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## AN INTEGRATED AIR DEFENCE SYSTEM FOR BOTSWANA DEFENCE FORCE TO MEET CURRENT SECURITY CHALLENGES

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## **AN INTERGRATED AIR DEFENCE SYSTEM FOR BOTSWANA DEFENCE FORCE TO MEET CURRENT SECURITY CHALLENGES**

*If we lose the war in the air, we lose the war and we lose it quickly.  
Field Marshal B. Montgomery*

**Attn:** Brigadier Anderson L. Phatshwane (Air Arm Commander)

### **AIM**

1. The aim of this paper is to highlight the current operational level Air Defence (AD) structure in the Botswana Defence Force (BDF), specifically in relation to its capability to be employed in defensive counter air (DCA) operations, identify the gaps in this structure, with a view to making recommendations based on aspects of the Canadian Aerospace Doctrine (CAD).

### **INTRODUCTION**

2. Maintaining an effective and cohesive fighting force indicates to others that a nation is serious about deterring aggressive action by other states and enforcing national sovereignty as well as protecting its national interests.<sup>1</sup>

... Militaries of nations all over the world have an air component, small or large, which is capable of performing a number of specific functions, influenced by the physical possibilities and limitations imposed by the environments and by each other. One cannot effectively work without the other; however, it is the unique capabilities of each function that when integrated with the other functions, ensure the proper application of aerospace power.<sup>2</sup>

Lately, air power has become the backbone of military operations, with a nation trying to achieve some degree of control of the air before other elements can commence their operations. AD operations contribute to gaining and maintaining the desired degree of control of the air and

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<sup>1</sup> Department of National Defence, *Canadian Forces Joint Publication (CFJP-01)*, (Ottawa: Canadian Military Doctrine, 2009), 2-2., Last accessed on 01 February 2016 at 20:50. [http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection\\_2010/forces/D2-252-2009-eng.pdf](http://publications.gc.ca/site/archivee-archived.html?url=http://publications.gc.ca/collections/collection_2010/forces/D2-252-2009-eng.pdf)

<sup>2</sup> Department of National Defence, *Canadian Forces Aerospace Sense Doctrine*, (2012), 1.

force protection. Operations such as Suppression of Enemy Air Defence (SEAD) or Destruction of Enemy Air Defence (DEAD) are effects that states' air forces aim to achieve at the onset.

3. Botswana's military, the BDF, has a very small air component, with a very nascent AD that lacks some effective aerospace functions that form the basis of the Canadian Aerospace Doctrine of command, sense, act, sustain, shield and generate. This therefore means the BDF air component cannot, in its current state, effectively meet the current and future air threat to either its sovereignty or national interests. It should also be noted that whereas the Canadian Armed Forces (CAF) speaks of Aerospace Doctrine that incorporates both air and space, the case of the BDF will be solely concerned with air capability. It must be noted that CAF does not have a functional AD of its own outside the North America Aerospace Defence (NORAD), the bilateral agreement between Canada and United States that provides aerospace warning, air sovereignty and defense of Northern America. However, there will not be discussion in this on what the CAD ought to have or not have included within it. Whereas the CAD was developed to support the four services of Army, Navy, Air Force and Special Operations Forces (SOF), along the full spectrum of operations, this paper will be limited to BDF AD operations in DCA within the context of both conventional and unconventional war.

4. Although doctrine is just a framework of how a force or component wishes to conduct military operations, it is further informed by new experiences gained in terms of technology, threat capability and threat doctrine, and, therefore, commanders must develop new methods of conducting and supporting operations in line with these. Since its inception in 1977, the BDF only came to have an AD capability in 1980. The BDF has never engaged in any combat operations, but has only ever been involved in expeditionary United Nations (UN) peacekeeping

operations in Mozambique and in Somalia in 1993. Having been only involved domestically anti-poaching operations, the BDF military in general and AD in particular, has not been exposed in terms of application, to a situation where the current trends in technology and doctrine of potential adversaries have been practiced or experienced. This situation has led to complacency by the military that has clung to the same doctrine and capabilities that existed at the time of the formation of the BDF, neglecting to move with trends, hence the need to highlight some aspects of AD that require immediate attention.

