

INTERNATIONAL TELECOMMUNICATION UNION

PLENARY MEETING

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Member States of the Inter-American Telecommunication Commission (CITEL)

PROPOSALS FOR THE WORK OF THE CONFERENCE

Agenda item 10

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention,

Background Information: Recent test deployments of broadband provided from stations on lightweight, solar-powered aircraft operating at approximately 20 km above ground in the stratosphere have demonstrated the potential of providing connectivity to underserved communities with minimal ground-level infrastructure and maintenance. Nominally fixed stations operating at 20 km are high enough to provide service to a large footprint but low enough to provide dense coverage at low latency. Thus, they could potentially provide a high Quality of Service to underserved communities. These stations are also highly resilient in the face of natural disasters and therefore could potentially be an effective tool for disaster recovery.

While tests of unmanned aircraft at high altitudes for Internet service are recent, high altitude platform stations (HAPS) have been studied by the ITU-R for about two decades, beginning for WRC-1997. HAPS are defined in Article 1.66A of the Radio Regulations as “[a] station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.” Some entities are developing unmanned aircraft that will circle for several months at approximately 20 km in the stratosphere to maintain coverage of a constant service area on the ground. Such nominally fixed aircraft, which could be considered HAPS, are one promising model for delivery of broadband from a high altitude, and could be used by broadband providers to offer service to underserved communities.

The initial HAPS identification provided for HAPS use in the fixed service at 47.2-47.5 GHz and 47.9-48.2 GHz. Because of concern with rain fade in that range, WRC-2000 agreed on HAPS identification in the fixed service for 27.9 – 28.2 GHz (HAPS-to-ground), paired with 31.0 – 31.3 GHz (ground-to-HAPS) outside Region 2. Also at WRC-2000, the bands 1 885 – 1 980 MHz, 2 010 – 2 025 MHz and 2 110 – 2 170 MHz were identified in the mobile service for HAPS operating as IMT base stations. In WRC-12, five countries joined a footnote for a HAPS designation in the fixed service for 6 440 – 6 520 MHz (HAPS-to-ground) and 6 560-6 640 MHz (ground-to-HAPS). Despite these designations, few HAPS systems have been deployed.

Since 1997, demand for broadband has increased markedly. The identifications for HAPS, now geographically limited, may need to be expanded, geographically and/or spectrally, in order to allow newer HAPS technologies to deliver broadband consistent with user demand. Global fixed service identifications facilitating the delivery of broadband from HAPS could provide the economies of scale necessary to make this technology affordable in underserved areas, especially those with terrain features that make it challenging to deploy conventional terrestrial networks and those that have suffered natural or other disasters.

In addition to expanded geographic reach, additional spectrum may be required to support modern broadband technologies. Therefore, the frequency bands currently allocated to the Fixed Service should be studied for additional identifications for HAPS to provide links to fixed stations. For purposes of such studies, such fixed stations could include gateway or other fixed terminals and would not include links directly to mobile devices.

The following proposal puts forth a new agenda item for WRC-19 to consider the results of studies on the delivery of broadband applications by HAPS, and related ITU-R Recommendations and Resolutions, and take appropriate action.

Proposals

SUP **USA/10(HAPS)/1**

RESOLUTION 808 (WRC-12)

Preliminary agenda for the 2018 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2012),

Reasons: This Resolution must be suppressed, as WRC-15 will create a new Resolution that will include the agenda for WRC-19.

ADD **USA/10(HAPS)/2**

DRAFT NEW RESOLUTION [USA-2019]

Agenda for the 2019 World Radiocommunication Conference

The World Radiocommunication Conference (Geneva, 2015),

considering

- a) that, in accordance with No. 118 of the ITU Convention, the general scope of the agenda for a world radiocommunication conference should be established four to six years in advance and that a final agenda shall be established by the Council two years before the conference;
- b) Article 13 of the ITU Constitution relating to the competence and scheduling of world radiocommunication conferences and Article 7 of the Convention relating to their agendas;
- c) the relevant resolutions and recommendations of previous world administrative radio conferences (WARCs) and world radiocommunication conferences (WRCs),

recognizing

- a) that WRC-15 has identified a number of urgent issues requiring further examination by WRC-19;
- b) that, in preparing this agenda, some items proposed by administrations could not be included and have had to be deferred to future conference agendas,

resolves

to recommend to the Council that a world radiocommunication conference be held in 2019 for a maximum period of four weeks, with the following agenda:

1 on the basis of proposals from administrations, taking account of the results of WRC-15 and the Report of the Conference Preparatory Meeting, and with due regard to the requirements of existing and future services in the bands under consideration, to consider and take appropriate action in respect of the following items:

1.[HAPS] to consider, on the basis of ITU-R studies in accordance with Resolution [USA/10/XX] (WRC-15), appropriate regulatory actions, potentially including expansion of existing identifications for HAPS links within existing fixed service allocations, by revising geographic, technical, and regulatory restrictions associated with existing HAPS identifications, and identifying additional frequency ranges (including any appropriate regulatory and technical conditions) for use by HAPS, within existing fixed service allocations;

2 to examine the revised ITU-R Recommendations incorporated by reference in the Radio Regulations communicated by the Radiocommunication Assembly, in accordance with Resolution 28 (Rev.WRC-03), and to decide whether or not to update the corresponding references in the Radio Regulations, in accordance with the principles contained in Annex 1 to Resolution 27 (Rev.WRC-12);

3 to consider such consequential changes and amendments to the Radio Regulations as may be necessitated by the decisions of the Conference;

4 in accordance with Resolution 95 (Rev.WRC-07), to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;

5 to review, and take appropriate action on, the Report from the Radiocommunication Assembly submitted in accordance with Nos. 135 and 136 of the Convention;

6 to identify those items requiring urgent action by the Radiocommunication Study Groups in preparation for the next world radiocommunication conference;

7 to consider possible changes, and other options, in response to Resolution 86 (Rev. Marrakesh, 2002) of the Plenipotentiary Conference, an advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks, in accordance with Resolution 86 (Rev.WRC-07) to facilitate rational, efficient, and economical use of radio frequencies and any associated orbits, including the geostationary-satellite orbit;

8 to consider and take appropriate action on requests from administrations to delete their country footnotes or to have their country name deleted from footnotes, if no longer required, taking into account Resolution 26 (Rev.WRC-07);

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

9.1 on the activities of the Radiocommunication Sector since WRC-15;

9.2 on any difficulties or inconsistencies encountered in the application of the Radio Regulations; and

9.3 on action in response to Resolution 80 (Rev.WRC-07);

10 to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, in accordance with Article 7 of the Convention,

resolves further

to activate the Conference Preparatory Meeting,

invites the Council

to finalize the agenda and arrange for the convening of WRC-15, and to initiate as soon as possible the necessary consultations with Member States,

instructs the Director of the Radiocommunication Bureau

to make the necessary arrangements to convene meetings of the Conference Preparatory Meeting and to prepare a report to WRC-19,

instructs the Secretary-General

to communicate this Resolution to international and regional organizations concerned.

Reasons: To facilitate access by underserved communities, as well as residents in rural and remote areas, to affordable and reliable broadband services.

ADD USA/10(HAPS)/3

DRAFT NEW RESOLUTION [USA/10/XX] (WRC-15)

Facilitating access to broadband applications delivered from HAPS

The World Radiocommunication Conference (Geneva, 2015),

considering

- a) that existing identifications for high altitude platform stations (HAPS) are in a limited number of countries;
- b) there is an urgent need for greater broadband connectivity and telecommunications services in underserved communities and in rural and remote areas;
- c) that some entities are currently testing the delivery of broadband over lightweight, solar-powered aircraft that are designed to circle at approximately 20 kilometers for several months at a nominal fixed point relative to the ground below;
- d) that current technologies can be used to deliver broadband services from base stations operating at high altitudes;
- e) that HAPS are one possible model for facilitating the delivery of broadband services;
- f) that HAPS could provide broadband connectivity in remote areas, including mountainous, coast, and sandy desert areas;
- g) that HAPS can provide broadband connectivity with minimal ground network infrastructure, and therefore could be effective for disaster recovery,

recognizing

- a) the importance of protecting existing services and users;
- b) that HAPS is defined in No. **1.66A** of the Radio Regulations as a station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.;
- c) that certain bands are presently identified for use by HAPS in limited areas of the world, such as the 1 885 – 1 980 MHz, 2 010 – 2 025 MHz, and 2 110 – 2 170 MHz mobile allocations as well as the fixed allocations in the 6 440 – 6 520 MHz (HAPS-to-ground) paired with 6 560 – 6 640 MHz (ground-to-HAPS); and 27.9 – 28.2 GHz (HAPS-to-ground), paired with 31.0 – 31.3 GHz (ground-to-HAPS) bands;

