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South African Responses to New Soviet Air Defence Systems in Angola in the 1980s

Janet Szabo[551]

Independent Researcher, South Africa

Abstract

Because of its air superiority during the counter-insurgency conflict against the South West Africa People's Organisation the South African Air Force had neglected to build up modern air and counter-air defences. When Soviet air defence systems were deployed in Angola in the 1980s, South Africa was forced to reconsider their tactics and responses to the war. The Soviet systems included early warning networks, surface-to-air missiles and anti-aircraft guns to cover troops advancing in the field, and fighter aircraft. The South Africans watched the build-up in the region with concern, viewing it as the precursor to offensive action, given Soviet air defence doctrine. While this build-up was also observed in the neighbouring Southern African countries and had the appearance of a purely defensive stance, given Soviet air defence doctrine, South Africa viewed this as the first steps to offensive actions in Angola and possibly Namibia (then South West Africa) and the start of a dangerous escalation in the military situation. In response, the SADF adopted a strong defensive stance and improved its own air defence capabilities to ensure that it was not outclassed. The South African Air Force also introduced new tactics. These included the introduction of toss-bombing, making greater use of precision-guided missiles and bombs, and investing more in research in terms of missiles and new technology for their aircraft.

Keywords: SADF, SAAF, Angola, Soviet Union, Air Defence, Radar

Introduction

In the 1980s, the South African Defence Force (SADF) was extremely concerned about the Soviet Union's active support for neighbouring countries – particularly Angola – in the form of weapons, and especially, modern air defence systems. As a result, the SADF constantly monitored the situation to ensure that it was not outclassed, and it improved its own air defence capabilities. The Soviet air defence systems introduced in Angola included early warning networks (such as radar), surface-to-air missiles and anti-aircraft guns, and fighter aircraft.

The SADF strategy at the time was based on pro-active action to deter and prevent neighbouring countries from being able to mobilise offensive air power against South Africa. In this regard, the SADF adopted a strong offensive posture. While the build-up

in neighbouring countries had the appearance of a purely defensive stance, given Soviet air defence doctrine, South Africa viewed it as the first steps to offensive actions and the start of a dangerous escalation in the military situation.[552]

During the 1970s and earlier, the South African Air Force (SAAF) had total air superiority to conduct cross-border operations. At the time, South Africa was conducting counter-insurgency operations, which saw the SAAF provide close air support and other operations, such as trooping, casualty evacuation, and transport of supplies. Because of its air superiority, the SADF paid little attention to developing its own air defence capabilities.[553] In addition, South Africa was under a total arms embargo from late 1977, which made it almost impossible to obtain additional or new aircraft, technology, or spares. The country also had a limited defence budget because of the size of its economy.[554] In the 1980s, spending on defence averaged around 16 per cent. A country study by the Federal Research Division of the American Library of Congress pointed out that, while South African spending on defence compared to economic output in the 1980s was high, a trend towards militarisation was not evident compared to other countries worldwide at the time.[555] In 1989, the United States Arms Control and Disarmament Agency ranked South Africa out of 144 countries as follows:

- 30 for total military expenditures;
- 44 for military spending as a percentage of gross national product,
- 63 for military spending as a percentage of total government spending,
- 49 for the size of its armed forces; and
- 103 for the size of the armed forces related to population.

In Angola, the post-independence political and military situation created conditions for foreign involvement (including the United States, the Soviet Union, Cuba, and South Africa) driven by regional and international Cold War politics. The three largest anti-colonial groups, – the Popular Movement for the Liberation of Angola (MPLA) under Agostinho Neto, the National Front for the Liberation of Angola (FNLA) under Holden Roberto, and the National Union for the Total Independence of Angola (UNITA) under Jonas Savimbi, – had agreed to the Alvor Accords with Portugal on 15 January 1975.[556] The Accords saw Angola secure independence on 11 November 1975 under a transitional government with elections scheduled for October.[557] The Accords however did nothing to address rivalry among the groups.

Operation Savannah in 1975 set the pattern for South Africa's military involvement in southern Angola. What was initially a clandestine operation to assist UNITA recover its lost territory, intensified over the years as the then Soviet Union, Cuba, and several other former East Bloc countries increased their involvement in support of the MPLA in Angola and SWAPO, who was then fighting for Namibian independence from South Africa.[558]

Although South Africa's forces withdrew from Angola in March 1976, they continued to provide substantial assistance to UNITA, and frequently launched military raids into the south of the country for more than a decade after that.[559] Following an alliance with the MPLA, SWAPO was able to move closer to the bases of the People's Armed Forces of Liberation of Angola (FAPLA).[560]

After 1979, the Soviet Union provided South Africa's neighbours with increased assistance – particularly Angola, which did not have its own infrastructure or technical expertise to manufacture or maintain aircraft and air defence systems. These included highly sophisticated aircraft and air defence systems, such as MiG fighters, surface-to-air missiles (SAMs), anti-aircraft artillery (AAA) and radar systems.[561]

