

# ARCHIVED REPORT

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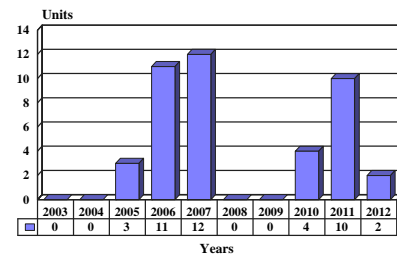
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## Rooikat - Archived 8/2004

### Outlook

- Production of original Rooikat 76 for South African requirement has been completed
- New 105 millimeter version has enhanced marketability
- Moderate export forecast
- No significant modernization or retrofit potential through the midterm

10 Year Unit Production Forecast  
2003 - 2012



### Orientation

**Description.** A wheeled vehicle.

**Sponsor.** The development and South African procurement of the Rooikat are sponsored by the South African Department of Defence through ARMSCOR, the government procurement executive and the South African Army.

**Contractors.** This vehicle was developed and is manufactured by Vickers OMC (formerly Reumech OMC, before that Reumech Sandock, and earlier Sandock-Austal Beperk Limited), Benoni, Republic of South Africa. This firm is considered the system integrator and overall prime contractor. In mid-1999, Reumech OMC was purchased by Alvis Vickers (then Vickers Defence Systems) of the United Kingdom. Major subcontractors are the various component organizations of Denel, including Lyttleton Engineering Works.

**Licensees.** None

**Status.** The serial production of the Rooikat 76 armored vehicle has been completed for service in the South African forces. The development of the Rooikat 105 has been completed, and production can commence when an order is received. The further development of the base vehicle continues.

**Total Produced.** As of 2003, 262 Rooikat 76 vehicles have been manufactured. At the same time, two Rooikat 105 developmental prototype vehicles had been manufactured.

**Application.** A multipurpose armored vehicle for armored combat, border patrol, armed scout and reconnaissance, and other high-mobility operations.

**Unit Price.** In equivalent 1995 United States dollars, the unit price of the serially produced Rooikat armed with the 76 millimeter gun was \$884,700. In equivalent 2003 United States dollars, the unit price of the Rooikat 105 is \$1,501,200.

### Technical Data

#### Rooikat 76

**Crew.** Four: commander, gunner, loader, and driver.

**Configuration.** 8x8.

**Armor.** The Rooikat 76 is fabricated from steel alloy armor that is proof against 23 millimeter armor piercing projectiles over the frontal arc. The armor configuration

on the underside of the vehicle is highly effective against land mines.

**Design Features.** The Rooikat 76 has a highly survivable design, which makes it one of the best-protected vehicles of its type in the world.

**Dimensions.** The following data are for the latest production standard of the Rooikat armed with the GT4 76 millimeter gun.

	<u><b>SI units</b></u>	<u><b>US units</b></u>
Length:	8.2 meters	26.9 feet
Width:	2.9 meters	9.51 feet
Height:	2.8 meters	9.18 feet
Combat weight:	28 tonnes	30.86 tons
Fuel capacity:	540 liters	143.62 gallons

**Performance.** The maximum speed and range figures are for operation on hard earth surfaces.

	<u><b>SI units</b></u>	<u><b>US units</b></u>
Maximum speed:	120 kilometers per hour	74.52 miles per hour
Maximum range:	800 kilometers	496.8 statute miles
Step:	1.08 meters	3.54 feet
Trench:	2.07 meters	6.79 feet
Slope:	30%	30%
Gradient:	70%	70%
Fording:	1.5 meters	4.92 feet

**Engine.** The Rooikat 76 uses an unspecified V-10 liquid-cooled diesel engine rated at 420 kilowatts (563 horsepower); the manufacturer is undetermined. The power-to-weight ratio is 15 kilowatts per tonne (18.24 horsepower per ton). A 24 volt generator and six (two banks of three) 12 volt, 100 ampere-hour batteries comprise the electrical fit of the Rooikat.

**Gearbox.** The Rooikat 76 uses an unspecified automatic unit with one reverse and six forward gear ratios, a two-gear-ratio transfer case, and a hydrodynamic torque converter. The driver can select 8x8 or 4x4 wheel drive as needed. Steering is mechanical with hydraulic assistance.

