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A MOBILE, LOW COST GROUND STATION SETUP WITH AUTONOMOUS CALIBRATION  
CAPABILITY.**Abstract**

Due to the recent success of pico and nano satellite missions, many research institutes established its own ground station facilities for independent access to their satellites. These ground station facilities are built in many cases from low cost components as only lower frequency bands are used for communication. Sometimes, these ground stations are referred as academic ground stations. In contrast to the large space agencies, small research institutes do not have dedicated manpower for operation of their missions. This means as well, that there is not a dedicated operations team to maintain the hardware. Hence, a huge demand in autonomous and self-configuring functionalities can be observed in the small satellite community. This paper presents a new mobile ground station design which can be placed easily in any working environment. Furthermore, a fully autonomous calibration procedure based on low cost sensors is included to facilitate the operation of a satellite. Applying this new concept, the ground station can be easily relocated and will calibrate itself to establish communication with a satellite.

This work mainly deals with two aspects of our new ground station design. First, the students from University of Applied Sciences Bochum designed a simple and modular mechanical structure to mount rotor and antennas. The innovative structural design simplifies assembly and disassembly of the complete ground station. Thus, the ground station can be relocated with simple means. The second aspect of this work is the automatic calibration feature. After moving the ground station to a new location, the system needs to be calibrated to compensate a misorientation of the rotor and to determine the actual latitude and longitude. Therefore, an autonomous calibration procedure was implemented based on low cost sensors. Main advantage of this system is, that satellite developers can easily establish ground station facilities without detailed knowledge about ground station hardware. The satellite tracking is completely handled from our hardware, satellite developers can directly start to operate the satellite without extensive testing of tracking performance