

South Africa's Defence Industry Charting A New Course?

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INTRODUCTION

The armaments industry in South Africa can trace its origins to the Second World War, when various weapons were manufactured in significant quantities. This industry was dismantled after the war, and was re-established only in the 1960s, when the imposition of apartheid policies after 1948 led to the progressive isolation of South Africa by most of the countries of the Western world.

In the years 1961 to 1989 the arms industry grew rapidly, driven by the government's perception of urgent external threats to its apartheid regime. South Africa adopted an aggressive foreign policy, becoming involved, directly and indirectly, in the regional conflicts in Angola, Namibia, Mozambique, and what was then Rhodesia. Spurred on by the United Nations (UN) arms embargoes of 1964 (which were voluntary) and 1977 (which were mandatory for UN Member States) the South African government took steps to develop an independent arms industry. This coincided with a surge in the country's general industrial capacity, much of it motivated by strategic considerations, such as substituting goods that could no longer be imported.

Armcor was set up as a statutory corporation in terms of the Armaments Development and Production Act number 57 of 1968. The Act defined the role and tasks of Armcor as "promoting and co-ordinating the development, manufacture, standardization, maintenance, acquisition, or supply of armaments... utilizing the services of any person, body or institution or any department of the state". Armcor could enter into contracts under its own name, own shares in companies, and arrange for manufacture either by its own subsidiaries or by third party contractors. Thus constituted, Armcor was empowered to develop the armaments industry with considerable freedom, unconstrained by many of the bureaucratic limitations that generally apply to a state department.

THE ARMS INDUSTRY BEFORE 1994¹

By the end of the 1980s, South Africa had established a substantial defence industry, which offered products and equipment that had been developed for use in the difficult terrain in the region. The country became effectively self-sufficient in arms production. The industry manufactured most calibres of arms and ammunition; army vehicles; communications and electronic warfare equipment (such as warning and self-protection systems); and air-to-air and anti-tank missiles. It was also capable of assembling aircraft to the level of Impala trainers and Oryx helicopters, and constructing and arming strike craft and minesweepers. The number of people employed in the armaments industry had reached an estimated 131,750, some 8.3% of the total employed in South Africa's manufacturing sector.

In the mid-1980s, Armcor had contracts with about 2,270 private sector companies, of which some 1,100 were contractors or subcontractors. The rest supplied standard items. At that time the main private sector suppliers were Altech (electronics), Reunert (electronics and main battle tanks), Grintek (electronics), and Dorbyl (armoured vehicles and shipyards). The private sector provided about half the equipment requirements of the South African Defence Force (SADF). The evolution of local manufacture during this period is illustrated in table 1.

Table 1: South African Arms Production 1961–1989

	1961	1970	1980	1989
Value	26	184	1,705	2,056
*Values shown in millions of rand (constant 1985 prices)				
<i>Source: P Batchelor and S Willet, Disarmament and Defence Industrial Adjustment in South Africa, SIPRI, 1998.</i>				

During this period, the industry was capable of producing most of the requirements of the SADF. However, some critical components and systems still had to be imported. These included a state-of-the-art combat aircraft and many ordinary electronic

components. The arms industry's ability to develop armaments and systems that were fully functional at the top end of the system's hierarchy varied greatly for various types of equipment. At the same time, many of the facilities that had been created at considerable expense started to fall idle once the requirements of the SADF (especially the Army) had been fully met. The industry therefore turned to export to employ capacity that would otherwise stand idle and to maintain its established capabilities. It was Armscor's participation in an armaments exhibition in Greece in 1982 that marked South Africa's entry into the export arena. In response, the UN Security Council adopted Resolution 558 of 1984, requesting all nations to refrain from purchasing South African armaments.

In 1989 FW de Klerk succeeded PW Botha as president. Shortly thereafter, the Soviet Union collapsed, closing the chapter on superpower rivalry. This affected countries in Southern Africa, which had been drawn into the competition between the dominant powers. A settlement was reached in Namibia, whose transition to democracy followed in 1990. There was no longer a clear need for South Africa to maintain a strong military force. Instead the government faced the urgent task of balancing the budget after years of apartheid-era profligacy. It was the defence budget that suffered most: it was cut by 40% between 1989–1994, while procurement expenditure declined by 60%, from R5.5 billion to R 2.2 billion at 1990 prices.

Inevitably, many of the arms industry's facilities, like the Dorbyl shipyards in Durban, were closed down, while those that remained in operation went through cycles of downsizing and rationalization. Export of South African-made arms was pursued relentlessly, but with the UN embargoes still in force, the success of the drive was limited. Arms sales, mainly to states like Iraq, Chile, and Taiwan, rose from R236 million in 1989 to about R600 million by 1994. This clearly did not compensate for the decline in the SADF budget. However, valuable lessons were learnt and arms-producing companies improved their marketing skills. Most of them spent considerable amounts of time and money on attempts to find commercial applications for their technology and facilities during this period. Others diversified by acquiring businesses in related civilian markets that could benefit from association with their high technological skills. However, there was no formal national policy for the defence industry. The government's attention was focused on managing the transition to democracy. The industry was therefore restructured in an ad hoc, market-driven, and largely chaotic way.

By 1994, the industry was much smaller and had lost significant capacity and capability. However it had reshaped into a tougher, more cost effective and consequently more competitive actor in the international arms scene.

SHAPING SOUTH AFRICA'S DEFENCE INDUSTRY: 1994–2002

The end of the Cold War had significant effects on the international arms trade, as defence spending went into sharp decline around the world. At the same time the cost of developing more complex weapons systems continued rising, making it more difficult to recover the cost of development over shorter production runs. The result was a wave of mergers and consolidations amongst the large international players. In Europe, major defence conglomerates such as the European Aeronautics Defence and Space Company (EADS), BAe Systems, Thales, and Alenia emerged. In the USA, Hughes and McDonnell Douglas were absorbed by larger groups. Of equal importance was the increasing recognition that a company should not develop major systems on its own when the cost and risk could be mitigated by establishing joint ventures with different suppliers. Most major weapons systems today are assemblies of subsystems and components manufactured by a number of specialized suppliers.

