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**□** ARM **□** ENG **□** PAP □ Input

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Technical Domain / Task Number 2 Working Group 5 (PNT)

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Application case of S-240 DGNSS Station Almanac

## Purpose of the document

IALA decided to develop S-20X standards on GNSS infrastructure and the S-240 DGNSS Station Almanac product specification was drafted in 2015. The document was reviewed via ENAV meeting and has been improved so far. ROK has been involved in the development of the product specification. The team introduced the Google map service of S-240 DGNSS Almanac which was developed to verify the S-240 dataset and establish a web based service system.

ROK identified application cases of S-240 DGNSS Station Almanac dataset, which is DGNSS reference station, DGNSS receiver and Voyage planning. This paper describes 3 types of application case of S-240 dataset.

## Related documents

* IALA Guideline 1106 – Producing an IALA S-200 series product specification
* IALA S-240 DGNSS Station Almanac Product Specification
* ENAV17 13.13.1 Progress on the development of S-240 DGNSS Station Almanac

# Discussion

## Case of DGNSS Reference Station

DGNSS reference station is maintaining a RSIM (Reference Station and Integrity Monitor) to provide a DGNSS correction service. Since detailed information of reference station is required for executing RSIM system, the S-240 dataset can be used to set up and change the station information at a time.

If the S-240 dataset is applied to the RSIM, unintentional error can be decreased and efficiency of DGNSS RSIM management can be improved. In order to verify the concept, the team developed the data setup window of GNSS RS/IM system for applying the S-240 XML dataset. If the reference station is selected in the setup window, the detailed parameter of RS/IM system can be applied to the system without human intervention.

