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| A close up of a sign  Description automatically generated | **World Radiocommunication Conference (WRC-23) Dubai, 20 November - 15 December 2023** | |  |
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| PLENARY MEETING | | **Addendum 6 to Document 85-E** | |
|  | | **22 October 2023** | |
|  | | **Original: Russian** | |
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| Regional Commonwealth in the field of Communications Common Proposals | | | |
| PROPOSALS FOR THE WORK OF THE CONFERENCE | | | |
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| Agenda item 1.6 | | | |

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

Introduction

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, depending on the transmitted information, only within the spectrum allocations to the following services:

– the aeronautical mobile service;

– the aeronautical radionavigation service;

– the aeronautical mobile-satellite service;

– the radionavigation-satellite service;

– the space operation service.

The RCC Administrations also consider that stations on board a sub-orbital vehicle shall ensure interoperability with civil aviation systems and shall not cause unacceptable interference to the operation of stations on board launch vehicles.

The RCC Administrations consider that the studies on Resolution **772 (WRC-19)** have not been completed and that, before decisions are made on this item, technical and regulatory ITU-R studies need to be conducted to determine:

1) the specific frequency bands and radio services in which it is possible to use stations for sub-orbital flights, specifying the purpose of such uses (communications, navigation, surveillance, telemetry etc.);

2) the technical characteristics and protection criteria of stations intended for sub-orbital flights;

3) the technical and regulatory conditions for sharing and compatibility of stations intended for sub-orbital flights with stations of incumbent services and applications, allowing for scenarios such as:

– use of ground/earth stations on board a sub-orbital vehicle in outer space (i.e. with no relevant space service allocations);

– use of space stations on board a sub-orbital vehicle in the air or on Earth (i.e. with no relevant terrestrial service allocations).

The RCC Administrations believe that the above-mentioned application scenarios for stations intended for sub-orbital flights, without the necessary allocations and conditions for their sharing and compatibility, are unacceptable in view of the associated high risk of catastrophic consequences.

Proposal

In order to satisfy WRC-23 agenda item 1.6, it is proposed to use the regulatory text in annex hereto.

NOC RCC/85A6/1

ARTICLES

NOC RCC/85A6/2

APPENDICES

MOD RCC/85A6/3

RESOLUTION 772 (REv.WRC‑23)

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

The World Radiocommunication Conference (Dubai, 2023),

considering

*a)* that sub-orbital vehicles are being developed which are intended to operate at higher altitudes than conventional aircraft, with a sub-orbital trajectory;

*b)* that sub-orbital vehicles are also being developed to fly through the lower levels of the atmosphere, where they are expected to operate in the same airspace as conventional aircraft;

*c)* that sub-orbital vehicles may perform various missions (e.g. conducting scientific research or providing transportation) and then return to the Earth’s surface without completing a full orbital flight around the Earth;

*d)* that stations on board sub-orbital vehicles have a need for voice/data communications, navigation, surveillance and telemetry, tracking and command (TT&C);

*e)* that sub-orbital vehicles must be safely accommodated into airspace used by conventional aircraft during certain phases of flight;

*f)* that there is a need to ensure that equipment installed on such vehicles can communicate with air traffic management systems and relevant ground control facilities;

*g)* that vehicles operating at the boundary of space and the atmosphere or re-entering the atmosphere may generate a plasma sheath that may envelop all or most of the vehicle;

*h)* that the plasma-sheath attenuation does not allow for radiocommunications directly to either ground or space stations,

recognizing

*a)* that there is no internationally agreed legal demarcation between the Earth’s atmosphere and the space domain;

*b)* that there is no formal definition of sub-orbital flight, although it has been assumed in Report ITU‑R M.2477 to be an 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 back to the surface of the Earth;

*c)* that stations on board sub-orbital vehicles may use systems operating under space and/or terrestrial services;

*d)* that the current regulatory provisions and procedures for terrestrial and space services may not be adequate for international use of relevant frequency assignments by stations on board sub-orbital vehicles;

*e)* that Annex 10 to the Convention on International Civil Aviation contains Standards and Recommended Practices for aeronautical radionavigation and radiocommunication systems used by international civil aviation;