With the downturn in defence spending after 1989, one of the strategies for the survival of the arms industry proposed by Armscor was to participate in the commercial market, producing civilian goods for the non-military market. However, the Armaments Development and Production Act expressly prohibited Armscor from using its facilities for such purposes.² Furthermore, private defence sector companies complained that Armscor had a vested interest in favouring its own subsidiaries at their expense. In April 1992 Armscor's manufacturing businesses were transferred to a new government-owned corporation, Denel. This resolved the conflict of interest, and restricted Armscor's functions to procurement, support for export marketing, arms control, the sale of SADF surplus weapons, and overall control of the armaments industry. Denel, as part of the Ministry for Public Enterprises, was free to compete in the commercial arena under normal conditions.

The new political order that emerged in 1994 following the election of an ANC-led government had a profound effect on all spheres of South African life, the armaments industry included. South Africa was readmitted as a member of the international community. The lifting of the UN embargoes in 1994 meant that any company could tender for military business in South Africa, while South African companies could compete as equals for business elsewhere. The openness of the new South African society also tore away the veil of secrecy that had long protected South African military contractors, and increased the level of public debate and competition. The level of distrust with which the military-industrial complex was viewed by the ANC alliance inevitably led to extended public debate on the need for, and the shape of, the military in a democratic South Africa.

Substantial new weapons system projects had been proposed during the run-up to the 1994 elections, and had been put on hold pending review by the new government. There was also the need to transform the SADF into a more representative South African National Defence Force (SANDF), while reducing military expenditure.

Defence Review and the structure of the Defence Department

The report was presented to Parliament in June 1997, and approved in April 1998. The Defence Review included a chapter on the defence industry, which was later developed into a White Paper on the Defence Related Industries by a Department of Defence (DoD) working group, under the auspices of the National Conventional Arms Control Committee (NCACC). The latter is a ministerial committee whose functions are setting policy on the industry, and in particular the transfer of arms, and issuing marketing and export permits to control the flow. The White Paper was completed in 1999 and approved by Cabinet in early 2000.³

The transformation of the organizational structure of the Ministry of Defence was completed following the publication, variously, of the Defence White paper, the Defence Review, and the White Paper on Defence. The functions of the defence industry were henceforth shared between the Defence Secretariat, Armscor and Denel.

DEFENCE SECRETARIAT

The Defence Secretary is the accounting officer of the department, and is also responsible for policy and civilian oversight for all defence matters. The Chief of Acquisitions reports to the Secretary and is answerable for industrial and procurement policy, including the co-ordination of the research and technology development programme of the department. The Acquisitions Division manages all projects up to the end of the project study phase, when it makes the "make or buy" decision, which is the key determinant of industry policy. Armscor is then instructed to go ahead with procurement, in line with the user requirement specification and the value system. The Chief of Acquisitions has a representative on each joint project team, to ensure that its mandate is carried out.⁴ The Directorate Conventional Arms Control also acts as the secretariat for the NCACC, and all applications for export permits are channelled through it.

ARMSCOR

Armscor is the designated acquisition agency of the DoD. Having surrendered to the Defence Secretary its roles as policymaker, nurturer of the industry and controller of arms transfers, Armscor's main function is to manage the acquisition process for the DoD. Its primary duties are programme management, the drafting of tender documentation, and the awarding of contracts. It ensures that the technical, legal, and financial integrity of companies supplying acquisitions are in accordance with DoD requirements. Additional tasks include offering marketing support for the industry, facilitating participation in international armaments shows, and the co-management of Industrial Participation Programmes with the Department of Trade and Industry (DTI). Armscor also functions as fund manager for a number of testing or research facilities that are strategically important but cannot operate on a purely commercial basis. Examples are the Gerotek vehicle test track, Alkantpan artillery range and the Institute for Maritime Technology.

DENEL

The third defence industry function is supplied by Denel, which does not fall within the Ministry of Defence but under the Minister of Public Enterprises. Denel is now the major manufacturer of weapons systems for the SANDF, with its main focus on aerospace and ordinance. Its relationship with Armscor is the same as that of the private industry. Denel is expected to act like a commercial enterprise in that it operates on a profit-oriented basis. Consequently, projects have to be commercially justified rather

than purely strategically motivated, as was the view that dominated in Armscor in earlier times. Ultimately it must be possible to privatize Denel, which can happen only if its operations are profitable and the company can show a clean balance sheet. However currently at Denel decisions on staff reduction and closures are more critically examined than would be the case for any similar company in the private sector, as will be outlined below.

The Defence Review and policy developments

A number of important policy guidelines, with a profound influence on the direction of the industry, were agreed in the Defence Review. First, procurement should be competitive. "Fair and open competition shall be used as far as is practicable in the procurement of armaments. This shall include the invitation of foreign tenders". Second, self-sufficiency is no longer a prime criterion.

The new Government of National Unity (GNU) undertook a comprehensive, consultative, and public review of all aspects of South Africa's defence.

“South Africa shall not strive for self-sufficiency in arms development, but only limited self-sufficiency in key areas... Department of Defence acquisition guidelines shall form the basis for defence industry planning. Technology development shall be targeted primarily at those areas where self-sufficiency is to be maintained.”

Third, all else being equal, local producers should be used. “Preference shall be given to the procurement of defence products and services from local suppliers, providing such procurement represents good value for money.” Because major armament systems have very long operational lives, extending for decades in some cases if upgrading and refitting is included, life cycle costing is an important element in determining cost effectiveness. Fourth, Armscor should make orders as high up in the systems hierarchy as possible. For example, it should contract for an entire aircraft rather than an airframe with an engine and some avionics. It is now up to the platform supplier to select and order subsystems from contractors, and take responsibility for the overall performance of systems. Although Armscor may in some cases specify subsystems or subcontractors, the previously close relationship Armscor had with industry has been weakened.⁵

EXPORT PROMOTION

The Defence Review recognized the importance of an armaments industry on the following grounds.

- The defence industry is a strategic and economic asset that has to be retained and developed. This will ensure self-sufficiency in strategic areas, the acquisition of cost-effective equipment, the earning of foreign exchange and the development of a high technology manufacturing capacity.⁶
- The local industry can confer operational advantages through offering unique solutions to the demands of local conditions through the design or adaptation of equipment. Being local, the industry can also contribute effective logistical support after purchase.
- From a socio-economic point of view, the industry can contribute significantly to the general standard of technical sophistication of local manufacturers.

In the White Paper on Defence Related Industries, export support is justified on the following grounds.

- Exports will help local companies to reach internationally competitive standards, to achieve efficient economies of scale and to generate monies for research and development. The latter is particularly important, as the DoD does not have the resources to sustain the technological development of the local defence manufacturers on its own. The SANDF will benefit from the export drive, obtaining equipment of better quality at lower cost.
- Armaments can be sold only to governments. Because governments will purchase arms only

from those countries whose industries can support the systems over their full lifecycles, guarantees from the exporting country may be required.

