

GOES DCS
123rd Satellite Telemetry Interagency Working Group (STIWG) Meeting
Thursday, April 25, 2019
Denver Risk Management Center (RMC), Western Division
12596 West Bayaud Avenue, Suite 400, Lakewood, CO 80228

The Advisory Committee on Water Information, Subcommittee on Hydrology, Satellite Telemetry Interagency Work Group or STIWG held its 123rd meeting at the USACE Risk Management Center in Lakewood, Colorado on April 25th, 2019. The meeting was held in person and via a Webex Event hosted by USACE. The attendees are listed in Appendix II: Attendees. The STIWG page at USACE is <https://acwi.gov/hydrology/stiwg/>.

LySanias Broyles opened the meeting and did a **roll** call with introductions within the meeting room. Valerie Randall did a roll call of the attendees that were connected remotely by telephone. LySanias then introduced an updated agenda which contained a few new items; e.g. establish a Random Channel Group and the end of life of some GPS unit s. He also went over the carry-over from the TWG of a motion to approve a change to the DAMS-NT Protocol to match the new message file format. He also emphasized the new FCC Proposed Rule-Making effort scheduled for May 9th and the need for the community to respond.

LySanias then reviewed the action items from the March 22, 2018 (122). This is summarized below along with some points made during discussion of the items. The action items from this meeting are listed in Appendix III with references to the applicable places in the report.

122-1: Respond to Beau Backus regarding DCS community small-sat uses.

Discussion: No feedback received so far. Beau stated that one new feature of the small-sat technology is that they can be launched in groups. This makes it hard to differentiate which satellite is targeted. You can have random access. This system is perfect for small messages but not for large images etc.

Action: Members were asked to provide feedback to Beau Backus.

Status: Carry forward to next year. See Action 123-1 Appendix III.

122-2: Develop a paper detailing the cost for STIWG community to transition to commercial providers.

Discussion: It was noted that at some point in time, it could be necessary to transition to a commercial provider. Most users would probably like a satellite solution. Internet is fine most of the time but when you need it most, it can fail. Public law states you use life cycle costs to include all aspects of the necessary funding. One issue is who would run the new system and what does that mean for community control of it. It was noted that GOES have a large footprint that likely could not be duplicated with commercial satellites. It would take multiple beams. Also, commercial providers will also be under pressure to give up bandwidth; an example is C band. LySanias stated that his back of the envelop cost would approximate \$.5M. Others added that we need to include things like training and sustainment.

Action: Members asked to consider what their cost profiles would be.

Status: Carry forward to next year. See Action 123-2 Appendix III.

122-3: Provide detailed summaries of hydro-met and other events to update whitepaper

Discussion: A STIWG white paper to tell the DCS story. It is located at

https://acwi.gov/hydrology/stiwing/stiwing_dcs_reliance_and_preservation.pdf.

LySanias stated that there have been many changes, since the original paper was written. It needs to be refreshed and we need new input from the agencies.

Action: Members to review the white paper and provide new information where appropriate.

Status: Carry forward to next year. See Action 123-3 Appendix III.

122-4: Responses to NOAA SPRES questionnaire.

Discussion: There was discussion on how many users have responded and how many have received a site visit. A few members detailed their site visits and no issues were reported.

Action: No further action:

Status: Closed.

122-5: Provide lat/long for all DRGS, HRIT/EMWIN receive stations for SPRES to Dr. T. Martin and Beau Backus.

Discussion: None

Action: No further action:

Status: Closed

122-6: Consider required fields for update to DCS Metadata (for secondary processors).

Discussion: There has been no action to date. Brian Jackson has volunteered to assist the group that considers this.

Action: Over the course of the next year, clarify a new action after reviewing last year's report.

Status: Carry forward to next year with changes. See Action 123-6 Appendix III.

122-7: Suggestions to provide lookup tables for DCP parameters (for secondary processors).

Discussion: Add lookup tables for the SHEF codes especially the SHEF codes in DADDS that are used to fill out the PDT. It would help Users to have that information available without having to look it up each time. It was also suggested that there be optional SHEF Codes for User defined codes.