**Suspension and Running Gear.** The 8x8 Rooikat 76 has an internally driven trailing arm suspension with coil springs and hydropneumatic shock dampers at each wheel station. A dual-circuit, drum-type braking system is fitted on all eight wheels. The 14.00x20 radial pattern tires are equipped with run-flat inserts; 16.00x20 tires are an option. The Athane firm has developed a new highly survivable tire for the Rooikat and similar vehicles. Called Terra Trak, the new tire is claimed to be puncture proof and does not require a central tire pressure regulation system. This tire has been tested on the Rooikat, and procurement is ongoing.

**Armament.** The main armament of the Rooikat 76 is the GT4, an indigenous 76 millimeter/62 caliber gun manufactured by Lyttleton Engineering Works, a component of Denel. This gun has a vertically sliding automatically operating breech block and is fully

stabilized. Elevation is +20 degrees, depression is -10 degrees, and traverse is 360 degrees. The maximum rate of fire is six rounds per minute. Two types of ammunition are used: High Explosive-Tracer and Armor Piercing Fin Stabilized Discarding Sabot. The latter is effective all around up to and including the T-62 threat level. Also included are a coaxially mounted 7.62 millimeter machine gun in the turret and an additional 7.62 millimeter machine gun for anti-aircraft defense. A total of 40 main armament rounds and 3,600 7.62 millimeter rounds are carried. In addition, four electrically operated smoke grenade launchers are mounted on each side of the turret. Turret traverse and gun elevation is all electric.

**Fire Control.** The fire control suite used in the Rooikat 76 is automatic in operation. The gunner has a day/night (image intensification) sight with eight-power magnification and an integral laser rangefinder. The gunner is also provided with a less sophisticated backup sight. The commander has a day panoramic sight that can be either slaved to the gun or used independently; the commander can override the gunner if required. The digital ballistic computer of the integrated fire control system receives inputs from the laser rangefinder and other sensors (ammunition type is manually entered) and automatically computes the ballistic offsets and implements them in the sight and gun. The time required for the fire control solution is usually less than two seconds. The fire control system has built-in test equipment.

**Rooikat 105**

**Crew.** Four: commander, gunner, loader, and driver.

**Configuration.** 8x8

**Armor.** The Rooikat 105 is fabricated from steel alloy armor that is proof against 23 millimeter armor piercing projectiles over the frontal arc. The armor configuration

on the underside of the vehicle is highly effective against land mines.

**Design Features.** The Rooikat 105 has a highly survivable design that makes it one of the best-protected vehicles of its type in the world.

**Dimensions.** The following data are for the latest prototype of the Rooikat 105 armed with the GT7 105 millimeter gun.

	<b><u>SI units</u></b>	<b><u>US units</u></b>
Length:	8.8 meters	28.9 feet
Width:	2.9 meters	9.51 feet
Height:	2.8 meters	9.18 feet
Combat weight:	28 tonnes	30.86 tons
Fuel capacity:	540 liters	143.62 gallons

**Performance.** The maximum speed and range figures are for operation on hard earth surfaces.

	<b><u>SI units</u></b>	<b><u>US units</u></b>
Maximum speed:	120 kilometers per hour	74.52 miles per hour
Maximum range:	1,000 kilometers	621.1 statute miles
Step:	1.08 meters	3.54 feet
Trench:	2.07 meters	6.79 feet
Slope:	30%	30%
Gradient:	70%	70%
Fording:	1.5 meters	4.92 feet

**Engine.** The Rooikat 105 uses an unspecified V-10 liquid-cooled diesel engine rated at 420 kilowatts (563 horsepower); the manufacturer is undetermined. The power-to-weight ratio is 15 kilowatts per tonne (18.24 horsepower per ton). A 24 volt generator and six (two banks of three) 12 volt, 100 ampere-hour batteries comprise the electrical fit of the Rooikat 105.

