Newsletter - *Calibrated for Creative Communications*

Vol. 13, no. 1, Spring 2015

Spring your Windows Open

It's spring again, and we offer another trip through time, technology, and society with:

- Talented Education
- Emerging Global Innovation Systems
- History of Computing in CEE
- The 9th IT STAR Conference on Strategies and Applications, and more

The narrators of our spring story are:

E. Sendova, Associate Professor at the Institute of Mathematics and Informatics, BAS
M. Bogdanowicz, Senior Scientist at the IS Unit of the Institute for Prospective Technological Studies
G. Beqiraj, N. Frasheri, J. Kacani and F. Premti, Academy of Sciences of Albania and/or the Polytechnic University of Tirana.
M. Holynski, Director of the Institute of Mathematical Machines, Warsaw.

Open your Windows to let Spring in!

Join us for the Journey,

The Editor

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EDITORIAL POLICY

This Newsletter maintains a world-class standard in providing researched material on ICT and Information Society activities from the perspective of Central, Eastern and Southern Europe (CESE) within a global context. It facilitates the information and communication flow within the region and internationally by supporting a recognized platform and networking media and thus enhancing the visibility and activities of the IT STAR Association.

The stakeholders whose interests this newspaper is addressing are

- IT STAR member societies and members
- ICT professionals, practitioners and institutions across the broad range of activities related to ICTs in government, business, academia and the public sector in general
- International organizations

Special arrangements for the production and circulation of the Newsletter could be negotiated.

The newsletter is circulated to leading CESE ICT societies and professionals, as well as to other societies and IT professionals internationally. Everyone interested in CESE developments and working in the ICT field is welcome to contribute with original material. Proposals for articles and material for the Newsletter should be sent two months before the publication date to info@starbus.org.

Talented Education

Inquiry-based Learning

Evgenia Sendova *is Associate Professor at the Institute of Mathematics and Informatics, Bulgarian Academy of Sciences (IMI-BAS) with PhD in informatics. She holds the IFIP Outstanding Services Award (1991) and the Siemens certificate for working with young talents in mathematics and science (2003).*

To do math and science at school age, not just to study them

To keep-up with the knowledge dynamics in a specific field, the citizens of the creativity & knowledge based society should acquire and develop key competences such as: inquiring and identifying relevant information; conducting their own explorations; applying creatively their findings; presenting the results in a way convincing for others. An educational strategy towards this goal is the inquiry-based learning (IBL).

Inquiry-based learning – a strategy *enhancing the scientist in the student*

The recent developments in Bulgaria related to implementing and disseminating the inquiry-based learning are mainly in the framework of European educational projects − current (e.g. *Mascil, KeyCoMath, Scientix*) and already completed (e.g. *InnoMathEd, Fibonacci*, *Meeting in Mathematics, Math2Earth, DynaMat*). When talking about the inquiry-based learning we should take into account that it occurs at four main levels viz. *confirmation inquiry*, *structured inquiry*, *guided inquiry* and *open inquiry*. The endeavors of researchers at IMI-BAS, involved with the above projects, are to prepare teachers to work at all these levels, providing them with environments stimulating not just a novel way of teaching but a novel way of *learning. Such environments* include the development of virtual labs for explorations, observations and generation of hypotheses in mathematics and science but are not reduced to them. A special emphasis is put on educational forms fostering situations, in which students work on their own research projects **doing science,** i.e. experiencing the process of research *through the eyes of professional mathematicians or scientists* and the teachers act as members of a research team, as authentic co-learners and explorers. This is in fact the fourth level of IBL – the open inquiry, where students derive questions, design and carry out investigations as well as communicate their results. Creating conditions for high school students to work at this highest level of IBL reflects the constructionist's belief that *being a mathematician/ scientist (like being a poet, or a composer or an engineer) means doing, rather than knowing or understanding*.

To put the Bulgarian students with special interests in math and science in a more realistic research situation, the *High School Institute in Mathematics and Informatics* (HSSI) was founded 15 years ago. This institute inherited the good traditions of an earlier movement of the technically creative youth in Bulgaria and an international research program held in the USA – the Research Science Institute (RSI) sponsored jointly by the Center for Excellence in Education (CEE), and the Massachusetts Institute of Technology (MIT).

The Research Science Institute (RSI) – an international program for high school students

If I have to describe this program with one sentence it would be: "the place where to be extraordinary is the most ordinary thing"… This applies to the students, to the mentors, to the morning and evening lecturers and to all the rest officially and unofficially involved. The Research Science Institute (RSI) was developed by the Center for Excellence in Education (CEE), a non-profit educational foundation in McLean, Virginia. Central to CEE is the principle that talent in science and math fulfills its promise when it is nurtured from an early age. The RSI is attended by approximately 80 high-school students from the US and other nations. Once selected, the students come to MIT and work on a research project under the guidance of faculty, post-docs, and graduate students at MIT, Harvard, Boston University, and other research and industry institutions from the Boston-area. All the students chosen for the Institute have already acquired a deep interest in a scientific field of inquiry. They work on their research projects for five weeks. At the conclusion of this internship, they write a paper summarizing their results and give an oral presentation of their work in front of a large

audience at the RSI Symposium.

