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| CPG19-7 | | |
| Hilversum, The Netherlands, 27th - 30th November 2018 | | |
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| Summary: | | |
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| Proposal: | | |
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1. The following pages are intended to be compiled in one CEPT Brief on AI 9

DRAFT CEPT BRIEF ON AGENDA ITEM 9.1 issue 9.1.4

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention;

Issue 9.1.4 Resolution 763 – Stations on board sub-orbital vehicles

# ISSUE

Resolution 763 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,

# Preliminary CEPT position

CEPT recognizes that:

* the delimitation between atmosphere and outer space has not been legally defined at an international level by the competent organisations;
* the definitions of status of the stations for suborbital flights for radiocommunication purpose by ITU-R do not prevent the competent international organisations (ICAO, UNOOSA) to potentially propose in the future, relevant definitions or other orientations concerning the kind of law (Air law, Space law, Sui generis) which could be applicable for the various types of suborbital systems concepts and projects.]
* the current satellite/space launch systems including re-usable part are already operated under the Radio Regulation

CEPT is of the view that:

* no change to the Radio Regulations is required for WRC-19;
* suborbital vehicles need to be differentiated from current satellite/space launch vehicles;
* suborbital vehicles need to be split in two different categories:

first category with trajectory and/or speed allowing continuous direct communication with ground during all the suborbital flight phase, then the stations fitted on board are considered as terrestrial stations or earth stations;

second category with trajectory and/or speed implying a reentry in the atmosphere avoiding direct communication to the ground (communication black out), then stations fitted on board are considered as space stations during the suborbital flight phase;

# Background

Space planes or sub-orbital vehicles have been discussed at a conceptual level for some time. However, with the advances in technology, the first re-useable suborbital space vehicle that can routinely take off and land on a traditional runway is close to becoming a reality with a number of companies either close to or actually testing vehicles.

A suborbital space flight can be seen as a flight in which the vehicle reaches altitude and speed not associated with conventional aircraft, without being able to complete an entire revolution of the Earth, and having the intent to land on Earth. It is envisaged that such vehicles might be the precursor to hypersonic travel that ultimately could cut the time taken to travel from Europe to Australia from approximately 24 hours to 90 minutes.

Further, such vehicles could also offer an alternative means of launching satellites. However, these satellites would need an additional propulsion system in order to reach the corresponding altitude for their insertion into the relevant orbit.

The introduction of such vehicles will bring a number of challenges to the spectrum and frequency management communities. With respect to spectrum, a suborbital space vehicle will travel at, or reach, altitude and speed not associated with conventional aircraft, which is generally near the boundary between the Earth’s atmosphere and space. From a frequency management perspective, planning rules for stations on board sub-orbital vehicles need to take into account that their field of view is significantly greater and their speed will produce higher levels of Doppler shift than that of an equivalent station on board an aircraft flying at an altitude around 35,000 ft.

Studies are therefore required to establish a common understanding as to how stations on board sub-orbital vehicles should be regarded in radio regulatory terms and whether a new category of service or station needs to be established. Furthermore, studies are needed to determine what spectrum will be required to ensure their safe operation, including their passage through the airspace used by conventional aircraft. Resolution 763 (WRC-15) calls for such studies and, if the results indicate that additional spectrum and/or other regulatory measures are required, provides for a possible WRC-23 agenda item.

This issue in the Director’s report arose from consideration of ITU-R Question 259/5 on Operational and radio regulatory aspects for planes operating in the upper level of the atmosphere.

In order to address the Question and also this related Director’s Report Issue, it is proposed to consider two categories of suborbital vehicles:

first category with trajectory and/or speed allowing continuous direct communication with ground during all the suborbital flight phase, then the stations fitted on board are considered as terrestrial stations or earth stations;

second category with trajectory and/or speed implying a reentry in the atmosphere preventing direct communication to the ground (communication black out), then stations fitted on board are considered as space stations during the suborbital flight phase;

ITU-R WP5B is producing a Report (the current version is in document 5B/305 Annex 25) addressing spectrum, regulatory and operational aspects of sub-orbital vehicles.

