

特 集：ロシアのIT産業 その1

今号と次号にわたり、ロシアのIT産業の現状をご報告いたします。

現在ロシアのIT産業は大きく成長しつつあり、昨年2001年のIT市場もプラス成長を遂げました。今号では基礎研究を行う研究機関をご紹介します、次号では海外からの発注を受けてソフト開発を行うベンチャー企業をご紹介します。

1. 概観：ロシアのIT産業	1
2. IT産業関連研究機関	
①ドロドニツィン・コンピューターセンター（モスクワ）	2
②プログラムシステム研究所（モスクワ州ペレスラヴリ・サリエスキー）	5
③高性能コンピューター・データベース研究所（サンクト・ペテルブルグ）	8
④情報問題研究所（モスクワ）	11
⑤情報伝達問題研究所（モスクワ）	14
⑥システムプログラミング研究所（モスクワ）	17
⑦インフォメーション・オートメーション研究所 （サンクト・ペテルブルグ）	19
⑧映像処理システム研究所（サマーラ）	24
⑨ニューロコンピューター研究センター（モスクワ）	27

1. 概観：ロシアのIT産業

西側に比べればまだ大きく遅れているが、ロシアにおいても社会の情報化が急速に進行中であり、IT産業も新しい産業分野としてダイナミックに成長しつつある。

ロシアのIT市場の規模は2001年で30億ドル強と見られる。2001年は多くの国でIT市場がマイナス成長だったが、ロシアは対前年比プラス25%である。

海外からの発注を受けてソフト開発を行なうベンチャー企業も増えているが、その紹介は次号で行なうこととし、今号では基礎研究所の状況を報告する。

研究機関は国立のものが多く、情報加工と情報伝達に関する新たな方法や原理を研究している。

限られた予算を有効に使うために、優先分野が定められているが、その「ITとエレクトロニクス」の項目は次の通りである。

パラレル・マルチプロセスコンピューター

高速コンピューター

ニューロコンピューター、トランスピューター、オプト・コンピューター

CAD

言語・テキスト・画像認識および合成システム

人工知能、バーチャル・リアリティ

情報通信

数学モデルシステム

マイクロシステムとマイクロセンサー

SLICとナノエレクトロニクス、量子コンピューター

オプト・ラジオ・音響エレクトロニクス、光通信、超高周波通信

クリオエレクトロニクス

研究機関はこれらの研究を行なうと同時に、応用的な開発も行なっている。そうしなければ、国家予算だけでは研究所の維持も、優秀な人材の確保もできないからだ。

これらの研究機関の多くはロシア科学アカデミーに属しており、科学アカデミーにはこの分野を管理するために、情報コンピューター部が新設された。同部が所管する研究機関の数は20を超える。

研究機関にはロシア基礎研究ファンドから研究費が支給される。

国際的なプロジェクトにも数多く参加していることから、これら研究機関のレベルは十分に高いことが推測される。

これら研究機関がバイオ、化学、医学といった他の分野の研究機関と共同でプログラム開発を行なうような例も見られる。

2 . I T 産業関連研究機関

ドロドニツィン・コンピューターセンター（モスクワ） Dorodnicyn Computing Centre of the Russian Academy of Sciences

I. Name of the Institute (Organization).

In Russian: Вычислительный центр имени А. А. Дородницына Российской академии наук

In Russian abbreviation: ВЦ РАН

In English: Dorodnicyn Computing Centre of the Russian Academy of Sciences

In English Abbreviation: CC RAS

II. Location.

Official address: Vavilov st. 40, 119991 Moscow GSP-1, Russia

Mail address: Vavilov st. 40, 119991 Moscow GSP-1, Russia

Tel.: +7 (095) 135-0020, 135-3229

Fax: +7 (095) 135-6159

E-mail: wcan@ccas.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about one and half hour by car.

III. History.

Computing Centre RAS (established in 1955) is a leading research institute of the Russian Academy of Sciences engaged in developing computational methods, software, mathematical models and applying them to various fields of science and technology.

The Computing Centre issues scientific proceedings on the above subjects. Starting from 1960 one of the most prestigious journals, "Journal of Computational Mathematics and Mathematical Physics", has been published by the Computing Centre. This journal is translated into English and is well known in the world. Researchers publish their results in many other Russian and international scientific journals as well.

IV. Management.

Kind of organization: Research Center

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director – Corresponding Member RAS, Professor Yu. G. Evstushenko

Secretary for International Scientific Cooperation - Dr. A.I.Derzhavina

VI. Organization chart.

Scientific Divisions of the Computing Centre of the Russian Academy of Sciences:

Mechanics and Mathematical Physics:

- Department of Computational Methods;
- Department of Continuum Mechanics;
- Department of Computational Physics;
- Department of Applied Mathematical Physics;
- Center of Supercomputer and Massively Parallel Applications;
- Department of Mechanics:
 - Subdepartment of Theory of Stability and Mechanics of Control Systems;
 - Subdepartment of Kinetic Theory of Gases;
- Department of Nonlinear Methods.

