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| **The 6th Meeting of the APT Conference Preparatory****Group for WRC-23 (APG23-6)** | **APG23-6/OUT-15** |
| 14 – 19 August 2023, Brisbane, Australia | 18 August 2023 |

Working Party 2

**APT View and PRELIMINARY APT Common proposal**

**on WRC-23 agenda item 1.6**

**Agenda Item 1.6:**

*to consider, in accordance with Resolution 772 (WRC 19), regulatory provisions to facilitate radiocommunications for sub-orbital vehicles*.

**1. Background**

Resolution **772 (WRC-19)**, in preparation for WRC-23 agenda item 1.6, invites the ITU-R to study the spectrum needs for stations on board sub-orbital vehicles, any appropriate modification to the Radio Regulations, excluding any new allocations or changes to the existing allocations in RR Article 5, and to identify whether there is a need for access to additional spectrum that should be addressed after WRC-23 by a future competent conference.

Sub-orbital vehicles are to be safely integrated into the airspace used by conventional aircraft and minimize disruption during the transition to and from controlled airspace. In addition, sub-orbital vehicles are intended to operate at higher altitudes and at higher speed than conventional aircraft during short periods of time without permanently entering an orbit as defined in RR No. 1.184.

To address this agenda item, the ITU-R undertook studies pursuant to Resolution 772 (WRC-19). WP 5B has generated a Working Document towards a Preliminary Draft New Report ITU-R M. [SUBORBITAL STUDIES] to study in preparation for this agenda item. The CPM Report for the agenda item 1.6 was developed at the CPM23-2 Meeting which proposed three methods to address this agenda item, and there are four alternative approaches to Method B.

Relevant ITU-R Recommendations and Reports：

ITU-R [M.2477-0](https://www.itu.int/pub/R-REP-M.2477) Radiocommunications for suborbital vehicles

**2. Documents**

The input documents and information documents received at APG23-6 are listed as follows:

* APG23-6/[INP-31](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-31_Japan_WP2_Views_and_Proposals_on_WRC-23_Agenda_Items.docx) (J), [INP-48](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-48_Indonesia_WP2_PACP_WRC-23_Agenda_Items.docx) INS), [INP-55](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-55_Singapore_WP2_PACP_WRC-23_Agenda_Items_0.docx) (SNG), [INP-59](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-59_Thailand_WP2_PACP_WRC-23_Agenda_Items.docx) (THA), [INP-66R1](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-66R1_Iran_WP2_Preliminary_Views_on_WRC-23_Agenda_Items.docx) (IRN), [INP-81](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-81_Australia_WP2_PACP_WRC-23_Agenda_Items_and_Res.427_WRC-19.docx) (AUS), [INP-88](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-88_KOR_WP2_PACP_WRC-23_Agenda_Items.docx) (KOR), [INP-93](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-93_Philippines_WP2_PACP_WRC-23_Agenda_Items.docx) (PHL), [INP-99](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-99_New_Zealand_WP2_PACP_WRC-23_Agenda_Items.docx) (NZL), [INP-104](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-104_China_WP2_PACP_WRC-23_Agenda_Items.docx) (CHN) , [INP-110](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-110_Malaysia_WP2_PACP_WRC-23_Agenda_Items.docx) (MLA)
* Information Documents: APG23-6/[INF-02](https://www.apt.int/sites/default/files/2023/06/APG23-6-INF-02_WMO_Position_on_WRC-23_Agenda.docx)(WMO), [INF-25](file:///C%3A%5C04ITU-R%5C2023%5CAPG23-6%5CINF%5CAPG23-6-INF-25_ICAO-Position_for_ITU-WRC23.docx) (ICAO), [INF-45](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-45_Status_of_RCC_preparation_to_WRC-23.pdf) (RCC), [INF-46](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-46_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf) (CEPT), [INF-52](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-52_CITEL_preparation_for_WRC-23.pdf) (CITEL), [INF-41](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-41_Brief_on_AI_1.6.docx) (DG Chair)

**3. Summary of discussions**

**3.1 Summary of APT Members’ views**

**3.1.1 Japan**- **Document APG23-6/**[**INP-31**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-31_Japan_WP2_Views_and_Proposals_on_WRC-23_Agenda_Items.docx)

* Japan supports Method B, which proposes the development of a new WRC resolution that includes a definition of suborbital vehicle and operational rules for stations on board sub-orbital vehicles. Japan is considering the different approaches, from a standpoint that various administrations should be able to cooperate in deciding the operational rule of suborbital vehicles, in accordance with the development status of the vehicle. Also, Japan is of the view that when specific frequencies are identified in the future, the protection of existing primary services in the same/adjacent frequency bands should be ensured.

