

SMALL SATELLITE MISSIONS SYMPOSIUM (B4)
Design and Technology for Small Satellites - Part 2 (6B)

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THE CHALLENGING SOUTH TYROLEAN 'MAX VALIER' NANO SATELLITE WITH X-RAY
AMATEUR TELESCOPE AND AIS EXPERIMENTS.

Abstract

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This paper presents a unique collaboration of educational institutions, industry, and research facilities for the realization of a 10 kg nano "Max Valier" satellite with multiple payloads. The full attitude controlled satellite will scan the sky for bright X-ray sources (first payload), with an AIS receiver it will receive signals from ships (second payload), and it will capture optical pictures with a CMOS-camera (third payload), and send these to earth. The X-ray telescope will have scanned the whole sky after half a year. The data will be evaluated and published by amateur astronomers. The spacecraft mechanical design basic idea follows a flat satellite concept with direct integration of spacecraft components and electronic boards into load carrying unibody structure. The spacecraft will have a body mounted non deployable sun pointed solar array. To achieve effective power generation and solar array sun pointing, the satellite is attitude controlled in 3 axes and spin stabilized in one axis with momentum wheel. The main board controller is fully redundant and a complete proprietary development of the GOB Bozen. It manages the periphery with 8 serial interfaces and numerous further ports. TM-TC and payload data transmission to ground is ensured over radio modems at 70 cm and S-Band with a link rate of 19200 Bd. An amateur radio beacon signal will also be transmitted on the 2m band. The ground control stations in Bozen and Meran will be used to control the satellite and for the data download. The S-band link will be realized with antennas of a diameter of 3m to achieve a link budget with 16 dB fade margin. The launch is planned on PSLV in India for the springtime of 2010.