- Where specialized financial arrangements are required, other state structures may have a role, such as providing export credit guarantees.
- Industrial participation, which requires government involvement, is the norm internationally, and especially where joint ventures or investment in local industry are concerned.
- User involvement is essential throughout the process, including during discussions of operational doctrine, assistance with trials, and supply from stock.⁷

The White Paper commits organized industry, the DoD, Armscor, the DTI, the SANDF, and the Department of Foreign Affairs (DFA) to playing an active role in the promotion of exports. This does not replace the marketing efforts of Denel and the private sector suppliers, but assists and amplifies them, while ensuring that adequate control measures are maintained. The DTI is expected to assist with market information provided by its trade councillors, and with export advice to the industry in general. The DFA is required to contribute political advice relating to dealings with particular countries, and diplomatic support from its foreign missions.

The Defence Secretariat is in the process of setting up a South African Defence Export Support Organisation (SADESO), which comprises members drawn from the Acquisitions Division of the Secretariat, Armscor and the SA Aerospace, Maritime, and Defence Related Industries Association (AMD). This new organization will co-ordinate marketing support for the arms industry, and may take over the export support function from Armscor to ensure universal participation.⁸

The Defence Secretariat participates in a number of bilateral commissions on defence matters. Partners include the People's Republic of China, Germany, France, Italy, the UK, the USA, Nigeria, Algeria, Sweden and most of the Southern African Development Community (SADC) countries. These commissions are also used to promote co-operation between the defence industries of the participating countries.⁹ The NCACC does not participate in the institutional provision of export support to the industry. Instead its function is to ensure that defence exports comply with the broader interests of South Africa, and do not compromise its diplomatic and security interests. Asked to comment on the functioning of the NCACC, members of the arms industry report that the process of granting approvals is very slow, and that policy is inconsistent: approvals of exports to certain countries are given and withdrawn unpredictably, even in mid-project.

Technology policy

According to the White Paper on Defence Related Industries, technology policy must support the strategic

requirements of the SANDF. However since it is unaffordable to support all areas, technology policy is focused on those activities that are classified as strategically essential. These include those that cannot be satisfied through procurement of standard equipment, technologies that provide an operational advantage, and those that can ensure fast turnaround for maintenance, repair or upgrading of systems.

The White Paper identifies logistic support, repair and maintenance of equipment and systems, systems integration, command control and communications systems, sensors signal processing and data processing and combat systems software and support as falling within the scope of strategically essential technology policy.

The Defence Research and Development Council (DRDC) controls policy and funding for the technology activities of the industry. It is chaired by the Chief of Acquisition of the DoD and works closely with the Armscor technology division. Its policies are aimed at supporting research and development (R&D), which is less often undertaken by the private sector, due to low profitability.

When a decision is taken to manufacture rather than purchase equipment, the project plan may include development funding. In the past major systems were developed using project funds, such as the Rooikat armoured car and the Rooivalk attack helicopter. Some industry observers have expressed doubt that funding on this scale will ever be available again, which implies that complete major platforms are unlikely to be developed locally again.

Industrial participation

Industrial offset programmes are an international phenomenon, especially in the defence industry. They are designed to balance out the inevitable imports with exports, and to compensate domestic industry for the loss of certain manufacturing projects (which they may not be fully qualified to carry out), with appropriate opportunities to participate in projects within their areas of expertise.

Armscor has maintained a policy of industrial offsets since 1989. Industrial participation (IP) on a national basis (NIP), became mandatory in September 1996, when Cabinet approved the principle of using government procurement as an instrument to leverage economic and industrial

benefits.¹⁰ In terms of the NIP policy, industrial participation becomes obligatory when government departments and parastatals such as Armscor conclude foreign procurement, purchases or lease contracts with a value of more than \$10 million. In terms of the NIP policy, the required IP obligation is at least 50% of the value of the contracts.

In line with, and additional to, the minimum requirements of these provisions of the NIP policy, the policies of the Ministry of Defence and Armscor impose an IP obligation on all defence purchases exceeding a value of \$2 million. This initial obligation focuses on strategic business within the domain of the defence industry, and is commonly known as 'defence industrial participation' (DIP). Armscor's IP policy stipulates a minimum counter-trade commitment at least equal to the value of the purchase contract. For defence contracts with a value above \$10 million, the requirement for IP commitment is divided equally between DIP and NIP.

SANDF force design and equipment needs

The Defence Review brought about drastic changes in the role of the SANDF in order to accommodate the altered circumstances of the country and region. The

Table 2: Equipment requirements

Equipment	Number required
Main battle tanks (currently Olifant Mk 1 A/B)	154
Armoured cars (currently Eland Mk. VII)	146
Armoured cars (Rooikat)	242
Anti-armour missile systems (ZT-3)	53
G 5 towed artillery	45
G 6 self-propelled artillery	43
127mm multiple rocket launchers	25
Infantry combat vehicles (currently Ratel)	1,214
Mine-protected troop carriers	4,304
Combat support helicopters (Rooivalk)	12
Advanced fighters (Cheetah, Gripen)	32
Lead-in jet training aircraft (Impala, Hawk)	16
Turboprop trainers (Pilatus PC-7)	60
Light recce aircraft (Cessna 185/PC-6)	16
Medium transport helicopter (Oryx)	48
Light utility helicopters (Alouette, BK 117, Agusta A109)	48
Electronic surveillance/in-flight refueling (Boeing 707)	5
Light transport aircraft (Caravan, Kingair)	12
Medium transport aircraft (DC-3, Casa 212)	20
Heavy transport aircraft (C130)	12
Maritime patrol vessels	16
VIP transport vehicles	9
Corvettes	4
Corvette-borne helicopters	5
Submarines	4
In-shore patrol vessels	2
Harbour patrol boats	39
Strike craft	6
Minesweepers/mine hunters	8
Combat support ships	1

emphasis is now on a primarily defensive role, but one that also takes responsibility for peacekeeping commitments on the continent.

The design of the SANDF has been built around the notion of a core force that will be small but technologically advanced. The reasoning is that a defence capability cannot be built from scratch if the need should suddenly arise. The force is intended to provide defence against a range of short-term contingencies, to provide early warning of conflict or crisis, and to form a nucleus capable of growth in the future. Although this force is quite small, the use of a comprehensive range of advanced technology is expected to equip it to meet its commitments satisfactorily.

