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South Africa: Evading the Arms Embargo



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A Research Paper

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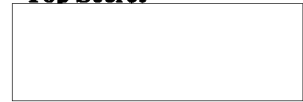


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South Africa: Evading the Arms Embargo



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A Research Paper

This paper was prepared by [redacted] Office of Global Issues, with contributions by [redacted] Office of African and Latin American Affairs, [redacted] Office of Information Resources, and [redacted] OGI. [redacted]

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Comments and queries are welcome and may be directed to the Chief, [redacted]
[redacted]

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South Africa: Evading the Arms Embargo

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Scope Note

This Research Paper describes South Africa's evasion of the international arms embargo and assesses its capability to design and produce weapons. Because the arms embargo forbids the sale of arms-related technologies to Pretoria as well as weapons, this report focuses heavily on Pretoria's methods for obtaining and applying forbidden technologies. The discussion is limited to conventional weapons, ballistic missiles, and associated technologies. Chemical and biological weapons are not treated at length in this report.

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This paper complements DI Research Paper ALA 89-10008 [Redacted] [Redacted] March 1989, *South Africa's Defense Industry: One Step Behind*, which highlighted some potential gaps in South Africa's weapons research and development programs. That paper argued that the excessive cost of producing or procuring jet engines and other critical foreign parts and technology would hamper South African efforts to build a largely indigenous advanced defense industry. Additional information about the extent of foreign assistance to Pretoria and recent developments since the publication of that paper have provided insights into South African plans to overcome these obstacles.

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South Africa: Evading the Arms Embargo [Redacted]

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Summary

Information available as of 22 January 1990 was used in this report.

South Africa mounts a large, well-organized, and well-funded effort to evade the international arms embargo. Since the mid-1960s, when it realized that an arms embargo was likely, Pretoria has made a major investment in developing an arms manufacturing capability. As a result, the South African Government will have a military-industrial complex well positioned to build advanced weapons to replace much of its current arms inventories when they reach obsolescence in the mid-1990s. [Redacted]

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South Africa emphasizes the acquisition of arms-related technology and production methods rather than buying components or finished weapons. Reporting [Redacted]

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- Through Armscor, Pretoria's state-owned arms manufacturer, and various government and university research facilities, South Africa has developed the capability to design and manufacture technically advanced weapons and subsystems.
- South Africa uses its contacts with the international scientific community to keep pace with developments in weapons-related technology and, therefore, to avoid having to duplicate research done elsewhere.
- Armscor and the South African Government have carefully developed the capability to use advanced computers to design and manufacture weapons, thus greatly increasing their production efficiency.
- Advanced production machinery and materials technologies have been imported and are widely used in the defense industry.

In addition, South Africa has trained engineers and arms workers, hired foreigners with needed skills, invested in foreign high-technology firms, and, when necessary, used espionage to obtain needed technologies.

[Redacted]

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In cases where the complexity of a project is beyond South African resources—particularly with ballistic missile and aircraft design—Pretoria has established links to foreign defense industries, mostly in Israel and France. [Redacted]

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We believe that South Africa will be in a position to produce a new generation of weapons in the 1990s. [Redacted]

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[Redacted], available information indicates that several advanced systems are already well along:

- A new fighter aircraft is being designed. The fighter appears to be a twin-engine design, is likely to be equipped with sophisticated avionics, and will incorporate advanced composite materials.
- Ballistic missiles with ranges of over 500 kilometers are likely to be produced by 1995.
- New tactical antitank, antiaircraft, and antiship missiles are being produced or developed.
- A new tank may be currently in the testing stage.

[Redacted]

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We do not know when these weapon systems are scheduled to become operational, and technical problems or funding cuts could force delays.

[Redacted]

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As these programs come to fruition, South Africa will gain substantial intelligence and force multiplier advantages over its neighbors. [Redacted]

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Airborne command and control systems, working with advanced ground weapons and combat aircraft, will further South Africa's substantial edge in combat against other forces in the region. [Redacted]

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Because South Africa has developed or acquired advanced technologies outside of international controls, it has little incentive to cooperate in international control efforts, such as the Missile Technology Control Regime, or in embargoes of other politically isolated states. Instead, South Africa may become a leading supplier of arms and technology to states such as Iran, Chile, and Taiwan as well as a partner in transnational programs to develop sensitive weapons, especially ballistic missiles.

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South Africa: Evading the Arms Embargo [Redacted]

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Success to Date

Although South Africa openly purchased sophisticated weapons until the mid-1970s, it began preparing for an international arms embargo a decade earlier.

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[Redacted] discussions of possible arms sales boycotts led Pretoria to begin increasing its weapons development and production capabilities, primarily through licensing agreements. The last major foreign arms sale to Pretoria, a \$480 million package that included the licensed assembly of French Mirage III and F1 fighters, was agreed to in 1971 and completed in 1977. Other, smaller sales, such as a 1975 agreement with Israel for patrol boats and a series of mid-1970s purchases of Italian radars, enabled Pretoria to update its arms inventory. By 1977, when the United Nations imposed a mandatory arms embargo, the South African Defense Forces (SADF) had a 10- to 15-year cushion for developing new weapons before existing stocks became obsolete. [Redacted]

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Modernizing Weapons

Pretoria has used this interim period to modernize weapon systems while awaiting a new generation of indigenously developed weapons. In particular, it has concentrated on the South African Air Force (SAAF). Armscor's Atlas Aircraft division has rebuilt aging Mirage III fighters [Redacted] and fitted canards, new wings, and new electronics into new fighters called Cheetahs. Atlas also now independently manufactures the French-designed, 1960s-vintage Atar 9K50 jet engine, first produced under license in the Mirage F1 program, [Redacted]

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[Redacted] Other divisions in Armscor have modernized the South African Army's fleet of 1950s-vintage Centurion tanks [Redacted] and upgraded the [Redacted] Navy's three French-supplied Daphne-class submarines. Although these programs have not expanded

Pretoria's inventory, they have provided a "quick fix" that has kept its equipment operational and competitive with that of other Southern African states.

