

Opto-microwave multiplexing device for radar imaging systems

Research Project

XLIM institute has recently developed new imaging techniques using the frequency diversity of a passive device to combine the received information on an antenna array into a single signal. This device acts as a passive multiplexer to code the signals received by an antenna array to a common output through orthogonal channels. The incoming signals on each antenna can be retrieved from the received waveform by deconvolution techniques. Thus, the reconstructed signals are processed to apply numerical beamforming or conventional near field imaging technics. This technique of passive multiplexing simplifies the reception chains for microwave imaging systems (whose complexity and cost highly in-crease with the number of antennas).

The objective of the project is to design an innovative radar imaging system based on an Opto-microwave multiplexing device, in order to improve the efficiency of existing ones and address a wide number of antennas. The work to be performed is to optimize the architecture of the receiving part which especially include electro-optic modulators, and specific optical fiber combiner :

- Implementation and integration of electro-optic modulators in a radio-over-fiber link
- Experimental set up and validation of the optical multiplexing device
- Signals estimation by deconvolution techniques and Imaging post processing
- Technological suggestions in order to develop a more integrated system

The duration of the project is, at least, 18 months with an expected start in September 2016.

Keyword

EOM, Opto-electronics, Radar imaging, signal processing

Expected Expertise

Applicants are expected to be familiar with opto-electronics and optical fiber systems (laser diodes, photodiodes, optical fiber and components, direct and external modulation systems) and with high frequency components and instruments. A good practical knowledge of optical and microwave test-bed setups is required. Moreover, Matlab programming for data acquisition and signal processing will be appreciated.

Contact

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Candidates are invited to submit a CV, a cover letter, and a list of references to: cyril.decroze@xlim.fr