Action: Clarify the lookup tables for DADDS and consider User defined SHEF Codes.

Status: Carry forward to next year with changes. See Action 123-7 Appendix III.

122-8: Develop cohesive slide-deck to supplement whitepaper for briefings.

Discussion: A short and concise slide-deck that complements the white-paper is a valuable tool when briefing stakeholders.

Action: Keep the slide-deck up to date as we update the white paper.

Status: Carry forward to next year. See Action 123-8 Appendix III.

122-9: Review Alion Survey

Discussion. This was completed and is out of date.

Action: None.

Status: Closed.

OpenDCS Standardization/Interagency Agreements Status

LySanias then gave a talk on developing the funding mechanism to incorporate changes to OpenDCS so that they are migrated onto all version of OpenDCS. He has identified existing interagency agreements that can be used as a basis for interagency agreements that will allow agencies to fund enhancements to the OpenDCS that will migrate to both the Cove and Sutron versions. LySanias went over one example of an existing MOU (USACE-DOI) and an Agreement within the DOI MOU to allow the pooling of funds to make enhancements to OpenDCS. Required or desired changes or enhancements to the OpenDCS should be communicated to the STIWG; not for approval but so others can have a chance to comment and possibly join the effort. This gives an opportunity for more than one agency to fund the upgrade.

Member Question: Who is going to order the equipment? Agencies like DOI have specific requirements for equipment purchases. LySanias answered that USACE would handle the contracts and that it would be for software not hardware. After some discussion it was agreed that this was acceptable to the Members at this time.

Spectrum Study: Site Visits, Reports, Experiences, etc. - Open Discussion

LySanias opened by stating that much of what he had planned to discuss was covered during the action items review. LySanias then asked if anyone has seen a report from the frequency study. No one in the audience had. Dave Lubar said the info would probably not be available until the whole study is completed and Beau Backus stated that maybe we would only have to wait until that particular sub-task had been completed; as the entire study was broken down into smaller tasks. LySanias asked if there is a way to get preliminary data for each site visit. It was stated that Al Wiseman is the person that could authorize it. LySanias followed up by stating that any user can have someone do a survey of frequency around their own site. It is good to have a baseline and during the discussion it was noted that spectrum is a resource that needs to be monitored. That way, when some of the co-users start to become operational agencies would know what has changed. Examples are that DRGS has only one other user currently operating in the 1670-1675 band, HRIT has a user above but it that is not operational yet, and that there are towers that can operate in the DCS band and that they know where they are and that when they go operational they can operate at 2000 watts. There will be changes to the waveforms as these systems go operational. Beau and Dave would like to know if people discover things as they are trying to keep track of the situation.

Spectrum Update - Dave Lubar

Dave Lubar had given a presentation the day before to the TWG. He asked whether all had heard the brief and the Members replied in the affirmative. A short discussion followed where it was agreed that the agencies and private industry should keep track of developments that the FCC is considering and comment through the appropriate channels.

Secondary Processors of GOES Data - Brian Jackson/Open Discussion

Brian Jackson of the NWS Hydrometeorological Automated Data System (**HADS**) NWS System. HADS “is a real-time data acquisition and data distribution system operated by the National Weather Service Office of Dissemination.” They own no platforms but collect data on more than 17,000 DCPs owned by over 200 Users. HADS is a NOAA Primary Mission Essential Function. Brian

briefed the list of stakeholders including 152 NWS Field Offices and the Advanced Hydrologic Prediction System (AHPS).

Brian noted that there is only 2 people providing Tier 2 support and that he is the only person providing Tier 3 support. He noted that several agencies use this data in disaster scenarios including major flooding. HADS major source of metadata on the DCP messages is the PDT. He asked that users please update them. Some actions requiring update are reprogramming or moving the DCP, discontinuing a DCP, moving the ID, updating the SHEF Codes and changing Points of Contact. He stated that adding the SHEF codes and the order they are in is very important as this defines what the DCP is reporting. POCs are very important as users are sometimes queried on their DCPs or informed on anomalies; e.g. the GPS roll-over. Send an email to hadsteam@noaa.gov to inform Brian that you have made a change. Also, if your agency has a metadata repository, it would help a lot if you informed Brian where it is located

Some important things to note about DCS and the PDTs is that there are no standards for DCP programming; metadata sources are often outdated, incomplete, inaccurate or difficult to find; the NWS may not be aware of available data; and there are DCPs with no data on where they are. This results in inaccurate data during critical situations. Also noted was that the DCS community is losing institutional knowledge making metadata more important. HADS first source of DCP metadata is DADDS and the PDTs. Brian showed a list of errors in the PDTs as of April 2019.

