



ACADEMICIAN V.M.GLUSHKOV - A PIONEER OF COMPUTER SCIENCE AND CYBERNETICS, AN IDEOLOGIST OF THE DIGITAL STATE

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COMPUTER PIONEER

The pioneer of computer science and cybernetics, **academician Victor Mikhailovich Glushkov** (1923-1982) is known for his scientific results of world significance in mathematics, computer science and cybernetics, computer engineering and programming, the creation of his own schools in these fields of science.

For the development of the theory of digital automata, for digital automation of computer architecture, for creation of multiprocessor macroconveyor supercomputers the international organization IEEE Computer Society in 1996 awarded V.M. Glushkov the medal "Computer Pioneer".



PART 1

BIOGRAPHY

BIOGRAPHY (1)

OF VICTOR MIKHAILOVICH GLUSHKOV

August 24 , 1923

Victor Mikhailovich Glushkov was born on August 24, 1923 in Rostov-on-Don in the family of a mining engineer. Father – Mikhail Ivanovich Glushkov, mother – Vera Lvovna Glushkova.

1944-1947

He studied at the Novocherkassk Industrial Institute. 1947- he studied in the fifth year of the Physics and Mathematics Faculty of Rostov State University.

1951

Defended his dissertation for the degree of Candidate of Physical and Mathematical Sciences.

1956

Appointed Head of the Laboratory of Computer Engineering and Mathematics of the Institute of Mathematics of the Academy of Sciences of the Ukrainian SSR.

1931- 1941

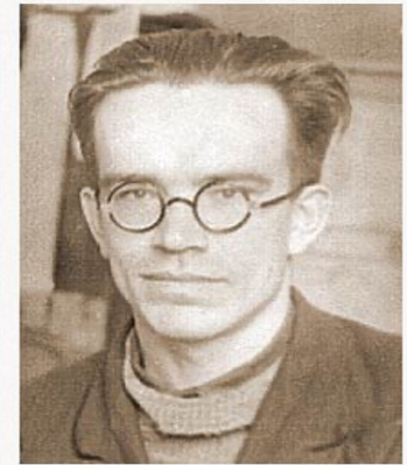
He studied at the secondary school of Shakhty, from which he graduated with honors.

1948

Assistant Professor of the Ural Forestry Institute (Sverdlovsk). At the same time he carried out intensive research work

1955

He defended his dissertation on "Topologically locally nilpotent groups" for the degree of Doctor of Physical and Mathematical Sciences. Becomes a member of the Moscow Mathematical Society.



BIOGRAPHY (2)

OF VICTOR MIKHAILOVICH GLUSHKOV

1957

He was appointed Director of the Computing Center of the Academy of Sciences of the USSR, created on the basis of the Laboratory of Computer Technology and Mathematics of the Institute of Mathematics of the Academy of Sciences of the USSR, and head of the Department of the Theory of digital automata of this center. - Awarded the title of professor. - Lecturer at Taras Shevchenko Kyiv State University.

1961

He was elected an academician of the Academy of Sciences of the Ukrainian SSR with a degree in computational mathematics and engineering.

1962

He was elected Vice-President of the Academy of Sciences of the Ukrainian SSR.

1964

He was elected an academician of the USSR Academy of Sciences. - The Lenin Prize was awarded for a series of works on the theory of automata.

1966

Head of the Department of Theoretical Cybernetics of Kiev State University. - Elected a member of the Central Committee of the Ukrainian Communist Party.

1962

He was appointed Director of the Institute of Cybernetics of the Academy of Sciences of the USSR, created on the basis of the Computing Center of the Academy of Sciences of the USSR, and head of the Department of the Theory of digital automata of this institute.

1963

Chairman of the Interdepartmental Scientific Council for the Implementation of Computer Technology and Economic and Mathematical Methods in the National Economy of the USSR under the State Committee of the Council of Ministers of the USSR for Science and Technology.

1969

Elected Chairman of the Program Committee of the Congress of the International Federation for Information Processing (IFIP).



BIOGRAPHY (3)

OF VICTOR MIKHAILOVICH GLUSHKOV

1967

Awarded the N.M. Krylov Prize of the Academy of Sciences of the Ukrainian SSR for a series of works on theoretical cybernetics. - Awarded the Order of Lenin.

1968

As a member of the team of authors, he was awarded the USSR State Prize for the development of new principles for the construction of computing machines.

1970

As part of the team of authors, he was awarded the State Prize of the Ukrainian SSR for the development and implementation of a management information system for a mass-produced radio engineering enterprise.

1973

He was awarded the Order of the People's Republic of Bulgaria, I degree.

1969

For great achievements in the development of Soviet science, he was awarded the title of Hero of Socialist Labor.

1973

For services to the development of cybernetics and computer technology and in connection with the fiftieth anniversary of his birth, he was awarded the Order of the October Revolution.

