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The foundations of the operational decision-making culture in France.

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The culture of operational decision-making in the French Army is rooted in the rich history of Western ideas and strategic thinking. Recent decades have seen it undergone significant changes, mainly due to the relentless pace of scientific progress and a commendable desire on the part of military commanders and private and public officials to learn from each other's good practices.

Over the past three decades, the need for interoperability, the recognition of new forms of conflict and adversity and the integration of new technologies, primarily in the information field, have led Western armed forces to adopt a command organization and operational decision-making methods inspired by and similar to American doctrine.

Organizations, tools, methods and processes, which are sometimes tailored to the business world, now seem to have taken precedence over the actual determinants of decision-making during war. Indeed, the timeless and universal notions of the fog of war, complexity, adversity, contingency, and the personality of the operational leader are not well suited to tools and meth-



A recent National Defense and Armed Forces Committee report highlighted the implications of new technologies on operational command and control

look over the tactical leader's shoulder'. Technologies for the processing and transmission of massive amounts of information shift the balance of responsibilities in the chain of command, and even the very notion of subsidiarity. As such, they require in-depth doctrinal studies on the responsibilities of each hierarchical level¹."

procedures. "As explained by Mr. Gérard de Boisboissel, Secretary General of the Chair of Cyber Defense and Security at Saint-Cyr Military Academy, 'the all-digital world is changing the way we operate. With increasingly accurate sensors and improved digital telecommunications, new technologies enable the commanding general or even the President of the Republic to

Stressing the relevance of the analyses conducted by the Armed Forces over the past several years, the report's recommendations invite the entire joint doctrinal community to accelerate reflections on command in operations and its organization. The US Army has since set the tone with dynamics primarily driven by the considerable resources invested in research and development by the digital giants, the GAFAM².

In the meantime, Russia and China are not to be outdone in this area. Renewed international ambitions and the impetus given by the Head of State since his election have reinforced the tropism of reflection on new technologies. In this same context, the Joint Operations Planning Centre (CPOIA) was tasked by the Joint Deputy Chief of Staff for Operations to study the long-term impact of developments in digital technology on joint command. A working group on joint command of operational commitments (GT C2IA) was therefore established in September 2017. This study, conducted across all the services, our allies and French companies, has already made it possible for us to consider the interesting initial recommendations based on operational lessons learned, transverse analyses and experiments. These reflections have been well underway in the Army for several years now. In the 2000s, the Army came to the forefront of this field with the digitization of the battlefield (NEB). Almost fifteen years later, the lessons learned from the French and allied digitized commitments of the early 2000s have retained a large part of their value³. In addition, an in depth study is underway, conducted by Army Staff and Land Forces Command (CFT), to increase the agility of command posts deployed in operations. Finally, preparatory work for the draft military planning law for 2019-2025 has enabled the Army Staff to consolidate a global vision in the field of innovation and research for the integration of new technologies. *“Digital transformation, big data, artificial intelligence and system networking have opened up new opportunities in areas as diverse as reconnaissance and 3D mapping, electronic warfare, collaborative combat, autonomous navigation of mobile robots, predictive maintenance, decision-making and command support, operational simulation or even human resources⁴.”* There is nothing new about this issue, but the Army is resolute in upholding it.

Before going any further, let us first outline the framework of this paper, starting with the term ‘operational decision-making’. The Russian-American corporate strategist, Igor Ansoff (1918-2002), distinguished three types of decision-making. Strategic decisions, taken by the company’s top management, deal with general guidance and have long-term implications, affecting the company’s future. Operational decisions are made by the company’s managerial staff. They have medium-term implications and important consequences for the organization. They carry a significant level of risk. Tactical decisions have a limited scope and represent a minor risk. They are taken by the managers or the employees. In this paper, we will take a less restrictive view and class under the heading of operational decision-making any complex reasoning process related to operations, regardless of the level considered, whose study can be facilitated by reference to theoretical models. This process is characterized by four phases: knowledge acquisition, problem modeling, selection and control of the action. Secondly, this notion of decision-making will be mainly studied from the specific angle of the

Army. The land environment, unlike any other, is characterized by its heterogeneity and very high complexity, both physical and human. However, as we will see later, since Army operations always take place in an airland, or even an inter-domain environment, it would be out of the question to completely dissociate land and joint commands in this paper.

As early as 2016, prospective work in the lead up to the document Future Land Action⁵ (ATF) highlighted eight operational superiority factors (FSO), including efficiency of command⁶. The document highlights that while technology plays a role in this factor, it is only one factor. Over recent years, there has been essential work on the impact and the potential contributions of new technologies. However, this should not obstruct the fact that decision-making in war is primarily based on human factors, and will be for a long time to come. Above all, decision making requires the ability of an operational commander to take into account the complexity and uncertainty inherent to warfare. Considering the number of civilian and military studies on the subject, careful reflection is needed on the fundamental principles of current operational decision-making. This paper aims to contextualize the current direction taken by the CDEC. Focusing solely on the technological dimension would not be consistent with reflections on improving command performance. With the ultimate goal to maintain our position as one of the world’s leading military powers, the stakes are high. This paper will review the historical and theoretical foundations of operational decision-making and the meaning behind this concept. Looking into how command systems can be improved leads us to question how they came TO be and what their purpose is.

“The true school of command is therefore general culture. Through it, thought is made to exercise orderly, to distinguish in things between the essential and the ancillary, to perceive consequences and interferences, in short, to rise to that degree where the grand scheme of things is revealed without prejudice to nuances. There is no illustrious captain who has not had a taste and feeling for the heritage of the human spirit. At the basis of Alexander’s victories, we always find Aristotle⁷.”



