

Lavrich, Yu.N.

Institute of Transport Systems and Technologies, the NAS of Ukraine,
5, Pisargevskogo St., Dnipro-City, 49005, Ukraine
tel.: +38 056 370 2182, fax: +38 056 370 2186, lavrich@westa-inter.com

THE SPECIFIC FEATURES OF SCIENTIFIC SUPERVISION OVER THE PRODUCTION OF PROMISING RADIOELECTRONIC DEVICES



Introduction. The development of new generations of weapons and military equipment is accompanied by scientific supervision that is a necessary condition for achievement of high-performance characteristics, at all stages.

Purpose. The purpose of this work is to substantiate possible ways and methods for scientific supervision over WME under current conditions.

Materials and Research Methods. The problems of weapons and military equipment production under current conditions have been analyzed.

Research results. Based on the conducted analysis a few modifications to scientific supervision have been offered, in particular: to renew applied research science within the existing academic structures, to establish a system for management of defensive research and development works (RDW) based on the principals of interconnected and coordinated participation of all scientific spheres, to audit and to assess the existing R&D capacity, to create a common R&D capacity bank, to provide access to the systematized R&D information, to revise approaches to assessment of national scientometric base, to create national periodicals concerning the production of weapons and military equipment, to correct the methodology for selection and evaluation of competitive suggestions from R&D institutions.

Conclusion. The offered modifications to the content of scientific supervision over design, development, and production of new WME generations will enable not only to reduce the duration of stages of development and introduction of new WME models, but also to improve the quality of serial products.

Keywords: scientific supervision, fundamental science, applied-research science, and engineering system.

The most important factor influencing the national security and defense is the state of science and technology, i.e. the level of R&D and fundamental science development, is the framework for ensuring the national security. The National Academy of Sciences of Ukraine (the NAS of Ukraine) throughout its history was and remains the leading scientific organization of the country. At the present stage, even experiencing the lack of funding, the NAS researchers have been able to reach the world class accomplishments in many areas

and directions of fundamental and applied research. It should be noted that these achievements belong to the national science and are associated with the names of prominent scholars, founders of scholarly research schools, Full Academic Members Borys Paton, Vadym Lashkarev, Viktor Glushkov, Volodymyr Utkin, and many others.

The author's long experience in the R&D system and manufacture of science-intensive products has shown that the R&D organizations, due to the authority of recognized scientific schools and leaders, play a significant role in solving the problems related to creation of weapons and mili-

tary equipment (WME). Creation of science-intensive products is an interconnected and coordinated work of three spheres: the academic, the industrial, and the manufacturing ones. The classification into fundamental and applied sciences manifests itself in the fact that the fundamental science was and remains the subject of concern of the Academy of Sciences, while the applied research is conducted by the industrial institutes, including the military ones.

Traditionally, the basic tactical and technical requirements for the WME were justified by research institutes of the Ministry of Defense of Ukraine, which further were responsible for military and technical support of developments. At the present time, military science goes through a crisis like the general science. The crisis manifests itself in reducing number of military universities, researchers, and R&D projects, degrading quality of scholarly research, and decreasing number of implemented R&D works, etc. The industrial and manufacturing components of science having been eliminated in the country, the fundamental component experiences the lack of communication channels with practice, in particular, with industry. Previously, the industrial sector of science was a well-ordered system, with each ministry having, at least, one leading research institute, often with branches, and numerous design bureaus (DBs), institutes, and laboratories. Most large factories had independent DBs closely collaborating with the fundamental and applied science while designing and manufacturing the products, which naturally created conditions for a qualitative transition from support and maintenance of production to self-sustained design works.