1973

Chairman of the Scientific Council on Computer Technology and Control Systems of the State Committee of the Council of Ministers of the USSR on Science and Technology and the Presidium of the Academy of Sciences of the USSR.

BIOGRAPHY (3)

OF VICTOR MIKHAILOVICH GLUSHKOV

1975

For services to the development of science, he was awarded the Order of Lenin. Elected Honorary Doctor of Dresden University, honorary member of the Polish Cybernetic Society, foreign member of the Academy of Sciences of the GDR.

1976

Awarded the Order of the Banner of Labor of the GDR.

1977

The USSR State Prize was awarded for a series of works on the theory of discrete converters and computer design automation methods. Elected a foreign member of the Polish Academy of Sciences

1978

Awarded the title of Honored Scientist of Ukraine.

1979

The S. Lebedev Prize was awarded for a series of works on the theory of advanced computers and the creation of high-performance computing equipment and control systems.

1980

The N. Krylov Prize was awarded for a series of works on optimization methods in planning and management.

1981

Awarded the prize of the Council of Ministers of the USSR and the State Prize of Ukraine.

January 30, 1982

He died at the age of 58. He was buried in Kiev at the Baykov cemetery.



PART 2

SCIENTIFIC HERITAGE

THE MAIN DIRECTIONS OF SCIENTIFIC ACTIVITY

- topological group theory and topological algebra in general;
- theory of digital automata;
- theory of programming and systems of algorithmic algebras;
- theory of design of computers;
- creation of computers: new architectures of computers and systems, general-purpose control computers;
- personal computers for engineering calculations;
- macroconveyor supercomputers;
- cybernetics as the science of general laws, principles and methods of information processing and management in complex systems,
- the development of artificial intelligence;
- creation of automated control systems for technological processes and management information systems;
- the theory of building a digital state; development of the basics of building a nationwide automated management system of the national economy;
- computer science;
- information society theory.

SOLUTION OF THE GENERALIZED FIFTH HILBERT PROBLEM

- In 1952, V. M. Glushkov's attention was attracted by **Hilbert's fifth problem** related to the **theory of topological groups**, which was posed by the famous German mathematician in 1900 among the 23 largest and most complex problems of mathematics. Some particular problems related to this problem were solved by 1952. However, by this time a generalized fifth Hilbert problem had been formulated in topology theory, and V.M. Glushkov managed to solve it, which was the subject of his doctoral dissertation on "**Topological locally nilpotent groups**", which he defended in 1955 at Lomonosov Moscow State University.
- The mathematical results obtained by V.M. Glushkov made him one of the leading algebraists of the world, the solution of the generalized fifth Hilbert problem, the study of the properties and structure of locally bicomact groups and Lie algebras made it possible to significantly develop topological algebra.



GLUSHKOV V.M. – FOUNDER AND HEAD OF THE INSTITUTE OF CYBERNETICS OF THE ACADEMY OF SCIENCES OF THE UKRAINIAN SSR

- Since August 1956, V.M. Glushkov has lived and worked in Kiev, linking his life with the development of computer technology, cybernetics, computer science and applied mathematics. At first he headed the **Laboratory of Computer Engineering and Mathematics of the Institute of Mathematics of the Academy of Sciences of Ukraine**, in 1957 he headed the **Computing Center of the Academy of Sciences of the Ukrainian SSR**.
- In December 1962, the **Institute of Cybernetics of the Academy of Sciences of the Ukrainian SSR** was organized on the basis of the Computing Center of the Academy of Sciences of the Ukrainian SSR, which, under the leadership of V.M. Glushkov, became **the largest research and design center in the USSR** in the field of computer science, management information systems.

THEORY OF DIGITAL AUTOMATA

- In the field of the **theory of digital automata**, V.M. Glushkov built the necessary mathematical tools and showed how computer components, circuits and programs can be represented through algebraic expressions, which made it possible to build and transform models of computer components. These results were implemented in computer design at the Institute of Cybernetics of the Academy of Sciences of the Ukrainian SSR and in other organizations. V.M. Glushkov created a school in the field of computer design theory, the core of which was **Yu.V.Kapitonova, A.A. Letichevsky**, etc.
- In 1961, V. M. Glushkov's famous **monograph "Synthesis of Digital Automata"** was published, later translated into English and published in the USA and other countries.
- In 1964, for a series of works on the theory of automata, V. M. Glushkov was awarded **the Lenin Prize**. In 1964, V. M. Glushkov was elected a **full member of the USSR Academy of Sciences** in the Department of Mathematics (Mathematics, including Computational Mathematics).
- The use of the concept of "automaton" as a mathematical abstraction of the structure and processes occurring inside computing machines has opened up completely new possibilities in computer creation technology. **Modern computer design automation systems use these ideas everywhere.**



PROGRAMMING THEORY AND ALGORITHMIC ALGEBRA SYSTEMS (1)



