TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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INTERNATIONAL FOUNDATION FOR TELEMETERING

TSCC Spring 2018

Chair Report

April 10, 2018 (Starting at 5:30pm)

Oxford Inn & Suites, Lancaster CA

(Same week as RCC Meeting: Edwards AFB)

TSCC Membership

- Academia (1)
  - Dr. Michael Marcellin
- Government (4)
  - Mark Bender
  - Albert Gabaldon
  - Myron Moodie
  - Tab Wilcox
- Industry (8)
  - Scott Brierley
  - Brad Fleury
  - Philip Ellerbrock
  - Wayne Klein
  - Steve Nicolo
  - Sergio Penna
  - Joe Sulewski
  - Gilles Freud
- Ex-Officios
  - Clifford Aggen (IFT Rep)
- Members Emeritus
  - Lee Eccles
  - Merv MacMedan
  - Erwin (Terry) Straehley

Agenda

- **17:30** **Call to Order S. Nicolo**
- **17:40** **Attendance and determination of Quorum W. Klein**
- **17:45** **Review and Approve Agenda S. Nicolo**
- **Review of new members and alternate proposals**
- **Vote on members**
- **17:50** **Officer Reports**
- Chair **S. Nicolo**
- Secretary-Treasurer **W. Klein**
- Approval and review of last Minutes
- Financial Status
- Action Item Review **S. Nicolo**

Agenda (Continued)

- **18:10** **Committee Reports**
- Nominating Committee — **S. Nicolo**
  - New nominations/follow-up on members
  - Changes since Last meeting
- Radio Frequency — **S. Brierley**
  - RF Vender Working Group (Update) — **J. Pappas**
- Data Multiplex — **B. Fleury**
- Networking and Protocols — **S. Nicolo**
  - **RCC TGG Network SC Report on 218** — **Shawn Perry**
- Transducers — **Need New Chair**
- Coding/Data Compression — **Need New Chair**
- Recorder / Reproducer — **M. Buckley**
- ETSC Report — **G. Freaud**

Agenda (Continued)

- **19:00** **Website status** **B. Baggerman**
- **19:10** **Old Business** **S. Nicolo**
- **19:20** **New Business** **S. Nicolo**
  - Subcommittee Discussion
  - Discuss and decide on Fall Meeting (ITC)
  - ITC Standards Paper Award
  - TSCC Future activities
- **20:00** **Adjourn** **All**

Subcommittee Discussions

- Nominating Committee — **Chair TBD**
  - Needs Chair
- Radio Frequency — S. Brierley
  - No Actions Proposed
- Networking and Protocols — **S. Nicolo (NEW)**
  - No Actions Proposed
- Transducers — **Chair TBD**
  - Discuss need for this Sub Committee
- Coding/Data Compression — **Chair TBD**
  - Discuss need for this Sub Committee
- Recorder / Reproducer — M. Buckley
  - No Actions Proposed
- ETSC Report — G. Freaud
  - No Actions Proposed

Sub Committees

- Sub Committee Group Proposal
  - For Now Propose Suspension of Reporting
    - Transducer Subcommittee
    - Coding and Compression Subcommittee
  - Start New Subcommittee
    - IA (Information Assurance).. Cyber Security

Member Summary

Last	First	Association	Member/alternate	Expires	Office	Committee	Last	First	Committee
Bender	Mark	Government	Aerospace Corp	2019	member	radio Freq			
Brierley	Scott	Industry	ULA	2021	Chair	radio Freq/transd	McNatt	William	radiofreq
Ellerbrock	Philip	Industry	Boeing	2023	member				
Fleury	Brad	Industry	Edge Consulting	2020	Chair	Data multiplex / RF	Rob Trepa	Edge	rec/rep;data multi
Gabaldon	Albert	government	China Lake	2021	member	R & R			
Gilles	Freud	Industry	Airbus	2021	member		Mayer	Gerhard	
Klein	Wayne	Industry	Apogee Labs	2017	Treasurer	Network&Protocol	Weaver	Bob	data multi, Net
Marcellin	Dr. Michael	academic	Univ of AZ	2019	member		Creusere	Charles	
Moodie	Myron	Government	SwRI	2019	member	Network&Protocol	Abbott	Ben	N&P
Nicolo	Steve	Industry	GDP Space/Ampex	2015	Chair TSCC	Chair TSCC	Weir	Malcolm	radiofreq
					Chair	Network&Protocol			
						Nominating Committee			
Penna	Sergio	Industry	Embraer	2019	member	Network&Protocol	Correa	Leonardo de Queiroz	
Sulewski	Joe	Industry	L-3	2018	member	Data Multiplex	Dehmelt	Chris	rec/rep, datamult,Net
Wilcox	Tab	government	YPG	2021	member	R & R			
Aggen	Cliff	IFT			IFT				
Eccles	Lee	Emeritus	Boeing		member				
MacMedan	Merv	Emeritus			member	data comp			
Straehley	Erwin	Emeritus			member	data multiplex			

