



Afghan skies: special management of the third dimension

military-Earth thinking notebook

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Engagement opérationnel

The management of the third dimension in coalition is an abstruse science a priori reserved for specialists. However, understanding its complexity makes it possible to better grasp the workings of air support and to see the other side of the coin.

The number of actors involved, the specific geographical features of the terrain, the limited size of the areas of responsibility and the persistence of civilian air traffic make Afghanistan a particularly interesting case study in this field. While bearing in mind that the organisation and action in this theatre could not be considered as standards, and although operations there are now over for the French forces, it seemed interesting for readers of the Cahiers to measure this complexity. This is the ambition of this article, originally published in *Penser les ailes françaises*, and reproduced here with the kind permission of the Centre d'études spatiales et aéronautiques.

Fighter aviation, like transport aviation and UAVs of the Air Force, is contributing to the war effort in Afghanistan. Activity there remains intense even though the number of munitions is tending to decrease significantly and, as a result, the visibility of air support is declining. However, this support continues to be indispensable at a time when its framework is becoming more and more delicate and the missions are becoming more and more difficult.

This area of evolution is now the conjunction of a particular architecture of air volumes and strict procedures that do not allow aviation to express its full potential. It is nevertheless a question of respecting certain intangible rules. These laws remain the same in terms of control, homogeneity of environment and expertise.

Finally, in this type of mission, it is also a question of developing new management reports with the supported. These new modes would be as much the consequence of technical progress as the difficulty of ensuring the implementation, support but also the conduct of a growing number of airborne vectors concentrated in volumes on a terrestrial

scale. Afghanistan is unequivocal in this respect and must advocate zonal management of air support, respecting the intrinsic qualities of increasingly sophisticated and (also) rapid air vectors.

The French fighter aviation detachment is based in Kandahar, in the south of the country. This region, the cradle of Pashtun and Taliban, is the scene of fierce fighting. The mission of the fighters is to provide air support to the ground troops operating there.

By virtue of true operational coherence, French fighters carry out CAS [1] missions in the immediate vicinity of their base. These missions take place almost exclusively in the Kandahar region for the benefit of American or British troops in the Helmand and Sangin valleys. Sometimes it is Spanish or Italian forces engaged in the north and west of the country that benefit from this air support, according to the arbitrations made by the land-based regional command centres. French troops benefit, on request, from air support from the air vectors based at Bagram in the north-east of the country. The Air Force UAV detachment is also positioned in Bagram. With six fighters and a detachment of around 100 people, more than thirty air missions with multiple in-flight refuelling are carried out every week, day and night.

Above all, the challenge for an aviator is to dominate the airspace, an essential prerequisite for any armed action. In Afghanistan, air domination is total and it is not the insurgents' ground attacks that will, in the medium term, strain the coalition's overall air potential (mainly rocket attacks on bases and the firing of small arms in flight). This total domination will therefore not vary. However, this total domination should not be taken for granted: the techno-guerrilla warfare in which certain small groups such as Hezbollah are engaged shows us that we must remain cautious and vigilant in this area.

It is not a question of going back over the technical elements that make up the CAS mission, nor over the general geopolitical stakes involved in the action in this region. These two subjects alone deserve special treatment. The aim is to provide some food for thought on the way airspace is managed in the light of practical experience. These questions are not controversial but legitimate, as they are a realistic reflection of situations on the ground. They are intended to stimulate debate and propose some avenues for exploration. Obviously, the joint framework with its strong American connotation does not contribute to management flexibility or to the potential speed of change. However, certain aspects are or will be unavoidable. They must alert us and prepare us to define the place of aviation in the joint concert and to defend the intangible rules that govern it.

