Newsletter - *Calibrated for Creative Communications*

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Rooftop of Things

The Summer Issue of IT STAR's Newsletter offers a glimpse of the Rooftop of *La Serenissima*, with great contributions from:

- *Augusto Casaca* (PT) on Smart Grids
- *Marc Bogdanowicz* (IPTS – Seville) introducing ICT Companies' Innovation Models
- *Fabio Massimo* (IT) with a lead on e-CF coming of Age
- *Bruno Lamborghini* (IT), *Martin Przewloka* (DE) & *Włodzimierz Marciński* (PL) – what to expect during the 9th IT STAR WS on ICT Strategies and Applications
- *Marek Holynski* (PL) with a brief history of early computing in Poland
- *Kiril Boyanov* (BG) & *Balint Domolki* (HU) on achievement and advice
- *Gintautas Grigas* (LT) on the most beautiful domain names
- *Niko Schlamberger* (SI) on SSI events promoting Informatics

There is more in store!

Take the Journey,

The Editor

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Editor

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Letters to the Editor

[Extracts from mails concerning the Spring NL issue]

Dear Plamen

Thank you for your e-mails and congratulations for the IT STAR Szeged book and DVD.

Horia Gligor
Vice-President, ATIC (Romania)

Hello, Dear Plamen

Sincerely thank you for IT STAR Spring NL, which we have received! It's fine: with interesting papers, excellent new section "IT & Sports" from Poland, our "Computer Days ¬ 2015" announcement, etc.

I have a proposal from Dr. Gintautas Grigas who has prepared a paper about a Lithuanian competition selecting the most beautiful Lithuanian Internet domain names….

Saulius Maskeliunas
President, LIKS (Lithuania) ■

Partner Publication

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

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.

The Use of Wireless Sensors and Actuators in the Smart Grid

Augusto Casaca

Augusto Casaca *is Full Professor at Instituto Superior Técnico, Portugal. He is presently Leader of the Research Group in "Communication Networks and Mobility" at Inesc-ID and "Network Architecture" at INOV, in Lisbon, Portugal. Augusto has participated in more than twenty international joint research projects in the areas of Broadband Communications, Networking and Smart Grid and has about 150 scientific publications. He has co-chaired five international conferences on Networking. He was Chairman of IFIP Technical Committee 6 (Communication Systems) for 6 years and is a Senior Member of IEEE. His present research interests are in the areas of wireless sensor network architecture, communication infrastructures for smart grids and delay tolerant networking.*

1. The Smart Grid

The electrical grid has, up to now, adequately assured the electricity supply in the several regions of the world. However, in the horizon, there are problems which need to be taken into account. These problems have origin in pressures from the consumption side, in the lack of primary sources of production, in the environmental impact and in the need for improvement of the grid reliability. Their impact can be mitigated by the introduction of more "intelligence" in the grid, by means of a more intensive deployment of Information and Communication Technologies (ICT) for grid control. This will also lead to a more economic, reliable and flexible supply of electricity. In a broad and simple definition of Smart Grid (SG), we can consider it as the evolution of the electrical grid to a more controlled grid via ICT.

One of the important characteristics of the SG is the integration of bi-directional energy and information flows in the electrical grid. This allows an active participation of the users, who can control and manage their electricity consumption and respective cost in almost real-time and can also have the role of energy micro-producers, as they will not only consume but might also produce energy. In this latter case, they will be called prosumers.

The SG is deployed along all the segments of the electrical grid as shown in figure 1. The deployment extends from central generation until the final customers or prosumers, including the transport and distribution segments.

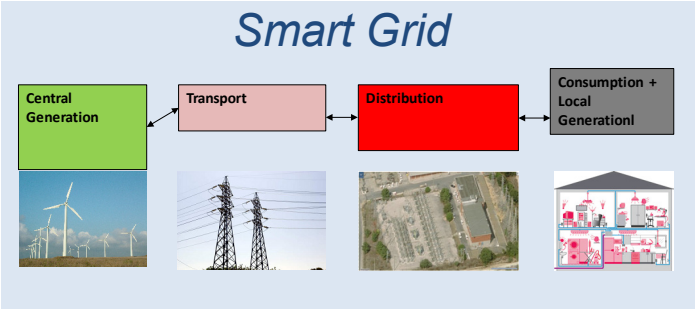


Figure 1 – Smart Grid deployment

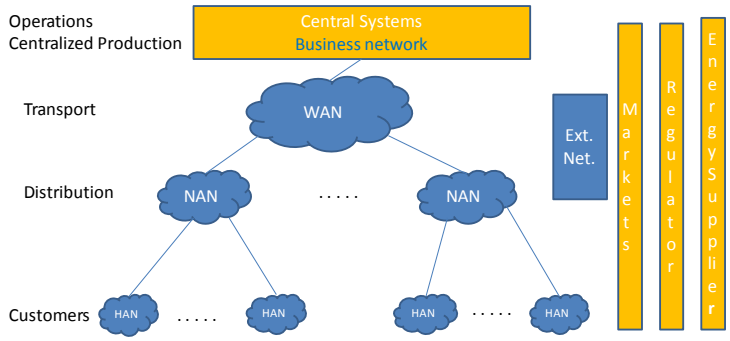
Some of the characteristics and benefits from the SG are the following:

1. User friendliness
   It gives the possibility of including the consumer in the decision process, e.g., through the availability of smart meters.
2. Demand Side Management
   It encourages the change towards consumer patterns that manage energy consumption as a function of the supply offer.
3. Inclusion of several options of generation and storage
   It gives the possibility of adapting to diverse distributed energy sources (usually renewable) and to energy storage devices like batteries and electrical cars.
4. Self-healing
   It has the capacity to quickly detect, analyze and restore grid faults.
5. High reliability and quality of energy supply
   It ensures a continuous energy supply with high quality to satisfy the consumer requirements.
6. Resilience to cyber attacks
   It has the capacity of protecting the grid against electronic and cybernetic attacks.

