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***Communications for all in East Africa***

**CHAPTER 2**

**AERONAUTICAL AND MARITIME ISSUES**

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| **Input Document to EACO WG Meeting** | **12/11/2020** |
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**Agenda Item 1.6**

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| ***Part A: Description*** |
| *to consider, in accordance with* ***Resolution 772 (WRC‑19),*** *regulatory provisions to facilitate radiocommunications for sub-orbital vehicles;****Resolution 772 (WRC‑19)****Consideration of regulatory provisions to facilitate the introduction of sub-orbital vehicles*  |
| ***Part B: Key Elements – the notables*** |
| Resolution **772** (**WRC-19**), in preparation for agenda item 1.6 (WRC-23), invites the ITU-R:1 to study spectrum needs for communications between stations on board sub-orbital vehicles and terrestrial/space stations providing functions such as, ***inter alia*, voice/data communications, navigation, surveillance and TT&C;**2 to study appropriate modification, if any, to the Radio Regulations, excluding any new allocations or changes to the existing allocations in Article **5**, to accommodate stations on board sub-orbital vehicles, whilst avoiding any impact on conventional space launch systems with the following objectives:– to determine the status of stations on sub-orbital vehicles, and study corresponding regulatory provisions to determine which existing radiocommunication services can be used by stations on sub-orbital vehicles, if necessary;– to determine the technical and regulatory conditions to allow some stations on board sub-orbital vehicles to operate under the aeronautical regulation and to be considered as earth stations or terrestrial stations even if a part of the flight occurs in space;– to facilitate radiocommunications that support aviation to safely integrate sub-orbital vehicles into the airspace and be interoperable with international civil aviation;– to define the relevant technical characteristics and protection criteria relevant for the studies to be undertaken in accordance with the bullet point below;– to conduct sharing and compatibility studies with incumbent services that are allocated on a primary basis in the same and adjacent frequency bands in order to avoid harmful interference to other radiocommunication services and to existing applications of the same service in which stations on board sub-orbital vehicles operate, having regard to the sub-orbital flight application scenarios.3 to identify, as a result of the studies above, whether there is a need for access to additional spectrum that should be addressed after WRC-23 by a future competent conference.In the 24th meeting of WP5B which was held in July ,2020, the **Working Document Preliminary Draft New Report ITU-R M.[SUB-ORBITAL STUDIES] Regulatory, operational, and technical studies of radiocommunications for suborbital vehicles** was introduced and is expected to be further discussed in the forthcoming meeting to be held in November,2020.This **new Report ITU-R M.[SURBORBITAL STUDIES]** report will be organized into five sections as outlining in Resolution **772 (WRC-19)** for agenda item 1.6 (WRC-23): The five sections there will be as itemized below: Section 1: IntroductionSection 2: Relevant ITU-R Recommendations and Reports.Section 3: To study spectrum needs for communications between stations on board sub‑orbital vehicles and terrestrial/space stations.Section 4: To study appropriate modification, if any, to the Radio Regulations, excluding any new allocations or changes to the existing allocations in Article **5,** to accommodate stations on-board sub-orbital vehicles.Section 5: Summary of studies. |
| ***Part C: Current Status of Band*** |
|  Sub-orbital vehicles are being developed which are intended to operate at higher altitudes than conventional aircraft, with a sub-orbital trajectory these sub-orbital vehicles are expected to perform various missions which include **conducting scientific research or providing transportation and then return to the Earth’s surface without completing a full orbital flight around the Earth**. The sub-orbital vehicles are also being developed to fly through the **lower levels of the atmosphere, where they are expected to operate in the same airspace as conventional aircraft**. The stations on board sub-orbital vehicles have a need for **voice/data communications, navigation, surveillance and telemetry, tracking and command (TT&C).** In this regard there is a need to ensure that equipment installed on such vehicles can communicate with air traffic management systems and relevant ground control facilities. |
| ***Part D: Conclusion of the results of studies, if any*** |
| Studies are ongoing |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EACO administration support the proposed invites under Resolution 772.  |
| ***Part G: Recommendations and Way Forward*** |
| *To support the ongoing studies* |

