

INFORMATION SUPPORT FOR EFFECTIVE RESOURCE MANAGEMENT

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Background

Bulgaria started a radical defense reform aimed at adapting the role of the military factor in the national security system and developing modern armed forces. The defense reform reflects national strategic priorities, changes in the regional security environment, and resource constraints. In this regard, of great importance is the development and implementation of the an adequate system for defense resource management in the Ministry of Defense and the armed forces for the achievement of long-term objectives under forecasted resource constraints.

Information on defense resources and development of a database are indispensable for the efficient functioning of the defense resource management system. A database in place allows studies and analyses of defense resources. The respective methodology for defense resource management can be built on specific analytic and modeling programs. The unimpeded information flow through a Planning, Programming and Budgeting System (PPBS) is of paramount importance for the efficient functioning, hence for successful implementation of the system. Procedures and means for automatic collection and updating the information will facilitate working processes and increase the level of information and analytic authenticity.

During 1999, the Bulgarian Ministry of Defense (MoD) developed two long-term strategic documents - the Military Doctrine¹ and the "Plan for the Organizational Structure and Development of the Ministry of Defense by the year 2004,"² later approved respectively by the Parliament and the Government. A decision was taken to implement Plan 2004 on a program basis. A necessary step was the creation of an integrated planning system covering both program development in the Ministry of Defense and the armed forces and defense budgeting. The planning system allows objective, effective and transparent allocation of resources, which would enable reliable civilian control.

The process of defense planning is based on the notion of unity of purpose, approach, resources, and time. A Planning, Programming and Budgeting System (PPBS) is implemented to support the process of decision making and provides a mechanism for consensus-building in programming and budgeting through joint planning and analysis of military force structures in the Ministry of Defense, by the Government and the Parliament.

Information on defense resources and development of a database are indispensable for the efficient functioning of the defense resource management system. A database in place allows studies and analyses of defense resources. The respective methodology for defense resource management can be built on specific analytical and modeling software. The unimpeded information flow through PPBS is of paramount importance for the efficient functioning, hence for successful implementation of the system. Procedures and means for automatic collection and updating the information will facilitate working processes and increase the level of information and analytic authenticity.

The establishment of a global database requires the development of an information system that gathers, organizes and analyzes input data. System analysis will be built at the final information level - allocating the resources for the short-term and long-term planned activities. The established global database lays the foundations for developing the main planning documents in the MoD such as the annual defense budget. The main purpose of the global information database is to provide assistance in monitoring the implementation of multi-year defense programs. It is not possible to organize correct reports, precise planning, prognosis and control without the automated information system.

The database created by the information system serves as foundation of the informational support for the DRMM (Defense Resource Management Model). DRMM is the leading instrument for strategic and operational analysis in the field of defense planning. The abovementioned analysis helped to develop PPBS.

DRMM is designed to be an analytical tool used by high-level military/civilian planners in the macro analysis of a given country's defense system.³ The DRMM is a computer model based on US defense planning practices. DRMM integrates force capability and cost assessment data into a single model that compares various tradeoffs between different force structure alternatives. The model is designed so that planners can create and modify the model's fundamental characteristics of a force structure in order to include the structure itself, equipment levels, manning, peacetime training, wartime stockpiles, and financial management practices.

The model produces outputs, both tabular and graphic, that quantify a country's force capabilities that can then be compared to alternative force structures and against the

capability of a notional opposing or comparative force. Moreover, the DRMM contains integrated force capability assessment and cost analysis modules that help to model the benefits of different force programs. The information provided by the model can assist defense managers in making informed decisions.

Implementation of PPBS in the Bulgarian Ministry of Defense

In implementation of the Military Doctrine and the “Plan for the Organizational Structure and Development of the Ministry of Defense by the year 2004,” a team in the Ministry of Defense proposed the creation of an integrated planning system to allow for objective, effective and transparent allocation of resources, and to enable reliable civilian control.

