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## Part III.

### PRACTICES FOR R&D MANAGEMENT

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#### DEVELOPMENT OF SECURITY RESEARCH GOVERNANCE AND COORDINATION IN BULGARIA 1998-2008

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**Abstract:**

*Paper is based on review of some projects as SECRES-2008, NATO Sfp981149, EU TACOM SEE-2006 and ongoing FORESEC in order to identify key problems in security research governance and management. As a result of the study a Model for organization of security related studies is proposed as well as a Model for public-private partnership. Special attention is given to the management of research in the area of Operational Analysis and use of Computer Assisted Exercises as tools for change management in the security sector. Development of Joint Training Simulation and Analysis Centre in Civil security is used as an example of building of strategy focused application oriented multidisciplinary research organization with governance mechanism using Balance Score Card, program / portfolio management and activity based costing methods.*

#### **Introduction: Security Research and Change Management in the Security Sector**

In the last 20 years the changes in the security area are very intensive and we expect to have further challenges for the management of reforms in the sector because of uncertainty, complexity and accel-

erated dynamics in the security environment. For Bulgaria, the process of change management is characterized with some oscillations of the transition from eastern to western model of statehood and from Warsaw Pact / Union of Economic Cooperation to NATO/EU environment. In the paper analysis is made for the development of security research area in order to draft lessons for better governance and coordination of the security projects. Based on this general analysis more detailed study is presented on use of Operational Analysis (OA) and Computer Assisted Exercises (CAX) as key tools for change management in the security sector in order to define required capabilities of the governance and coordination system for security research. As a result a Model for security research management and for public private partnership in specific area of command and control in the security sector are developed. In a conclusion the main parameters of the possible National Security Research Program are considered.

Results and proposals presented in the paper are drafted from NATO SfP981149 project [8] and EU TACOM SEE-2006 project [7] as case studies as well as from the experience along participation in the work of European security Research and Innovation Forum - ESRIF (especially in the Working Group on Governance and Coordination), NATO Science committee Panel on Human and Societal Dynamics (HSD), Geneva centre for Democratic Control of Armed Forces (DCAF) International Advisory Board (IAB), Turkish Institute for Democracy and Security (TIDS) IAB, Science Coordination Committee (SCC) of the Standing Government Committee on Protection of Population (SGCPP) and many other bodies dealing with different aspects of security research management.

Topic of security research governance and coordination in Bulgaria (1989-2008) is considered in the context of the security sector change management process in the same period and some interim results of special project SECRES-2008 are used. In many studies it was proven that security research has a strong influence on capacity for the security sector reform and governance, so it rises up the issue of improvement of the management process for the security studies themselves. Other key issue is this of integration between security

and other studies on national level as well as integration of security research in the framework of NATO and EU, where Bulgaria is full fledged member.

### **Development of the Security Research in Bulgaria**

Security research in Bulgaria before 1989 was mostly focused on technology issues and at the same time on the specific applications in the framework of Soviet Union led classified program for research in the area. Shortly the infrastructure involved to support these studies was based on:

- Institutes and higher education institutions of the Ministry of Defence (MoD), Ministry of Interior (MoI)
- State committee for research and technologies
- Defence industry institutes

During the uncertain period before decision to join NATO (1990-1997) security research in the country was practically very limited and mostly linked with small projects in:

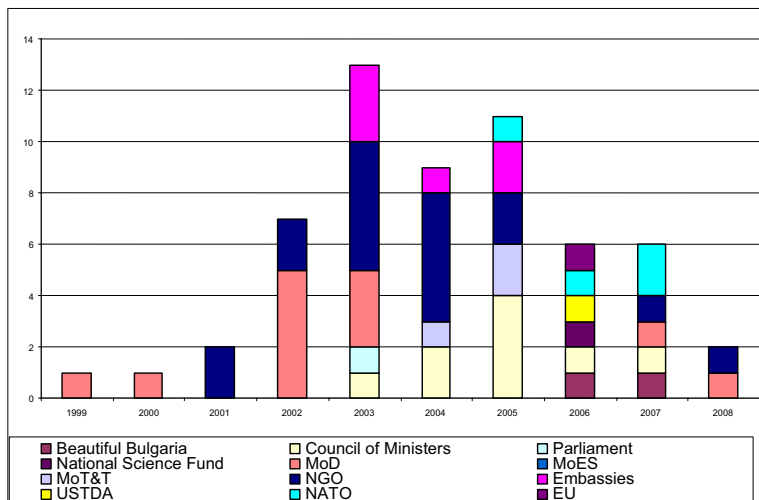
- Institutes and higher education institutions of the MoD, MoI
- Increased role of NGO and limited interest from National Fund “Scientific Research” (NF-SR)

Security research in the period 1998-2008 started to be shaped by critical decisions in security sector transformation and the process of integration in NATO and EU after accession to these alliances in 2004 and 2007 respectively. Elements of a new base for security research started to be build mostly bottom up way to include [4]:

- NGO, universities and NF-SR, Ministry of Emergency Situations (MoES)
- Centre for National Security and defence Research (CNSDR) in the Bulgarian Academy of Sciences (BAS): programs with MoD, SGCPP, MoI
- Key institutes in BAS – Institute of Metal Science (IMS), Space Research Institute (SRI), Institute of Parallel Processing (IPP), others
- “New” defence companies and Bulgarian Defence Industry Association (BDIA)
- Offset programs and Ministry of Economy and Energy (MoEE)

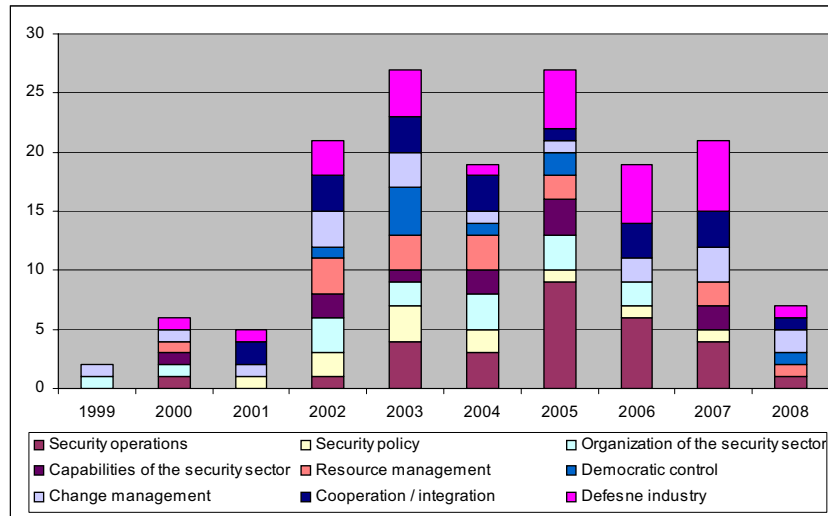
In the period 2007-2008 George C. Marshall Association – Bulgaria using the base of NATO Sfp981149 project and in close cooperation with CNSDR-BAS and IPP-BAS as well as some universities and NGO implemented limited study on security research projects for the period 1999-2008 named SECRES – 2008 Project. This study covers the following elements:

