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PRELIMINARY VIEWS ON WRC-19

AGENDA ITEM 1.14

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SGT-1

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Agenda Item 1.14: *to consider, on the basis of ITU-R studies in accordance with Resolution **160 (WRC-15)**, appropriate regulatory actions for high-altitude platform stations (HAPS), within existing fixed-service allocations*

BACKGROUND

Article 1.66A of the ITU Radio Regulations define a high-altitude platform station (HAPS) as "a station on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth". Agenda Item 1.14 was adopted by WRC-15 to consider, in accordance with Resolution 160 (WRC-15), regulatory actions that can facilitate deployment of HAPS for broadband delivery. Resolution 160 resolves to invite ITU-R to study additional spectrum needs of HAPS, examining the suitability of existing HAPS identifications and conducting sharing and compatibility studies for additional identifications in existing fixed allocations in the 38-39.5 GHz band on a global basis and in 21.4-22 GHz and 24.25-27.5 GHz bands in Region 2 exclusively.

Currently there are 3 spectrum bands identified for HAPS in the fixed services. These are:
- 47.2–47.5 GHz and 47.9 48.2 GHz,
- 27.9-28.2 GHz and 31.0-31.3 GHz,
- 6 440–6 520 MHz (HAPS-ground) and 6 560-6 640 MHz (ground-HAPS).

However, spectrum needs of next-generation HAPS cannot be accommodated within these identifications due to either geographical restrictions or technical limitations which impairs their operation. The global identification for HAPS links (which is in the 47.2-47.5 GHz band fixed-service allocation paired with the 47.9-48.2 GHz band fixed-service allocation) suffers from the effects of rain fade attenuation that severely limit service provision over high-precipitation geographies. The remaining 2 available bands (27.9-28.2 GHz paired with the frequency band 31.0-31.3 GHz, and 6440-6 520 MHz paired with 6 560-6 640 MHz) have been identified by a very limited amount of countries, none of which is within ITU Region 2.

BROADBAND HAPS

Advances in aeronautics and transmission technologies have significantly improved the capabilities of HAPS to provide effective connectivity solutions and meet the growing demand for high capacity broadband networks, particularly in currently underserved areas. Recently conducted full-scale test flights have shown that solar-powered platforms in the upper-atmosphere can now be used to carry payloads that offer connectivity over large areas in a reliable and cost-effective way, and a growing number of applications for the new generation of HAPS are being developed. The technology appears particularly well suited to complementing terrestrial networks by providing backhaul. A number of advantages of the new generation of HAPS are foreseen:

- **Wide-area coverage:** A single plane will be able to serve footprints larger than 100 km in diameter, and recent technological advances in the development of optical inter-HAPS links now allow the deployment of multiple linked HAPS, in fleets that can cover whole nations.
- **Low cost:** The cost of operating solar platforms is projected to be significantly lower than other connectivity solutions in many areas, while mass production of the aircraft will significantly lower upfront capital expenditure for deployment.
- **Reach:** HAPS platforms will operate at around 20 km above ground, which reduces their vulnerability to weather conditions that may affect service, provides large coverage areas and avoids interference caused by physical obstacles.

- **Rapid deployment and flexibility:** It will be possible to deploy HAPS services without long lead times and it is relatively simple to return solar platforms to the ground for maintenance or payload reconfiguration.
- **Geographical reach:** HAPS that use the architecture of solar platforms can also provide connectivity where it is impossible to deploy terrestrial infrastructure: remote sites on land or sea.
- **Environmentally friendly:** HAPS can run exclusively on solar power for long periods, connecting people with almost no environmental impact.

Spectrum harmonization and utilization is facilitated by common worldwide identifications. International regulatory flexibility enable improvements in global connectivity by encouraging national regulators to permit operation of higher-speed Internet access services over new, complementary platforms, while ensuring protection of existing services. Additionally, harmonization of spectrum promotes economies of scale and commonality of equipment.

SHARING STUDIES

ITU-R Working Party 5C (WP 5C) is the group responsible for Agenda Item 1.14. WP 5C has, in turn, established a specific Sharing Studies Drafting Group to examine the compatibility between HAPS and services operating or planning to operate in the bands under study as per Resolution 160 (WRC 15).

Further resolves 1 of Resolution 160 (WRC-15) asks that ITU-R studies on AI 1.14 "*include sharing and compatibility studies to ensure protection of existing services allocated in the frequency ranges identified and, as appropriate, adjacent band studies, taking into account studies already performed in ITU-R*". WP 5C has identified a number of sharing and compatibility studies to be conducted, including adjacent band studies, The draft studies are currently located in the Working Party 5C Chair's Report.

A number of administrations and technology proponents are accordingly conducting compatibility studies to assess coexistence between HAPS and incumbent and proposed systems and services (including WRC-19 Agenda Items 1.6 and 1.13).

PRELIMINARY VIEWS

Brazil, Ecuador

Brazil supports – ITU-R activities in accordance to Resolution **160 (WRC-15)** and is conducting sharing and compatibility studies to assess coexistence between HAPS and other services in candidate frequency bands. Provided that these studies demonstrate sharing and compatibility with existing services and candidate applications are feasible, and future development of existing services is considered, Brazil supports appropriate regulatory actions, including addressing additional spectrum needs for HAPS.

Canada

Canada supports the introduction of technologies that seek to provide broadband connectivity in un-served and underserved regions and therefore supports the study of broadband HAPS systems by ITU-R according to Resolution 160 (WRC-15). Should studies demonstrate that sharing is feasible between HAPS systems and systems of the services in currently identified and candidate bands, Canada supports the adoption of appropriate regulatory provisions for HAPS to satisfy Resolution 160 (WRC-15). These regulatory provisions could include modifications to the regulatory requirements in existing frequency bands already identified for HAPS, as well as possible additional spectrum identifications in the candidate frequency bands, in accordance with Resolution 160 (WRC-15).

USA

In order to facilitate the use of HAPS links on a global or regional level, the United States supports studies, in accordance with Resolution **160 (WRC-15)**, and appropriate WRC-19 action based on the results of these studies, including possible modifications to the existing provisions on HAPS identifications in the Radio Regulations and possible new HAPS identifications in the fixed service bands at 21.4-22 GHz and 24.25- 27.5 GHz in Region 2, and 38-39.5 GHz globally.

Mexico

Mexico supports the development of technologies to provide broadband connectivity in marginalized or underserved regions. With a view to satisfy this Agenda Item, Mexico supports sharing and compatibility studies between broadband HAPS systems and the fixed service within the framework of Working Group ITU-R 5C, in accordance with Resolution 160 (CMR- 15).

On condition that the compatibility studies demonstrate feasibility of sharing between HAPS and the fixed service, Mexico supports the adoption of appropriate regulatory measures to satisfy Resolution 160 (WRC-15) including additional identifications in candidate bands that are allocated to the fixed service.

Uruguay

Uruguay supports the studies carried out within the framework of Resolution 160 (WRC-15). While these studies demonstrate the feasibility of sharing and compatibility with existing services and do not impose restrictions on their future development, Uruguay supports the adoption of the pertinent regulatory measures, including the eventual need for additional spectrum for HAPS.