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Author: Mr. Frank Zeppenfeldt
European Space Agency (ESA), The Netherlands, frank.zeppenfeldt@esa.int

Dr. Nader Alagha
ESA, The Netherlands, nader.alagha@esa.int
Mr. Juan Lizarraga Cubillos
ESA, The Netherlands, juan.lizarraga.cubillos@esa.int

INTEGRATED SATELLITE TERRESTRIAL VHF DATA EXCHANGE SYSTEM (VDES)

Abstract

During the World Radio Conference 2012 (WRC-12) the maritime community was invited in Resolution 360 to study methods for improving maritime radio communications in the VHF bands. Discussions in various fora (CEPT, ITU, International Association of Lighthouse Authorities, IHO, IMO) have led to the preliminary definition of the VHF Data Exchange System (VDES).

The satellite communications group of ESA has advocated that satellite communications shall be considered as an integrated component of the VDES. Satellite communications is an effective means to deliver information in a broadcast or multicast mode to a large number of ships, i.e. efficiently addressing many vessels using only minimal parts of the scarce maritime radio spectrum resource. The satellite can also provide a wide field of view to collect short messages from the ship in the high seas. Accordingly, ESA has taken the initiative to request additional maritime mobile satellite service frequency allocation.

The proposed VDES relies on digital data links over a number of maritime VHF channels. Bundling two or more VHF channels (25 kHz each), and using new modulation, coding and access schemes would yield an increased information throughput and enhanced service availability compared to the existing analogue communication links used in such VHF channels. A specific benefit of VDES is that 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 with minor modifications.

VDES will allow medium data rate (50-300 kbps) communications to implement various services which are contemplated under the IMO e-Navigation Maritime Service Portfolios. VDES might be considered as part of the ongoing GMDSS review.

The paper will provide an overview of the activities on VDES and related developments currently supported and planned by the European Space Agency.

Some important system trade-offs with regards to the interworking of terrestrial and satellite component will be addressed by ESA funded studies, and their intermediate conclusions will be reported upon in this paper. We will further describe an experimental VDES satellite capability which is funded by ESA, planned to be in orbit in 2016. ESA has also plans to support the design of cost-effective VHF satellite user terminals for maritime applications and two different profiles of Receive-only and Receive-Transmit terminals and to validate access schemes for VDE-SAT compatible with the upcoming VHF data exchange standard.