**Gearbox.** The Rooikat 105 uses an unspecified automatic unit with one reverse and six forward gear ratios, a two-gear-ratio transfer case, and a hydrodynamic torque converter. The driver can select 8x8 or 4x4 wheel drive as needed. Steering is mechanical with hydraulic assistance.

**Suspension and Running Gear.** The 8x8 Rooikat 105 has an internally driven trailing arm suspension with coil springs and hydropneumatic shock dampers at each wheel station. A dual-circuit, drum-type braking system is fitted on all eight wheels. The 16.00x20 radial pattern tires are equipped with run-flat inserts. The new Terra Trak tire as described above is available for the Rooikat 105.

**Armament.** The main armament of the Rooikat 105 is the GT7, an indigenous design 105 millimeter gun manufactured by Lyttleton Engineering Works, a component of Denel. This autofrettaged gun has a vertically sliding automatic breech block and is fully

stabilized; a fume extractor and thermal sleeve are fitted. Elevation is +17 degrees, depression is -8 degrees, and traverse is 360 degrees. All standard NATO types of 105 millimeter tank gun ammunition can be fired from the GT7, including the Armor Piercing Fin Stabilized Discarding Sabot type. A coaxially mounted 7.62 millimeter machine gun in the turret and an additional 7.62 millimeter machine gun for anti-aircraft defense are also located on top of the turret. A total of 32 main armament rounds (nine at the ready) and 3,200 7.62 millimeter rounds are carried. In addition, four electrically operated 81 millimeter smoke grenade launchers are mounted on each side of the turret. Turret traverse and gun elevation are electric.

**Fire Control.** The digital fire control suite used in the Rooikat 105 is automatic in operation. The system is available in three levels of sophistication or performance, described by the contractor as follows:

- **Low** – The GT7 gun is stabilized and electromechanically controlled. The gunner's day/night sight has an integral laser rangefinder and is slaved to the GT7 gun.
- **Medium** – This level is the same as the low-performance system, but adds a computerized fire control system integrated with the sight and

several sensors to compute and set the fire control solution.

- High – This level incorporates the features of the low- and medium-performance systems, and adds a fully stabilized gunner's sight.

While these are the standard offerings, additional fire control options are available. These include various sensors, stabilized panoramic or non-panoramic sight for the commander, and other options for the gunner's sight.

The existing Rooikat 105 prototype vehicles are fitted with the medium-performance system as follows:

The gunner is provided with a GS 35 day/night (image intensification) sight with eight-power magnification and an integral laser rangefinder slaved to the main armament. The commander has a CS30 day panoramic sight that can be either slaved to the gun or used independently; the commander can override the gunner if required. The digital ballistic computer of the integrated fire control system receives inputs from the laser rangefinder and other sensors (ammunition type is entered manually) and automatically computes the ballistic offsets and implements them in the sight and gun. The time required for the fire control solution is usually less than two seconds. The fire control system has built-in test equipment.

## Variants/Upgrades

**Variants.** The ZA-35 twin 35 millimeter self-propelled anti-aircraft artillery system is based on the chassis; this program went dormant in 1996. The ZA-HVM is a similar program that mounts the SHAV-3 surface-to-air missile system. The integrator for both systems is Kentron, another Denel company.

As a private venture, the contractor is developing the Rooikat 35, a mechanized infantry combat vehicle armed with one of the 35 millimeter cannons as used on the ZA-35. A version of the Rooikat 35 is the Rooikat 35/ZT-3 Tank Destroyer. This vehicle mounts a launcher for the ZT3 Swift anti-tank missile; both vehicles have a three-man crew. To date, both these programs are paper design studies only.

**Rooikat 105.** This privately funded development is the premier variant of the original Rooikat vehicle. The contractor has integrated a 105 millimeter gun with the Rooikat to enhance the appeal of the vehicle on the export market. The Rooikat 105 is the slightly modified base vehicle upgraded with the GT7 105 millimeter rifled tank gun in a modified turret. A prototype was completed in 1991, and completed its firing trials in 1995. The GT7 is an indigenous 105 millimeter tank gun that is compatible with all NATO-standard ammunition. The gun is fitted to a modified three-man turret; a 7.62 millimeter machine gun is coaxially mounted. A variety of fire control equipment can be

fitted. The development of the Rooikat 105 was completed in 1994, and the vehicle is available for purchase.

