

## WRC-23 Agenda Item 1.8: Use of FSS Networks by Unmanned Aircraft Systems for Control and non-Payload Communications

### Overview

WRC-23 Agenda Item 1.8 to consider, on the basis of ITU-R studies in accordance with Resolution 171 (**WRC-19**), appropriate regulatory actions, with a view to reviewing and, if necessary, revising Resolution **155 (Rev. WRC-19)** and No. **5.484B** to accommodate the use of fixed-satellite service (FSS) networks by control and non-payload communications (CNPC) of unmanned aircraft systems (UAS). UAS comprise an unmanned aircraft (UA) with an Earth station on-board and an associated unmanned aircraft control station (UACS) connected via satellite links used to facilitate beyond line-of-sight (BLOS) control and non-payload communication (CNPC).

### Background

UAS CNPC links have been the subject of studies in ITU-R since 2007. WRC-12 dealt with terrestrial and satellite spectrum requirements for the operation of unmanned aircraft systems in non-segregated airspace and ensured that sufficient spectrum is available, in particular, for terrestrial links.

UA CNPC links in segregated airspace have been operating for several years using FSS networks in the geostationary orbit under No. **4.4** of the Radio Regulations (non-interference, non-protection). Based on the experience gained during these operations of CNPC links, technical, operational, and regulatory studies in response to WRC-15 Agenda Item 1.5 (Resolution **153 (WRC-12)**) were performed to assess the framework, under which conditions the identified FSS spectrum can be used for UAS CNPC links. As a result, WRC-15 agreed on Resolution **155 (Rev.WRC-19)** ("Regulatory provisions related to earth stations on board unmanned aircraft which operate with geostationary-satellite networks in the fixed-satellite service in certain frequency bands not subject to a Plan of Appendices 30, 30A and 30B for the control and non-payload communications of unmanned aircraft systems in non-segregated airspaces").

Studies on the protection of terrestrial services were performed in ITU-R in order to review the power flux density (pfd) limits given in Annex 2 of Resolution **155 (WRC-)** WRC-19 agreed to amend Resolution 155 accordingly, providing a new PFD mask in Annex 2 of Resolution **155 (Rev.WRC-19)**.

Resolution **155 (Rev. WRC-19)** is a complex resolution, containing 19 resolves. This is further complicated in that UAS falls under the responsibility of two international organisations, via ITU and ICAO.

ICAO is responsible for the Standards and Recommended Practices (SARPS), which includes safety, whilst ITU is responsible for the spectrum aspects. WRC-23 Agenda Item 1.8 links the two organisations via resolves 18 of Resolution **155 (Rev. WRC-19)** which calls for WRC-23 "to consider the progress made by ICAO in the process of preparation of SARPs for UAS CNPC links" and "to review this Resolution".

## Key Points

The frequency bands under consideration are:

› 12.5 – 12.75 GHz (space-to-Earth)

› 14 – 14.47 GHz (Earth-to-space)

› 19.7 – 20.2 GHz (space-to-Earth)

› 29.5 – 30.0 GHz (Earth-to-space)

There is a concern that because CNPC links have “safety of life” implications, CNPC links could be considered to have “super-primary” status within FSS applications and constrain the other FSS operations using the same frequency bands. This should not be the case as UAS CNPC links using FSS shall operate in accordance with ICAO SARPs, which deal with safety aspects.

The safety aspects of UAS CNPC shall not have any impact on:

- › Existing agreement between notifying administrations reached during FSS satellite coordination process.
- › Future coordination of FSS networks during the application of provisions of Articles 9 and 11 of the RR
- › Existing terrestrial services and their current and expected applications; and
- › Assignments which fall under RR 11.41

If the conditions for the safety operation of CNPC established by ICAO cannot be met by existing FSS links, while respecting the principles described above, then this link should not be used for UAS.

## GSOA Position

### GSOA recommends the following actions:

A review of the current conditions for use of FSS assignments, where this could allow for additional assignments to be available for UAS CNPC while meeting safety requirements, is required.

CNPC links will only operate under satellite networks which have completed ITU co-ordination and notification.

Administrations authorising the operations of the UAS CNPC links using the FSS under the ICAO SARPs shall consider the compatibility of the interference environment in which the UAS will be operating, prior to authorising their operations. Being the safety status responsibility of ICAO, ITU RR 4.10 does not apply.

Interference environment for MSS operations in 14-14.47 GHz, 19.7-20.2 GHz, and 29.5-30 GHz should not be further constrained by the operations of UAS CNPC in FSS.

