Kandó Kálmán Faculty of Electrical Engineering

Institute of Computer Engineering

Address: **Budai út 45, H-8000 Székesfehérvár, Hungary**
Tel.: **+36-22-316-260**
Fax: **+36-22-312-337**
E-mail: **titkarsag@szgti.bmf.hu**
Website: **http://www.szgti.bmf.hu**

Director: **Dr. Péter Lőrincz**

1   Introduction

Institute mission statement:

'Budapest Tech considers the Institute as a link between the Mid-Transdanubia and Budapest Tech.'

Institute of Computer Engineering, Kandó Kálmán Faculty of Electrical Engineering, Budapest Tech which is the legal predecessor of Kandó Kálmán Polytechnic was founded in 1970 in Székesfehérvár.

We have trainings from 1970/71 in the branch of technician enginneering, and from 1993 in the branch of electrical engineering. As a result of the financial support and an agreement between the local industrial organizations and the Ministry of Education the computer technology/informatic training has been involved to meet the demand for the experts of this field.

In 1994 Kandó Kálmán Polytechnic launched the technical management training, placing the information technology branch in the Székesfehérvár location. Through this we satisfy the local needs, since there is a growing demand for employees with complex technical and economic knowledge.

In 2001 the Institute accepted the offer from John von Neumann Faculty of Informatics and extended its training by launching the informatic engineer branch which was accredited as excellent by the Hungarian Accreditation Board. In 2004 we started the Information Technology BSc training.

In 2000 the integration caused a lot of changes in our life. According to these changes our Institute is a part of the structure of Kandó Kálmán Polytechnic, since we are an integrative part of its operational and stuctural organization. A matrix - controlled organization has been formed. The regional competence centre realizes

the regional strategy of the college, it provides the presence and the operative contects with the region.

Infrastructure

The institute is located on 9300 m^2 in the green, with good parking facilities. The floorspace of the buildings: 'K': 1217 m^2, 'F': 1362 m^2. The youth hostel can place 129 people, with 2-3 person per room. In the room: washbasin, internet access. Communal rooms, good parking facilities, peaceful neighbourhood the town centre and the college is within walking distance. Salaried teachers: 35. Teachers with scientific degree: 8. Total staff: 75.

Student Number (Oct. 15, 2005)

Electrical engineers: 508, technical managers: 95, informatic engineers: 103, total: 706.

Figure 1
The main building of the Institute of Computer Engineering, Székesfehérvár

2   Education Profile

Electrical Engineering, Information Technology Systems Branch

Our aim is to train electrical engineers with comprehensive knowledge in the modern electronic, informatics theory and practice, competence for application, further development and operation of informatics systems and software.

Hardware: To train electrical engineers, who relying on their electric circuit knowledge are able to design, develop and error-detect analogous, digital and microprocessor instruments and systems.

Computer Network Module: The aim is to train electrical engineers, who acquire the theoretical and practical knowledge needed for computer network design, implementation, operation and management in the domain of network hardware, systems technology and systems software.

Internet Technology Module: The aim is to train engineers, who, besides their hardware knowledge, have competence in the area of network and internet technology, and also able to realize business applications.

Software Development and Production Module: The aim is to train engineers, who, with their programming-technical knowledge, are able to organize complex informatic systems, capable of system and user-level programming and operation.

Logistic IT Tools Module: The aim is to train engineers, who are capable of planning and controlling logistic systems, economic planning and calculations, fulfilling tasks in the domain of business production controlling and informatics.

Technical Management, Information Technology Branch

The aim is to train technical managers, who besides their technical and comprehensive information technological competence are well-prepared in the domain of corporate management, enterprise and marketing. Through their complex knowledge and language knowledge they are able to manage smaller enterprises, among them those of in the field of information technology. They can cooperate with the enterprises concerning economic activties.

IT Engineer BsC

Our aim is to train IT engineers, who relying on their professional informatic knowledge are able to create technical products, to fulfil design, development and implementation tasks for information technology and informational infrastructural systems, as well as for their data, and program systems. They acquire engineering practical methods needed for installation and operational tasks for information technology and informational infrastructures.