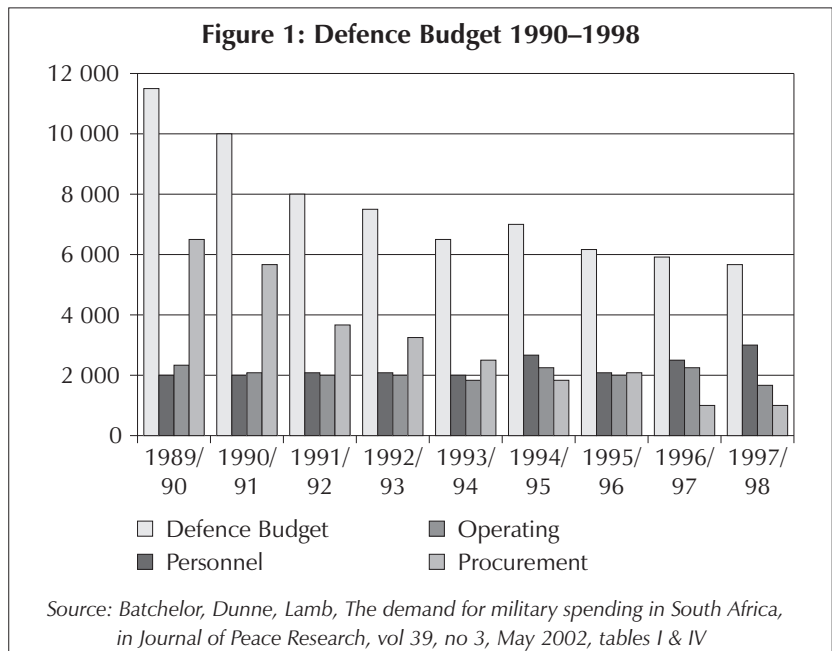
The equipment required by the force according to the Defence Review¹¹ is shown in table 2.

DEFENCE SPENDING

As shown in figure 1, the defence budget steadily declined from 1989 to 1990, a trend that continued after 1994, falling from 2.4% of gross domestic product (GDP) to 1.6% in 1998. Capital spending and procurement bore the brunt of the cost cutting, declining by 62% from 1994–1998. Personnel costs remained fairly constant, as large numbers of low-paid defence force conscripts were replaced by relatively better-paid regulars.

The procurement budget for the years 1998–2002 is shown in figure 2. The capital budget continued its decline until 2000, reaching a low of 1.5% of GDP. Following the approval of the Defence Review and the launch of the Strategic Defence Package (SDP), the procurement budget rose sharply. Analysts expect that the procurement budget will stabilize in 2004 at a level of about 1.8% of GDP, which should be adequate to allow for the rational upgrading and replacement of equipment. This level should be sustainable for the foreseeable future, even allowing for the redirection of national resources to social spending, given the fiscal and monetary discipline achieved by the government since 1994.

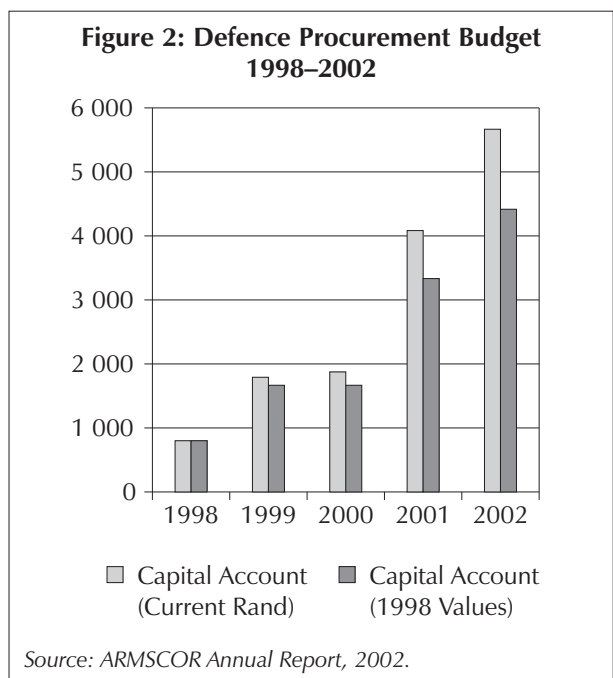
Between 1989 and 1998 the defence industry endured severe cutbacks, leading to huge reductions in capacity and the discontinuation of many key product lines and capabilities. That it survived at all testifies to considerable resilience of the industry. The rapid rise in spending since then, along with export promotion and industrial participation, has transformed the industry and given it the means to sustain its growth.



Black economic empowerment

The new government has consistently stated its intention to transform the South African economy and to redress the wrongs of the past by adopting a concerted programme of black economic empowerment. This policy has been effectively applied by agencies of the state such as central government, Eskom, Telkom and Armscor. The last three have not only transformed themselves into more racially equitable institutions, but have also set minimum requirements that must be met by any supplier wishing to tender for contracts.

The black empowerment policy, which was recently formalised by the government, contains the following provisions.



- Proportionate transfer of shareholding to the previously disadvantaged racial groups should occur. Such groups of shareholders should be broadly representative, to avoid charges of enrichment of the few. Most defence contractors have transferred up to 25% of shares to groups of back investors. Some companies have reported that where they have formed relationships with established black businesses, the new shareholders have been able to add substantial value.
- Emphasis should be placed on the training and development of personnel from the designated groups. Here too there is evidence that most companies are spending a greater proportion of their training expenditure on individuals from previously disadvantaged backgrounds. For example Denel aims to spend 70–80% of its training budget in this way. It also operates the Kentron Bridging School, which prepares candidates for careers in technology.
- Enterprises should strive to allocate a given portion of their procurement budgets to small and medium business enterprises, to assist entrepreneurs from the historically disadvantaged communities. This presents a major problem, given the specialized nature of the defence industry. There are currently very few black-owned small, micro or medium-sized enterprises in this field.
- Transformation of the racial composition of companies should take place at all levels, to better represent the demographics of South African society. In the case of the private sector, there is an obligation to submit plans to the government, showing the employment equity plan of each business. Annual reports are submitted to chart the implementation of these plans. In the case of the parastatals, Denel and Armscor, currently there is a prohibition on the appointment of white staff without the approval of the board.

The defence industry relies more than most on experienced, highly skilled manpower from the professional ranks for its viability and growth. Although transformation is progressing well, the formation of engineering skills needed for systems engineers and technical specialists takes time and disparities in senior engineering and management posts still exist.

