

THE 2020 SLOVAK REPUBLIC CONCEPT ON THE SCOPE OF RESEARCH AND DEVELOPMENT SUPPORTING STATE DEFENSE AND GOVERNMENT PROGRAM STATEMENT

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This article focuses on the research and development concept and its support to the Slovak state defense. It compares the latter with the Manifest of the Government Slovak Republic, dated 2016. It shows on mistakes and wrong steps in military policy oriented to support military science and research. In conclusion shows on some solutions to development military science and research to next years.

Key words: *armed forces, defense sources, conception, transformation, development, research, program, cooperation.*

1. INTRODUCTION

The fundamental problem of the research and development program aimed at securing the support for state defense in the Slovak Republic is the absence of adequate departmental R&D establishments and, at the same time, a great fragmentation in the coordination of such entities that are willing to implement research and development aimed at this particular area. Currently, it is not possible to achieve top results in this field without the existence of a so-called “critical mass of human and material resources”.

The absence, or non-elaboration of “*The Concept on the scope of and support for research and development in the field of Defense for the years 2011 to 2015*”, as a direct continuity of the previous “*Concept on the scope of and support for research and development in the field of Defense by 2010*”, has had a negative impact on a number of areas since 2011, in particular:

- the implementation of the domestic commitments of the Ministry of Defense of the Slovak Republic;
- the implementation of international commitments of the Ministry of Defense towards NATO and the EU;

- the allocation of funds for research and development to support the state defense;

- credibility of the Ministry, not only in the eyes of professional scientific research available to the citizens of the Slovak Republic, but also at international level.

The task B 8. of the Resolution of the Government of the Slovak Republic No. 766/2007 revealed the development of “*The Concept on the scope of and support for research and development in the field of Defense for the years 2011 to 2015*” (hereinafter referred to as “concept”) as a document, which elaborates on “*The long-term intention of the State Science and technical policy up to 2015*”. However, the Resolution of the Government of the Slovak Republic No. 876 of 15 December 2010 cancelled the task.

In 2013, the work on the preparation of a new concept to address the negative state of affairs in this field emerging from 2011 onwards, was initiated. But the preparation of a new concept was stopped the same year due to developing a new national strategy “*Research and Innovation Strategy for the Smart Specialization of the Slovak Republic*”, and its subsequent “*Action Plan for the 2014-2016 Implementation*”. Preparation of new priority areas in the R&D field by NATO Science and Technology Organization (STO), as well as by

the EU European Defense Agency (EDA) was another cause leading to the suspension of the elaboration of a new concept in 2014.

An even bigger tragedy was the disbanding of top defense entities with a mission in the R&D field. For example, the Slovak Aviation Institute, Inc., Košice, a successor of the *Military Aviation Technical and Experimental Institute Košice*, which was founded in 1994, merged with the *Aircraft Repair Company Trenčín, Inc. Trenčín*, in 2009 and thus, the cutting edge Research and Development Department for aviation and air defense of the Armed Forces of the SR disappeared. Also, merging the Military Technical Institute in Liptovský Mikuláš with the *Aircraft Repair Company Trenčín* in 2009 imposed the liquidation of the Research and Development Department of Land Forces of the Armed Forces of the SR. The Ministry of Defense of the SR, as a Government Organization, “voluntarily” gave up on their own independent bodies for carrying out the verification tests of upgraded and purchased technology applied into the use within its Armed Forces, lost the independent investigation of air incidents, accidents and disasters, lost the top experts in aviation, air defense, ground technique and systems. Consequently, to meet NATO standards-STANAG for

modernized or newly introduced technology means “buying services”, which currently the SR is not able to provide on its own. The Military Technical and Testing Institute Záhorie is the only development and testing facility of the Ministry of Defense of the SR, which provides for the development and tests of weapons, ammunition and military technique. The Institute has an accredited testing laboratory for arms, ammunition and military technique. The time dedicated to the research is limited, though.