3 Research and Scientific Activity

Traditionally our institute deals with applied IT and its interdisciplinary domains regarding the level of education and applied research. Our activity beyond our institutional and individual competences is determined by our regional contacts. The large-scale industrial organizations have a dominant role in it, but we have extended relationship with small-scale and medium-scale enterprises too.

Figure 2
EMC measuring room at the Institute of Computer Engineering

3.1 EMC Laboratory

In December 2003 with the support of Videoton Holding Plc. we started to establish a laboratory, the purpose of which is to perform standard measurements for electromagnetic disturbance (EMC) compatibility. The best solution is to establish a specially screened measureing laboratory. This laboratory (measuring room) is covered with a multifunction and multilayer surface, which hinders, on one hand, the disturbance from the outer environment, (metal cover on the walls of the room, such as Faraday-cage) on the other hand, it absorbs the disturbing waves generated by the tool to be measured, (absorbant cover, ferrite tile, brick wall, covered with special materials) thus do not influence the validity of measuring.

The laboratory is located on the basement of the main building. Figure 2 shows the measuring space. Further instruments: RS spectrum analyser, RFT network interference measuring instrument, power supply unit for interference measuring set.

The 'soul' of the conducted and radiated interference measuring is the spectrum analyser. By means of the analyser we can measure, analyse and evaluate the signals received from the aerial and the isolating equipment in a given frequency range. To do so we use the ESPI 3 analyser/measure-receiver (Figure 3). This analyser is suitable for measuring fom 9 KHz to 3 G Hz and perfectly applicable for the measuring tools offered. (aerials, isolating mode, near-field measuring heads, etc.) The evaluation of the measurement is carried out with a software on the computer (Figure 4).

Since September 2005 the laboratory is avalilable for the third-year electrical engineers. Through individual measuring they can acquire the spectrum analysis by measuring different equipment (PC, electric engine), and they are also equipped with the basic knowledge they need for EMC compatible planning today.

The laboratory – as a service – is available for the business organizations of the region, the institute, besides giving professional assistance, also provides pre-calibration for the equipments involved in the production.

As secondary result of the project two national and one international publication have been published.

Figure 3
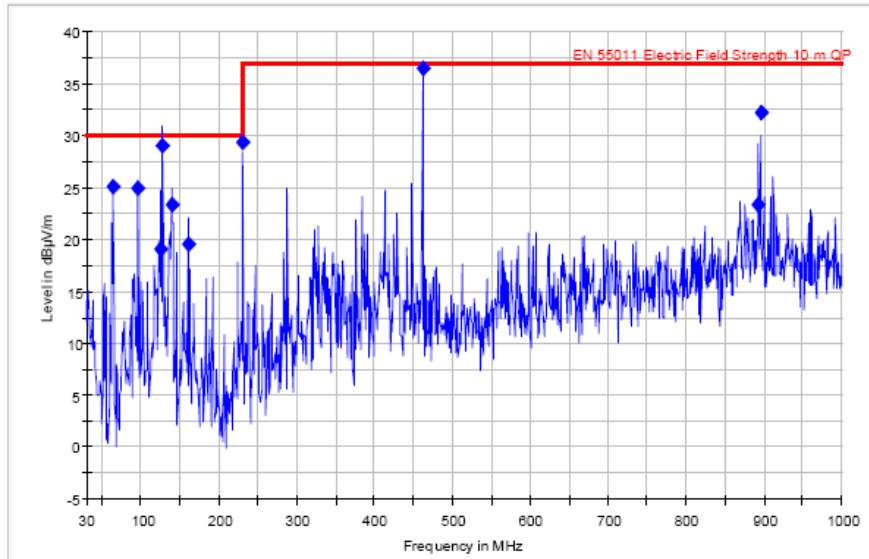The use of the spectrum analyzer in a near-field zone measuring

Figure 4
The frequency – spectrum of the PC radiant power

3.2 Hunveyor-4 Simulated Space Probe Model

The 'Hunveyor' is an abbreviation, which comes from the expression of Hungarian UNIversity SurVEYOR. It aims to construct the model of the American Surveyor space probes, used to prepare landing on he moon, and to survey. The goal is that this model can be operated in earth-specific conditions. The project began in 1997 at the Faculty of Technics in ELTE, and Institute of Technology, Kandó Kálmán Faculty of Electrical Engineering, Budapest Tech joined in 2001 as the fourth participant in the country.