How to present their research projects in math and science to specialists in the corresponding field as well as to peers who are working on a large spectrum of science topics, is part of my duties as a tutor (already for 17 consecutive summers) in RSI. We, the tutors, direct our students to the general goal via a path traced by *milestones* (intermediate objectives). At each milestone, students are expected to have finished a concrete stage of the final product development and mastered specific skills and competences.

Traditional milestones for the written and oral presentation include:

- *Presenting a mini-project using the same sample as the one for the final paper*
- *Gradual filling the sample starting with the background of the project, the methods used, considering partial cases and possible generalizations; classifying the cases of failure*, *etc.*
- *Presenting the introductory part of their project for 3 min* at a "*posterless" session (with no props)*
- *Presenting their project for 5 min with any visual support they think appropriate*

All the milestones are accompanied by a feedback from us, the tutors, who work closely with the students - we read and critique the draft papers, provide editorial remarks, suggest avenues of research and areas of additional background reading, give ideas for tuning the oral presentations to a specific audience, etc. Let us note that to communicate verbally the meaning and the relevance of scientific research to an audience larger than a few colleagues working in the same field is a competence difficult to acquire. Finding an appropriate metaphor could save a ton of rigorous explanations. Consider for example a phrase which is famous among the mathematics community: *A drunk man will find his way home, but a drunk bird may get lost forever.* It is formulated by Shizuo Kakutani, known for his influential work in the fields of ergodic theory, functional analysis, and Brownian motion, as it relates to probability theory. The phrase encodes the fact that a two dimensional random walk is recurrent (i.e. the probability of returning to the origin is 1) whereas in higher dimensions random walks are not (in other words the probability of returning to the origin decreases as the number of dimensions increases).

It was in this spirit that the Bulgarian participant in RSI 2013 Rumen Dangovski demonstrated the notion of *non-commutativity*, central to his project *on the lower central series of PI-Algebras* in an attractive and approachable way: he put a sock over his shoe thus showing that the order of the operations "putting a shoe" and "putting a sock" does matter.

For the recent 15 years the projects of 9 Bulgarian students participating in RSI have been recognized as "top 5" for written presentations in all fields (meaning the best in their respective fields – mathematics or informatics) and 3 – in the "top 10 oral presentations". But what is even more rewarding as a post effect is that these students are involved in many ways (including as mentors and advisors) in the activities of the Bulgarian *High School Institute in Mathematics and Informatics*. By mentoring and guiding the next generations of young minds they also pass the awareness that approaching the work with genuine interest in research and discovery is what matters in the long run.

One of the main ideas behind establishing the High School Students Institute (HSSI) in Bulgaria was to implement RSI-like activities in mathematics and informatics context, taking into account the local conditions and traditions.

The Bulgarian High School Students Institute in Mathematics and Informatics

As one of the founders of the Bulgarian school for identifying and developing mathematically gifted students, Petar Kenderov, often says: *Talent is a resource which, unlike the ores, could vanish if not discovered early enough…* With this idea in mind and following the inspiring example of RSI, in the year 2000 the *High School Institute in Mathematics and Informatics* (HSSI) was founded by the Institute of Mathematics and Informatics at the Bulgarian Academy of Sciences, the Union of Bulgarian Mathematicians, St. Cyril and St. Methodius International Foundation, and Evrika Foundation in response to the decision of UNESCO to declare that year as "World Year of Mathematics".

The activities of HSSI are focused on projects in mathematics, informatics and information technologies. The participants in HSSI are high school students between 8th and 12th grade, mainly from specialized Science and Mathematics Secondary Schools in the country. Every participant in HSSI works individually (or in a team) on a freely chosen topic in mathematics, informatics and/or IT under the guidance of a teacher or another specialist. A written

presentation of the project is sent to HSSI. All papers are reviewed by specialists. Papers involving creativity elements are given special credit. The best projects are accepted for a presentation in the conference sessions of HSSI.

The High School Students' Conference is usually attended by more than 200 students, teachers, researchers, journalists. Based on the merits of the paper and presentation, the Jury judges the works and selects the best ones. Their authors are invited to take part in an interview for selecting two Bulgarian participants in RSI and to participate in the School Section of the Annual Conference of the Union of the Bulgarian Mathematicians.

The selection of two Bulgarian representatives for RSI is held by a Jury of specialists at the Institute of mathematics and Informatics in which the students are expected to demonstrate scientific knowledge related to their projects, commandment of English and general culture together with other talents and hobbies (dance, arts, juggling, painting, poetry, etc.). The participation in RSI in the recent years is fully supported financially by the *America for Bulgaria Foundation.*

The authors of the best projects from the School Section are invited to participate in a three-week Research Summer School. During the first two weeks, lectures and practical courses in mathematics and informatics are delivered by specialists from universities, academic institutions and software companies. The main goal of the training is to extend the students' knowledge in topics related to their interests and to offer new problems, potentially the core of short-term projects. During the third week the participants present their results of their short-term projects and exchange ideas for further studies.

To help teachers improve their mentoring skills, a High School Teachers Workshop is organized during the third week of the Research Summer School. Participants are the research advisors of the students' projects, presented at the events of HSSI during the school year.

In 2014 an Institute for high school students showing research potential in various sciences (an extended version of HSSI) was established at the Bulgarian Academy of Sciences and had already two sessions of students' project presentations.