The establishment of an extensive air umbrella – through the operational use of anti-aircraft artillery and ground-to-air missile systems – in Angola, forced South Africa, and the SAAF in particular, to revise its tactics drastically. This situation also restricted the use of certain types of aircraft, such as the slower and less sophisticated Blackburn Buccaneer S Mk 50 bomber, the Atlas Impala Mk II ground attack aircraft, and the English Electric Canberra B(1) Mk 12 bomber. In turn, this had some effect in limiting the operations of ground forces and the provision of air support.[562] The presence of heat-seeking missiles in Angola led to very expensive research in South Africa into deterrent measures and curtailed the use of SAAF helicopters.[563]

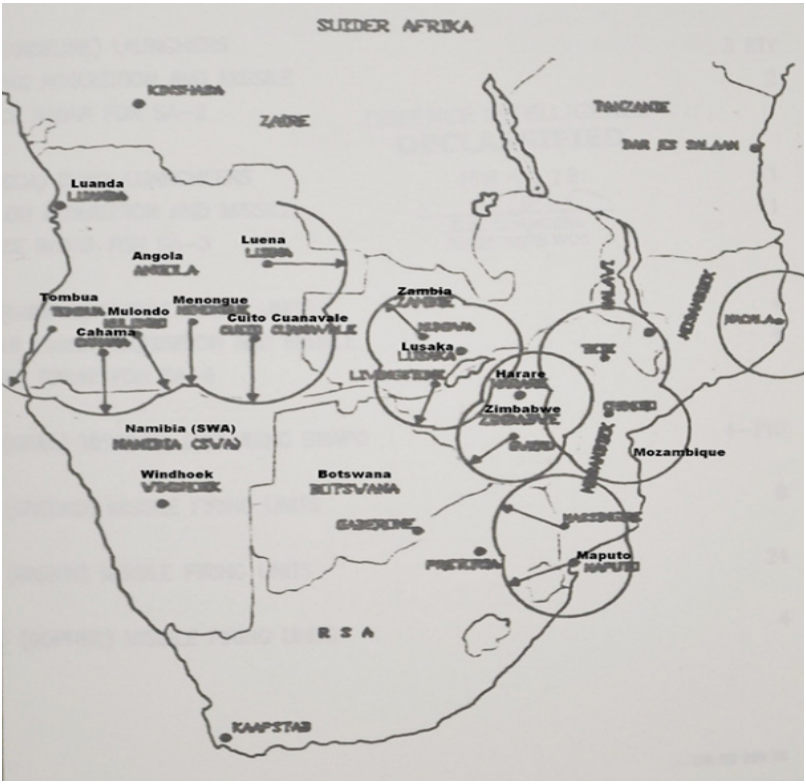

Figure 1: Soviet radar coverage in Southern Africa[564]

Breytenbach notes this was in keeping with Soviet doctrine.[565] This had a pronounced influence on the thinking, planning, and actions of the SAAF.[566]

Situation in Angola in the 1980s

By the early 1980s, Soviet radar systems had been set up in southern Angola in a zigzag pattern along the Namibe–Menongue railway line (at Namibe, Lubango, Menongue, Cahama and Cuito Cuanavale). These were a mix of P-18 (NATO reporting name "Spoonrest"), P-15 (NATO reporting name "Flat Face"), P-35 (NATO reporting name "Barlock"), the height-finder radar of the SA-3 surface-to-air missile system (NATO reporting name "Side Net"), and fire control radar of the SA-3 system (NATO reporting name "Low-Blow") radars.

Each radar site had a mix of equipment, which worked on a shift system to ensure continuous radar coverage of the area.[567] All radars on the approximately 700 km long front were controlled from one central point at Lubango.[568] In the early 1980s, the SADF viewed the deployment of radar at Cahama as possibly the beginning of a new radar chain.[569]

In addition to the technology, there was also a well-developed visual sight early warning system using FAPLA forces and members of SWAPO in their deployment positions. From the mid-1970s, SWAPO had bases in southern Angola from where they launched attacks into what was then South West Africa (SWA) (now Namibia).[570] They reported all aircraft positions, flight directions, and altitudes. Maintenance of all equipment was done by Soviet and Cuban technicians. Small arms fire and RPG-7s were also used against SAAF aircraft. By the second half of the 1980s, the Angolan air defence system was not very different from the one the allied forces encountered in Iraq in 1991.[571] This conformed to the Soviet doctrine of air defence in mass and depth.[572]

The SA-3 missiles were deployed in Luanda, Namibe, Lubango, Matala and Menongue to defend specific strategic assets.[573] Writing in 1983, Prinsloo notes that the SA-2, SA-6, SA-9 and SA-8 were also reported to have been deployed to Angola.[574] His assessment was supported by a 1986 Central Intelligence Agency (CIA) assessment on Angola.[575] This was significant, as some of these systems were still relatively unknown in their entirety in the West, indicating that the conflict was escalating.[576] Air defences in Angola were also gradually being strengthened with the ZU-23 twin-barrelled anti-aircraft autocannon (initially in a static role) as well as 37-mm and 57-mm guns. Prinsloo further indicates that the combinations of 14.5-mm, 20-mm, 23-mm, 37-mm and 57-mm guns in addition to the SA-7 (STRELA) man-portable shoulder-fired surface-to-air missiles were placed at all key point areas across southern Angola.[577] The smaller calibre weapons were effectively camouflaged. Together these weapons provided cover to an altitude of several thousand meters.[578]