1. Context of the project – changes in the security sector in last 20 years
  2. General theory of Change Management in the Security Sector
  3. Review and analysis of security research in the period 1999-2008
  4. Role of OA and CAX in support of change management (lessons learnt form security studies base 1999-2008)
  5. Required research infrastructure for security studies, including governance and coordination / management of security research
  6. National Security Research Program for the next 10 years – lessons from ESRIF, SAFE and FORESEC projects
  7. Recommendations for educational courses on security matters
- Some initial results of the study are presented below.



**Fig. 1. Distribution of projects according to the financing organization.**

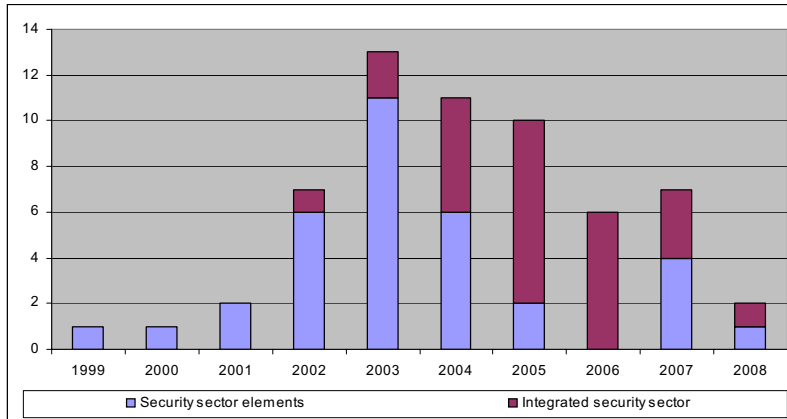
Ministry of Defence is not the only and even more not the main financing organization in security related research as it is seen on Fig. 1. as it was in the beginning of the period.



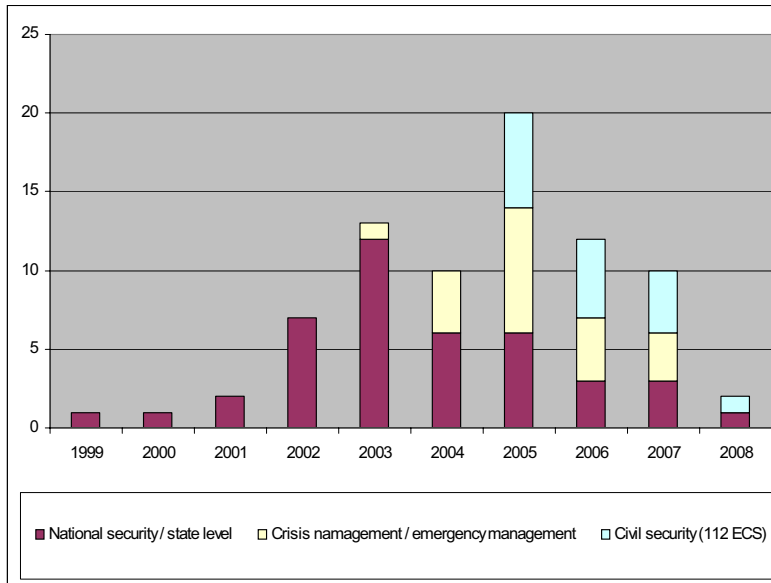
**Fig. 2. Distribution of projects according to the area of study (there are some projects that cover more than one area of study and are counted in more than one area)**

Diversity in the areas of study is real and it provides good balance between different aspects of security sector architecture Fig. 2 proves that even bottom up approach currently provides good coverage of the problems for study.

There is visible tendency presented on Fig. 3 to use the concept of integrated security sector as a driving framework for analysis and studies in the security area.



**Fig. 3. Distribution of projects according to the implementation of the concept for the integrated security sector versus study of the certain element of the sector**



**Fig. 4. Distribution of projects according to the level of security studied: state level, society, citizen level (incl. 112 ECS)**

Year by year there is a tendency to address not only defence and state level national security issues, but more and more crisis / emergency management and civil security (including specific aspects of 112 Emergency Communications System (ECS) to provide support to the citizens on the personal level). This trend is presented on Fig. 4 and not the absolute numbers, but ratio is important for the analysis.

Keeping in mind that such a study is mostly to test the methodology and build a team for real comprehensive study on security research in Bulgaria for the last 20 years and support to the planning of the next 10-20 years, we still could consider some important general findings:

- There is diversity in funding sources, and areas of study, but after the peak of 2003-2005 there is negative tendency in security research (Fig. 1 - 4);
- There is a shift from hard to soft aspects of security (defence to civil security);
- There is an increase in studies that accept the concept of integrated security sector.

To collect data for R&T in security a Questionnaire to national representatives was developed in the framework of ESRIF. Key questions included are:

### **1. coordination at the national level**

- Coordination at the national level for R&T in security?
  - Definition of R&T needs
  - Definition of the calls and projects
  - Final selection of projects
- Relation with
  - The people expressing needs
  - the final user,
  - Level of an interministerial coordination leading ministry.
  - Work with intergovernmental organizations ESA, EDA, NATO.
  - Coordination with the European community agencies: Frontex, EMSA, others.

## **2. Bilateral cooperation**

- European bilateral relations and actions in R&T for security.
- Relations and actions with US in R&T for security.

## **3. coordination at the European level**

- National R&T actions at the European level.
- Long term cooperation:
  - Is it cooperation for mutual benefit?
  - Is it cooperation for common understanding?
  - Do you only share information?
  - Do you share information and make joint R&D?
  - Do you make also joint systems development?
  - Do you have also joint policy?
  - Do you have regular contacts with your European partners?
  - Formal or informal contacts?
  - Do you participate to organization (s), working groups working in the field of security R&T at the European level?

