

TELEMETERING STANDARDS COORDINATION COMMITTEE



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INTERNATIONAL FOUNDATION FOR TELEMETERING

TSCC FALL 2020

Chair Report

November 30, 2020
WebEx Telecon (Due to Covid)

TSCC Membership

- Academia (1)
 - Dr. Michael Marcellin
- Government (5)
 - Mark Bender
 - Albert Gabaldon
 - Richard Graham
 - (*1) ~~Myron Moodie~~
 - Richard Graham
 - Tab Wilcox
- Industry (7)
 - Scott Brierley
 - Brad Fleury
 - Philip Ellerbrock
 - Wayne Klein
 - Steve Nicolo
 - (*2) ~~Sergio Penna~~
 - (*2) ~~Joe Sulewski~~
 - Gilles Freaud
 - Malcolm Weir
- Ex-Officios
 - Clifford Aggen (IFT Rep)
- Members Emeritus
 - Lee Eccles
 - Merv MacMedan
 - Erwin (Terry) Straehley

(*1) Myron is leaving. Has proposed a replacement (Todd Newton)

(*2) Sergio P. & Joe S. are no longer in TSCC

Agenda

13:00 Call to Order S. Nicolo

13:00 Attendance and determination of Quorum W. Klein

13:05 Review and Approve Agenda S. Nicolo

13:10 Officer Reports

Chair Report

S. Nicolo

Action Item Review

S. Nicolo

Secretary-Treasurer

W. Klein

Financial Status

Agenda (Continued)

13:30 Committee Reports

Nominating Committee

S. Nicolo

New nominations/follow-up on members & Votes

Discussions on open seats

Radio Frequency

S. Brierley

Telemetry Data Processing

B. Fleury

Networking and Protocols

S. Nicolo

Recorder / Reproducer

M. Buckley

EITTS (**former** ETSC) Report

G. Freud

Cyber Security

M. Weir

Agenda (Continued)

14:30 Website

14:40 Old Business

S. Nicolo

15:00 New Business

Spring Meeting

All

15:30 Adjourn

All

Subcommittee Changes

- None

Subcommittee's & Reports

■ CURRENT SUBCOMMITTEE REPORTS

- Nominating Committee S. Nicolo (Acting Chair)
- Radio Frequency S. Brierley
- Networking and Protocols S. Nicolo (Acting Chair)
- Recorder / Reproducer M. Buckley
- Telemetry Data Processing B. Fleury
- Cyber Security (New SC No Report) M. Weir (NEW)
- EITTS (former ETSC Report) G. Freaud
 - EITTS (European Initiative for Test & Telemetry Standardization)

Member Summary (2019)

-To be updated

	Last	First	Association	Member/alternate	Expires	Office	Committee	Last	First	Committee
1	Bender	Mark	Government	Aerospace Corp	2019	member	radio Freq			
2	Brierley	Scott	Industry	ULA	2021	Chair	radio Freq/transd	McNatt	William	radiofreq
3	Ellerbrock	Philip	Industry	Boeing	2023	member				
4	Fleury	Brad	Industry	Edge Consulting	2020	Chair	Data multiplex / RF	Rob Trep	Edge	rec/rep;data multi
5	Gabaldon	Albert	government	China Lake	2021	member	R & R			
6	Gilles	Freaud	Industry	Airbus	2021	member		Mayer	Gerhard	
7	Graham	Richard	Government	China Lake	2023	member	R & R			
8	Klein	Wayne	Industry	Apogee Labs	2022	Treasurer	Network&Protocol	Weaver	Bob	data multi, Net
9	Marcellin	Dr. Michael	academic	Univ of AZ	2019	member		Creusere	Charles	
10	Moodie	Myron	Government	SwRI	2019	member	Network&Protocol	Abbott	Ben	N&P
11	Nicolo	Steve	Industry	GDP Space/Ampex	2020	Chair TSCC Chair	Chair TSCC Network&Protocol Nominating Committee	Weir	Malcolm	radiofreq
12	Penna	Sergio	Industry	Embraer	2019	member	Network&Protocol	Correa	Leonardo de Queiroz	
13	Sulewski	Joe	Industry	L-3	2018??	member	Data Multiplex	Dehmelt	Chris	rec/rep, datamult,Net
14	Weir	Malcolm	Industry	Ampex		Chair	Cyber			
15	Wilcox	Tab	government	YPG	2021	member	R & R			
	Aggen	Cliff	IFT							
	Eccles	Lee	Emeritus	Boeing		member				
	MacMedan	Merv	Emeritus			member	data comp			
	Straehley	Erwin	Emeritus			member	data multiplex			