**3.1.2 Indonesia**- **Document APG23-6/**[**INP-48**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-48_Indonesia_WP2_PACP_WRC-23_Agenda_Items.docx)

* Indonesia is of the view to support Method B on Agenda Item 1.6 with further consideration on selection one of the approaches.
* Method B of the CPM Report consists of a new Resolution and no change to the Articles of the ITU Radio Regulations, to provide clarity on the status of stations onboard the sub-orbital vehicles and to establish regulatory provisions for coexistence with other services and applications. This new Resolution allows development of regulatory framework for the operation of radiocommunications on Sub-orbital vehicles, to ensure safety of sub-orbital vehicles and other services.

**3.1.3 Singapore**- **Document APG23-6/**[**INP-55**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-55_Singapore_WP2_PACP_WRC-23_Agenda_Items_0.docx)

Singapore supports Method B Approach C:

* A definition of stations on a sub-orbital vehicle which includes operation when in space and includes space launch vehicles.
* The identification of the specific services in which sub-orbital vehicles may operate (AM(R)S, AMS, MSS, RNSS) and to clarify that stations on sub-orbital vehicles may operate as aircraft stations or earth stations in those services, for all parts of a flight.
* The requirement that the operation of stations on sub-orbital vehicles in the above services is under the same conditions as those for conventional stations.
* The exclusion of systems in the space operation services from the scope of the Resolution.

**3.1.4 Thailand (Kingdom of)- Document APG23-6/**[**INP-59**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-59_Thailand_WP2_PACP_WRC-23_Agenda_Items.docx)

* Thailand supports Method B in order to develop a new WRC Resolution containing the provisions to operate radiocommunications for on board sub-orbital vehicles. Method B Approach C is preferred. Thailand is of the view that the definition of sub-orbital flight and sub-orbital vehicle should be provided in the new Resolution.

**3.1.5 Iran (Republic of) - Document APG23-6/**[**INP-66**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-66R1_Iran_WP2_Preliminary_Views_on_WRC-23_Agenda_Items.docx)**R1**

* The Republic of Iran supports Method A for the reasons in discussion parts, and due to the fact that Method B referred to four approaches which includes serious ambiguities and inconsistencies at this stage.
* However, this Administration may consider any of alternatives mentioned in Method B provided that the following issues be addressed and included in the associated WRC-23 Resolution accordingly.
* Moreover, in order to properly and duly protect the incumbent services and their future developments the following resolves are to be added to the corresponding Resolution for Agenda Item 1.6 Resolution:
	+ Assignment pertaining to sub-orbital vehicle shall not cause unacceptable interference to nor claim protection from the assignments relating to incumbent services and their future developments.
	+ For the implementation of the above resolve, the notifying administration of sub- orbital vehicle, when submitting Appendix 4 information /data elements shall also send a firm commitment that in case of reported unacceptable interference immediately cease the interference or reduce it to an acceptable level. Such commitment shall be objective, measurable and enforceable.
	+ In case of no action taken in application of resolves 2 above, the Bureau shall send a reminder and request that administration to comply with the requirements referred to in resolves 2) above.
	+ Should the interference persist, 30 days after the dispatch date of the above- mentioned reminder, the Bureau shall submit the case to the subsequent meeting of the RRB for review and eventual suppression from the date base of the Bureau and inform the notifying administration accordingly.
	+ The compliance to this Resolution does in no way, what so ever, release the notifying administration(s) from its obligation to not causing unacceptable interference nor claiming protection from the incumbent services as indicated in the Resolution.

**3.1.6 Australia** - **Document APG23-6/**[**INP-81**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-81_Australia_WP2_PACP_WRC-23_Agenda_Items_and_Res.427_WRC-19.docx)

* In response to Agenda item 1.6 Australia proposes a new WRC Resolution:
	+ referring to Report ITU-R M.2477 for description of sub-orbital flight and of suborbital vehicle;
	+ requiring frequencies to be used by sub-orbital vehicles in accordance with their present regulatory status and not changing the stations from either terrestrial or earth station to a space station.
	+ No changes to the Articles of the Radio Regulations.
* While the sub-orbital vehicle is physically located beyond the Earth’s atmosphere for a brief period of time, the physical location of the sub-orbital vehicle on which the stations are located does not change the need for, or purpose of the use of, specific radiocommunication applications.
* Australia proposes the Preliminary APT Common Proposal, with changes as proposed consistent with Method B Approach B of the CPM Report.

