

# ARCHIVED REPORT

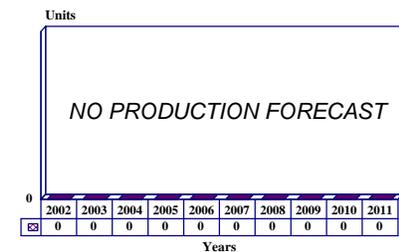
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## Foudre - Archived 3/2003

### Outlook

- Two new ships ordered as LHDs to different design
- No further construction of Foudre class planned
- Downsized version of new design may replace old Batral class LSTs

10 Year Unit Production Forecast  
2002 - 2011



### Orientation

**Description.** A class of Landing Ships Dock (LSD) tasked with the transportation and amphibious landing of mechanized infantry regiments. The French Navy classification is “Transport de Chalands de Débarquement” (TCD).

#### Sponsor

DCN International  
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 75725 Paris Cedex 15  
 France  
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#### Pennant List

##### Ship

L9011 *Foudre*  
 L9012 *Siroco*

##### Builder

DCN, Brest  
 DCN, Brest

#### Contractors

DCN  
 Brest Shipyard  
 France

**Licensees.** No production licenses have been granted.

**Status.** In service. Modernization of onboard systems continues.

**Total Produced.** Two

##### Launch Date

11/1988  
 12/1996

##### Commission Date

12/1990  
 5/1998

**Mission.** The ship is designed to support intervention operations and amphibious assaults by the deployment of mechanized troops attached to the French Rapid Intervention Force. The ship can also be used to deploy troops for humanitarian missions – for example, to evacuate civilians, care for the wounded, and transport equipment to disaster areas.

The FS *Foudre*, as the lead ship of this class, was also intended to act as the flagship of an amphibious warfare task group for the French Navy.

**Price Range.** The second ship has been priced at US\$258 million.

## Technical Data

### Specifications

	<u>Metric</u>	<u>US</u>
<b>Dimensions</b>		
Length	168 m	551 ft
Beam	23.5 m	77 ft
Draft	5.2 m	17 ft
Draft, Dock Flooded	9.1 m	30 ft
Well Area	1,732 m <sup>2</sup>	
Well Deck	14 x 122 m	
<b>Displacement</b>		
Standard	11,300 tonnes	
<b>Performance</b>		
Speed	37 km/h	20 kt
Range	20,300 km at 28 km/h	11,000 nm at 15 kt
Cargo Capacity	1,880 tonnes	
Cranes	2 each	35-ton capacity
Crew	10 officers, 200 enlisted	
Troops	350 (1,600 in emergency)	
<b>Armament</b>		
<u>Type</u>		
Guns	40 mm Bofors	1
	20 mm Giat 20 F2	2
	12.7 mm machine guns	2
Missiles – SAM	SADRAL	1x6
Helicopters	Super Puma 332F, or Super Frelons	4/2
<b>Electronics</b>		
Radar – Navigation	Racal Decca RM 1229 I-band	2 (one for helicopter control)
– Air/Surface Search	Thomson-CSF DRBV 21A Mars D	1
– Surface Search	Racal Decca 2459 I-band	1
Electronic Warfare <sup>(a)</sup>		
ESM	DR-4000S	1
Decoy Launchers	Dagaie	2
COMINT	Telegon 4	1
Communications	Syracuse SATCOM	1
Combat Data Systems	OPSMER command support system	
Weapons Control	Sagem VIGY-105 optronic (1997)	2
<b>Propulsion</b>		
Prime Mover	SEMT Pielstick 16PC2.5V400 diesel	2x10,400 shp
Auxiliary Propulsion	Electrical	
Generators	850 kW	5
Propellers	Controllable pitch, 2 shafts	2
Thrusters	Lateral traverse thrust units	4

<sup>(a)</sup> Electronic warfare equipment is fitted-for-but-not-with.

**Design Features.** The ship is designed to function as a flexible platform for varying types of missions. A primary role of this class is to provide transportation and amphibious landing capabilities for mechanized infantry regiments and to provide logistics support for the operations of those regiments. The ship is sized to

carry a complete battalion landing team consisting of 35 officers, 432 enlisted personnel and 1,050 tons of equipment, with a crew of 226.

The ship's flight deck covers 1,450 square meters (*Foudre*) and includes two landing spots. One of them is fitted with a landing grid and a SAMAHE helicopter handling system. An additional landing spot is provided on the rolling cover of the well deck. The *Siroco*'s landing deck is longer, resulting in an area of 1,740 square meters. The inner well of the ship is 122 meters long by 14.2 meters wide, extending over three-quarters of the ship's total length. This area can be used either as a floating dock or as a dry dock for the transport of land vehicles. The well can accommodate two CDIC Landing Craft Tanks (LCTs) or 10 CTM Landing Craft Mechanized (LCMs).