TSCC Activities

- **TSCC Spring 2020: Canceled due to Covid**
- **TSCC Fall 2020: ITC 2020 was canceled due to Covid. The Fall 2020 meeting will be a WebEx meeting.**

TSCC Activities

- **Pink Sheet: 1/27/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Reviewed & Commented.
- **PUBLICATION 2/11/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Review.
- **PUBLICATION:6/8/20:** 118-20 VI 2, Test Methods for TM Systems and Subsystems Volume II: Test Methods for TM RF Subsystems, has been published and is available on both the RCC public and private pages.
- **Pink Sheet Review: 9/8/20:** TG178 IRIG118 Vol 2 CH x (New Chapter) EQUALIZER TEST METHODS
- **PUBLICATION: 10/15/20::** 118-20 Volume 5, Test Methods for Telemetry Systems and Subsystems Volume V: Test Method for Digital Recorder/Reproducer Systems and Recorder Memory Modules, has been published and is available on the public and private pages.
- **PUBLICATION: 10/30/20::** 118-20 Volume 1 Test Methods for TM Systems and Subsystems: Volume 1 Test::: Methods for Vehicle TM Systems has been published and is available on both the public and private portals.
- **Pink Sheet: 11/17/20:** IRIG-106, Chapter 7 Packet Telemetry Downlink. This document update is the result of Telemetry Group tasks **TG-173**..... Pink Sheets released for review (Comments by 11/7/20)

Actions

- S. Nicolo to update member list on web site.
- W. Klein to look into new plaque vender with more reasonable cost. (DONE)
- Resolve/Update Attendance History Document (Treasurer will then take ownership)..... OPEN
- One year Plaques still need to go out... OPEN

TELEMETERING STANDARDS COORDINATION COMMITTEE



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Treasurer Report – Fall 2020

November 30, 2020
WebEx

Treasurer Report

for the Period 10/18/19 thru 11/30/20

■ INCOME (Total)	\$ 1.00
• Checking Account Activity Maintenance (October 2020)	\$ 1.00
■ EXPENDITURES (Total)	\$ (0.00)
■ Net Increase (Decrease) in Cash	\$ 1.00
■ Beginning Cash Balance	\$ 2477.00
■ Ending Cash Balance	\$ 2478.00
• Note(s): TSCC account #: xxxxxx2632	

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC FALL 2020
Nominating
Subcommittee Report

November 30, 2020
WebEx Telecon (Due to Covid)

Nominating Sub-Committee Membership

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

Member Summary (2019)

-To be updated

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	Aggen	Cliff	IFT							
	Eccles	Lee	Emeritus	Boeing		member				
	MacMedan	Merv	Emeritus			member	data comp			
	Straehley	Erwin	Emeritus			member	data multiplex			

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 – Fall 2019: (Must Vote)
 - Mark Bender (Government): Would like to serve another term- MUST VOTE
 - Dr Michael Marcellin (Academic): Dr Marcellin will stay another year or until he can be replaced. He has recommended a replacement (Chuck Creusere from New Mexico State- I will contact Chuck)
 - Myron Moodie (Government): Will not serve another term but did recommend a replacement (Todd Newton)
 - Sergio Penna (Industry).. Will not serve next year
 - Joe Suleski: Joe's term expired 2018. He will not serve another term

Membership Changes

- MEMBERS:
 - Short four members
 - Members Retiring from TSCC: Joe Sulewski, Myron Moodie, Sergio Penna.
 - Dr Michael Marcellin (Retiring from TSCC at the end of 2021 or until we can replace him)
- Voting on Members & Alternates:
 - Member Replacement for Myron Moodie (Todd Newton)- Resume distributed. Will vote by mail.
 - Alternate for Steve Nicolo (Propose Tim Kelly – Delta Information Systems will distribute resume for a vote by mail)
- Alternates still needed for:
 - Mark Bender
 - Albert Gabaldon
 - Tab Wilcox
 - Malcolm Weir (Just became Full Member)
 - Richard A. Graham Jr (Just became full member)
 - Steve Nicolo (Propose Tim Kelly – Delta Information Systems)