Formatics and Mathematical Cybernetics:

- Department of Mathematical Pattern Recognition and Methods of Combinatorial Analysis:
 - Subdepartment of Digital Signal Processing and Speech Recognition;
- Department of Computational Forecasting Methods:
 - Subdepartment of Mathematical Modeling in Ecology and Medicine;
- Department of Applied Intelligent Systems;
- Department of Applied Optimization Problems;
- Department of CAD Methods for Developing Systems;
- Department of Mathematical Modeling of Conflict Situations;
- Department of Modeling Systems;
- Department of Operations Research; Department of Reliability and Stability Problems.

Divisions of Mathematical Modeling of Systems and Decisions:

- Department of Mathematical Modeling of CAD Systems:
 - Subdepartment of Real-Time CAD Systems;
- Department of Imitation Systems;
- Department of Mathematical Modeling of Technical Systems;
- Department of Computational and Information Systems.

Mathematical and Programming Software:

- Department of Software Engineering;
- Department of Complex Systems;
- Department of Scientific Information.

Computational Technique:

- Department of Computational Systems and Nets;

VII. Current major activities.

The main research and application areas of the Computing Centre are as follows:

- Computational Fluid Dynamics;
- Mathematical Physics;
- Mathematical Modeling of Climatic Ecological Processes and other Nonlinear Phenomena;
- Mechanics of Solid Bodies. Elastic-Plastic Problems;
- Pattern Recognition and Image Analysis;
- Computer Aided Design;
- Optimization Methods. Linear and Nonlinear Programming;
- Analytical Mechanics and Lyapunov's Stability of Motion;
- Dynamics of Rigid Bodies. Space Dynamics;
- Interactive Optimization and Decision Support Systems;
- Parallel Computing;
- Artificial Intelligence. Expert Systems. Applied Intelligent Systems;
- Mathematical Modeling of Economic Processes; Development of Software.

プログラムシステム研究所
(モスクワ州ペレスラヴリ・ザリエスキー)
**Program Systems Institute of the Russian Academy of
Sciences**

I. Name of the Institute (Organization).

In Russian: Институт программных систем Российской Академии Наук

In Russian abbreviation: ИПС РАН

In English: Program Systems Institute of the Russian Academy of Science

In English Abbreviation: PSI RAS

II. Location.

Official address: Program Systems Institute, Pereslavl-Zalessky, 152020, Russia

Mail address: Program Systems Institute, Pereslavl-Zalessky, 152020, Russia

Tel.: +7 (08535) 20593

Fax: +7 (08535) 20593

E-mail: psi@botik.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about four hour by car.

III. History.

The Program Systems Institute of the RAS was established in 1984. Now, it is one of the leading research institutes in the field of modern information technologies.

At present, the Program Systems Institute has achieved significant results in the field of artificial intelligence, parallel calculations, technologies of constructing regional telecommunication networks, distributed intelligent systems.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Science

V. Executives.

Director: Professor, Academician of RANS, Doctor Sc. (Eng.) Alfred K. Ailamazian.

VI. Number of employee.

More than 100 experts work in the Institute's research centers, among them three Academicians of the RAS and RANS, 12 Doctors and 33 Candidates of Sciences.

VI. Organization chart.

Organization of the Institute:

- Research Center for Multiprocessor Systems;
- Telecommunication Laboratory BOTIK;
- Distance Learning Laboratory;
- Artificial Intelligence Research Center;
- Medical Informatics Research Center;
- Control Processes Research Center;
- System Analysis and Computers in Education Research Center.

VII. Current major activities.

Artificial Intelligence Research Center:

- Methods of computer-aided instruction, and the technology of acquiring and representing knowledge by intelligent systems;
- Methods of computer-aided simulation of reasoning based on argumentation and precedents;
- Distributed intelligent systems for solving tasks of estimating conditions, forecasting and simulating reserves of quoted resources;
- Methods semantic analysis and classification of documents;
- Means of search and semantically-oriented selection of information in global networks;
- Methods of intelligent control of complex systems' behavior in dynamic environment;
- Software for controlling complex movements and safe drawing together and jointing of technical facilities;
- Software tools for knowledge-based distributed integrated dynamic systems.

Medical Informatics Research Center:

- Information technologies for supporting medical and diagnostic procedures;
- Simulation of activity of patient care institutions and their associating;
- Conceptual models of medical information visual representation;
- Conceptual models of a common electronic medical card using special methods of representing a subject;
- Realization of a standard medical information system INTERIN of a large-scale enterprise;

System Analysis and Computers in Education Research Center:

- Mathematical models of complex systems' limited capabilities based on methods of averaged optimization;
- Software for developing training simulators in industry and higher schools.

Research Center for Multiprocessor Systems:

- Software for multiprocessors;
- Functional programming, development of the theory of supercompilation and metacomputation, methods of their application in hands-on programming;
- Differential geometry, the Vasiliev's invariant theory for units, algebraical topology, graph theory, computer algebra;
- Technology of constructing regional telecommunication systems;
- Methods of using computer facilities and computer networks in all forms of all levels of education.

Control Processes Research Center:

- Expansion principle in management theory;
- Geometric theory of controllability and invariance;
- Algorithms and software environment for simulating and control;
- Asymptotic analysis of rigid systems;
- Hybrid management systems;
- System analysis of regional development strategies;
- Control of innovation processes in a region.

