



Digital, tuned, FPGA based fluxgate magnetometer for the Solar Orbiter Mission

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The magnetic field is a fundamental plasma parameter and is therefore key to processes such as wave particle interactions, coronal mass ejections, turbulence and shocks, all of which are central to Solar Orbiter science. In addition, the magnetic field provides the connection between solar phenomena and those measured at the spacecraft, making the magnetometer central to the principal mission goal of linking solar processes to their signatures in the heliosphere. It is essential therefore for the Solar Orbiter magnetometer to provide accurate magnetic field measurements and to have the required level of flexibility to effectively coordinate measurements with other in-situ and remote sensing payload teams.

Here we describe a digital FPGA based magnetometer design for the Solar Orbiter mission. Digital detection can have considerable size, weight and power advantages (key requirements for Solar Orbiter) over analogue equivalent fluxgate magnetometer designs. An FPGA based design offers significant flexibility, which is essential for coordination of measurements with other instruments.