Many of these questions are answered currently in SECRES-2008 project, but in order to justify answers on national level a formal project is required to be run under Ministry of Education and Science, together with MoD, MoI, MoES, and MoEE.

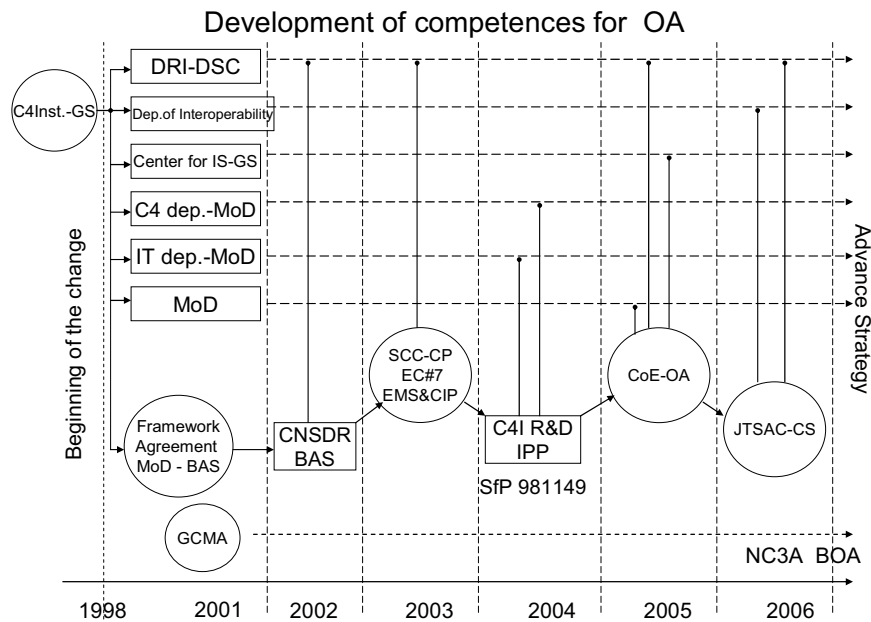
## **Development of OA and CAX support to the Security Sector Change Management**

Because of diversification of research studies and introduction of the concept of the integrated security sector as well as three levels of security – state, society, citizen, there is a tendency to understand better the challenges of uncertainty, complexity and speed of change for security research topics. One of the instruments to address these challenges and to involve closer the decision makers, in order to strengthen interagency cooperation is this of the OA and respectively CAX.

There is still not well analyzed process of evolution of OA capabilities in security research area – schematic developments are pre-



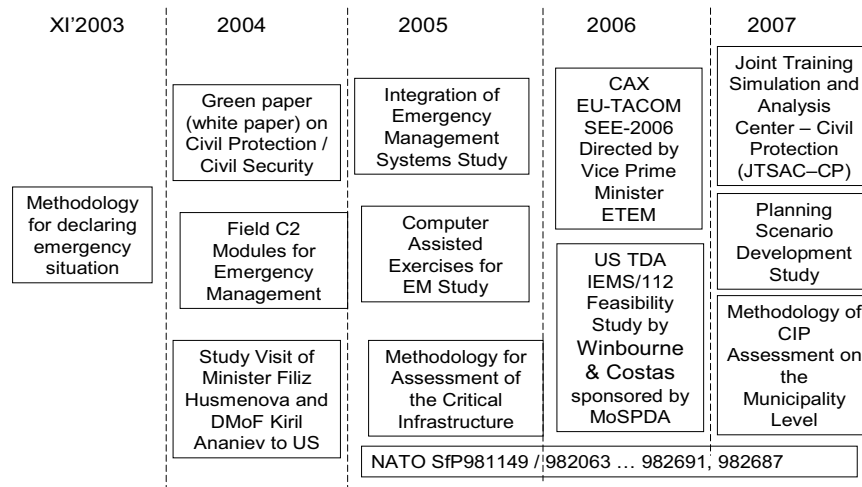
sented on Fig. 5. One of the last positive shifts to mention is the decision to establish OA department in the General Staff as well as discussion around new National Security Strategy to strengthen the administration of the Security Council of the Government with expert groups capable in OA area.



**Fig. 5. Evolution of OA related bodies in BAS after the start of defence reform with Plan 2004 in 1999.**

In BAS the focus is civil security, but in close relation with other dimensions of security. On Fig. 6 some of the civil security related projects around CNSDR/IPP-BAS are presented in order to provide basis for the analysis.

## Some Civil Security Projects in CNSDR/IPP-BAS

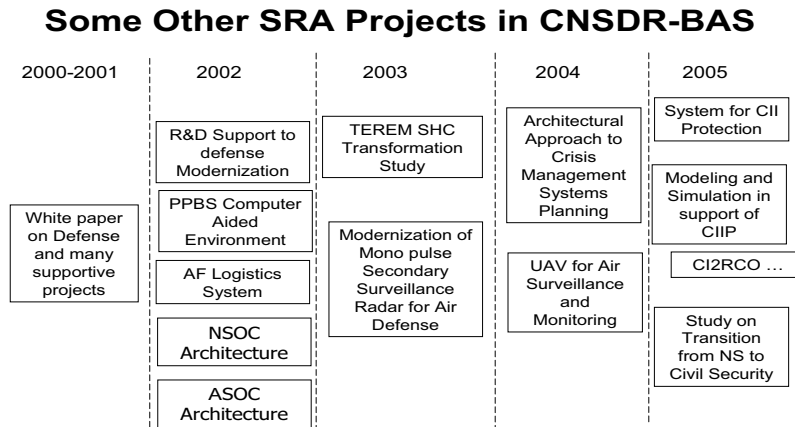


**Fig. 6. Development of civil security related projects in CNSDR/IPP-BAS for the period of existence of the SCC to the SGCPP – all of them under the new established expert council #7 “Emergency Management and Critical Infrastructure Protection Systems”**

In this environment BAS and universities have a great role to play by providing young experts to join these bodies as well as to provide rotation with NATO C3 Agency (NC3A), European Defence Agency (EDA) and Joint Research Centre (JRC) for example.

Further study on the use of OA in security area decision making will help to identify better way how to support the process more effectively. First important effort in this area was supported by NATO through SfP981149 Project when it comes to capacity building in OA support to the transformation of the security sector.