[Redacted]

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Producing New Weapons

Through Armscor, South Africa has also successfully developed and fielded a small number of new, advanced weapon systems in the last several years. These systems have been designed and built entirely within South Africa, although they use foreign technologies and components. The weapons are customized for South Africa's terrain and military doctrines, which stress mobility and survivability. The G-6 self-propelled 155-mm howitzer,¹ for example, has a range of about 40 km and uses 6X6 all-wheel drive, which gives it greater mobility over South Africa's terrain with lower fuel consumption and fewer breakdowns than tracked vehicles. Similarly, the Rooikat, a light armored vehicle designed for killing tanks, combines 8X8 all-wheel drive for mobility with a low profile that makes it a difficult target to hit. As a result of the modernization and new production programs, frontline equipment in all of the military services has been manufactured, substantially modified, or entirely rebuilt within South Africa. [Redacted]

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Emerging Weapons Requirements

In our judgment, South Africa is now poised to manufacture a wider assortment of new, sophisticated weapons through the mid-1990s. South Africa's defense industries have gained sufficient experience in adapting and integrating foreign technologies with

¹ The G-6 uses the G-5 howitzer, which itself is based on a design developed by the Space Research Corporation of Canada. South Africa obtained the plans for the howitzer in 1976, unveiled a prototype in 1979, and began production in 1982. [Redacted]

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Table 1
Strength and Inventories of South African Forces,
1965-89

	1965	1975	1985	1989
Army				
Personnel	19,000	38,000	76,000	75,000
Tanks	Mixed Sherman, Centurion	141 Centurion	250 Centurion/ Olifant ^a	250 Olifant ^a
Light armor	Panhard	1,000 Eland ^a 250 Saracen	1,600 Eland ^a 1,500 Ratel ^a	1,600 Eland ^a 1,500 Ratel ^a
Artillery	Mixed light	Miscellaneous 25 pounder, towed 155 mm	40 G-5 ^a 20 Valkiri ^a	75 G-5 ^a 10 G-6 ^a 80 Valkiri ^a
SAM	0	18 Cactus ^a 36 Tigercat	20 Cactus ^a 24 Tigercat	20 Cactus ^a 24 Tigercat
Navy				
Personnel	3,500	4,000	9,000	7,500
Destroyers	2	2	0	0
Frigates	4	4	1	0
Mine warfare	12	10	6	9
Submarines	0	3	3	3
Fast attack	0	0	9 ^a	9 ^a
Air Force				
Personnel	4,000	8,500	13,000	13,000
Fighters	38 Sabre 16 Mirage III	56 Mirage III	51 Mirage III 32 Mirage F1 ^a	45 Mirage III/Cheetah ^a 32 Mirage F1 ^a
Bombers	Canberra, Buccaneer	6 Canberra 6 Buccaneer	6 Canberra 6 Buccaneer	6 Canberra 5 Buccaneer
Light attack	0	160 Impala ^a	122 Impala ^a	124 Impala ^a
Helicopters	60 mixed	40 Alouette III 20 Puma 15 Super Frelon	80 Alouette III 50 Puma 12 Super Frelon	80 Alouette III 50 Puma 14 Super Frelon
EW/tanker	0	0	0	3 Modified 707
Transports	Mixed C-47, C-130, Viscount	7 C-130 9 Transall 23 C-47	7 C-130 9 Transall 12 C-47	7 C-130 9 Transall 5 C-47

^a Built or substantially modified in South Africa.

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Table 2
Major Weapons Produced in South Africa Since 1975^a

Weapon (Producer)	Comments
Aircraft	
Impala (Atlas)	Trainer. Licensed copy of Italian MB 326. Produced 1964-86.
Cheetah (Atlas)	Rebuilt/modified Mirage III. Production began 1986.
Mirage F1 (Atlas)	Licensed assembly 1974-77.
Seeker remotely piloted vehicle (probably Atlas)	Copy of Israeli Scout RPV.
Attack helicopter (Atlas)	Development began 1981. XTP-1 test bed displayed 1987.
Rolls-Royce Viper jet engine (Atlas)	Production licensed by Italy for Impala.
Atar 9K50 jet engine (Atlas)	Licensed assembly under Mirage F1 program. Production of improved version (lower weight, increased reliability) continues.
Missiles	
Cactus (Kentron)	Developed as part of French Crotale program, South African production began in 1971.
Skorpioen (Kentron)	Licensed copy of Israeli Gabriel.
Kukri (Kentron)	Probably derived from US and French air-to-air missiles. Development effort began 1971, production in 1982.
Antitank guided missile	Entered production in mid-1989, probably based on Israeli Mapats ATGM.
Ballistic missiles	Under development since early 1980s with Israeli cooperation.
Ground weapons	
Olifant tank	British Centurions modified 1976-77.
Ratel infantry fighting vehicle (Sandock-Austral)	Produced 1976-87. Also available in antiaircraft, command, mortar, repair versions.
Ingwe armored fighting vehicle (Sandock-Austral)	Private venture, several versions available.
Casspir armored personnel carrier (TFM, Ltd.)	Production began 1979, logistic versions available.
Rooikat tank destroyer (Arm Scor, Lyttleton Engineering)	First shown publicly in October 1988.
Mfezi armored ambulance (Magnis Truck Corp.)	Series production began in mid-1989.
Artillery	
G-6 155-mm self-propelled (Arm Scor, Lyttleton)	First prototype in 1981, advanced prototypes in 1984-86. Series production since 1988.
G-5 155-mm towed howitzer (Arm Scor, Lyttleton)	Development began in 1976, production in 1982. Operational in 1983.
Valkiri 127-mm multiple rocket launcher (Arm Scor)	Development began in 1977, production in 1981.
Warships	
SAS Drakensberg (Sandock-Austral)	12,500-ton fleet replenishment ship. Laid down 1984, launched 1986, operational 1987.
Minister-class patrol boats (Sandock-Austral)	Six built under Israeli license 1978-86.

^a In addition to these systems, South African firms produce a wide range of small arms, munitions, vehicles, and spare parts sufficient to satisfy the needs of all three services.

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Figure 2. The Cheetah. This modified Mirage-III is built at Armcor's Atlas Aircraft subsidiary.

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their domestic weapon designs in order to tackle more ambitious projects with realistic cost and risk assessments. The political leadership in Pretoria, meanwhile, is likely to encourage these programs, both to replace the military's aging preembargo inventory and to retain a substantial qualitative edge over black African Frontline States and potential outside intervention forces, such as Cuba's.

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Priorities

We believe that South Africa's most pressing need will be for new combat aircraft. Many of the SAAF's strike aircraft are 1950s and 1960s vintage Mirages and British Canberras and Buccaneers that, even with refurbishment, will increasingly experience operational losses due to age.

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Procurement of a short-range ballistic missile (SRBM) is another high priority for South Africa. In 1986 the head of Armcor stated publicly that missile development would be a major goal for Pretoria. SRBMs would enable Pretoria to make attacks on airfields and other military facilities without risking aircraft and pilots. Missiles would also give the SADF a delivery system for possible chemical or nuclear weapons.