The aim of the HUNVEYOR-4 project is to provide a long-term framework and a pleasant atmosphere for the scientific work at the institute, and to give opportunities for developments, projects and scientific papers among the students.

Its main goal is to provide the students with practical knowledge in the field of engineering design, organization and implementation. It gives them the chance to get acquainted with the newest techniques and technologies, to get experience in team-work.

Our goal is not to make a ready, completed space probe. The real goal is to construct, to practise engineering tasks, repeatedly reconstruct the existing units following the technological development and the continuously developing newer and newer technologies. A number of students participate in the project, and as a result of this work several diploma works have been prepared on this subject. We held a national meeting for the HUNVEYOR-builders with great success. We

regularly take part at conferences, where we report on our results not only in Hungary but internationally too, such as, at the *Lunar and Planetary Science Conference* organized annually by NASA in Houston (USA, Texas), in the events of the European Agency, and at conferences in Japan. We have several publications on the subject. The above activity is performed by us, as a member of the Cosmic Material Analyser Space Research Group of the Geonomic Board of the Hungarian Scientific Academy.
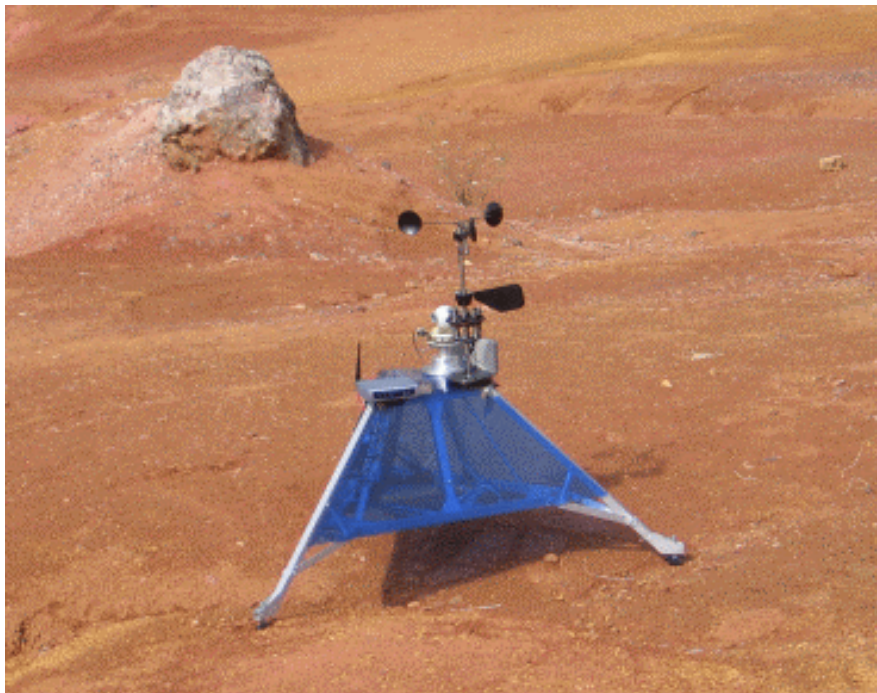

Figure 5
Hunveyor-4

Our aim is not to create a completed space sond. It is its building, the practice of the engineering task is the real aim, even the repetition of some units, i.e. redesigning or rebuilding can be considered, as to follow the technical and technological development. During the recent years numerous students have taken part in this project, which resulted in several diploma works. In January this year our institute organized the national HUNVEYOR-builders reports' meeting, which had great success.

