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AGENDA ITEM 1.9.2
PRELIMINARY VIEWS FOR WRC-19
(Item on the Agenda: 3.1 (SGT2A))
(Document submitted by the Coordinator)

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SGT2A – Radiolocation, Amateurs, Maritime & Aeronautical

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Agenda Item 1.9.2: *modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (Earth to space and space-to-Earth), preferably within the frequency bands 156.0125-157.4375 MHz and 160.6125-162.0375 MHz of Appendix 18, to enable a new VHF data exchange system (VDES) satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, applications specific messages (ASM) and AIS operations and not impose any additional constraints on existing services in these and adjacent frequency bands as stated in recognizing d) and e) of Resolution 360 (Rev.WRC-15);*

BACKGROUND

RESOLUTION 360 (REV. WRC-15) “*Consideration of regulatory provisions and spectrum allocations to the maritime mobile-satellite service to enable the satellite component of the VHF Data Exchange System and enhanced maritime radiocommunications*”, invites ITU-R to conduct, as a matter of urgency, and in time for WRC-19, sharing and compatibility studies between VDES satellite components and incumbent services in the same and adjacent frequency bands specified in *recognizing d) and e)* to determine potential regulatory actions, including spectrum allocations to the MMSS (Earth-to-space and space-to-Earth) for VDES applications. To this end, the ITU-R has initiated sharing studies between the proposed VDES satellite (VDE-SAT) frequencies and the incumbent services in the same and adjacent bands so that this component does not impose any additional constraints on existing services in these and adjacent frequency bands as stated in *recognizing d) and e)* of Resolution 360 (Rev. WRC-15). The satellite component of the VDES could be beneficial towards enhancing maritime navigation and safety related applications on a global basis.

Traditional maritime communication methods (i.e. voice) have been used for the transfer of the information required to improve the safety of navigation particularly in adverse conditions. More information (such as weather, ice charts, status of aids to navigation, water levels and rapid changes of port status) is required in real-time to improve operational decisions on land and on ship that will lead to safer and more efficient voyages. Shore authorities have also demonstrated interest in increasing the quantity of information retrieved from ships in real-time (such as voyage information, passenger manifest and pre-arrival reports) in a more efficient way to transmit and process this information as digital information.

As a result of these additional requirements on maritime communications, WRC-15 made regulatory changes to Appendix 18 to facilitate the use of the terrestrial component of VHF Data Exchange system (VDES). These channels may be used by maritime authorities across the world to respond to increased data transfer and improve maritime safety and efficiency in the growing maritime environment.

VDES is an extension of the very successful Automatic Identification System (AIS) used by the maritime community, while protecting the original function of AIS identification, position reporting and tracking. AIS, designed primarily as a collision avoidance system, and application specific messages (ASM) will continue to operate along with the new VDES channels. VDES is based on robust and efficient digital transmission rates through the aggregation of several 25 kHz channels for increased throughput capacity.

Once vessels have travelled outside the area of terrestrial coverage from shore stations, satellite networks could provide VDES capability to support and enhance safety and navigation. The satellite component of VDES is being further studied for WRC-19 to take into account existing services within and adjacent to the frequency band under consideration.

Under **5.225A**, the adjacent frequency band 154-156 MHz includes a primary allocation to the radiolocation service in some countries.

Preliminary studies within ITU-R Working party 5B (WP 5B) concluded that compatibility between the radiolocation service and the maritime mobile satellite service (Earth-to-space) is feasible without imposing any additional constraints on the radiolocation service. Application of the radiolocation service in the frequency band 154-156 MHz is limited to the space surveillance radars.

Studies in WP 5B during the preparation for WRC-15, proposed a pfd mask for the maritime mobile satellite service to protect the incumbent fixed and mobile services. These studies are being considered during the WRC-19 cycle.

Furthermore, WP5B is currently drafting a report on the technical characteristics and feasibility assessment of the VDES satellite component including two proposed alternative frequency plans.

Frequency plan alternative 1 allow for utilization of the channels 24, 84, 25, 85, 26 and 86 in a shared manner between VDE-TER and VDE-SAT.

- Four channels 1024, 1084, 1025 and 1085 are shared between ship-to-shore and ship-to-satellite (VDE-SAT uplink) services
- Two channels 1026 and 1086 are exclusively reserved for ship-to-satellite (VDE-SAT uplink) services
- Four channels 2024, 2084, 2025 and 2085 are shared among shore-to-ship, ship-to-ship and satellite-to-ship (VDE-SAT downlink) services
- Two channels 2026 and 2086 are exclusively reserved for satellite-to-ship (VDE-SAT downlink) services.
- Two channels 2027(ASM 1) and 2028 (ASM 2) are shared between ship-to-shore, ship-to-ship, shore-to-ship and ship-to-satellite services

Frequency plan alternative 2 allow for utilization of channels 24, 84, 25 and 85 primarily for VDE-TER, while channels 26 and 86 exclusively reserved for VDE-SAT uplink. VDE-SAT uplink is also possible in channels 24, 84, 25 and 85, but the VDE-SAT uplink in these channels do not impose constraints on VDE-TER. Frequencies are exclusively reserved for VDE-SAT downlink within the frequency range 160.9625 MHz to 161.4875 MHz, which is not channelized in RR Appendix **18**.

- Four channels 1024, 1084, 1025 and 1085 are reserved for ship-to-shore services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on ship-to-shore services.
- Four channels 2024, 2084, 2025 and 2085 are reserved for shore-to-ship and ship-to-ship services, but ship-to-satellite (VDE-SAT uplink) services are possible without imposing constraints on shore-to-ship and ship-to-ship services.
- Four channels 1026, 1086, 2026 and 2086 are exclusively reserved for ship-to-satellite (VDE-SAT uplink) services.
- Frequencies are exclusively reserved for satellite-to-ship (VDE-SAT downlink) services within the frequency range 160.9625 MHz to 161.4875 MHz, which is not channelized in RR Appendix **18**.
- Two channels 2027(ASM 1) and 2028 (ASM 2) are shared between ship-to-shore, ship-to-ship, shore-to-ship and ship-to-satellite services.

ISSUES

- What is the appropriate pfd mask to ensure compatibility with in-band fixed and mobile services?
- Are there any regulatory measures necessary to ensure no additional constraints are imposed on the incumbent services (fixed, mobile, radiolocation and radio astronomy) in adjacent frequency bands?

PRELIMINARY VIEWS

Canada

Noting that the proposed alternatives are being discussed, Canada believes that other alternative channel plans must also be explored. In order to establish a comprehensive VDES channel plan for all VDES components, Autonomous Maritime Radio Devices (AMRDs) operating within the same frequency band must also be taken into account.

These devices may use AIS technology; digital selective calling (DSC) technology; or transmit synthetic voice messages. Combinations of these technologies can be found in equipment already available on the market. AMRDs are being addressed under Agenda Item 1.9.1. In view of this, VDES channel plans should take into account frequencies for AMRDs.

USA

The United States supports the ITU-R studies prescribed in Resolution 360 (Rev. WRC-15) and these studies should also take into account the protection of existing terrestrial services which operate in these and adjacent frequency bands.