First, we should make some clarifications. In the broadest sense, the notion of decision-making applies to any entity with a living or artificial neuronal system. This movement is set in motion when there is a need for action resulting from a problem or a requirement, without the action to be taken in return being considered as an instant response. Decision-making is based on complex

cognitive processes, which can be based on rational (established and measurable facts) and/or metaphysical (which are beyond sensitive knowledge and experience) arguments. Cognitive processes correspond to perception, attention, sensation, memory, representation, language, reasoning, categorization, recognition, learning, emotion, forgetting, action, individual and collective behavior, and collective phenomena. Several theological and philosophical theories address this question. Praxeology has dealt with the study of human action since the end of the 19th century. This is a term now mainly associated with the Austrian economist Ludwig von Mises (1881-1973), although he did not coin it. Praxeology refers to the interdisciplinary study of behaviors, from the perspective of choice and performance. This field of study is broadly based on the contributions of cognitive sciences. It finds applications in social sciences, politics, economics, business administration (management) and, of course, in the art and science of war. It is central to current research in the field of artificial intelligence development. It would be out of the question to address all of these theories in this paper. Conversely, it seems appropriate to consider those that allow us to view the issue as a whole, i.e. what the performance of operational command includes, by conceptualizing and simply going through the notion of operational decision-making. The first approach is aimed at identifying what can be considered as the fundamental references of France's modern decision-making culture. Ultimately, this approach will help to explain what we understand as operational command, by clarifying the connection between decision-making (processes and procedures), the means to achieve it (a staff and decision support tools) and the decision-maker (the operational commander).

The philosophical roots of the search for knowledge and decision-making.

In the beginning was confrontation. Dialectics (from the ancient Greek *dialegesthai*: to converse, and *dialegein*: to sort, to distinguish) has been a prominent feature in Western philosophy ever since antiquity. Formalized by the pre-Socratic thinker, Zeno of Elea (ca. 490 - 430 B.C.), its use spread after Plato's dialogues⁸. Dialectics refers to a movement of thought that, through opposition and confrontation, makes it possible to attain knowledge. At the same time, it is a method of discussion, reasoning, questioning and interpretation. Plato's work refutes of any kind of empiricism because the world has too many different obstacles to understanding. According to Plato, knowledge can only be the product of pure reason. Dialectics, as a rational and methodical approach, makes it possible to successively verify concepts and proposals in order to reach knowledge and allow action aimed at the Good. Plato uses both types of reasoning specific to dialectics. The first is the method of division, which consists of going through step by step the object you are trying to define. He then uses the method of consequences, which consists of examining and testing all the implications of a hypothesis. Dialectics became widely spread in the Middle Ages and has since become a classic reasoning technique. It generally works by opposing a thesis and its antithesis, and then attempts to overcome the resulting contradiction by developing a final synthesis. One of Plato's disciples, Aristotle⁹, who was also tutor of the young Alexander

of Macedonia, refuted Plato's purely rationalist approach. He determined two phases in decision-making. The first phase analyzes the situation and discusses it. It highlights possible options, with their strengths, weaknesses and risks. The second phase entails the definite choice of a course of action. To use modern, military decision-making terminology, the deliberation phase focuses on the study of the general framework of action and leads to the development of a concept of operation, while the selection phase selects a course of action. In this process of questioning, Aristotle insisted on the necessary recourse to the moral virtue of prudence, or practical wisdom called *phronèsis*. According to Aristotle, *phronesis* is the part of the rational soul that deals with the domain of contingent things. It is opposed to the other part of the rational soul, which he called *sophia*, the theoretical wisdom whose domain is that of established things. *Phronèsis* is an empirical knowledge rather than a learned or deduced knowledge (the one given to us by *sophia*). It lies in the realm of the reasonable rather than the pure rational. It calls on the subjectivity of the decision-maker and may oppose or complement the exclusive objectivity required by *sophia*. In situations of uncertainty, *Phronèsis* is thus geared towards action. In the decision-making process, it allows for analysis of the context, the various courses of actions and their consequences. It sets the framework for the second phase, the selection process. As Lieutenant Colonel de Gaulle suggested in 1934, one is tempted to think that Alexander's decision-making in warfare had its origins in the teachings of his tutor.

During the Renaissance, Niccolò Machiavelli¹⁰ built on the Aristotelian approach with his principle of *Fortuna* and *Virtù*, positing that nature is only marked by contingency (*Fortuna*). According to Machiavelli, it was mainly character, determination, subjectivity and intuition (*Virtù*) that would enable the decision-maker to make timely and contingent choices to solve a problem. Conversely, Descartes¹¹ considered that only reason made us human (*ego sum, ego existo*¹²). Only intelligence and pure reason would make it possible to carry out the action successfully. In his *Discourse*, Descartes proposed a method based on four rules to avoid error. He developed a philosophy of doubt, aiming to reconstruct knowledge on certain foundations, with reference to the certainty provided by mathematics. During the Enlightenment, dominated by the cult of science, Kant¹³ took the opposite view from pure Cartesianism and questioned the uncertainty and weakness of metaphysical argumentation aimed at the knowledge of being (spirit, nature, God, matter, etc.), the causes of the universe and the first principles of knowledge. In order to reinforce the metaphysical approach he considered essential, this approach led him to establish a critical examination of the possibilities of reason. Subsequently, while seeking to move away from purely philosophical abstractions, Nicolas de Condorcet, a scientist and a politician of the Enlightenment, proposed an original voting method that allowed a rational choice between several candidates. He thereby formalized a decision-making process that he divided into three phases. The first dealt with the principles that could constitute the general framework of decision-making and focused on determining the different aspects of a problem, their implications and the options to consider for decision-making. The second clarified the issue and took into consideration the opin-

ions of the actors involved in the problem, compared them, contrasted them, and retained only a limited number of them. The last phase selected an option based on specific criteria chosen by the voters.



