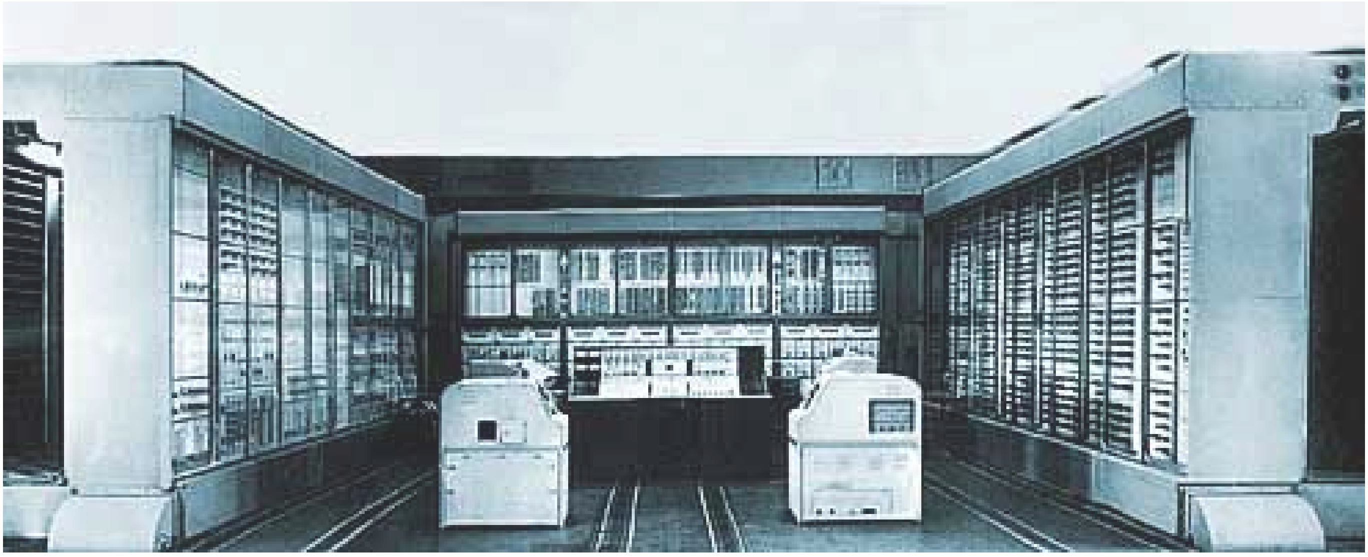
Newsletter - Calibrated for Creative Communications

Vol. 12, no. 2, Summer 2014



In2 the Circuit – Rewired

The Summer issue contains part II of the series of articles on computer firsts in Central and Eastern Europe – this time with recollections of the introduction of **Datatron 205** in Austria, and the **Z23** in Slovenia.

The first Soviet computers – **MESM, M-1**, and the first serially produced **"Strela"** – are presented, along with their constructors, decision-makers and institutions, where they were created and installed.

We are pleased to publish the Program of the forthcoming **8th WS on History of Computing**, 19 September 2014 in Szeged, Hungary, and look forward to an exceptional event focusing on ICT developments in Central, Eastern and Southern Europe, starting in the 1940s. Among the speakers are computer pioneers who will share personal remembrances of the early days of computing. The function of ICT museums will be considered and an overview of IBM's role in the Region will be presented.

The Newsletter revisits a 1967 insightful vision of the future of technology and it is surprising to discover that the **Smartwatch** idea has its origins in the 60s.

The topic of e-Leadership competences is addressed through the proposal for **Digital Innovation Leader** competences. Information is provided about an IPTS study, which identifies **Europe's top ICT hubs**, and more ...

Take the Journey,
The Editor

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Letters to the Editor

[Extracts from mails concerning the Spring NL issue]

Dear Plamen

I found your Newsletter on history of computers very interesting. I think your hard work on developing interest is paying off.

John V. Atanasoff II
USA

Congratulations for your spring-issue of starbus.

Especially interesting is the article about early eastern computers. These informations are not so easily available, compared to western ones.

Veith Risak
Past President of OCG
Austria ■

ADVISORY BOARD

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

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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.

Development and Use of the First Three Soviet Computers

Vladimir Kitov

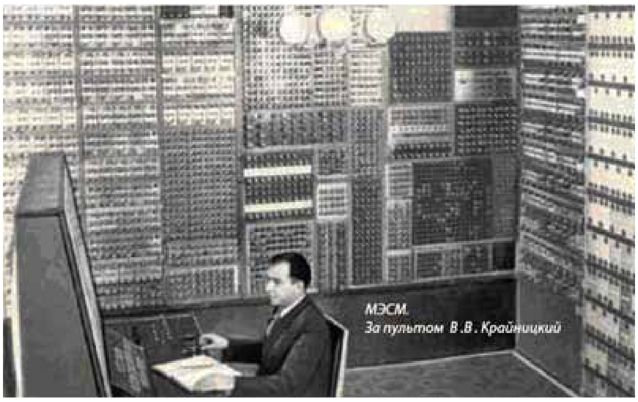
Vladimir Kitov is Professor of Applied Mathematics at the Plekhanov Russian University of Economics. He is author of 70 publications, including 3 monographs on real-time systems and computer networks and a textbook on System Programming.

The first official "stamp" for the Computer Industry in the USSR was patent number 10475 – invention of "Automatic Digital Computer", registered on December 4, 1948 by the prominent Soviet scientists I.S.Bruk and B.I.Rameev. At the same time, in parallel with them, another computer pioneer -- S.A.Lebedev -- also pondered the architecture of his computer.

Creating the first Soviet computers "MESM" and "M-1" began in 1949 by teams led by Sergei Lebedev in Kiev and Isaac Bruk in Moscow. The two computers were created in academic laboratories and were completed at the same time at the end of 1951.

Since the end of 1948, S.A.Lebedev in Kiev started working on the "MESM" computer. During the next two years, under his leadership, the principles of "MESM" were developed - its individual modules and implementation of their union as a holistic computer. It included about six thousand vacuum tubes and used hexadecimal binary system with a fixed point. The memory device was made on trigger cells using a magnetic drum. In its three-address commands system basic operations were addition, subtraction, multiplication, division, shift, comparison with sign, comparison of the absolute value. "MESM" speed was about 50 operations per second. Initial data input used either punch cards or dialing codes on the plug-in switch. Output of data was performed using electromechanical printer. Computer used room of 60 square meters, power consumption - 25 kW. On December 25, 1951 MESM was approved by the Commission of the Academy of Sciences of the USSR and was recommended for practical use.

