TELEMETERING STANDARDS COORDINATION COMMITTEE

TSCC

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TSCC Fall 2016 Meeting

Nov 7, 2016 (Monday) – 13:00 **MST**
Renaissance Hotel & Spa
Glendale, AZ
(ITC)

Abridged Agenda

- **RF Working Group Discussion**
- **Officer Reports**
- Chair   **D. Corry**
- Secretary-Treasurer   **W. Klein**
- Vote on New members   **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**
- **Website**
- **Confluence/Feedback on stadards D. Corry/B. Baggerman**
- **AOB   D. Corry**

Welcome

- Confirmation of Quorum
- Diarmuid Corry is chair.

TELEMETERING STANDARDS COORDINATION COMMITTEE

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TSCC Spring 2016 *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.

- End of Term re-elections:
  - Scott Brierley

TSCC Makeup

- The TSCC currently has 15 Members
  - 2 academic organization members
  - 5 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
  - Albert Gabaldon
  - Tab Wilcox

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

- Ex-Officios
  - TBD (TG chair)
  - Cliff Aggen (IFT Rep)

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

TSCC Membership

- The Aerospace Corporation
- Apogee Labs
- Boeing Commercial Airplane Co.
- China Lake
- Continuity Consulting
- Curtiss-Wright Controls Avionics & Electronics
- Edge Consulting
- Embraer
- GDP Space Systems
- GVM-Consulting/Airbus
- L-3 Communications
- Southwest Research
- United Launch Alliance
- University of Arizona
- White Sands

TSCC Membership

- L3 Communications
- Yuma proving ground
- 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

- 1 open membership slot. We have 15 full members

- New members need to be Gov't or academic in order to maintain our aprox 33% split between industry, academic and government.

New Membership Vote

- Voting on Members and Alternates:
  - Gilles Freaud moving from Alternate to full member to replace Gerhard Mayer
  - Gerhard Mayer to become alternate for Gilles Freaud

- 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 - Steve Nicolo
  - Secretary-Treasurer – Wayne Klein
- Subcommittee Chairs
  - All positions full

Open Actions

- Recruit 16th member from government

Treasurer Report
for the Period 3/14/16 thru 11/6/16

- INCOME
  - No funding received this session period $ 0.00

- EXPENDITURES
  - 2016 Spring Meeting Room Rental $ (399.00)

- Net Increase (Decrease) in Cash $ (399.00)

- Beginning Cash Balance $ 2188.45

- Ending Cash Balance $ 1789.45

  - Note(s): TSCC account #: xxxxxx2632
    - Spring Meeting was held at Holiday Inn Research Park, Huntsville Alabama

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

- IRIG 106 Chapter 2 Pink Sheets are out
  - Comments required NLT 25 November

Significant Activity

- RF Vendors Working Group meeting to be held after the TSCC meeting
  - Thanks to Johnny Pappas and Lorin Klein for organizing the RF Vendor working group

Significant Activity

- RF Vendors Working Group will be
  - Nov. 7, 4:00 to 6:00 pm
  - Cira Ballroom A, Renaissance Hotel &Spa, Glendale, AZ

  - 4:00-4:15   TSCC RF Vendors Working Group Background
    4:15-:4:30   Introduction- Participants
    4:30-4:45   TRMC Spectrum Efficiency Activity- Tom Young
    4:45-5:00   RCC RF Systems Committee Activity- Update-Kip Temple
    5:00-5:20   Spectrum Relocation Integration Group Activity- Lorin Klein
    5:20-5:30   RF Vendor Working Group Collaboration Tool-Bob Baggerman
    5:30-5:45   Introduction of Subjects of Interest
    5:45-6:00   Go Forward Organizational Structure and Planning for Future Meetings

Significant Activity

- Description of the working group as provided by Johnny Pappas:
  - This meeting will serve as the kick off meeting for the RF Vendors Working Group and will also be a unique opportunity for a joint meeting with an extremely wide range of leading user and provider experts.
  - The recently released ITC broad announcement informs the telemetry community of the newly formed group and to encourage a wide range of participation at this meeting.
  - This meeting is open to all Government, Commercial, and Academia persons with interest in RF Standards, Test Procedures, and other RF and Spectral Relocation related issues.

