

Simulation of future RF usage

Surveillance/MICA Workshop

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Impact of new systems on the RF environment

- New technologies may be developed
- Existing systems/technologies may be deployed more widely
 - What if all aircraft are equipped with Mode S transponders?
 - What if gliders / UAS / ground vehicles... are equipped with ADS-B out?
 - What would be an acceptable output power?
 - How many Extended Squitters could be transmitted per second?
- Performance of existing systems may be modified
 - What if more data is transmitted in ADS-B, e.g. 7.2 Extended squitters per second instead of 6.2
- What would be the impact on the 1030/1090MHz RF band?
- What would be the impact on the detection of existing surveillance systems?

Simulation of future RF usage

- Before to deploy new systems or to modify the operation of existing systems, we can simulate the impact on the RF environment with a RF Model
 - to determine the reply rates of aircraft, or other vehicles
 - to compute the transponder occupancy, the 1030/1090 RF band occupancy
 - to determine the impact on the detection range of surveillance systems (e.g. ADS-B ground station)
- RF Model parameters:
 - Ground surveillance interrogators details (Position, MIP, IRF, Power, BDS extracted...) of all interrogators
 - Realistic air scenario - as the interrogations to other aircraft may impact the occupancy of the examined aircraft transponder
- RF Model results:
 - RF Model results depends a lot on parameters
 - Abnormal/unexpected behaviours are not simulated
 - RF Model should be calibrated to ensure that the results are aligned with the reality (e.g. compared to results of 1030MHz/1090MHz recording analysis)

Simulation activity at EUROCONTROL

- Data-base of transmitters on 1030MHz
 - Based on IC allocation cycles + previous survey
 - Interrogation patterns from users or from own analysis
 - Civil + military

- In-depth analysis of airborne and ground recordings
 - Avionics anomalies
 - Ground interrogators configuration
 - Unexpected transmissions on the frequencies

- RF modelling capability