The Research Summer School of HSSI for 2015 will be held at the American University of Blagoevgrad (2-16 August) with an international component. A special event will be the participation of Prof. Chris Skinner, a long-term professor at RSI and current Professor at Princeton, as a guest lecturer.

The overall experience of work within these educational settings shows that the students build up a set of competences interwoven with predetermined objectives of preparing them for a dynamic society in which the *future is not what it used to be*.

The Emerging Global Innovation Ecosystems

Marc Bogdanowicz *is Senior Scientist at the IS Unit of the Institute for Prospective Technological Studies (European Commission, Directorate-General JRC) in Seville, Spain.*

The JRC-IPTS has recently published a report that sheds new insights on the way large ICT Multinationals are reorganising themselves within global innovation networks as to capture at best innovation and its benefits.

The report was prepared in the context of a research project on *European Innovation Policies for the Digital Shift* (EURIPIDIS), jointly launched by JRC-IPTS and DG CONNECT of the European Commission, in order to improve understanding of innovation in the ICT sector and of ICT-enabled innovation in the rest of the economy. It focuses on the improvement of the transfer of best research ideas to the market.

EURIPIDIS' aims are:

1. To better understand how ICT innovation works, at the level of actors such as firms, and also of the ICT "innovation system" in the EU

2. To assess the EU's current ICT innovation performance, by attempting to measure ICT innovation in Europe and measuring the impact of existing policies and instruments (such as FP7 and Horizon 2020), and

3. To explore and suggest how policy makers could make ICT innovation in the EU work better.

The point of departure of this report, and its main contribution, lies in the way in which these questions are tackled. The approach first starts with a conceptualisation of what is called an 'innovation ecosystem'. Secondly, this concept is applied simultaneously at both the sector level and the individual company level.

The ecosystem is defined as groups of symbiotically interacting 'players' which include: companies and other players such as the providers of knowledge, resources, and 'rules of the game'. It is the companies, which constitute the economic 'engine' of the ecosystem since they create value for consumer-users, output, and employment. In doing so, however, the companies are also influenced by the other players in the ecosystem.

Second, two levels - the sector level and the company level – in the ecosystems are considered to interact with the result that it is not possible to fully understand the one without the other. One of the main contributions of the paper is to demonstrate the necessity, if the process of innovation is to be properly understood, of a simultaneous analysis at both sector and company levels.

The analysis proceeds hence in two stages. The first stage involves the identification of the main players within the company who are collectively involved in the company's innovation process. Crucially, this analysis includes not only researchers and developers (accounting for the R&D on which most studies of innovation conventionally focus) but also other players such as those involved in company strategy, sales and marketing, design, software development, and distribution - players who are left out of most analyses.

The second stage of the analysis involves situating the intra-company players within the broader context of the key external players who are part of the company's Global Innovation Ecosystem. Increasingly (for both large and small companies) knowledge that is relevant for the company's innovation process will be found not only outside the company's legal boundaries but also outside its home country. This means that in order to benefit from this external knowledge, the company's Global Innovation Ecosystem needs to be designed so that it can effectively access and use knowledge globally.

To explore this theoretical view, the report describes several case studies, based on desk research and in depth interviews by the author with top-level managers of those companies. The following case studies can be found in the report: British Telecom, Vodafone, Telefonica, Google, Microsoft, Apple, Skype. Some additional companies re-organisation is also analysed, less in depth.

The analysis shows that there are different kinds of company Global Innovation Ecosystems in a three-layered ICT Ecosystem.

Layer 1 players, the equipment manufacturing layer, may be divided into those that have managed to establish significant innovation platforms and those that have not. This has been one factor shaping their different company Global Innovation Ecosystems. A further force for change has been the entry of new, innovative competitors, notably Chinese companies such as Huawei and ZTE, but also new players from the US.

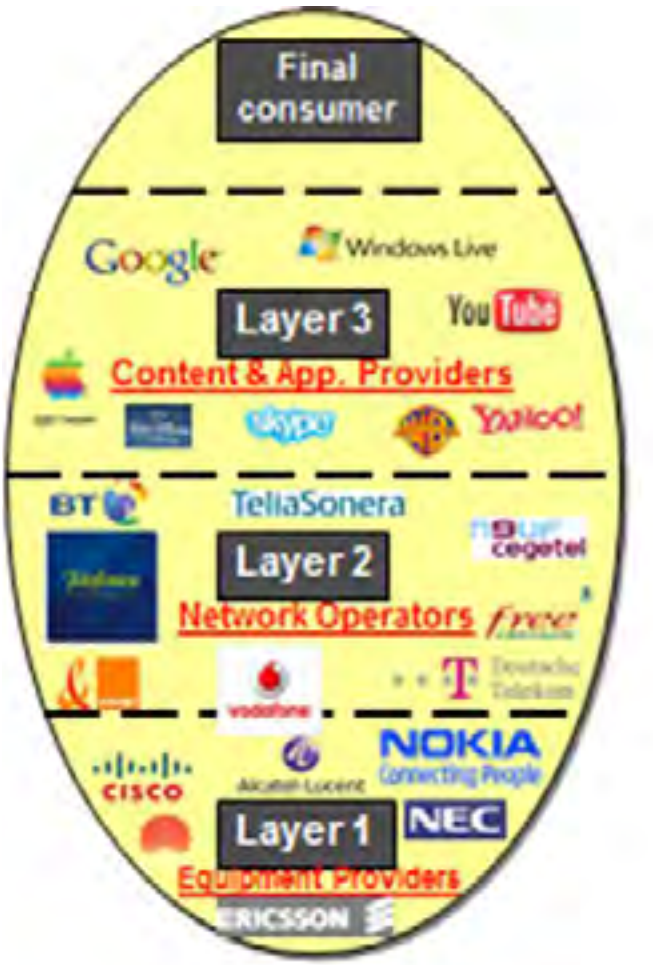
Very different structural conditions exist in the network operator layer 2. More specifically, this layer is driven by economic forces, which include very high fixed costs coupled with low marginal costs; economies of scale and substantial entry barriers. The result of these forces is that Layer 2 is dominated by a small number of large operators. But this is not all. The inevitable focus of the operators on their networks has required a set of capabilities that are fundamentally different from the capabilities that the software-based Internet companies in Layer 3 need in order to become and remain competitive. This explains the inability of the dominant Layer 2 network operators to successfully diversify their activities into Layer 3 (despite their serious efforts to do so) in an attempt to avoid becoming the simple providers of 'dumb pipes' that carry data for others who make money from the use of that data. In addition, the innovation activities of the network operators in Layer 2 are also shaped by their reliance on innovation by ICT equipment providers in Layer 1. Having said this, the report also shows that telecoms operators such as Vodafone and Telefonica, have been making good use of their global networks as innovation platforms in their company Global Innovation Ecosystems.