- ▶ V.M. Glushkov made a fundamental contribution in the form of the algebra of regular events. The apparatus of **algorithmic algebra systems** (AAS) was developed, which is a two-base algebraic system consisting of a generative algebra of operators and an algebra of three-valued logical conditions.
- ▶ As part of the development of this theory, **V.M. Glushkov anticipated the concept of structural programming** proposed by **Dijkstra** in 1968, and proved the **fundamental theorem on regularization** (reduction to a structured form) of an arbitrary algorithm, in particular a program or firmware.
- ▶ V.M. Glushkov proposed an abstract computer model representing the interaction of two automata — a control and an operating one. The automatic interaction scheme adopted in the abstract computer model could be extended to the case of arbitrary cybernetic systems, which makes it possible to formalize their functioning using the AAS apparatus. The **Glushkov regularization theorem** mentioned above was not noticed and understood in a timely manner, later it was overlapped within the framework of structural programming.

PROGRAMMING THEORY AND ALGORITHMIC ALGEBRA SYSTEMS (2)

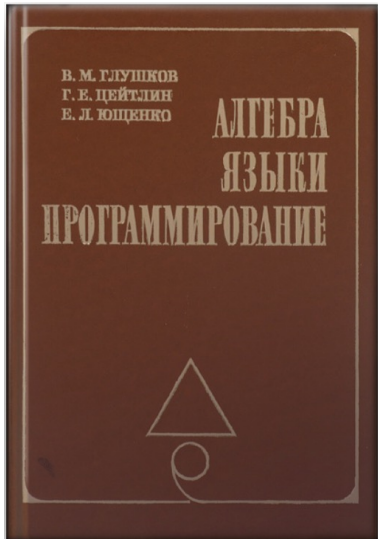
The monograph by V. M. Glushkov, G. E. Tseitlin and E. L. Yushchenko "**Algebra, languages, programming**", containing an introduction to the theory of universal algebras, taking into account the application of this apparatus in theoretical programming, was published in 1974.

In connection with research on the formalization of languages, verification of programs and their optimization in the mid-70s, a new direction in algorithmic (program) logic and process logic emerged.

The AAS apparatus was used to formalize the semantics of the address language in the implementation of the **address language on Dnepr-2 computer**, a model of a two-way parallel analyzer of the Cobol language on an EC computers, components of cross-systems of specialized mini- and micro-computers on an EC computers. A project of programs "**Analyst**" was proposed for proving identities (theorems) in axiomatized AAS (G.E. Zeitlin — 1979).

In 1979-1983, V.M. Glushkov, G.E. Tseitlin, E.L. Yushchenko, V.P. Gritsai published their results on the analysis and synthesis of parallel programs, multilevel structural design of programs. The "**MULTIPROCESSIST**" **system** was developed — a structural synthesizer of algorithms and programs based on their projects, designed in the language of the ultra-high level of the AAS, implemented in 1981 in the DOS EC computers.

The Kiev School (E.L. Yushchenko, G.E. Tseitlin, V.N. Redko, etc.) developed these studies.



CREATION OF COMPUTERS, DEVELOPMENT OF NEW COMPUTER ARCHITECTURES (1)

- ▶ In 1958, V. M. Glushkov proposed the idea of creating a universal control machine, which was implemented in a **general-purpose control computer (UMSHN)**. The leaders of this work were **V.M. Glushkov and B.N. Malinovsky**. The basic principles of machine construction, formulated by V.M. Glushkov and B.N.Malinovsky: semiconductor element base, highly reliable protection of programs and data, small bit depth of the machine word and a universal communication device with the object. These principles were implemented both in the development of the UMSHN, later called the **Dnepr computer**, and in the subsequent developments of other control computers (**Dnepr-2, Kiev**) used in the automated control systems.
- ▶ In parallel, work was carried out to control complex technological processes at a distance (using the **Kiev computer**): steel smelting in the Bessemer converter at the metallurgical plant in Dneprodzerzhinsk and carbonation column at the soda plant in Slavyansk.
- ▶ In the USA, the development of a universal control machine was started a little earlier, but its launch into production was carried out in 1961, i.e. almost simultaneously with the Dnepr computer.



