Master thesis 2019

3D modelling using Synthetic-aperture radar (SAR) measurement

Synthetic-aperture radar (SAR) is a radar used to synthetically create a large antenna aperture (aperture is the size of the antenna). SAR uses the motion of the radar antenna over a target region to provide spatial resolution and is typically mounted on a moving platform to creates the synthetic antenna aperture/array. From the SAR measurements two- or three-dimensional images are created. Typically, the larger the aperture, the higher the image resolution will be, regardless of whether the aperture is physical (a large antenna) or synthetic (a moving antenna) – this allows SAR to create high-resolution images with comparatively small physical antennas.

To create a SAR image, successive radar pulses are transmitted to "illuminate" a target scene, and the echo of each pulse is received and recorded together with the antenna location (relative to the target changes with time). Signal processing of the successive recorded radar echoes allows the combining of the recordings from these multiple antenna positions.

The SAR-assignment at Acconeer includes

(i)   proof-of-concept: measure/scan different objects by move the radar chip (A1) with a step motor (high precision movements)
(ii)   process measurement radar data and measurement position in matlab and construct 3D images of the measured objects
(iii)   build a test module including: a radar chip (A1) to measure distances together with accelerometer/gyro to track movements
(iv)   measure/scan different objects at different speeds and motion patterns
(v)   process measurement radar data and measurement position in matlab and construct 3D images of the measured objects

For further information, or to send your application, contact us at: info@acconeer.com

About Acconeer

Based on research from Lund University, Acconeer has created a unique radar solution that creates new opportunities for human interaction with technology. Acconeer is located at Ideon Gateway, overlooking both Lund and Malmö. We are a group of around 40 people, working close together in an agile manner, determined to create a major breakthrough in sensor technology.

The radar sensor is based on pulsed coherent radar technology and combines extremely low power consumption with high accuracy. The unique characteristics of this radar sensor make it possible to identify materials and detect motion in advanced sensor applications. The small size, only 5x5 mm, and low power consumption are ideal for compact battery-driven and mobile devices. Further information on Acconeer is available at: http://www.acconeer.com