



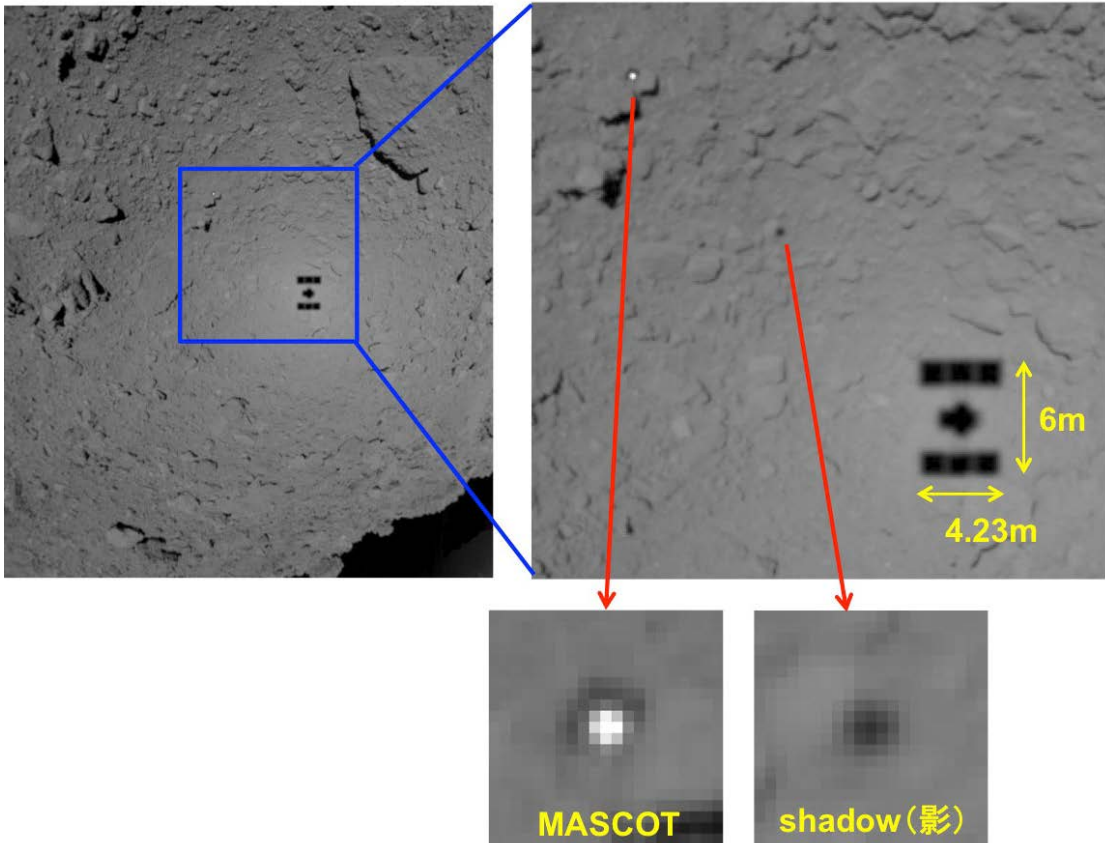
JAXA Report to CCSDS

Contents

- ❑ Status of Hayabusa2
- ❑ JAXA-CCSDS Website

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Hayabusa2 successfully
images *MASCOT* separating
from the spacecraft!

The small asteroid lander, *MASCOT*, that was developed in Germany and France, was successfully separated from the *Hayabusa2* spacecraft on October 3 and delivered safely to the surface of *Ryugu*. After landing, *MASCOT* acquired scientific data on the asteroid surface, which was transmitted to the *MASCOT* team via the spacecraft. Scientific analysis of this data is expected to be performed by the *MASCOT* team from now onwards.

From the *Hayabusa2* spacecraft, JAXA attempted to capture the separated *MASCOT* using the three optical navigation cameras (ONC-T, ONC-W1, ONC-W2). When the image data was received from the spacecraft, we could confirm that *MASCOT* appears in images photographed with the ONC-W1 and ONC-W2.