CREATION OF COMPUTERS, DEVELOPMENT OF NEW COMPUTER ARCHITECTURES (2)

- ▶ V.M. Glushkov supervised the creation of **computers for engineering calculations**: computer "**Promin**" (1963) was followed by computers **MIR-1** (1965), **MIR-2** (1969) and **MIR-3**. Their main difference from other computers was the hardware implementation of a machine language close to a high-level programming language. Computers of the MIR family interpreted the algol-like **language "Analyst"**, developed at the Institute of Cybernetics under the leadership of V.M. Glushkov by A.A. Letichevsky, Yu.V. Blagoveshchensky, A.A. Dorodnitsyna.
- ▶ The MIR-1 computer development team headed by V.M. Glushkov was awarded the **USSR State Prize**.
- ▶ In the late 1960s, under the leadership of V.M. Glushkov, the development of the "**Ukraine**" **computer** was started, which represented the next step in the development of computer intellectualization and in the development of the architecture of high-performance mainframes, different from the principles of J. von Neumann.
- ▶ The **monograph "Computing machine with advanced interpretation systems"** written by V.M. Glushkov, A.A. Barabanov, L.A. Kalinichenko, S.D. Mikhnovsky, Z.L. Rabinovich, was published in 1970 and contained a theoretical justification for the development of computer architecture in the direction of implementing high-level languages. The computer "Ukraine" was not built due to the lack of the necessary element base at that time.



RECURSIVE COMPUTER AND MACROCONVEYOR

In 1974, V. M. Glushkov made a report on a **recursive computer** at the IFIP Congress. He expressed the opinion that only the development of a **fundamentally new non-Neumann architecture** of computing systems will solve the problem of creating supercomputers whose performance increases indefinitely with increasing hardware. The idea of building recursive supercomputers, the performance of which increases indefinitely with increasing hardware, supported by a powerful mathematical apparatus of recursive functions, was ahead of its time and remained unrealized due to the lack of the necessary technical base.

In the late 70s, V.M. Glushkov proposed the principle of a **macroconveyor architecture of a computer** with many streams of commands and data (**MIMD architecture** according to modern classification) as a principle of implementation of the non-Neumann architecture and received an author's certificate for this invention.

The development of macroconveyor computers was carried out at the Institute of Cybernetics under the leadership of V.M. Glushkov by S.B. Pogrebinsky (chief designer), V.S. Mikhalevich, A.A. Letichevsky, I.N. Molchanov.

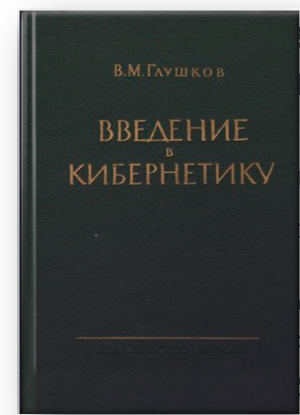
Supercomputers EC-2701 (in 1984) and **EC-1766** (in 1987) were transferred to serial production at the Penza Computer Plant. At that time, these were the most powerful computing systems in the USSR with nominal performance exceeding the milestone of **1 billion op./s**. At the same time, the multiprocessor system provided almost linear performance growth as computing resources increased and dynamic reconfiguration. They had no analogues in world practice and were the original development of the EC computers in the direction of high-performance systems.

V.M. GLUSHKOV – PIONEER OF CYBERNETICS

V.M. Glushkov was a recognized authority in the field of cybernetics in the world. Based on the works of N. Wiener, K. Shannon, A.I. Kitov, A.A. Lyapunov and others, he formed his understanding of cybernetics as a scientific discipline, its methodology and the structure of research sections. About this in the 60s, V.M. Glushkov wrote scientific articles in domestic journals, articles in **the Encyclopedia Britannica** and in the **American Technological Encyclopedia**.

V.M. Glushkov's **monograph "Introduction to Cybernetics"** was published in 1964.

Cybernetics was widely interpreted by V. M. Glushkov as the science of general laws, principles and methods of information processing and management of complex systems. Computer technology was considered as the main technical means of cybernetics. This understanding was reflected in the world's first **"Encyclopedia of Cybernetics"**, prepared on the initiative of V.M. Glushkov and published in 1974 under his editorship. The encyclopedia covered theoretical, economic, biological and technical cybernetics, computer theory, applied and computational mathematics, computer science.



MANAGEMENT INFORMATION SYSTEMS (1)



V.M. Glushkov paid great attention to the work on the creation of **management information systems (ASU)**, he was the **main ideologist and one of the main creators of the ASU industry in the USSR**. The applied developments of V.M. Glushkov and his school covered a wide range of applications: automated process control systems (ASUTP); automation systems for scientific research and testing of complex industrial facilities; automated systems for organizational management of industrial enterprises – **management information systems (ASU)**.

