Russian Academy of Sciences
Program Systems Institute

The Program Systems Institute of the Russian Academy of Sciences

The Program Systems Institute of RAS is a leading Russian research institution in the realm of infor-mation technologies.

The Institute was founded in 1984 as a branch of the Institute for Cybernetics Problems of the Academy of Sciences of the USSR by a decree issued by the government of the USSR. The foundation aimed at developing of computer science in the country. In 1986 the Institute was reorganized and named the Program Systems Institute of the USSR Academy of Sciences. Today's PSI RAS has a number of acknowledged achievements in the fields of artificial intelligence, highend computer systems (super-computers), regional telecommunication networks building, and distributed information systems.

Professor Alfred Aylamazyan, Founder and first Director of PSI RAS, Pereslavl Honorary Freeman, Doctor of Science

The Program Systems Institute is formed of five research centers which employ 100 researchers including two academicians of RAS and RANS, 14 doctors of science, and 20 Ph.Ds.

The Program Systems Institute initiated the establishment of a unique scientific and educational complex in Russia including

- the Aylamazyan University of Pereslavl — the first Russian nongovernment university created in a small town;
- the Aylamazyan International Children's Computer Center;
- kindergarten, primary school "Pochemouchka".

Artificial Intelligence Research Center

- Methods of representation and mining of knowledge by intelligent systems
- Methods of semantic search and analysis of semi-structured data
- Dynamic intelligent systems and software tools in building dynamic systems that use expert and empirical data
- Methods of intelligent control over complex systems behavior in a dynamic environment
- Software tools for managing complex movements and procuring secure convergence and concatenation of complex technical objects
- Bit-parallel algorithms and computational structures
- *www.botik.ru/PSI/AIReC*

Medical Informatics Research Center

- Information technologies of treatment and diagnostics support
- Modeling of medical institution activities
- Conceptual models of automated support of patient's electronic Medical Card
- Conceptual models of visualization of medical information
- Implementation of the Interin PROMIS medical information system for large-scale medical institutions
  www.interin.ru

Control Processes Research Center

- The extension principle in control theory
- Algorithms and software tools for modeling and control
- Aircraft flight optimization
- System analysis of regional development strategies. Innovative processes control
  www.botik.ru/PSI/CPRC

Russian Academy of Sciences
ProgramSystems Institute

Research Center for Multiprocessor Systems

- Supercomputer and multiprocessor software
- Functional programming, supercompilation and metacomputation theories, and their applications to practical programming
- Differential geometry and the Vasiliev knot invariants theory
- Technologies for building regional computer networks
- Computer-assisted and distance learning
  www.botik.ru/PSI/RCMS

System Analysis Research Center

- Optimal control methods for irreversible thermodynamic systems and estimations of extreme performance of these systems
- Mathematical models and optimal processes in irreversible microeconomics
- Optimal control of temperature fields and energy saving problems (cooling in supercomputers, energy saving in house-building)
- Problem on equivalence of differential equations
- Geometrical conditions of solvability of convolution equations
  www.botik.ru/PSI/SARC

APPLICATION SOFTWARE

The INTERIN Integrated Distributed Information System for Medical Institutions — an integrated information and functional environment incorporating the elements of different types of medical information systems. The system provides information integration and complex informatization of medical institutions, from documents circulation and financial accounting to clinic data management, integration with medical equipment, and decision-making support.

The SKIF Supercomputer Program of the Russia and Belorus Union State — a family of high-performance computer systems as well as software (including the T-system — a piece of software for multiprocessors utilizing the concept of "automatic dynamic program parallelization") and application systems for them. 16 sample computers of the SKIF family have been developed. In November 2004, one of them, the SKIF-1000 supercomputer, was ranked 98th among the world's TOP500 Supercomputers and 1st among the Russian 50 most powerful computers with the 2.5 Tflops peak performance.

The SIMER+MIR Technology for building distributed intelligent systems — an integrated suite of software tools maintaining all generation stages of integrated distributed systems and adapting them for application problem solving.

Intelligent Systems Applications:

- Intelligent distributed systems for decision making support in estimation, forecasting, and allocation of resources (for example: fish resources the in Caspian, Azov and Black Sea basins)
- The SIRIUS intelligent metasearch engine
- The InEx data mining system
- The ACTIS text classification system

The BOTIK Telecommunication System in Pereslavl-Zalessky provides enterprises, organizations and private persons with permanent high-speed network connections (100 Mbps backbone, 10–100 Mbps at subscibers) at a reasonable price. BOTIK has more than 700 subscribers (organizations and private individuals) and over 2,500 networked computers in a town of 45,000 inhabitants. BOTIK technical solutions for building cost-effective urban networks have been implemented in several regions of Russia and CIS countries: Almaty, Kazakhstan (*www.samal.kz*); Moscow (*www.urbannet.ru*); Ramenskoye district, Moscow (*www.aviel.ru*), and others.

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