Internship in GNSS Hybridization Method Studies and Prototyping

End-of-studies internship in the Engineering cycle

Recognized throughout the world, Syntony GNSS is a Toulouse-based brand, labeled FrenchTech, focused on technological innovation in the field of GNSS.

Our goal? Pushing the limits!

Specialising in radio navigation and embedded systems, we are the world leaders in our field and present in many high-growth markets.

We have developed a range of products (simulators, receivers and indoor/outdoor location systems) that meet the growing needs of the aeronautics and space industries, but also those of public transport, rail and mining or the rise of IoT (Internet Of Things).

Our customer base is made up of industry leaders (such as Airbus, OneWeb, Airbus Safran Launchers, Thales Alenia Space, Honeywell, Rockwell, Stockholm, New York, Toronto metros and many others...). Our solutions are constantly evolving in order to anticipate their future needs but also to strengthen our leadership and meet new challenges.

Thus, Syntony GNSS vibrates around three fundamental values:

- **Innovation as a guide**, to design the products and tools of tomorrow, in line with the real and evolving needs of our customers
- **The dynamism of our teams**, to adapt our strengths and talent to the quality of our solutions
- **Open-mindedness and inclusion**, to remain attentive to our customers, partners and collaborators, with the aim of promoting Humanism, equality and the richness of multiculturalism.

From students to qualifié.es professionals, help shape the future of boating with us. Work with experts, in a caring environment where your ideas can fly and your contributions fuel the synergy of the company.

In an international dimension, you participate in the challenges of today and tomorrow.

The Context

As part of several of these products, Syntony has developed various GNSS receivers, as well as a GNSS signal simulator, based on an SDR (Software Defined Radio) architecture.

The implementation of the multi-sensor hybridization strategy (INS/GNSS) is part of the medium- and short-term development objectives for several of Syntony's GNSS receiver product ranges (whether they are dedicated to outdoor and/or indoor positioning).

What you'll accomplish with Syntony GNSS

You will join the R&D Innovation team and your internship topic will be the realization of studies and the prototyping of algorithms allowing the hybridization of GNSS/INS navigation algorithms with other sensors (magnetometer, odometer, barometer, etc.) or information from mapping (map-matching).

The objective is to measure the contribution of fusion algorithms for the improvement of positioning performance, particularly in terms of integrity and accuracy, as well as in a disturbed environment (urban or semi-urban, in the presence of multi-paths, etc.) as encountered in railway applications.

To do this, various studies were carried out within Syntony's R&D innovation division. In addition, Syntony has several datasets collected in railway applications, as well as advanced simulation resources (CONSTELLATOR GNSS signal simulator and IMU sensor simulation tool). They will be used for the development of the algorithms and their validation.

Data collection is also to be expected if necessary, and the use of location data from an Android smartphone is also possible.

The internship subject will be part of several Receiver products based on GNSS/INS hybridization algorithms dedicated to railway applications. However, priority will be given to the integration of odometric data into the GNSS/INS fusion algorithms already existing at Syntony, as well as their implementation and evaluation on real (data collection) and synthetic (ometer simulation) data.

The subject of the internship may evolve according to the themes depending on the candidate and the duration of the internship.

The technical skills we are looking for:

- Data analysis
- Signal processing / estimation method (Kalman filter, least square)
- Knowledge of Navigation, GNSS System (GNSS receiver, positioning, orbitography, ...) is a plus
- Matlab / Octave / Python (optional)
- Technical curiosity, desire to learn, team spirit.
- Fluency in technical English and good writing skills English / French
- A taste for experimentation and analysis of real data is a plus (critical thinking, autonomy, writing).

About you

Currently in the last year of the Aeronautics, Space, Embedded Systems Engineering... or at the end of a Master's degree (with a specialization in space systems, GNSS, satellites, signal processing, etc.), you are looking for an end-of-studies internship in the field of radionavigation and embedded systems.

You have a solid foundation in mathematics and a strong appetite for theoretical studies with experimental application.

Your technical curiosity, your desire to learn and your team spirit will be the assets necessary for the success of your mission.

Are you interested in this topic? Apply and join a company that promotes innovation in the development of its unique products to design the products of tomorrow, dynamism and open-mindedness in listening to and respecting its customers and employees.