

CGMS-52 PLENARY SESSION

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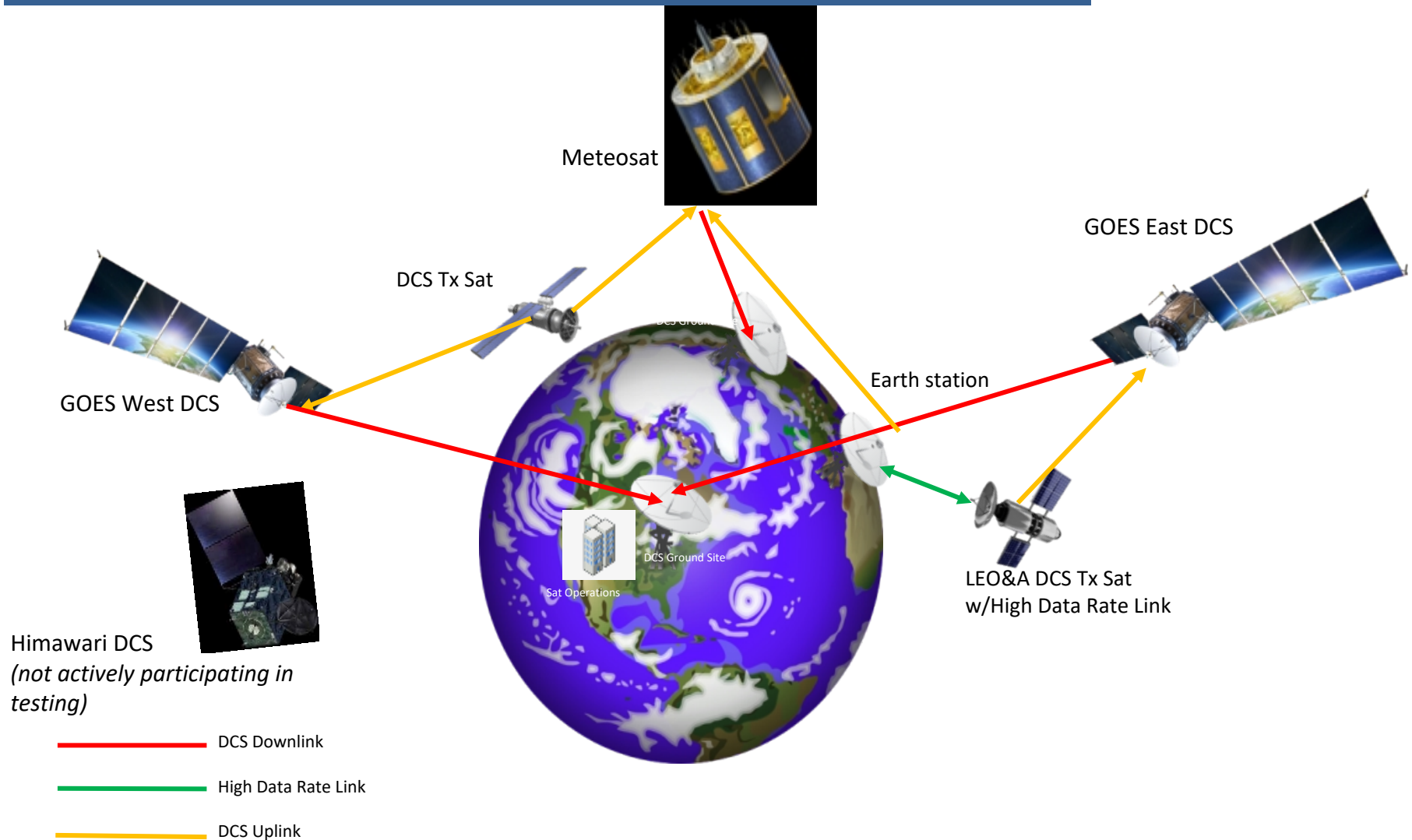
Proposal on the Agreed Permitted Smallsat Use of DCS by Satellite Systems and Under What Conditions

Presented to CGMS-52 Working Group 1 session, agenda item 7.11
CGMS-52-NOAA-WP05_V3

Executive summary of the WP

NOAA proposes the development of a process for updating the CGMS DCS Handbook over the CGMS-53 intersessional period to provide best practices for satellite use of DCS, including the permitted uses of DCS by satellites; conditions of use; criteria to support Members' assessments of applications for use of DCS by satellites; identification of consistent agreement practices to be applied by DCS administrations/agencies, and a process for notification and coordination with the CGMS Task Group on Data Collection Systems (DCS) of applications for satellite use of DCS.