- d) that the existing HAPS identifications were established without reference to today's broadband capabilities;
- e) that Resolution **233 (WRC-12)** noted that mobile broadband systems can help reduce the digital divide between urban and rural areas, including underserved communities;
- f) that Resolution **233 (WRC-12)** also noted the need to continually take advantage of technological developments to increase the efficient use of spectrum and facilitate spectrum access;
- g) that Resolution **34 (REV.WRC-12)** noted that that the development of common worldwide allocations is desirable in order to improve and harmonize utilization of the radio-frequency spectrum,

resolves to invite ITU-R

- 1 to study additional spectrum requirements for HAPS, taking into account:
 - technical and operational characteristics of HAPS systems, including the evolution of HAPS through advances in technology and spectrally-efficient techniques, and their deployment;
 - the possibility of modifying the geographic, technical, and regulatory restrictions associated with existing HAPS footnote identifications listed in *recognizing c)* to facilitate access to broadband, taking into account the technical characteristics of newer configurations of stratospheric broadband systems and the evolving user needs, particularly in underserved, rural, and remote areas and areas suffering from disasters;
- 2 to study additionally, based on the studies in *resolves to invite the ITU-R 1*, the feasibility of identifying portions of the following existing fixed service frequency ranges, not subject to Appendices **30**, **30A**, and **30B** in any region, for the use of HAPS: 10.95 – 11.2 GHz, 11.45 – 11.7 GHz, 21.4 – 22 GHz, and 24.25 – 28.35 GHz;
- 3 to conduct sharing and compatibility studies with existing services allocated in the frequency ranges identified in *resolves to invite ITU-R 1* and 2 and, as appropriate, adjacent band studies, taking into account studies already performed in the ITU-R;
- 4 to develop ITU-R Recommendations and Reports, as appropriate, taking into account *resolves to invite ITU-R 1*, 2, and 3 above,

further resolves to invite WRC-19

to consider, on the basis of the studies conducted under the *resolves to invite ITU-R* above, appropriate regulatory actions, including the possible expansion of existing HAPS identifications within existing fixed service allocations for HAPS links by revising geographic, technical, and regulatory restrictions associated with existing HAPS identifications, and possible identification of additional frequency ranges within existing fixed service allocations for HAPS links in accordance with *resolves to invite ITU-R 2* and 3.

Reasons: To facilitate the delivery of broadband services to underserved communities over affordable and reliable infrastructure.

ATTACHMENT

PROPOSAL FOR FUTURE AGENDA ITEM FOR BROADBAND FROM HIGH ALTITUDE BASE STATIONS

Subject: Proposed Future WRC Agenda Item for WRC-2019 to consider the results of studies on the delivery of broadband applications by HAPS, and whether changes are needed to the set of existing bands identified for use by HAPS and ITU-R Recommendations and Resolutions to facilitate the delivery of broadband to underserved communities, taking actions as appropriate.

Origin: United States of America

Proposal: To study high altitude platform station operations for broadband.

Background/reason:

Test deployments of broadband provided from stations operating at approximately 20 km above ground in the stratosphere have demonstrated the potential of providing connectivity to underserved communities with minimal ground-level infrastructure and maintenance. Stations operating at 20 km are high enough to provide service to a large footprint but low enough to provide dense coverage at low latency. Thus, they could potentially provide a high quality of service to underserved communities at reasonable cost. These stations are also highly resilient in the face of natural disasters and therefore could potentially be an effective tool for disaster recovery. Since 1997, demand for broadband has increased markedly. Studies are required to ensure that existing ITU-R HAPS identifications are sufficient to enable the current generation of broadband technologies to be delivered over HAPS and to possibly identify additional ranges for identifications.

Radiocommunication services concerned: Amateur, Amateur-satellite, Broadcasting-Satellite, Earth Exploration Satellite, Fixed, Fixed-Satellite, Inter-Satellite, Meteorological Satellite, Mobile, Mobile Satellite, Radio Astronomy, Radiolocation, Radiolocation-satellite, Radionavigation, Radionavigation-Satellite, Space research, Standard frequency and time signal-satellite.

Indication of possible difficulties: None foreseen.

Previous/ongoing studies on the issue: Recs. ITU-R F.1569, F.1570, F.1607, F.1609, F.1612,

F.1764, F.1891, and F.2011, provide requirements and studies on the provision of HAPS operating in the fixed service. Recs. ITU-R M.1456 and M.1641 provide requirements and studies on the provision of mobile services from HAPS using certain bands around 1.9/2.1 GHz.

Recs. ITU-R SF.1601 and SM.1633 provide propagation, interference mitigation, compatibility, and other technical analyses regarding the operation of HAPS.

<i>Studies to be carried out by:</i> ITU-R Study Group 5, WP 5C	<i>with the participation of:</i> SG 4 and SG 7
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ITU-R Study Groups concerned: SG 4, 5, 6, and 7

ITU resource implications, including financial implications (refer to CV126): Minimal

Common regional proposal: Yes/No

Multicountry proposal: Yes/No

Number of countries:

Remarks