

50th STUDENT CONFERENCE (E2)
Educational Pico and Nano Satellites (4)Author: Mr. Adam Dabrowski
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Gdansk University of Technology, PolandHANSESAT - WIRELESS CUBESAT PAYLOAD TECHNOLOGY DEMONSTRATOR FROM
GERMANY AND POLAND**Abstract**

CubeSats and other nanosatellites provide a remarkable platform for students and universities to carry out experiments in the vacuum of space. Even though they are small, CubeSats are nonetheless expensive and complex machines, and developing one to carry out an experiment for a research project often marks an insurmountable obstacle for researchers.

Designed by a team of international students from universities in Bremen and Gdańsk, the HanseSat 3U CubeSat shall demonstrate a new, innovative interface that enables the wireless transmission of power and data between two modules within the nanosatellite. As a feat of what can be achieved through cross-border cooperation, the interface will be used to enable a camera to take images of the Hanseatic area from space.

It consists of two modules: The 2U Bus module contains all subsystems that are essential for operating the spacecraft, such as the power supply, flight computers and communication systems. On top of the Bus, the 1U Payload module is stacked. The Payload module offers space for scientific experiments.

The HanseSat team has developed an interface that is able to supply the experiment in the Payload module wirelessly with power. The interface is also enabling the exchange of data between the Bus and the Payload through a Visible Light Communication system. While wired connections will be used for the verification of the functionality of the interface, the two modules do not need to share any physical connections to operate except the structure of the spacecraft. Thereby, the interface allows an exchange of different Payload modules without the need for a connector.

Benefits for future projects will be presented: the Bus module design can be reused by other universities who can develop their own experiments that fit into the volume of the Payload module. This can drastically reduce the cost a university team has to cover enabling its own space mission.

To demonstrate that the interface developed by the HanseSat team is capable of the promised benefits, the payload for the proposed mission will be a camera that shall take an image of the Hanseatic area. The functionality of the system can be verified in an elegant way: if the wireless power transfer succeeds, the camera will be supplied so that it can take an image. The image-data is then transferred wirelessly from the Payload to the Bus module and from there linked down to a ground station.