THE DEFENCE INDUSTRY TODAY

It now regards itself as having a future in the global community, while simultaneously enjoying the full support of the South African government. Strategies used to develop the defence industry have been aimed at building on existing strengths and establishing competitive advantage. Through a

complex process (including tendering in competition with world-class products, both locally and internationally), companies have been able to identify core products or competencies that are worth maintaining. These include:

- G5 and G6 and related artillery systems;
- turret/gun systems for armoured cars and infantry combat vehicles;
- ammunition and propulsion systems for the above;
- observation payloads and sighting systems for unmanned airborne vehicles and helicopters made by Kentron;
- air-ground self-defence missile systems made by Kentron;
- laser range finders and submarine periscopes made by Eloptra;
- mine protected vehicles made by Alvis-OMC;
- missile launch warning systems and low cost radar warning receivers for aircraft made by Grintek;
- health and utilisation monitoring systems for avionics made by AMS; and
- electronic fuses for a variety of artillery rounds and aircraft bombs made by Reunert.

Capabilities or facilities that are deemed viable include:

- manufacture of airframe sections by Denel Aviation;
- precision engineering for aircraft gearboxes and other engine maintenance by Denel Airmotive;
- systems engineering and project management at ATE, a company that can handle major upgrading and weapon integration programming on a wide variety of aircraft;
- specialised systems engineering and project management by a number of skills-based smaller companies, who handle smaller projects or portions of projects for local and overseas clients; and
- upgrading and reconditioning of a variety of platforms by various companies.

After the restructuring period of the mid-1990s, the industry has been reorienting itself.

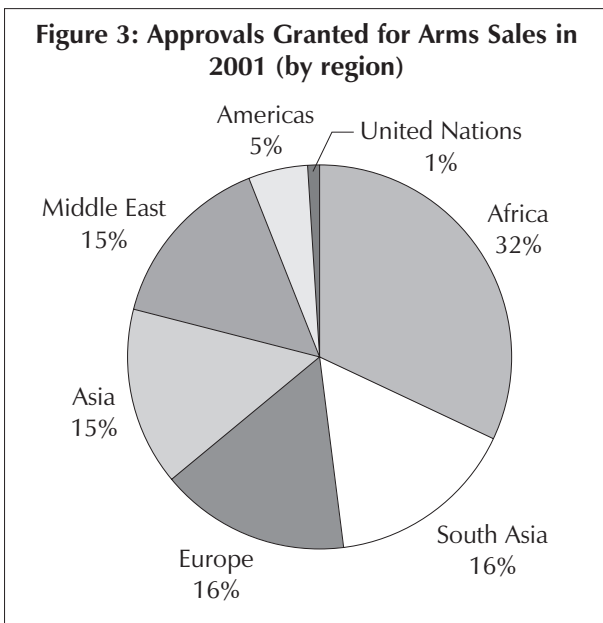
Some high profile products that are no longer considered viable include the Olifant main battle tank, shipbuilding in general, and the manufacture of personal weapons and ammunition. The latter are being affected by the worldwide glut of capacity. Therefore the South African industry is focusing on small volume products, such as machine guns for combat vehicle turrets and custom built hunting rifles, as well as exporting brass parts to ammunition manufacturers, which is still profitable and sustains the strategic small arms ammunition manufacturing facility.¹²

Products and facilities identified as uncompetitive have been merged or closed down. For instance, the Dorbyl shipyard in Durban was closed as it became

evident that shipbuilding was no longer financially viable. Reunert sold its share of the business to Vickers of the UK. Alvis-OMC now focuses on upgrading and supporting those of its products in service with the SANDF, and exports newly-built mine-protected vehicles. Alvis Gear Ratio has expanded its client base to include a number of heavy vehicle manufacturers, both locally and abroad.¹³ The net result of these closures has been a reduction in the number of companies working in the arms industry.

Exports and their benefits

Exports have been growing steadily since 1994. According to the Directorate of Conventional Arms Control, export approvals worth R1.384 million were granted in 2000, rising to R1.736 million in 2001. This compares with R854 million in 1994 (all in nominal rand). All indications are that these numbers will rise further. The strategy of focusing on competitive products and exporting aggressively is clearly paying off. Already some companies such as Eloptro (Denel), Grintek ewation, and Fuchs (Reunert) export virtually their total output. Many companies such as Alvis-OMC, Grintron (Grintek) and RDI (Reunert) do more than 50% of their business abroad. Approved sales for 2001 appears in figure 3.



Algeria accounts for 28% of all sales in Africa, with the rest of the continent accounting for four percent of sales.

Partnerships

Partnering has increased at both the local and international levels. Because of the pre-1992 Armscor policy of earmarking particular technologies for use by particular firms, there was very little overlap in the arms industry. Traditionally there has been relatively

low vertical integration in manufacturing, with considerable subcontracting. For instance, the components for the engine, transmission, drive train and suspension of armoured vehicles were purchased as separate items. This trend has continued and cooperation between manufacturers and the scale of subcontracting has grown.

It is on the international front that the most effective use is made of partnerships. These can take the form of shareholding in joint venture companies, or of joint venture projects, which are regulated by memorandums of understanding assigning roles and rewards within particular projects.

The following list summarises some of the important shareholding agreements entered into by the armaments industry.

- Denel sold 51% of Airmotive to Turbomeca of France in February 2002. The new company, Turbomeca Africa, will play an enhanced role in the maintenance of some of the Turbomeca products used in the aircraft of the SANDF.¹⁴
- Grintek has made extensive use of joint ventures to drive its diversification into telecommunications and industrial electronics. It currently has two important joint ventures in the defence field. SAAB of Sweden holds 49% of Grintron, which specialises in the communications systems and equipment markets and electronic self-protection systems. The German ewation division of EADS holds 45% of Grintek ewation. Both companies export more than 50% of their turnover, and have been receiving increasing export orders, most of them from the European market.¹⁵
- Alvis-OMC is 75% owned by Alvis of the UK, and 25% by DGD technologies, an empowerment group. The OMC's product range and market allocations are fully integrated with those of Alvis, and exports stand at about 50% of turnover. Furthermore, Alvis has invested substantially in research and development facilities in the company, and is commissioning design work in South Africa.¹⁶
- Reutech Radar Systems is 33% owned by the DAS division (Germany) of EADS. The company probably could not exist without the relationship, which combines technology on the one hand with the export of products and subsystems on the other. The product range is of such complexity and sells in such small runs that these inputs are essential to ensure the viability of the company.¹⁷

There are many other non-shareholding joint ventures. Denel alone had as many as 13 key international partnerships in 2002.¹⁸ The private sector has many more. These partnerships provide technology and export opportunities for the local market, and therefore play an essential part in the resurgence of the industry.

