



Radio Technical Commission for Maritime Services

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RTCM Special Committee 104 on Differential GNSS Service

Liaison Note to IALA – New Proposed RTCM 10402.4 Standard

1. RTCM would like to present the new proposed RTCM 10402.4 RTCM Recommended Standards for Differential GNSS (Global Navigation Satellite Systems) Service to the IALA ENG Committee. The existing standard used by IALA Radio beacon System installed in coastal and inland waterway areas around the world is RTCM 10402.3 (including Amendment 1). RTCM 10402.3 supports GPS and GLONASS only.

In recent years, development of other GNSS (Galileo, BeiDou, QZSS) and SBAS has increased the number of the satellites available. This brings subsequent performance benefits and redundancy for radio beacons users.

RTCM has updated the current RTCM 10402.3 to provide corrections to multiple GNSS by developing new RTCM messages, taking advantage of GLONASS-M capabilities and by the revision of several RTCM messages.

The major proposed changes are the following:

- Updated the descriptions of differential GNSS to reflect recent developments in satellite systems
- Completed a new radiobeacon almanac message that supports multiple reference stations and applies to all GNSS
- Developed 4 new generic message types that can be used to provide differential corrections to multiple GNSS. These messages currently support GPS, GLONASS, Galileo, BeiDou, QZSS and SBAS systems, but can be expanded as required (e.g., for IRNSS);
- Incorporated differential GLONASS corrections into the new generic differential GNSS message type, taking advantage of the improved GLONASS-M capabilities;
- Updated the status of a number of messages from "Tentative" to "Permanent" to reflect their acceptance by the DGNSS community
- Flagged for retirement some messages that are no longer in use or supported by the DGNSS community.

The table below summarizes the proposed changes for each message:

#	VERSION 2.3	PROPOSED FOR 2.4	NEW PROPOSED TITLE
1	Fixed	Fixed	Differential GPS Corrections
2	Fixed	Retired	Delta Differential GPS Corrections
3	Fixed	Fixed	GPS Reference Station Parameters
4	Tentative	Fixed	Reference Station Datum
5	Fixed	Fixed	GPS Constellation Health
6	Fixed	Fixed	GPS Null Frame
7	Fixed	Fixed	DGPS Radiobeacon Almanac
8	Tentative	Retired	Pseudolite Almanac
9	Fixed	Fixed	GPS Partial Correction Set
10	Reserved	Retired	P-Code Differential Corrections
11	Reserved	Retired	C/A-Code L1, L2 Delta Corrections
12	Reserved	Retired	Pseudolite Station Parameters
13	Tentative	Retired	Ground Transmitter Parameters
14	Fixed	Fixed	GPS Time of Week
15	Fixed	Retired	Ionospheric Delay Message
16	Fixed	Fixed	GPS Special Message
17	Fixed	Fixed	GPS Ephemerides
18	Fixed	Retired	RTK Uncorrected Carrier Phases
19	Fixed	Retired	RTK Uncorrected Pseudoranges
20	Fixed	Retired	RTK Carrier Phase Corrections
21	Fixed	Retired	RTK/Hi-Accuracy Pseudorange Corrections
22	Tentative	Retired	Extended Reference Station Parameters
23	Tentative	Retired	Antenna Type Definition Record
24	Tentative	Retired	Antenna Reference Point (ARP)
25- 26	--	--	Undefined
27	Fixed	Fixed	Extended Radiobeacon Almanac
28- 30	--	--	Undefined
31	Tentative	Retired	Differential GLONASS Corrections
32	Tentative	Retired	Differential GLONASS Reference Station Parameters

33	Tentative	Retired	GLONASS Constellation Health
34	Tentative	Retired	GLONASS Partial Differential Correction Set GLONASS Null Frame
35	Tentative	Retired	GLONASS Radiobeacon Almanac
36	Tentative	Fixed	GLONASS Special Message
37	Tentative	Retired	GNSS System Time Offset
38-40	--	--	Undefined
41	--	Fixed	Generic GNSS Basic Differential Corrections
42	--	Fixed	Generic GNSS Partial Basic Corrections
43	--	Fixed	Generic GNSS Nav Data Validity & Signal Health
44-58	--	--	Undefined
59	Fixed	Fixed	Proprietary Message
60-63	Reserved	--	Undefined

Note: "Retired" means that the Message Type is no longer supported effective immediately, and vendors can remove it from their equipment.

The RTCM SC-104 committee would like IALA to consider if the proposed update would meet the needs of the current and future IALA Radio Beacon Services. Any comments and suggestions to the above table would be appreciated.

The RTCM SC-104 committee would also welcome any IALA's comments on the future of the IALA Radio Beacon Services.

Finally, we would like to remind IALA that the RTCM SC10402.3 message type 27 has been updated, and that ITU-R M-823 should reflect the latest version.