WRC-15 REPORT FOR AFC MEMBERSHIP

INTRODUCTION

Two personnel from ASRI attended the ITU-R World Radio Conference 2015 (WRC-15) from the 2-27 Nov 2015 as sector member delegates, representing the views of the AFC membership[1]. These were taken from the AFC position for WRC-15, focusing on six core agenda items of direct relevance to aviation operators in North America. Attending in direct support of aviation issues were also ICAO and IATA, with CAA representatives and aircraft manufacturers on several national delegations too. This report aims to cover all the major primary and some secondary aspects considered relevant for the AFC[2].

Executive Summary

WRC-15 was successful for aviation interests in winning allocations for new and supporting services, whilst also defending current spectrum allocations and regulatory protections. There were early wins for ADS-B over satellite (GFT), and also Wireless Avionic Intra-Communications (WAIC) (1.17). The HF adjacent band allocation for the amateurs (1.4) and AeroMACS interference levels for satellites (1.7) were both eventually resolved to aviation's advantage, though the process was not entirely smooth. Both mobile broadband (IMT[3]) spectrum allocations (1.1) and Unmanned Air Systems (UAS) over satellite (1.5) agenda items dragged out to the last possible moment (and beyond) due to hardline positions by some administrations. The large focus on IMT spectrum at WRC-15 did not materialize into any meaningful gains for IMT supporters, though a new agenda item for IMT above 6 GHz was approved for the next WRC.

Additional, several other allocations were approved that will indirectly benefit aviation:

- Automotive radar was approved in the 80 GHz band, which has been given enough flexibility in its implementation to be used for aircraft taxiing[4].
- Increased regulatory protection for C-band VSATs in Africa being used for Air Traffic Management (ATM) network backhaul.
- Increased protection for ELTs using the COSPAS-SARSAT system in 406.1 MHz.

Approved future agenda items for aviation at the next WRC were limited to the regulatory development of Global Aeronautical Distress and Safety Services (GADSS), and also planning the regulatory framework for space planes. Several other agenda items will need to be monitored for their potential effect on aviation spectrum and systems.

The next WRCs are expected in Feb 2019 (WRC-19), and then tentatively November 2023 (WRC-23)

AGENDA ITEM 1.1

IMT did fairly poorly after its big push for more mobile broadband spectrum below 6 GHz, with very few new IMT allocations being agreed to[5]. No significant IMT allocations were made that will impact

[1] Participating under the ASRI flag, independent of any national delegation. However, US, ICAO and IATA positions were taken into account.
[2] Some issues are not addressed here due to low relevance, or potential unknowns about their impact to aviation at this time.
[3] International Mobile Telecommunications, covering both 4G and Wifi.
[4] On an advisory basis only.
[5] Most allocations were minor in scope, or added more countries to existing footnotes.

aviation services directly. Aviation support systems (GPS, SATCOM, etc.) were relatively unaffected, though a few countries did confirm more extensive use of the lower VSAT band[6] (3.4-3.6 GHz) for IMT.

Discussion on 1.1

IMT in Agenda Item 1.1 was the biggest agenda item of the conference by far, with its own set of meetings (the Joint Task Group (JTG)) providing numerous reports and recommendations of different 'candidate bands' for new IMT allocations. Given the indecision at the end of the JTG meeting process, it was known that there was both strong support and opposition to new allocations across all bands being considered. As a result, the WRC-15 negotiations continued throughout the entire 4 weeks, not reaching a conclusion until the last Thursday.

Despite rumors that the ground based radar band bands would have serious support for IMT, both the 1.3-1.35 and 2.7-2.9 GHz bands were quickly declared as no change. Some parts of the L-band and C-band were allocated to IMT (either globally, or regionally), but it was minimal for what was expected. However, IMT did come close to an adjacent band allocation to the radio altimeters in the 4.4-4.5 GHz. Sustained opposition from ASRI, IATA and ICAO, along with several administrations eventually helped prevent any allocation that would affect aviation[7]. However, this band is likely to be revisited at a future WRC, and steps should be taken now to confirm radio altimeter performance, and the required protection.

The work following this agenda item created several new agenda items for IMT at WRC-19, including the 5150-5925 MHz band[8], and also converting numerous existing mobile allocations between 24.5-86 GHz to IMT[9]. Given IMT's poor results at WRC-15 for new spectrum in the 'sweat spot' below 6 GHz, political pressure to revisit this frequency range for WRC-23 is expected.

AGENDA ITEM 1.4

Although the amateurs did succeed in agreeing a new amateur allocation on a secondary basis, it was only for 15 kHz of spectrum, and with lower power limits than hoped for. The new allocation of 5351.5-5366.5 kHz will not create any co-site interference issues for aviation, as it is sufficiently separated from the Aeronautical HF spectrum above 5450 kHz.

Discussion on 1.4

The amateur community experienced higher than expected opposition to their proposal for a secondary allocation in the 5250-5450 kHz band. As the negotiations went through to week 3, the proposed allocation shrank from 100 kHz, down to only 15 kHz with transmit power restrictions. Though unfortunate for the amateurs, it did remove any possibility of co-site interference with aeronautical HF ground stations in the adjacent 5450-5480 kHz band. It should be noted that the amateurs already have 5 channels authorized for transmission in the 5250-5450 kHz band in the US by the FCC, and these are operated without any interference to US aeronautical HF stations.

[6] This is often used for ATM message backhaul given its extremely high reliability in all weather conditions.
[7] This effort alone consumed a large part of the aviation representatives' resources and political capital. Furthermore, it was unknown how much protection was actually needed given the low amount of information available on system performance.
[8] Includes the airborne weather radar band in 5350-5470 MHz, and also AeroMACS operating below 5150 MHz
[9] Specifically, the frequency bands: 24.25-27.5 GHz, 31.8-33.4 GHz, 37-40.5 GHz, 40.5-43.5 GHz, 45.5-47 GHz, 47-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz

AGENDA ITEM 1.5

Use of the standard Fixed Satellite Service (FSS) for the control of oceanic and remote UAS was approved, but with a very convoluted resolution that manages to contradict itself. The final text was a result of very chaotic negotiations that lasted the whole conference, including going beyond the official end of the negotiation periods. A major operating restriction was placed on satellite control of UAS, preventing use of the service until ICAO finishes its standardization work, and reports back at WRC-23.

Discussion on 1.5

Given that a final draft of the ITU-R report central to this agenda item could not be completed within the previous 3 years, it was inevitable that 1.5 would be problematic. Strong opinions from both sides led many people to believe that there would be no agreement at this conference. However, the last two weeks saw the formation of an 'experts group' of less than 10 people to try and find some common ground. The result was debated beyond the last possible point, but a resolution allowing UAS control over the FSS was agreed. The final text was clearly a group creation, with 20 different requirements that contradict each other[10], and a review of ICAO's progress at WRC-23 before the allocation can be formally used.

The follow-up work will now be done by ICAO to create suitable SARPs for satellite control of UAS, however several aviation representatives commentated that the contradictory text may make this very difficult for ICAO. This also does not address the use of a safety service in non-safety spectrum that has the potential to create problems for other aviation safety spectrum, and a large internal fallout in the aviation community [11].

AGENDA ITEM 1.7

The interference limit on AeroMACS were increased to a level that will not affected planned AeroMACS deployments.

Discussion on 1.7

Although it was a straight-forward agenda item with no major controversies, full agreement of 1.7 did not occur quickly due to connected issues. However, the final result is what aviation required to allow AeroMACS usage up to its maximum projected growth, without breaching the interference levels specified for the GlobalStar satellite constellation in the same frequency range.

AGENDA ITEM 1.17

WAIC's AM(R)S allocation in 4.2-4.4 GHz was agreed within a single meeting, and approved by the end of the first week. The resolution proposed in the CPM report was unchanged, except for minor editorial work.

