UN ICG-16/WG-B/AppSG
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Another Potential Provision for GNSS Application Enhancement toward SDGs

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Unclassified

Is the current Booklet enough?

Space for QOL

Current Booklet Process

Quicker Achievement of SDGs and Global Warming Mitigation

Increase products, systems and businesses developed by GNSS users utilizing lessons learned and guidance

Lessons learned and guidance to GNSS users

GNSS Application Use Cases to achieve SDGs and mitigate Global Warming Effect

To be added?

What other information necessary to further assist?

Methods to ease development, enhance user friendliness and worldwide applicability

Answer would be Technical Standards?

Standards are complicated!
Too many standards to follow!
I like to do as I like!

If faithfully follow standards,

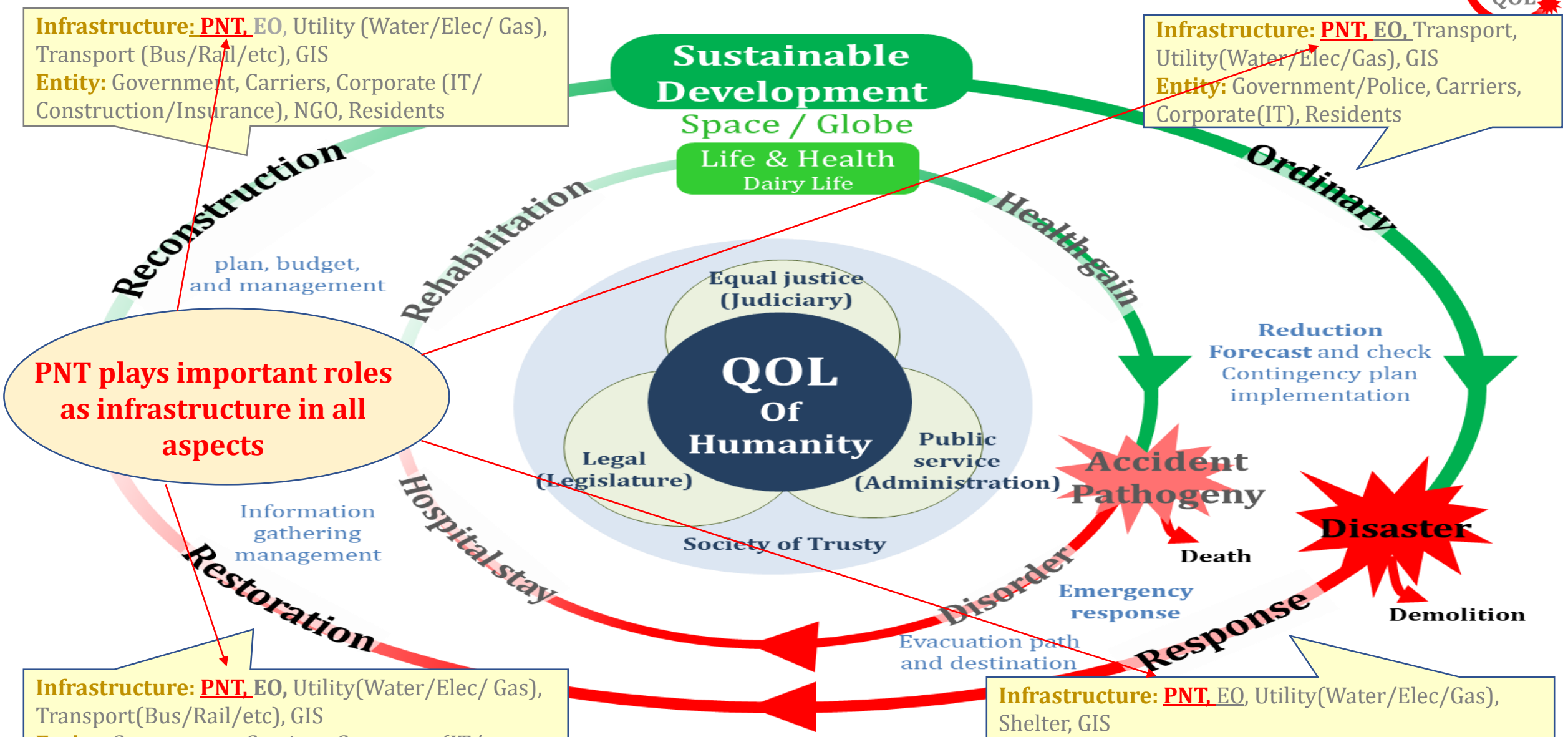
Interoperability, user friendliness, common interface, etc. are assured to your GNSS products, systems and services, and better business chance and contribution toward SDGs maybe waiting.

