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SUBJECT: Soviet Military Options for Neutralizing South African Air Power in Angola

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Central Intelligence Agency



Washington, D.C. 20505

DIRECTORATE OF INTELLIGENCE

2 May 1986

Soviet Military Options for Neutralizing South African Air Power in Angola

Summary

Luanda's Soviet-supported offensive against UNITA in 1985 was stopped short of a key objective last fall by South African air strikes. In helping to plan the next offensive, which could begin as early as this spring, Soviet advisors in Angola are probably looking for ways to prevent the South African Air Force from repeating its successful intervention. Their best option is probably a defensive one--increasing the effectiveness with which Angolans and Cubans use the large amount of air defense equipment already in Angola, especially mobile surface-to-air missiles and jet interceptors. The Soviet advisors also, however, have available an offensive option--airstrikes against the South African airfields in northern Namibia from which last fall's attacks were launched. From a military point of view, such airstrikes appear feasible and might inflict significant damage. Even disregarding political considerations, however, they also have serious military drawbacks, such as transitory results and a high likelihood of South African reprisals. [redacted]

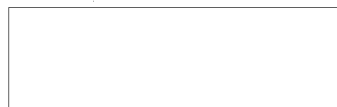
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*This memorandum was prepared by [redacted] the Third World Activities Division, Office of Soviet Analysis. Comments and queries can be directed to the Chief, Third World Activities Division, [redacted]

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1. Angolan government operations thus far have occurred only inside Angola's borders (although Angola allows its territory to serve as a base for SWAPO guerrilla operations in Namibia). [redacted] the Soviets avoid directly involving their own personnel in these combat operations except under unusual circumstances. In light of last fall's South African airstrikes, however, we can not rule out the possibility that the Angolans and their Soviet advisors will decide they need to break one or both of these precedents to neutralize South African air power during future Angolan offensives. This analysis examines the military options available under such a scenario, but does not address their political ramifications or the likelihood that they will be adopted.* [redacted]

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South African Air Strikes

2. In September and October 1985, South Africa deployed combat aircraft to four airfields near the Angolan border: Ondangwa, Rundu, Grootfontein, and (in the Caprivi strip) Mpacha (see Figure 1). In mid-September, five Canberras, four Buccaneers, and ten Mirage F-1s were observed at Grootfontein, six possible Mirage F-1s at Ondangwa, and 8 Impalas at Rundu.** Sometime before 1 October the Mirages at Ondangwa apparently moved to Rundu, closer to the scene of combat, and the number of Impalas there increased to fourteen. The move to Rundu effectively halved the distance between the South African aircraft and the forces spearheading the Angolan government offensive. [redacted]

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3. [redacted] bomb craters around a position that had been occupied by Angolan government forces advancing against the UNITA town of Mavinga. Luanda later accused Pretoria of staging four air attacks in support of UNITA. Although the South Africans have consistently denied any involvement, evidence of air bombing indicates that they launched a strike within a few days of the arrival of their aircraft in Namibia and one or more around 1 October. The Angolan offensive stalled at the time of the first strike and Angolan forces retreated at the time of the later ones. [redacted]

