Spectrum for RPAS

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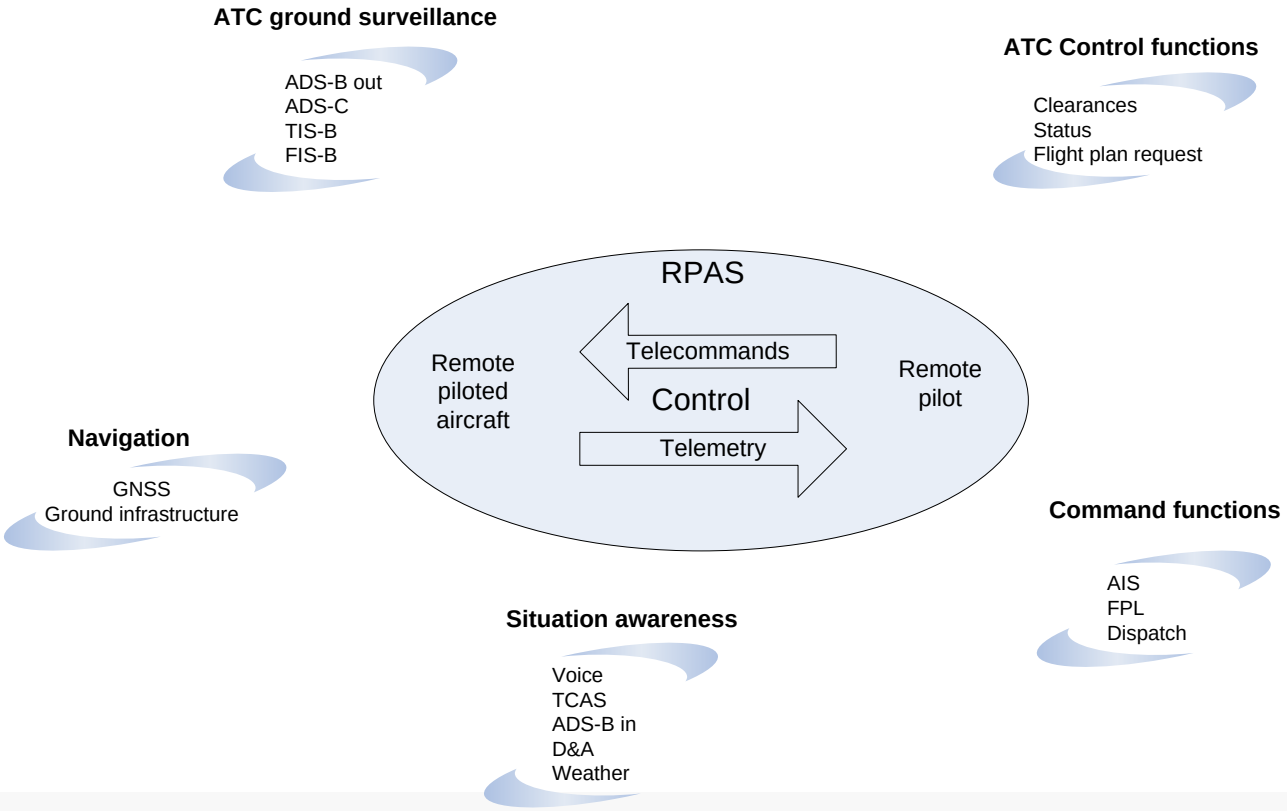
Spectrum for RPAS

- Identifying the amount of spectrum
- Assessing the spectrum requirements
- Basic principles for RPAS spectrum

RPAS require more spectrum

With the assumptions that

- RPAS are aircraft and shall not be treated otherwise
- ATC communication systems are not modified because of RPAS
- RPAS operations are transparent to ATS and to the other airspace users



Which spectrum are we talking about ?

- Regular ATS and surveillance applications
  - within the current allocated or forecast aviation spectrum

- Specific wireless connection supporting “telecommand” and “telemetry” functions and parameters : the C2 datalink for non payload communications (CNPC)
  - Spectrum to be identified

Assessing the required spectrum

$$Capacity = Bandwidth.\log_2(1 + SignaltoNoiseRatio)$$

- Transmitted data depends on:
  - Type of operation
  - Type of command and control (attitude control, vector control, waypoints control)
  - Detect and avoid information/data stream
  - Complexity of the RPAS design
  - Architecture choice : e.g. ATC communications carried by the C2 datalink
  - …
- Quality parameters (continuity, availability, latency and integrity) and subsequent Required Communications Performance (RCP) expected to be high because of the critical nature of the C2 datalink
- C2 datalink expected to have high level of protection against unintentional interference (minimum) and adequate one against intentional interference
- Guard + traffic assumptions

Basic principles to be met

- Safety service communications should at least have the same level of protection of current aviation
  - → RPAS CNPC links (used for safety system) to work under an allocation to a safety service

- RPAS communications
  - Operations : meet the ICAO operational requirements
  - Spectrum allocation assignments and use of the relevant frequency bands
    - Safety service clearly identified in the Radio Regulations
    - in line with article 4.10 of the Radio Regulations which recognizes that safety services require special measures to ensure their freedom from harmful interference
  - Interference report :
    - in close cooperation with ITU, reported in a transparent manner and addressed in the appropriate timescale.

- The process of frequency assignment for RPAS C2 datalink should not set a precedent which jeopardize the current aviation level in safety and the level of protection of aviation communication which strongly contribute to their achievement.

Process chosen within EUROCAE WG 73

- Assessing the spectrum allocated in the 5 GHZ band (5030-5091)

- First step
  - Propose key design parameters for future 5 GHz RPAS terrestrial network and SATCOM link architecture
  - It prepares for European contribution to WGF
- Second step in collaboration with WGF and national experts
  - Define the full set of protection criteria
  - Run frequency planning exercise