*f)* that some space launch systems may include components or items not reaching orbital trajectories, and that some of these components or items may be developed as reusable items operating on sub-orbital trajectories;

*g)* that conventional space launch systems currently have a radiocommunication regulatory framework that may differ from the future radiocommunication framework of sub-orbital vehicles,

noting

*a)* Question ITU‑R 259/5, on operational and radio regulatory aspects for planes operating in the upper level of the atmosphere;

*b)* that Report ITU‑R M.2477 provides information on the current understanding of radiocommunications for sub-orbital vehicles, including a description of the flight trajectory, categories of sub-orbital vehicles, technical studies related to possible avionics systems used by sub-orbital vehicles, and service allocations of those systems;

*c)* that the provisions of No. **4.10** may apply to certain aspects of these operations;

*d)* that the development of compatibility criteria between International Civil Aviation Organization (ICAO) standardized aeronautical systems is the responsibility of ICAO;

*e)* that the definitions and future applicable radiocommunication services for sub-orbital vehicles should be clarified by the ITU Radiocommunication Sector (ITU‑R), with necessary coordination with ICAO,

resolves to invite the ITU Radiocommunication Sector

1 to study spectrum needs indicating the specific frequency bands and radio services for communications between stations on board sub-orbital vehicles and terrestrial/space stations providing functions such as, *inter alia*, voice/data communications, navigation, surveillance and TT&C;

2 based on the results of the studies into spectrum needs, to study appropriate modification, if any, to the Radio Regulations, by introducing changes to the existing allocations in Article **5**, to accommodate stations on board sub-orbital vehicles, whilstavoiding any impact on conventional space launch systems, with the following objectives:

– to determine the status of stations on sub-orbital vehicles, and study corresponding regulatory provisions to determine which existing radiocommunication services can be used by stations on sub-orbital vehicles, if necessary;

– to determine the technical and regulatory conditions to allow some stations on board sub-orbital vehicles to operate under the aeronautical regulation and to be considered as earth stations or terrestrial stations even if a part of the flight occurs in space;

– to facilitate radiocommunications that support aviation to safely integrate sub-orbital vehicles into airspace and ensure interoperability with international civil aviation;

– to define the relevant technical characteristics and protection criteria for the studies to be undertaken in accordance with the bullet point below;

– to conduct sharing and compatibility studies with incumbent services that are allocated on a primary basis in the same and adjacent frequency bands in order to provide that the level of permissible interference for security services is not exceeded and to avoid harmful interference to other radiocommunication services and to existing applications of the same service in which stations on board sub-orbital vehicles operate, having regard to the sub-orbital flight application scenarios, including scenarios that consider the use of the same stations on board a sub-orbital vehicle on Earth, in the air or in outer space;

– to determine, based on the results of the study, the technical and regulatory conditions for sharing and compatibility of stations intended for sub-orbital flights with stations of incumbent services and applications, having regard to all possible application scenarios of these stations (see above) and ensuring the safe use of both the incumbent services and the stations used for sub-orbital flights,

invites the International Civil Aviation Organization

to participate in the studies and provide to ITU the relevant technical characteristics required for the studies called for in *resolves to invite the ITU Radiocommunication Sector*,

invites the 2023 World Radiocommunication Conference

to consider the results of the studies above and take the appropriate action,

instructs the Director of the Radiocommunication Bureau

to bring this Resolution to the attention of the relevant ITU‑R study groups and report on the results of the studies of the ITU-R study groups to a future competent conference,

invites administrations

to participate actively in the studies by submitting contributions to ITU‑R,

instructs the Secretary-General

to bring this Resolution to the attention of the United Nations Committee on the Peaceful Uses of Outer Space and ICAO and other international and regional organizations concerned.

**Reasons:** There are insufficient studies conducted on this item. In particular: the relevant technical characteristics and protection criteria of stations on board sub-orbital vehicles have not been determined; studies have not been conducted into sharing and compatibility with incumbent services and their applications, having regard to the application scenarios of the same stations on board sub-orbital vehicles on Earth, in the air or in outer space without the relevant allocations. The technical and regulatory conditions for the safe use of such stations have not been determined. Studies must be continued and concluded in order for decisions to be taken at the next competent conferences.

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