chairman
- Albert Gabaldon, Alternate Chairman
  - Balázs Bagó (Zodiac)
  - Bob Baggerman (Georgia Tech Research Institute)
  - Tim Chalfant
  - Tim Gatton (Wideband)
  - Mike Lockard (EMC Corp)
  - Chris Dehmelt (L-3 Comm Telemetry East)
  - Rob Trepa (Edge Consulting)
  - Alfredo Berard
  - Carol Wong (NetAcquire)
  - Christian Rueck (Databus Tools)
  - Don Downing (Ampex)
  - Albert Gabaldon
  - Jack Salisbury
  - Johnny Pappas (Zodiac)
  - Kevin Bossoletti
  - Hung Mach (Boeing)
  - Marty Small (Calculex)
  - Matthew Grammer
  - Mike Fitter (Wideband Systems)
  - Doug Novak
  - Preston Hauck (NetAcquire)
  - Brad Fleury (Edge Consulting)
  - Steve Nicolo (GDP Space)
  - Tom Beams (Calculex)
  - E.J. Wendell (Leidos Data Storage)
  - Anthony Wirtz
  - Pete Jones (Wideband-Systems)
  - Rick Williams (Scientific Data Systems)
  - Kevin Bossoletti
  - Oahn Nguyen

Sub-Committee Focus

- Data Recorders, Ground and Airborne

- Standards in Place
  - IRIG 106-13 – Range Commanders Council (RCC) Telemetry Standards

    http://www.wsmr.army.mil/RCCsite/Pages/Publications.aspx
  - 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 106-17 Chapters 6/9/10 Change Requests (CR's) In-Work
- STANAG 4575, AEDP-6 Ratification
  - Released Ed 4 to NSA for ratification and subsequent release to member nations for promulgation.

Significant Activity
RCC Document 106-17 Chapter 10

- **TSCC R&R to take a more significant roll in CR reviews & recommendations**
  - Help ease the TG R&R work load & approval process
- **2017 release CR's in-work**
  - <u>CR 56:</u> Update Programmers Handbook & Test Methods to IRIG106-13 Chapter 10
  - <u>CR 77 (aka TG123):</u> Revise 118 Test Methods
  - <u>CR 79:</u> Revise Fibre Channel Format 0 to same as F22/F35, Format 1 to be a FC bit bucket

Significant Activity
RCC Document 106-17 Chapter 10

- **2017 release CR's are in-work Cont.**
  - <u>CR 86:</u> Implement new Chapter 6 command to publish setup record TMATS
  - <u>CR 88:</u> Remove Chapter 6 Commands from Chapter 10
  - <u>CR 89:</u> Create new Chapter 11 which is the Chapter 10 section 10.6 data format only
  - <u>CR 91:</u> Remove Fibre Channel & Firewire as required recorder interfaces & add Ethernet

Significant Activity
RCC Document 106-17 Chapter 10

- **2017 release CR's are in-work Cont.**
  - <u>CR 92:</u> Version 2 Chapter 10 packet header
  - <u>CR 93:</u> New format 2 time packet, Network/IEEE-1588
  - <u>CR 94:</u> Revised Chapter 10 UDP header to version 2
  - <u>CR 95:</u> Revise section 10.9 for RMM clock to be optional
  - <u>CR 96:</u> New message packet format for change of value data words
  - <u>CR 97:</u> Add new video/still image formats w/ coordination from OSG/MISB

Open Actions

- TSCC –
  - Review Chapter 10 section 10.8 "Declassification" for removal from the standard
  - Review Ethernet payload identification related to range needs
  - TSCC Web site to be updated for public document access and storage
  - Validator
    - The RCC has requested the TSCC to develop a recorder validation tool (Chapter 10 Validator)
      - Software/hardware definition, procedure
      - Would include maintaining a "Golden File" of data. Any issues of TSCC maintaining files with ITF? Would be maintained on webpage.
      - We have a volunteer to lead the effort…
      - At least two versions exist…