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**Agenda Item 1.7**

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| ***Part A: Description*** |
| *to consider a new aeronautical mobile-satellite (Route) service (AMS(R)S) allocation in accordance with* ***Resolution 428 (WRC‑19)*** *for both the Earth-to-space and space-to-Earth directions of aeronautical VHF communications in all or part of the frequency band 117.975-137 MHz, while preventing any undue constraints on existing VHF systems operating in the AM(R)S, the ARNS, and in adjacent frequency bands;****Resolution 428 (WRC‑19)****Studies on a possible new allocation to the aeronautical mobile satellite (R) service within the frequency band 117.975‑137 MHz in order to support aeronautical VHF communications in the Earth-to-space and space-to-Earth* |
| ***Part B: Key Elements – the notables*** |
| Resolution **428 (WRC-19)** under agenda item 1.7 (WRC-23) invites ITU-R to undertake studies on a possible new allocation to the aeronautical mobile satellite (R) service within the frequency band 117.975‑137 MHz in order to support aeronautical VHF communications in the Earth-to-space and space-to-Earth directions. **Space-based VHF communication** is a concept in which **aircraft operating in remote regions** and **oceanic areas** provide **communications from the aircraft to air traffic control (ATC) via satellite.** This concept, when implemented, is expected to be a **parallel** and **complementary system** to **satellite reception of automatic dependent surveillance broadcast (ADS-B) data from the on-board aircraft navigation and position fixing systems, including aircraft identification, four-dimensional position (latitude, longitude, altitude and time) and additional data as appropriate.** The ADS-B technique is termed “automatic” because there is no intervention from the pilot or interrogation from terrestrial stations, and “dependent” because the data is dependent upon on-board systems such as global positioning system (GPS) and altimeter.While direct ATC communication with aircraft operating in remote areas or oceanic regions is not possible, there are other limited communications available that are dependent on aircraft equipage. These systems range from HF communications to controller to pilot data link communications (CPDLC). However, these systems are not recognised in the context of direct controller to pilot communications (DCPC) that are required for ATC to provide reduced separation minima in remote airspace in a similar fashion as to what is provided in dense airspace in areas where terrestrial VHF communications infrastructure is predominant. Therefore, this leads to constraints in airspace capacity and efficiency in oceanic and remote areas, where no VHF terrestrial infrastructure is practical to provide DCPC communication operations with ATC. Considering the future integration of remotely piloted aircraft systems (RPAS) into the same airspace as manned aircraft, the space-based VHF communication concept would provide for a seamless integration of RPAS into such airspace with direct communications to ATC while operating in oceanic and remote regions. **In the 24th meeting of WP 5B which was held in July 2020 Documents 5B/78** from Singapore were introduced, this document proposed a **framework for a new ITU-R Report** with an introductory part and some information on the progress of the activities **in Singapore** on this topic. However, due to time limitation in this virtual meeting that did not permit consideration in detail on the framework for a new ITU-R Report it was agreed this documents would be carried forward to the next WP 5B meeting and ask Administrations to base their contribution on this topic on this document.To support the required **sharing and compatibility studies to be carried out within WP 5B,** the contributing Working Parties responsible for existing services to be protected, as identified by CPM23-1, have been requested to provide their relevant information, including **technical and operational characteristics and protection criteria for their respective services allocated in, or adjacent to, the frequency band 117.975-137 MHz.** **The draft liaison statement to the contributing groups 4C, 7B, 3M and 3L** was considered reviewed and agreed after some adjustments. **Working Party 3M and 3L** have been invited to provide guidance on the relevant propagation models that could be used for the studies. In particular, as ionospheric effects may be important at the frequency band 117.975-137 MHz, information is needed regarding their prediction and quantification in relation to a given link availability for all ranges of latitude and elevation.  |
| ***Part C: Current Status of Band*** |
| Current use of the VHF frequency band 117.975-137 MHz Section IV – Table of Frequency Allocations

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|  Allocation to Services |
| Region 1 | Region 2 | Region 3 |
| 117.975-137 AERONAUTICAL MOBILE (R) 5.111 5.200 5.201 5.202 |

5.111 The carrier frequencies 2 182 kHz, 3 023 kHz, 5 680 kHz, 8 364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article 31. The same applies to the frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz, but in each of these cases emissions must be confined in a band of  3 kHz about the frequency.     (WRC‑07)5.200 In the band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article 31 for distress and safety purposes with stations of the aeronautical mobile service.     (WRC‑07)5.201 *Additional allocation:*in Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Mali, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Romania, Senegal, Tajikistan, Turkmenistan and Ukraine, the frequency band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service.     (WRC‑19)5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Mali, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Senegal, Tajikistan, Turkmenistan and Ukraine, the frequency band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service.     (WRC‑19)Current Use of the adjacent frequency band 117.975-137 MHzRadiocommunication services operating in the 108-117.975 MHz and 138‑143.6 MHz frequency bands based on the RR Table of Allocations: – Aeronautical radio navigation service – Aeronautical mobile (OR) service – Aeronautical mobile (R) service – Broadcasting service – Fixed service – Land mobile service – Meteorological satellite service – Mobile satellite service – Mobile service – Maritime mobile service – Radio location service – Space operation service– Space research serviceSection IV – Table of Frequency Allocations