VIII. R&D Works.

Artificial Intelligence Research Center:

- Technology of constructing distributed intelligent systems IMER+MIR: integrated combination of software environment that supports all stages of generation of integrated distributed systems and their adaptation to applied tasks solution;
- Distributed intelligent systems for supporting decision-making concerning estimation and forecasting;
- Applied intelligent systems.

Medical Informatics Research Center:

- The integrated distributed information system of a patient care institution INTERIN is designed for supporting basic medical, diagnostic, laboratory and managerial functions of a patient care institution.

Research Center for Multiprocessor Systems:

- T-system: software for multiprocessors realizing the concept of "automated dynamic deparallelizing of programs".

Telecommunication laboratory BOTIK:

- Region's telecommunication system: standard technical decisions concerning the development of economically-effective telecommunication systems of civil designation.

高性能コンピューター・データベース研究所
(サンクト・ペテルブルグ)

Institute for High Performance Computing and Data Bases

I. Name of the Institute (Organization).

In Russian: Институт Высокопроизводительных Вычислений и Баз Данных

In Russian abbreviation: ИВВиБД

In English: Institute for High Performance Computing and Data Bases

In English Abbreviation: IHPCDB

II. Location.

Official address: 198005, Russia St. Peterburg, Fontanka 120, of. 7

Mail address: 198005, Russia St. Peterburg, Fontanka 120, of. 7

Tel.: +7 (812) 251-9092

Fax: +7 (812) 251-8314

E-mail: adm@fn.csa.ru

Access (transportation, necessary time): St. Petersburg International airport Pulkovo, then about one and half hour by car.

III. History.

Institute for High Performance Computing and Data Bases (IHPCDB) was founded in St. Petersburg, Russia, in 1996 as the scientific and research institution of the Ministry of Science and Technical Policy of the Russian Federation.

The IHPCDB was established on the base of the International Institute for Interphase Interactions and its Supercomputer Centre, which was established due to the III's staff efforts. Previous experience of researchers of the III in the field of applied mathematics, numerical simulation of physical processes, high performance computing and information technologies was also used.

Both the IHPCDB staff experience and the computing and information facilities provide an opportunity to carry out the fundamental and applied researches to meet every current demands of both national and foreign scientific institutions, companies and firms.

The IHPCDB long-term research programs are consistent with the activity of the Fellows during last years, representing various results and scientific products and many international contacts as well, such as conferences, workshops and seminars, published reports and articles, books, computer simulation software etc.

The IHPCDB, being the new wave scientific organization in Russia, is strictly oriented to mutual and continuous co-operation in and assistance for modern scientific, technological and educational projects in Russia and around the world.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Ministry of Science and Technology of Russian Federation

V. Executives.

Director - Professor Alexander V.Bogdanov.

V. Number of employee.

The IHPCDB staff is planned to be about 200 scientists and programmers.

VI. Organization chart.

The IHPCDB consists of the following departments:

- Department of System Integration and Networking:
 - Lab for System Integration
- Department of Informations Systems:
 - Database Lab;
 - Web-Technology and Hypermedia Lab;
 - Intelligent Systems Lab;
 - Bioinformation Systems Lab;
 - Integrated Systems Lab.
- Department of High Performance Algorithms and Programs:
 - Lab for Monte Carlo Methods;
 - Lab for Computational Physics;
 - Lab for Computational Physical Chemical Gas Dynamics;
 - Lab for Computational Fluid Dynamics;
 - Lab for Mathematical Modeling of Nonlinear Processes;
 - Lab for Scientific Visualization;
 - Lab for Methodical Support Users.
- Department of High Performance Programs-hardware-controllers Technologies:
 - Lab for Mathematical Methods and Algorithmic Provision
 - **Lab for Decision Support Systems**
 - Lab for Applied Program and System Provision
- Department for Fullerenes and Nanoclusters;
- Department for Mathematical Modeling;
 - Lab for Computational Mechanician;
 - Lab for Modelling Social and Economic Processes;
 - Lab for Scientific Visualization;

- Lab for Modeling Complicated Systems.
- **Department for Information – Analytical Support.**

All of them are dealing with the current and planned studies in corresponding scientific programs.

The IHPCDB is equipped with the most powerful supercomputers' cluster in Russia.

Organization of the Institute:

VII. Current major activities.

Main directions are:

- simulation in fundamental sciences (physics, biology, economy, etc);
- visualisation systems;
- CAE-systems;
- artificial intelligence systems;
- informational systems (parallel DB, data mining, etc);
- hypermedia technologies.

情報問題研究所（モスクワ）
**Institute of Informatics Problems of the Russian
Academy of Sciences**

I. Name of the Institute (Organization).

In Russian: Институт проблем информатики Российской академии наук

In Russian abbreviation: ИПИ РАН

In English: Institute of Informatics Problems of the Russian Academy of Sciences

In English Abbreviation: IIP of RAS

II. Location.

Official address: 117333, Moscow, Russia, Vavilov Str., 44, Bld.2.

Mail address: 117333, Moscow, Russia, Vavilov Str., 44, Bld.2.

Tel.: +7 (095) 135-6260

Fax: +7 (095) 930-4505

E-mail: ipiran@ipiran.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about one and half hour by car.

