

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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THE USE OF GLOBAL SATELLITE COMMUNICATION SYSTEM IN PROBLEMS OF
CONTROLLING AND TRANSMITTING INFORMATION OF UNIVERSITY SATELLITE

Abstract

One of the efficient ways in training highly skilled specialists for rocket and space branch is to draw young people into work at real space projects. Creation of university satellites is a very important stage in such kind of training. The first Ukraine students nano-satellite (SNS) is jointly being developed by the four leading university of Ukraine. This project is aimed at the creation of laboratory course in space vehicle (SV) control, space data receiving and processing. Satellite's purpose is the earth remote sensing. To receive good quality pictures of the Earth surface it is necessary to take photos in low orbits, in which duration of communication sessions is too small. In most cases, amateur radio frequencies for the creation radio line with ground-based station (GBS) are used on the board of these student's satellites. It is done to simplify procedure of the license's reception. But speed transmission on these radio bands is too low. Possibility in creating communication between SV and GBS using subscriber modules of global satellite communication systems (SCS) is considered. It can increase duration of data transmission considerably, as well as reduce labour-intensiveness and terms of satellite creation. Such system proved to have an advantage in creating of communication channel with fixed ground objects, with water transport, and also with airplanes, which can be in the field of vision over a long period of time, due to relatively not great heights and speeds. At using SCS a number of problems connected with high speed of SV and gaps in the zones of covering appear because of high altitudes of SV's orbit. This work offers a mathematical model and program of SNS communication session with GBS through SCS. Modelling communication sessions with the use of subscriber module Qualcomm GPS 1620 of SCS GlobalStar have been carried out. The results of modeling have shown that duration of communication in the orbit of SNS with altitude of 600 km and incline angel of 98 degrees is about 4,5 hours per day. Dependence of communication session duration on height and incline angel of satellite's orbit has been defined. The suggested way allowed to increase the amount of transmitted information from the satellite per day considerably.