

ARCHIVED REPORT

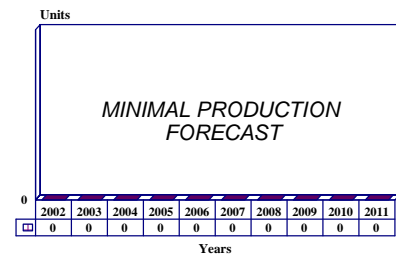
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Inhauma Class - Archived 12/2003

Outlook

- Projected June 2002 launch never took place
- Completion now projected for June 2006, but regarded as improbable
- Last ship has probably been abandoned
- Report will be archived next year

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. General-purpose frigate.

Sponsor

Ministerio de Marinha
 Esplanada dos Ministerios, Bloco N
 70055-900 Brasilia DF
 Brazil
 Tel: +55 61 312 1212
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Contractors

Arsenal de Marinha
 Ilha dos Cobras
 Rio de Janeiro
 Brazil

Status. Production and service.

Total Produced. Four ships of the original Inhaúma class type have been built. A fifth ship of a modified design, the Barroso class, is being completed.

Pennant List

<u>Ship</u>	<u>Builder</u>	<u>Launch Date</u>	<u>Commission Date</u>
V30 <i>Inhaúma</i>	Arsenal de Marinha	12/1986	12/1989
V31 <i>Jaceguay</i>	Arsenal de Marinha	6/1987	4/1991
V32 <i>Julio de Noronha</i>	Verolme Shipyard	12/1989	10/1992
V33 <i>Frontin</i>	Verolme Shipyard	2/1992	3/1994
V34 <i>Barroso</i>	Arsenal de Marinha		

Mission. A general-purpose frigate, the Inhaúma class is tasked with coastal and ocean patrol and general escort duties.

Price Range. These ships cost approximately US\$350 million each in 1992.

Technical Data

<u>Dimensions</u>	<u>Metric</u>	<u>US</u>
Length:	95.8 m	314.2 ft

	<u>Metric</u>	<u>US</u>
Beam:	11.4 m	37.4 ft
Draft:	3.7 m	12.1 ft
Displacement, Standard:		1,670 tons
Displacement, Full Load:		1,970 tons

Performance

Speed, Maximum:	50 km/h	27 kt
Speed, Cruising:	27 km/h	15 kt
Range:	7,400 km at 27 km/h	4,000 nm at 15 kt
Crew:	14 officers, 112 enlisted	

	<u>Type</u>	<u>Quantity</u>
Armament		
Guns		
Medium Caliber:	4.5 in Mk 8 Vickers	1
Light:	Bofors 40 mm L70	2
CIWS:	Phalanx Mk 15	1
Torpedo Tubes:	Mk 32	2x3
Torpedoes:	Mk 46 Mod 5	20
Missiles:	MM-40 Exocet SSM	4
Helicopter:	SAH-11A Westland Super Lynx	1

Electronics

Radar		
Surface/Air Search:	SPS AWS-4	1
Fire Control:	Alenia RTN-10X	1
Navigation:	Type 1007	1
Sonar		
Active/Passive Hull:	Atlas Elektronik DSQS-21C	1
Electronic Warfare:		
ESM:	Racal Cutlass	1
ECM:	Racal Cygnus	1
Decoy launcher:	Plessey Shield	2
COMINT:	Telegon 10	1
Command & Control:	CAAIS 450 with WSA-420 weapons control	1

Propulsion

Gas Turbines:	LM 2500	1x27,500 shp
Diesels:	MTU 16V956 TB91	2x2,900 shp
Propellers:	Controllable pitch	2

Design Features. The Inhaúma class is a very conventional, if substantially over-armed, light frigate design using standard hull forms and layouts. The 95 meter hull is flush-decked, with a deckhouse running nearly the whole length. The helicopter deck and hangar form part of the superstructure.

The propulsion system is a CODOG (Combined Diesel or Gas turbine) with one General Electric LM 2500 gas turbine and two MTU 16V956 diesel engines. The maximum speed is 27 knots, and the cruising speed is 15 knots. These ships are extremely unstable and have experienced serious topweight and construction deficiencies during trials.

Operational Characteristics. Four Exocet MM-40 surface-to-surface missiles comprise the primary surface armament. The gun armament includes a Vickers 4.5 inch L55 Mk 8 automatic gun and two 40 mm Bofors L70 anti-aircraft guns on either side of the hangar. The ships will have the Phalanx Mk 15 Close In Weapons System (CIWS). There are two triple-mount Mk 32 torpedo tubes for the Mk 46 torpedo. Each ship will carry one Lynx helicopter, which can give missile targeting data and carries two Mk 46 torpedoes.

The primary sensor is a Siemens-Plessey Systems AWS-4 radar, providing surface and low-level air search capabilities. Fire control systems include a Selenia Orion RTN 10X tracking radar and a Saab EOS 400 visual laser rangefinder. The EOS 400 has a TV camera mounting, eliminating the need for a manned director. There is an STN-Atlas Elektronik DSQS-21C active/passive hull-mounted sonar. The command and control system is the Ferranti CAAIS (Computer-Assisted Information System). It receives inputs from all the ship's sensors, giving the operators a tactical display.