**3.1.7 Korea (Republic of) - Document APG23-6/**[**INP-88**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-88_KOR_WP2_PACP_WRC-23_Agenda_Items.docx)

* The Republic of Korea supports Method B described in the CPM Report, which proposes a new WRC Resolution containing the regulatory provisions to operate radiocommunications for sub-orbital vehicles, including definition or description of suborbital vehicle without any changes to the Articles of the RR. Among the options under Method B, there is no preferred one at this moment.

**3.1.8 Philippines**- **Document APG23-6/**[**INP-93**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-93_Philippines_WP2_PACP_WRC-23_Agenda_Items.docx)

* Philippines supports Method B, Approach D towards the development of a new WRC Resolution which provides the following elements:
	+ Definition or description of sub-orbital flight and sub-orbital vehicle.
	+ The identification of the specific services in which sub-orbital vehicles may operate (AM(R)S, MSS, RNSS and potentially others) and to clarify that stations on board sub-orbital vehicles may operate as terrestrial/aircraft stations or earth stations in those services. RR No.**4.4** shall be applied when the above services are used by stations on board sub-orbital vehicles beyond the major portion of the atmosphere.
	+ The requirement that the operation of stations on sub-orbital vehicles in the above services is under the same conditions as those for conventional stations.
	+ The sub-orbital vehicles shall ensure that it does not affect the existing civil aviation and space launch systems, and not impose any additional constraint on other services or applications operated in the same service.

**3.1.9 New Zealand - Document APG23-5/**[**INP-99**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-99_New_Zealand_WP2_PACP_WRC-23_Agenda_Items.docx)

* New Zealand has an interest in this agenda item and can support Method B but is still considering its position on the Approaches under Method B. We consider that work should be concluded in this study cycle and do not support Method A (No Change) or C (Continuing work).
* New Zealand proposes the Preliminary APT Common Proposal to make changes to the Radio Regulations for suborbital vehicles.

**3.1.10 China (Republic of) - Document APG23-6/**[**INP-104**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-104_China_WP2_PACP_WRC-23_Agenda_Items.docx)

* China supports that a new WRC Resolution should be developed, which contains the provisions to operate radiocommunications for sub-orbital vehicles without any change to RR Article 5.
* China supports Approach D of Method B in the CPM Report.

**3.1.11 Malaysia - Document APG23-6/**[**INP-110**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INP-110_Malaysia_WP2_PACP_WRC-23_Agenda_Items.docx)

Malaysia is considering Method B to address this agenda item.

* Malaysia supports possible spectrum needs for stations on board sub-orbital vehicles, appropriate modification, if any, to the Radio Regulations (RR), excluding any new allocations or changes to the existing allocations in RR Article **5** to accommodate stations on board sub-orbital vehicles to facilitate radiocommunications that support aviation to safely integrate sub-orbital vehicles into airspace and ensure interoperability with international civil aviation.
* The sub-orbital vehicles shall ensure that it does not affect the existing civil aviation and space launch systems, and not impose any additional constraint on other services or applications operated in the same services.

**3.2 Summary of issues raised during the meeting**

APT Members support that sub-orbital vehicle needs to be defined or described. Whether it is defined or described in RR. Article 1 or/and Article 4 or in the new WRC Resolution is discussed. No consensus was reached.

**4. APT View(s)**

No view at AGP23-6 meeting.

**5. Preliminary APT Common Proposal**

No PACP.

**6. Issues for Consideration at APG Coordination Meeting at WRC-23 (if any)**

APT Members support that sub-orbital vehicle needs to be defined or described. Whether it is defined or described in RR. Article 1 or/and Article 4 or in the new WRC Resolution need to be discussed.

**7. Views from Other Organisations**

**7.1 Regional Groups**

**7.1.1 ASMG** - **Document APG23-5/INF-22**

* Follow the ongoing studies on the development of a new WRC-23 Resolution containing regulatory provisions to facilitate the operation of sub-orbital vehicles, and ensure that it does not affect the existing civil aviation and space launch systems, and doesn’t impose any new restrictions on other co-primary services and applications.
* The necessity to agree on specific definition for sub-orbital vehicles and to regulate their trajectories starting from launch to landing on the ground.
* No change in Article 5 of the Radio Regulations.

**7.1.2 ATU** - **Document APG23-6/INF-55**

**Support Method C** a revision to Resolution 772 (WRC 19), to clarify the list of necessary studies and to extend their duration.

**Reasons:**

* The required studies provided under resolves 2 **Resolution 772 (WRC-19)** were not completed with the list of possible interference scenarios, including scenarios for the use of ground/earth stations on board a sub-orbital vehicle in a section of its flight path passing in outer space.
* As per the **Recognizing c) and d)** of the draft new resolution (WRC-23) proposed under method B, SOVs may have a radiocommunication impact on larger areas involving additional territories and/or on space stations (due to operation in higher altitudes) and **may impact services operating in the same and adjacent or nearby frequency bands** (due to increase of Doppler shift).

