

Assistance to Decision Making Tools at Strategic Level

Within the French Defense Procurement Agency (“DGA”), the CAD¹ (Defense Analysis Center) is an organization within DGA in charge of conducting studies to prepare future in the whole field of forces systems. Reflections, discussions, and surveys in relation to **assistance for strategic decision making** were led during the last six years on EMA’s² request (Committee for technical/operational studies and Steering Committee for joint simulation), a number of them having been conducted by CAD.

The following lines are delivering an overview of the efforts made, of the progress achieved and a view of the various techniques capacities to assist decision makers. These are currently facing with a complex world while being submerged by an information overflow. We describe the current status of a both **dynamic and probably endless approach to collect the best tools available for the highest decision makings**.

BY LUCIEN STEINMETZ³, HEAD OF DEPARTMENT, STRATEGIC SYSTEMS, DGA⁴,
DAVID FORICHER⁵, MANAGER FOR TARGETING CELL, DGA,
SÉBASTIEN RODE⁶, MANAGER FOR TECHNICAL/OPERATIONAL STUDIES, DGA

The environment of assistance for strategic decision making

..It is always advisable to clearly perceive our ignorance.

Charles DARWIN

Those in charge of the elaboration of strategic decisions are entitled to hope possible aids for decision making. However before dealing with these aids, we believe that we should **explain our understanding of these terms**.

Decision-making....

Making a decision is, by definition, **selecting an option between several of them**. Subsequently, decision can only come from the action capability. Decision making is generated by a statement of dissatisfaction, in relation to a present or future situation. Decision then aims at bridging such a gap. In the decision making process, the first choice is to determine where we



ADJ Jean-Raphaël DRAHI/SIRPA TERRE

want to go, i.e. what end state we wish. Then arises the question of selecting a solution in order to achieve our goal. This generic process is subsequently prepared by gathering useful information, structuring this information, expressing what the options are (possible selections) and assessing (or comparing) these options. Then the decision comes. Supported by our “limited rationality”, the reality of our decisions sometimes deviates from this ideal process, skimming over some stages.

... Assisted...

As well as the decision making process is multiform, there is not one but several **decision- making assistance tools**. These may be related to the decision maker or those in charge of preparing decision components. *A methodology* enables to support the holistic approach of decision making. *Databases* are a support to information gathering either to analyze the problem or to elaborate options. Similarly,

information processing tools may be useful in the work of information structuring. *Simulation*, operating models is supporting the evaluation. *Multi-criteria analysis tools* enable to discuss alternatives. It is neither reasonable nor to be wished to contemplate building from these aids any black boxes superimposing “the” decision. The objective is to provide an assistance for the decision maker to enable him to go over his cognitive limits.

... At strategic level

Four levels for operations command and control are currently identified: political, strategic, operational and tactical levels⁷. The decisions made at each of these levels are characterized by specificities impacting expectations in terms of decision-making assistance. **Strategy** is the art of coordinating the action of military, political, economic and moral forces to prepare the defense of a nation (or a coalition)⁸. Among the characteristics of decision at strategic level, we can list:

- *An increased complexity of situations to be analyzed and actions to be launched*. This is expressed through the extend and the variety of domains involved but also by the number of players, the importance of the number of parameters to be considered or the range of finesses (butterfly effect).
- *A specific importance of non rational factors*, viewing a specific difficulty to gain access to an objective information (political domain, assessment of intents, uncertainties...).
- *A time scale*. Even if a strategic decision can be constrained to a short loop, the strategy scale of time is of importance (because the dissatisfaction to come may be “distant” or because the action will expand during a significant duration). Time dedicated to decision preparation may also be of importance.
- *Impact of decision*. Any mistake related to orientation in strategic choices is generally the most expensive mistake.

Which assistance for decision process at strategic level?

*We must know first what we want,
We must then have the courage to voice it,
We must finally have the energy to do it.*

Georges CLEMENCEAU

To determine the assistance to be provided to the strategic decision making process requires **to regularly confront technical solutions with operational utilization in order to better define and satisfy the need**. Works related to this theme were led by CAD within DGA/D4S⁹ in the framework of its mission to prepare the future.