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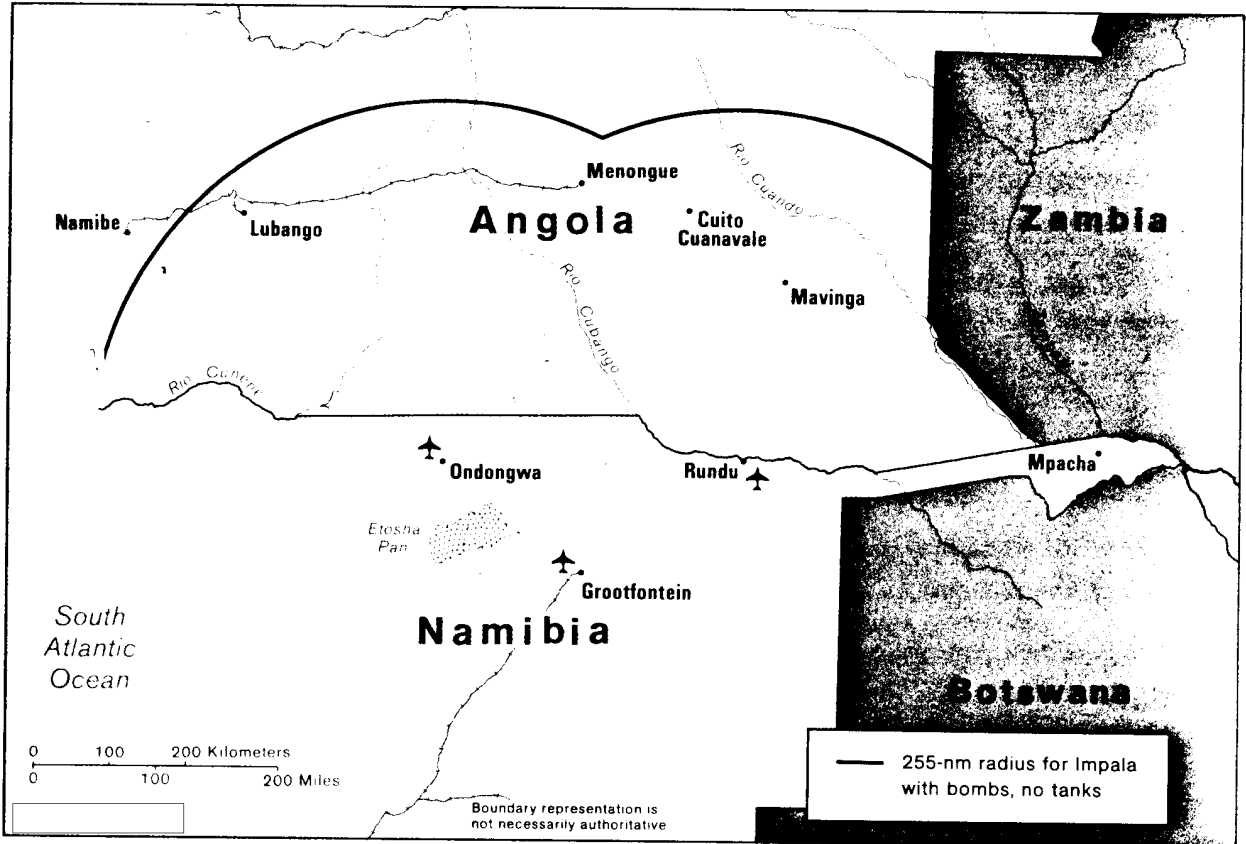
4. During this operation, the four South African airfields were vulnerable to attack. There were no early-warning radar networks nor long-range SAM systems protecting them. In addition, aircraft were not dispersed or maintained on strip

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**Appendix A describes South African fighter aircraft and air defense capabilities.

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Ranges From Selected South African Airfields in Namibia



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[redacted]

alert; the Mirages seen at Rundu were parked wingtip to wingtip well away from the runway. Other than the fighter aircraft, air defenses consisted of only seven field-deployed Tigercat SAM launchers and a single 70-mile range Ames radar installation at Ondangwa. Revetments at several fields were designed primarily for protection against insurgent raids. [redacted]

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Angolan Response

5. Angola failed to respond to South African air incursions into its territory during last fall's offensive. In September, after the first attack, Luanda moved MIG-23 Floggers forward to Menongue--the field closest to the battle zone.* Angola did not, so far as we know, scramble interceptors against South African aircraft and did not even maintain them on strip alert. It also did not move its mobile SAMs to provide air defenses for troops in the field. The troops were an easy target--they only had limited air defenses consisting of small arms and, perhaps, optically-controlled anti-aircraft guns.

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Future Military Options

6. [redacted] Soviet advisors have taken a more direct role in planning and directing Angolan combat operations since a series of government reverses in 1982, 1983 and 1984.** This involvement probably was a contributing factor in the government's improved performance during the 1985 offensive. The Soviet Military Assistance Group (MAG) in Luanda is probably now deeply involved in planning the next offensive, and one of its highest priorities is likely to be finding ways to prevent a repeat of South Africa's successful airstrikes of last fall. [redacted]

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Improved Air Defenses

7. One option for Soviet planners is to improve Angolan and Cuban performance in a type of warfare for which they are already organized and equipped--air defense. Soviet advisors need look no further than Soviet operational doctrine to find techniques that could appreciably improve Angolan air defenses. Moscow has detailed procedures for maintaining aircraft on ready alert and scrambling them against unidentified or hostile radar contacts. The Soviets also have well-developed tactics for using mobile SAMs like the SA-9 and SA-13 to cover troops advancing in the field. Advances in these areas should be supplemented by progress in command and control in general, control of

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*Appendix B describes Angolan fighter aircraft and air defense capabilities.