Lack of space

- Flow absorption: a challenge for the air environment of the bases

The first striking feature is the congestion of airspace in areas of interest but also in the vicinity of air bases. The Kandahar and Bagram bases are home to an extraordinary concentration of all types of assets. Working areas are located close to the runway circuits. This does not facilitate the work of deconfliction. Kandahar and Bagram have only one runway. The traffic is one of the densest in the world and has nothing to envy the

largest international airports (more than 1,000 movements per day in Kandahar). It is sometimes 45 minutes of waiting time before take-off and flight management that must be reviewed even before leaving the ground (CAS slots, appointments with tankers). On landing, the waiting time is inevitably much shorter. The planes come with little oil. The landing priorities between the different applicants are therefore defined with great finesse. The patrol leader must integrate all these parameters to present his formation with a sufficient reserve of waiting time. This waiting reserve before clearing must be carefully measured out because the time spent in the area of interest is directly impacted by it. One tonne of fuel represents 25 minutes of CAS. The frame is put down.

The co-location of air assets operating in the south of the country is fully justified by Afghanistan's internal structural weakness and by purely tactical data. Belonging to a coalition and being present at the heart of it also provides visibility which is not without advantages. Kandahar has only been home to the fighter only since 2007, five years after the Air Force's offensive means of support entered the combat zone in 2002. We tend to forget that already. Finally, it is the consequence of the limited number of infrastructures capable of accommodating and supporting air assets hungry for oil, oxygen, weapons or robust CIS networks. It is a question of guaranteeing these flows, effectively protecting stationed vectors and rationalising their location according to the very nature of their missions. The ability of a vector to ensure a permanent presence over land combat zones is particularly important in air support missions. The need for air presence is immense and all avenues to rationalize it must be exploited. Thus, the classic pattern authorised by the very nature of a fighter aircraft has not been adopted. This would involve a lightning strike beyond the horizon on a planned objective, from a totally secure platform guaranteeing technical and logistical support and protection of personnel.

The impact on air permanence, its responsiveness and the overall cost per domino effect on the coalition is immediate (mainly the oil delivered by tanker aircraft, whose availability is always one of the key elements). Each half-hour of transit time is thus broken down into minutes to be deducted from the useful results of an air mission and consumed in tonnes of fuel. Our fellow sailors in naval aviation, located at sea, also make this kind of quotient. Crew fatigue is not considered as a variable in the final equation even though these flight hours indirectly impact training and education in metropolitan France. This is another debate, another challenge, that of the aeronautical MCO [2] and the availability of dedicated vectors for operational readiness.

Located less than three minutes from Kandahar City, a strategic zone, the base's airspace is managed in an exemplary and admirable manner by virtuoso controllers. This remarkable skill, combined with the rigour of the crews and the precision of the procedures, keeps the safety of movements at a minimum. The situation is still very delicate, but the margins for significant progress seem to have been exhausted. For four years now, air traffic flow experts have been working to free up shreds of slots in order to intersperse more and more movements. But the limit has been reached, and it is also physical. There are no more parking spaces available [3]. New ones are being built, however, even if the construction of a second runway is not on the agenda. The number of helicopters continues to increase. The base now accommodates 30,000 men.

In terms of management, we are talking about the excellence of air control in Kandahar and no crew would think of not scrupulously following the orders given. Those orders are refined, thoughtful and effective.

- Saturated tactical volumes

What is much more surprising is the technical difficulty of operating in tactical areas. The number of air vectors evolving in the same place at the same time is very important. It is even systematic. This congestion creates various problems, all major. The difficulty of ensuring collision avoidance is not the least important. Indeed, it is often two or even three patrols stacking up over a small area with different radio frequencies and tactical objectives. This requires constant vigilance at all times to make changes in level, to ensure departures from the zone and arrivals at each in-flight refuelling. To say that this does not impact the support work would not be honest. Considering the optronic capabilities of the PODs[4], the search point required by the ground troop, the levels available and the volume of space still free, it is the military effect that is impacted. At worst, it takes time.

In this incessant ballet, the kinetic action remains however sanctuarized and has priority over all other considerations. If necessary, space is released on command. If necessary, the pilot will also open his eyes wide and free himself from what is no longer essential. The survival of the infantryman will always remain essential in CAS.

