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ARTIFICIAL SATELLITES OBSERVATIONS AND THEIR SCIENTIFIC USAGE IN CZECHOSLOVAKIA

Abstract

First artificial satellite observations concerned the transmission of the radio signals of the Soviet Sputnik". The Institute of Radiotechnics an Electronics in Prague recorded the data and the Astronomical Institute supplemented them by the Doppler determinations of satellite positions. The visual observations joined the set of observations from which the first flattening of the Earth body was made possible (was published in Nature). Visual observations were quick at hand and easily to be analysed, however, they revealed the absence of precise time measurements as a principal draw-back of the satellite position determinations. The progress came with the construction of the four-axially mounted cameras, which had the focus 50 – 100 cm. The Soviet Academy of Sciences supplied the cooperating countries by the s.c. AFU-75 cameras and the Carl Zeiss Jena developed SBG cameras. Sets of those movable cameras made a useful and relatively accurate satellite observation net. The time of photocameras as the main devices for satellite position determination came to end. Laser ranging offered new and precise method of satellite positioning at the early seventies showed a fast growth of number as well as of quality of satellite laser ranging. The first satellite laser ranging device in Eastern Europe has put into operation at the Ondrejov Observatory in 1973. Most of the main parts of the instrumentation was manufactured in former Czechoslovakia which enabled quick increase of the observing sites with laser ranging systems. Observed satellite positions were used for the satellite orbit analysis, esp., for the analysis of the orbital perturbations, and the main interest was devoted to the disturbing effects of the non-gravitational forces, esp., to the study of the atmospheric perturbations. The final goal was aimed at the construction of the models of thermosperic density distribution and changes. Even if the laser data brought pots of relatively accurate data sets, the necessity of the in-situ measurements was more and more felt. A new push came with construction of the microaccelerometers which determined the drag acceleration directly by the in-orbit measurement of the displacement of the drag-free masses in a closed space. In Czechoslovakia, such a device was put into operation in 1993 and built acc. to the construction of the French D5B satellite. The experiment used the Soviet satellite KOSMOS on which the Czech microaccelerometer was mounted. Then, the very successful experiment with a cubic accelerometer on board of the Space Shuttle Atlantis followed in 1996.