There are some other security research area projects to mention as presented on Fig. 7, which shaped the base for scientific support to the change management process. Many more projects mostly in policy area were implemented in the period by NGO and universities, but if we look for consolidation and institutional maturity, influence on decision making process - the key grouping is around CNSDR, IPP, IMS, SRI in BAS.



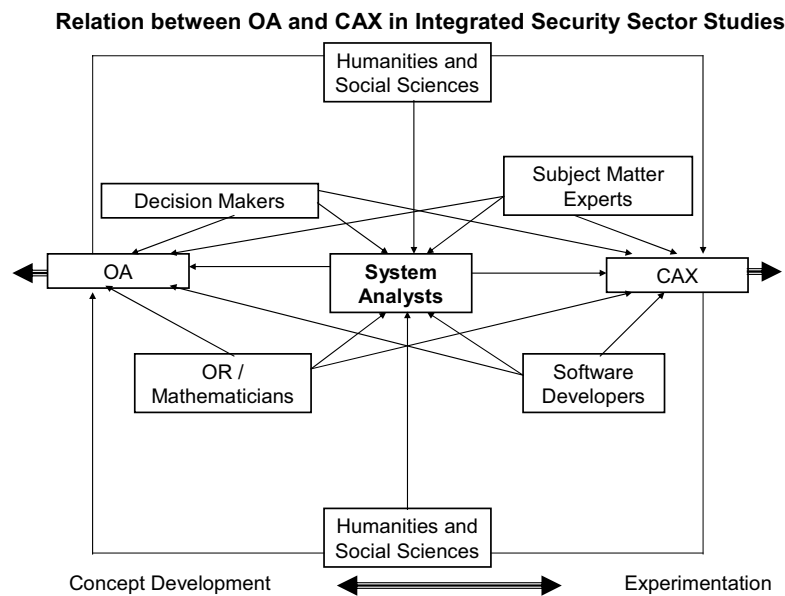
**Fig. 7. Other Security Research Area (SRA) projects in CNSDR-BAS under the Inter-agency expert-consultative council, established between MoD and BAS in 1999**

The Operational Analysis (OA) could play a serious positive role in making better decisions and it means to contribute to the good governance model development. In addition our studies proved that testing of new concepts alternatives for decisions or even developing of alternatives through computer assisted exercises (experiments) could highly improve transparency, effectiveness, efficiency and provide opportunity for measurement and accountability [8]. These last characteristics are of crucial importance for the effectiveness of the democratic control, one of the key areas of study in Bulgaria.

Using NATO Sfp981149 and NATO Sfp982063 projects in Bulgaria to build capacity in OA and CAX in support of the security sector transformation was possible positively to influence the process of decision making, but the approach has to be internalized in administration. After that next step is the research centre, partly to out-source to academic sector in order to provide high quality of the analyses. At the same time this approach could be used as a tool for integration between security sector entities as Ministry of Interior, Ministry of Emergency Situations, and Ministry of Defence etc. using

the same academic base for their operational analyses. Such a way in the future will be possible to base decisions in the security sector on really integrated joint studies.

Other finding in our study is that putting Humanities and Social Sciences in the loop of CDE as shown on Fig. 8 is of great importance recently when decisions in the security sector are influenced very much by perceptions of the people and the results are more directly related to the security of the every citizen. This is “an open door” to study the human factor interaction with the technology and organizational arrangements – even not only security sector human factor, but representatives of the community as well.



**Fig. 8. Interaction is the process of CDE using the OA and CAX**

The Joint Training Simulation and Analysis Centre in Civil Security (JTSAC-CS) that was used for support of the change management process in civil security area in Bulgaria is based on specially developed Model for concept development and experimentation in the area of civil

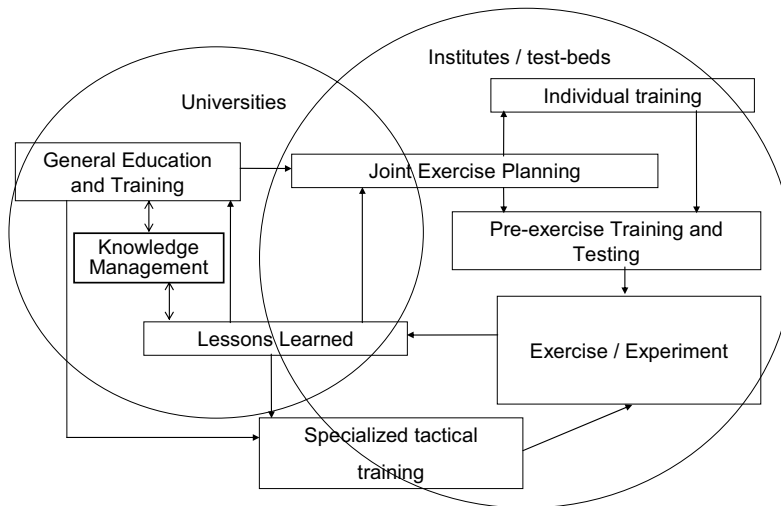
security through CAX. This Model is a base for change management process – transformation of the security sector into an integrated network enabled organization as goal of the third generation of security sector reform to address challenges of civil security (previous two generations of the security sector reform were the structural and functional ones – identification and differentiation phase of the change).

JTSAC is an instrument for research, including modelling and simulation (M&S) in crisis management to support CAX in this area. Especially in the context of the exercise EU TACOM SEE-2006 (EU terrorist attack consequence management in SEE exercise) – in particular its CAX part, the JTSAC supported [7]:

- Strategic review of civil protection system in Bulgaria and its EU/NATO/regional context
- Development of Civil Security Concept for Bulgaria
- Development of General scenario, Operational Architecture and Message Flow for EU TACOM SEE-2006
- Establishing of a Model environment based on JTSAC for implementation of the Operational Architecture and Message Flow for EU TACOM SEE-2006
- Individual and pre-exercise training of the participants in the exercise
- CAX implementation itself and
- Currently undergoing process of analysis, assessment and lessons learned drafting from the exercise with plans to update White paper on Civil Protection and Concept for Civil Security

CAX has a key role in this process of CDE, because provides integration of different organizations and technologies as well as involve people in the loop of experimentation. In certain sense CAX itself is motivation and a tool for joint work and well documented experimentation, providing objective material for analysis and adaptation of the concepts [ ].