One of the earliest methods of tactical decision-making process can be attributed to Sieur du Prais-sac at the beginning of the 17th century. “Any military issue can be resolved with the following: by whom, if, with whom, where, when, how, and how many¹⁴.” This extract reflects the need for any military leader of the time to adopt a rational approach to the battle.

In the spirit of the Enlightenment philosophy, Guibert¹⁵, Bourcet¹⁶ and Joly de Maizeroy¹⁷ later set out their own methods, which sought to determine the best way to provide a framework for decision-making in war.

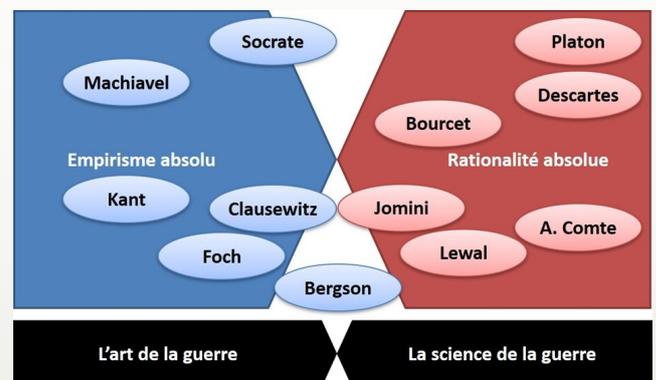
The positivist movement was one of the landmarks of the Enlightenment. Auguste Comte, who was both influenced and critical of the Enlightenment, initiated this trend at the end of the 19th century. Positivism rejects any metaphysical speculation and the idea that only facts of experience and their relations can be the object of certain knowledge. This trend had a very strong influence on a number of French officers after the defeat of 1870. Major General Jules Lewal, Commandant of the *École Supérieure de Guerre* (Command and General Staff College) from 1877 to 1880, spent twenty years conducting research and experiments to help to rebuild French military thinking. In 1892, he published an *Introduction à la partie positive de la stratégie* (Introduction to the Positive Part of Strategy¹⁸). He also developed a method of tactical reasoning, the Lewal method, which was a forerunner of our current land forces tactical decision-making procedure (*Méthode d'élaboration d'une décision opérationnelle tactique – MEDOT*¹⁹).

The relationship between Zeno of Elea and the *MEDOT* may seem bold given the above concise statement. Nonetheless, it is a claim supported by texts, some dating back almost twenty-five centuries. This approach aims to highlight the intellectual roots of the Western and, more particularly, French decision-making culture. Ever since antiquity, there has been a constant distinction between a purely rationalist decision-making method and a purely empirical approach. Various theories have been put forward as an extension of Cartesianism, which attempt to explain the concept of decision-making and to describe a model that could make it more rational. Thus, throughout the history of Western thought, scientific progress has always led to the temptation to adopt a purely scientific or procedural approach to access knowledge or solve a problem. This distinction reveals in many thinkers a continuous search for compromise between rationality and subjectivity to enable decision-making. It was Henri Bergson²⁰ who, at the beginning of the 20th century, ultimately highlighted this essential compromise to guide action. According to him, intuition is different from intelligence, but it does not oppose it.

Intuition is only possible after a protracted intellectual effort, such as a synthetic re-entry of the data processed by intelligence. In addition, intuition can only be communicated through intelligence. The determination of this compromise is thus based on Machiavelli's famous *Virtù*, on those intellectual and moral abilities specific to an individual, which make it possible, when faced with a problem, to determine goals, acquire the appropriate knowledge and make choices in spite of an uncertain and hazardous environment with varying degrees of complexity. Having established the philosophers' conceptual framework, let us now consider how these ideas would be reflected in the works of writers interested in the concept of war.

Strategists and the war leader's bounded rationality.

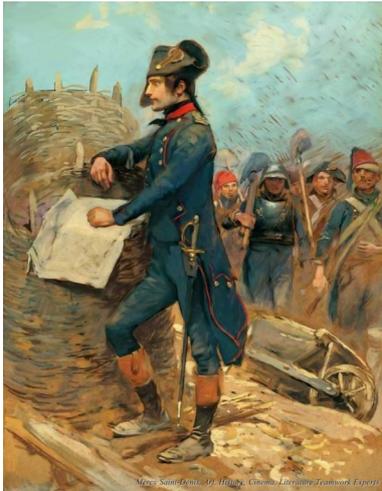
Let us examine how Western military thinkers and strategists have elected to initiate reasoning on the principles of decision-making and action in armed conflicts since the beginning of the 18th century. These practice-based approaches have made it possible to theorize the various ways the processes of acquiring the knowledge necessary to wage war, but also to gradually establish a true Western philosophy of decision-making in war. In this section, without claiming again to be exhaustive, we will focus on authors who could characterize these various theories profitably and simply.



On a recurrent basis and up until the present day, the reflections of most strategists revealed several factors that hinder or increase the ability to develop knowledge, i.e. to understand a situation, as well as to make decisions in war. These factors relate mainly to **uncertainty**, which is closely linked to human nature, including that of the adversary, and to **intuitiveness**, which is crucial for the war leader in order to think and conduct the action. Based on these developments, these thinkers deduced that it was mainly his subjective analytical skills, his 'eye', that determined a war leader's decision-making ability. Hervé Coutau-Bégarie summed it up simply: “The great leader is the one who understands and acts accordingly. This is very rare²¹.”