Open Actions

- **Resolve/Update Attendance History Document (Treasurer will then take ownership)**
- **Need TSCC Co Chair**
- **Need 3 new members**

TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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"TSCC Spring 2018 Treasurer Report"

April 10, 2018 (Starting at 5:30pm)

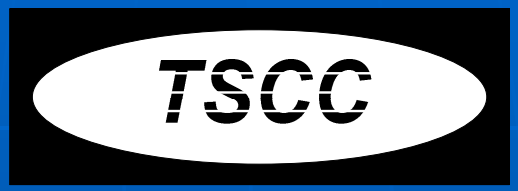
Oxford Inn & Suites, Lancaster CA

(Same week as RCC Meeting: Edwards AFB)

Treasurer Report
for the Period 10/22/17 thru 4/10/18

- INCOME
  - None — $ 0.00
- EXPENDITURES — $ (398.17)
  - Domain Name Renewal (3 years) $ (89.96)
    - Jan 3, 2018 through January 2. 2021
  - 2017 Award Plaques $ (308.21)
- Net Increase (Decrease) in Cash — $ (398.17)
- Beginning Cash Balance — $ 2717.65
- Ending Cash Balance — $ 2319.48

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Spring 2018

Nominating Subcommittee Report

April 10, 2018 (Starting at 5:30pm)

Oxford Inn & Suites, Lancaster CA

(Same week as RCC Meeting: Edwards AFB)

Nominating Sub-Committee Membership

- Current Nominating Subcommittee Membership
  - CHAIR TBD__**NEED NEW CHAIR**
    - Scott Brierley - United Launch Alliance
    - Wayne Klein – Apogee Labs
    - Stephen Nicolo – GDP Space Systems

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 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.
- Expirations – Fall 2018:
  - Joe Suleski

Membership Changes

- Voting on Members:
  - Fall 2017 Voting
    - Wayne Klein (Term was up Fall 2017—MUST VOTE)
  - For Member Terms voting will occur at next meeting (Fall 2018)
    - Joe Sulewski (Term is up Fall 2018)
- Voting on Alternates:
  - None

- Alternates still needed for:
  - Mark Bender
  - Albert Gabaldon
  - Tab Wilcox

- Retiring members:
  - None

TSCC Membership

- Academia (1)
  - Dr. Michael Marcellin
- Government (4)
  - Mark Bender
  - Albert Gabaldon
  - Myron Moodie
  - Tab Wilcox
- Industry (8)
  - Scott Brierley
  - Brad Fleury
  - Philip Ellerbrock
  - Wayne Klein
  - Steve Nicolo
  - Sergio Penna
  - Joe Sulewski
  - Gilles Freud
- Ex-Officios
  - Clifford Aggen (IFT Rep)
- Members Emeritus
  - Lee Eccles
  - Merv MacMedan
  - Erwin (Terry) Straehley

Future Membership Slots

- We have 13 full members. Need 2 Government and 1 Academia or Industry to maintain our approx 33% split between industry, academic and government.
- Possible Government Nominees:
  - Kevin Bossoletti > Said no but recommended **Brian Platt**
  - Jack Salisbury
  - Scott Kujiraoka

Members Emeritus

- Lee Eccles (ret., formerly Boeing) was voted in as Member Emeritus in Fall 2017 Meeting

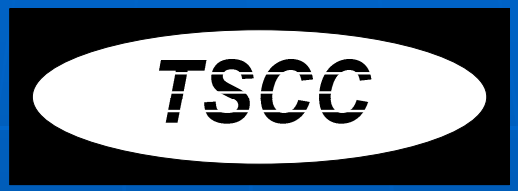
TSCC Officers

- 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, 2018**
- Current Officers:
  - Chair – Steve Nicolo
  - Vice-Chair - Vacant!!!!!!!!
  - Secretary-Treasurer – Wayne Klein
- Subcommittee Chairs
  - All positions full

