

# ARCHIVED REPORT

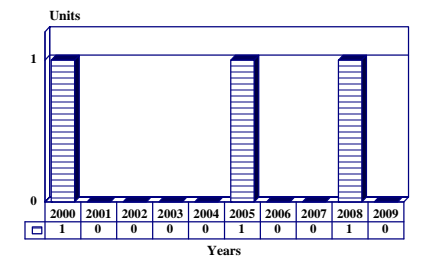
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## Galicia Class - Archived 6/2001

### Outlook

- Second ship launched, entering service summer 2000
- Project started out as shared concept with Dutch Rotterdam
- Commonalities in platform itself, communications suites
- L52 to act as amphibious command center, with different electronics suite than the first-of-class
- Spanish Armada probably upgrading to full-deck LHD next

10 Year Unit Production Forecast  
2000 - 2009



### Orientation

**Description.** Attack Transport Ship/Landing Platform Dock (LPD) designed for a wide range of amphibious and transport operations.

**Sponsor.** Spanish Navy through the Department of Defense.

#### Contractors

Bazan SA (Empresa Naçional Bazan)  
 Paseo de la Castellana 55  
 PO Box 90  
 E-28046 Madrid  
 Spain  
 Tel: +34 91 335 8400  
 Fax: +34 91 441 5090  
 Telex: 27480 bazan e  
 Cable: BAZAN  
 (*prime; shipbuilder*)

BTR Silvertown  
 Burton-on-Trent  
 UK  
 (*shaft bearings*)

DASA (DaimlerChrysler Aerospace)  
 Munich  
 Germany  
 (*search and target indication radar*)

INDRA Sistemas SA  
 ENOSA  
 C/Mar Egeo No 4  
 Polignono Industrial No 1  
 San Fernando de Henares  
 E-28850 Madrid  
 Spain  
 Tel: +34 91 396 2900  
 Fax: +34 91 396 3816  
 (*major subcontractor group*)

**Status.** In service and production.

**Total Produced.** Two launched. Second unit being finished for pending service entry.

### Pennant List

<u>Number &amp; Name</u>	<u>Builder</u>	<u>Launch</u>	<u>Commissioning</u>	<u>Homeport</u>
L51 <i>Galicia</i>	Bazan, El Ferrol shipyard	6/1997	4/1998	Rota
L52 <i>Castilla</i>	Bazan, El Ferrol shipyard	6/1999	6/2000	Rota

**Mission.** The primary task is stated as providing amphibious lift capability for military operations, with a secondary mission of supporting in non-combat amphibious situations, such as natural emergencies and other catastrophes. A third mission for these ships is to function as a support platform for mine countermeasure vessels (MCMVs).

**Price Range.** The cost of the second ship was pegged at only Ptas13 billion, as opposed to the Ptas22.243 billion (about US\$150 million) for the first-of-class. This is presumably due to the uneven distribution of the necessary development and design costs saddled on the first-of-class.

## Technical Data

	<u>Metric</u>	<u>US</u>
<b>Dimensions</b>		
<i>Length:</i>	160 m	524 ft
<i>Beam:</i>	25 m	82 ft
<i>Draft:</i>	5.9 m	19 ft
<i>Flight Deck:</i>	60x25 m	196.9x82 ft
<i>Dock:</i>	770 sq m	8,285 sq ft
<i>Vehicle Area:</i>	1,010 sq m	10,868 sq ft
<b>Displacement</b>		
<i>Full Load:</i>	12,450 tonnes (app.)	13,000 tons (app.)
<b>Performance</b>		
<i>Max. Speed:</i>	37 km/h	20 kts
<i>Cruising Speed:</i>	22 km/h	12 kts
<i>Range:</i>	12,000 km at 22 km/h	6,500 nm at 12 kts
<i>Crew:</i>	14 officers, 80 CPO + PO, 90 ratings and seamen	
<b>Military Lift Capacity</b>		
<i>Landing Craft:</i>	LCVP	3
	<i>and</i> LCU/LCM	2,
	<i>or</i> LCVP	6
	<i>or</i> LCM 8	4
<i>Armored Personnel Carrier or Tank:</i>		170
	(2,488 tonnes total weight)	33
<i>Helicopter Hangar Space:</i>	AB-212	6
	<i>or</i> SH-3	4
<i>Stores and Equipment:</i>		430 cu m/120 tonnes
<i>Ammunition:</i>		325 cu m/180 tonnes
<i>Fuel:</i>	for landing craft/helicopters	30 tonnes/200 tonnes
<i>Troops:</i>	fitted combat ready	615 + short time overload 150
<b>Armament</b>		
<i>Guns:</i>	Meroka CIWS [aft: provision for]	2
	Oerlikon 20 mm	4
<b>Electronics</b>		
<i>Radar — Air/Surface Search:</i>	Signaal DA-08, E/F-band	1
<i>Surface Search:</i>	Kelvin Hughes ARPA, I-band	2
<i>Navigation, Helicopter Control:</i>	I-band	1
<i>Communications:</i>	SATCOM, Link 11	1
<i>ESM:</i>	Intercept	
<i>Countermeasures:</i>	SRBOC chaff launchers	6

