



国際標準化の進捗報告と討議

2023年11月16日
標準化WG

国際標準化アイテム（On-going）

No.	表題	内容	備考（国際会議、国内調整等）	国内審議機関
1	ISO/CD 13657	位置情報交換フォーマット	ISO/TC20/SC14/WG8: 11/9 パリ	SJAC
2	ISO/CD 16215-1	衛星測位(PNT)サービス：第 1 部	ISO/TC20/SC14/WG8: 11/9 パリ	SJAC
3	IEC 61108	みちびき船用受信機の試験規格	IEC/TC80: 9/19-20 ロンドン	JEITA
4	ISO NP	衛星測位の光学補強（インフラ測位）	ISO/TC20/SC14/WG8: 11/9 パリ	SJAC
5	ISO PWI	月の基準座標系（METI申請中）	ISO/TC20/SC14/WG1: 11/7 パリ	SJAC
6	ISO PWI	月面UTM地図図法（同上）	ISO/TC20/SC14/WG1: 11/7 パリ	SJAC
7	ISO/TS 22591	安全要求のある高精度測位（同上）		SJAC
8	国交省標準化	小型船舶の転落救助システム		未定
9	自主事業	相対位置情報交換フォーマット	意見募集	SJAC

（注） CD: Committee Draft, NP: New Proposal, PWI: Preliminary Work Item, TS: Technical Specification
 SJAC: 日本航空宇宙工業会, JEITA: 電子情報技術産業協会



ISO/TC 20/SC 14

Space systems and operations



Reference ↑	Title
ISO/TC 20/SC 14/AG 1 ⓘ	Chair's Advisory Group
ISO/TC 20/SC 14/AG 2 ⓘ	Terminology task force
ISO/TC 20/SC 14/AG 3 ⓘ	STRAG - Reference Architecture Advisory Group
ISO/TC 20/SC 14/WG 1 ⓘ	Design engineering and production
ISO/TC 20/SC 14/WG 2 ⓘ	System requirements, verification and validation, interfaces, integration, and test
ISO/TC 20/SC 14/WG 3 ⓘ	Operations and support systems
ISO/TC 20/SC 14/WG 4 ⓘ	Space environment (natural and artificial)
ISO/TC 20/SC 14/WG 5 ⓘ	Space System Program Management and Quality
ISO/TC 20/SC 14/WG 6 ⓘ	Materials and processes
ISO/TC 20/SC 14/WG 7 ⓘ	Orbital Debris Working Group
ISO/TC 20/SC 14/WG 8 ⓘ	Downstream space services and space-based applications

技術用語タスクフォース

参照アーキテクチャー

設計と製造

システム要求、検査・検証、
インタフェース、統合、試験

運用と支援システム

宇宙環境

宇宙システムのプログラム
管理と品質

材料とプロセス

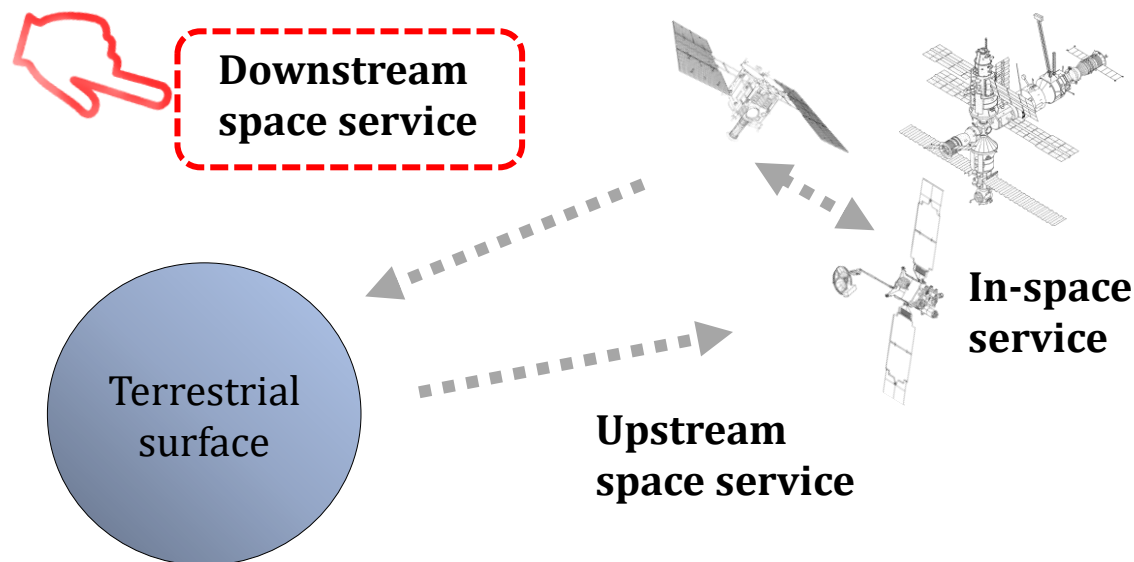
宇宙デブリ

宇宙利用サービス

宇宙システム「ダウンストリーム」定義

Service	Location	
	Server	Client
Downstream space service	Space	Terrestrial
Upstream space service	Terrestrial	Space
In-space service	Space	Space

In this document, terrestrial is an antonym of celestial and includes land, maritime, aeronautical, and near space which is close to the surface.