Significant Activity

- Description of the working group provided by Johnny Pappas:
  - Specifically, we would like to establish a list of subjects and areas not currently addressed by existing standards, test and measurement procedures, and identify who would be interested in participating in sub committees to tackle high priority subjects related to the above topics.

Significant Activity

- Description of the working group provided by Johnny Pappas:
  - In addition, Tom Young, from Edwards AFB will inform the group of activities he is involved with related to the Spectrum Efficient Technology (SET) and the Test Resource Management Center(TRMC) programs.
  - Kip Temple, (new chairman of the RCC RF Systems Committee) will address the group and inform us of current and future activities in his Group.
  - We are hoping there will be good participation from individuals involved with the Spectrum Relocation Integration Group

Significant Activity

- Description of the working group provided by Johnny Pappas:
  - We are very excited about the formation of the RF Vendors group.
  - This group will provide a unique mix of experts, from a wide range of RF related disciplines with a desire and willingness to work jointly with the Government, Vendors, and Academia.
  - I believe the enthusiasm I have received to date directly exhibits the aspirations and desires for working collectively to accelerate the advancement of RF Systems from both a user and provider perspective.

Proposed Subjects for RF Vendor Working Group

- **Standardization**
  - Additional and Standardized formats for DQE And DQM
  - Antenna, SCU, Receiver Interface standardization
  - TMOIP Format 218 Upgrade
  - Common API for Receivers and Antenna
  - Measuring Mission Metrics
  - New Waveforms COFDM
  - C band tracking performance
  - Low cost telemetry uplink
  - Other ways to do similar function as STC
  - RF over IP
  - Simple Retransmission Control Standardization
  - Standarized Parmetrics
  - Standard Parameters for Value of Data
  - Methods to RF Transmit Async Data
  - Method to transmit Out of Band Data
  - RF over fiber

Proposed Subjects for RF Vendor Working Group

- **Test Methods**
  - Test Methods for DQM and DQE
  - 118 Standards not designed for modern procedures
  - Test Adaptive Equalization
  - Standard library of waveforms to aid testing
  - Test methods for Best Source Selection
  - Test Methods 118
  - Diversity Combiner Test Methods
  - Latency Measurements

- **General**
  - Standardization of Software Security Requirements
  - Library of Error Correction Snippets
  - Proper Modulation Transmitting
  - Library of Demodulators

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
  - 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
Rob Trepa
Nick Duran - Smartronix (TBD)
Jack Sheldon
Erwin Straehley
Duane Wheaton

Action: Find some new sub committee members

Sub-Committee Focus

- IRIG-106 – 15
- Pink Sheets circulating for IRIG 106 and the handbooks
  - TG-133, TG-136, TG-139, TG-142,
  - "Chapter 7" recording impacts to TMATS and recording ongoing discussions
  - RCC open meeting Thursday afternoon at ITC

Open Actions

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

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
  - 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)
      - Some feedback from TSCC – sent to RCC
      - Final drafts under review right now
    - There are MDL items that still need to be addressed based on current implementations
      - iNET team working to have an MDL summit to present a path forward for MDL based current usage.

Sub-Committee Focus II

- Standards Activity:
  - IRIG106-Ch7
    - IP over PCM
    - New Pink Sheets for review
- Standards Activity:
  - IEEE1588 (PTPv3)
    - Still in review
  - TMoIP (RCC 218)
    - Pink sheets released
    - Informal review meeting at ITC

Sub-Committee Focus IV

- Have not been notified of significant activity on any of the following standards of interest:
    - RTP, TCP, UDP, SNMP, FTP, IGMP, etc. etc.