Open Actions

- Three open positions to be filled (2 Government & 1 Acadamia or Industry)
- Need TSCC Vice-chair
- Committees
  - Subcommittee Chairs
    - Nominating Committee Chair Needed
    - Transducer Committee (Need Chair if we are keeping this committee)
    - Coding and Compression (Need Chair if we are keeping this committee)
  - Alternates still needed for:
    - Mark Bender
    - Albert Gabaldon
    - Tab Wilcox

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Spring 2018 RF COMMITTEE

April 10, 2018 (Starting at 5:30pm)
Oxford Inn & Suites, Lancaster CA
(Same week as RCC Meeting: Edwards AFB)

Sub Committee Membership

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

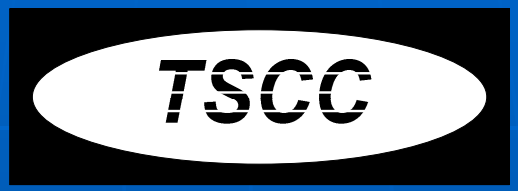
Sub-Committee Focus

- 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

- RF Vendors Working Group meeting was held after the fall TSCC meeting
- Reviewed TG-153 (RCC-118, Vol 2, Ch 8) LDPC Test TEST PROCEDURES FOR HARDWARE IMPLEMENTING LOW DENSITY PARITY CHECK CODES

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Spring 2018 Data Multiplexing Committee Report

Brad Fleury
Edge Consulting and Sales

Committee Members

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

Sub-Committee Standards

- Current standards
  - IRIG-106 -17
  - Telemetry App's Handbook.
    - TMATS use cases, complete but updates are made as needed
    - RCC XML handbook for IHAL and DDML XML

Sub Committee Membership

Jon Morgan – RCC lead EAFB
Joe Sulewski – L-3 Communications
Joe Merritt – RT Logic
Jack Sheldon
Erwin Straehley
Duane Wheaton

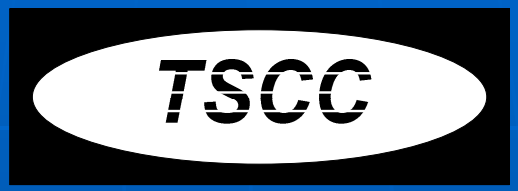
Sub-Committee Focus

- Minimal activity since Fall meeting
- Name change from Data Multiplex to Telemetry Processing
- No new Pink Sheets circulating for IRIG 106
- “Chapter 7” recording impacts to TMATS and recording largely implemented in 106-15

Open Actions

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

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2017 Networks Subcommittee Report

Sub Committee Membership

- Steve Nicolo, Chair – GDP Space Systems, Ground Telemetry (NEW CHAIR)
  - 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
  - Sergio Penna, Embraer
  - Dave Buckley, Curtiss-Wright Controls

Sub-Committee Focus I

- Standards Activity:
  - iNET Suite:
    - IRIG 106 Chapters 21-28 Pink sheets released (formerly known as the iNET standards)

Sub-Committee Focus II

- Standards Activity:
  - IRIG106-Ch7
    - IP over PCM
- Standards Activity:
  - IEEE1588 (PTPv3)
  - TMoIP (RCC 218)- Review and comments submitted

Open Actions

- Review subcommittee members

TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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"TSCC Spring 2018 Recorder & Reproducer Committee Report

April 10, 2018 (Starting at 5:30pm)

Oxford Inn & Suites, Lancaster CA

(Same week as RCC Meeting: Edwards AFB)

Sub Committee Membership

- Mark Buckley (Telspan Data), Chairman
- Albert Gabaldon, Alternate Chairman
  - Bob Baggerman (Zodiac)
  - Balázs Bagó (Zodiac)
  - Paul Carrion (Calculex)
  - Chris Dehmelt (L-3 Comm Telemetry East)
  - Justin Denning
  - Paul Ferrill (ATAC)
  - Tim Gatton (Aerogear Telemetry)
  - Dan Green (Zodiac)
  - Bill Harrison (Smartronics)
  - Eric Lamphear (Telspan Data)
  - Jake Layer (Smartronics)
  - Mike Lockard (EMC Corp)
  - Hung Mach (Boeing)
  - Doug Novak (USAF Tyndall AFB)
  - Johnny Pappas (Zodiac)
  - Christian Rueck (Databus Tools)
  - Bela Szabo (RT Logic)
  - Rob Trepa (Edge Consulting)
  - Malcolm Weir (Ampex)
  - Craig Wierzbicki (TTC)
  - Rick Williams (SDS)