The helicopter hangar houses up to four 9-tonne helicopters, either Cougars or AS.332F Super Pumas. Additionally, extensive storage areas are designed for tanks and vehicles. Vehicles are moved inside the *Foudre* using a 52-tonne-capacity elevating platform (38 tonnes on the *Siroco*) that connects the upper vehicle deck and the well deck. External access is via either a lateral ramp door or the stern gate.

The *Foudre* features extensive command facilities, in keeping with its role as a group flagship. The navigation suite and the propulsion plant are basically the same as on the Meuse class replenishment ships. This similarity provides a ready source of repair parts and simplifies maintenance.

The main propulsion is two SEMT Pielstick 16PC25 V400 diesel engines, each with 10,400 horsepower. Five 850 kW electrical generators provide auxiliary power. The *Foudre* has a maximum speed of 20 knots and a range of 11,000 nautical miles at 15 knots. There are two propellers at the stern, and four lateral traverse thrust units for maneuvering control in restricted waters.

The ship is equipped with hospital facilities, allowing large-scale medical functions. The medical facilities include a 55-bed hospital with two operating theaters, two re-animation rooms, a biology laboratory with a blood bank, an x-ray room, and other amenities. A modular field hospital may be embarked on the *Siroco*.

**Operational Characteristics.** The *Foudre* class fills a major need in the French Navy by providing a modern amphibious capability with armament and medical facilities. The ship is able to accommodate a mixture of helicopters and landing craft to support various amphibious operations. The CDIC LCT is a larger, more capable version of the EDIC, which had a length and width of 194x40 feet and a range of 1,800 nautical miles at 8 knots. The CDIC holds 11 trucks or five light tanks, and weighs 670 tons fully loaded. The CTM LCM measures 56x14 feet and weighs 56 tons. It has a 130-nautical-mile range and carries 30 tons of cargo or 80 troops. The Cougar helicopter seats 25 troops, carries small field equipment, and has a 300-nautical-mile range.

The aeronautical installations of the ship make it possible for four heavy-duty helicopters (Super Frelon) to be deployed simultaneously and refueled, both day and night. The four-helicopter hangar has shops and storage areas for helicopter maintenance.

The well deck can be flooded for landing craft or remain dry for non-amphibious vehicles. It can also be used to transport patrol craft. Vehicles can enter and exit through the ship's stern gate (which can be lowered to serve as an access ramp) or through side doors on the upper vehicle deck, which can double as ramps onto a pier. A crane with a capacity of 35 tons is situated at the aft end of the flight deck.

The FS *Foudre* carries a Decca 1226 navigation radar and the Syracuse Satellite Communications (Satcom) system. A Rodeo radar is supplied for controlling the SADRAL anti-aircraft missiles. This is originally an army system, modified for naval use. The electronic countermeasures include a DR-4000S electronic support measures (ESM) receiver which controls Dagaie decoy launchers. No active jammer is fitted.

The armament on the *Foudre* consists of one 40 mm and two 20 mm guns and the SADRAL point defense missile system. SADRAL consists of a launcher with six Mistral missiles, which have a 2.5-nautical-mile firing range. Sagem optronic fire control was fitted on the *Foudre* in 1997.

## Variants/Upgrades

L9011 *Foudre* Modernization. Flume stabilization was fitted on the *Foudre* in 1993. A new air search radar has been fitted, along with the above-described armament that was fitted on the number-two ship. A Sagem optronic fire control system was scheduled to be fitted on the *Foudre* in 1997, and plans call for

installing ESM/ECM systems as well. The OP3A ship self-defense system was retrofitted on the *Foudre* during the scheduled overhaul.

L9012 *Siroco*. The second ship of this class has a slightly larger flight deck than the lead ship *Foudre*. A

trio of Breda/Mauser 30 mm/70 guns replaces the mixed 40 mm/20 mm Bofors/Giat battery of the *Foudre*. The *Siroco* also is fitted with the Opération d'Amélioration de l'Autodéfense Antimissile (OP3A) ship self-defense system. This system includes Simbad missile launchers by Matra BAe Dynamics (twin-round) integrated with the SENIT 8.01 combat management system (CMS) as well as electro-optical sensors by Sagem. The OP3A has been retrofitted on the *Foudre* as well.

Overall, the L9012 is slightly larger, more capable and fitted with more modern systems than the first-of-class. Its well dock can accommodate 10 LCUs, and up to six AMX 30 MBTs, 23 AMX 10RC light tanks or a similar number of VAB armored personnel carriers (APCs), all of which can carry army equipment on board. Furthermore, the ship can also house the new 55 tonne Giat Leclerc MBT that is being used by both France and the UAE. Four helicopter landing spots are designed for the ship, holding Super Pumas, Super Frelons or Tigers. The hangar is suited for four Super Puma-type helos.