First of all, it is interesting to note that among classical and neoclassical thinkers²², French and Prussian²³ authors have mainly contributed to reflections on war for almost three centuries. The Swiss Jomini is an exception, notwithstanding the fact that he began his military career as a volunteer in the French Army. It was Marshal Ney, with whom he served, who

helped him to publish his *Traité de Grande Tactique* (Treatise on Grand Military Operations). Subsequently, the contributions of British thinkers such as Fuller and Liddel-Hart, although of definite value, were of a more restricted kind and, in some respects, more biased and questionable. Conversely, the mutual influences between the French and Prussian military ways of thinking are considerable



and culminated in the works of Clausewitz and then Foch; fundamental in the development of modern French military thinking. With Frederick II²⁴, Maurice of Saxe²⁵, Guibert²⁶, and then Bülow²⁷ as their forerunners, to name but a few, classical theorists, influenced by the spirit of the Enlightenment in the 18th century and by positivism in the 19th century, sought to identify consistency in war. Determining consistency aims to establish laws, i.e. universal principles whose knowledge would explain the victories of the past and make it possible to win future battles or wars. The renowned principles laid down by Foch, refined and then adopted by the French Army, are a case in point. These principles, which support military thinking and doctrines of force employment, are still essential concepts for guiding the reasoning of operational decision-makers and their staffs²⁸. They are part of a culture, or even a military identity, in each of the countries that have developed them. However, critics of such invariants to war argue that all these principles are likely to be invalidated by numerous exceptions drawn from military history. The universality and timelessness of such principles, which have been established as dogmas, do indeed raise questions. Clausewitz thus stated that “*war is a chameleon whose nature changes with each engagement*”²⁹. Foch therefore insisted on the need to develop and be acquainted with “*fixed principles, to be applied in a flexible way, according to the circumstances of each case, which is always specific and requires to be considered in itself*”³⁰. As a result, obeying these principles is not deemed as easy as it might seem, due to the uncertainty and complexity of any operational commitment. Clausewitz summarized the problem of decision-making in wartime and the skills it requires in the following way: “*War is the domain of uncertainty; three quarters of the elements on which action is based remain in the fog of some degree of uncertainty. More than in any other field, a subtle and penetrating intelligence is required to be able to discern and instinctively appreciate the truth*”³¹. Clausewitz conceptualized uncertainty around two essential notions: the fog of war and friction, to which he added the phenomena of chance and disorder. Subsequently, since “*the unknown is the factor that governs war*”, to use Foch’s expression, the decision-maker must design the action by integrating this fact, not by denying it. To this end, he developed the theory of ‘bounded rationality’, in reference to the words of the American economist and sociologist, Herbert Simon, taken up by Major General Vincent Desportes in his book

Décider dans l’incertitude (Deciding in the Dark). Faced with an operational problem, it is therefore necessary to adopt a way of thinking that is not inhibited by the unavoidable constraints always found in war, “*always insufficient information, the impossibility of considering all solutions and the inability to analyze them to the full extent of their consequences*”³².

However, the theories of most strategists and their principles of war do not adequately reflect the **reality of war, the main essence of which remains man**. Man, with his culture, his ideology, his strengths and his intellectual, emotional and physical limitations, is central to the issue of decision-making, especially in war. Colonel Ardant du Picq, taking the opposite view to the positivist trend and the sometimes purely scientific nature of war studies in France, knew perfectly well how to place this dimension in the discussions at the beginning of the 20th century. “*Combat is the ultimate goal of the armed forces and man is the primary instrument of combat; nothing can be wisely prepared in an army - establishment, organization, discipline, tactics, all things that are like the fingers of one hand - without the exact knowledge of the primary instrument, man, and his moral state at this definitive moment of combat*”³³. In times of war when the stakes are high and his very survival is sometimes under threat, the decision-maker can be subjected to “*a strong inhibition that limits his capacity for reflection, and a compelling need to act*”³⁴. The psychological and emotional stress in combat affects, more than in any other field, the decision-making abilities of individuals, sometimes to the point of sideration. The work done by US neuroscientist Antonio Damasio has since confirmed that decision-making is in fact largely influenced by emotions³⁵. These would thus play a critical role in what is referred to as ‘intuitive decision-making’. Similarly, social intelligence, or interpersonal intelligence, which makes it possible to understand others (their thoughts, their feelings) and to interact effectively in situations of collaboration, negotiation or confrontation, is an essential aspect of the ability to enable appropriate understanding of an environment and an adversary.

Man is also **the enemy**. Let us now turn to him, since he is usually the essential provider of opposition, of friction against our own will. For General Beaufre, “*strategy is the art of the dialectic of two opposing wills using force to resolve their dispute*”³⁶. Just like us, the opponent sets goals for himself, which he usually tries to conceal. He designs a maneuver, which is not always straightforward or necessarily rational in our eyes. He can cheat, deceive, but also err in his assessment or make mistakes when conducting his maneuver. The uncertainty induced by the enemy is all the greater as he can be numerous and unpredictable. The context of some of the operations of the past decades, in which a force was deployed as an interposition force between factions, has often provided an example for it³⁷. In these respects, the analogy between war and chess is ultimately misleading. First of all, the transparency of the battlefield and the balanced relationship between two players only in chess are not usually found in war. In addition, the ‘closed world’ of a chessboard limits game play, even if the possibilities are considerable³⁸, and gives players the opportunity to learn, anticipate and duplicate ‘moves’. However, the enemy can always be surprising, especially as the battle has not taken