In the platform, content and applications layer 3 – there is a unique hotbed of Internet-related entrepreneurship and innovation along with massive entry by new companies. In order to explain this hotbed of activity, the report develops the argument that the key determinant is the emergence of what is called the Internet Innovation Platform. Furthermore, six key characteristics of this platform are identified that together make it ideally suited to facilitating the entry of new, innovative companies: availability of network services; open low-cost access; relatively low fixed costs; very low marginal costs; high consumer surplus; high scalability. This conclusion puts the issue of ICT platforms high on the

political agenda, as those are largely dominated by US and Asian companies.

The increasing prevalence of company Global Innovation Ecosystems challenges conventional policy in several key areas including: technology transfer, intellectual property rights, financing, taxation, public procurement and even evidence-based policy-making. The essential point is that in company Global Innovation Ecosystems innovation is a joint product rather than being the result of the effort of a single firm. But this means that the designers of policies in these areas must now take account of the incentive effects on multiple rather than single players. Furthermore, they also have to understand the cooperative and competitive relationships between these players if they are to design effective incentives. All this can significantly increase the cost of formulating and implementing innovation policies in these areas.

A simplified presentation of the ICT Ecosystem (Fransman, 2014)



The report, entitled: "Models of Innovation in Global ICT Firms: The Emerging Global Innovation Ecosystems" and authored by Professor Fransman is available at: http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html ■

Impressions

Previous spring issues

Spring 2009 - Springtime Awakening

Spring 2010 - Spring is in the Air

Spring 2011 - Back to Spring

Spring 2012 - Chirps of Spring

Spring 2013 - Spring Reloaded

Announcement & Call for Papers

9th IT STAR Workshop on ICT Strategies and Applications

We are pleased to announce the 9th IT STAR Workshop on ICT Strategies and Applications on 16 October 2015 in Warsaw, Poland.

Organizer & Hosts

Regional ICT Association in Central, Eastern & Southern Europe – www.itstar.eu

Polish Information Processing Society – www.pti.org.pl

Topics & Program Outline

The event will provide a forum to 50-75 representatives of academia, government, business and professional organizations and is intended to build upon the findings of previous IT STAR conferences, and specifically ICT Skills, Education and Certification: the Multi-stakeholder Partnership (http://www.starbus.org/ws4/ws4.htm), Electronic Business (http://www.starbus.org/ws5/ws5.htm) and Electronic Business II (http://www.starbus.org/ws7).

Topics for debate will include EU and national ICT strategies, policies and legislation, innovation, emerging technologies and business processes, networked economy and the take-up of e-Business solutions by SMEs, e-Leadership and empowerment of practitioners.

On the backdrop of a broader outline of EU and world trends, the program will focus on 3 specific areas:

- National strategies, policies and action plans
- Industry, Innovation and Take-up
- Skills and e-Leadership

Papers & Publication

The post-conference proceedings will be published within the IT STAR series.

Key Dates for papers and presentations:

- Deadline for submission of extended abstracts – **5 May 2015**
- Notification of acceptance – **27 May 2015** with concrete instructions concerning format and preparation of full papers.
- Deadline for submission of full papers and slide presentations – **1 September 2015**

Contacts & Website

Please send your expressions of interest and extended abstracts to P. Nedkov <nedkov@utanet.at>

Conference information and updates – http://www.starbus.org/ws9

Spotlight

PIPS – Host of IT STAR's 9th WS on ICT Strategies and Applications, 16 October 2015

The Polish Information Processing Society (PIPS) was established in 1981 as a professional IT-related organization. PIPS fosters links between experts from industry, academia and business and promotes education, knowledge sharing, codes of conduct and skills frameworks. It voices the opinions, needs, interests, and rights of its membership in relations with the general public, local and central government, and with other associations in Poland and abroad.