Sub-Committee Focus

- Data Recorders, Ground and Airborne
- Standards in Place
  - IRIG 106-17 Telemetry Standards Chapters 6, 10, & 11
    http://www.wsmr.army.mil/RCCsite/Pages/Publications.aspx
  - IRIG 106-118 Test Method for Digital Recorder/Reproducer Systems & Recorder Memory Modules
    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

Significant Activity

- RCC Telemetry Group Recorder & Reproducer Committee
  - IRIG 106-17 Chapters 6/9/10/11 Published
- STANAG 4575, AEDP-6 Ratification
  - Released Ed 4 to NSA for ratification and subsequent release to member nations for promulgation.

Significant Activity
RCC Document 106-19 Chapter 10

- TSCC R&R will continue with its formal roll in pink sheet reviews

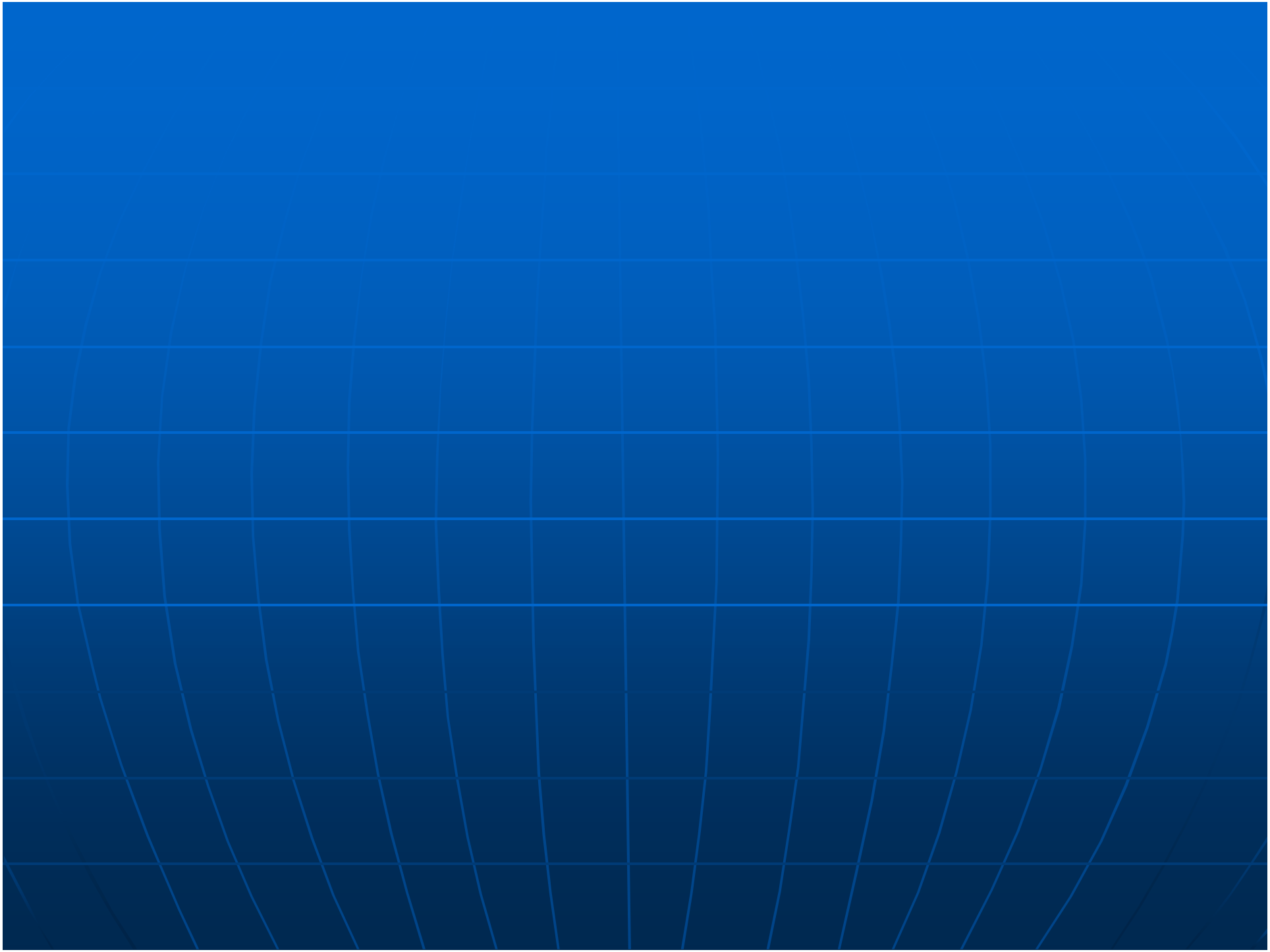
- TSCC R&R to take a “less formal” roll in CR reviews & recommendations