At night, flying under JVN[5] makes it possible to discover all the vectors orbiting in the same area (as well as all the ground shots). But make no mistake, JVNs are not a guarantee of absolute security. The pilot has an erroneous perception of relative speeds and the depth of his field of vision. Moreover, night flying will always be more delicate. One can legitimately think that the L16[6] will make it possible to better manage this aspect. But on the condition that one never lets oneself be dazzled by the information presented. Friendly vectors that are not referenced in the network and all those that are not detected by a collection system will not appear. They are, however, very present. Nevertheless, this network will always be a very valuable aid to position the air-to-air refuelling tanker, which has an unfortunate tendency to often not be at the planned point: it always does so for excellent tactical reasons, and there are many of them. They always do it for excellent tactical reasons, and there are many of them, so it is precious quintals of oil that are squandered. In view of the countless services rendered when the contraction of oil/time/distance/radio range begins to weigh cruelly on the crew's consciousness, one must be careful not to criticise them. On the contrary, let them be congratulated for their indispensable work.

The density of operations as an indication of certain deficiencies (and potential avenues for progress)

Until two years ago, vectors had enough space to evolve, and this with fluidity. So why is this no longer possible today? Several factors may provide an element of answer: the coordination between dissociated volumes of space and the massive loss of the volumes of responsibilities dedicated to C2[7] air.

- The internal coordination of the coalition ground troops in question

Ground operations do not take place in the same continuum of time and space as the airborne vector. It is trivial to say so, but this basic pedagogy must be continued. The airborne vector needs volume to evolve. This volume is at the regimental level, not at the company level. Thus, the airspace reserved for a given JTAC [8] is often not sufficient. Also, waiting even a few minutes for radio contact, clearance, or transfer to another JTAC

is hundreds of kilograms of fuel.

Within a single TF,[9] the TOC[10] is expected to coordinate among all of his or her own JTACs. This is the first level of synthesis. The creation of the TOC, a real conductor at the regimental level, follows the imperative need to coordinate joint ground action. Artillery management, monitoring of land sections and airspace management are among its missions. In flight, the fighter aviation is permanently based on this structure. Prior contact is mandatory before entering its volume of responsibility. While management within the same TF is satisfactory, coordination between two JTACs operating in the same sector (on the ground) but not belonging to the same TF is very limited and time-consuming. The distance between two hunter patrols in support of two JTACs working in the same area is very small or non-existent (one turning radius). The separation is then done by altitude difference until all the slices are used. Then the altitude separation margins are trimmed. At night, for obvious reasons of flight safety, no concessions can be made and the separation is maintained at 1,000 feet per vector.

In this case, the two different TOCs are not aware of the presence of any other air support in the vicinity of their own JTAC. When it is three Canadian, English and American TFs that suffer from this lack of coordination, the language barrier cannot be invoked. This is a reality that aircraft face on a daily basis. The density of land operations and the number of TFs deployed aggravates this situation.

- A volume of inter-service space that is very greedy to the point of obstruction

As a result of joint combat, airspace is now phagocytised by a multitude of land-based zones. These zones are on the scale of the air. They are the result of the ROZ[11] dedicated to army drones, helicopters and, above all, artillery fire. The ceiling of these zones is regularly 16,000 feet or more depending on the caliber of the battery. Their shape is unequivocal: they are either round (for omnidirectional fire), or fit perfectly the ground/ground size of a battery wedged on a firing axis. The airborne vector is therefore faced with a wall with multiple managers that are difficult to coordinate as described in the previous paragraph. The activation of these ROZs proves to be very limiting for aviation. For most of them, the most important ones, the activation is permanent. The tendency is to continue to multiply them.

This wall, to a certain extent, finds its physical declination with all the captive balloons [12] that bristles the Afghan skies, some of which rise to over 4,000 feet above ground level. The justification for these balloons is not the subject of debate. Their usefulness is obvious, but they are just as many metal cables that physically block the Afghan sky.