Discussion on 1.17

The first working group of 1.17 agreed within moments that the text provided by the CPM report was suitable and approved by all. However, a question was raised at the higher-level meetings concerning the

[10] The new UAS messages are classified as safety traffic requiring additional protection on the FSS networks, yet other statements require it should be treated no differently from other, non-safety, traffic on the same networks.
[11] Questions being raised, such as 'Why cannot LTE systems be used for aircraft voice or terrestrial drone control'.

appropriateness of stating that Article 43.1 should not apply to at the allocation[12]. A proposal was considered to edit the Article to incorporate systems such as WAIC, rather than exclusions for allocations in this manner. However, this could have begun a significant body of work to update all of Article 43, and even others, without suitable preparation and research at the ITU-R Study Groups. In the end, the current exclusion was deemed suitable, and the allocation provided with the required protection for the radio altimeters in the same frequency band.

AGENDA ITEM GFT

ADS-B over satellite was approved under the GFT agenda item by the second week, including protections for existing navigation systems, and also recognizing IFF[13] systems in the same spectrum by certain administrations. A lot of press was generated by the decision, however several facts were inaccurate and misleading concerning the current safety of aviation.

Discussion on GFT

The buildup to the conference had led many to believe that GFT would result in a large fight over the incomplete studies, and what systems any new allocation would protect. However, the negotiations did progress at a reasonable pace, and the process finished in the second week.

An AMS(R)S primary allocation was approved only for ADS-B signals being received in space in the 1087.7-1092.3 MHz band, but secondary to existing radionavigation services operating in the same spectrum. Text about preventing modifications to airframes had been watered down after opposing claims that that the ITU had no authority on such an issue, and was therefore referenced to ICAO during its expected standardization process.

Recognizing that decisions were being made on incomplete and disputed studies, an attempt was made to make the allocation conditional on studies being completed satisfactorily in the next study cycle, and then ratified at WRC-19. However this was unsuccessful, and instead the final resolution fully approves the allocation, with a request that the studies be completed for WRC-19 (without any specific agenda or condition).

Following the agreement, several press releases were made by the supporting organizations, stating that aviation is currently not able to track aircraft over 70% of the globe without the ADS-B satellite system, and that the new system would have been able to track MH370. Neither of these statements are true, and the aviation community should be wary of repeating these statements.

FUTURE AGENDA ITEMS FOR WRC-19

The below agenda items will directly involve aviation, or have a strong secondary interest:

Summary

The Global Aeronautical Distress and Safety System (GADSS) will provide the main focus of the aeronautical representatives at the ITU-R in the next few years, funneling the output from ICAO into the

[12] ITU-R Radio Regulations, Article 43.1: Frequencies in any band allocated to the aeronautical mobile (R) service and the aeronautical mobile-satellite (R) service are reserved for communications relating to safety and regularity of flight between any aircraft and those aeronautical stations and aeronautical earth stations primarily concerned with flight along national or international civil air routes.

[13] ID Friend or Foe – Primarily a military system

ITU for development of the concept and future agenda items. Another primary task will be preventing new systems, such as positive train control, from interfering with existing aviation systems. The completion of the GFT studies will also require significant work in the first year, but should be completed well before the WRC-19 (unless they show that the system does not work). Given the relative lack of aviation specific agenda items, this study cycle may provide an opportunity to deal with more fundamental issues, such as updating longstanding aviation regulatory text.

GFT Studies

The completion of the ITU-R Reports for both the ADS-B over satellite system, and GFT, will be required before the WRC-19. Given the lack of agreement in the previous WRC study cycle, there is a small risk that the studies could show a negative result for the system. It is unsure how such an outcome would be handled by WRC-19.

Global Aeronautical Distress and Safety Service (GADSS) – Agenda Item 1.10

The GADSS agenda item is a very open ended agenda item for WRC-19 (and possibly beyond), as no-one has yet been able to fully define the system, or what spectrum will be required to support it. Therefore, several administrations prevented text that would allow the creation of a new allocation at WRC-19. Instead the agenda item focuses on developing the concept, with an unwritten expectation that a more specific agenda item at WRC-23 may also be required[14].

IMT in 5 150 - 5 925 MHz – Agenda Item 1.16

Postponed from the WRC-15 negotiations due to a stalemate in the JTG process for Agenda Item 1.1, the 5 GHz band for Wifi will continue in WP 5A. It will directly address the airborne weather radar band in 5350-5470 MHz, but also may need input on the AeroMACS system operating up to the 5150 MHz band edge in the adjacent band. A 2014 AFC survey found no US airlines operating radars in the 5350-5470 MHz band, though support may be required by other aviation users who still employ the systems elsewhere in the world.

Train Communications – Agenda Items 1.11 & 1.12

Although not directly addressing any aviation bands, the resolutions for new train communication systems in WRC-19 Agenda Items 1.11 and 1.12 do provide an open remit to consider any mobile spectrum (including aeronautical mobile) for new train communication systems. These will need to be monitored, as the 960-1215 MHz radionavigation band for DME and SSR often comes under consideration for new applications like these.

IMT above 6 GHz - Agenda Item 1.13

The consideration of the frequency bands 24.25-27.5 GHz, 31.8-33.4 GHz, 37-40.5 GHz, 40.5-43.5 GHz, 45.5-47 GHz, 47-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz for IMT will need to be assessed internally by aviation. Several bands have other allocations potentially used by aviation, or are adjacent to them[15].

Space planes - Agenda Item 9.1.4

[14] The maritime equivalent (GMDSS) already is planned through both WRC-19 and WRC-23.
[15] For example, the frequency band 31.8-33.4 GHz is currently allocated to radionavigation, and apparently has in the past been used by airborne radars.

Apparently initiated by the BR staff due some internal interest in the ITU-R, a new Director's Report agenda item was created to consider the required preparation work before a WRC-23 agenda item. This would include studies on how the technical and regulatory requirements of space planes would be recognized in the ITU-R framework, and if any allocations may be required for a new agenda item in WRC-23.

Wireless Power Transfer development - Agenda Item 9.1.6

Some preliminary work has been conducted by ITU-R Study Group 1 on Wireless Power Transfer (WPT), but most work has been conducted by external standards organizations. This new agenda item will need to be monitored to ensure it does not impact HF and VHF aviation allocations in adjacent spectrum. The new technology has a much broader bandwidth with more complex modulation mechanisms, potentially leaking large amounts of power outside the existing bands being proposed for WPT.

POST-CONFERENCE ASSESSMENT

Outcomes

Aviation's positive results are a good reflection of the importance the aviation industry still has at the ITU-R, though this is still not at the levels seen many years ago, and will continue to decline as newer services compete for attention with higher revenue sources. IMT will continue to be a major spectrum competitor in future years, as the worldwide harmonized spectrum that aviation uses is very attractive real-estate to many different industry sectors[16]. It is almost certain the 2.7-2.9 GHz band will be considered again at WRC-23 unless something significant changes before then. Therefore, aviation needs to continually assess and understand its spectrum usage to ensure any defence of it can be fully coordinated. The frequency bands adjacent to the radio altimeter are also likely to be reassessed soon.

The results were not without significant internal arguments within the aviation industry itself, especially UAS and GFT. These differences may still surface in the next WRC cycle as work still needs to be completed on both items. Although this is unlikely to change the existing decisions of WRC-15, it may absorb significant resources in the process of completing the work.

Meeting Process

The WRC-15 meeting itself was chaotic, primarily due to inexperienced or passive chairpersons, who could not move the individual meetings towards a decision. Therefore, the most problematic subjects were simply elevated to the main plenary meetings and the WRC-15 Chairman. Unfortunately, he also had no ITU-R chairmanship experience, and combined with some administrations taking very strong positions, the WRC struggled to make progress in the last week.