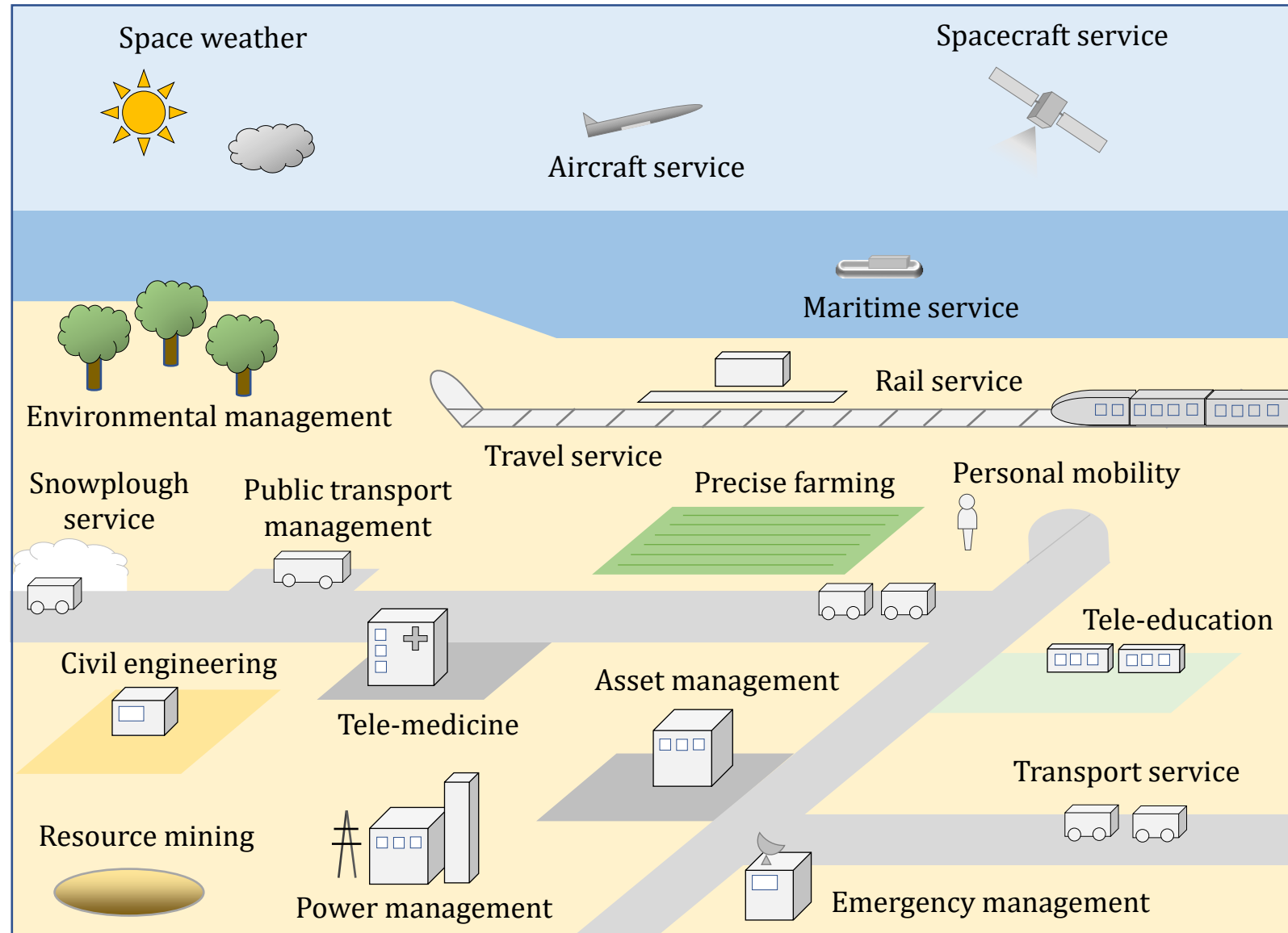


Space service --- service using space segment as part of system

Space-based application --- application using space service

Downstream space service --- space service to direct to terrestrial surface from space for end users

Downstream space-based application --- space-based application using downstream space service

