

Air Force Air Bases and the Challenges of Threats and Future Operations

Bruno DE SAN NICOLAS and Bruno VALLOS

Respectively Colonel and Lieutenant Colonel, Air Staff plans office (EMAA).

Air bases, and the network of which they are a part, are major combat assets that allow the Air Force to conduct its permanent missions and at very short notice to project power or forces to give the political level the reactivity it requires. To continue to do this, like all of our armed forces they have to adapt to the new threats against them. The distribution of bases across national territory and on operations follows the principles that today define the Air Force's stationing plan.

During the night of Friday 13 April 2018, Operation *Hamilton*⁽¹⁾ was launched from a number of air bases. The operation showed the vital nature of the bases in the preparation and conduct of sizeable air operations. This operation, like the actions conducted at very short notice in Mali in 2013, brought out the importance to air power of the base network, and demonstrated its relevance and effectiveness.

Air bases today

The definition of an air base (from the *Code de la défense*⁽²⁾) covers it as a place for stationing of forces and means of material and personnel support divided into units. And yet the air base is not just an administrative notion, for it is at once a combat platform, an aerodrome from which operational missions of the Air Force are executed simultaneously,⁽³⁾ a place of training and maintenance in condition of the air forces and a living area for airmen. It therefore fulfils many functions which confers upon it a central position in the organisation of the Air Force, as General André Lanata, former Chief of the Air Staff (*Chef d'état-major de l'Armée de l'air*—CEMAA), underlined when saying that functioning by air bases is the key to understanding the organisation of the Air Force, and that the air base constitutes an intrinsic part of

(1) Joint US, French and British operation against the Syrian regime in Damascus and near Homs in reprisal for the 7 April 2018 chemical attack at Douma.

(2) Article R3224-11 of the *Code de la Défense* (www.legifrance.gouv.fr/).

(3) The airborne element of deterrence, the permanent posture of air security (PPSA) with combat aircraft and helicopters on alert, direct intervention from the mainland to theatres of operation by projection of forces or power and public service missions.

the ‘combat instrument’ of the Air Force. He added that the network of bases constitutes the linkage essential for reactivity, permanence and resilience of action.⁽⁴⁾

More broadly, air bases contribute to the resilience of the nation, taking part in crisis management and in the re-establishment of functions essential to the continuity of the state, witness the role played by the network of bases during major events such as natural catastrophes. After hurricane *Irma* in 2017, the Air Force rapidly set up arrangements to help stricken populations, dispatched masses of freight and conducted evacuations, working in particular from the air base BA367 in Cayenne.

Air bases are also protected areas in which public assets and services of the state can take temporary refuge, as was the case at Evreux during the riots in 2005, when the town’s buses were sheltered there.

The network of air bases: principles of the stationing plan

The geographical distribution of air bases relies on a stationing plan which obeys several principles, some drawn from the lessons of history. The plan must above all ensure the continuity of permanent operational tasks.

Deterrence means having sites offering resilience of forces through dispersion of assets and redundancy in platforms such as operational centres. Some among these are hardened and underground, among them a large number of highly secure sites dedicated to redundancy in communications.

Air defence of the homeland is conducted via the permanent posture of air security (*Posture permanente de sûreté aérienne*—PPSA), which requires detection of all air threats and the immediate activation of reaction measures. This is achieved by surveillance of airspace, itself relying on networked radar and radio stations that cover the entire national territory and are linked to air operations command and control centres. This network has to take account of the physical and geographical reality of the territory to be protected and therefore requires the creation of numerous isolated sites positioned in the main on high points and which are attached to the nearest air base for their permanent support. This defence measure will soon be extended to cover space. Localisation of platforms housing air assets dedicated to the PPSA permit combat aircraft and helicopters to intercept any aircraft overflying national territory in a short space of time. We therefore need not only to have two air bases in each quarter of France able to accept weapon-carrying aircraft but also bases close to sensitive sites for accepting helicopters performing air policing tasks against the slowest aircraft.

In consideration of immediate strike missions conducted from national territory, the stationing plan has to take into account the need to disperse forces to ensure a high level of resilience when under direct threat, as well as the capability to refuel and re-arm units easily. Moreover, projection of conventional or special forces must be

(4) National defence and armed forces committee hearing of General André Lanata, Chief of the Air Staff, 19 July 2017, at the *Assemblée nationale* (www.assemblee-nationale.fr/15/cr-cdef/16-17/c1617006.asp).

Air Force Air Bases and the Challenges of Threats and Future Operations

achieved from a network of adapted and secure military air staging points close to ground force bases and logistic depots in order to minimise transportation times which would otherwise prejudice reactivity.