The interest and work in the SG concept is already five to ten years old [1]. However, in the latest years the interest for its implementation has improved, due to the introduction of renewable energy sources in the grid, to the appearance of electrical cars and to the occurrence of reliability problems in some parts of the grid, especially in the low voltage distribution segment. There are several initiatives running around the world, which include R&D projects, pilot networks and even initial commercial deployments. In Europe, the Smart Grids European Technology Platform was created. This platform is the main European forum for the definition of policies and R&D activities for the Smart Grid sector. The conceptual model of the SG has also been standardized by the National Institute of Standards and Technology (NIST) and by the CEN-CENELEC-ETSI [2].

2. The communication infrastructure

The SG consists of a vast network of interconnected systems, which requires the deployment of a communication infrastructure dedicated to the control of the electrical grid. The communication infrastructure is a multi-level and hierarchical network, which uses several communication technologies.
Figure 2 shows a simplified diagram of the different communication domains.



(WAN – *Wide Area Network;* NAN – *Neighborhood Area Network;* HAN – *Home Area Network;* Ext. Net. – External Network)
Figure 2 – Communication domains in the Smart Grid

The HAN is the network at the customer premises. It allows an efficient management of the use of the energy, facilitating the implementation of demand side management via an active involvement of the customer. It consists of several smart mechanisms including sensors and actuators, e.g., smart meters, displays, home energy management systems. The communication among the several HAN components can be wired (e.g., PLC) or wireless (e.g., Wi-Fi, ZigBee).

The NAN acts as an access network to send the customer data to the central systems of the energy operator. The data from the HANs are aggregated via a concentrator, which acts as a gateway between HAN and WAN. Communication in the NAN can be also wired (e.g., PLC) or wireless (e.g., GPRS, ZigBee).

The WAN interconnects multiple NANs with the central systems, usually crossing long distances. Diverse technologies typical of WAN can be used. The trend is to have an IP network supported by wired or wireless communications.

The Business network interconnects the central systems of the energy operator, such as, SCADA (Supervisory Control and Data Acquisition System), WAMS (Wide Area Measurement Systems) and MDMS (Meter Data Management Systems). Technologies typical of Business networks, like Ethernet, are used at this level. The communication with the regulator, market operators and energy suppliers is done via networks external to the SG and using the usual communication technologies available in the market.

3. The use of wireless sensors and actuators

The automation of the electrical grid is already a reality in large parts of the transport grid and also in the high voltage distribution grid. However at the low voltage distribution level there is still a lack of proper monitoring and automation facilities. The realization of the SG will have a strong impact in this grid segment, through the introduction of the appropriate sensors and actuators in the grid.

The initial realization of the SG in the low voltage distribution segment was the Advanced Metering Infrastructure (AMI). This is the communication infrastructure that allows the communication of the customer smart meters with the central systems and it is already widely deployed. This infrastructure is straightforward and is normally based on PLC or GPRS/3G technologies.

The AMI will evolve into a more complex network as wireless sensors and actuators are also deployed in the SG. The sensors that are deployed in the grid will be used for measuring currents, voltages, power, light intensity and temperature, for example. They form a Wireless Sensor Network, which is a mesh network with its own communication protocols. The data acquired by the different sensors are sent into a sink node, which resides at the level of a secondary substation. Also actuators might be deployed. They can be used to activate HAN devices or photovoltaic panel inverters at the prosumer site. The actuators can be included in the wireless sensor network, which altogether is then designated as a Wireless Sensor and Actuator Network (WSAN).

The introduction of wireless sensors will enable a more flexible Distribution Automation (DA). The objective of DA is to monitor the grid equipments, detect and locate the faults, and restore operation. By using wireless sensors for monitoring, as opposite to the traditional use of wired sensors, we gain flexibility and have cost benefits [3] [4].
Also the control of Distributed Energy Resources (DER) can be achieved by the use of wireless sensors and actuators. DER consists in having small energy production units, normally renewable energy sources, located next to the loads. Line voltage and current might get unbalanced as a result of the injection of DER energy. The control of voltage and current requires measurement of electrical parameters by sensors, which together with the running of local and centralized control algorithms and respective action on the micro-generation devices can restore the balancing of the lines.

One of the most desired solutions in the SG is the possibility of reducing peak loads, obtaining a flatter consumption profile along the time (Demand Side Management). The trivial solution is to sell energy at a variable price, which increases with grid load. In this case the decision is up to the customer. A more elaborated method is the so-called Direct Load Control, in which the operator controls the customer equipments (with their agreement), being able to switch them on and off directly. There is also a hybrid solution in which the customer equipments activity is automatically shifted into another time of the day. These two latter solutions require also the deployment of sensors and actuators in the grid and in the customer premises.