Aviation's overall representation was low-to-moderate, with active aviation representatives only in the larger and more well established delegations. This low participation was offset by ICAO and IATA representatives, who were active in providing opinions that undecided administrations could support[17]. A

[16] Especially as a lot of aviation spectrum is not shared with any other major user, ensuring minimal interference to safety systems.

[17] It was noticeable that many smaller states without strong positions were quick to support the messages and positions from ICAO, generating significant support on the debate floor.

key objective going forward to WRC-19 should be supporting the ICAO position development process, and establishing more links with aviation representatives in other administrations.

RECOMMENDATIONS FROM WRC-15

Investigate radio altimeter protection requirements

The existing ITU-R performance characteristics for radio altimeters does not have the necessary detail to enable a proper assessment of suitable protection requirements for adjacent band systems. These performance characteristics should be discussed internally by aviation within ICAO to confirm the parameters, and then decide on what should be sent to the ITU-R. Without the characteristics, aviation has no way to specify suitable protection in the future, and doing this now while not subject to an agenda item will be an easier process to manage.

Establish HF ground station protection in the ITU-R

The possibility of WPT interfering with HF communication is high, however no official performance or protection characteristics for the aero HF ground station receivers exists. The aviation industry will be unable to defend aero HF stations from interference without meaningful technical support, especially if asked for parameters that will allow for protection. These characteristics should be developed within ICAO and confirmed among worldwide ANSPs before submitting to the ITU-R.

Spectrum audit of potential IMT bands above 6 GHz

Although a low risk, some existing mobile allocations above 6 GHz may also have aviation systems in, or adjacent to, the frequency band. These will need to be reviewed against current aviation systems to confirm compatibility.

Assess AeroMACS adjacent band compatibility with IMT above 5150 MHz

The adjacent frequency band use of both 802.11 and LTE system above 5150 MHz may have an impact on the AeroMACS reference channel on 2145 MHz. AeroMACS system experts should be contacted to determine if this will cause issues, and therefore be prepared for involvement in the ITU-R group.

Supporting Annex:
List of agenda items for WRC-19 (directly copied from official ITU-R WRC-15 meeting report).

List of agenda items for WRC-19

Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.1 to consider an allocation of the frequency band 50-54 MHz to the amateur service in Region 1, in accordance with Resolution **658 [COM6/6] (WRC-15)**;			
Resolution **658 [COM6/6] (WRC-15)** Allocation of the frequency band 50-54 MHz to the amateur service in Region 1	**WP 5A**	*resolves to invite the 2019 World Radiocommunication Conference* to consider the results of the studies below and take appropriate actions, including spectrum allocation, *invites ITU-R* 1 to study spectrum needs in Region 1 for the amateur service in the frequency band 50-54 MHz; 2 taking into account the results of the above studies, to study sharing between the amateur service and the mobile, fixed, radiolocation and broadcasting services, in order to ensure protection of these services.	**WP 5B** **WP 5C** **WP 6A** (WP 3K) (WP 3M)
1.2 to consider in-band power limits for earth stations operating in the mobile-satellite service, meteorological-satellite service and Earth exploration-satellite service in the frequency bands 401-403 MHz and 399.9-400.05 MHz, in accordance with Resolution **765 [COM6/7] (WRC-15)**;			
Resolution **765 [COM6/7] (WRC-15)** Establishment of in-band power limits for earth stations operating in mobile-satellite service, the meteorological-satellite service and the Earth exploration-satellite service in the frequency bands 401-403 MHz and 399.9-400.05 MHz	**WP 7B**	*resolves to invite the 2019 World Radiocommunication Conference* to take into account the results of ITU-R studies, and consider the possibility of establishing in-band power limits for earth stations in the EESS and MetSat in the frequency bands 401-403 MHz and in the MSS frequency band 399.9-400.05 MHz, *invites ITU-R* to conduct and complete, in time for WRC-19, the necessary technical, operational and regulatory studies on the possibility of establishing in-band power limits for earth stations in the EESS and MetSat in the frequency band 401-403 MHz and the MSS in the frequency band 399.9-400.05 MHz,	**WP 4C** **WP 5A** **WP 7C** (WP 3M)

[18] A concerned ITU-R group may be either a contributing group on a specific item (indicated in bold), or an interested group (indicated between round brackets) that will follow the work on a specific issue and act as appropriate.

List of agenda items for WRC-19

Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.3 to consider possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a possible primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz, in accordance with Resolution **766 [COM6/8] (WRC-15);**			
Resolution **766 [COM6/8] (WRC-15);** Consideration of possible upgrading of the secondary allocation to the meteorological-satellite service (space-to-Earth) to primary status and a primary allocation to the Earth exploration-satellite service (space-to-Earth) in the frequency band 460-470 MHz	**WP 7B**	*resolves to invite the 2019 World Radiocommunication Conference* to consider, based on the results of ITU Radiocommunication Sector (ITU-R) studies, the possibility of upgrading the secondary MetSat (space-to-Earth) allocation to primary status and adding a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz, while providing protection and not imposing any additional constraints on existing primary services to which the frequency band is already allocated and in the adjacent frequency bands, *invites ITU-R* 1 to conduct and complete, in time for WRC-19, sharing and compatibility studies to determine the feasibility of upgrading the MetSat (space-to-Earth) allocation to primary status, and the addition of a primary EESS (space-to-Earth) allocation in the frequency band 460-470 MHz, while protecting the primary fixed and mobile services to which the frequency band is already allocated and maintaining the conditions contained in No. **5.289**; 2 to complete the studies, taking into account the present usage of the frequency band 460-470 MHz by incumbent services, to determine the appropriate pfd limit to be placed on MetSat (space-to-Earth) and EESS (space-to-Earth) to protect the existing primary services to which this frequency band is already allocated, provided that, if the studies conclude that a less restrictive pfd limit than that contained in *considering further a)* can protect incumbent services, then the pfd limit contained in *considering further a)* shall apply,	**WP 5A** **WP 5D** **WP 6A** (WP 3M)
1.4 to consider the results of studies in accordance with Resolution **557 [COM6/9] (WRC-15)**, and review, and revise if necessary, the limitations mentioned in Annex 7 to Appendix **30 (Rev.WRC-12)**, while ensuring the protection of, and without imposing additional constraints on, assignments in the Plan and the List and the future development of the broadcasting-satellite service within the Plan, and existing and planned fixed-satellite service networks;			
Resolution **557** [**COM6/9] (WRC-15)** Consideration of possible revision of Annex 7 to Appendix 30 of the Radio Regulations	**WP 4A**	*resolves to invite the 2019 World Radiocommunication Conference* to consider the results of the ITU-R studies and take necessary actions, as appropriate, *invites ITU-R* to conduct studies on, review, and identify possible revisions to, if necessary, the limitations mentioned in Annex 7 to Appendix **30 (Rev.WRC-12)**, while ensuring the protection of, and without imposing additional constraints on, assignments in the Plan and in the List and the future of BSS networks mentioned in *recognizing c)* and existing and planned FSS networks mentioned in *recognizing d)*.	(WP 3M)

List of agenda items for WRC-19

Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.5 to consider the use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service and take appropriate action, in accordance with Resolution **158 [COM6/17] (WRC-15)**;			
Resolution **158** [**COM6/17] (WRC-15)** Use of the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) by earth stations in motion communicating with geostationary space stations in the fixed-satellite service	**WP 4A**	*resolves to invite ITU-R* 1 to study the technical and operational characteristics and user requirements of different types of earth stations in motion that operate or plan to operate within geostationary FSS allocations in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz, including the use of spectrum to provide the envisioned services to various types of earth station in motion and the degree to which flexible access to spectrum can facilitate sharing with services identified in *recognizing further a)* to *n)*; 2 to study sharing and compatibility between earth stations in motion operating with geostationary FSS networks and current and planned stations of existing services allocated in the frequency bands 17.7-19.7 GHz and 27.5-29.5 GHz to ensure protection of, and not impose undue constraints on, services allocated in those frequency bands, and taking into account *recognizing further a)* to *n)*; 3 to develop, for different types of earth stations in motion and different portions of the frequency bands studied, technical conditions and regulatory provisions for their operation, taking into account the results of the studies above, *resolves* that these earth stations not be used or relied upon for safety-of-life applications, *resolves to further invite the 2019 World Radiocommunication Conference* to consider the results of the above studies and take necessary actions, as appropriate, provided that the results of the studies referred to in *resolves to invite ITU-R* are complete and agreed by ITU-R study groups.	**WP 4B** **WP 4C** **WP 5A** **WP 5C** **WP 7B** **WP 7C** (WP 3M) (WP 5D)

