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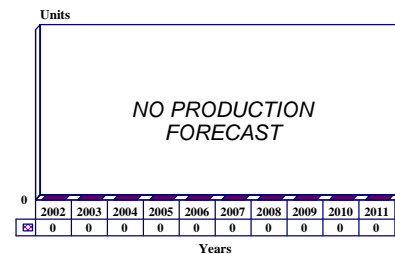
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Sandown Class - Archived 2/2003

Outlook

- Production ceased with delivery of last hull to RN
- No further export orders seem likely
- License-built construction in Spain ended
- Technical and operational changes constricting available market
- One British Sandown available for export

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. Dedicated minehunter used to locate and neutralize/destroy enemy mines in coastal and ocean waters.

Sponsor

Ministry of Defence
Procurement Executive
CB/Admin 3
St. Georges Court
14 New Oxford Street
London WC1A 1EJ
UK

Royal Saudi Arabian Navy
Riyadh
Saudi Arabia

Ministerio De Marina
Madrid
Spain

Contractors

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United Kingdom
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(Valves on Sandown)

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Tel: +44 1722 413060
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E-mail: def.sales@greshampower.com
Web site: <http://www.greshampower.com>
(Frequency converters, UPS, DC distribution systems, battery chargers, battery support systems)

Kongsberg Simrad Ltd
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Tel: +44 1224 226500
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(Camera systems on Sandown)

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 Web site: <http://www.ncs-france.thomson-csf.com/>
 (Combat, maritime surveillance and monitoring systems on Eridan)

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 (Valves, air systems)

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 Tel: +44 1380 723624
 Fax: +44 1380 728367
 E-mail: varivane.industries@btinternet.com
 (Furniture and fittings on Sandown)

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 Woolston Shipyard
 Victoria Road
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 Tel: +44 1703 445144
 Fax: +44 1703 421539
 Telex: 47682 vtwool g
 (Hull on Sandown, Al Jawf; prime)

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 Tel: +44 23 9237 3511
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 Web site: <http://www.vtc-hsde.com>
 (Control systems on Sandown)

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 Craydown Lane
 Middle Wallop
 Nr Stockbridge
 Hampshire S020 8DX
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 Fax: +44 1264 782084
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 Web site: <http://www.cobham.com>
 (Decoy systems on Sandown)

Licensee

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Status. In service and production.

Total Produced. Nineteen ships have been completed.

Pennant List

<u>Number & Name</u>	<u>Navv</u>	<u>Builder</u>	<u>Launch</u>	<u>Commissioning</u>
M101 <i>Sandown</i>	UK	Vosper-Thornycroft	4/1988	6/1989
M102 <i>Inverness</i>	UK	Vosper-Thornycroft	2/1990	3/1991
M103 <i>Cromer</i>	UK	Vosper-Thornycroft	10/1990	11/1991
M104 <i>Walney</i>	UK	Vosper-Thornycroft	11/1991	8/1992
M105 <i>Bridport</i>	UK	Vosper-Thornycroft	7/1992	11/1993
M106 <i>Penzance</i>	UK	Vosper-Thornycroft	3/1997	5/1998
M107 <i>Pembroke</i>	UK	Vosper-Thornycroft	12/1997	10/1998
M108 <i>Grimsbay</i>	UK	Vosper-Thornycroft	8/1998	5/1999
M109 <i>Bangor</i>	UK	Vosper-Thornycroft	4/1999	1/2000
M110 <i>Ramsey</i>	UK	Vosper-Thornycroft	11/1999	10/2000
M111 <i>Blythe</i>	UK	Vosper-Thornycroft	5/2000	5/2001
M112 <i>Shoreham</i>	UK	Vosper-Thornycroft	2/2001	9/2002

