

ARCHIVED REPORT

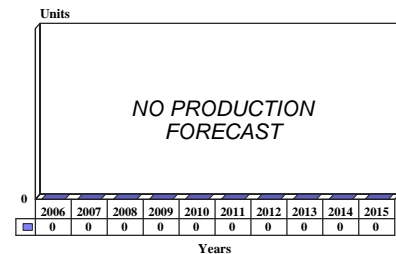
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Albion Class LPD - Archived 1/2007

Outlook

- Program concluded with delivery of last ship
- No more LPDs planned for Royal Navy Amphibious Squadron
- No export opportunities have emerged
- Tight funding precludes any additional construction proposals

10 Year Unit Production Forecast
2006 - 2015



Orientation

Description. Landing platform dock (LPD) responsible for the coordination of amphibious combat operations while providing the transport of heavy armored vehicles and personnel.

Status. In production.

Total Produced. Two completed.

Sponsor

Ministry of Defence
 (Procurement Executive)
 Royal Navy Director General Surface Ships
 CB/Admin 3
 St. Georges Court
 14 New Oxford Street
 London WC1A 1EJ
 U.K.
 Tel: +44 117 913 6000

Pennant List

<u>Ship</u>	<u>Builder</u>	<u>Launch Date</u>	<u>Commission Date</u>
L-14 <i>Albion</i>	VSEL, Barrow-in-Furness	3/9/2001	7/2003
L-15 <i>Bulwark</i>	VSEL, Barrow-in-Furness	11/15/2001	12/2004

Mission. The two ships are tasked with transporting personnel and heavy equipment and landing them onto contested beachheads. In a broader sense, these LPDs are seen as centerpieces for amphibious assault

operations and function as command, control, and communications platforms for such operations.

Price Range. The order details suggest a unit price of roughly \$370 million.

Contractors

BAE Systems - Naval Ships, <http://www.baesystems.com>, 1048 Govan Rd, Glasgow, GS1 4XP United Kingdom,
 Tel: +44 141 445 8000, Fax: +44 141 445 4455, Prime

Thales Nederland, <http://www.thales-nederland.nl>, Haaksbergerstraat 49, Hengelo, 7554 PA Netherlands, Tel: + 31 74 2488111, Fax: + 31 74 2425936, Consortium Member

Thales Communications UK Ltd, <http://www.thales-communications.ltd.uk>, Newton Rd, West Sussex, RH10 9TS Crawley, United Kingdom, Tel: + 44 1293 518855, Fax: + 44 1293 540045, Email: tcinfo@uk.thalesgroup.com, Consortium Member

Thales Navigation, <http://www.thales-navigation.com>, ZAC de la Fleuriaye, BP 60433, Carquefou, 44474 France, Tel: + 33 2 28 09 38 00, Fax: + 33 2 28 09 39 39, Consortium Member

Filtronic Components Ltd, Airedale House, Acorn Park, Shipley, BD17 7SW Bradford, United Kingdom, Consortium Member

Frazer-Nash Defence Systems Div, 111 Windmill Rd, Sunbury-On-Thames, TW16 7EF United Kingdom, Tel: + 44 932765822, Fax: + 44 932761098, Consortium Member

Imtech Marine & Industry, Sluisjesdijk 155, Rotterdam, 3087 Netherlands, Consortium Member

Railko Ltd Uk, Loudwater, High Wycombe, HP10 9QU Buckinghamshire, United Kingdom, Consortium Member

Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length (overall)	171.0 m	560.6 ft
Length (waterline)	154.7 m	507.4 ft
Beam	26.5 m	86.9 ft
Draft	7.0 m	23.0 ft
Displacement		
Standard	14,600 tonnes	
Full Load	16,800 tonnes	
Performance		
Speed	33 kmph	18 kt
Range	13,000 km at 33 kmph	7,000 nm at 18 kt
Crew	325	
Sealift Capability		
	<u>Type</u>	<u>Number</u>
Military Lift	Royal Marines	1 Commando (305-405 troops)
Aircraft	Chinook HC.4 heavy-lift helicopter	1
<i>or</i>	Sea King HC.4/EH 101 medium-lift support helicopters	2
Tanks	Main Battle Tanks (MBTs)	6
Landing Craft	LCU Mk 10 Ro-Ro (in dock)	4
	LCVP Mk 5 (on davits)	4
Vehicles	High and Low Vehicles carried on board LCUs, LCVPs	25+36
Armament		
CIWS	Goalkeeper	2
Light Guns	20mm	2
Electronics		
Radars		
Air Search	Type 996 (E/F band)	1
Surface Search	Type 1008 (I band)	1
Navigation	Type 1007 (I/J-band)	2
Lasers	Outfit DEC(3)	2
Command System	ADAWS 2000	
Electronic Warfare		
ESM	Outfit UAT(1)	1
Decoy Launchers	Outfit DLJ(2) Sea Gnat	4