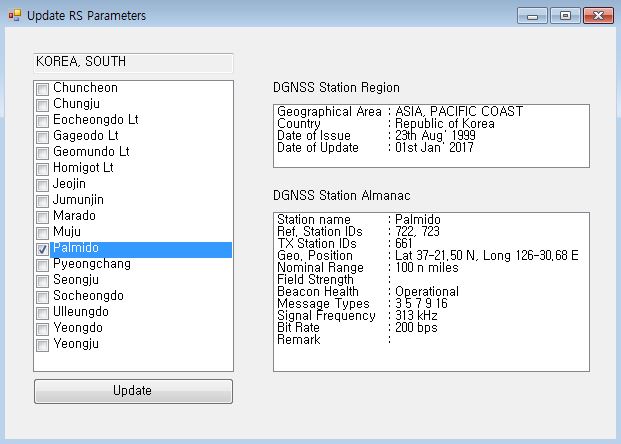


Figure 1. Data setup window

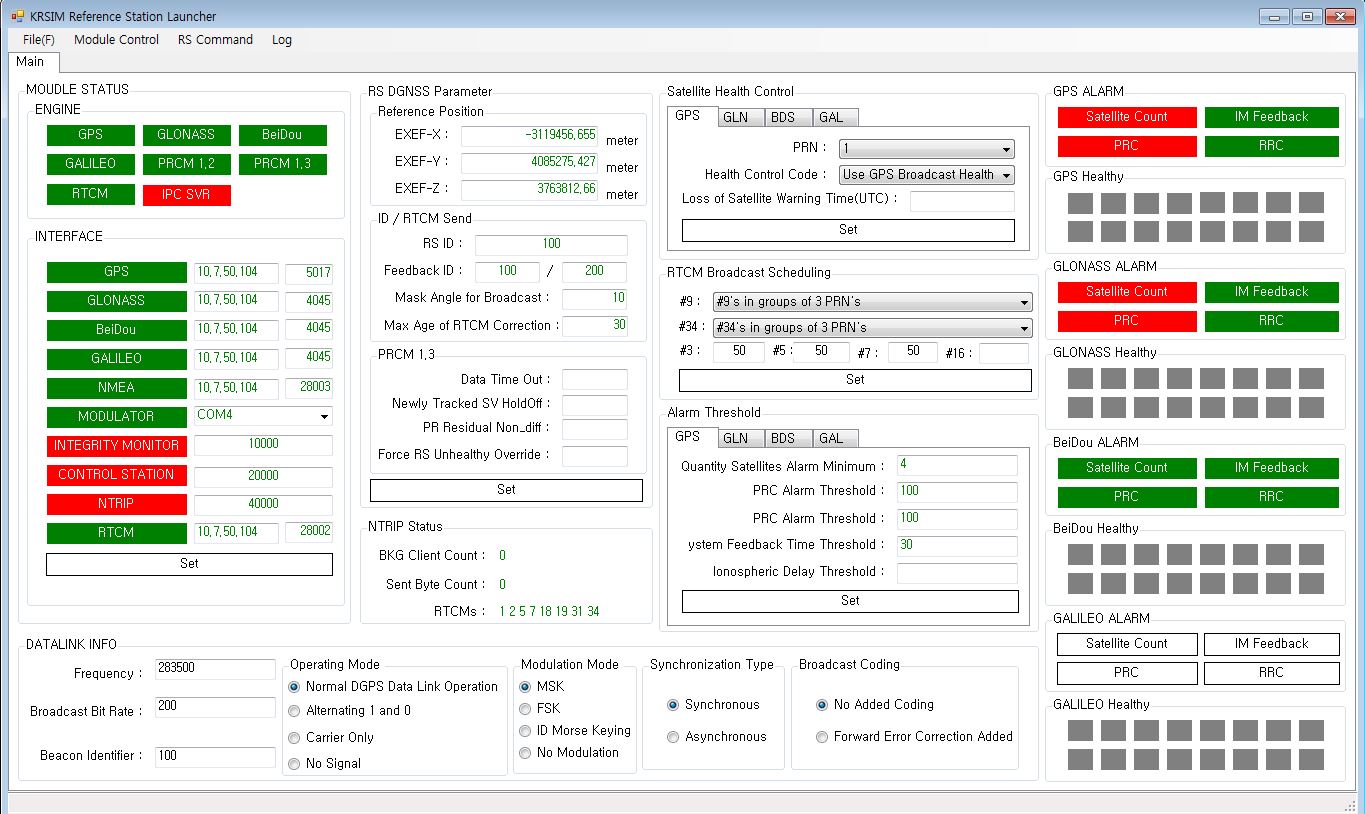


Figure 2. Setup result of DGNSS RS/IM using S-240 dataset

Figure 2 shows that the RS/IM of DGNSS reference station set up according to the S-240 dataset. The team confirmed the possibility which the S-240 dataset can be used for setting up the RS/IM system.

## Case of Beacon receiver

When a DGNSS receiver receives signals from multiple DGNSS reference station, it will be beneficial if the shortest distance of DGNSS station is selected in the beacon receiver. For the status information of DGNSS reference station, each station broadcasts a message according to the Message Type 3 of ‘RTCM Recommended Standards for Differential GNSS Service v2.3’ and Message Type 1004 or 1005 of ‘RTCM Standard 10403.1 for Differential GNSS Services v3.0’. Those messages are broadcast following a planned schedule. Figure 3 shows the comparison of a method to select the signal from DGNSS reference system between current beacon receiver and proposed process using the S-240 dataset. The proposed method is needed to test the application effect with beacon receiver industries.

|  |  |
| --- | --- |
| <Current process in a beacon receiver > | <Proposed process with S-240 dataset> |

Figure 3. Comparison between current and proposed process

## Case of Voyage planning

Mariners is using the DGNSS reference information around own ship in creating voyage plan and passing sea route. If the S-240 dataset can be used with Maritime ENCs, status information and service coverage of DGNSS reference station can be checked visually. The DGNSS station information can support for mariner to create route plan and navigate safely. The S-240 dataset can be updated before departing a port.



Figure 4. Example of displaying DNGSS reference station on ENCs

# Conclusion

ROK conducted a research on application case of S-240 DGNSS station almanac, which is DGNSS RSIM, DGNSS beacon receiver and voyage planning. The team developed a setup window of detailed information based on S-240 dataset for RSIM system and the possibility of applying the case was reviewed. The case of DGNSS beacon receiver was also proposed. The application of S-240 dataset except the purpose of DGNSS Station Almanac needs to be tested with DGNSS industries in terms of efficiency, usability and safety.

# Action requested of the Committee

The Committee is requested to:

1. note this paper
2. review the application cases of S-240 dataset proposed by ROK

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