# MACEDONIAN SECURITY AND DEFENCE R&D MANAGEMENT: ICT POLICY AND STRATEGY

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> ... *"An invasion of armies*
> *can be resisted. But not an*
> *idea whose time has come..."*
> *Victor Hugo*

## ABSTRACT

Macedonia's work toward developing adequate communications infrastructure and skills necessary to access and participate in the emerging global information infrastructure has been impeded by transition shocks and a poor economic climate.

Poor material conditions preclude access to, and knowledge about, the Internet in many sectors of society. Computer resources remain insufficient and the Internet is generally inaccessible for most citizens due to relatively high costs. This situation particularly affects young people attending schools which are insufficiently equipped to teach and expand student's IT skills.

Afforded little opportunity to develop efficient and accountable management systems and good practice regarding public service, local authorities have begun to lag behind in terms of development stakes. In spite of this, in 1996 the Government initiated a process of decentralization of local government. The municipalities have been limited in their policy and decision-making powers and have had limited control over resources. The new process of local authority reform currently underway is in preparation for transfer of competencies and financial resources, planned by the government in order to create sustainable and viable local governments in line with European standards.

To encourage activities impelling the country towards an information society and digital economy, in July 2000, the "e-Macedonia for all" initiative was started by the former President Boris Trajkovski. It was followed by the preparation of the "e- Declaration 2002", a document with specific recommendations for accelerating development of an information society and digital economy in the country, officially adopted by Parliament and recognized as a national priority, in July 2002. The document specifies the following six gaps which the country needs to close in order to advance: (i) bringing together private sector and Research and Development community; (ii) creating an enabling environment for a pro-active adaptation and use of ICT by government and businesses; (iii) establishing new e-government services for citizens and businesses; (iv) improving regulatory framework; (v) protecting intellectual property rights, and (vi) developing needed competencies and skills. At the end of 2002, the government established the Commission for Information Technology (CIT), charged with determining a National ICT Strategy and Action Plan which will establish development guidelines and priorities. One of the main objectives of this body is consolidation of the efforts that have so far been invested in the development of Information Society and to increase the speed of implementation of actions according eSEE Agenda and Declaration of Principles and Plan of Action adopted during the first phase of WSIS (World Summit on the Information Society) held in Geneva in December 2003. The *CIT's Working Program for the period 2003-2007* (as of September 2003) which is in accordance with *eEurope+ Agenda* describes goals and activities of the Commission and its objectives, including National e-Strategy, and prioritizes e-Commerce, e-Government, e-Tender, Internet kiosks, access to government-held information, legal environment, use of ICT in health, culture, science.

One of the activities undertaken by the CIT, based on its scope of work, working program and responsibilities, is a *Strategic Partnership Agreement between the Macedonian Government and Microsoft Corporation* signed in December 2003, according to which the Macedonian Government will access the company's licensed software. In return, Microsoft reportedly will invest US$6 million in the next four years in the country, in order to help implement its applications in the government institutions and will support the implementation of e-governance services.

The Macedonian government has been actively involved in the SEE Europe initiative, under the auspices of the Stability Pact, which aims to better integrate the South Eastern Europe (SEE) countries into the global, knowledge-based economy. The latest document *"SE Europe Agenda for the Development of the Information Society,"* adopted in October 2002, in Belgrade, has been accepted by the Macedonian government which is thereby committed to the Agenda items. One commitment adopted National Information Society Strategy and Action Plan, based on the eSEE Agenda, and National Information Society Policies with clear goals and responsibilities. According to previous, there is need for realization of a Global Communication – Information System for Ministry of Defense and the Army of Republic of Macedonia requirements.

## 1. National Information Society Policy (NISP)

The Information Society is a product of the changes in utilization of the new information and communication technologies. The global communications, the e-commerce and the Internet are advantages of the developed world, ensuring more wellbeing, development and democracy.

The world in the new millennia is characterized by the process of globalization which is a result of the technology development and the liberalization policy. In that world, the information is the crucial resource, and the knowledge and the ability to learn and improve is a key to competitive advantages.

The Republic of Macedonia, through the **National Information Society Policy (NISP)** is involved in the global development processes.

The process of development of the NISP is based on the reality and the needs of the local environment, on the realistic assessments of the capabilities, resources and the potentials of all entities in the building of the Information Society.

NISP is a document which is integrated with the other development strategies in the state, supported by all political entities by a consensus, in order to provide for the implementation of all designed programs, projects and initiatives to move towards the Information Society. At the same time, this document contributes towards linking the activities in the area of the information and communication technologies (ICT) in Macedonia with the programs, projects and the structural funds of the EU.

