

Concept Paper for CCSDS 131.3-B-1 - Space link protocols over ETSI DVB-S2 standard

1. Purpose

The proposed work is to update the existing Blue Book, CCSDS 131.3-B-1, “Space link protocols over ETSI DVB-S2” to extend its use on ground-to-space and space-to-space links, and to allow use of the USLP protocol with this standard. This will be done by adding a short chapter identifying the codes and the space link protocols that may be used for these links. Due to the limited technical change, the work mainly consists in editing the book, discussing the update with the working group and finally reviewing it prior to the release of the updated document.

2. Benefits

The use of the efficient coding and modulation formats foreseen in CCSDS 131.3-B in ground-to-space and space-to-space links will allow a significant increase of data rates, if needed.

The change will allow the use of USLP fixed length Transfer Frames on ground-to-space and space-to-space (beside space-to-ground) links implementing CCSDS 131.3-B.

At the same time, with the introduction of the USLP protocol, CCSDS 131.3-B will be updated to allow the use of USLP frames, removing an unnecessary limitation on the length of the input Transfer Frames.

3. Requirements of prospective missions

Ground-to-space and space-to-space links foreseen for Lunar missions (possibly with constellations of orbiters around the Moon) will require significantly high data rates to fulfill their mission requirements. CCSDS 131.3-B can provide the means to reach such targets, enabling a degree of flexibility (thanks to combinations of coding and modulation formats supported) that would allow future extensions alongside the missions evolutions.

ANNEX 1 – Consistency with charter

The charter of the Space Link Coding and Synchronization Working Group lists as the scope of activity, “This working group will concentrate on creating, maintaining and updating the set of Channel Coding Books to incorporate recommended coding scheme for Telemetry, Telecommand and Proximity-1 links.” This concept paper proposes an update to a channel coding book to recommend coding schemes for ground-to-space and space-to-space links, so it is in line with the charter.

A new CWE Project to update CCSDS 131-3-B-1 is defined in Annex 2.

ANNEX 2 – Proposed CWE Projects

Title: Space link protocols over ETSI DVB-S2

Document Number: 131.3-B-1

Document Type: Blue Book

Description of Document: This update to the Blue Book will produce issue 2, enabling the use USLP frames as well as allowing space-to-space and ground-to-space links applications.

Applicable Patents: Similar to 131.3-B-1.

Patents Comments: Up to now no new patent identified.

Book Editor (estimated resources + Agency Volunteering): Total resources: 2 work-months, by CNES. Nominal time from other Working Group members to review the document. Lead editors: CNES.

Expected Contributing Agencies: CNES

Expected Monitoring Agencies: NASA, ESA, DLR

Schedule

September 2019 – October 2020

Total time to complete: 13 months

Schedule Milestones	Forecast	Comments
Project Approved	30/07/2019	
Internal WG Review		
First draft circulated to WG	30/08/2019	
First draft comments due	30/09/2019	
Second draft circulated to WG	15/10/2019	By Fall 19 Meeting
Second draft comments due	15/11/2019	After Fall 19 Meeting
Final document proposed to the area director	30/11/2019	
External Milestones		
Secretariat Document Processing	15/01/2020	
Agency Review	15/03/2020	
RID Resolution	15/05/2020	At Spring 20 Meeting
CMC Approval	15/10/2020	Includes CESG Poll + CMC Poll for PUBLICATION