

# ARCHIVED REPORT

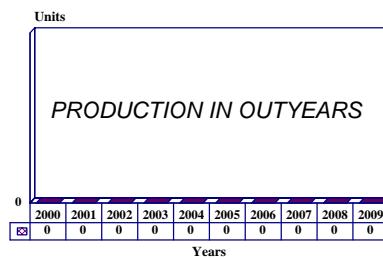
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## T-AGOS - Archived 5/2001

### Outlook

- Ocean surveillance ships, most recent models with SWATH hull
- Original mission changing; some ships have been moved to drug interdiction tasks
- Still a highly important element of MCM and littoral warfare
- Funding will probably become available further in the future
- Upcoming AGOR ship may cover some needs for a while

10 Year Unit Production Forecast  
2000-2009



### Orientation

**Description.** Non-combatant ocean surveillance ships originally designed to gather underwater acoustical data; built in both monohull and SWATH (Small Water Area Twin Hull) configuration.

#### Sponsor

US Navy

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#### Contractors

Tacoma Boatbuilding Co  
Tacoma, Washington (WA)  
USA  
(original builder of T-AGOS 1-12, 16)

Halter Marine Group Inc  
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(construction of T-AGOS 13-18, 23)



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May 2000

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*(towed array handling systems)*

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*(design)*

McDermott Marine  
 Morgan City, Louisiana (LA)  
 USA  
*(construction of Victorious class)*

Dyn Marine Services of Virginia  
 Reston, Virginia (VA)  
 USA  
*(operation & maintenance of onboard systems)*

**Licensee.** The Victorious class has been produced under license in Japan (as Hibiki class) by:

Mitsui Shipbuilding and Engineering Ltd  
 Tamano  
 Japan

**Status.** In service. The oldest Stalwart class ships are being transferred to the service of other US agencies as well as to foreign navies. Final fitting continues on the last ship of the SWATH hull style, with funding being sought for one more unit.

**Total Produced.** A total of 18 Stalwart class and six Victorious class (four US and two Japanese) have been built. A single Impeccable has recently been finished; one more is still projected.

**Mission.** Undersea surveillance and oceanic research and development, for submarine hunting patrols, and, more recently, for some units of the Stalwart class for counter narcotics missions.

Specifically, the main function of the ships is towing the SURTASS (Surveillance Towed Array Sensor System) at slow speeds (3 knots) for extended periods of time at depths between 500 and 1,500 feet. The patrols are of 60-90 days duration. The information from the array to shore is relayed through a SATCOM link.

#### Pennant List

<u>Ship Name</u>	<u>Builder</u>	<u>Ordered</u>	<u>Commissioned</u>
<b>STALWART CLASS</b>			
T-AGOS-1 <i>Stalwart</i>	Tacoma Boatbuilding Co	FY79	4/1984
T-AGOS-2 <i>Contender</i> <sup>(a)</sup>	Tacoma Boatbuilding Co	FY79	6/1984
T-AGOS-3 <i>Vindicator</i> <sup>(a)</sup>	Tacoma Boatbuilding Co	FY80	11/1984
T-AGOS-4 <i>Triumph</i> <sup>(a)</sup>	Tacoma Boatbuilding Co	FY81	2/1985
T-AGOS-5 <i>Assurance</i> <sup>(a)</sup>	Tacoma Boatbuilding Co	FY81	5/1985
T-AGOS-6 <i>Persistent</i> <sup>(a)</sup>	Tacoma Boatbuilding Co	FY81	8/1985
T-AGOS-7 <i>Indomitable</i>	Tacoma Boatbuilding Co	FY81	11/1985
T-AGOS-8 <i>Prevail</i>	Tacoma Boatbuilding Co	FY81	3/1986
T-AGOS-9 <i>Assertive</i>	Tacoma Boatbuilding Co	FY82	9/1986
T-AGOS-10 <i>Invincible</i>	Tacoma Boatbuilding Co	FY82	1/1987
T-AGOS-11 <i>Audacious</i>	Tacoma Boatbuilding Co	FY82	6/1989
T-AGOS-12 <i>Bold</i>	Tacoma Boatbuilding Co	FY82	9/1989
T-AGOS-13 <i>Adventurous</i> <sup>(a)</sup>	Halter Marine	FY85	3/1988
T-AGOS-14 <i>Worthy</i> <sup>(a)</sup>	Halter Marine	FY85	7/1988
T-AGOS-15 <i>Titan</i> <sup>(a)</sup>	Halter Marine	FY86	8/1988
T-AGOS-16 <i>Capable</i>	Tacoma Boatbuilding Co	FY87	7/1989
T-AGOS-17 <i>Tenacious</i>	Halter Marine	FY87	2/1989
T-AGOS-18 <i>Relentless</i>	Halter Marine	FY87	5/1989
<b>VICTORIOUS CLASS</b>			
T-AGOS-19 <i>Victorious</i>	McDermott Marine	FY87	9/1991
T-AGOS-20 <i>Able</i>	McDermott Marine	FY89	7/1992
T-AGOS-21 <i>Effective</i>	McDermott Marine	FY89	1/1993
T-AGOS-22 <i>Loyal</i>	McDermott Marine	FY89	7/1993