NISP provides for efficient implementation and usage of the ICT in all entities in the Republic of Macedonia, which will provide an incentive for the competitiveness of the Macedonian economy, transparency and efficiency in the operation of the Government and the participation of the citizens in the building of the Society.

Building and development of the Information Society is defined and emphasized in several documents accepted by the Republic of Macedonia: the Action Plan of the European Commission eEurope 2005, the Final Declaration of the World Summit of the Information Society (WSIS) Geneva 2003, the Action Plan of the IT Committee 2003-2007, the Strategic Partnership Agreement between the Microsoft and the Government and the adopted Declaration of the Assembly of the Republic of Macedonia "e-Declaration 2002, Recommendations for Accelerated Development of the Information Society and the digital economy in the Republic of Macedonia as a national priority", as well as other agreements and conventions ratified by the Republic of Macedonia.

## 1.1 BASIC GUIDELINES

### 1.1.1 INFRASTRUCTURE

Provided state-of-the-art, easily accessible and affordable ICT infrastructure, available under equal and non-discriminatory conditions, through:

- Affordable prices for Internet access and other electronic communications services;
- Continuous and sustainable support for the ICT infrastructure;
- Introduced protocol for electronic communications between the business entities, citizens, the public administration and the non-governmental sector.

### 1.1.2 E-BUSINESS

The introduction of e-business should facilitate the economic development by providing better economic efficiency, competitiveness and profitability through:

- Significantly re-organized and upgraded business processes, with adequate models for implementation of e-business in the companies, and

- Electronic networking between the business entities, citizens, the public administration and the non-governmental sector.

### 1.1.3 E-GOVERNMENT

Efficient and transparent operations of the Government open for citizen's participation, which will provide for better electronic services for the citizens and the business community, through:

- enabling citizens to participate in the Information Society;
- ensured level of on-line transactions in the provision of electronic services offered by the Government;
- political, institutional and regulatory framework.
- continuous development of a national ICT network of state institution aiming towards efficient and safe exchange of official information and data;
- ensuring new, better and lower-cost services which stimulate economic and social prosperity.

### 1.1.4 E-EDUCATION

Development of modern and flexible education and research system and support for the ICT orientation in the education, science and culture:

- significantly increased level of ICT literacy of the citizens;
- introduction and harmonizing of the e-Education standards;
- structural and content development and increased presence of the ICT education on all levels;
- promotion of modern and flexible forms of education assisted by the ICT; life-long learning, distance learning, vocational training etc.
- continuous development of the national academic research network as a pillar of the modern and efficient action of the education entities on the national and the global level.

### 1.1.5 E-HEALTH

Establishment and improvement of the links between the stakeholders in the health sector and creating a more flexible environment for permanent upgrade of services, through the establishment of:

- unique encoding system and electronic identification;
- harmonized technology platforms and data exchange based on defined protocols;
- electronic services for the citizens and creating prerequisites for telemedicine.

### 1.1.6 E-CITIZENS

For the citizens of the Republic of Macedonia to be stakeholders of the Information Society, it is necessary:

- to build coherent policies for all sectors to offer e-services which will be unified, standardized, user-friendly, independent of the software platform, available to all citizens regardless of their location and the social status, taking into consideration the needs of the citizens;
- continuous creation of enabling environment and good governance practice, so that the citizens can use the ICT tools to participate in the overall social processes, as well is the process of decision-making on the local and the national levels.

### 1.1.7 LEGISLATION

Adoption of legislation which will be in conformity with the international conventions and agreements to which the Republic of Macedonia has acceded or has ratified, and legislation which will be fully harmonized with the EU directives on Information Society and Knowledge-Based Economy.

The legislation will especially provide:

- De-monopolization of the electronic communication services market and prevention of the restriction of competition;
- Protection of the intellectual property rights, databases, security of the information and privacy of data;
- Protection from cyber crime;
- Electronic business.

## 2. National Strategy for Information Society Development and Action Plan

Beginning with the National Information Society Policy (NISP) of the Republic of Macedonia through the process of preparing the Strategy for Information Society Development and the Action Plan, the urgency for rapprochement of the Republic of Macedonia towards the Information Society is promoted, entailing national engagement of all key entities in the Republic of Macedonia.

Creation of the Strategy and the Action Plan started from Macedonian reality and local environment requirements, based on realistic skills assessment, resources and potentials of all entities in the Information Society building process.