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The Structure of Armscor

The Armaments Corporation of South Africa, Ltd., Armscor, began as a small state-owned corporation established in 1968 to oversee the development and production of arms in South Africa. The company is one of the largest in South Africa, with over 20,000 employees and \$700 million in assets. Armscor has also developed an impressive array of subsidiary companies and facilities:

- Atlas Aircraft* *Development, manufacturing, servicing of aircraft*
- Telcast* *Manufacture of high-technology castings*
- Kentron (Irene)* *Design and production of missiles and guided weapons*
- Somchem* *Production of propellants and explosives*
- Naschem* *Production of large-caliber ammunition, bombs*
- Eloptro* *Manufacture of optical and electro-optical equipment*
- Lyttleton Engineering* *Manufacture of small arms, mortars, cannons*
- Pretoria Metal Pressings* *Manufacture of small arms and ammunition*

- Swartklip Products* *Manufacture of pyrotechnics and munitions*
- Infoplan* *Computer services*
- Arniston, St. Lucia, Alkantpan, Eugene Marais* *Test ranges*

Armscor is controlled by a board of directors of seven to 12 members. The board is appointed by the President of South Africa and includes the head of the SADF.

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Private South African companies also work closely with Armscor. These include Dorbyl (warships), Sandock Austral (armored vehicles), REUTECH (communication systems), and OMC Engineering (armored vehicles). Armscor claims that about 75 percent of its work is done by over 1,000 major outside contractors, although most finished assembly of major systems appears to be carried out by Armscor itself.

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Slightly further down the line, Pretoria will need to replace much of its Navy. South Africa's three Daphne submarines were commissioned in 1970 and 1971 and, even with refits, their hulls are not likely to remain serviceable beyond the 1990s. The Navy's two frigates—its largest warships—are already in reserve status. The remainder of the combat fleet consists of

Israeli-designed patrol boats not intended for long periods at sea; extended operations in the rough waters of the Indian Ocean or South Atlantic could shorten their operational lives considerably.



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Staying Ahead in the Region

South Africa's weapons acquisition will be designed, in our judgment, to maintain regional hegemony rather than to counter any immediate military challenge from hostile neighbors. Although the scheduled departure of Cuban forces from Angola by July 1991 will remove South Africa's most significant military adversary in the region, South African military planners will look to deter the return of outside, well-armed forces. Pretoria probably also calculates that the overall defensive capabilities of its neighbors will improve. South Africa expects the personnel strength of the combined armed forces of the Frontline States will peak in 1997.

in heavy weapons, tanks, aircraft, and air defense systems. Pretoria has several other motives for building offensive arms:

- Pretoria's military doctrine promotes the use of raids and strikes into neighboring countries to discourage antiapartheid insurgents. As long as Pretoria faces an active insurgency, in our judgment, it will attempt to maintain offensive weapons that are one step ahead of its neighbors' defensive systems.
- By withdrawing from Namibia, South Africa has lost access to Mpacha airfield at the tip of the Caprivi strip, which had extended the SAAF's

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[redacted] with notable improvements

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Figure 4. The G-6 self-propelled howitzer, built by Armscor's Lyttleton Engineering subsidiary.

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range well into central Africa. We believe the loss of Namibia will encourage defense planners to bolster Pretoria's long-range strike capability by stepping up development of ballistic missiles.

- Pretoria may also perceive a need for advanced weapons to defend its Walvis Bay enclave on the coast of Namibia. [Redacted]

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In adjusting to the loss of its buffer zones, South Africa will require a higher degree of technological sophistication in its weapons. Pretoria will face a significant challenge in evading the arms embargo and obtaining technologies currently available in the West:

- Fighters will require electronics and weapons capable of engaging multiple targets. Stealth technologies are also likely to be sought to minimize the aircraft's radar profile and to increase its ability to evade ground-based air defenses.

- Tanks will need modern armor, including ceramic materials and bolt-on reactive armor, to survive advanced antitank weapons and munitions.
- Antiaircraft missiles, both radar and infrared guided, will need electronic counter-countermeasures to defeat jammers and decoys. [Redacted]

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Meeting the Challenge

South Africa's well-established collaborative efforts with foreign companies and ability to purchase subsystems abroad for its major weapon systems, albeit discreetly and sometimes clandestinely, give Pretoria access to the personnel, resources, and technology that it needs to work on these problems. [Redacted]

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Weapons Research

South Africa's Resources. Within the Ministry of Defense, the Plans Staff is responsible for forecasting future arms needs and, [Redacted]

[Redacted] works closely with Armscor to define requirements and designs. Armscor's chief executive has publicly stated that the company and armed forces were working to identify defense requirements 15 to 20 years in advance. Armscor brochures indicate that the company tries to satisfy requirements by purchasing and adapting existing arms and components whenever possible, and in 1987 a high Armscor official stated that South Africa could obtain any military commodity or technology it needed, although it usually had to pay a premium price and make payment in US dollars. [Redacted]

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Because off-the-shelf weapons or technology are sometimes either unavailable or cannot satisfy a requirement, Armscor maintains and is expanding research and engineering facilities at several of its