**Appendix C describes past Soviet involvement in combat in Angola.

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interceptors from the ground, and logistics. These are areas in which the Soviets could play a direct coordinating role until local forces implement the appropriate techniques. [REDACTED]

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8. Relatively little new equipment would be necessary to improve air defenses. Angola already has more than enough fighter aircraft and SAMs to mount substantial air defenses. Its major equipment deficiency is the lack of radar coverage over UNITA's strong points in the southeast corner of Angola and the South African airfields in northern Namibia. Moscow could provide high-altitude coverage over both areas from existing defended locations by supplying the long-range Tall King radar. [REDACTED]

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9. Soviet emphasis on a more aggressive style of air defense operations could pay substantial dividends. An aggressively and competently piloted Flogger or Fishbed could be competitive with a South African Mirage, particularly if within range of friendly air controllers, although the South Africans might still have an advantage in both personnel and equipment. SAMs accompanying troop columns could eliminate the type of easy target the South Africans struck last fall. Shifting the location of mobile SAMs around fixed targets would increase even further the chance of South African losses. Thus far, the South Africans have been extremely reluctant to take on defended targets. South Africa might not be deterred altogether from attacking, but its attacks might be conducted in a more conservative--and less effective manner. [REDACTED]

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Soviet Participation

10. If Soviet planners decide to concentrate on improving Angolan air defenses, they could probably achieve significant results while remaining within current limits on their participation in combat. Most of the necessary improvements involve training and supervision, not actual combat. Soviet advisors, for instance, could further instill in Cuban and Angolan crews the need for better alert procedures for interceptors and increase pressure on higher Angolan authorities to launch the aircraft against unidentified or hostile targets. Soviet personnel themselves could assume air control functions, directing the interceptors to their targets. Likewise, if they are not already doing so, Soviet MAG personnel could increase training of Cuban and Angolan air defense troops in Soviet procedures for the use of mobile SAMs, particularly SA-9s and SA-13s, for covering troops in the field. Finally, as in the past, the MAG could arrange for the supply of additional equipment, notably Tall King radars. Under this option, there appears to be no imperative need for Soviet pilots to take to the air or for Soviet advisors to accompany missile batteries in the field. [REDACTED]

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[REDACTED]

Air Strikes in Namibia

11. Soviet MAG planners could also break precedent and go on the offensive against South African airpower, although so far we have no evidence that they are contemplating such a plan. An offensive air strike probably would take the form of an attack on South African airfields in Namibia--particularly Ondangwa and Rundu, the apparent staging points for last fall's strikes. The strikes could be aimed at damaging the unoccupied airfields themselves or could be carried out against South African aircraft after they have moved forward to the airfields. [REDACTED]

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At Unoccupied Airfields

12. Attacks against the airfields would focus on cutting runways, with a secondary objective of destroying buildings, support equipment, and supplies. Dropping a pattern of bombs on a runway from a fast-moving fighter, however, is a difficult task even for a well-trained pilot with precision fire-control equipment. Angolan pilots (probably in Fishbeds) who attacked the Mavinga airstrip during the offensive last fall missed the runway altogether, and even the fire control in the Angolan Fitters is not precise enough to eliminate the need for a high level of pilot proficiency. In addition, interdiction of these fields for more than a few days would require repeated strikes, since even a local highway department has the capability to patch a damaged asphalt runway like those in Namibia in a day or two. [REDACTED]

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13. Opposition to the initial strike against unoccupied airfields would be light--probably just minimal ground artillery fire in the near term, although mounds now under construction at Rundu may be for air defense equipment. During later strikes, the South Africans probably would be able to build up their defenses quickly with fighter aircraft and field-deployed SAM systems. [REDACTED]

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At Occupied Airfields

14. Attacks against South African aircraft after they have moved forward to Namibian airfields pose a different set of problems. If the South Africans do not disperse their aircraft--as they failed to do at Rundu last October--the aircraft could be relatively easy to destroy. Weapons such as cluster bombs and even aircraft cannons could be used, and secondary explosions from fuel and ordnance could be expected after a few hits. Even if the South Africans did not deploy air defense equipment, however, the risk of opposition would be greater than in the case of a strike against unoccupied airfields, since failure to achieve surprise would permit the South Africans to get some Mirage fighter aircraft into the air. Timely intelligence also would be a problem, because the South Africans appear to limit

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the presence of all but a handful of their aircraft at the northern Namibian fields to as short a period as possible.