Variants/Upgrades

Barroso. This follow-on design of the original class, which now constitutes the fifth ship of the series, was ordered in 1993. Its hull, at 328 feet (100 m) is 4.2 meters longer than the original. The extension has been provided to improve the ship's sea-keeping qualities. The ship in addition features an extended helicopter deck aft and a 1 meter longer combat information center. Also, the forecastle deck has been extended aft by 1 meter. Required personnel is also up, to 160 from 122.

The engine room has been extended by 2 meters to accommodate the more powerful and larger MTU 20V1163 TB83 diesels, which are expected to give it a top speed of 29 knots. The operating range remains unchanged at 4,000 miles at 15 knots.

The superstructure has been modified from the original design, the initial images available suggesting a lower weight and a higher degree of stealthiness. The foremast is lower and lighter in weight, the bulk of the funnel has been reduced, and the 01 deck has been extended farther forward. Access doors are repositioned.

In armament, the 4.5 inch L55 Mk 8 is retained, but the two Bofors 40 mm L70 guns have been replaced by a

single Bofors 40 Sea Trinity Mk 3 CIWS. The gun is slaved to an EOS-400 electro-optical sight.

Electronically, the Shield decoy launchers have been replaced by the IPQM system, and the Racal-built EW systems by the indigenous Elebra ET/SLQ-1 for radar warning. Additionally, the SLQ-2 is being substituted for the current jammer. The surface search radar function is being provided by the AESN RTN-20S in place of the old Plessey AWS-4 systems deployed on the first batch, and an RTN-30X fire control radar replaces the RTN-10X. Navigation radar is Racal Decca's I-band TM 1226C, while the first four had Kelvin Hughes' Type 1007 (I and J band). Electronic system operation is integrated using an ESCA Sicontra Mk II command system which augments and updates the Ferranti-designed CAAIS-450/WSA 421 installed on the first four of the Inhaúma class.

A second ship of this class was projected for order in 1995 but no move was ever made to execute this proposal. Instead, the Navy is working on developing a new 3,500-3,600-ton-class frigate with more stealthy characteristics. Specifications for this new class are understood to have been completed. It appears that at least two of this design will be built initially, once funding is made available.

Program Review

Background. The Brazilian Naval Design Office began design studies for a new frigate class in October 1977. The original design studies had two very different requirements. Brazil's ex-American World War II destroyers were aging rapidly and needed replacement. The Brazilians also wanted to replace the Imperial Marinheiro class corvettes, which were basically fleet tugboats with a firefighting and minesweeping capability. Furthermore, there was a strong desire to build the ships domestically but it was recognized that help would be needed from other countries. An agreement was reached with the German maritime consulting firm Marinetechnik MTG in February 1978 under which the firm would provide technical advice and assistance.

The Navy continued its design studies and, in 1979, produced a set of design requirements. A maximum speed of over 25 knots was stipulated, and armament

included a helicopter and surface-to-surface missiles. During this time, extensive tests were carried out in Europe on the hull model while the Brazilians built up the industry needed to build the ships. Also, changes were made in the weapons and engines. The armament was changed from 57 mm guns to 4.5 inch type and the power source from a diesel suite to CODOG. This change was necessary to achieve commonality with the Niteroi class frigates.

A final agreement was reached with Marinetechnik in October 1981, and in February 1982 the first two ships were ordered from the naval dockyard in Rio de Janeiro. Funding and design problems delayed the keel laying for the first ship until September 1983. The second ship's keel was laid in October 1984. In early 1984, the Brazilian Navy had announced plans to order the second pair of ships in September of that year.

Although the Brazilian government affirmed its commitment to ordering two more ships, the anticipated order did not materialize. Instead, the Navy stated that the second pair of ships would be ordered when funds permitted.

The Navy signed an agreement with the Verolme Brazil Shipyard in June 1986 for the third and fourth Inhaúmas. In December 1986 the first ship in the class, BNS *Inhaúma*, was launched at the naval shipyard on Ilha dos Cobras in Rio de Janeiro. Financial difficulties slowed the pace of the program following the launch of this ship. Although the BNS *Jaceguay* was scheduled to be launched in July 1986, launch was postponed until June 1987. The *Inhaúma*'s construction was also delayed. Construction of BNS *Frontin* and BNS *Julio de Noronha* began in early 1987.

The Navy had announced in 1986 that it planned to build 16 Inhaúma class frigates. In 1987 this program was re-evaluated due to construction delays. Several options were considered, including cutting back the number of ships, delaying some orders, or maintaining the original schedule. Problems at the Arsenal de Marinha delayed the construction of the *Inhaúma* and the *Jaceguay* in 1988. In May 1988, the US Department of Defense informed the US Congress of the sale of four Phalanx Mk 15 CIWS systems to Brazil for use aboard the first four ships of the class.