4. Conclusion

The introduction of wireless sensors and actuators in the electrical grid as an aid to the implementation of the SG paradigm is changing the control capabilities of the electrical grid. Departing from the AMI, more elaborate communication solutions, which use also WSAN communications,

are being used in pilot networks and soon will be a reality in large parts of the electrical grid with advantages to the customers and grid operator.

References

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The e-Competence Framework Comes of Age

Fabio Massimo

***Fabio Massimo** is Chairman of CEN PC 428 "Project Committee - Professions for Information and Communication Technologies' ", National President of CNA ICT Association, Italian Vice President of PIN-SME (Pan European Network for ICT) based in Brussels and member of several other professional organizations.*

The European framework of ICT competences, after ten years of growth and development and three versions released, is to become a standard for Europe.

Strongly desired by the European Commission, in response to demands from large European industrial companies and other stakeholders, the e-CF, as it is commonly named, has been developed over the years with the work, collaboration and contribution of many experts and thousands of stakeholders of both ICT and user companies, as well as institutions.

At first, the e-CF was published as a "Workshop Agreement", a document that gathered the consensus of the members of the CEN Workshop on ICT Skills. Then, the same document became the basis for the work of CEN TC 428, the CEN technical committee set up with the contributions of National Standard Bodies from several countries. CEN TC 428 aims at turning the e-CF into a European Norm (EN).

The final version of the new standard was approved by the TC on February 26, 2015 and entered the process of formal approval by the National Standards Bodies of Europe. The e-CF is expected to become official as a standard by the end of 2015.

Why is this an important step for the ICT sector?

Digital technologies have become the basis to development in all areas: social, industrial, educational; nowadays there can be no development without the support of knowledge of digital technologies.

So the e-skills strategy is a basic pillar of the European CIP "Competitiveness and Innovation Framework Program" for 2014-2020 and the e-CF is the mounting stone of the program, it is the tool that allows all of us to describe and define the set of digital skills.

To describe the requirements, the needs and the goals of users, professional users, practitioners, ICT professionals and e-leaders, we need a common language, officially recognized as standard and shared across Europe.

Recruiting skilled people coming from different countries, comparing or setting up a basic study program and university, training staff, writing contracts are just some of the large variety of applications for which a comprehensible and common language in Europe is fundamental.

e-CF is this language

The e-CF defines the competences as a high-level language, i.e. as a reference, but as such it is not sufficient for all purposes.

For instance, defining an ICT academic or engineering program requires great detail and granularity. In this case, the e-CF provides the infrastructure and methodology, but it must be combined with the wider body of knowledge of the ICT sector.

Similarly, companies are used to exploit professional profiles that identify people's activities within the company. Also in this case, the new standard provides the structural basis and methodology to define categories of profiles in the different ICT areas (e.g. web, security, software development etc.). Depending on market needs, some profiles or some sectors will generate new European standards or shared rules based on e-CF.

Certifications providers find e-CF as a basis for proposing certifications to the market. Compliance with e-CF ensures that different schemes are comparable to each other and integrated with proprietary certifications so that the market can recognize a commercial overall value.

The e-CF is the seed from which a larger family of standards, tools and chains of products can grow. The new standard is the end of a long process and it represents the maturity of ideas and methodologies conceived a decade ago and, at the same time, it is the starting point of a new evolutionary path aimed at developing a truly digital single market in Europe. ■

Understanding ICT Companies' Models of Innovation

Marc Bogdanowicz

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

IPTS is currently focusing its efforts on understanding better the conditions for the transfer of best ICT research ideas to the market.

One of the recently finalized studies[1] offers a qualitative observation of ten innovative ICT SMEs in France. It aims at describing what might be the *models of innovation* that allowed those companies to innovate, survive and prosper.

The concept of "models of innovation" refers to the way the innovators manage the trajectory of the invention towards its commercialization. The innovators take decisions on how to create the conditions for value making, within an overall context of high uncertainty due to nature of their innovative activity.

The ten observed companies have demonstrated to bear an important diversity of trajectories, markets, products, and growth rates but all together seem to share commonalities when it comes to their models of innovation.

As shown in the report, most observations collected from the 10 case studies tend to organize around three main driving dimensions, three domains of uncertainties that need to be adequately addressed by the innovating company:

1. Access to technological knowledge
2. Access to finances
3. Access to market knowledge

These dimensions organize a triangular model of innovation for each firm: they motivate many of the decisions and behaviors that the innovators show.

Additionally, timing comes repeatedly as a transversal dimension, a constraint expressed as an issue of matching (to find the right timing), not necessarily of speed (being the faster[2]).

Such model seems to convincingly encompass all the statements and behaviors collected in the observations. The innovation system, usually seen as "the supporting network of scientific and technical institutions, the infrastructure, and the social environment" (Freeman 1990, quoted by Carlsson, 2003)[3] is only called upon in addition, when easy to understand and use, in order to facilitate a solution to any of the three main dimensions.