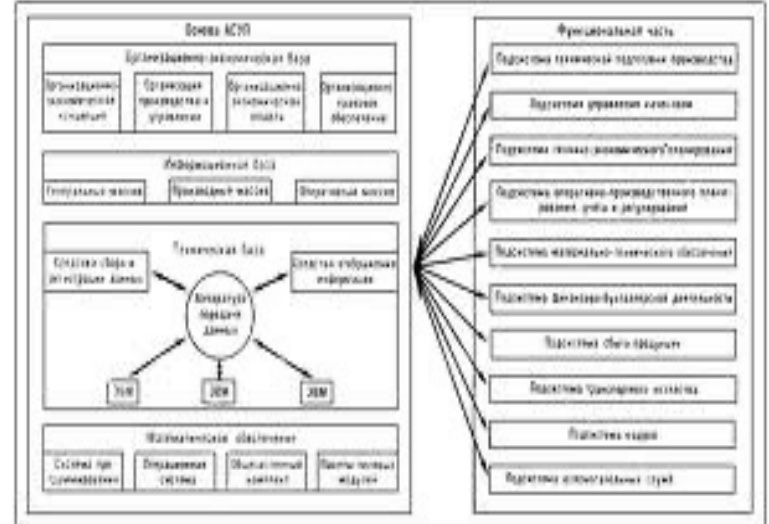
V. M. Glushkov, together with his students and colleagues, made a great contribution to the formation and implementation of the idea of creating an **automated process control system**, the development of appropriate theory, mathematical, software and special technical means for controlling technological processes in microelectronics, metallurgy, chemical industry, shipbuilding.

MANAGEMENT INFORMATION SYSTEMS (2)

The development of **management information systems (MIS, ASU)** for enterprises was started under the leadership of V.M. Glushkov in 1963-1964. In 1967, the Lviv television plant "Electron" commissioned and recommended for replication **the country's first MIS (ASU) "Lviv"** for an enterprise with a mass production character.

Further, V.M. Glushkov set the task of creating a standard management information system for machine and instrument-making enterprises. In the early 70s, work was completed on the **"Kuntsevo" system** (for the Kuntsevo radio plant), which V.M. Glushkov proposed to lay the foundation for the creation of an management information system at the enterprises of nine defense ministries.

V.M. Glushkov's monograph "Introduction to management information systems" systematized the original results obtained by him in this field.



INDUSTRY MANAGEMENT INFORMATION SYSTEMS

- Since the late 60s, the creation of management information systems for industries (OASU) has become relevant. V.M. Glushkov was a **scientific supervisor and consultant** for many projects of large OASU. Under the scientific supervision of V.M. Glushkov, the **OASU of the Ministry of Instrument Engineering**, the OASU of the Ministry of Defense Industry, other OASU of the nine defense ministries, the **Republican ASU in the Ukrainian SSR**, the **ASU "Moscow"**, the ASU "Olympiad-1980", the **ASU of the Armed Forces of the USSR** and other systems were developed.
- V.M. Glushkov was **the Scientific Director of the Interdepartmental Committee of Nine Defense Industries and the Board of Directors of the main Institutes of Defense Industries for Management, Economics and Computer Science**



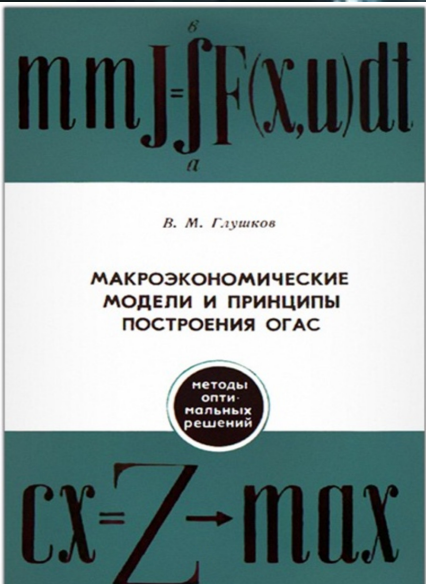


THE OGAS PROJECT – THE WORLD'S FIRST DIGITAL STATE PROJECT

In 1962, on the instructions of A.N. Kosygin, V.M. Glushkov began developing a project for a **nationwide automated system for collecting and processing information for accounting, planning and management of the national Economy (OGAS)**.

He personally studied the work of more than a thousand objects of the national economy: factories, mines, railways, airports, supreme governing bodies — Gosplan, Gosstnab, CSU, Ministry of Finance. He worked on the application of macroeconomic models and ways to improve public administration techniques, which was reflected in his **monograph "Macroeconomic models and introduction to the OGAS" (1975)**.

V.M. Glushkov proposed the **concept of OGAS** as a unified system for collecting reporting information, planning and managing the national economy, implementing the principles of **program-target management** and intersectoral balance using scenario modeling.



UNIFIED STATE NETWORK OF COMPUTING CENTERS (EGSVTS)

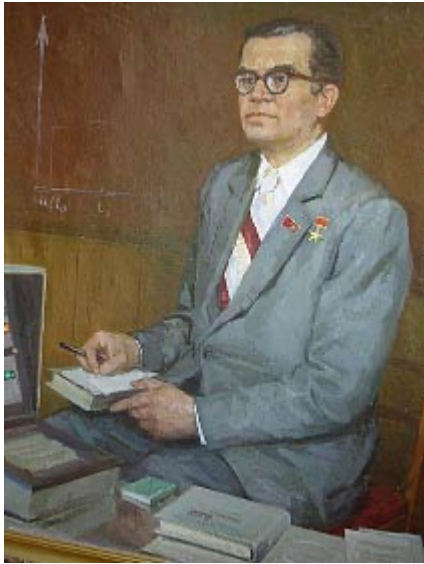


The technical basis of the OGAS was to be a **Unified State Network of Computing Centers (EGSVTS)**.