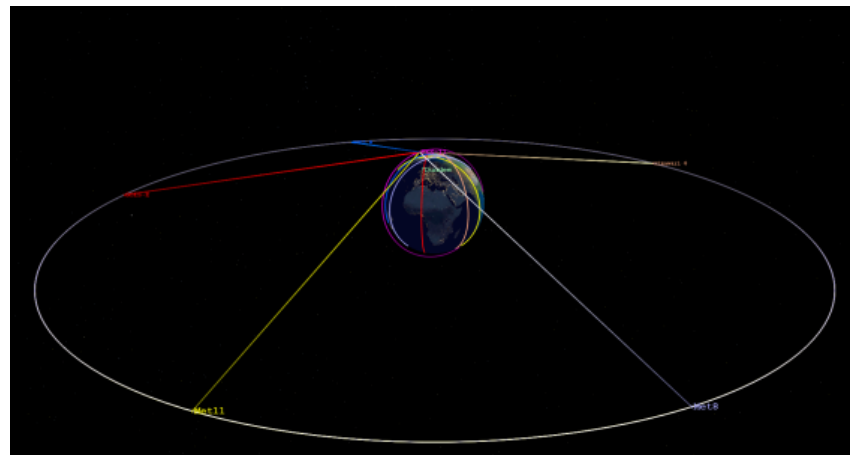
Overview of Concept



Satellite DCS Mission Goals

TechEdSat-11

- Demonstrate that DCS messages of varying sizes can be reliably transmitted from a LEO platform and received on the ground through the GOES and Meteosat DCPR systems, error-free.
- Additional performance characterization of the LEO transmitter interoperability with the three to four available DCPRs.
- Demonstration of an extended message transmission and/or potential future operational scenarios involving LEO DCS UHF transmitters.



TES-11 in Polar Orbit communicating with GOES and Meteosat. TES-11 will be visible to and will coordinate operations with GOES, Himawari, and Meteosat DCPRs.

Satellite DCS Mission Goals

- We have validated that satellites can use DCS.
- The concept is still being validated for international DCS support as well as a more operational use of the system concept.
- CGMS would benefit from agreeing on best practices for permitted uses of DCS by satellite systems, criteria for assessing satellite systems applications to use DCS, and coordination/notification mechanisms within the TGDCS.
- Recommend updating the Data Collection Services Handbook (2020) to reflect these best practices.

Conditions (Who Can Use?)

- Use of the DCS by satellites must be controlled and limited to users that meet specific conditions.
- Satellite use of DCS shall only be for the collection and/or relay of environmental data by administrations and/or non-profit users, primarily in the areas of:
 - Hydrology
 - Meteorology
 - Climatology
- All satellite users of DCS must agree to permit CGMS DCS administrations the full, open, timely, and appropriate use as determined by the CGMS DCS administration, of all environmental data collected and relayed from their platforms;
 - this may include the international distribution of environmental data under the auspices of the World Meteorological Organization.
- Accessibility of the satellite provided DCS processed data from the ground segment is handled in accordance with the user's specifications and system design limitations as identified in the CGMS Data Collection Services Handbook (2020).