III. History.

The Institute of Informatics Problems of the Russian Academy of Sciences was established in 1983 with the purpose of carrying out fundamental and applied researches in the field of technical and software products for computer engineering and systems.

The Institute carries out fundamental researches in the field of informatics, and develops software and technical means and systems.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of the Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director: Doctor Sc. (Eng.) Igor A. Sokolov

VI. Organization chart.

Research departments:

- Department 11 - Statistics problems of informatics and management;
- Department 12 - Problems of creating information and computation systems of high parallelism;

- Department 16 - Information technologies structurization and data retrieval;
- Department 17 - Information technologies management;
- Department 22 - Promising computer systems architecture;
- Department 28 - Tools for creating applied software systems;
- Department 31 - Information management systems of special designation;
- Department 45 - System analysis of information and telecommunication systems;
- Laboratory 13 - Technology of information support of scientific and research activity;
- Laboratory 14 - Image and text processing systems;
- Laboratory 15 - Education informatization problems;
- Laboratory 21 - System software;
- Laboratory 23 - Composition methods and means of creating information systems;
- Laboratory 24 - Functional modeling and microprocessor systems testing;
- Laboratory 25 - Means for creating multimedia systems;
- Laboratory 26 - Applied Internet systems;
- Laboratory 27 - Problems of information protection assurance in information and telecommunication systems;
- Laboratory 34 - Methodological bases of informatization;
- Laboratory 42 - Management problems of information and telecommunication systems;
- Laboratory 43 - Applied network systems;
- Laboratory 44 - Test methods for information and telecommunication systems.

VII. Current major activities.

Fundamental and applied researches and developments in the field of creating integrated information and telecommunication systems:

- networks and systems mathematical models;
- networks and systems management techniques;
- promising telecommunication technologies, techniques of creating promising hardware facilities;
- technology of data retrieval, processing, transfer, storage and protection in networks;
- Internet network improvement and development.

Fundamental researches and developments in the field of stochastic systems:

- techniques and algorithms for analysis and control of complex stochastic systems;
- applied technologies for scientific researches and education

Theoretical problems and applied technologies in the field of data accumulation, processing and representing:

- techniques and software for text processing;
- technologies of real-time data analytical processing;
- techniques and means of image processing;
- means of electronic documents imaging

Creation of new generation information and computation systems:

- interoperable environments of information resources;
- highly efficient systems with hybrid architecture;
- computer networks modeling and functional testing;
- architecture of naturally-safe computer charts;
- toolbox for computer-aided designing

VIII. R&D Works.

- Expert systems' shell "DECTOOLS" (ESS "DECTOOLS");
- Digital electronic devices modeling system in the VHDL language;
- Instrumental object-oriented system of character input;
- Software for estimating properties of X.25 and Frame Relay (XFR)-based protocols networks;
- Software for network operation modeling with frame relay;
- Color synthesis, color separation, color print and color reproduction correction system;
- Agent of e-mail subscriber access to message transfer system X.400;
- Tools of analysis of Boolean equations system for semi-modularity and distributivity;
- Check summation program;
- Automated classification of text documents "TERMIN-5".

情報伝達問題研究所（モスクワ）
**Institute for Information Transmission Problems of the
Russian Academy of Sciences**

I. Name of the Institute (Organization).

In Russian: Институт проблем передачи информации Российской академии наук

In Russian abbreviation: ИППИ РАН

In English: Institute for Information Transmission Problems of the Russian Academy of Sciences

In English Abbreviation: IITP RAS

II. Location.

Official address: 101447, GSP-4, Russia, Moscow, Bol'shoi Karetnyi per., 19

Mail address: 101447, GSP-4, Russia, Moscow, Bol'shoi Karetnyi per., 19

Tel.: +7 (095) 209-4225, 209-0579

Fax: +7 (095) 209-0579

E-mail: director@iitp.ru, ovs@iitp.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about one and half hour by car.

III. History.

The Institute for Information Transmission Problems of the Russian Academy of Sciences was founded in 1961, on the initiative of Professor A. A. Kharkevich, full member of the USSR Academy of Sciences. It was designed to solve problems bearing upon the progress of information theory and its applications, upon the development of principles of integrated systems of information transmission and distribution (the structures of communication networks and switching centers, the problems of control, the teletraffic theory), and upon automatic pattern recognition (reading machines, recognition of images, speech recognition).

There is a stable scientific body of highly trained and young specialists, composed of mathematicians, physicists, biologists, linguists, programmers, and engineers in the Institute.

The Institute's scientific potential was instrumental in giving rise to its collaboration with the well-known universities and scientific centers of such countries as Australia, Austria, Bulgaria, Canada, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Israel, Korea, Netherlands, Slovak Republic, Sweden, Switzerland, USA, etc., in all more than 25 Agreements and Contracts in 2001.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director - Full member of the Russian Academy of Sciences, Dr.Sc. (Technology), Professor Nikolai A. Kuznetsov

Assistant Director for International Connections - Dr. Natalya A. Grechishkina

V. Number of employee.

Total number of the Institute's personnel is 317 employees, among them: 278 - researchers (including 3 Academicians, 74 Doctors and 138 Candidates of Sciences).