In the **pre-sketch project of the EGSCV (1964)**, V.M. Glushkov justified the construction of a network of about 100 large centers in industrial cities and centers of economic districts connected by broadband communication channels with message switching and connected to 20 thousand centers of enterprises and organizations. The creation of a distributed data bank and the development of a system of mathematical models of economic management were envisaged.

AUTOMATED SYSTEM OF PLANNED CALCULATIONS IN OGAS.

THE DISPLAN SYSTEM



- The central component of the OGAS was to be an **automated system of planned calculations** for the development and adjustment of long-term, long-term, medium-term (five-year) and current (annual) plans, implementing the principles of **program-target management and intersectoral balance** using **scenario modeling**.
- The prototype was a **DISPLAN (interactive system of planned calculations)**, created by a team led by V.M. Glushkov and implemented within the framework of the **republican management information system in the Ukrainian SSR**. The DISPLAN system was a complex of mathematical, technical, system-wide and special software tools designed to automate scheduled calculations in real time. This system made it possible to make quick adjustments and effective optimization of intersectoral balances, **combined balance methods with methods of program-target management**.



THE MAIN CHARACTERISTICS OF THE DISPLAN SYSTEM

- The DISPLAN was intended for both **long-term and short-term planning** on the scale of a **country or a group of countries, as well as on any designated territory**
- The DISPLAN allowed for **continuous planning**, which made it possible to take into account new trends in the economy, rapid scientific and technological progress, as well as various force majeure. After receiving new data into the system, forecasts were immediately recalculated, and plans were changed
- The DISPLAN system made so that the plans of sectoral and territorial development remained constantly interconnected making possible to solve the tasks of automated interaction of territorial and sectoral management bodies.
- The plan drawn up by the DISPLAN made it possible to calculate both excess and scarce resources. In the presence of scarce resources, the plan was considered unbalanced. The work on balancing the plans consisted in developing concrete proposals to change its individual sections aimed at reducing the deficit.
- The hierarchical structure of the system made it possible to carry out planning work not only in the State Planning Committee, but also in Ministries, enterprises, and target program management centers.
- The DISPLAN was not a static, but a **dynamic planning model** with the capabilities of **plan-fact analysis**. Its advantage was that the data came from real automated management information systems, projects and development programs.
- It was assumed that the DISPLAN would be used in conjunction with planning and forecasting methods, such as **the method of the "forecast tree" by V. M. Glushkov**, first proposed by him in 1969.
- DISPLAN was implemented into the Republican MIS of the Ukrainian SSR. It should also be noted that by 1990, about **90% of planned calculations in Ukrainian SSR were carried out in automatic mode using DISPLAN.**

THE CONCEPT OF SCIENTIFIC AND TECHNOLOGICAL PROGRESS (STP) MANAGEMENT

V.M. GLUSHKOV'S PREDICTIVE TREE METHOD

- The most important contribution of V.M. Glushkov to the development of strategic planning and management is the **concept of management of scientific and technological progress** and the method of managing STP using coordinated forecast expert assessments (**the method of the forecast tree of V.M. Glushkov**):
 - the management of STP should be carried out not in a sequential way, but in parallel;
 - the scale of the goal, the head research institute for each state target program;
 - proper management of the process of formation and implementation of state integrated target programs based on parallelization of network schedules;
 - the method of forecasting STP based on expert assessments (**the method of the forecast tree V.M. Glushkov**): the sequential unfolding of the tree of sub-goals, starting from the final goal and the translation of forecasts into plans;
 - plans and forecasts were to be transmitted to various subsystems of the OGAS, for example, in the DISPLAN;
 - the Glushkov method formed the basis of the concept of forecasting the scientific and technical potential of the Council of Mutual Economic Assistance member countries



THE FATE OF OGAS

Submitted to the Government in 1964, the OGAS project met with sharp objections from the leadership of the Central Statistical Office of the USSR, then it was processed for a long time in the Central Statistical Office of the USSR, the State Planning Committee of the USSR, but it was never implemented. The incompetence of the top management of the country, the unwillingness of the middle bureaucratic level to work under strict control, the unwillingness of society as a whole, the imperfection of computer technology and communications that existed at that time, and misunderstanding on the part of economic scientists prevented the creation of the OGAS. The concepts of OGAS and EGSVTS met resistance from the social system itself.