## Research and Education as Change Consolidation Tools



**Fig. 9. Process of education and training in support of change management.**

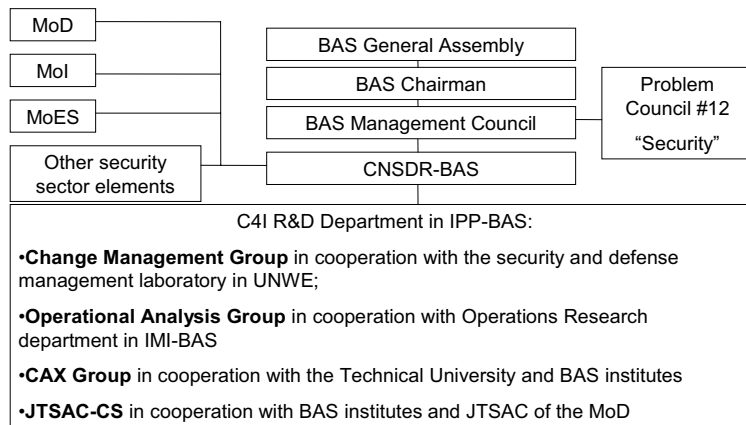
Experimentation of new concepts is a driving force of change, but training has a critical role to play in this process as well. We see training aspects in all different elements of knowledge management process for change management as presented on Fig. 9:

- General education and training (E&T)
- Joint planning for CAX
- Individual training
- Pre-exercise group training
- CAX itself (or just experiment for knowledge acquisition)
- Lessons learned analysis and recommendations drafting
- And specialized tactical training in parallel or separately of CAX

To play such a role of “Change Management Tool” the training has to be based on effective M&S of the future reality or virtual reality at all in order to learn from “the future”. It has to be supported by effective measurement system and adaptation. In this sense CAX is only

platform to arrange different type of training with main focus to experiment concepts and to drive the change.

Research Infrastructure on Security Governance/Management/C2



**Fig. 10. Evolutionary developed research infrastructure for studies on security sector governance, management and C2 in BAS**

Consolidation of OA and CAX capacity in BAS as a key scientific and research player in support of the security sector in Bulgaria (and well integrated in NATO and EU security research communities) is still not accomplished. On Fig. 10 there are existing arrangements presented with the focus on capabilities in the Information Systems Study and development (C4I R&D) Department in IPP-BAS with its Group of Operational Analysis and Training (GOAT – consisting of change management team and operational analysis team) combined with the CAX Group using JTSAC-CS.

These are mainly resource centres for respective expertise. On the project base integrated project teams (IPT) are formed to provide direct support to the customers. Relationships with the customer could be managed better on the level of CNSDR and IPT to be related with host organization (institute that could provide administrative and accounting support). In case of BAS there is a problem council #12 focussed on Security as a research area and this is a good advisory body

for the BAS management when it comes to governance and coordination of the security studies.

### **Planning, control and evaluation of results in research project management**

Having an approved / funded project the next step- development of a detailed project plan. Limited timeframe and the goal to achieve tight deadlines of many deliverables within a fixed budget requires extremely accurate economic evaluation and break down of available resources as well as implementation of effective management tools.

The planning stage is of the utmost importance. The goals, budget and deadline of the project are set at this stage. Planning is often seen as working out a schedule, leaving resource management, budgeting etc. out. A thorough planning goes through the following stages:

- Setting and defining goals
- Defining activities necessary to bring the project to completion – technical stage
- Setting tasks, links between them and duration
- Allocation of the resources
- Planning a work schedule
- Putting project, budget and work schedule as part of the “project plan” in writing

Following the basic steps in planning the project ensures that there is a clear purpose as well as good coordination and control throughout the project development. The project plan contains the following elements:

- Goal –oriented approach (focus on results)
- Clear definition of tasks
- Allocation of resources (i.e. human resources)
- Maximizing results through careful time management

A well worked-out plan should be used as a tool for:

- Costing
- Evaluation of results
- Reporting
- Management

Management refers to setting the precise tasks, planning, control,

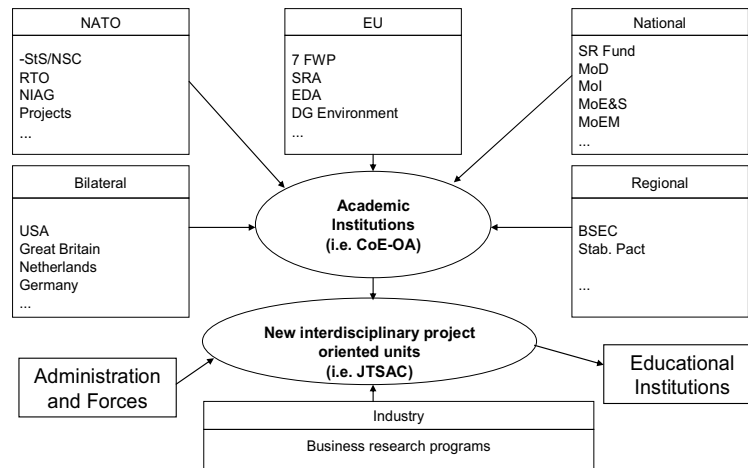


analysis of results, comparing with planned values, identifying the possible reasons for deviations from the norm and taking decisions for corrections.

The greatest challenge in the implementation of scientific projects and management of scientific organizations is how to optimize the allocation of financial resources coming from various sources (NATO, EU, national projects) and manage a portfolio of projects with financing from different sources (Fig. 11).

The challenge common to science and industry is the creation of an interdisciplinary centre, oriented towards practical applications. One such centre is for example the Joint Training Simulation and Analyses Centre for Civil Security, located in an Institute for Parallel Processing – Bulgarian Academy of Sciences.

**Model for Financing / Coordination of the Centers**



**Fig. 11. Environment with diverse financial sources**

(Abbreviations: StS/NSC – Security through Science/ NATO Science Committee; RTO – Research&Technology Organization; NIAG – NATO Industrial Advisory Group; 7 FWP – 7 Framework Programme; SRA – Security Research Area; DGEnv – Directorate General Environment; BSEC – Black Sea Economic Cooperation; Stab.Pact – Stability Pact and its follow up organization – regional Cooperation Council for SEE; CoE – OA - Centre of Excellence in Operational Analyses; SR Fund- „Scientific Researches” Fund)

Project portfolio management is a process which enables us to grasp the details of each and every one of our projects – their financial side, benefits and risks. The decision-making process as to which project should be launched, stopped or continued ensures that prioritizing and the choice of projects is consistent with the goals of the organization. What is achieved through the use of portfolio management is transparency, accountability and responsibility in the management of the security sector.