The requirements towards the newly created system are as follows:

- To ensure a long-term binding of defense resources with defense/combat potential;
- To be compatible with the planning systems of NATO and NATO member countries;
- To lay the foundations for effective civilian control and transparency in the defense budget formulation in compliance with the requirements of the Bulgarian Military Doctrine.

Borrowing the name from the analogous US system, the planning system became known as PPBS. It adapts the principles of effective defense resource management to the traditions, organizational limitations and realities in Bulgaria. The creation of an integrated planning system adds to the effort of the Ministry of Defense to develop a defense system with force structure, doctrine, and equipment compatible with these of the NATO member countries.

The implementation of different PPBS levels results in a basic framework of the process of program and budget evaluation by the National Assembly (the Bulgarian single-chamber Parliament), society, allies and partners.

Practically, one of the main results of the PPBS is the development of a Six-Year Defense Program: an official document that comprises comprehensive information about the approved defense programs. It stores information for the previous year, the current year, the budget period and the next five years. It is necessary to maintain a computer database that is updated no less than four times a year as follows:

- During the annual review of implementation;
- During the presentation of the already developed program memoranda;
- During the budgeting process in MoD;

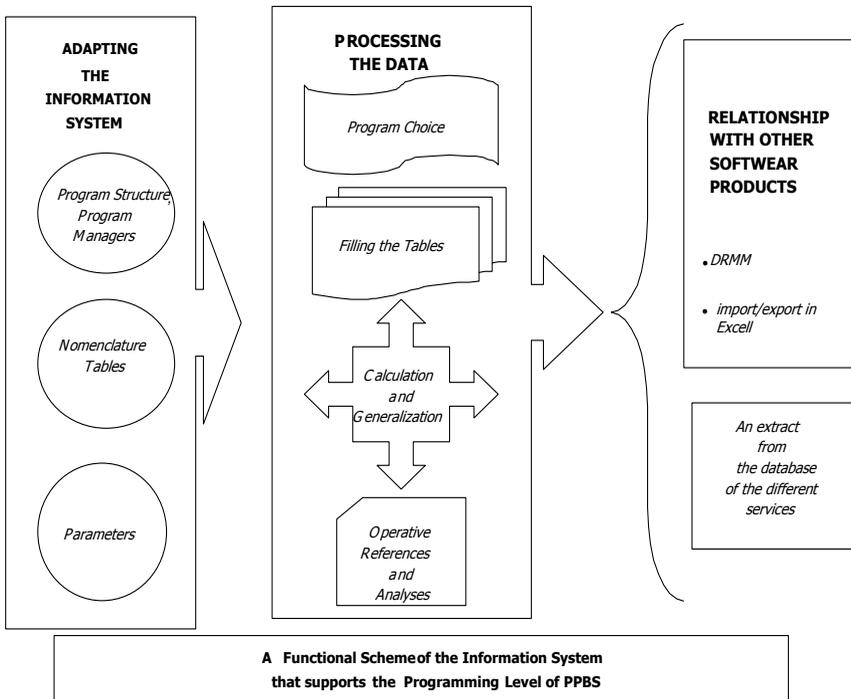
- After parliamentary approval of the defense budget.

All related information is stored in a hierarchical database reflecting the structure of the defense programs.

Information support for PPBS

The establishment of a global database requires the development of an information system that gathers, organizes and analyzes input data. System analysis will be built at the final information level - allocating the resources for the short-term and long-term planned activities. The established global database lays the foundations for developing the main planning documents in the MoD such as the annual defense budget. The main purpose of the global information database (GID) is to provide assistance in monitoring the implementation of multi-year defense programs. It is not possible to organize correct reports, precise planning, forecasts and control without the automated information system GID. The principles of GID are presented in Figure 1.

Figure 1



MoD will test a prototype of the described GID in 2001. The prototype is developed using Microsoft Office ACCESS database software. The program modules are built using Visual Basic environment. The main program consists of normative information - program structure, program managers, nomenclature tables (menus) and tables of the system parameters - an opportunity to choose the initial fiscal year and specific filters. The filters are set up depending on the survey level: MoD, General Staff of the Armed Forces (GS), or the services. The system will be adapted to operate not only at the level of major programs, but will incorporate their sub-levels: programs, sub-programs and program elements (see figure 3). One of system parameters allows choosing the variant of data we have in database - approved (planned in Programming Guidance) or active (current) variant of allocated resources by programs.