<u>Number & Name</u>	<u>Navy</u>	<u>Builder</u>	<u>Launch</u>	<u>Commissioning</u>
420 <i>Al Jawf</i>	Saudi Arabia	Vosper-Thornycroft	8/1989	12/1991
422 <i>Shaqra</i>	Saudi Arabia	Vosper-Thornycroft	5/1991	2/1993
424 <i>Al Kharj</i>	Saudi Arabia	Vosper-Thornycroft	2/1993	8/1997
M31 <i>Segura</i>	Spain	Izar	7/1997	3/1999
M32 <i>Sella</i>	Spain	Izar	7/1998	6/1999
M33 <i>Tambre</i>	Spain	Izar	3/1999	1/2000
M34 <i>Turia</i>	Spain	Izar	11/1999	9/2000

Mission. The Sandown class has been designed for hunting and destruction of mines, with no provision for minesweeping. Designated also as Single Role Mine Hunters (SRMH), the Sandown class supplements the earlier multirole Hunt class.

Price Range. The first-of-class cost an equivalent of US\$133.5 million. The cost of subsequent ships is estimated at US\$60 million each.

Technical Data

	<u>Metric</u>	<u>US</u>
Dimensions		
Length:	52.5 m	172.1 ft
Beam:	10.5 m	34.4 ft
Draft:	2.3 m	7.5 ft
Displacement		
Standard:		450 tons
Full Load:		484 tons
Performance		
Speed (on Diesels):	24 kmph	13 kt
Speed (Electric):	12 kmph	6.5 kt
Range:	5,500 km at 22 kmph	3,000 nm at 12 kt
Crew:	5 officers, 29 NCOs & enlisted (40 berths)	
Electronics		
Navigation Radar:	Type 1007	1
EW		
ESM:	Matilda	1
Decoy Launchers:	Barricade	2
Command & Control:	Nautis-M	1
Mine Disposal		
Sonar:	Type 2093 VDS	1
Submersibles (UUV):	PAP 104 Mk 5	2
Armament		
Gun:	Oerlikon/DES 30 mm L75	1
Machinery		
Main Propulsion:	Paxman-Valenta 6RPA 200EM	2x1,500 shp
Auxiliary System:	Diesel-electric	2x200 hp
Propellers:	Voith-Schneider	2
Bow Thruster Unit:	Schottel	2

Design Features. The all-fiberglass hull is shock and rot resistant and has a low magnetic signature. It is single-skinned, and advanced molding techniques have been

used to incorporate the stringers into the hull material. The hull itself is transverse framed, but the inclusion of the stringers into the hull eliminated the need for

expensive and complex crossing joints in the hull structure. The previous Hunt class used titanium bolts for these joints.

A major feature of the Sandown class is the provision of two enclosed hangars for the PAP-104 Mk 5 underwater mine disposal vehicles. This feature greatly enhances the operational readiness of the submersibles. The aft deck is clear in comparison with the Hunt class and is more sheltered.

The SRMH class ships are equipped for rapid under way replenishment to maximize their on-station time. The main propulsion system consists of two 6RPA 200EM Paxman Valenta diesel engines (with a low magnetic signature) for cruising speeds. Two diesel-electric generators powering electric motors are used during minehunting operations. Emergency and auxiliary power is supplied by three 250 kW diesel generators. The ships have two propellers and bow thruster units for better maneuvering at low speeds.

The command and control system is the Nautis-M, which provides command, control, and navigation capabilities. It utilizes distributed processing instead of a central computer. Nautis receives inputs from the ship's radar, sonar, and navigation equipment, and displays the navigational and sonar situation as well as a record of the ship's movements and operations. A 16-inch CRT provides a 12-inch display. Tote-type data are presented in the peripheral area.

The ships have the Type 2093 Minehunting Variable Depth Sonar (VDS), a solid-state upgrade of the hull-mounted Type 193M minehunting sonar. There are two operating frequencies, 100 kHz for long-range searching and 300 kHz for short-range search and classification. The Sandowns have a Type 1007 navigation radar. Ships deploying to hostile areas will be fitted with two Wallop Barricade countermeasures/decoy launchers. There is one 30 mm gun on each ship. Provision is also made for mounting Outfit DEC lasers on the aft superstructure.