5. The current and future air threat is real, given also the current terrorist capability to hit anywhere and anyhow. Terrorists may not only want to harm the people of Botswana, but the interests of the country's allies and partners in the country. In the past (1990), the South African Defence Force helicopters attacked a military base in Botswana and AD failed to respond to this attack. There have been a number of Botswana airspace violations by her neighboring countries' air forces on a number of occasions lately. Botswana's potential adversaries are South Africa to the south, which once launched air attacks on Botswana in the 1990s, and Zimbabwe to the north, which has accused Botswana on a number of aiding opposition to militarily topple the current government. Both countries have very fast attack aircraft, Zimbabwe with MIG 23s and South Africa with Grippens. It is against this backdrop that the paper will highlight the capability gaps and how the CAD can inform changes in the BDF's operational level AD capability sphere. To address this issue, the paper will discuss the setup of AD in the BDF and will also outline the capabilities. It will then discuss in brief the Canadian Aerospace Doctrine with specific reference to AD, and with emphasis on the functions of command, sense act, and shield. The paper will then make a comparison between what capabilities reside in the BDF and what is in the CAD,

regarding the four functions discussed. Thereafter, the paper will, in its conclusion highlight the necessary take aways from the CAD to formulate recommendations.

### **AD SET UP AND CAPABILITIES IN THE BDF**

6. The current set-up of AD in the BDF is such that there is no designated Air Defence Commander. There are three units that constitute AD:

- a. The Air Defence Artillery Regiment (ADAR). This unit is under command of the Army Commander and is equipped with short range Surface to Air Missiles (SAM 14) and 37 mm Gun that is manually fired and has no fire control radar. The unit is completely divorced from its other associated AD elements;
- b. The 28 fighter squadron. It is a squadron of BF 5 fighter aircraft (from Canada) which is under the Air Arm commander (equivalent of Air Force commander). This aircraft is also used in an interceptor role for AD; and
- c. Air Defence Unit (ADU). This is a unit under the Air Arm Commander as well and is responsible for radar manning and operation. Its assets are located only in the regions of Botswana. This is despite the potential threat from Zimbabwe in the north, which has a very unstable political situation. In the time past, the Zimbabwean president had accused Botswana of aiding rebels in his country, something which places Zimbabwe as a potential threat to Botswana.

7. There is no provision for a central coordination of AD effort between the above mentioned three units. Centralized command would otherwise result in the ability to: effectively monitor the airspace, detect any possible hostile air threat, and assign the right AD asset to

counter with the threat as early as possible. The Joint Task Force (JTF) level exercises that the BDF has engaged in have all pointed to a serious disjointedness in the command and control of AD assets.

8. The future aerospace power will be based on ultra-fast moving manned aircraft, unmanned aerial weapon delivery and intelligence gathering platforms, with stealth technology, which will be used to conduct effect based operations (EBO).<sup>3</sup> This future capability must be met by an equally well advanced AD system. There can be no discounting the possibility of some of this type of capability falling into the hands of terrorists and neighbors who are potential threats to Botswana's interests and those of her allies within her borders. AD Doctrines of other nations with advanced militaries may, therefore be looked at to advise a more integrated AD system for the Botswana's military.

### **CAD SPECIFIC TO AD**

9. The Royal Canadian Air Force (RCAF) delivers aerospace power to control and exploit the air and space environments in order to contribute to Canadian security and national objectives. The CAD, which is aligned to the CAF doctrine, and has six core functions of command, sense, act, sustain, shield and generate, which each cannot efficiently and effectively exist in the absence of the other.<sup>4</sup> The core functions of command, act and sense operate within a continuous cycle of activities. The outputs of the sense function are assessed by a commander in order determine the current state, after which this command function directs and finally results in the act function.<sup>5</sup> The sustain, shield, and generate functions must be performed continuously in

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<sup>3</sup> Scot Robertson, "What Direction? The Future of Aerospace Power and the Canadian Air Force Part 2." *Canadian Military Journal* Volume 9, no.1 (2008): 6.

<sup>4</sup> Department of National Defence, *Canadian Forces Aerospace Doctrine* (2011):35

<sup>5</sup> *Ibid.*,36.

order to effectively maintain, protect, and develop Air Force assets and capability. Each function will now be looked at in relation to DCA operations.