The large set of anecdotal evidence collected from the observation of 10 companies offers points worth paying attention:

On Technological knowledge:

- Technological knowledge stays a central factor for ensuring survival and success. Keeping "more than up to date" with the technology is considered as a fundamental aim. It also reflects the needs due to the maturing of the business itself, from technology provider to integrator.
- The founder's initial technological expertise has been a central factor motivating the creation of the company.
- All those companies host a research department and show to be highly R&D intensive, which can be seen as unusual as compared to other SMEs.
- More importantly, all companies claim to develop a variety of methods to reach for technological knowledge outside the company: from informal techno-watch to formal participation in lengthy standardization processes, up to technology and firm acquisitions. Those companies show therefore an important networking activity, whose methods and aims reflect forms of open innovation.
- At the same time, the companies underline their lack of contacts – if not trust – in universities and research centers (claiming issues of differentiated timing, but also of objectives), as well as they seem to avoid entering any of the EU R&D programs (for reasons of administrative burden, cost effectiveness, slowness, etc.). Such claims illustrate probably the distance between the every day's management of an innovative SME and the perceived accessibility of the local system of innovation and its pillars: the university, the public authorities.
- All together much of those observations point at open innovation behaviors.

On access to financing:

The difficulty of raising enough funding for continuous growth is, in the author's experience, a major reason for failure and disappearance. Disappearance does not origin necessarily in a business model or a technical failure.

- A majority of the interviewed companies rely on their own revenues to fund their commercial and technical development at least in the first years. Raising money is always a difficult task.

1 Puissochet A., 2015. Models of Innovation: Ten cases of successful innovative ICT SMEs in France

2 The notion of first mover did not appear, but it might still be very relevant.

3 For a thorough literature review, see for example: http://faculty.weatherhead.case.edu/carlsson/documents/InnovationSystemsSurveypaper6.pdf

- Financial resources, public as private, look scarce, dispersed, not well suited.
- Public funding seems efficient for the support of start-ups and new companies, and largely focused on R&D. A general statement could be that the companies see public funding of R&D as satisfying. Research tax credit and zero rate lending for R&D are widely used and well appreciated.
- Raising private funds is a more difficult process and especially raising funds for commercial and international development. Most of the private funding observed happened at initial stages of the company and the move towards more ambitious growth seems to be the impossible one.
- IPOs were used successfully, but may take place only after a significant level of company development, and often to support a major strategic move, such as international effort.

On access to market knowledge:

- Understanding the market goes through collaborating with the customer.
- It is done through a diversity of channels and sometimes methods to allow a better understanding of the needs and of the level of acceptance of new technologies.
- With time, such collaboration can become a codified method (design process,…), allowing for faster and more efficient processes.
- Standardization bodies are another way to explore the needs of the customers. Most of the industry consortium work routinely with commercial requirements and use cases.
- Global market knowledge is a very early must, part of the global AND of those companies. It adds a layer of additional complexity to market knowledge management. Local presence and collaboration apparently help.

Contextual aspects probably drive the above features of the model of innovation of the observed companies also. Some observations of the study tend to indicate that those companies behave as Specialized Technology Suppliers, defined as independent specialized hi-tech R&D intensive companies that deliver their technology "on tailored demand" to a variety of customer sectors across the economy. STS act mainly or only as B2B players. They deliver technology under different forms from IPs to products to development services. The move to B2C is difficult but may bring significant reward if successful.

Such companies behave probably in a rather independent way, as compared for example, with technology suppliers that are strongly embedded in large industrial value chains dedicated to a major industry such as the automotive or aeronautics.
Also, the study showed their very relative independence to large multinationals, which are more customers than competitors, due to the specificity of their products, services and markets.

Finally, while occupying a strategic role in the digitalization of the economy as a whole, due to their cross-sector adaptability, those companies seem little integrated in the processes, constraints and benefits of the local and national innovation systems.

Probably, those observations, while they need to be considered with caution[4], still bear some policy implications.

The very diversity of the companies acting as innovators in the economy, illustrated here by a group of Specialized Technology Suppliers, calls for some caution regarding a one-fits-all perspective about ICT innovation.

Access to technological knowledge seems to be a rather well mastered issue in all those companies. The still major role given to in-house R&D should raise attention: the current policy focus on innovation and entrepreneurship, together probably with some disappointment about the growth rate of R&D expenditures in EU during the crisis period might somehow distract policy attention from a subject, - R&D-, which stays at the core of all those companies.

Reversely, the multiple open innovation strategies deployed by the companies confirm a known trend of outreaching and demonstrate the potential diversity in options. Here global reach might be seen as a challenge to (past) policy making. The access to financing stays a pending homework for Europe. The study does not come as a surprise, even though one wonders about the financial fate of all those companies whose global success cannot be challenged. Their survival and growth is to be admired. Their sheer size should be questioned, within the funding constraints to which they have been confronted since their creation.

Market knowledge looks like a major uncertainty to tackle for the innovators. Without market there is no innovation, but only invention. If innovation is at the core of the business model of those companies, commercialization is at the core of the companies' growth. Our cases show this is not a natural path from the start, with high failure potential and expectable "valley of death" when it comes to adapt to what the market will really take-up. For policy makers this cannot be seen only as an issue of public procurement. It might be an issue of financing, of timing, of coaching or of global outreach. Many would say, among the interviewees, it is also a question of luck and serendipity.

In any case it looks like a little explored aspect of policy support to new and to experimented entrepreneurs confronted to demand, to competitors, to pricing issues and to global reach.

The full report will be soon available at http://is.jrc.ec.europa.eu/pages/ISG/EURIPIDIS/EURIPIDIS.index.html ■

4 As a qualitative study cannot claim for generalisation

http://www.starbus.org/ws9

Update on Preparations

Since the Announcement & Call that was published in the Spring NL Issue, significant progress has been made regarding the organization and program of this event.