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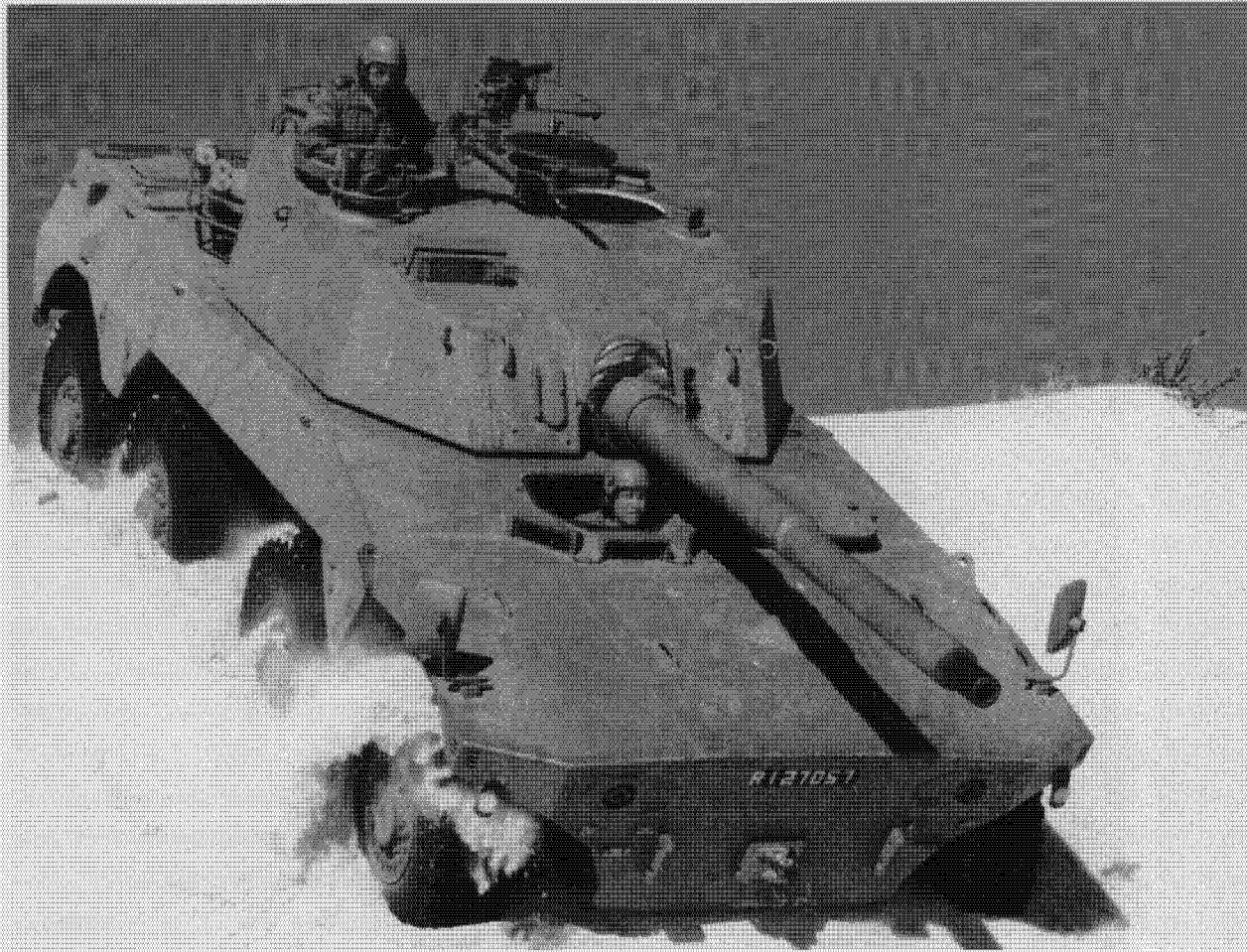


Figure 5. The Rooikat tank destroyer

plants.² Missile research has long been carried on at Kentron, Armscor's tactical missile subsidiary, and in July 1987 Armscor announced that it would build a new complex for research on missiles and advanced weapons.

Armscor can turn to other South African research centers if its own capabilities are inadequate for a given project:

- *The Council for Scientific and Industrial Research (CSIR)*. CSIR is a large, state-owned and funded organization that conducts civilian, industrial, and military research in a broad number of fields.

several CSIR offices are working on military-related programs, including the Aeronautical Systems, Microelectronics and Communications, and possibly the Materials Science Divisions.

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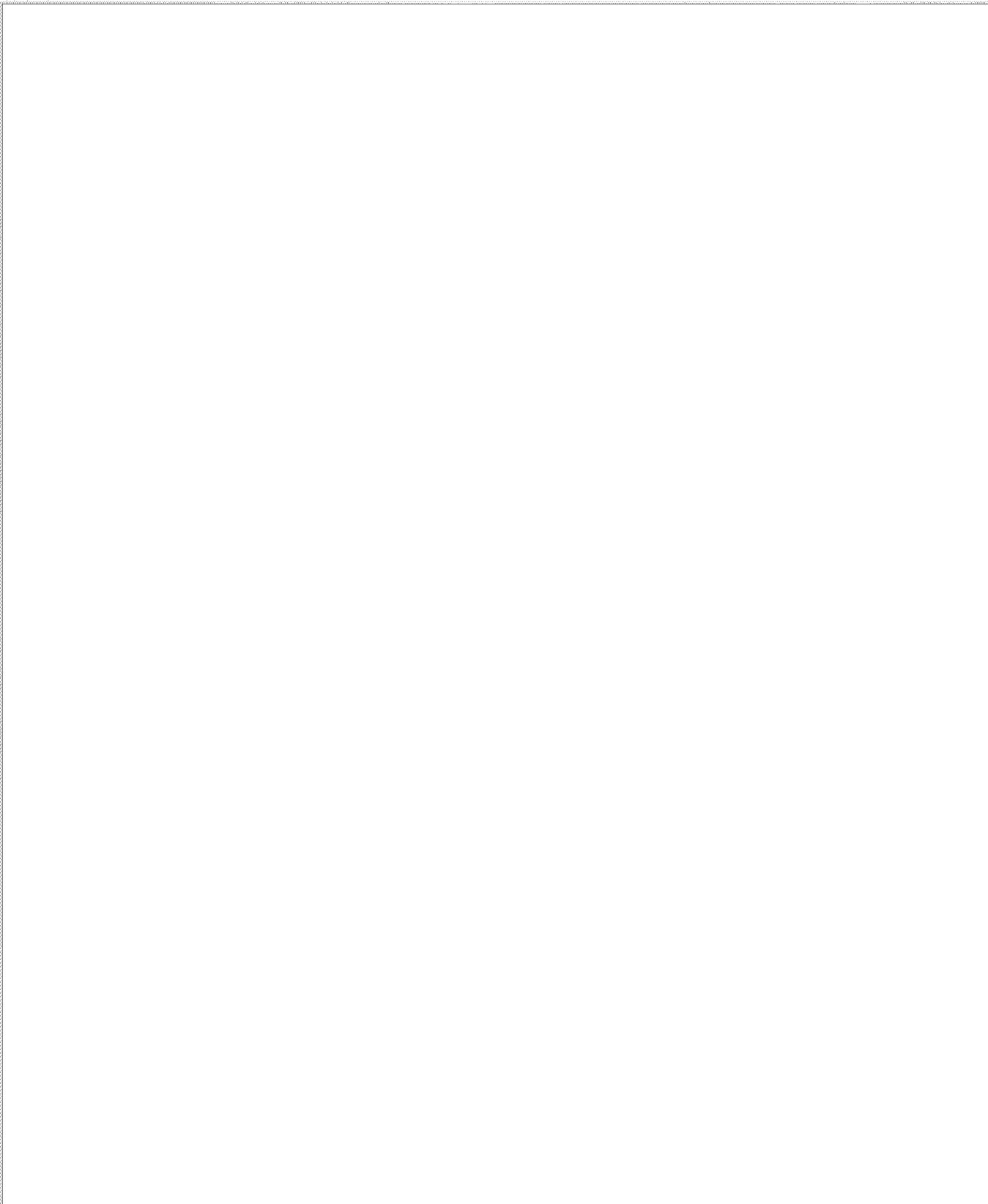