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15. Angola has the aircraft to carry out strikes on at least Ondangwa and Rundu, although operational considerations might restrict the composition of the strike force. Political considerations aside, aircraft range would be the principal problem. Our calculations indicate that Soviet planners would expect a Fishbed to be able to conduct a mission out to around 250 nautical miles with two fuel tanks and two bombs. These calculations are based on a Western standard (Mil-C) which appears to approximate Soviet standards. Calculations for various aircraft models under various conditions lead to the following conclusions:

- Against targets within 250 nautical miles of Angolan bases (including Ondangwa and Rundu but not Grootfontein or Mpacha), a strike force could include Fishbeds with two drop tanks and a light load of bombs or missiles, Floggers with one drop tank and a full armament of air-to-air missiles, and Fitters with two medium-sized drop tanks and a relatively heavy bomb load of 6-500kg bombs. The mission profile involves a high-altitude approach to the target, five minutes of low-altitude combat, and a high-altitude return to base.
- Against more distant targets out to 350 nautical miles with a similar mission profile, planners could use Floggers with three drop tanks and a full AAM load, and Fitters with two large drop tanks and a light bomb load. The target would be outside Fishbed range.
- A requirement to approach the target at low altitude to avoid air surveillance would substantially reduce the feasible strike ranges. Our calculations indicate that a low-low-high mission could be flown out to 250 miles by the same aircraft that could fly a 350-mile high-low-high mission. Fishbeds could not be used, and Grootfontein and Mpacha would be out of range under these conditions.

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16. Figure 2 shows 250-mile and 350-mile range arcs from the three airfields in southern Angola from which fighters have operated--Namibe, Lubango, and Menongue. Arcs are also shown for a fourth airfield, Cuito Cuanavale, which is currently being improved and could be operational as a fighter base in time for the forthcoming offensive.

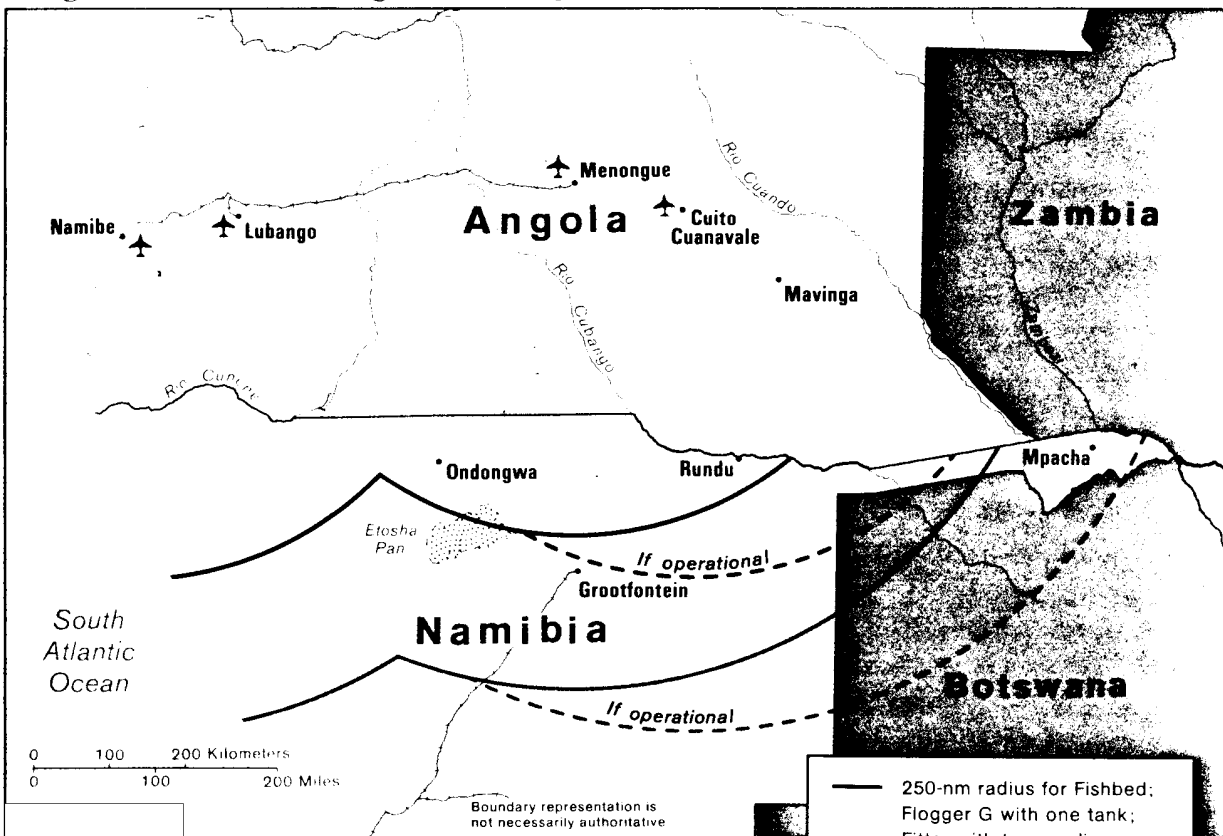
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17. Angola currently does not have radar surveillance or ground-controlled intercept capabilities over the potential targets--target selection and air combat would have to be carried out exclusively by pilots in the strike force. Angolan forces, however, have or could probably get the remaining equipment that