Convoys were also protected with 12.7-mm, 14.5-mm and 23-mm guns, which were mounted on the vehicles. The SADF considered that the increase in self-propelled air defence systems in the area could mean the weapons were being used in a mobile role.[579] While the SA-7 was reported to have been used extensively by FAPLA, this did not prove

to be successful against the SAAF.[580] Prinsloo says this was because there was no chain of command to higher headquarters to authorise fire – FAPLA fired on all aircraft that came into their area.[581]

It is worth noting that the Soviet Union supplied Angola with its most modern air superiority fighter, the MiG 23ML, at about the same time as it supplied its allies, the Warsaw Pact, for example Hungary, from 1981–1990.[582] Angola also received the same number of aircraft (12) as the People's Republic of Hungary.[583]

South African responses

South Africa needed the continued presence of UNITA in the south-eastern Cuando Cubango province to ensure that the SADF counter-insurgency operations against SWAPO were confined, and that SWAPO fighters were unable to cross into the Caprivi or Kavango from Angola. Between 1978 and 1987, the SADF conducted numerous small-scale and several larger hot pursuit operations against SWAPO (Reindeer [1978], Sceptic [1980], Protea [1981], and Askari [1983–1984]). Although these were largely successful, FAPLA continued to support SWAPO.[584]

From 1983, with Operation Karton, a new pattern began to emerge, and became clearer with operations Wallpaper (1985) and Alpha Centauri (1986). FAPLA focused on destroying UNITA through planned attacks on its stronghold of Mavinga. This was critical as the town could be used as a springboard for an assault on the UNITA headquarters at Jamba.

The build-up of air defence systems on South Africa's borders increased the risk that the SADF would have to respond with conventional attacks – and this proved to be the case from Operation Askari (1983) onwards – thereby escalating the conflict and tensions. In an attempt to mitigate this build-up, more emphasis was placed on international political negotiations and interventions to convince the Angolans and their supporters (such as the Cubans and Soviets) that they were playing with fire.

The move to a conventional phase of the fighting also gave the SADF first-hand experience of how Soviet doctrines regarding air defence of moving columns were applied in a Southern African context. While the SADF had clashed previously with conventional forces in southern Angola, these had been in defensive positions and not mobile.[585]

This air defence build-up also had specific implications for the SAAF:

- aircraft, such as the Mirage III, becoming out of date and therefore being out-classed in combat;
- restricted air reconnaissance translating into less air intelligence available for operational planning;
- restricted helicopter support;
- more aircraft being needed to reclaim air superiority and therefore fewer available to support ground forces; and
- SAAF air bases becoming increasingly vulnerable to attack by enemy air forces.

Prinsloo indicates this was already a concern for air bases at Hoedspruit in South Africa and Ondangwa and Grootfontein in SWA.[586] The Nkomati Accord, signed between South Africa and Mozambique in 1984, reduced this threat for Hoedspruit.[587] Lord also notes the SAAF's concerns when attacking targets in Angola that their bases in northern SWA could come under attack – although this never happened to the SAAF.[588]

This had implications for the SAAF's responses. These would depend mainly on the perceived air threat, the importance of the objective, as well as the sortie rate and ability to replace aircraft.[589] Breytenbach further indicates:

> [C]onsidering the attrition effect and the RSA [Republic of South Africa] situation of no 'reservoir' of aircraft, the choice for the SAAF seems not to be between actions with the lowest possible attrition rate, but rather between actions which would guarantee deterrence, or in the event of a battle, a speedy victory over the enemy.[590]

To overcome this, the SAAF would need to conduct swift 'Blitzkrieg'-style operations and make increased use of electronic measures and precision-guided munitions to minimise the attrition effect.

In order to surmount the disadvantages in their situation, several courses of action were recommended to the SAAF:

- modernising aircraft;
- acquiring new technology aircraft;
- having aircraft airborne for longer periods to operate on more than one front against an enemy, which means air-to-air refuelling technology became critical;
- gunship-type helicopters would need to be obtained or developed to supplement close air support for ground forces and be able to act as tank destroyers. (The Alouette III light utility helicopter was used very effectively as a gunship, and one C-47 Dakota armed with a 20-mm cannon, the "Dragon Dak", was also used in this role.)[591]

Other action recommended included the improvement and modernisation of long-range air reconnaissance capabilities as well as maximising the use of factors affecting the outcome of an anti-aircraft engagement.[592] Several of these possible actions were not practical while the country was under sanctions, and given the time it took to develop new equipment and systems.[593]

Expanding on this last point regarding the aircraft itself, Prinsloo suggests attention should be paid to aspects such as flight profile. This included performance parameters of the aircraft and weapons load, training of pilots, terrain, defences deployed on the target (this would be based on intelligence on the size and shape of the target area).[594] "Aircraft survivability" refers to a function of the vulnerability of the aircraft to anti-aircraft ammunition and the statistical parameters governing the probability of a hit by a bullet or a missile.[595] Other factors for consideration were the weapons system, terrain, and the element of surprise, technological expertise, deployment patterns, and atmospheric conditions.

