

**Proposals Regarding Definitions and Unmanned Aerial Vehicles with respect to  
Wideband Aeronautical Mobile Telemetry (AMT)  
WRC-07 Agenda Item 1.5**

This contribution addresses the issue of definitions for the terms “aeronautical telemetry” and “aeronautical telecommand,” and the use of telemetry spectrum for unmanned aerial vehicles (“UAVs”).

**Background**

Agenda Item 1.5 calls for the consideration of the spectrum requirements and possible additional spectrum allocations for aeronautical telecommand and high bit-rate aeronautical telemetry, in accordance with Resolution 230 (WRC-03). Resolution 230, in turn, calls upon Administrations to:

1. consider the spectrum required to satisfy justified wideband aeronautical mobile telemetry requirements and associated telecommand above 3 GHz.
2. review, with a view to upgrading to primary, secondary allocations to the mobile service in the frequency range 3-16 GHz for the implementation of wideband aeronautical telemetry and associated telecommand.
3. consider possible additional allocations to the mobile service, including aeronautical mobile, on a primary basis in the frequency range 3-16 GHz for the implementation of wideband aeronautical telemetry and associated telecommand.
4. designate existing mobile allocations between 16 and 30 GHz for wideband aeronautical telemetry and associated telecommand.
5. to conduct, as a matter of urgency, studies to facilitate sharing between aeronautical mobile telemetry and the associated telecommand, on the one hand, and existing services, on the other hand, taking into account the *resolves* above.

**Definitions**

At the meeting of ITU-R Working Party 8B held in November 2003, the French Administration presented a paper (Document 8B/30) which proposed the adoption of definitions for eventual addition to Article 1 of the Radio Regulations for the terms “aeronautical telemetry,” and “aeronautical telecommand.” The French definitions are as follows:

**“Aeronautical telemetry:** The use of telemetry for the transmission from an aircraft station of results of measurements made in an aircraft, including those relating to the functioning of the aircraft.”

In the view of the French Administration, this definition “takes into account other sectors of activity systems: air or maritime surveillance, visible or infrared sensors, earth exploration, synthetic aperture radars, radiolocation, weather data, telemetry, etc. This definition (non restrictive) is important and includes global frequency requirements.” Document 8B/30.

**“Aeronautical telecommand:** The use of radiocommunication for the transmission of signals to an aircraft station to initiate, modify or terminate functions of equipment on an associated aircraft object, including the aircraft station.”

The US has urged that definitions are unnecessary inasmuch as “telemetry” and “telecommand” are already defined in the Radio Regulations, and any effort to amend Article 1 (a necessary step to the adoption of definitions) would open an entirely separate front in the effort to secure WRC approval for additional spectrum allocations for flight testing. Consistent with this, it was suggested to the French delegation that the pursuit of definitions for the purposes of the Radio Regulations be dropped as counter-productive to the two Administrations’ shared goal of realizing additional spectrum allocations. WP8B square-bracketed the definitions in the CPM text and agreed to carry the matter forward for resolution at the next meeting. See Chairman’s Report of the 15<sup>th</sup> Meeting of Working Party 8B, Document 8B/98, Annex 6. It is understood that the pros and cons of adopting definitions remain under advisement within CEPT.

Nonetheless, the US recognizes that it might be helpful, if only for educational purposes, to provide the ITU-R and WRC delegates with a notion as to what the terms aeronautical telemetry and aeronautical telecommand mean in the context of flight-testing. The US also believes that there are less formal approaches to exploring the meaning of these terms as an alternative to adopting formal definitions under Article 1 of the Radio Regulations. Thus, the US has included a description of these terms, for the purposes of studies required for this WRC-07 Agenda Item, in the opening paragraphs of the primer on flight testing which was introduced at the last meeting of WP8B, and which is found in the Chairman’s Report at Annex 4. As set forth in Section 1 of the Preliminary Draft New Report ITU-R [AMT]: Operational; Description of Aeronautical Mobile Telemetry:

“Aeronautical telemetry (or “AMT”) describes a particular use of the Mobile Service (“MS”) for the transmission from an aircraft station of results of measurements made on board an aircraft, including those relating to the functioning of the aircraft. Examples of AMT data include engine temperature, fluid pressure, and control surface strain gauges, among many other functions.

Aeronautical telecommand, on the other hand, represents another use of the MS for the transmission of signals to an aircraft station. Such signals are used, for example, to initiate, modify or terminate functions of equipment on an associated aircraft, including the aircraft station.