There is an option to work with a system of sub-level databases, i.e. for a single service or single program. This means every representative (program manager) from MoD, GS or services will have a limited information access to his working area. An extract database from global database will be created along the chain of command. For instance, there will be copied a separated database with concerning defense programs for the GS, for services - Land Forces, Air Forces, Navy. The next step is to generalize the input data from the sub-levels and to do calculations.

There is no limit for the number of subordination levels in the program structure. The system allows the attachment of new levels (programs) and the deletion of old ones. The database includes twelve complete tables for each program, sub-program or program element. For each program the number of the rows (nomenclatures) in the menu-tables could be different, as every program requires specific resources.

The nomenclature in menu-tables can be altered at the highest level of database access only. The tables "Resource allocation plan for program provision" and "Generalized Sample Table for concrete year from a Program Objective Memorandum" are program oriented. All other tables are connected with the resources allocation according to budget accounts. This structure allows the expenditures based on programs and budget accounts within every program to be followed. As a result, the defense budget could be built on a program or budget accounts basis.

The menu-tables are:

- Resource allocation plan for program provision;
- Draft budget account for necessary funds by programs;
- Planning table for reduced during reform personnel and financial funds for compensations;

- Plan - account for military exercises expenditures;
- Foreign currency payments planning table;
- Planning table for scholarships financial funds;
- A table for paragraph 18-00 “Other expenditures”;
- A table for paragraph 46-00 “Membership payments, participation in international non commercial organizations and other activities”;
- A table for paragraph 36-00 “Other non tax incomes”;
- A program for expenditures in building (repair) of military infrastructure;
- Generalized Abstract Table for concrete year from a Program Objective Memorandum.

The first step is to choose the period and then the respective database. This structure of software allows the storage of several databases, from different stages of the defense program development (programming, program review process, budgeting). The next step is to choose certain program (subprogram). After that it's necessary to input actual figures for the previous, current and budget year and the prognosis for the next six-year planning period.

The database allows the input of planned and actual figures. GID allows the development of a control system that covers the financial resources spent at any level of the program implementation. This means fourteen tables to be completed with the planned and actual figures. In case a new program is developed the data for the assets spent can be transferred in a database. This secures the control over the spent financial resources. Alternative variants should be created in the fields of financial and capital resources. The alternatives for each program are based on the already approved main PPBS documents - the PPBS Concept and Methodology for Program Development in the MoD. There is possibility to create alternatives with various financial funding – 10 percent less or more than the financial quota for the program. The main purpose is to easily combine the required resources, namely number of units, employees, armaments and equipment, capital expenditures and their financial equivalent. Each alternative should be precisely evaluated in order the planned objectives to be accomplished. The evaluation process will result in the proper (optimal) alternative choice.

GID allows the verification of the resources for the main programs, sub-programs and program elements on annual basis. This results in a comparison between the planned resources and resources actually granted. The comparison should be made for each program for the current year or the whole planning period.

An interface for Excel connection was developed allowing information exchange with

an Excel table. The connection assures Microsoft Office interoperability.

There is an opportunity for a strict control over the data, information protection and level access. The references that could be gathered enable a precise analysis of the information completeness for each program. This principle seriously reduces the risk of duplication of information.

The database created by the information system is the foundation of the informational support for the DRMM (Defense Resource Management Model). DRMM is the leading instrument for strategic and operative analysis in the field of defensive planning. The abovementioned analysis helped us to develop PPBS.

DRMM as main tool for analysis and modeling of defense resources

DRMM is designed to be an analytical tool used by high-level military/civilian planners in the macro analysis of a given country's defense system.⁴ The DRMM is a computer model based on US defense planning practices. DRMM integrates force capability and cost assessment data into a single model that compares various tradeoffs between different force structure alternatives. The model is designed so that planners can create and modify the model fundamental characteristics of a force structure in order to include the organizational units, equipment levels, manning, level of personnel peacetime training, wartime stockpiles, and fiscal management practices.