The main task is to work out an integrated Model for project portfolio management, evaluation of results on the basis of specialized software products like MS Project and a set of Excel tables. This makes automatic planning possible, assigns values to each activity and its results and in addition, generates reports for the users at regular intervals [6].

MS Project is commonly used tools for project management, applied in the operational analyses group at IPP-BAS. It gives a lot of opportunities to organize and present the detailed data of the project, to monitor actual work and compare it with the plan. In addition, it can initiate corrections to be made in case of deviations [2].

Even the most sophisticated tool for project management cannot fully replace human judgment, but it should be able to provide help in achieving the following [2]:

- Tracing the complete information concerning the requirements of work, duration and resources for the project;
- Visual presentation of the project's plan in standard, well-defined formats;
- Consistent and effective planning of tasks and resources;
- Project information exchange with other applications of Microsoft Office (Microsoft Access, Microsoft Excel);
- Control over the project and establishing communication with the providers of resources and other interested parties.

Costing is one of the most important steps in the process of management and decision making. The activities of the security research projects can be defined as processes, functions or tasks which emerge at a specific time and lead to concrete results. The main activities, resources and realization in time are interdependent and require quantifying models for evaluation.

The traditional planning of resources and evaluation is based on the premise that work and its product uses up resources. In contrast, the method for evaluation of activities is based on the assumption that work and the products of that work “consume” activities, whereas activities, on their part, use up resources.

The Activity Based Costing (ABC) method is different from traditional methods because it is focused on the “activity” element. Activities are viewed as fundamental objects of evaluation. In short, ABC evaluation is done in two steps – from resources for activities and from activities to objects, creating deliverables. What follows is the logical question why expenses are not linked directly to the final results. In complex systems like the security research projects the answer is the following – there is a larger number of courses for action within a certain scenario. One and the same result of an event can be achieved through different interventions, while every intervention can be realized by more than one set of activities.

If we do not look at the evaluation of expenses from the point of view of the activities involved, we ignore an important stage in the development of the system: How do we choose the most effective activities from a set of activities which have the purpose of achieving the same result or outcome of a situation or scenario? One of the ways to determine the effective activities is to do a comparative analysis of the expenses at the level of activities. The next step is to rank activities in reverse proportion to their price assigning the lowest value to the activity ranked first, which meets the requirements for applicability.

Generally speaking, the ABC method, though not radically different from the expense/result analyses, gives a different perspective which can easily explain the discrepancy in the relation between expense and result by tracing the different courses of realization of activities leading to concrete results.

The benefit of applying this method for evaluation is directed at those in charge of decision making, at developing a system for comparison of alternative scenarios, at the optimization of operation planning, distribution of resources and objective economic evaluation.

The algorithm of the evaluation method described is the following [3]:

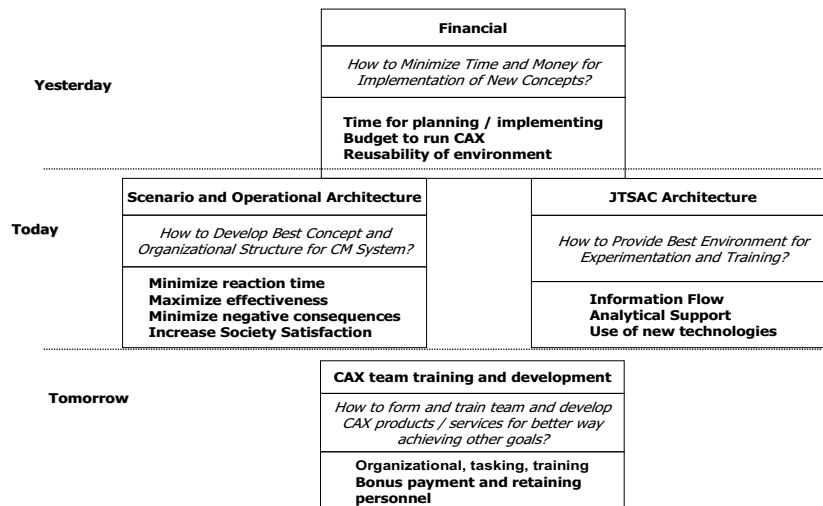
1. Determining the activities, which contribute to the final result.

2. Calculating expenses for a given task and their limits.
3. Calculating expenses for different items and reallocation of direct and indirect expenses.
4. Calculating total expenses for each activity.
5. Defining the links between the different activities and the final results, followed by an evaluation of the activity/result relation.

The analysis of activity lies at the basis of the ABC method and leads to gathering information of the following type:

- The kind of activity done in the process of development of each module of the system;
- Number of operations;
- Number of people required to perform an activity;
- Activity expenses;
- Evaluation of the benefits of the activity;
- Duration of the operation;
- Results;
- Relation of participants.

### CAX-Projects Assessment



**Fig. 12. Balance of Perspectives for CAX project**

The results of the project can be measured in different ways. Extremely effective is the balanced system of evaluation. This is not just a system for evaluation, but a system for strategic management of the organization. It provides a set of tools to put strategy into action. The main tools of the system are:

- Indicators for efficiency;
- Planning and management, oriented towards results;
- Increasing application of information technologies;
- Encouraging the exchange of information in order to compare achievements.

If the balanced system of productivity evaluation is successfully implemented it turns into a powerful tool for planning and monitoring activities which will lead to successful achievement of the strategic goals of the organization/projects. [9]

The primary goal is to shift focus from financial management which is restrictive to the approach with a long-term perspective, based on the strategy of the organization. The indicators of primary importance are those associated with the future development of the organization. The methodology envisages the organization in four different balanced perspectives (Fig. 12) – we developed one for CAX projects.

QPR is used by our change management group in order to build a balanced system of indicators for the transformation of the system of civil security through analyzing results from computer-simulated exercises in crises management.

Special focus was given to develop a model for assessment of the CAX as a tool for change management through experimentation and training. Using the standard model for Balanced Score Cards special questionnaires were developed for CAX participants (users of JTSAC, CAX developers and CAX stakeholders), leadership of ministries in the area of Financial effectiveness, Operational adequacy, Architecture and CAX support, Influence on capacity building for CAX team. Work is under progress to link these questionnaires with the process of planning and implementation of the CAX, development of JTSAC and overall process of emergency management transformation

in order to improve measurability of the change management process and to upgrade it to classical economic mission.

