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Brazil: LDC Arms Merchant

An Intelligence Assessment

Secret

*ER 80-10130
February 1980*

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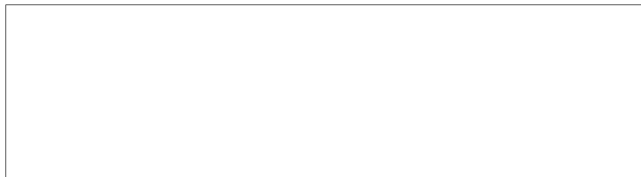
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Brazil: LDC Arms Merchant (C)

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*Research for this report was completed
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Key Judgments

With an estimated annual output of \$1.5 billion and active customers in over a dozen countries, Brazil is the largest arms producer and exporter among the less developed countries (LDCs). Brazil's dominant position is the result of a concerted drive for self-sufficiency, begun in the early 1960s, that supports the nation's aspirations to "Grandeza," including greater influence in world affairs. (s)

Production capabilities have expanded, and export sales have accelerated as Brazil has turned increasingly to foreign markets for income to underwrite development. Arms sales, in addition to aiding expansion of manufactured exports, are helping to cement relations with several neighboring countries and, to a limited extent, with Brazil's oil suppliers in the Arab world. We expect Brazilian arms exports to continue growing rapidly during the coming decade, with contracts doubling from the \$250 million in 1979 to about \$500 million by 1982. (s)

The drive to develop the arms industry has reflected Brazil's unique geopolitical position. The country's extensive borders with uninhabited and remote areas have fostered a concept of national security, which, together with the military's well-established internal security role, has made a well-equipped peacetime army a matter of national policy and prestige. Nonetheless, a lack of clear external threats and large outlays for economic development have inhibited military spending during the past 15 years. While Brazil's military establishment is the largest in Latin America—over 250,000 men in uniform and a defense budget exceeding \$2 billion—it constitutes only a minor drain on the nation's manpower and other resources. (C)

Rapid expansion of arms production during the past two decades has been made possible by development of a broad technological base. Most technology used in arms production has come from abroad, directly through licensing and indirectly from nonmilitary subsidiaries of multinationals operating in Brazil. Success in assimilating foreign arms technology results

* This paper presents the key judgments of a forthcoming larger, more comprehensive study, *Brazilian Arms Industry*, published as a Research Paper. The Research Paper will assess the current state of development of the Brazilian arms industry in greater detail, including its technological base and institutional framework. It will also provide an in-depth examination of specific arms producers and individual product lines. Copies of the Research Paper may be

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from a willingness to use relatively simple designs and extensive adaptation of civilian components. Nonetheless, Brazil still is dependent on foreign suppliers for a number of essential elements, including aircraft engines and advanced electronics. This dependence will continue in the 1980s as Brasilia's desire for more sophisticated weapons increasingly taxes the nation's technological base. (c)

Growth in the arms industry in the 1980s will depend heavily on expanding exports. Sales to the Middle East will continue to be the driving force behind arms export growth, with sales to Iraq alone expected to roughly double during the 1980-84 period. Sales to Latin America—Chile, Bolivia, Uruguay, and Venezuela—will also expand while Brazil's efforts to woo potential African clients such as Nigeria, Mauritania, and Mozambique begin to pay off in higher export earnings. Other major markets that Brasilia is interested in tapping include China, Indonesia, and Malaysia. (c)

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Arms Production

Brazil produces and exports a wider range of weaponry than any other LDC. Now the largest non-Communist producer of wheeled armored vehicles and sixth largest light aircraft producer, Brazil is rapidly developing its capabilities for producing jet military aircraft and tracked armor. The country's product line has expanded to include artillery rockets, mortars, and a wide range of automatic weapons and explosives. While most production is in state-owned firms, a private firm, Engenheiros Especializados, S.A. (ENGESA), which produces the wheeled armor and most military trucks, accounts for some 60 percent of total arms exports. (C)