The above reorganization associated with the repeated cancellation of the research and technology department between 2005 and 2011 at the Ministry of Defense of the Slovak Republic proves non-systematic, and means a huge step back in the field of research and development in the defense.

The only research institution of this kind, which carries out fundamental and applied research in a broad spectrum of activities, is the Armed Forces Academy of General Milan Rastislav Štefánik in Liptovský Mikuláš. The latter’s main mission is the training of human resources for the Armed Forces of the Slovak Republic, conducting fundamental research, as well as training human resources in the field of research and development, which is implemented to a limited extent.

2. THE MAIN OBJECTIVES AND PRIORITY GOALS OF THE SCIENCE AND TECHNOLOGICAL POLICY FOR 2020

The objectives and priority areas in the research and technological field are based on the directions set by NATO and EU.

The conclusions and priorities of the meetings of the Science Technology Board-STB & NATO of March 2015 in Brussels, that were approved at NATO Wales Summit in 2014 and ratified by CNAD in December 2014 in Brussels, set top 10 priority areas and a direction of NATO in the area of research and development. The priority areas include [1]:

- maritime defense,
- cyber defense, new network architecture, communications and information systems with new protocols of the information transfer,
- non-lethal weapons and weapon systems on the basis of directed energy, lasers, infra-red spectrum, acoustic effects, microwaves, electromagnetic pulses,
- modelling, simulation technology, and information analysis to support decision-making processes,
- hybrid warfare and defense against them,
- monitoring and recovery of the biometric data of individuals by using the neuro-scientific knowledge

of the science, monitoring, and modification of psychic simulations in order to increase the resilience of an individual, trauma regeneration,

- sensors and sensor systems based on the spectrum between the extra low frequency and optical frequencies, for technologies of the CBRN detection,

- unattended autonomous systems (UAV, UGV, UWS) with the use of new materials and technologies (polymers, nanotechnologies, composites, ceramics, etc.) to increase their protection and resistance to CBRN, armed with light weapons, communication systems and sensors, etc.

Similarly, as in STO NATO, after a complex reorganization of EDA EU in 2014, existing activities and priorities in the area of research and development were reviewed for the purpose of defense capabilities development research, acquisition and armaments. The new organizational structure brought about a change in the main areas of solutions in terms of research and development. The objectives and priorities for the years 2015-2020 are included in the main thematic areas:

- Counter IED,
- Air-To-Air Refuelling,
- European Air Transport Fleet,
- Effective Procurement Methods,
- Medical Support,
- Helicopter Initiatives.

The basic principles for a new orientation of research and

development of technologies applied in the process of developing defense capabilities include [2]:

- acceptance of the research and development of technologies as a driving force for the development of defense capabilities and a tool for increasing their effect and effectiveness,

- orientation of research and development of technologies to support the required capabilities in the medium or long term, in accordance with the activities of STO NATO and EDA EU, and, at the same time, to provoke their identification by systematic analysis of deficiencies,

- deeper involvement of a potential future user to the processes of defense research and the technology development in the form of demos and experiments,

- building and developing new workplaces at the Armed Forces Academy Liptovský Mikuláš and The Military Technical and Testing Institute Záhorie with the support of the Ministry, or considering the renewal of the research and development departments for aviation, air defense, and land forces,

- analyzing the current capacity of the Slovak Republic and the identification of scientific and technological areas corresponding to the priorities of the EU and NATO and their engagement in the processes of international cooperation within STO NATO and EDA EU [3,4],

- the use and application of existing knowledge base and outputs of the new scientific research projects into the Armed Forces of the SR.