Hotel IBIS Warszawa Stare Miasto (Old Town) was chosen as the conference venue.

Based on the submitted proposals the program is maturing with confirmed presentations within the scope of the three conference topics

- **National Strategies, Policies and Action Plans**
- **Industry, Innovation and Take-up**
- **Skills and e-Leadership**

The program will be posted in due time on the conference website. We publish below short abstracts of 3 scheduled keynotes for a glimpse on some of the issues that will be debated. The conference website is regularly updated for further developments.

Keynote: **E-skills and e-leadership for the digital scenario**
Bruno Lamborghini, AICA Chairman and EITO COB

The digital scenario of which we see now only the tip of the iceberg is driven by new forms of social and human evolution based on wide diffusion in all activities and people life of global communication networks, machines to machines environments, Big (Open) Data systems, knowledge sharing, open innovation, virtualization of exchanges.

To avoid disruptive change with risks of losing control, we need, from now on, to deeply invest in new e-skills and e-leadership competences, preparing young and senior people through lifelong education and training based on the right technology use, but more and more on social consciousness, security issues, ethics and self responsibility.

Even if the digital scenario is a global scenario where many cultures and approaches are converging every day more, I believe that the European countries have a major role to play and a major responsibility to define some of the rules of the new digital game following the European cultural heritage and our specific human values to promote humanistic informatics and shaping a more favorable digital living environment.

We expect and we have to do any effort in order that the European Union can take the lead in driving the new conditions and the route of what will happen in the digital scenario of the next future.

The European Computer Associations have to represent the core of this effort and we should commit ourselves in promoting lifelong education for preparing the right e-skills and e-leadership competences for managing companies and public institutions towards a social and humanistic digital scenario. ■

Keynote: **From Smart Items to successful business models – value adding applications with the Internet of Things**
Martin Przewloka, Senior Vice-President at SAP SE

There is hardly anyone who still doubts: the Internet of Things will change our lives radically. In this context, we are bombarded with countless trends and concepts, such as Industry 4.0 or Advanced Manufacturing, Tele-Medicine, Cyber Physical Systems, etc. And moreover, everything becomes smart: Smart Items, Smart Grids, Smart Buildings, just to name a few. Technology is advancing rapidly and seems to know no bounds, but why do we see so few disruptive innovations that really change the things? Why is it so hard to establish new applications and business models and what we must do to achieve this?

In this keynote, paths are presented how new application areas were developed faster and how they can be successfully brought to the market. Using concrete examples and projects, the methods and experience of SAP, as a global

industrial company, are described to develop new market segments in the Internet of Things. Attention is paid both on technological aspects as well as to new types of business models in the next generation Internet. ■

Keynote: **Digital competencies - do we appreciate their role and importance?**
Włodzimierz Marciński, Plenipotentiary of the Polish Minister for the development of digital competences in administration

Digital technologies form a natural symbiosis with a number of realms of our activities. We develop them and they in turn change our lives. These relationships are stable and no doubt will be deepened. We are still at the beginning of even greater social change, which will become the result of constant development of digital technology.

E-skills, especially most advanced ones, have become in high demand worldwide, even in industries seemingly not directly related to the IT sector. Effective implementation of digital technology directly translates into an increase of the GDP level. However, you can be a passive consumer of the achievements of the digital world but you can also be their creator.

How effectively and rationally this potential of this world will be used depends on us, on our knowledge, skills and attitudes.

Today in Poland digital literacy is very polarized. We have quite a big group of programmers winning the highest awards in international contests and competitions. Giants of the digital market such as IBM, HP, Motorola, Intel, Samsung, Google, Huawei and Accenture opened development centers in our country employing large number of Polish specialists.

But at the same time the European and global digital literacy studies for our society are not impressive. To change this the Broad Alliance for Digital Skills Development was established. It operates under the patronage of the President and aims to inspire and support activities leading to digital education, effective use of digital technology and the acceptance of change caused by the constant development. ■

What is a Mathematical Machine? – A Brief History of Early Computing in Poland [1]

Marek Holynski

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

On December 23, 1948 the weather in Warsaw was particularly bad. Wet snow continued to fall as the inhabitants of the ruined city desperately tried to salvage what they could of their holidays with a meager meal for their family.

Only a small group of people seemed untroubled by the worries of the upcoming celebrations. These were attendees of a seminar on electronic calculating machines, listening to a talk given by Prof. Kazimierz Kuratowski.

Kazimierz Kuratowski

Kuratowski was a renowned topologist and director of the Institute of Mathematics in the Polish Academy of Sciences. He had just returned from a lecture in the United States, where he was shown ENIAC, the first electronic general-purpose computer, dubbed in the press as “the giant brain”. His excitement about the newly built machine gave the listeners great motivation to pursue a similar project and led to the immediate formation of a research team.

Thus, the new research team, later officially named the Mathematical Apparatuses Group, began building their

1 © IT STAR – Paper published in History of Computing (Proceedings of the 8th IT STAR WS on History of Computing) – IT STAR Series Vol.7 – ISBN 978-88-98091-34-8

own computer, despite having access to very limited resources. The researchers, who were barely surviving on the food parcels from post-WWII international relief agencies and wore leaky boots, did not have access to the proper equipment, parts, or even premises to pursue their endeavors. Moreover, the new American advancements in relevant fields were not often shared with the public, much less other countries, due to their applications in the military. Even those that were released did not often reach Poland, as a result of the Iron Curtain.