Quality of Life (QOL) achieved by GNSS/PNT

Space for QOL

Infrastructure: PNT, EO, Utility (Water/Elec/ Gas), Transport (Bus/Rail/etc), GIS
Entity: Government, Carriers, Corporate (IT/ Construction/Insurance), NGO, Residents

Infrastructure: PNT, EO, Transport, Utility(Water/Elec/Gas), GIS
Entity: Government/Police, Carriers, Corporate(IT), Residents



PNT plays important roles as infrastructure in all aspects

Infrastructure: PNT, EO, Utility(Water/Elec/ Gas), Transport(Bus/Rail/etc), GIS
Entity: Government, Carriers, Corporate (IT/ Construction/Insurance), NGO, Residents

Infrastructure: PNT, EO, Utility(Water/Elec/Gas), Shelter, GIS
Entity: Government/Police/Rescue, Carriers, Medical, Corporate(IT/ Construction), NGO, Residents

QOL is a part of SDGs

Space systems community in standardization committees has been discussing space application drives QOL during past ten years. This is “REAL” purpose of standardization.

SUSTAINABLE DEVELOPMENT GOALS

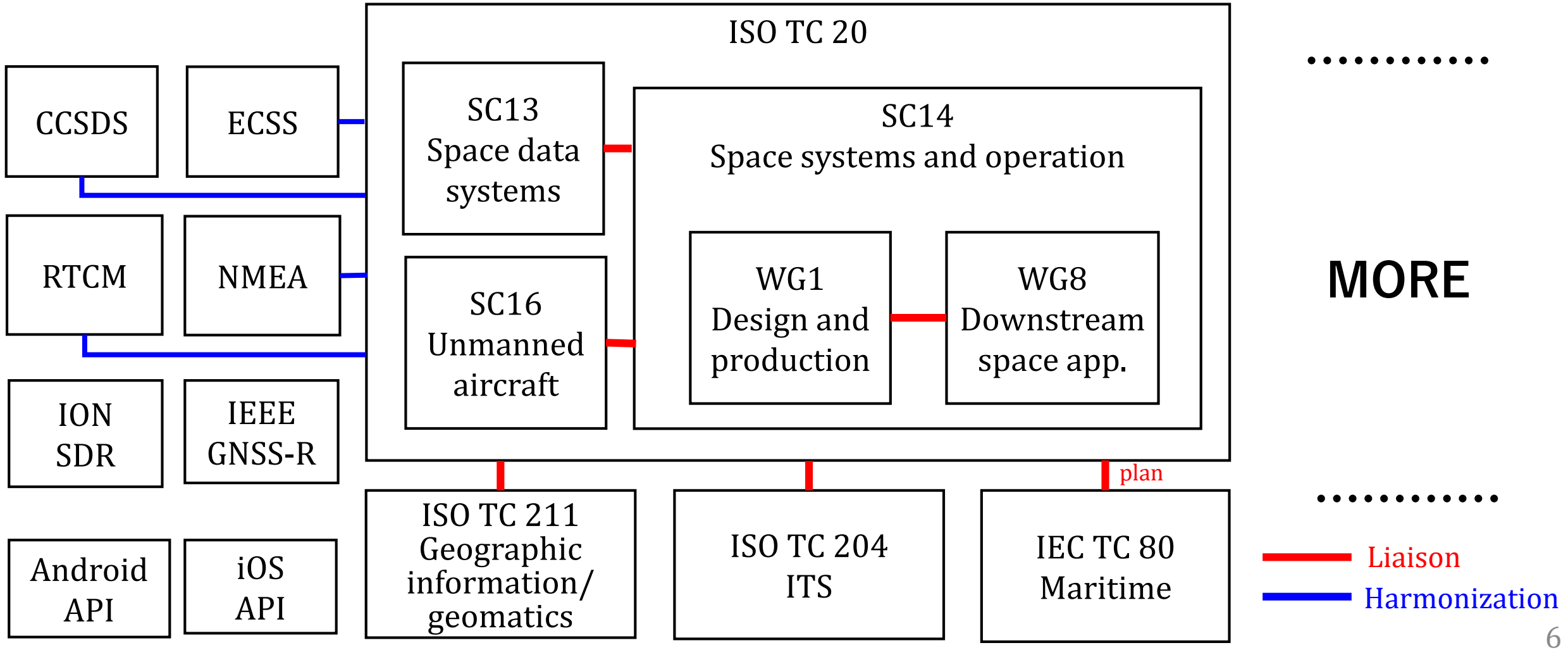
Supporting

Space for QOL

ISO/TC 20/SC 14 committee “Space systems and operation” discusses on for **Quality Of Life (QOL)** at viewpoint of **design and production**

Major communities to standardize space applications

Can AppSG contribute to GNSS users on this aspect?