With a membership of over 1,700 PIPS is Poland's largest professional association dedicated to advancing technological innovation by promoting the study and application of computing technologies. Members are individuals who have computer sciences or information technology degrees or, for at least 3 consecutive years, have worked in a field related to information technology.

The Society has 10 Regional branches across Poland and the following Special Interest sections:

Software *Engineering Section*
Global Information Society Section
IT History Section
Mainframe Computers Section
Polish Wikipedia Section
Judicial Informatics Section
ECDL Examiners Section
Information Security Section
Future IT Section

PIPS organizes numerous courses, conferences, lectures, exhibitions, technology shows and competitions and has been very vigorous in introducing information technologies to schools, in determination of strategies for the further development of computer sciences and information technologies in Poland, as well as in shaping the legislation concerning all aspects of information technology.

The Society effectively supports the **European Computer Driving License** (ECDL) by managing 15 regional coordinators, 4 product coordinators and more than 2000 examiners. Currently, PIPS cooperates with 86 examination centers, 466 examination laboratories and 420 educational laboratories.

PIPS offers a wide range of consultancy services through its **Chamber of Experts** and provides independent, objective opinions, helps adopt best practices, performs analysis and solves many complex cases in various ICT projects.

PIPS is an IT STAR member since 2007. ■

Keynote Speakers

9th IT STAR WS on ICT Strategies and Applications, 16 October 2015, Warsaw, Poland

At this early stage of preparations the following individuals have agreed to talk at the conference:

Prof. Dr. Bruno Lamborghini *is Chairman of the European Information Technology Observatory (EITO), President of AICA and professor of Information Society at the Catholic University of Milan.*

Włodzimierz Marciński *(t.b.c.) is Plenipotentiary of the Polish Minister for the development of digital competences in administration. He is also a member of the Committee of Experts on Information Technology in the Council of Europe and a member of the Committee on Computer Science. He chairs the Broad Agreement for the Development of Digital Skills in Poland.*

Prof. Dr. Martin Przewloka *serves as Senior Vice President at SAP AG and is worldwide responsible for the Global Program of Mobile Empowerment. Formerly, he was responsible for several SAP industry solutions as well as for SAP ERP, the SAP flagship product. Martin is based at the SAP headquarters in Walldorf/Germany.* ■

COMPUTERS IN ALBANIA: 1960 - 1990

Gudar Beqiraj *is Vice President of the Academy of Sciences of Albania. His research activity includes development of different algorithms and programs in Algol, Pascal, Fortran applied in Albania in domains such as geology, geophysics, agriculture, medicine, and other.*

Neki Frasheri *is Academician, Prof. Dr., Mathematician and Researcher at the Center for R&D on IT and lecturer at the Faculty of Information Technology, Polytechnic University of Tirana.*

Jorgaq Kacani *is Academician of the Academy of Sciences of Albania and Rector of the Polytechnic University of Tirana.*

Frederik Premti *is Vice-Rector for International Relations & Scientific Cooperation, Polytechnic University of Tirana.*

Abstract

The first computers appeared in Albania in 1971 with the creation of the Center of Mathematical Calculus, first as a department at the Faculty of Natural Sciences of the University of Tirana and later under the Academy of Sciences.

There were two Chinese digital computers of second generation, using perforated tapes and Algol 60, joined by a third one a few years latter of the same generation. The Center of Mathematical Calculus did a colossal work during the 70s opening the road for the application of mathematical methods in collaboration with a number of passionate engineers and other specialists. In the early 80s, a project was funded by UNDP, culminating with the transformation of the old Center in the Institute of Informatics and Applied Mathematics (INIMA), and the first research and government metropolitan network in Tirana, based on two mainframes and three minicomputers supporting 50 terminals in the city.

In the late 60s, the Chair of Mathematics of the Faculty of Natural Sciences, Prof. Petraq Pilika, "the Master", as his colleagues called him, succeeded to attract the attention of the political leadership to establish a center of mathematical calculus equipped with computers. The only international partner politically capable of offering computers then was China, and in 1970 a number of specialists – electronic engineers and mathematicians – were sent for training.

The training was on X-2 computer, which allowed only processor commands programming. The second group was trained on DJS7 computer and programming language Algol60, and the third group in the analog DMJ-3A machine. DJS7 and DMJ-3A computers were also exposed at the Chinese exhibition in Tirana. The inauguration of the Center of Mathematical Calculus was done in November 1971, as a section of the Faculty of Natural Sciences. In 1973, with the creation of the Academy of Sciences, the Center was formed as a separate research institution of the Academy.

The analog computer DMJ-3A did not have any serious usage. It was composed of 40 standard electronic integration and summation circuits that could be combined manually with each other in complex schemes with the aid of a panel with removable plugs. A combination of electronic modules was done in such a way that the equation of resulting complex circuit was the same as the equation of the physical process the machine should simulate. Measuring electrical processes in this circuit helped to obtain a solution for the physical process in question. Apparently in Albania the terrain for acquiring such capacities was not matured yet.

The DJS7 was a transistor based digital computer with central memory of 4096 magnetic rings words of 21 bits, one magnetic drum of 16,384 words where the Algol 60 compiler resided, an input device with perforated paper tape and a teleprinter as output device. The encoding of holes in the perforated tape was the teletype standard. The computer was equipped with a commanding console with push-buttons for commanding of the hardware and lamps for displaying the status of the processor. For a couple of years this was the main computer used in the Center due to the availability of Algol 60 programming language. When the X-2 was equipped with Algol 60, DJS7 resulted obsolete and abandoned.