V.M. Glushkov actively fought for informatization and computerization of the country within the framework of the OGAS. More than 250 of his publications in popular scientific and public publications, regular cycles of lectures that he gave to the public and the top management of the country, numerous notes to high party and economic authorities testify to his civic position. But he could not do anything without large-scale decisions of the Government and the Central Committee of the CPSU, which became a barrier on this path. And this was a tragic part of his life: like no one else, he understood that this led to the death of the social system and, as further historical events showed, to the collapse of the USSR.



ARTIFICIAL INTELLIGENCE

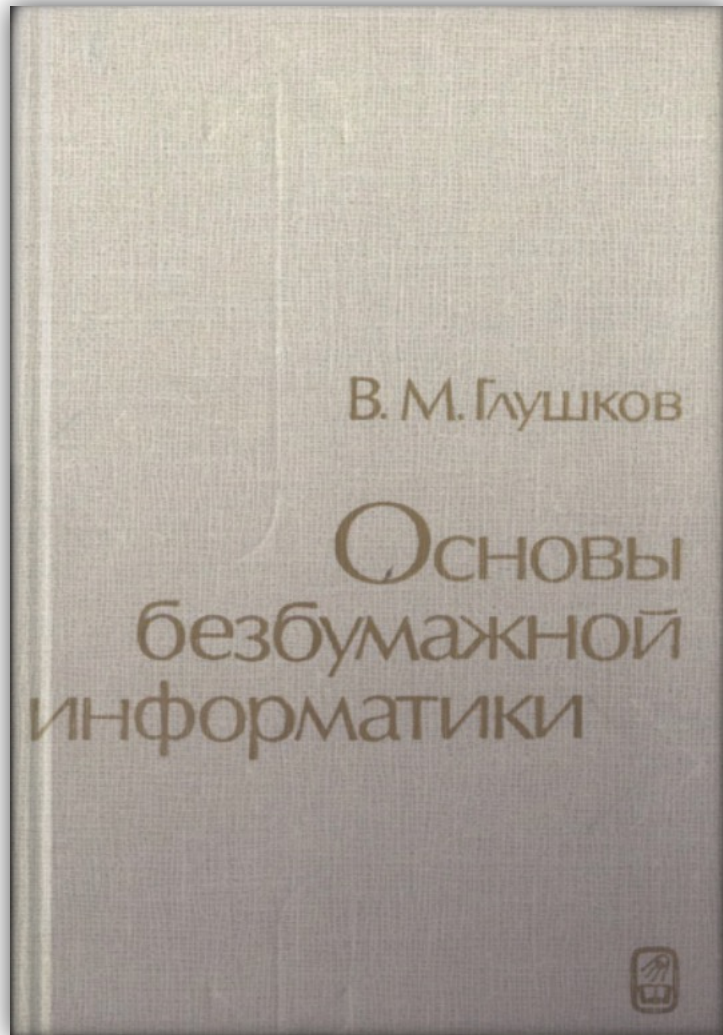
- V.M. Glushkov presented new ideas for building **artificial intelligence systems** such as "**eye-hand**", "**reading automaton**", "**self-organizing system**", **automation systems for mathematical proofs**, which were implemented at the Institute of Cybernetics of the Academy of Sciences of the Ukrainian SSR
- He worked on **computer simulation systems** for such intellectual activity processes as decision-making, mapping of conditions and situations in economic, technical, biological and medical systems.
- V.M. Glushkov actively promoted a practical approach to the problem of artificial intelligence as a matter objectively brought to life by the growing power of computers and their penetration into all spheres of human activity.
- V.M. Glushkov's students and followers successfully develop his ideas and are engaged in research on pattern recognition, methods computer vision, methods of structural analysis of scenes in the field of view of robots, are engaged in neurocomputer technologies and medical information systems.



COMPUTER SCIENCE AND INFORMATION SOCIETY

V.M. Glushkov developed the theory of **the information society**. The OGAS concept developed by the scientist largely anticipated the ideas of the **digital state and the digital economy**.

"**Fundamentals of Paperless Computer Science**" is his last monograph, published in 1982. This book describes a set of ideas and mathematical apparatus related to the problems of informatization of all aspects of life and the transition to an information society.





V.M. GLUSHKOV -

ORGANIZER OF SCIENCE AND PUBLIC FIGURE

- Chairman of the Scientific Council on Computer Technology and Control Systems of the State Committee of the Council of Ministers of the USSR on Science and Technology.
- Deputy of the Supreme Soviet of the USSR of several convocations
- Vice-President of the Academy of Sciences of the Ukrainian SSR
- Scientific Director of the Interdepartmental Committee of Nine Defense Industries and the Board of Directors of the main Institutes of Defense Industries for Management, Economics and Computer Science

PART 3

INTERNATIONAL RECOGNITION AND AWARDS

INTERNATIONAL ACTIVITIES

- V.M. Glushkov led a large international activity. He was an adviser to the UN Secretary-General on cybernetics and computer technology and their use in developing countries, he represented Soviet science abroad.
- V.M. Glushkov was the scientific director of a number of international projects within the framework of the Council for Mutual Economic Assistance (COMECON) in the field of management information systems.
- V.M. Glushkov was an adviser to the Secretary General of the Communist Party of Bulgaria Todor Zhivkov on the introduction of automated management systems of the national economy.
- V.M. Glushkov was a scientific consultant to the Government of the GDR in the field of management information systems.