<u>Ship Name</u>	<u>Builder</u>	<u>Ordered</u>	<u>Commissioned</u>
<b>HIBIKI CLASS</b>			
AOS-5201 <i>Hibiki</i>	Mitsui SEL	FY89	1/1991
AOS-5202 <i>Harima</i>	Mitsui SEL	FY90	3/1992
<b>IMPECCABLE CLASS</b>			
T-AGOS-23 <i>Impeccable</i>	Tampa Shipyard/Halter Marine	FY91	2000 (est)
T-AGOS-24 <i>Integrity</i> <sup>(b)</sup>	(TBD)	FY92	?

<sup>(a)</sup> Currently assigned to non-T-AGOS duties.

<sup>(b)</sup> Construction was approved and funds were allocated in FY92, but no order was to be placed until after USS *Impeccable* has run trials; it still has not. The future of two additional units also projected at one time is even more uncertain.

**Price Range.** Approximately US\$182 million each, judging by the contract average price.

## Technical Data

**NOTE:** The following data apply to the Impeccable (T-AGOS 23) class, the latest model in the series.

	<u>Metric</u>	<u>US</u>
<b>Dimensions</b>		
<i>Length:</i>	85.8 m	281.5 ft
<i>Beam:</i>	29.2 m	95.8 ft
<i>Draft:</i>	7.9 m	26.0 ft
<b>Displacement</b>		
<i>Standard:</i>	4,304 tonnes	4,236 tons
<i>Full Load:</i>	5,456 tonnes	5,370 tons
<b>Performance</b>		
<i>Speed — Maximum:</i>	22 km/h	12 kts
<i>with SURTASS in Tow:</i>	5.5 km/h	3 kts
<i>Range:</i>	4,800 km at 22 km/h	3,000 nm at 12 kts
	11,950 km at 5.5 km/h	6,450 nm/3 kts
<i>Crew:</i>	8 officers, 11 enlisted, 26 civilians	
<b>Electronics</b>		
<i>Radar:</i>	LN-66	2
<i>Sonar:</i>	UQQ-2 SURTASS	1
<i>Satellite Communication:</i>	WSC-6(V)1	
<b>Machinery</b>		
<i>Prime Movers:</i>	Westinghouse electric motors	2x5,000 shp (3.73 MW)
<i>Power Generators:</i>	GM EMD 12-645F7B diesels	3x5.48 MW
<i>Propellers:</i>	Two shafts	2
<i>Auxiliary Propulsion:</i>	Omnithruster hydrojets	2x1,800 shp (1.34 MW)

**Design Features.** These ships are designed to tow an array of underwater listening devices to collect acoustical data. The ship also carries electronic equipment to process and transmit that data via satellite to shore stations for evaluation. The ship, the listening devices and electronic equipment are all part of a

system called the Surveillance Towed Array System, or SURTASS.

Acoustic systems under normal operating conditions include an active low frequency towed array, which has a series of modules, each of which houses two

high-powered active transducers. These can be used with either mono- or bistatic receivers.

The ships from T-AGOS-19 onward use a SWATH (Small Water Area Twin Hull) hull design, featuring two longitudinal 'pontoons' on which the main platform lies suspended, much like on a catamaran hull concept. However, on a SWATH structure, the hulls each contain an additional pod underneath to which the propulsion units are attached and on which the ship rides. This structure provides greater stability for operating in adverse weather conditions and generates less self-induced hull noise in the water, which is a key consideration in these ships' missions.

The propulsion plant on the T-AGOS 23 (Impeccable class) ships consists of three General Motors 12-645F7 diesel engines driving two Westinghouse electric motors. These are connected to two Omnithruster hydrojets, which drive the ship at 12 knots on transits and 3 knots during surveillance patrols. The main diesel generating room and the machinery control center are designed for unmanned operation, with all engine control taking place in the pilot house. There is also a set of alternate controls in the winch control booth, letting the towed array winch operators control the ship as well.