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| Allocation to Services |
| Region 1 | Region 2 | Region 3 |
| 108-117.975 MHz AERONAUTICAL RADIONAVIGATION 5.197 5.197A |
| 137.025-137.175 MHz SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.205 5.206 5.207 5.208 |
| 137.175-137.825 MHz SPACE OPERATION (space-to-Earth) 5.203C 5.209A METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209  SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.205 5.206 5.207 5.208 |
| 137.825-138 MHz SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.205 5.206 5.207 5.208 |
| 138-143.6 MHzAERONAUTICAL MOBILE (OR) | 138-143.6FIXEDMOBILERADIOLOCATIONSpace research (space-to-Earth) | 138-143.6FIXEDMOBILESpace research (space-to-Earth)5.207 5.213 |
| 5.210 5.211 5.212 5.214 |

5.197 *Additional allocation:* in the Syrian Arab Republic, the band 108-111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under No. **9.21**.    (WRC‑12)5.197A *Additional allocation:*  the band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev.WRC‑07)**[[1]](#footnote-1)\*. The use of the band 108-112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards.     (WRC-07)5.203C The use of the space operation service (space-to-Earth) with non-geostationary satellite short-duration mission systems in the frequency band 137-138 MHz is subject to Resolution **660 (WRC‑19)**.Resolution **32 (WRC‑19)** applies. These systems shall not cause harmful interference to, or claim protection from, the existing services to which the frequency band is allocated on a primary basis.     (WRC‑19)5.204 *Different category of service:*in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Singapore, Thailand and Yemen, the frequency band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. **5.33**).     (WRC-19)5.205 *Different category of service:*in Israel and Jordan, the allocation of the band 137‑138 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**).5.206 *Different category of service:*in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, the Russian Federation, Finland, France, Georgia, Greece, Kazakhstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Syrian Arab Republic, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the  allocation of the band 137-138 MHz to the aeronautical mobile (OR) service is on a primary basis (see No. 5.33).     (WRC‑2000)5.207 *Additional allocation:*in Australia, the band 137-144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.\* This provision was previously numbered as No. **5.347A**. It was renumbered to preserve the sequential order.the frequency band 138-144 MHz is allocated to the fixed and mobile services on a primary basis.    (WRC‑19)5.213 *Additional allocation:*in China, the band 138-144 MHz is also allocated to the radiolocation service on a primary basis.5.214 *Additional allocation:* in Eritrea, Ethiopia, **Kenya,** North Macedonia, Montenegro, Serbia, Somalia, Sudan, South Sudan and **Tanzania,** the frequency band 138-144 MHz is also allocated to the fixed service on a primary basis.    (WRC‑19) |
| ***Part D: Conclusion of the results of studies, if any*** |
| *The Studies are ongoing*Relevant ITU-R Reports/RecommendationsRecommendation [ITU-R SA.363](https://www.itu.int/rec/R-REC-SA.363/en)-5 – *Space operation systems*Recommendation [ITU-R SA.609](https://www.itu.int/rec/R-REC-SA.609/en) – *Protection criteria for radiocommunication links for manned and unmanned near-Earth research satellites*Recommendation [ITU-R SA.509](https://www.itu.int/rec/R-REC-SA.509-3-201312-I/en) – *Space research earth station and radio astronomy reference antenna radiation pattern for use in interference calculations, including coordination procedures, for frequencies less than 30 GHz*Recommendation [ITU-R SM.1541-6](http://www.itu.int/rec/R-REC-SM.1541/en) – *Unwanted emissions in the out-of-band domain*Recommendation [ITU-R SM.329-12](http://www.itu.int/rec/R-REC-SM.329/en) – *Unwanted emissions in the spurious domain*Recommendation [ITU-R F.699-8](http://www.itu.int/rec/R-REC-F.699/en) – *Reference radiation patterns for fixed wireless system antennas for use in coordination studies and interference assessment in the frequency range from 100 MHz to 86 GHz.*Recommendation [ITU-R M.1808](https://www.itu.int/rec/R-REC-M.1808-1-201911-I/en) ‒ *Technical and operational characteristics of conventional and trunked land mobile systems operating in the mobile service allocations below 869 MHz to be used in sharing studies*Report [ITU-R SA.2426](https://www.itu.int/pub/R-REP-SA.2426) – *Technical characteristics for telemetry, tracking and command in the space operation service below 1 GHz for non-GSO satellites with short duration missions* |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EAC Administrations do not oppose the new allocation of all or part of the frequency band 117.975-137 MHz to aeronautical mobile-satellite (R) service on the primary basis to develop aeronautical VHF communications systems for both Earth-to-space and space-to-Earth directions provided that conditions imposed on existing VHF systems operating in AM(R)S, ARNS and systems operating in adjacent frequency bands are acceptable.  |
| ***Part G: Recommendations and Way Forward*** |
| To continue making follow-up on the studies on a possible new allocation to the aeronautical mobile satellite (R) service within the frequency band 117.975‑137 MHz in order to support aeronautical VHF communications in the Earth-to-space and space-to-Earth directions. |