As of 4/17/2019

- 40,086 PDT records
- 4,995 PDTs (58 owners) PDT last update date on 2009 day 295
- 4,921 PDTs with lat/lon and no sensors listed
- 4,908 PDTs not parked and no location listed
- 27,297 PDTs without a point of contact
- 11,719 PDTs without manufacturer and model
- 1,023 PDTs listed as Handar
- 1,540 PDTs coordinates wrong or suspect (not precise), lat/lon transposed, or missing negative for W hemisphere.

Users can contact BRIAN.JACKSON@NOAA.GOV and he will assist them is updating their PDTs.

Action 123-7: Schedule a PDT week to help focus users on PDTs. Letecia to schedule. See Appendix III.

HRIT – L. Broyles/Open Discussion: Vote to adopt new format changes to DAMS-NT as part of protocol

During the TWG, it was brought to the attention of the attendees that Microcom had used a set of vendor optional specific fields to make the appropriate changes to the DAMS-NT protocol so that DAMS-NT could handle the new DCP message format introduced into DADDS. The question is whether the STIWG wants to approve the changes to the protocol now or delay it until the member have a chance to review them.

It was decided to give some time for review and the STIWG would approve the changes when all were able to approve.

Action 123-8: Letecia to send the Microcom brief and the ICD to all the members for review prior to voting on the DAMS-NT standard change for approval by the STIWG before the legacy format is discontinued. See Appendix III.

Full Spectrum Processing of HRIT:

It was noted by LySanias that there is more information on the HRIT/EMWIN broadcast than is being used by many Users. There are GOES-16/17 images and other products, all the EMWIN products; e.g. watches, warnings, weather discussions, tropical storm information as well as the DCS messages. An action was opened to assess how to access the complete set of information. It was also suggested that we investigate whether we can disseminate Iridium message on HRIT apart from receiving them over the DAMS-NT.

Action 123-9: The OpenDCS Standardization Group to consider Full Spectrum processing of the HRIT broadcast. See Appendix III.

Action 123-16: Investigate disseminating iridium data over HRIT. See Appendix III.

Securing the Future of GOES DCS – LySanias Broyles

- STIWG Whitepaper and PowerPoint Updates:

STIWG Action 122-3 was to “Provide detailed summaries of hydro-met and other events to update whitepaper. The STIWG white paper “Perspective on DCS Reliance and Preservation of 23 September 2015 is located at https://acwi.gov/hydrology/stiwg/stiwg_dcs_reliance_and_preservation.pdf. LySanias stated that there have been many changes, since the original paper was written. It is asked that agencies review the white paper and provide feedback to the STIWG. The action item is being carried forward as Action 123-3 Appendix III.

- SPRES Questionnaire: tolerable latency and alternative sources

There has been discussion of whether the 30 second delay via HRIT acceptable? If not, what is acceptable? Another question is if not, what is an alternative dissemination plan. Using a terrestrial system assumes some downtime as does almost any system but GOES is very reliable and does work when other communications systems are down. There are real life consequences to missing DCS observations due to internet outages. Thus, our requirement is NO delay or latency. This means that the DRGS is the primary delivery system and HRIT or other delivery systems are backups.

- Public Law PL115-25 Discussion

PL115-25 states that “To improve the National Oceanic and Atmospheric Administration’s weather research through a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to support substantial improvement in weather forecasting and prediction of high impact weather events, to expand commercial opportunities for the provision of weather data, and for other purposes.” The law text can be found at: <https://www.congress.gov/115/plaws/publ25/PLAW-115publ25.pdf> It was stated during discussion

that significant, bipartisan effort was made to get this passed in the last Congress. This law drives some of the research and forecasting efforts in the NWS. We are unsure of how this affects DCS today, but this is something that the STIWG should be aware of.