The *Inhaúma* began sea trials in March 1989 and was commissioned on December 12, 1989. The *Jaceguay* had been launched already in June 1987, but problems experienced during trials delayed its commissioning until April 2, 1991. It was reported in 1990 that the Verolme Shipyard was in financial trouble and that construction of the last two ships had been halted. However, the shipyard developed a plan to remain solvent and resumed building the last two ships. The delivery schedule of these ships was therefore delayed by about one year. The *Julio De Noronha* was finally commissioned on October 27, 1992, and the *Frontin* followed in March 1994.

After years of hesitation and indecision, the tentative program to build 12 additional ships of this class was formally abandoned in late 1992. This decision merely recognized the fact that the financial resources to build the ships were not available. Furthermore, the technical deficiencies revealed during the sea trials of the first

four made a complete redesign essential. Had the original German design been accepted, this class may have been extended to eight or even 12 ships – although the projected fleet of 16 was never really viable.

In mid-1993, the Brazilian Navy announced that a derivative of the Inhaúma design was being prepared with an enlarged hull and a lighter weapons fit. First metal on the new ship was cut on December 21, 1994.

The Brazilian plan was to lay down two ships of this improved design, with the second to be ordered in 1995. This repeat order never materialized, though, and instead the Navy opted to purchase the four British Type 22 Batch 1 class frigates from Britain and undertake an extensive modernization of its older Niteroi class frigates. These were intended as interim steps while the operational requirements for a new frigate class were being generated, the first to be laid down in about 10 years from that time. Meanwhile, the modified Inhaúma design was expected to be launched in August 1998, and to enter service two years later. This did not happen.

In January 1996, Brazilian Navy Minister Mauro Cesar Rodrigues Pereira stated that he still hoped funding for the second Modified Inhaúma class ship would be made available. He suggested that the original plan to build 10 Inhaúma class ships (presumably four original and six modified versions) was still under discussion, but it was unclear whether those plans would be truly carried out. He confirmed that the Brazilian Navy was examining all available options in order to decide which programs were financially feasible.

The Verolme shipyard has since suffered bankruptcy, and the government-controlled Arsenal de Marinha do Rio de Janeiro now appears to be the nation's leading naval shipyard. It has three dry-docks and one floating dock, with graving docks of up to a 70,000 ton capacity. The Base Naval do Rio de Janeiro has, in comparison, two dry-docks, and many of the other naval bases have one dry or floating dock only. Arsenal is handling the construction of the *Barroso*, but the scheduled launch of the ship in June 1999 did not take place. Later reports put the launch date in June 2002, but there is no indication that this took place. Her commissioning is now said to be scheduled for June 2006. Some reports suggest that she has been abandoned on the slipway and that her completion is no longer actively contemplated.

Funding

This program is funded by the Brazilian Department of the Navy (Ministerio de Marinha). Funding has only been provided for up to the fifth ship of the series, now being completed.

Funding for a second ship of the modified design has been desired since 1995 but has not been forthcoming. It is highly unlikely that more will be built, since the Navy has shifted its priorities toward modernizing its other ships, and finding a replacement for the sole carrier is becoming increasingly pressing. Therefore, it is unlikely any funds for the Inhaúma program will be made available.

Recent Contracts

No new contracts have been issued since 1994.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Oct	1977	Brazilian Navy begins frigate design studies
Feb	1978	Assistance agreement signed with Marinetechnik MTG
	1979	Requirements for new frigate promulgated
Oct	1981	Final design contract signed with Marinetechnik
Feb	1982	First two ships ordered
Sep	1983	First keel laid
Jun	1986	Second two ships ordered
Dec	1989	First ship, BNS <i>Inhaúma</i> , commissioned
Oct	1993	First ship of modified design ordered
Mar	1994	Last ship of first group delivered
Dec	1994	First metal cut on fifth ship of class
May	1995	<i>Barroso</i> laid down
Jun	1999	Projected launch of <i>Barroso</i> does not take place
Jun	2006	Projected commissioning of <i>Barroso</i>

Worldwide Distribution

Brazil. Four ships in service, one under construction.

Forecast Rationale

The latest, unofficial information on the *Barroso* is that her abandoned hulk has been left to rust on the slipway, where she has spent the last eight years “under construction.” There is no reliable information that suggests when or if this ship will ever be ready for launch, and her completion has now supposedly been slipped back to June 2006. This information was originally obtained from an unofficial Brazilian Navy Internet site, but has now been confirmed by more reliable and recognized naval sources. In reality, the

naval industry has long given up on predicting an in-service date for this ship. The constant extensions in the construction period of the *Barroso*, the lack of any plausible export orders, and the growing probability that the ship will never be completed have led us to record a minimal production forecast for this ship. The situation with regard to this ship is now so bleak that, although she still exists as a program, this report will be archived next year.

Ten-Year Outlook

Although a single ship of this class is technically under construction, there is no reliable evidence of any work actually being performed and the project may have been abandoned; the forecast chart has therefore been omitted.

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