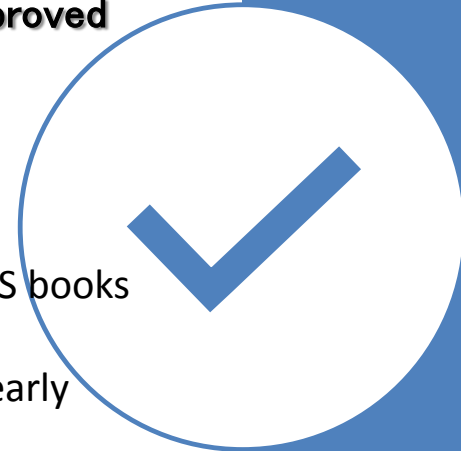
(Source: JAXA HP)

JAXA-CCSDS Public Website (UPDATE)

- **Summaries of all of the 153 published** Blue/Magenta/Green Books in Japanese language have been added to JAXA-CCSDS Public Website.
- **Our next effort is to organize the published/approved/not approved books into small groups to visualize their relations.**

Current status of book organization:

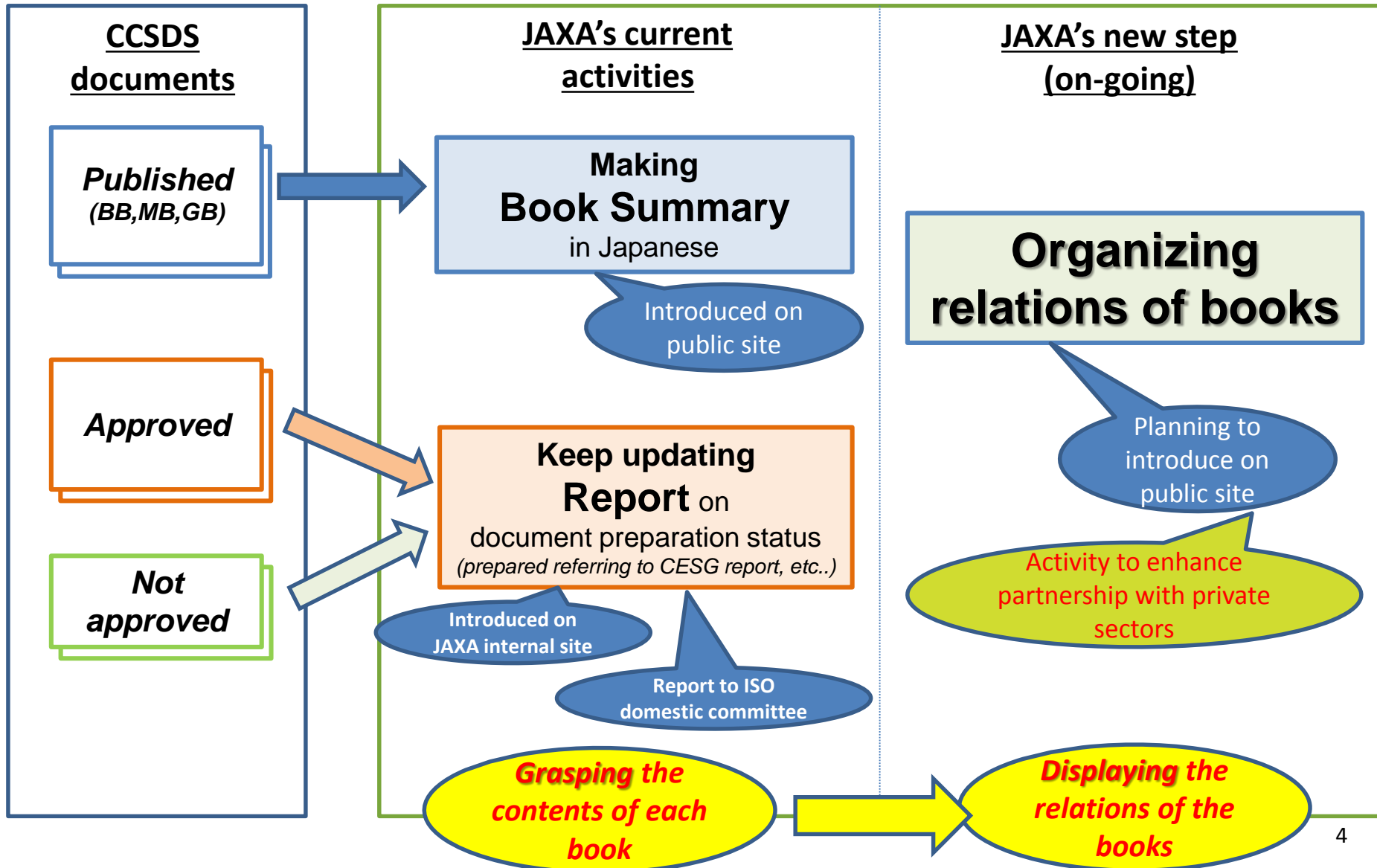
- We have categorized all published/approved/not approved CCSDS books according to their respective services to visualize their relations.
- As a result, the entire structure and relations of the books are clearly displayed.
- Also useful for grasping the status of book development.
- We are planning to make the outcome open to public in the hope that it will encourage non-agency entities to employ CCSDS and to participate in developing CCSDS standards.



