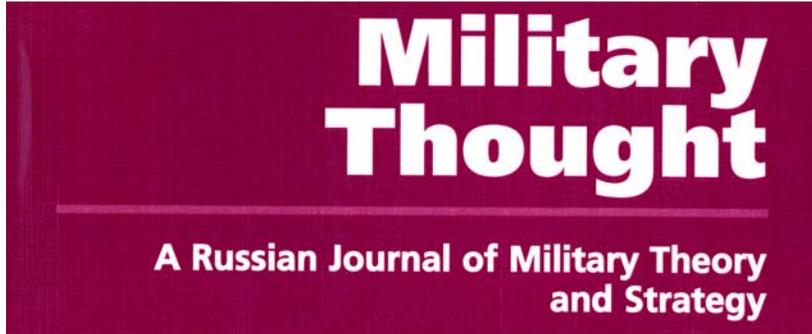


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**CENTRAL SCIENTIFIC RESEARCH INSTITUTE NO. 24 OF THE RUSSIAN  
DEFENSE MINISTRY: EVOLUTION, DEVELOPMENT**

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The country's postwar economic reconstruction and development of all spheres, including the military sphere, required the introduction of the latest scientific and technological achievements, above all in the sphere of control and management. The development of cybernetics in the Soviet Union entered the stage of intensive growth in the first half of the 1950s. Electronics and computer technology began to be introduced in all sectors of the national economy, including the defense industry. Within a very short time span, first domestic electronic computing machines were built and put into operation.

The Navy was among the leaders in mastering new technology and equipment. In December 1952, it was decided to organize a naval computing center, while a year later, the Navy commander in chief ordered for a special group with a staff of 25 to be formed at the A. N. Krylov Navy Academy and sent for a course of training in computer technology to the Moscow Institute of Power Engineering. Subsequently, on August 3, 1954, the USSR Council of Ministers issued a directive on creating Computing Center No. 2 as a scientific research institute of the Navy. In November 1954, the first group of officers (12) was formed and sent to Moscow for advanced training. It was led by Capt. 2nd Rank V. I. Zezyulin. The group included officers G. O. Barkalaya, Ya. S. Dymarskiy (both subsequently Doctors of Science, D. Sc.), P. I. Kotlyarov and Yu. L. Tumarov (both subsequently earning the Cand. Sc. degree). After completing a course of training, the group started working in a 60 sq m room at the Krylov Navy Academy.

In August 1955, the T/O of the Computing Center was approved, with a staff of 1,008 and a land plot for construction (which began in 1956) was allotted in the town of Petrodvorets, Leningrad Oblast. On November 28, 1955, the Center started operating as an independent military unit. This day is considered to be the founding date of Central Scientific Research Institute No. 24 of the Defense Ministry.

The Center's first director was Rear Adm. B. Ya. Krasikov, who answered directly to the deputy commander in chief of the Navy for shipbuilding and armaments. Originally, the Computing Center was only designed to use computing technology in developing new weapon systems and fulfilling specific operational and tactical tasks. At the initial stage, this specialization and work organization at the Center was justified since it ensured a substantial increase in the volume of computation tasks and the quality and quantity of calculations. Eventually, however, that structure was unable to meet the Navy command's new requirements and objectives for creating automated command and control systems on different levels, developing arms programs and evaluating prospects for the navy's organizational development as a whole. Thus design and development specialists ended up separated, not united by single management. So in 1959, Computing Center No. 2 was set up as the leading developer of first combat information and command and control systems for submarines, while in 1960, work began on an integrated automated command and control system for the Navy. In addition to computing technology specialists, the Center employed designers and developers of automated command and control systems: G. S. Kubatyan (subsequently chief of a main directorate), B. F. Dubovov (subsequently department chief), A. A. Fedulov (the unit's first D. Sc.), V. S. Danilov, A. A. Chekhalyan, and V. Ya. Rozenberg. Work also began on the development of electronic simulators to train submarine crews (A. A. Novikov, A. A. Meshalkin, D. T. Sorokin, M. G. Volkov, and A. E. Bulychev).

In the early 1960s, the Center became a leading developer of digital computing equipment for automated command and control systems in the Navy. That, however, proved insufficient. Development of automated command and control systems on different levels required a new level of knowledge in command and control of forces (troops) and the formulation of basic principles of its organization in naval warfare. The Center was not in a position to address that problem. So on March 9, 1961, it was reorganized as the 24th Scientific Research Institute of the Navy.