Operational Characteristics. Mines are destroyed with the PAP 104 mine destruction vehicle. This is a mini-submersible with a closed circuit TV camera and a variety of payloads, including a 200 pound explosive charge, explosive cutters, or a combination of both. It is connected by a guidance wire to the mothership. A TV monitor and control desk in the ship's Operations Room (Combat Information Center) let personnel identify and classify ground and moored mines 1,600 feet away from and 400 feet below the ship. Once a mine has been classified, the mothership commands the PAP 104 to drop an explosive charge on bottom mines or cut the cables of moored mines. The PAP 104 is 8 feet long by 4 feet wide and weighs 1,500 pounds.

The Sandown class is not fitted with Oropesa sweep wires, nor does it carry the MSSA.1 acoustic sweep. These will be fitted at a later date.

Variants/Upgrades

Al Jawf Class. Three ships were built for Saudi Arabia, under a UK/Saudi defense procurement agreement, Al Yamamah II. These ships, also built by Vosper in Woolston, England, have been modified to function as both minehunter and patrol vessels. To permit the operation as a patrol vessel, the main engines have been upgraded to 845 bhp for slightly higher speed. The ships are each armed with a twin Emerlec 30 or 35 mm gun mount forward, and have the French Shiploc ESM receiver coupled to Dagaie chaff launchers. The ships are also fitted with light minesweep equipment.

An option for another three ships was part of the original contract, but this has now lapsed, and it is highly improbable that these ships will be built.

CME (Contra Minas Español). Indigenous designation for the Spanish Armada's Segura class (see below).

Segura Class. Spain built four of an originally planned eight enlarged derivatives of the original Sandown design. Instead of being a standard licensing agreement, the Spanish program is based on a technology transfer agreement struck in 1989. This

involves use of an Izar design that incorporates licensed Vosper-Thornycroft technology for the hull. The first four ships were ordered in 1993, and a second batch of four was to be ordered in 2000. This order has never been placed, and it now appears unlikely that these ships will be built.

The equipment outfits adopted for the Spanish ships would allow both minehunting and minesweeping missions. However, the first four ships are dedicated minehunters, while the follow-on batch of four are oriented toward minesweeping. The ships are outfitted with two Gaymarine Pluto remote control mine disposal vehicles instead of PAP 104. As for the weaponry, the Spanish versions are fitted with one 20 mm and two 12.7 mm machine guns. Also, the ships have Racal Hyperfix, QM-14, and Navigator Mk 21 navigation aid, as well as the SQQ-32 sonar for minehunting. In addition to the mine warfare operations, the ships will be used for maritime patrol and policing work.

UK Batch 2. The seven ships ordered by the Royal Navy in July 1994, have some slight differences from

those in Batch 1. These ships have larger-diameter Voith-Schneider propellers (1.8 meters) and they are equipped with a two-person decompression chamber, as well as berthing for female crew members and a more powerful air conditioning system. Another difference is that the newer ships have an additional Gemini crane for remote control mine disposal system (RCMDS) vehicle launch and recovery. This modification will be

carried out in retrofit on all previous ships in due course. Also, the second batch ships have an improved decompression chamber for divers.

Plans are also in place to equip both the Hunt and the Sandown classes with a remote minesweeping capability. This function could be extended to a number of other ship types in the future.

Program Review

Background. By the early 1970s, the 118-ton class minesweepers, built in the mid-1950s, were rapidly aging. Their mine disposal capabilities were outmoded, and their limited hull dimensions precluded major upgrades. Although some had been converted to minehunters, their wooden hulls were deteriorating and replacement was essential. They were initially replaced by the Hunt class, which were built from 1975 through 1988. These are very sophisticated and expensive dual-role ships, suitable only for deployment with the regular fleet. Reserve units were equipped with the smaller and simpler River class minesweepers that were built from 1980 through 1986. There were 13 Hunt class minesweeper/hunters and 12 River class minesweepers, the latter being withdrawn from service in 1993.