(Continued to the next slide.)

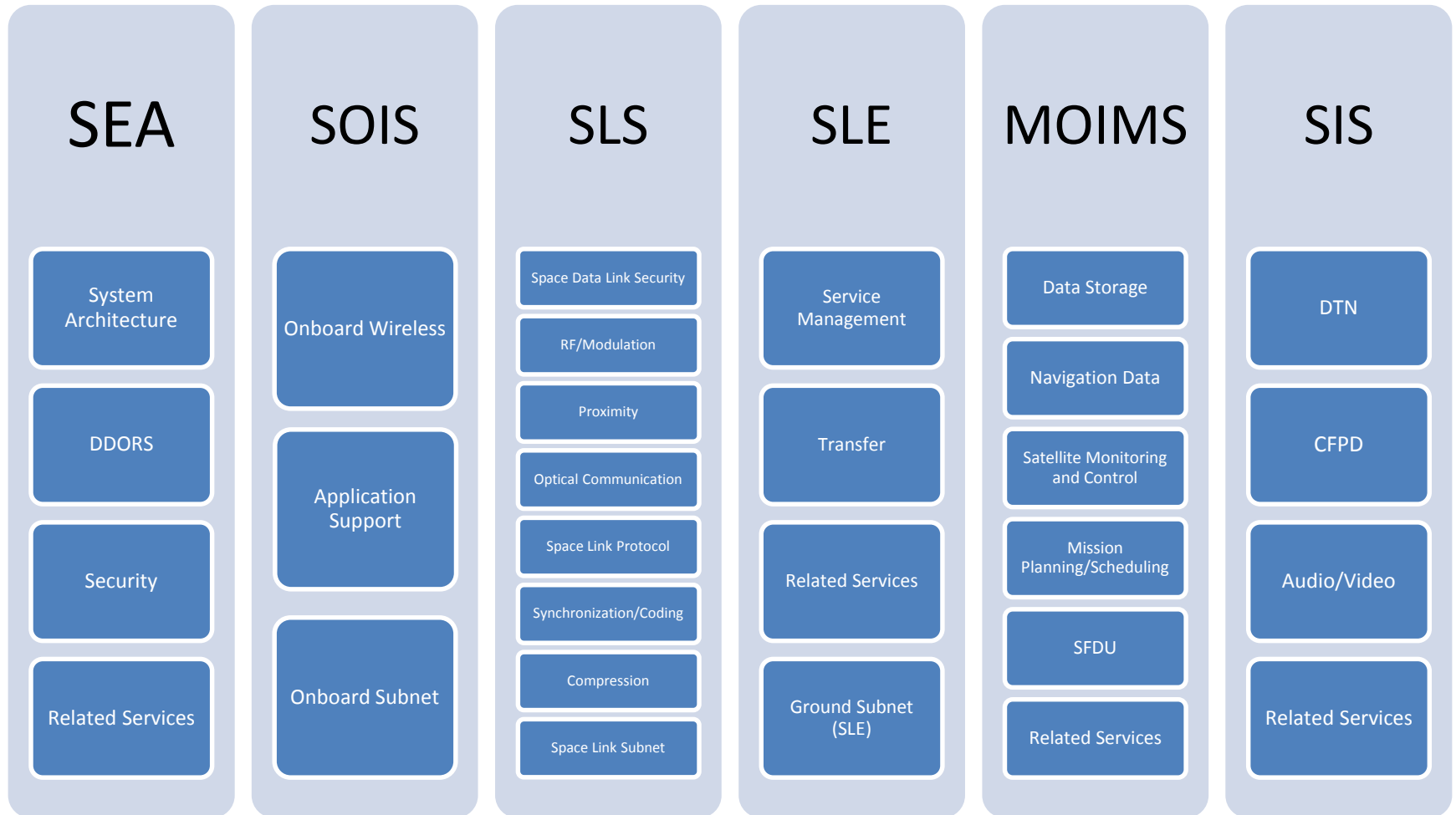
JAXA's Activities for Making CCSDS-Related Information Open to Public

We have completed grasping the contents of each book. We are now moving on to organizing the relations of the books.