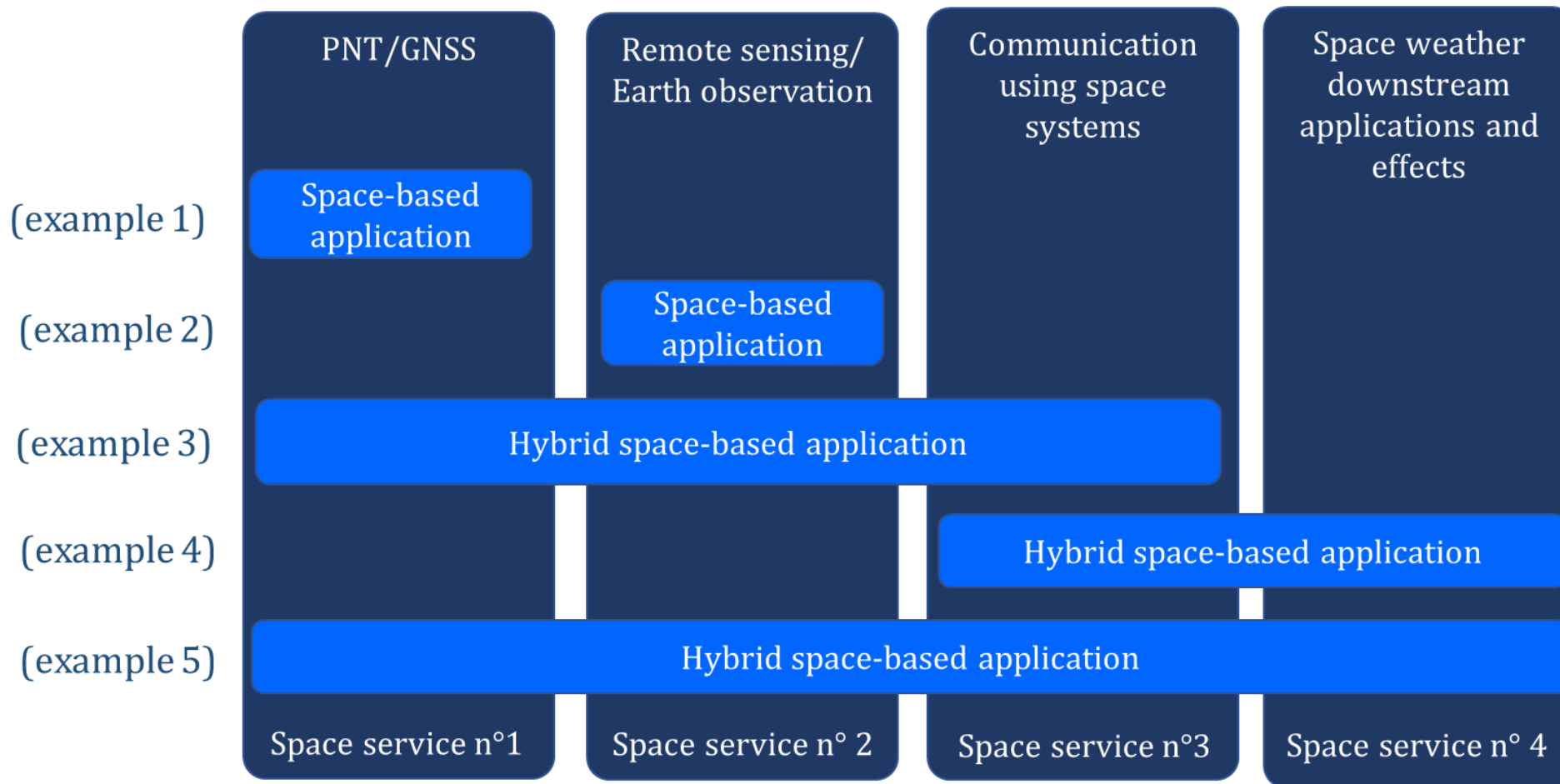




「宇宙利用サービス」 4つの柱



ISO/TC 20/SC 14/WG8
Downstream space services and space-based applications*



① 衛星測位

② 地球観測

③ 衛星通信

④ 宇宙天気

[略語]

PNT:

Positioning, Navigation,
and Timing

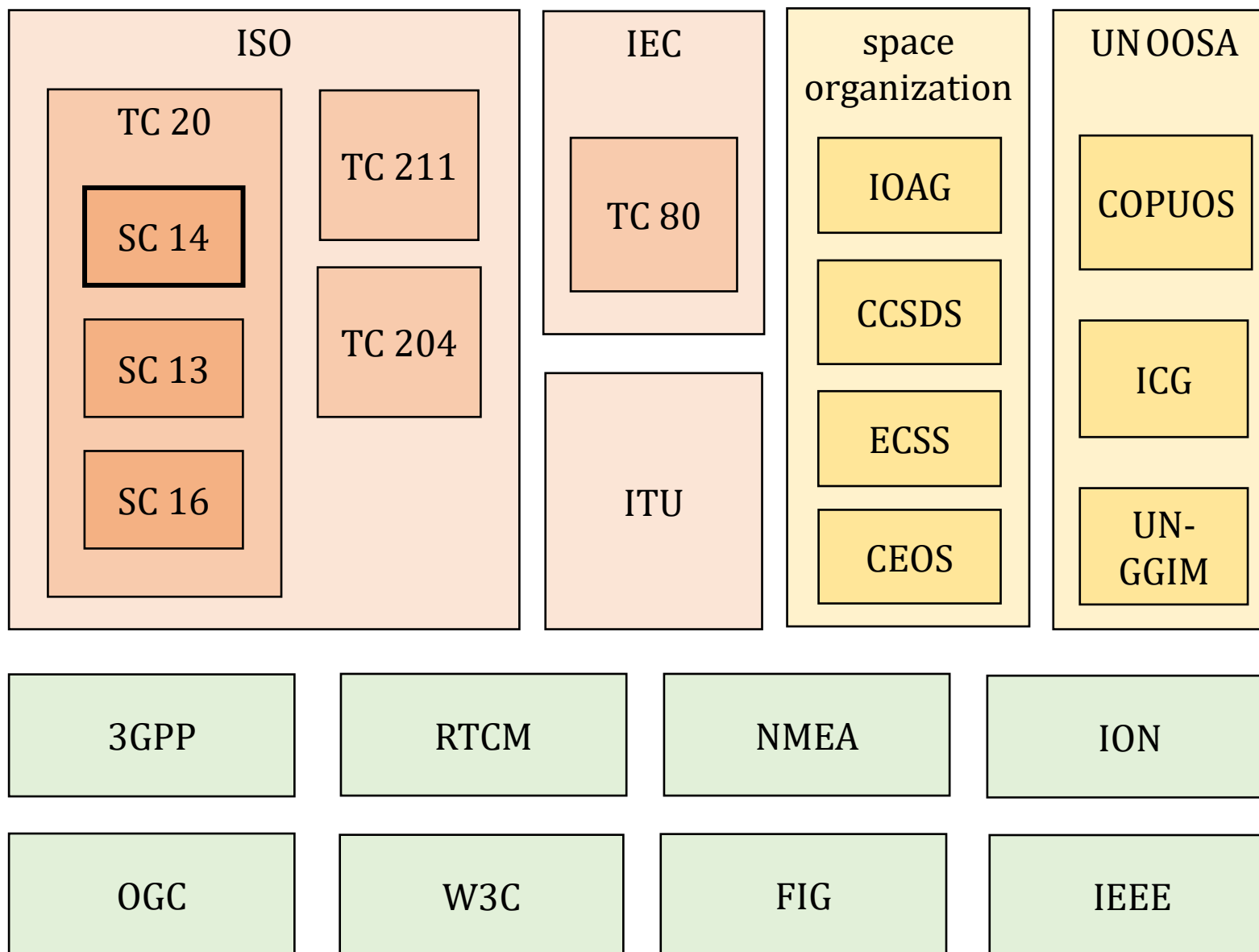
測位:

位置計測・航法・調時

* for Land, Maritime, Aeronautical, Space domains

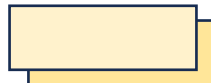


TC 20/SC 14/WG8 「宇宙利用サービス」 関連組織

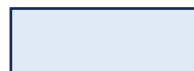




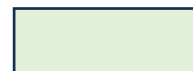
開発が進む「宇宙利用サービス」に関する国際規格の体系



衛星測位



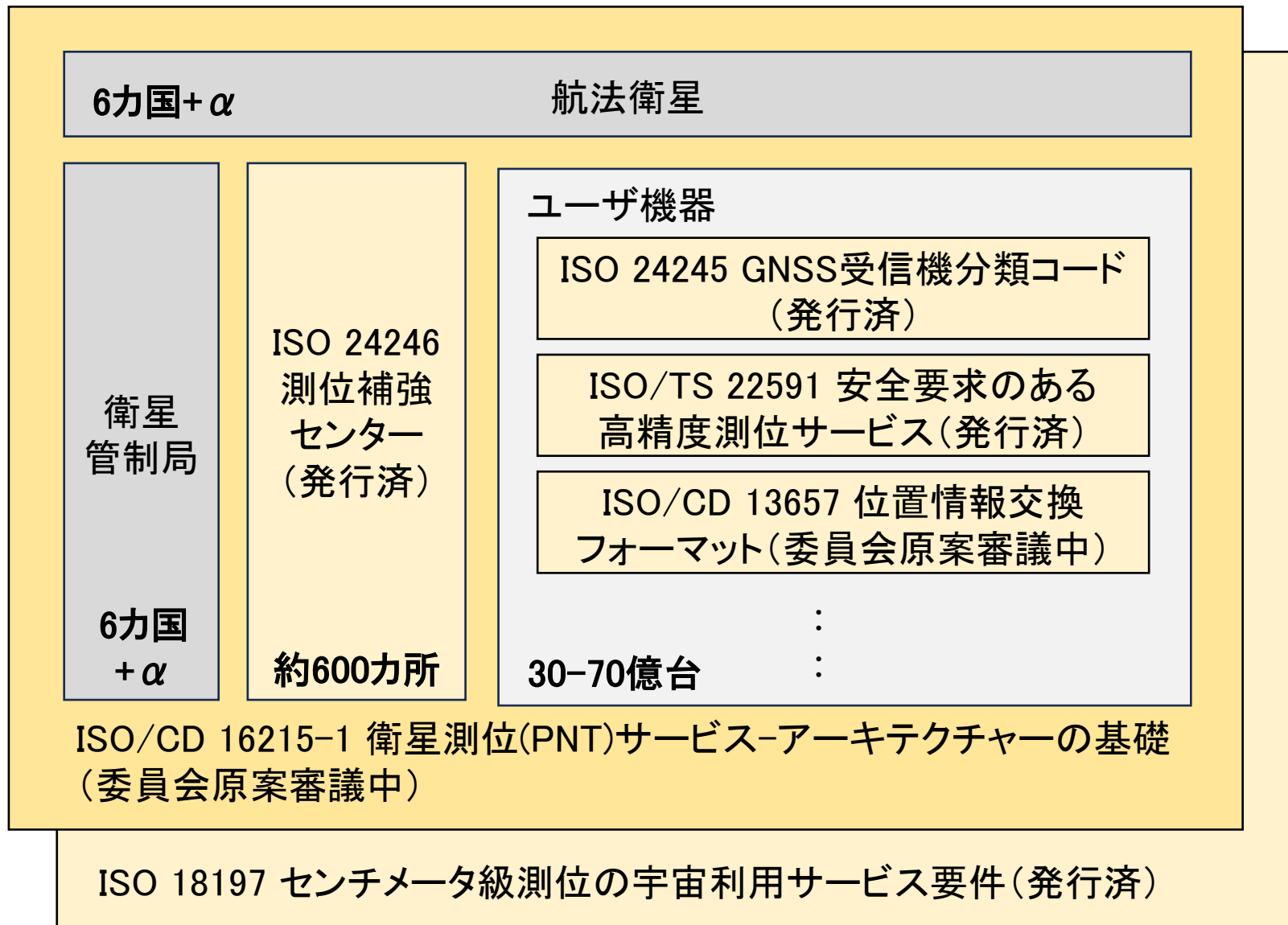
リモセン



衛星通信



宇宙天気





ISO 24245:2023 GNSS受信機分類コード

日本航空宇宙工業会(SJAC)よりJIS化を提案、日本規格協会(JSA)にて推進

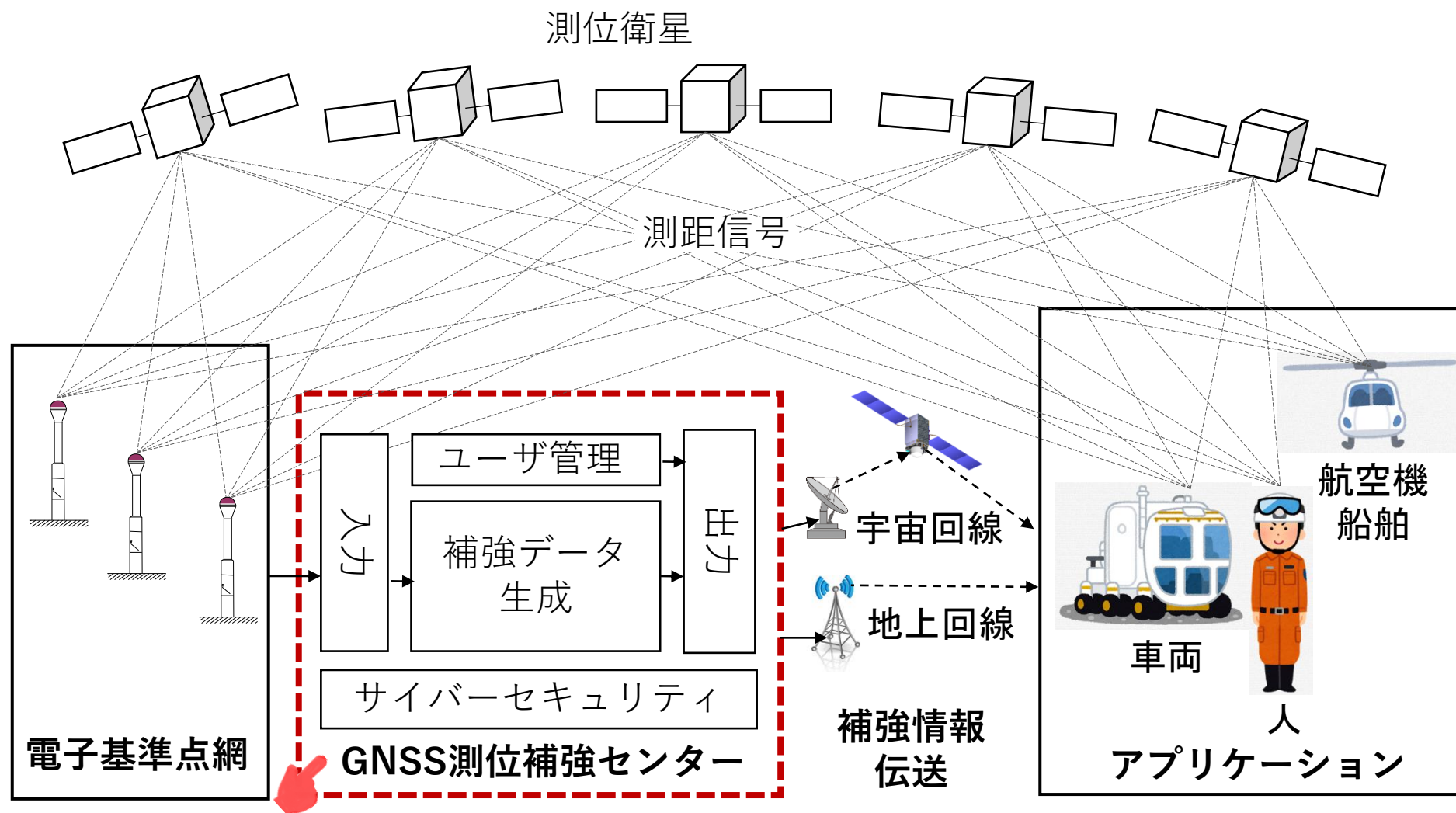


M : Messaging with positioning information	M1 : One-way messaging or broadcasting		Search and rescue
	M2 : Two-way communication		
T : Timing (time and time interval)	T1 : Single frequency band		
	T2 : Dual or multiple frequency band		
C : Code-based positioning	C1 : Single frequency ranging	C10, C10a : No augmentation	Point positioning
		C11, C11a : DGNSS OSR corrections	DGNSS
		C16, C16a : SSR correction without fixed phase range	ISO18197§5.4.1
	C2 : Dual or multiple frequency ranging	C20, C20a : No augmentation	Dual frequency
		C25, C25a : DFMC SBAS	Ditto
		C26, C26a : SSR correction without fixed phase range	ISO18197§5.4.1
P : Phase-range positioning	P0 : No ranging	P06, P06a : Input SSR / Output OSR correction	
	P1 : Single frequency ranging	P10, P10a : OSR correction	RTK, NRTK
		P16, P16a : SSR correction	PPP, PPP-RTK
	P2 : Dual or multiple frequency ranging	P20, P20a : OSR correction	RTK, NRTK
		P26, P26a : SSR correction	PPP, PPP-RTK

[NOTE] RTK: Real-time Kinematic, OSR: Observation Space Representation, SSR: State Space Representation