List of agenda items for WRC-19

Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.6 to consider the development of a regulatory framework for non-GSO FSS satellite systems that may operate in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space), in accordance with Resolution **159 [COM6/18] (WRC-15)**;			
Resolution **159** [**COM6/18] (WRC-15)** Studies of technical, operational issues and regulatory provisions for non-geostationary fixed-satellite services satellite systems in the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space)	**WP 4A**	*resolves to invite ITU-R* to conduct, and complete in time for WRC-19: 1 studies of technical and operational issues and regulatory provisions for the operation of non-GSO FSS satellite systems in the frequency bands 37.5-42.5 GHz (space-to-Earth) and 47.2-48.9 GHz (limited to feeder links only), 48.9-50.2 GHz and 50.4-51.4 GHz (all Earth-to-space), while ensuring protection of GSO satellite networks in the FSS, MSS and BSS, without limiting or unduly constraining the future development of GSO networks across those bands, and without modifying the provisions of Article **21**; 2 studies carried out under *resolves to invite ITU-R* 1 shall focus exclusively on the development of equivalent power flux-density limits produced at any point in the GSO by emissions from all the earth stations of a non-GSO system in the fixed-satellite service or into any geostationary FSS earth station, as appropriate; 3 studies and development of sharing conditions between non-GSO FSS systems operating in the frequency bands listed in *resolves to invite ITU-R* 1 above; 4 studies of possible necessary revisions to Resolution **750 (Rev.WRC-15)** to ensure protection of the EESS (passive) in the frequency bands 36-37 GHz and 50.2-50.4 GHz from non-GSO FSS transmission, taking into account *recognizing i)* above, including study of aggregate FSS interference effects from networks and systems operating or planned to operate in the frequency bands described in *resolves to invite ITU-R* 1 above; 5 studies towards ensuring protection of the radio astronomy frequency bands 42.5-43.5 GHz, 48.94-49.04 GHz and 51.4-54.25 GHz from non-GSO FSS transmissions, taking into account *recognizing i)* above, including study of aggregate FSS interference effects from networks and systems operating or planned to operate in the frequency bands described in *resolves to invite ITU-R* 1 above, *further resolves* to invite WRC-19 to consider the results of the above studies and take appropriate action,	**WP 5A** **WP 5B** **WP 5C** **WP 5D** **WP 6A** **WP 7B** **WP 7C** **WP 7D** (WP 3M) (WP 4B)