For the permanent public service mission of search and rescue (SAR OACI⁽⁵⁾ and maritime rescue) Air Force helicopters intervene on land and sea according to their areas of responsibility. Unsurprisingly, medical evacuation (Medevac) tasks require proximity to major military hospitals.

The distribution of air bases must also cater for the operational preparation of units. In order for operational potential not to be reduced by transit times and distances, bases are positioned as close as possible to designated air training areas and to firing ranges. These areas have to allow combat aircraft to fly supersonically and to be compatible with the performance of new generation munitions whose increased range requires ever larger dedicated airspace if realistic training is to be maintained.

In the search for optimisation of aircraft maintenance, logistic flows, support, simulation and personnel, aircraft of the same type are generally grouped together on a single air base. There is, however, a limit to this, as it affects resilience of the assets concerned and also has environmental impacts, not least being the noise disturbance. This is why there are as a general rule only two or three aircraft units stationed on each base.

Stationing of military assets inevitably means construction of often-vast airport infrastructure, special-to-type industrial installations for maintenance in particular, and restaurant and accommodation facilities that together offer permanent support to missions and alert postures. Some air bases in strategic positions require reinforcement in certain situations: they have aircraft parking areas and transit squadrons designed for these reinforcements, as at Solenzara in Corsica and Djibouti. Given all of these facilities, moving an air base is neither simple nor fast, and is often very costly.

Personnel conditions need also to be taken into account in the stationing plan. Proximity of an attractive centre of life and employment for family members contributes directly to the retention of personnel at a difficult time for human resources. Since air bases employ 1,500 to 5,000 military and civilian personnel, they are also ambassadors for the service, links between the forces and the nation and advantageous for recruitment.

These principles shape the network of air bases that gives the Air Force the capacity to fulfil its operational contracts—especially its permanent missions of deterrence and protection of the territory—and to achieve efficient operational preparation of its forces in a manner sustainable over the long term.

(5) *Organisation de l'aviation civile internationale* – the International Civil Aviation Organization.

Air bases and future threats

Air bases at home and in operational theatres are effective military instruments but are also tempting targets, since aircraft are more vulnerable on the ground than in the air. This is why bases have to be able to counter threats of all types: from airspace, from the ground, the potentially saturating, the hybrid and the non-kinetic.

The threat from the air is of strikes by guided bombs and cruise missiles. That from the ground includes ballistic missiles, anti-tank missiles, artillery, rockets, mortar rounds and direct attacks by light, mobile commando-like units. The non-kinetic threat covers cyber or electronic warfare (EW) activity and action aimed at degrading satellite positioning signals and its consequences. Attacks by mini drones are one aspect of hybrid or asymmetric threats, along with terrorist attacks.

A few decades ago, these threats were largely the prerogative of state actors but with today's proliferation of weapons, non-state actors have the ability to acquire the means to impose at least some of them. The means are obtained either by capture from the arsenals of failed states or directly from regional powers which use the non-state actors as intermediaries.

Countering aerospace threats: Anti Access/Aerial Denial (A2/AD)

Defence in depth, using an A2/AD-based system of defence, is the only way to counter threats from the air and to prevent adverse forces from attacking our air bases. This system of defence is defined by its capacity for detection, intercept and resilience.

When facing modern, fast, long range and potentially stealthy threats from airspace, we need the long-range detection that is provided by a multiplicity of sensors networked together to improve overall detection performance and to give us better sight of stealth vehicles. Intercept capabilities need to be spread geographically in order to cover each other and to provide multi-layer defence. This includes guns and long, medium and short-range missiles, and in this way the best means can be brought to bear as a function of the threat by a cost-effectiveness analysis. Resilience is inseparable from the interlinked network and the multi-layer aspect of defence: it is essential that defensive system continues to operate despite successful attacks against it, and this overall defence network depends naturally on that of air bases.

These composite, Integrated Air and Missile Defence Systems (IAMDS) aim also to cooperate with aircraft to prevent an adversary from evading interception, thus creating a robust posture of defence in depth.

Air defence weapons programmes such as the system for command and conduct of airspace operations (*Système de commandement et de conduite des opérations aérospatiales*—SCCOA 4 and 5) and the new generation, medium range ground-based ground-air system (*Système sol-air moyenne portée terrestre-nouvelle generation*—SAMPT-NG) will cover these needs in both quality and quantity. But qualitative superiority alone can no longer lead to victory when the adversary has access to assets

and knowhow that reduce the gap with ours. We therefore have to possess systems and weapons in sufficient quantity to afford us resistance and endurance. Modernisation will also take into account cyber threats and EW activity—the Trojan horses of modern combat.

Additionally, a forward air base with this type of defence is a thorn in the side of the adversary's structure that limits his freedom of action. Hence it is not only a defensive arrangement but an offensive one, too.

