Interference from Non-Aeronautical Sources (e.g. from LED systems, from IMT to MSS aircraft receivers in L-band)

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Objective

Explore interference from non-Aerounautical sources

LED Lights interference

- Reports of electromagnetic interference (EMI) Emanating from LED lighting systems on marine vessels.
- EMI conditions for the protection of VHF GMDSS to the automatic identification system (AIS) and to VHF marine radios
- Operate in the 156-162 MHz band from unintended radiation from LED lighting systems on-board marine vessels
- Most LED lighting systems on marine vessels cause significant desensitization of the receivers of both the AIS and the VHF marine radios,
- LED lamps located in close proximity to the AIS antenna and/or the VHF radio antenna cause interference

Studies on LED interference

- Quantify the intensity of this problem in technical terms.
- Assess the insufficiency of current EMI standards to address this problem in terms of the potential performance degradation of safety related shipborne radiocommunications
- Impact on Radio-navigation equipment that are mandatory carriage requirements under the safety of life at sea (SOLAS) convention
- Develop new technical and installation guidance to minimize degradation from EMI to sensitive radio communications and radio navigation equipment on their vessels.

SATCOM receivers, VDLM2, Power lines

- Protection of satcom receivers in the vicinity of airports, restrictions around airports in terms of power, frequency and location of base stations necessary. The Spectrum Regulator to incorporate these restrictions in the licence of mobile networks.
- LED interference to VDLM2 localized impacting aircraft near or at certain parts of the terminal or when the aircraft is at the gate.
- Power lines in Telecommunications: Provision of signalling, High speed internet potentially Affect Services NDB, HF Communications
- Documented Cases of Interference, Aircraft accident in Switzerland, interference to ARINC HF in San Francisco
- Solution is avoidance of frequencies (frequency separation).

IMT to MSS Receiver in L band

- Mobile-satellite service (MSS) is a radiocommunication service
- IT operates between 1.5 and 2.5 GHz, with the upper portion often referred to as the S-band.
- The MSS service is between mobile earth stations and one or more space stations, or between space stations used by this service; or between mobile earth stations by means of one or more space stations.
- This service may also include feeder links necessary for its operation and is adjacent to the 1 518-1 559 MHz SATCOM band

IMT to MSS Receiver in L band

- For coexistence between IMT and MSS in L-band, main issues are due to poor performance of MSS receivers and require:
- Balanced technical baseline solution
- Blocking characteristics of MSS receivers and unwanted emissions from IMT base stations
- PFD limits can be used (in addition to technical baseline) to ensure compatibility in sensitive areas at airports and seaports.
- On national basis measures for 1518-1525 MHz also work above 1525 MHz

Faulty Baby Alarms and ISM

- Purpose : Monitoring baby activity during sleep
- Potentially Affect Services in VHF Communications
- Documented Cases of Interference, numerous in the UK
- Solution: Supply replacement unit
- ISM: 5th Harmonic of 27 MHz
- Purpose : various including RF drying ovens for biscuits etc
- Potentially Affect Services in VHF Communications
- Documented Cases of Interference, Numerous within the UK
- Solution : retune centre frequency of the RF unit and Better RF Shielding

Cable TV

- Purpose : Provision of television and internet services
- Potentially Affect Services : ILS, VOR, VHF Communications
- Documented Cases of Interference:
- Numerous in Germany and Belgium, initial Problems in the UK
- Solution : Improved termination of cables and Frequency avoidance

Wireless Cameras/ GSM

- Wireless CCTV cameras
- Potentially Affect Services : DME, SSR, GNSS
- Documented Cases of Interference
- Solution: confiscation , prosecution
- GSM: Provide mobile phone communications in flight
- Potential Impact: Interference to Aircraft Systems, Passenger Behaviour (Air Rage), Interference to Ground Non-Aeronautical Services

Windfarms 1

- Purpose: Renewable Energy Provision
- Potentially Affect Services: Radar, ILS, MLS, VHF Communications
- Documented Cases of Interference
- Solution : objection to Development, site change

Conclusions

- Various non aeronautical services impact on Aerounautical Systems
- LED lights and IMT are the most critical ones so far with global implications around Airports and in the sea.

References

- ITU studies
- USA FCC studies and reports
- RTCA 202 , Eurocae WG58
- CEPT SE 7 Technical Report
- ECC Report 24 on studies

Thank you