In mid-1983, the UK Ministry of Defence (MoD) awarded Vosper Thornycroft a contract to design a 500-ton ship optimized for minehunting. The new ship was to have improved sensors and greater maneuverability than the two previous classes. Minehunting involves hunting for mines with a sonar system and destroying the mines with a remote-control mini-submersible. This avoids the need to carry mine-sweeping chains and paravanes. Vosper Thornycroft's Single Role Minehunter design was approved in January 1984. The MoD began ordering long-lead items, including the Nautis-M system and the Type 2093 sonar, in late 1984.

The MoD ordered the first ship, HMS *Sandown*, on August 28, 1985. In late 1986 the MoD requested bids from Vosper Thornycroft and Yarrow Shipbuilding for additional Sandown class ships. HMS *Sandown* was laid down on February 2, 1987. In July 1987, the MoD awarded Vosper Thornycroft a US\$190 million contract for four Sandown class minehunters. This order reportedly was placed to keep Vosper from closing down, since it was building only two Hunt class ships and had no other orders. The second and third ships' keels were laid in late 1988. HMS *Sandown* was commissioned in March 1989.

The first foreign navy considered the Sandown class in late 1986. The Saudi Arabian Navy planned to upgrade its mine warfare forces, and the Sandown design was one of several considered, along with the Hunt (Brecon) design from the UK, the Lerici design from Italy, and the Tripartite (Eridan/Alkmaar) design from France and the Netherlands. In early July 1988, the Saudi Arabian government and the UK came to terms on an arms package including three Sandown class minehunters (with options on three more), 48 Tornado aircraft, and other systems.

As part of the agreement with Saudi Arabia, the Royal Navy agreed to transfer the second British ship, HMS *Inverness*, to the Royal Saudi Navy. The two navies also agreed that the Royal Navy would transfer alternate ships to the Saudi Navy. The Saudis made the request to allow them to gain experience with the vessel and due to the continuing threat from uncleared mines from the Iran-Iraq war. The first Saudi ship, HMS *Al Jawf*, was launched in August 1989 and delivered in December 1991. Acceptance trials of the ship continued until mid-1993, and the *Al Jawf* was seen moored at Priddy's Hard in the UK as late as November 1994.

In 1989, Spain's Empresa Bazán Nacional shipyard (Bazan) signed an agreement with Vosper Thornycroft for a technology transfer, allowing the Spanish yard to build a modified Sandown, the Single Role Mine Hunter-2 (SRMH-2), for the Spanish Navy. The Spanish requirement calls for a ship with a secondary patrol mission and reduced magnetic, noise, and infrared signatures. Orders for these ships were continuously delayed due to financial shortfalls. Eventually, the plan to build the SRMH-2 design was abandoned in March 1992 and replaced with an order for four Izar-designed patrol ships which had minehunting as a secondary capability. These apply Vosper fiberglass technology for the hull but are significantly different designs from the Sandown class, being more than 200 tons heavier and 3 meters longer and having a very different electronics fit. The original plans for these ships called for a total of 16 to be built, but this was subsequently reduced to eight. The first

batch of four is in service, but the order for the second group is long overdue. Spain was also involved in the bidding for Turkey's new minehunter requirement, presumably using the Segura design, but lost out to the German rival in spring 1999.

The HMS *Inverness* was turned over to the Royal Navy on March 3, 1990. The third ship, HMS *Cromer*, was launched in October 1990. Initial trials revealed a number of problems with the Type 2093 sonar system that were to delay full service acceptance until December 1992. The primary problem was leakage of water into the VDS unit. The cause was finally determined to be a financially imposed substitution of inadequate fasteners in the unit assembly. The basic design of the Type 2093 and the workmanship of Marconi Underwater Systems Ltd were subsequently exonerated and the problem solved by reverting to their original design.