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**Agenda Item 1.8**

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| ***Part A: Description*** |
| *to consider, on the basis of ITU‑R studies in accordance with* ***Resolution 171 (WRC‑19),*** *appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution* ***155 (Rev.WRC‑19)*** *and No.****5.484B*** *to accommodate the use of fixed-satellite service (FSS) networks by control and non-payload communications of unmanned aircraft systems;***Resolution 171 (WRC‑19)**Review and possible revision of Resolution 155 (Rev.WRC‑19) and No. 5.484B in the frequency bands to which they apply |
| ***Part B: Key Elements – the notables*** |
| WRC-23 agenda item 1.8 calls for review and possible revision of Resolution **155 (Rev.WRC-19)** and No. **5.484B** in the frequency bands to which they apply. Work on the use of the FSS by Unmanned Aircraft Systems (UAS) has been ongoing since WRC-15 agenda item 1.5. In the 24th meeting of WP 5B which was held in July 2020 a formal Work Plan for the guidance of Working Party (WP) 5B in its work were prepared. This meeting **continued with the development of ITU-R M.[CNPC\_CHAR] and Finalization of ITU-R M.[UA\_PFD]. Iran and USA made a proposal on the review of Resolution 155 Resolution 155 (Rev.WRC-19)**The proposed Work Plan includes the same four elements contained in the previous “Guideline for the Implementation of Resolution **155 (WRC-15)**”, Document 5B/712, Annex 1, that WP 5B had been successfully using to guide its work in the last study cycle.Those four elements are:1) Consideration of the regulations regarding Earth Stations In Motion.2) UAS CNPC Earth Station Characteristics.3) Sharing Studies with other Systems.4) Procedural considerations for the implementation of Resolution **155 (Rev.WRC-19)**.The following sections identify the key items in each of these four elements and propose a Work Plan to assist WP 5B in meeting its responsibilities under Resolution **155 (Rev.WRC-19).**1. **Consideration of the regulations regarding Earth Stations In Motion**

Due to some overlapping regulatory principles for operation of UAS/CNPC and Aircraft ESIMs for spectrum compatible use in their respective bands, how to progress with Resolution **155** **(Rev.WRC-19)** should take into account the outcome of the WRC-19 decision on Aircraft ESIMs from the view point of:a) Protecting space servicesb) Protecting terrestrial services.For terrestrial service it is necessary to take into account the representative characteristics of fixed and mobile services for existing and future use of the band, noting that the PFD for the Fixed Service is being developed in ITU-R M.[UA-PFD] however there is a need to complete sharing studies with other services as . For space services, Resolution **169 (WRC-19)** includes provisions on commitments, treatment on cases of unacceptable interference, and operational use that should be reviewed for possible incorporation into Resolution **155 (Rev.WRC-19)**.1. **UAS CNPC Earth Station Characteristics**

The following steps are necessary for the implementation of Resolution **155 (Rev.WRC-19)** regarding development of UAS CNPC Earth station characteristics a) extracted from the BRIFIC and b) those provided as potential characteristics for information only at this stage. This work is being documented in the [Report/Recommendation], **Characteristics of unmanned aircraft system control and non-payload Earth stations for use with space stations operating in the Fixed Satellite Service,** [UAS CNPC\_CHAR], 5B/712, Annex 5.1. **Sharing Studies with other Systems**
2. **Procedural consideration for future implementation of Resolution 155 (Rev.WRC-19)**