Open Actions

- iNET Pink Sheet review
- TMoIP Pink Sheet review

Membership

- **Stephen Nicolo, Chair**.
  - John Carlson – GDP Space Systems
  - Bob Mayer – GDP Space Systems
  - Michael Marcellin- Univ. of Arizona
  - George Nelson - Delta Information System
  - Gary Thom - Delta Information System

Sub-Committee Focus

- Data Compression and Coding
- Error Correction
- Current standards – updates
  - IRIG 106

Significant Activity

- iNET was rolled into IRIG 106 Chapters 21 thru 28. Preliminary Pink Sheets for Chapters 21 through 28 were reviewed for the purpose of determining there relevance to TSCC Coding and Data Compression Subcommittee.
    - It was determined that only Chapters 27 and 28 contain any reference to the topic of Coding and Data Compression. These references only indicate that Low Density Parity Check should be applied to RF MAC frames as the Forward Error Correction code.
    - The complete paragraph number and title as well as the text relating to LDPC from each chapter is included on the following page.

Significant Activity

- **IRIG 106 Chapter 27:**
  - **27.2.1 Data Link Layer Framing**
    - Forward error correction is added to the RF MAC frames to create Low Density Parity Check (LDPC) blocks suitable for transmission over the RF link. Details of the higher levels of this protocol are covered in Chapter 28.
  - **27.4.5 Low-Density Parity-Check (LDPC)**
    - Each codeblock shall contain one 512-byte RF MAC frame or, if the RF MAC frame is not 512 bytes, padding bytes with values of zero shall be added after the FCS to fill a 512-byte codeblock before encoding. The FEC code shall be a Low-Density Parity-Check (LDPC) code as specified in CCSDS 131.1-O-2, September 2007.
  - **27.4.5.1 Encoder Implementation**
    - A reference implementation of the LDPC is available from ref [4] using the values r=2/3 and k=4096.
- **IRIG 106 Chapter 28:**
  - **28.2.1 Data Link Layer Framing**
    - Forward error correction is added to the RF MAC frames to create LDPC blocks suitable for transmission over the RF interface. Details of the lower levels of this protocol are covered in Chapter 27.

Significant Activity

- **IRIG 106 Appendix Q: Extended Binary Golay Code (Error Correction Code): Pink Sheets TG Task 144 Submitted for review and comment along with Chapter 7**
  - **Extended Binary Golay Code**
    - **This is an error correcting code that adds 12 bits of error correction code to a 12 but word (24 bits total).**
    - **Can detect up to 7 bit errors and can correct up to 3 bit errors in a 12 bit word.**

Significant Activity

- **IRIG 106 Appendix R: Telemetry Transmitter Command and Control Protocol: Pink Sheets distributed for review.**
  - Appendix N Update Summary
    - Added Low Density Parity Check (LDPC) related commands to basic command set – FE(FEC) command.
    - Removed other FEC codes.
    - Added Space Time Coding (STC) related commands to basic command set – ST(STC) command
    - Moved the following commands from the Extended Command Set to the Basic Command Set:
      - DS(DSRC) – Data Source
      - ID(IDP) – Internal Data Pattern
      - CS(CLKS) – Clock Source
      - IC(ICR) – Internal Clock Rate
      - TE(TEMP) – Internal Temperature
    - Moved the differential encoding (DE) command from the basic Command Set into the Extended Command Set; clarified applicability to modulation mode (I.e. SOQPSK only)
    - Added STC Disabled Transmitter Communication Example

Significant Activity

- IRIG 106-15: Forward Error Correction (FEC) Codes
  - LDPC Codes were added in Appendix R
    - Codes were CCSDS LDPC Codes
- Video Compression
  - H.264: Mature and used widely in commercial and government applications
    - Last updated in 2014
    - A new version was just approved in 2016, but not yet published
  - H.265: New standard offering banwdidth saving up to 50% over H.264. It was generally developed for higher resolution applications (i.e. 4K)

Open Actions

- Work on Committee Membership – Looking for members
- Continue to look for additional applicable specifications