List of agenda items for WRC-19

Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.7 to study the spectrum needs for telemetry, tracking and command in the space operation service for non-GSO satellites with short duration missions, to assess the suitability of existing allocations to the space operation service and, if necessary, to consider new allocations, in accordance with Resolution **659 [COM6/19] (WRC-15)**;			
Resolution **659** [**COM6/19] (WRC-15)** Studies to accommodate requirements in the space operation service for non-geostationary satellites with short duration missions	**WP 7B**	*resolves to invite the 2019 World Radiocommunication Conference* to consider the results of ITU-R studies and take necessary action, as appropriate, provided that the results of the studies referred to in *invites ITU-R* below are complete and agreed by ITU-R study groups, *invites ITU-R* 1 to study the spectrum requirements for telemetry, tracking and command in the space operation service for the growing number of non-GSO satellites with short duration missions, taking into account No. **1.23**; 2 to assess the suitability of existing allocations to the space operation service in the frequency range below 1 GHz, taking into account *recognizing a)* and current use; 3 if studies of the current allocations to the space operations service indicate that requirements cannot be met under *invites ITU-R* 1 and 2, to conduct sharing and compatibility studies, and study mitigation techniques to protect the incumbent services, both in-band as well as in adjacent bands, in order to consider possible new allocations or an upgrade of the existing allocations to the space operation service within the frequency ranges 150.05-174 MHz and 400.15-420 MHz, *invites Member States and ITU-R Sector Members, Associates and Academia* to participate in studies by submitting contributions to ITU-R.	**WP 4A** **WP 4C** **WP 5A** **WP 5B** **WP 5C** **WP 6A** **WP 7C** **WP 7D** (WP 1A) (WP 3M) (WP 4B)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.8 to consider possible regulatory actions to support Global Maritime Distress Safety Systems (GMDSS) modernization and to support the introduction of additional satellite systems into the GMDSS, in accordance with Resolution **359** (**Rev.WRC-15**);			
Resolution **359** (**Rev.WRC-15**) Consideration of regulatory provisions for updating and modernization of the Global Maritime Distress and Safety System	**WP 5B**	*resolves to invite ITU-R* 1 to conduct studies, taking into consideration the activities of IMO, as well as information and requirements provided by IMO, in order to determine the regulatory provisions to support GMDSS modernization; 2 to conduct studies, taking into consideration the activities of IMO and the recognition of additional satellite systems for use in the GMDSS, including consideration of the mobile-satellite service (MSS) allocations used and the potential impact of possible modifications to the provisions of the Radio Regulations on sharing and compatibility with other services and systems in the frequency band and adjacent frequency bands, *invites the 2019 World Radiocommunication Conference* 1 to consider the result of ITU Radiocommunication Sector (ITU-R) studies and take necessary actions, as appropriate, to support GMDSS modernization; 2 to consider regulatory provisions, if appropriate, based on the ITU-R studies, and taking into consideration the activities of IMO, related to the introduction of additional satellite systems into the GMDSS, including consideration of the MSS allocations used, while ensuring the protection of all incumbent services, including those in adjacent frequency bands, from harmful interference, as stated in *recognizing e)*,	**WP 4C** (in charge of developing studies and draft CPM text on resolves 2 and sending that to WP 5B) **WP 7D** (WP 1A) (WP 3M) (WP 5A)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.9 to consider, based on the results of ITU-R studies:			
1.9.1 regulatory actions within the frequency band 156-162.05 MHz for autonomous maritime radio devices to protect the GMDSS and automatic identifications system (AIS), in accordance with Resolution **362 [COM6/10] (WRC-15)**;			
Resolution **362** [**COM6/10] (WRC-15)** Autonomous maritime radio devices operating in the frequency band 156-162.05 MHz	**WP 5B**	*resolves to invite the 2019 World Radiocommunication Conference* to consider the results of ITU-R studies and take appropriate actions, *invites ITU-R* 1 to conduct the necessary studies in time for WRC-19 to determine the spectrum needs and technical and operational characteristics of autonomous maritime radio devices operating in the frequency band 156-162.05 MHz; 2 to conduct the necessary studies to categorize the various autonomous maritime radio devices; 3 to conduct sharing and compatibility studies, based on the results of *invites ITU-R* 1 and 2, to ensure that no undue constraints are placed on the GMDSS and AIS; 4 to conduct studies, taking into account the results of *invites ITU-R* 1 to 3, and existing maritime technology, to determine potential regulatory actions and appropriate frequencies for autonomous maritime radio devices within the frequency band 156-162.05 MHz,	**WP 4C** **WP 5A** **WP 5C** (WP 1B) (WP 3M)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
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**);			
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 radiocommunication	**WP 5B**	*resolves to invite the 2019 World Radiocommunication Conference* to consider, based on the results of ITU-R studies, modifications of the Radio Regulations, including new spectrum allocations to the maritime mobile-satellite service (MMSS) (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 VDES satellite component, while ensuring that this component will not degrade the current terrestrial VDES components, 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)*, *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,	**WP 4C** **WP 5A** **WP 5C** (WP 1A) (WP 3M)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.10 to consider spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System (GADSS), in accordance with Resolution **426 [COM6/11] (WRC-15)**;			
Resolution **426** [**COM6/11] (WRC-15)** Studies on spectrum needs and regulatory provisions for the introduction and use of the Global Aeronautical Distress and Safety System	**WP 5B**	*resolves to invite the 2019 World Radiocommunication Conference* 1 to take appropriate actions, taking into account the results of ITU-R studies; 2 to analyse the necessity for further studies, and consider whether this matter should be brought to the attention of a future competent conference, *invites ITU-R* 1 to conduct the relevant studies, taking into account information and requirements provided by ICAO for both the terrestrial and satellite components, including: *a)* quantification and characterization of radiocommunication requirements related to GADSS, such as: – data traffic requirements for different system components of GADSS (such as the aircraft tracking, autonomous distress and flight data recovery systems) and their terrestrial and satellite components at each phase of the operation; – information on the radiocommunication requirement related to safety-of-life applications; – performance criteria for terrestrial and satellite systems; *b)* analysis of the existing allocations to the relevant aeronautical services and determining whether any additional spectrum is required; *c)* studies on sharing and/or compatibility with the existing services; 2 to undertake studies of the existing regulatory provisions to determine whether it might be necessary to apply additional regulatory measures,	**WP 4A** **WP 4B** **WP 4C** **WP 5A** **WP 5C** **WP 5D** **WP 6A** **WP 7C** **WP 7B** **WP 7D** (WP 3M)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.11 to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands to support railway radiocommunication systems between train and trackside within existing mobile service allocations, in accordance with Resolution **236 [COM6/12] (WRC-15)**;			
Resolution **236** [**COM6/12] (WRC-15)** Railway radiocommunication systems between train and trackside	**WP 5A**	*resolves to invite the 2019 World Radiocommunication Conference* based on the results of ITU-R studies, to take necessary actions, as appropriate, to facilitate global or regional harmonized frequency bands, to the extent possible, for the implementation of railway radiocommunication systems between train and trackside, within existing mobile-service allocations, *invites ITU-R* to study the spectrum needs, technical and operational characteristics and implementation of railway radiocommunication systems between train and trackside,	**WP 4A** **WP 4B** **WP 4C** **WP 5B** **WP 5C** **WP 5D** **WP 7C** **WP 7B** **WP 7D** (WP 3K) (WP 6A)
1.12 to consider possible global or regional harmonized frequency bands, to the maximum extent possible, for the implementation of evolving Intelligent Transport Systems (ITS) under existing mobile-service allocations, in accordance with Resolution **237 [COM6/13] (WRC-15)**;			
Resolution **237** [**COM6/13] (WRC-15)** Intelligent Transport Systems applications	**WP 5A**	*resolves to invite the 2019 World Radiocommunication Conference* taking into account the results of ITU Radiocommunication Sector (ITU-R) studies, to consider possible global or regional harmonized frequency bands for the implementation of evolving ITS under existing mobile-service allocations, *invites ITU-R* to carry out studies on technical and operational aspects of evolving ITS implementation using existing mobile-service allocations,	**WP 4A** **WP 4B** **WP 4C** **WP 5B** **WP 5C** **WP 5D** **WP 7C** **WP 7B** **WP 7D** (WP 3K) (WP 6A)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.13 to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution **238 [COM6/20] (WRC-15)**;			
Resolution **238** [**COM6/20] (WRC-15)** Studies on frequency-related matters for International Mobile Telecommunications identification including possible additional allocations to the mobile services on a primary basis in portion(s) of the frequency range between 24.25 and 86 GHz for the future development of International Mobile Telecommunications for 2020 and beyond	**TG 5/1***	*resolves to invite ITU-R* 1 to conduct and complete in time for WRC-19 the appropriate studies to determine the spectrum needs for the terrestrial component of IMT in the frequency range between 24.25 GHz and 86 GHz, taking into account: – technical and operational characteristics of terrestrial IMT systems that would operate in this frequency range, including the evolution of IMT through advances in technology and spectrally efficient techniques; – the deployment scenarios envisaged for IMT-2020 systems and the related requirements of high data traffic such as in dense urban areas and/or in peak times; – the needs of developing countries; – the time-frame in which spectrum would be needed; 2 to conduct and complete in time for WRC-19 the appropriate sharing and compatibility studies[1], taking into account the protection of services to which the band is allocated on a primary basis, for the frequency bands: – 24.25-27.5 GHz[2], 37-40.5 GHz, 42.5-43.5 GHz, 45.5-47 GHz, 47.2-50.2 GHz, 50.4-52.6 GHz, 66-76 GHz and 81-86 GHz, which have allocations to the mobile service on a primary basis; and – 31.8-33.4 GHz, 40.5-42.5 GHz and 47-47.2 GHz, which may require additional allocations to the mobile service on a primary basis, *further resolves* 1 to invite CPM19-1 to define the date by which technical and operational characteristics needed for sharing and compatibility studies are to be available, to ensure that studies referred to in *resolves to invite ITU-R* can be completed in time for consideration at WRC-19; 2 to invite WRC-19 to consider, based on the results of the above studies, additional spectrum allocations to the mobile service on a primary basis and to consider identification of frequency bands for the terrestrial component of IMT; the bands to be considered being limited to part or all of the bands listed in *resolves to invite ITU-R* 2, _____ [1] Including studies with respect to services in adjacent bands, as appropriate. [2] When conducting studies in the band 24.5-27.5 GHz, to take into account the need to ensure the protection of existing earth stations and the deployment of future receiving earth stations under the EESS (space-to-Earth) and SRS (space-to-Earth) allocation in the frequency band 25.5-27 GHz.	Note: the groups below are involved groups contributing to this issue. **WP 3J** **WP3K** **WP 3M** **WP 4A** **WP 4B** **WP 4C** **WP 5A** **WP 5B** **WP 5C** **WP 5D** **WP 6A** **WP 7B** **WP 7C** **WP 7D**

* See the CPM19-1 Decision in Annex 9 to this Administrative Circular.

