TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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INTERNATIONAL FOUNDATION FOR TELEMETERING

TSCC Fall 2022

Chair Report

October 24th, 2022
Renaissance Glendale Hotel and Spa
Glendale, AZ
ITC 2022

Agenda

1615	**Call to Order**	**P. Ellerbrock**
1615	**Attendance and determination of Quorum**	**W. Klein**
1620	**Review and Approve Agenda**	**P. Ellerbrock**
1625	**Officer Reports**	
	Chair Report	**P. Ellerbrock**
	Action Item Review	**P. Ellerbrock**
	Secretary-Treasurer	**W. Klein**
	Financial Status	

Agenda (Continued)

1645   Committee Reports

Nominating Committee	**S. Nicolo**
Radio Frequency	**S. Brierley**
RF Vendors Working Group Activities Update	**J. Pappas**
Telemetry Data Processing	**TBD**
Networking and Protocols	**M. Weir**
Recorder / Reproducer	**M. Buckley**
EITTS **(former** ETSC) Report	**TBD**

Agenda (Continued)

1715	Website	S. Nicolo
1730	Old Business	S. Nicolo/Phil Ellerbrock
1745	New Business	All
	Fall Meeting	
1800	Adjourn	All

Action Item Review

- S. Nicolo update member list on web site?
- Resolve/Update Attendance History Document (Treasurer will then take ownership)…….. OPEN
- One year Plaques still need to go out… OPEN

Treasurer Report
for the Period 4/26/22 thru 10/23/22

- INCOME (Total) $ 0.00

- EXPENDITURES (Total) $ (379.41)
  - Best Standards Paper Award Plaque ($151.65)
  - Web Site Hosting Renewal (2 Years) ($227.76)

- Net Increase (Decrease) in Cash $ (379.41)

- Beginning Cash Balance $ 2342.18

- Ending Cash Balance $ 1962.77

  - Note(s): 1) TSCC account #: xxxxxx2632
              2) TSCC.ORG Domain Name will expire/auto renew on 1/3/24
                 Domain Registration: Network Solutions
              3) TSCC Org Hosting Renewal Date on 7/5/24
                 Web Site Hosting: In Motion Hosting

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Nominating Subcommittee Report
TSCC Fall 2022

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Nominating Sub-Committee Membership

- **Current Nominating Subcommittee Membership**
  - CHAIR …S. Nicolo Chair
    - 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, government, and academic organizations**
- Membership by representatives of non-US entities shall not exceed 25% of the total regular membership

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.

- 5 Year Term Expirations –

We have not had a quorum for past several meetings due to COVID and also because of retiring members over the COVID period. As we we have done for previous meetings, I propose that we continue with a majority vote to pass and not require a quorum for the vote.

  - Fall 2022: (Vote Fall Meeting 2022)
    - Wayne Klein (Industry): His 5 year term is up

TSCC Membership

- Academia (1)
  - (*1) Dr. Michael Marcellin
  - Todd Newton

- Government (4)
  - Mark Bender
  - Albert Gabaldon
  - Todd Newton
  - Tab Wilcox

- Industry (6)
  - Scott Brierley
  - (*2) ~~Brad Fleury~~
  - Philip Ellerbrock
  - Wayne Klein
  - Ben Kupferschmidt (New Member)
  - (*3) Steve Nicolo
  - Malcolm Weir

- Ex-Officios
  - Clifford Aggen (IFT Rep)

- Members Emeritus
  - Lee Eccles

(*1) Dr Michael Marcellin will be retiring when we can replace him.

(*2) Brad Fleury retired from TSCC. He moved out of the telemetry field.

(*3) Steve Nicolo has served for 15 years but can not serve another 5 year term. He is good for another year or two or until he can be replaced.

Membership Changes

- MEMBERS:
  - TSCC currently has 11 members with 1 of the 11 retiring asap. We are short several people.
  - Members previously retired from TSCC over past 3 years: Joe Sulewski, Myron Moodie, Sergio Penna, Gilles Freaud, Richard Grahm, Brad Fleury
  - Brad Fleury retired from TSCC. Brad moved out of the telemetry industry. We thank him for his 10+ years of TSCC service.
  - Brad Fleury has nominated Mike Bartoldus as a replacement for him. I contacted Mike and he declined.
  - Dr Michael Marcellin (Retiring from TSCC at the end of 2021 or until we can replace him)
  - Dr Michael Marcellin recommended a replacement (Chuck Creusere from New Mexico State) ….. I contacted Chuck and he is considering this but cannot agree at this time.
  - We have no European members. Renaud Urli from Airbus was recommended by Malcolm Wier for Full TSCC Membership. He will be attending this meeting.
  - Steve Nicolo will continue to serve until he can be get back to full membership
- Voting on Members & Alternates:
  - Voted in Ben Kupferschmidt from CW as full member (Sept Vote By Mail)
- Alternates still needed for: Mark Bender, Albert Gabaldon Tab Wilcox, Malcolm Weir, Steve Nicolo