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Ranges From Selected Angolan Military Airfields



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- 250-nm radius for Fisherbed; Flogger G with one tank; Fitter with two medium tanks, heavy bombs loaded
- - - 350-nm radius for Flogger G with three tanks; Fitter with two big tanks, light bomb load

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they would need to mount a strike. Even if Fishbeds could not be used, the Fitters and Floggers already in the Angolan inventory would be enough to mount strong simultaneous attacks on at least two targets. Soviet planners could arrange for the necessary stockpiles of expendable stores, including bombs and drop tanks. A decision to mount a series of strikes would require larger stocks of expendable stores, more maintenance support at advanced fields such as Menongue, and probably some additional aircraft, particularly Fitters. The Soviets should be able to provide the timely intelligence that would be required.

Soviet Participation

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18. Soviet officers might conclude that, if Angola were to undertake strikes on Namibian airfields, direct Soviet participation in combat would be required. The reasons for this conclusion, and the type of intervention required, would vary depending on the nature of the target.

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19. If the objective of the mission were to attack airport runways and facilities, the Soviets might choose to fly most of the strike aircraft--or at least the Fitters--themselves. They might feel that only Soviet pilots could be depended on to hit the runways, and they might also feel that the absence of South African aircraft would make the risk of losses acceptably low. The presence of Soviets in any attacking aircraft, in turn, probably would cause the Soviets to want to have their own pilots in the covering interceptors as well. If repeated strikes were to be carried out, the Soviets might plan to turn over more combat duties to Cubans and Angolans as they learned lessons from the initial strikes. The Soviets probably also would want to reduce their exposure to the risk of losses, which could be expected to increase on subsequent strikes.

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20. For an attack on airfields occupied by South African aircraft, the Soviets might feel that Cuban or even Angolan pilots could wreak havoc on a row of parked aircraft, making it unnecessary for Soviet pilots to incur the risk of finding the South Africans in the air. In this case, they probably would also entrust air cover missions to Cuban or Angolan pilots, particularly if ground-controlled-intercept radar coverage had been extended over the target fields. In either scenario, however, the Soviets might feel that a Soviet pilot should lead the formation to the target, since the strike would have to transit a substantial distance without help from external navigation aids.

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Implications

21. The military payoffs of increasing the effectiveness of Angolan air defenses appear to be all positive. Little would be lost (except probably some equipment) by increasing Cuban and

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Angolan exploitation of the mobility of their mobile SAM systems. More aggressive efforts to intercept South African aircraft over Angolan territory might lead to some embarrassing losses, but the lost aircraft would be easily replaced and the engagements might cause the South Africans to be more cautious in future air support of UNITA. Another risky move might be the extension of radar coverage over South African territory by providing Angola Tall King radars or by moving Bar Lock radars farther south. The South Africans in 1981 made clear their objections to radar coverage over Namibia by destroying the two southernmost Angolan Bar Lock installations, and attacks on such radar sites could be anticipated. Despite the chances of increased hostilities under this option, the Soviets would probably be able to avoid exposing their own personnel any more than they do currently.

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22. The payoffs from strikes against South African bases in Namibia are more problematic. The effects of a single strike against unoccupied runways are probably too transitory to be worth the effort, and repeated strikes could prove too costly, both in terms of logistics and probable losses.

23. A strike which destroyed some South African Mirages on the ground might have more lasting effects--both negative and positive. At least in the short term, it would probably produce an escalation of the conflict. South Africa would probably be quick to retaliate--and therefore plans for Angolan air strikes in Namibia probably would be preceded by enhanced air and ground defenses around high-value targets in southern Angola as well as precautions against other types of reprisals. Assuming that South African retaliation did not destroy Angolan air power, however, a successful Angolan strike might also cause the South Africans to be more cautious in future air support of UNITA. They might deploy fewer aircraft to Namibia at a time, further limit their presence at the advanced fields, and attack only when the need was overwhelming. Coupled with improved air defenses within Angola, the result might be a decrease in the South African air threat over Angola. Although the Soviets, Cubans and Angolans would have to be concerned about pilot losses in a continuing air conflict, any losses of South African Mirage aircraft would be irreplaceable in today's international political environment.

