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| U.S. Radiocommunications Sector  Fact Sheet | | |
| **Working Party:** ITU-R WP 5B | **Document No:** USWP5B27-18 | |
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| **Purpose/Objective:** This contribution provides updates to the Working Document towards Draft CPM Text for WRC-23 Agenda Item 1.6 to facilitate the introduction of sub-orbital vehicles (SoV). | | |
| **Abstract:** Resolution **772** (**WRC-19**), in preparation for Agenda Item 1.6 (WRC-23), 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 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. This contribution provides some regulatory provisions to the WD-Draft CPM Text for WRC-23 AI 1.6 to facilitate the introduction of sub-orbital vehicles. | | |

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| **Radiocommunication Study Groups** |  |
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| working document towards draft cpm text for WRC-23 agenda item 1.6 | |
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**Introduction**

Resolution **772 (WRC-19)**, in preparation for Agenda Item 1.6 (WRC-23), 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 **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. This contribution provides some regulatory provisions to the WD-Draft CPM Text for WRC-23 AI 1.6 to facilitate the introduction of sub-orbital vehicles.

Attachment: 1

ATTACHMENT

working document towards draft cpm text for wrc-23 agenda item 1.6

CHAPTER 2

Aeronautical and maritime issues

(Agenda items 1.6, 1.7, 1.8, 1.9, 1.10, 1.11)

Agenda item 1.6 of Chapter 2

**(WP 5B[[1]](#footnote-1)\* /** **WP 3M, WP 4A, WP 4C, WP 7B, WP 7D)**

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

Resolution **772 (WRC 19)** - Consideration of regulatory provisions to facilitate the introduction of sub-orbital vehicles.

# 2/1.6/1 Executive summary

*[Text of the executive summary, not more than half a page of text to describe briefly the purpose of the agenda item, summarize the results of the studies carried out and, most importantly, provide a brief description of the method(s) identified that may satisfy the agenda item. See also §A2.1 of Annex 2 to* [*Resolution ITU-R 2-8*](http://www.itu.int/pub/R-RES-R.2-8-2019)*]*

Resolution 772 (WRC-19) 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 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. Resolution 772 (WRC-19) also invites the ITU-R to define the relevant technical characteristics and protection criteria for the studies to be undertaken, to conduct sharing and compatibility studies with incumbent services that are allocated on a primary basis in the same and adjacent frequency bands in order to avoid harmful interference to other radiocommunication services and to existing applications of the same service in which stations on board sub-orbital vehicles operate, having regard to the sub-orbital application scenarios

Studies have been carried out in Report ITU-R M.2477 showing current space launches require large areas of international and national airspace that are made unavailable during the launch and re-entry window. This results in airspace disruptions, extra travel time, re-routing flight paths, additional aircraft fuel consumption, etc. Studies in Report ITU-R M.2477 also show the feasibility of using the current avionics systems onboard suborbital vehicles, to facilitate the safe integration of suborbital vehicles into the same airspace as conventional aircraft during their transition to and from space in order to minimize the airspace disruption. Report ITU-R M.2477 also identified several existing radiocommunications services that can be used by stations onboard suborbital vehicles, but may not necessarily be limited to: a) AM(R)S for VHF voice and data communications and ADS-B; b) RNSS for navigation with GNSS systems in 1 164-1 215 MHz and 1 559-1 610 MHz; MSS for voice and data communications; and MS for TT&C applications.

Suborbital vehicles have radio stations that operate in frequency bands allocated for both terrestrial services and space services. Consequently, there is a need for this clarification to be made in Article 4 of the Radio Regulations.

Proposal for this clarification to be made in **Article 4**:

*Stations onboard suborbital vehicles (RR 1.62, 1.63, and 1.64) may use allocations to terrestrial and/or space radiocommunications services when executing suborbital flight. Suborbital flight is the intentional flight of a vehicle expected to reach the upper atmosphere with a portion of its flight path that may occur in space for a brief period of time. Radiocommunications for this use shall have the same status as those allocations under which they operate, and shall operate in accordance with limitations of those allocations specified in* ***Article******5****.*

# 2/1.6/2 Background

*[Text of the background, not more than half a page of text to provide general information in a concise manner, in order to describe the rationale of the agenda items (or issue(s)). See also §A2.2 of Annex 2 to* [*Resolution ITU-R 2-8*](http://www.itu.int/pub/R-RES-R.2-8-2019)*]*

With the rapid development of the suborbital flight concepts and technologies in recent years, such as hypersonic flight and reusable carrier rocket technology, suborbital flight is an operational reality, supporting a wide range of fields including education, transportation, tourism, and scientific research. Current research and development aim to enable suborbital vehicles to carry several thousand kilograms of cargo and passengers by 2035, with and up to 6 000 flights per year by 2045.

