

## IALA COUNCIL 69<sup>th</sup> session



**18-21 June 2019**  
**Rotterdam**  
**The Netherlands**

### 8 – STRATEGY AND POLICY

#### *8.2 – Position on the development of AtoN services*

##### 8.2.1 – Future of DGNSS services

Note by General Lighthouse Authorities of the UK and Ireland

### INTRODUCTION

The General Lighthouse Authorities of the United Kingdom and Ireland (GLA) are in the process of reviewing the future of their marine radiobeacon DGPS service. To support the GLA decision process, the GLA would like to seek the counsel of other IALA members, particularly those that have previously, or currently operate a similar service, on what they perceive as the future for this marine aid-to-navigation (AtoN).

The GLA recognise that mariner's receive a more reliable and usable service when AtoN, such as the marine radiobeacon DGPS service, are provided in a coordinated manner across neighbouring countries and administrations. The GLA also recognise that each national competent authority is responsible for AtoN provision within its area of responsibility.

### DISCUSSION

Marine radiobeacon DGPS services were introduced in the late 1990s to counter the effect of selective availability (SA). SA was an intentional error aimed at civilian GPS users to preserve high accuracy positioning for military users. SA was set to zero in 2000, since which time the accuracy improvement through marine radiobeacon DGPS has been minimal, with many users reporting position integrity as the key benefit of using the system.

The future of this service is entwined with the development of other services and factors, namely:

#### Global Navigation Satellite System (GNSS) evolution

All GNSS constellations are evolving to provide data for civilian use on multiple frequencies. Through using different frequencies, the user's receiver can determine the level of error caused by ionospheric delay, leading to a more accurate position estimate.

In addition, the number of constellations available is increasing with the completion of the Galileo and BeiDou constellations. The availability of more signals, from more satellites, means the user's receiver can over-determine the position solution and identify errors (see RAIM).

#### Space Based Augmentation Systems (SBAS)

SBAS is currently available over large parts of the northern hemisphere with a new system being developed over Australia. While predominately providing services for aviation, there is potential for SBAS data to support maritime operations, providing both integrity and accuracy improvements over wide areas.

The European Commission, which provides EGNOS, the European SBAS, is considering the declaration of a maritime service. Much of the technical and operational framework to enable such a maritime service has been considered at an international level in order to enable other SBAS providers to opt to follow should they wish.



Recognition of a maritime user is important, as without such any SBAS outages or system errors may not be alerted to the maritime community. In addition, SBAS data is not available everywhere (including high latitudes), as such this approach to achieving integrity and accuracy improvements may not be appropriate for all IALA members.

#### Receiver Autonomous Integrity Monitoring (RAIM)

The availability of more satellites from more GNSS constellations enables suitably equipped maritime receivers to conduct their own integrity assessment, known as Receiver Autonomous Integrity Monitoring (RAIM). RAIM requires at least 5 or 6 satellites, depending on the approach, which means that while single GNSS RAIM is possible, it may be unreliable in some circumstances.

The availability of more satellites through the evolution of more civilian signals and more GNSS, should support the development of more advanced maritime RAIM algorithms. Therefore, RAIM may be a more suitable means of obtaining integrity for multi-constellation, multi-frequency receivers.

#### Maritime user equipment

It is anticipated that most maritime receivers in use today are single frequency (L1) GPS and that as these receivers are replaced, mariners will move towards multi-constellation, multi-frequency receivers. Such receivers are expected to retain marine radiobeacon and SBAS augmentation options; however, the provision of single frequency, or dual frequency corrections (in the case of next generation SBAS) could be seen to be limiting the capability of the receiver. The next revision of the RTCM DGNSS radiobeacon standard is expected to support multi-constellation corrections, but it is questionable whether there is any benefit of such, over and above SBAS and or RAIM.

In addition, current receivers are tested to ensure their GNSS and marine radiobeacon components meet international norms, but currently there is no IEC test specification for maritime SBAS. Where this functionality exists in receivers today, the manufacturer is free to implement SBAS how it deems fit, leading to some receivers ignoring the integrity element of the service. Work is ongoing to address this and it is anticipated that post 2021, suitably approved equipment will emerge on the market.

Receiver technology, along with RAIM and SBAS development are improving with significant technology steps expected over the period of 2023-2025.

### **PROPOSAL**

The GLA propose:

- An informal discussion at Council 69 on the future of this AtoN. It would be beneficial to hear from Councillors whether their organisation has considered the future of their system and if so, their reasoning for opting to retain or cease transmissions.  
These discussions will not be taken as a formal position on the future of any system and while general themes may be captured individual views will not be.
- That Council consider inviting the ENG Committee to hold a workshop on this matter, possibly towards the end of 2019. The aim of the workshop would be to develop IALA Guidance on this topic, something that is already in the ENG task plan.

### **THE COUNCIL IS REQUESTED TO**

**Participate in an informal discussion** during Council 69 and **consider** inviting the ENG Committee to hold a **Workshop on the future of the maritime radiobeacon DGPS system**.