Moreover, the text of the French definitions has been added in square brackets to the Preliminary Draft New Report.

## **UAVs**

With respect to UAVs, there is an overlap between Agenda Item 1.5 and Agenda Item 1.6 inasmuch as some of the same spectrum is being considered under both. In pertinent part, Agenda Item 1.6 calls for consideration of additional allocations for the aeronautical mobile (R) service in parts of the bands between 108 MHz and 6 GHz, in accordance with Resolution 414 (WRC-03). Resolution 414 generally calls for consideration of the frequency range between 108 MHz and 6 GHz for new aeronautical applications.

During the September 2004 meeting of ITU-R WP8B, the French Administration also introduced draft CPM text which contemplates study of the band 5030-5150 MHz, and in particular

the sub-band 5091-5150 MHz, under both Agenda Items. See Annex 6 and 7 to the Chairman's Report of the 15<sup>th</sup> Meeting of Working Party 8B, Document 8B/98 (hereinafter the "Chairman's Report"). Comments by French delegates have suggested that their intent is to explore use of this band for the command and control of UAVs in regular operation, not necessarily limited to flight-testing.

Moreover, Working Party 8B has approved the language of a Questionnaire, again authored by France, for distribution to Member States and affected organizations with the invitation to the next meeting of WP8B. The document asks a series of questions going toward Administrations' plans for integrating UAVs in their national airspace. See Annex 16 to the Chairman's Report.

Finally, it may be noted that the Radio Technical Commission for Aeronautics recently chartered a new subcommittee (SC-203) which is beginning to explore the many issues raised by UAVs in national airspace.

## **Discussion**

### **1. Definitions**

The US should continue efforts to dissuade the Europeans and others from pursuing definitions, at least under Agenda Item 1.5. As noted above, definitions are unnecessary: The terms "telemetry" and "telecommand" are already defined in Article 1 of the Radio Regulations. See RR 1.131 (telemetry) and 1.134 (telecommand). Adding "aeronautical" to those terms will add no value to the Radio Regulations.

The international aviation community has long operated with footnote allocations that simply state: "[U]se of the band [X] by the aeronautical mobile service for telemetry ..." without any special definition for "aeronautical telemetry" or "aeronautical telecommand." Put another way, the existing allocations for flight test telemetry were adopted without any perceived need for such definitions. See, e.g., No. 5.342 (e.g., Russian Federation and Ukraine, among a number of Administrations); No. 5.343 (Region 2); No. 5.394 (United States, Canada); and No. 5.395 (France).

An effort to formulate definitions for these terms is not only unnecessary, but will also entail a wasteful diversion of resources attempting to answer the question, just how high is "up?" That is to say, the Radio Regulations contain definitions for "space telemetry" and "space telecommand." Any effort to define "aeronautical telemetry" and "aeronautical telecommand" would have to start with the challenge of separating "space" from "aeronautical" in an era when flight testing increasingly will involve vehicles operating at the edge of space and beyond.

Finally, a search for definitions will impose increased burdens on the Special Committee for Regulatory and Procedural Matters and ITU staff in an era of tight ITU budgetary constraints. The United States has been a proponent of reducing the scope of WRC Agendas; the US should not be perceived as advocating a matter which entails potentially significant additional burdens on the ITU without a substantial justification therefor.

### **2. UAVs**

Insofar as UAVs are concerned, the United States does not seek, nor should it support, efforts to utilize Agenda Item 1.5 for the designation of spectrum for the command and control of

UAVs - - with one exception, that is the control of such vehicles during flight testing at designated test centers on a basis coordinated with other users by individual Administrations. Such use does not include command and control of UAVs in national airspace.

To the extent spectrum is to be considered for the command and control of UAVs in regular operation in national airspace, any studies thereof should be conducted under Agenda Item 1.6.

There are two reasons for this.

First. Agenda Item 1.5 was approved for one purpose only; namely, to ensure adequate spectrum resources for flight-testing in the face of extraordinary increases in telemetry data rates. Use of the Agenda Item for broader purposes is inconsistent with WRC-03's intent in this respect. See Res. 230 (WRC-03), *recognizing a*) ("there are emerging telemetry systems with large data transfer requirement to support testing of commercial aircraft and other airframes").