Future focus, interests and the financing of research and development programme aimed at securing the state defense up to the year 2020, should be also oriented to:

- support the most talented and creative individuals and their teams in the implementation of the domestic and foreign research of the highest quality through the use of the achievements of the European Research Council,

- finance joint research with the aim of stimulating new research and innovation by supporting future and emerging technologies,

- develop research infrastructure (including e-infrastructures) in order to achieve world levels, which are available for all researchers in Europe and beyond,

- support research and development tasks in the field of supportive and industrial technologies accompanied by targeted subsidiary for investment in key technologies, nanotechnology, innovative materials, biotechnology, advanced manufacturing and processing with parallel support for cross-cutting activities to capture the benefits of combining several key enabling technologies used in favour of the defense,

- safe, clean and efficient use of new kinds of energy,

- intelligent and integrated environmentally friendly transport.

The priority areas of the research meant to support the defense of the state until 2020 will include:

1. building **communication and information systems and networks** based on new knowledge of science and technology,

2. building and innovating the **cyber defense** field as a situational alert network system in the network cyberspace with regard to the competences required for effective command, control and communication in the Armed Forces of SR,

3. analysis of “**hybrid wars**” and defense against them, which are shown as an effective tool of destabilisation of the system in a variety of interest areas of the defense,

4. support **modelling and simulation technologies**, as a direct support element of the decision-making processes and streamlining its financial costs on the processes of development of the Armed Forces of the Slovak Republic, preparation of commanders and staff, variations, upgrades, and acquisition of equipment, weapons, technology and material,

5. the implementation of **the land and air non-controlled systems** into the structures of the Armed Forces of the SR as the future tool to increase security and the protection of troops

and soldiers in the territories of interest,

6. **protection against CBRN weapon systems and non-lethal weapons**, which are likely to be used in future peacekeeping and/or regional war conflicts,

7. the use of **dual technologies** in the field of science and technology in a way that by their implementation, the acquisition of new capabilities and the abilities of the Armed Forces of SR is secured, while the financial costs of their implementation are effectively reduced.

3. THE INTERNATIONAL SCIENTIFIC TECHNOLOGICAL COOPERATION

One of the objectives of **international cooperation of the EU** is the integration of the defense research and development of the Slovak Republic into the international defense research and development of the EU, particularly through EDA. The basis of European cooperation in the field of the defense research and development is a close tie to the defense industries of the Member States under the “umbrella” of EDA.

In the framework of NATO, The Organization for Defense Research and Technology is established (STO). Its mission is to conduct and support cooperative research and information

exchange to support the development and effective use of national defense research and technology capabilities for military needs of NATO. STO develops and maintains a coordinated long-term strategy for the defense research and Technologies of NATO, and acts as the integrating body within NATO.

As a part of the national structures guaranteeing the activity of the Slovak Republic in NATO STO, **the national Distribution and Information centre of NATO STO** at AFA Liptovský Mikuláš has been created, which concentrates, keeps and distributes information gained from NATO STO for the specialized community in the Slovak Republic.

The development of **bilateral cooperation** in the field of the defense research and development to support the State defense focuses primarily on cooperation within the V4 countries. Finding common priority areas is difficult since possible joint projects have to encounter the diversity of ideas and the timing of their implementation and the financial capacity of the countries V4.

4. FUNDING FOR RESEARCH AND DEVELOPMENT TO SUPPORT STATE DEFENSE BY 2020

As a member of NATO and the EU, the Slovak Republic has the **total defense spending below the level**

of 2% of GDP on a long - term basis; in recent years it has been settled at the level of approximately 1%. The “Long-term plan of the State Science and Technical policy up to 2020” explains that in order to ensure the fulfilment of the goals and objectives for the development of science and technology starting with 2015, **the total expenditure on Science and Technology in the Slovak Republic shall be 1.8% of GDP.**

Recommended intensity of support for the defense research in EU Member States, on the basis of a resolution of the Management Committee of EDA No. 2007/13, is **2% of the total expenditure on defense.** Expenditure of the Ministry of Defense on **research and development to support the state defense** totals in average 0.142%, and since 2011 it has had a decreasing trend.