S.A.Lebedev played a prominent role at all stages of the Soviet computers history: In addition to "MESM", under his leadership was created computer "BESM" (1953), which served as a prototype for the first computers in China and several other countries. In the Soviet Union, S.A.Lebedev's computers "M-20", "BESM-3M", "BESM-4," BESM-6"and others became famous.



Computer "MESM"

Computer "M-1"

The I.S.Bruk computer "M-1" had several thousand semiconductor devices and only 730 vacuum tubes. This significantly reduced size of the computer, occupied a room as small as 15 square meters. It used a two-address command system, electronic memory electrostatic tubes memory on a magnetic drum, wide-screen TTY output and transmitter for their input from a punched tape. Number of bits – 24, internal memory on the tubes of electrostatic and magnetic drum-256 25-digit numbers. Its performance was 20 transactions per second. Operations: addition, subtraction, multiplication, division, and a number of auxiliary operations. Power consumption - 8 kW.

During the first two years of "M-1" operation it was used to calculate the operation mode of electrical networks in Moscow, heating of ballistic missiles during motion in the atmosphere for a number of projects of the Institute of Atomic Energy. In addition to "M-1", under the leadership of I. S. Bruk, a series of computers was created.

I.S.Bruk (1902-1974)

B.I.Rameev (1918-1994)

S.A.Lebedev (1902-1974)

In the early 1950s, the Committee for Computers headed by Keldysh was established. A few months later two computer projects were presented to this committee: S. A. Lebedev's project for creating computer "BESM" and Yu. Ya. Bazilevskiy and B. I. Rameev's project for creating computer "Strela". In a competition between the two projects M. V. Keldysh supported "Strela". Computer "Strela" became the first Soviet serial computer and Keldysh, in 1961, became president of the USSR Academy of Sciences [6]. Less than two years after the creation of "MESM " and "M -1", the Soviet industry produced and began to use computer "Strela". Seven copies of computer "Strela" were made. Unlike their predecessors, which operated in the same scientific institutes where they had been created, computer "Strela" was a serial one and was used in seven major state organizations of the USSR.

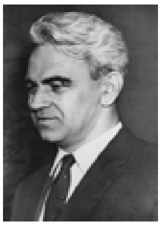
Computer "Strela"

Computer "Strela" performed 2000 operations per second. In the random access memory (RAM) it had 43 cathode-ray tubes - one tube for each digit. It operated numbers with floating point, which corresponded to almost 10 -11 -bit decimal numbers. The External hard drive had two units with tape width of 125 mm and length up to 100 m. Data on the tape housed in groups of zones. In the last modification the computer had a magnetic drum storage with capacity of 4096 words, having a speed of 6000 rev./min. The computer used about 6,000 vacuum tubes and tens of thousands semiconductors. It used a computer room area of over 400 square meters. Total power consumption - 150 kW: the computer itself consumed 75 kW; 25 kW - for the ventilation unit and 50 kW - for the refrigeration unit. It is worth to mention that computer "Strela" implemented many modern ideas. In particular, it had co-processors for fast execution of short programs.

The seven organizations of the USSR, where the first Soviet serial computer "Strela" was installed, are: Institute of Applied Mathematics (IAM), Computing Center №1 of the Ministry of Defense (CC №1), Research Institute "Almaz", Computing Center of the USSR Academy of Sciences, Research Computing Center of Moscow State University, the Nuclear Center "Arzamas-16" and the Nuclear Center "Chelyabinsk-70."

Institute of Applied Mathematics

The first copy of computer "Strela" was installed in 1953 at the institute founded and directed by Mstislav Keldysh, which later became known as the Institute of Applied Mathematics (IAM). The IAM was the main center for nuclear and space calculations and one of the world's leading centers of computational mathematics. In the USSR, computational mathematics using computers became a link to Soviet nuclear and missile projects. In the mid-1950s, M.V. Keldysh, M.A. Lavrentiev and S.L. Sobolev wrote a letter to the leaders of the Communist Party with the suggestion to create in the USSR a certain number of computers to solve problems of developing nuclear weapons.



M.V. Keldysh (1911-1978) - Founder and Director of the Institute of Applied Mathematics

Computing Center №1 of the Ministry of Defense of the USSR (CC № 1)

Another installation of computer "Strela" was in Computing Center № 1 of the Ministry of Defense of the USSR created in 1954 by Anatoly Kitov (CC №1 of the USSR Ministry of Defense) [5]. Computer "Strela" in the CC №1 was the first computer installed in the organizations of the Ministry of Defense. In 1950s the Computing Center №1 of the Ministry of Defense carried out a lot of different activities: it calculated orbits of artificial satellites and interplanetary space stations; developed new types of specialized computers; conducted extensive work on mathematical modeling of various combat situations, calculations were carried out for the General Staff and the various departments of the Ministry of Defense (intelligence, logistics, ground troops, artillery and others); it created software and hardware for missile defense systems and processing information from radar stations, etc. In 1950s, from the point of view of number of tasks of national importance, number and quality of scientific and engineering personnel, number of research units etc., CC №1 of the Ministry of Defense was not only the most powerful in the USSR, but also one of the most powerful scientific computer centers in the world. In those early years, it was one of the main propagators of computer science and cybernetics in the country. In the USSR A. Kitov was the creator of the first computer department (1952). He is the author of the first dissertation on programming - "Programming tasks external ballistics for long-range missiles" (1952), the first Soviet article about computers and their applications (1953), the first Soviet positive article about Cybernetics (1955), the first Soviet book on programming, computers and their applications (1956), the first Soviet text-book for universities on computers and programming (1959), two algorithmic programming languages "ALGEM" and "NOR-

MIN". Under the guidance of A. Kitov in a secret military Computing Center number 1 the most powerful computer with electronic tubes in the world was created - computer "M-100" (1959, 100 000 of operations per second). A. Kitov is the creator of the world's first national project of a computer network to manage the economy of the country and its Armed Forces.

A.I. Kitov (1920-2005) - Founder and Scientific Director of Computing Center number 1, Ministry of Defense

"Almaz" Research Institute

Another computer "Strela" in the first half of the 50s was installed in a secret research institute called "Almaz". It was created in the late 1940s as a Special Office № 1 of Ministry of Armaments, its core competence was the development of air defense missile systems (AAMS). Over the years, this top-secret research institute has successfully completed a major cycle of works on creation of missile defense. For many years, the director and chief designer of a number of AAMS was Alexander Raspletin - founder of the national school of managed anti-aircraft missile systems developers. In 1950s-60s, A.A. Raspletin provided scientific and technical guidance on development and modernization of air defense missile systems S-25, S-75, S-125, S-200 as well as on creating a space defense system.