Today, the globalization courses have divided the world in two zones: stagnation and development zone, which have a decisive impact on the position of individual countries, as well as on their subjectivity. Those countries that failed in the articulation of resources needed for the development by using modern Information Communication Technologies will nevertheless remain in the stagnation zone, failing to keep up the pace with the modern world.

Where the Republic of Macedonia shall be in the following period, shall depend on the application and implementation of the Strategy for Information Society Development.

The process of creation of this strategic document is supported by UNDP and FOSIM through implementation of the Project for Formulation of the National Strategy on Information Technologies for Development.

The Strategy and the Action Plan have been prepared in accordance with the obligations undertaken by the Republic of Macedonia:

- Declaration accepted by Member States of the Stability Pact for Southeastern Europe, signed in Ljubljana on 4th June 2002;
- Agenda for Information Society Development for the countries of Southeast Europe, adopted in Belgrade 20th October 2002;
- Conclusions of the Ministerial Conference for Electronic Administration, Athens, 2003;
- Declaration adopted by the Assembly of the Republic of Macedonia "E-Declaration 2002, Recommendations on accelerated development of Information Society and Digital Economy in the Republic of Macedonia as national priority";
- Action Plan of the Committee for Information Technology 2003 - 2007;
- Action Plan and Declaration of the World Summit on Information Society, Geneva, 2003;
- Adopted concept for E-Government by the Government of the Republic of Macedonia, 2004.

In the process of preparation of the Strategy, the following EU documents and recommendations were used:

- The Council of Europe, Lisbon Summit in March 2000, established the basic building blocks of e-Europe, a concept that represents an obligation not only for EU Member States, but also for candidate states for EU membership;
- European Commission Action Plan, eEurope+2003;
- European Commission Action Plan eEurope2005, and
- Draft Action Plan of the European Commission, i-2010.

The Strategy and the Action Plan are accepted and adopted by the Parliament of the Republic of Macedonia, on the basis of which the responsibilities shall be defined for all entities in the process of building the Information Society. This document contributes towards linking the activities in the Information and Communication Technologies (ICT) domain in the Republic of Macedonia with the programs, projects and Structural Funds of the European Union.

According to the structure, the document consists of two components: Strategy and Action Plan for Information Society Development, whereas the Strategy comprises of the basic development directions divided in 7 pillars (Infrastructure, E-business, E-Government, E-education, E-health, E-citizen, Legislation). Each of these pillars is built around the current state of affairs, objectives, strategic measures and responsible authorities with List of Priority Projects, programs, initiatives or pilot projects. The areas relating to Public and Private Sector Reforms are a separate part of the document, as well as the priority areas for achieving sustainability of the Strategy for Information Society Development, starting from the need of having long-term sustainability of the Information Society development in the Republic of Macedonia, where the priority areas entailing actions for achieving the objectives are defined and explained. Priority projects and defined measurable indicators are provided in the Action Plan, listed according to the same timetable of the previously stated pillars.

The Strategy should provide for efficient implementation and ICT practice for all entities in the Republic of Macedonia, through realization of priority projects defined in the Action Plan.

## 3. ICT Strategy in MoD

According to the abovementioned and in accordance to our aspiration to be part of NATO military and political structure, which presumes to follow and to use the newest ICT, and in accordance to the purpose of achieving the interoperability and compatibility with NATO structures within the C3 area, through accomplishment of partnership goals, we are faced with the necessity of the establishment and implementation of a Global Communication – Information System for Ministry of Defense of the Republic of Macedonia.

The development of the Internet in the MoD is running phase by phase, according to the so called "**Project Internet**". At this moment, internet concept consists of more VLAN, like main building of MoD, other outside MoD locations at the area of Skopje, with the main purpose of data sharing between the user connected to this network and a permanent continuing access to the Internet to be allowed as well. The concept of e-mail addresses is provided for all users on this network. In order to provide better security the users are notified on the domains. They are getting access to an e-mail communications, automatic updating of antivirus software and secure control of specific activities, for all users. Second level of security improvements is made by a so called "**Intrusion Detection System**", that automatically notices and prevents all unauthorized attacks. Whole network is protected by existing of PIX Firewall, what is additionally WAN network improvement from external attacks. The connection with global Internet network is established through leased link with 6Mb/s.

Global Communication – Information System (GCIS) in MoD and Macedonian Army through the highest priority **"Optical Digital Telecommunication System"** is a primary and basic technical – technological infrastructure of the territory of the Republic of Macedonia in stationary working conditions and presents fundament for developing the mobile communication systems.