Organizing/Grouping of the Books

- We have categorized the books into 28 groups.
- Not only published books but also approved and not-approved books are included.



Example of Grouping (1)

Books on SLE: All books have been published. Periodic reviews will be conducted.

CSS-Ground Subnet (SLE)			
Published Books			
Green Book	Blue Book	Magenta Book	Remarks
CCSDS 910.0-G-2 Space Link Extension Services - Executive Summary	CCSDS 910.4-B-2 Cross Support Reference Model – Part-1: Space Link Extension Services		
CCSDS 910.3-G-3 Cross Support Concept - Part 1: Space Link Extension	CCSDS 911.1-B-4 Space Link Extension – Return All Frames Service Specification	CCSDS 915.1-M-2 Space Link Extension-Application Program Interface for Return All Frames Service	RAF
	CCSDS 911.2-B-3 Space Link Extension – Return Channel Frames Service Specification	CCSDS 915.2-M-2 Space Link Extension-Application Program Interface for Return Channel Frames Service	RCF
	CCSDS 911.5-B-3 Space Link Extension – Return Operational Control Fields Service Specification	CCSDS 915.5-M-2 Space Link Extension-Application Program Interface for Return Operational Control Fields Service	ROCF
	CCSDS 912.1-B-4 Space Link Extension – Forward CLTU Service Specification	CCSDS 916.1-M-2 Space Link Extension-Application Program Interface for the Forward CLTU Service	FCLTU
	CCSDS 912.3-B-3 Space Link Extension – Forward Space Packet Service Specification	CCSDS 916.3-M-2 Space Link Extension-Application Program Interface for the Forward Space Packet Service	FSP
	CCSDS 913.1-B-2 Space Link Extension – Internet Protocol for Transfer Services		
CCSDS 914.1-G-1 Space Link Extension - Application Program Interface for Transfer Services - Summary of Concept and Rationale		CCSDS 914.0-M-2 Space Link Extension-Application Program Interface for Transfer Services-Core Specification]	SLE Transfer Service API
CCSDS 914.2-G-2 Space Link Extension - Application Program Interface for Transfer Services - Application Programmer's Guide			
Approved Books			
None			
Not-Approved Books			
None			

Example of Grouping (2)

Books on Optical Communications: One published, Six approved, and One not approved.

SLS-Optical Communication				
Published Books				
Green Book	Blue Book	Magenta Book	Orange Book	Remarks
CCSDS 140.1-G-1 Real-Time Weather and Atmospheric Characterization Data				
Approved Books				
CCSDS 140.1 Atmospheric Characterization for Optical Communications Systems				Project Completed
CCSD 140.0 Optical Communications Concepts and Terminologies				First draft
	CCSDS 141.0 Optical Communications Physical Layer			First draft
	CCSDS 142.0 Optical Communications Coding & Synchronization			First draft
			CCSDS 141.10 Optical High Data Rate (HDR) Communication – 1550 nm	First draft
			CCSDS 141.11 Optical High Data Rate (HDR) Communication – 1064 nm	Secretariat Document Processing
Not Approved Books				
		CCSDS 141.1 Atmospheric Characterization and Forecasting for Optical Link Operations		Project Not Started

Presentation idea (1):

Incorporating JAXA Standard on design of Communication Link

- The organization of the CCSDS books are categorized in accordance with the network layer structure defined in the “JAXA Standard on design of Communication Link”.
- The books applied to “JAXA Standard on design of Communication Link” are displayed in red.

SLS-Space Link Subnet							
Published Books							
			Green Book	Blue Book	MB		
Data Link	Data Link Protocol	TM	CCSDS 130.2-G-3 Space Data Link Protocols--Summary of Concept and Rationale	CCSDS 700.0-G-3 Advanced Orbiting Systems, Networks and Data Links: Summary of Concept, Rationale and Performance	CCSDS 732.0-B-3 AOS Space Data Link Protocol		AOS Space Data Link Protocol
		TC			CCSDS 132.0-B-2 TM Space Data Link Protocol		
	Sync & Coding	TM		CCSDS 130.1-G-2 TM Synchronization and Channel Coding - Summary of Concept and Rationale	CCSDS 131.0-B-3 TM Synchronization and Channel Coding		TM Sync. & Channel Coding
		TC		CCSDS 230.1-G-2 TC Synchronization and Channel Coding--Summary of Concept and Rationale	CCSDS 231.0-B-3 TC Synchronization and Channel Coding		TC Sync. & Channel Coding
	Data Link / Sync & Coding	TC			CCSDS 232.1-B-2 Communications Operation Procedure-1 Issue 2		
Physical				CCSDS 401.0-B-28 Radio Frequency and Modulation Systems – Part 1: Earth Stations and Spacecraft			
Approved Books							
None							
Not Approved Books							
None							

