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| **World Radiocommunication Conference (WRC-15) Geneva, 2–27 November 2015** |  |
| **INTERNATIONAL TELECOMMUNICATION UNION** |  |
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| PLENARY MEETING | **Addendum 5 to Document 61-E** |
|  | **14 October 2015** |
|  | **Original: English** |
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| Iran (Islamic Republic of) | |
| Proposals for the work of the conference | |
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| Agenda item 1.5 | |

1.5 to consider the use of frequency bands allocated to the fixed-satellite service not subject to Appendices **30**, **30A** and **30B** for the control and non-payload communications of unmanned aircraft systems (UAS) in non-segregated airspaces, in accordance with Resolution **153 (WRC‑12)**;

Introduction

Unmanned aircraft systems (UAS) consist of an unmanned aircraft (UA) and associated unmanned aircraft control station (UACS), control links and satellite systems.

A potential increase of the worldwide use of UAS is reported by the proponent of that system expected. For safe flight operations reliable communication links for UA and associated UACS, control links and satellite systems are not only essential but fundamental and crucial. These links consist of the links between the remote pilot and satellite UACS, on the one hand, and between the satellite and UA, on the other hand, to command and control one or more probably several UA and to relay air traffic communications.

Currently, UA operations have been restricted to segregated airspaces where separation from manned aircraft can be assured. This separation provided a great degree of cautions required for the safety of life and safety of flight in the airspace. However, it is intended or announced by some Member States to authorize the operation of UA or UAs together with manned aircraft in non-segregated airspace and, to the extent practicable, use globally harmonized spectrum. The operation of UA outside segregated airspace requires addressing the same issues as manned aircraft, namely safe and efficient integration into the air traffic control system. To achieve this objective the development of safe mechanisms for the control and non-payload communications (CNPC) of UAS is a fundamental requirement.

The requirements of numerous UAS applications for communications beyond line of sight will necessitate the use of satellite communications to provide all, or components of, the CNPC for UAS. It may not be technically feasible to rely on terrestrial systems alone to support the CNPC requirements of UAS.

ICAO has identified seven conditions to be addressed by the studies.

ICAO is merely responsible for developing the technical Standards and Recommended Practices (SARPs) for CNPC to ensure safe operation of UAS in non-segregated airspace. UAS CPNC operations in non-segregated airspace need in addition to technical, operational and regulatory requirements yet to be established by ITU to also satisfy, among other criteria, ICAO SARPs requirements provided that reliable links between the remote pilot and satellite (UACS), on the one hand, and between the satellite and unmanned aircraft (UA) on the other hand are ensured. The issue of using a reliable link from all aspects is the core and fundamental issue yet to be discussed and possibly agreed upon.

On the other hand, the interference management of frequency assignments and implementation of the Radio Regulations are matters which are exclusively dealt with by ITU Administrations. CNPC links must meet specific Required Communications Performance (RCP) to satisfy the aviation safety requirements. UAS CNPC links operated on frequencies in FSS allocations would have to, among other things, be validated to meet those SARPs. Regulatory measures will also be required to address the technical and operational characteristics, interference and regulatory environments associated with UA CNPC links. In addition regulatory measures will be required to satisfy the safety related aspects and requirements.

In order to address the requirements of UAS CNPC under agenda item 1.5 of WRC-15, ITU-R is developing a document towards a preliminary draft new Report covering the technical, operational, regulatory, interference environment and safety aspects of UAS CNPC. To this effect, relevant elements of Report ITU-R M.2233 to the extent applicable were considered in the development of this document. In particular performance and service availability of the CNPC link.

However, this document after almost three years of hard work is still at an early stage and has not been agreed by ITU-R at its July 2015 meeting in Bucharest, Romania and is currently placed between **bold** Square Brackets with a special Note indicating that:

***Quote***

“There was no agreement

a) on WD towards preliminary draft new Report ITU-R M.[UAS-FSS]; and

b) on updating this Report based on the materials received in the July meeting of WP 5B due to the complexity of the issues and the divergence of views. Consequently these input contributions together with Annex 18 to Document 5B/761 are carried forward to the next meeting”.

***Unquote***

There is a wide and deep divergence of views among the ITU-R participants on almost all elements of this voluminous document towards a preliminary draft new Report.

I.R. of Iran's Proposals

I.R. of Iran proposes no change to the Radio Regulations (Method B).

There are a long list of reasons such as:

– No agreement was reached on the results of studies due to the fact that there is a major divergence of views on the appropriateness, feasibility of the use of the FSS for such a sensitive and delicate issue which very high degree of importance in terms of safety of flight and satiety of life.