## Command

10. Aerospace power can effectively and efficiently project power by enabling aerospace effects such as DCA operations.

...The RCAF is organized into six functional commands: Maritime Air Command (MAC), **Air Defence Command (ADC)**, Training Command, Tactical Air Command, and Air Transport. It has aligned its operational procedures, tactics, and communications with its United States Air Force (USAF) partner in NORAD. For the operational functioning, the ADC then decentralizes execution to the Air Defence Groups (ADGs) which with the various environments/components.<sup>6</sup>

Fundamental to the success of this process is a well-defined command and control structure.<sup>7</sup> For the ADC, it entails the exercise of authority and direction over his assets, integrating functions into a single strategic, operational, or tactical level concept. Command and control activities in aerospace include:

- a. Monitoring the full spectrum of factors within operational airspace,
- b. Assessing town capabilities and performance of individuals, materiel and systems,
- c. Assigning of available assets to achieve a mission.<sup>8</sup>

... In theatre, air operations are controlled through an overarching Theatre Air Control System (TACS), and are centered on the Combined Aerospace Operations Centre (CAOC), and include the organizations, units, personnel, equipment, and procedures

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<sup>6</sup> Department of National Defence, *Canadian Aerospace Doctrine (2011)*: 10.

<sup>7</sup> Department of National Defence, *Canadian Forces Aerospace Command Doctrine (2012)*: 2.

<sup>8</sup> *Ibid.*,3.



necessary to plan, direct, and control air operations and to coordinate air operations with other environments in the joint environment.<sup>9</sup>

The ADC would integrate the functions of sensor and shooters based on his assessment of threat and assets available to him such as Radars, Surface to Air Missiles (SAM), AD guns, and interceptors. This is a critically important function which will base its decisions mostly on inputs from the sense function.

### **Sense**

11. This is the operational aerospace function that provides the commander with knowledge necessary to direct their assets appropriately to achieve desired effects<sup>10</sup>

...The Canadian doctrine emphasizes the aspect of fusion, which incorporates multi-level information processing and integration of this information into a coherent understandable picture, through the process of collecting, analyzing, assessing, evaluating, collating, correlating and integration. There is also an emphasis on Joint Integrated Multinational and Public (JIMP) relationships, which places emphasis on cooperation with other information collection entities that are outside the military chain of command.<sup>11</sup>

AD assets integral to the military which are responsible for this function are radars, unmanned aerial vehicles (UAVs), manned aircraft and individual observers. The sense function will inform the command to properly assign the act function.

### **Act**

12. This integrates maneuver, firepower, and information operations to achieve desired effects. The battlespace is shaped by kinetic and non- kinetic (dispersion, deception, camouflage

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<sup>9</sup> Department of National Defence, "Royal Canadian Air force Doctrine: Strategic (Fundamental Concepts)." Last accessed 5 February 2016, <http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/aerospace-doctrine.page>

<sup>10</sup> Department of National Defence, *Canadian Forces Aerospace Sense Doctrine*(2012): 2

<sup>11</sup> Department of National Defence, *Canadian Forces Aerospace Sense Doctrine* (2012): 24.

and concealment) action.<sup>12</sup> It also includes capability to force project, which entails the ability to rapidly establish new bases using high readiness deployable units, and making use of pre-established unmanned bases.<sup>13</sup> Fighter/Interceptor aircraft, missiles, and guns will be the primary assets for this function in the DCA role. This has the sub function of shape, which is very critical in DCA. It shapes the aerospace battlespace to create favorable circumstances for friendly forces and unfavorable circumstances for an adversary. Air forces shape the physical, moral and informational domains while the Intelligence Surveillance and Reconnaissance (ISR) assets provide information superiority by enabling the identification, tracking, and targeting of hostile airborne assets. The act function has another element called shape function, which entails shaping the aerospace in terms of surveillance and resource allocation.

13. The shape function in a domestic setting emphasizes control of the air, which, in a DCA role, emphasizes the capability to monitor and influence the security of friendly airspace and its approaches and thus influence the battlespace to create favourable circumstances for friendly AD assets unfavourable circumstances for hostile airborne objects.<sup>14</sup> In the CAD example:

... Canadian control of her airspace is the responsibility of NORAD Command (NORAD – a bilateral agreement between the United States (US) and Canada which has increased the overall effectiveness of North American air defence). These efforts are closely coordinated with both countries' civilian aviation controlling and regulatory agencies. Domestic control of the air operations is the area of defense missions of aerospace warning and aerospace control.<sup>15</sup>

The aerospace warning is based on the detection, assessment and validation of an impending or actual intrusion into airspace of interest by aircraft, missile or spacecraft. It

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<sup>12</sup> Department of National Defence, *Canadian Forces Aerospace Doctrine* (2011): 38

<sup>13</sup> *Ibid.*, 39.