Significant Activity
RCC Document 106-17 Chapter 10

- 2019 Working RCC TG R&R CR's
  - CR-RR-17-000 Documents new CR numbering
  - CR-RR-17-001 (Formally CR-092) New Packet Header
  - CR-RR-17-002 (Formally CR-096) MDL Data Type
  - CR-RR-17-003 (Formally CR-097) Fix Video Formats
  - CR-RR-17-004 Distribution Statement
  - CR-RR-17-005 Document PN types (PN11, PN15)
  - CR-RR-17-006 Christian Rueck, via TSCC, comments
  - CR-RR-17-007 New CH6 Appendix (CoAP/JASON)
  - CR-RR-17-008 New CH29 HDLC for Ethernet Telemetry
  - CR-RR-17-009 **(Proposed)** New Ethernet/FC Formats
  - CR-RR-17-010 **(Proposed)** Update CH9 S-Group
  - CR-RR-18-011 **(Proposed)** PCM Format 2 (DQM/DQE)

Open Actions

- TSCC –
  - 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…



NETWORKS IRIG 218 STATUS UPDATE

IRIG 218 TMoIP Update Status

ITC 2017
(updated 4/6/18)

Shawn T. Perry
NAWCAD Pax River
RCC TTG Chairman

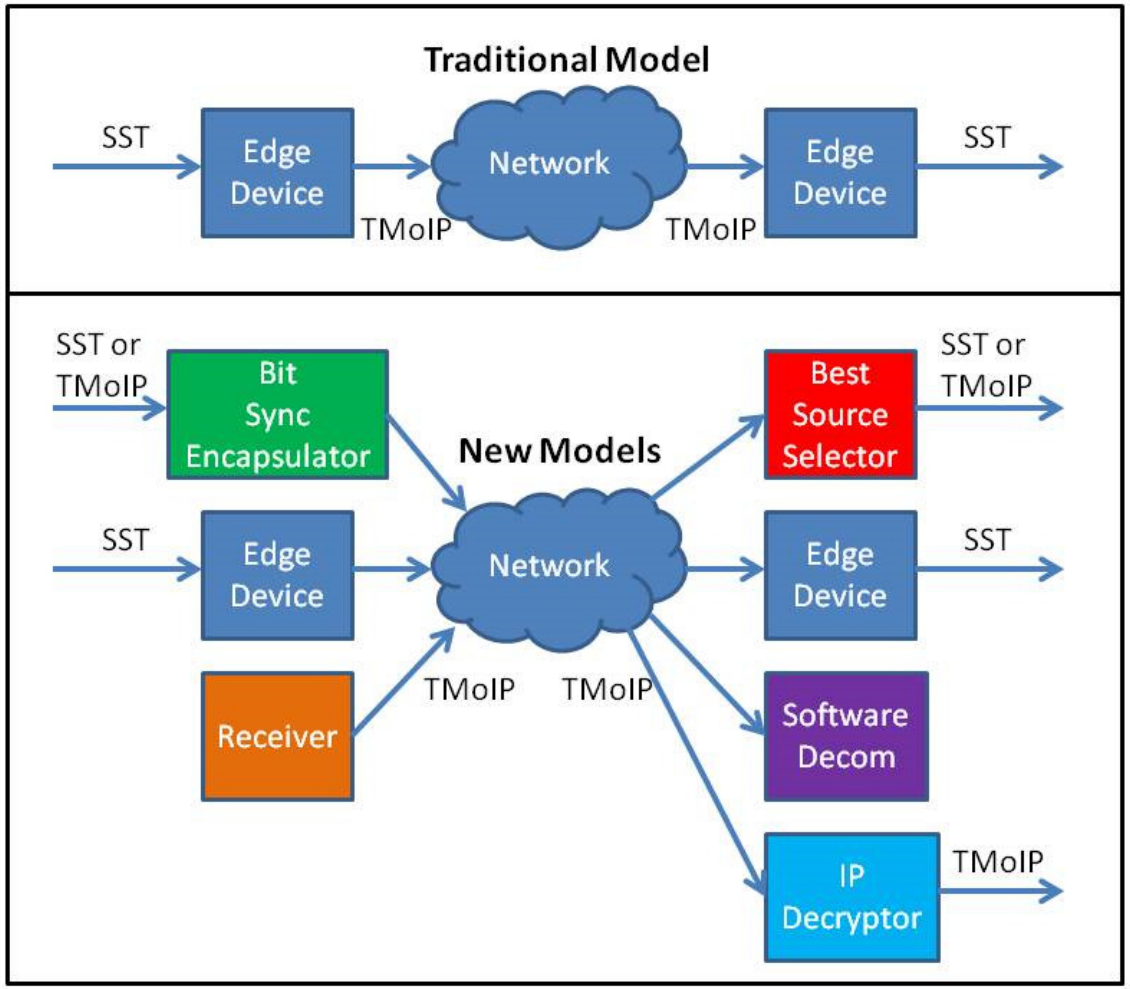
TMoIP Origin

- Developed as Ranges transitioned from ATM to IP
- Goal of providing simple transport of SST
- Based on standards such as pseudowire
- 218-10 mentions future growth possibilities (RTP, IPv6)
- Great success so far for Range implementations
  - Distributed flight testing at contractor sites
  - Opens door for Range interconnectivity for LVC
- Ambiguities led to interoperability difficulties
  - Vendors developed proprietary variations

Changing Paradigm

- New requirements emerged
  - Test articles lacking Ch4 time
  - TMoIP not just for muxes anymore
  - Software decoms, best source, receivers, IP decryptors
  - PCM and DQE frame payload shaping
- Vendors and Ranges reached out to RCC TG
- RCC TG reached out to RCC TTG
- RCC TTG posted RFI on 218 growth requests