	<u>Type</u>	<u>Number</u>
Machinery		
Configuration	Diesel-electric	
Diesels	Wärtsilä Vasa Type 16V32E	2x6,250 kW
	Wärtsilä Vasa Type 4R32E	2x1,560 kW
Secondary Propulsion	Electric motors	2x6 MW
Bow Thruster		1x216 kW
Propellers	Fixed-pitch, diameter 4.0 m	2

Design Features. The Albion class design uses commercial-build standards in the hull, meeting the Lloyd's Register Rules +100AQ, Ice Class 1c, IWS, for unrestricted service. Suggestions that this reflects a compromised standard of construction or that it implies that the ships are not intended to go in harm's way are false. The growing use of civilian standards in warships reflects the necessity to comply with anti-pollution and safety criteria and provide coverage against accidents involving such ships. The reasoning is that although this may entail a premium in the initial procurement cost, the savings are more substantial in the end, because the maintenance costs are (at least theoretically) reduced over the ship's lifetime.

The ship's damage control facilities are supplied by Canada's CAE Electronics, which was also responsible for the City class frigates' machinery control systems and U.S. Navy battle damage control systems. Mission-critical systems are built to full naval standards. Furthermore, a facility for nuclear, biological, chemical defense (NBCD) is included.

The Albion class is the first British surface warship in the U.K.'s naval fleet to utilize fully integrated diesel-electric propulsion. The main power source consists of two Type 1632E Wärtsilä Vasa diesel engines, which produce 16,763 horsepower (12.5 MW). These engines are supplemented, for slow speeds, by two Wärtsilä Vasa 4R32E engines that yield 4,157 hp (3.1MW). The engines' generators power two 6MW electric propulsion motors. These drive two shafts fitted with 4-meter propellers with fixed pitch. For slow-speed maneuvering, the ship is equipped with at least one 108 kN bow thruster.

The ships accommodate four LCU Mk 10s inside the well deck aft. There are two helicopter landing spots on

the rear flight deck, which also doubles as the deckhead. The docking well closes with a liftgate at the stern. The ship has side loading ramp access as well, facilitating pier-side operation. The vehicle decks total 550 linear meters in length (1.8 m wide).

Four Mk 5 Vehicle and Personnel Landing Craft (LCVPs) will be carried on davits, as will two rescue boats. The new LCU will allow roll-on, roll-off capability of the vehicles it carries, thereby facilitating the processes of loading and unloading.

Operational Characteristics. Based in Plymouth, U.K., the Albions have a dual operational role. Their primary function is to carry heavy armored equipment and other military equipment not suitable for helicopter transport, and land that equipment using four LCUs operated from a docking well at the stern. This role is supported and supplemented by the secondary role of acting as a forward base for helicopter-borne amphibious envelopment operations. In addition to their heavy transport role, the two ships have a command function in the planning, command, and control of amphibious warfare. Consequently, strong demands are placed on the survivability of the ships' C³I systems.

Each ship operates eight landing craft, four of which will be able to carry main battle tanks. The landing craft are launched by flooding the docking well at the stern of the ship. The tail ramp is then dropped, allowing the landing craft to float in and out of the dock.

The ships can carry 31 trucks of 16 tonnes GVW, 36 low vehicles, 30 tonnes of cargo, and four Mk 10 LCUs fully loaded in the aft docking well, in addition to the maximum 405 troops in an overload situation. One LCAC can be substituted for two LCUs.



ALBION CLASS LPD

Source: Royal Navy

Variants/Upgrades

There are no variants of, or upgrades to, this design.