**7.1.3 CEPT** - **Document APG23-6/**[**INF-46**](https://www.apt.int/sites/default/files/2023/02/APG23-5-INF-39_Status_of_CEPT_preparation_for_WRC-23_and_RA-23.pdf)

CEPT is of the view that a new WRC Resolution is required that:

* A new WRC Resolution is required that provides the conditions for the operation of terrestrial stations and earth stations fitted onboard sub-orbital vehicles;
* These stations on sub-orbital vehicles shall not impact the radiocommunications of satellite launchers which operate in the space operation service.

**7.1.4 CITEL** - **Document APG23-6/**[**INF-52**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-52_CITEL_preparation_for_WRC-23.pdf)

A number of Administrations propose the following modifications:

* ADD RESOLUTION [A16] Regulatory provisions for the operation of radiocommunications on sub-orbital vehicles - proposed new Resolution is in accordance with Approach B of Method B contained in the draft CPM text prepared by WP 5B.
* ADD 43.XX – proposed new provision to Article 43 of the RR provides the necessary reference within the Radio Regulations to the above proposed new Resolution.
* SUP RESOLUTION 772 (WRC-19) – Consequential to the results of studies at ITU-R in relation to this Resolution
* The proposed approach clarifies that stations on-board sub-orbital vehicles may be terrestrial station or earth station or both, and can be used in all phases of flight maintaining the same class of station within their respective service allocation.

**7.1.5 RCC** - **Document APG23-6/**[**INF-45**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-45_Status_of_RCC_preparation_to_WRC-23.pdf)

* The RCC Administrations consider that, since the stations on board sub-orbital vehicles shall provide voice/data communications, navigation, surveillance, telemetry, tracking and command, they shall operate only within the current frequency allocations to:
	+ aeronautical mobile service;
	+ aeronautical radionavigation service;
	+ aeronautical mobile satellite service;
	+ radionavigation satellite services;
	+ space operation service.
* The RCC Administrations also consider that stations on board a sub-orbital vehicle shall ensure its safe flight in international airspace and its interoperability with civil aviation systems, moreover, these stations shall not cause unacceptable interference to the operation of stations on board launch vehicles.
* The RCC Administrations consider the need to proceed with studies under possible agenda item of WRC-27 based on modified Resolution 772(WRC-19).

**7.2 International Organisations**

**7.2.1 ICAO** - **Document APG23-6/**[**INF-25**](https://www.apt.int/sites/default/files/2023/07/APG23-6-INF-25_ICAO-Position_for_ITU-WRC23.docx)

* To support the regulatory provision for terrestrial stations and earth stations required onboard a suborbital vehicle to safely integrate it into air traffic service airspace, as decided by the responsible Member State(s), to maintain the services under which these stations are classified.
* Any such changes to the Radio Regulations shall not create constraints on aeronautical operations.

**7.2.2 SFCG** - **Document APG23-6/**[**INF-41**](https://www.apt.int/sites/default/files/2023/08/APG23-6-INF-41_Brief_on_AI_1.6.docx)

* SFCG supports the development of regulatory provisions for radiocommunications for sub-orbital vehicles (SoVs) in order to facilitate the safe integration of SoVs into the existing air traffic management system, based on sharing and compatibility studies and as long as any negative impact on EESS/SOS/SRS/MetSat operations is avoided. It is also important that any regulatory changes associated with this agenda item will not adversely impact the operation of launch vehicles or sounding rockets.
* SFCG is of the opinion that approach A of Method B in CPM Report is the option that provides the least potential to impact EESS/SOS/SRS/MetSat operations. This is because of its limitation to specific frequency bands that do not overlap those used by space sciences services and that it addresses the case of launch vehicles and sounding rockets.

**7.2.3 WMO** - **Document APG23-6/**[**INF-0**](https://www.apt.int/sites/default/files/2023/06/APG23-6-INF-02_WMO_Position_on_WRC-23_Agenda.docx)**2**

* WMO supports the development of regulatory provisions to facilitate sub-orbital vehicle operations but would be opposed to provisions that have a negative impact to current and/or future MetSat, EESS and SOS operations.
* The Approaches in Method B of the CPM Report include provisions to prevent sub-orbital vehicles from causing any more interference than other systems operating in the services under consideration. In particular, Approaches A and B of Method B align with WMO objectives.
* Method A and Method C fail to adequately address the issue of regulatory provisions to support the operation of sub-orbital vehicles.

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