Open Membership Slots

- We currently have 11 of 16 full members as of Fall 2022. Two additional will be retiring when they can be replaced (Total of 7 members are required)
- Need 7 members. Need to focus on members from Government and Academia
- We must all go into full gear to recover from the Covid hit

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
  - The TSCC Vice-Chair succeeds to the Chair's position to fulfill a two year term as Chair
  - The Secretary-Treasurer may be re-elected

- Officers
  - Chair – New Chair Philip Ellerbrock
  - Vice-Chair - TBD
  - Secretary-Treasurer – Wayne Klein
- Subcommittee Chairs
  - Need Subcommittee Chair for Telemetry Data Processing Subcommittee to replace Brad Fleury who retired

Member Summary Fall 2022

	Last	First	Association	Member/alternate	Expires	Office	Committee	Last	First	Committee
1	Bender	Mark	Government	Aerospace Corp	2024	member	radio Freq			
2	Brierley	Scott	Industry	ULA	2026	Chair	radio Freq/transd	McNatt	William	radiofreq
3	Ellerbrock	Philip	Industry	Boeing	2023	Chair TSCC		Moore	Jessica	
4	Gabaldon	Albert	government	China Lake	2026	member	R & R			
5	Klein	Wayne	Industry	Apogee Labs	2022	Treasurer	Network&Protocol	Weaver	Bob	data multi, Net
6	Kupferschmidt	Ben	Industry	Curtiss Wright	2027					
7	Marcellin	Dr. Michael	academic	Univ of AZ	2019	member		Creusere	Charles	
8	Newton	Todd	government	Southwest Research	2026	member				
9	Nicolo	Steve	Industry	GDP Space/Ampex	2020	Chair	Nominating Committee			
10	Weir	Malcolm	Industry	Ampex	2024	Chair	Cyber			
11	Wilcox	Tab	government	YPG	2026	member	R & R			
	Aggen	Cliff	IFT			IFT				
	Eccles	Lee	Emeritus	Boeing		member				

Open Actions

- TSCC has 5 open positions with 2 more soon to be retiring.
- Members needed (major focus)
- Alternates still needed for several members

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RF Sub-Committee Report
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Sub Committee Membership

- Scott Brierley, Chairman
- Members:
  - Johnny Pappas
  - Mark Bender
  - Mark Dapore
  - Brad Fleury
  - Lloyd Lautzenhiser
  - Bill McNatt
  - Rich Siegal
  - James Carwell

Sub-Committee 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

- Pink sheet review of IRIG-118
  - Volume 2, Chapter 11 Test Methods for DQM
    - TG-181

  - Appendix 2-G of IRIG-106 recently added to provide Standards for Data Quality Metric and Data Quality Encapsulation
    - Standard defines how to map the Data Quality Metric (DQM) into a 16 bit word
    - Standard for Data Quality Encapsulation (DQE) allowing the DQM and associated data to be transported to a distant best source selector

  - IRIG-118 updated to provide a test method for the recently added DQM standard

Significant Activity

- ## Pink sheet review of IRIG-118

  - ### The pink sheet cover letter describes the task as:

    - This task adds new test methods that can be used to test the DQM values from receivers to assess how well the receiver estimates the resulting bit error probability (BEP) versus actual bit error rate (BER) over a given transmission channel condition.