By June 1993, all five Sandown class ships then on order had been delivered. Severe financial pressures had forced the Royal Navy to allow the tenders for the second group of seven ships of this class to lapse in February 1991. At that time, it was stated that the ships would be reordered when financial conditions permitted. Statements from the UK Ministry of Defence suggested that these would be invited during 1993, with the orders for a batch of three to five ships being placed before the end of that year. The long-term plan remained for the construction of 20 ships of this type.

In January 1992, the Royal Australian Navy initiated a program for a class of four minehunters (with the possibility of orders for a further pair of ships at a later date). Following the disastrous experiences with the Rushcutter class of inshore minehunters, in which a new and untried sonar had been combined with a radically new hull design, the RAN specified that both the hull and sonar systems should be proven prior to purchase. Only three hull designs were considered acceptable, those of the Italian Gaeta class, the Swedish Landsort 52, and the British Sandown class. It quickly became apparent that a VDS solution for the sonar was inevitable and, by early 1993, this choice had narrowed to the US SQQ-32 and the British Type 2093. All three contending hulls were required to have proven compatibility with both sonars.

These requirements proved to be excessive in that only the British Sandown/Type 2093 combination could be considered a proven option. Rather than face a single-competitor race, the RAN relaxed the proven specification to a requirement to demonstrate full compliance with specifications. The technical evaluation conducted by the RAN indicated that the Sandown class with Type 2093 was superior to its

competitors. However, this would have led to virtually all Australian naval shipbuilding being concentrated in the hands of Transfield Corp. This, the Australian government decided, was unacceptable. The Gaeta design offered by Australian Defense Industries was selected (retaining the Type 2093 sonar system from the Transfield bid).

In parallel with the Australian requirement, Turkey launched a projected program for the construction of six minehunters to replace ex-US hulls dating from the 1950s. This program was originally launched in 1991 but has since been repeatedly delayed because of financial constraints and political problems. The favored contestant for this contract was the German Type 332 Frankenthal class, with the Sandown class coming in second. Turkish plans envisage the procurement of 14 hulls under this program to replace all 18 Mercure and Adjutant class mine warfare vessels. A decision in spring 1999 finally made official the choice for the German platform.

Thailand opened a requirement for coastal mine warfare vessels to bids in mid-1995. Again reflecting earlier problems with untried equipment, the request for proposals required that bids be supported by a demonstrated and proven in-service capability. By mid-1996, the leading contender was reported to be a version of the Sandown class with improved accommodation, minesweeping equipment, and a hull-mounted version of the Type 2093 sonar. Eventually, however, the decision was made to opt for the Gaeta class equipped with the DSQS-11M sonar.

The 1993/94 UK Defense review "Defending Our Future" included a very sharp reduction in British MCMV numbers, cutting the fleet from 40 hulls to 25. However, this is deceptive since the program includes a major upgrade of the earlier Hunt class with new command systems and sonars and the construction of additional Sandown class vessels. The eventual fleet was planned to be 13 Hunt and 12 Sandown class, representing a very substantial gain in real capability. To execute this policy, an order for a total of seven Sandowns was placed with Vosper in early July 1994. This deal was valued at US\$375 million.

The July 1998 Strategic Defence Review threw a curve ball in Britain's overall minehunter mix by stating that the total number of ships be kept at 20. This will consist of 11 Sandown class minehunters plus nine modernized Hunt class. The first casualty will be HMS *Cromer*, which was only commissioned in April 1992. Two Hunt class ships were retired along with the *Cromer* and have been sold to Greece. Two additional Hunt class have been converted to patrol ships. Consequently, no new construction is expected to take

place in Britain following delivery of the last of the class, HMS *Shoreham*, in November 2001.

Funding

This program is funded by the Ministry of Defense of each country that procures the class.