– There are considerable technical, operational and regulatory obstacles for the use of FSS for UAS CNPC links. Moreover, existing allocations for AMS(R)S as well as AMSS and MSS, under certain conditions could satisfy the requirements for UAS CNPC in the frequency bands of these services.

– There were several concerns expressed resulted that no agreement on technical, operational, regulatory, interference and safety aspects of the use of the FSS for UAS CNPC was reached. Moreover, there was concern that in order to protect such operation there will be an impact on other FSS operation. There was discussion of the unique nature of the CNPC links and the special requirements in RR Article 4.10in respect to applications related to safe operation. There was some discussion that this may impose unnecessary constraints on the future development of the selected bands for regular FSS. On the other hand there was no consensus that the FSS should be granted to have the same degree of safety aspects due to the fact that such course of action would impede future coordination of FSS among satellite operators.

– For links 1 and 4, a serious ambiguity of the regulatory status of the radio link between the unmanned aircraft control stations and the fixed-satellite service space station (links 1 and 4) exists if the earth station is not at fixed point due to the fact that the use of mobile earth stations in the FSS is not compatible with the FSS definition.

– The type of earth station used (UA) in links 2 and 3 of unmanned aircraft earth stations are of a mobile nature (aeronautical mobile earth station) and thus cannot communicate with a fixed‑satellite space station due to the fact that its future operation in that link is not compatible with the definition of the FSS and its associated earth station as contained in Article 1 of the Radio Regulations.

– The conducted studies are based on the assumption that UA CNPC links will have the same technical characteristics as the FSS traditional systems operating in the same frequency bands. However, the use of FSS earth stations on board the aircraft for the UAS CNPC links (on-board station of UA CNPC links) significantly changes the conditions of compatibility with existing services in comparison with the current use of special and typical FSS earth stations in the Earth's surface.

– The FSS is not recognized by ITU as a safety service. It should be noted that most satellite networks are today seen to be brought into use without completion of all the required coordination with other satellite networks; that is these networks do not have favourable findings in the MIFR with respect to RR No. 11.32. Consequently, the networks are recorded under RR No. 11.41, i.e. with outstanding coordination requirements, operating on a non-interference, non-protected basis in respect of those networks with which coordination is not completed. This means that both the operational limitations (in terms of protecting other networks) and interference scenario (in terms of being protected against interference from other networks) are not fully determined.

– Protection criteria for UAS CNPC links have not yet been identified, therefore it is not possible to complete the compatibility studies of these links with existing services. Presented in the WD towards PDNR ITU‑R M.[UAS-FSS] results of parametric studies of interference does not allow to conclude about the possibility of protection and fulfilment of technical requirements for UAS CNPC links at the existing levels of interference. Moreover, parametric studies submitted do not cover all radio services, and relate only to the interference from the fixed service.

– It is worth mentioning that the referenced Resolution (Option #1) in Method A(Use of the fixed-satellite service) was never ever discussed in any WP 5B meetings at all. It was attached to some input documents but due to the major disagreement about the subject matter the Resolution is question was just attached without being discussed. Moreover, the content of the Resolution is totally inappropriate and does not reflect the reality.

– There is a long list of disadvantage of Method A (of 17 items) which indicate a considerable degree of non-feasibility and inappropriateness of the use of commercial FSS:

a) 50% of which have not completed the coordination and even have only coordinated with few among many affected administrations.

b) Within the rest of 50% for which blanket coordination has been announced, there is no information on the level of interference that has been accepted.

c) Moreover, even if and only if all coordination’s are completed, there is no guarantee that the future commercial FSS satellites currently in operation would not cause harmful interference to the above-mentioned link.

Occurrence of interference for a fraction of minute could create catastrophic results as tens of unmanned aircraft will be misguided which could collide with other unmanned and or manned aircraft.

NOC IRN/61A5/1

ARTICLE 5

Frequency allocations

**Reasons:** No agreement was reached on the results of studies due to the fact that there is a major divergence of views and disagreement on the appropriateness, feasibility of the use of the FSS for such a sensitive and delicate issue which very high degree of importance in terms of safety of flight and satiety of life. In fact the study even after several years is at its very early stage and the activities of the ITU-R are in form of document toward preliminary draft new Report which is far from being considered to yield a tangible result.

SUP IRN/61A5/2

RESOLUTION 153 (WRC‑12)

The use of frequency bands allocated to the fixed-satellite service not subject to Appendices 30, 30A and 30B for the control and non-payload communications   
of unmanned aircraft systems in non-segregated airspaces

**Reasons:** This Resolution is no longer required.

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