Secret Research Institute "Almaz"

Computing Center of the Academy of Sciences of the USSR (CC AS)

Computer "Strela" was installed in the Computing Center of the Academy of Sciences of the USSR (CC AS), which was founded in 1955 by A.A. Dorodnitsyn. Literally within a few years after its founding, CC AS became the country 's leading institute in the field of computational methods, mathematical modeling, mathematical and computer software, as well as in a variety of applications, primarily in the area of military applications, such as aviation, shipbuilding, ballistic calculations and etc. The main lines of its research was computational hydro-aerodynamics, computational mathematics and mathematical physics; design automation; space dynamics; development of computer software systems, etc. Still popular worldwide is the Journal of Computational Mathematics and Mathematical Physics, published since 1960 under the auspices of this Computing Center.

A.A. Dorodnitsyn (1910-1994). Founder and Director of the Computing Center of the Academy of Sciences of the USSR

Research Computing Center of Lomonosov Moscow State University (SRCC MSU)

The Computing Center of Moscow State University was founded in 1955. It was the first computer center in the educational institution and one of the first in our country overall. In December 1956, SRCC MSU got computer "Strela". During nearly 25 years, Andrei Tikhonov, an outstanding mathematician and head of the Moscow State University department of computational mathematics, had been scientific director of SRCC MSU. It was the golden age of computer science at the University of Moscow. In addition to scientific and educational purposes, "Strela" in SRCC was used to solve important complex classified tasks for the country.

Soviet Nuclear Program

The higher Soviet leadership attached great importance to the Soviet nuclear program. The Soviet government decided to start work on the atomic bomb in February 1943. Leaders of the Soviet atomic project were the appointed deputy of Stalin, L.P. Beria, and the famous physicist I.V. Kurchatov. Information coming from the USA and other countries on intelligence channels facilitated and accelerated the work of Soviet scientists. For the atomic project in 1946 the first top-secret Soviet nuclear center "Arzamas-16" was created. Initially, the necessary calculations for nuclear projects were carried out on adding machines. In the first half of the 1950s these calculations were performed on computer "Strela" in IAM (Director Keldysh). The first Soviet atomic and hydrogen bombs were developed in the nuclear center "Arzamas-16" where prominent physicists of the 20th century Julius Chariton and Andrei Sakharov worked. At the end of 1956 computer "Strela" was installed in "Arzamas-16 ".

Currently, 24.000 employees work in the nuclear center "Arzamas-16". In 2011 there was installed a modern supercomputer - to date, the most powerful supercomputer in Russia.

One of the first atomic bombs named "Tsar Bomb" at the Museum of the Nuclear Center "Arzamas-16".

The last seventh computer "Strela" was installed in 1957 in the nuclear center "Chelyabinsk-70". It was organized in 1955 as the second nuclear center after "Arzamas-16". The Nuclear Center is located on the eastern foothills of the Middle Urals, midway between the cities of Yekaterinburg and Chelyabinsk. In the Nuclear Center "Chelyabinsk-70" there were created the majority of peak nuclear weapons, most of them have no analogues in the world. There was created the world's smallest nuclear charge for artillery shells of 152 mm. Since the beginning, the Nuclear Center "Chelyabinsk-70" had a strong team of theoretical physicists, specialists on mathematical modeling, computer programming. Its scientists obtained unique scientific results in the field of nuclear physics processes through their computer simulations.

Conclusion

The first Soviet serial computer "Strela" played a prominent role in strengthening the military might of the USSR. In the years 1950-1960, the period of "Cold war" with the West, the Soviet priority in using computers in the USSR was to provide calculations and solving various problems of mathematical modeling for the nuclear program, missile and space programs and military command. In the first half of the 1950s due to S.A.Levedev, I.S.Bruk, B.I.Rameev, Y.Y.Bazilevskiy, A.I.Kitov, M.V.Keldysh, A.N.Tikhonov, A.A. Dorodnitsyn, M.A.Lavrentiev, A.I.Berg, S.L.Sobolev and other Soviet scientists [4] USSR, together with the United States of America and Great Britain, was among the first three countries in the world in the field of computer science and informatics.

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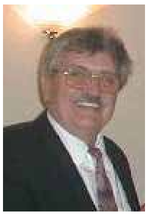
4. Electronic resource - http://www.computer-museum.ru/english/galglory_en/0.htm
5. Electronic resource - http://en.kitov-anatoly.ru/articles
6. V.A.Kitov. President of the Academy of Sciences of the USSR M.V.Keldysh. 100 years since the birth. Electronic resource - http://www.ras.ru/keldysh/25ce5e69-94f7-4077-addf-a570597f594d.aspx?hidetoc=0. ■

Datatron 205 comes to Vienna [1]

Dr. Walter Grafendorfer



Walter served his country and the Austrian Computer Society in many capacities – he was a senior official at the Federal Ministry for Research and Innovation and Secretary General of the OCG.

Prof. Sagoroff, a Bulgarian immigrant and Professor at the Institute of Statistics at the Vienna University, went at the end of the fifties to the USA and promised not to come back until he has the money for a computer. At that time the universities started the Computer Age in Austria via such institutes as the one for Statistics at the Vienna University and for Numerical Mathematics at the Vienna University of Technology, then the "Technische Hochschule". The computing centers at the universities were established only at the beginning of the seventies.

The Professor came back to Austria with a contract of sale and the financing in his pocket for a Computer "Datatron 205" from Electrodata Division of Burroughs. The selling price was 160.000 US$ but with the educational allowance of 50% the final price was 80.000. The money came mainly (or completely, I do not quite remember) from the Rockefeller Foundation, to which Sagoroff had good connections.

I, at that time a student, was chosen for the maintenance of the computer and was sent in the summer of 1960 to the Burroughs Corporation in Pasadena, California for training to operate the machine. This was a big challenge and was my first stay in a non-German speaking country. I was the only European together with Americans, one Canadian and two Brazilians in a class that lasted about four weeks. Due to my good background as Radio and Telecommunication Engineer I had no problems at all.

The machine was installed in a new building in construction, which was finished two years after the installation of the computer. So many things, such as the electric power installation, had to be made provisionally. Once, the power fuses were gone and had to be replaced, but the fuses were melted

1 Originally published in the IT STAR NL Vol. 4, no. 3, 2006

together with the holding device and the electrician tried to fix the problem with a chisel and hammer: he produced a shortcut and a whole district of Vienna was without electricity.