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APPENDIX A

South African Fighter Aircraft
and Air Defense Capabilities

The South African Air Force is the most powerful air force in Africa south of the Sahara. It combines a high level of pilot proficiency with a substantial inventory of combat aircraft. The South African air order of battle, summarized in Table 1, features some 240 domestically-produced Impala light attack aircraft, less than 100 French-built Mirage III and Mirage F-1 fighters, and a handful of longer-range Buccaneer and Canberra strike aircraft. Although some of these aircraft were initially produced in the early 1960s or before, all are competitive with, if not superior to, their Soviet-supplied Angolan counterparts. [redacted]

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The main constraint on South African air force equipment is the arms embargo which cuts South Africa off from foreign suppliers. Pretoria could replace lost light attack aircraft and even increase this part of its force thanks to its domestic production of the Impala, but it has no comparable source of high-performance fighters. Although some second-hand aircraft might become available on the world market, the South African air force must assume that any Mirage downed in combat is lost for years, if not forever. As a result, South Africa is likely to be particularly risk-averse in its employment of these aircraft. During the fall 1985 offensive it concentrated on undefended targets, such as troops in the field, even though strikes on defended targets, notably supply and air facilities at Menongue, might have been even more decisive.

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Another constraint on the South African air force is that its forces are based in eastern South Africa, far from Angola (see Figure 3). The long-range Buccaneers and Canberras and some of the Mirages are stationed at Waterkloof airbase near Pretoria, while the remaining Mirages are at Hoedspruit airbase near the Mozambique border. The permanent presence of combat aircraft in northern Namibia is limited to eight or ten Impalas, and any substantial strike force must be forward-deployed from distant home bases. [redacted]

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South Africa's remaining air defense assets are less impressive than its aircraft. South Africa has two SAM systems--the Tigercat and the Cactus--but both are relatively short-range systems and also are in relatively short supply. Replacement of launchers and even missiles may be difficult--the Tigercats are surplus Jordanian equipment purchased in 1976, and Cactus (an early variant of the French Crotale) was domestically produced but may be out of production. The South African air early warning radar network is concentrated in the southern and eastern parts of South Africa and does not cover the portion of Namibia adjacent to Angola. [redacted]