L9013 & L9014. These two ships, originally planned to be members of the Foudre class have now been ordered as the lead ships of a new class. Named *Mistral* and *Tonnerre*, they are classed as the NTCD (Nouveaux Transports de Chalands de Débarquement). Besides supplementing the roles of the Foudre class, they will replace the 1960s-vintage Ouragan class amphibious ships. It is believed that these ships will be based in part on the BIP concept. According to the French Navy's operational requirements and specifications, the NTCD would have to be capable of offering an operational base for the new-generation NH 90 transport helicopters and Tiger attack helicopters. A new report is being prepared on this class and will be included in next month's supplement.

BIP. The multipurpose amphibious assault ship BIP (Batiment d'Intervention Polyvalent) is a likely candidate when choosing the successor of the Foudre class. The BIP is said to combine DCN's experience gained in aircraft carriers and amphibious ships, resulting in a design not dissimilar to the US LHD-1 Wasp class, except for the presence of a ski jump. The BIP multipurpose carriers are a family of amphibious ships based on a common design. They are aimed at the need to launch landing craft and amphibious assault vehicles while ensuring air space control for protection of these forces.

To date, four designs have been proposed, varying in displacement from 8,000 to 19,000 tons. The largest of these is the basis of the NTCD class described above. Within the design envelope, deck areas, deck strengths, hangar areas and heights are adjusted to meet client needs. Generally, sizes are set to ensure compatibility with the forces of friendly nations in anticipation of the increasing role of coalition forces in international peacekeeping operations.

The BIP is designed to offer maximum payload flexibility, which can include varying quantities of aircraft (V/STOL, transport helicopters and combat helicopters), landing craft (LCAC, LCU), tanks, armored vehicles, trucks and jeeps. Thus, the BIP is easily adapted to different missions such as amphibious assault, troop transport, helicopter transport or humanitarian operations. The configuration of the hangars, lifts and doors is optimized for fast loading and offloading of the payload either in a harbor or at sea. The BIP design would thus appear to be in a good position to offer a solution for that need, considering its high degree of design flexibility.

NIMIS. This is the competing design concept being floated around by Alstom's Chantiers de l'Atlantique shipbuilding group as an alternative to the BIP plans and as a possible future carrier choice for the French Navy. The NIMIS is described as a 13,000 tonne LHD design that is 162.5 meters long, has a crew of 140, and can transport a marine contingency of 500 plus 100 vehicles.

Little else is known about this concept other than that substantial amphibious carrying capability will be required, alongside a deck for fixed- and rotary-wing aircraft, while retaining a larger degree of mission flexibility than offered by a full-sized aircraft carrier. In short, the new ship is likely to be a multimission platform with a much broader array of systems and capabilities than offered by the more conventional solutions.

TCD 90. This is the original name for this program, conceived in the mid-to-late 1980s for service in the 1990s – hence the number “90.” The letters come from the French designation “Transport de Chaland de Débarquement” (TCD).

## Program Review

**Background.** The French Navy's DTCN (Direction Technique des Constructions Navales, the organization responsible for all French warship design) began design a new landing ship dock in 1981. The French Navy's 1984-1988 construction program envisioned acquiring large amphibious ships. The only two ships of this type in the French Navy needed to be replaced in the 1990s. When the French Navy presented its construction program to the Parliament in 1983, three large amphibious warfare ships were requested and approved.

The final plans for this class were completed by early 1983. The first ship was ordered from the Brest Naval Arsenal in September 1984. The building program called for one ship to be ordered in 1984, one in 1986, and the last in 1988, with all three entering service between 1990 and 1993. The TCD 90 design was unveiled at the October 1984 Le Bourget Naval Exhibition. The French began ordering long-lead items for the first ship, FS *Foudre*, in November 1984, but the keel was not laid down until March 1986. The second ship was ordered the same month.

Equipment for the second ship was assembled by early 1987, but construction had not begun. In mid-1987, the French Navy postponed the last two ships due to a shortage of funds. The French Navy considered changing these plans in late 1987. One proposal was to order the second ship on speculation from a private shipyard and try to sell it to a foreign navy. If no buyers were found, the French Navy would purchase it. Incidentally, this is a common practice in France in order to provide work for private shipyards that lack business. In early 1988, however, the Navy decided against this plan; work on the FS *Foudre* continued, and it was launched in November 1988. The FS *Foudre* began sea trials in November 1989 and was commissioned in 1990.

Acquiring a second Foudre class LPD was a cost-effective, albeit temporary, solution to the amphibious lift capability shortfall, since much of the material required had already been assembled. On the other hand, this pre-procurement of material resulted in cutting the *Foudre* building time from 47 months to only 26 months. Furthermore, the construction cost of

the *Siroco* was 20 percent lower than that of the first ship.