3.3 SeaFM Facility Management – Integrated Economical Form for Enterprises Possessing Valuable Assets and Inventory

The target of SeaFM project supported by Baross Gábor tender is to design, update and test a computer based package program for facility management. The

aim of the development is to create an open system based on a flexible module-based built, powerful data-base.
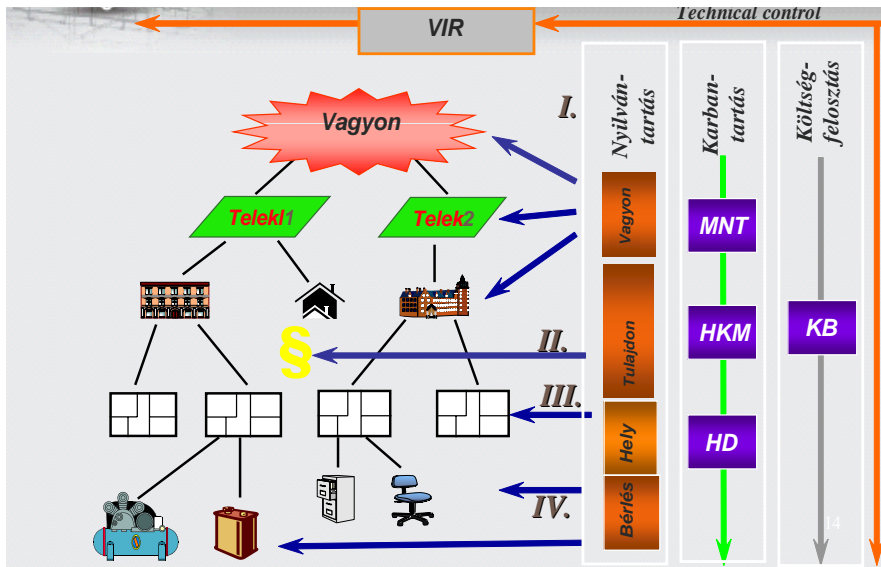

Figure 6
The modules of SeaFM

The possible users of the system: companies with several sites, multinational companies, domestic entreprises, small- and middle-sized companies with facility handling profile, self-governmental asset handling joint stocks, industrial areas, educational or health care institution possessing great property.

The consort partners participating in the development: Seacon Europe Ltd., Budapest Tech, BakonySoft Ltd.

As a result of this co-operation an international publication was issued.

3.4 The Industrial Application of Programable Analogue Cell-Block Electrical Circuits

In the past 4-5 years we received appreciable support from Videoton Enreprise. In the meantime, on base of continuous talks, a co-operational area was agreed, which was needed for the company, and we had professional background for.

The main activity of the development sector of Videoton is the production support, i.e. special instrument and device development.

The main specific character of each device is such a universal input-output stage which consists of analogue electrical circuits or details o f it according to specific needs.
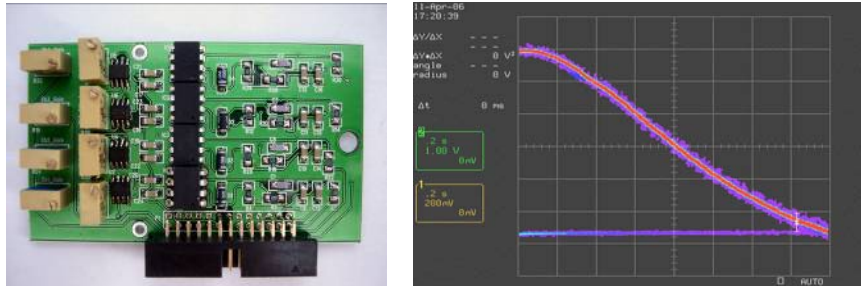
Figure 7
The measurable electric board and transfer characteristic with FPAA coo work

Our institute has a tradition in research of programable electric circuit applications and application development.