The aim of this project is to enable effective working of C-4 (Command, Control, Communication and Computers) system including all other information systems that are included in defense structure of the Republic of Macedonia as follow:

- Making own, single, integrating, autonomous and functional CIS,
- Achieving full compatibility and interoperability,
- Secure, updated, relevant and on time information,
- Fast, continuous and effective exchange of information and data,
- Achieving of automatic working of the administrative process,
- Fast and effective decision making and
- Multiplexed and integrated transfer of all kinds of information.

The system is completely own infrastructural solution for MoD and the Army requirements and it presumes that this system will provide complete optical connection between all infrastructural objects in the MoD and the Army. The definition of the functionalities of ODTS is based of the Strategic Defense Review and Dynamic plan for accomplishing of the activities and obligations coming from SDR and the Strategy for developing of GCIS for MoD and Army as well.

Because of its specificity and complexity, this project is long-term, which means that its realization is going by phases and after its completion it could be supposed that the most recent ICT technical - technological solutions will be implemented. The unification of informatics communication protocol and telecommunications networks is foreseen.

A financial construction is needed for successful realization of this project, implementation of the system for long-term planning. Programming and budgeting is used with precise definition of the resources indispensable for execution of any individual phase of the project, dynamic and all remained resources and additional sources needed for providing financial assets.

From this aspect, big amount of the resources are provided phase by phase through FMF (Foreign Military Financing) fond and bilateral cooperation with our strategic partner - USA Government. In this context, realization of this project is leaded through the primary USA Government contractor – UNISYS - US Federal Government Group - authorized company for realization of this project.

The project started with its first phase at the beginning of 2002 by definition and foundation of the optical infrastructure within the larger territory of Skopje.

By finishing of the first phase, all objects of the MoD and Army within the larger territory of Skopje were optically connected, providing prerequisites for meeting of all IT MoD and the Army requirements.

*First Phase of the ODTS Project*

At this moment is finishing the 2<sup>nd</sup> phase of the project i.e. the complete active network equipment is established, a new monitoring center for communication network control is constructed with adaptation of existing system hall in the MoD and at this moment operative measures are taken over integration of the Army and MoD LAN networks, their interconnection and usage of new services.
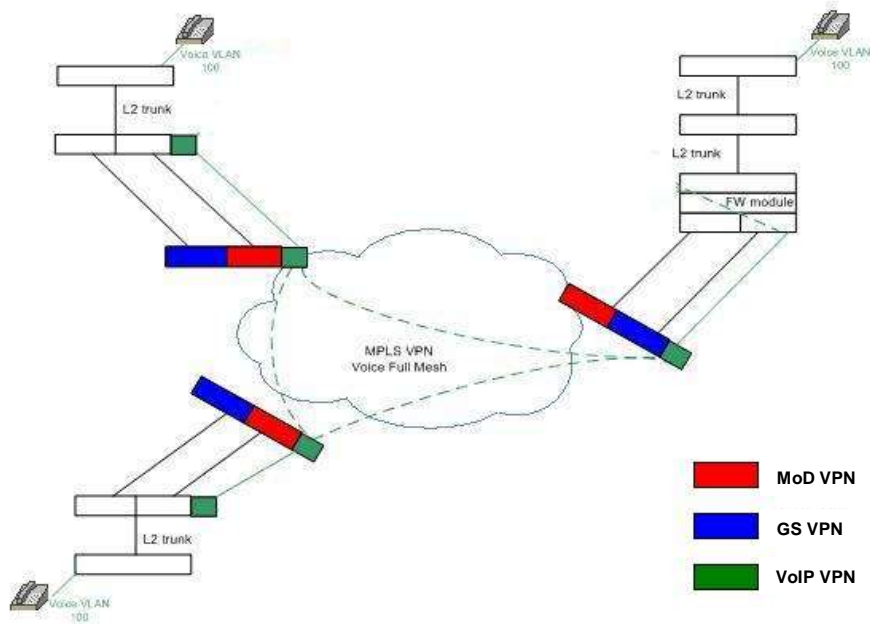