Membership

- **Committee Chair**

  Gerhard Mayer , Gilles Freaud (A)

- **Subcommitee Chair**

  - **SC-1: RF Spectrum & Frequ. M´nt**

    Jean-Claude Ghnassia, Luc Falga (A)

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

    Werner Lange, Christian Herbepin (A)

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

    Balasz Bagó, Pascal Morel (A)

  - **SC-4: Network Telemetry**

    Eckhard Schulze, Christoph Eder (A)

  (A)…Alternate

Subcommittee Focus(1)

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

- Current Standards
  - **IRIG 106-15**, **Chapter 2 update**
  - IEEE 802.11n/15.3/15.4
  - DVB-T & OFDM derived industry standard: *AMT needing an own standard ??*

Subcommittee Focus(2)

- SC-2:Ensure data acquisition and time tagging in high-rate data streams

- Current Standards
  - IEEE 1451, IEEE 1588,
  - IEEE 802.11.n/15.1/3/4
  - **IRIG 106-15,**
  - **Chapter 4 & 7 downlink format**

Subcommittee Focus(3)

- SC-3:Info collection & dissemination on recording system and techniques

- Current Standards
  - IRIG 106-15 update, **Ch.10 TM downlink, TMATS update**

Subcommittee Focus (4)

- SC-4: Info collection & dissmination on network telemetry systems

- Current standards:

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

  iNet Metadata standard

Significant Activity
ETSC Open Meeting
ETTC 2015, Toulouse 10 June. 2015

1. Committee Reports:

ETSC   *Gerhard Mayer et al.*
TSCC   *Diarmuid Corry (Curtiss-Wright)*
CCSDS   Rob Ritter (IMI)

2. Short Presentations & Disscussion:

COFDM Parameters for Standardisation   Luc Falga (Airbus)

Briefing on the
"Working Draft IRIG 106, Chapter 7" Dr. Balazs Bagó (Zodiac)

3. New Business
Membership standings, coming election, preparation for the
ETC 2016

Open Actions

- **Track IRIG 106-15 update process**
- **Track the update process of IRIG 118**

- 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

Briefings of the ETSC Open Meeting 2015 available under:

http://telemetry-europe.org/index.php/general-information/reports

etc2016

European Telemetry and Test Conference

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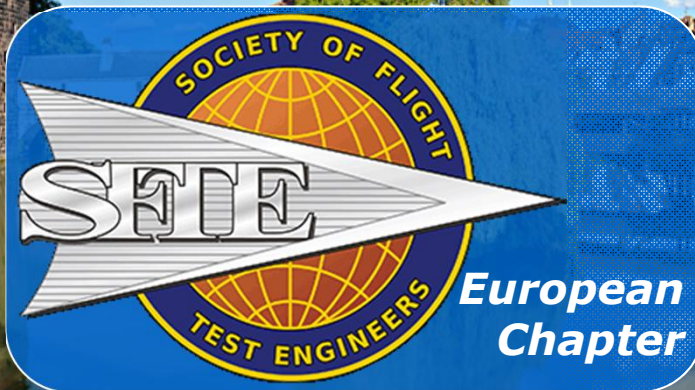Nuremberg, Germany
ETSC Open Meeting
May 12th, 2016**

**Call for Papers online :
www.etc2016.de**

in cooperation with:

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Old business 2015

- Roles and responsibilities document created posted to website
  - Under "Charters and By-Laws" link

Website Status

- Are people still having problems logging in?
  - Note: there are two login links
    - One to read/participate in groups
    - One to edit website Wiki Pages
- TSCC website is being used
  - Recorder committee and MDL users group are only users to date!
- Webmaster Bob Baggerman
- Do we need a "website manager" role?

www.tscc.org

Any Other Business?

- Open discussion on role of TSCC
  - Are we being effective?
  - Do we add value?
  - What is relationship with RCC?