**Rooikat 120.** The contractor Vickers OMC has investigated the development and integration of a new three-man turret armed with a 120 millimeter tank gun with the Rooikat, but this remains a paper development.

**Modernization and Retrofit Overview.** Other than for the weather sensor described below, no significant modernization or retrofit programs have been developed for the Rooikat. However, in the long term, the GT4 76 millimeter main armament of the South African Rooikat vehicles could be replaced with the much more potent GT7 armament of the Rooikat 105.

In August 1995, Analysis, Management and Systems was awarded a contract to retrofit a meteorological sensor unit on the Rooikat. This device, mounted on the roof of the turret, incorporates a mechanical elevation component that raises the sensor one meter (3.28 feet) above the turret. The integration of this equipment will allow for a higher degree of first round hit probability.

As noted above, Althane has developed a new-design puncture-proof tire called the Terra Trak. The new tire was tested on a Rooikat in 1998 and has been ordered for the Rooikat inventory.

## Program Review

**Background.** Development of the Rooikat vehicle began in 1976 in response to the need to replace the Eland (a license-produced version of the popular Auto-mitrailleuse Légère) and similar vehicles for armed reconnaissance and related missions. In fact, the need to replace the Eland 90 was deemed especially important. Three different vehicles, two configured in 8x8 and one in 6x6, were developed for evaluations. The 6x6 vehicle was armed with a 76 millimeter/62

caliber gun in a three-man turret and weighed 22 tonnes (24.25 tons). One of the 8x8 vehicles mounted the same 105 millimeter L7 gun used in the Oliphant tank; this vehicle weighed 39 tonnes (42.99 tons). An armored personnel carrier version of this vehicle was developed. The second 8x8 configuration formed the basis for the Rooikat. Following the evaluation of the developmental vehicles, it was decided to concentrate on the 8x8 vehicle with the GT4 76 millimeter gun, which is 62

calibers in length. Five advanced development vehicles were completed by 1987, and the program was unveiled in 1988. Serial production commenced in early 1989, with the first deliveries being made about 10 months later.

The Rooikat has been designed primarily to replace the Eland 90 light wheeled vehicle in armed scout/reconnaissance and combat missions. The vehicle's mobility and highly survivable design are optimized for the rugged and harsh conditions found in the southern portions of the African continent.

In mid-1999, Reumech OMC was purchased by Alvis Vickers (then Vickers Defence Systems) of the United Kingdom.

**Description.** The hull of the Rooikat is of all-welded steel alloy construction, providing protection over the frontal arc from 23 millimeter armor piercing projectiles as well as ballistic fragments. The Rooikat is especially well protected against anti-vehicular mines. Tests indicate that the vehicle remains mobile even with two wheels on one side blown off.

The driver is seated in the front of the vehicle at the center and is provided with three bulletproof windows for an excellent field of vision. The windows can be quickly covered with armored shutters; the driver then operates with the aid of three periscopes, the center one can be replaced with a passive night driving periscope. While the driver is provided with a hatch, he can also enter the driving compartment from the rear. This allows for a change of drivers without the crew having to leave the vehicle.

Immediately behind the driver is the all-welded three-man turret. Within the turret, the commander is seated to the right with the gunner to his front and below; the loader is seated to the left. Both the

commander and the loader are provided with hatches, with the commander having vision blocks and a day panoramic sight that can be either slaved to the gun or used independently. The gunner is provided with a day/night periscope mounted on the roof; this instrument has an integral rangefinder. In addition, the gunner has an auxiliary sight. The loader has a hatch cover and two periscopes. The rest of the Rooikat's fire control suite is described above. An escape hatch is provided on each side of the hull.

The powerpack is at the rear of the vehicle. Access panels to the powerpack are provided in the roof. The powerpack, provided with quick-disconnect couplings and connectors, can be removed by two men in 45 minutes. The driver can select 8x8 or 8x4 wheel drive to suit the tactical situation. The gearbox has a manual shift for emergency use.