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.14 to consider, on the basis of ITU-R studies in accordance with Resolution **160 [COM6/21] (WRC-15)**, appropriate regulatory actions for high-altitude platform stations (HAPS), within existing fixed-service allocations;			
Resolution **160** [**COM6/21] (WRC-15)** Facilitating access to broadband applications delivered by high-altitude platform stations	**WP 5C**	*resolves to invite ITU-R* 1 to study additional spectrum needs for gateway and fixed terminal links for HAPS to provide broadband connectivity in the fixed service taking into account: – the existing identifications and deployments of HAPS systems; – the deployment scenarios envisioned for HAPS broadband systems and related requirements such as in remote areas; – the technical and operational characteristics of HAPS systems, including the evolution of HAPS through advances in technology and spectrally-efficient techniques, and their deployment; 2 to study the suitability of using the existing identifications in *recognizing c)*, on a global or regional level, taking into account the regulatory provisions, such as geographical and technical restrictions associated with existing HAPS identifications based on the study performed in *resolves to invite ITU-R* 1; 3 to study appropriate modifications to the existing footnotes and associated resolutions in the identifications in *recognizing c)* in order to facilitate the use of HAPS links on a global or regional level, limited to the currently identified frequency bands and, where the use of an identification is not technically feasible for HAPS use, the possible removal of the unsuitable identification; 4 to study, in order to meet any spectrum needs which could not be satisfied under *resolves to invite ITU-R* 1 and 2, for the use of gateway and fixed terminal links for HAPS, the following frequency bands already allocated to the fixed service on a primary basis, not subject to Appendices **30**, **30A**, and **30B** in any region: – on a global level: 38-39.5 GHz, and – on a regional level: in Region 2, 21.4-22 GHz and 24.25-27.5 GHz, *further resolves* 1 that the studies referred to in *resolves to invite ITU-R* 3 and 4 include sharing and compatibility studies to ensure protection of existing services allocated in the frequency ranges identified and, as appropriate, adjacent band studies, taking into account studies already performed in ITU-R; 2 that modifications studied under *resolves to invite ITU-R* 3 shall not consider the use of HAPS links in the frequency bands subject to Appendix **30B**; 3 to develop ITU-R Recommendations and Reports, as appropriate, on the basis of the studies called for in *resolves to invite ITU-R* 1, 2, 3, and 4 above, … *resolves to invite the 2019 World Radiocommunication Conference* to consider the results of the above studies and take necessary regulatory actions, as appropriate, provided that the results referred to in *resolves to invite ITU-R* are complete and agreed by ITU-R study groups.	**WP 4A** **WP 4C** **WP 5A** **WP 5D** **WP 7B** **WP 7C** (WP 3M) (WP 7D)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.15 to consider identification of frequency bands for use by administrations for the land-mobile and fixed services applications operating in the frequency range 275-450 GHz, in accordance with Resolution **767 [COM6/14] (WRC-15)**;			
Resolution **767 [COM6/14] (WRC-15)** Studies towards an identification for use by administrations for land-mobile and fixed services applications operating in the frequency range 275-450 GHz	**WP 1A**	*resolves to invite the 2019 World Radiocommunication Conference* taking into account the results of ITU-R studies on sharing and compatibility between passive and active services as well as spectrum needs for those services, to consider identification for use by administrations for the land-mobile and fixed service applications operating in the frequency range 275-450 GHz, while maintaining protection of the passive services identified in No. **5.565**, and take appropriate action, *invites ITU-R* 1 to identify technical and operational characteristics of systems in the land-mobile and fixed services operating at frequencies above 275 GHz; 2 to study spectrum needs of systems in the land-mobile and fixed services, taking into account the results of the above studies; 3 to develop propagation models within the frequency range 275-450 GHz so as to enable sharing and compatibility studies between the land-mobile, fixed and passive services in this frequency range; 4 to conduct sharing and compatibility studies between the land-mobile, fixed and passive services operating in the frequency range 275-450 GHz, while maintaining protection of the passive services identified in No. **5.565**; 5 to identify candidate frequency bands for use by systems in the land-mobile and fixed services, taking into account the results of the studies under *invites ITU-R* 1, 2 and 4, and the protection of passive services identified in No. **5.565**,	**WP 3J** **WP 3K** **WP 3M** **(see Note 1)** **WP 5A** **WP 5C** **(see Note 2)** **WP 7C** **WP 7D** **(see Note 3)** (WP 4A) (WP 5D) (WP 6A)
Note 1: WP 3J, WP 3K and WP 3M will undertake studies with respect to the *invite ITU-R 3* and submit the initial results to WP 1A by November 2016 and final results of the studies before June 2017. Note 2: WP 5A and WP 5C will undertake studies with respect to the *invite ITU-R 1* and *2* for applications in the land-mobile and fixed services and submit the initial results to WP 1A by November 2016 and final results of the studies before June 2017. Note 3: WP 7C and WP 7D will developed technical and operational characteristics of passive systems and submit the initial information with this regards to WP1A by November 2016 and final information before June 2017.			

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
1.16 to consider issues related to wireless access systems, including radio local area networks (WAS/RLAN), in the frequency bands between 5 150 MHz and 5 925 MHz, and take the appropriate regulatory actions, including additional spectrum allocations to the mobile service, in accordance with Resolution **239 [COM6/22] (WRC-15)**;			
Resolution **239** [**COM6/22] (WRC-15)** Studies concerning Wireless Access Systems including radio local area networks in the frequency bands between 5 150 MHz and 5 925 MHz	**WP 5A**	*resolves to invite the 2019 World Radiocommunication Conference* to consider the results of the ITU-R studies and take appropriate actions, *invites ITU-R* to conduct and complete the following in time for WRC-19: *a)* to study WAS/RLAN technical characteristics and operational requirements in the 5 GHz frequency range; *b)* to conduct studies with a view to identify potential WAS/RLAN mitigation techniques to facilitate sharing with incumbent systems in the frequency bands 5 150-5 350 MHz, 5 350-5 470 MHz, 5 725-5 850 MHz and 5 850-5 925 MHz, while ensuring the protection of incumbent services including their current and planned use; *c)* to perform sharing and compatibility studies between WAS/RLAN applications and incumbent services in the frequency band 5 150-5 350 MHz with the possibility of enabling outdoor WAS/RLAN operations including possible associated conditions; *d)* to conduct further sharing and compatibility studies between WAS/RLAN applications and incumbent services addressing: i) whether any additional mitigation techniques in the frequency band 5 350-5 470 MHz beyond those analysed in the studies referred to in *recognizing a)* would provide coexistence between WAS/RLAN systems and EESS (active) and SRS (active) systems; ii) whether any mitigation techniques in the frequency band 5 350-5 470 MHz would provide compatibility between WAS/RLAN systems and radio determination systems; iii) whether the results of studies under points i) and ii) would enable an allocation of the frequency band 5 350-5 470 MHz to the mobile service with a view to accommodating WAS/RLAN use; *e)* to also conduct detailed sharing and compatibility studies, including mitigation techniques, between WAS/RLAN and incumbent services in the frequency band 5 725- 5 850 MHz with a view to enabling a mobile service allocation to accommodate WAS/RLAN use; *f)* to also conduct detailed sharing and compatibility studies, including mitigation techniques, between WAS/RLAN and incumbent services in the frequency band 5 850-5 925 MHz with a view to accommodating WAS/RLAN use under the existing primary mobile service allocation while not imposing any additional constraints on the existing services,	**WP 4A** **WP 4C** **WP 5B** **WP 5C** **WP 7C** (WP 1B) (WP 3J) (WP 3K) (WP 3M) (WP 5D)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution **28 (Rev.WRC-15)**, and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in Annex 1 to Resolution **27 (Rev.WRC-12)**;			
Resolution **28 (Rev.WRC-15)** Revision of references to the text of ITU-R Recommendations incorporated by reference in the Radio Regulations	**CPM19-2**	*instructs the Director of the Radiocommunication Bureau* to provide the CPM immediately preceding each WRC with a list, for inclusion in the CPM Report, of those ITU-R Recommendations containing texts incorporated by reference that have been revised or approved since the previous WRC, or that may be revised in time for the following WRC,	–
Resolution **27 (Rev.WRC-12)** Use of incorporation by reference in the Radio Regulations	**CPM19-2**	*resolves* 1 that for the purposes of the Radio Regulations, the term "incorporation by reference" shall only apply to those references intended to be mandatory; 2 that when considering the introduction of new cases of incorporation by reference, such incorporation shall be kept to a minimum and made by applying the following criteria: – only texts which are relevant to a specific WRC agenda item may be considered; – the correct method of reference shall be determined on the basis of the principles set out in Annex 1 to this Resolution; – the guidance contained in Annex 2 to this Resolution shall be applied in order to ensure that the correct method of reference for the intended purpose is employed; 3 that the procedure described in Annex 3 to this Resolution shall be applied for approving the incorporation by reference of ITU-R Recommendations or parts thereof; 4 that existing references to ITU-R Recommendations shall be reviewed to clarify whether the reference is mandatory or non-mandatory in accordance with Annex 2 to this Resolution; 5 that ITU-R Recommendations, or parts thereof, incorporated by reference at the conclusion of each WRC, and a cross-reference list of the regulatory provisions, including footnotes and Resolutions, incorporating such ITU-R Recommendations by reference, shall be collated and published in a volume of the Radio Regulations (see Annex 3 to this Resolution),	–