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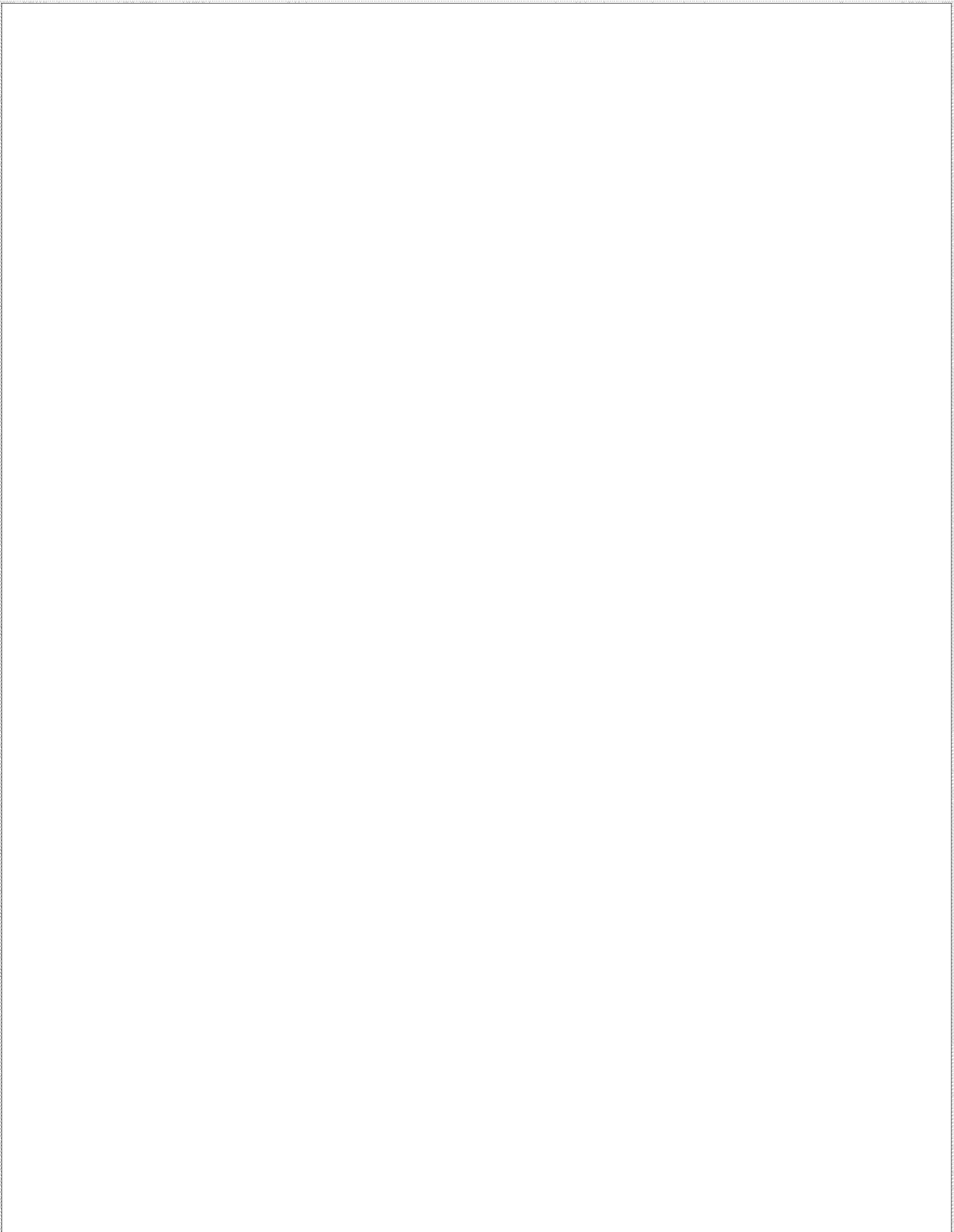
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• **Universities.** Several South African universities have institutes involved in weapons-related research. (b)(3) the University of Stellenbosch's Bureau of Systems Engineering does about 75 percent of its work for Armscor. (b)(3) work at other university centers includes research, development, and small-scale manufacturing of weapon components and microelectronics for military use.

We believe that the quality of the researchers working in these institutes is excellent. (b)(3)

(b)(3) senior and staff personnel are experienced and well-trained—many with Ph.D.'s (some of them earned at US universities)—and that they enhance their technical knowledge by participating in international scientific conferences. (b)(3)

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**Table 4
Known South African Military
Research Facilities**

Organization	Specialized Facilities or Programs
<i>Armscor facilities</i>	
Milistan	Formed in 1987 as a think tank for strategic analysis, decisionmaking support for setting Armscor's technology research budgeting priorities.
Kentron	Research on tactical and ballistic missiles.
Somchem	Solid-propellant development.
Houwhoek	Missile research facility.
Atlas Aircraft	Research on aircraft.

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Foreign Sources of Technology

In cases where South African defense projects are too advanced and ambitious to pursue independently, Pretoria seeks to form partnerships with other countries (b)(3) and uses various legal and clandestine methods to obtain defense-related technologies. By using this approach, Pretoria

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reduces its costs, obtains advanced technology at an accelerated pace, and avoids duplicating basic research [Redacted]

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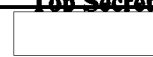
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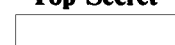


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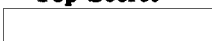


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Paying the Bills

Pretoria's new weapon programs will require large expenditures. The cost of weapons is high for any country—tanks cost close to \$3 million each and even relatively unsophisticated fighters cost at least \$20 million, according to our data—and South Africa's isolation will add to those prices. Pretoria will have to continue investing in research and test centers, as well as to expand and modernize its production facilities. Because of the limited size of South Africa's armed forces, these costs will not be amortized over long production runs. Pretoria, for example, would need only about 250 tanks to replace its current inventory, resulting in higher-than-normal unit costs. Moreover, accurate projections for cost overruns—almost inherent in major defense programs—are not likely to have been included in Pretoria's budgetary calculations and may force reductions or delays in research, production, and procurement. [Redacted]

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The South African Government's current effort to reduce its arms expenditures is already beginning to effect these programs. The Defense Forces' budget rose steadily in the late 1980s, with most of the increases going toward developing and procuring

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[Redacted]

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[Redacted]

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(b)(3) weapons [Redacted] In early 1990, however, South African defense officials stated publicly that decreased regional tensions will soon result in cuts to the Defense Forces and weapons procurement, [Redacted]