Analog or Digital?

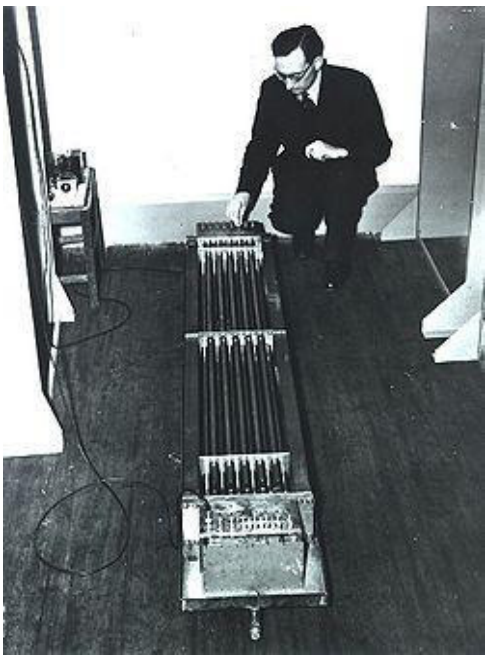
The Mathematical Apparatuses Group was provided three rooms at the Institute and for quite a while their work remained only on paper. Their first attempts to deal with real devices did not bring the significant results. For each damaged module they repaired, another one was breaking down, and the process would repeat itself.

Finally, in 1953 they were able to get something working: an analog machine built with 400 vacuum tubes, which was called the Differential Equations Analyzer. It was able to solve complex differential equations with very high accuracy and was used for a number of practical applications, including the design of turbines and aircrafts.

Differential Equations Analyzer

The next project was completed in 1955. The Electronic Machine for Automatic Calculations was able to perform 2000 additions or subtractions, 450 multiplications and 230 divisions per second, using an analog technology that operated on 1000 vacuum tubes. The solution, which allowed for the "fast" memory of this machine relied on a number of glass tubes filled with mercury, which often times were not sealed properly, resulting in a health hazard.

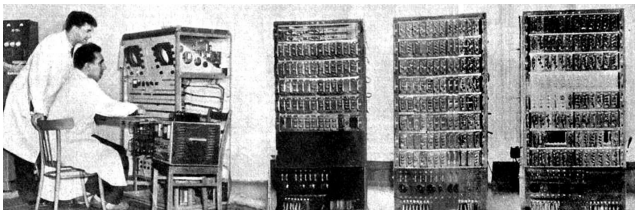
According to an anecdote passed from one generation of computer scientists to the next, one of the team members was reminded of a commonly used item made of latex that had the perfect dimensions for sealing the glass tubes. While the saleswomen at the pharmacy were not particularly surprised when he requested one hundred pieces, they were taken aback by the request to invoice these highly personal items to the Polish Academy of Sciences.



Mercury memory of the Electronic Machine for Automatic Calculations

From ABC to XYZ

In order to consolidate the existing research and design efforts, the Polish Academy of Sciences established the independent Mathematical Apparatuses Division (Zakład Aparatów Matematycznych – ZAM) in 1957. It was there that, in autumn of 1958, the first Polish electronic digital machine was launched with the name **XYZ**.

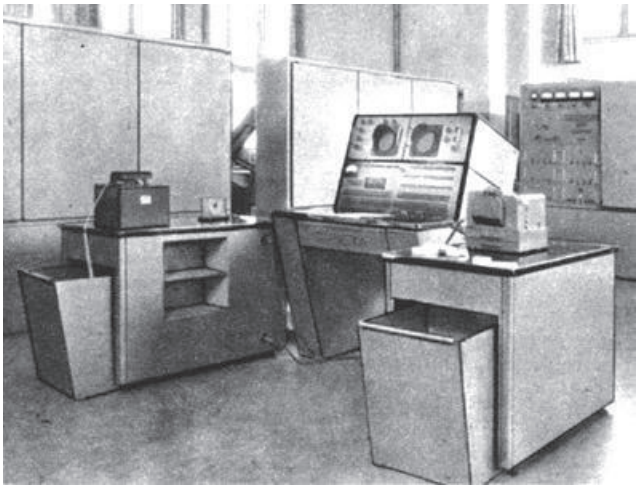


XYZ digital computer

It used 400 tubes and 2000 diodes, flip-flops on one triode, had drum memory and punched cards for input and output. It could perform up to 1000 arithmetic operations per second and had an internal binary language with symbolic addressing. The head of the team, Prof. Leon Lukaszewicz, when asked by journalists why the machine was named XYZ, would answer: "Well, the version we started with was called ABC".

Leon Lukaszewicz

At that time, commercial applications for such an efficient machine had just begun to emerge. In 1960 the first unit of ZAM-2 was built. It improved on the previous versions by including 600 kb of memory, teletype, a paper tape reader, and being suitable for mass production.



ZAM-2

The Mathematical Apparatuses Division, which by 1962 was operating out of its own building, began its transformation into the **Institute of Mathematical Machines** (Instytut Maszyn Matematycznych – IMM). In order to maintain the tradition, the Institute exists to this day under the old name, despite the burden of facing continuous inquiries (especially from younger generations) about what mathematical machines really are.

