e-NAV10 Input

Agenda item 14.1

Task Number 29

Author(s) Leo Käärmann, Estonian Maritime Administration

Kaisu Heikonen, Finnish Transport Agency

# Review of the IALA NAVGUIDE 2010 Edition

# Chapter 4 / Position fixing / RTK via AIS

1. **Summary**

This paper provides some text that can be considered to be added to the IALA NAVGUIDE Chapter 4. The provided text shortly describes how corrections for Real Time Kinematic positioning could be transmitted over AIS system.

## Purpose of the document

The WG2 of the e-NAV committee might use the text when reviewing the sections of IALA NAVGUIDE Chapter 4 dealing with positioning fixing.

# Background

The WG1 of the e-NAV committee has identified those sections of IALA NAVGUIDE that should be reviewed by the various working groups of the e-NAV committee (e-NAV12-6, Updating Ch4 of the IALA NAVGUIDE). WG2 was tasked to lead the review on chapters 4.9 - 4.13.9 (position fixing). It was asked to consider rationalizing and adding information on

* ePelorus;
* the role of electronic celestial navigation;
* inertial navigation; and
* radar referenced positioning;
* ranging DGPS / AIS;
* RTK / AIS.

# Discussion

This paper provides text on RTK / AIS. The following text can be considered by WG2 to be added to the reviewed IALA NAVGUIDE:

"Some users (like hydrographers) need more accurate positioning information than can be achieved by using the traditional pseudorange augmentation provided by systems like WAAS/EGNOS or Beacon DGNSS. These users can benefit from the use of Real Time Kinematic (RTK) technique, which can deliver centimeter level accuracy from one known reference location to multiple mobile users. This technique provides corrections to the to the carrier phase measurements.

In survey applications the RTK correction information is usually distributed to users via VHF/UHF radio modems or via commercial broadband internet. However when used in hydrographical measurements further away from the shoreline these communication options might not be available all the time. The communication options in these areas would be via satellite or via AIS (the latter is also available only inside coastal VHF coverage usually less than 70km from shoreline).

RTK over AIS is in operational use for selected user groups in some countries and it has been reported to function without major problems and deliver well the required positioning accuracy level. The correction transmissions are done in broadcast mode the mobile unit being the one initiating the transmissions. When mobile user is requesting RTK corrections AIS base station will start to reserve time slots (by FATDMA) for transmissions. The reservation schema can be for example two 5 slot sequences every second in both AIS channels. This will result in approximately 20% loading of the VDL. Using lower message transmission frequency would not guarantee augmented RTK regime accurately and higher frequency on its turn would cause too much load for the VDL. The correction delay of about 1-1.5 seconds caused by the transmission over AIS datalink has been reported to be acceptable. When the mobile user doesn't need the corrections any more base station will stop reserving the time slots and release them for other use again.

The limitation of this technique is that only one mobile user can be served by one AIS base-station at a time."

# Action requested of the Committee

The Committee is requested to:

1. Consider adding the provided text to the reviewed IALA NAVGUIDE