Formerly dependent on the United States, the United Kingdom, and France for weapons, Brazil is now completely self-sufficient in a broad range of military goods—from simple light arms and ammunition to most types of armor. Production of military trucks was initiated in the late 1960s with the help of extensive infrastructure associated with the auto industry. Prototype armor production got under way in 1968, and aircraft production a few years later. Large subsequent gains in arms production have benefited from the rapid expansion of Brazilian industrial capacity, now the largest of any LDC and about three-fourths that of Italy and Canada. (C)

The Technological Base

Brazilian arms technology has been acquired primarily from multinationals based in the United States and Europe. It has come both directly, through licensing agreements, and indirectly, from civilian subsidiaries operating in the country. As the industrial and technological base has grown, a limited amount of truly indigenous technical development has taken place, most notably in wheeled armor production. (C)

Although a number of major products including jet aircraft and helicopters are currently produced under foreign license, Brazil's most notable success has been

the adaptation of civilian technology to military products. This has resulted in the creation of relatively simple models that minimize the need for foreign licenses and parts and thus maximize national control over production and marketing decisions. Brazilian armor in particular uses large amounts of components including engines, transmissions, and steering linkages that are interchangeable with civilian components. This not only facilitates production, but also simplifies troop training and maintenance and makes the product more appealing to LDC customers. (C)

While Brazil remains dependent on foreign suppliers in many key areas such as aircraft power plants and most electronics, it is expanding its production capacity in these areas as well. Development programs are under way for jet engines, computers, electronic firing and communication gear, and radar, although the payoff in most cases will be in the distant future. (C)

Decreasing Technical Dependence

Although Brazil remains dependent on foreign suppliers in many key areas, it is rapidly developing a capability to produce arms without foreign licenses and components. Armored production currently incorporates the greatest degree of independent technology of any major Brazilian weapons system. National industry provides dual-hardness armor, engines, transmissions, turret rings, wheels, tires, trucks, and suspension. The 90-millimeter (mm) gun for its armor is now produced under Belgian license without restrictions. The only essential dependency remaining appears to be the use of foreign optics, laser range-finders, and night-vision equipment. Recently, local production lines have expanded to include all essential components for tracked tanks patterned after US models of World War II vintage. (C)

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Table 1

Brazil: Major Weapons Produced for Domestic Use and Export

Producer	Comment	Producer	Comment
Military vehicles		Aircraft (continued)	
JARARACA command vehicle	ENGESA Brazilian designed; armed with 12.7-mm heavy machinegun.	Helicopters	Helibras Under French licenses/assembly only at present. SA-315 Lama and AS-350/ Esquirel.
CASCABEL armored recon vehicle	ENGESA Brazilian designed; six-wheeled, armed with 90-mm gun on turret.	Rockets	
URUTU amphibious armored personnel carrier	ENGESA Brazilian designed; armed with 16-mm cannon or twin 20-mm guns.	27-mm and 70-mm air-to-ground	Avibras Brazilian designed; the 70 is a copy of a Belgian design.
Military trucks	ENGESA Brazilian designed; all-terrain, all-wheeled drive with 1.5-, 2.5-, and 5-ton ratings.	Ground-to-ground	Avibras Brazilian designed; armed with 40-kg and 150-kg HE warheads; launchers made by ENGESA and Bernardini.
SUCURUI wheeled tank destroyer	ENGESA High speed; armed with 105-mm gun.	Multiple rocket system	Avibras Local version of 108-mm; range 2-5 km.
X1A2 tracked tank	Bernardini and six associated firms Local version of US M3A1 Stuart with 90-mm gun.	Artillery and ammunition	
Aircraft		90-mm gun and turret	ENGESA Made under Belgian license; used on local armor and for retrofit.
Xavante jet ground attack/trainer	EMBRAER Made under license from Aeromacchi of Italy.	90-mm ammunition	ENGESA Assembly licensed by Belgium.
Bandeirante transport	EMBRAER Brazilian designed; available in several civilian and military models.	105-mm ammunition	IMBEL
Turboprop trainers	Aerotec, EMBRAER and Neiva Local versions of T-23, T-25, and T-27.		

