Report from the CGMS WGI Task Group on Low Latency Data Access

Presented to CGMS-52 Working Group I session, agenda item 5.1

Coordination Group for Meteorological Satellites

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Executive summary of the WP

The Low Latency Data Access Task Group was formed from the merger of the former Direct Broadcast Task Group and the Coordination of LEO Orbits Task Group.

The LLDA Task Group provides a forum for CGMS agencies to address improving LEO satellite systems low latency data access from both a global and regional perspective, harnessing common emerging technologies and taking account of the evolution of the commercial and agency space systems. It is foreseen that historical boundaries between global and regional mission requirements and architectures may be substantially eliminated.

A dedicated Terms of Reference has been produced and is presented in this document in response to WGI/A51.06.

The document “Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis of Low Latency Data Access from LEO Meteorological Satellites” [CGMS-52-EUMETSAT-WP-13] was produced in response to WGI/A51.07.

The SWOT analysis also contains an analysis on the potential role of satellite platform as a service (SPaaS), in response to WGI/A51.08 where SPaaS are identified as an opportunity.

A merged Best Practices from the formerly separate Task Groups has been drafted and is presented separately [CGMS-52-CGMS-WP-03].

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CGMS-51 Actions for LLDA TG

TG	AGN item	Action #	Description	Actionee
LLDA	5.1	WGI/A51.06	Merge the Direct Broadcast Systems and LEO Coordination tasks groups into a single “Low latency Data Access from LEO Satellites” task group, with Andrew Monham and Antoine Jeanjean as Co-chairs.	**Andrew Monham**
LLDA	5.1	WGI/A51.07	Distribute a summary of the SWOT analysis on Low Latency Data Access from LEO meteorological satellites to the remaining CGMS Working Groups.	**Antoine Jeanjean**
LLDA	5.1	WGI/A51.08	Analyse potential role of satellite platform as a service (SPaaS), considering current and expected providers, internet connection speed, hosted instruments specifications (size/weight/power), orbit type, satellite lifetime and cost breakdown. Report to CGMS-52.	**Antoine Jeanjean**
LLDA	5.5	WGI/A51.09	Merge the LEO (Global) and DB (regional) best practices into a single “Low Latency Best Practices” document proposed to be structured as follow: • Common BPs for both regional and global missions • BPs specific for DB • BPs specific for global mission Present the merged BPs for endorsement to CGMS-52.	**Toby Hutchings**

- See next slide for progress

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Overview of Action Status and Supporting Documents

- **WGI/A51.06**: **Action completed (Task Groups merged)**
  - This presentation focusses on the review of the Terms of Reference of the LLDA TG

- **WGI/A51.07: SWOT Analysis completed - awaiting comments before distributing to all WGs**
  - The LLDA TG Report document: *CGMS-52-WGI-WP-06* describes the review of future information technologies in achieving low latency global coverage, with focus on Internet of Things solutions in LEO and GEO.
  - The outcome of this analysis is taken into account in the separate document: Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis of Low Latency Data Access from LEO Meteorological Satellites: *CGMS-52-EUMETSAT-WP-13*
  - *See separate presentation of the analysis under this WGI agenda point 5.6 covering both IOT and SWOT analysis*.

- **WGI/A51.08: SPaaS Analysis made - forms part of the SWOT Analysis**

- **WGI/A51.09:** "Merge of LEO Direct Broadcast and Coordination of LEO Orbits Best Practices proposal" [CGMS-52-CGMS-WP-03] was produced. Proposal to publish the document by CGMS-53. The document would benefit from one further round of iteration inside the LLDA task group.
- *See separate presentation of the BP draft under this WGI agenda point 5.5*

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Action WGI/A51.06: creation of LLDA TG

LLDA current list of members:

CMA
Siwei Tian
Shuze Jia
Chengli Qi
Lei Yang

EUMETSAT
Andrew Monham (TG co-chair)
Antoine Jeanjean (TG co-chair)
Pier Luigi Righetti
Jose Maria de De Juana Gamo
Karolina Nikolova
Sean Burns
Remy Chalex

ESA
Juha-Pekka Luntama
Frank Zeppenfeldt

ISRO
?

