The NANOSATC-BR1 and NANOSATC-BR2: scientific payloads and data

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The INPE-UFSM's NANOSATC-BR, CubSats Development Program, started with the NANOSATC-BR1 (NCBR1), a CubeSat 1U type (10x10x11,3 cm), designed to host technological payloads experiments to test the radhard electronic circuits and a XEN-1210 magnetometer (resolution of 15 nT) to measure intensities of the Earth magnetic field over the South American Magnetic Anomaly (SAMA). The NCBR1 was launched on June 2014 at the Yasny base, Russia, and has completed more than five years in orbit. This Brazilian space mission was the first scientific Brazilian mission using CubeSats to generate data at an altitude of about 600 km. The second mission is named NANOSATC-BR2 (NCBR2), a 2U CubeSat (10x10x22.6 cm), a continuation of the successful NCBR-1. The NANOSATC-BR2 will have a similar altitude in a polar orbit as NCBR1. The NANOSATC-BR2 was designed with significant improvements to accommodate six experiments, but here we will focus on the two scientific payloads. One magnetometer, is similar to the one on the NCBR1, but with broader scientific capability. It will be possible to obtain the three magnetic field components and ULF pulsation over the SAMA region and also able to compare the data from the SAMA region with the Equatorial and Polar regions, and with the existing geomagnetic field models, contribute in this way to improve these models. The second scientific experiment is a Langmuir probe that measures the electron density and electron temperature in the Ionosphere. This experiment has many scientific goals, highlighting the studies regarding the electron precipitation and the plasma instability processes in the SAMA region. These kinds of studies are essential because the satellites and the precise location of the GNSS services are strongly affected in this region, mainly due to the lowest magnetic field presented in the SAMA and because of the presence of ionospheric instabilities. The in-situ measurements of electron density and electron temperature will permit studies of the Plasma Bubble phenomena in more detail and provide a more extensive database for improving the existing ionospheric models. The

data from the scientific experiments on-board the NCBR2 will complement the ground-based data obtained from different instruments techniques. The launch of NCBR2 is contracted and scheduled for the first quarter of 2020.

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