The person in charge of the airspace is no longer the air C2 who has the skills (an air controller) and the means devolved to space management (a radar). Those responsible for these huge volumes are the ground managers who do not have radar (the TOCs) and whose skills in coordinating such a complex tangle of volumes have yet to be tested.

Thus, two or even three different organisations must be contacted to penetrate a support zone or to ensure the volume required for specific vector action (firing, SOF [13]). Initially activated by radio, the flight levels are reserved and the crew takes note of all the specific constraints of the sector.

During the mission, the flight information is weak or even dangerous (not reflecting an electromagnetic reality that ignores the vectors supposed to be - or not - in the area). It is a real case of awareness that is posed because deconfliction "to procedures" has already shown its limits and aerial action must be taken. Soldiers on the ground need support and reactivity.

So what are the main lessons of this permanent laboratory, what are the constants?

A few avenues of recourse: defending known and robust principles

- Expertise, uniqueness and homogeneity of the environment

The need to have a synthesis level of conduct to manage the space is obvious. In view of the complexity of operations, the need to divide airspace into elementary volumes to manage joint combat is also justified. This division must take into account the physical constraints of the fighter and not be satisfied, at the very least, with the performance of the slowest vectors. Stratification, which is natural for the airman, can integrate all requirements: from low-level helicopters, mini-flying reconnaissance aircraft (used by the infantryman) to very high level in-flight refuelling, transit or strategic reconnaissance (including UAVs). Space architecture is therefore fundamental.

Moreover, the procedures will only be robust and credible if they are unique. In this area, the Air Force has expertise that no one should challenge at the risk of being confronted with the evils we are facing in Afghanistan. It is a question of better security but also of more effective action.

But this expertise will be nothing without the unity of management and command that guarantees overall coherence. At the level of the air force, unity is a crucial factor in that it allows flexibility of use, responsiveness, retasking and efficient management of the resources available in theatre, in real time. This does not prejudice, where appropriate and for a limited period of time, the reasoning and conduct of air actions at local level within the regional commands. But the pilot, wherever he is, must be able to contact or be contacted by the command structure, from Mazar-I-Sharif (in the far north) to Spin Boldak (in the south). The tactical or local level is easily surpassed. This is obvious. Despite the technical constraints (radio/radar relay in particular), this unity of management must be systematically sought for airborne vectors. We must not be sucked in by other considerations that are not exclusively specific to the third dimension. We must therefore be vigilant with regard to control structures and procedures.

One of the qualities of air action is its ability to transcend physical boundaries. We must therefore not create new ones, and we must not accept that procedures, the division of space and management methods should become so many constraints that hamper the effectiveness of the air arm. Admittedly, past operations may have suggested that this aspect was only a technical detail, but one cannot confuse an operation in the emptiness of the African desert with the complexity of a joint, allied operation, which is the meaning of history. C2 air must be able to guarantee the air vector the homogeneity of its space of evolution, "from floor to ceiling".

In Afghanistan, if half of the airspace is beyond the control of C2 air, it is also all the airspace required by the CAS.

- Zonal management: economy of means, identical efficiency

Finally, the ability of airborne vectors to move quickly must also be integrated. They have high-performance optronic means, precise localization means and an all-weather metric strike capability. While the level of these performances must be constantly upgraded, not all of these qualities are put to good use. Indeed, while each ground operation wishes to have its own air support (which is legitimate in terms of the protection provided), the fact remains that space congestion and even the overall cost ultimately militates in favour of zonal management of air support. Thus, a patrol can also provide air support for different land sections, at the same tempo and in the same geographical area. Intervention time is the quotient between distance and speed. A few minutes and tens of kilometres is not a dimensional criterion in relation to the density of ground action.

We must therefore definitively break the myth that a patrol cannot provide zonal protection (and no longer exclusive to a specific request for a given land section). If nothing specific happens in the area of responsibility, the prioritization of presence will remain possible. A rotating "tasking" is also easily envisaged. If necessary, the reserve constituted by the ground alert patrols could also absorb part of the activity if the air patrols prove insufficient. This is already the case and procedures are well established.

