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Author: Prof. Mengu Cho
Kyushu Institute of Technology, Japan, cho@ele.kyutech.ac.jp

Dr. Werner R. Balogh
United Nations Office for Outer Space Affairs, Austria, werner.balogh@unoosa.org

CAPACITY BUILDING IN BASIC SPACE TECHNOLOGY DEVELOPMENT THROUGH
ON-THE-JOB TRAINING IN NANO-SATELLITE DESIGN, BUILDING AND TESTING

Abstract

The desire to utilize space is not limited to space faring nations. An increasing number of developing countries share the desire to use space technology and its applications to improve life on Earth or to participate in the space exploration. as a scientific endeavor of all humankind. Small and nano satellite programmes are valuable tools to develop a space infrastructure and scientific and application programmes and can also play an important role in a country's plan to develop a basic capacity in space technology development. Developing countries that in the past have mostly focused on applications-oriented aspects of space technology are increasingly also interested in building indigenous capacities for basic space technology development. Some countries even consider, in the longer run, establishing a basic space industry capacity. Nano-satellite development is an ideal first-step to establish such a basic capacity. It is, however, nearly impossible to gain the capacity solely by reading books or attending lectures. Experience gained through on-the-job training is crucial. Even designing and building a satellite model in a laboratory environment alone cannot give the experience. It is crucial to experience the complete cycle of designing, building and testing a satellite. Students learn the difficulties through the failures they observe during the testing and the efforts necessary to correct the defects. There is therefore a need and demand for educational institutions to offer appropriate on-the-job training opportunities for satellite design, building and testing. Kyushu Institute of Technology (KIT) and United Nations Office for Outer Space Affairs plan to launch an educational programme from summer 2010, offering on-the-job training opportunities to post-graduate level students from developing countries. Beginning in 2009, KIT has started a project to create a nano-satellite environment test center, which can handle a full range of environmental tests required for a 50cm-class nano-satellite, where three nano-satellites have been already tested before the launch in 2010. Because the students can stay inside the campus to do the tests, intensive and efficient cycles of designing, building and testing become possible. In the university atmosphere the students can also learn about the core technology concepts for building a satellite development infrastructure from the scratch - knowledge they will be able to build on once they have returned to their home countries, which is not always possible if they are trained in an established satellite manufacturer or a space agency. This paper presents the details of the joint program.