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Small Earth Observation Missions (4)

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ECOBELTSAT-1: THE BELT AND ROAD SATELLITE PROJECT

Abstract

The EcoBeltSat-1 is a small satellite designed to operate in Sun-Synchronous Orbit (SSO), with the ability to provide information of technical utility to generate solutions to environmental problems of countries along the Belt and Road Framework. The project is designed by postgraduate students in engineering from Beihang University, located in Beijing, People's Republic of China.

This project introduces two main plans. The first one initiates at Beihang University consisting of the launching of our first CubeSat: EcoBeltSat-1 in 2020 and the second one aims to integrate The Belt and Road Countries through the use of a satellite constellation based on EcoBeltSat-1 to transfer technology and increase the participation and interest in space technology using educational methods.

The satellite's design takes into consideration the measurement and study of atmospheric and environmental variables, in terms of pollution (through the use of an atmospheric spectrometer) and surface winds and sea level (through the use of a GNSS-R, a reflectometry) which is used in future generation plans of renewable energy systems, contributing to a clean environment.

EcoBeltSat-1 Project on its first phase consists of two payloads. Here, we are proposing to develop a sustainable strategy to measure air pollution. EcoBeltSat-1 offers access to space for scientists to determine the effect of cross-border air pollution flux and acquire a more precise understanding of climate change and global warming. We will accomplish this mission by the use of an onboard atmospheric spectrometer as the first payload. The second payload is based on GNSS-R (reflectometry). We aim to demonstrate the capabilities of GNSS remote sensing to derive geophysical parameters of the ocean/land surfaces and wind speed. Utilizing these payloads, we plan to provide data for future projects in wind and solar energy. For the second phase, we propose to build a satellite constellation with different missions, that can be complementary and mutually inclusive in providing valuable data for the countries involved in the project.

After the mathematical model, the subsystems of the satellite were substantially completed and placed into the 3U CubeSat structure. ADCS, EPS, OBDH, Ground Station, TTC adaptations have been improved. After the vacuum and vibration tests, the thermal control analysis will be done, and the satellite will be ready for launch. The article will focus on giving a general overview of the EcoBeltSat mission, completed ground tests and status on the planned work.