In a document prepared for the SA Defence College in 1986, Colonel CN Breytenbach also added the following considerations to counter future threats:

- making the best use of stand-off weapons, such as precision-guided-missiles and laser-guided bombs;
- using electronic countermeasures (ECM) and electronic counter-countermeasures (ECCM) to protect indispensable aircraft; and
- developing and using drones and expanding the South Africa's intelligence gathering capabilities using electronic intelligence gathering aircraft and satellites.[596]

Brigadier General Dick Lord, who commanded 1 Squadron during the Border War, flying the Mirage F1AZ, and who was later in charge of air force operations out of Oshakati and Windhoek in SWA, notes:

> The actual insurgency war against SWAPO was supported throughout the entire 23 years by the SAAF. However, it was the helicopter, transport and light aircraft crews who bore the brunt of the conflict. The 'fast jets' were only summoned from their home bases in South Africa for specific operations such as Protea.[597]

This was because the situation in Angola never reached that of an all-out war.

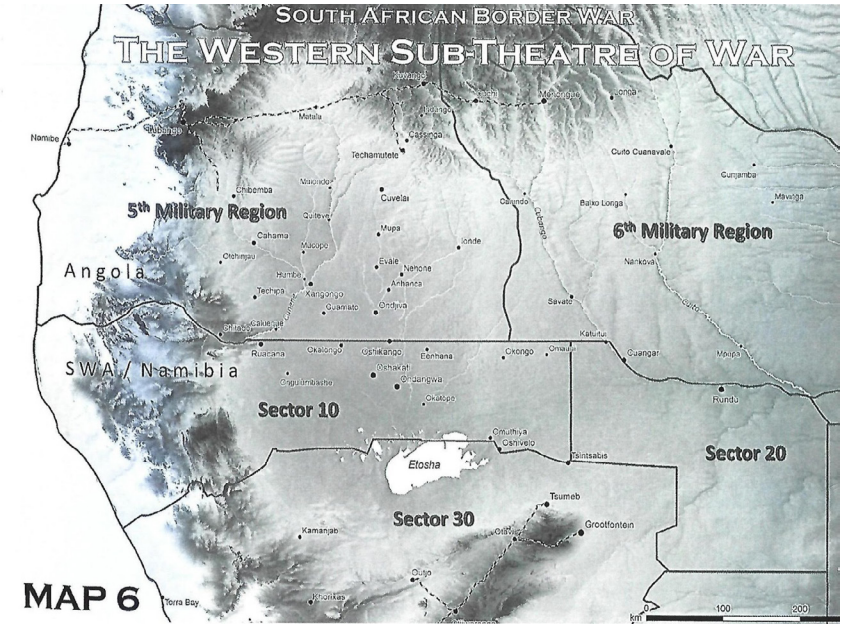

Figure 2: SAAF Area of Operations in the Border War.[598]

Challenges facing the SAAF

The SAAF was now pitted against more sophisticated Soviet weapons, culminating in high-mobility semi-conventional operations against Angolan, Soviet and Cuban forces.[599] From 1983, FAPLA and SWAPO began operating jointly to a greater degree. In August 1983, UNITA appealed to the SADF for assistance to take the FAPLA-held town of Cangamba in Moxico Province. This action escalated SADF involvement with the Angolans, Cubans and Soviets. The success at Cangamba meant that the Soviets significantly increased the amount and sophistication of replacement weaponry that was sent to Angola, and the Cubans sent additional troops. This was a development that gave the South Africans further cause for concern.[600]

In the early 1980s, it appeared that the Angolan MiGs were only flying in defence of their bases. Radar had however locked onto SAAF planes over southern Angola since the early 1980s.[601] The SAAF shot down two MiG-21s, one in Operation Daisy on 6 November 1981, and another on 5 October 1982.[602]

Lord notes that the SAAF Mirage F1 was superior to the Angolan MiG-17 and MiG-21 but was out-performed by the MiG-23, which was introduced in 1983 and used to good effect towards the end of the conflict.[603] As Lord notes, 'all indicators pointed to further encounters with MiGs and our air-to-air missiles had proved to be sub-standard'.[604]

The SAAF began looking for a replacement for the Mirage III in 1971. The Mirage F1 offered an improvement on the Mirage III as it had advantages, such as increased speed, increased pursuit flight time, double the ground mission range, and increased manoeuvrability.[605] In June 1971, Dassault and SNECMA (the French aerospace engine manufacturer) announced a technical cooperation agreement with South Africa for the license manufacture of the Mirage F1 and engines. The intention was to produce up to 100 Mirage F1s.[606]