*Second Phase of the ODTS Project*

In the 2<sup>nd</sup> phase, a new achievement and ICT solutions, like MPLS (Multi Protocol Label Switching) and VoIP (Voice over IP) are used, which means better services quality that will be offered by this system.
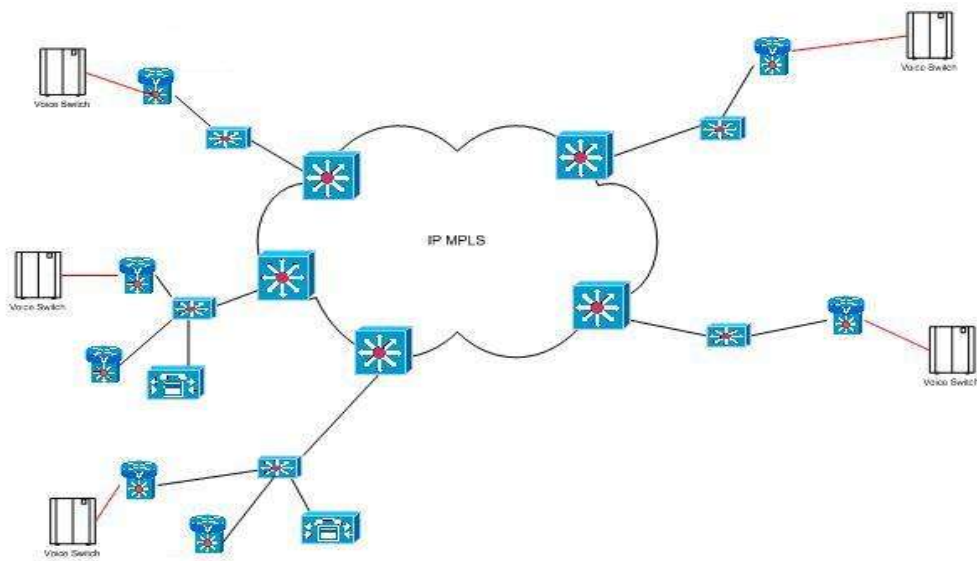
*Topological description of the MPLS and VoIP network*



**MoD VPN**

**GS VPN**

**VoIP VPN**

*General description of the VPN functionality*

In the third phase it is planned interconnection between LAN of the ARM and MoD as well as providing of connection and redundancy of following locations:

- Military location Cojlija;
- Barrack Petrovec - WING;
- Air Support Operation Center.

All these locations are to be connected with the other capacities of the Global WAN network. From the aspect of passive connection there is intend an optical infrastructure to be established. In context of network redundancy,

an obtaining radio link will be established which will be located at Petrovec and Vodno (Stationary Signals Node). All necessary administrative procedures are in procedure in order this phase to be finalized.



*Logical scheme for connection of the locations out of Skopje in the larger territory of Republic of Macedonia*

By finishing of the third phase further extensions and development of required system capacities are considered. The completely connection of all capacities of the Army of Republic of Macedonia at the entire Macedonian territory in global system is foreseen, in one WAN network with connection of all buildings in the barracks and all other Army buildings, also connection of Defense Section of RM and realization of LAN networks after implementation of reform activities and their structure reorganization according to Strategic Defense Review.

For connection of the locations to the larger territory of Macedonia in global system from physic connection aspect it is planned already constructed optical infrastructure of the "Macedonian Telecommunications" or some other telecommunication services provider to be used through implementation of the IPVPN concept and other security concepts.

## SUMMARY

The accelerated penetration of information and communication technologies including Internet and e-commerce in all areas of human activity is rapidly changing the way we live, work and do business. Imperative of the countries with low level of ICT access and usage is to apply policies for reducing the digital divide. In this sense it is very important to monitor indicators that reflect ICT sector and ICT usage in enterprises and households with internationally accepted methodologies and with clear definition of ICT products and services.

Global Communication – Information System (GCIS) in MoD is going forward. Right now there are preparations for new applicable projects which are closely connected with ODTS.

Main purpose of these projects will be realization of the following systems:

- Personal Management Information System (currently in phase of realization);
- Document Management System;
- Logistic Automated Information System;
- Planning, Programming and Budget Execution System;
- Geographic Information System;
- Training and Education System.

Generally considered, the main benefit of the high ICT access is the more transparent information distribution giving chance to the people to be as much as possible independent (overcoming the previous info monopoly nevertheless governmental or political elites) and able to use this information in a very inventive way v.v. R&D. It prevails a feeling it is our generation big chance to utilize this information technology society advantage for

good of people wellbeing and to assert common efforts in order to prevent its abusing (as it was case with black powder, atom energy etc).

## References

[1]  Joint Project Document – "Formulation of a national strategy on information society technologies for development"
[2]  National Strategy for Information Society Development and Action Plan
[3]  National Information Society Policy (NISP)
[4]  MoD and ARM Strategy for GCIS Development
[5]  ODTS Project