With regard to the implementation of *resolves* 4 of Resolution **155 (Rev.WRC-19)** any required regulatory provisions need to be identified or developed for inclusion in Articles **9** and **11** of the Radio Regulations.In addition, country-based national frequency authorization approval and checking of station class compliance with pfd masks needs to be undertaken.In consideration of the safety-of-life aspects of agenda item 1.8, Resolution **155 (Rev.WRC-19)** and footnote No. **5.484B** require clarification to ensure that:1) UAS CNPC Links have the appropriate regulatory status.2) UAS CNPC Links operate as an application of the FSS, which is a primary service.3) The interference that the UA may receive from other services when it is operating as an application of the FSS is fully and clearly described.4) The limits on emissions from the UA, to ensure that other services experience no more interference than they would from any other application of the FSS, are fully and clearly described. |
| ***Part C: Current Status of Band*** |
| The operation of unmanned aircraft systems (UAS) requires reliable control and non- payload communication (CNPC) links, in particular to relay air traffic control communications and for the remote pilot to control the flight. Satellite networks may be used to provide CNPC links of UAS beyond the line-of- sight, as shown in the diagram below.The CNPC links between space stations and stations on board unmanned aircraft (UA) are proposed to be operated under the Resolution 155 in the primary fixed-satellite service (FSS) in frequency bands shared with other primary services, including terrestrial services, however that would not preclude the use of other available allocations to accommodate this application.UAS CNPC links relate to the safe operation of UAS and have to comply with certain technical, operational and regulatory requirements, UAS CNPC linksFigure 1Elements of UAS architecture using the FSS |
| ***Part D: Conclusion of the results of studies, if any*** |
| The following studies ITU-R M.[UAS CNPC\_SHAR] need to be addressed for implementation of Resolution **155 (Rev.WRC‑19)**.Sharing studies with space servicesSharing studies with the Fixed-Satellite ServiceGSO FSS networks* + - 1. **Non-GSO FSS systems**

Non-geostationary-satellite systems in the fixed-satellite service in the respective frequency bands are secondary (see and Article **22.2** footnote **5.484A**).Sharing studies with the other space servicesSharing studies with the Broadcasting-Satellite Service (space-to-Earth)Broadcasting-Satellite Service is allocated primary in 12.5-12.75 GHz in Region 3.Sharing studies with the Mobile-Satellite ServiceMobile-Satellite Service is allocated primary in 19.7-20.1 GHz and 29.5-29.9 GHz in Region 2 and in 20.1-20.2 GHz and 29.9-30 GHz for all regions.Sharing studies with terrestrial servicesSharing studies with the Fixed Service Fixed Service is allocated primary in 10.95-11.2 GHz and 11.45-11.7 GHz in all regions, in 11.7‑12.1 GHz in Region 2, 12.2-12.75 GHz in Region 3, 14-14.3 GHz in some countries, 14.3‑14.4 GHz in Regions 1 and 3, and in 14.4-14.47 GHz in all regions.This work is being documented in the Report, **Review of power flux-density limits in accordance with *resolves* 16 of Resolution 155 (WRC-15)**, [UA\_PFD], 5B/712, Annex 7.Sharing studies with the Mobile ServiceMobile Service is allocated primary in 10.95-11.2 GHz and 11.45-11.7 GHz in all regions, 12.2-12.75 GHz in Region 3, 14.3-14.4 GHz in Region 1 and 3, and in 14.4-14.47 GHz in all regions.  1.2.3 Sharing studies with the Radionavigation ServicesRadionavigation Service is allocated primary in 14.0-14.3 GHz band. |
| ***Part F: Proposed East Africa Common View and/or Position*** |
|  The EACO administrations supports the review and possible revision of Resolution 155 (Rev.WRC‑19) and No. 5.484B in the frequency bands to which they apply |
| ***Part G: Recommendations and Way Forward*** |
| To continue follow-up the on going sharing studies. |

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**Agenda Item 1.9**

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| ***Part A: Description*** |
| *to review Appendix****27*** *of the Radio Regulations and consider appropriate regulatory actions and updates based on ITU‑R studies, in order to accommodate digital technologies for commercial aviation safety-of-life applications in existing HF bands allocated to the aeronautical mobile (route) service and ensure coexistence of current HF systems alongside modernized HF systems, in accordance with* ***Resolution 429 (WRC‑19);)******Resolution 429 (WRC‑19)****Consideration of regulatory provisions for updating Appendix 27 of the Radio Regulations in support of aeronautical HF modernization* |
| ***Part B: Key Elements – the notables*** |
| Resolution **429 (WRC-19)** in its *resolves to invite the ITU Radiocommunication Sector*, invites the ITU-R to conduct, and complete in time for WRC-23: 1. to identify any necessary modifications to Appendix **27** for the aeronautical mobile (route) service between 2 850 and 22 000 kHz noting *recognizing* *c)*;
2. to identify any necessary transition arrangements for the introduction of new digital aeronautical wideband HF systems and any consequential changes to Appendix **27**;
3. to recommend how new digital aeronautical wideband HF systems can be introduced while ensuring compliance with safety requirements and *recognizing e)*;
4. to define the relevant technical characteristics and to conduct any necessary sharing and compatibility studies, taking account *noting e),* with incumbent services that are allocated on a primary basis in the same or adjacent frequency bands to avoid harmful interference in accordance with *recognizing e)*;