Standard equipment on the Rooikat includes an automatically operating fire detection and suppression system for the engine compartment, three radios, and a vehicle intercommunication system. A nuclear, biological, and chemical overpressure system integrated with an air conditioning system is optional.

**Operational Analysis.** While the Rooikat is a very hardy, highly survivable, and of robust design, the anemic 76 millimeter GT4 gun does it an injustice. This was a decision mandated by the threat level at the time, as well as the fact that more ammunition can be stored. Still, the GT4 gun is more suitable for light armored cars and armored personnel carriers since it is effective only against a late 1950s vintage tank. In other words, the Rooikat vehicle platform is over-designed for the armament it originally was designed to mount. The contractor has resolved this deficiency with the Rooikat 105; this new vehicle does much to eliminate the criticism of the Rooikat.

## Funding

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Funding for the development and South African procurement of the Rooikat has been provided by the Republic of South Africa Department of Defense through ARMSCOR. The further development of the Rooikat 105 has been funded by the contractor.

## Recent Contracts

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Not available, as contractual information related to the procurement of new-production Rooikat vehicles is not released.

## Timetable

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This timetable is for the Rooikat only and no other armored vehicle program of Vickers OMC; it does not include the ZA-35 or ZA-HVM programs.

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1976	Design conceived
	1981	Engineering development initiated
February	1986	First prototype completed
	1987	Last prototypes completed
	1988	Program unveiled, production order given
December	1989	First production deliveries made
	1990	Development of Rooikat 105 begun
	1994	Development of Rooikat 105 completed
	1999	Production of Rooikat 76 completed for South Africa
Mid	2003	Rooikat 76 and 105 available for new orders; development of other versions continues

## Worldwide Distribution

**Export Potential.** Because of its former racial policies, the Republic of South Africa was long ostracized by the world community. The sanctions imposed by the United Nations severely handicapped the country's efforts at selling armaments on the world market. While the internal politics of the Republic of South Africa have now changed in a major way and the sanctions have been lifted, it will be some time before this country's weapons are fully accepted on the international market. In addition, all players in this market are facing the glutted conditions of the new century.

**Country. Republic of South Africa** (240 Rooikat 76).

## Forecast Rationale

The production of the both versions of the Rooikat is dormant, but the marketing effort continues, with emphasis on the Rooikat 105. Production to address the Republic of South Africa's order for 240 vehicles was completed in 1999, and no additional production of the Rooikat 76 is forecast. This is due to the somewhat unique design of the Rooikat 76 and the limited performance of the 76 millimeter main armament. However, the newer 105 millimeter version has

generated a good deal of interest on an international scale. Although this interest has yet to be translated into a sale, we forecast that a few units of the 105 millimeter version of the Rooikat will be sold on the sub-Saharan market in two separate sales.

The further development of a 120 millimeter version has raised market interest and thus this program will bear watching.