The difference in the European and American measuring units was also a problem. The computer technician from Burroughs, John, who had to install the machine could not start his work because the electric power lines for the power supply had not been completed. He had to convert first the size of the lines into the European standard. Then, an Austrian electrician connected the power supply with the power net on one side and the computer on the other side. One must know that this machine with 1.600 tubes had enormous power consumption and the frequency had to be transformed from 50 to 60 cycles/sec with a big synchronous motor and generator connected via a toothed belt. The whole power supply was controlled by a big box with many switches, relays etc. After day and night shifts, the power supply was ready to be started. John had a final look at the wiring and said, “I think he (the electrician) did a good job, let’s start”. All involved persons were standing around. The motor generator set began to run with loud noise and I was chosen to switch the power via a big toggle with both hands to the computer room. Immediately a “crash, bang...” was heard and other loud noises with lightening followed, smoke and bad smell coming out of the box. A wiring error caused this disaster. We looked at each other bewildered and John said “Well, that’s not my job”. The turn was now on me and my colleague and during some day and night shifts we replaced all the burned and exploded relays, transformers and rectifiers, which were absolutely necessary, with ordinary parts from hobby shops. Other parts such as over voltage switches etc. were installed later on (or even never). After a few days, we could start the system again and John and I finished the installation of the computer on time so that John could go back home to the US as scheduled saying to me “I would like to have you in my team”.

The Datatron 205 was a first generation computer with 1600 electronic tubes as active elements. Only diodes were made of semiconductors. The main storage was a magnetic drum with a capacity of 4000 words (200 words on 20 tracks) with 44 bits each and an average access time of 8 msec. The distance between the head and the surface of the drum was only a few micrometers, which was really a challenge for the maintenance. In order to speed up the processing of a program a simple trick was used: blocks of 20 consecutive instructions were stored 10 times on additional tracks and fetched from there, making the average access time for the instructions 0,8 msec which is 10 times faster. The arithmetic operations were done in a set of registers represented by flip-fl ops. Two electronic tubes were necessary for 1 bit. The computer was decimal oriented with 4 bits for one decimal digit (Binary Coded Decimal –BCD) resulting in 44 bits per word (10 decimal digits plus sign). Besides the arithmetic registers for arithmetic operations Burroughs had invented a special “Index Register” for programming loops and called it proudly B-Register after Burroughs. To program an inner loop within a loop the content of the B-Register had always to be stored and recalled which was time consuming both in programming and during processing. Therefore, one day I had the idea to install a second Index-Register (4 additional racks with 8 electronic tubes each) with the corresponding instructions, which was possible because the whole machine was wired manually. But I underestimated the work and spent many night hours (the block time on the machine was scheduled six weeks in advance, 24 hours per day, including holidays) at the rear of the machine (many times laying on the floor) for wiring with a simple soldering iron. Finally I did it, the users were happy and I proudly called the new Index Register G-Register after my name.

In these first generation machines neither the operating systems nor programming languages existed. There was even no assembler language. All programs had to be written in machine language (a series of machine instructions). A tape reader (1000 char/sec) was used as input device and a teletype writer and a paper tape punch as output devices. If one wanted to correct (debug) or change a program it was necessary to cut the tape and cleave in the changed part.

The electronic tubes had an average living time of about 10.000 hours. With 1.600 tubes, statistically every 6 hours a tube was (has?) gone. In order to prevent interruptions during processing, preventive maintenance was very important. I developed an effective method to test the tubes: with a hammer shaft I stroke at the shafts of the racks where the tubes were mounted. Through the vibration the electrodes of weak tubes broke which was indicated normally by a lightening inside the tube followed by a short cut signal. The Datatron 205 was in use eight years, from 1960 to 1968. As far as I know, this was the only machine of this type in Europe therefore I was the only person in Europe who could maintain and repair it. We never needed support from the producer in the US, only spare parts which were not available in Europe. This was, of course, one of the most challenging and satisfying times of my life.

The Datatron was replaced in 1998 by an IBM 360 Model 44 (for scientific applications). A part of a Datatron 205 is exhibited in the Computer History Museum in Mountain View, California. ■

First Real Computers in Slovenia [2]

Franci Pivec

Franci Pivec is head of the History of Computing Section of the Slovenian Society Informatika. Franci works at the Institute of Information Science in Maribor and is a member of IFIP TC9 on Relationship between Computers and Society.

In 2002 in Portorož, during the founding meeting of the History of Computing Section of the Slovenian Society Informatika, Dr. Tomaž Kalin, one of the pioneers of Slo-

2 Originally published in the IT STAR NL Vol. 6, no. 4, 2008

venian Computing, said that in the early 1960s it had taken a long time for them to decide, which computer would best suit their needs. Nowadays, it is difficult to understand that they were choosing between British and German computers, i.e. Elliott 803 and Zuse Z23, whereas the Americans did not enter the competition at all.

Elliott 800 appeared in 1958. Elliott 803, its fully transistorized version from 1960, was manufactured in 200 pieces. Most British universities were proud to own these computers, and Slovene visitors were able to get acquainted with them there. (One of these computers is still kept at the Science Museum in London.) For domestic universities, these computers cost about GBP 30,000.

At ETH in Zurich, which is geographically much closer to Slovene researchers, computers manufactured by Zuse KG from Neukirchen had been operating continuously since 1950. Since 1958 Zuse KG had been developing the Z23 computer, which was presented on the market in 1961; most of the 98 pieces produced were bought by German universities, which were often visited by Slovenes. On the domestic market, the price amounted to DM 200,000.

The choice fell on Z23, which arrived in Ljubljana in 1962. It is evident that the decision was not based on the price but rather on the connections with ETH and German universities. Also, the influence of an academic, Dr. Anton Kuhelj, could be mentioned here who was then the Director of the Institute of Mathematics, Physics and Mechanics (Inštitut za matematiko, fiziko in mehaniko) and was familiar with Zuse's pre-war work in the aircraft aerodynamics research; this was associated with the development of the first computers Z1, Z2 and Z3. Anyway, the choice was not bad at all.

Z23 was a fully transistorised computer (2,700 transistors and 6,800 diodes) and its ferrite memory was capable of 256 (no K has been left out here) 40-bit words. The capacity of the magnetic drum was 8,192 words and its rotational speed was 6,000 rotations per minute. It weighed a ton and it required a 4000 watt power supply. During operation it was very loud and specialists were able to tell what it was processing by the noise it was making, similar to good car mechanics. It took more than twenty minutes to start up the drums. The Freiburg command code (native Zuse code) was used to control the computer, and ALCOR compiler was required for ALGOL programs. Herbert Grosch admits in his ''computing memoirs'' that this was a highly competitive computer and he adds that IBM eagerly followed the work of Zuse engineers and that John Lentz used much of their knowledge for IBM computers.