ISO 24246:2022 GNSS測位補強センター

日米欧にあるGNSS測位補強システムを、広く世界に普及し社会実装を進める。
衛星測位技術のJIS化事業のリストに掲載。





ISO/CD 13657 位置情報交換フォーマット



センチメートル級測位に
対応できる。
地殻変動補正パラメータ
を取り扱える。
バイナリ・フォーマット。

6.9 Coordinates (G)

The content and format of the Coordinates (G) shall be as shown by Table 6.9-1. The dynamic coordinates are detailed representation considering crustal dynamics. This representation can be applied onto not only stationary features but also moving features, instead of Measurement (B).

Table 6.9-1 Coordinates (G)

No.	Item		Byte size	Content	Data type	Bit size
1	Message type		1	0x07	unsigned char	8
2	Time of day (UTC)	Hour-Minute-Second	3	000000 to 235959, BCD 0xFFFF : Invalid	unsigned char	24
		Under-Second	1	00 ~ 99, BCD 0xFF : Invalid	unsigned char	8
3	Nation or region		2	See 6.9.1	unsigned int	16
4	Coordination system		1	See 6.9.2	unsigned char	8
5	3-dimensional Position	Latitude	8	Double precision floating-number [°] IEEE754-2008, binary64 2 ⁶⁴ -1 : Invalid	double	64
		Longitude	8	Ditto	double	64
		Height	8	Ditto, Unit [m]	double	64
6	Crustal deformation correction See 6.9.2	Latitude	8	Ditto, Unit [°]	double	64
		Longitude	8	Ditto, Unit [°]	double	64
		Height	8	Ditto, Unit [m]	double	64
7	Geoid height		8	Ditto, Unit [m]	double	64
8	Check sum		1	Check sum of item no. 1 to 7. (see Note below)	unsigned char	8
	Total		65	-	-	520

Note: The check sum includes a Header, when these data are connected just behind the Header.