Remote Automatic Weather Stations (RAWS) – Jesse Gray

Jesse Gray gave a presentation on the Remote Automatic Weather Station Network (RAWS). He noted there were 2178 permanent stations spread across the 50 states including some in Puerto Rico, American Samoa and Guam. All the stations are 300 baud, hourly transmission installations. Many of the stations are used in Fire Weather and Resource Applications. There are also 593 Portable Weather Stations in the network. These are also 300 baud; hourly transmission stations.

He noted that all the permanent stations meet the Minimum Sensor Complement of relative humidity, air temperature, wind speed, wind direction, solar radiation and have a rain gauge. The RAWS can also carry the Alternate Sensor Complement is required. The portable stations have recommended sensor complements of relative humidity, air temperature, wind speed, wind direction, solar radiation, fuel moisture, fuel temperature and a rain gauge. Portable stations must be maintained to standards even when on the shelf between deployments.

Jesse also noted they have 75 Incident Remote Automatic Weather Stations or IRAWS. These stations are used for risk incidents; normally on wildfires. He briefed there were 117 deployments on wildfires in 2018 and 23 so far in 2019. These stations use radio voice transmitters and also uplink to GOES. The uplink uses 5 second windows every 15 minutes.

He also showed that there are 76 smoke monitors in the network. These are all 300 baud and are used in fire weather applications.

There network contains a DRGS and two HRIT receivers. There are also 3 LRGS primary, backup and test. The data is converted in the Wildland Fire Management Information (WFMI) software.

Question: is the DCP data used for management. Answer: This is for firefighters in the field to dial into the system and see all in a defined period of time.

Brian Jackson says it would be good to get PDTs on all these stations for the HADS system.

TWG or DCS Topics - Open Discussion

- Establish Random Channel Work Group

Currently, there is no documentation, specifically rules and regulations, on the use of random channels, or it is very dated. There is a need for a working group for this topic. Duane Preble had some old documentation that Richard Pardee found. He will send it to Letecia Reeves.

Action 123-10: Letecia to acquire the “Duane Preble” documentation from Richard Pardee. See Appendix III.

Action 123-11: The STIWG to form a Random Channel Work Group to document the protocol for their use. See Appendix III.

- End-of-Life GPS Units (Windows CE devices; seeking clarification)

The Windows CE Version # 5 version will go away soon. Systems will have to migrate to Windows CE 6. It is not clearly understood whether this will affect any of our systems including GPS units.

Action 123-12: Identify the GPS units that use Windows CE. Clarify specifically what this refers to and does it affect any of our current systems. See Appendix III.

- Vote on whether to leave the DCS messages on channel 32 when the dual stream test is completed.

There was no objection to keeping new format on channel 32 and letting channel 31 lapse.

- “Good News” stories on the importance of DCS (protection of life, property, critical infrastructure, economy, etc.) e-mailed 29 – 30 Apr to Brett Betsill.

Action 123-13: Send “Good News” stories on the importance of DCS (protection of life, property, critical infrastructure, economy, etc.) e-mailed by April 27th to Brett Betsill, the STIWG and Valerie Randall. See Appendix III.

Action 123-14: Keep a running compilation of “Good News” stories. See Appendix III.

- Small-Sat Testing on Random Channels - Beau Backus

As part of the Small-Sat project, it was discovered that we need rules of engagement of using random access channels. During the discussion it was put forward that we could make use of the international channels. Beau stated that they have been working with EUMETSAT on documenting the actual uses of the international DCS channels at the present time. There is currently a discrepancy in the way they are programmed and the reality. They are still working on compiling a 19 Khz group of channels for EUMETSAT. The STIWG should accurately map how the channels are assigned on GOES, EUMETSAT and HIMAWARI.

Action 123-15: Map the DCS channels that are used for GOES and International use and identify them by random access or time access use. See Appendix III.

- *Template for Comments to FCC on Proposed Rulemaking Regarding 1675 – 1680 MHz*

It was asked if there is a template for comments to the FCC. It was stated that there is no standard template for providing the comments. There is sort of a quasi-format. You can also see examples on the FCC pages.