X-2 was a transistor based digital computer with central memory of 8192 magnetic rings words of 42 bit (the octal system was used), two magnetic drums of 16384 words each, two input devices for perforated paper tape, and a cylinder line printer. The commanding of hardware was done with the console equipped with keys and lamps. Principal keys in three rows controlled the status of three first memory words, while the status of processor registers was shown with respective rows of lamps (see the Fig. 1). Electronic components were assembled in small boards 10x20 cm that were plugged into the huge case (approx. 5X2x0.7 meters), interconnected in a network of wires.

Fig.1 – the console of X-2

Processor commands of X-2 were with 21 bits (always octal system), where 6 bits were for the command code and the rest 15 bits for the operand (address). The operator of the machine had the possibility to insert, through the keys in the console, the first 6 commands the processor should execute, which were sufficient to command the transfer of the code or data from input or drum devices to the main memory and the jump to the first executable command of the program. The encoding of holes in the perforated tape was proprietary and simple. Each row of holes had 5 places for holes, one for the parity control and 4 for binary numbers.

In 1974, Chinese specialists implemented Algol 60 in X-2 with the compiler stored in one of magnetic drums. The version of Algol 60 accepted only floating point numerical data. This improvement made X-2 the main computer of the Center and it was used intensively until 1985 when new equipment was deployed.

During the late 70s, new computer centers were created. The Center of Financial Calculus was equipped with some simple computers dedicated for accounting data processing. Despite a lack of communication with the USA, a Data Control computer, equipped with field processor for preprocessing of seismic data and programmed in Fortran was deployed in the Institute of Oil and Gas in Fieri, and a computer similar to X-2 was deployed for military purposes.

In 1975, a new computer of DJS class – DJS21 was deployed in the Center of Mathematical Calculus but dedicated to the Institute of Military Topography, firstly for processing of topographic data and later used for general purposes as well. DJS21 had 16192 words of 42 bits (only 8096 words used by the programmer), two magnetic drums, 4 magnetic tape vacuum devices, and a simple printer (printing one number in line in a narrow band of paper, separating the mantis and exponent of numbers). A combination of the console (similar to that of X-2) and teletype was used for the control of the computer – it had the interruptions system and a very simple operating system, the operator could command the computer through some simple commands in the teletype, for example the command "ting" was used to reset the computer. The Algol 60 of DJS21 did not have procedures for magnetic tapes, the original application of topography was written with processor commands. Forced by the need of using magnetic tapes for the registration of population, in 1979 the director of the Center of Mathematical Calculus, Kristan Bukuroshi, specialized on compilers, wrote procedures for this purpose.

From its creation, the staff of the Center worked hard, using institutional and personal links, to establish cooperation with specialists from different areas to pick up problems that would get solved using mathematical methods. Within a couple of years key fields of economy, engineering and science were identified: geology and geophysics (modeling and field data processing), electrical energetic system (stability of the grid), civil engineering (static calculation of concrete structures), agriculture and health care (statistical processing), statistics (data processing), optimization (use of primary materials) etc. In fields as geophysics, energy and civil engineering, the use of computers became a standard for all projects.

Engineering problems were dominant compared with economic ones, the latter were strongly linked with ideological and political factors and the application of mathematical methods was dangerous, despite formal requests for the application of scientific methods in economy. A typical story happened in the early 80s when first a few microcomputers entered in the country. The IT person in the Directorate of Statistics was not qualified for their programming. One day the head of the State Commission of Planning called a meeting with key programmers in Tirana, and presented a long list of economic related problems. After the meeting a schedule was done to organize the work but from superior instances the order was "wait for written request" that never came. Instead, the above-mentioned IT person used this event to increase the pressure on different programmers to develop software for statistical data processing. About 15-20 quite different programs for similar tasks were developed, making the data processing work very difficult. Later and with the initiative of the director of our Calculus Center, a single program similar to a spreadsheet was developed adaptable to different statistical problems.

The idea of a UNDP project evolved in the early 80s and was implemented during the mid-80s under the management of UNESCO. The project had three components:

1. Implementation of a metropolitan network from CII Honeywell Bull France (renamed later as Bull France) composed of two mainframes DPS7 (Fig. 2) with 2+6 MB RAM and three minicomputers MINI6 interconnected through a frontal DATANET with about 50 terminals (keyboard and monitor) distributed in Tirana in ministries, faculties and institutes. The central node of the network had 6 disk units of 200 Mb each, 4 magnetic tape vacuum devices of 60 MB each, and a simple 4-color pen plotter. The operating systems were GCOS64 and GCOS7 for mainframes and GCOS6 for minicomputers. Programming languages were Fortran and Cobol in all nodes, plus Pascal and GPL (Pascal-like GCOS Programming Language of operating system) in mainframes.

2. Development of a pilot-project from main fields of engineering and economy. Accounting and project management (PERT) software packages were included, also the general purpose IDS2 database management system and the documentary database system MISTRAL.

3. Training of system and network engineers for the maintenance of the whole network, and specialists for each pilot-project. Bull France accepted system engineers in its internal courses on the architecture of hardware and operating systems; this training permitted our engineers to fully maintain the whole system. Joint teams did the implementation of the system from Bull France and local engineers.