Z23

Janez Štalec, who worked with Z23 since its installation, specifies the following components: computer, memory drum, quick memory, console desk, punched tape reader and hole puncher, printer, graphomat. The computer was capable of 30 operations at fi xed notch and 20 operations at sliding notch.

Simultaneously with the installation of Z23, the Computer Centre was established within the framework of the Institute of Mathematics, Physics and Mechanics in 1962. The Computer Centre, together with the Jožef Stefan Nuclear Institute (Nuklearni inštitut Jožef Stefan), obtained a loan to purchase the computer. This was the first open-access computer centre in the then Yugoslavia. It specialised primarily in programming and the use of numerical methods. It very quickly started to participate in solving practical problems in economics, statistics, metal constructions, switchboards, agronomy, geodesy, architecture, transport networks, municipal facilities, etc.

The Slovene ''Zuse'' became famous outside the professional circles in 1967 when, for the first time in history, it was used to calculate the scores at the European Figure Skating Championship in Ljubljana, which was broadcast on TV worldwide. In this way it was easier for computer experts to convince the financiers to purchase more modern computers. Soon afterwards the Slovene ''Zuse'' sank into oblivion; some of its parts, however, are still kept by sentimental computer specialists. The whole Z23 can be seen in the Computer History Museum in Mountain View in California. ■

Partner Publication

http://mondodigitale.aicanet.net/ultimo/index.xml ■

8th IT STAR WS on History of Computing

19 September 2014, Szeged, Hungary

Content

- Announcement
- Related Publications
- Mission and Scope
- Program
- Papers and Publication

Moderator, Speakers & Co-authors

- Moderator, Speakers & Co-authors

Program

PROGRAM

09.00

Opening and Setting the Scene
Plamen Nedkov, Conference Moderator

Keynote: **60s and Early 70s – Eastern European Cooperation in Computing**
Blagovest Sendov

09.30 – 10:30

Soviet Union: **First Computers and Evolution of Cybernetics**
Vladimir Kitov

Yugoslavia: **History of Computing in the West Balkan Countries**
Franci Pivec, Marijan Frkovic, Niko Schlamberger

10.30 Coffee break

11:00 – 13:00

The Museum of Computer History – Teaching Support for Computer Organization Subjects
Ana Pont Sanjuán, Antonio Robles Martínez, Xavier Molero Prieto, Milagros MartínezDíaz

History and Highlights of a Computer Museum
Istvan Alfoldi, Mihaly Bohus, Daniel Muszka

[Guided tour, Szeged Museum]

13.00 Lunch break

14.00 – 14.30

IBM and Eastern Europe
Petri Paju

14. 30 – 16.00

Bulgaria: **History of Computing in Bulgaria**
Kiril Boyanov

Italy: **The Early Approach to the Computer Era**
Corrado Bonfanti

Lithuania: **The History of Computing at a Glance**
Antanas Žilinskas

16.00 Coffee break

16.30 – 18.30

Czechoslovakia: **History of Computing in the Czech and Slovak Republics**
Alena Solcova

Romania: **History of Computing in Romania**
Vasile Baltac, Horia Gligor

Albania: **40 Years of Computers**

Hungary: **Computing in Hungary – Through the History of Five Institutions**
Balint Domolki

18.30

Conference Wrap-up

http://www.starbus.org/ws8

Organization

- IT STAR
- Conference Co-Chairs

Venue

- Museum of Computer History

Host

- John von Neumann Computer Society

Member Societies

- IT STAR Member Societies

Informer instead of a watch

Vision from 1967/1968 of Future Technologies (1st January 1968 New Year's Survey)


TIESA

SPAUDŽIAM DEŠINĘ

INFORMERIS VIETOJ LAIKRODŽIO

***Laimutis Telksnys**, PhD in Technical Sciences, Head of the Recognition Processes Department, and Deputy Director of the Institute of Physics and Mathematics of the Lithuanian SSR Academy of Sciences replies to the question:*

"How do you imagine the year 2017?"

Science and technology, including theory and engineering of recognition processes will be developed so that …

Each person, who presently has a watch, will have an "informer", i.e. a transmitter-receiver of sounds, light images (or maybe even of taste, odor and neural signals) and a powerful, to our current understanding, computing machine. The informer will be no larger than a wristwatch; therefore, it will be convenient to wear.

To find out what is written in the world on this or that issue of science, or technology or to get some data, a man will be able to inquire via the individual informer an automatic library and instantly will get the answer: orally, in writing or in images.

It will be possible to receive scientific, technical or economic information by means of an informer. Additionally, the automatic library will send a copy of the desired book of fiction in some minutes, or will read it loudly at one's request. There will be a possibility to see a selected performance, concert, movie or telecast with the favorite performers, living now or earlier, using an individual or household informer.

The automatic library of sports will be able to show sports competitions that took place even long time ago. The automatic information centers will be able to provide data about merchandise of one or another type present in the world, to tell the address of any inhabitant or institution of the world, to advise about tourist routes, to accept various individual orders and then distribute to producers.

The state of health of each man will be constantly monitored by the automatic diagnostic center. It will instantaneously warn a man even at the least danger to his/her health, and will advise to wear warmer clothes, to keep a certain regime, to take some medicine, and, in more serious cases, to consult a doctor of this or that profession, and, in the case of an accident, automatically call the emergency medical service.

In scientific work, recognition automatons will be widely used, that will group measurement data of complicated states of nature and society. Therefore, the scientific work will be considerably faster and more efficient.

At present, it is very difficult to say whether all that will be actually realized after fifty years. Maybe, much more will be accomplished. It is clear only that quite a few scientific and technological problems should be solved.

It is interesting to notice that scientists of our Republic have quite a lot of achievement in the field of recognition automation. For example, the Computing machines special designer office of the "Sigma" association has prepared a device for serial production that can read hand-written and printed numbers and four special characters. In a second, the automatic device recognizes and translates into the machine language up to 200 graphic characters. This is the first recognizing industrial device in the USSR.

In addition to these designing works, Kaunas Polytechnic Institute and Vilnius State V. Kapsukas University pursue large-scale scientific research, and in the Institute of Physics and Mathematics of the Academy of Sciences even a Recognition Processes Department has been established.

I would like to stress once again that the subjects described here now appear incredible to some extent but after a few decades, due to the rapid development rates of science and technology, could seem quite modest.