# List of relevant documents

ITU-Documentation (Recommendations, Reports, other)

ITU-R Question 259/5

Annex 25 to Working document towards a preliminary draft new Report ITU-R M.[SUBORBITAL VEHICLES] Spectrum requirements for suborbital vehicles (WP 5B Chairman's Report on the meeting in May 2017, Doc. 5B/305).

CEPT and/or ECC Documentation (Decisions, Recommendations, Reports)

EU Documentation (Directives, Decisions, Recommendations, other), if applicable

# Actions to be taken

Share a common understanding as to how stations on board sub-orbital vehicles should be regarded in radio regulatory terms

Based on the above, analyse the possible usage of the existing frequency allocations for terrestrial and space radio communication services and the corresponding regulation provisions for stations on board suborbital vehicles.

# Relevant information from outside CEPT (examples of these are below)

## European Union (date of proposal)

## Regional telecommunication organisations

APT (March 2018)

APT Preliminary View

APT Members support the ITU-R studies in accordance with Resolution 763 (WRC-15), which includes but not limited to the concept, definition, operation and functions of stations on board sub-orbital vehicles, including which radiocommunication service it operates on, as well as the spectrum requirement for sub-orbital vehicles operations.

ATU (September 2017)

Support the ongoing studies and encourage active participation in order to positively influence the outcomes of the studies.

Arab Group (April 2018)

Support following-up on-going studies in ITU-R.

CITEL (June 2018)

One country is of the view that existing station and service definitions in Article 1 of the Radio Regulations can be applied to sub-orbital vehicles (space planes).

RCC (March 2018)

The RCC Administrations consider that stations ensuring sub-orbital flights shall be operated within the frameworks of existing radio services and these stations shall be subject to regulatory, technical and procedural provisions currently in force for these radio services.

The RCC Administrations also consider it necessary to develop additional technical and operational measures which would help to avoid harmful interference to radiocommunication services from stations ensuring sub-orbital flights when existing measures will be insufficient. The developed technical and operational measures shall be specified in the new ITU-R Recommendation and shall not impose additional constraints on the operation of stations used during spacecraft launch and delivery in orbit.

## International organisations

IATA (date of proposal)

ICAO (September 2016)

To support the studies called for by Resolution 763 (WRC-15) noting that those studies need to be completed during this study cycle.

If the results of studies indicate that additional spectrum and/or other regulatory measures are required, seek an agenda item for WRC-23.

IMO (September 2017)

No Position

SFCG (November 2019)

SFCG members will continue to monitor the developments of this issue in WP 5B for any spectrum requirements identified that could impact space science service operations.

It is important that any regulatory changes associated with this agenda item will not adversely impact the operation of launch vehicles or sounding rockets. Launch vehicle operations during the first minutes of low orbit must not be limited beyond the current regulations.

WMO and EUMETNET (date of proposal)

IARU (June 2017)

This issue is of concern to the IARU only if spectrum requirements for space planes are identified that are in addition to the existing allocations for aeronautical and space operation services and if, therefore, a possible future agenda item for WRC-23 is developed.

## Regional organisations

ESA (date of proposal)

Eurocontrol (November 2019)

Based on the issues raised by the studies called for by Resolution 763 (WRC-15).

Support proposals for an agenda item for a future conference to resolve the remaining regulatory and technical questions and concerns; including as necessary any new allocations.

## OTHER INTERNATIONAL AND REGIONAL ORGANISATIONS

EBU (date of proposal)

GSMA (date of proposal)

CRAF (date of proposal)

**NATO (November 2018)**

No known impact at this time, however potential changes in the RR may affect NATO capabilities.

NATO is monitoring the progress on the definition of suborbital vehicles and will monitor the studies that may lead to the creation of a related agenda item for the WRC-23.