	<u>Type</u>	<u>Quantity</u>
<i>Torpedo Decoy System:</i>	NIXIE	1
<b>Machinery</b>		
<i>Prime Movers:</i>	Bazan/MAN-B&W Type 40/54A	2x4,070 kW
<i>Propeller:</i>	5-blade constant pitch (one shaft)	1
<i>Transmission:</i>	Gearbox system	1
<i>Auxiliary Motive Power:</i>	electrical motor	1x500 kW
<i>Trolling Speed Propulsor:</i>	bow thruster	1
<i>Main Power Generator:</i>	diesel motors	4x1,250 kWE
<i>Emergency Power Generator:</i>	diesel motor	725 kW

**Design Features.** The ship is built entirely from Grade-A steel; the use of higher tensile steel was limited as much as possible. Hull structure and the sides and decks are longitudinally reinforced. The superstructure features a flush deck with one island and ten decks (five decks inside the hull, a weather deck and four decks in the superstructure for accommodation), the combat system and the hangar. The hull is of double-bottom design.

In the center area, the ship features a wide dock for housing the landing craft as required. The main and lower vehicle decks have large areas for stowing craft and vehicles. Both decks have direct access to the aft elevator which also serves the hangar and the flight deck.

A main cargo area is located on Deck 5 and a second store on Deck 2 to provide sufficient area for the marine gear. The ammunition carried onboard is stored amidships in two holds, with direct access to the forward elevator. Also in the middle of the ship, the Galicias have their freshwater tanks. The ballast tanks (for submerged condition when launching and embarking landing craft) are on the sides, while the fuel tanks are aft at the center line and inside the double bottom, for lateral protection.

The helicopter deck has been designed large enough to accommodate two large rotary wing landing pads and a hangar for four large or six medium-sized helos.

Two RAS (refueling at side) receiving stations are included in the superstructure, one on the foredeck and one on the flight deck.

Externally, the ship has been designed using the latest technologies with emphasis on reduced radiated noise, radar cross section (RCS) and magnetic field radiation. As for the latter, for instance, a degaussing system is included in the design. However, no particular measures are reported to have been taken to reduce the ship's infrared (IR) signature.

Great pains have been taken in the design process to counter the ship's vulnerability and to enhance its

survivability in a combat situation. To that end, the command center has been placed inside the superstructure, protected on both sides by other compartments. Three separate power zones and seven vertical ventilation zones have been designed in the ship's structure, with each zone featuring their own ventilation, air conditioning and NBC filtration system.

Fire prevention includes the subdivision of the ship in seven subsections, all of which are separated by fireproof doors and fire resistant materials on bulkheads. The fire pumps are distributed over the seven zones. In addition to them, five additional fire fighting systems exist onboard, including conventional fire extinguishers, gas and foam systems and a sprinkler arrangement.

As pointed out above, the design also accommodates the possibility of penetrating external threats such as nuclear, biological and chemical agents. A gastight NBC 'citadel' is included in the interior structure of the ship, providing a temporary quarantine in case of an NBC attack for at least 24 hours.

The Galicia class LPD is constructed by applying a preassembled modular construction technique. The ship is divided into 20 segments, or modules, which are prefitted with the structural elements, equipment, plumbing and wiring. The modular construction method has played a major role in saving overall building costs.

In difference to the Dutch version of this basically same design, the Spanish Galicia class features diesel-only propulsion. The Dutch Rotterdam class, in contrast, is configured with diesel-electric propulsion.