<sup>14</sup> Department of National Defence, *Canadian Forces Aerospace Shape Doctrine* (2011): 10

<sup>15</sup> *Ibid.*, 22

includes capabilities for maintaining awareness of civil and unknown activity within the designated airspace.<sup>16</sup>

...Robust ground and space based system of sensors and communication links, supported in specific circumstances by airborne assets helps this function to be carried out. Aerospace warning control deals with the implementation and coordination of the procedures governing airspace planning and organization in order to minimize risk and allow for the efficient and flexible use of airspace.<sup>17</sup>

It includes the capability to monitor, control and prosecute all unauthorized activity approaching or operating within the designated airspace.

14. These could be air surveillance operations (monitoring, detecting and tracking any intrusion), air enforcement operations (conducted in a permissive environment to support law enforcement over a designated airspace), and air defence operations (carried out to nullify or reduce the effectiveness of any hostile airborne object through active and passive means).<sup>18</sup>

Therefore, DCA operations protect friendly forces, equipment, personnel, infrastructure, and vital interests of any aerospace threat, with the aim being to detect, identify, intercept, nullify and/ or destroy any airborne hostile object as far away from its intended target as possible.

## **Shield**

15. Shield is a concept that includes the requirement to identify and protect the friendly forces' Centre of Gravity (COG) from hostile aerial attack and its components are divided into the physical (kinetic and non- kinetic), moral and informational. It is also designed to deter, prevent, and preempt airborne hazards before they inflict any harm.<sup>19</sup> In the DCA role, shield

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<sup>16</sup> Department of National Defence, *Canadian Forces Aerospace Shape Doctrine* (2011): 22

<sup>17</sup> *Ibid.*, 22.

<sup>18</sup> *Ibid.*, 23.

<sup>19</sup> Department of National Defence, *Canadian Forces Aerospace Shield Doctrine* (2012): 26.

function detects, assesses, warns and defends and all the capabilities that are there to do these must be considered, integrated, planned for and required, mitigated when planning.

## **COMPARATIVE ANALYSIS OF THE CANADIAN AEROSPACE DOCTRINE TO BDF AD SET UP**

### **Command**

16. The BDF AD does not have a designated AD Commander who would, like the CAD advocates, exercise authority and direction over assets and integrate functions into a single strategic, operational or tactical concept. There is a lot of disjointedness in the BDF with AD assets under operational command of different environment commanders.

### **Sense**

17. The CAD has embraced the concept of fusion and JIMP whereas the BDF AD does not adhere to this concept, and lacks multi-level information processing which helps to give a much clearer and broader picture of the threat. BDF does not have a permanent center for collecting, analyzing, assessing, evaluating, collating, correlating and integrating the air picture, but rather usually makes an ad hoc arrangement in the event of a need for this center.

### **Act**

18. CAD allows for a bilateral agreement between Canada and the US under NORAD, which has given rise to robust ground and space-based sensors and communication links that will allow for timely sensor- to- shooter reaction time. The BDF on the other hand, though operating alone, does not have in place robust ground or space based sensors and communication links between the ADU, fighter squadron and ADAR.

### **Shield**

19. The BDF AD has the AD assets discussed earlier which in their current disposition of disjointedness cannot perform the tasks stipulated in the Canadian aerospace shield doctrine of effectively identifying and protecting the COG from hostile aerial attack. There can be no deterrence when there is no corresponding synergy between components meant to deter the enemy air threat as seen the case in the BDF AD.

## **CONCLUSION**

20. It has been noted that with the structure of the BDF AD today, it cannot be an effective deterrence to any hostile air invasion of Botswana's airspace because of the way it is structured. With the absence of an AD Commander and a unified chain of command that can command, control, and coordinate the functioning of AD, being the sensors, communication and the force application means, there will be a vacuum in the area of AD in the BDF. Control of the air is very vital as it allows friendly air freedom of action and denial of the same to the adversary of whatever nature. The CAD is a great model that can inform the establishment of a centralized command structure of AD in the BDF. Without an integrated AD, there will be a disconnect between the command, sense, act, shape, and shield functions as stipulated in the CAD, which one cannot effectively function in the absence of the other.

## **RECOMMENDATION(S)**

21. Having looked at the CAD and the BDF AD setup, it is recommended that:
- a. The CAD is adopted in as far as it relates to the AD, especially the concepts of centralized command structure (ADC) and decentralized execution ( ADGs);

- b. Communication links between the command, sensors, and shooter should be set up to ensure timely passage of information and action; and
- c. Modern AD assets are procured to keep up with new and future trends in the aerospace warfare.

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