6.9.1 Nation and region

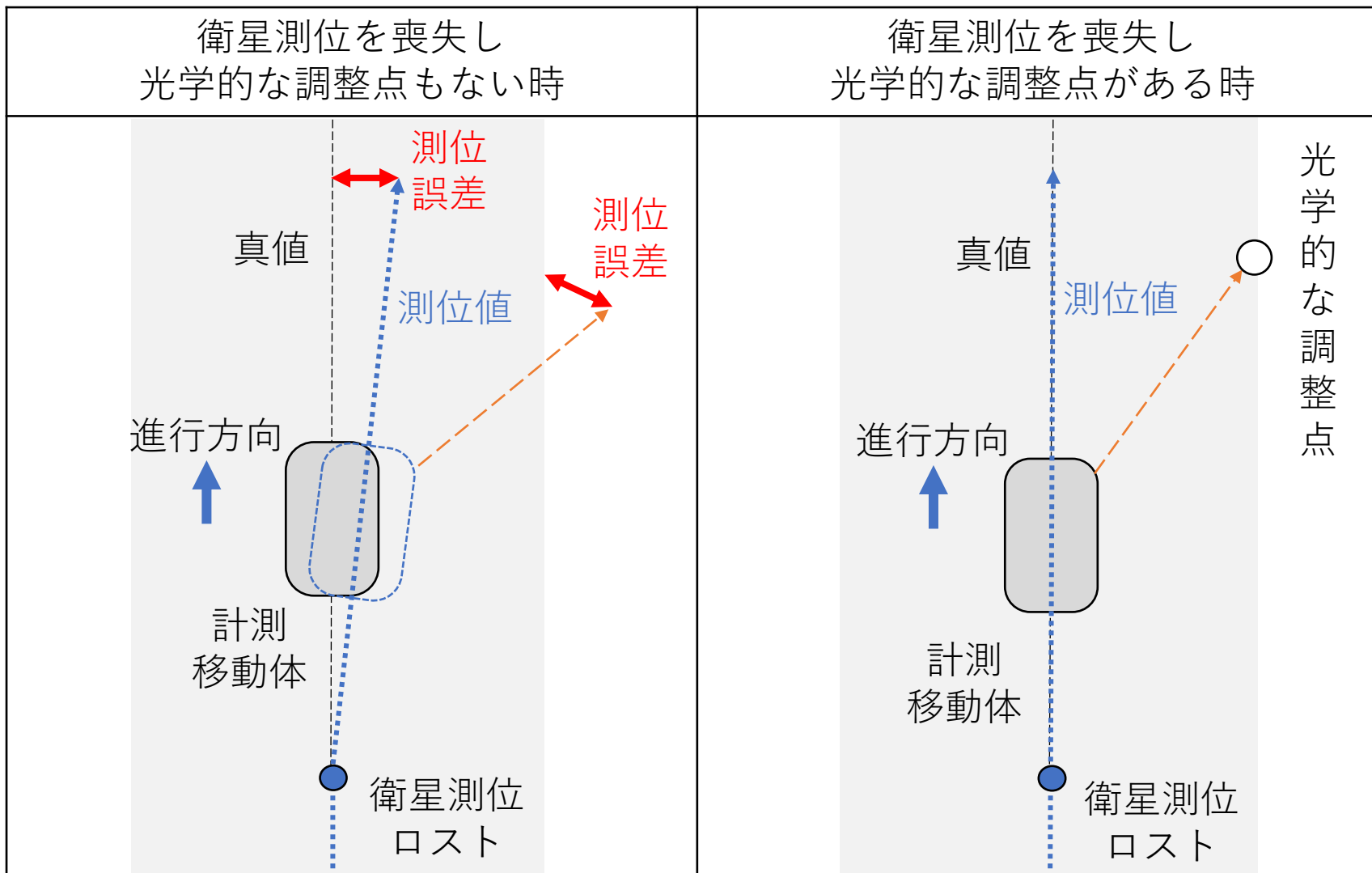
The third and fourth items of Table 6.9-1 shall be defined as the reference coordinate system of respective nations and regions.

6.9.2 Crustal deformation correction

The crustal deformation correction as the sixth item of Table 6.9-1, shall be defined as the difference of coordinates of the secondary realization from coordinates of primary realization, which is defined in ISO 19161-1:2020.

衛星航法の光学補強サービス

Space-based positioning with optical augmentation



■ 3 D 調整点



■ 2 D 調整点



ランドマーク・アップデート手法

Land Marks and Check Points

selected to identify clearly in the imagery captured by MMS;

- ✓ Corners of parcel lines
- ✓ Manholes
- ✓ Corners or edges of gutters



Land Mark Update Method

(1) 3D Coordinates of GCP
(Observed by GPS and/or TS)

(2) Land Mark Point Coordinates
(From the original measurement data)

(3) Position Correction Vector
(Difference between the GCP and the
landmark coordinates)

