



Modern sand and concrete sentries

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Engagement opérationnel

Preserving the integrity of the Force means preserving its potential as well as its operational capability and freedom of action. As such, protection is a constant concern of the military command, essential to the success of the mission. As such, the hardening of the parking infrastructures in operation is a major component of the mission and must be the object of all attention. The author gives us an original situation report on this subject, based on the principles adopted and the techniques implemented within Operation Barkhane..

In order to play an active part in the stability of a world in crisis, France is taking part in numerous external operations. Our soldiers are thus deployed simultaneously in many theatres, exposed to enemies who have become terrorists, as dangerous as they are unpredictable. Constantly evolving threats, most often unconventional, force us to adapt our operating methods. In the stabilization phase, the Army deploys its soldiers in the heart of vast hostile territories, in secure and isolated sites called forward operating bases (FOBs[1]). These bases represent a particularly effective tactical response to the need to cover very large territories with limited human and material resources. Bases that are "victims" of their operational effectiveness and which make them potential targets for our enemies. Bases to be fortified in a permanent search for economy of means and control of deadlines. This is the difficulty of the exercise, which consists in protecting our stationed troops while maintaining their ability to manoeuvre, which is essential to military command. The eternal dilemma between protection and mobility, or when hardening should not rhyme with "bunkering".

Real insecurity

From Beirut, with its infamous attack on the Drakkar building in 1983, to Côte d'Ivoire and the bombing of the Bouake camp in 2004, to the recent and numerous attacks by our

soldiers in Afghanistan and Mali, France pays a heavy price for its interventions abroad. This painful observation demonstrates, if proof were needed, that it is impossible to neglect the protection of our forces stationed in foreign operations. This is particularly true in the face of new threats, the modus operandi of which is terrorism.

Feedback from recent operations confirms that our forces are subject to numerous attacks. Direct or indirect fire, improvised explosive devices and vehicle bombs have become part of our soldiers' daily routine.

Modern conflicts are complex. The threats are diffuse and asymmetric.

Dew threats

The operations are carried out with a limited number of personnel, facing opponents who can be described as irregular, highly mobile and acting with punch-type actions. The enemy's modus operandi does not follow any manual... The enemy is everywhere and nowhere at the same time, an invisible and omnipresent threat. There is no longer a front facing standard military powers as in conventional confrontations. We are confronted with vast spaces in which the enemy appears stealthily and tries to create a climate of fear in the local populations. The enemy is aware of the overall unequal balance of forces in terms of the military and technological means deployed. They are also aware of the weakness of our assets, sometimes isolated and in the face of potentially hostile populations. It strikes without having the capacity to engage in combat over the long term. It seeks to turn its weakness into a strength by choosing specific and targeted actions that are as deadly and spectacular as possible and that involve few troops; these actions are carried out in a climate of insecurity that it strives to maintain. The enemy seems to understand that he will not be able to win this war head-on and militarily, so he is choosing to "push" us to withdraw.

The advanced bases, or the response of common sense and pragmatism

By securing these large spaces, our forces are giving themselves the means to reverse this trend. Securing and controlling is precisely one of the major effects to be obtained by using these advanced operational bases, of which the Madama base is the latest to be created to date. Bases with a common objective: to occupy the terrain, to create a sense of insecurity among the enemy.

We had to solve the impossible equation of maintaining our freedom of action, which is essential to the success of the mission and the protection of the soldiers, while covering very vast territories with very little means. A major element of the response was the use of forward operating bases.

Each base is a constituent part of a network of FOBs, positioned in mutual support on several lines of defence. This "architecture" ensures overall coherence and optimum organisation of the protection of an area of operation. The oil stain process takes on its full meaning here.

The securing and control of these large areas, with small numbers of personnel, has been made possible by the progress made in recent years in terms of equipment. Knowledge of the effects of weapons^{2} has also increased considerably. This allows our military engineers and engineers to design infrastructures that are precisely dimensioned to face

the aggressions of our enemies in a logic of just response to just need. Our weapons systems are always more efficient. The range of weapons is increasingly greater, communication systems are more and more sophisticated and effective. The use of modern optical and video means, coupled with the use of drones, gives us a definite advantage. It is now possible to secure and control vast and potentially hostile regions with few resources. Thus, the effectiveness of our modern weapons systems, combined with an optimal geographical distribution of isolated but well-equipped bases, makes it possible to considerably reduce the number of soldiers needed in these areas, while maintaining excellent territorial control.