### **Integration of the architectural approach with project/portfolio management and a balanced system of indicators (CAX management example)**

The management of a complex system like the security research project / organization is practically impossible without using modern information technology. Effective management requires access to information in the process of decision making on the part of those who need it (or have the right to do so). The existence of integrated and secure database is one of the most important conditions for effective management and control of the security research project / organization [1].

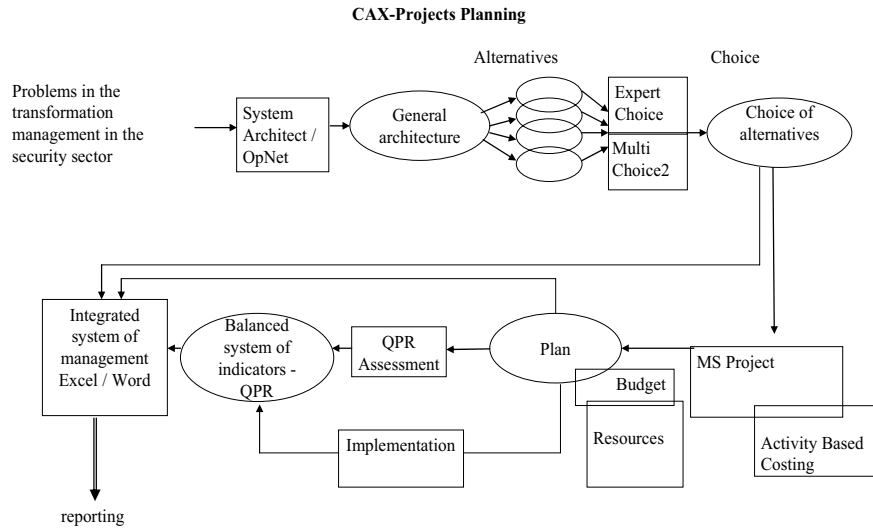
The methods of evaluation of efficiency are key instruments for analyzing the system. Effective management is a process of achieving the desired productivity from the activities level of the system, which is reflected in different indicators of the success. These indicators have qualitative and quantitative characteristics. The application of the balanced system of indicators allows us to form a budget more rationally, based on effectiveness instead of on intuition. Furthermore it is based on a more accurate planning of results, because of the effect of simulated processes, greater transparency of the organization activities, quick identification of problematic areas, learning from best practices, more opportunities for ideas and innovations [10].

The increased efficiency of the management system requires optimal methods and technology for meeting the criteria for success [5].

The architectural approach is closely connected with the theory of processing information and cognitive psychology/ decision making theory, leadership theory. Well known methods from this area are used in a new field – transformation of the security sector in the context of political and economic change as well as in the field of good governance of the security sector – general change management process.

Software is being developed in the C4I R&D department of IPP-BAS in cooperation with the University of World and National Econ-

omy under the project EU TACOM SEE-2006 [7] which will enable us to plan and report expenses for crises management research and exercise projects (Fig. 13).



**Fig. 13. Elements of the system for planning and reporting expenses for training**

In the process of CAX Planning there are several M&S tools used in order to improve experimentation and training. First System Architect was used for EU TACOM SEE-2006 to develop operational and system / technical architecture for CAX environment. OpNet was used for M&S of the network to support information management in the wide area network to include several emergency operations centres in Bulgaria and abroad. In order to select different options for the CAX environment Expert Choice and its Bulgarian analogue Multichoice 2 were used for final approval of CAX architecture as well as to select subcontractors for different elements of the architecture.

MS-Project and MS-Excel Activity Based Costing Model were used for development of the budget and deliverables time table. Finally QPR Balance Score Card system is under development for pre-

cise analysis of the results and strategic management of the exercise as well as emergency management system transformation at large.

Even simple table / chart based models in MS-Excel proved to be very effective for improving the process of experimentation of Civil Security Concept and for adapting of the training of diverse personnel to the realities of CAX.

This package for M&S in support of CAX planning will be very useful in preparation of more training sessions in future and better utilization of JTSAC-CS as a cluster research infrastructure.

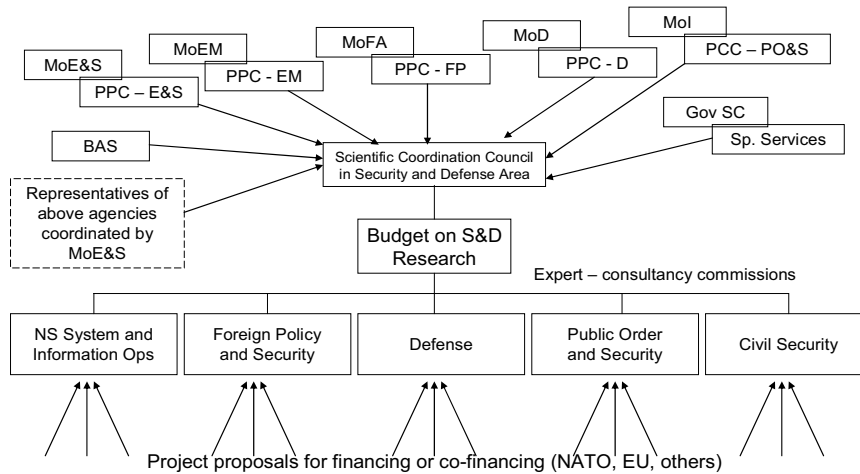
### **Management of Security Research**

Analysis of the accessible projects in security research area for the period 1999-2008 as well as direct experience with several NATO, EU and Bulgarian Government funded projects (including NF SR) as well as discussions during series NATO Advanced Research Workshops (ARW) on Bulgarian integration into Europe and NATO (issues of science policy and research evaluation practices – 2004-2006) and current results of SfP982063 are considered as a base to propose a Security research management concept with the following elements:

- National Security Research Program, coordinated with EU and NATO
- Network of research and technology (training) centres of MoES (BAS and Universities)
- Unified financing mechanism and governance model
- Unified Project management / Program management model
- Risk management model



## Scientific Coordination Council in Security and Defense



**Fig. 14. Model for evaluation, selection and management of scientific projects in the field of security and defence**

(PPC – problem projects committee in E&S – education and science, EM – emergency management, FP – foreign policy, D – defence, PO&S – public order and security areas)

General Governance model for security research is based on the answers to the following questions:

- Type of decisions?
- Who makes these decisions?
- Input Information?
- Influence on the behaviour of the community of involved in using the results of the security research projects?