Program Review

Background. The U.K. Royal Navy acquired its first two LPDs, HMS *Fearless* and HMS *Intrepid*, as part of the East of Suez operations in the late 1950s. These two ships were modified derivatives of the U.S. Navy's Raleigh class LPDs and were built during the same period. By the time the two ships were commissioned in 1965/67, the East of Suez role had been abandoned, and they spent most of their time supporting Royal Marine operations on the NATO Northern flank.

The two ships were worked hard during this period, and their condition deteriorated rapidly. Of a 1950s design, they had a high manpower requirement and were expensive to run. By the late 1970s, plans were already being made to replace them with more modern designs. These were canceled in 1981 under the Nott Defense Review. The two ships were scheduled to be decommissioned in 1982 and replaced by merchant ships. Before this could take place, the Falklands campaign occurred and the two LPDs proved essential in the British Navy operations. In fact, the two

amphibious ships were considered as mission-critical as the aircraft carriers.

The faults and poor overall condition of *Fearless* and *Intrepid* gave renewed impetus to plans for their replacement. In 1983, the LPD(R) program was initiated. It envisioned the one-for-one replacement of the existing ships with new and sophisticated LPDs that would combine the roles of heavy equipment transport, amphibious warfare command ships, and assault helicopter carriers. Effectively, the initial proposals would have been equivalent to a U.S. Navy Wasp class LHD. This was not financially viable, and the helicopter assault role was devolved to a third ship. This was an LPH, which could stand out to sea away from the most serious risks and could thus be less heavily equipped.

Plans for all three ships were continuously delayed on financial grounds, and no orders had been placed by mid-1990. By this time, HMS *Intrepid* had deteriorated so badly that she was no longer regarded as safe to take

to sea (she was stricken from the Fleet in 1999). The idea of using merchant car ferries as substitutes was raised. This idea was finally quashed during the Persian Gulf deployments of 1990/1991, when the weight of a Challenger tank loaded onto a civilian ferry caused the decks to collapse and nearly sank the ship. In addition, the use of leased merchant ships proved prohibitively expensive.

As a direct result of experience gained during the Gulf War of 1991, the U.K. MoD announced in 1992 that it would be revitalizing the U.K. amphibious warfare fleet with an \$800 million package. This would include \$285 million for the projected LPH, \$250 million each for the two LPDs, and three mid-life refits of existing LSTs at \$5 million each. However, within a few months, additional U.K. defense expenditure cuts placed the entire U.K. amphibious warfare capability at risk. The entire program was canceled in January 1993.

Coincidentally, just as the two previous LPDs had been saved by the Falklands war, the amphibious warfare reconstruction package was saved by the conflicts in the territories once forming part of Yugoslavia. Within two months of the project cancellation, British troops were deployed to Bosnia on a long-term basis. A previous deployment had taken place in 1992, during which British participation was limited to rescuing a herd of pedigree horses (the famous Lippizaners used by the Spanish Riding School in Vienna).

An immediate response was to place a construction order for the LPH with Vickers Shipbuilding & Engineering Ltd (VSEL). Project definition studies for the command system for the LPDs had already been placed, and the program was thus re-established in full. The PD1 design studies had commenced in December 1991. The results of these led to the institution of the PD2 design study, which produced a fully fledged joint indicative design. The technical specifications contained herein were taken from the declassified PD2 specification.

The U.K. MoD issued the Defence Review paper *Front Line First* in mid-1994. While this instituted many extensive reforms in British military infrastructure, some of the money saved was reinvested in new equipment. The British Navy was a major beneficiary of this process, with tenders being invited for seven Sandown class mine countermeasures vessels (MCMVs), four Type 23 frigates, and both LPD(R)s. At first, there was a presumption that these invitations to tender (ITTs) would not result in immediate orders for the full numbers of ships specified. However, the order for the Sandown class (a noncompetitive contract) was placed within days of releasing the ITT.

Original plans were for the LPD(R) prime contractorship to be awarded on a competitive basis.

However, only a single yard, VSEL, was prepared to tender. The ITT was then reissued to VSEL based on a noncompetitive procurement on NAPNOC (No Acceptable Price, No Contract) terms. This incurred a further delay to the LPD(R) program, which, according to the 1994 Major Projects Report, was already 35 months late. The bid received from VSEL under these terms has been reported as \$560 million, approximately twice the original projections.