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[Redacted]. Some of these reductions are already being made: at the January 1990 unveiling of Atlas Aircraft's new attack helicopter, the Rooivalk, the chief of the SAAF's air staff said that the aircraft would be tested but not put into production. [Redacted]

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[Redacted] The possibility is increasing, however, that high cost projects, such as for fighter aircraft, could be stretched out or scaled back [Redacted]

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South Africa will continue to have only modest success in using arms exports to lower its costs. Estimates for the value of Pretoria's arms sales vary, but in May 1989 an Armscor spokesman placed them at about \$225 million for 1987, and we have no reason to doubt this figure. Most of the revenue comes from sales of small arms and munitions [Redacted]

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[Redacted] This situation is unlikely to change. While ammunition is relatively anonymous, most customers are unlikely to order weapon systems, such as aircraft or tanks, which could be readily identified as South African-made. [Redacted]

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[Redacted]

⁶ The total defense budget was announced as about \$4 billion, but we believe it is considerably greater than that—possibly by as much as 50 percent. Pretoria routinely hides defense-related spending in nondefense accounts, and does not include its subsidies for arms-related work at CSIR and universities or subsidies for arms firms. Revenues from arms exports are also turned over to the Defense Ministry without being counted in the budget [Redacted]

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[Large Redacted Area]

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Outlook for Programs

Pretoria will try to combine all the resources of its defense industry to produce a number of new, advanced weapon systems in the first half of the 1990s. Several projects are already under way, involving arms for all of South Africa's forces, [Redacted]

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[Redacted] In addition, we believe that the broad outlines of future programs are beginning to take shape. [Redacted]

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Current Programs

Aircraft. Atlas has probably been working on the design of an indigenous fighter aircraft only since 1987, when designers and engineers could have been released from the Cheetah program. The planned fighter—codenamed Cava, according to press reports—will be a twin-engine, multirole aircraft initially powered by the improved Atar 9K50. [Redacted]

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and will [Redacted]

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probably replace the Air Force's Mirages, Buccaneers, and Canberras—suggesting production of at least 100 aircraft. Atlas's experience with the delta-winged Mirage III and Cheetah and composite materials suggest additional details about the fighter's planform and material composition.

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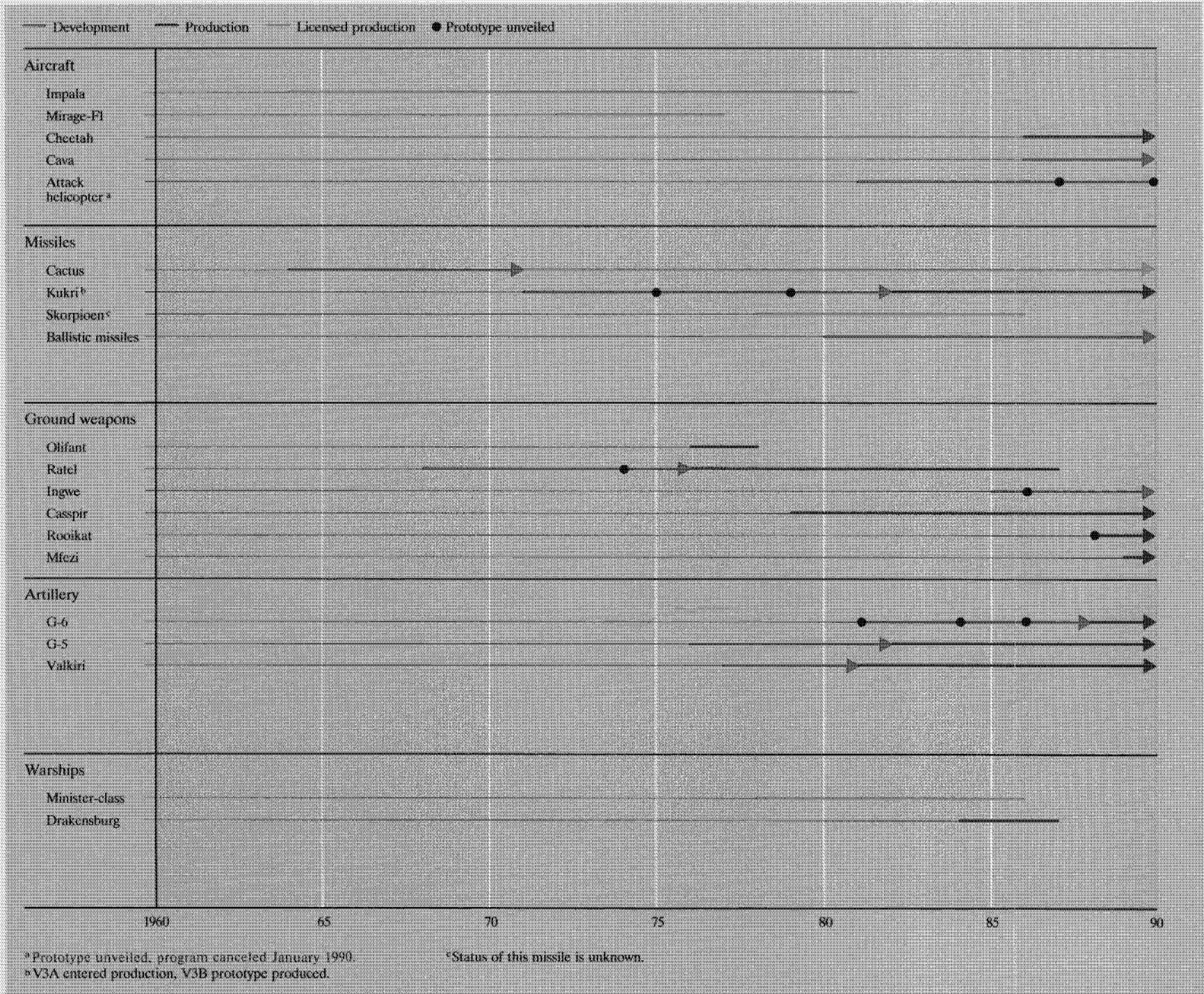
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Figure 9
South Africa: Arms Production Timeline