place in a tilt-yard since medieval times. The comparison with lying poker is then probably more appropriate. Multiple players have no clear vision of the resources of the various opponents at the beginning of the game, which they will use without necessarily following rules established beforehand. The players' actions and reactions, particularly at psychological level, are therefore fundamental in trying to decipher the opponents' intentions and potentially defeat them, if chance has anything to do with it. In a less trivial way, the US economist and strategist Edward Luttwak³⁹, conceptualized this notion of action/reaction by establishing a difference between the linear decision-maker and the paradoxical decision-maker. The linear decision-maker identifies problems, describes them, develops the solution according to their nature and implements it. However, according to Luttwak, the linear decision-maker does not take into account the fundamental aspect of war, i.e. the dialectic of wills, the contrary intention and the opponent's reactions to a decision taken. Thus, operational decision-making does not only consist in matching resources to achieve objectives, but also and above all, in making the opponent's reaction support our goals. Otherwise, the chosen solution remains ineffective or even counterproductive. Against the linear decision-maker, Luttwak puts forward the paradoxical decision-maker who, in turn, integrates this dialectic of wills into his maneuver and takes into account one of the main requirements of operational decision-making, i.e. acting to degrade the other's decision-making capacity. Finally, since uncertainty is the same for both sides, the winner is the one who, through his bounded rationality, his 'eye' and his intuition, will be able to take the best decision-making initiative quickly by concealing his goals and his potential, by understanding those of the opponent, and thus by acting against his will. The latter acting in the same way, one of the keys to success in war is to get the adversary to reveal his intention, his disposition and his vulnerabilities by provoking reactions, usually through contact, and therefore by committing resources that are always scarce. Understanding the opponent can thus be really achieved only during action⁴⁰ and calls first upon experience, or even often on occasional failure. There is therefore systematically a cost to be incurred in learning from the enemy, thus dispelling part of the fog of war and adapting one's own maneuver. This was summed up by Army General Mangin in 1920 when he stated: *"The enemy is a good teacher, but his lessons are expensive"*⁴¹.



Since the 18th century, all strategists have noted the contradictory coexistence of two main currents, sometimes found in the same author, like Jomini. The first trend is that of a decision-making philosophy that emphasizes military genius, the 'eye' and instinct. The second establishes a theory of knowledge, which postulates the presence of scientific consistency. Extol-

ing military genius as classical authors have done, and as the military institution still does today, is not only about the need to establish traditions and raise up righteous role models for new generations of officers. It reflects in a very pragmatic way the inability of purely scientific models to dispel the fog of war and reduce man-made friction. The leader's intuition therefore represents the necessary compromise between a purely rationalist approach and a purely empirical approach to battle. The leader's ability to throw off the temptation of absolute rationality and let his intuition prevail in the face of circumstances, and hence to take risks, would thus be the military leader's distinctive feature. In *The Edge of the Sword*, Lieutenant-Colonel de Gaulle stated that it was the leader's instinct that provided the concrete framework for action. *"Assessing the circumstances in each particular case is therefore the essential role of the leader. Because he knows them, measures them, exploits them, he is victorious; because he ignores them, judges them badly, neglects them, he is defeated. It is on contingencies that action must be built"*⁴². We are again confronted here with Machiavelli's famous *Virtù*. However, as he continued, instinct was not enough; it also required a strong capacity for synthesis, so as to give each factor its rightful place, a synthesis that generally reflects uncommon ability. Finally, synthesis was only beneficial if it was accompanied by self-appraisal, by the power to distance oneself from the pressures of the environment: *"All the great men of action were thinkers. All of them had, to the highest degree, the ability to withdraw into themselves, to deliberate within themselves"*⁴³. Bergson, at the same time, professed exactly the same principles in his lectures: contingency of action, role of internal deliberation, importance of fair judgment. Do we not also find in these aspects the entire Aristotelian concept developed in *Nicomachean Ethics*? As Jean Guittou⁴⁴ pointed out, the man of action and the man of thought are never very far apart.

The staff, the essential decision-making tool of the war leader.

As we have seen above, command can be considered an art as it is centered on a leader's personality, talent, spontaneous inspiration and ultimately on the expression of his personal intent. It is also a science because it cannot be effective without methods, systems and organizations. In fact, the ability to exercise operational command seems to be the result of a particular alchemy, the effects of which are, incidentally, never secured. Napoleon was experiencing weakness throughout his campaigns, which eventually led to Waterloo. Lieutenant-General Henri Navarre, who was held responsible for the Dien Bien Phu disaster⁴⁵, had previously been a noted leader with sound judgment during the First World War, in the Levant during the interwar period and then during the Second World War. The decision-making ability of the same leader may therefore be altered or strengthened over the years. Like heroism, military genius is probably not a constant fact in an individual⁴⁶ and depends on circumstances and the environment. The decision-maker should therefore be assisted in the exercise of his command by a limited and immediate group of subordinates, facilitating his grasp of the environment and enabling him to design, have his intention carried out and then

conduct it in the most efficient way. This is the role of a staff.

The great military commanders, from the ancient times to the Renaissance, gathered around them a small group of advisors and experts to accompany them during their campaigns. These were often civilians temporarily assigned to serve in the armed forces of a monarch. These experts were mostly artillerymen (e.g. the Bureau brothers at the Battle of Castillon), engineers for bridge building and siegecraft, which then played a major role in warfare, supply specialists, messengers and clerics. The political and military consequences of the Enlightenment and of the French Revolution during the 18th century led to greater complexity in the art and techniques of warfare. Until then, the commander could still see the battlefield with the naked eye and give orders to his troops almost instantly by use of voice, pennants or the sound of trumpets or bugles. An increased number of troops imposed a decentralization leading to the development of the divisional system by Brigadier General Guibert and extensive theatres of operations with the Napoleonic campaigns. Controlling operations became more complex and required more expertise. The margin of initiative and subsidiarity granted to subordinate levels also became essential to ensure compliance with the commander's intent, who could no longer conduct operations "on sight". His intent must then be clearly designed and expressed in initial orders including specific coordinating measures. The lack of precision in the orders given to Lieutenant General Grouchy, for example, was paid dearly by the Emperor on 18 June 1815. The increasing complexity of the art and science of war therefore had an impact on how command was exercised prior to, and then during the battle. It became essential for the military leader to have a small group of officers specialized in the administrative tasks of armed forces in the field, capable of reading, arguing, explaining and forwarding the most complex orders, thus leaving him free to exercise his command.