The experience of development of sophisticated science-intensive systems, by the example of *Dniprovskiy* DB, has shown that creating a factory's DB scientific school takes, at least, 10 years. For this period, the DB became the leader in designing transmitters, receivers, digital systems, and other functional devices not only for military purposes but also for wider application. Today, in the country, most DBs at the best have turned

into factory units or been transferred to private owners. Having no communication with the fundamental science, they produce outdated products. In the structure of the Cabinet of Ministers of Ukraine, in addition to the Ministry of Defense, there is also the Ministry of Education and Science that in one person is responsible for education and science. Such a concentration should also facilitate solving the tasks of WME. However, the education system is under permanent transformation, now it aims the formation of skills and abilities rather than knowledge, with most universities having neither R&D capacity nor experience in the creation of WME systems. The common feature of virtually all universities in the country is the lack of interdisciplinary knowledge, without which it is impossible to create promising WME models.

Previously, there were republican academies and one Union Academy of Sciences. Today, in addition to the fundamental science represented by the NAS of Ukraine, there are many academies created by universities themselves and children's Academy of Sciences (the Small Academy of Sciences, SAS), which neither relate to fundamental sciences nor have application of their research works. In Ukraine, there is an imbalance in science and education towards the humanitarian sphere [1], which is traceable in the number of educational institutions, humanitarian disciplines, majors, etc. Even the scientific knowledge resources declared by universities do not create illusions about their ability to find new solutions and approaches in the field of WME. The universities were and remain the place for educating and training professionals and researchers, while the actual research work is carried out at the institutions of the Academy of Sciences and industrial research institutes. It is difficult to understand the approach of researchers from universities to organizing scholarly research activities. In the conditions of complete or partial extinction of enterprises, while seeking to survive, science, in general, and in universities, in particular, can try to establish priorities and to get government

orders through attracting representatives of enterprises and organizations supposedly capable of adequately predicting which R&D products will be needed and have demand in 5–10 or 15 years. Forecasting is a difficult and not very exact science, with the level of confidence in it backed by comprehensive research of academic structures. It seems, this truth is not known to everyone. If such enterprises are experts and direct customers of works chosen at their discretion, this will entail an unreasonable waste of budget funds.

The assignment of research status to individual universities in Ukraine aimed, first of all, the creation of conditions for the acquisition of elite education based on organic association of the three components in these universities: training, research, and introduction of innovative technologies. Obviously, with such approaches and priorities of universities it can be stated that R&D problems of WME cannot be outlined either, not to mention their effective solution. In spite of propaganda statements about their research orientation the existing Ukrainian universities have nothing to do with research and according to the QS World University Ranking for 2016–2017 they are not rated among the top four hundred best world universities.

At present, many organizations make dubious statements about the readiness to carry out independently the entire complex of works previously made by numerous academic and industrial research institutes, including the Ministry of Defense. However, the experience of WME creation has shown the opposite: there have been no examples of development or even scientific supervision over military projects by any military (civilian) university alone.

An effective system for the development and introduction of WME is a complex research task, the results of which enable the creation of new promising products.

This research proposes possible ways and means for scientific supervision over WME development in present-day conditions based on the capacity and experience of the NAS and Ukrainian designers.

PROPOSALS ON SCIENTIFIC SUPERVISION OVER WME DEVELOPMENT

The NAS of Ukraine has advantages, in terms of both scientific supervision and effective independent research aimed at the development of WME advanced models. On the one hand, there is a list of scholarly research studies with, at least, double use implemented within the framework of research projects of academic institutes. However, given that in most countries new research discoveries and achievements of scientists are found their application firstly in the military field, a structure that provides scientific substantiation, implementation of scholarly research results, and support of the development of promising WME models at all stages of the life cycle must be in place.

On the other hand, continuity and scientific traditions are the framework and a necessary condition for the creation of advance competitive defense science. It is just this condition that a priori enables and makes it necessary the involvement of the NAS in creating the WME as leading scientific organization carrying out scientific supervision at all stages. The existing experience in the creation of science-intensive systems for the prevention and control of outer space has shown that namely the academic institutes, such as the Radio Engineering Institute (formerly the Laboratory of the Russian Academy of Sciences), formulate the methodological foundations for the design of such systems. By the way, similar scientific structures have been created at the Chinese Academy.

The content of scientific supervision over WME creation is multifaceted and cannot be the same for all types of WME, it must continuously vary and take into account the emergence of new scientific discoveries, new priority directions and ways to ensure the defense capability of the country.