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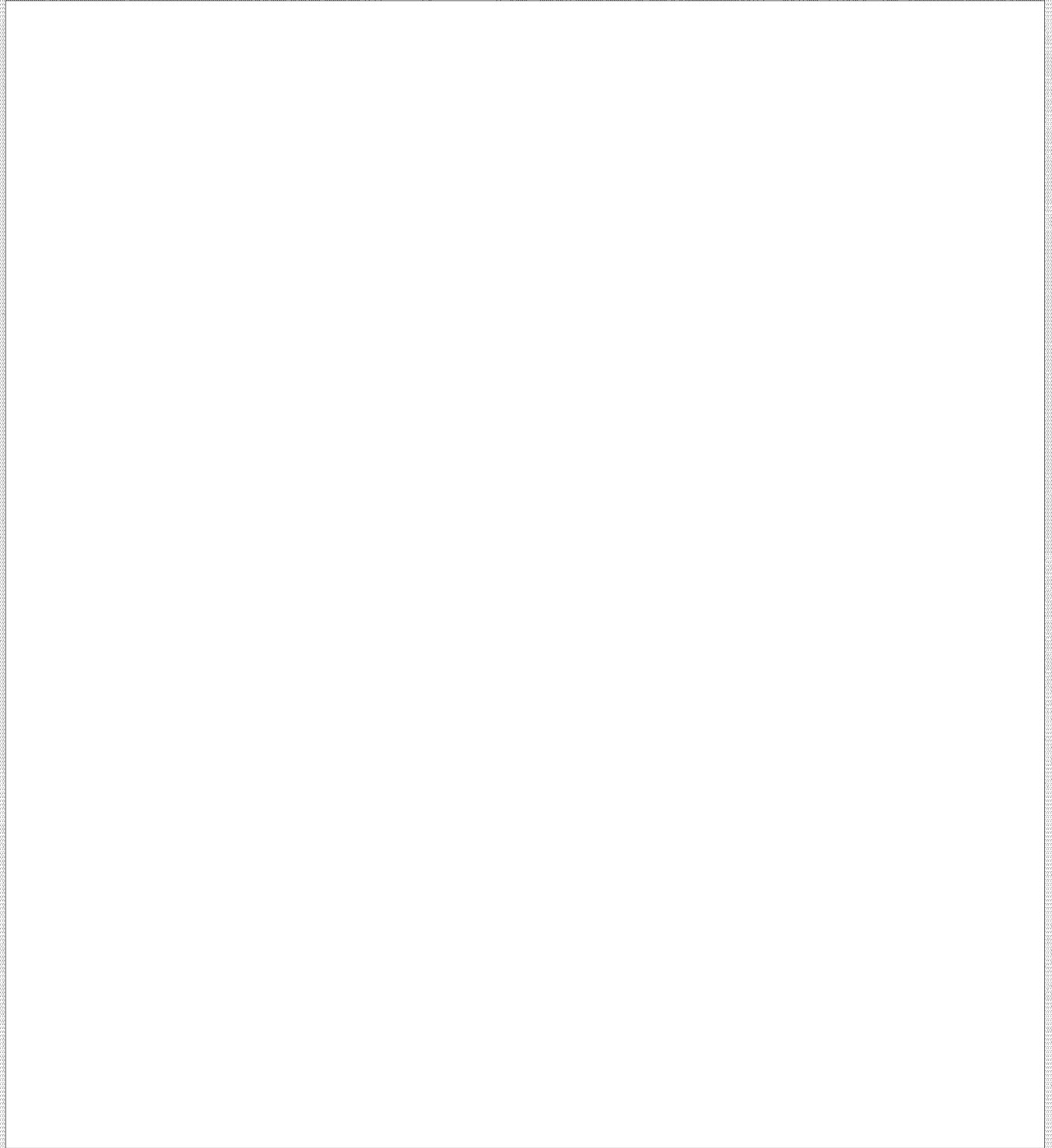
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detecting and locating ground-based radar and communication systems and to provide information for use in attacking them.

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Pretoria is almost certain, in our view, to seek additional air-, ground-, and sea-based electronic countermeasures equipment to use for degrading enemy communications, radar, and other electronic systems. Whether South Africa is able to develop these systems itself or buy the hardware abroad, Armscor and its associated firms are almost certainly capable of installing and integrating the equipment in aircraft, ships, and vehicles.

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Warships. South Africa does not have any warships under construction but could build major combatants if it chose. The Sandock-Austral shipyard at Durban built a 12,500-ton supply ship, the Drakensberg, for the South African Navy in the mid-1980s; all of the components for the Drakensberg were made in South Africa. In our view, Sandock would be able to apply this capability to build frigates, which run about 2,500 to 3,000 tons, and that would be superior to any ships in the Angolan or Mozambican Navies. Press reporting also indicates that Pretoria has obtained the blueprints for West Germany's Type 209 submarine. In our view, South Africa's shipbuilding capability and experience operating and overhauling submarines would enable it to build the 1,400-ton ship, although it would probably need four to five years to do so.

[Redacted]

Space Systems.

Pretoria is examining the use of space-based systems. We believe that weight considerations and the requirement for real-time intelligence dictate an electro-optical system for an imaging satellite instead of a film return system. Development of a launch system, however, capable of lifting the weight of an imaging satellite and the costs associated with such a program may be major impediments. Nonetheless, successful development would probably enable the South Africans to spot military movements, bases, and facilities in neighboring countries—capabilities that would provide it with a significant margin of intelligence superiority.

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Future Programs

As new weapons go into operation with the SADF, we believe Pretoria is likely to combine them with new command, control, communications, and intelligence collection systems. Because of the technological sophistication and costs of producing these integrative systems, Pretoria is likely to either purchase them abroad or build them with foreign

partners.

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Implications

Outlook for the Embargo

In our view, Pretoria will continue to have considerable success in obtaining technologies and components for use by its arms industry and the SADF. Despite political pressures and enforcement actions, we believe Pretoria will almost certainly continue to find

Battle Management. The acquisition of tactical battle management systems is likely to become a major priority for the SADF, in our view, especially as Angola and Zimbabwe improve their air defenses. Along with the Phalcon AWACS for directing air battles, the South Africans will probably continue to seek new airborne SIGINT and ELINT systems for