The ship has facilities to transport a fully equipped Marine battalion, with four landing craft under the deck. The top of the deck provides landing spots for two helicopters and offers hangar space for up to six AB-212 type or four SH-3s helos. The garage area can house up to 33 tanks or 170 armored personnel carriers, or alternatively an unspecified number of movable Patriot anti-aircraft rocket systems.

The ship is fitted with a full medical facilities, including two operating theaters, ten intensive care units, treatment areas, and a sick bay for 100 wounded.

The layout of the *Galicia* differs slightly from that of the Dutch version, partly because of the different powerplant solution. The ship has a different garage deck arrangement and position for the stores areas, and accommodation for each ship reflects national preferences in onboard practice. The working areas are very different, due to the national preferences in procurement practices (different equipment and machinery), and, most notably, each ship uses their own national CIWS: Meroka on the *Galicia*, versus Goalkeeper on the *Rotterdam*.

The integrated platform management systems also differ, the Dutch using one by Rietschoten & Houwens, while the Spanish ships are equipped by Bazan Cartagena.

However, significant commonalities also exist, including the choice of the communications suite, which has been collaboratively procured from Rohde & Schwarz. The internal communications subsystem comes from the Spanish-Portuguese consortium of FABA and EID. FABA is part of the Bazan Group.

**Operational Characteristics.** In support of amphibious operations, the landing craft can transport and disembark on a coast a marine battalion (about 610 persons), supporting them for up to ten days, along with their armored vehicles and tanks. The ship can operate fully independently for up 30 days in logistics support of the marine troops. Besides this principal function, the ship can also operate as a helicopter platform for anti-submarine warfare missions and as a platform for VTOL (vertical take-off and landing) fixed-wing aircraft. Logistics support can be also provided in MCM (mine countermeasures) operations.

The secondary mission of providing support in non-amphibious operations involves crisis management, as well as assistance and support in evacuation of citizens from hostile areas. This also includes

evacuation of refugees and evacuation and treatment of wounded personnel.

When at sea, the stern of the ship can be lowered four meters (13 feet), in order to facilitate easier embarkation and debarkation in less-than-ideal weather conditions. The lowering is done by filling the ballast tanks with water, allowing water to fill the internal docking area, which in turn allows the landing vehicles to be loaded and unloaded on the transport craft.

As for its aircraft support capability, the ship can simultaneously operate two helicopters off its deck, thanks to the facilities in terms of the antennas onboard.

In order to maximize its operational safety, the ship has been designed with a great deal of emphasis on crisis management and compensation for its innate vulnerability. This being a major component in a ship's survivability in a combat situation, the ship has been designed so that it continues operation even if it has been hit.

Fire suppression systems onboard are also extensive (see **Design Features**), and operation under conditions of nuclear/biological/chemical warfare attack has been addressed with the construction of special protective zones (see above). The anti-fire agents and devices are centrally controlled from one location onboard. In addition to automatic control, the systems can be also manually operated on both sides of the bulkhead.

It is noted that the gastight NBC 'citadel' onboard has the capacity of maintaining an overpressure for at least 24 hours, in order to prevent NBC contamination.

Overall, the ship can be reconfigured relatively easily for different missions, allowing support and transport of different types of vehicles and/or equipment. This flexibility in its configuration is one of the key factors in how the ship is an integral part of the Spanish Marine Corps' varying missions. This mission flexibility is, incidentally, very similar to that provided by the Dutch sister ship, the *Rotterdam* class, and is part of NATO's larger picture of coordinating amphibious and landing operations and capabilities of its individual member countries.

## Variants/Upgrades

**Enforcer.** A family of similar designs based on the same concept as the *Galicia* class and its Dutch sister ship, the *Rotterdam* class. This is being offered by Royal Schelde to export markets. These ships are intended to offer entry-level amphibious lift capability at reduced cost to countries with such requirements. The designs range in displacements from 9,180 to 14,000 tonnes and the transport capability ranges from 501 troops to 613.

**L52 *Castilla*.** The second ship of the *Galicia* class (presumably under that name) will have some major differences from the L51 *Galicia*. The second-in-class will be fitted as an amphibious warfare command and control (C<sup>2</sup>) ship. For that reason, it will have command support systems and communications facilities for a Spanish Marine Corps (TEAR) staff of 65.

Consequently, the number of combat troops that can be lifted will be down from *Galicia's* 543 to 404.