HF communication equipage is required by all commercial aircraft requesting oceanic clearance. Introduction of new wideband HF systems will provide benefits to aircraft operators including:• Improved voice quality • Ability to meet RCP 240 requirements• Avionics size, weight, and power reduction• Ease of use• Capacity and network improvements• User authenticationNew wideband HF systems will bring the listed benefits to the aviation industry in numerous areas but first and foremost would be Major Air Routes, Polar routes and remote land masses with poor VHF infrastructure. The network would be constructed to increase capacity and optimize use for high aircraft density, which may be accomplished with network densification and directionality of transmission and reception antennas. The new aircraft radio system will allow significant savings in size, weight, and required power to operate. Smaller, lighter, and more powerful processors and digital signal processing components will be used to replace the solid-state components used in legacy avionics. The aircraft radio and antenna tuning unit (ATU) will be consolidated into one unit and moved closer to the antenna in most aircraft to minimize feeder loses and reduce weight. These improvements directly translate into fuel savings by the airline.Modification of Appendix 27 of the Radio Regulations will allow spectrally efficient advanced waveforms, which were not previously considered for use in 3 kHz channel allotments for legacy HF voice and High Frequency Data Link (HFDL). This will allow digital voice for significantly reduced noise and improved clarity, as well as 100+ kbps data rates. Various modulation waveforms (up to 256 QAM) and channel bandwidths (up to 48 kHz) combine to support a wide range of data rates, based on available signal quality. Through use of the advanced modulations and greater bandwidths achieved through channel bonding, increased data throughput can be realized in order to achieve RCP-240 compliance. This will bring utility to HF not previously obtained via HFDL by enabling terrestrial based data system to be used for Controller-Pilot Data Link Communications (CPDLC) and Automatic Dependence Surveillance Contract (ADS-C) in oceanic or remote land areas.This increased throughput will also be the enabler that will allow for the transmission of digitized voice interleaved with data messaging. Previously, HF voice systems and HF data systems were separated because they were designed for use as one-or-the-other within a 3kHz channel allotment. A wideband HF system breaks down that barrier and enables both data and voice simultaneously. Greater bandwidth and data throughput will allow for more enhanced security. Introduction of new wideband HF systems will complement existing long-range aeronautical communications links such as L-Band SATCOM. HF and SATCOM have different environmental susceptibilities and failure modes (e.g., solar events, rain fade, jamming, satellite failures, ground station failures, etc.) thus, HF will provide a spectrally diverse, terrestrial based long-range communications path supporting high availability aeronautical systems through dissimilar redundancy and increase the useful bandwidth available for aircraft communications.**The Working Party 5B meeting, held in July 2020 managed to;*** Develop work plan for studies under agenda item 1.9
* Begin development of ITU-R Report [Aero-Wideband-HF-Studies] for sharing a compatibility studies, as well as regulatory considerations
* Develop liaison statement(s) to *contributing* groups within the ITU-R and ICAO, as appropriate.

WP 6A in **Document 5B/6** sent a liaison statement providing the references to ITU-R documents containing technical information concerning the protection of HF Broadcasting Service to assist WP 5B in its studies under WRC-23 agenda item 1.9.**Contributions 5B/32 & 5B/37** proposes a framework for a new ITU-R Report and a Work plan.  |
| ***Part C: Current Status of Band*** |
| Appendix 27 of the Radio Regulation details the Frequency allotment Plan for the aeronautical mobile (R) service and related information. |
| ***Part D: Conclusion of the results of studies, if any*** |
| *The studies are ongoing* |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EACO Administrations do not oppose modifications to RR Appendix 27 to introduce digital technologies for commercial AM(R)S safety-of-life applications in HF bands allocated to the aeronautical mobile (route) service provided that coexistence of current and modernized HF systems could be met. |
| ***Part G: Recommendations and Way Forward*** |
|  To Continue making follow up on the development of ITU-R Report [Aero-Wideband-HF-Studies] for sharing a compatibility studies, as well as regulatory considerations |

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| **Input Document to EACO WG Meeting** | **12/11/2020** |
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**Agenda Item 1.10**