Countering drones

In parallel with conventional air operations, operations in the Levant over the past three years have witnessed increased use of drones by all parties. Used initially as machines for reconnaissance and coordination of action, they have since become weapons.

The size of a drone can range from a few millimetres, the nano-drone, to a wingspan of several tens of metres for the high altitude, long endurance (HALE) drone. Whilst large drones can be treated in a similar way to a conventional air threat, the smallest require adaptation of defence measures.

Mini-drones, by virtue of their size and the use of plastics, are almost invisible to radar. They navigate by GPS, move slowly at low altitude over a range of a few tens of kilometres. They are easy to put into operation, for which little training is needed. They can therefore be used for low-tech surprise attacks without exposing the operators. Basic drones carrying mortar shells were successfully used at the beginning of 2018 against Russian air bases in Syria in saturating attacks against parked bombers, which they succeeded in damaging.

The Air Force's anti-drone policy is being activated within the arrangements for protection and air security (*Dispositifs de protection et sûreté aérienne*—DPSA) and those for protection of the Armed forces ministry's sensitive installations, which include air bases. At their level, protection and ground-air defence squadrons are in charge of putting new detection and protection assets into action.

With regard to protection of installations, we have to ensure continuity between the centralised arrangement for air security, for which the Air defence and air operations command (*Commandement de la défense aérienne et des opérations aériennes*—CDAOA) is responsible to the Prime Minister, and which takes air threats into account, and the decentralised arrangements for security and protection that must counter the mini drone threat to sites. These two functions are closely linked in order to afford a permanent, seamless response appropriate to the threat.

In addition to active protection against aircraft and drones, the long-established rules of the art of protection of air bases have been retained: multi-layer ground defence in depth, hardening and dispersion of aircraft shelters to avoid mass destruction, protection of munitions and fuel dumps, and protection of personnel and intervention

forces. Helicopters on active air security measures patrols⁽⁶⁾ and airborne gendarmes ensure protection beyond the physical limits of the base.

Advantages of drones in air base protection and defence

The PRODEF⁽⁷⁾ challenge, recently organised by the Air Force and the Agency for innovation in defence (*Agence de l'innovation de Défense*—AID) has highlighted the possible contribution to the security and protection mission of new technologies such as patrolling or surveillance drones using artificial intelligence (AI) to detect suspect behaviour. The bases themselves are very active in this field. In 2016 the 'smart base' at Evreux organised the first 'hackathon' on security and protection. This demonstration gave rise to novel ideas for detecting possible threats to air bases, particularly through the use of digital methods. The Centre for military air experimentation (*Centre d'expérimentations aériennes militaires*—CEAM) is continuing trials aimed at using commercial drones in support of base surveillance capabilities.

The first are being put into service now and will in time allow surveillance rounds to be conducted, allowing detection, interception and identification of intrusions and *de facto* increasing the level of protection of the sites. It is even conceivable that drones be used to scare birds from runways. Clearly the combined activity of surveillance drones and the aircraft of the base requires the establishment of strict rules to ensure air safety.

Innovation is apparent everywhere in the drone and anti-drone sectors, and is led by the dynamism of the civil sector. The Air Force is closely following developments there from its Centre for drone excellence at the air base of Salon-de-Provence and from the CEAM at Mont-de-Marsan.

*
**

Air operations can only exist because of the existence of air bases, either on home territory or deployed in overseas territories, in foreign countries or theatres of operation. They are the fundamental combat instrument of the Air Force and also the places for operational preparation, stationing of units and for the life of airmen. By their size, their level of protection and their role as logistic centres they easily accommodate joint organisations, particularly in-theatre.

In an unstable geostrategic environment, the Air Force seeks to maintain a stationing plan based on an appropriate geographical division of air bases that allows assets to be dispersed, affords sufficient resilience and retains the reactivity required for the permanent missions and for operations launched from the homeland, which for the past decade have increased in number.

(6) In French this is *Mesures actives de sûreté aérienne*—MASA.

(7) Lagneau Laurent, *L'Agence de l'innovation de Défense lance un défi pour améliorer la sécurité des bases aériennes*, *Zone militaire-Opex 360*, 11 January 2019 (www.opex360.com/).

Air Force Air Bases and the Challenges of Threats and Future Operations

The essential protection of the bases takes account of the diversification of threats, especially the rapidly developing one coming from drones. But we also have to ensure the protection of our deployed bases against serious threats that were once the prerogative of states but which are now entering the arsenals of numerous irregular adversaries as a result of galloping proliferation.

The air base is a remarkable, reactive, high-performance and complex system whose 360-degree security has to be designed from a holistic point of view if we are to ensure continuity of operations whatever the situation. The Air Force is committing considerable effort to that security, effort that must be continued over the years to come, given the increasingly challenging nature of threats. ♦