Sub Committee Membership

- Mark Buckley (Telspan Data), Chairman
- Albert Gabaldon, Alternate Chairman
  - Balázs Bagó (Zodiac)
  - Bob Baggerman (Zodiac)
  - Paul Carrion (Calculex)
  - Tim Chalfant
  - Chris Dehmelt (L-3 Comm Telemetry East)
  - Justin Denning
  - Paul Ferrile (ATAC)
  - Tim Gatton (Wideband)
  - Dan Green (Smartronix)
  - Eric Lamphear (Telspan Data)
  - Mike Lockard (EMC Corp)
  - Hung Mach (Boeing)
  - Doug Novak
  - Johnny Pappas (Zodiac)
  - Jason Phillips (RT Logic)
  - Christian Rueck (Databus Tools)
  - 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 106-15 – 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 6/9/10/11 Pink Sheets Out for Review
- 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
  - <u>CR 56:</u> Update Programmers Handbook & Test Methods to IRIG106-13 Chapter 10
  - <u>CR 77:</u> Revise 118 Test Methods & TSCC to Investigate Open Source Validator SW
  - <u>CR 79:</u> Fibre Channel Format 1 (FC-FS Layer, All)

Significant Activity
RCC Document 106-17 Chapter 10

- **2017 release CR's**
  - <u>CR 80:</u> CH9/10 Clarifications & Corrections, to be Reviewed by TG R&R
  - <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**
  - <u>CR 92:</u> Version 2 Chapter 10 packet header
    - Moved to 19 Release
  - <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

Significant Activity
RCC Document 106-17 Chapter 10

- 2017 release CR's
  - <u>CR 96:</u> New message packet format for change of value data words
    - Moved to 19 Release
  - <u>CR 97:</u> Add new H.265
    - Moved to 19 Release
  - <u>TSCC CR 16-001:</u> Add "IRIG Time Source" bits to Time Format 1

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…

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

EUROPEAN TEST AND TELEMETRY CONFERENCE
CONFERENCE EUROPEENNE DES ESSAIS ET TELEMESURE
JUNE 13-15, 2017
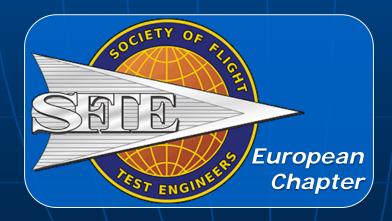TOULOUSE - France

ETTC'17

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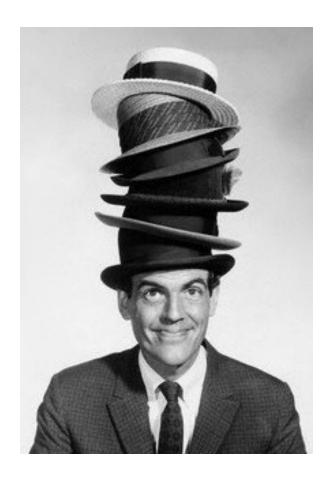SOCIETY OF FLIGHT TEST ENGINEERS

SFTE

European Chapter

Website Status

- TSCC website is being used
  - Recorder committee and MDL users group are only users to date!
- Webmaster Bob Baggerman

  www.tscc.org

TSCC Collaboration Tools

November 7, 2016

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Intro

- **Bob Baggerman**
  - Zodiac Data Systems

- **I wear many hats including**
  - www.irig106.org
  - www.tscc.org (administrator)

- **Contact Info**
  - bob.baggerman@zdsus.com
  - bob@baggerman.org
  - bob@irig106.org
  - admin@tscc.org

TSCC Workflow

- **What We Do**
  - TSCC → Telemetry Standards *Coordination* Committee
  - TSCC members *discuss* telemetry technology
  - TSCC members *produce* standards recommendations documents

- **How We Do It**
  - Email discussions
  - Infrequent meetings
  - Shared "documents"

- **Why We Do it**
  - Don't know

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Better Tools – Why and How

- **Why TSCC workflow tools are needed**
  - TSCC membership is distributed
  - TSCC membership is very heterogeneous
    - No common tools
  - Need to collaborate better to be an effective organization
  - Need better tools to collaborate better
    - A low budget web site is our only shared resource
  - ALL subcommittees can benefit from common tools

- **How to collaborate better**
  - Email tools
  - Document tools

Tools – Email Lists

- **Email lists are easy to setup and use**

- **TSCC already provides email list capability**
  - Used by Recorders / Reproducers for a long time
  - Very good experience
    - rr-all@tscc.org
    - rf-all@tscc.org
  - Based on GNU Mailman
    - Web management interface
  - Individuals can manage subscribe / unsubscribe