In addition to the development of automated command and control systems on different levels, this period saw the evolution of a new area of research - the study of naval operations with mathematical models and the development of computing technology and methodology for the performance of strategic and operational and tactical missions. During this period, the institute was headed by Rear Adm. I. A. Polikarpov. The new area of research (which was subsequently organized as the Institute's 1st Directorate) was entrusted to Capt. 1st Rank N. I. Nikolskiy. In the following period, the First Directorate was headed by O. S. Zhukovskiy, B. A. Nikitin, B. N. Ivanov, Yu. V. Alekseev, S. K. Svirin, G. A. Khoroshilov, Yu. N. Sinchenko, V. S. Gnitsevich, A. L. Zamuraev, V. A. Bavykin, and A. V. Nikitin. It is currently directed by S. D. Yakovlev.

The building of various types of nuclear submarines and surface warships and the rapid development of nuclear weapons and missile systems, including cruise missiles with OTH capability, necessitated the development not only of specific models of weapons and ship designs but also of integrated combat systems with required specifications. Experience shows that even with advanced warships but without well developed support infrastructure, the Navy as a whole may be insufficiently battle ready. At the same time, excellent anti-ship missiles without an effective target designation system can prevent warships from using their combat capability as they should. In other words, there was a pressing need for an integrated force development program in the Navy as a well balanced combat system. This was the principal task that the Institute worked on as the Navy's leading research center (since 1969).

After I. A. Polikarpov, the Scientific Research Institute was headed by I. A. Semko (1967 - 1972), V. S. Babiy (1972 - 1983), M. D. Iskanderov (1983 - 1991), A. P. Rudometkin (1991 - 1994), and O. T. Shkiryatov (1994 - 2004). The institute's present director is V. L. Vasyukov.

The T/O structure of the Institute's 1st Directorate was revised repeatedly. At the initial stage, it comprised four departments (in compliance with the tasks set to the naval forces): the anti-submarine warfare department (E. M. Rudoy, Yu. V. Alekseev, L. N. Mileyko, and I. Yu. Tychinin); the surface ship warfare department (I. I. Ilyashevich, V. M. Kolesnikov, and V. N. Khyaninen); the coastal warfare department (Yu. N. Maklakov, G. S. Kondratenko, G. A. Khoroshilov, I. I. Domovskiy, A. I. Ismailov, and V. A. Vasilenko); and the advanced research projects department (V. S. Babiy, S. K. Svirin, V. N. Khyaninen, G. G. Sandalov, V. B. Naumov, and Yu. K. Gavrya).

The increasing number of tasks set to the Navy and the narrowing specialization of research programs caused the number of departments at the 1st Directorate to grow from four in 1966 to 14 in 1974. Experience showed, however, that the narrowing of research specialization impaired the force development program for the Navy as an integrated combat system. In the end, an optimal composition of the Directorate was established with six departments which are currently headed by O. V. Aristarkhov, A. A. Nesterchuk, V. A. Kovtun, G. G. Roslik, V. P. Kushnir, and S. A. Shaderkin.

It was in large part due to the 1st Directorate's performance that the 24th Scientific Research Institute of the Navy became a major generator of scientific ideas in substantiating the principal lines of naval arms and equipment development programs. In the mid-1980s, the scientific research staff, led by Prof. S. K. Svirin, D. Sc. (Naval Science), Merited Scientist of Russia, published a classic work, Arms Development Theory, which is still a principal guideline and required reading for all researchers in the field. The main area of activity by the Institute and its 1st Directorate during that period included operational-strategic and military-economic substantiation and support for the organizational development of the Navy as principally a blue water navy.

Reality demanded further research on balanced force development for the Navy. The Institute became the Defense Ministry's first research center to develop the needed methodology and appropriate scientific-methodological apparatus. Substantial contribution to the project was made by S. K. Svirin, V. N. Khyaninen, R. A. Chervinsky, G. O. Barkalaya, L. N. Mileyko, and I. Yu. Tychinin. The work was directly supervised and facilitated by admirals and senior officers at the Navy Main Staff, especially its Operations Directorate, in particular V. Kh. Saakyan, K. V. Makarov, V. P. Ivanov, Yu. A. Kaysin, V. M. Kozik, V. N. Beznosov, V. V. Zaborskiy, S. G. Kozyrev, and V. M. Lebedev.