Proceeding from the state of the military, industrial and manufacturing sectors of science at the present stage of development of the country, the R&D potential of the Academy cannot be realized unless the applied science as well as R&D activities at DBs directly engaged in product de-

sign are revitalized. In today's conditions of separation of sciences, the independent formation of industrial science is unrealistic. After all, first and foremost, the applied science is simply unthinkable without the fundamental science: the former uses achievements and is a tool of the latter. The most realistic way of the industrial science formation is to develop it in the structure of the NAS and to search effective forms of combining fundamental and applied sciences within the existing academic structures.

Under limited funding, the organization at the National Academy of Sciences should be targeted towards the fundamental research and the integration of research and applied infrastructure into a single complex of coordinated and interdependent scientific, R&D, design, technological, and testing divisions.

Today it is quite possible, without increasing the staff, to create in the National Academy of Sciences a structure for coordinating the fundamental and applied research, and to organize in its R&D subdivisions engaged in fundamental research, structures (laboratories, groups, etc.) for conducting applied research. Initially, it makes sense to carry out such transformations in the institutes of the National Academy of Sciences, which submit R&D projects to the competitions of the National Academy of Sciences. These projects can become a framework for forming the subjects to be studied by future structures of industrial science.

The structure of the Ministry of Defense has a military research administration with the functions of organization, planning, and coordination of scientific and R&D activities in the Armed Forces of Ukraine (AFU). However, we must take into account that in the structure of the Ministry of Defense, the military science is represented by individual research institutes that have neither sufficient experience in the development of complicated science-intensive products nor scientific schools and are not familiar with the existing R&D capacity accumulated. Taking into consideration the experience of organizing the scien-

tific supervision over WME in the USA and other countries, for the National Academy of Sciences it is advisable to initiate the creation of research institutes for different branches of military forces, otherwise the main subjects of their studies will remain problems of general nature that do not reflect the real needs of military forces.

The effectiveness of scientific supervision over the development and production of advanced knowledge intensive WME directly depends on the establishment of an effective system of defense R&D, design, and testing works based on interconnected and consistent involvement of all scientific spheres – academic, industrial, and manufacturing ones, with advanced experience of foreign countries regarded.

The creation of new WME generations always is preceded by cycles of research by institutes of the NAS of Ukraine, the Ministry of Defense of Ukraine and design bureaus of defense corporations. According to the system general theory methodology [2] there are two completely different approaches to substantiation of national WME system. The first approach foresees improving the existing weapons system, i.e. evolutionary transformation that harmonizes it with required standards and operation conditions. The second one implies full-scale design of new weapons system.

In Ukraine, like in most countries, the choice between «upgrade» or «new technology» for upgrading the weaponry and military equipment cannot be made only by the Ministry of Defense, insofar as a scientific substantiation is required taking into account the actual state of the WME, the existing R&D capacity, and the level of economic development. In the cost structure of modern armed forces, the R&D expenditure exceeds the repair and maintenance cost, with the specific weight of the latter decreasing constantly. In the armies of advanced economies, the optimal ratio between the new, modern, and outdated weapons is 25:50:25%, whereas in Ukraine it is 0.5: 1.5: 98% [3].

Recently, the Academy of Sciences has initiated and successfully completed a number of national target and R&D programs. It is quite obvious

that under the existing conditions, a research backed approach to defense capability based on efficient use of allocated funds either by upgrade or by development of a new generation of WME can be developed only within the framework of scholarly research carried out by the National Academy of Sciences. At the same time, the creation of new generation of WME is impossible without the use of new scientific ideas, design schemes, and technological solutions. It is just here where the future level of development and its conformity to the current stage are determined, therefore a successful solution to this issue cannot be found out without scientific supervision by an authoritative R&D organization, namely, the NAS of Ukraine. Based on the analysis of accumulated R&D capacity it is capable of creating the intellectual basis of the 21st century MWE, which will significantly reduce the time frame for the creation of new WME models.

