VANTIGE GPS-AJ

WP5000: PROJECT ABSTRACT

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PROJECT ABSTRACT

Cobham has been manufacturing GNSS antennas and anti-jam equipment for over 20 years. This NAVISP programme has enabled significant resources to be devoted towards the development of the next generation anti-jam product, reducing its time to market, increasing sales opportunities and improving Cobham's competitiveness.

Cobham's current generation anti-jam equipment uses a controlled radiation pattern antenna (CRPA) - phased array technology, to steer nulls in the antenna pattern towards jammers, reducing their effectiveness and enabling GNSS signals to be received.

The next generation product will provide a higher degree of interference protection and signal reception by providing beam steering as well as nulling. The beam steering functionality enables a number of antenna beams to be formed in programmed directions increasing the gain towards satellites and hence improving signal strength. The processed signals from the multiple beams are passed to a GNSS receiver using a high speed digital data link, rather than an RF connection as is done presently.

This NAVISP programme enabled the development of the new beamsteering algorithms along with digital signal processing hardware and firmware. The high speed digital data link is included in this design which is based on the latest system on a chip (SOC).

An accurate representation of the CRPA antenna response is required to be able to steer the beams and is also used for the direction finding (DF) functionality which determines the locations of the interferers. The antenna response is modified when the CRPA is mounted on a structure and this affects the accuracy of the beamsteering and DF.

Antenna responses were measured in Cobham's anechoic chamber in Marlow and also in a much larger 3rd party chamber. Electromagnetic (EM) simulations of the antenna were carried out and compared to measurements to determine whether the effects of mounting the antenna on a structure could be predicted by simulation and whether a simulated antenna response could be used instead of a measured one.

Testing anti-jam systems typically requires an anechoic chamber. It is time consuming to setup and carry out these tests. An automated bench top test suite has been developed under this programme to remove the need for the anechoic chamber, enabling quick regression testing of the system during development.

Customers are starting to require GNSS anti-spoofing measures and a work package was dedicated to gaining some familiarity in this area. An analysis of the global GNSS anti-jamming market was also carried out to determine the market opportunities for Cobham.

This NAVISP programme has enabled Cobham's next generation anti-jam product to be developed and allowed investigation of avenues of research that wouldn't usually be possible without direct funding from a customer.

The bench top test suite is in regular use for regression testing of both current and next generation products. The next generation beam steered solution, developed in this programme, has opened up sales opportunities and is currently being evaluated by customers.