End of Meeting Discussion

Before the end of the meeting, the STIWG was asked to come up with locations for the next set of meetings.

The meeting was adjourned at 12:00.

Appendix I: Agenda

- 8:00 Remote Connections/Roll Call - *LySanias Broyles*
- 8:05 Introductory Remarks
- 8:10 Review Action Items from 22-March-2018 meeting
- 122-1: Respond to Beau Backus regarding DCS community small-sat uses
 - 122-2: Paper detailing the cost for STIWG community to transition to commercial providers
 - 122-3: Provide detailed summaries of hydro-met and other events to update whitepaper
 - 122-4: Responses to NOAA SPRES questionnaire
 - 122-5: Provide lat/long for all DRGS, HRIT/EMWIN receive stations for SPRES to Dr. T. Martin and Beau Backus
 - 122-6: Consider required fields for update to DCS Metadata (for secondary processors)
 - 122-7: Suggestions to provide lookup tables for DCP parameters (for secondary processors)
 - 122-8: Develop cohesive slide-deck to supplement whitepaper for briefings
 - 122-9: Review Alion Survey
- 8:30 OpenDCS Standardization/Interagency Agreements Status
- 8:45 Spectrum Study: Site Visits, Reports, Experiences, etc. - *Open Discussion*
- 9:00 Spectrum Update - *Dave Lubar*
- 9:30 Secondary Processors of GOES Data - *Brian Jackson/Open Discussion*
- 9:45 DADDs Modernization Feedback - *Letecia Reeves/Richard Antoine*
- 10:00 Break**
- 10:15 EDDN and Configuration Repository - *Dan Schwitalla*
- 10:30 HRIT – L. Broyles/Open Discussion
- Vote to adopt new format changes to DAMS-NT as part of protocol
 - Full Spectrum Processing
- 10:45 Securing the Future of GOES DCS
- a) STIWG Whitepaper and PowerPoint Updates
 - b) Singular Document to Retain DCS on future Space-crafts
 - a. SPRES Questionnaire: tolerable latency and alternative sources
 - c) PL115-25: <https://www.congress.gov/115/plaws/publ25/PLAW-115publ25.pdf>
 - d) Iridium Gateway Outage and Internet-based Delivery Implications
 - e) FCC Decision to Propose Sharing of 1675 – 1680 MHz
 - a. <https://www.fcc.gov/news-events/blog/2019/04/17/fast-reliable-and-secure>
 - b. <https://www.fcc.gov/document/proposing-allocation-service-rules-1675-1680-mhz-band>
- 11:15 Remote Automatic Weather Stations (RAWS) – *Jesse Gray*
- 11:30 TWG or DCS Topics - *Open Discussion*
- a) Establish Random Channel Work Group
 - b) End-of-Life GPS Units (Windows CE devices; seeking clarification)
 - c) Vote: Whether or not to make new DAMS-NT changes for HRIT format part of DAMS-NT protocol currently in vendor specific portion of DAMS-NT messaging
 - a. OpenDCS and DDS have been made compatible
 - b. Requires a minor DRGS firmware upgrade
 - c. No objection to keeping new format on channel 32
 - d) “Good News” stories on the importance of DCS (protection of life, property, critical infrastructure, economy, etc.) e-mailed 29 – 30 Apr to Brett Betsill
 - e) Small-Sat Testing on Random Channels - *Beau Backus*
 - f) ***Template for Comments to FCC on Proposed Rulemaking Regarding 1675 – 1680 MHz***
- Adjourn