The ability to design and to produce the element base is one of the key principles of reliable operation of any industry in modern sovereign state. The basic operating and technical restrictions as well as shortcomings of radioelectronic systems of whatever application are established as early as at the level of element base. By the end of the 20th century, the share of radioelectronic equipment in the cost of weaponry and military equipment reached 70–90 %. The respective electronic component base is required for its regular upgrade (very 4–5 years) [4]. Traditionally, Ukraine is known for well-developed UHF electronics [5] that represents a narrow sector with specific techniques based on the silicon technology typically used in microelectronics. Disavowal of leading role of microelectronics has led to a crisis in this industry, a drop in output of electronic component, stoppage of production, and, as a result, to saturation of the Ukrainian market with imported electronic products [6]. Under the existing world specialization and cooperation, the choice of technologies and nomenclature of the element base for creating WME is a subject of deep comprehensive research and requires the elabora-

tion of medium- and long-term forecasts that can be obtained only by means of both fundamental and applied science. The scientific supervision over new promising WME development without basic requirements for new generation of its element base will inevitably affect the engineering and economic characteristics of both the design works and the manufacture.

Today, Ukraine does not have so powerful economy, therefore, the most logical scenario is to integrate into the international specialization. Being a WTO member, Ukraine has an access to modern element base of world manufacturers. However, at the same time, it needs to elaborate new standards and regulations for design works.

The lack of capacity to coordinate the joint efforts of educational establishments and R&D institutes on the study and scientific supervision over creating the promising weapon systems at all stages remains an obstacle on the path towards effective collaboration of the Ministry of Defense, the NAS of Ukraine, and other organizations for solving the problems of AFU provision with modern WME. The most important component of scientific supervision over WME must be a new approach to the design and commissioning works insofar as the existing one is unable to reduce their long terms and high costs. It is advisable to elaborate such standard omitting some stages, based on the experience of creation of large systems and design principles as defined in the so-called Chief Designer specifications.

Today, to set priorities of development and implementation of systemic and predictable approach to the creation of national WME is impossible unless a research and industrial council consisting of representatives of the NAS of Ukraine, R&D institutes, DBs, and defense sector corporations and operating on regular basis is established. This council may be modified or amended from time to time, as may be required, and proceeding from the results of R&D works carried out at educational establishments. The key deliverable of the Council activities must be R&D plan of the NAS of Ukraine as leading scientific organ-

ization of the country with all implementing partners and contractors specified. The works must be funded from separate item of the national budget of Ukraine for defense capacity and security R&D works. For the time being, no council has been founded and its activities are done by organizations having no R&D capacity, which waste time and money.

While choosing directions of R&D works it is very important to prevent duplication of activities. Analysis of projects implemented by the NAS of Ukraine and educational establishments of the Ministry of Defense and the Ministry of Education and Science can help create a bank of promising directions and exclude the outdated ones in order to save money and to reassign them for necessary activities. The results of R&D works must be suitable for inclusion into the target R&D plan or list of promising directions.

The scientific supervision by the NAS of Ukraine that acts as liaison agent for all scientific fields must cover R&D activities and needs of organizations involved in applied war and defense research, irrespective of their subordination, and enable independence of obtainment of research results and conclusions, unbiased examinations on wide range of problems in order to prevent prejudice and one-sidedness of judgements, depending on subordination.

The effectiveness of scientific supervision can be ensured by NAS engagement in developing proposals and elaborating scientific and methodological documents concerning the development of WME, military and military engineering policy, and defense industry, in carrying out independent examinations of projects, programs, plans, design works, technical and organizational solutions related to WME development problems. In other words, the effective scientific supervision cannot be implemented unless the NAS of Ukraine is directly involved in the national system of WME design and commissioning works on regular basis.