The sensor capabilities of the second ship will be superior to those of the first, including a three dimensional air surveillance radar. The radar type chosen in 1999 is a DaimlerChrysler Aerospace (DASA) TRS-3D/16-ES. This is a surveillance and target acquisition radar that produces a clear situation display even in poor weather and against hostile electronic countermeasures activity. The radar has electronic scanning that compensates for the ship's movements in the sea without the need for a large antenna structure for the compensation function. Being of modular structure, the radar is easy to install and adapt to various weapon systems. The 1999 contract includes an option for further units for other vessels contingent on trial use.

**LHD.** A through-deck amphibious assault ship (LHD) has been designed as a possible successor to the two *Galicia* class LPDs. The new design would retain the *Galicia's* well dock but would have a full-length deck with a ski jump, making possible the use of AV-8B Harrier Plus STOVLs. Additionally, there would be four landing spots for helicopters. The concept of such a design was made public in late 1998, with a model being exhibited at Bazan's head office in Madrid.

The ship is expected to carry at least four Harriers and four Sea Hawk helicopters. As for the electronic fit, it is expected to have a 3-D radar and two separate tracking and illumination radars (STIR). There is a possibility that it would thus support a vertically launched Evolved Sea Sparrow Missile (ESSM) system, in addition to the Meroka CIWS.

The LHD will probably be an amalgamation of concepts realized on both the *Galicia* class and the *Principe de*

*Asturias* helicopter carriers, a version of which was sold to Thailand as well.

It may emerge that this through-deck design will be the successor to the *Galicia* class in the Spanish Navy, in lieu of any more *Galicias* being procured.

**Rotterdam Class.** This Spanish landing transport dock is a very close relative to the Dutch *Rotterdam* class, having started out as a joint design with project definition completed in December 1993. From that point on, the *Galicia* evolved to a slightly different direction, having militarized the original mercantile design to a higher degree than the Dutch version.

Differences exist in propulsion, weaponry and the integrated platform management systems, as well as in numbers of select lift capabilities, due to the design differences based on national preferences. Some of those differences are also attributed to the different national acquisition procedures, rather than technical necessities evolving from different needs.

One of the key differences is the propulsion on the Dutch version being diesel-electric, whereas the Spanish solution preferred an all-diesel powertrain. The different machinery dictated some changes in the interior layout of the ship. Also, the garage deck arrangement is said to differ between the two classes, as does the position for the stores areas. Minor differences are also said to exist in the accommodation facilities of each ship, tailored to respective countries' national preferences. In weaponry, each navy uses their domestic CIWS (Goalkeeper in the Dutch ship, Meroka in the Spanish).

For a detailed description of *Rotterdam* class, please refer to a separate report on that ship elsewhere in this book.

## Program Review

**Background.** In the early 1980s, the Royal Netherlands Navy acknowledged it was facing a need for amphibious transport capacity. Work on a preliminary design began in 1984, and staff requirement for the new vessel was formalized in December 1988. In the short term, the solution was seen as using commercially operated STUFT (Ships Taken Up From Trade) vessels of NATO partner countries. These ships provide to a high degree the amount of flexibility that is required for military transport applications, particularly by the Marines. Meanwhile, NATO began making plans to expand the organization's amphibious transport capacity.

In mid-1990, the Spanish government indicated an interest for a ship similar to the *Rotterdam*. In June 1992, a Memorandum of Understanding was signed between the two countries, entailing, among other matters, development of a joint design that would be wider in order to accommodate the Spanish landing vehicles inside in the dock. Intention of a common communications and radar fit was also expressed. A joint project office was set up in Madrid, handling both the *ATS/LPD* program and the auxiliary oiler replenishment vessel (AOR) that had been started earlier, and shares some program elements as well as a common philosophy with the amphibious ships.

Project definition began in January 1993 and was completed in December of that year. On June 30, 1993, the Dutch parliament had authorized the beginning of contract negotiations with Royal Schelde shipyard, with intention to order one LPD, while Bazan had been earmarked as the Spanish contractor from the beginning of the project. By this time, the project was quoted as being about eight months behind the schedule, but it was believed that the delay would be compensated for by quick establishment of a direct partnership between the two shipyards assigned to the project.

The talks between the Dutch marines and the local contractor started by the end of 1993, and a basic agreement was reached by April 1994. A contract was signed on April 25, kicking off the detailed design and system engineering phase. The Spanish government authorized the purchase of one ship in July 1994.

Almost a year later, in April 1995, the first steel was cut on the Dutch version of these LPDs, designating the start of actual production of this ship design.

