

MAIN TOPIC

- Optimized strategy for reliable in-vehicle communication, vehicular connectivity and localization

SCIENTIFIC APPROACH

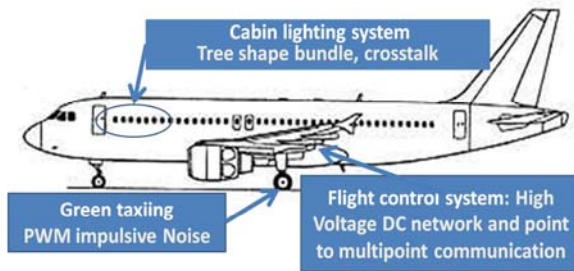
Understand physical phenomena to help in the development of electronic/telecommunication systems

- Wire and wireless channel characterization: modeling / measurement
- Signal processing: robust channel estimation
- EMC in electrically large structure and novel methodologies for EMC tests

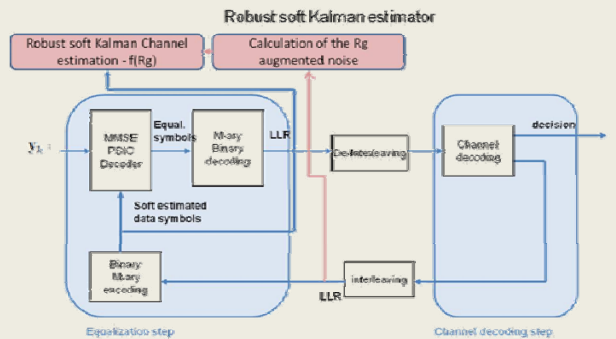
PLC in "More Electrical" vehicle , emphasis on aircraft (MEA)

Need of additional communication network while not increasing cables weight. Not possible to directly apply indoor PLC technologies because of specific in-vehicle EMC standards, complex cable harnesses and presence of impulsive noise.

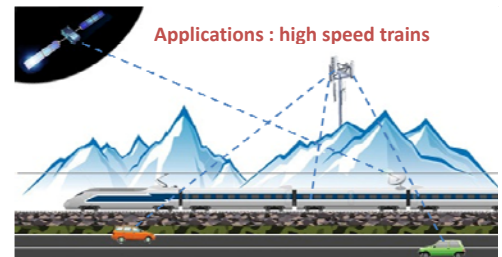
- EMC and channel characterization
- Simulation of PHY layer
- Feasibility and performances of in-vehicle PLC
- Demonstrator with reconfigurable PLC modems
- Health monitoring



Signal processing and cognitive radio for fast varying channels



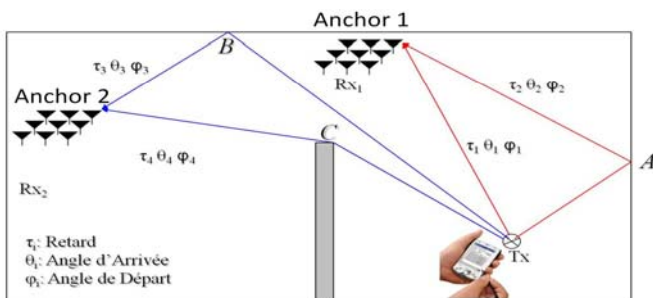
Novel robust turbo-receiver : innovative approach based on an optimized soft KF



High resolution localization technique in non line of sight (NLOS) outdoor and indoor environment

- Outdoor: mobile to dedicated localization stations
- Indoor: Mobile to anchor (MIMO context)

Novel technique based on fingerprinting + High resolution algorithm and metric that matches 3D-ray launching and experimental signal signatures taking polarization diversity into account.



Mode stirred reverberating chambers (MRC)

- EMC: New test methodology.
- Telecommunication: Original MIMO channel emulator based on coupled MRCs.



Societal Challenges: Smart, green and integrated transport; Secure societies - protecting freedom and security of Europe and its citizens.

Context: Int. Campus on Safety and Intermodality in Transportation (CISIT), i-Trans competitiveness cluster, IRT Railenium,

Collaboration: Safran, Airbus, EADS, Thales, Messier-Bugatti, SNCF, Alstom, RFF, SIRADEL, UPCT (ES), Murcia Univ. (ES), ULB (BE), Gent Univ., Mons Univ. (BE), Libanese Int. Univ. (LB), Leeds Univ. (UK), Politec. di Torino (IT), EPFL (CH).