These electric circuits are such devices that are capable of electric circuit topology, or parametrical trans-configuration of an existing electric circuit being supported by a micro-computer processor.
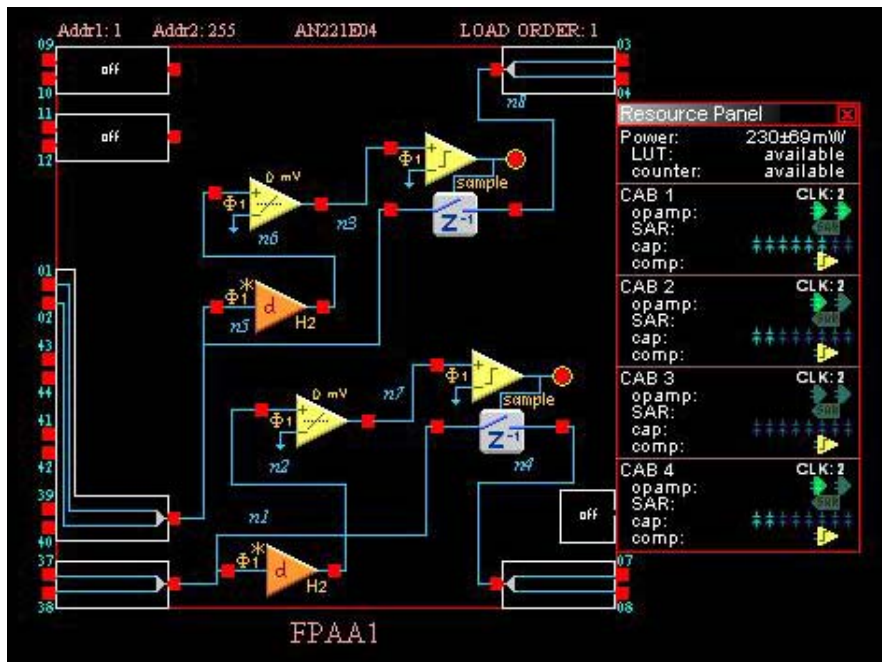

Figure 8
The realized FPAA circuit

This kind of application and this activity of our institute arroused the interest of the professional staff from Videoton. Following the contact the development

started, which resulted in a sort of knowledge transfer to Videoton Development department, so the FPAA circuits have been used ever since. Several special devices were implemented. One of these is such a device that controlls characteristics that can be seen in Figure 7. In the case of this device the examined analogue electrical circuit is controlled by a generator and on the OFF-side instructed and controlled by a FPAA electrical circuit.

This sort of co-operation is a desired success story as the contact was born on base of a conference article, then a lecture at a conference, afterwards the co-operation became deeper and deeper. As a consequence several diploma works were done, ten publications appeared, and a successful work was done in the Student Scientific Circle.

3.5 ProAlpha Integrated Enterprise Controlling Software Package Introduction to Higher Education

As a consequence of the co-operation between Institue of Computer Engineering, Budapest Tech, and ProAlpha Hungary Ltd., we introduced the integrated entreprise controlling software package (ERP) to the educational system and we created a company with virtually productive activity.

The participant partner s in the project: ProAlpha Hungary Ltd., Videoton Informatica Ltd., Budapest Technical College.
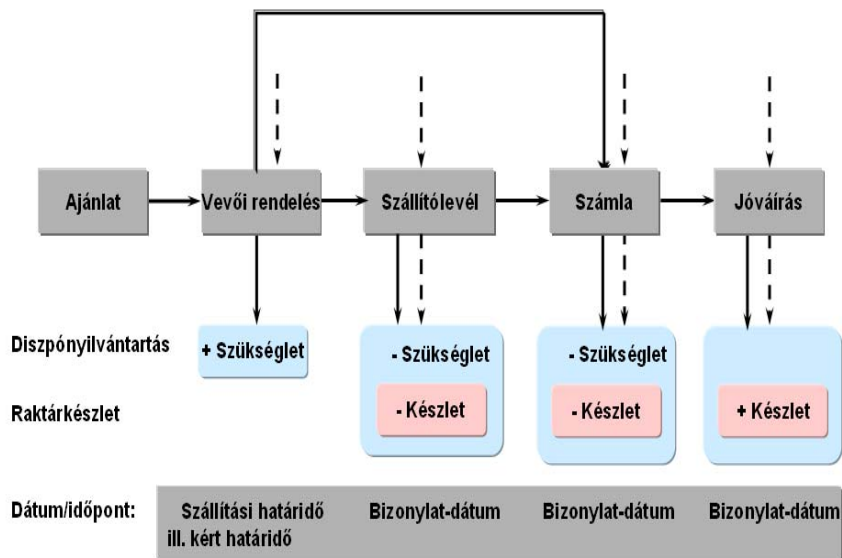
Figure 9
ProAlpha 'purchasing' process