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Table I

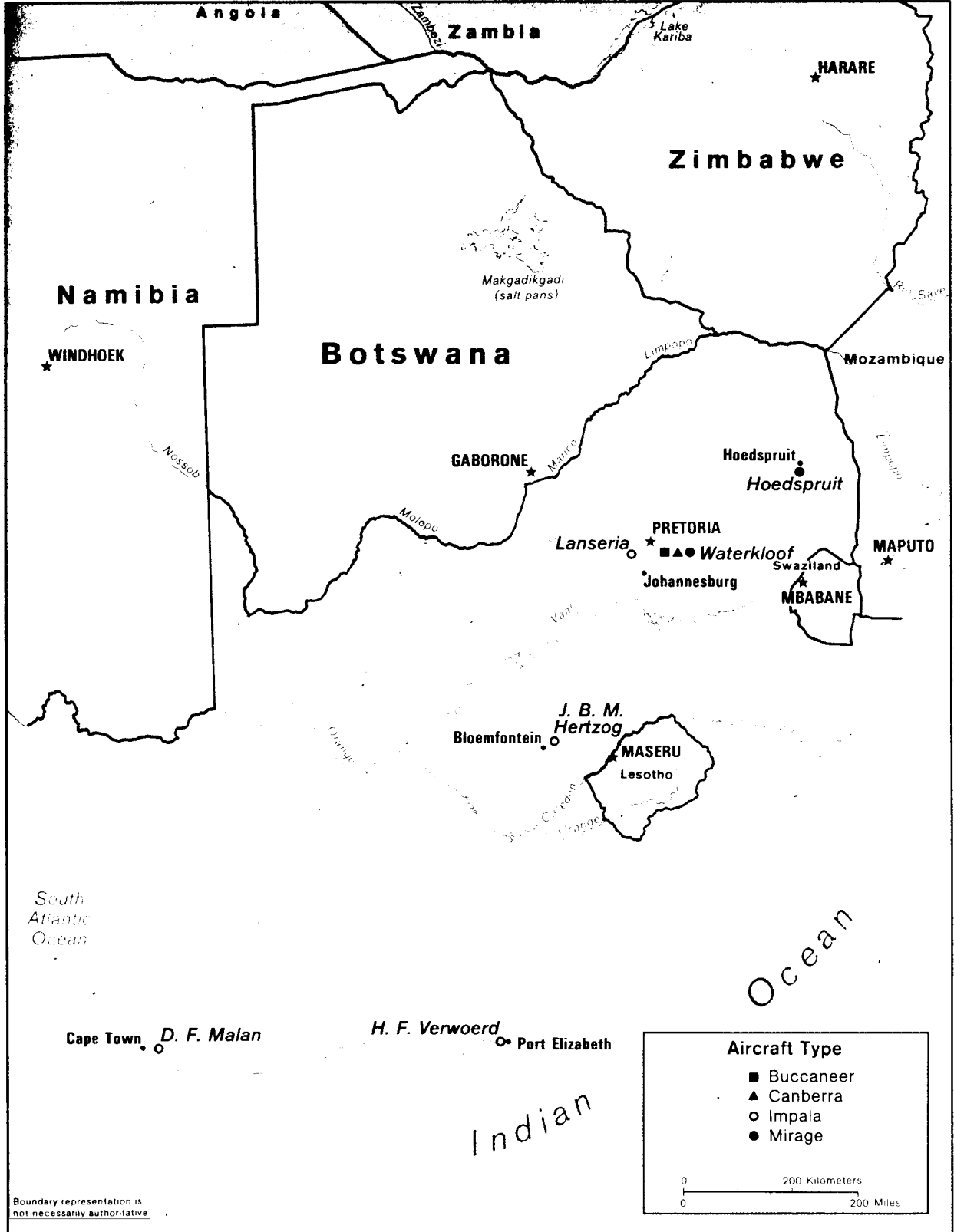
South African Air OOB

Aircraft	Initial IOC	OOB
Attack		
Impala	1962	240
Mirage F-1A	1974	31
Buccaneer	1962	5
Canberra	1951	6
Fighter		
Mirage F-1C	1974	13
Mirage III	1961	56*
Air Defenses		
SAM: Tigercat (36 launchers), Cactus (24 launchers)		
EW Radar: Network in RSA, not in Namibia.		

*About 30 of these aircraft are trainer versions, although they have a combat capability.

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Selected South African Home Airfields



Boundary representation is not necessarily authoritative

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APPENDIX B

Angolan Fighter Aircraft and Air Defense Capabilities

Angola's air force and air defense equipment, summarized in Table 2, is entirely of Soviet origin. The bulk of the air force consists of around 80 late-model MIG-21s (Fishbed Js and Ls). The Fishbed has good speed and maneuverability, but lacks the range for long-range strike operations and does not have electronics and missiles comparable to those in modern interceptors. In 1984 the Soviets began supplying aircraft which provide these capabilities--the SU-22 Fitter J ground-attack aircraft and the MIG-23 Flogger G interceptor. The number of these in Angola, however, is still relatively low--around 25 Floggers and only 9 Fitters. [REDACTED]

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Angola has probably received every SAM model which the Soviets have exported to the Third World except the SA-5. Much of Angola's large SAM inventory is concentrated in the south along the Namibe-Menongue railroad (see Figure 4). They do not form a complete barrier, due to Angola's size, but provide defenses for most key locations. For example, South African attacks on the two largest airfields in the area, Namibe and Lubango, would have to evade SA-6 sites south of the rail line and then penetrate defenses by multiple SAM systems, including the long-range SA-2, around the airfields. The other main airfield in the area, Menongue, is defended by SA-3s, SA-8s, and SA-9s. [REDACTED]

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The Angolan SAMs are supported by a radar network which provides high-altitude coverage of most of the country (see Figure 5). The network employs Bar Lock, Flat Face, and Spoon Rest surveillance radars and Odd Pair and Side Net height finders. The radar network also gives Angola the capability to control its interceptor aircraft from the ground--the principal Soviet technique for using fighters in an air-defense role. Notably absent is the newer and longer-range Tall King surveillance radar which, if positioned at current radar sites, could extend Angolan high-altitude early warning and ground-controlled intercept capabilities over the South African airfields in northern Namibia. [REDACTED]