The costs of closures and conversions

After the major cutbacks of 1989–1994, most companies started to develop projects to convert their technology to commercial use. Most of these efforts failed, and have subsequently been closed. It is a basic truism that introducing new products into existing markets and existing products into new markets both carry risks. Given that the existing market was in the process of shrinking, the lowest-risk route was to pursue exports.

Nevertheless, some successes were achieved in fields other than exports. Broadly speaking, these can be divided into three categories.

INTRODUCING EXISTING PRODUCTS INTO NEW MARKETS

Existing products can be introduced into new markets only when the article or technology is quite literally dual-use, which is rarely the case. There have been two major successes in this area. First is the production of mine-protected and armoured troop carriers by Alvis-OMC. The latter are able, with little adaptation, to find markets in police forces, and in private security companies (for such tasks as cash-in-transit protection). Second is the aviation industry in general (that is, companies that design, manufacture or maintain aircraft or aircraft components). In many areas, aviation industry technology is identical for civil or military applications, or can be easily adapted to civilian use. Denel Aviation is manufacturing gearboxes, amongst other high-tech components, for Boeing, while Aerosud is building cabin fittings, also for Boeing. The technology of these items is closely related to that used for military aviation, and the companies manufacturing them needed only to acquire application and product-specific skills.

DIVERSIFICATION BY ACQUISITION

Some companies that were heavily or exclusively involved in the defence industry diversified through acquisition. The intention was to broaden the customer base and protect shareholder value, rather than to convert technology. For example, Denel acquired a number of small commercial companies, including Irengo and Voltco. The former makes miscellaneous electronic gadgets and cheap plastic products, and the latter manufactures domestic electric fittings. Denel is considering how best to use them to add value to the group.¹⁹

Grintek has adopted a somewhat different approach and acquired shares in a number of small companies

active in the field of telecommunications. The professional telecommunications field is not all that far removed from the military communications systems that Grintek produces. The acquired companies would stand a better chance of penetrating Telkom's market with Grintek's backing. Also, Grintek can offer top engineering skills, which would add value to the services offered to customers, making these companies value-added resellers. On this basis Grintek Telecom has done very well, earning 44% of Grintek's turnover in 2002.²⁰

TRUE CONVERSION

Most arms-producing companies tried developing products for the commercial market using technologies derived from military products. The vast majority failed for one or more of the following reasons:

- there was not a large enough market for the item;
- the product was either not properly packaged for commercial consumption or did not appeal to buyers;
- the manufacturing companies did not understand the needs of the target markets or how to position their products in these markets;
- the overhead structure required of a professional or military contractor is too heavy, and tends to result in inflated prices; and
- the mindset of management accustomed to the military environment is unsuited to that required by the commercial market.

Building complex weapon systems requires companies to work together.

There is one outstanding example of a successful conversion. UEC Projects, belonging to the Altech group, designed and manufactured the Digital Satellite Television (DSTV) decoder, which earns over R500 million per annum. This project was successful because UEC possessed the technological skills needed for fast digital signal processing and the design and production of the required circuit boards. Neither of these skills existed in the TV industry at the time. UEC was approached by Multichoice, which possessed both the market know-how and the critical technological expertise required for encryption and the design of satellite decoders using highly compressed signals. Both groups worked with Panasonic, which had volume manufacture expertise and consumer market distribution skills and channels.

Denel has set up a company, Dendustri, which has also shown promise. Several of the Denel divisions set up separate workshops to house surplus machines and seek work in industry. These were combined under a management aiming to ensure dedication, mindset change, and the trimming of overheads. Dendustri has been awarded a contract to supply anodes (a specific area of electronics) to the aluminium smelter in Richards Bay.²¹

THE MANUFACTURERS

Denel

Denel revised its management strategy in 1999 in light of its experiences during the first few years of political transition. It now perceives of itself as a global player in the defence industry. It has abandoned the notion of conversion and diversification into civilian markets, and is re-examining existing commercial operations with an eye to their commercial viability and their compatibility with the core business. Denel has been in a continual process of restructuring, re-organising, and adding and disposing of business units and projects as it has adapted to the changing commercial environment. The current structure is compared with that of 1993 in table 3.

The following is a summary of some of the major changes that occurred after 1994:

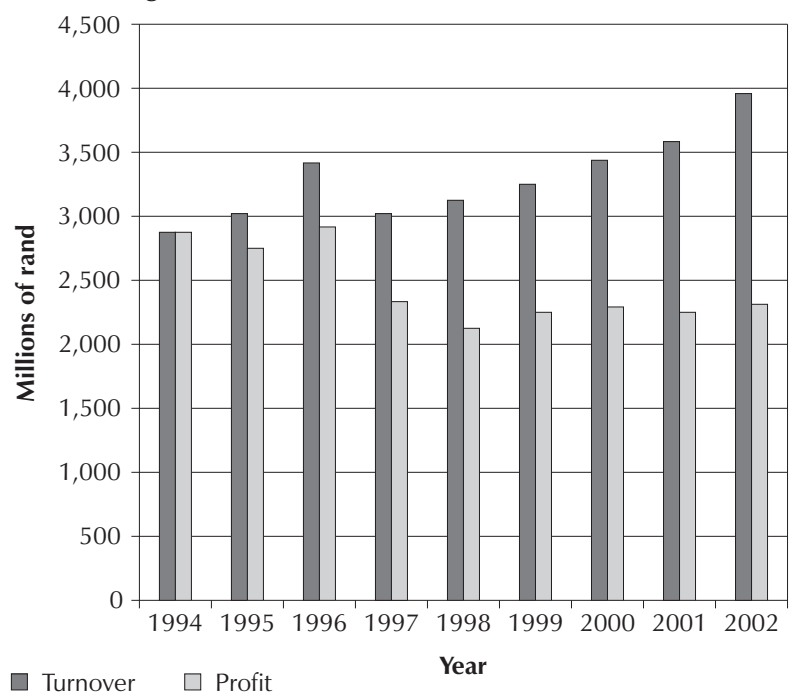
- Denel was re-organised in terms of a more market-oriented framework (as opposed to the technological framework of 1993).
- Houwteq, the satellite project, was closed down.
- Infoplan, who provided computer bureau services to the SANDF, was transferred to the State IT Agency (SITA). This represented a loss of turnover to Denel of some R300 million per annum.
- Denel's commercial IT business, Ariel Technologies, was merged with the IT businesses of Transnet and Eskom to form Arivia.com, in which Denel retains a 22.98% interest.
- Simera was restructured into the three core business areas of providing aircraft and airframe, engines, and personnel to the South African Air Force (SAAF).
- Fifty-one percent of Denel Air-motive was sold to Turbomeca.
- Its Aviation Transport Maintenance business, which was severely affected by the downturn in international aviation after September 11, 2001, was closed down.
- The company's 50% shareholding in Debis IT Services was sold back to Debis IT Germany.
- Mechem's research and development division was sold to the Council for Scientific and Industrial Research (CSIR).
- The small calibre weapons manufacturers *Lyttleton Ingenieurswese Werke* (LIW) and Musgrave were merged to form Vektor.
- Dendustri was formed to consolidate the commercial activities of Denel's various manufacturing operations.
- The Gerotek vehicle test range was transferred to Armscor.