The stages of the project:

- May 2001: Presentation of product, ProAlpha Software Ltd.: 'The Application of Networks in International Logistics' in the frame of Erasmus/Socrates intensive program;

- September 2001: Signing the co-operation and license contract between the Institute and the German ProAlpha AG in which ProAlpha Hungary Ltd. undertook to put at our disposal the ProAlpha enterprise controlling program package and the additional data-base for educational purposes. The Institute undertook to introduce the training of the program package in education as a result of which a demonstrative data-base was to be created.

- October 2001: Installing the program package to a dedicated server;

- December 2001: The first project is completed: Students of Enterprise Logistics at kitchen furniture factory Factum Ltd.

- February 2002: The introduction of ProAlpha in Business Application subject for technical managers (fulltime and correspondence students)

- May 2002: After the translation of the database of ProAlpha into English and German it is used as application practice in team work in t he frame of Erasmus/Socrates program 'E-business in international Logistics';

- September 2003: The introduction of ProAlpha program in the Economic Information Technology II for students of Technical Information Technology;

- March-June 2005: Scheduled hired work production in the frame of proAlpha integrated enterprise controlling system. Two students from TFH Wildau do their project work at Videoton Informatika Ltd.

As a result of this co-operation several articles were published in the country and abroad, and many diploma works were done.

The most appreciable effect of the above mentioned research activity is that the students participate actively in this activity or they handle it as a pragmatic way of education so that they became part of the scientific activity of the institute.

References

Dr. Seebauer Márta: Egyedi gyártás tervezése proAlpha integrált vállalatirányítási rendszerben. Alba Polisz Regionális Konferencia 2004. „Tudományos főirányok az EU-ban", Székesfehérvár, 2004. november 8., ISBN 963 7154 33 7

Dr. Seebauer Márta, Boruzs Mária: ProAlpha integrált vállalatirányítási szoftvercsomag bevezetése az oktatásba. Gazdaságinformatikai Konferencia, 2003. november 11., Győr, Széchenyi István Egyetem

Hári Zoltán, Komori Győző: Gyártástervezés. Projekt konferencia 2004 – Konzulens: Dr. Seebauer Márta

Bellovics Tibor, Király Péter, Szunomár Anna, Szauter Gábor: Beszerzés és értékesítés proAlpha® integrált vállalatirányítási rendszerrel. Projekt konferencia 2001 – Konzulens: Dr. Lőrincz Péter

Dr. Márta Seebauer, Zsolt Viniczay: SeaFM Facility Management Project. Integrated Management Methodology for the Property and Facility of Companies. In proceedings of 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, SACI 2006, May 25-26, 2006, Timisoara, ISBN 9637154 46 9

Margit Makó: Self Configuration Analog Circuits, 17th Kandó Conference 2006 'In memoriam Kálmán Kandó' Budapest Tech Kandó Kálmán Faculty of Electrical Engineering, January 12-14, 2006, ISBN 963 7154 426

Margit Makó: Acoustic Noise Elimination by FPAA, In Proceedings of 3rd Romanian-Hungarian Joint Symposium on Applied Computational Intelligence, 2006 May 25-26, Timisoara, Romania, ISBN 963 7154 46 9, pp.571-577