VI. Organization chart.

The internal structure of the Institute included 15 laboratories, 6 sectors, scientific-organization department, some servicing departments and administration.

Institute Laboratories:

- Sector 1 - Mathematical methods in control theory;
- Sector 1.1 - Sector of Computer Logic in Information Processes;
- Sector 2 - Sector for Digital Optics;
- Error control codes and information transmission;
- Geoinformation technologies and systems;
- Partner system group;
- Theory of the speech signal;
- Artificial Intelligence Group;
- Laboratory 1 - Laboratory of Information Transmission and Control Theory;
- Laboratory 2 - Laboratory of Image Processing Models and Algorithms;
- Laboratory 3 - Laboratory of Data Analysis, Error Correction Codes and Cryptology;
- Laboratory 4 - Dobrushin Mathematics Laboratory;
- Laboratory 5 - Laboratory of Teletraffic Theory;
- Laboratory 7 - Laboratory of Bioelectric Information Processing;
- Laboratory 8 - Laboratory of Sensory Information Processing;
- Laboratory 9 - Laboratory of Neurobiology of Motor Control;
- Laboratory 10 - Laboratory of Communications Network Theory;
- Laboratory 12 - Laboratory of Bioinformatics of Cell Processes and Motocontrol;
- Laboratory 13 - Laboratory of Systems for Behavior Organizing;
- Laboratory 14 - Laboratory of Problems of Consciousness and Communication;
- Laboratory 15 - Laboratory of Computational Linguistics;
- Laboratory 16 - Laboratory of Stochastic Dynamical Systems;
- Laboratory 17 - Laboratory of Information Transmission Networks.

VII. Current major activities.

At present the IITP's basic directions of research are the:

- Information theory and applied mathematics;
- Computer and communication sciences in technology, management, language, and living systems;
- Problems of the theory of nonlinear analysis of complex systems;
- Multicomponent homogeneous random systems;
- Information transmission;
- Queuing theory;
- Coding and cryptography;
- Pattern recognition and artificial intelligence;
- Information distribution and computer networks;
- The theory of linguistic communication and linguistic processes (including machine translation);
- Statistical methods of information processing and control;
- The theory and methods of image processing (including data compression);
- Intellectual partner computing and information systems;
- Information transmission and processing in living objects;
- Sensory systems;
- Motion control in living systems and robotics.

システムプログラミング研究所 (モスクワ) Institute for System Programming of the Russian Academy of Sciences

I. Name of the Institute (Organization).

In Russian: Институт Системного Программирования Российской академии наук

In Russian abbreviation: ИСП РАН

In English: Institute for System Programming of the Russian Academy of Sciences

In English Abbreviation: ISP RAS

II. Location.

Official address: 109004, Moscow, B. Kommunisticheskaya, 25

Mail address: 109004, Moscow, B. Kommunisticheskaya, 25

Tel.: +7 (095) 912-4425, 912-5659

Fax: +7 (095) 912-1524

E-mail: ivan@ispras.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about one and half hour by car.

III. History.

The Institute for system programming of RAS was created on 1994 from departments of system programming and discrete mathematics formerly of the Institute of Cybernetics Problems of RAS.

It is housed in the Division of Informatics, Computer Technology and Automation of RAS, whose Presidium establishes the Institute's directives.

Leading specialists of the institute participated in large national programs, such as system software for BESM-6 computer (1968), heterogeneous computer system AS-6 (1979) for space flight control at the Mission Control Centres; vector, pipeline supercomputer Electronica SS BIS (1987).

Research is done on cooperation with national and international academy and education institutions. ISP RAS, as research institution, has the license on research from the Ministry of Science and Technology of Russian Federation.

The institute is one of the founders of the journal "Programming and Computer Software", published in Russian and English simultaneously by Academy publisher.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director - Prof. Victor P. Ivannikov

V. Number of employee.

The institute has 130 employees, including 110 researchers (10 full professors and 32 Ph.D).

VI. Organization chart.

DEPARTMENTS

- Operating Systems;
- Compiler Technology;
- Mathematical Methods and Algorithm;
- Applied Systems;
- Computer Architectures;
- Visualization in Scientific Researches;
- Simulation Systems;
- CASE Systems;
- Open System Environment Profiles.

VII. Current major activities.

Main activities of the institute are:

Primary research directions are compiler technology and program analysis:

- Software engineering;
- Computer graphics and visualization;
- Real time systems;
- Discrete mathematics;
- Formal methodology; parallel computing.

Development

- ISP RAS develops information technologies in the interests of leading West companies in accordance with and based on its researches.

Education

- Many employees of the institute are in the same time the professors of Moscow State University and Moscow Institute of Physics and Technology (Technical University), and are teaching there.

インフォメーション・オートメーション研究所
(サンクト・ペテルブルグ)

St. Petersburg Institute for Informatics and Automation of Russian Academy of Sciences

I. Name of the Institute (Organization).

In Russian: Санкт-Петербургский институт информатики и автоматизации
Российской академии наук

In Russian abbreviation: СПИИРАН

In English: St. Petersburg Institute for Informatics and Automation of RAS

In English Abbreviation: SPIIRAS

II. Location.

Official address: Russia 199178 St. Petersburg 14 line 39

Mail address: Russia 199178 St. Petersburg 14 line 39

Tel.: +7 (812) 328-3311, 328-4450

Fax: +7 (812) 328-0685

E-mail: spiiran@iias.spb.su

Access (transportation, necessary time): St. Petersburg International airport Pulkovo,
then about one and half hour by car.