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
4 in accordance with Resolution **95 (Rev.WRC-07)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;			
Resolution **95 (Rev.WRC-07)** General review of the Resolutions and Recommendations of world administrative radio conferences and world radiocommunication conferences	**CPM19-2**	*instructs the Director of the Radiocommunication Bureau* 1 to conduct a general review of the Resolutions and Recommendations of previous conferences and, after consultation with the Radiocommunication Advisory Group and the Chairmen and Vice-Chairmen of the Radiocommunication Study Groups, submit a report to the second session of the Conference Preparatory Meeting (CPM) in respect of *resolves* 1 and *resolves* 2, including an indication of any associated agenda items; 2 to include in the above report, with the cooperation of the chairmen of the Radiocommunication Study Groups, the progress reports of ITU-R studies on the issues which have been requested by the Resolutions and Recommendations of previous conferences, but which are not placed on the agendas of the forthcoming two conferences,	–
7 to consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution **86 (Rev.WRC-07)**, in order to facilitate rational, efficient and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;			
Resolution **86 (Rev.WRC-07)** Implementation of Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference	**WP 4A**	*resolves to invite future world radiocommunication conferences* 1 to consider any proposals which deal with deficiencies and improvements in the advance publication, coordination, notification and recording procedures of the Radio Regulations for frequency assignments pertaining to space services which have either been identified by the Board and included in the Rules of Procedure or which have been identified by administrations or by the Radiocommunication Bureau, as appropriate; 2 to ensure that these procedures, and the related appendices of the Radio Regulations reflect the latest technologies, as far as possible,	–
8 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution **26 (Rev.WRC-07)**;			
Resolution **26 (Rev.WRC-07)** Footnotes to the Table of Frequency Allocations in Article 5 of the Radio Regulations	–	Not in the scope of the CPM	–

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
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-15;			
Issue 9.1.1: Resolution **212 (Rev.WRC-15)** Implementation of International Mobile Telecommunications in the frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz	**WP 4C (see Note 1)** **WP 5D (see Note 2)** **(see also Note 3)**	*resolves* that administrations which implement IMT: *a)* should make the necessary frequencies available for system development; *b)* should use those frequencies when IMT is implemented; *c)* should use the relevant international technical characteristics, as identified by ITU-R and ITU-T Recommendations, *invites ITU-R* to study possible technical and operational measures to ensure coexistence and compatibility between the terrestrial component of IMT (in the mobile service) and the satellite component of IMT (in the mobile service and the mobile-satellite service) in the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz where those frequency bands are shared by mobile service and the mobile-satellite service in different countries, in particular for the deployment of independent satellite and terrestrial components of IMT and to facilitate development of both the satellite and terrestrial components of IMT, *encourages administrations* 1 to give due consideration to the accommodation of other services currently operating in these frequency bands when implementing IMT; 2 to participate actively in the ITU-R studies in accordance with *invites ITU-R* above, *instructs the Director of the Radiocommunication Bureau* to include in his report, for consideration by WRC-19, the results of the ITU-R studies referred to in *invites ITU-R* above, *further invites ITU-R* to continue its studies with a view to developing suitable and acceptable technical characteristics for IMT that will facilitate worldwide use and roaming, and ensure that IMT can also meet the telecommunication needs of the developing countries and rural areas.	–
Note 1: WP 4C is responsible for the studies requested in the *invites ITU-R* with respect to the satellite component of IMT, taking into account the technical and operational characteristics provided by WP 5D. Note 2: WP 5D is responsible for the studies requested in the *invites ITU-R* with respect to the terrestrial component of IMT, taking into account the technical and operational characteristics provided by WP 4C. Note 3: The conclusion of the draft CPM text shall be agreed by both WP 4C and WP 5D. For this purpose, the Chairmen of both WPs shall coordinate the schedule of the meetings, as appropriate.			

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
Issue 9.1.2: Resolution **761** [**COM4/7**] **(WRC-15)** Compatibility of International Mobile Telecommunications and broadcasting-satellite service (sound) in the frequency band 1 452-1 492 MHz in Regions 1 and 3	**WP4A (see Note 1)** **WP 5D (see Note 2)** **(see also Note 3)**	*resolves to invite ITU-R* 1 to conduct, in time for WRC-19, the appropriate regulatory and technical studies, with a view to ensuring the compatibility of IMT and BSS (sound) in the frequency band 1 452-1 492 MHz in Regions 1 and 3, taking into account IMT and BSS (sound) operational requirements; 2 to prepare, *inter alia*, the regulatory action that could be taken, based on the studies carried out under *resolves to invite ITU-R* 1 above, in order to facilitate the long-term stability of IMT and BSS (sound) in the frequency band 1 452-1 492 MHz, *invites the 2019 World Radiocommunication Conference* to consider the above-mentioned results and to take necessary actions, as appropriate, *invites Member States* 1 to actively participate in the ITU-R activities with regard to the studies referred to above; 2 in Region 1, to use guidance from the ITU-R studies to determine the need for bilateral coordination between IMT systems and BSS earth stations, taking into account *noting b)*, until WRC-19 defines regulatory and technical conditions for this bilateral coordination; 3 in Region 3, to use guidance from ITU-R studies to determine the need for bilateral coordination to protect BSS earth stations, taking into account *noting b)*, until WRC-19 defines regulatory and technical conditions for this bilateral coordination, *instructs the Director of the Radiocommunication Bureau* to report to WRC-19, under agenda item 9.1, the results of the studies referred to in *resolves to invite ITU-R* 1.	(WP 6A)
Note 1: WP 4A is responsible for the studies requested in the *resolves to invites ITU-R* with respect to the BSS (Sound), taking into account the technical and operational characteristics provided by WP 5D. Note 2: WP 5D is responsible for the studies requested in the *resolves to invites ITU-R* with respect to the IMT, taking into account the technical and operational characteristics provided by WP 4A. Note 3: The conclusion of the draft CPM text shall be agreed by both WP 4A and WP 5D. For this purpose, the Chairmen of both WPs shall coordinate the schedule of the meetings, as appropriate.			

Issue 9.1.3: Resolution **157** [**COM5/6] (WRC-15)** Study of technical and operational issues and regulatory provisions for new non-geostationary-satellite orbit systems in the 3 700-4 200 MHz, 4 500-4 800 MHz, 5 925-6 425 MHz and 6 725-7 025 MHz frequency bands allocated to the fixed-satellite service	**WP 4A**	*resolves to invite the ITU Radiocommunication Sector* to study the following issues relating to non-GSO systems in the following frequency bands allocated to the FSS: *a)* in the frequency band 3 700-4 200 MHz (space-to-Earth), identification of possible revision of Article **21**, Table 21-4 for non-GSO FSS satellites, with a view to enabling new non-GSO systems to operate in these FSS frequency bands, while ensuring that existing primary services, i.e. the mobile service and fixed service, are protected and maintaining the existing Article **21** pfd limits for GSO networks; *b)* in the frequency bands 3 700-4 200 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space), the Article **22** epfd↓ limits and epfd↑ limits applicable to non-GSO systems with a view to enabling additional non-GSO systems to operate in these frequency bands, while ensuring that GSO networks are protected from unacceptable interference pursuant to No. **22.2** and existing protection criteria; *c)* in the frequency bands 4 500-4 800 MHz (space-to-Earth) and 6 725-7 025 MHz (Earth-to-space), the possible development of Article **22** epfd↓ and epfd↑ limits similar to those in other FSS frequency bands with a view to enabling non-GSO systems to operate in these frequency bands, while ensuring that GSO networks are protected from unacceptable interference pursuant to No. **22.2** and existing protection criteria; *d)* in the frequency band 6 700-7 025 MHz, the protection of feeder links for MSS systems operating in the space-to-Earth direction from unacceptable interference, pursuant to existing criteria, from non-GSO FSS system earth stations operating in the Earth-to-space direction; *e)* in the frequency band 4 500-4 800 MHz (space-to-Earth), the development of appropriate regulatory provisions for non-GSO FSS systems to protect terrestrial services; *f)* in the frequency bands 4 500-4 800 MHz (space-to-Earth) and 5 925-6 425 MHz (Earth-to-space), the development of regulatory provisions to clarify that Nos. **5.440A** and **5.457C** would apply in a manner to ensure that non-GSO FSS systems do not cause harmful interference to, or claim protection from, AMT for flight testing by aircraft stations, *further resolves* 1 that the results of studies referred to in the *resolves* above shall: – in no way change the protection criteria and protection levels defined in those criteria for the GSO FSS, the fixed service and the mobile service; – ensure protection of the existing non-GSO FSS systems with highly-elliptical orbits, 2 that new non-GSO systems that operate in FSS bands subject to the provisions of Appendix **30B** shall ensure that the allotments appearing in the Plan and the assignments of the List of Appendix **30B** will be fully protected,	**WP 5A** **WP 5C** (WP 3M)