Furthermore, current systems allow for the rapid acquisition of key ground points. Total permanence above a ground progression with an exhaustive and precise description over the water is no longer essential to ensure the safety of ground troops or the effectiveness of air action. While the situational elements essential to a good understanding of ground action continue to be fundamental, the JTAC, the quality of its dialogue, its training, and the accuracy of the on-board systems are even more important than radio permanence with a given JTAC. The famous continuum of time and space that is so different. In a few minutes the situation is known precisely. However, this does not mean that it is not necessary to rely on planned support: on the contrary, at the tactical level, a clear distinction between risk areas and risk periods can be made to multiply support at the operational level.

However, we can see that we are still a long way from this current management mode despite daily demonstrations during impromptu ICT support [14]. The response time is almost immediate. Fighter patrols are diverted on average every second mission to support another ground platoon in difficulty. The ability to act quickly at relatively large distances also fundamentally distinguishes the fighter from current armed UAVs (which have other complementary qualities). This is important to note. This zonal management was successfully applied during the September 2010 elections. The number of ICTs handled by devices positioned preventively in a rational manner and capable of meshing the entire territory was proof of the consistency of this type of reasoning. Unfortunately, this subject of debate, which was already being debated by the CJOC[15] (formerly the IJC[16]) three years ago, is still struggling to take hold.

What is undeniable: air volume is not indefinitely extensible. Neither are the radio frequency ranges or the electromagnetic spectrum.

Conclusion

The third dimension and its management must remain the prerogative of specialists, as demonstrated every day by Kandahar's air traffic controllers, the true goldsmiths of one of the most complex spaces in the world. This expertise, which the Air Force has been developing since its inception, guarantees optimized and robust procedures. The unity of airspace management must also guarantee what is unique to the aircraft: its ability to operate in a homogeneous system free of all physical borders. This is fundamental if aviation is to remain efficient, to take advantage of its extraordinary mobility and to make a tactical impact that is commensurate with its capabilities.

As far as air support is concerned, the debate remains open between zonal management, which respects the intrinsic qualities of the fighter vector, and the current management of requests (prioritisation of JTARs[17] and special support on a case-by-case basis). Zonal management is indirectly carried out for ICTs. The theatre's air duct structure (ASOC [18]) ensures it. This mode of management also proved to be preventive during the September 2010 elections. The CAOC[19] was able to apply what is known as the School of War [20], which particularly agitates the operational planning groups of the moment, the (falsely modern) strategy of the oil stain [21]. 21] The fighter pilot naturally applies it since always even if it is more akin in the air field to influence. It is not the air defense pilots who will contradict it, they are the specialists of the "interdiction [22]". 22] Bombers, for their part, pose their threat at a distance directly proportional to the range of air/ground delivery systems and weapons.

The two things are not so far apart, on closer inspection. The airborne oil stain must not be blotted out by unsuitable structures and methods of space management. It is the airman's duty to ensure that these fundamental principles, which have shaped air action since its inception, are respected. Afghanistan is no exception, at the risk of being criticised, this time with good reason.

1] CAS: Close Air Support.

2] MCO: Maintenance in Operational Condition

3] TWTAs are only allowed to park for one hour to complete their rotation.

4] I POD: optronic sighting system (laser, video, electromagnetic...).

[5] JVN: night vision binoculars.

6] Link16: networks where members (with electronic authorisations) participate in a kind of community and exchange all information about their position and what they detect with their on-board sensors (radar in particular). This system becomes indispensable for participating in a good level coalition. The Rafale is equipped and the Mirage 2000D is being transformed. The first converted Mirage 2000Ds were sent to Kandahar at the end of January 2011.

7] C2: Command and Control

8] JTAC: Joint Tactical Air Controller. It is a person located on the ground (usually from the Army) and qualified to interact with the vectors providing air support for one of its own sections. His role is fundamental because the fighter only dialogues with this qualified element who gives all the elements of the support (specific requests, objectives, desired effects, positions of friendly troops...). The JTAC is the link between the CG(Ground Commander) and air support. A JTAC has qualified JFOs(Joint Forward Observers) at its disposal, who provide information on the elements closest to the contact. Thus, a JTAC may be responsible for different ground sections and different JFOs. The JTAC is usually located in immediate withdrawal from combat. The French JTACs are all trained by the Air Force at the CFAA (Air Support Training Centre) in Nancy.