The 1977 arms embargo caused this licence to lapse. The SAAF only acquired 16 Mirage F1-CZs and 32 Mirage F1-AZs.[607] At the time, the SAAF already operated the Mirage III interceptor CZ, ground attack AZ, dual-seater BZ, trainer DZ, and photo reconnaissance RZ versions.[608] The interceptor CZ and ground attack AZs were replaced by Mirage F1. They were flown by 1 and 3 Squadrons. Heitman notes that the F1AZ fighters performed key roles, such as interdictions and close air support, air defence suppression, and strike sorties.[609] They were able to carry rockets and bombs of up to 3 650 kg on the fuselage and wing pylons, two 30-mm cannon and two air-to-air missiles on the wingtips. Depending on the weapons loads, the mission and the payload–distance equation and the risk level, the aircraft had a combat radius of up to 900 km, with a top speed of over 2 300 km/h, although they were usually flown at around 1 100 km/h at low level.[610]

The Buccaneer flew the precision-guided strikes, using the Kentron H2 Raptor glide bomb. The aircraft was able to carry up to 7 000 kg of weapons, and had a range of around 3 700 kilometres.[611]

The Impala Mk II was used extensively for close air support and battlefield air interdiction, reconnaissance, photo reconnaissance, and quick reaction air support missions. It had a range of between 130 and 600 km, the ability to carry long-range tanks, and was armed with two 30-mm cannons and could carry up to 1 800 kg of weapons on six hard points.[612] The aircraft was considered relatively slow – with top speeds of just over 800 km – and it was withdrawn from external operations before Operation Moduler in 1987 when the Angolan air defences became too effective.[613]

The SAAF Mirage was armed with the R550 Matra Magic heat-seeking missile (a short-range French air-to-air missile), which was fired against the MiG-21 and MiG-23 over Angola. The limited performance envelope of the early generation R550 led to South Africa designing, developing and producing its own air-to-air missile – the V3B Kukri – despite sanctions.[614] Lord says, '[t]he Matra 550 was more reliable but failed to achieve hits during operations when the infrared fuse detonated ineffectively in the exhaust plume of the MiGs.'[615]

The Matra R530 was a short-range radar-guided air-to-air missile, which was developed in the 1950s. Lord notes that, because of constant problems with the electromagnetic fuse, the Matra R530 was never used operationally. While it performed satisfactorily in tests, it did not reach accepted standards in the rough operational border conditions.[616]

The Mirage III proved disappointing because of its limited range in relation to the large distances involved in the combat area; the Mirage F1 had a longer range.[617] The SAAF adopted special low-level flying techniques to counter the Soviet mobile guided missile systems.[618]

An SADF assessment in the early 1980s noted that the Angolan Air Force had an estimated 50 MiG-21s and 15 MiG-17s.[619] These could operate from Luanda, Namibe, Lubango and Menongue. Day and night interceptions were possible, and this was regularly feasible. The aircraft operated in conjunction with a highly sophisticated radar system. This made Angola the best-equipped and therefore the most serious threat to the SAAF of all the countries bordering South Africa at the time.[620]

With the launch of Operation Askari in late 1983 to disrupt SWAPO operations in southern Angola and to prevent a further mass infiltration into SWA the following year, the SADF hoped to capture an SA-8 battery. This Soviet mobile air-defence missile system incorporated both its engagement radars and missile launchers in one vehicle. This would be of significant intelligence value to South Africa, as this was the first time this system had been deployed outside the Soviet Union.[621] This goal was not achieved when political pressure on South Africa forced military operations on the Cahama front to end by 31 December 1983; however, they captured one complete SA-9 missile system at Cuvelai.[622] This was a self-propelled Soviet short-range, low-altitude infra-red guided surface-to-air missile system.

In the political sphere, Askari facilitated peace negotiations between South Africa and Angola, which led to the establishment of a Joint Military Commission (JMC). The commission comprised officials of both countries who were tasked to monitor the "area in

dispute" (a semi-circular area stretching roughly 150 kilometres to Cuvelai at its furthest point from the border with SWA). In terms of the agreement, South Africa would withdraw from the area in stages, the Cubans would remain north of Cuvelai, and the Angolans would ensure that SWAPO did not operate in the area. A joint South African–Angolan force would monitor the area to ensure compliance.[623] SWAPO however continued to move through the area and into SWA. By mid-1984, South Africa was faced with the same situation as in previous years regarding the insurgency.

One of the unforeseen outcomes of Askari and the SADF attacks on FAPLA wherever they were protecting SWAPO, was to put pressure on the Angolans to acquire an air defence system, which – at the time – was only second in terms of sophistication to those in the Warsaw Pact countries.[624] At this point, the conflict experienced a significant shift, which saw the SADF engage more frequently with FAPLA rather than with SWAPO.