An important priority in the direct support of science and technology (research and development) will be increasing the proportion of business resources to support research and development, so that since 2016

the share of these resources for the overall promotion of science and technology has reached 2/3.

Direct support of science and technology (research and development) to support the state defense between 2016 and 2020 will be carried out in accordance with section 16 (4). 11 of Act No. 172/2005

Coll., through the budgetary heading of the Ministry.

The funding for the research and development to support state defense **is allocated each year from the budget of the SR Ministry of Defense.** Earmarked funds, which are purpose-bound by Resolution of the SR Government each year, **do not provide** for the real needs of financial support in the field of research and development (**Table 1**).

Currently, the funds are used exclusively for institutional support; specialized support in the form of grants is currently not being implemented [5].

Institutional support in favor of the Armed Force Academy of Gen. M. R. Štefánik, Liptovský Mikuláš as a state academy, is provided in accordance with Act No. 172/2005 Coll. on a yearly basis in the form of a “Contract” in order to ensure the following (6):

- to solve the task of research and development to support state defense through individual projects,

- to ensure international cooperation within a range of international conventions and membership of the Slovak Republic in NATO and EDA EU,

- to ensure the operation of the Distribution and information centre of documents, NATO STO (*in accordance with the legislation AC/323-D/22 Operating procedures*).

In the long term, taking into account the experience of the previous period (2004-2012) and the active participation of the Slovak Republic in NATO STO and EDA EU projects, it is possible to forecast **the amount of the minimum need of funds (Table 2)** for the comprehensive provision of all

required activities and areas of research and development in the Defense field (in 2016, preparation for a public call for special support to research and development, and the selection of projects for the gradual involvement in projects of STO NATO and EDA EU starting from 2017 will be made).

Table 1. The funding for the research and development of MoD SR (in Eur)

Year	2016	2017	2018	2019	2020	2021
Total Eur	000 150	000 150	000 150	000 100	000 100	000 100

Table 2. The forecast of the minimum of funds for the research and development in MoD SR (in thousands EUR)

Subroutine/Project	YEAR					Notes
	2016	2017	2018	2019	2020	
Subroutine 06E-0I Research and development in support of state defense	150	650	870	050 1	170 1	
Of this:						
Targeted support for research and development in support of the defense	0	150	150	200	220	to tackle new projects according to the Act No.435 / 2010 Coll., The assumption 1-5 projects per year
Institutional support research AOS LM	150	150	200	200	200	according to the Act .No.172 / 2005 Coll
Support participation in NATO projects STO	0	180	220	300	350	projects per year 1-3
Support participation in EU projects EDA	0	170	300	350	400	projects per year 1-2

5. RESEARCH AND DEVELOPMENT MONITORING AND EVALUATION

The concept of focus and support for research and development, aimed at securing state defense, responds to the growing importance of research

and development evaluation at all levels, both in the Slovak Republic, as well as in all developed countries. The evaluation system respects the current global trends with the use of new knowledge and best practices from the evaluation research in the individual EU Member States.

The basic principles of evaluation will be a multi-criteria based approach, a demonstrable project will serve as a feedback for the future decision making on financing new projects of research and development. The results will be evaluated in relation to the embedded resources. The evaluation will be covered by the Department of the Management of Research, Development and Coordination with the defense industry, SEMPO MO SR, which is responsible for defense research and development. Results of the “ex post” assessment and evaluation of the research and development results’ use for a period of three years from the completion of the project will serve as a feedback for the future decision making on financing new research and development projects.

These ambitious plans, however, are necessary to be confronted with the options and plans of the entities in the field and the government as they are mentioned in **the program statement of the new government in 2016**. Among other things, the following are mentioned [7]: For the security of the SR, the system of collective defense policy of NATO and Common Security and Defense Policy of the EU are crucial. The Government will formulate the basic objectives of the security and defense policy and the parameters for preservation of the security of citizens and the State in the current

and future security environment in the updated security and defense strategy of the SR, taking into account the strategic adaptation of NATO and the EU which will be presented to the National Council of the SR no later than in 2017. While updating, the participatory way of processing will be used with an aim to ensure their approval and the long-term support of implementation across the political spectrum.