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		invites administrations to participate in the studies by submitting contributions to the ITU Radiocommunication Sector, *instructs the Director of the Radiocommunication Bureau* to include in his report, for consideration by WRC-19, the results of the ITU-R studies referred to in *resolves to invite the ITU Radiocommunication Sector* above.	
Issue 9.1.4: Resolution **763** [**COM5/7**] **(WRC-15)** Stations on board sub-orbital vehicles	**WP 5B**	*resolves to invite the ITU Radiocommunication Sector* 1 to conduct studies to identify any required technical and operational measures, in relation to stations on board sub-orbital vehicles, that could assist in avoiding harmful interference between radiocommunication services; 2 to conduct studies to determine spectrum requirements and, based on the outcome of those studies, to consider a possible future agenda item for WRC-23; 3 to complete the studies within the next ITU Radiocommunication Sector (ITU-R) study cycle, *instructs the Director of the Radiocommunication Bureau* 1 to bring this resolution to the attention of the ITU-R study groups; 2 to include in his report, for consideration by WRC-19, the results of the ITU-R studies referred to in *resolves to invite the ITU Radiocommunication Sector* above,	**WP 4A** **WP 4C** **WP 7B**
Issue 9.1.5: Resolution **764** [**COM6/1**] **(WRC-15)** Consideration of the technical and regulatory impacts of referencing Recommendations ITU-R M.1638-1 and ITU-R M.1849-1 in Nos. 5.447F and 5.450A of the Radio Regulations	**WP 5A**	*resolves to invite the ITU Radiocommunication Sector* 1 to investigate the technical and regulatory impacts on the services referred to in Nos. **5.447F** and **5.450A** that would result from referencing Recommendation ITU-R M.1638-1 in place of Recommendation ITU-R M.1638-0 in those footnotes, while ensuring that no undue constraints are imposed on the services referenced in these footnotes; 2 to investigate the technical and regulatory impacts on the services referred to in Nos **5.447F** and **5.450A** that would result from adding a new reference to Recommendation ITU-R M.1849-1 to these footnotes**,** while ensuring that no undue constraints are imposed on the services referenced in these footnotes, *instructs the Director of the Radiocommunication Bureau* to include the results of these studies in the Director's Report to WRC-19 for consideration of any regulatory action in response to *resolves to invite the ITU Radiocommunication Sector* above.	**WP 5B** (WP 3M)

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
Resolution **958** [**COM6/15] (WRC-15)** Urgent studies required in preparation for the 2019 World Radiocommunication Conference	(see below)	*resolves* to complete studies on the topics identified in this resolution and its annex, *invites ITU-R* as a matter of urgency, to complete the studies called for in this resolution, *instructs the Director of the Radiocommunication Bureau* *to report on these studies under agenda item 9.1 of WRC-19, as appropriate, based on the results of studies.* ANNEX TO RESOLUTION 958 [COM6/15] (WRC-15) Urgent studies required in preparation for the 2019 World Radiocommunication Conference	(see below)
<u>Issue 9.1.6</u>: Issue 1) in the Annex to Resolution **958** [**COM6/15] (WRC-15)**	**WP 1B**	1) Studies concerning Wireless Power Transmission (WPT) for electric vehicles: a) to assess the impact of WPT for electric vehicles on radiocommunication services; b) to study suitable harmonized frequency ranges which would minimize the impact on radiocommunication services from WPT for electrical vehicles. These studies should take into account that the International Electrotechnical Commission (IEC), the International Organization for Standardization (ISO) and the Society of Automotive Engineers (SAE) are in the process of approving standards intended for global and regional harmonization of WPT technologies for electric vehicles.	**WP 1A** **WP 5B** **WP 6A**
<u>Issue 9.1.7</u>: Issue 2) in the Annex to Resolution **958** [**COM6/15] (WRC-15)**	**WP 1B**	2) Studies to examine: a) whether there is a need for possible additional measures in order to limit uplink transmissions of terminals to those authorized terminals in accordance with No. **18.1**; b) the possible methods that will assist administrations in managing the unauthorized operation of earth station terminals deployed within its territory, as a tool to guide their national spectrum management programme, in accordance with Resolution ITU-R 64 (RA-15).	**WP 1C** **WP 4A**
<u>Issue 9.1.8</u>: Issue 3) in the Annex to Resolution **958** [**COM6/15] (WRC-15)**	**WP 5D**	3) Studies on the technical and operational aspects of radio networks and systems, as well as spectrum needed, including possible harmonized use of spectrum to support the implementation of narrowband and broadband machine-type communication infrastructures, in order to develop Recommendations, Reports and/or Handbooks, as appropriate, and to take appropriate actions within the ITU Radiocommunication Sector (ITU-R) scope of work.	**WP 1B** **WP 5A**

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Topic/Agenda Item Number	Responsible group	Action to be taken by the group	Concerned group[18]
Issue 9.1.9: Resolution **162** [**COM6/24] (WRC-15)** Studies relating to spectrum needs and possible allocation of the frequency band 51.4-52.4 GHz to the fixed-satellite service (Earth-to-space)	**WP 4A**	*resolves to invite ITU-R* to conduct, and complete in time for WRC-19: 1 studies considering additional spectrum needs for development of the fixed-satellite service, taking into account the frequency bands currently allocated to the fixed-satellite service, the technical conditions of their use, and the possibility of optimizing the use of these frequency bands with a view to increasing spectrum efficiency; 2 subject to justification resulting from studies conducted under *resolves to invite ITU-R* 1, sharing and compatibility studies with existing services, on a primary and secondary basis, including in adjacent bands as appropriate, to determine the suitability, including protection of fixed and mobile services, of new primary allocations to the FSS in the frequency band 51.4-52.4 GHz (Earth-to-space) limited to FSS feeder links for geostationary orbit use, and the possible associated regulatory actions; 3 studies towards possible revision of Resolution **750 (Rev.WRC-12)** so that systems operating in the passive frequency band 52.6-54.25 GHz are protected; 4 studies regarding the protection of radio astronomy, as described in *recognizing c)*, including regulatory measures, as appropriate, *instructs the Director of the Radiocommunication Bureau* to report on the results of the ITU-R studies to WRC-19, *invites administrations* to participate actively in these studies by submitting contributions to ITU-R.	**WP 4B** **WP 5A** **WP 5C** **WP 5D** **WP 7C** **WP 7D** (WP 3M)
9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations*; and _____ * This agenda item is strictly limited to the Report of the Director on any difficulties or inconsistencies encountered in the application of the Radio Regulations and the comments from administrations.			
9.3 on action in response to Resolution **80 (Rev.WRC-07)**;			
Resolution **80 (Rev.WRC-07)**	–		–
10 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention,			
Resolution **810 [COM6/2] (WRC-15)** Preliminary agenda for the 2023 World Radiocommunication Conference	–	For information at CPM19-2.	–