

# Space Link Services Area

## Resolution SLS-R-2018-10-001

### Start of CWE Project for “Lossless Data Compression” CCSDS 121.0 Issue 3 Blue Book

**22<sup>nd</sup> October 2018**

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**The Space Link services Area,**

**CONSIDERING** that

- the Multispectral and Hyperspectral Data Compression Working Group has been conducting the required reconfirmation review of CCSDS-121.0-B-2 and identified that:
  - a) The introduction of a new optional “file” format (and associated header) for compressed output is warranted
  - b) A few potential sources of ambiguity should be fixed
- changes warranted under item (a) exceed the scope of a corrigendum, and thus require a new project to produce an Issue 3 revision of the aforementioned standard

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- a related Concept Paper has been prepared (and it is here attached),
- the WG produced a draft CWE Project available at <http://cwe.ccsds.org/fm/Lists/projects/DispForm.aspx?ID=663> (and here attached)
- the WG has consensus on the Concept Paper and on the Draft CWE Project

**RECOGNISING** that required resources have been identified

**RESOLVES** to request CMC to approve starting the CWE Project identified above

**RECOMMENDS** that the CMC approve this resolution and, finally

**REQUESTS** that a CMC poll be conducted to accomplish this.

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Concept Paper for

Issue 3 Revision of

**CCSDS-121.0-B Lossless Data Compression**

## **1. Purpose**

The Multispectral and Hyperspectral Data Compression Working Group (SLS-MHDC) falling under the Space Link Services (SLS) Areas of the CCSDS, has identified the need to update the Recommended Standard CCSDS-121.0-B-2 “Lossless Data Compression.” This determination has arisen in the course of reconfirmation review.

The update is intended to (a) resolve potential ambiguities, and (b) provide a better mechanism for producing a compressed data set as a “file” rather than as a sequence of packets. Addressing issue (b) extends beyond a simple corrigendum, and thus requires an Issue 3 update.

## **2. Key Technical Features**

The existing CCSDS-121.0-B provides a low-complexity one-dimensional data compression approach. The proposed revision will allow a user to optionally produce compressed output as a file, and defines an appropriate header for such a file structure.

## **3. Benefits**

The present standard has been widely used by space missions, and is expected to see continued use. It is incorporated, for example, as the “block-adaptive” entropy coding option in the CCSDS-123.0-B Recommended Standard.

Defining a file output structure will benefit users who wish to treat compressed output as a file rather than a sequence of packets.

## **4. Requirements of Prospective Missions**

Missions requiring a well-established very low complexity one-dimensional compression approach, and wishing to produce output as a file, will benefit from this revision. This revision will also resolve some potential ambiguities, thus facilitating verification of future software and hardware implementations of this Recommended Standard.

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## 5. Relationship to Existing Standards

The present Issue 2 is the parent of the proposed Issue 3.

## 6. Deficiencies, Flaws, and Limitations in Existing Standards

The present Issue 2 Recommended Standard does not support compressed output as a file structure.

## 7. Resources and Schedule

The Multispectral and Hyperspectral Data Compression Working Group identified the following Candidate Resources and Schedule.

Book Editor	1WM	ESA
Prototype 1	1WM	ESA
Prototype 2	1WM	ESA
Contributing Agencies	ESA, NASA	
Monitor Agencies	CNES	
Start of Work	Dec 2018	
Publication	Dec 2019	

For more details, please refer to the CWE Project at:  
<https://cwe.ccsds.org/fm/Lists/Projects/DispFormDraft.aspx?ID=663>

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Overview

















































Project Title	Lossless Data Compression (Issue 3)
Approval	Draft
Document Number	121.0
Charter	<a href="#">5.03 Multispectral and Hyperspectral Data Compression Working Group</a>
Document Type	Blue
Description of Document	Issue 3 revision to address potential ambiguities and adds option for a file header.
Applicable Patents	There are no patent issues for this technology that are known by the CCSDS community
Patent Comments	Previous NASA GSFC patent has expired.
Survey of Similar Standards Documents or Projects Undertaken in Other Bodies and elsewhere in CCSDS	

Resources

Book Editor	ESA
Book Editor Resources	1 WM
Prototype 1	ESA
Prototype 1 Resources	1 WM
Prototype 2	NASA
Prototype 2 Resources	1 WM
Prototype 3	
Prototype 3 Resources	
Contribute	CNES, NASA
Monitor Only	
Resource Comments	

Schedule

Legend for Schedule Milestones  = Required for Orange Books  = Required for Green Books  = Required for Magenta Books  = Required for Blue Books Note - Red Books are Draft Blue/Magenta Books					<b>Original Completion Date</b> (Date in M/D/YYYY format.)	<b>Comments</b> (Date in M/D/YYYY format.)
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Schedule Milestones	Orange Book	Green Book	Magenta Book	Blue Book		
Project Approved					11/26/2018	
Project Start Date					12/1/2018	
<b>Internal WG Review</b>						
First Draft Circulated to WG					12/14/2018	
First Draft Comments Due					1/21/2019	
Second draft circulated to WG					2/28/2019	
Second Draft Comments Due					4/5/2019	
Final WB Submitted to AD for Further Processing					5/12/2019	
<b>External Milestones</b>						
Secretariat Document Processing					6/13/2019	
First Agency Review					9/17/2019	
RID Resolution					11/15/2019	
Secretariat Document Processing 2					11/19/2019	
Final Agency Review					11/21/2019	Not expected
RID Resolution					11/21/2019	Not expected
First Prototype Development					11/15/2019	
Second Prototype Development					11/15/2019	
CMC Approval					12/30/2019	
<b>Total Time to Complete (in months)</b>					<b>13</b>	

Version: 22.0

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