The word "computer" was only allowed to appear in the Polish language fairly late -- in the mid 70s. Before, it was routinely replaced by the censors' office with the phrase "electronic calculating machine", a compulsory copy from the Russian term for computers.

Instytut Maszyn Matematycznych

The end of pioneering

The new Institute continued ZAM's series with ZAM-3 and ZAM-21 (launched in 1965). The last of them, ZAM-41, was not far from the contemporary notion of a computer - it performed 30,000 fixed-point operations per second, was equipped with a tape memory, line printer and other peripherals. Its production started in 1966. IMM later became responsible for building mainframes R-30 and R-32, the Polish contribution to the "Unified System of Electronic Computers" released in the Comecon countries and ZAM line had to be dropped.

ZAM-41

With the advent of minicomputers, IMM became a strong center for designing and manufacturing such systems like Momik 8b, Mera, K-202, and Mazovia, as well as various peripheral devices. In the late 60s, however, numerous other research centers became involved in constructing, producing and using computers for different applications ultimately ending the pioneering era of Polish research in computing.

Mera-400

K-202 ■

People

Anniversaries

IT STAR warmly congratulates *Kiril Boyanov* and *Balint Domolki* on the occasion of their 80th Anniversaries – Kiril turned 80 on 22 February, and Balint's anniversary is on 11 July 2015.

We are profoundly grateful for their contributions, support and friendship, and wish them all the best of health and happiness for many years to come.

The Editor

Kiril Boyanov *is Full Member of the Bulgarian Academy of Sciences (BAS) and Bulgarian representative to IT STAR. He has provided leadership within the Bulgarian ICT industry and in ICT R&D, notably as Director of the Institute of Parallel Processing (now Institute on Information and Communication Technology), at BAS.*

Balint Domolki *was member of the team that built the first electronic computer in Hungary. He held leading positions in the software industry, including Managing Director and Chairman of the Board of IQSOFT, and represented Hungary in various IFIP bodies. He is Honorary Chairman of the John von Neumann Computer Society and its representative to IT STAR.*

On the occasion of their jubilees we invited them to respond to two questions and here is what they had to say:

Q 1. If you have to single out ONE personal achievement you are particularly fond of, which one would that be?

Kiril Boyanov: I proposed methods for modeling on micro-operation level, which were further developed by the introduction of the term "imitation". Simulation methods for investigation and control of the functioning of computing systems and devices were created on that base. Software and hardware imitators can test systems, where the functioning of some devices, which are not included in the system, are imitated. On this base systems for automatization of computer design were created.

Balint Domolki: Having spent most of my career at the managerial (rather than the academic) side of the IT profession, it would not be appropriate to mention an early programming algorithm, gaining considerable popularity in the 60s. So, I would rather single out my role in the development of the software industry and ICT policies in Hungary. Closest to heart, however, are my recent activities in organizing the preservation of values in the history of Hungarian computing.

Q 2. If you were asked by your prime minister about ICT strategy, what would you prioritize?

Kiril Boyanov: Information and communication technologies must be amongst the top priorities in the development of the economy in our country. They are not product and energy consuming, they are environmentally clean, their products are easily transported and the marketing and service are amongst the cheapest. The value added there is the intellect, and Bulgaria has the experience and opportunities to generate specialists possessing high intelligence.

***Balint Domolki*:** My advice to any prime minister can be expressed in three simple words: "Leave ICT alone!". Since my belief is, that in a field developing as fast as ICT does, advances can be best driven by the market forces of free competition, not to be distorted by any kind of government intervention. ■

Obituary

It is with deep sadness that we announce the passing of **Clementina Marinoni** on 10 April 2015.

Clementina was head of the HR Project Department at Fondazione Politecnico di Milano. She served as methodological leader of a series of European e-Competence Framework (e-CF) projects and other related activities of the CEN Workshop on ICT Skills and has made an enormous contribution to the European ICT Skills Agenda.

Clementina was a contributor to this Newsletter, and the IT STAR Community met her during the 5th IT STAR Workshop on Electronic Business in November 2010 in Zagreb, Croatia, as speaker on e-CF in SMEs.

A commemorative service was held on 13 April at the San Giuseppe Lavoratore Church in Milan.

Member Society News & Events

Austria

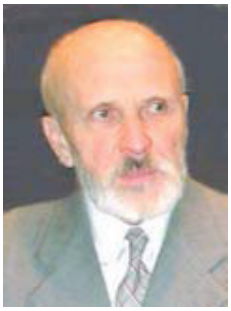
Congratulations to the Austrian Computer Society (OCG) on the occasion of its 40 Anniversary!

Festivities are scheduled in conjunction with the OCG annual 2015 conference, scheduled for 8 – 10 June in Vienna. The program of activities is posted at http://www.ocg.at/jv15. ■

Lithuania

Contest for the most Beautiful Lithuanian International Domain Name (IDN)

Gintautas Grigas



Assoc. Prof. Dr. Gintautas Grigas *is an emeritus senior researcher at the Informatics Methodology Department, Institute of Mathematics and Informatics (IMI). He is a founder of the Extramural School of Young programmers in 1981, former head of the Programming Methodology Department of IMI, author of 30 books on Programming, Programming languages, teaching informatics (three books translated into Russian, one in Polish) and author of some 100 scientific papers and numerous science popularization articles.*

Each nation has a number of beautiful names of its villages, towns and cities, as well as streets, squares, and avenues. Their names were moulded by centuries. Care was taken to ensure their consistency and linguistic correctness. Now we are increasingly advancing to the virtual space with its virtual settlements – web pages, websites and portals. Which names we may choose for them, and are we choosing them actually? Are we properly exploiting possibilities offered by advanced information technologies?

