



Subject: Agenda item 1.5

## France

### SUGGESTIONS FOR AERONAUTICAL TELEMETRY AND AERONAUTICAL TELECOMMAND DEFINITIONS, AND ADDITIONNAL SPECTRUM NEEDS FOR AIRCRAFT TELEMETRY

Aeronautical systems using aircraft telemetry are still operational. The use of these aeronautical platforms will be generalised in a near future (2007). It is urgent to identify and to allocate additional frequency bands to this pseudo RR service of telemetry.

Thus, this point needs to precise aeronautical telemetry and telecommand definitions, to evaluate the necessary bandwidth for aeronautical platforms and to identify the potential sub-bands in the frequency band 3 to 30 GHz.

These three above mentioned items are developed below.

#### 1 Definitions

There is no definition in the ITU RR concerning the aeronautical telecommand nor the aeronautical telemetry. The only definitions are article **1.131** for telemetry, article **1.133** for space telemetry, article **1.134** for telecommand and article **1.135** for space telecommand.

Therefore aeronautical telemetry could currently be translated under two possible definitions as followed:

#### Definitions proposed

**1) Aeronautical telemetry:** Telemetry used for data transmission down link from an aircraft to provide aeronautical measured parameters.

This definition is close to the current use of aeronautical telemetry but is too restricted for the future telemetry needs. The second proposed definition is based to the one existing for the space telemetry and take into account the estimated future needs for aeronautical telemetry. Therefore the second one is preferred by France.

**2) 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.

This second proposition, more global, 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.

The aeronautical telemetry, understood under the non restrictive definition, includes wide band data transmission systems which could require up to 500 MHz bandwidth and more.

In the same way, a definition for the aeronautical telecommand close to the space telecommand definition is proposed as followed:

**3) 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.

It is noticeable that the aeronautical telemetry is not a RR service. The adequate service for the aeronautical telemetry is the aeronautical mobile service or the mobile service without the mention "except aeronautical mobile".

An early specific indication in the radio regulation through footnotes for the use of aeronautical mobile service frequency bands by the aeronautical telemetry could encourage industrials to develop specialised equipment and will ease technological development of high bit rate aeronautical telemetry.

## 2 Ongoing uses of aeronautical telemetry

The allocated frequency band for analogical equipment is 2 188- 2 483.5 MHz.

It is also allocated into the European common allocation table (ECA) as aeronautical telemetry related to CEPT/ERC/REC 62.02E.

## 3 Future requirements

It is obvious that the analogical equipment of aeronautical telemetry have to be replaced by digital equipment. This is in order to increase the ability to transmit a bigger amount of data from the aeronautical aircraft. This transmission includes aeronautical measured parameters and onboard sensor data.

The requirements can be detailed as below:

- aircraft station telecommand: **a few kHz**;
- aircraft object telecommand: **300 kHz**;
- telemetry related to the functioning of the aircraft: up to **60 MHz**;
- telemetry related to the results of measurements made in the aircraft:
  - currently and for short term plans between **5 and 500 MHz**;
  - (up to **1 GHz** for medium and long range plans);
- technical characteristics: depends on the type of transmitted data;
- flight volume: from the lowest to the very high altitude.

The current allocated frequency bands can absolutely not satisfy these specific requirements in particular because of the overuse of the electromagnetic environment. It is the case for aeronautical industry as well as for other systems.

The use of GSO or NGSO relay must be also taken into account under cover of mobile satellite service. It concerns link bandwidths of 50 to 500 MHz.

A review of all frequency bands between 3 and 30 GHz is necessary in order to identify the most appropriate bands to the aeronautical telemetry and to facilitate the development of new technology. This should consolidate the industrial choice and the operational orientations of the users.

#### **4 Conclusions**

4.1 It is urgent to establish specific ITU definitions for aeronautical telemetry and aeronautical telecommand.

4.2 The ongoing evolution of the aeronautical telemetry use (second definition) needs the allocation of new frequency bands, in order to facilitate the development of new technologies, to satisfy the new requirements.

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