- **Every subcommittee should be using this!**

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Control Systems Division - 71
09 Mars
2010

Tools – Web Site Wiki

- **Current TSCC web site is a wiki**

  - Anyone can edit (like Wikipedia)

  - Based on DokuWiki

- **Wiki combines**

  - Web formatting to maintain look and feel

  - Allows easy editing and updating

- **Wiki lacks the features for effective collaboration**

Tools – "Document" Collaboration

- **What is a Document**
  - MS Word document
  - Google docs
  - Web document

- **MS Word Documents**
  - Word is ubiquitous
  - Shared Word documents are hard to configuration manage

- **Google Docs**
  - Works well for Google users
  - Google Docs don't <u>easily</u> integrate into web presence
  - Doesn't support other collaboration features

Tools - Confluence

- **Confluence is**
  - A web based product designed for collaboration
    - Atlassian
  - Easy to master
  - Pages are created in a hierarchical fashion
  - Previous versions of pages are kept
    - Can view changes between revisions
  - Suitably powerful web based WYSIWYG (almost) editor
  - Allows attaching user comments and annotations
  - Allows "watching" pages
  - Allows attaching arbitrary files to pages
  - Produces relatively attractive PDF or Word documents from pages
  - Cheap for small organizations
    - $10 / month for up to 10 users hosted
    - $10 to purchase to self host

Tools – Confluence – How we use

- **Hosted on Atlassian web server**
  - tsccwork.atlassian.net
  - Convenient link from www.tscc.org
- **Users**
  - One overall admin user account
  - Each subcommittee has an admin user account
  - < 10 users!

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Tools – Confluence – How we use

- **Work spaces for each subcommittee**

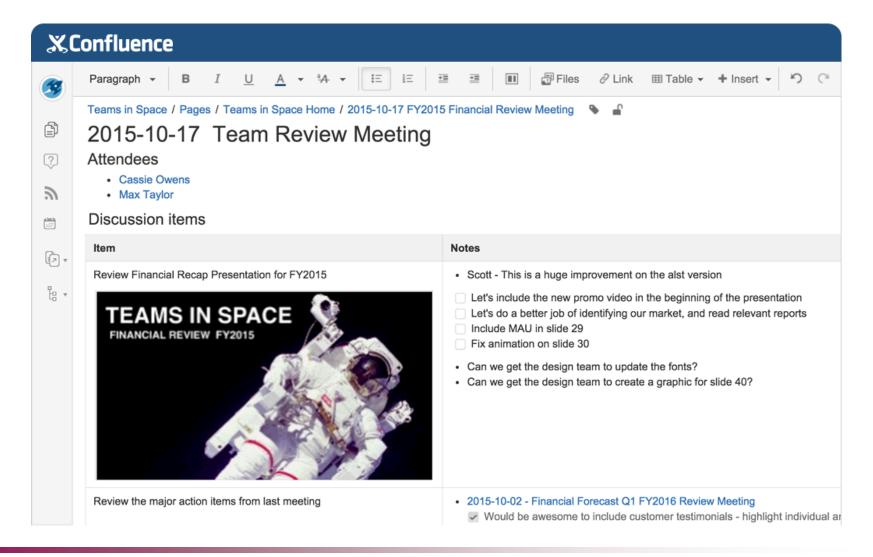- **Subcommittees create pages**
  - Pages are hierarchical
  - Informational pages
  - Working documents

- **Working documents**
  - Documents for general review and comments
  - Admin creates and edits these
  - Subcommittee may want to share Admin login to two or three trusted people
  - Members can review and comment
    - Anonymous comments OK for now
    - Can control access and security as needed if necessary

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Tools – Confluence – Examples

Tools – Confluence – Examples

Hopefully some live examples here!

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Summary

▪ **Collaboration is the key to TSCC effectiveness**

▪ **Email lists are easy and powerful, let's use them!**

▪ **Document collaboration is more difficult**

  ■ Let's try Confluence and see if it suits our needs