Governance model specifies the decision rights and accountability framework for encouraging desirable behaviour in the use of security research results. Real challenge is to encourage using more effective way of security research in the process of change management.

Based on the above mentioned steps and stages in the management of the process of generation and analyses, selection and man-

agement of projects, we suggest that a general model for evaluation, selection and management of scientific projects for security and defence be developed (Fig. 14.).

The integrated Security Sector is represented by all ministries and their expert committees which are concerned with security in the Scientific Coordination Council. Proposals for financing various scientific projects are forwarded to the Council. The committees discuss the proposals (alternatives), and then the analysed proposals are sent to the Scientific Coordination Council. It makes a selection and decision based on the multi criteria analyses method. This Council has its own budget. It represents all institutions, experts from the Bulgarian Academy of Science and in coordination with Ministry of Education and Science (MoE&S). The approved projects are given a second evaluation after a detailed plan and budget is presented by their team. Next phase - projects are strictly monitored through the different stages of development as projects with diversified financing by commissions. The latter suggest decisions to the Coordination council for launch, development and finalization of the projects from the portfolio.

By using scientific-based methods and models for the management of processes and measuring results in the development of an integrated security sector we can guarantee transparency, effectiveness and activities focusing on results.

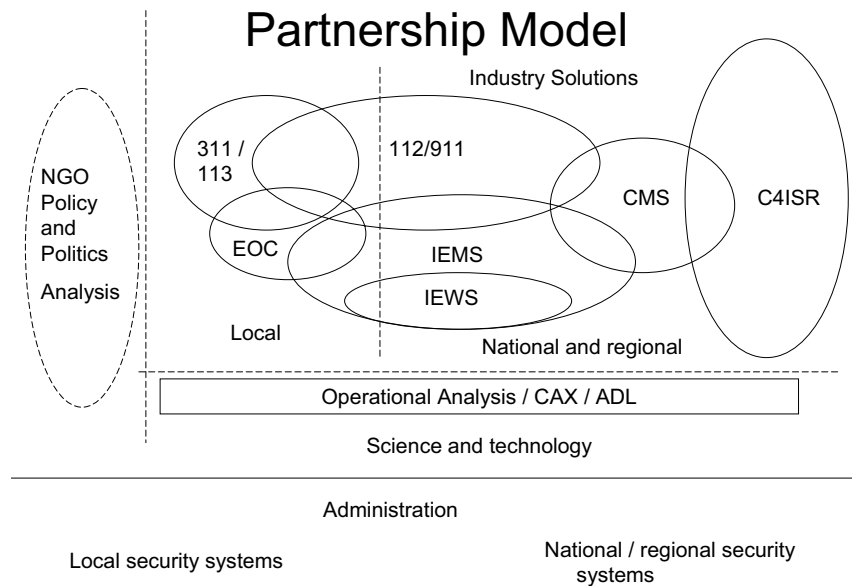
It is necessary to introduce business early into the lifecycle of new systems according to the mechanism of Concept Development and Experimentation (CDE), Advanced Technology Demonstration (ATD) and Computer Assisted Exercises (CAX). We should achieve cooperation through projects, financed by the customer (administration) and producer (business) and carried out by scientific organisations which integrate science with practice and the opportunities given by technology.

The implementation of results from scientific research projects can be achieved by forming an interdisciplinary centre in an academic institution – i.e. JTSAC-CS.

Public Private Partnership is characterized by the following:

- Transparency, reporting, efficiency (because of the competitive element)
- Clear and accurate specifications, plans for execution, expenses, management
- Well- defined criteria for evaluation
- Coordination with the procedures for budgeting in administration
- Understanding of the requirements by the end-users and organizations that provide financial support.

Under the project NATO SfP 981149 and EU TACOM SEE-2006, a public-private partnership was formed in the Centre of Excellence with ‘Electron progress’ joint-stock company, ‘Telesys’ Ltd, ‘Smart Media’ Ltd., ‘TV-MET’ Ltd. and other companies in order to achieve better results using the advantages that administration, academic institutes and business could bring to the table.



**Fig. 15. Example for public-private partnership model in civil security management area**

Transition to effective operations in totally new security environment is not only the issue of reforming security sector, introducing new technologies, involving community and industry. It is real challenge for “inventing” effective development and operation partnership model. Following the experience in Bulgaria working in close cooperation between administration, industry, academic sector, non government organizations and international institutions we are keen to establish and further improve the model presented on Fig. 15. Of course it is up to industry to provide solutions for different systems like 311 and 911 in US (113, 112 in EU), integrated early warning, integrated emergency management, crisis management, C4ISR for the military sector. These systems are integrated according to the concepts developed by using OA in academic sector, working with administration. In this environment training through CAX and ADL (other computer based training) is taking place with the involvement of the communities as well. General political environment, public policies are developed by NGO and defended in the society publicly.

Such an “ideal model” could not be implemented in a day by a decree. It is long process of change management, mostly change in the culture of all involved organizations, and again OA and CAX are one of the key tools to support the process of such a change.

### **Conclusion: National Security Research Program**

Period of planning for the National Security Research Program (NSRP) has to be coordinated with the national research program from one side and with the plans for organizational development and modernization of the security sector – so it is realistic to think about time perspective of 2009-2020. Planning could be based on inputs from projects as:

- Input from SECRES
- Input from ESRIF, SAFE, FORESEC

but the process requires special project to be implemented on the national level in coordination with NATO and EU.

Problem Areas of research that were identified by the Council

#12 in BAS are:

- Risks and threats – scenarios
- Capabilities to respond and shape
- Governance, management, C2
- Education and training, research and development

Scientific Approaches to be used in implementation of the National SR Program are:

- Social sciences and humanities
- Technology
- OA and CAX

This program is typical horizontal program that calls for interdisciplinary and applications projects to be supported.

NSRP has many implications for educational programs in the security domain in main universities as:

- University of World and national economy (UNWE), Sofia University (SU), technical University (TU) and other civilian universities
- Defence Staff College (DSC), National Military University (NMU), Academy of MoI (AMoI) and other specialized security institutions

It requires involvement of these academic institutions in research process in order to feed changes in the educational programs. In great extent twinning of SFP981149 and SFP982063 with the series of NATO ARW / ASI in Bulgaria and nationally funded studies in research planning and management are the main sources to develop a comprehensive, NATO/EU compatible program that is an instrument for scientific support to security sector development and for bilateral and multilateral research cooperation.

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