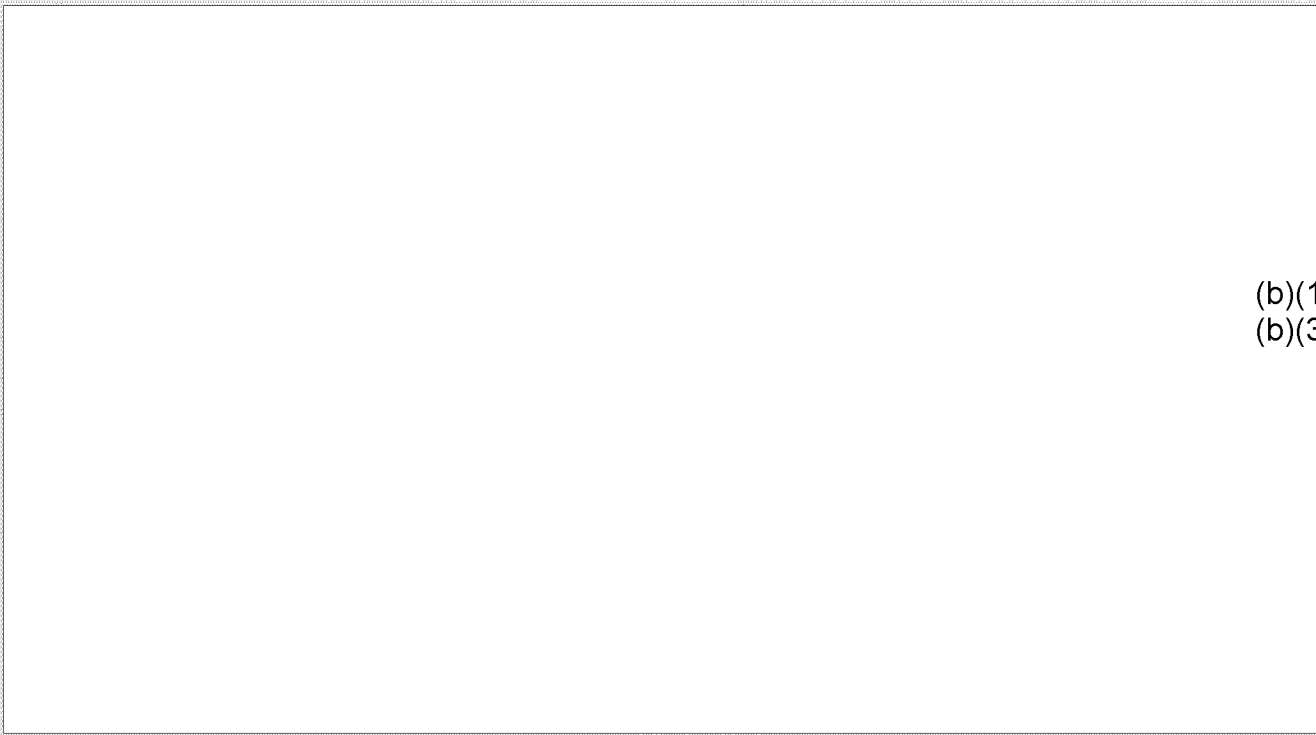
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individuals, companies, and governments willing to assist it. Pretoria will suffer occasional setbacks. [redacted] but undoubtedly accepts these risks and costs of circumventing the embargo. [redacted]

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A longer term possibility is that South Africa will trade the technologies it has acquired for those it still needs. Already officially cut off and forced to rely on clandestine and domestic resources for arms technology, Pretoria has no reason to respect international embargoes on specific countries or international control regimes, such as the Missile Technology Control Regime. Rather, South Africa has every incentive to form partnerships with other embargoed countries. Embargoes or political restrictions on other states are unlikely to impress Pretoria, and we see no reason for the South Africans not to swap or provide technology or arms to China, Argentina, Iran, Chile, Taiwan, or, under the right circumstances, the Soviet Union—should those countries be interested. [redacted]

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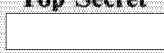
Continued South African Dominance

Pretoria's drive to modernize its forces and capabilities is likely to widen its military lead over the Frontline States. The poverty and instability of neighboring governments, particularly in Mozambique, is likely to preclude them from purchasing, absorbing, and maintaining enough modern weaponry to offset South Africa's advantages. Decreases in Soviet military aid to client states, such as Angola, probably means that South Africa's neighbors will be unable to acquire up-to-date arms. They may be forced to look to second-tier suppliers, such as China and North Korea, for less expensive, and perhaps less capable, aircraft, missiles, and tanks. [redacted]

[redacted] Chinese or North Korean weapons, even if provided to the Frontline States, would probably not constitute a challenge to South Africa's superiority. [redacted]

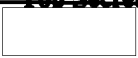
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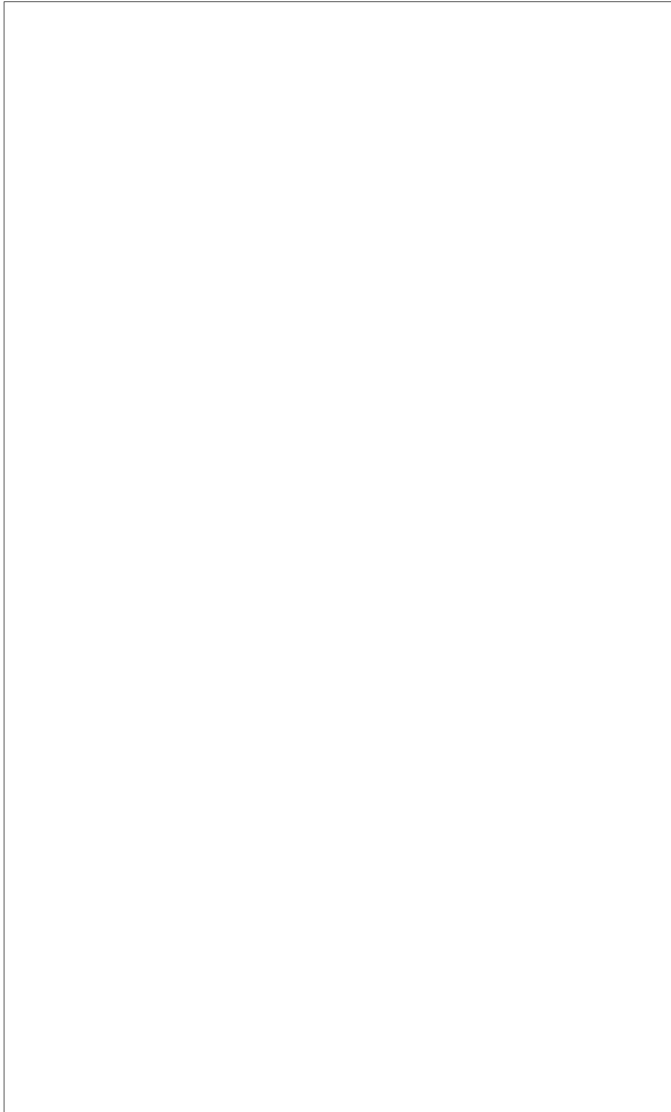


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The modernization of South African arms will enhance Pretoria's ability to "go to the source" and impose military solutions on its conflicts with regional states. The African National Congress (ANC) is currently struggling to regroup after relocating much of its military wing from Angola to Tanzania, and Pretoria may calculate that more pressure on the Frontline States, particularly Botswana and Zimbabwe, will help interdict ANC infiltration routes. If necessary, we have no doubt that Pretoria would use its new modern weapons to strike deep into its neighbors' territory to force their acquiescence.



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