

Study and implementation of PPP and RTK methods in a GNSS receiver

End-of-studies internship in the Engineering cycle

Syntony GNSS is a human-sized company with an international dimension, based in Toulouse and with the **FrenchTech label**, specializing in **Global** Navigation Satellite Systems (GNSS).

Our ambition: To provide our customers with relevant, innovative, reliable and robust solutions.

World leaders in radio navigation and embedded systems, we are present in fast-growing markets, such as aeronautics, space, road and rail transport, mining and IoT (Internet of Things). We have developed a range of products (simulators, receivers, indoor/outdoor location systems) that meet the growing needs of these industries.

Keysight, Airbus, Airbus Constellation, Hitachi Rail, Thales Alenia Space, Honeywell, Rockwell, MDA, or the Stockholm, New York and Toronto metros... So many partners who trust us and push us to always go further.

With passion, we constantly evolve our solutions to anticipate their needs and perfect our know-how.

At Syntony, we offer a pleasant and stimulating work environment, where the quality of life at work and the availability of our employees promote fulfillment and collaboration. Intellectual stimulation is omnipresent through innovative and varied projects.

We work on a variety of subjects, ranging from aeronautics to space, transport, mining and the environment.

Thus, Syntony vibrates around three fundamental values:

Benevolence:

Together, we cultivate listening, respect and empathy in our interactions, while also valuing the multiculturalism that enriches our exchanges.

We contribute to a positive environment where everyone feels valued and supported. We enrich each other by building strong relationships, both internally and externally.

Excellence:

Together, we strive for excellence in everything we do. Through our commitment, our high standards and our sense of responsibility, we guarantee quality, efficiency and performance. It is through our collective rigour that we meet challenges and provide sustainable solutions.

Adaptability:

Together, we are flexible in the face of the changes around us.

By combining creativity, collaboration and resilience, we find innovative solutions and move forward efficiently. Our agility allows us to evolve in line with our environment.

From students to qualified professionals, help develop future navigation solutions in partnership with our team of experts. Evolve in a caring environment where your ideas take flight and your contributions strengthen the synergy of the company.

Internationally, we meet the challenges of today and tomorrow, supporting our customers throughout the entire process: from the initial vision to development, to delivery and the collection of their satisfaction.

The Context

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

The implementation of precise positioning techniques is part of the functionalities of our Syntony GNSS receiver products (whether they are dedicated to outdoor and/or indoor positioning).

What you'll accomplish with Syntony GNSS

As part of this internship, it will be a question of carrying out studies on RTK (Real-Time Kinematic) or PPP (Precise Point Positioning) corrections integrated into our real-time GNSS position calculation solution. The aim is to determine the advantages and disadvantages of different integration solutions.

Proposed activities

The work will take place in 4 stages:

Study of RTK and PPP Techniques

Investigate the theory behind RTK and PPP techniques.

To analyse the technical and scientific documents available on these methods.

Practical analysis

Compare the performance of RTK and PPP compared to our current GNSS solution in terms of accuracy, latency, and reliability.

Simulate the integration of RTK and PPP into our GNSS solution to assess their impacts on the overall performance of the system.

Pros and Cons Assessment

Identify potential benefits (increased accuracy, reliability) and disadvantages (additional costs, complexity of implementation).

Prepare a detailed report outlining your findings and recommendations.

Using Tools

Use Python for GPS data manipulation and numerical analysis.

Visualize results in a clear and understandable way.

The technical skills we are looking for:

- Data analysis
- Signal processing
- Knowledge of Navigation, GNSS System (GNSS receiver, positioning, orbitography, ...) is a plus
- Matlab / Octave / Python (optional)
- 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 engineering school or Master's degree, with a good foundation in mathematics and/or a specialization in space systems, GNSS, satellites, signal processing or RF..., you are looking for a 6-month internship at the end of your studies. An appetite for theoretical studies with experimental application is also sought.

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

Ready to get on board with us? 🚀 ✨

Send us your CV under the reference ENG-650-EN: jobs@syntony.fr.