The Austrians formalized such military staffs at the beginning of the 18th century, during the reign of Empress Maria Theresa. At about the same time, under Louis XIV, that they appeared in France⁴⁷. Under Louis XVI, Marshal Ségur created the first corps of staff officers in 1783. Some of them, including Berthier, would serve the Emperor extremely well. It was the Prussians, with the major reform of the army undertaken by Scharnhorst and Clausewitz following the defeat of Jena in 1806, who really gave substance to the military staffs of modern European armed forces. As a result, the concept of a staff specialist corps was developed; it included specialists trained in the planning and conduct of operations at different levels of the military system. The organization of armed forces and command was changing rapidly throughout Europe. These transformations were achieved through technological advances in transportation, communications and intelligence, and significantly changed the way strategic, operational and tactical decisions were taken. It was at the end of the 19th century, and the telegraph and wireless telephony at the beginning of the 20th century, that technical means made it possible to make information flows much faster than the movements of armed forces. It was at this point that the amount of information available would really exceed the ability of a single individual to integrate all available information. It became

then vital that the Commander-in-Chief of the Armed Forces be able to delegate some of the tasks previously assigned to him, while retaining overall control of operations. This control required the development of a comprehensive, secure and fast communications system. It was the beginning of the communications and information systems (CIS). Officer training was also improved in order to tailor armed forces to modern warfare by creating effective and reliable chains of command. The staff then became a structure deliberately tasked with advising and assisting a general officer, integrating information, assisting in decision-making, organizing, planning, scheduling, drafting orders, controlling their execution, monitoring events, and learning from them. This is the modern definition of a military staff.

In France, it was under Napoleon that the general staff was set up as a real system, although it was mainly restricted to drafting the Emperor's orders and administering troops in the field. Marshal Berthier, although a poor tactician but an outstanding organizer, conceptualized and established this so-called 'flat' organization, which still characterizes most modern staffs. Thus, until the end of the 1980s in the French Army, the staffs were organized into sections (G). G1 was in charge of personnel management, G2 of intelligence, G3 of operations, training and employment, and G4 of logistics (transportation, supplies, etc.). During the Algerian War, G5 was also in charge of psychological warfare. From 1917, US troops came under French command and adopted the organization and procedures then existing in French staffs. The Americans kept this type of organization without major lasting changes until the early 2000s. Let us go back a century. In 1818, Marshal Gouvion-Saint-Cyr modernized the staff specialist corps, which remained unchanged until 1876, and established the Royal Staff Corps Academy. Drawing lessons from the defeat in the Franco-Prussian War in 1870, Major General de Cissey, Minister of War, decided in 1876 to create the *École Supérieure de Guerre* (War College), which included a two-year course designed to prepare officers for staff and command functions, as the Prussians did at the *Kriegsakademie*. This approach paid off. Faculty members of the *École Supérieure de Guerre* before 1914, such as Lewal, Maillard, Bonnal, Foch, Pétain, Lanrezac, to name but a few, contributed to the education of staff officers, enabling Marshal Joffre to state in 1918: *"In the first few weeks of the war, we could never have done what we did had the Army's general staffs not remained rock-solid in the midst of the storm, spreading clarity and composure around them. They remained - in the most exhausting labor and throughout a terrible moral ordeal - clear-headed, flexible, and demonstrating a skill of execution from which victory would arise"*⁴⁸. However, in 1940, the French staffs were totally outperformed by the German staffs, whose responsiveness was increased by an organization and use of communications skills designed in peacetime. Complacent in the laurels of victory, the French were slow to integrate into their command organization technological progress and the new conditions of modern warfare. It made them gradually ineffective during the interwar period. This observation rightly led Marc Bloch to declare that *"an idea, in the field of positive sciences or techniques, has no value other than as an image or a shortcut to concrete facts. Oth-*

erwise, it is reduced to its label, which only covers a small amount of void⁴⁹." The defeat of 1940, therefore, was above all a failure of thought, mainly of our staffs.



The role of the Chief of Staff (COS) in this type of pyramidal structure is essential for coordinating the action of the sections and anticipating the actions to be carried out by the staff. Since collective work requires procedures and standardized

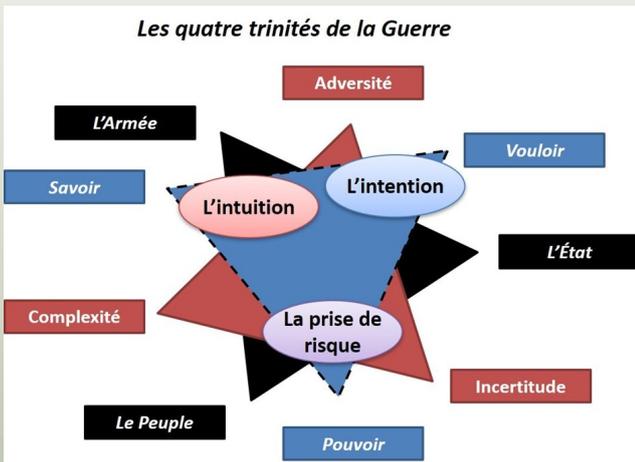
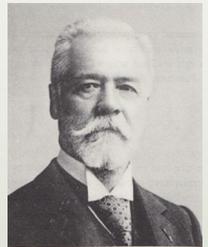
roles and productions, the COS function also ensures consistency and timely production of the orders required by subordinate units. The decisive roles of Marshal Berthier for Napoleon or then Colonel Bayerlein for Field Marshal Rommel illustrate the importance of the function. Sometimes a very close and reciprocal relationship can also be established between the operational commander and one of his direct deputies, as was the case with then Brigadier General Weygand for then General Foch or then Major General Salan for General de Lattre, to name only the most emblematic pairs. These examples illustrate the added value provided by trusting interactions between a leader and members of his immediate circle. The characteristic of great leaders is therefore to know how to select those around them and take officers on who are capable of advising, understanding, interpreting, translating and implementing their intuition and will in a concrete way. Referring to General de Lattre in Indochina, General Beaufre mentioned this fundamental dimension. "Here, his method was truly personal: he would prepare this phase by selecting carefully those around him. It was with them that, collectively, he would gradually mature a decision⁵⁰."

