Input paper: [[1]](#footnote-1) ENG17-3.1.2.11

Input paper for the following Committee(s): check as appropriate Purpose of paper:

**□** ARM X ENG **□** PAP X Input

**□** DTEC **□** VTS **□** Information

Agenda item [[2]](#footnote-2) n.n

Technical Domain / Task Number 2 …………………………………

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Coordination of Loran Group Repetition Intervals (GRI)

# Summary

Loran-C, Chayka, eLoran and similar services are starting to see some resurgence as part of a systems of systems approach to mitigating GNSS vulnerabilities. A number of nations are developing eLoran services or considering the development of eLoran within their waters.

Loran-C and eLoran signals travel over vast geographical regions and are synchronised to aid identification and to limit the level of (cross rate) interference. The time offset between each station’s broadcast is called the Group Repetition interval (GRI).

Historically, GRI was defined centrally within the originating service provider (such as the US Coast Guard) or managed at a regional level through local agreement. With the general decline in Loran-C and eLoran systems over the past decade there is currently no clear coordinating entity and it is unclear where new stations are expected to obtain their GRI.

The situation is akin to the marine radiobeacon network situation circa 2000 where a lack of coordination resulted in significant interference in some areas and an overall inconsistent performance. At that time, IALA took on a coordination role for marine radiobeacons, working with its members and industry to develop a suitable solution that was then implemented by national administrations.

Without a clear coordinator, the service provided by any new Loran-C/eLoran system may be sub-optimal and if not managed could lead to increased interference. This clearly decreases the benefit of the system to aid resilient positioning, navigation and time (PNT).

## Purpose of the document

The purpose of this document is to raise awareness of this issue and to invite discussion within the Committee and the IALA Secretariat as to whether this is something IALA could coordinate and which IALA members would be willing to offer technical support.

# Discussion

The allocation of GRIs is not a straightforward process as it requires knowledge of how Loran-C / eLoran systems work and the various factors that affect the signal as it propagates to the user. Thankfully much of this information is already in the public domain and tools exist that can help selection of the most appropriate GRI.

As Loran-C/eLoran transmissions are international in nature it is important that any coordinating body has the appropriate international standing to ensure the coordination is impartial and maintains the sole focus of maximising the use of the systems for the benefit of the users.

It is proposed that should IALA consider taking on this coordination role, it does so in a similar manner to the way it coordinates marine radiobeacon frequency allocation [1]. The process could be very similar with any request for a new GRI made to the Secretariat, which in turn seeks support and expert advice from its membership, including those within the ENG Committee.

It is likely that some IALA members (national, associate and industrial) have experience in this area and may have software tools available to support IALA in this role [2]. This would need to be explored before IALA was in any position to take on this role, but it would enable IALA to provide this international service without needing to develop its own technical expertise, at least initially.

Initial discussions could include identifying interested members and scoping the amount of work involved. The GLAs are keen to support such discussions and have some software tools that could assist IALA in this role.

# References

1. INFORMATION AND GUIDANCE ON ALLOCATION OF ID NUMBERS FOR WORLD DGNSS, IALA website (https://www.iala-aism.org/technical/positioning-navigation-and-timing/world-dgnss-stations-list/allocation-world-dgnss-ids/)
2. Safar et al, “Group Repetition Interval selection for eLoran”, https://loran.org/proceedings/Meeting2008/Papers/SAFAR\_8A3.pdf

# Action requested of the Committee

The Committee and its members are requested to:

1. Note the information provided in this paper and;
2. Initiate discussions between ENG and IALA Secretariat as to whether this is a role that IALA could/should consider and if so, how any request would be managed and to identify interested members.

1. Input document number, to be assigned by the Committee Secretary [↑](#footnote-ref-1)
2. Leave open if uncertain [↑](#footnote-ref-2)