2019 TWG STIWG Report

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2019 DCS Technical Working Group Meeting
24 Apr 2019
USACE Western Division Risk Management Center, Denver, CO

2018 Meetings

- Spring TWG/STIWG: 22 MAR 2018, Miami, FL
  - DCS Training
  - Small Satellites
  - Radio Frequency Interference
  - Spectrum Regulatory Issues/reports
  - Migration from DOMSAT (to HRIT): End of Life 2019
  - GOES 16 and 17 Launches/Status: **Both Operational!**
  - Future of DCS
- Fall Technical Review/STIWG Teleconference: 13 DEC 2018
  - Vendor technical reports: Transmitter issues, etc.
  - DCS Overview
  - DADDS Needs Assessment
  - 2-Way DCP Communication
  - SPRES Spectrum Study Data Call
  - Critical Site Redundant Transmissions
  - Open Source Software Licensing: Apache 2.0
  - MOA/SA Status

Working Groups

- DCS Preservation
  - Tasked with addressing issues pertaining to matters that impact the viability, availability and integrity of GOES DCS data from the GOES satellites.
- OpenDCS Standardization
  - Tasked with establishing an executable plan that will unify existing OpenDCS variants and capabilities into a single platform. The second objective is to establish a way to jointly plan and fund the new platform's development and support by the STIWG agencies.
- ***New:*** Random Channel Coordination
  - Will be tasked with reviewing existing codified documentation and establish appropriate guidance on the use of random transmission channels

STIWG OpenDCS Support Agreements

- Interagency Support Agreements
  - Existing MOA/MOU's allow USACE to establish SA's to receive funds from STIWG agencies in support of OpenDCS development through the RMA contract
    - 2018 Completed draft of agreement under existing 7600A between USACE and NOAA
      - Outlines the scope of work, expectations, requirements and funding
  - Update: Interagency agreements have been delivered to STIWG agencies
    - Continue engagement to be ensure proper routing
    - Each agency handles SA's differently for review and approval

Radio Frequency Interference Analysis and Mitigation

- Spectrum Pipeline Reallocation Engineering Study (SPRES) projects are underway
  - Agencies responded to surveys detailing system requirements, use, tolerances, site information, etc.
- The NOAA **SPRES** contract objective is to quantify the sharing challenges for federal Earth station users as well as identify techniques to facilitate successful spectrum sharing without causing harm to the integrity or access to NOAA data.
  - Covers the 1675 – 1680 MHz spectrum (DRGS downlink)
  - Several DRGS site visits have been completed
  - Awaiting final report on findings
- Some agencies have awarded separate scopes of work
  - Site analysis
  - Equipment modernization
  - Implementation of recommended mitigation measures
  - Interference monitoring

2-Way DCP Communication

- Affords bi-directional communication with deployed platforms
  - Remote configuration changes
  - Turn off/on message transmission
  - Diagnose malfunctions
- Useful for platforms difficult to reach
  - e.g. Mountainous regions requiring helicopter rental to access
- STIWG is actively pursuing the continued research and development of this capability
- Will require development of additional software to interface with DADDS
- Anticipate a live demonstration/proof of concept in the near future

DCP Issues

- Design Analysis H-2221 transmitter: 2,000+ sites impacted
  - Unexpected nationwide outage impacted thousands of remote sites across agencies
  - Caused by transmitter date roll-over bug
  - CS2 GPS sync requirement safeguard worked and stopped transmissions
  - Corrective firmware update provided to users by Xylem to install in the field
- Multi-Vendor roll-over outage (06-APR-2019): ~2,000 sites impacted
  - Similar to Y2K bug; insufficient bit-resolution to represent the date
    - Rolls over to beginning of the epoch
  - Received vendor notices on which devices are impacted
  - Users have opportunity to proactively mitigate
  - Report: Several hundred DCP's were still impacted
    - Users report not being notified when the necessary patches/updates were available
    - Currently working to update impacted platforms
  - Users would like to see better communication, engagement with users and timely solutions from vendors on these matters

High Rate Information Transmission (HRIT)

- STIWG selected new DCS HRIT File Format
  - Reduces DCP message overhead
    - Compresses header fields
    - Provides more transmission performance information
      - Repurposes legacy fields
      - DAMS-NT improvements required to see new performance field
      - Backward compatible with existing LRGS software
  - Requires HRIT receiver firmware upgrade to process new file format
    - Currently being tested along with legacy HRIT feed
      - Legacy feed will be discontinued mid-Spring 2019
      - LRGS monitor may show HRIT's may show more than the normal number of messages received until the legacy feed is turned off or the virtual channels are adjusted

HRIT (Cont'd)

- HRIT Full Spectrum Processing
  - Develop new or integrate into existing software
  - Will expand ingest to include imagery, reports, etc.; non-DCS data
  - Actively discussing the level of effort and scope of work
    - Porting the Rice Compression Algorithm
    - Intuitive GUI
    - Data archival structure and maintenance
    - Cross-Platform (e.g. Java) or other approach

STIWG Representation and Engagement

- 2018, 2019 ACWI-Subcommittee on Hydrology Meeting
- 2018, 2019 Committee for Operational Environmental Satellites Meeting
- 2018, 2019 Stream Information Collaborative Meetings
- 2018 USACE CWMS User Representative Group
- 2018 SatCom Forum – Amsterdam, NL
  - Presented along with international users of weather satellite systems
  - Discussed challenges and opportunities with manufacturers
- 2018 Real-Time Water Quality Monitoring Workshop – St. John's, Newfoundland, CA
  - Invited by Canadian STIWG participants to present on GOES DCS
  - Canadian users are moving towards deploying more GOES DCS platforms
  - Investigating deployment of GOES East and West DRGS receive sites
- 2019 Engagement to discuss potential impacts of radio frequency interference
  - National Science Foundation
  - Interstate Council on Water Policy

STIWG DCS Objectives

- STIWG DCS Whitepaper synopsis of uses and importance of GOES DCS
  - Existing living document due for update this year
    - System capabilities, mission topics: wildfires, floods, storms, water quality, water quantity, hydro-power, navigation, emergency response, etc.
- Slide-Deck: Condensed presentation for briefing on DCS “in a nutshell”
- OpenDCS Standardization
- **DOMSAT discontinued 14-May-2019**
- **HRIT firmware update installed for new file format**
- **CS2 Migration Deadline – May 2026**
  - Users are migrating 100 baud DCP transmitters to 300 baud CS2 compliant
  - Bandwidth savings from narrowband transmitters allow for creating additional channels
  - More frequent critical site transmissions (e.g. 15-minute interval)
  - Channel expansion for increasing system use
- DCS Administration and Data Distribution System (DADDS) Modernization
  - System for managing GOES DCS platforms and access to data
- Future of GOES DCS
  - Spectrum Analysis/Studies
  - Agency investments

END