III. History.

St. Petersburg Institute for Informatics and Automation of the Russian Academy of Sciences was founded in 1978.

Now the institute is the only one research organization in the North-West of Russia operating under the Department of Informatics, Computer Science and Automation of the Russian Academy of Sciences.

Initially the institute was established as a research organization investigating fields of computer science and methodologies of research automation for Leningrad institutions of the USSR Academy of Sciences, as well as providing for powerful computational resources to support their research. The above tasks were partially accomplished by 1985. Then on the institute basis one of the first global computer and information networks "Academic Network" was created, and LRCC was transformed into Leningrad Institute for Informatics and Automation of the USSR Academy of Sciences (LIAS).

By 1991, the institute grew into a large scientific research organization. Currently SPIIRAS develops the following research leads: fundamentals of the informatization of the society and regions, regional information systems and computer networks and systems; architecture, system decisions and software development for information and control complexes for real time signal processing; fundamentals of information processes in complex (socio-, eco-, bio-, geo-, etc.) systems; theoretic basics in developing

information technologies for research automation, control and manufacturing intelligent systems.

The institute has established cooperation with scientific, educational and industrial organizations worldwide, conducting research in the fields close to SPIIRAS scientific directions. These relations are being developed in various forms, including information and scientific exchange, participation of SPIIRAS researchers in international scientific projects and events, hosting international scientific events and foreign scientists in, SPIIRAS. Scientific exchange is conducted on the short- and long-term bases and includes exchange of young scientists and post-graduate students for internships and other courses. The annual number of SPIIRAS foreign professional visitors was about a hundred persons every year, and the number of SPIIRAS experts sent to various centers abroad varied from forty to sixty every year.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of the Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director: Full Professor Rafael M. Yusupov

Foreign relations assistant: Irina P. Podnozova

VI. Number of employee.

30 Doctors and more than 50 Candidates of Sciences work in the Institute.

VII. Organization chart.

- Laboratory of Applied Informatics:
 - Group of Problems of Society Informatization and Global Processes Modeling;
 - Group of Biomedical Informatics.;
 - Group of Speech Informatics;
 - Computer Graphics Center;
- Laboratory of Informational Technologies in Robotics;
- Laboratory of Information Technologies for Ecology and Physics Research;
- Laboratory of Software Technologies and Systems;
- Laboratory of Neuroinformatics and Intelligent;
- Laboratory of Computer-Aided Integrated Systems;
- Laboratory of Modeling Automation;
- Laboratory of Research Automation;
- Laboratory of Computer Systems and Problems of Information Protection;
- Laboratory of Data Transfer Systems and Computer Networks;
- Computing Distributed Structures Laboratory;

- Laboratory of Intelligent Systems;
- Object-oriented Geoinformatic Systems Research Group;
- Geophysics Informatics Grope;
- Group of Informatics Support of Business Activities;
- Research group for information technologies in education.

The scientific and experimental base of SPIIRAS consists mainly of automated workplaces of researches with contemporary personal computers, Computer scientific and educational center for information technologies and Center of collective usage-distributed computations and information resources with access to Interministry supercomputer center of RAS (ISCRAS). All computers and both centers are connected to local area computer network (LAN), that is connected to Internet and Rokson networks.

Robototechnical complex with force-moment control based on two robots "Puma" to study information technologies and advanced control methods at making precision montage and demontage operations held in extremal conditions using virtual objects in real world is used.

VIII. Current major activities.

Main activities of the institute are:

Fundamentals of the Informatization of the Society and Regions, Regional Information and Computer Networks and Systems

- Systems and methodological basics of informatics as interdisciplinary basic science; elements of the theory of development of information society;
- Theoretic and applied research in developing regional information and computer networks and information systems;
- Information security;
- Scientific and methodological support in informatization of the Russian North-West and St. Petersburg Scientific Research Centre of the Russian Academy of Science;
- Information support in Manufacture Systems.

Architecture, System Decisions and Software Development for Information and Control Complexes for Real Time Signal Processing

- Theory of self developing automata networks targeted at computations in distributed multi-processors systems, and its applications to developing computers with dynamic architecture for real time digital signal processing;
- Theory and techniques in developing case tools for object-oriented programming for network information technologies;
- The architecture and technology of development of the program appendices for computer networks (grids) and built-in real-time systems, engineering process of software products.
- Computing complexity and programming languages;

Fundamentals of Information Processes in Complex (Socio-, Eco-, Bio-,Geo-, etc) Systems

- Information processes in Earth surface distant probing systems;
- Theoretic and applied problems and tasks of formalization and processing of distributed territorially information, geoinformatics system;
- Theoretic basics of information processes in complex systems;
- Information processes modeling in physics research and ecology;
- Information processes in biological and medical systems;
- Elements of the theory of information processing on the basis of key properties of biomolecules, artificial immune system.