Significant Activity

- ## Pink sheet review of IRIG-118
  - ### The following tests were added:

Test Number	Test Description
11.1	BER vs BEP with Additive Noise
11.2	DQM (BEP) Step and Dwell Response
11.3	BER vs BEP with Adjacent Channel Interference
11.4	BER vs BEP for Static 3-Ray Multipath Channel Conditions
11.5	BER vs BEP for Static 2-Ray Multipath Channel Conditions
11.6	DQM (BEP) Resynchronization Response

Significant Activity

- ## Pink sheet review of IRIG-118
  - ### 11.1 BER vs BEP with Additive Noise
    - Use One of the following to add noise to the signal
      - step attenuator/power meter
      - noise test set
      - Receiver Analyzer
    - Convert DQM (Data Quality Metric) to BEP (Bit Error probability), and plot measured BER (Bit Error Rate) and BEP vs Eb/No

  - ### 11.2 DQM (BEP) Step and Dwell Response
    - Setup similar to 11.1, except add an electronic step attenuator
    - Three results from this test
      - How DQM reacts to a step in Eb/No
        - How quickly after a step change in Eb/No does it settle on a DQM value
      - Does the DQM estimate correspond to the payload in the DQE (Data Quality Encapsulation) frame
      - Accuracy of the BEP estimate for a dynamic channel condition

Significant Activity

- ## Pink sheet review of IRIG-118
  - ### 11.3 BER vs BEP with Adjacent Channel Interference
    - Test setup adds calibrated noise to the carrier, and adds adjacent channel interferers at a set carrier (victim) to Interference ratio (C/I)
    - Test method does not define the interferer, but can be
      - IRIG 106-compliant waveform
      - Cellular based waveform
      - Other waveforms that are indicative of interferers present at or near the test range
    - Plot measured BER (Bit Error Rate) and BEP vs Eb/No for each C/I

Significant Activity

- ## Pink sheet review of IRIG-118
  - 11.4 BER vs BEP for Static 3-Ray Multipath Channel Conditions
    - Uses dynamic multipath channel as defined in IRIG 106 Chapter 2 Appendix 2-F
    - Three test methods available
      - Fixed RF component
      - Channel Emulator
      - Receiver Analyzer
    - Repeat for mild, moderate, and severe channel conditions at different bit rates, modulation, equalization, and carrier frequencies
    - Plot measured BER (Bit Error Rate) and BEP vs Eb/No for each

Significant Activity

- ## Pink sheet review of IRIG-118
  - 11.5 BER vs BEP for Static 2-Ray Multipath Channel Conditions
    - There are 165 individual 2-ray channel conditions though not all need to be tested
    - Plot measured BER (Bit Error Rate) and BEP vs Eb/No for each 2-ray channel condition (Amplitude and Delay)

  - 11.6 DQM (BEP) Resynchronization Response
    - Setup similar to 11.1, with the following additions
      - Two types of input signals to the receiver under test
        - Signal at high Eb/No
        - Wideband noise and signal plus noise
    - Three results from this test
      - Characterize the receiver's signal quality estimate during a resynchronization event
      - Investigate any anomalous DQM values output by the receiver during resynchronization
      - Measure resynchronization time

Open Actions

- RF Vendor Working group will be verifying the new IRIG-118 DQM test method

Issue

- Brad Fleury has retired so no report is available.

Sub Committee Membership

- ## Malcolm Weir, Chair
  - Ben Abbott
  - Dave Buckley
  - Chris Dehmelt
  - Rich Hoffman
  - Wayne Klein
  - Fil Macias
  - William Malatesta
  - Myron Moodie
  - Todd Newton

- Steve Nicolo
- Sergio Penna
- Carl Reinwald
- Joe Sulewski
- Gary Thom
- Robert Weaver
- Malcolm Weir
- Hyong Yi

Sub-Committee Focus

- The use of Industry-Standard Networking Technology for Telemetry

- Standards in Place
  - "Part 2" of IRIG-106 (Chapters 21-28)
  - IRIG-218
  - IETF RFCs 791,2460,793,768,3411,959,etc
  - IEEE 802.3, 1588
  - CCSDS Colored Books
  - SMPTE, MISB, DISA publications as applicable

  - *Note that only the first two mentioned have a telemetry focus*

Significant Activity

- Presentation of Draft Appendix to IRIG-106 Chapter 24 at RCC-TG / Pax River (Aug 2022):
    - "Guidance for Using Chapter 11 Data Types"
    - Links legacy (Chapter 10) standard to new transports (TmNS)
    - Some pushback from legacy standard proponents

Open Actions

- None at this time

Sub Committee Membership

- Mark Buckley (Telspan Data), Chairman
- Albert Gabaldon (NAVAIR-CL), Alternate Chairman

