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THE ROLE OF SATELLITE IN THE EMERGING MARITIME VHF DATA EXCHANGE SYSTEM

Abstract

The recent initiative of creating the future VHF Data Exchange System (VDES) within IALA (International Association of Lighthouse Authorities) provides an opportunity to design an integrated terrestrial and satellite communications system to exchange maritime information between ships, and between ship and shore. The proposed VDES relies on digital data links over a number of maritime VHF channels. Bundling two or more VHF channels, and using more modern modulation, coding and access schemes than those currently in use in maritime VHF communications would yield an increased information throughput and enhanced service availability.

This paper introduces the concept of a VDE satellite component as an integral part of the VDES. Satellite communications is an effective means to deliver information in a broadcast or multicast manner to a large number of ships, i.e. efficiently addressing many vessels using only minimal parts of the scarce maritime radio spectrum. This efficiency resides in the satellite's inherent capability of simultaneously addressing all ships within its footprint allowing the dissemination of a relatively large data volume to a sizable number of vessels when they are out of reach of the terrestrial VDE. Conversely, a satellite uplink VHF channel would allow data collection from a large number of vessels spread over a large maritime zone in a timely manner. Moreover, the frequencies which are currently under discussion for a satellite VDE channel - as part of the VDE - would allow the use of the existing VHF infrastructure on the ships and would require only minor modifications.

VDES can address some of the gaps which have been identified by the maritime community in the area of e-Navigation. The satellite component of VDES would support "Push-addressed", "push-multicast", or broadcast applications such as regionally-targeted map updates.

This paper addresses design directions and trade-offs in VDE satellite definitions, provides a mission concept serving relevant maritime applications and shows by system analyses how the requirements associated with the system use cases can be fulfilled.