Protection that's up to the task

The protection of FOBs leads to a difficult, if necessary, compromise between the effectiveness of the protection and the conservation of the ability to manoeuvre. This problem is specific to all aspects of force protection (equipment, vehicles), but is particularly difficult to resolve in the design of protection infrastructures for military bases deployed in external operations.

The objective is to harden and protect this sensitive complex that an FOB represents. A complex that brings together a multitude of more or less interactive functions, and composed of military personnel with diverse origins and missions as well as sensitive. Its concept^[3] and its architecture must be given great attention.

Targets of choice or the ransom of success

The deployment of FOBs is particularly effective. The control carried out by our forces has significantly reduced our enemies' room for manoeuvre. Their action and their control over the local population are reduced. It seeks to weaken the effectiveness of our force. Our bases are therefore paradoxically "victims" of their effectiveness and have become priority targets. Western symbols to be wavered. Our forces must harden them to the level of the threat.

However, the enemy does not seem to want to undertake a frontal attack and even less the destruction or capture of advanced bases.

Unalterable principles... Thank you, Vauban!

Our armed forces are facing new threats, however a number of protective principles remain.

There is an old saying, "City besieged by Vauban: city taken. City defended by Vauban: impregnable city". We are not seeking to make the site an impregnable bastion, like a stationary rock or a fortress that is to be besieged. We are, however, confronted with the same evils, which call for a number of common responses. We should therefore not be surprised to find in the design and architecture of the advanced bases solutions borrowed from the past and Vauban's citadels.

We thus find, in the architecture and constructive choices of FOB, a number of principles

implemented in conventional fortifications (choice of site, influence of the environment, organisation of the defences...).

However, as these new bases are intended to be a temporary tactical response and quick to implement, they do not have the same levels of hardening as our old fortified cities of past centuries.

Among these principles, dear to our glorious building ancestors, there is one fundamental one, still valid today, which says that "the ground rules". We cannot always choose our parking area; we must not always be subjected to it, but make the most of it. It is necessary to optimise every movement of terrain in order to make them valuable allies in the design and organisation of base defences.

Choice of the implantation zones

The choice of a site is mainly determined by the tactical effect sought, the existence of local resources, the logistics flows, the presence of a helicopter landing zone and the ability to create an airfield nearby. Any site location, whether it is created ex nihilo or adapted from an existing infrastructure, must comply with a number of organisational concepts. These are designed to ensure, through the application of basic principles, that the protection requirements and the measures envisaged are appropriate. These concepts are expressed through spatial and temporal considerations.

Development of a site

In order to optimize the protection of the base, the application of these principles is illustrated in the two organizational diagrams below, which present the main areas to be **created**.

From the outside to the inside, there is first of all an area called perimeter protection or "glacis". This area constitutes a clear zone, free of tall vegetation or obstacles, over which surveillance (observation and target acquisition) can be easily carried out. Then comes the so-called peripheral protection zone or "buffer zone". This is the zone of interposition between the glacis and the sanctuary. It constitutes the essential component of the defence in depth of the system.

Finally, as close as possible to the heart of our system is the inner protection zone or "sanctuary". This zone concentrates the activities that are essential for the accomplishment of the mission. It is the neuralgic heart of the military system that must be preserved.

The knowledge of these zones and their respective utility is the basis of the reflections and the choice of equipment and materials used in the phase of hardening of the infrastructures. We know what we want to protect and how, but we still need to determine the means to achieve it.

Efficient and economical protection

The protective and hardening devices used must allow our forces to maintain their physical integrity. More than ever, the gap between the resources allocated to our forces and the missions assigned to them has never seemed so wide. More than ever, our modern societies have seemed less willing to accept the loss of soldiers in the performance of their mission. This emphasizes the evolution of our society and its positioning in relation to death. This obsession with the search for the zero dead, which is developed in many articles, is a dimensional element of base and outpost protection systems.