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| ***Part A: Description*** |
| *to conduct studies on spectrum needs, coexistence with radiocommunication services and regulatory measures for* ***possible new allocations for the aeronautical mobile service for the use of non-safety aeronautical mobile application****s, in accordance with* ***Resolution 430 (WRC‑19);*****Resolution 430 (WRC‑19)**Studies on frequency-related matters, including possible additional allocations, for the possible introduction of new non-safety aeronautical mobile applications |
| ***Part B: Key Elements – the notables*** |
| Resolution **430 (WRC-19)** in its *resolves to invite the ITU Radiocommunication Sector*, invites the ITU-R to conduct, and complete in time for WRC-23: 1 studies on spectrum needs for new non-safety aeronautical mobile applications for air-air, ground-air and air-ground communications of aircraft systems2 sharing and compatibility studies in the frequency band 22-22.21 GHz, already allocated on a primary basis to the mobile, except aeronautical mobile, service, in order to evaluate the possible revision or deletion of the “except aeronautical mobile” restriction while ensuring the protection of primary services in the considered frequency bands and, as appropriate, in adjacent frequency bands;3 sharing and compatibility studies on possible new primary allocations to the aeronautical mobile service for non-safety aeronautical applications in the frequency band 15.4-15.7 GHz, while ensuring the protection of primary services in the considered frequency bands and, as appropriate, adjacent frequency bands;  |
| ***Part C: Current Status of Band*** |
| TABLE 1Relevant ITU-R documents containing system characteristics of incumbent services in the frequencyband 15.4-15.7 GHz and 22-22.21 GHz and adjacent frequency bands

| Frequency band (MHz) | Service | Relevant ITU-R documents |
| --- | --- | --- |
| 15.35-15.4 | EARTH EXPLORATION-SATELLITE (passive) |  Recommendation ITU-R RS.1813-1Recommendation ITU-R RS.1028Recommendation ITU-R RS.1029 |
| RADIO ASTRONOMY | Recommendation ITU-R RA.769-2Recommendation ITU-R S.1341-0Recommendation ITU-R SA.509-3Report ITU-R M.2170 |
| SPACE RESEARCH (passive) |  Recommendation ITU-R SA.509-3 Recommendation ITU-R SA.510-2 |
| 15.4-15.43 | RADIOLOCATION | Recommendation ITU-R M.1730-1Report ITU-R M.2170Report ITU-R M.2229Report ITU-R M.2230 |
| AERONAUTICAL RADIONAVIGATION | Recommendation ITU-R S.1340-0Recommendation ITU-R S.1341-0Report ITU-R M.2170Report ITU-R M.2229Report ITU-R M.2230 |
| 15.43-15.63 | FIXED-SATELLITE (Earth-to-space)  |  ITU-R S.1328-3Report ITU-R M.2170Report ITU-R M.2230 |
| RADIOLOCATION | Recommendation ITU-R M.1730-1Report ITU-R M.2229Report ITU-R M.2230 |
| AERONAUTICAL RADIONAVIGATION | Recommendation ITU-R S.1340-0Recommendation ITU-R S.1341-0Report ITU-R M.2229Report ITU-R M.2230 |
| 15.63-15.7 | RADIOLOCATION | Recommendation ITU-R M.1730-1Report ITU-R M.2230 |
| AERONAUTICAL RADIONAVIGATION | Recommendation ITU-R S.1340-0Recommendation ITU-R S.1341-0Report ITU-R M.2230 |
| 22-22.21  | FIXED |  |
| MOBILE except aeronautical mobile |  |
| 22.21-22.5 | EARTH EXPLORATION-SATELLITE (passive) | Recommendation ITU-R RS.1813-1Recommendation ITU-R RS.1028Recommendation ITU-R RS.1029 |
| FIXED |  |
| MOBILE except aeronautical mobile |  |
| RADIO ASTRONOMY | Recommendation ITU-R RA.769-2Recommendation ITU-R SA.509-3Recommendation ITU-R SM.1633 |
| SPACE RESEARCH (passive) | Recommendation ITU-R SA.509-3 |

 |
| ***Part D: Conclusion of the results of studies, if any*** |
| *The Studies are ongoing* |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EACO Administrations consider that, when possible new allocations to aeronautical mobile service in the frequency band 15.4 – 15.7 GHz as well as possible remove of constraints for the uetaise of the frequency band 22 – 22.21 GHz by aeronautical mobile service, it is necessary to:- provide protection of primary services in the band and adjacent frequency bands; - define unwanted emissions’ limits for station of aeronautical mobile service in the frequency bands 15.35-15.4 GHz and 22.21-22.5 GHz to protect EESS (passive) and radio astronomy service. |
| ***Part G: Recommendations and Way Forward*** |
|  To continue making follow-up on the ongoing studies. |