Prof. Laimutis Telksnys on his 80th Jubilee lecture, 24th November 2010

***Prof. Dr.Habil. Laimutis Telksnys** is a Senior Researcher at the Recognition Processes Department of Vilnius University Institute of Mathematics and Informatics, head of the project "LIEPA – Services controlled by the Lithuanian Speech" www.rastija.lt/liepa/english . He was initiator and head of the famous project "Rural Area Information Technology Broadband Network (RAIN)".*

Prof. Laimutis Telksnys was awarded two Instrument Association Prizes for computerized devices for automation of scientific investigations, World Exhibition EXPO 2000 gold medal for computerized multimedia dictionary "Lithuanian Dialects. Multimedia Dictionary. Volume I, 2000", and three Lithuanian State Awards (for the High Speed Hand Printed Character Recognition Computer - 1968, the Theory and Methods of Recognition of Non-stationary Random Processes - 1980, and Information Technologies for Lithuanian Culture and Language - 2008). ■

e-Leadership Competences

[This paper was translated into Italian and presented during the recent AICA conference "DIDAMATICA" – 7-9 May 2014, Naples. The topic of e-Leadership Skills is of major importance and we thought the NL Readership might benefit from the publication along with the announcement of a forthcoming conference on the same topic – The Editor]

e-Leadership Competences: The Digital Innovation Leader

A developing area within CEN's and IT STAR's ICT- Skills Agenda

Plamen Nedkov and Roberto Bellini

Plamen is Chief Executive of IT STAR and Steering Committee Member of CEN's WS on ICT Skills.

Roberto is AICA's Vice-President in charge of e-Competences and ICT Professionalism.

Introduction

IT STAR – www.itstar.eu is a regional association in Central, Eastern and Southern Europe whose 15 members are leading national professional informatics societies. The Association focuses on Information Society issues – IS indicators and readiness, policies, strategies and other, as they relate to the Region, within a European and Global context. It facilitates partnership by providing a professional platform to national and international stakeholders from academia, government, industry and civil society.

The CEN Workshop on ICT Skills – http://www.cen.eu/work/areas/ict/eeducation/pages/ws-ict-skills.aspx is a flexible working body of CEN, the European Standardization Committee, contributing to the long-term e-Skills Agenda of the European Commission, in close interaction with DG "Enterprise and Industry". It brings together representatives of industry, academia and IT associations to address such matters as professionalism, e-Skills shortages and other, related to competitiveness, growth, innovation, employment and social cohesion. Its main activity is the development and publication of CEN Workshop Agreements (CWAs) - consensually achieved specifications in an open environment of consultations.

The two organizations are actively contributing to each other's initiatives and activities.

For the purpose of this presentation we will follow the chronology of events that have contributed to the establishment of eBusiness/eLeadership competences within the agenda of both organizations and have given thrust to the AICA proposal for a CEN project on "Digital Innovation Leader Competences", on which consultations and development are underway.

Milestones

Three IT STAR events with important CEN WS participation have helped shape the eBusiness/eLeadership agenda laterally:

- 4th IT STAR WS and publication on **Skills Education and Certification: The Multi-Stakeholder Partnership**, 27-28 November 2009, Rome, Italy - http://starbus.org/ws4/ws4.htm
- 5th IT STAR WS and publication on **Electronic Business**, 12 November 2010, Zagreb, Croatia - http://starbus.org/ws5/ws5.htm
- 7th IT STAR WS and publication on **Electronic BusinessII**, 3 May 2013, Bari, Italy - http://www.starbus.org/ws7

The 4th IT STAR WS [1] provided the first outline for the development of the eLeadership competences agenda. It asserted the need of stronger bonds in the tripartite relationship between Academia, Industry and Government: Governmental regulation and support, academic knowledge and business motivation positively influence educational programs and qualifications, the emergence of new products and services and increased competitiveness. The ICT industry, in particular, is a sphere of rapid technological change making existing knowledge quickly obsolete. While innovation today is mainly produced outside academia, universities give high-value contributions by way of strong partnership schemes, and cultivate the spirit of innovativeness [2].

The European e-Competence Framework (e-CF) – www.ecompetences.eu, as a common European framework for ICT professionals in Industry, was considered as an instrument for alignment of existing models of competence management, and for curriculum development.

Prof. Bruno Lamborghini introduced a notion, now widely accepted within the EU, emphasizing the growing role of the CIO and its evolution into that of a Chief Innovation Officer [3].

The 5th and 7th IT STAR WSs [4] sharpened the focus on the evolving digital ecosystem and marketplace. In this regard, SAP's concept and vision for a Business Web [5], as

1 Proceedings of the 4th IT STAR WS, ISBN 8890162058, © IT STAR 2010
2 See Marc Bogdanowicz, *SBIR or How the US Runs the Innovation Race,* IT STAR NL Vol. 12, No.1, Spring 2014 – http://nl.starbus.org
3 See Peter Hagedoorn, *The New Role of the CIO in Digital Europe*, IT STAR NL Vol. 12, No.1, Spring 2014 – http://nl.starbus.org
4 Proceedings of the 5th IT STAR WS, ISBN9788890540615, © IT STAR 2011 and Proceedings of the 7th IT STAR WS, ISBN 9788898091119, © IT STAR 2013
5 See Martin Przewloka, Disruptive B2B2C eBusiness Solutions provided on next-generation mobile empowered Business Webs

cloud-based open platform offering data, services and applications, is an excellent introduction to next-generation business webs.

In parallel, both events offered outlines and definitions for eBusiness/eLeadership skills needed by the enterprise to transform itself in order to adequately respond to the challenges of globalization and the new business dynamics vis-à-vis disruptive and sustainable technologies, increased competition and complexity.

Several generic approaches were considered, among them:

- Skills processed by "hybrid professionals" or "dual thinkers" understanding the organization and its business needs, and, in parallel, accounting for the potential and value of ICT in promoting innovation [6]
- Hybrid business and ICT skills expected from business decision makers, allowing sound assessment of opportunities that emerging information technologies and systems offer [7]

In this vein, e-Business/e-Leadership skills are "capabilities needed to exploit opportunities provided by ICT, notably the Internet; to ensure more efficient and effective performance of different types of organizations; to explore possibilities for new ways of conducting business/administrative and organizational processes; and/or to establish new businesses". [8]

Obviously, **T-shaped profiles** are in demand, the horizontal **T**-bar visualizing competences to interact across disciplines and the vertical bar representing depth of expertise in ICT.

The Digital Innovation Leader (DIL) Competences

The DIL profile [9] was first presented during the 7th IT STAR WS on Electronic Business II in Bari, Italy.

During the September 2013 Plenary of CEN's WS on ICT Skills DIL was presented as an area within the e-Business Skills agenda, in which CEN might wish to get involved. In consequence, the plenary participants extended their support and encouraged AICA to submit a project proposal. A proposal was developed and presented at the subsequent plenary session and further preparations are in progress.

The proposal addresses **e-Business competences** as abilities to apply knowledge, skills and attitudes for achieving results by using IT within all enterprise activities sustaining business.