In Spain, the technology transfer agreement of 1989 that permitted Izar to build these ships locally also involved industrial investments by the local builder for its facilities, at an equivalent of US\$20 million. These investments included development of an infrastructure and specialist skills for the program. More specifically, this meant converting one of the Cartagena shipyard's docks into a covered fiberglass construction facility and setting up a training program with assistance from France's DCN.

Recent Contracts

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Vosper-Thornycroft	345	July 1994 – UK MoD contract for the construction of seven Sandown class MCMVs.
GEC-Alsthom	6.4	November 1994 – Supply of 14 Paxman-Valenta 6RPA200EM diesels for Royal Navy Sandown class minehunters.
Metalastik Vibration Control Systems	N/A	July 1997 – Elastomeric engine and shaft mountings for the Spanish Segura class.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1983	UK MoD awards Vosper Thornycroft contract for design work on new minehunter
Jan	1984	Royal Navy approves Vosper Thornycroft design
Aug	1985	First ship, HMS <i>Sandown</i> , ordered
Feb	1987	HMS <i>Sandown</i> laid down
Jul	1987	Four Sandown class minehunters ordered
Jul	1988	Saudi Arabia orders three Sandown class minehunters
Feb	1989	Spain signs agreement with Vosper Thornycroft
	1989	Saudi Arabia, UK revise agreement
Mar	1989	HMS <i>Sandown</i> commissioned
	1990	First Saudi ship complete
	1991	First Saudi ship commissioned
Mid	1993	Spain authorizes ordering of four ships
May	1993	Sandown class rejected by Australia
Oct	1993	Further ITT from UK Royal Navy
Nov	2001	Last UK ship delivered

Worldwide Distribution

UK. 11 in service.

Saudi Arabia. 3 in service.

Spain. 4 in service.

Forecast Rationale

The delivery of the last Sandown class minehunter in the UK production run of the class appears to be the end of the line for this particular MCMV. The market for such ships has shrunk significantly over the last 10

years, with the number of new opportunities being at an all-time low. As a result, the Italian Gaeta class design, the Swedish Landsort, the German MJ332, the Sandown class, and the French Eridan are all competing for a market that has diminished to the point where it has virtually vanished.

Although all five of these designs have performed well and are mature and viable competitors for any given mine warfare requirement, there simply are not enough orders to sustain them. Indeed, such is the paucity of orders in this particular sector that it is questionable if more than one of these designs will survive. Their promoters have attempted to ensure their survival by designing them with equipment and operational system fits that can be changed according to user requirements. At this time, only the two designs that have an ongoing workload, the Italian Gaeta class (in Australia) and the German MJ-332 (in Turkey), seem likely to survive. In this tight and competitive market the Sandown class suffers – probably fatally – from its stress on the mine-hunting role rather than the combined minehunter/sweeper capability preferred by most export clients.

The primary reason for the diminution of the mine countermeasures vessel (MCMV) market is the low probability of running into minefields in today's

operational environment, combined with a shift in the direction of mine warfare technology itself. The old concept of the highly signature-suppressed MCMV is being replaced with a much simpler vessel that relies on stand-off minehunting technology using helicopters, unmanned underwater vehicles (UUVs), and expendable mine destroyers. This concept fits neatly into an environment where few mine warfare ships actually clear mines. Most of them spend their lives performing coastal patrol and maritime policing duties. The highly optimized Sandown design is not well suited to such mundane yet essential work.

It now appears most unlikely that either of the two outstanding options on Sandowns will become reality. The Spanish Navy is heavily committed to a series of expensive procurement programs, including the F-100 class frigates and the second of the Galicia class amphibious landing ships, and it seems improbable that additional funds for minehunters will emerge. Saudi Arabia's option for three additional ships of this class is becoming increasingly uncertain and is now regarded as being virtually moribund. When the improbability of any domestic orders from the British is added, it does appear that the end of Sandown production has been reached.

Ten-Year Outlook

In view of the absence of any prospective sales for this class, no production is forecast.

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