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**Agenda Item 1.11**

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| ***Part A: Description*** |
| *to consider possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e‑navigation, in accordance with* ***Resolution 361*** ***Resolution 361 (Rev.WRC‑19)****Consideration of possible regulatory actions to support the modernization of the Global Maritime Distress and Safety System and the implementation of e‑navigation* |
| ***Part B: Key Elements – the notables*** |
| In the GMDSS modernization under consideration by the International Maritime Organization (IMO), **MF and HF band radio communication systems will continue to be used.** However, it is difficult to select an appropriate frequency in consideration of communication distance, season, time, geographical location, etc. in MF/HF frequency bands, because no radio communication specialist has been on board since the introduction of GMDSS. **Therefore, it is required to introduce an automatic connection system (ACS) by automatically selecting a frequency.**GMDSS uses the **digital selective-calling (DSC) system,** which automatically transmits distress alert in each frequency band (2, 4, 6, 8, 12 and 16 MHz bands) in sequence. For the **introduction of ACS to the MF/HF frequency bands** in the marine mobile service, **it is appropriate to use the DSC system that has already been used.** Therefore, draft IMO performance standard stipulates that the MF/HF equipment should comprise a facility to establish a connection between stations of the maritime mobile service by simple means using DSC.Automatic connection system function on MF/HF**Automatic connection system (ACS)** enables to establish a communication link between ship station and ship/coast station by automatically selecting a frequency.**DSC equipment should be provided visual indication that automatic frequency switching by ACS function is enabled.** |
| ***Part C: Current Status of Band*** |
| The **technical characteristics of DSC** are described in **Recommendation ITU-R M.493-15,** the **operational procedures** are described in **Recommendation ITU-R M.541-10,** and **both Recommendations need to be revised for introduction of ACS using DSC.** Revision of Recommendation ITU-R M.493-15 is proposed.The working document towards a preliminary draft revision of Recommendation ITU-R M.493-15 for introduction of ACS, with the proposed modification to some sections in the recommendation has been proposed: |
| ***Part D: Conclusion of the results of studies, if any*** |
| The process of revising the recommendations to support the *modernization of the Global Maritime Distress and Safety System and the implementation of e‑navigation is ongoing* |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EACO Administrations *support the modernization of the Global Maritime Distress and Safety System and the implementation of e‑navigation.* |
| ***Part G: Recommendations and Way Forward*** |
|  To continue making follow-up on the ongoing ITU-R studies and information and requirements provided by IMO, to support GMDSS modernization;  |

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**Agenda Item 9.1 Topic(b)**

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| ***Part A: Description*** |
| 9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention;9.1 on the activities of the Radiocommunication Sector since WRC‑19:b) Review of the amateur service and the amateur-satellite service allocations in the frequency band 1 240‑1 300 MHz to determine if additional measures are required to ensure protection of the radionavigation-satellite (space-to-Earth) service operating in the same band in accordance with **Resolution 774 (WRC‑19);****Resolution 774 (WRC‑19)**Studies on technical and operational measures to be applied in the frequency band 1240-1300 MHz to ensure the protection of the radionavigation-satellite service (space-to-Earth) |
| ***Part B: Key Elements – the notables*** |
| RNSS systems using the frequency band 1 240-1 300 MHz are operational, or becoming operational, in various parts of the world, with the aim of supporting a wide range of new satellite positioning services, for example enhanced accuracy and position authentication.Some cases of harmful interference caused by emissions in the amateur service into RNSS (space-to-Earth) receivers have occurred, and resulted in investigations and in instructions to the operator of the interfering station to cease transmissions.The number of RNSS receivers in the frequency band 1 240-1 300 MHz is currently limited in certain regions, but will increase dramatically in the near future with the ubiquitous deployment of receivers used in mass-market applications.The amateur service in the frequency band 1 240-1 300 MHz is currently used for amateur voice, data and image transmission in several countries in Europe and around the globe, and may transmit a variety of emission types including wideband, continuous and/or high equivalent isotopically radiated power (e.i.r.p.) transmissions. |
| ***Part C: Current Status of Band*** |
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| Allocation to services |
| Region 1 | Region 2 | Region 3 |
| 1 240-1 300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A |

 |
| ***Part D: Conclusion of the results of studies, if any*** |
| *The Studies are ongoing* |
| ***Part F: Proposed East Africa Common View and/or Position*** |
| The EACO administrations support the protection of RNSS (space-to-Earth) receivers from the amateur and amateur-satellite services in the frequency band 1240-1300 MHz |
| ***Part G: Recommendations and Way Forward*** |
|  To continue making follow up on the following:-1. The possible technical and operational measures to ensure the protection of RNSS (space-to-Earth) receivers from the amateur and amateur-satellite services in the frequency band 1240-1300 MHz
2. The detailed review of the different systems and applications used in the amateur service and amateur-satellite service allocations in the frequency band 1240-1300 MHz
 |

Name: BLAISE NKANIRAONATEL BURUNDIParticipant on behalf of ONATEL'CEO Mr KABEBA Privat

1. [↑](#footnote-ref-1)