1.	Balázs Bagó	Safran
2.	Bob Baggerman	ATAC
3.	Justin Denning	EAFB
4.	Paul Ferrill	ATAC
5.	Tim Gatton	Aerogear Telemetry
6.	Dan Green	Safran
7.	Eric Lamphear	Telspan Data
8.	Mike Lockard	EMC Corp
9.	Hung Mach	Boeing
10.	Doug Novak	Tyndall AFB
11.	Johnny Pappas	Safran
12.	Christian Rueck	Databus Tools
13.	Bela Szabo	RT Logic
14.	Malcolm Weir	Ampex
15.	Rick Williams	SDS

Sub-Committee Focus

- Data Recorders, Ground and Airborne

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

    http://www.wsmr.army.mil/RCCsite/Pages/Publications.aspx

    https://www.trmc.osd.mil/wiki/display/RCC/Home
  - 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

    Note the new URL. Hosted by TRMC
    - **DoD ONLY ← ← ← ← ← ← ← ← ← ← ← ← ← ←**
      - **Not likely to ever change**
    - **Publicly released documents should still be available**

Significant Activity

- RCC Telemetry Group Recorder & Reproducer Committee
  - IRIG 106-22 Chapters 6/9/10/11
    - Released May 2022
    - *Chapter 6 No Major Changes*
    - *Chapter 9*
      - *New Q-Group "Message Structure Definitions"*
      - *New Video CODEC Info, Meta-Data Type*
      - *New Format 2/3 Analog Data Type & IF Info*
    - *Chapter 10 No Major Changes*
    - *Chapter 11*
      - *Minor Edits, Deprecated Video Formats 1 & 3, Changed Format 2*
      - *New IF Analog Data Types*
      - *Added Note for Proposed Version 2 Header*

Significant Activity

- Some weekly telcons held
  - NAS Standardization Discussions
  - Multiple Network Chapter 10 Publishers & Time
- Change Requests In-Work
  - Chapter 6
    - Change to .FILES Command for Opened/Closed Files
    - Additions for Paused Recording State
  - Chapter 10
    - Data at Rest Encryption
    - V2 Header
    - Message Data Structure Packet

Future Work

- Finish up the IF analog recording, Format 2

- New proposed CRs (via email to RnR Chair)
  - Use secondary header to extend CH ID to 32 bits for ground systems with more than 65K channels
  - Use reserved bits of secondary header
    - IEEE 1588 time uses UTC instead of TAI time value
  - Clarifications on the test methods
  - Redo naming convention. yyyymmdd.
    - Gives a more 'natural' sorting of the file names
  - CR19-003 Format 1 Message Packets
    - Uses message/sub-message/measurement description ID

Old Business - TSCC Activities

- **TSCC Spring 2020: Canceled due to Covid**

- **TSCC Fall 2020: ITC 2020 was canceled due to Covid.**

- **TSCC Spring 2021 - Webex**

- **TSCC Fall 2021 – ITC Vegas/Webex.**

- **TSCC Spring 2022 – Eglin AFB**

- **TSCC Fall 2022 – ITC Glendale**

Old Business – Best Paper

- ITC Best Stds Paper winner
  - Five papers were submitted
  - Clear Winner:
    - ID # 02: ADVANCES IN PACKET BASED BI-DIRECTIONAL TELEMETRY SOLUTIONS by Ray O' Connell

New Business

Discussions at August RCC-TG 142:

R&R Committee

- **Ryan Chandler to become Chair replacing Albert Gabaldon**

- *Chapter 10 RTC as Absolute Time – Mark Buckley*
  - *Working final details for RCC-TG*
  - *Draft standard is close for pink sheet*

- *NAS/NFS recorders*
  - *Two ranges approved moving forward to develop*
  - *Malcolm Weir and Mark Buckley volunteered during RCC-TG*
  - *Perhaps should be called an Ethernet Datagram Recorder*

- *Data At Rest – Malcolm Weir*
  - *Let NIST dictate encryption*
  - *May be companion spec to Chapter 12*
  - *RCC-TG may work on Conops*

New Business

Discussions at August RCC-TG 142:

NVI Committee

- *Chapter 24 TmNS Appendix A for Ch 11 Support – Thomas Grace*
  - *Completed discussions and revisions.*
  - *Appendix will be published in next RCC-TG release.*
- *Handbook – Matt Morgan/Todd Newton*
  - *Considering WIKI.*
  - *Publish in "Markdown" format for text so it is easily translated to WIKI.*
  - *Considering standing up in TRMC website.*
  - *SWRI may work this for Ch 21 through 28.*
- *MDL – Bill Malatesta*
  - *Working on a release 1.2 format*
  - *Working through examples and templates*

Adjourn!