What had begun as a low-intensity, bush conflict focusing on counter-insurgency, would escalate over the next four years until it ended in 1988, into high intensity, internationalised undeclared conventional war between the SADF and UNITA on the one hand, and FAPLA, SWAPO, the Cubans and the Soviets and other East Bloc advisors on the other.[625] South Africa was now fighting on two fronts – the initial front in Ovamboland and the Angolan 5th Military Region to the north, as well as the 6th Military Region, north of Rundu.[626]

Because of the great distances, the lack of significant infrastructure development and terrain (especially in northern SWA), air power had a key role to play in counter-insurgency operations (e.g. transport, reconnaissance, troop movements by helicopter, casualty evacuation as well as airborne command posts and radio relays). As the "air umbrella" in neighbouring countries was strengthened, this had an effect on the conventional SADF operations as well. It provided the insurgents with safe bases from which to operate, and posed significant challenges for the SADF to avoid the possibility of serious losses during long-distance offensive air raids against deep targets.[627]

During the period of the JMC, the intensity of the SADF operations was significantly decreased. This removed the need to deploy the Canberra, Buccaneer, and Mirage F1 squadrons constantly. Lord however indicates that the introduction of the SA-8 mobile ground-to-air missile batteries and the suspected presence of SA-6 missile systems changed the combat scenario, affecting the SAAF flying tactics and attack profiles.[628] The break, however, did allow the pilots to undertake training to counter the new threats.

After Askari in 1983–1984, most SAAF cargo and casualty evacuation (CASEVAC) flights were done at night to avoid patrolling MiGs. Lord notes:

> All these flights, carried out under extreme operational pressure, were successful because they occurred in the all-important "gap" which existed in the enemy radar chain. It is my belief that plugging this hole with a suitable early-warning radar system was more important to the enemy triumvirate than capturing Savimbi's HQ [headquarters] at Jamba.[629]

The "gap" to which Lord refers was that between the radar in Livingstone in Zambia and Cuito Cuanavale in south-eastern Angola The SAAF exploited this intelligence to fly behind enemy lines in Angola.

Air defence build-up in Angola

In 1985, during Operation Second Congress (Operation Congresso II) – the Angolan offensive against UNITA with the aim of seizing Mavinga – only Menongue and Cuito Cuanavale were suitable airfields for sustained air operations in the 6th Military Region.[630] Occupation of Mavinga could have enabled the installation of radar and missile systems to close this gap. The base at Menongue operated jet fighters and helicopters, while Cuito Cuanavale only operated helicopters. As combined SADF–UNITA operations against FAPLA intensified, these were withdrawn to Menongue. The helicopters comprised four Mi-25s, two Mi-8s, four Mi-17s as well as several Alouette IIIs.[631] In this operation, helicopters were crucial to resupply Angolan troops because of UNITA attacks against the road convoys. Mi-25 gunships escorted the transport helicopters, which would fly in a line between 3 000 and 6 000 feet above ground level – probably believing the most serious threat came from rocket-propelled grenades and small arms fire as well as Stinger missiles. The Reagan administration provided UNITA with Stingers between 1986 and 1989.[632]

The SAAF Canberra, Buccaneer, Mirage and Impala aircraft (in conjunction with SADF artillery) conducted bombardment of the FAPLA brigade convoys. Impala Mk IIs also attacked some helicopter flights. The Lockheed C-130 Hercules transport aircraft undertook resupply flights to UNITA and SA forces. Lord notes:

> We assessed that, in general, the standard of enemy flying was poor. Their navigation abilities were extremely weak and it was noted they always used physical features such as river lines and roads to enable them to reach their destinations … Radio discipline and procedures were poor.[633]

This made it easy for the SAAF to predict and anticipate their moves as the terrain presented very few distinct physical features, and infrastructure, such as roads, was very limited. But this would change with the arrival of Cuban and Soviet pilots.

The Angolans also learned the lessons of a lack of suitable air defence systems (which allowed the SAAF freedom of movement over FAPLA brigades) and passive air defence measures (vehicles not dug in were exposed to shrapnel). Lord says, '[t]his was a pattern of the war. Every time we beat the opposition and captured tons of equipment, they came back for more, better equipped and better trained.'[634]

The SAAF had first-hand experience of the SA-2 and SA-3 SAM systems during air strikes on targets near Lubango. These missiles were fired from fixed sites and, provided the SADF intelligence information was accurate, the threat they posed could be avoided.[635]

For the SAAF, it was all about tactics to achieve minimum time under fire and to stay safe from the Angolan defence systems. They adopted toss-bombing (SAAF Mirages flew onto their targets at 50 meters above the ground, then rose steep and fast, while 7–8

kilometres from the target, released their bombs or "lobbing" them onto the target, then immediately returned to a height of 30 meters above ground level to fly home). They also turned to flying in formation – both combined with low-level flying and high speed), and night flying. Lord concedes that the practice of toss-bombing was the most inaccurate of delivery systems.[636] Towards the end of the conflict in Angola, the SAAF adopted the approach of 'unless a kill was guaranteed, our aircraft would not pitch-up from low level flight into enemy radar cover'.[637] This was because the arms embargo prevented the SAAF from replacing combat aircraft losses, and the risk was not acceptable at that time. The SAAF was working on equipping 5 Squadron with the new Atlas Cheetah E, which would not be operational for many months.[638]

In June 1986, SAAF photo reconnaissance confirmed the presence of Su-25 ground attack aircraft at an airfield near the Angolan coastal town of Namibe.[639] The Su-25 was a Soviet sub-sonic ground attack plane used in Afghanistan with great success in the 1980s.[640]

In the same year, SA intelligence indicated that the Angolan Air Force was trying to establish an airfield closer to the SWA border. Monitoring the very high frequency (VHF) transmissions from Angolan combat pilots confirmed that an airfield was being built at Cahama.[641] In June 1987, SAAF intelligence-gathering aircraft also confirmed the presence of SA-3s and SA-8s near Cuito Cuanavale.[642]

All this formed part of the massive build-up of Soviet weaponry, including radar, SAMs, MiG-23 fighters and Mi-25 attack helicopters at Menongue and Cuito Cuanavale. In addition, there was a significant increase in the number of Cuban troops and Soviet advisors, heralding a renewed attack on UNITA. The attack was almost identical to the one in 1985.

