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| IALA RECOMMENDATION |

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PNT relevant services & systems that can contribute to Resilient PNT

Edition 1.0 (Draft)

Document date

Revisions to this IALA Document are to be noted in the table prior to the issue of a revised document.

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| Date | Page / Section Revised | Requirement for Revision |
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THE COUNCIL

**RECALLING t**he function of the IALA with respect to Safety of Navigation, the efficiency of maritime transport and the protection of the environment,

**NOTING** IMO resolutions A.915(22) on Maritime Policy for the Future Global Navigation Satellite System (GNSS), and A.1046 (27) on World Wide Radionavigation System,

**NOTING ALSO** IMO SIP recommendation for resilient PNT “include text from reference” as reported in NCSR1, Report, Annex 7,

**NOTING FURTHER** that Existing and future Global Navigation Satellite Systems (GNSS) like GPS, GLONASS and GALILEO are strategic key elements for resilient PNT data provision, and that terrestrial services and augmentation services, and other ship based sensors, should be considered as candidates to improve performance and achieve resilient PNT,

**NOTING FURTHER** that different applications will require different service levels and therefore different levels of resilience, a scalable approach to resilient PNT is recommended; one that may be different for different users,

and safety (augmentation services: e.g. IALA Beacon DGNSS, AIS DGNSS, RTK) or to ensure backup functionality (backup services: e.g. eLORAN, R-Mode) respectively to GNSS.

* The interoperability and compatibility of space-based and terrestrial services support their alternatively or complementary application for resilient PNT data provision.

From references such as [IMO MSC.112(73)], [IMO MSC.113(73)], [IMO MSC.114(73)], [IMO MSC.115(73)], and [IMO MSC.233(83)]:

* Several performance standards for ship borne GNSS and DGNSS receivers were developed and approved by IMO in the last decade: GPS/GLONASS, DGPS/DGLONASS, combined GPS/GLONASS, and GALILEO.

A logical consequence of this sensor related standardisation process is the preparation of PS for multi-system shipborne radio navigation receivers considering the progress in GNSS and equipment

**NOTING FURTHER** the need to ensure that Differential GNSS (DGNSS) services in the frequency band 283.5 kHz – 325 kHz are operated in accordance with certain minimum standards that take into account relevant ITU-R Recommendations and IMO Resolutions,

**RECOGNISING** the need to ensure that Differential GNSS (DGNSS) services in the frequency band 283.5 kHz – 325 kHz are operated in accordance with certain minimum standards that take into account relevant ITU-R Recommendations and IMO Resolutions,

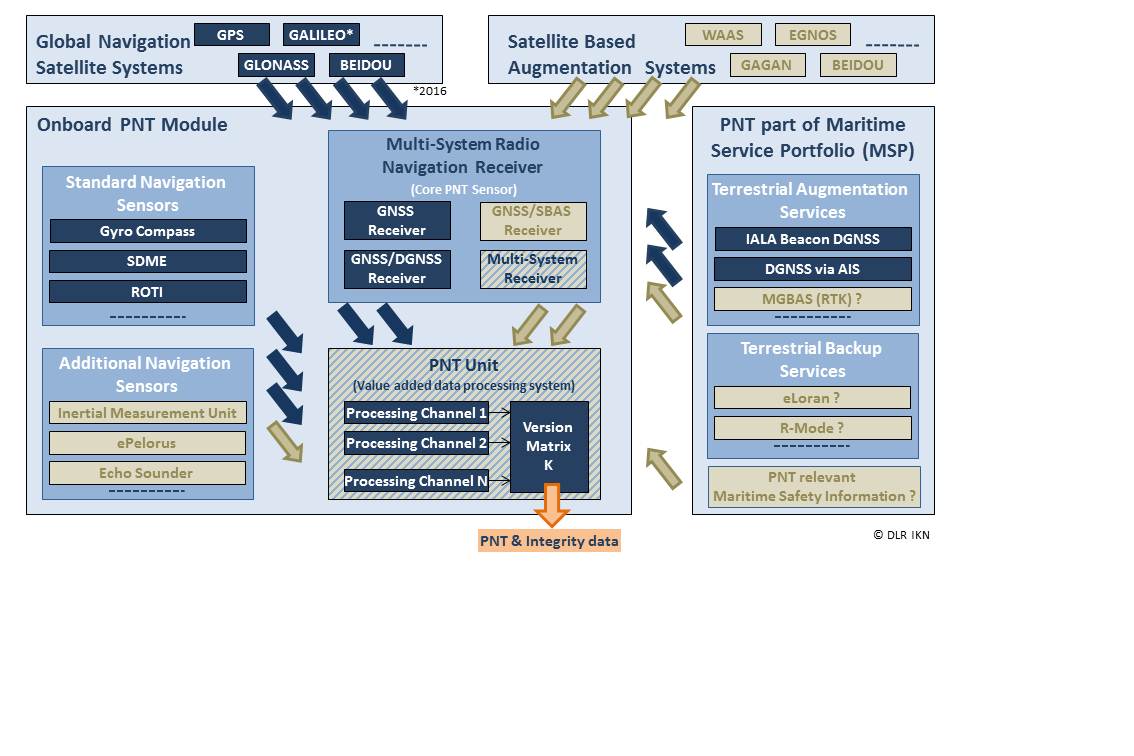
**RECOGNISING ALSO** that the minimum standards should include the signal format, reference datum, availability, continuity, integrity, accuracy, signal monitoring, range and coverage, status reporting, validation, and the publication of information about the system,

**RECOMMENDS** thatMembers and other appropriate Authorities providing, or intending to provide, DGNSS services in the frequency band 283.5 – 325 kHz, adopt the design and implementation principles set out in the Guideline xxxx,

**RECOMMENDS** that IALA members and authorities maintain and develop a system of PNT services which contribute to resilient PNT taking into consideration appropriate Guidelines which aid the overall principles set out in Annex A.

1. TITLE REQUIRED

It is envisaged that a resilient PNT system shall consist of many different elements. . can be considered an indication of the different interactions and overarching view.



1. Overarching view of the different elements which can contribute to resilient PNT.

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Further information and guidance on how systems should be used and the considerations for their integration can be found in GXXX.

Radionavigation system and services available for use in such a system are described in a number of Recommendations and Guidelines, including A-124, R-121, R-129, R-135, GXXX, GXXX and the IALA WWRNP