According to Report ITU-R M.2477, a suborbital vehicle (SoV) is a vehicle executing flight defined as the intentional flight of a vehicle expected to reach the upper atmosphere with a portion of its flight path that may occur in space without completing a full orbit around the Earth before returning to the surface of the Earth. Currently, there are a variety of technical solutions to achieve suborbital flight. Launch modes include horizontal and vertical, landing modes include horizontal landing and vertical landing, recovery modes include self-controlled return and parachute recovery, and thrust modes include rocket power and combined power. Suborbital flights can be implemented by different combinations of the above modes. Figure 1 show examples of the operational concepts of a suborbital flight.

Figure 1

Examples of the operational concepts of suborbital flight



Diagram

Description automatically generated

Studies in Report ITU-R M.2477 showing current space launches require large areas of international and national airspace that are made unavailable during the launch and re-entry window of launch vehicles. This causes airspace disruptions to commercial flight, resulting in extra travel time, re-routing flight paths, additional aircraft fuel consumption, etc. Studies in Report ITU-R M.2477 also show the feasibility of using the current avionics systems onboard suborbital vehicles, to facilitate the safe integration of suborbital vehicles into the same airspace as conventional aircraft during their transition to and from space in order to minimize the airspace disruption. Report ITU-R M.2477 also identified several existing radiocommunications services that can be used by stations onboard suborbital vehicles, but may not necessarily be limited to: a) AM(R)S for VHF voice and data communications and ADS-B; b) RNSS for navigation with GNSS systems in 1 164-1 215 MHz and 1 559-1 610 MHz; MSS for voice and data communications; and MS for TT&C applications.

Agenda Ttem 1.6 will address key issues, including regulatory issues, to safely integrate suborbital vehicles into the same airspace as conventional aircraft during their transition to and from space in order to minimize the airspace disruption. Importantly, Agenda Item 1.6 provides the opportunity to show how suborbital vehicles may communicate with existing aeronautical radiocommunication services with minimal changes to the Radio Regulations.

# 2/1.6/3 Summary and Analysis of the results of ITU-R studies

*[This section should contain a summary of the technical and operational studies performed within ITU-R, including a list of relevant ITU-R Recommendations. Depending on the agenda item, this section could be divided in two parts, one part dealing with the summary and the other part dealing with the analysis. The results of the ITU-R studies should also be analysed with respect to the possible methods of satisfying the agenda item, and presented in a concise manner.]*

# 2/1.6/4 Methods to satisfy the agenda item

*[This section should contain the brief description of the Method or Methods to satisfy the agenda item as per section A2.4 of Annex 2 to* [*Resolution ITU-R 2-8*](http://www.itu.int/pub/R-RES-R.2-8-2019)*]*

## 2/1.6/4.1 Method A:

This method proposes to add a clarification to be made to **Article 4** of the Radio Regulations.

Proposal for a clarification to be made in **Article 4**:

*Stations onboard suborbital vehicles (RR 1.62, 1.63, and 1.64) may use allocations to terrestrial and/or space radiocommunications services when executing suborbital flight. Suborbital flight is the intentional flight of a vehicle expected to reach the upper atmosphere with a portion of its flight path that may occur in space for a brief period of time. Radiocommunications for this use shall have the same status as those allocations under which they operate, and shall operate in accordance with limitations of those allocations specified in* ***Article 5****.*

# 2/1.6/5 Regulatory and procedural considerations

## 2/1.6/5.1 For Method A:

ARTICLE 4

**Assignment and use of frequencies**

**MOD**

**4.xx** *Stations onboard suborbital vehicles (RR 1.62, 1.63, and 1.64) may use allocations to terrestrial and/or space radiocommunications services when executing suborbital flight. Suborbital flight is the intentional flight of a vehicle expected to reach the upper atmosphere with a portion of its flight path that may occur in space for a brief period of time. Radiocommunications for this use shall have the same status as those allocations under which they operate, and shall operate in accordance with limitations of those allocations specified in* ***Article 5****.*

**SUP**

RESOLUTION 772 (WRC-19)

**Consideration of regulatory provisions to facilitate the introduction of sub-orbital vehicles**

1. \* Note: See relevant text in CPM23-1 meeting report (Annex 4 to BR Administrative Circular [CA/251](https://www.itu.int/md/R00-CA-CIR-0251/en)) on how to facilitate the work related to satellite. [↑](#footnote-ref-1)