The major driving factor behind this cost increase was the Treasury's demand that the contractor assume responsibility for all the risk inherent in the contract. Previously, such responsibility had been divided between the contractor and the MoD. Obviously, the administrative and related overhead costs involved in complying with the total responsibility concept are very high and can only be accommodated by increases in the unit cost quoted to the customer. In 1996, this escalated to such a point that the Treasury was attempting to reduce the number of ships planned to a single unit.

The impasse was apparently breached by a three-sided accommodation, publicized as an order on July 18, 1996. Presumably, the Treasury dropped its demand for total contractor responsibility, with an immediate effect on the projected unit cost. It also agreed to order both ships simultaneously, rather than as single orders, two years apart. This enabled the contractors to achieve economies of scale in the purchase of long-lead items and be sure that the second ship would really be funded. Finally, there is a strong possibility that the quoted price contains provisions for using cross-decked equipment from the two existing LPDs.

The names of the new ships were also announced at that time. The first would be HMS *Albion*, a traditional British warship name dating back to the 15th century. The most recent ship of this name was the Royal Navy's second LPH. The second new LPD would be named HMS *Bulwark*, a traditional name that also dates back more than 500 years and which was previously carried by the British Navy's third LPH.

In May 1999, it was announced that the two Albion class LPDs would join HMS *Ocean* as the core of a new Amphibious Warfare Squadron to be based at Devonport. The previous amphibious warfare squadron had been disbanded in 1966 when the U.K. abandoned its East of Suez defense role. The new formation would be the responsibility of the Commodore, Amphibious Warfare, who would report to Flag Officer, Surface Flotilla. The rest of the Squadron would consist of five Landing Ships Logistic (LSL) and the aviation training ship HMS *Argus*. When necessary, the formation would be joined by the Royal Netherlands Navy LPD HNIMS *Rotterdam* to form the U.K./Netherlands Amphibious Task Group.

In May 1999, it was admitted that the completion dates of the two Albion class LPDs had slipped from the original schedule. HMS *Albion* was 10 months behind schedule, while HMS *Bulwark* had slipped by six months.

During 2001, both HMS *Albion* and HMS *Bulwark* were launched. While this placed both ships firmly on the road to completion, it did highlight the fact that the program was substantially behind schedule. However, a close examination of the project milestones did indicate that at least some of the delays experienced earlier in the program had been recouped. This was fortunate, since the remaining LPD in British service, HMS *Fearless*, was found to have deteriorated to the point where she was no longer seaworthy. She was stricken from the operational fleet in 2002. There were reports that she was for sale to other navies, but her condition is reported to be so bad that she is fit only for scrapping.

HMS *Albion* finally put to sea to begin her Phase 1 of Contractors Sea Trials on December 16, 2002. She was handed over to the Royal Navy at Devonport on April 4, 2003, and commissioned by the Princess Royal on June 19, 2003. She completed the Safety and Readiness Check, trials, and operational training process. In early February 2003, her commanding officer was quoted by the BBC as saying: "The focus at the moment is for the work to be completed and the crew to finish their training... it is fair to say we are some way from being fully operational yet. More than 60 percent of the equipment on the ship is new to naval service.

Achieving operational status by the end of July [2003] will be challenging enough." HMS *Bulwark* was scheduled to commence sea trials in February 2003, but additional delays to her completion due to the priority given to HMS *Albion* mean that this date was slipped to June 2004.

HMS *Bulwark* left the BAE Systems Marine facility in Barrow, U.K. on May 31, 2004 to begin sea trials. Following their completion, she arrived in her homeport of Plymouth for the first time on Monday, July 12, 2004. The vessel was formally handed over to the Royal Navy by the shipbuilders BAE Systems. The ship arrived in Devonport flying the Blue Ensign, which was replaced by the Royal Navy's White Ensign in a ceremony signifying the handover.

HMS *Bulwark* was thus delivered almost six weeks ahead of schedule, the result of a major effort by BAE to accelerate the delivery date of this revised program. The emphasis was not only on delivering the ship early but also with a clean bill of health, with regard to outstanding works and defect clearance. This emphasis was probably a response to adverse comments made in a number of sources that alleged the first ship of the class had been delivered with numerous defects and examples of poor workmanship. These reportedly required extensive rectification. The ship was formally commissioned in July 2004 but did not enter service until December of that year. With her entry to active service, the Albion class program concluded.