South Africa responded with Operation Moduler, which lasted from 22 June to 26 November 1987. This saw the start of high-intensity conventional battles between the SADF and UNITA on the one hand, and the Cubans, Soviets and FAPLA on the other.[643] It was fought along the Lomba River and between the Lomba and Chambinga rivers in south-eastern Angola.

MiGs were active over the battlefield east of Cuito Cuanavale but, because of the distances, South African aircraft based at Rundu in northern SWA only arrived in the area after they had left. The radar at Cuito Cuanavale and Menongue had coverage from the ground upwards, while the SAAF, because of the limits of the radar horizons, could only cover the combat area above 24 000 feet.

In September 1987, two SAAF Mirages engaged two MiG 23s; however, both Matra 550 missiles fired against one of the MiGs detonated early. In another encounter in the same month, Mirage F1CZs again encountered MiGs. This time, a Mirage was badly damaged, and the pilot, Arthur Piercy, seriously injured during a crash-landing in Rundu. Lord notes:

> This incident brought home the fact that the technological advantage now lay in the hands of our enemies. While the facts were being analysed, 3 Squadron was restricted to base defence and escort duties.[644]

The SAAF adapts

Following these encounters, tactical changes were initiated in the air combat manoeuvring programme against forward sector AAM-7 and AAM-8 missiles.[645] Lord states the SAAF had hoped to acquire the Matra Magic missile, but the international arms embargo prevented this.[646] One significant achievement during Operation Moduler was the capture of an SA-8 ground-to-air missile system.[647]

The weapons boycott had ruled out the SAAF acquiring the Matra Magic missile; therefore aspects of the fighting doctrine had to change. Lord notes:

> Commandant Mossie Basson, a former 1 Squadron pilot … gathered information relating to performance of the AAM-7 and AAM-8 missiles. He brought in tactical changes to our fighting doctrine, explaining why and when to cut afterburner to reduce the infrared signature of our aircraft.[648]

Although the anti-aircraft artillery of the SADF did not feature extensively during the final phase of the Border War, it is interesting to note the success of the Cactus surface-to-air missile system. This system was developed from the French Crotale system to suit an South African requirement. The Cactus is credited with damaging one MiG – possibly a MiG-23 – and appears to have been an effective deterrent to Angolan and Cuban pilots.[649] Heitman notes that, following this, no MiGs flew near that area on the battlefield.[650]

The success of Operation Moduler in stopping the FAPLA advance on Mavinga and forcing the Angolans to begin retreating to Cuito Cuanavale, was followed by Operation

Hooper from 27 November 1987 to 13 March 1988. Hooper had the aim of destroying FAPLA forces east of the Cuito River by the end of 1987. This operation posed significant challenges for the SAAF. Whereas the fighting on the Lomba River during Operation Moduler had been almost equidistant between Rundu and Menongue (ensuring similar limitation in terms of fuel and radar for both SAAF and Angolan Air Force pilots), over the Chambinga high ground immediately east of Cuito Cuanavale, the conditions were in favour of the Angolans. MiGs from Menongue could reach the battlefield in 11 minutes while the Mirage F1AZ from Rundu took 45 minutes. Underwing fuel tanks and ordnance also affected SAAF performance, and the Angolan radar from Cuito Cuanavale had good coverage of the area.[651]

Lord notes, '[t]he severe fuel limitations did not allow attacks to be made from different directions; thus, making attack profiles predictable and, therefore, easier for the enemy to defend.'[652] Air refuelling of planes with heavy bomb loads was also problematic, as the pilots did not have much practice.[653] Because the aims of Operation Hooper were not achieved by December, the operation was extended to March 1988.

The proximity of Menongue to the battlefield meant MiGs became regular features over the battlefield. This resulted in two quick dogfights between MiGs and Mirage F1s on 25 February 1988. In the subsequent SAAF debriefing when the intercepts were analysed, it was indicated that the MiG pilots had picked up the SAAF Mirages visually from above.