Second. Command and control of UAVs in civil airspace involves the use of spectrum for an aeronautical safety service such as the Aeronautical Mobile Route Service (AM(R)S). While flight testing involves the safety of pilots and those on the ground, aeronautical mobile telemetry is not a radio service but a function performed under the Mobile Service (MS) and hence is not a safety service as defined by the ITU. Agenda Item 1.6 deals with aeronautical safety services within the meaning of the Radio Regulations, not Agenda Item 1.5. Accordingly, Agenda Item 1.6 is the appropriate vehicle for any consideration of UAVs operating in civil airspace.

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Draft U.S. proposals reflecting this discussion are attached.

## United States of America

### Draft Proposal for the Work of the Conference

**Agenda Item 1.5 (WRC-07):** *“to consider spectrum requirements and possible additional spectrum allocations for aeronautical telecommand and high bit-rate aeronautical telemetry, in accordance with Resolution 230 (WRC-03)”*

#### Background Information

At the meeting of ITU-R Working Party 8B held in September 2004, one Administration presented a paper (Document 8B/30) which proposed the adoption of definitions for the terms “aeronautical telemetry,” and “aeronautical telecommand.” WP8B square-bracketed the definitions in the CPM text and agreed to carry the matter forward for resolution at the next meeting. See Chairman’s Report of the 15<sup>th</sup> Meeting of Working Party 8B, Document 8B/98, Annex 6.

#### Proposal:

USA/\_\_/01

#### NOC: Article 1

**Reasons:** Formal definitions are not necessary for resolution of this Agenda Item. Aeronautical mobile telemetry has been conducted for many years internationally without special definitions for the terms “aeronautical telemetry” or “aeronautical telecommand.” See, e.g., No. 5.342 (e.g., Russian Federation and Ukraine, among a number of Administrations); No. 5.343 (Region 2); No. 5.394 (United States, Canada); and No. 5.395 (France). This approach is not only the least restrictive of the options for implementing AMT, but has a long and successful history in the ITU.

The effort to secure Article 1 definitions would impose substantial burdens on the Special Committee for Regulatory and Procedural Matters and ITU staff, as well as complicate the work of the WRC. Given the points noted in the preceding paragraph, those burdens would far outweigh any conceivable benefit. The US also believes that there are less formal approaches to exploring the meaning of these terms as an alternative to adopting formal definitions under Article 1 of the Radio Regulations. To the extent any Administration should be of the view that further clarification regarding the scope of the Agenda Item would be in order, that clarification can be provided via text in the Preliminary Draft New Report.

## United States of America

### Draft Proposal for the Work of the Conference

**Agenda Item 1.5 (WRC-07):** *“to consider spectrum requirements and possible additional spectrum allocations for aeronautical telecommand and high bit-rate aeronautical telemetry, in accordance with Resolution 230 (WRC-03)”*

#### Background Information

Unmanned aerial vehicles (“UAVs”) are envisioned by many as fulfilling a variety of civil applications, and flying in national airspace of numerous Administration within the next decade. Vehicles such as these must be carefully tested before any such operation commences given the obvious safety implications associated with these flights.

Additional spectrum designated for aeronautical mobile telemetry pursuant to Agenda Item 1.5 may be utilized for the flight testing of such aircraft. Such testing is expected to occur at designated test centers on a coordinated basis with incumbent services. Such use does not include command and control of UAVs in national airspace. Consideration of the spectrum needs of UAVs operating in national airspace should be the subject of other Agenda Items.

#### Proposal:

USA/\_\_/02

**NOC: Article 5** (with regard to the use of spectrum by unmanned aerial vehicles operating in regular flight in national airspace pursuant to Agenda Item 1.5 (WRC-03)).

#### Reasons:

Agenda Item 1.5 was approved for one purpose only; namely, to ensure adequate spectrum resources for flight testing in the face of extraordinary increases in telemetry data rates. Use of the Agenda Item for broader purposes is inconsistent with WRC-03’s intent in this respect. See Res. 230 (WRC-03), recognizing a) (“there are emerging telemetry systems with large data transfer requirement to support testing of commercial aircraft and other airframes”).

Second. Command and control of UAVs in civil airspace involves the use of spectrum for an aeronautical safety service such as the Aeronautical Mobile Route Service (AM(R)S). While flight testing involves the safety of pilots and those on the ground, aeronautical mobile telemetry is not a radio service, but a function performed under the Mobile Service (MS), and hence is not a safety service as defined by the ITU. Accordingly, Agenda Item 1.5 is not the appropriate vehicle for any consideration of UAVs operating in civil airspace.