The model produces outputs, both tabular and graphic, that quantify a country's force capability that can then be compared to alternative force structures and against the capability of a notional opposing or comparative force. Moreover, the DRMM contains integrated force capability assessment and cost analysis modules that help to model the benefits of different force programs. The information provided by the model can assist defense managers in making informed decisions.

The DRMM is designed to assist governments with a computer model that will:

- Help civilian defense and military officials develop cost-constrained, cost-effective defense programs;
- Familiarize officials with the Planning, Programming and Budgeting System (PPBS) techniques and methodology;
- Provide military and civilian leaders with a national defense planning model;
- Help to balance national defense expenditures against economic and political reform efforts; and
- Assist countries in providing for their defense requirements during a period of (severely) constrained budgets.

The DRMM operates on any IBM-compatible personal computer in the Windows environment. Developed using the Microsoft Visual FoxPro database management system, the DRMM stores tens of thousands of data elements representing key characteristics of any given national military force structure.

Data Requirements

The DRMM is a deterministic data model consisting of four different types of data, namely force setup data, cost setup data, force (or unit) data and cost factors. Force setup data consists of qualitative information, such as the universal set of weapon types, war reserve material types, personnel types, and critical organizational unit characteristics to be used in the model. Force setup data also includes limited calculation factors such as the range of possible unit mobilization times. The setup data serves as the building blocks or reference lists of information that will be used to assign characteristics to specific units or whole force structures and to include the Opposing Force/Comparison Force. Matching specific unit information with force setup data creates force (or unit) data.

Cost setup data defines country-specific currencies, cost accounts, budget categories, project names, inflation factors, and unit types. The second level of data is the Cost Factors for personnel, equipment operating, unit operating, equipment procurement, and project costs. These can be defined as either “actual” cost based on historical pricing or “standard” costs from engineering or financially calculated standards. It is also at this level where funding factors can be applied to the individual cost factors. Inflation rates are also found at this level.

The model uses setup data to facilitate the user access to force data and cost factors. In the DRMM there will be only one combined force-cost body of setup data which remains constant for all alternative force structures modeled. Conversely, there will be as many combined sets of force (or unit) data and cost factors for each force structure alternative entered into the model. The differences are in the multiple Force and Cost data sets, particularly in quantity for uniquely defined alternatives. The following paragraphs will explain each of the four categories of data in detail.

The DRMM is used to store data, which represent the various key cost and force characteristics of a national military force structure. There are two major components of the DRMM: the force module and the cost module.

a. Force Module

Within the force module, the DRMM focuses on four major areas: units, equipment, personnel, and resources. These four areas are briefly described below.

(1). *Units*

The force structure is described at the unit level and at a level of detail determined by the user. Force and cost data can be reflected at the regiment and/or separate battalion level, whereas the organization of some countries Armed forces may dictate that force and cost data, is maintained at a lower echelon, e.g. company. In addition to describing a country's own armed forces structure, an opposing force (threat)/comparison force structure can be developed to compare the relative combat capability of the two forces. In cases where the description of a realistic opposing force is too politically sensitive, this option can be used to measure regional parity between neighboring countries or a comparative notional force. This option of software allows the comparison of trends in combat capability between alternative force structures and is not intended to predict battle outcome. The model can generate a 'buildup graph' of selected forces, reflecting the readiness level, training time, and travel time under a defined scenario.

(2). *Equipment*

The equipment inventory of a country's force structure and its associated activity level is entered in the DRMM at the major item of equipment level. The DRMM uses a weapon system scoring methodology that assigns a numerical value to the major combat systems (tanks, APCs, artillery, etc.) in the inventory. The combat power of a force is computed by aggregating the total weapon systems scores for all equipment in the selected unit inventory. This score represents a static measure of the combat capability of a force, and as long as this not a war game, it does not predict the outcome of a conflict. Although equipment, such as trucks and other non-firepower related items, should be entered in the model for costing and training purposes, these items of equipment do not receive a combat capability score. The model produces combat capability output in five different levels: Authorized, Actual, Mission Capable, Effective, and Training. The model also allows the user to show degraded combat capability due to reduced equipment on hand, equipment under repair, lack of training on equipment and lack of resources to fully use the equipment. The associated activity level of the equipment allows the model to calculate unit operating costs and a rough measure of unit training levels.