The old Center of Mathematical Calculus was transformed into the Institute of Informatics and Applied Mathematics (INIMA) (Fig. 3). A new building was constructed and shared with another Center for Scientific and Technical Information and Documentation. The inauguration of INIMA was done in 1985 and the work was shifted to the new computers.

Despite the idea that this system would be used both for technical and managerial (economic) problems, only technical problems were really considered. The intensity of the work increased significantly for traditional and new problems exploiting new capacities of computers. But in the existing strictly centralized governance system of the country only two databases were created, that of the Center of Information and Documentation, and a second one for the written work of political leaders. Applications for the accounting and project management were not used at all. Only statistical data processing continued as before. And in 1989 the data of a second population registration were processed.

In parallel with the deployment of new systems, a small number of microcomputers continued to enter in the country. The RadioTV Factory in Durresi started to assemble microcomputers as well.

Fig. 2 – View of the hall of DPS7

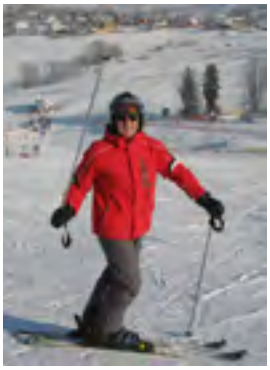
Fig. 3 – Front view of INIMA building

A huge progress was done in the area of education. Firstly, short and long post-university training courses were organized on basic elements of informatics education. In 1984 the first Chair of Informatics was created in the Faculty of Natural Sciences of the University of Tirana and in 1985 the first generation of students was accepted for 5-years university studies in informatics. The program included programming languages, computer and network architecture, operating systems, theory of languages and compilers, databases and a strong background in mathematics (calculus, statistics, optimization etc). INIMA supported the new Chair with teachers. Teaching of elements of programming and informatics were included in different university curricula as well. During the 80s, a number of dissertations were completed in the area of informatics and applied mathematics, with the main focus on the transfer of know-how applied in economic and technical problems of the country.

INIMA kept close contacts with Bull France and later with Bull Italia, which contributed to the introduction of Unix, Ethernet and TCP/IP in INIMA. The normal activities of the Institute continued until the early 90s, when radical changes in the country created difficult survival times. ■

IT & Sports

Polish ICT Alpine Skiing Championship



Marek Holynski *is Director of the Institute of Mathematical Machines in Warsaw and Vice President of the Polish Information Processing Society.*

The 15th Polish ICT Alpine Skiing Championship was held on 14 February 2015 in Szczyrk, a popular skiing resort in southern Poland. This event, annually organized by the **Polish Information Processing Society (PIPS),** is a major winter happening for the country's ICT community. Nearly 100 competitors took part – ICT professionals, managers, representatives of public administration responsible for IT activities and NGOs involved in computer related projects.

The conditions were perfect – sunny, plenty of snow, and well prepared tracks. Setting the giant slalom, a seemingly simple exercise, was in fact quite tricky and not easy but many of the participants were members of alpine racing teams in the past and the rivalry was keen.

Many participants were former members of alpine racing teams

There were many valuable prizes from our Sponsors and the overall scoring had to be further subdivided in individual and team ranking, men and women, participants under 35 years, between 36 and 50, and over 50.

The Winners

Skiing and sailing appear to be the most favorite sports of ICT specialists in Poland and events such as this one provide not only fun, but also great opportunities for professional come-together.

Skiing until twilight ■

Member Society News & Events

Austria

New OCG representative to IT STAR

Dr. Roland Bieber, Secretary General of the Austrian Computer Society, replaces Eugen Mühlvenzl as representative to IT STAR.

Bulgaria

10th International Conference on Large-Scale Scientific computations LSSC'15
http://parallel.bas.bg/Conferences/SciCom15/
8-12 June 2015, Sozopol

Hungary

13th AAATE Conference (AAATE: Association for the Advancement of Assistive Technology in Europe), 9-12 September, Budapest, Hungary - www.aaate2015.eu

Organizers: AAATE, John von Neumann Computer Society, Pannon University, Virtual Environment and Imaging Technologies Research Laboratory

Contact: Mr. Attila Varga, Diamond Congress Ltd.

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Italy

New AICA International Chapter

A new AICA Chapter has been established with the objectives to keep closer contact with Italian nationals working abroad, or significantly involved in international activities. AICA's friends from other countries may also become members if they wish to support the initiatives of the Italian Association for Informatics.

Participants of the inaugural meeting

One of the main goals of this International Chapter is to provide a vehicle for a better exchange of information among experts. Nello Scarabottolo, former President of CEPIS, has been elected as President of this newly born AICA Chapter.