TSCC Membership

- Academia (1)
 - Dr. Michael Marcellin
- Government (5)
 - Mark Bender
 - Albert Gabaldon
 - Richard Graham
 - (*1) ~~Myron Moodie~~
 - Richard Graham
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 - (*2) ~~Joe Sulewski~~
 - Gilles Freaud
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(*1) Myron is leaving. Has proposed a replacement (Todd Newton)

(*2) Sergio P. & Joe S. are no longer in TSCC

Open Membership Slots

- We currently have 12 of 16 full members as of Fall 2020.
- Need 1 Government member to maintain our approx 33% split between industry, academic and government.... 1 was proposed and resume was sent out-Todd Newton
- NEED Additional
 - 1 + Academia
 - 1 + Industry

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
 - **Officer Terms up December 31, 2020**
- Officers
 - Chair – Steve Nicolo (2nd Consecutive Term-is up 12/31/20)
 - Vice-Chair - Philip Ellerbrock
 - Secretary-Treasurer – Wayne Klein
- Subcommittee Chairs
 - All filled at this time

Open Actions

- TSCC has 4 open position.
 - 1 + Gov - 1 was proposed and resume was sent out-Todd Newton)
 - 1 + Academia
 - 1 + Industry
- Members needed (major focus)
- Alternates still needed for:
 - Mark Bender
 - Albert Gabaldon
 - Tab Wilcox
 - Malcolm Weir (Just became Full Member)
 - Richard A. Graham Jr (Just became full member)
 - Steve Nicolo (Propose Tim Kelly -Delta Information Systems-will distribute resume for vote)

TELEMETERING STANDARDS COORDINATION COMMITTEE



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RF Sub-Committee Report – Fall 2020

November 30, 2020
WebEx

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

- Pink Sheet Review of RCC 118-19 Volume 2
 - TEST METHODS FOR TELEMETRY SYSTEMS AND SUBSYSTEMS, VOLUME II
 - TEST METHODS FOR TELEMETRY RADIO FREQUENCY (RF) SUBSYSTEMS

Significant Activity

- Pink Sheet Review of IRIG-106
 - TG-153
 - Added LDPC (Low Density Parity Check) test methods as section 2.6 in IRIG 106

Significant Activity

- RF Vendors Working Group
 - RCC/IFT doesn't recognize this as an activity of the TSCC RF Subcommittee
 - RFVWG not an LLC or incorporated group, just a bunch of people on an E-mail list
 - No restrictions on membership

Significant Activity

- Fall 2019 RF Vendors Working Group
 - May be redundant with report from Johnny Pappas
 - Following slides are from info provided by Johnny Pappas
 - RF Vendors working group was convened on the last day of 2019 ITC at the top of Bally's

Significant Activity

- The RFVWG worked with key members of the Telemetry Group, RF Systems Committee to setup the configuration and transmitted signal waveform scenario.
- The purpose of the industry day was to establish compatibility between RF Transmitters, Simulators, and RF Receivers
 - THIS WAS NOT A TEST.
 - Receiver Performance was NOT be measured and was only for the benefit of the vendors own use
 - Any sharing of information outside the vendor was up to each vendor

Significant Activity

- Anyone that has a transmitter, receiver, simulator was invited to participate
 - Transmitters and Simulators produced L,S, & C band signals with FM, SOQPSK & STC, LDPC, and CPM waveforms.
 - In-band or If recorders recorded the event

Significant Activity

- Transmitter vendor provided a load, heatsink and the cables from their RF output to a Single N or SMA-type port
 - For STC testing, the Tx vendor is responsible for bringing the set of cable and diplexer to merge S0 and S1 together and provide a single N or SMA type port.
 - Each receiver vendor was responsible for bringing their RF cable to connect their Rx RF input (like Ch1) to the Multicoupler output port (SMA or N-type)

Open Actions

- None

TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC Fall 2020 - Report Telemetry Data Processing