Denel's turnover, after adjusting for inflation (now at 80% of the 1994

Table 3: Structure of Denel

1993	2003
Corporate Denel Insurance Dinmar (Marketing)	Other Densecure
Systems LIW Kentron Eloptro Musgrave Mechem	Denel Ordnance LIW La Forge Mechem Naschem PMP Somchem Swartklip Vektor
Manufacturing Naschem PMP Somchem Swartklip	Denel Aerospace Denel Aviation Astro Park Denel Personnel systems (DPS) Eloptro Kentron Overberg Test Range
Aerospace Simera (Atlas Aircraft) Houwteq Overberg Test Range	Denel Commercial Irenco Dendustri SPP Properties IT Business
Engineering Dendex Gennan (Gerotek) Mexa	
Informatics Infoplan Excelsa Intersolve health	
Properties Denprop Bonaeropark	

Figure 4: Denel Turnover and Profit 1994–2002

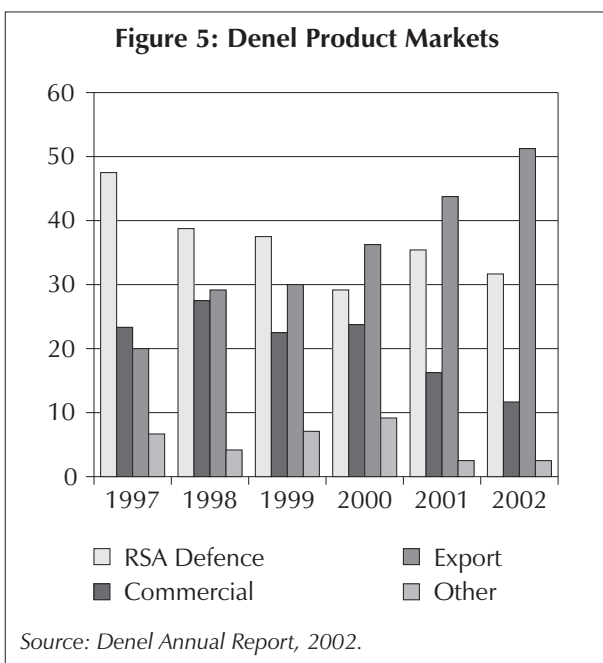


Source: Denel Annual Report, 2002.

figure in real terms) has remained remarkably stable, considering the considerable decline in defence spending and the major restructuring that the group has undergone (see figure 4). The growth of export sales as compared with local military and commercial sales is reflected in figure 5. Exports have played a major role in shoring up Denel's performance.

The annual report for 2002 shows that Denel's figures for that year include R124.7 million in restructuring costs for Datam and Turbomeca/Airmotive, R126 million for Rooivalk write-offs, and R183 million for losses on discontinued operations. Accounting for continuing operations only would yield a loss of R180 million. But if the amount spent on Rooivalk write-offs were set aside, Denel would have made a profit of R124.9 million after tax. Some of the projects and facilities which would have been closed down earlier had they been in the private sector were retained because of the political and strategic exigencies that apply to Denel as a state-owned corporation.

Nevertheless it would appear that the worst is behind Denel, and that there is a realistic prospect of a return to profitability. The worst problems appear to have been addressed, and the order book has been growing. Anecdotal evidence indicates that while Denel has grown dramatically (from earnings of R5.1 billion in 2001 to 7.5 billion in 2002), the 2003/4 financial year has started with orders at the highest volume yet recorded. Exports in particular are rising sharply, and are essential to Denel's viability in the future.



Some of Denel's major export projects include the following:

- The Finnish Navy has selected the Umkhonto vertical launch surface-to-air missile to equip 6 vessels.
- Eloptra has received a R62 million contract from Zeiss for submarine periscopes.²²

- Eloptra has also received orders from the UK for laser range finders. These and laser target designators are selling well overseas.²³
- Kentron has received several orders for observation payloads for Unmanned Aerial Vehicles. The position determination sub-system for the BAE helmet mounted sight is also proving popular with international clients.²⁴
- Denel Aviation supplies the auxiliary gearbox for RB 211 engine on Boeings.
- The G5 and G6 artillery systems, with ammunition, continue to sell in high volumes.

The private sector

The private sector is much more susceptible to shareholder pressure for profit performance, and is therefore much less tolerant of losses and uncertainty. The declining defence spending since 1989 has therefore had the most visible effect in the private sector. Procurement spending with the private sector was 55.5% of total local spending in 1994. This had declined to 45% of a much reduced spend in 2001. The incidence of closures was thus much accentuated in the private sector. The most high profile cases were Altech's exit from the defence industry when they disposed of ADS to Thales of France, the sale of Reumech-OMC to Vickers/Alvis, the disposal of Grintek by Anglovaal, and the disposal of Truckmakers and Plessey-Tellumat by Sanlam. Whereas the private sector had consisted mainly of the big three in 1994 (Reunert, Altech, and Grintek), turnover in 2001 is spread over five majors, namely ATE (9.2%), Reutech (8.8%), Grintek (8.5%), ADS (4.2%), Alvis-OMC (4.4%), and miscellaneous others having 10%.

The 41 members of the SA Aerospace, Maritime and Defence Industries Association (AMD) claim to represent 90% of all defence related business in South Africa and 97% of all defence related exports. Of the 41 companies, 26 can be classified small and medium enterprises. The number of significant companies has clearly declined drastically. In 1993 112 of the nearly 3000 firms in the industry derived more than 50% of their revenue from defence. Those that survive do so mainly by reliance on exports.