(3). *Personnel*

The DRMM accounts for personnel at the unit level. Personnel quantities are entered at the unit level based on Personnel Types. Personnel Types must be agreed on by both the force team members and the cost team members so that personnel quantity data reflected at the unit level are compatible with the budget personnel accounts.

(4). *Resources*

The DRMM accounts for user-defined resources (sometimes called war reserve material) at the unit level. The types of resources included in the model are defined by the user in the Forces Setup files under Resource Types and Resources. Typically, ammunition and POL are two major resource types tracked in the DRMM but resource categories of spare parts, crews, food, etc. could also be defined. The required and actual quantities of a defined resource are entered in the DRMM at the unit level. The DRMM also includes a function to allocate resources from a higher level to a lower level (e.g. from brigade or depot to battalion if actual quantities exceed required quantities at the brigade level and a shortage of the same resource exists at the battalion level). Resource Types can also be categorized to cause a degradation in combat capability (the ‘effective’ score) in case there are resource deficiencies.

b. Cost Module

The cost module defines peacetime operating costs of a country’s defense program in the four major areas of defense resource management: force structure costs; readiness costs; investment costs; and sustainability costs. The DRMM model also incorporates inflation rates so that these costs can be viewed in terms of their escalated values in future years. In practice, DRMM advocates a unit-based costing approach where the above mentioned costs are associated as much as possible to specific units. In this manner the DRMM approach builds the costs from the bottom-up as opposed to a top-down allocation approach historically used by many countries.

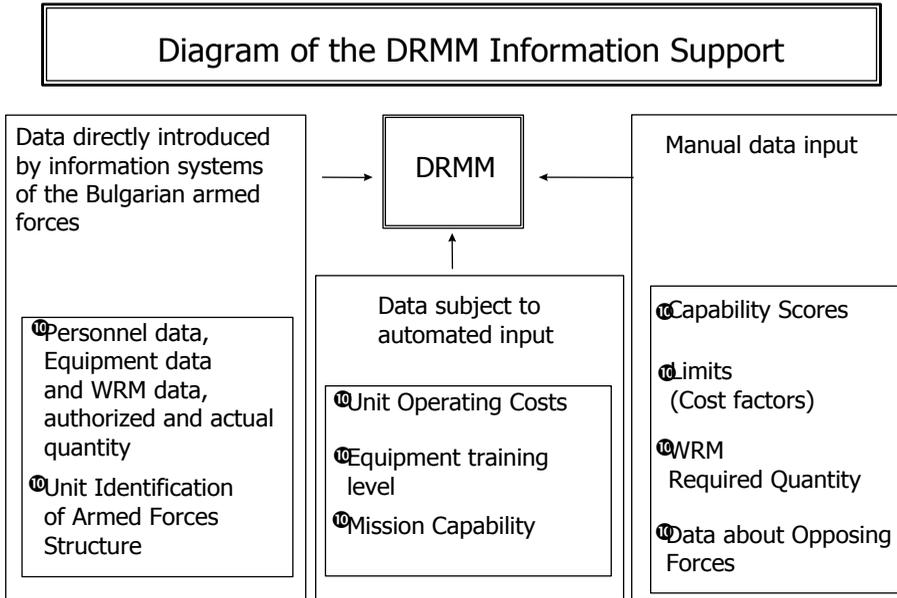
The DRMM costing approach is also one of decision “support” rather than decision “making”. DRMM does not attempt to optimize resource allocation. Rather, DRMM allows the user to develop likely alternatives whose effect on costs can then be analyzed and evaluated. This approach facilitates the force and cost analysts to be more intimately involved in the modeling effort than one where the model dictates a solution.