This table is Confidential.

Brazilian internalization of aircraft technology is impressive. The aircraft industry produces all its own airframes but engines and most avionics are still imported. Although limited communications gear is produced nationally for military aircraft, most long-range equipment is still imported. Rocket technology is one of the least developed areas in Brazil but programs are under way to develop engines, vector thrust control, and inertial guidance packages. Significant progress is unlikely before the mid-1980s, however. Guidance packages, in particular, appear beyond the nation's capacity before the 1990s. (S)

The Technology Transfer Process

Typical of Brazil's strategy in acquiring technology is first the assembly of an item under license using imported components and then proceeding progressively through production of simple components and subassemblies until all but a few items are made and assembled locally. This process is almost always spelled out in foreign licensing agreements in the form of national content targets that must be complied with to qualify for government funding and preferential tax

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Table 2

**Brazil: Production Capabilities for
Key Elements of Major Weapons Systems**

	Current	1985	1990
Missiles			
Composite fuel technology	No	Possible	Yes
Engines	No	Possible	Yes
Vector thrust control	No	Possible	Yes
Inertial guidance	No	No	Possible
Command and control	No	Possible	Possible
Stress engineering	Yes	Yes	Yes
Design and engineering	Yes	Yes	Yes
Aircraft ¹			
Airframe construction	Yes (L,J)	Yes (L,J)	Possible (S)
Engines	No	Possible (L)	Possible (L,J)
Communications	Yes	Yes	Yes
Weapons	Yes	Yes	Yes
Fire control	No	No	No
Computers	No	No	No
Radar	No	No	Possible
Avionics	No	Yes	Yes
Design and engineering	Yes	Yes	Yes

¹ The code is L for light aircraft, J for jet and subsonic, and S for supersonic.

This table is Secret.

treatment. All components become incorporated in explicit import substitution programs as policymakers endeavor to eliminate dependence on external suppliers that exercise restrictions on subsequent exports. Under normal conditions, production lines achieve 100-percent national content after five years, with imports limited to raw materials and common semi-manufactures. (C)

	Current	1985	1990
Ground combat vehicles			
Armor plate	Yes	Yes	Yes
Engines	Yes	Yes	Yes
Transmissions	Yes	Yes	Yes
4-wheel drive	Yes	Yes	Yes
Axle assemblies	Yes	Yes	Yes
Track assemblies	Yes	Yes	Yes
Turret rings and components	Yes	Yes	Yes
Guns (large caliber 90-105-mm)	Yes	Yes	Yes
Suspension	Yes	Yes	Yes
Fire control systems	Yes	Yes	Yes
Laser rangefinders	No	Possible	Possible
Optics, advanced	No	Possible	Yes
Night vision	No	No	Possible
Radar	No	No	Possible
Communications	Yes	Yes	Yes
Design and engineering	Yes	Yes	Yes

In most joint venture agreements, the foreign partner provides design, engineering, and limited financing. A minimum of foreign personnel is normally involved, most skilled production workers being obtained from Brazilian industry. European manufacturers have generally been more amenable than US firms to such arrangements; they have viewed association with Brazil as a first step toward penetrating Latin American markets. (C)

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The Research and Development Establishment

A rapidly growing share of Brazil's weapons technology is being developed indigenously by a number of key government research and development institutions. The area of greatest activity is aerospace, including aircraft and rocketry, but some work is also being done on high explosives, alcohol-fueled internal combustion engines, tracked armor, guided missiles, and automatic infantry weapons. The most prominent R&D institutions include:

- *Aerospace Technical Center (CTA)*. Under the control of the Air Ministry, this facility at Sao Jose dos Campos consists of five institutes with both civilian and military R&D. Past projects included development of sounding rockets, design of domestic transport aircraft, and more recently alcohol engines.
- *Institute of Space Research (INPE)*. Under the National Research Council (CNPq), a civilian entity, INPE has been primarily responsible for payload development for the sounding rocket program. Located near the CTA at Sao Jose dos Campos, it also handles telemetry for Brazilian launches from the Barreira do Inferno range.
- *Research and Development Institute (IPD)*. Under the Army, responsible for coordinating Army R&D including the new tracked tank. It is currently located on an Army base in Rio de Janeiro with facilities at the Marambaia Proving Grounds.
- *Military Engineering Institute (IME)*. Also under the Army, it is the primary engineering school and research center for ground forces. Both the IPD and IME are slated for consolidation under the Army Technical Center (CTE), established in 1977. (c)

Technical Training

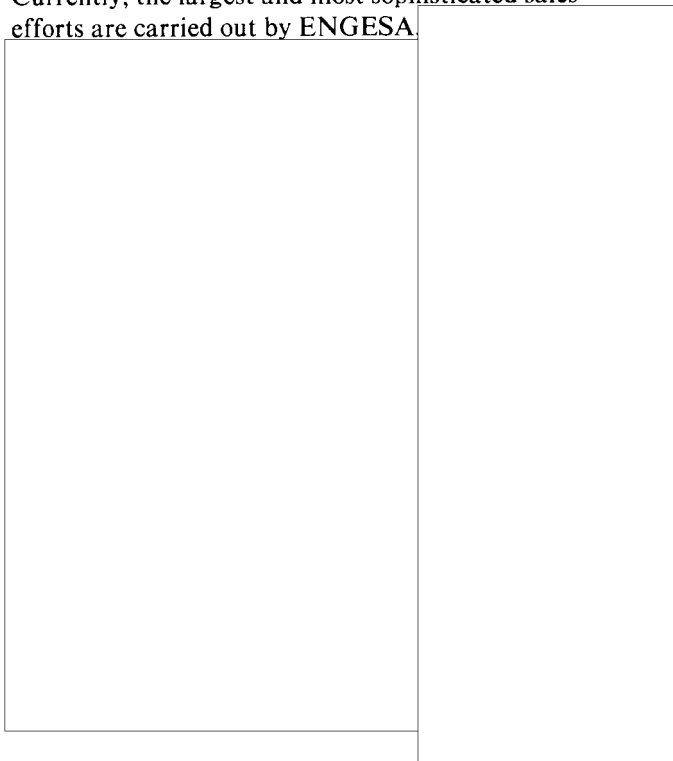
Brazil's research activities are supported by excellent facilities for training research and technical personnel, most of which offer advanced degree programs in engineering. The Aerospace Technical Center offers

some of the most advanced degree programs in a wide variety of engineering and technology fields provided in Latin America. Other outstanding training facilities include the Institute of Aeronautical Technology of the Air Force and the Institute of Technological Research under the Sao Paulo state government. (c)

Foreign Sales Policy

Reflecting the limited domestic arms market, export potential has become the overriding criterion for approval of new arms production. Typical planning calls for exporting four to five units for every unit sold in Brazil. Because of the political ramifications of arms sales, Brasilia controls all arms export negotiations even when undertaken by private entities. Foreign Ministry and Army approval are required for even preliminary talks with potential foreign customers. With few exceptions, Brazil has provided little or no credit to finance arms sales. (S NF NC)

Currently, the largest and most sophisticated sales efforts are carried out by ENGESA.