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Table 2

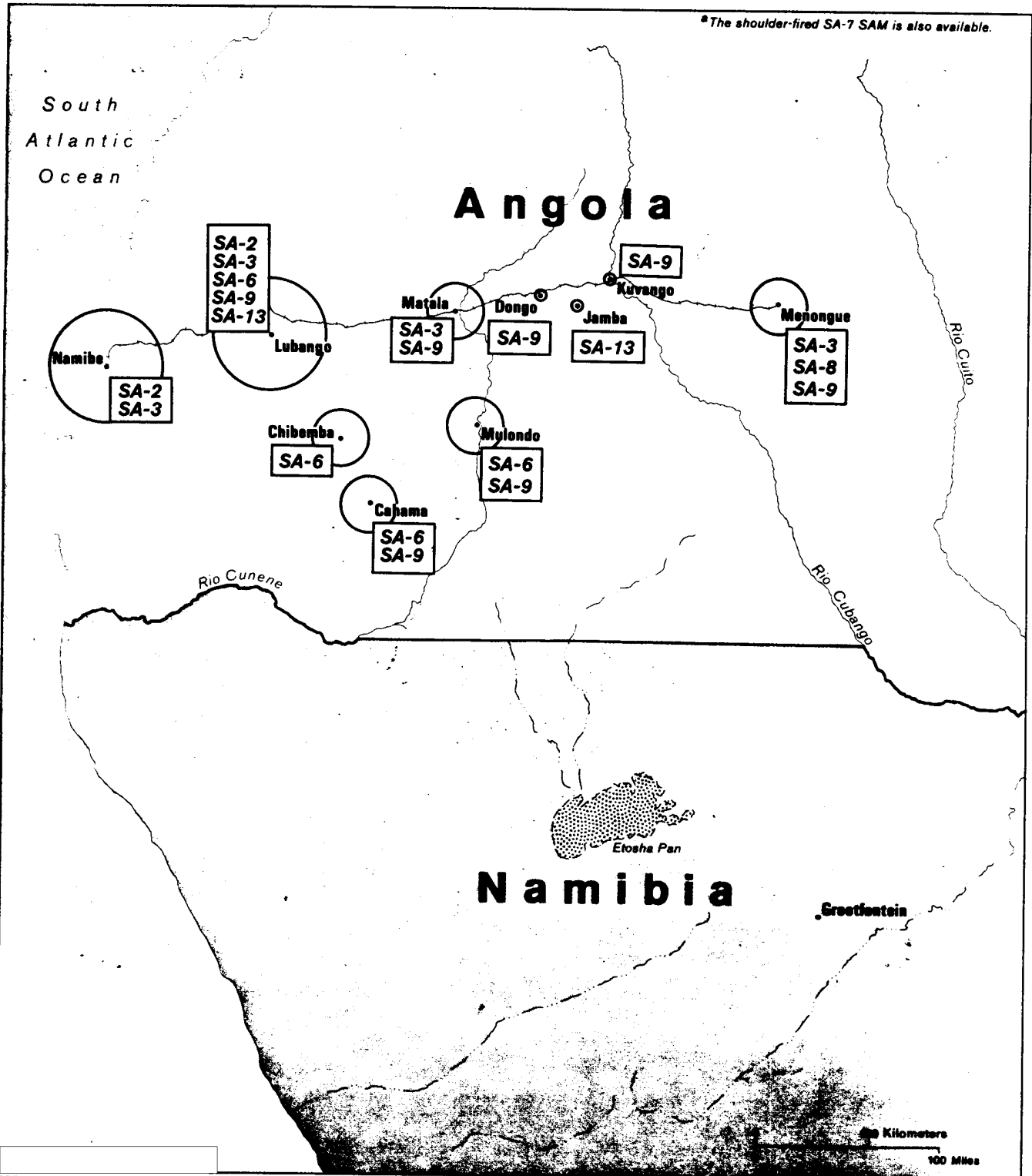
Angolan Air OOB

Aircraft	Initial IOC	OOB
Attack		
Fitter J	1979	9
Fighter		
Flogger G and C	1978	25
Fishbed J/L	1968/72	80*
Air Defenses		
SAM: Fixed:	SA-2, 3	
SAM: Mobile:	SA-6, 8, 9, 13	
Radar:	Network inside Angola	

* Over 100 have been delivered, but substantially fewer have been observed in service.

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Surface-to-Air Missile Sites^a



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APPENDIX C



Past Soviet Involvement in Combat in Angola

Soviet involvement in military operations in Angola has increased over the years, and appears to have reached a new high during the 1985 offensive. We estimate that the Soviet MAG was deeply involved in planning the offensive and arranging for its logistic support. High MAG officials undoubtedly monitored the progress of the offensive, and may even have helped supervise its execution. 

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Soviet officers also accompanied Angolan brigades in the field. Several probable Angolan prisoners complained that, as soon as the going got rough, the Soviets would be airlifted out by helicopter, followed soon afterwards by the Cuban advisors, leaving the Angolan troops to get out of the situation as best they could. Soviets are probably also present as advisors with air defense forces, but air defense units were not exposed to combat during the offensive. 


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 most Angolan aircraft are flown by Cuban or Angolan pilots. The Soviet MAG probably includes military pilots qualified in all the Angolan fighter models. 


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These Soviet activities indicate that limits exist on the involvement of Soviet personnel in combat. The main purpose of these limits seems to be to minimize the risk of the loss or capture of Soviets in the field. There appear to be no restrictions on Soviet involvement in headquarters functions such as planning and monitoring combat operations. Such activities are permitted, not only in Luanda, but at safe locations in the field. Actual Soviet participation in combat, even by pilots, is unlikely beyond a possible episodic occurrence. 

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It should be noted that, while the Soviets in Angola appear to avoid combat as a matter of policy, Soviet pilots have flown combat missions elsewhere in the Third World. The most recent known case occurred in Aden earlier this year, when two Soviet pilots were shot down during combat operations. 

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