SPACE SIMULATORS IN SPACE SCIENCE EDUCATION IN HUNGARY (1.): A HUNVEYOR TYPE PLANETARY VOYAGE AND PLANETARY SURFACE OPERATIONS SIMULATOR. Sz. Bérczi1, T. Diósy1,2, Sz. Tóth1,2, S. Hegyi1, Gy. Imrek1, Zs. Kovács4, V. Cecić5, E. Müller-Bodó1, F. Roskó1, L. Szentepeity1, Gy. Hudoba6
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Introduction: Space Camp, Huntsville, Alabama, (with NASA Marshall Space Flight Center) every year organizes International Space Camp, a week program for students and teachers [1]. There several Hungarian students could visit the various programs in which various space simulators operate. That is why that attention of space science education turns toward such type of new educational directions.

As a prototype we began not a Space Camp type manned spaceflight simulator, but instead a planetary voyage and lander, although the example to Hunveyor was also from NASA space arsenal: Surveyor. According to the electronic basic framework such systems contain a "terrestrial" direction and control room (it is only a computer in a minimal case) and contain another computer on the place of operations for the space works itself. This second one may be in another room, (it is also a computer in minimal case), but this is working on a planetary surface (metaphorically) and in the case of Hunveyor it is on board of the university lander probe in space simulator mode [2, 3].

In this work we show some details of the some electronic form, activities, possible combinations. The benefit of the system is, that in its skeletal basic structure both "ends" of the "terrestrial" and the "planetary" of a communication line the peripheries and programs are continuously extended, developed, multiplied, so finally a complex system of various space simulators can grow up in this program.

Other group of enthusiastic students and colleagues plan to build a manned space simulator (EMAUSZ) too, and we support their program by lending all knowledge we collected in the Hunveyor planetary simulator construction.

Two computers in two rooms connected: The hearth of the system is the communicational channel between two computers connected. Each ends use various peripheries. On "terrestrial" side are the directing and controlling peripheries (joystick, claviatures, monitors) while on the "planetary" side the sensorial, manipulator peripheries are dominant. In an on line connections the RS 232 ports of the PC-s were used for the connection [4]. Fig. 1.

Planetary simulator in work: The Hunveyor planetary simulator construction is a special form of planetary science education. We made our system with "terrestrial" control room and a planetary lander site. The whole voyage simulation allowed many enthusiastic programs to be involved in the program, so finally astronomy, planetary geography, petrology and robotics with its electronic background were all educated during the use of a simulation. Many astronaut and robot working together can be simulated also in this activity. And planetary simulator is the most simple one. It is at the beginning, and further simulators, with manned flights can be practiced by constructing first this Hunveyor type one.

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Fig. 2. If the planetary simulator is connected to the internet remote users can keep in contact with the program.

THE HUNVEYOR SIMULATOR SYSTEM ON THE INTERNET

Fig. 1. The basic arrangement of Hunveyor simulator. The terrestrial and the planetary computers communicate with each other. Both of them may be extended and developed with various peripheries. On terrestrial side joystick, monitors and claviatures, on the planetary side motors of instruments and measurements can be attached to the system. The whole Hunveyor Planetary Simulator System preserves the benefits of our earlier lander construction and the developing program for new experiments on board of the lander, but extends its capability in educational works involving activities in astronomy and new topics in planetary geology too.

THE COMPUTER OF THE „TERRESTRIAL” CONTROL

THE HUNVEYOR’S „LUNAR” OR „MARTIAN” COMPUTER