Self Configuration Analog Circuit by FPAA, In proceedings of 4th Slovakian-Hungarian Joint Symposium on Applied Machine Intelligence, January 20-21, 2006, Herlany, Slovakia, ISBN 963 7154 44 4, pp. 508-516

Margit Makó: Configuration of EEG Input-unit by Electric Circuit Evolution, In Proceedings of 9th International Conference on Intelligent Engineering Systems (INES 2005), September 16-19, 2005, Cruising on Mediterranean Sea, ISBN 0-7803-9474-7, IEEE 05EX1202C

Configuration of Universal Analog Input-Unit by Electronic Circuit Evolution, (Margit Makó), 6th International Carpatian Control Conference, May 24-27, 2005, Miskolc, Hungary, ISBN 963 661 644 2, pp. 395-400

The Function-Controlled Input for the IN CIRCUIT Equipment, In Proceedings of IEEE 8th International Conference on Intelligent Engineering Systems (INES 2004), Cluj-Napoca, Romania, September 19-21, 2004, ISBN973-662-120-0, pp. 443-446

Univerzális bemenőfokozat FPAA-val, Dunaújvárosi Főiskola Közleményei, 2004 „OKTATÁS-KUTATÁS-GAZDASÁG", Konferencia a Dunaújvárosi Főiskolán, ISBN1586-8567, 123-128 o.

Univerzális bemeneti egység IN CIRCUIT mérőberendezéshez, BMF regionális Konferencia 2004, Székesfehérvár, 2004. november 8. Konferencia kiadvány: ISBN 963 7154 33 7

Szoftver-támogatott analóg áramkör realizáció, „A tudomány és az európai felsőoktatási térség" konferencia Dunaújvárosi 2003. nov. 5., Konferencia kiadvány, ISSN 1586-8567 pp. 553-567

Kandó Konferencia, 2006. jan. 12. Budapest

A megújult HUNVEYOR-4 gyakorló űrszonda

Symposium on Applied Machine Intelligence, Jan. 20-21. 2006. Herl'any, Slovakia, Constructing HUNVEYOR-4, the Educational Space Probe

Hatodik Hunveyor Szeminárium, 2006. jan. 24. Székesfehérvár A HUNVEYOR-4 gyakorló űrszonda építése a BMF Kandó Számítógéptechnikai Intézetében

37th Lunar nad Planetary Sciences Conference (NASA), March 12-18, 2006, Houston (Texas, USA)

Gy. Hudoba, S. Hegyi, H. Hargitai, A. Gucsik, S. Józsa, A. Kereszturi,A. Sik, Gy. Szakmány, T. Földi, P. Gadányi, Sz. Bérczi. (2006): Planetary Analog Studies and Simulations: Materials, Terrains, Morphologies, Processes: Concise Atlas in the Solar System (9) Eötvös University, Hungary, XXXVII LPSC1114

Sz. Bérczi, S. Hegyi, Gy. Hudoba, S. Józsa, Gy. Szakmány (2006): Planetary Analog Metarials Studies: Martian Shergottites and Their Counterparts from the Szentbékkálla Series of Mantle Lherzolite Inclusions and the Host Basalts in Hungary, XXXVII LPSC, #1122

S. Hegyi, B. Drommer, A. Hegyi, T. Biró, A. Kókány, Gy. Hudoba, Sz. Bérczi. (2006): Analog Planetary Material Studies of Igneous Rocks in Field Trips at Hungarian sites of North-Balaton and Mecsek Mountains with University Space Probe Models Hunveyor and Husar, XXXVII LPSC, #1136

Szikra I., Ferenczi Gy., Varga T., Darányi I., Hudoba Gy., Földi T., Hegyi S., Bérczi Sz. (2006): A New Form of Space Science Education: Preparations for Phoenix Lander Mission Simulations by Hunveyor in Terrestrial Conditions, XXXVII LPSC, 1169

Felsőoktatási Matematika-, Fizika- és Számítástechnika Oktatók XXX. Konferenciája, 2006. aug. 23-25. Pécs

Fresh Air in Education - The HUNVEYOR Educational Space Probe