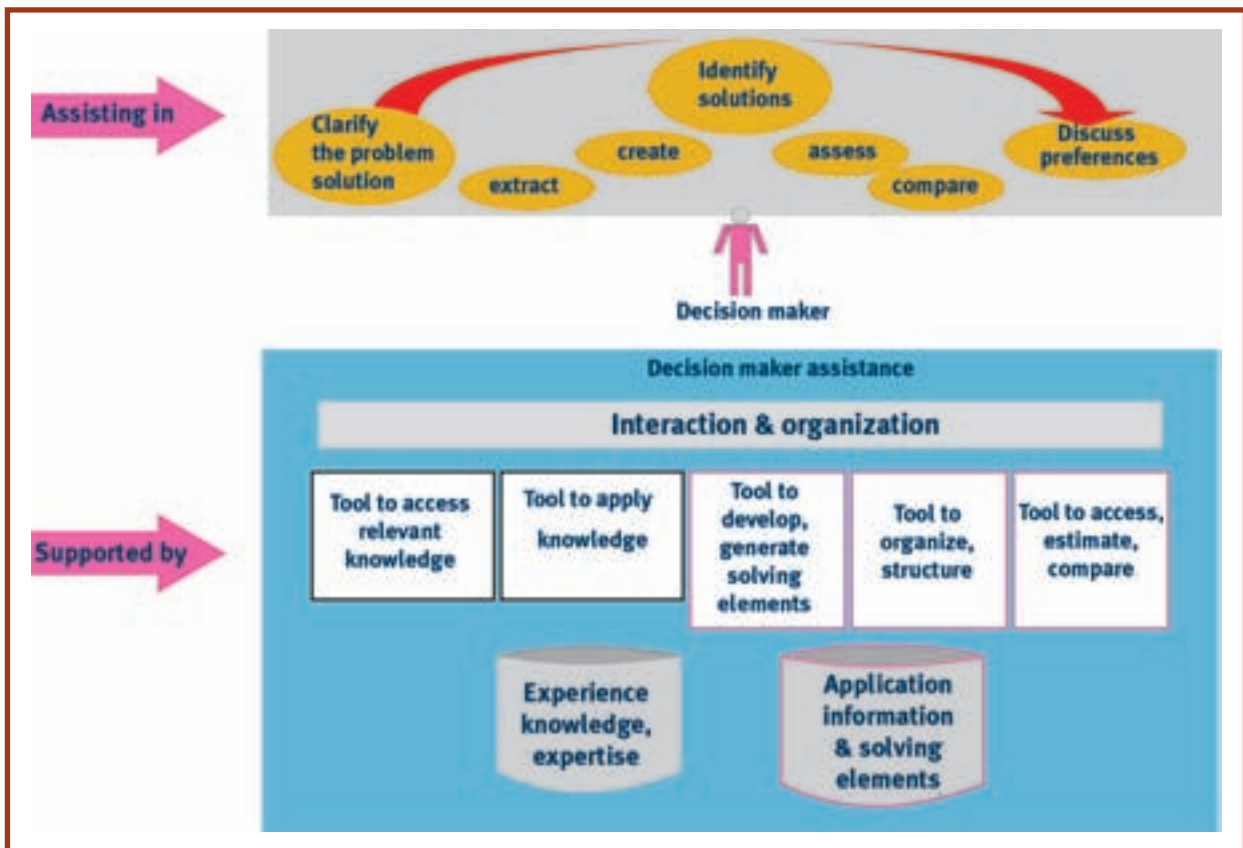
Basic principles

We can list some principles guiding the completion of the aids (methods and tools) for strategic decision:

- *Systems adaptability*. Through “transformation”, doctrine and organizations are planned to be evolving. Aids for decision shall not be a rigidity factor and subsequently shall be able to go along with these changes. When methods are led to evolve, tools (instrumenting them) shall be in a position to adapt.
- *Evolving capacity*. A large part of related aids is linked with the information processing domain. Under the civilian society impulse, significant progresses may appear within short periods of time and with an extended dissemination. Aids available for the decision maker should benefit from

the most efficient tools especially those widely disseminated and likely to be used by our allies and adversaries.

- *Acceptability for users*. Support delivered should facilitate in material terms the decision making process without tainting the methods appropriation by the decision maker. These systems should neither darken the decision process nor take the lead in the choice responsibility (gain control to keep confidence). To be accepted, they should also provide a significant added value in regard of the effort delivered for their implementation.



- *Self-sufficiency.* The various aids should be able to complement each other. But in the framework of an iterative, modest and realistic approach, each separate aid should also have its own operational efficiency.

Actions under way

Challenges and principles stated previously place at a high level the expectations regarding decision making aids systems related to strategic level. Preparation of such future systems delivers indeed a real challenge. We detail hereafter some of the actions initiated at (Defense) ministry level:

- *Assistance in setting up the problem, in structuring, in comparison (assessment) applied to pre-decision planning (DAS-EMA level):* these works were conducted within an operation namely “SIMULIA-ADS” which started in the early 2000s. They enabled building up a method to define and evaluate strategic options for interventions. Definition of criteria coming from situation assessment, broken down in prospective scenarios, actors’ games and strategic reference led to assessment of options through a multi-criteria analysis. If needed, the various items of the situation assessment can be dealt with by experts through differentiated depths of analysis. Moreover, tools are instrumenting this method by enabling the management of trees of criteria and assessments. Formalization of options assessment allows simulation of the influence of variations in the evaluations (weigh of criteria, marks values). It enables also the implementation of techniques coming from operational research (optimization through constraints, games theory...) in order to re-combine strategic options. EMA organized several tests gathering together potential users, DGA and manufacturers: nationally with CPCO¹⁰, DAS¹¹ and DRM¹² and currently with CID¹³ but also internationally in supporting works assigned to France with *MNE₄* preparation. So, this survey contributed to the formalization maturation of the needs which was concretized in 2006 through the writing of a staff document (OEM¹⁴) and the launching of the preparation stage of an assistance for strategic decision.
- *Aid for simulation of decisions consequences through effects propagation.* The goal is now to instrument a method related to the effects based approach. The method consists in formalizing the situation understanding through a system of systems and defining the wished evolutions of this system through effects (with no obligation to consider the actions enabling their implementation). This system modeling will be used then to foresee the consequences of the whole of effects on the system components and to measure their contribution to the desired end-state achievement. Such tools offer an interface facilitating generation and management of system models and enable simulation of effects propagation. An “OBE tool” study was dedicated to the rapid experimentation of an “off-the-shelf” tool especially in the *MNE₄* framework at beginning 2006. A “PREFICS” study should enable by spring 2007 a deepened reflection on the perimeter and content of such a tool adapted to pre-decision level.
- Taking into consideration the *complexity of actions for violence control in urban areas*, simulation in a domain which is specialized due to

