



RESEARCH MASTER INTERNSHIP 2009-2010

Department Electronics, Optronics and Signal

Supervisor :

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INTERNSHIP DESCRIPTION

Domain : Antennas, Microwave, GNSS.

Title : **REALIZATION OF A MINIATURE FILTERING ANTENNA FOR GNSS APPLICATIONS**

Previous studies performed in SCAN team (Signal-Communication-Antennas-Navigation) of the DEOS (Department Electronics, Optronics and Signal) have proposed new solutions to mitigate the effects of electromagnetic interferences (intentional and non-intentional jammers) on the accuracy of GNSS receivers using an antenna array (most of the time four antennas). Indeed, by means of adaptive beamforming techniques, one can cancel jammers contribution by changing the radiation pattern of the antenna array. Currently, this work is extended for mitigation of multipath in urban areas. However, it requires the antennas and the RF channels to be integrated inside a small mobile terminal (cellphone, PDA, ...).

This internship will focus on the realization of a miniature antenna for GNSS applications that must enable filtering operation at the same time. We will focus on dielectric resonator antennas (DRAs). Initially, dielectric resonators have been used to realize oscillators and filtering functions, but numerous studies have shown that these resonators can also be used as efficient radiating elements. Recently, it has been shown that a single dielectric resonator can perform both the radiating and filtering functions. This internship will therefore consist of the study of this new principle. We also will expect to design a miniature filtering antenna at the GPS L1 frequency (1575.42 MHz). Depending on the simulation results, a prototype may be realized to check the numerical results in terms of impedance and radiation patterns (Ansoft HFSS).

This internship will be conducted in collaboration with Raphaël GILLARD, professor at the INSA of Rennes and jointly responsible of the Antennas and Microwave group of the IETR laboratory (Institut d'Electronique et des Télécommunications de Rennes).

Methods: theoretical analysis and numerical modelling

20 % Theoretical Research

80 % Applied Research

0 % Experimental Research

Possibility to go on a Ph.D.:

Yes

No

APPLICANT PROFILE

Knowledge and required level:

Antennas

Microwave (filters)

Numerical modelling (Ansoft HFSS)

Applications should be sent by e-mail to the supervisor.