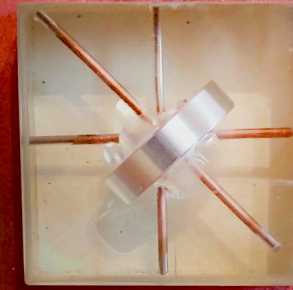
WORKING IN IFIP

At the IFIP Congress in 1974 in Stockholm, V.M. Glushkov, by decision of the General Assembly, was awarded a special award — **the IFIP SILVER CORE.**

Thus, the scientist's great contribution to the work of this organization was noted as a **member of the Program Committee of the Congresses of 1965 and 1968**, as well as a **Chairman of the Program Committee of the Congress of 1971.**

IFIP

BY RESOLUTION OF THE GENERAL ASSEMBLY,
IFIP PRESENTS
THE SILVER CORE



TO ACAD. V. GLUSHKOV
USSR

IN APPRECIATION OF HIS SERVICES AS
CHAIRMAN PC CONGRESS 71
PC CONGRESSES 65 AND 68

GIVEN AT THE IFIP CONGRESS 1974 IN STOCKHOLM

Prof. Glushkov

H. Zemanek

SOVIET AWARDS AND PRIZES



Lenin Prize
1964



twice laureate State Prize
of the USSR
1968, 1977



Hero of Socialist
Labor
1969



3 Orders of
Lenin
1967,1969,1975



Order October
Revolution
1973

INTERNATIONAL ORDERS AND MEDALS



Medal «Computer Pioneer»
IEEE Computer Society.
1996



Order of the People's Republic
of Bulgaria (I degree)
1974



Order of the Banner of
Labor of the GDR
1965

AWARDS AND INTERNATIONAL RECOGNITION

For his great contribution to the development of science and technology and the application of these achievements in the national economy, V.M. Glushkov was awarded the title of Hero of Socialist Labor, awarded many government orders and medals, including three Orders of Lenin, the Order of the October Revolution, the Order of the People's Republic of Bulgaria, 1st degree, the Order of the Banner of Labor of the GDR and others. He was a laureate of the Lenin Prize and a laureate of the State Prizes of the USSR and the Ukrainian SSR.

V. M. Glushkov was elected a member of the **German Academy "Leopoldina"**, a **foreign member of the Academy of Sciences of Bulgaria, the GDR and Poland**, an honorary doctor of the University of Dresden, an honorary member of the Polish Cybernetic Society. From 1962 until the end of his life he was Vice-President of the Academy of Sciences of Ukraine.

SCIENTIFIC SCHOOL OF V.M. GLUSHKOV



V.M. Glushkov can rightfully be considered the founder of the school in the field of cybernetics and computer science, he has more than a hundred direct students who have defended candidate and doctoral dissertations.

Under his leadership, the staff of the Institute of Cybernetics of the Academy of Sciences of Ukraine was formed, on the basis of which a Cybernetic Center was established in 1993, including the V.M. Glushkov Institute of Cybernetics, the Institute of Problems of Mathematical Machines and Systems, the Institute of Software Systems, the Institute of Space Research, the Institute of System Analysis and the International Research Training Center.

The team of V.M. Glushkov's students and followers includes many leading specialists working in Russia, Ukraine, Belarus, Uzbekistan and other CIS countries, in the USA, Germany, Bulgaria, Hungary.



V.M. GLUSHKOV – PERSONALITY AND THINKER

Victor Mikhailovich Glushkov was a charming, cheerful, sociable and encyclopedically educated man, fluent in English and German. He knew and loved poetry, music, philosophy, physics, astronomy, and was fond of radio engineering since childhood. He gave himself to the people he communicated with, created an aura of creative search, inspiration, and an amazing sense of involvement in new, big and interesting things.

V.M. Glushkov has published **more than 800 printed works**. Of these, more than 500 were written by him personally, and the rest were written jointly with his students and other co—authors. He was a true ascetic in science, possessed of gigantic efficiency and diligence.

V.M. Glushkov as a thinker was distinguished by the breadth and depth of scientific vision, with his works he anticipated what is now appearing in the modern information society.

V.M. Glushkov is an **ideologist of the digital state**, at the dawn of the development of the information society, he promoted the ideas of **artificial intelligence** and **digital immortality**.

Many of V.M. Glushkov's ideas are waiting to be realized.



THANKS FOR YOUR ATTENTION!



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<https://glushkov.su>