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**40 YEARS OF COMPUTERS IN ALBANIA**

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# The Beginning – 1971

- Center of Mathematical Calculus
  - Part of Chair of Mathematics of University of Tirana
  - In 1973 included in the new Academy of Sciences
  - Three Chinese computers (transistor technology)
    - Digital **X-2** (used until 1985)
    - Digital **DJS-7**
    - Analogue **DMJ-3A**
  - Programmed in Algol60 and processor commands
  - Training in PR of China

# Computer X-2

- transistor based digital computer
- memory of 8192 magnetic rings words of 42 bit
- magnetic drums of 16384 words each
- two input devices for perforated paper tape
- a cylinder line printer
- commanding console



# Computer DJS-7

- transistor based digital computer
- central memory of 4096 magnetic rings words of 21 bits
- magnetic drum, 16,384 words, Algol60 compiler resided
- input device with perforated paper tape
- teleprinter as output device
- when the X-2 was equipped with Algol60, DJS7 resulted obsolete and abandoned

# Computer DMJ-3A

- analogue computer, composed from ...
- ... 40 electronic integration and summation circuits
  - could be combined manually with each other in complex schemes with the aid of a panel with removable plugs ...
  - so equation of resulting complex circuit be the same as the equation of the physical process to simulate
  - measuring electrical processes in this circuit helped to obtain a solution for the physical process in question
- practically not used ...

# Computer DJS-21

- a new computer in 1975 – DJS21
- memory of 16192 words of 42 bits (only 8096 words used by the programmer)
- two magnetic drums and four magnetic tape devices
- a simple printer (one number per line)
- combination of the console and teletype
  - interruptions system and a very simple operating system
- Algol60 of DJS21 didn't have procedures for tapes
  - in 1979 Kristan Bukuroshi wrote tape procedures

# Other Computing Centers

- Center of Financial Calculus (accounting)
- Center of Calculus of Institute of Oil and Gas
- Military Center of Calculus (?)

# Problematics

- Application of mathematical methods
  - geology and geophysics
  - electrical energetic system
  - civil engineering
  - agriculture and health care
  - Optimization
  - Registration of population and houses
- In geophysics, energetics and civil engineering computing became standard procedure



# Era of Informatics

- The experience gained pushed government for a new UNDP project for engineering and economy
- In practice economic problems neglected due to their “correlation” with political and ideologic issues
- Engineering problems dominated the development

# New Network in 1985

- UNDP project managed by UNESCO
- Metropolitan network of 50 terminals
- Two mainframes DPS-7 and three MINI-6
- CII Honeywell Bull France (later Bull France)
- Intense training in France
- Pilot projects from application areas

# Mainframes DPS-7

- Integrated circuits technology
- Memory 2 + 6 MB
- Removable disks of 200 MB
- Magnetic tapes of 60 MB
- Line printers and one pen plotter
- Operating system GCOS64 and GCS7
- Fortran, Cobol, Pascal and GPL

# New INIMA

- Old Center of Mathematical Calculus transformed in Institute of Informatics and Applied Mathematics (INIMA)
- Continuation of engineering problems
- Databases: technical documentation and some political stuff – written works of the leader
- Economical problems: requested but not applied because of ideology

# Education in Informatics

- First Chair of Informatics in Faculty of Natural Sciences of University of Tirana
- First 5-year studies on informatics in 1985
- Short and long term post-university studies for other specialists
- Teaching of bases of informatics and programming in most of faculties
- Mixed mathematics-informatics dissertations

# Survival and Internet

- Political system overturned in early nineties
- Economic difficulties – network abandoned
- New implementations – Ethernet and TCP/IP
- Proposals for new networks failed
  - Tendencies for monopolization
  - Development delayed for ten years
- Private ISP started only in 1998

# Nineties

- INIMA involved in
  - EU projects ETCETERA, HANNIBAL, ESATT+
  - Collaboration with Italian companies
    - Digitalization of Italian real estate database
    - 1,000 working places
  - Beginning with Internet services
- Section of Computers in Faculty of Electrical Engineering
- Survival during riots of 1997 ...

# New Millennium

- The World Bank project for Y2K
- Tentatives for the NREN failed
  - project from Italy implemented but not functional
- Involvement in Framework projects
  - SEEREN for regional networking
  - SEE-GRID for regional grid network
  - HP-SEE for parallel processing and applications
- Lack of sustainability due to missing local funds



# Chaos in R&D

- Frequent changes of legislation for education and research
- Reform of 2007 removed institutes from the Academy, INIMA dissolved replaced by NAIS
- Proposed reform in 2014 aims returning of parts of institutes in Academy
- Justification by problems not not causes
- Attention to agencies but not laboratories

# Political Problems

- Implementation of ICT fueled by political conditions and not real requirements
- Significant but problematic development
  - Govnet infrastructure (NAIS) in reality partly controlled by private companies and Microsoft
    - Policy of INIMA was to build systems by itself
- Funding for education and research not stable
  - More on infrastructure but less on content
- An example of “cargo cult” ...

Thank You