Lord suggests this was because the yellow in their camouflage scheme was too light. This was subsequently changed to a darker brown. It was also during this time that two pilots from 3 Squadron visited the Kentron missile factory to give input on the performance of the V3B Kukri missile in dogfights with MiGs.[654]

The vital modifications to the F1 aircraft however only became reality in late 1988. These included compact radar-warning receivers as well as chaff and flare dispensers. Matra 550 missiles with modified fuses to prevent premature detonation in exhaust plumes were supplied by Kentron. In October 1988, the SAAF received 50 much-needed third-generation Snake missiles with head-on capability.[655]

The fighting around Cuito Cuanavale had reached a stalemate. At this point – the first and only time during the Border War, according to Lord – the Angolans controlled the air.[656] This however did not mean the SAAF was without advantages. It continued to make good use of its better pilot training, meticulous planning and exploiting the weaknesses of the Angolans (such as not operating well in the dark) to enable the SAAF to operate favourably and reduce the threats against them. In an attack on Angolan convoys in February 1988 on the Menongue–Cuito Cuanavale road, a Mirage F1AZ was shot down by a surface-to-air missile (NATO reporting name "SA-13 Gopher").[657]

According to Lord, '[t]he F1AZs were configured for ground attack sorties with large fuel tanks and bomb pylons giving a high-drag index. This made the Mirages inferior to the MiG-23s armed with forward-sector air-to-air missiles.'[658] Former SAAF Mirage F1 pilot, Cobus Toerien, confirmed this, saying that, because the MiGs had head-on capability, the SAAF had to get something better. This resulted in the Cheetah C multi-role aircraft, which had state-of-the-art radar in the extended nose, in-flight refuelling capabilities, as well as a very small radar cross-section.[659] The aircraft was however only in service from 1993 onward.

Also in February 1988, two SAAF sorties were intercepted by MiG-23s. In one of these, the MiGs broke away, and in the second, a Cuban MiG-23 formation also accelerated out of range.[660]

In March 1988, Operation Hooper (which had not achieved its aims) was replaced by Operation Packer, which had similar objectives. These were to destroy FAPLA east of Cuito Cuanavale or to drive them off the east bank of the Cuito River by 20 March. This was also not achieved, and the operation was extended to 12 May 1988. On 23 March, the last SAAF sortie of the bush war was flown.[661]

Lord summarises the SAAF's final conventional battles as follows:

> SAAF pilots had contended with the full spectrum of Soviet air-defence missile systems which included SA-2, -3, -6, -7, -8, -9, -11, -13, -14 and 16. They reported sighting 112 missiles fired at them, flew 794 strike sorties and dropped nearly 4 000 bombs.[662]

In contrast, Lord says the Angolans flew about 1 200 sorties during the seven-month period.[663] Casualty figures for the SAAF were four killed and seven wounded.[664] The SAAF also used the H2 460 kg pre-fragmented, folding-wing glide bomb, which had a guidance system as well as pre-fragmented bombs with air-burst fuses, which replaced rockets.

Conclusion

As the international political climate changed in the late 1980s, which enabled a political settlement to be reached among all parties, South African forces withdrew from Angola by 27 August 1988. This was amid peace negotiations under United Nations Charter 435.

In retrospect, as the Angolan armed forces (as well as the Cubans and the military wing of SWAPO) had access to some of the most modern and sophisticated missiles and anti-aircraft systems in the world at the time, this meant that the SAAF was faced with unprecedented challenges, which had to be overcome during the final phases of the Border War (operations Modular, Hooper, and Packer). Angolan, Cuban and Soviet pilots were able to operate with increasing freedom over the front lines, compared to the SAAF, and they did not have the same constraints about replacing losses or accessing new aircraft. This did not mean the SAAF was completely ineffective – they were still able to provide replenishment, conduct bombing missions, evacuate casualties, perform intelligence and surveillance operations, and to move troops as well as a degree of close air support.

The establishment of an extensive air umbrella – through the operational use of modern Soviet anti-aircraft artillery and ground-to-air missile systems – in Angola, forced the SAAF to revise its tactics drastically.

The revised tactics of the SAAF to deal with the extensive Angolan air defence umbrella saw the introduction of toss-bombing, making greater use of precision-guided munitions, additional investment in research into missiles, and new technology for their aircraft as well as unmanned aerial vehicles, like the Seeker (forcing the Angolans to use up missiles that would otherwise have been fired against SAAF aircraft). This also underlined to the SADF that it would have to give priority attention to its air defence systems (aircraft, radar, and artillery) to enable it to neutralise the growing air defence threat in Angola.

The SAAF had to use their limited resources wisely because of sanctions and the fact that they were facing a superpower (the Soviet Union) with all its resources. Equipment, such as the Cheetah C multi-role fighter, the Rooivalk attack helicopter, the Oryx medium helicopter, and the V3C and V4 air-to-air missiles only came into service after the fighting was over.

Responses by the SAAF and the SADF have also been studied fairly extensively by international militaries (the US Marine Corps and the Australian Defence Force) to evaluate the success of a careful balancing of troop strength and firepower as well as logistic requirements over long distances, and the role of air support in successful mobile conventional and unconventional warfare. This proves that small but extremely mobile combat formations can be effective and survivable.

Endnotes

[551] Janet Szabo is an award-winning journalist with more than 20 years' experience, which includes editing radio copy and covering African and South African military and defence affairs for the South African Broadcasting Corporation (SABC). After earning a master's degree in Air Power in the Modern World from King's College in London in 2017, she also contributes articles to local and international publications on the South African Border War in Angola and South African military campaigns in German East and South West Africa during the First World War.

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