Controlling construction costs

As the financial and material resources allocated to our forces are limited, it is necessary to implement constructive systems with controlled costs, combining simplicity of implementation, reusability and immediate availability. Recently developed knowledge of the ballistic performance of materials enables us to make appropriate choices. This choice of materials and protective materials has therefore naturally been oriented towards local resources and prefabricated elements. They have the advantage of being efficient, reusable, and can be quickly and easily implemented, even with light handling means. It is possible, for example, to create perimeter protection for an enclosure several kilometres long in less than 15 days.

The armies have designed their protection systems with the constant aim of protecting people and property, while at the same time presenting the lowest possible financial signature.

Fortification must not rhyme with "bunkerisation".

All the choices made by the forces are dictated by the desire to be able to carry out their mission in the best possible way. This doctrine also applies to the fortification of forward bases, for which hardening should not be confused with "bunkerisation". It is clearly counterproductive to want to overprotect oneself.

Our forces are not in a siege war, patiently waiting for an assailant, entrenched behind deliberate impassable walls.

Mobility remains a fundamental principle we seek. Wanting to sanctuarize the entire device can lead the force to a configuration of overprotection synonymous with "bunkering", and consequently immobilization. Immobilisation in this case means mission failure. This is the paradox of the hardening of infrastructures deployed in external operations. A paradox that has existed since the dawn of time, opposing the thickness of armour to the penetration force of arrows or swords.

It is necessary to ask the right questions and determine the major effect to be achieved. The answer of our forces is clear. It is a question of finding the right balance between the need for protection and the need for mobility. The ability to manoeuvre, to maintain the ability to move, is at the heart of tactical and strategic considerations. Focusing on the level of protection and thinking about designing impassable "walls" can only lead in the case of FOBs to operational nonsense.

The deployment of forward bases has emerged as a tactical, pragmatic and effective response to the problem of controlling a vast territory with a large number of troops thanks to the so-called "oil stain" process. Military bases deployed in external operations, whose protection is a priority of the military command.

Physically and psychologically rested, our soldiers can concentrate on their missions. Soldiers who are protected by resolutely modern sand and concrete fortifications that are reversible and quick to implement. Intelligent fortifications protecting advanced bases that are increasingly better equipped. A necessary evolution to meet the search for the right balance between effective protection and freedom of maneuver. In view of the theatres of operations in which we are currently present and the emerging crises in many regions with similar "environments", we can be sure that these bases will continue to be used on a massive scale. The creation in early 2015 of the Madama forward base in northern Niger is a perfect illustration of this.

1) A Forward Operating Base (FOB) is a footprint used to support tactical operations, thanks to its autonomy in support and sustainment. Isolated, it is set up to guarantee the conduct of operations or to provide support for tactical operations that may be temporary or long-term. Forward operating bases are integrated as epicentres of the so-called "oil patch" process, based both on the grid of controlled areas and the deterrent pressure on empty areas of land forces.

[2] The Army has carried out, in liaison with experts from the Defence Infrastructure Service (SID), a vast experimental campaign (called the AZUR campaign) designed to find out the effects and puncture power of weapons in service in our armies.

3) The concept of site protection covers:

- active measures: actions allowing direct opposition to an enemy attack (soldier actions).
- passive measures: all actions intended to ensure the integrity of persons and property. The fortification or hardening of installations is an essential component.
- Reactive or resilience measures: actions allowing the outcome of the attack to return to a stable situation and to restore the initial capabilities.

A graduate engineer from Arts et Métiers, of CSO origin, the Chief Engineer 2nd Class COLLIU was integrated in ²⁰¹¹ as a career officer under Article 15.2 within the Defence Infrastructure Service (SID). After several initial assignments in the engineering department in Angers, Reunion and Versailles, he served in 2008 in Abu Dhabi as the first head of the SID detachment in the UAE. Since 2011, he has been Head of the Defence Infrastructure Support Unit (USID) at the Pau-Bayonne-Tarbes-Dax Defence Base.

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