TMoIP Models



RFI Results

- Timestamp top priority
  - RTP vs Control Word expansion
  - Format requests varied (UTC vs TAI)
  - Nanosecond resolution
- Unused Control Word bits
- Payload shaping
  - PCM and DQE frames with bit sync status
- Improved interoperability
  - Ability to auto-adjust to bit rate changes and user selected parameters (minimal latency)

TTG 218-18 Goals

- Identify valid requirements
- Maintain 218-10 functionality
- Maintain vendor proprietary variants
- Make update painless to implement on deployed hardware
- Create process for continual improvement

TMoIP Packet

TABLE E-1. TMoIP PACKET SUMMARY

Field	Description		Length	P/C/F [1]
Ethernet Dest Addr	Identifies station(s) to receive frame		6	P
Ethernet Src Addr	Identifies station that originated frame		6	C
802.1Q Length/Type	Virtual LAN (VLAN) tag length/type		2	F = 0x8100
VLAN Tag Ctrl Info	Bit	Description	2	
	0 - 2	User Priority Field		P
	3	Canonical Format Indicator (CFI)		F = 0
	4 - 15	VLAN Identifier (VID)		P
Length/Type			2	F = 0x0800
IP Header	Byte	Description		
	0	Version + IP header length	1	F = 0x45
20 Bytes Total	1	TOS	1	P
	2 - 3	Total length of IP packet	2	C
	4 - 5	16 bit ID	2	C/F
	6 - 7	Flags + Fragment Offset	2	F
	8	TTL	1	F/P
	9	Protocol (UDP)	1	F = 0x11
	10 - 11	IP Header checksum	2	C
	12 - 15	Source IP address	4	P
	18 - 19	Destination IP address	4	P
UDP Header	Byte	Description		
	0 - 1	Source Port	2	P
8 Bytes Total	2 - 3	Destination Port	2	P
	4 - 5	UDP Length	2	C
	6 - 7	UDP Checksum	2	C
Payload	TMoIP Control Word		4 (or 12)	C
	TM Raw Packet Data		Var	C
Ethernet FCS	Ethernet Frame Check Sequence		4	C

[1] P = Programmable by user.
C = Calculated or placed in packet without user intervention.
F = Fixed.
Var = Variable.