The Navy's rapid development in the 1960s and the 1970s not only sharply increased its numerical strength but also drastically changed its peacetime operations. At this stage, combat service was the principal form of the operational employment of naval forces in daily peacetime activities. Whereas originally it was limited to independent (unreplenished) cruises by submarines and cruise patrols by surface warship flotillas, subsequently operational employment came in the form of the constant presence of large strategic formations and combined units of mixed-arms naval forces in the most important areas of the world's oceans, supported by floating maintenance facilities, support ships and supply vessels. Combat service became the ultimate form of maintaining naval forces in combat readiness in peacetime, as well as a kind of a laboratory to test naval force development programs and operational performance standards. The 24th Scientific Research Institute was also assigned a new task-namely to provide a

comprehensive analysis of the Navy's overall performance, identify possible shortfalls, and work out recommendations to upgrade and advance combat service forms and procedures. To this end, in 1965, a special group, Pokhod, was set up at the Institute, directed by Capt. 2nd Rank N. V. Zateev, who was subsequently replaced by V. I. Beloshnikov and E. F. Mokrinskiy. In 1969, the group evolved into a separate department, which was headed (in succession) by E. M. Rudoy, G. V. Kosintsev, A. N. Zolotov, and G. V. Bugrov. Research associates at this subdivision developed effective scientific methodology for operational performance analysis, providing thousands of recommendations on different levels, whose realization helped substantially to enhance the effectiveness of the Navy's operational performance.

Differences in the specialization of projects concerned with the development of automated command and control systems on different branch of service levels necessitated the organization of another two new directorates at the Institute. The 2nd Directorate was tasked with substantiating long-term development of automated command and control systems for the Navy, fleets, and flotillas. The directorate was headed (in succession) by Yu. N. Maklakov, V. L. Lushchik, A. A. Murtazaev, V. N. Milovanov, and A. N. Kosarev. Its current director is E. I. Beskhmel'nitsin. Major R&D projects carried out by the Second Directorate included the substantiation, creation and introduction of unique automated command and control systems in the Navy. An especially valuable contribution was made by such researchers as V. I. Volkov, Yu. A. Lebedev, and Yu. G. Khrabrov.

The Third Directorate engaged in the development of combat information and command and control systems for submarines and surface warships. It was headed by G. S. Kubatyan, A. A. Loskutov, D. P. Zubkov, V. K. Buyko, Yu. P. Blinov, and S. P. Navoytsev. Its current director is M. V. Bondar. Specialists of the Third Directorate developed standard methodology for the automation of warships' command and control systems based on an integrated complex of digital computing machines, ensuring information collection and processing, command and control of weapon systems and ship control with appropriate information and decisions being displayed on terminals and display controls. A substantial contribution to the development of first and subsequently command and control systems was made by Yu. I. Tutaev, I. A. Chebotarev, A. V. Loskutov, V. S. Chernov, Yu. A. Popov, N. E. Strelkov, and A. G. Zubov. The creators of the Tucha system were awarded the State Prize (chief developer I. A. Chebotarev). The Directorate also created operational-tactical simulators for unit and combined arms unit command and staff training. Researchers I. N. Korzhov, Yu. I. Puchkov, and M. G. Volkov contributed to their introduction.

The development of automated command and control systems on different levels required the establishment of a special subdivision-namely the Special Mathematical Software Support Center. It was created in December 1976 and headed by S. M. Kostin, who was subsequently replaced by G. D. Litvinov and V. V. Zemlyanukhin. The Center became the Navy's principal unit for the research and development of software support technology and methodology. Furthermore, the Center created large-scale fleet operation models. It is essential to note such research associates as V. V. Ryabov, N. G. Nikitin, V. A. Pavlovich, and V. N. Guryev, as well as Sh. K. Vakhitov, a leading mathematician in the Navy.

The former computing center was structurally organized as the Fifth Scientific Directorate which was headed by V. A. Shcherbakov and then E. A. Kukhto. In the 1970s and 1980s, the Fifth Directorate's research associates put into operation BESM-4 computer systems, as well as ES-1030, ES-1033, ES-1060, and ES-1061 series machines. Priority in the modernization of the computer park was given to the introduction of mini - and micro computers.

Much effort in this area was deployed by T. G. Chervatyuk, P. A. Andreev, Yu. A. Stepanov, and Yu. P. Gushchin.

Thus, beginning in 1961, the scope of tasks entrusted to the Institute has been constantly expanding. In 1969, it became the Navy's leading research center for force organizational development programs, automation of naval command and control systems, and modeling and development of software for automated command and control systems. Pursuant to the Navy commander in chief's directive, the Institute was upgraded to Category 1 R&D establishment of the Defense Ministry, entrusted with designing especially complex products, while in 1988, it acquitted the status as "central" - the 24th Central Scientific Research Institute of the Defense Ministry. To ensure the training of scientific cadres and advance their qualifications and proficiency, in 1971, it established a specialized council for the defense of Cand. Sc. Degree dissertations and in 1976, also doctoral (D. Sc.) dissertations. By now, more than 200 Cand. Sc. and 25 D. Sc. dissertations have been defended at the Institute.