Presentation idea (2):

Incorporating Published, Approved, and Not Approved books in one view

- Published, Approved, and Not Approved books are incorporated in one chart. (Book status is displayed by cell color.)
- Books are categorized by book themes.

SLS-Optical Communication

Cell color: White→Published Books, Yellow→Approved Books, Red→Not Approved Books

	Green Book	Blue Book	Magenta Book	Orange Book
High Data Rate (HDR) - Physical Layer - C & S Layer				CCSDS 141.10 Optical High Data Rate (HDR) Communication – 1550 nm
				CCSDS 141.11 Optical High Data Rate (HDR) Communication – 1064 nm
Physical Layer		CCSDS 141.0 Optical Communications Physical Layer		
Coding & Synchronization		CCSDS 142.0 Optical Communications Coding & Synchronization		
Concept and Terminologies	CCSD 140.0 Optical Communications Concepts and Terminologies			
Atmospheric Characterization	CCSDS 140.1-G-1 Real-Time Weather and Atmospheric Characterization Data		CCSDS 141.1 Atmospheric Characterization and Forecasting for Optical Link Operations	

Presentation idea on JAXA-CCSDS Website

SEA	SOIS	SLS	SLE	MOIMS	SIS
System Architecture	オンボードワイヤレス	スペースリンクサブネット	地上サブネット (SLE)	データ保管	DIN
Security	オンボードサブネット	RF・変調	サービスマネジメント	航法関係データ	CFDP
DDOR	アプリケーションサポートサービス	近傍通信 (Proximity)	転送サービス	衛星モニタコントロール	音声/ビデオ
Related Services		Optical Comm. 宇宙リンク・プロトコル 宇宙リンク同期・符号化 圧縮方式 スペースデータリンク・セキュリティ	関連サービス	ミッション計画・スケジューリング SFUD 関連サービス	関連サービス

Area	Group	Overview
SLS	Space Link Subnet	Standardization of Physical Layer, Sync./Channel Coding Layer, Data Link Layer of RF communication
	RF/Modulation	Standardization of PN Ranging, GMSK Telemetry, Bandwidth Efficiency...
	Proximity	Standardization of Physical Layer, Sync./Channel Coding Layer, Data Link Layer of Proximity communication
	Optical Communication	Standardization of three methods of optical communication, atmospheric characteristics that affect optical communication, etc.

CSS

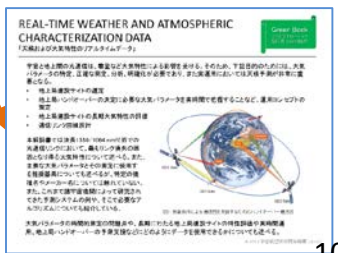
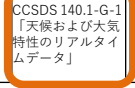
JAXA-CCSDS Website

Add a link to the Excel file for download to the JAXA-CCSDS website.



SLS-Optical Communication

	解説資料 (Green Book)	推奨規格 (Blue Book)	推奨実践規範 (Magenta Book)	予備検討規格 (Orange Book)
High Data Rate (HDR) - Physical Layer - C & S Layer				CCSDS 141.10 Optical High Data Rate (HDR) Communication - 1550 nm CCSDS 141.11 Optical High Data Rate (HDR) Communication - 1064 nm
Physical Layer		CCSDS 141.0 Optical Communications Physical Layer		
Coding & Synchronization		CCSDS 142.0 Optical Communications Coding & Synchronization		
Concept and Terminologies	CCSD 140.0 Optical Communications Concepts and Terminologies			
Atmospheric Characterization	CCSDS 140.1-G-1 「天候および大気特性のリアルタイムデータ」		CCSDS 141.1 Atmospheric Characterization and Forecasting for Optical Link Operations	



CCSDS Summary in Japanese language

Question

Would it be alright if we made the organization of CCSDS books to public? We are planning to disclose book titles only. (source: the CWE framework)