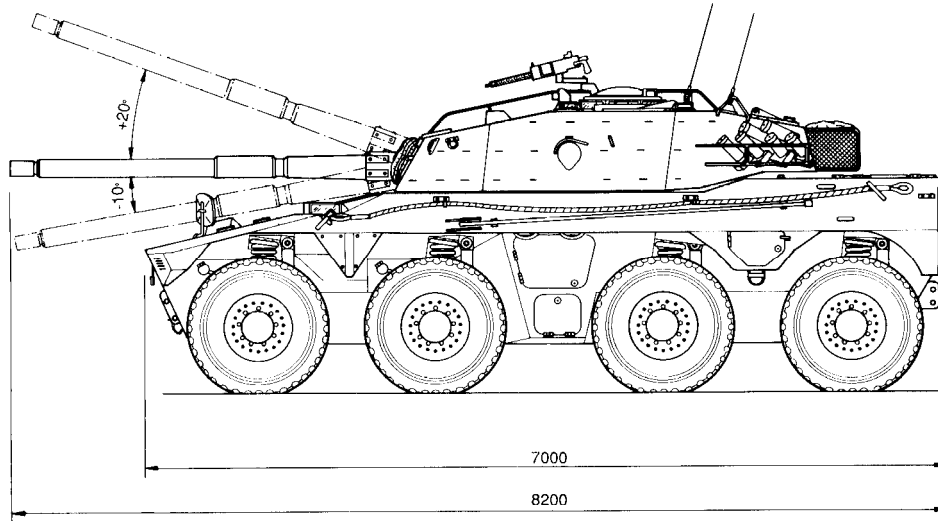
## Ten-Year Outlook

### ESTIMATED CALENDAR YEAR PRODUCTION

Vehicle	(Engine)	<u>High Confidence</u> <u>Level</u>				<u>Good Confidence</u> <u>Level</u>				<u>Speculative</u>			Total 03-12
		through 02	03	04	05	06	07	08	09	10	11	12	
VICKERS OMC													
ROOIKAT (a)	V-10	252	0	0	0	0	0	0	0	0	0	0	0
ROOIKAT (b)	V-10	2	0	0	3	11	12	0	0	4	10	2	42
Total Production		254	0	0	3	11	12	0	0	4	10	2	42

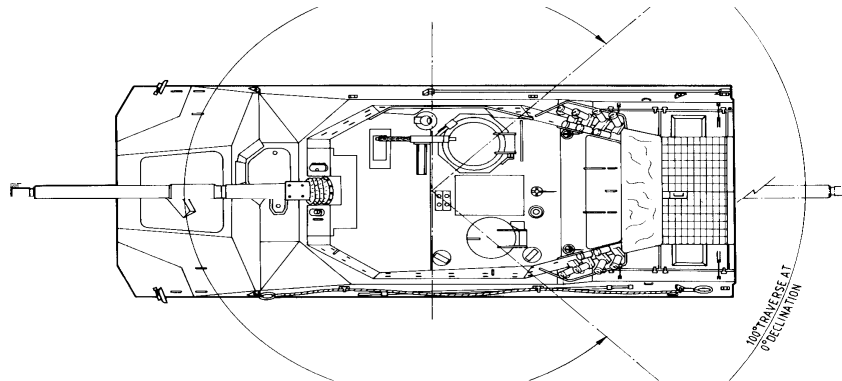
(a) The historical production figure includes the initial three definitive developmental prototype vehicles that were used for operational evaluations, five advanced development vehicles and four pre-production (engineering development) vehicles. This forecast production line is for the Republic of South Africa only.

(b) The through 2002 production is for the initial prototype vehicles that are also used for contractor demonstrations.



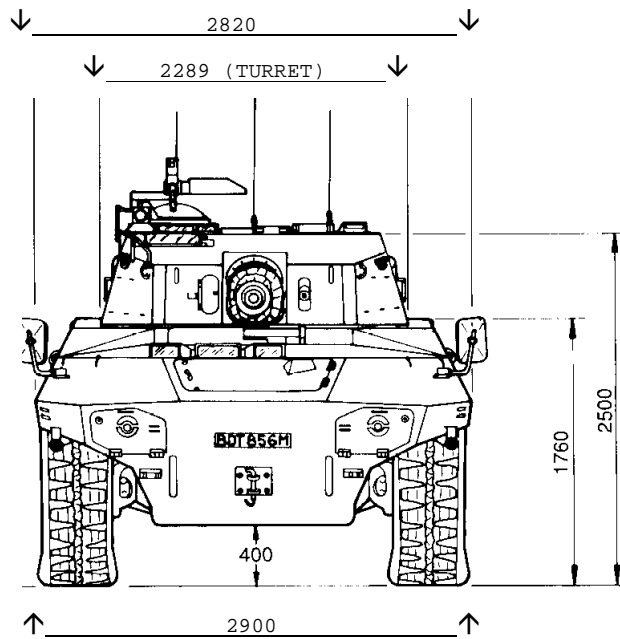
ROOIKAT 76 (260° Traverse at 10° Declination (Side View))

Source: Vickers OMC



ROOIKAT 76 (Overhead View)

Source: Vickers OMC



ROOIKAT 76 (Front View)

Source: Vickers OMC



ROOIKAT 76

Source: South African Army