TMoIPControl Word

TABLE 3-3. TMoIP CONTROL WORD

Field	Bits	Description
VER	4	Version identifier "0000" indicates 218-10 "0001" is reserved for proprietary modified 218 formats "0010" indicates 218-18 "0011" through "1111" reserved for future versions
VDB	12	Version Defined Bits
SEQ NUMBER	16	Sequence Number

Notes

218-10 remains unchanged.

218-P version was added to maintain functionality of several proprietary modified 218-10 variants in use.

218-18 version removes the unused alarm bits, adds the ability to designate that a payload is sized to a PCM or DQE frame, adds bit sync status for PCM frame aligned payloads, and adds a 64-bit timestamp.

218-10

TABLE 3-3.1. TMoIP 218-10 CONTROL WORD

Field	Bits	Description
VER	4	Version identifier "0000" indicates 218-10
L	1	Local Defect Alarm, indicates local circuit fault in the TM stream
R	1	Remote Defect Alarm, indicates remote circuit fault in the TM stream
M	2	Local Defect Alarm Modifier
RES	2	Reserved
LEN	6	If non-zero, LEN indicates TMoIP Payload Length, defined as the TMoIP Control Word + Raw Packet Payload If zero, LEN indicates TMoIP Payload Length greater than 63 bytes. In this case the TMoIP payload length is determined via length fields in lower protocol layers.
SEQ NUMBER	16	Sequence Number

Notes

Req The TMoIP raw packet size shall be user configurable.

Opt The TMoIP raw payload size may be auto-configurable, based on user priorities (e.g. stream/delay characteristics).

Req The minimum TMoIP raw packet size = 1 byte.

Notes: a. To limit the effects of Ethernet fragmentation, the final Layer 2/3/4/6 packet size should be less than the Ethernet Maximum Transmission Unit (MTU).

b. Padding may be required to meet the minimum Ethernet MTU size.

218-P

TABLE 3-3.2. TMoIP 218-P CONTROL WORD		
Field	**Bits**	**Description**
VER	4	Version identifier "0001" indicates Proprietary variants of 218-10
PDB	12	Proprietary Defined Bits
SEQ NUMBER	16	Sequence Number

Notes

This version allows vendors who created modified versions of 218-10 to maintain functionality. Due to variances in implementation, not recommended in mixed vendor environments.

218-18

TABLE 3-3.3. TMoIP 218-18 CONTROL WORD

Field	Bits	Description
VER	4	Version identifier "0010" indicates 218-18
PLD	2	Payload type "00" indicates no frame alignment "01" indicates PCM frame aligned "10" indicates DQE frame aligned "11" Reserved
FSS	2	Frame Sync Status (used for PLD = "01" only) "00" indicates Search "01" indicates Check "10" indicates Lock "11" indicates Flywheel
RES	2	Reserved
LEN	6	If non-zero, LEN indicates TMoIP Payload Length, defined as the TMoIP Control Word + Raw Packet Payload If zero, LEN indicates TMoIP Payload Length greater than 63 bytes. In this case the TMoIP payload length is determined via length fields in lower protocol layers.
SEQ NUMBER	16	Sequence Number
TIMESTAMP	64	64-bit timestamp – NTP format 32 bit seconds field 32 bit fractional seconds field Prime epoch 00:00 01 Jan 1900 UTC

Notes

Req The TMoIP raw packet size shall be user configurable.
Req The TMoIP raw payload size shall be auto-configurable, based on user priorities (e.g. stream/delay characteristics).
Req The minimum TMoIP raw packet size = 1 byte.

Notes:
a. To limit the effects of Ethernet fragmentation, the final Layer 2/3/4/6 packet size should be less than the Ethernet Maximum Transmission Unit (MTU).
b. Padding may be required to meet the minimum Ethernet MTU size.

IRIG vs NTP vs PTP

- IRIG
  - >64 bits and can't achieve 1 ns resolution
- NTP
  - Most likely implemented time source (minimal effort)
  - 64 bits with 233 ps resolution
- PTP 1588
  - Questions concerning 1588 profiles which affect format
  - Greatest implementation impact to vendors
  - Greater long-term use potential, but immature now

Conclusions

- Successful vendor interoperability test at ITC
  - Few test cases with interoperability issues
  - Vendors identified “bugs” and work-arounds
- Didn’t break 218-10 or proprietary methods
- Should be backward compatible with existing HW
- New features
  - 64-bit 233 ps resolution timestamp
  - Payload shaping for minor frames and DQE
  - Bit sync status information metadata