In the field of academic science, the Government will:

- ensure the further development of the system for the comprehensive review of research in universities, by applying good policy practices employed at international level,

- ensure the strengthening of motivational financial instruments to support research activities of universities yielding results at international level,

- create transparent instruments to support the research activities of universities in areas relevant for the development of the SR and its regions,

- intentionally support improvement of doctoral studies as the highest quality tool to develop human resources, and create a grant scheme for the acquisition of post doctoral candidates for excellent workplaces in particular.

The Government considers state defense its priority, and for its implementation it will, within

the scope of the preservation of the security of citizens and the State, create conditions corresponding to the fundamental changes in the security environment. The Government, in accordance with its constitutional responsibility for state defense, shall adopt measures to enhance the striking power of the Slovak Republic by developing individual and collective abilities to withstand armed attack, and at the same time, to strengthen the defensive potential of NATO, as well as the military capabilities of the EU.

The Government will prepare an update to the security and defense strategy of the SR, and will implement targeted and long-term sustainable modernization and replacement of the main types of equipment and techniques together with the formation of the stock material for the development of the capabilities of the armed forces in accordance with the commitments of the SR. Emphasis shall be laid on the development of the capabilities of the mechanized brigade and forces, also available for the fight against terrorism.

The Government will support an increase in the intensity of the training of the armed forces, as well as their participation in the exercises focusing on the defense of the State. It will continue to improve the readiness of the reserve forces, mainly through the preparation of

active reserve forces. On the basis of an evaluation of the contribution of voluntary military training to create reserve forces, it will consider its development.

The Government will support the development of defense infrastructure; improve the system of supplies, services, and activities to support the armed forces in the defense of the Slovak Republic and of the Allied forces in the performance of the collective-defense tasks in the territory of the SR as the host country. It will also encourage the involvement of the defense industry of the SR in the provision of equipment, technology and material for the armed forces and the use of its products abroad.

In accordance with the Alliance commitments of the SR, the Government shall ensure a gradual increase in the defense spending of the SR. It will continue to support major strategic projects of modernization of the armed forces by approval and funding them on a case by case basis.

6. CONCLUSION

The documents **“The concept of the scope of Research and Development** to support the defense of the State with a perspective to 2020” and **“The Government Programme Statement”** from 2016 **do not contradict each other, and in principle do not support each other either.** The knowledge transfer

of research and development for the benefit of new weapon systems, the acquisition of new “know-how”, as well as the use of the latest findings and the conclusions of the analysis of the projects and the work, will significantly allow the Armed Forces of the SR to use more efficiently related funds to modernize the equipment, techniques and materials.

New priorities are conditioned by **adequate financial resources**. By re-evaluating the financial budget allocation for the Ministry of Defense of the SR in accordance with the forecast amount, we shall fulfil national and international commitments towards NATO and EDA EU. This will ensure a proactive approach and the development of research and development, the transfer of new technologies in the processes for the development of defense capabilities. However, and this is **the first problem**, the program statement does not speak at all about the amount allocated for the defense, and the amount of funds to be spent on research and development. Looking at the priority areas for research, there are huge discrepancies between the level of ambition and the lack of funding.

The second problem is human resources capacity that should carry out research. The capacity of 65 teachers at AOS will not be sufficient. What is more, some subjects are not taught at AOS (CBRN Defense).

The establishment of new offices at AOS, or in Záhorie, or restoring the Office of research and development for the air force and air defense takes at least 3-4 years if business support for research and development amounts up to 2/3 of the total resources for research and development.

The elaboration of the document “The concept of the scope of Research and Development to support the defense of the State with a perspective to 2020”, however, enters a real direction for implementation in alignment with NATO and EU trends in the field, and we definitely need to work with it.

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