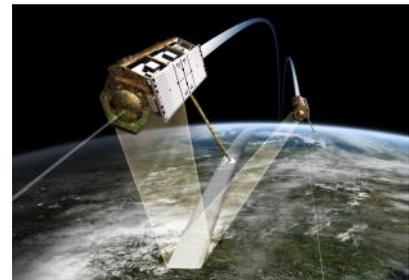Student Electrical Engineering,
Telecommunication Engineering

Master Thesis: Development of an Acquisition Planning Simulator for Efficient On-Board Quantization for Interferometric and Multi-Channel SAR Systems

Your mission:

For present and future spaceborne synthetic aperture radar (SAR) missions, an increasing volume of onboard data is going to be demanded. This is due to the employment of large bandwidths, high pulse repetition frequencies, and multiple polarizations, which implies inevitably hard requirements in terms of onboard memory and downlink capacity. In this scenario, SAR raw data quantization represents an essential aspect. The data rate employed for the digitization of the recorded radar signal affects both, the amount of data to be stored and transmitted to the ground, and the quality of the resulting SAR products.

The objective of the proposed thesis is to develop a simulator for the acquisition planning for present and next-generation interferometric and multichannel SAR systems. For a given mission scenario (described by a set of system and acquisition parameters, such as, e.g., orbit position, beam coverage, antenna characteristics), algorithms will be implemented, which are aimed at optimizing the required data rate with respect to the resulting performance, expressed in terms of typical quality descriptors of a SAR system, such as, e.g., ambiguities, radiometric/spatial resolution, interferometric phase errors. Different resource allocation strategies will be considered depending on the specific application, which is described by certain performance requirements and, therefore, by the resulting allowable compression rates. Potentials and challenges for efficient quantization algorithms will be investigated for high-resolution wide swath (HRWS) multi-channel SAR systems as well, where the inherent correlation existing among the received samples opens the opportunity for efficient data reduction strategies.

Your qualifications:

- Study in Electrical or Telecommunication Engineering
- Experience with scientific programming languages, such as Matlab, IDL or Python
- Good knowledge of English

Your benefits:

Look forward to a fulfilling job with an employer who appreciates your commitment and supports your personal and professional development. Our unique infrastructure offers you a working environment in which you have unparalled scope to develop your creative ideas and accomplish your professional objectives. Disabled applicants with equivalent qualifications will be given preferential treatment.

Earliest starting date: as soon as possible
Duration: 6 month
Remuneration: According to German TVöD 05

Location: DLR Oberpfaffenhofen (Germany)

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