JAXA
Toshi Kurino

KMA
Dohyeong Kim
Sung-Rae Chung

NASA- GSFC
Jake Simmons
Stephen Holt
Jerry Visalsawat
Kelvin Brentzel

NOAA
Beau Backus
Bruce Thomas
Changyong Cao
Elsayed R. Talaat
Fred Mistichelli
Jordan Gerth
Justin Gronert
Mark Turner
Nancy Ritchey
Otto W. Bruegman
William Skip Dronen
Satya Kalluri
Toby Hutchings

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Terms of Reference – Low Latency Data Access Task Group from LEO satellites

1. To provide a forum for CGMS agencies to address improving LEO satellite systems low latency data access from both a global and regional perspective, harnessing common emerging technologies and taking account of the evolution of the commercial and agency space systems. It is foreseen that historical boundaries between global and regional mission requirements and architectures may be substantially eliminated. This shall include analysis of:
   a) Novel methods to achieve global data coverage and access
   b) Temporal coverage over a given geographic area
   c) Low latency data delivery
   d) Reducing pass scheduling conflicts
   e) Maximising the amount of instrument observation collected
   f) Reducing risk of radio frequency interference
   g) Fixed temporal separation between instrument observation
   h) Reduced risk of satellite proximity

2. To address technical and operational aspects of direct broadcast services (present and future) of mutual or global interest for the CGMS agencies

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Terms of References – Low Latency Data Access Task Group from LEO satellites

3. To promote standards and interoperability and operational procedures to the CGMS agencies for the benefit of the user community of their direct broadcast services and the associated regional retransmission services

4. To explore impact of space-based data relay systems
   Specific studies may be actioned by WGI to the LLDA TG to assess impact of new technologies on enabling innovative solutions to achieve low latency data access from LEO weather satellites.

5. The LLDA task group report to CGMS WGI

6. The LLDA task group will nominate a chair. It will meet at least once a year, and more if necessary, and will pursue its work by correspondence between its meetings

Current LLDA TG co-chairs are Andrew Monham and Antoine Jeanjean. The TG will meet at least 3 times per year. The TG has a specific mailing list: L-WGI_LLDA@LISTSERV.EUMETSAT.INT

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Terms of Reference – Low Latency Data Access Task Group from LEO satellites

7. The LLDA yearly documents deliverables consist of:

- Item 1: Report from the CGMS WGI Task Group on Low Latency Data Access from LEO satellites (EUMETSAT)
- Item 2: Operational systems status report of LEO satellites + status of implementation of best practices (CMA)
- Item 3: Operational systems status report of LEO satellites + status of implementation of best practices (EUMETSAT)
- Item 4: Operational systems status report of LEO satellites + status of implementation of best practices (NOAA)
- Item 5: Best Practices for Low Latency Data Access from LEO Satellites - latest version and new proposals (NOAA)

Key issues of relevance to CGMS:

- The Low latency Data Acquisition Task Group includes in scope the considerations under HLPP 2.9: New technologies for satellite systems

To be considered by CGMS:

- WGI is invited to :
  - Endorse the Low Latency Data Access Task Group Terms of Reference.
  - Provide comments on the LLDA merged Best Practices draft and endorse the intention to finalise the document prior to CGMS-53 *(please refer to presentation of CGMS-52-NOAA-WP-03)*
  - Provide comments on the SWOT Analysis of Low Latency Data Access from LEO Meteorological Satellites *(please refer to presentation of CGMS-52-EUMETSAT-WP-13)* and take note of its yearly update cycle.
  - Provide comments on the LLDA TG Report Section 5 containing the Future Direction IoT: *CGMS-52-WGI-WP-06 (please refer to presentation of CGMS-52-EUMETSAT-WP-13)*