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# MARSIS: The North Polar Cap Campaign

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The Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS) is the first radar to collect data from Mars orbit. MARSIS is a multi-frequency synthetic aperture orbital sounding radar. MARSIS acquires data in the conventional fashion of a radar in the range 0.1-5.5 MHz, which corresponds to wavelength of tens to hundreds of metres. These long wavelengths maximize the penetration of the signal into the subsurface of Mars.

MARSIS has been configured to collect High Resolution Data in order to improve the science investigation of the North Polar Deposits of Mars (Planum Boreum). This special configuration provided data of unprecedented quality that contributed to the reconstruction of the three-dimensional structure of the icy North Polar Layered Deposits and of the enigmatic Basal Unit beneath.

The processing of the achieved data show that the deepest MARSIS detection is at the bottom of the basal unit and is estimated to be around 3.3 Km in the vacuum and 2.4 Km in the medium.

CONCLUSION:

We successfully implemented an advanced setting of the on board software in order to boost the signal-to-noise ratio of measurements and above all to have an adequate set of contiguous and
unprocessed data. This gave us the flexibility to improve the ground processing, choosing different size for the Synthetic Aperture Technique. Although this procedure pushed the instrument to the limit of its original design capabilities, performance was flawless.