Theoretic Basics in Developing Information Technologies for Research Automation, Control and Manufacturing Intelligent Systems

- Knowledge representation theory and processing in control, planning and design of dynamic systems, in control and decision-making of multi-agent systems;
- Theory and techniques of intelligent and multi-agent control for robotic systems and virtual reality application;
- Theory and techniques for multi-level processing of various data for, the automated recognition and understanding of audio and video information;
- Visual methods of performance of the information for decision making;
- The theory and methods of the distributed simulation of complex systems on the basis of the vehicle of the distributed algorithmic networks;

IX. R&D Works.

The Institute's applied researches are connected with the development of critical technologies of federal level.

They are as follows:

- basically new class of computers: dynamic architecture computers that allow to solve tasks of radiolocation data real-time processing, vessel traffic and telecommunication networks control;
- new type specialized computers based on the mechanism of data processing by immune networks that are highly efficient at image recognition and hazard estimation;
- computer system of audio and visual data highly-reliable recognition;
- Information technology (IT) for intelligent flexible robot control, and its applications to systems of pointing, tracking, virtual reality control and incompatibility modeling;
- IT for revealing "hidden knowledge";
- instrumental program systems (IPS) of modeling complex dynamic systems on the basis of a new paradigm: algorithmic networks and cognitive graphics;
- IPS of state order intelligent management and control of production systems configuration at their reengineering;

- software for concealing data in digital images and plug-in water marks based on the technique using the modification of components of singular decomposition of image and a new format of compressed representation of digital images (steganographics);
- IPS for supporting the multi-agent system development process following the example of a computer network complex protection system, the system of modeling distributed attacks on computer networks, operation planning systems;
- computer system of speech recognition for dialogue systems of management, instruction, speech access to network resources; biotechnical system of global telecommunication in sonic and subsonic radio frequencies ranges;
- system of a remote analysis of a biological object's physiological state, and telecontrol of its behavior;
- automated system of program projects integrated control.

The above-listed technologies are ready for application. Some of them have been already put to use in Russia and abroad.

映像処理システム研究所 (サマール)
Image Processing Systems Institute of the Russian Academy of Sciences

I. Name of the Institute (Organization).

In Russian: Институт систем обработки изображений Российской академии наук

In Russian abbreviation: ИСОИ РАН

In English: Image Processing Systems Institute of the Russian Academy of Sciences

In English Abbreviation: IPSI RAS

II. Location.

Official address: Russia, 443001, Samara, Molodogvardejskaya st., 151

Mail address: Russia, 443001, Samara, Molodogvardejskaya st., 151

Tel.: +7 (846 2) 325620, 351826

Fax: +7 (846 2) 322763

E-mail: ipsi@smr.ru

Access (transportation, necessary time): Samara airport, then about one hour by car.

III. History.

The Image Processing Systems Institute was originated in the interior of Samara State Aerospace University (former Aviation Institute) in the middle of 70s. At that time, the research group of V.A. Soifer was mainly consisted of under-graduate and post-graduate students. It is this group which composed the core of the Chair and the Laboratory of "Technical Cybernetics" established in 1982. Close cooperation of the Chair with Institutes of the Academy of Sciences facilitated the organization of the subsidiary Samara Branch of the Central Design Bureau of Unique Instrumentation of the RAS in 1988, which was reorganized in 1993 into the IPSI RAS with 50 employees. Activities of the IPSI RAS are mainly focused on solving fundamental and applied problems of Computer Optics, image processing, and image recognition. The IPSI RAS takes an active part in a number of state scientific & technical programs and international projects, and works by contracts with Russian and foreign companies. The IPSI RAS has broad scientific relations with leading universities and research Institutions of Russia, Ukraine, Belarus, the USA, Germany, Italy and other countries.

IV. Management.

Kind of organization: Research Institute

Ownership: State property of Russian Federation

Responsible Ministry: Russian Academy of Sciences

V. Executives.

Director - V.A. Soifer, Corresponding Member of Russian Academy of Sciences

VI. Number of employee.

The institute has 130 employees, including 110 researchers (10 full professors and 32 Ph.D).

VII. Organization chart.

The IPSI consists of two departments including four laboratories and an experimental design bureau.

- Diffractive Optics Laboratory.
- Laser Measurements Laboratory
- EDB "Microtechnologies".
- Mathematical Methods of Image Processing Laboratory.

VIII. Current major activities.

Main activities of the institute are:

Fundamental problems of computer-aided synthesis of diffractive optical elements with wide functional capabilities, mathematical modeling of processes of controlling space-time parameters of wavefields.

Mathematical methods, information technologies, and automated systems for signal processing, image analysis, and pattern recognition.

- theoretical computation and computer-aided design of diffractive optics;
- development of illuminating units with the use of diffractive optical elements (DOEs);
- development of fiber-optics sensors;
- development of communication systems using the multimodal filtration.
- development of iterative methods for designing DOEs;
- experimental studies of DOE operation;
- development of microrelief fabrication technologies and technological complexes for fabrication of DOE prototypes and DOE-based devices;
- development of mathematical methods, algorithms and information technologies for digital image processing and pattern recognition.