Within the enterprise, disciplinary competence clusters can be identified in such business processes as Marketing & Sales (M&S), Customer Technical Assistance (CTA), Operational Activity and Logistics (OAL), Supply Chain Management (SCM), Administration and Infrastructure Management (AIM), Human Resource Management (HRM), Research & Technology Development (RTD), IT Development (ITD) and other.

e-Business methods are seen as integration enablers of the company's products and services and of their internal and external data processing systems in obtaining more flexible performance, to work closely with suppliers and partners and to better satisfy the needs and expectations of their customers, and for an efficient management of their internal functions.

The proposal is for a project aiming to identify and shape the more powerful **Clusters of Competences** to increase innovation of products and services with more intelligence added through disruptive and/or sustainable digital technologies.

Another objective is to build a competence extraction methodology from successful business innovation case studies and specify the characteristics and functions of a **Dynamic Innovation Knowledge Repository**, to store and retry, upon request, the various types of competences considered "new" at the moment of fill in. Once combined, these competences could be transferred in more consolidated framework such as e-CF.

The project **Deliverables and sub-tasks** are defined as:

A. Produce Innovation Classification Criteria - the objective is to capture and discriminate (based on a bottom-up approach) successful cases of business innovation and entrepreneurship based on digital contributions.

- Define and document the various types of innovation by digital contribution.
- Define the format to describe innovation case studies and best practices.
- Compile some case studies as valuable examples.
- Identify networked sources in Europe of innovation business cases with important digital contribution.
- Collect and analyze a sufficient number of successful innovation business cases of both types - disruptive and sustainable.
- Define the taxonomy to map the innovation business cases.
- Fill in the taxonomy with the totality of innovation business case collection.
- Produce a rank list of successful business cases.

B. Produce differentiated sets of digital competences per Innovative business cases, focused on innovative products/ services.

- Define the interview format for "innovators" playing a role in the innovation business case present in the ranked taxonomy – innovators could be project leaders, business leaders, entrepreneurs, …
- Select innovators in the ranked list and gather and ana-

6 See Paolo Schgör, *e-Business in Real Life,* Proceedings of the 5th IT STAR WS, ISBN9788890540615, © IT STAR 2011
7 See Denise Leahy and Dudley Dolan, *eSkills for e-Leadership,* Proceedings of the 7th IT STAR WS, ISBN 9788898091119, © IT STAR 2013
8 See http://ec.europa.eu/enterprise/sectors/ict/e-skills/extended/index_en.htm#h2-1
9 See Roberto Bellini, Giulio Occhini and Paolo Schgör, *Digital Innovation Leader Profile,* Proceedings of the 7th IT STAR WS, ISBN 9788898091119, © IT STAR 2013

lyze the competences considered critical.
- Check the relevance of the competence identified through one or more focus groups (at least one per industry sector), to which invite the contact point/project manager already involved.
- Design a suitable tool specification for a Dynamic Innovation.
- Competence Repository able to capture systematically further competences of new business innovations.
- Consolidate the results of the focus groups building up the T-shaped profiles for Business Innovation - disruptive and sustainable - in a digital environment.

<u>C. Test some of these disciplinary competence sets; proof that the concept adopted to identify and categorize innovation competences of past successful case studies could be beneficial for new innovation projects.</u>

- Select a group of innovators that (a.) have already contributed, and (b.) without a past contribution, and configure 2-3 focus groups.
- Assess in these focus groups the relevance of the new competences already extracted.
- Fill in and consolidate the result in the Dynamic Innovation Competency Repository (DICR).
- Prepare Final report and presentation of results.

The project is intended to build upon previous CEN and EC activities in the field, including the e-CF experience and the recent Study on "e-Skills for Competitiveness and Innovation: Vision, Roadmap and Foresight Scenarios,"10 performed by empirica, IDC and INSEAD for the EC, which recommends the following actions with regard to e-Leadership skills:

1. Engage with a broader set of stakeholder groups to sharpen metrics for e-leadership skills
2. Regularly monitor demand and supply of e-leadership while improving planning and data availability about e-leadership skills
3. Develop and apply e-leadership curricula guidelines and quality labels
4. Create new formats and partnerships for teaching e-leadership skills
5. Align actions to develop e-leadership skills with efforts to foster entrepreneurship across the EU
6. Foster e-leadership in the context of entrepreneurship and self-employment
7. Build awareness of the relevance of e-leadership skills for innovation, competitiveness, and employability ■

10 Brochure prepared by INSEAD eLab on behalf of the European Commission - Enterprise and Industry Directorate General. © European Union, 2013

European Commission

New Curricula for e-Leadership

Delivering Skills for an Innovative and Competitive Europe

25th June 2014, Politecnico di Milano – Aula Magna
Piazza Leonardo da Vinci, 32
Milano, 20133 - **ITALY**

Demand is growing throughout the European industry to improve the quality of e-leadership, covering organization leadership in ICT innovation to deliver business value. Recent research has confirmed that the shortage of e-leadership skills across Europe is significantly calling for action.

What is E-Leadership and how the educational ecosystem is responding in this new era of digital requirement? What kinds of curricular activities can be provided at present? And companies, whether they are large, SMEs or start-ups, are aware of what it means to be able to "see" the change with the "lens" of the digital age? What do they expect from the educational system? What innovations have been able to develop?

The event "New Curricula for e-Leadership - Delivering Skills for an Innovative and Competitive Europe" aims to answer these questions by bringing together a wide group of complementary stakeholders and policy makers from cluster countries. It is part of a cycle of meetings planned in 10 different European countries to define a set of skills enabling innovation at all levels of enterprises, from start-ups to large corporations, from private to public bodies. E-leadership expresses the ability to foresee and envision new business models, new organizational and productive models, using the potentials of digital technology to drive the change.

This meeting is part of the study "*eSkills Guide-Guidelines and the European Quality Labels for New Curricula*", commissioned to Empirica by the European Community, DG Enterprise, aiming to develop, demonstrate and disseminate European guidelines and quality labels for new curricula fostering e-leadership skills. In Italy, the initiative is part of a series of actions taken to disseminate digital culture, promote ICT professionalism, and the European eCompetence Framework 3.0 (e-CF3.0) on ICT skills, now UNI regulation.

This should also encourage the development and improvement of attractive, adapted, up-to-date educational offers able to increase the supply of experienced and highly qualified leaders in ICT-based innovation.

The event is organised by the European Commission, Directorate-General Enterprise & Industry and Fondazione Politecnico di Milano in conjunction with: Rete Competenze per l'Economia Digitale, Cefriel, PoliHub, AICA.