Until mid-1993, French government statements continued to report that the construction contract for the next two ships of the class would be awarded in the 1994-1995 time frame. In mid-November 1993, it was officially stated that an order for the second Foudre class LPD was being placed with DCN, with the necessary funding (US\$258 million) being included in the 1994 budget. First metal was cut in April 1994, with the hull being built in the same drydock that is used for the aircraft carrier FS *Charles de Gaulle*. The original service entry target date was 1999, to coincide with the launch of the *Charles de Gaulle*.

The plans originally called for building three or four Foudre class LPDs to supplement the amphibious warfare fleet. The Optimar 95 naval plan called for a power-projection force consisting of amphibious ships and frigate escorts. The current amphibious mix includes three large LSDs, one small LSD and five LSTs (Batral class light transports). Two of the LSDs (the Ouragan class) are now 30 years old, and alternatives are being considered. The program to procure a new amphibious ship was announced as part of the national budget plan in September 1998, with a program launch in 1999, but no funding for a new ship class was included in the appropriate budget. The 1999 national budget, presented in September 1998, again included a provision for launching the program to procure a new amphibious warfare ship in 1999. However, at the end of 1998, it was announced that these plans were being delayed by another four years. Accordingly, the 2000 defense budget did not include provisions for additional construction of the Foudre class.

The situation was resolved in November 2000 when the French Navy ordered two new LHDs of the NTCD class. Names *Mistral* and *Tonnerre*, these ships combine full-length flight decks and large docking wells. These two ships will be completed in 2004 and 2005, respectively, according to present schedules. Their order marks the end of any possibility of continuing with Foudre class construction.

## Funding

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This program is funded by the Delegation Generale pour l'Armement (DGA) for the French Navy.

## Recent Contracts

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<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
DCN Brest	258	November 1993 – Second ship of the series ( <i>Siroco</i> ) ordered.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1982	DCN begins landing ship dock design studies
	1983	Four-year plan calls for three new LSDs
Sep	1984	FS <i>Foudre</i> ordered from Brest Naval Arsenal
Mar	1986	Keel laid down
	1987	Second and third ships postponed
	1988	Second ship considered built for export
Nov	1988	FS <i>Foudre</i> launched
	1990	FS <i>Foudre</i> commissioned
Nov	1993	Second of class ordered
Apr	1994	First steel cut on the second ship
Oct	1994	Second ship formally laid down
Dec	1996	Launch of second ship, FS <i>Siroco</i>
May	1997	Harbor trials begin
Nov	1997	Sea trials begin
Apr	1998	Contractor's sea trials completed
May	1998	Second ship scheduled to enter service
	1999	Procurement program for new amphibious ship launched
Nov	2000	Two NTCD class ships ordered
	2004	First of successor ships expected to be available
	2005	Second of successor ships expected to be available

## Worldwide Distribution

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France. 2

### Forecast Rationale

Last year, we pointed out that the collapse of the tri-national Project Horizon and the service entry of the *Charles de Gaulle* had opened a window of opportunity to continue with the much-delayed amphibious warfare ship program. We also stressed that the Foudre class is only one part of an effective amphibious warfare capability. For the French amphibious group to have credibility it needed the ability to conduct vertical envelopment operations using substantial numbers of helicopters. The small number carried by the Foudre class is not adequate for this requirement, suggesting that the construction of a dedicated helicopter carrier is required. This new ship could be based on the BIP concept proposed by DCN. This would provide a ship with a larger flight deck and greater operating range to act as an major offshore helicopter base, paralleling Britain's helicopter carrier, the HMS *Ocean*.

These predictions have been amply fulfilled by the order of the two new NTCD class ships *Mistral* and *Tonnerre*, whose characteristics fit exactly into the pattern we had projected and whose construction period falls exactly between the end of work on the *Charles de Gaulle* and the commencement of serious construction on the French part of the Franco-Italian Project Horizon.

The NTCD class are very different ships from the Foudre class; in US Navy terminology they are LHDs as opposed to LSD. As such they will replace the old Ouragan class LSDs and provide the essential vertical envelopment capability for French amphibious operations. Furthermore, another urgent requirement facing the French amphibious fleet is the replacement of the five Batral class LSTs. The earliest of these is now approaching 30 years old and their operational life is at an end. In addition to their age, they are also

considered to be far too small for a major amphibious role and any replacement would have to be significantly larger. Current design trends are for ships in this class to become small air-capable ships with a full-length flight deck for assault helicopters, in addition to having

a well deck for landing craft. It is possible that they will be replaced by a downsized version of the Mistral class, again based on the BIP designs. However, the implication of these considerations is that further construction of the Foudre class has now been ruled out.

## Ten-Year Outlook

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No additional ships of this class will be constructed; therefore, the forecast chart has been omitted.

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