Criteria for Satellite use of DCS

- Non-administrative “commercial”, environmental use of the DCS for satellite data collection and relay should only be authorized where there is an administrative or CGMS interest in the collection and/or receipt of the data.
 - Satellite use of DCS will continue to be predominantly used for environmental related applications.
- Testing use of Satellite DCS payloads should only be authorized for manufacturers of Satellite DCS platforms, that require access to the system to test and certify prototype and production models.
- Agreements for the collection and relay of environmental data, by satellite using DCS, should be valid for 5 years from the date of initial launch deployment, and renewable for additional 5-year periods.
- Agreements for the testing use of satellite hosted DCS, by equipment manufacturers, should be valid for 1 year from the date of initial testing, and renewable for additional 1-year periods.
- Agreements for the collection of non-environmental data and relay, via the DCS, by administrations, or non-profit institutions where there is an administrative interest identified to the CGMS, should be valid for 1 year from the date of initial in-situ deployment of the platforms, and renewable for additional 1-year periods.

International DCS (iDCS) Frequencies for Satellite use of DCS

- Satellites using DCS will utilize iDCS frequencies or channels.
 - There are 11 iDCS channels, numbered accordingly.
 - Each channel is 3kHz wide.
- iDCS Channels 3–9 (inclusive) will need to be designated as alert mode channels.
- The center-frequency of Channel 6 (highlighted) is the frequency for all satellite use of DCS.
 - The three channels on either side of Channel 6, Channels 3-5 below and Channels 7-9 above, accommodate the frequency offsets of Doppler shifted transmissions.

Channel	Center Frequency (MHz)	Channel	Center Frequency (MHz)
1	402.035500	7	402.053500
2	402.038500	8	402.056500
3	402.041500	9	402.059500
4	402.044500	10	402.062500
5	402.047500	11	402.065500
6	402.050500		

Approvals and Process

- For satellites to use DCS, each satellite hosting a DCS transmitter **must have an agreement with the approving authorities** for that system.
- Approving authorities for each system **shall notify the CGMS TGDCS to consult on user requests** for System Use Agreements **and renewals** before concluding agreements for satellite use of the DCS.
 - All user requests must also have appropriate administration/agency endorsements prior to submission to the TGDCS.
- Agreements with Administrations/Agencies should address, but are not limited to:
 - The length of time the agreement is valid and procedures for its termination,
 - Authorized use(s), and priorities for use,
 - Any applicable administration(s) interest in the data,
 - Required equipment standards,
 - Standards of operation,
 - Conformance with applicable ITU and applicable administration spectrum regulatory agreements,
 - Reporting time and frequencies,
 - Data formats,
 - Data delivery systems and schedules.

Conclusion

DCS systems have come under pressure from small satellite constellation companies that seek additional usable RF spectrum and wish to increase use of this band for their space operations. We expect that satellite use of the DCS system will alleviate some of this risk and may further strengthen the value of protecting the system.

Satellite use of the DCS also fosters a new means for collecting and distributing meteorological and climatology data. This can be done using DCS equipped smallsats in polar orbits. Additionally, should a commanding capability be implemented in GOES, this DCS equipped smallsat could also relay these commands from other DCS systems.

The initial concept for Satellite use of DCS was successfully validated through TES-10. We can now say that the concept is valid and that DCS can be utilized to some definable degree by satellites. The launch and operation of TES-11 and 16 will provide a more significant validation of the operational challenges of this concept.

NOAA recommends CGMS consider endorsing satellite use of DCS and asking WGI TGDCS to develop and include best practices in the DCS Handbook.

Key issues of relevance to CGMS:

- ☐ The initial concept for Satellite use of DCS was successfully validated through TES-10.
- ☐ We can now say that the concept is valid and that DCS can be utilized to some definable degree by satellites.
- ☐ Examples of best practices for satellite use of DCS to be included in an update to the CGMS DCS Handbook were outlined, including the permitted uses of DCS by satellites; conditions of use; criteria to support Members' assessments of applications for use of DCS by satellites; identification of consistent agreement practices to be applied by DCS administrations/agencies, and a process for notification and coordination with the CGMS Task Group on Data Collection Systems (DCS) of applications for satellite use of DCS.
- ☐ Reference to HLPP 2.1 Coordination/Optimisation of Data Collection Systems (DCS)

To be considered by CGMS:

- ☐ Members are invited to note the example best practices provided in this presentation and provide comments and suggestions.
- ☐ Recommend CGMS endorse satellite use of DCS and ask the WGI TGDCS to update the DCS Handbook to include the best practices on satellite use of DCS.