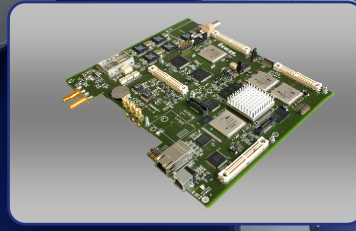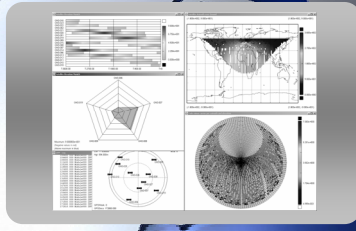Opportunity for

Master Thesis (6 Months)

Efficient Interference Mitigation for Better GNSS Signal Processing on NVIDIA Graphic Cards

Thesis Summary

GNSS signals are broadcast as wide-band signals in the frequency range between 1.1 to 1.6 GHz. It may happen that intentional or unintentional interference occurs and non-GNSS signals are received by the navigation receiver. Typical examples of interference signals are pulsed signals from aircraft navigation DME equipment, RADAR signals, out-of-band radiation of television transmitters, chirp signals of in-car jammers or intentional jamming with tone signals.

The mitigation of those signals is critical for navigation performance and is performed after sampling the received GNSS signal by the analog-to-digital converter. Pulsed interference signals are removed in time domain with pulse blanking. For continuous interference, frequency domain methods are employed. The signal is Fourier transformed and interference is identified within the signal spectrum and removed. Afterwards the purified spectrum is inversely transformed to continue the standard GNSS signal processing. A powerful method to accomplish this task is called short-term-FFT-transform (STFT).

The proposed Master Thesis consists of reviewing a STFT based method and analyze the high computational demands. We target an implementation on an NVIDIA Graphics Card (based on existing libraries) providing super computer capabilities of several trillions of floating point operations per second (TFLOPS). This will be followed by the implementation of processing algorithms enabling IFEN's GNSS software receiver to support this sophisticated method in real-time. The thesis work will finally include testing and experimentations with live GNSS + interference signals to verify the benefits of the implemented methods for a selected number of GNSS signals ad applications.

The thesis is carried out in the IFEN premises either in Poing/Germany or in Graz/Austria. It is within the context of the Galileo Evolution program of the European Space Agency.

Requirements

- Master student in Aerospace Engineering, Navigation, Communications Engineering or equivalent sciences
- Programming skills in (C/C++) and willingness to enhance them during the thesis
- Good written and spoken English
- Ability to grasp and learn new concepts quickly and efficiently
- Capacity to approach challenges with a positive attitude and open mind

Application

Please send your resume via Email to **careers@ifen.com**

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