IEC standards on GNSS

IEC 61108-1:2003, Maritime navigation and radiocommunication equipment and systems – 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 re

Since 1990s, Maritime standard, Part 1: GPS

Part 2: GLONASS in 1998, Part 3: Galileo in 2010

IEC standards on GNSS

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

Part 4: DGNSS in 2004

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

Part 5: BDS in 2020

IEC/PT 61108-6, Maritime navigation and radiocommunication equipment and systems – Global navigation satellite systems (GNSS) – Part 6: Indian Regional Navigation Satellite System (IRNSS) – Receiver equipment – Performance requirements, methods of testing and required te

Part 6: IRNSS now developing

IEC standards on GNSS

IEC/PT 61108-7, Maritime navigation and radiocommunication equipment and systems - Global navigation satellite systems (GNSS) - Part 7: Satellite Based Augmentation Systems - Receiver Equipment - Per

Part 7: SBAS for Maritime, developing now

New proposal on QZSS

IEC/PT 61108-#, Maritime navigati
– Global navigation satellite systems (GNSS) - Part #: Quasi-Zenith Satellite System - Receiver Equipment - Performance requirements and method of testing (New Proposal)

IEC 61121-1 to 4, Maritime navigation and radiocommunication equipment and systems
– Digital interfaces
– Part 1: Single talker and multiple listeners (NMEA 0183)
– Part 2: Signal talker and multiple listeners, high-speed transmission (NMEA 0183 HS)
– Part 3: Serial data instrument network (NMEA 2000)
– Part 450: Single talker and multiple listeners (Ethernet)

NMEA has a mirror standard with IEC.

ISO standards on GNSS

Geodetic and surveying area: RTK instruments

ISO 17123-8:2015, Optics and optical instruments — Field procedures for testing geodetic and surveying instruments — Part 8: GNSS field measurement systems in real-time kinematic (RTK)
ISO 12188-1:2010, Tractors and machinery for agriculture and forestry — Test procedures for positioning guidance systems in agriculture — Part 1: Dynamic testing of satellite-based positioning devices
ISO 12188-2:2012, Tractors and machinery for agriculture and forestry — Test procedures for positioning guidance systems in agriculture — Part 2: Testing of satellite-based auto-guidance systems during straight and level travel

Agricultural area: tractors and machinery dynamic positioning, auto-guidance, and level travel.

EN to ISO standards on GNSS

EN 16803-1:2020, Space – Use of GNSS-based positioning for road Intelligent Transport Systems (ITS) – Part 1: Definitions and system engineering procedures for the establishment and assessment of performances
EN 16803-2:2020, Space – Use of GNSS-based positioning for road Intelligent Transport Systems (ITS) – Part 2: Assessment of basic performances of GNSS-based positioning terminals
EN 16803-3:2020, Space – Use of GNSS-based positioning for road Intelligent Transport Systems (ITS) – Part 3: Assessment of security performances of GNSS-based positioning terminals
EN 16803-4, Space - Use of G Systems (ITS) - Part 4 : Definitions and system engineering procedures for the design and validation of test scenarios (in the future)

Some European Standards transferring to ISO, ITS positioning performance including security

ISO standards on GNSS

ISO/TS 22591:2021 Space-based services for a high accuracy positioning system with safety requirements TS: Technical Specification
ISO 18197:2015 Space systems—Space based services requirements for centimeter class positioning
ISO 24246:2021 Space systems—Requirements for space-based positioning augmentation centres
ISO/FDIS 24245 Space systems —Global navigation satellite system (GNSS) receiver class codes FDIS: Final Draft International Standard

ISO space systems series are discussed in new WG8 (established in Sep. 2022)

Similar idea to Wi-Fi class codes, so useful!

ISO standards on GNSS

Developing countries required

ISO/AWI 16215-1 Space systems — Space-based positioning, navigation and timing (PNT) services — Part 1: architectural basis ※AWI: Approved Work Item
ISO/AWI 13675 Space systems—Space based services — positioning information exchange services ※AWI: Approved Work Item
ISO 19161-1:2020, Geographic information — Geodetic reference — Part 1: International terrestrial reference syste(ITRS)
ISO 21384-2:2021 Unmanned Aircraft Systems – Part 2: UAS component
ISO 21895:2020 Categorization and classification of civil unmanned aircraft systems

ISO TC 211, a tight liaison

Unmanned aircraft system (SC 16), a tight liaison

And more …

Proposal

- Select useful standard per GNSS application and guide users to utilize them easily.

- As supplement of the Booklet, include these information to the Booklet (ver. 2 ?).

Annex

Abbreviated terms

3GPP	3rd Generation Partnership Project
EN	European Normalisation (European Standard)
ICAO	International Civil Aviation Organization
IEC	International Electronical Commission
ISO	International Organization for Standardization
ITU	International Telecommunication Union
RTCM	Radio Technical Commission for Maritime services