The Internet was born in the United States. This was the reason to use only 26 English (ASCII) letters in the Internet domain names for a long time. It was enough for English speaking people, but it wasn't comfortable for the speakers of other languages because they haven't possibility to use many names of institutions, organisations, people names, place names, and other necessary words in the online addresses. So it was searched for ways to use letters of any script in domain names and to turn the Internet into a truly international virtual space.

The first target for reforms was the second level domain names, i.e. those which stand before top level domain name (before .lt, .pl, .org, .com, etc.). In March 2003 the normative documents RFC 3490, RFC 3491, and RFC 3492 regulating usage of a second level International Domain Names (IDN), i.e. those containing non-ASCII letters, were approved. After that the registration of IDN's was prepared and started in various countries.

The registration of Lithuanian IDN's in the domain .lt has started on March 30, 2004. On commemoration of tenth anniversary of this date, in 2014 the Lithuanian Computer Society together with association "Infobalt", Domain registry service "Domreg.lt", and the State Commission of the Lithuanian Language organised the Contest for the most beautiful Lithuanian international domain name (IDN) containing language specific letters (ą, č, ę, ė, į, š, ų, ū, ž). Voting was carried out on the news portal "Delfi". The winner of the Contest was the kindergarten website "Klaužada.lt" (the word "klaužada" is oposition to a naughty child; there is no direct translation into English). A little behind – "Žvaigždutė.lt" (a diminutive for the word "star", the name of a popular Lithuanian song), and "Žalgiris.lt" (the name of the legendary Lithuanian basketball team).

The Contest accelerated the Lithuanian IDN's registration. 538 new Lithuanian names have been registered during a year (from March 2014 to March 2015). This has encouraged organizing the Contest this year again. The winner was "Voveraitė.lt" (squirrel), the website of the Sport hall in Telšiai. A little behind – an exotic name "Nebeprisikiškiakopūsteliaujantiesiems.lt". It's the longest (37 letters) properly composed Lithuanian word that may be roughly

translated into English by the following phrase: “for those who no longer manage then gather wood sorrels.” Overall, beautiful and liked names have a poetic nature or historical roots. Thus, in many cases it is difficult to translate them in such a way that they would provoke an adequate impression for a speaker of another language.

We hope this Contest will grow into an annual tradition, and March 30 will be marked as a Day of Lithuanian IDN’s.

It is interesting to know which domain names are popular in other languages. We will be happy to see similar contests in other countries. ■

Slovenia

Slovenian Society INFORMATIKA: Promoting Informatics

Niko Schlamberger, SSI President

***Niko Schlamberger** is President of the Slovenian Society INFORMATIKA. He has served the International ICT Community in various functions including IT STAR Coordinator, IFIP Vice-President and CEPIS President.*

Slovenian Society INFORMATIKA carries out its mission in various ways, one of which is organizing conferences. As the space does not allow for a more extensive explanation about why and how, let me mention just two such events.

Conference *Informatics in Public Administration* is a successor to a conference of a similar content and has taken place in December 2014 in Brdo pri Kranju for the sixth time (www.iju2014.si). The bottom line is that government is in itself probably the biggest information system as its main deliverables are services related to enable citizens to execute their rights, and to the well being of the population at large. Obviously, for such a system to be efficient it is inevitable to make use of modern information technology. The number of informatics professionals in the government and practically all public servants depending on their services more than justify such an event that has been visited by 400+ participants. The slogan of the conference *The Sun From behind the Cloud* in itself informs about the center of gravity of the content. The conference is interesting also for information technology commodities providers, which want to be up-to-date with plans of the public sector. The other important emphasis was devoted to the then emerging strategy of development of public administration. During two days it was also possible to get acquainted with the service supply and future plans of various government offices.

H.E. Boris Koprivnikar, Minister of Public Administration and Vice Prime Minister at the ceremonial opening of IJU 2014

Days of Slovenian Informatics (www.dsi2015.si) is another event of the kind. It has taken place in April 2015 for the twenty-second time in the enjoyable setting of the Slovenian seaside in Portorož. The slogan *Informatics: Today We Are Developing for Tomorrow* summarized the contents of the conference, namely, to be able to keep the competitive edge we need to be aware of what is likely to be the mainstream in the future. But there is more to it than just that. The conference has from more than two decades undergone an evolution process, the result of which reflects its present form. The main innovations are the half-day pre-conference and a special slogan for each conference day.

The conference has gained the reputation of the most important independent professional event of its kind. For its business potential it is also appreciated and supported by executives of IT goods and services providers.

Both events are also an opportunity to promote the importance of digital literacy. In workshops, participants were provided the possibility to take demo tests of several modules of the European computer driving license. The results were convincing to prove that ECDL or an equivalent certificate should be a requirement for employment.

SSI President Niko Schlamberger during the opening ceremony of DSI 2015 ■

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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e-mail: boyanov@acad.bg
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