As a rule, the conceptual design of promising weapon system of new generation is rather vague and the necessary condition for successful weap-

only development is timely building of R&D capacity that is the framework for new R&D works. In the leading countries, the capacity building phase makes up about 10% of general budget expenditure on WME development [7]. Pursuant to the generally accepted terminology, the capacity means accumulation of excessive knowledge, technology, products, semi-finished goods, and other type of reserves. Studies of innovation and knowledge theory have shown that namely information excess and diversity are necessary condition for successful creation of various functional systems. Currently, one of decisive factors effecting the WME sustainable development is availability of forward R&D capacity. This capacity can be built only by means of fundamental and applied research carried out by the NAS of Ukraine for the sake of national defense capability and security. Hence, the NAS of Ukraine together with other organizations has to develop and to build a common R&D capacity and a list of priority fundamental and applied research, and the latter must be approved at the highest level.

A logical implication of such research and a precondition for R&D capacity building is R&D works related to the creation of advanced elements of the functional system and integration of new (improved) materials into the element base, components, modules, blocks, algorithms, and programs. It is a known fact that new scientific discoveries can be realized not in every instance, because of the lack of technology. The modern specific feature of scientific supervision is necessity to implement or, at least, to make practical application of new results (discoveries) possible. Doing this the NAS of Ukraine as a coordinator shall initiate within the priority lines of science and engineering development the studies for preserving and developing the existing R&D capacity and for building the forward R&D capacity for design of science-intensive products to be used in government target programs aimed at innovative development of the real sector of the national economy.

A systematic R&D information is the framework for the formation of scientific supervision

system for the creation of promising WME systems. Today, the information traffic has grown so much that it is difficult to notice important new items either, not to mention their detailed study that requires access to relevant data. The experience of scientific and practical workshops, seminars, and other conferences has shown that there are many participants who still believe that certain scientific ideas and methods are impossible although they have long been realized, including in our country.

Nowadays, only the USA, the Russian Federation, China, Ukraine, and France (after the launch of GRAVES radar in 2005) have facilities for surveilling the outer space. Ukraine, as a spacefaring nation, takes an active part in various international space programs, putting both national and foreign spacecraft to near-Earth orbits with the help of its carrier rockets. The government programs foresaw the creation of the National Space Surveillance and Analysis System (NSSAS) [8] and ground infrastructure as part of its upgrade [9]. Despite the fact that Ukraine has been using such facilities since 1975, none conferences have addressed the problems of operating the DNI-PRO-type information systems, their upgrade and construction of new generations.

It is difficult to find more science-intensive product, however Ukraine that is one the five world manufacturers of these systems, is creating all preconditions for losing the technology of its creation. This is not an exaggeration; only one design bureau in Ukraine dealt with these developments and have created a wide range of such systems. The most recent microelectronic one created on the 4th–5th generation element base is known to many beyond Ukraine, but not inside. Under the lack of scientific analysis and assessment of capabilities, those who stand for the elimination of the technology prevail so far in Ukraine. At the same time, for repairing the outdated cells of only one WME type every year the country spends money that can be sufficient for manufacturing and commercializing 3 or 4 new DNIPRO type systems. Comprehensive audit and

assessment of the existing R&D capacity as NAS contribution into this science-intensive product will enable not only to preserve, but also to further develop the double-use technology. The existing R&D capacity in the field of similar science-intensive information systems will make it possible to solve the most complicated problems thereby raising the role of science in our country and to carve out a niche in the international market of science-intensive services.

Under aggravating underfunding of the NAS of Ukraine, the participation of R&D institutes in specialized conferences becomes practically impossible, as well as the publication of works in most reputable domestic scholarly research journals, not to mention the foreign ones. At the same time, upon initiative of corporations of various forms of ownership, which seek to highlight the results of their activities in reputable scholarly research publications, publications of academic scholars on such subjects in their periodicals would be advisable, which, among other things, will enable raising funds for publishing in high-rated journals.

The path of a new creation in science runs from absurdity to madness that are the boundaries of scientific thought existence. On the one hand, if at first the idea is not absurd, then there will be no hope for it (Albert Einstein), and on the other hand, the question is whether it is crazy enough to be have a chance of being correct (Niels Bohr). However, for the scholarly research journals the priorities are observance of numerous editorial requirements and subjective reviews, with the novelty of the scientific idea being the second important. To make scientific ideas and views accessible to a wide range of scholars requires a revision of approaches to the placement of scholarly research papers – the journal should be a platform for scientific discussions.