its particular complexity. This study aims at producing demonstrators of three tools, one of them being dedicated to decision-making assistance. The underlying method and tool will be close to those mentioned in the previous paragraph but adapted to the particularly difficult case of violence control in urban areas. Moreover, automats for actors of urban violence should be developed. Such modeling would be more focused on behavior than systems. It would make available undiscovered simulation capabilities in order to assess or compare alternatives. This subject is dealt with at operational level rather than strategic or tactical levels. Currently in a preparation stage, this study should be completed by the end of 2008.

- *Aid for stating the problem, structuring, comparing (assessment) applied to operational and defense planning.*

An approach namely SIMULIA-APO, aims at delivering a set of assistance tools for the operational planning process. The first tool considered would assist in generating a mesh of effects and actions: this proposed tool is under development; it will enable the effects propagation in a system really representing the theater or a specific situation. This tool has been experimented in the "OBE tool" study. The two complementary tools will assist for building-up and task organizing the joint force. The assistance in terms of forces generation consists, after breaking down the operation into designed tasks, to propose the adapted forces modules based on their capabilities descriptions and to optimize this selection.

Another approach namely SIMULIA-APD is aiming at the assistance for defense planning. It proposes to re-use SIMULIA-APO tools to quantify the capability requirements for the whole of missions assigned to the French armed forces and identify deviations between what is existing or foreseeable and such requirement. Development of demonstrators for these two tools families is under progress and should be completed by spring 2007.

- *Aid for collecting and structuring information.* The purpose is here to investigate capacities of utilizing information available from open sources. A first survey evaluated existing techniques and technologies in the domain of Internet monitoring being adapted to defense requirements (military or of military interest intelligence). A second one led to the realization of a demonstrator built as a federation of commercial softwares. To limit developments and remain demonstrative, the study was restricted to a single Middle-East area. From a definition of interest sources, the tool collects, sets up and delivers information cartography (either under a geo-localized format or under an inter-concepts relationships graph).

Reflections

Experience gained enabled the identification of **effort axes**, among which:

- *Stress even more the mutual understanding*, favoring a better interaction between technique and needs, between DGA and headquarters (through means such as integrated-teams work or experiments).

- *Define the fair involvement of the decision maker.* Design of such systems benefits first from the involvement of the decision maker which is a source of efficiency and better management. Time is however for the decision maker a rare resource. More than usually, it should be used rightly.
- *Keep our mind open* to the evolutions of the information world guided by the civilian world. Be listening and able to adapt.

1 CAD: Centre d'analyse de Défense.

2 EMA: Etat-major des armées : (French) Armed Forces Joint Staff.

3 L. Steinmetz, D. Foricher and S. Rode are *Spezialized Engineers of the DGA (ingénieurs de l'armement)*.

4 DGA: *Délégation générale pour l'armement, a French Joint Defense Agency for Procurement. The closest US equivalent would be Under-Secretary of Defense for Acquisition, Technology & Logistics.*

5 *Ingénieur principal de l'armement: Engineer with DGA, Army equivalent would be Major.*

6 *Ingénieur de 2e classe: Engineer with DGA, Army equivalent would be First Lieutenant.*

7 "Joint dimension of operations command", *Doctrine n°5.*

8 *Biblirom LAROUSSE.*

9 *D4S : Direction des systèmes de forces et des stratégies industrielle, technologique et de coopération. Directorate for forces systems and industrial, technological & co-operation strategies.*

10 *CPCO : Centre de planification et de conduite des opérations: Joint Operations Planning and Command & Control Center.*

11 *DAS : Délégation des affaires stratégiques : Directorate, Strategic Policy.*

12 *DRM : Direction du renseignement militaire = Directorate, Military Intelligence.*

13 *CID Collège interarmées de Défense = Joint Defense College.*

14 *OEM - objectif d'état-major: "HQ Objective".*

Work is still on-going as the first studies demonstrated that **decision at strategic level** could be efficiently **assisted**. Moreover real progress could be expected. An "equipped" strategic decision making process benefits from works performed by the other levels. However, it should also be a factor for a better appropriation of the decisions spirit by the lower echelons. Having the lead in this area **also permits France to maintain its autonomy, to keep control of its concepts and tools**. Quality of support provided for decision making at high level, through our allies' acknowledgment can also contribute to the acceptance of the positions taken by the French strategy.