Funding

The Albion class program is being funded by the U.K. MoD as procurement authority acting on behalf of the U.K. Royal Navy.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
YARD Ltd	3.8	Dec 1991 – LPD(R) project definition contract awarded.
EDS-Scicon	N/A	1992 – Phase one command system project definition study contract.
GEC-Marconi	N/A	1992 – Phase one command system project definition study contract.
Thomson-CSF	N/A	1992 – Integrated communications system study contract.
Griffin Hovercraft	N/A	Jun 1993 – Order for four 2000TDX(M) LCACs.
Redifon SPT/BAeSEMA/Thomson-CSF	52.5	Jul 1994 – U.K. MoD contract for the development, production, and integration of the MPS2000 voice and data communications and messaging system. Redifon's share of the package estimated at \$3.75 million.
EDS Defence Ltd	N/A	May 1996 – Contract for the Command Support System (CSS) (including Albion).
GEC plc (VSEL)	720.0	Jul 8, 1996 – Order for two LPDs of the Albion class.

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Signaal	N/A	Mar 1997 – Order for Goalkeeper CIWS on Albions.
Gegelec Projects	N/A	Mar 1997 – Four diesel generator sets for the propulsion system.
Azdec	N/A	1998 – Infra-Com two-way IR communications systems for the two ships.
Bae/Ailsa-Troon	58.0	May 1998 – Ten Landing Craft Utility (LCU) for the two LPDs.

Timetable

<u>Day</u>	<u>Month</u>	<u>Year</u>	<u>Major Development</u>
		1977	Initial studies for LPD replacements
		1981	LPD program canceled
		1982	Program reinstated
		1984	Program effectively suspended
		1991	ITT issued to 11 firms for combat system design
	Dec	1991	PD1 process begins
	Feb	1992	Command system development contract awarded to BAeSEMA
	Jan	1993	Program canceled
	Feb	1993	Program reinstated again
	Jun	1993	Second Project Definition (PD2) phase begins
	Feb	1994	PD2 completed
	Aug	1994	ITT issued to VSEL, Yarrows, Vosper, Swan Hunter. Comms contract to Redifon
	Mar	1995	VSEL announced only remaining bidder for building of ship
18	Jul	1996	Construction contract awarded
	Nov	1997	First steel cut for first ship
22	May	1998	Keel laid
30	Jul	1999	Prototype LCU Mk 10 intended for Albions launched
9	Mar	2001	HMS <i>Albion</i> launched
15	Nov	2001	HMS <i>Bulwark</i> launched
	Jul	2003	HMS <i>Albion</i> commissioned
	Dec	2004	HMS <i>Bulwark</i> commissioned

Worldwide Distribution

U.K. Two ships in service.

Forecast Rationale

With the commissioning of HMS *Bulwark* in December 2004, this long and troubled program has finally ended. There is little doubt that the British government could have managed this program far better. In fact, it is hard to see how the projected replacement for HMS *Fearless* and HMS *Intrepid* could have been managed any worse. The program was beset by government indecision and vacillation. During the 22 years it took to bring it to fruition, it was frequently canceled and revived, re-orientated, upgraded, simplified, cost-analyzed and generally obstructed.

It is also quite reasonable to say that, when the Albion class was finally built, the industrial environment was

such that the Royal Navy can count itself lucky to have received the ships at all. Although the prime contractor has been much criticized for its handling of the Albion program, it managed the program in an industrial environment where a blizzard of mergers, acquisitions, and corporate re-alignments served to blur lines of managerial and corporate responsibility. Any assessment of the program has to take that environment into account. Much of the difficulty experienced with the Albion class was a creation of the times and outside the contractor's control.

As a result of the investment over the last few years, the British amphibious warfare squadron is now modern

and well equipped. Indeed, the British amphibious warfare capability, once doomed for disposal, is now second only to the United States in its strength and modernity. Additional amphibious warfare construction

has a very low priority and is most unlikely. There are no export openings for the Albion class ships, so it appears that their construction is at an end. This report will be archived next year.

Ten-Year Outlook

Since no additional ships of this class are planned, a production forecast has been omitted.

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