Brad Fleury
WebEx TSCC Meeting

Committee Members

- Brad Fleury – Director Edge consulting and sales
- Alternate – looking for a new person

Sub-Committee Standards

- Current standards
 - IRIG-106 -17 (-19)
 - 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

Looking for new members

Sub-Committee Focus

- Very low activity last year
- Discussion about release of 218-19
 - Tm over ip spec

Open Actions

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

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TSCC Fall 2020 - Report Telemetry Data Processing

Brad Fleury
WebEx TSCC Meeting

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TELEMETERING STANDARDS COORDINATION COMMITTEE



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TSCC FALL 2020 Networks Subcommittee Report

November 30, 2020
WebEx Telecon (Due to Covid)

Sub Committee Membership

- Steve Nicolo, (Acting Chair) – GDP Space Systems, Ground Telemetry
 - Ben Abbot, Southwest Research Institute
 - Rich Hoffman, GDP Space Systems
 - Gary Thom, Delta Information systems
 - Wayne Klein, Apogee Labs
 - William Malatesta, NAVAIR
 - Hyong Yi, Curtiss-Wright Controls, Avionics and Electronics
 - Robert Weaver, Apogee Labs
 - Chris Dehmelt, L3 Telemetry – East
 - Malcolm Weir, Ampex
 - Dave Buckley, Curtiss-Wright Controls

Subcommittee Focus

Standard	Location	Contact
RCC IRIG-218		New release coming out if 2019
RCC IRIG-106 Chapters 21-28	irig106p2-chpt21-28.zip	Secretariat Range Commanders Council U.S. Army White Sands Missile Range New Mexico 88002-5110
SCPS	http://www.scps.org	http://www.scps.org/html/contact_points.html
CCSDS	http://public.ccsds.org/default.aspx	http://public.ccsds.org/about/contact_us.aspx
TCP (Transmission Control Protocol)	http://www.faqs.org/rfcs/rfc793.html	
UDP (User Datagram Protocol)	http://tools.ietf.org/html/rfc768	
SNMP (Simple Network Management Protocol)	http://tools.ietf.org/html/rfc3411	http://tools.ietf.org/html
EEE-1588 (A Precision Clock Synchronization Protocol for Networked MEasurement and Control Systems)	http://ieee1588.nist.gov	http://www.ieee-ims.org/site/index.php
FTP (File Transfer Protocol) http://www.ietf.org/rfc/rfc959.txt http://tools.ietf.org/html	FTP (File Transfer Protocol) http://www.ietf.org/rfc/rfc959.txt http://tools.ietf.org/html	FTP (File Transfer Protocol) http://www.ietf.org/rfc/rfc959.txt http://tools.ietf.org/html

TSCC Activities

- **Pink Sheet: 1/27/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Reviewed & Commented.
- **PUBLICATION 2/11/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Review.
- **Pink Sheet: 11/17/20:** IRIG-106, Chapter 7 Packet Telemetry Downlink. This document update is the result of Telemetry Group tasks **TG-173**..... Pink Sheets released for review (Comments by 11/7/20)

TSCC Activities

Pink Sheet Reviews

- IRIG 218 : TMoIP Standard: Provided comments
 - **Pink Sheet: 1/27/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Reviewed & Commented:
 - **PUBLICATION 2/11/20:** IRIG 218-20 TMoIP Standard for Pink Sheet Review:
- IRIG 106 Chapters 7/9/11 (Released/Updated June 2019)
 - Additional work on PCM Format 2 CR18-016 (Sept 2019)

■

Open Actions

TELEMETERING STANDARDS COORDINATION COMMITTEE



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Recorders & Reproducers Report – Fall 2020

November 30, 2020
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Sub Committee Membership

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

1.	Balázs Bagó	Safran
2.	Bob Baggerman	ATAC
3.	Paul Carrion	Calculex
4.	Chris Dehmelt	L3-Harris
5.	Justin Denning	EAFB
6.	Paul Ferrill	ATAC
7.	Tim Gatton	Aerogear Telemetry
8.	Dan Green	Safran
9.	Bill Harrison	Smartronix
10.	Eric Lamphear	Telspan Data
11.	Jake Layer	Smartronix
12.	Mike Lockard	EMC Corp
13.	Hung Mach	Boeing
14.	Gary Marker	Wideband
15.	Doug Novak	Tyndall AFB
16.	Johnny Pappas	Safran
17.	Steve Proudlock	Net Acquire
18.	Charles Reyzer	Boeing
19.	Christian Rueck	Databus Tools
20.	Bela Szabo	RT-Logic
21.	Malcolm Weir	Ampex
22.	Craig Wierzbicki	Curtiss Wright
23.	Rick Williams	SDS