Lithuania

The Lithuanian Computer Society will hold its traditional biennial multi-event "*Computer Days – 2015*" (www.liks.lt/kodi_en) on September 17–19, 2015 at the KUT Panevėžys Faculty of Technologies and Business in Panevėžys, Lithuania. The following events are included in the format:

- 17th International Scientific Conference (MKK)
- 12th Conference on Informatics in School Education (MIK)
- 2nd Conference on Distance and E–Learning (DMK)
- 7th Conference of Lithuanian Young Scientists "Operation Research and Applications"
- Workshop on Information Society Development Issues
- Tutorials for IT teachers, doctoral, post- and undergraduate students
- 14th Congress of the Lithuanian Computer Society
- Conference of Lithuanian Association of Informatics Teachers
- Workshop on ECDL implementation activities in Lithuania

Poland

Federated conference on Computer Sciences and Information Systems - https://fedcsis.org/
13 – 16 September 2015, Lodz, Poland

Slovenia

The Annual SSI conference *Days of Slovenian Informatics* - www.dsi2015.si will convene from 13 to 15 April 2015 in Portoroz. ■

Other Events

The Role of Patents – Innovation in the European Digital Single Market
17 March 2015, Brussels, Belgium
*[The development of a digital economy in Europe is creating not only opportunities, but also new challenges in the area of intellectual property rights. This is particularly true for **patents**, which generally have to strike the right balance between creating the incentives for investments in R&D, which provides access to … see*
https://ec.europa.eu/jrc/en/event/conference/european-digital-single-market-role-patents *for more]*

27th International Olympiad in Informatics
http://ioi2015.kz/
26 July – 2 August 2015, Almaty, Kazakhstan

5th IEEE International Conference on Electronics Information and Emergency Communication - http://www.iceiec.org
14–16 May 2015, Beijing, China

6th IEEE International Conference on Software Engineering and Service Science - http://www.icsess.org
September 23-25,2015, Beijing, China ■

SNAPSHOT

REGIONAL ICT ASSOCIATION IN CENTRAL, EASTERN & SOUTHERN EUROPE

Type of organization

Regional non-governmental and non-profit professional association in the ICT field.

Date and place of establishment

18 April **2001**, Portoroz, Slovenia

Membership

Countries represented (*see next page for societies*), year of accession, representatives

- Austria (2001) G. Kotsis, E. Mühlvenzl, R. Bieber
- Bulgaria (2003) K. Boyanov
- Croatia (2002) M. Frkovic
- Cyprus (2009) P. Masouras
- Czech Republic (2001) O. Stepankova, J. Stuller
- Greece (2003) S. Katsikas
- Hungary (2001) B. Domolki
- Italy (2001) G. Occhini
- Lithuania (2003) E. Telesius
- Macedonia (2003) P. Indovski
- Poland (2007) M. Holynski
- Romania (2003) V. Baltac
- Serbia (2003) G. Dukic
- Slovakia (2001) I. Privara, B. Rovan
- Slovenia (2001) N. Schlamberger

Mission

"To be the leading regional information and communication technology organization in Central, Eastern and Southern Europe which promotes, assists and increases the activities of its members and encourages and promotes regional and international cooperation for the benefit of its constituency, the region and the international ICT community."

Governance

IT STAR is governed according to the letter of its Charter by the Business Meeting of MS representatives:

2014 Szeged, **Hungary** (September)
2013 Bari, **Italy** (May)
2012 Bratislava, **Slovakia** (April)
2011 Portoroz, **Slovenia** (April)
2010 Zagreb, **Croatia** (November)
2009 Rome, **Italy** (November)
2008 Godollo, **Hungary** (November)
2007 Genzano di Roma, **Italy** (May)
Timisoara, **Romania** (October)
2006 Ljubljana, **Slovenia** (May)
Bratislava, **Slovakia** (November)
2005 Herceg Novi, **Serbia & Montenegro** (June)
Vienna, **Austria** (November)
2004 Chioggia, **Italy** (May)
Prague, **the Czech Republic** (October)
2003 Opatija, **Croatia** (June)
Budapest, **Hungary** (October)
2002 Portoroz, **Slovenia** (April)
Bratislava, **Slovakia** (November)
2001 Portoroz, **Slovenia** (April)
Como, **Italy** (September)

Coordinators

2010 – Igor Privara
2006 – 2010 Giulio Occhini
2003 – 2006 Niko Schlamberger
2001 – 2003 Plamen Nedkov (cur. Chief Executive)

Major Activities

- 8th IT STAR WS on History of Computing http://www.starbus.org/ws8
- 7th IT STAR WS on eBusiness - http://www.starbus.org/ws7
- 6th IT STAR WS on Digital Security - http://www.starbus.org/ws6
- IPTS - IT STAR Conference on R&D in EEMS - http://eems.starbus.org
- 5th IT STAR WS and publication on Electronic Business - http://starbus.org/ws5/ws5.htm
- 4th IT STAR WS and publication on Skills Education and Certification - http://starbus.org/ws4/ws4.htm
- 3rd IT STAR WS and publication on National Information Society Experiences – NISE 08 http://www.starbus.org/ws3/ws3.htm
- 2nd IT STAR WS and publication on Universities and the ICT Industry http://www.starbus.org/ws2/ws2.htm
- 1st IT STAR WS and publication on R&D in ICT http://www.starbus.org/ws1/ws1.htm
- Workshop and publication on National Experiences related to the EU's 5th and 6th FP http://www.starbus.org/download/supplement.pdf
- Joint IT STAR – FISTERA Workshop on ICT and the Eastern European Dimension

Periodicals & Web-site

The IT STAR Newsletter (nl.starbus.org) published quarterly.
www.itstar.eu ■

IT STAR Member Societies

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www.ccs.org.cy

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www.aicanet.it

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www.liks.lt

Macedonian Association for Information Technology – MASIT
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www.masit.org.mk

Polish Information Processing Society
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www.pti.org.pl

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