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Table 3

Million US \$

Brazil: Arms Export Contracts and Deliveries, by Destination

	1954-73		1974		1975		1976		1977		1978	
	C ¹	D ²	C	D	C	D	C	D	C	D	C	D
Total	4.1	4.0	70.8	0.9	61.6	25.2	20.7	84.2	75.5	21.0	161.1	92.9
Europe and Canada	0.4	0.4										
Portugal	0.4	0.4										
Latin America	3.7	3.6	20.8	0.9	61.6	22.2	17.7	46.2	7.0	9.0	31.6	16.3
Bolivia	0.9	0.9	15.3	0.3	0.1	0.1	1.7	1.1		2.7	6.7	10.4
Chile			5.5	0.5	24.7	4.1	14.0	25.4	6.7	4.9	23.7	4.7
Colombia	0.8	0.8									1.2	1.2
Ecuador					30.5	15.4		15.1	0.3	0.3		
Panama					0.1	0.1						
Paraguay	0.7	0.6		0.1	1.2	0.5	0.7	1.4			NEGL	NEGL
Peru							1.3	0.2		1.1		
Uruguay	1.3	1.3			5.0	2.0		3.0				
Middle East			50.0		3.0		38.0		65.0	9.0	121.7	68.8
Iraq									35.0		107.7	43.0
Libya			50.0		3.0		38.0		30.0	9.0	14.0	25.8
Africa South of Sahara							3.0		3.5	3.0	7.8	7.8
Sudan									3.5			
Togo							3.0			3.0	7.8	7.8

¹ C: contracts.² D: deliveries.

This table is Secret.

New Technology and New Products

Development and tooling up for the next generation of arms products is well advanced. Production of helicopters, tracked tanks, and high-quality 90-mm ammunition got under way in 1979 and several other production lines are now gearing up. Most ambitious are plans for a 30-ton tank with a 120-mm gun slated for production in the early 1980s. The aircraft industry also has several follow-on planes under development, including an enlarged military transport (target production 1983) and a new jet trainer/ground attack

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aircraft (target 1985). Budget limitations are hampering both of these programs, however, and export production will probably be delayed until the late 1980s. (C NF)

Other areas of development interest include artillery and mortar rockets. Although Brazil is eager to develop medium-range military rockets, budget limitations will again be a delaying factor. While not strictly military, perhaps the biggest program planned is development of a satellite launch vehicle (SLV) to meet a launch target of 1986. We believe the program will cost \$1-2 billion and will require a massive effort not only in rocketry, but also in electronics, including guidance and navigation. Brazil, for example, is still 15 years behind the United States in aviation landing and navigational aid technology and is little better in basic radar technology. [redacted]

Outlook

We expect Brazil's arms exports—still dominated by wheeled armor and transport aircraft—to pass the \$500 million mark by 1982. Augmenting sales will be such new items as tracked tanks, jet fighters, naval guns, rockets and launchers, and communications gear. By the late 1980s a modern 30-ton tracked tank, howitzers, helicopters, and some avionics and fire-control systems may also be in the arms production and export portfolio. Brazil nonetheless will remain dependent for years to come on foreign technology for more sophisticated weapons systems and advanced support and ancillary equipment. (S)

The Middle East, Brazil's largest market, offers the greatest potential for export growth, primarily for armor and large guns. Latin American markets should be next in importance while sales to Africa may also emerge as a significant factor. We expect ENGESA to continue to dominate the marketing of Brazilian arms, although decisions on product lines, sales practices, and priorities will come increasingly under government control as the industry becomes more important to exports. (S NF)

Sales of arms in Latin America will reinforce existing patterns of influence while sales efforts in Africa will advance Brazil's broader foreign policy objectives in that region—closer cultural, political, and economic ties with former Portuguese colonies and increased influence in black Africa in general. Nonetheless, arms sales to the Middle East, while boosting trade, will not result in significant political gains vis-a-vis its major customers. Iraq and others will clearly hold the upper hand in bilateral relations as Brazil attempts to narrow its massive trade deficit and shore up oil supplies through sales of both military and civilian goods. (S NF)

Brazilian arms exports could run counter to US conventional arms restraint policies, but we believe Brasilia's political interests are sufficiently congruent with those of the United States to avoid a major confrontation. Brasilia, for example, has suspended sales to Cyprus for the duration of the peace talks, has banned sales to South Africa and Rhodesia, and has refused to sell arms to Lebanon, Nicaragua, and El Salvador. In the event of a dispute, however, Brazil would be unwilling to subordinate its growing independence, export revenues, and prestige merely for US approbation. [redacted] 25X1

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