(5) Correction of MMS
vehicle trajectory

(4) Corrected vehicle position
by adding position correction vector

Vehicle Position of
original
MMS measure

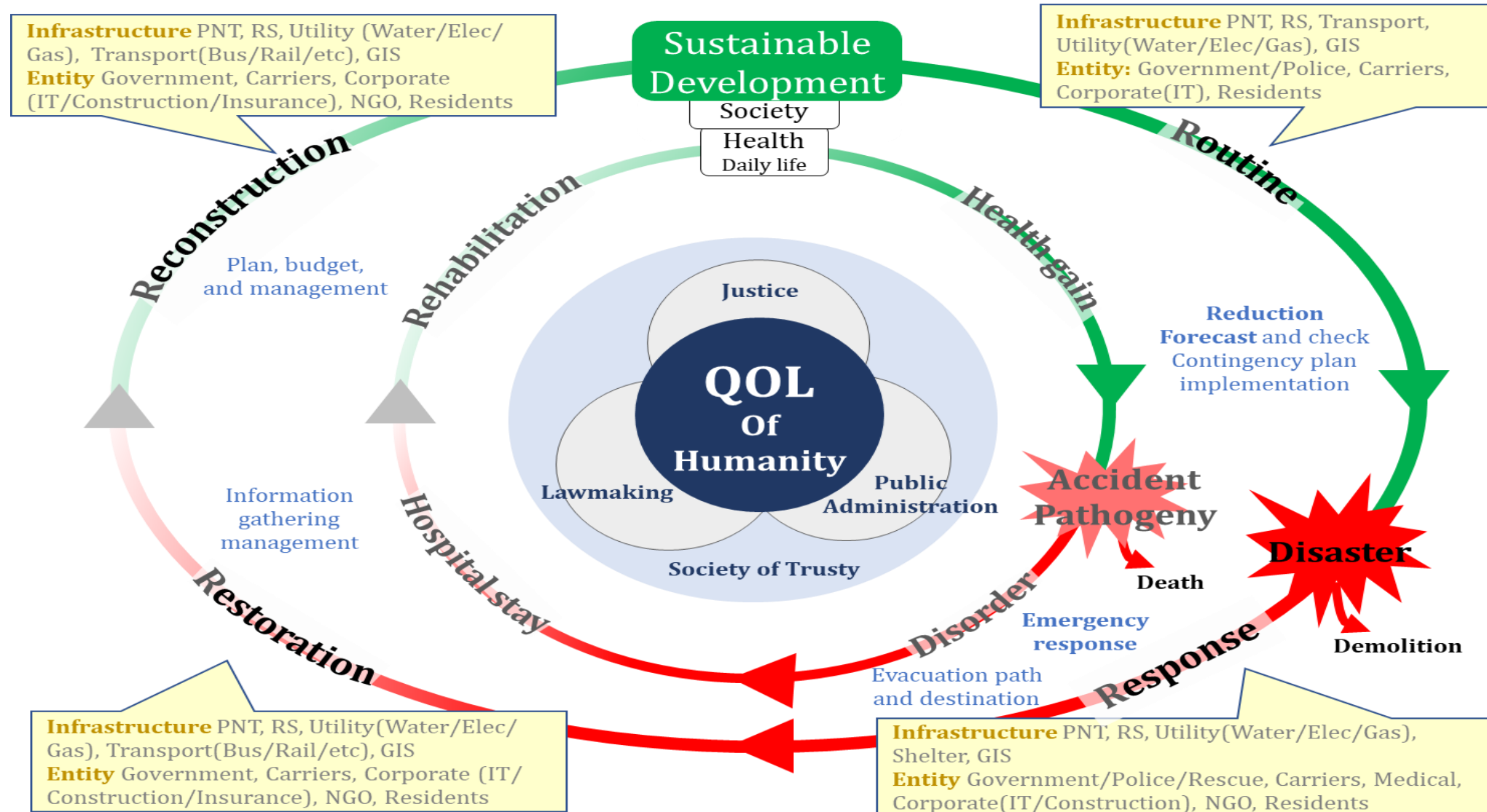
© PASCO CORPORATION 2010

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出典

FIG Working Week 2011
Bridging the Gap between Cultures
Marrakech, Morocco, 18-22 May 2011

WG8 トップレベル文書Annex から抜粋 Space systems for the Quality of Life



Needs of standardization for QZSS

In IEC 61108 series, QZSS receivers are not standardized yet. Standardization is needed about QZSS.

Document	Title
IEC 61108-1 :2003	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 1: Global positioning system (GPS) - Receiver equipment - Performance standards, methods of testing and required test results
IEC 61108-2 :1998	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 2: Global navigation satellite system (GLONASS) - Receiver equipment - Performance standards, methods of testing and required test results
IEC 61108-3 :2010	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 3: Galileo receiver equipment - Performance requirements, methods of testing and required test results
IEC 61108-4 :2004	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 4: Shipborne DGPS and DGLONASS maritime radio beacon receiver equipment - Performance requirements, methods of testing and required test results
IEC 61108-5 :2020	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 5: BeiDou navigation satellite system (BDS) - Receiver equipment - Performance requirements, methods of testing and required test results
IEC 61108-6 :2023	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 6: Navigation with Indian Constellation (NavIC) / Indian Regional Navigation Satellite System (IRNSS) - Receiver equipment - Performance requirements, methods of testing and required test results
IEC 61108-7 Ready	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 7: Satellite Based Augmentation Systems - Receiver Equipment - Performance requirements and method of testing
IEC 61108-8? New Proposal	Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part #: Quasi-Zenith Satellite System (QZSS) - Receiver equipment - Performance requirements, methods of testing and required test results

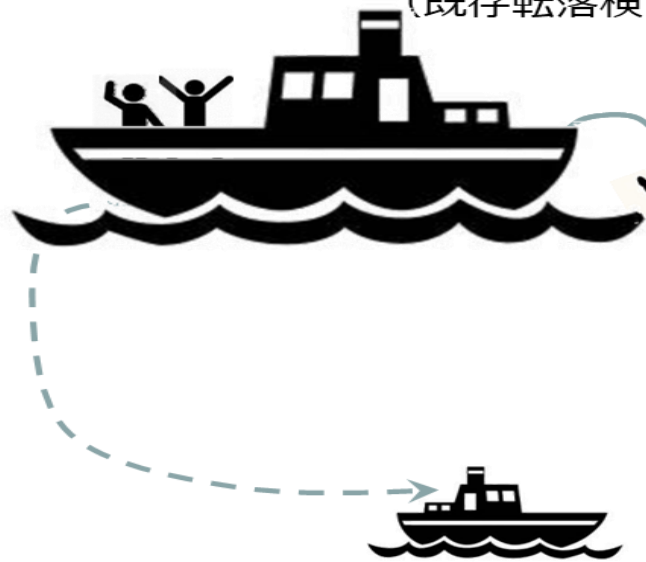
小型船舶の転落救助システムの標準化 (MLIT申請中)

LTE範囲内通信手段、範囲外の無線通信技術の開発



①小型船舶（転落位置把握／転落情報発信）

スマートタグ転落検出技術の開発
船舶位置高精度測位技術の開発
航海記録デジタル蓄積技術の開発
(既存転落検出システムとの連携)