Throughout its existence, the Institute has carried out hundreds of R&D projects, mainly large scale, comprehensive projects, and thousands of express studies assigned by the Navy Main Staff. As a general rule, important decisions by the Navy command in the aforementioned fields have been based on the results of studies accomplished at the Institute.

Unfortunately, not all recommendations made by the Institute were always followed in practice. For example, the need to strike the right balance between attack forces, the command and control system, and the entire support infrastructure of the Navy was not fully taken into account in force development organization until the early 1980s. In the interest of achieving military strategic parity as soon as possible, the bulk of funding provided for the Navy's organizational development was spent on building surface warships, submarines, aircraft, and arms and equipment. The growing lag and decline in infrastructure and the intense exploitation of warships in the course of combat and operational training exercises and combat service caused a drop in the numerical strength of battle worthy naval forces.

As follows from the aforementioned, the creation and development of the 24th Central Scientific Research Institute was necessitated by the need to build a powerful navy and give it a blue water capability in the interest of achieving military strategic parity with the U. S. Navy as well as the navies of other NATO member countries. Such was the dictate of the times. In the late 1980s - early 1990s, however, the situation turned around: Priorities in force development in general and naval force development in particular were abruptly revised. The level of funding for the Navy and the provision of all types of assets and logistic support declined considerably. Combat duty service as the ultimate form of maintaining the operational effectiveness of its forces began to be scaled down. For example, by 1991, the number of sea patrol cruises by nuclear submarines declined six times compared to 1982, falling almost to zero soon after the breakup of the Soviet Union. At the same time, U. S. and NATO nuclear submarines are constantly patrolling the Atlantic.

The attitude toward science also changed. Whereas in the difficult postwar years, 12 percent to 15 percent of the country's annual budget was invested in science and research, in the early 1990s, it was less than 2 percent. It is the view of the present author that putting the military science on a self-financing basis was a bad mistake. In 1989, pursuant to a Council of Ministers resolution, Central Scientific Research Institute No. 24 was transferred to a self-supporting basis, while in 1998, it was reorganized as a federal state unitary enterprise. Development had stopped and the struggle for survival began. There were four major downsizings, as a result of which the Institute's staff was reduced by more than three times.

Three out of five directorates remained: The functions of the First Directorate remained virtually unchanged (evaluation of prospects for organizational development and employment of naval forces); the Second Directorate was tasked with evaluating prospects for the development of automated command and control systems on all levels, from top to bottom; the Third Directorate was made responsible for the introduction of advanced information technology in the interest of command and control systems. Thus Central Scientific Research Institute No. 24 ended up in a less advantageous position than, e. g., the Institute of Shipbuilding and Armaments (the First Central Scientific Research Institute of the Defense Ministry) since the latter is closer linked with the defense industry, and in the prevailing market situation, it is better positioned to present various ship and weapon designs as a viable commodity while implementing even a substantially scaled down shipbuilding program. Meanwhile, the software product offered by the Institute No. 24 is not in much demand. Aware that the plan to transfer the military science to a self-financing basis was inexpedient, the Russian government decided to return it the status of a public sector establishment, financed from the state budget.

In 2001, pursuant to a Russian government resolution and a corresponding order by the defense minister, Institute No. 24 incorporated Scientific Research Institutes No. 14 and No. 34 (EW and communication), thus merging three structurally organized scientific research centers: operational strategic analysis of prospects for naval force development, communication, and EW weapon systems.

In November 2005, the Navy's Scientific Research Center for Operational Strategic Studies will turn 50. Throughout its history, it has carried out more than 1,000 R&D projects (including 80 percent of integrated projects) where the institute was a leading scientific research center of the Navy and the Defense Ministry, providing scientific support for more than 300 R&D projects. Apart from scheduled projects, the Institute carried out more than 12,000 unscheduled projects and assignments as well as about 250 commercial projects. The Institute's specialists provided credible assistance to fleets in introducing new arms and equipment (including in exercising command and control) as well as in conducting command and staff war games and training exercises on different levels. Institute specialists attended these activities on more than 2,000 occasions. About 1,500 utility patent applications were submitted with more than 20 percent of inventions patented and put into operation. One extremely important project in recent years was the Institute's participation in formulating Russia's Naval Strategy. The Center answers to the Main Staff of the Navy and is directed by Capt. 1st Rank Sergey Petrovich Navoytsev.