Pensées mili-terre

Centre de doctrine et d'enseignement du commandement

9] TF: Task Force. This is the command level of the Army, which is then broken down into elementary parts. In Afghanistan, the French TF is the TF "Lafayette" which has 3,700 men. The size of a TF is very variable and depends mainly on nationality. One of the US TF located in Kandahar is composed of 20,000 men. The French hunting detachment does not depend organically on the TF "Lafayette" but is subordinate to COMAIR, an Air Force Colonel whose mandate is six months. COMAIR depends organically on REPFRANCE, an army colonel located in Kabul. TF "Lafayette" is commanded by an army general.

10] TOC: Tactical Operations Center. Usually located on a very secure FOB (Forward Operations Base) at a distance from the fighting.

11] ROZ: Restricted Operations Zone. A specific area that is created each time a volume must be reserved. ROZs can be temporary, permanent, and can have any shape (depending on the need). The penetration of a ROZ is subject to authorization. In Afghanistan, each TF, each FOB has its own ROZ. Usually these volumes go up to FL 160. They are integrated into the theatre's space architecture and updated daily.

12] These tethered balloons are generally used for perimeter surveillance through the use of optronic means (day + night) attached to the pods. They are connected to the ground by a metal cable. This cable goes up or down depending on the MTO and the wind.

13] SOF: Show of Force. It is a very low pass over the enemy position. SOF is a final warning before lethal action. This maneuver is widely used in Afghanistan.

14] TIC: Troups In Contact. Direct engagement of a friendly force with insurgents.

15] CJOC: Combined Joint Operations Center. Joint and Allied Command Center. Located in Kabul in the embassy district (green zone), this command center directed operations in Afghanistan. The CJOC is now called the IJC, which is now located at Kabul Airport.

16] IJC: ISAF Joint Command

17] JTAR: Joint Tactical Air Request. The JTAR (see footnote 8) individually expresses its air support requirement via this format. All the elements necessary for support are present (radio frequencies, coordinates, etc.). The JTAR is then prioritised by the various land commands before being definitively prioritised by the IJC at the global level. All JTARs are treated on a case-by-case basis. The ranking rule is confidential. The Air Force provides air support according to a serial number given to the JTAR.

18] ASOC: Air Support Operations Center. Organically attached to the CAOC, it is the backbone of the Air Force Command and Coordination Center (the CAOC). Based within the IJC, which is a joint command centre, the ASOC ensures the real-time control of all aircraft over the Afghan theatre. The ASOC deals in particular with the conduct of CAS missions (retasking, in-flight refuelling...). Its role is fundamental. It is the sole decision-maker for the theatre as far as air action is concerned. Its location within the IJC should allow a better reactivity with the "customer": the ground forces. The ASOC is "4 eyes only", which means that French airmen do not have direct access to the ASOC like the US/UK/CAN/Australians do.

19] CAOC: Command Air Operations Center

20] Former CID (Joint Defence College). This formation takes up one of its former names to better mark its military character.

21] A strategy that demonstrated its effectiveness during the Algerian War. It is a question of creating solid anchoring points on the territory and spreading out over it. The multiplication of these points should make it possible to extend, little by little, its local authority to the junction of another sphere of influence. And so on and so forth.

22] The main objective of the air defence mission is to gain and then maintain air superiority (SWEEP - clean-up). Thus, each volume of space is given special treatment by the friendly fighter to prevent enemy aircraft from penetrating it. Usually, an air defense vector is responsible for a given volume of space for which it is the guarantor (area of responsibility). When placed end to end, each volume constitutes the global space whose control is sought. Since 1916 and the Battle of Verdun, the Sweep has been working in this way.

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