DRMM may be provided with data manually and automatically. It is very important opportunity for a fast development of the database necessary for DRMM functions to be granted. The database should be often updated automatically because of the significant volume of information. The updating should be done using the already existing information systems.

The compatibility of the Model with the existing information systems, keeping force section (personnel, equipment, WRM etc.) and allowing transformation of these data to the DRMM system data, is very important for its functioning. This allows us to update the data easily and on time. The manual introduction of data is time consuming but it can eliminate the risks of errors to a great extent. **Figure 2** presents

the diagram of information support that was tested in the Bulgarian Ministry of Defense.

Figure 2



The functional scheme of the connection between the organizational structure of DRMM and the hierarchic program structure of the MoD is depicted in Figure 3. The newest version of DRMM enables data relation between DRMM and PPBS. The program relation allows a serious enlargement of the analysis spectrum.

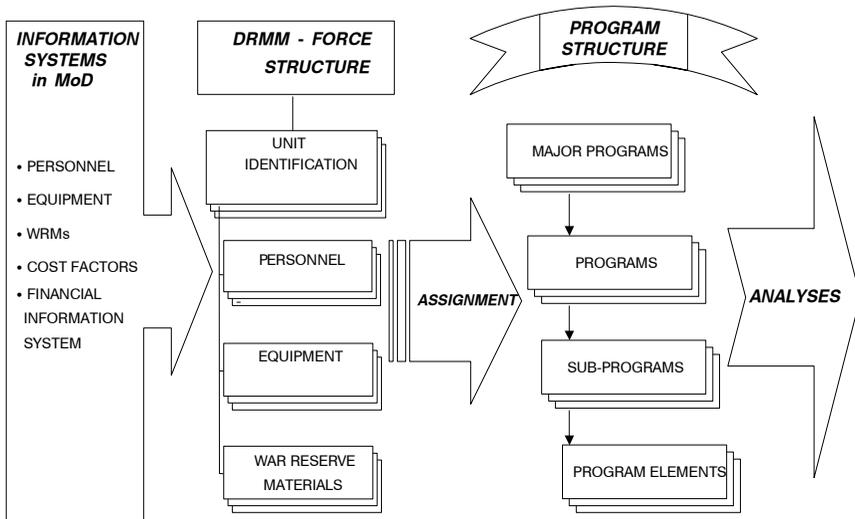
Conclusion

The DRMM informational base is indispensable for the proper functioning of the system. The process of automatic gathering and updating of the information will disencumber the working environment and increase the level of information authenticity. It is crucial that the planning management prepares clear global and factual initial cases for the development of information systems supporting PPBS. Analytical tools, such as DRMM, will improve the planning, programming and budgeting processes.

Despite the huge amount of difficulties related to the execution of the objectives of the new Bulgarian Military Doctrine, Plan for Organizational Structure and Development of the MoD by the year 2004, and the implementation of PPBS in MoD, the process of reforms is irrevocable. It will provide a missing link in the

civilian control in the Bulgarian Armed Forces, thus contributing to Bulgaria's preparation for NATO membership.⁵

Figure 3



Notes:

- ¹ *Military Doctrine of the Republic of Bulgaria*, Approved by the XXXVIII National Assembly of the Republic of Bulgaria on April 8, 1999, (Sofia: Military Publishing House, 1999). Full text in English is available at <http://www.md.government.bg>.
- ² *Plan for Organizational Development of the Ministry of Defense till 2004* (Sofia, MoD, 1999).
- ³ *Defense Resource Management Model, User's Manual*, Department of Defense, US, 1998.

- ⁴ Jones, L.R. and Bixler, G.C., *Mission Financing to Realign National Defense* (Greenwich, Connecticut: JAI Press, 1992).
- ⁵ Todor D. Tagarev, "The Missing Link in Civilian Control," in *Proceedings of the MAP Seminar on Regional Cooperation in Enhancing Civilian Expertise and the Role of Civil Society in Security and Defence Policy Making* (Sofia: February 2000).

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