The term staff is now used in all complex organizations, large corporations, public administrations or political parties, to designate a team of experts and advisors around a decision-maker. Let us now turn to the mutual influences that military, sociology and business administration theorists have had for more than a century.

The interactions between managerial theories and operational decision-making in warfare.

Since the end of the industrial revolution, large capitalist companies have tried to break away from the family management model that prevailed at the time. To manage major projects, they set up organizations capable of supervising a large number of people who were not always qualified. The only type of organization known at that time, which has proven its effectiveness in performing multiple and complex tasks, was the military organization. Through the contributions of the precursors of sociology and the first theorists of business administration, now called management, the major civilian structures gradually adopted military reasoning methods and organization at the beginning of the 20th century. Taking into account tougher competition, the business world would embrace, over time, military decision-making concepts and their terminology. The hierarchical organization of most of today's large public administrations and corporations is thus a legacy and an adaptation of military organizations. But the story did not end there. From the 1960s onwards, US military decision-making methods and structures would in turn begin to be influenced by business administration methods, which had already incorporated advanced information systems. At the same time, NATO integration would gradually standardize Western command structures on an American model, now strongly influenced by management theories. The search for good practices in both the civilian and military worlds had finally led, with varying degrees of success, to a number of experiments and adjustments that foreshadowed what modern command systems and operational decision-making processes are today.

Taking into account the issue of decision-making, let us now see how sociology, management and cognitive sciences have focused on developing organizational models that ensure optimal efficiency in decision-making within corporations. The German economist and sociologist Max Weber (1864-1920), considered to be one of the founders of sociology, was attracted by the changes brought about in Western society with the advent of modernity. Through his analyses of industrial capitalism and bureaucracy, he focused mainly on describing the process of rationalizing practical action. At the same time, the American engineer Frederick Taylor (1856-1915) developed from 1890 principles and methods⁵¹ leading to what would become 'scientific management'. With Taylorism, for the first time there is a distinction between operational functions and functional services within companies. Operational functions include all activities and personnel directly associated with the manufacturing and



shipping of goods produced by the company (production, sales, logistics, etc.). Functional services include activities and personnel that support the company's main activity (human resources, management control, accounting, etc.) or are involved in cross-company projects. Functional services thus have a support and expertise role compared to operational services. Since the 2000s, the French Army has used this notion of operational functions, whose meaning remains broadly the same. Taylor's work was taken over by Henry Ford (1863-1947) who perfected and extended the concept from 1908 onwards, with a model of organization and business development that quickly became a reference in the Western world. Translated into French in 1912, Taylor's book also influenced the work of a French mining engineer and business leader, Henri Fayol, considered to be one of the pioneers of management. He developed a theory, Fayolism, which he formalized and published in 1916⁵². According to him, the leader is the key element of good management. Responsible for the success or failure of a company, he must possess specific qualities, which are not innate and can only be acquired with training and experience. These qualities are extremely similar to those expected of a military leader: health and physical vigor; intelligence and intellectual vigor; moral qualities (will, perseverance, audacity, courage of responsibility, sense of duty, concern for the general interest); strong general culture; broad competence in the main trade of the company; management knowledge; and the art of handling people. Fayol therefore introduced the notion that future leaders should be selected according to their qualities, but that these were not enough. Assuming that a leader can only supervise a small number of people (5 to 10), he should be able to rely on experts (a staff) and management tools. For Fayol, a manager performs five acts that he called 'Elements of Management': planning, organizing, command, coordination and control. Finally, he detailed modern management tools, such as scoreboards for management control or strategic monitoring for anticipation. These tools were intended to ensure the most rational decision-making process. We will see in the second part of this paper that all the principles set out by Fayol are now found in what the military calls Command & Control (C2).

But rationality, as established by the organization, does not ensure that rational decision-making will prevail. Like Armed Forces in war, companies face uncertainty stemming from contingency and competition, cognitive limitations to the increased number of complex information, and the more or less assertive emotional and social intelligence of any decision-maker. Moreover, decision-making is becoming more complex and arduous than in a military organization, considering the less assertive collective nature of the objectives pursued by a company. Beyond the organization, maximum rationality in decision-making must therefore be guaranteed by methods and processes. Thus, in the mid-1950s, sociology and work on corporate management made it possible to classify the types of decision-making: decision-making in an established environment, decision-making in a risky environment and decision-making in an unpredictable environment. This typology makes it possible to better formalize the decision-making processes specific to the operation of a company or administration. Her-

bert Simon (1916-2001)⁵³ is considered to be the father of the decision-making theory and the concept of bounded rationality, which earned him the Nobel Prize. Simon assumed that in a given environment decision-makers do not choose the 'best solution' but the most satisfactory solution, taking into account their level of awareness, their motivation and their true capacity for action. Randomness, chance, and unpredictability defeat our ability to use determinism and hence, the principle of causality, to our advantage. In his work, he determined what he called a "substantive" rationality, which is understood as the perfect rationality of the Cartesian, then French positivist approach, and which assumes that the individual has all the necessary information and sufficient 'computing' skills to make the optimal decision. Since these conditions are very rarely met, he therefore turned to a medium-term relationship between total rationality and the renunciation of all rationality, which he called procedural rationality. It is a method of reasoning based on procedures to mitigate the uncertainty factor limiting rationality. We can also remember from Simon's work his theorization of the notion of staff (be it civilian or military). He thus insisted on the triple interest covered by an appropriate organization in the decision-making process. First, establishing and using routine procedures makes it easier to deal with uncertainty. Conversely, the organization allows the decision-making process to be divided among several experts. Finally, sequencing decision-making helps to limit the risk of error and can help to correct errors of assessment. Simon thus attributed the following linear elements to any decision-making process:

- identifying the problem and collecting the information necessary to solve it;
- a research process to discover goals and formulate specific objectives;
- defining and selecting options to achieve these objectives;
- assessing results;
- working out a performance strategy.