It is advisable for sharing scientific ideas, thoughts, and experience of national and foreign developers among all stakeholders to initiate, through the NAS of Ukraine, national general scholarly research publications in the sphere of R&D, milita-

ry engineering, technology, technical and economic matters of WME creation, which would be common for the Ministry of Defense, Ministry of Education and Science, DBs, and defense corporations.

In addition, given the financial capacity of the research staff of academic institutions, the status of national scientometric base should be raised, since most foreign databases, based on which the accomplishments of Ukrainian researchers are evaluated, are commercial projects in science. At the same time, it should be noted that reports of Ukrainian researchers given at domestic conferences, the proceedings of which are not included in such bases, are known and available to many abroad, the authors are offered to publish their reports in foreign periodicals for free, but in this case they lose copyright.

Today, the NAS of Ukraine holds contests of scholarly research works and thereby facilitates the concentration of capacity of its R&D institutions to provide solutions for the problems of the Defense Ministry, but the selection method based on which proposed R&D project can be rejected for formal reasons in the absence of the author, does not help select the truly new ideas and approaches based on the experience of the authors. The NAS of Ukraine, while conducting competitions of R&D projects, can create a bank of such projects and, upon results of analysis and expert

examination with direct customers engaged, can coordinate the necessary activities of its institutions, assess the capabilities of scientific supervision in terms of today's problems and opportunities for using proposals for the design of promising WME systems. While participating in competitions of other organizations, it is advisable for the NAS of Ukraine to take into account the subjects of their competitions, which will expand the range of interested potential customers and the objectivity of evaluation. An integral part of the effective solution to the current WME problems is to take part in the national WME exhibitions. However, they should not only demonstrate the capabilities of defense industry to create the types of weapons accessible to most countries in the WME markets, but also show the science-intensive products and technologies not available to other countries.

CONCLUSIONS

The analysis has shown that under conditions of almost complete segregation of scientific spheres the whole R&D capacity of Ukraine is concentrated in hand of the NAS of Ukraine. Therefore, effective revival of scientific supervision over creation of promising WME systems is impossible unless the NAS Ukraine is directly involved in and supervises over the process.

REFERENCES

1. Hodakov V.E. Higher education in Ukraine: look from outside and within. Kherson, 2006. 338 p. [in Russian].
2. Petkov A.A. Methodological aspects of justification the state military system. *Science and military safety*. 2004, 2: 32–35 [in Russian].
3. Klimchenko V.Y., Belavin O.V. Justification of rational correlation between overhaul, modernization and buying, developments volumes of AMT RTA on medium-term and long-term prospects. *Actual questions of development of Military Powers of Ukraine*. Kharkiv, 2013. 3(36): 35–41 [in Ukrainian].
4. Nemudrov V., Borisov K., Zavalin Yu., Korneev I., Malishev I., Shiller V. ECB systems on a crystal and packaging systems – new possibilities for a military technique. *Electronics: Science, Technologies, Business*. 2014, 1: 144–150 [in Russian].
5. Lugovskiy V.V., Nikolaenko Yu.E., Demedyuk A.V., Larkin S.Yu. The base government program states on technique and microwave technologies development for 2005–2009 in Ukraine. *Technology and constructing in electronic apparatus*. 2005, 6: 3–5 [in Russian].
6. The resolution of the «SIET-2008» conference on thematic direction «The development problems on microelectronics in Ukraine – the state and prospects». *Proceedings of the IX International scientific-practical conference «SIET-2008»*. Odessa, 2008. 3–4 [in Russian].
7. Kravchenko A.Yu., Smirnov S.S., Reulov R.V., Hovanov D.G. The role of scientific-technical reserve for innovative processes on perspective armament creation: problems and decision ways. *Armament and economy*. 2012, 4 (20): 1–15.