The Navy's Communication Scientific Research Center was established in 1932 as a scientific research institute of signals communication of the Workers' and Peasants' Red Army's naval forces. Its founder and first director was Adm. A. I. Berg, academician of the USSR Academy of Sciences. The Institute was subsequently directed by such well regarded scientists as Ya. T. Varaksin (1938 - 1952), A. T. Suprun (1952 - 1963), V. V. Lopatinskiy (1964 - 1983), N. F. Direktorov (1983 - 1993), V. I. Shorin (1993 - 1998), and A. G. Dolbnya (1998 - 2003). Its current director is Capt. 1st Rank Sergey Aleksandrovich Lobov. Throughout its more than 70 year history, the institute (center), jointly with military industrial enterprises, developed and introduced such naval EW systems as Blokada 1 (1934), Blokada 2 (1942), and Pobeda (1944); long range systems of communication with submarines (Globus, 1961) and surface warships (Ekvator, 1966). Powerful long wave radio stations Gerkules (1962), Antey (1963), Atlant (1968), and Prometey (1974) were built, with their more advanced version Okean (1996). Furthermore, R&D projects carried out at the institute were used as a platform for a global

communication system and geographically distributed microwave radio frequency and space based communication systems for command and control of naval forces in strategic parts of the world's oceans (1964 - 1978). High speed, rapid and automated radio frequency communication complexes were developed for warships at sea. The main contracting authority and supervisor of SRC projects is the Navy's chief of communications.

The Scientific Research Institute of Naval EW Systems was originally established as a scientific research institute of radar technology in 1945, just after the war. In 1956, it was reorganized as the 14th Scientific Research Institute of the Navy (SRI No. 14) and was at different times directed by such prominent scientists as B. N. Shatrov (1945 - 1952), N. M. Gusev (1952 - 1957), A. L. Genkin (1957 - 1958), S. P. Chernokov (1958 - 1974), I. I. Tynyankin (1974 - 1976), V. N. Romanenko (1976 - 1986), D. D. Kashuba (1986 - 1993), and A. A. Baranenko (1993 - 2003). Its present director is Capt. 1st Rank Vladimir Nikolaevich Parshukov.

Throughout the institute's history, its scientists and research associates have provided feasibility studies and military-scientific support for more than 500 models of EW weapon systems for the Navy, including hydro-acoustic, hydro-physical, radar, and optical-electronic, EW jamming, automated information gathering and processing, software support, mutual orientation, and other systems. The Institute's (Center's) specialists were highly instrumental in developing such important areas of research as the creation of information and command and control systems; control of maritime borders and protection of coastal installations against harmful impacts; and procedure for integrated processing of information coming from different sources with the provision of recommendations for the decision making process.

Today, the Scientific Research Center continues its research programs to develop EW information systems; local, regional and federal systems of monitoring the maritime situation in the interest of ensuring the country's security, protecting its economic interests, protecting its state borders, and ensuring security at sea. To ensure effective coordination of scientific research programs, the Center has a number of coordinating councils, including on hydro-physics, hydro-acoustics, sea radar ranging, and optical electronics. This scientific research organization has an appropriate laboratory and experimental base and modeling complexes, while its scientific production needs are ensured by an experimental plant. The main contracting authority for the Center is the Navy's Electronic Engineering Directorate.

Today, Institute No. 14 organizes and conducts scientific research, R&D, technological, designing, testing and other types of work both independently and in interaction with other scientific research organizations. It remains the only scientific research organization capable of providing long-term operational-strategic appraisal of force development programs for the Navy as an integrated combat ready system without which Russia cannot claim the role as a maritime power or reliably protect its economic, political, and military interests at sea. The Institute has an impressive scientific research capability to fulfill the tasks assigned to it and to further advance this capability. It has three dissertation councils, 31 holders of the D. Sc. degree, and 269 holders of the Cand. Sc. degree. D. Sc. S. K. Svirin, A. N. Zolotov, L. V. Ivanovskiy, A. I. Mashoshin, S. V. Kovtunenkov, V. A. Saprykin, and M. N. Baranov have the honorary title "Merited Scientist of Russia," while research associates Yu. V. Alekseev, S. N. Kochergin, Yu. N. Maklakov, Sh. K. Vakhitov, A. D. Labutin, Yu. F. Zykov, B. S. Kryakovskiy, and A. A. Baranenko are State Prize winners.

During the current transition period of restructuring and reform, one fundamental task for Central Scientific Research Institute No. 24 should be to ensure the preservation of the scientific

schools that have evolved over the past decades and advance its scientific and technical capability.