The ship built for the Spanish Navy was stated to be named the *Galicia*, which was first used in Spain for the 1927 cruiser *Principe Alfonso*, also known as the

*Libertad* from 1931 to the end of the Civil War. Decommissioned in 1970, the cruiser was followed a year later by another *Galicia*, this time being the new name for the ex-USN LSD *San Marcos*.

In May 1997, the Spanish government authorized the construction of a second ship of this class, the L52. As indicated elsewhere in this report, that particular ship will be somewhat different in its systems fitment from the first-of-class. This is due to this ship's slightly altered mission intent, as an amphibious warfare C<sup>2</sup> unit.

The first ship of the Galicia class is now in service, and the second is also under way, with a projected commissioning date of June 2000.

The third ship of either this class, or a modified version of it, is already being discussed as well. Bazan has constructed a scale model in which a full-length flight deck has been built on the same basic hull as on the Galicia class ships. No decision has been made yet on whether this will be the design that the Spanish Navy will adopt for its third amphibious landing craft. It is apparent, though, that the current trend of increasing capabilities in the littoral range supports the acquisition of a multi-role vessel such as the LHD concept.

## Funding

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The project definition phase was carried out jointly with the Royal Netherlands Navy; the subsequent construction of the ship (Rotterdam and Galicia classes) has been funded by the Dutch and Spanish navies independently.

It was considered in 1996 that if a second Galicia class unit were to be built, its funding could possibly be obtained from civilian ministries (National Health, Public Works, and the Interior), as opposed to coming from the Department of Defense. This, it was thought, could be feasible by justifying the purchase of the ship through "social" or "humane" reasons, emphasizing the ship's capabilities for non-military rescue and emergency operations. This was prompted by the example of the Italian Navy, which had earmarked its San Giorgio class LPD for civilian relief operations in peacetime but be manned by the Navy. In times of national emergency, the ship is assigned to military service.

Funding for the second ship (L52) eventually was covered by the sale of nine AV-8S Matador aircraft to Thailand. The cost of the second ship was pegged at only Ptas13 billion (US\$78 million), as opposed to the Ptas22.243 billion that had been laid out for the first-of-class. The cost of the ship was divided over the period of four fiscal years (starting 1997) to the completion of the ship.

In late 1998, the shipbuilder indicated that it would be able to speed up the construction of the second-of-class to 32 months, from the 44 months it took to build the *Galicia*, thanks to the advances in the construction technique and the modular structure of the ship. However, while the design underwent changes which partly offset the shortening of the building period, the Navy also said that it was not prepared to advance the payments to accommodate a faster delivery schedule.

## Recent Contracts

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<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Bazan	N/A	July 29, 1994 – Authorization for the first ship.
BTR Silvertown	N/A	Spring 1997 – Propeller shaft bearings (12 each).
Bazan	78.0	May 9, 1997 – Spanish government approves construction of second ship.
DASA	N/A	Summer 1999 – TRS-3D/16-ES search and target designation radar for L52.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1990	Amphibious Transport Ship seen as a possible solution by the Dutch Navy
Jul	1991	Joint project definition with the Dutch announced
May	1992	Common staff requirement agreed with Dutch; project office in Madrid
Dec	1993	Project definition phase completed
Jul	1994	Purchase of one ship authorized
May	1997	Approval for the procurement of second ship
Jun	1997	Launch of first-of-class
Apr	1998	Commissioning of first-in-class; construction start for the second
Jun	1999	Second ship launched
Jun	2000	Anticipated in-service date for the second-in-class
	2002-2003	Possible order for a third ship (or an export unit)

## Worldwide Distribution

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Spain (1+1+1)

## Forecast Rationale

## Ten-Year Outlook

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### ESTIMATED CALENDAR YEAR PRODUCTION

<u>Designation</u>	<u>System</u>	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>			<u>Total 00-09</u>
		<u>Thru 99</u>	<u>00</u>	<u>01</u>	<u>02</u>	<u>03</u>	<u>04</u>	<u>05</u>	<u>06</u>	<u>07</u>	<u>08</u>	<u>09</u>	
GALICIA	ASSAULT LANDING SHIP (SPANISH NAVY)	1	1	0	0	0	0	0	0	0	0	0	1
GALICIA	ASSAULT LANDING SHIP (VARIOUS)	0	0	0	0	0	0	1	0	0	1	0	2
Total Production		1	1	0	0	0	0	1	0	0	1	0	3