It is therefore not surprising to find that, today, the entire sequence in civilian and military operational decision-making methods, including in particular NATO's operational decision-making method, the Comprehensive Operations Planning Directive (COPD)⁵⁴, has adopted at strategic⁵⁵ and operational⁵⁶ levels by the French Army in 2012. For land forces at tactical level, the Tactical Operational Decision Making Method (MEDOT)⁵⁷ covers only the first three steps of the process described by Simon.

However, experience shows that the decision-making process seldom leads linearly from the identification of the problem, the famous "*What is it all about?*" of Foch, to its solution, the desired end state. The objectives of a decision are often confirmed only during the action, due to the uncertainty associated with variable environmental conditions, in particular competition or the enemy. Thus, studies and lessons learned on complex decision-making have shown that the steps described by Simon are not often followed in an ideal way. The interme-

diate conclusions of each of these steps can generally only be based on assumptions that make it possible to overcome uncertain or unknown factors in order to complete the search for solutions. In many cases, moreover, uncertainty can only be resolved during the action. However, this process can be given a certain value because, at specific times prior to the action, it allows a decision-maker to validate the intermediate conclusions of his staff. Pragmatism and common sense should therefore lead in principle to a very flexible use of these methods. However, this is not always the case, particularly in the military field, when the users of these methods, especially if they have poor knowledge of them, restrict themselves to assigning them only a normative and not an indicative function. Starting from this difficulty of making a linear decision in a complex and changing environment, in 1960, a US Air Force pilot, John Boyd, established a diagram to conceptualize his ability to beat all his students in simulated air combat. He described four sequential processes through a decision-making loop: “*Observe, Orient, Decide and Act*” (OODA). Recognizing that any logic model of reality is incomplete or even inconsistent, the cycle had therefore to be customized to each new observation. This concept was eventually deemed to be applicable in the corporate sector. This loop is for example to be compared to the Deming Wheel used in quality management (PDCA: *Plan, Do, Check, Act*). By extension, military operational decision-making methods have incorporated this OODA concept. Therefore, it is now accepted that methods such as the COPD or *MEDOT* should be understood as iterative and incremental logical processes, rather than a succession of phases and steps to be carried out.

Derived from the work of Taylor and Fayol, then enriched by Simon’s, the theory of organizations has now become an autonomous scientific discipline, aiming to identify principles of administration and direction of work. This discipline, on the border line between economics, sociology, management and political science, describes the likely types of structures for any type of organization dedicated to decision-making. Matrix structures are part of the typology described in organizational theories. This type of structures is part of a set of practices that have been established to assist in the management of projects, such as the US air and space programs in the 1950s. Having met with some success in the 1970s, these structures were finally abandoned by the large companies (e.g. General Motors and Sony) that had adopted them in the 1980s, because they generated too many implementation problems given their performance in their operation. From the mid-1990s, however, with the concept of Revolution in Military Affairs (RMA), which aimed to contain technologies giving control of various environments and information flows, the US armed forces were inspired by work on matrix organizations to devise new types of command structures. Subsequently confronted with information management and decision-making problems during their engagements in Iraq and Afghanistan, US forces finally adopted some of these models to upgrade their operational staffs from the late 2000s. Thus, the ISAF Joint Command in Kabul operated from 2010 to 2013 in a matrix mode. Also adopted for a time at NATO, which tested it from 2011 to 2014 with the Allied Joint Force Command in

Brunssum, this type of organization was finally abandoned because it required too many resources in view of the operational results obtained. In addition to ignoring the experiences of large civilian companies that had tried the matrix, the drafters of these staffs had certainly neglected an essential assumption in Simon’s theories. Decision-making is based on information, but information collection is directed by the law of diminishing returns. It means that collection has a cost, which reduces and then cancels out the gain that can be expected, by increasing the efforts produced by the information requirements.

As we have tried to show in this brief overview, the operational decision-making culture in France is rooted in a long history. In recent decades, it has undergone significant changes, mainly due to the relentless pace of scientific progress and a commendable desire on the part of military leaders and private and public officials to learn from each other’s good practices. Today, faced with the challenges posed by the integration of new technologies, but also the opportunities they offer, management experts and specialists in military doctrine are questioning the relevance of the Napoleonic hierarchical model, which still prevails in companies and our operational command structures.

Exchanges between these two worlds have thus intensified with varying degrees of success over the past century, to the point of sometimes causing confusion. Thus, decision-making structures, methods and processes, sometimes ideally suited for the business world, now seem to have taken precedence over the real determinants of decision-making in war. In fact, the notions of fog of war, complexity, adversity, contingency, and personality of the leader are not well suited to management tools that require quantifiable and objective data to enable decision-making. The second part of this paper therefore led us to question what the notion of operational command covers today. The issue is whether modern command systems have not in the end become distorted, due to an abusive use of technology and procedures, thereby distancing them from their primary purposes: reducing complexity, facilitating decision-making and accelerating the production and transmission of orders. Without this prior reflection, it is unlikely that an approach aimed at improving command performance will achieve convincing results over the long term.

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