Registration

Please register your interest at www.eskills-guide.eu. ■

A new JRC-IPTS study identifies Europe's top ICT hubs

Marc Bogdanowicz

Marc is Senior Scientist at IPTS –Seville.

Wondering what makes an ICT hotspot? Take a look at Munich, London, Paris or smaller cities such as Darmstadt identified in a new EU Atlas of ICT hotspots. This atlas shows where digital technologies thrive and examines the factors contributing to this success.

Most of Europe's ICT activity takes place in 34 regions across 12 countries. Key ingredients to success included access to top Universities and research centres and funding opportunities such as venture capital.

European Commission Vice-President said: "This is proof that digital success comes through a willingness to invest, an open mindset for innovation and planning. Europe needs to build these values today to be a global leader in technology."

A *European ICT Pole of Excellence* (EIPEs) is defined in this report as a geographical area inside the EU, with best performing activities in ICT production, R&D and innovation, activities, playing a central role in global international networks.

The report looked at all EU regions (1303 NUTS3 regions) in terms of ICT activity and assigned scores according to its relative weight; 14% of the regions scored above 20 points. The top 34 scored between 41 and 100.

The report analysed three elements (business activity, R&D and Innovation in the ICT sector) on the basis of their intensity (e.g. business turnover, turnover growth, number of employees), their internationalisation (e.g. how many international partners businesses/research centres/ universities have) and networking (what is the role of each region in networks: which of them are hubs and connect directly to many partners, which of them have links that only allow few exchanges). The findings relied on a Composite Indicator bringing together 42 Indicators to evaluate ICT activities. Several data sources and databases were used to elaborate the indicators and measurements: University rankings, citation indexes, information on European research projects' collaborations, how many global top R&D investor companies in ICTs are present in each region, venture capital funding or employment data and companies' turn over information.

Clearly enough, this report addresses the EU Strategy to reinforce Europe's industrial and technology leadership in ICT. The report findings and the Atlas will be used in future EU policy formulation on encouraging innovation in the EU. They will also feed into a new JRC-IPTS project which further focuses on ICT innovation policy and on transferring the best research ideas to the market. Moreover, the JRC-IPTS plans to analyse the technological diversity of ICT activity and its evolution; this will help identify complementarities between locations.

All reports, including the Atlas and an interactive map, are available at http://is.jrc.ec.europa.eu/pages/ISG/EIPE.html

■

Top performing regions according to the EIPE Composite Indicator

Level	EIPE Rank	Region name
1st tier	1	München, KreisfreieStadt
	2	Inner London - East
	3	Paris
2nd tier	4	Karlsruhe, Stadtkreis
	5	Cambridgeshire CC
	6	Stockholmslan
	7	Darmstadt, KreisfreieStadt
	8	Uusimaa
	9	Zuidoost-Noord-Brabant
	10	Groot-Amsterdam
	11	Arr. Leuven
3rd tier	12	Bonn, KreisfreieStadt
	13	Hauts-de-Seine
	14	Milano
	15	Berlin
	16	Dublin
	17	Aachen, KreisfreieStadt
	18	Delft en Westland
	19	Oxfordshire
	20	Edinburgh, City of
	21	Stuttgart, Stadtkreis
	22	Heidelberg, Stadtkreis
	23	München, Landkreis
	24	Arr. de Bruxelles-Capitale
	25	ByenKobenhavn
	26	Berkshire
	27	Wien
	28	Madrid
	29	Surrey
	30	Frankfurt am Main, Kreisfreie Stadt
	31	Hampshire CC
	32	Erlangen, KreisfreieStadt
	33	Yvelines
	34	Dresden, KreisfreieStadt

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) V. Risak, G. Kotsis, E. Mühlvenzl
- 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

Statutes

IT STAR Charter http://www.starbus.org/download/charter.pdf adopted on 23 October 2004 by the IT STAR Business Meeting in Prague, the Czech Republic.

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:

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

- 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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Czech Society for Cybernetics and Informatics – CSKI Pod vodarenskou vezi 2, CZ-182 07 PRAGUE 8 – Liben Czech Republic Tel. +420 266 053 901 Fax +420 286 585 789 e-mail: cski@utia.cas.cz www.cski.cz	**Greek Computer Society – GCS** Thessaloniki & Chandri 1, Moshato GR-18346 ATHENS, Greece Tel. +30 210 480 2886 Fax +30 210 480 2889 e-mail: epy@epy.gr www.epy.gr
John v. Neumann Computer Society – NJSZT P.O. Box 210, Bathori u. 16 H-1364 BUDAPEST, Hungary Tel.+36 1 472 2730 Fax +36 1 472 2739 e-mail: titkarsag@njszt.hu www.njszt.hu	**Associazione Italiana per l' Informatica ed il Calcolo Automatico – AICA** Piazzale R. Morandi, 2 I-20121 MILAN, Italy Tel. +39 02 760 14082 Fax +39 02 760 15717 e-mail: g.occhini@aicanet.it www.aicanet.it
Lithuanian Computer Society – LIKS Geležinio Vilko g. 12-113 LT-01112 VILNIUS, Lithuania Tel. +370 2 62 05 36 e-mail: liks@liks.lt www.liks.lt	**Macedonian Association for Information Technology – MASIT** Dimitrie Cupovski 13 1000 SKOPJE, Macedonia e-mail: indovski.p@gord.com.mk www.masit.org.mk
Polish Information Processing Society ul. Puławska 39/4 02-508 WARSZAWA, Poland Tel./Fax +48 22 838 47 05 e-mail: marek.holynski@gmail.com www.pti.org.pl	**Asociatia pentru Tehnologia Informatiei si Comunicatii – ATIC** Calea Floreasca Nr. 167, Sectorul 1 014459 BUCAREST, Romania Tel +402 1 233 1846 Fax +402 1 233 1877 e-mail: info@atic.org.ro www.atic.org.ro
JISA Union of ICT Societies Zmaj Jovina 4 11000 BELGRADE, Serbia Tel.+ 381 11 2620374, 2632996Fax + 381 11 2626576 e- mail: dukic@jisa.rs www.jisa.rs	**Slovak Society for Computer Science – SSCS** KI FMFI UK, Mlynská dolina SK-842 48 BRATISLAVA, Slovak Rep. Tel. +421 2 6542 6635 Fax +421 2 6542 7041 e-mail: SSCS@dcs.fmph.uniba.sk www.informatika.sk
Slovenian Society INFORMATIKA – SSI Litostrojska cesta 54 SLO-1000 LJUBLJANA, Slovenia Tel. +386 123 40836 Fax +386 123 40860 e-mail: info@drustvo-informatika.si www.drustvo-informatika.si	IT STAR