8. The space law of the Ukraine: *Compiled laws on national and international legal acts*. Kyiv, 2004 [in Ukrainian].

9. The Ukraine national target scientific and technical space program on 2008–2012 years. Kyiv, 2008 [in Ukrainian].

Received 26.05.17

Ю.М. Лаврич

Інститут транспортних систем і технологій НАН України,
вул. Писаржевського, 5, Дніпро, 49005, Україна,
+380 56 370 2182, факс +380 56 370 2186, lavrich@westa-inter.com

ОСОБЛИВОСТІ НАУКОВОГО ЗАБЕЗПЕЧЕННЯ ВИРОБНИЦТВА ПЕРСПЕКТИВНИХ ЗРАЗКІВ РАДІОЕЛЕКТРОННОЇ АПАРАТУРИ

Вступ. Розробка нових поколінь озброєння і військової техніки (ОВТ) на всіх етапах супроводжується науковим забезпеченням, що є необхідною умовою досягнення високих тактико-технічних характеристик.

Мета. Обґрунтування можливих шляхів і способів наукового забезпечення ОВТ в сучасних умовах.

Матеріали і методи дослідження. Проведено аналіз проблемних питань створення озброєння й військової техніки в сучасних умовах.

Результати дослідження. На підставі проведеного аналізу запропонований ряд доповнень до змісту наукового забезпечення: відтворення галузевої науки всередині існуючих академічних структур, створення системи управління оборонними науково-дослідними дослідно-конструкторськими роботами (НДДКР) країни на основі взаємопов'язаної та узгодженої участі всіх наукових сфер, проведення аудиту й оцінка існуючих науково-технічних наробок, створення їх єдиного банку, забезпечення доступу до систематизованої науково-технічної інформації та перегляд підходів до оцінки вітчизняної наукометричної бази, створення загальнонаціональних наукових видань з питань створення ОВТ, коректування методології відбору й оцінки конкурсних пропозицій наукових установ.

Висновки. Врахування запропонованих доповнень до змісту наукового забезпечення розробки нових поколінь озброєння й військової техніки дозволить не тільки значно скоротити тривалість стадій розробки й впровадження нових зразків озброєння, а й підвищити якість серійної продукції.

Ключові слова: наукове забезпечення, фундаментальна наука, галузева наука, система розробки.

Ю.Н. Лаврич

Інститут транспортных систем и технологий НАН Украины,
ул. Писаржевского, 5, Днепр, 49005, Украина,
+380 56 370 2182, факс +380 56 370 2186, lavrich@westa-inter.com

ОСОБЕННОСТИ НАУЧНОГО ОБЕСПЕЧЕНИЯ СОЗДАНИЯ ПЕРСПЕКТИВНЫХ ОБРАЗЦОВ РАДИОЭЛЕКТРОННОЙ АППАРАТУРЫ

Введение. Разработка новых поколений вооружения и военной техники (ВВТ) на всех этапах сопровождается научным обеспечением, являющимся необходимым условием достижения высоких тактико-технических характеристик.

Цель. Обоснование возможных путей и способов научного обеспечения ВВТ в современных условиях.

Материалы и методы исследования. Проведен анализ проблемных вопросов создания вооружения и военной техники в современных условиях.

Результаты исследования. На основании проведенного анализа предложен ряд дополнений к содержанию научного обеспечения: воссоздание отраслевой науки внутри существующих академических структур, создание системы управления оборонными научно-исследовательскими опытно-конструкторскими работами (НИОКР) страны на основе взаимосвязанного и согласованного участия всех научных сфер, проведение аудита и оценка существующих научно-технических заделов, создание их единого банка, обеспечение доступа к систематизированной научно-технической информации и пересмотр подходов к оценке отечественной наукометрической базы, создание общенациональных научных изданий по вопросам создания ВВТ, корректировка методологии отбора и оценки конкурсных предложений научных учреждений.

Выводы. Учет предложенных дополнений к содержанию научного обеспечения разработки новых поколений вооружения и военной техники позволит не только значительно сократить продолжительность стадий разработки и внедрения новых образцов вооружения, но и повысить качество серийной продукции.

Ключевые слова: научное обеспечение, фундаментальная наука, отраслевая наука, система разработки.