SPACE EDUCATION AND OUTREACH SYMPOSIUM (E1)
Calling Planet Earth - Space Outreach to the General Public (6)

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SPACE EDUCATION AND OUTREACH USING A DIGI-SINGER ON-BOARD A NANO-SATELLITE

Abstract

Currently, there is no education curriculum that teaches space development or utilisation in Japanese elementary or junior high schools. The early education is vital for such young students to get an interest for future carrier. The aim of this project is to provide an opportunity to understand space related industries. The Kyushu Institute of Technology (Kyutech) has conducted an educational program for students in elementary and junior high schools in collaboration with a local science museum with support from the Japanese Ministry of Education since 2009. In this program, the children experience a part of satellite development together with our university students and receive Morse beacon sent from a nano-satellite (HORYU-2) using a handy receiver and a handmade Yagi antenna. Such signal can be easily acquired without special equipment, but requires special training or a computer program to decipher, and hence this is not so appealing to the children.

HORYU-4 is a high voltage experiment satellite (i.e. 30cm cubic, <8kg mass) under development at Kyutech to be launched in 2016. As a payload of HORYU-4, we have decided to carry Yamaha's eVOCALOID(TM) LSI as an on-board vocal synthesiser, namely Digi-Singer. Similar approach has been implemented in 1980's, such as Digi-Talker on UoSAT-1/2. Both approaches do not require skills to interpret the signal and therefore are well suited for the school activity. The major difference from the Digi-Talker is that the Digi-Singer is capable of transmitting songs. This instrument can playback midi files uplinked from our ground station. Uploading songs is easy because midi files, i.e. a few kBs, are lighter than conventional songs formats such as MP3. The files can be sent through slow uplink speed such as 1200bps used for small satellites. The audio signals from the vocal synthesiser shall be transmitted by an on-board UHF transmitter (also used for transmitting digital signal) and received on the ground using an affordable receiver (e.g. a software defined radio) with the handmade antenna. Children can experience space not only in science classes but also in classes of music, art or physical education.

Audio from the Digi-Singer is not only used for the school education, but also for events and creative activities such as a dancing event and illustration, and can attract people who have not been interested in space technologies.

This paper will introduce the development of Digi-singer and the outreach scheme targeted at the general public and younger people.