IX. R&D Works.

- methods for replacing classical microlenses and prisms by diffractive ones;
- analytical formula for computing the phase function of focusators in focal lines, contours of letters, plane domains;
- asymptotic formulae for the light field in the focal region, the results of simulation;
- theory of design and evaluation of errors of compensators when forming aspherical wavefronts;
- methods of designing combined and multifocus optical elements;
- methods of design and errors evaluation of modans;
- optical spatial filters for image recognition;

- software for the design of photomasks and simulation of diffractive optical elements;
- software complex for designing illuminating devices with DOEs.
- Iterative technique for design of focusing DOE has been improved by use of adaptive correction and phase pixel interpolation and extrapolation.
- For iterative design of radially symmetric focusing DOE, a fast algorithm of the arbitrary-order Hankel transform has been developed.
- To attain stable operation in the presence of noise, the iterative Gerchberg-Papoulis algorithm for interferogram processing has been improved through the use of regularization procedure.
- Iterative algorithms for design of phase formers of Gauss-Hermite, Gauss-Laguerre, and Bessel modes, and multi-modal beams with invariant properties have been developed.
- Methods for optical signal analysis using the direction field and frequency field have been developed.
- Automated optical-digital systems for interpretation and recognition of structurally redundant images (fingerprints, interferograms, and crystallograms) have been designed.
- parallel-recursive image processing with sliding window
- information technology for detecting local objects on the image
- image reconstruction techniques based on pattern recognition theory
- a technique for image compression with controlled maximum error
- identifying models of systems for image generation using a small number of observations
- simulation of the video-information channel of technical vision systems
- arithmetic methods in the theory of discrete orthogonal transforms (dot) and convolutions
- fast algorithms of discrete cosine transforms in digital image processing
- extraction of algebraic primitives from images
- super-fast algorithms of discrete orthogonal transforms and parallel-recursive convolution calculation
- Indicator "ичп - 1" implements online Substrate cleanness monitoring
- Laser system for experimentally evaluating The doe energy efficiency
- "Microrelief" unit
- Automatic system to control parameters Of lighting devices
- Microrelief generation techniques developed and used at IPSI RAS
- Layer-wise photoresist growth
- Fabrication of lppc-aided does
- Microrelief control
- Does with continuous and binary microrelief developed and fabricated at IPSI RAS
- Multi-level-microrelief-based does developed and fabricated at IPSI RAS
- Examples of co-planar illuminators developed and fabricated at IPSI RAS.

ニューロコンピューター研究センター（モスクワ）

Scientific Center of Neurocomputers

I. Name of the Institute (Organization).

In Russian: Научный центр нейрокомпьютеров Российского Агентства по системам управления

In Russian abbreviation: НЦН РАСУ

In English: Scientific Center of Neurocomputers of the Russian Agency for Management Systems

In English Abbreviation: SCN RASM

II. Location.

Official address: Russia, 107066, N. Basmannaya, 20, Moscow

Mail address: Russia, 107066, N. Basmannaya, 20, Moscow

Tel.: +7 (095) 263-9430

Fax: +7 (095) 261-9047

E-mail: scn@mail.cnt.ru

Access (transportation, necessary time): Moscow International airport Sheremetjevo-2, then about one and half hour by car.

IV. Management.

Kind of organization: Scientific Center

Ownership: State property of Russian Federation

Responsible Ministry: Russian Agency for Management Systems

V. Executives.

Director - Alexander I. Galushkin, Professor, Doctor Sc. (Eng.), Honored Scientist of Russia.

VI. Current major activities.

The Scientific Center of Neurocomputers is one of the leading Russian institutions specialized in design, development and application of information systems for solving supercomplicated tasks in the field of commutation, management of non-formalized systems with high level of uncertainty, mathematical modeling under conditions of unavailability of prior information.

The main sphere of interests of the Scientific Center of Neurocomputers is the development of neurocomputers:

- Development of neural networks' algorithms for solving different tasks, and neurocomputers' models on the base of neurochips as advanced supercomputers.

The Scientific Center of Neurocomputers has a 30-year experience in the field of neurocomputers in Russia, and holds a leading position in the world in the elaboration of the neural networks theory and neural mathematics.

VII. R&D Works.

Along with other trends of research activity, the Scientific Center of Neurocomputers carries out works on the application of advanced computer engineering in the following spheres:

- modern digital communication systems;
- large-scale electric grid management systems;
- distributed networks sensors and remote control sets executive devices management systems;
- forecasting of chaotic temporary rows (forecasting of temporary rows of share rates, currency cross-rates, indices and other instruments);
- building of neural network and hybrid expert systems for estimating investment projects, the estimation of prospects of enterprises' bankruptcy due to economic reasons, the development of specialized expert systems simulating decision-making by a particular expert ("expert-clone");
- mathematical modeling of processes, a system or event based on observation data for the following forecasting and modeling;
- knowledge mining from data, including from large-scale bases; knowledge structuring based on self-instruction systems.

The Scientific Center of Neurocomputers has unique powerful computers for solving the above-mentioned tasks.

The Scientific Center of Neurocomputers is a production base of the Neurocomputers Department of the Moscow Institute of Physics and Technology and the Department M5 of the Bauman Moscow State Technical University.