Appendix II: Attendees

Last Name	First Name	Organization
Abney	Ruth	US Army Corps of Engineers
Unknown Webex	Unknown Webex	Alberta Environment
Allen	Charles	doi/bor
Allin	Lauren	US Bureau of Reclamation
Anderson	Quentin	Tennessee Valley Authority
Antoine	Richard	NOAA/NESDIS
Arrunategui	Paolo	ADR Tecnology
Ary	Edward	USBR
Backus	Beau	NOAA/NESDIS
Bell	Brian	USACE
Breitkreutz	Pat	Nebraska Department of Natural Resources
Broyles	LySanias	US Army Corps of Engineers
Bryant	Tammy	US Army Corps of Engineers
Campbell	Paul	Environment and Climate Change Canada
Chodkiewicz	Scott	U.S. Army Corps of Engineers - Mobile District
Clayton	Richard	Bureau of Reclamation
Dayton	Phil	USBR
De Dominicis	Shayne	Manitoba Hydro
Dorsey	Warren	NOAA/NESDIS Affiliate
Emry	Ross	U.S Army Corps of Engineers
Escobar	David	ADR Technology
Farrell	Ross	USACE St. Louis
Ferguson	Trent	?
Gray	Jesse	NIFC/BLM
Hardesty	Matt	Colorado DWR
Heil	Jim	NOAA/NWS
Hensley	Winston	NOAA-COOPS-OSTEP
Hogue	John (Jay)	USACE Vicksburg
Holcomb	Nathan	NOAA/NOS
Hyde	Leona	Government of Newfoundland Labrador
Jackson	Brian	NOAA / National Weather Service
Krug	Warren	NOAA/NOS/CO-OPS
Lubar	David	Aerospace Corp.
Macomber	Tom	?
Mirza	Sheraz	System Integration Development (SID)
Neilson	Michael	USACE-Sacramento
Pardee	Richard	usgs wma
Powers	Ari	US Army Corps of Engineers, Portland District
Rele	Bhushan	?????
Randall	Valerie	SSAI
Reeves	Letecia	NOAA/NESDIS
Seymour	Paul	System Integration Development (SID)
Shima	Patrick	DOI/USBR/RMP

Simms	Christopher	USACE
Sims	Jamese	Office of the Federal Coordinator for Meteorological Services (OFCM)
Smith	Patrick	?
Sullivan	Matthew	National Oceanic and Atmospheric Administration - Wallops Island
Swoford	Robert	?
Thornton	Travis	National Oceanic and Atmospheric Administration - Wallops Island

Appendix III: Action Items

Numbers in parentheses are STIWG 122 actions carried over and, in some cases, expanded.

123-1 (122-1): Respond to Beau Backus regarding DCS community small-sat uses. See page 1.

123-2 (122-2): Develop a paper detailing the cost for STIWG community to transition to commercial providers. See page 1.

122-3: (122-3) Provide detailed summaries of hydro-met and other events to update whitepaper. See page 1.

123-4 (122-6): Consider required fields for update to DCS Metadata (for secondary processors). Over the course of the next year, clarify a new action after reviewing last year's report. See page 2.

123-5 (122-7): Consider providing lookup tables for DCP parameters (for secondary processors); specifically, for the SHEF Codes in DADDS. a) Clarify the look up table. b) Provide an option for User defined SHEF codes. See page 2.

123-6 (122-8): Develop a cohesive slide-deck to supplement whitepaper for briefings. See page 2.

123-7: Schedule a PDT week to help focus users on PDTs. Letecia to schedule. See page 4.

123-8: Letecia to send the Microcom brief and the ICD to all the members for review prior to voting on the DAMS-NT standard change for approval by the STIWG before the legacy format is discontinued. See page 5.

123-9: The OpenDCS Standardization Group to consider Full Spectrum processing of the HRIT broadcast. See page 5.

123-10: Letecia to acquire the "Duane Preble" documentation from Richard Pardee. See page 6.

123-11: The STIWG to form a Random Channel Work Group to document the protocol for their use. See page 6.

123-12: Identify the GPS units that use Windows CE. a) Clarify specifically what this refers to. b) Clarify if this affects any of our current systems. See page 7.

123-13 Send "Good News" stories on the importance of DCS (protection of life, property, critical infrastructure, economy, etc.), e-mailed by April 27th, to Brett Betsill, the STIWG and Valerie Randall. See page 7.

123-14 Keep a running compilation of "Good News" stories. See page 7.

123-15 Map the DCS channels that are used for GOES and International use and identify them by random access or time access use. See page 7.

123-16: Investigate disseminating iridium data over HRIT. See page 5.