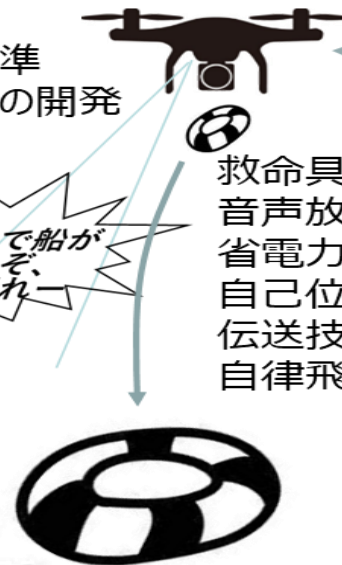


船舶高精度位置基準
漂流位置予測技術の開発
(②に装備)

後15分で船が
来るぞ、
頑張れー

③救難支援ドローン（発進／救助）

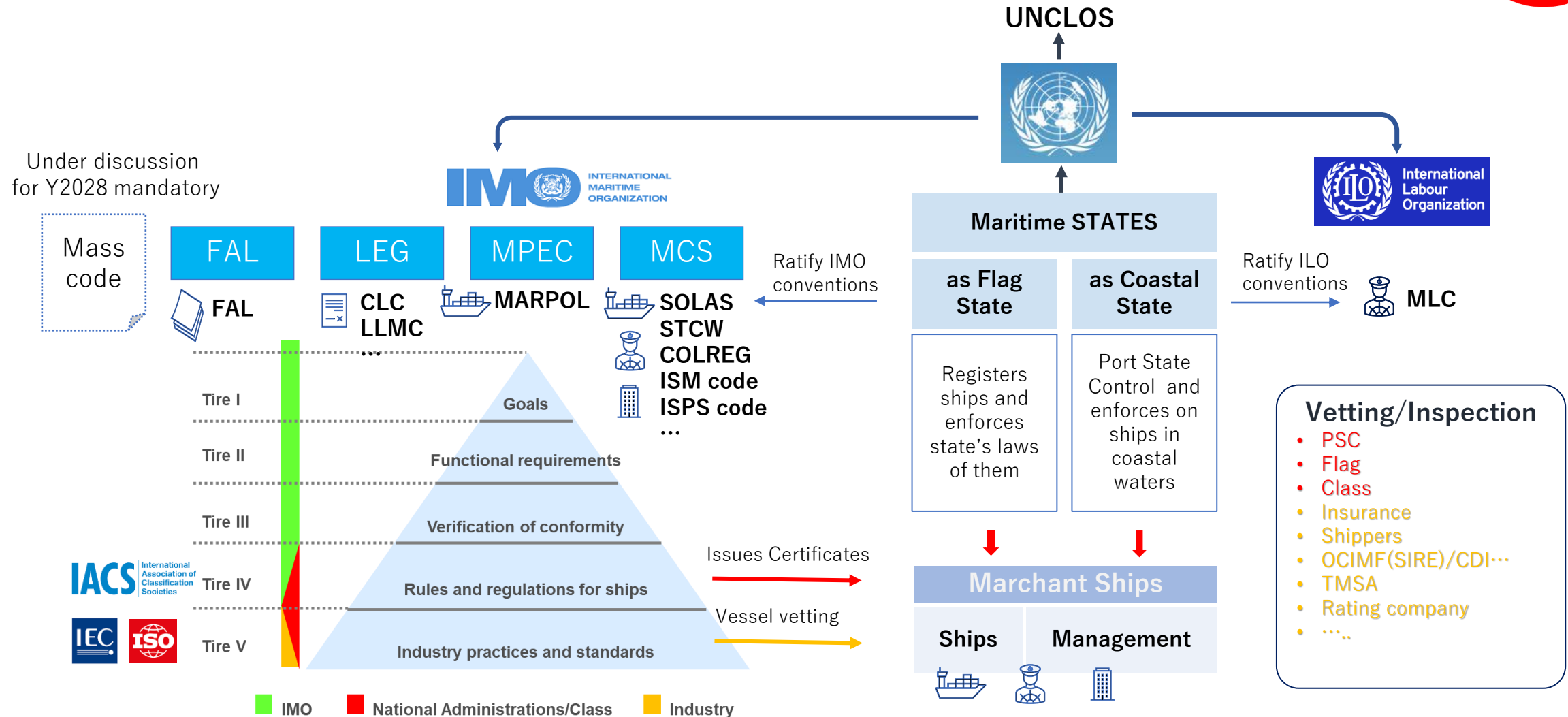
救命具投下/
音声放送手段の開発
省電力動画/
自己位置無線
伝送技術の開発
自律飛行システムの導入



みちびき高精度測位補強情報
利用配信システムの導入
ドローン機能制御技術の開発
通信手段自動切替技術の開発



Maritime Laws and Regulations



略語集

3GPP	3rd Generation Partnership Project (Mobile Communication)
API	Application Program Interface
CCSDS	Consultative Committee on Space Data Systems, 宇宙データシステム諮問委員会
ECSS	European Corporation for Space Standardization, 欧州宇宙標準化協力会議
FIG	Federation Internationale des Geometres, 国際測量者連盟
IEEE	Institute of Electric and Electronic Engineers, 米国電気電子工学会
ICG	International Committee on GNSS, 衛星測位国際委員会(国際連合)
ION	Institute Of Navigation, 米国航法学会
IEC	International Electrotechnical Commission, 国際電気標準会議
ISO	International Organization for Standardization, 国際標準化機構
NMEA	National Marine Electronics Association, 全米船用電子機器協会
OGC	Open Geospatial Consortium
PPP	Precise Point Positioning, 精密単独測位
RTCM	Radio Technical Commission for Maritime Services, 海事無線技術委員会
UN	United Nations, 国際連合
UN-GGIM	UN Global Geospatial Information Management