There are a large number of small, skills-based, entrepreneurial companies that live off subcontracts from the majors, out of whom they often have originated. They tend to also find other work both locally and abroad and therefore serve the purpose of migrating defence industry skills to the rest of industry. Some examples include:

- Aerosud, which exports cabin fittings for Boeing 737 series aircraft;
- Land Mobility Technology, who do suspension simulation, evaluation, and qualification for Land Rover;
- MDB, who are giving engineering and management input to Jordan in the upgrading and refurbishment of 100 second-hand Ratel vehicles;

- Excel, Logtec, and ITC who provide logistic system engineering and support; and
- Ansys, who specialise in weapon systems' integration on aircraft.

CONCLUSIONS

The arms industry has undergone a thorough restructuring during the last decade. Initially the changes were simply a continuation of the downsizing and closures that had marked the period 1989–1994. Only projects in progress and rising export sales sustained the industry during this time, but on an ever-declining defence budget. The financial year ending in March 2001 marked the turning point. Spending rose dramatically, driven by the Strategic Defence Packages (SDPs), and the DIP projects that followed. The period was marked by the formation of partnerships between local and major international defence equipment companies. These opened up many opportunities for local manufacturers, connected with SDP projects and entry into international markets. Today the industry is much smaller than it was in 1989 in terms of turnover, employment, and range of products. However, the products are competitive, they are finding international markets, and turnover is growing. Participation in the support, maintenance, and upgrading of the new systems provides the broad base of the industry's earnings and an opportunity for the transfer of technology.

The weapons industry has therefore repositioned itself as a supplier of sophisticated products like components or subsystems to first-tier clients in Europe or the USA, and of complete products to second-tier clients like countries in the Middle East and South and South-East Asia. The Defence Review process has established a blueprint for a core force that defines the direction which product and technology development will follow for years to come. Procurement and technology policy has been developed to steer industry development in the desired direction. As further main equipment projects are implemented, those platforms that cannot be obtained locally will be procured overseas. However, the DIP requirements should ensure that local companies participate meaningfully in such projects.

It would therefore appear that the arms industry is again on the path to sustainable growth and profitability. The policies outlined above are driven primarily by commercial concerns, insofar as they are intended to create an internationally competitive arms industry, orientated towards export and participating in the local market on an open basis. Therefore the industry has focused its product range on those markets that offer the best commercial opportunities. Thus the product range has become quite sophisticated and the markets of choice are found in Asia, the Middle East, South Asia, and via European partners primarily to first world clients.

However, as with other sectors, the industry is facing the challenge of implementing employment equity practices while sustaining its market position.

Exports into Africa, excluding sales to North Africa, were only 3.8% of exports in 2001. It is unlikely that the present direction and structure of the industry could see any increase in this figure. Exports into Africa are problematic in part because most sub-Saharan countries have relatively small defence budgets and modest requirements. In addition, under the National Conventional Arms Control Act of 2002, South African export licensing must take into account situations of conflict, impact on development and other factors that could prevent some African countries purchasing weapons from South Africa.

On the other hand the government has signed the Protocol on Politics, Defence, and Security Co-operation in the Southern African Development Community (SADC) Region. In terms of this protocol and the subsequent SADC Mutual Defence Treaty, the governments undertake to participate in a number of areas, including military co-operation between the armed forces, the development of a collective security capacity for responding to external threat and regional peacekeeping capacity within national armies, such as the recent agreement on an African Standby Force. This broad agreement would suggest an increased effort to standardize equipment, at least to the level of ensuring interoperability. Yet, although South Africa has the manufacturing base to play an important role in the provision of logistic and maintenance support in the region, such engagement would not seem to fit into the emerging nature of our defence industry. In this sense there is a discernable dislocation between South Africa's defence industrial policy and foreign policy as reflected in NEPAD and other commitments. The question therefore should be what role the defence industry should play in support of foreign and national security policy, and what role government and the DoD in particular should play in this regard.

NOTES

- 1 This section is drawn from P Batchelor and S Willet, *Disarmament and Defence Industrial Adjustment in South Africa*, SIPRI, 1998, chapter 2.
- 2 *Ibid*, p 85.
- 3 White Paper on Defence Related Industries, December 1999. See also <<http://www.polity.org.za/govdocs/white-papers/defence>>.
- 4 Private communication with Bruce Ramfolo, Head of Acquisition, Secretariat for Defence, April 2003.
- 5 Private communication with GJ Smit, General Manager, Acquisition, Armscor, April 2003. Also private communication with S Grobbelaar, Managing Director: Grintek, April 2003.
- 6 See the Defence Review Second Report, 21 February 1997.
- 7 White Paper on Defence Related Industries, p 1.
- 8 Private communication with Bruce Ramfolo, Head of Acquisition, Secretariat for Defence, April 2003.
- 9 *Ibid*.
- 10 Armscor website <<http://www.armscor.co.za/DIS/WhatisDIP.asp>>.
- 11 This force design requires a defence budget of about 2% of GDP, while the defence budget declined to 1.5% before the Strategic Defence Acquisition package was agreed in late 1999. It is currently running at around 1.8%. The numbers of most equipment types have accordingly been decreased in successive plans, but these serve as an indication of the approximate size and shape the defence force.
- 12 Private communication with J de Jager, retired Armscor senior manager
- 13 Private communication, T Savides, Director International Marketing, Alvis-OMC, April 2003.
- 14 Denel Annual Report, 2002, p 13-14.
- 15 Grintek Annual Report 2002, p 28.
- 16 Private communication, T Savides, op cit.
- 17 Private communication, C Stracham, Executive Officer Operations, ADS, April 2003.
- 18 Denel Annual Report 2002, p 15.
- 19 Private communication with T van Reenen, Company Secretary: Denel, March 2003.
- 20 Private communication, S Grobbelaar, op cit.
- 21 Private communication with T van Reenen, Company Secretary: Denel, March 2003.
- 22 Business Report, 21 October 2002.
- 23 Denel website, April 2003.
- 24 Private communication with H Pretorius, Group Executive Director: Aerospace, Denel, April 2003. Also private communication with T van Reenen, op cit.

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About this paper

The South African defence industry has evolved since its establishment in the 1960s. Once the generator of military equipment to the South African armed forces, today it is focused on the export market and engaging in international alliances to ensure sustainability. The evolution of this change is traced in this paper, while the challenges and prospects for the future of the industry are reviewed.

About the author

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