Sub-Committee Focus

- Data Recorders, Ground and Airborne
- Standards in Place
 - IRIG 106-19 – 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>

Significant Activity

- RCC Telemetry Group Recorder & Reproducer Committee
 - IRIG 106-19 Chapters 6/9R/10/11
 - 2021 versions to be released to pink sheet, shortly
 - *Update Task is/was scheduled to be completed Nov 2020*
- STANAG 4575, AEDP-6 Ratification

Significant Activity

- TSCC R&R to take an increased roll in CR reviews & recommendations
 - R&R Meeting was **HELD** to discuss V2/MDL header
 - Attempt to ease transition to eventual full TmNS
 - Thr, 24 Oct 2019, 1130 – Bronze 4 Room
 - *(Current status – Unknown)*
- Finally made progress on SQ-Group
 - SQ-Group Attributes for Description of Messages Structures, Sub-Message Structures & Measurements
 - Submitted to DataMUX Committee
 - Publication is “Ready Soon” **REALLY!!!**
- 2020/2021 CR's - Status (Following page)

CRs for 2021

CR No	Description	Status
RR_17_CR-001	Ver 2 Packet Header	Working , again, On Hold again, NOT
tdpRR_17_CR-003	Fix Video Formats	Finalizing
RR_17_CR-006 (CR)	UART, First Packet Flag	Working
tdpRR_17_CR-010	Update S-Group Q-Group	99.999% Complete
RR_18_CR-015 (CR)	PCM, unpacked 16bit	Working
RR_19_CR-003	Message Data Structure Packet	Finalized?
RR_19_CR-004	Network Based Files (STANAG Format)	Working
RR_19_CR-005	IF Recording – Format 3 Format 2 – TBD	Finalizing
New CRs		
RR_20_CR-01	Fix PCM Format 2 – (DQE: 32bit, Throughput)	Finalizing
TSCC_RR_20_CR-02	.CMD for open/closed files	Working...
tdpRR_20_CR_03	Editorial/Typo (Rename subchannels ARINC Ch9)	Finalizing
RR_20_CR_04	Packet Overflow bit - Clarification	Finalizing

Open Actions

- TSCC –
 - CH10/11 in a networked world*
 - Recording CH10 Publishers as Native Packets w/ Correlated Time
 - V2 Header w/ 1588 Time
 - V2/MDL Header
 - Standardization of range/test article NAS
 - *(NAS file/directory/block structure)*
 - *Finally out grow STANAG*
 - Metadata hooks into a post/real-time CH10 architecture

* CH10/11 is NOT a networking protocol
CH10/11 will NOT be a networking protocol

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EITTS

European Initiative for Test and Telemetry Standardisation

Report – Fall 2020

November 30, 2020

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Sub-Committee Focus

- ▣ No significant progress in 2020
 - Disseminate the standards to the European Community.
- ▣ Next step
 - Smart sensors wired or wireless
- Next face to face meeting
 - ETTC 2021 in Toulouse 15 to 17 June 2021
 - Call for paper to be launched in the coming days

TELEMETERING STANDARDS COORDINATION COMMITTEE



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Cybersecurity Subcommittee Report – Fall 2020

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Sub-Committee Focus

- Cybersecurity for Test Articles, Telemetry Links and Ground Systems
- Standards in Place
 - None Identified
 - See next slide

Significant Activity

- While the defense community is investing heavily in this field, most activity is restricted in some way and so is unsuited for TSCC process (i.e. it's not approved for public release)
- Defensive cybersecurity is too closely related to offensive, hence the restrictions
- Cross-over between cybersecurity and encryption (another set of restrictions)
- Cross-over between "IT establishment" and ground system

Open Actions

- Recommend mothball committee pending developments