**Operational Characteristics.** Ocean surveillance ships generally have a single mission to gather underwater acoustical data. The T-AGOS ships operate to support the anti-submarine warfare mission of the Commanders in chief of the Atlantic and Pacific Fleets.

Nevertheless, oceanographic and hydrographic surveys, underwater surveillance, acoustic research and submarine support are just a few of the services these ships support. The ships are operated and maintained by civilian contractors. The Surveillance Towed Array Sensor is a linear array deployed on a tow cable. Information from the array is relayed via WSC-6 (SHF) SATCOM link to the shore. SURTASS patrols are 60 to 90 days in duration.

Prior to 1992, all T-AGOS ships were operated by the Military Sealift Command (MSC) and designated USNS (United States Naval Ship). Each ship has 33 crew members. A civilian crew of 26 operates the ship, while 19 naval personnel handle the SURTASS, its data processors and the satellite communications relay.

Please refer to the **Variants/Upgrades** section for a more detailed description of each type's operational characteristics.

In 1992, due to the perceived decline in the submarine threat, the monohull Stalwart class ships began to be transferred to the National Oceanic and Atmospheric Administration (NOAA). Since then, some have also been transferred to other agencies and world navies. The existing baseline SURTASS suites on the remaining Stalwarts are being deactivated, and those ships are being redesignated for other support tasks.

Three of the original monohull Stalwart class ships have been modified for a drug interdiction mission. They now support the Joint Interagency Task Force East.

## Variants/Upgrades

There are three basic designs either in service or under construction, designated as T-AGOS type surveillance ships. The first version is the Stalwart class (T-AGOS-1 through 18); the second version is the Victorious class described above (T-AGOS-19 through 22); and the last is the Impeccable class (T-AGOS-23).

**Stalwart Class** is built on a conventional hull and bears little similarity to the current design. It has a displacement of 1,600 tons light and 2,285 fully loaded. The dimensions are 68.3 meters by 13.1 meters, with a draft of 15.1 feet. The crew size is only 30 men, instead of the 45 on the new class. The propulsion plant and electrical plant are almost identical except for location.

USNS *Stalwart*, along with two sister ships, was deactivated in the early 1990s when the end of the Cold War signaled a reduced submarine threat from the former Soviet Union. The Atlantic commander decided to convert the three ships for a new mission – finding drug traffickers.

Those three ships – USNS *Stalwart* (T-AGOS 1), USNS *Indomitable* (T-AGOS 7) and USNS *Capable* (T-AGOS 16) – have since been modified for their new mission. The underwater acoustic array was removed, and an air search radar, integrated display system, sophisticated communications suite and other special mission equipment were installed to detect and monitor the suspected criminals. The ships now support the Joint Interagency Task Force East.

**Victorious Class.** The Victorious class ocean surveillance ships are built on a Small Waterplane Twin Hull, or SWATH, design for greater stability at slow speeds in high latitudes under adverse weather conditions. They were the initial SWATH design, with a smaller hull (length: 71.5 meters, width: 28.5 meters, draft: 7.6 meters) but with a higher transit speed than the succeeding Impeccable class. The crew is also slightly smaller, totaling 33 personnel, including 22 civilians.

**Impeccable Class.** The latest production version of the SWATH design. The size was increased from the Victorious class SWATH in order to handle the larger and heavier equipment for the low frequency active (LFA) sonar system, including a towed array. The Impeccable class reportedly has the SURTASS Block upgrade and LFA systems built-in. These ships have the same WSC-6 communications, links and operating procedures as the Stalwart class.

The preceding Victorious ships should eventually have the capability to receive and process bistatic LFA signals, as a retrofit. The reliability of the SURTASS block upgrade, on the other hand, was found to be unsatisfactory during the initial tests of the *Impeccable* and is intended to be resolved. This deficiency notwithstanding, the US Navy has found the block upgrade system to still be operationally effective and suitable, i.e., it will probably be retrofitted later on the Victorious class.

Original procurement was projected for up to five Impeccable class ships. A contract for the first SWATH ship, T-AGOS 19, was awarded in November 1986, and options for the next three were exercised in October 1988. The keel for the first Impeccable class was laid in February 1993, but the program has been in flux for extended periods of time. The first ship was more than 60 percent completed when the original shipyard encountered difficulties. The contract was sublet to Halter Marine in April 1995 to complete the ship.

The T-AGOS 23 was approximately 18 months away from completion when construction was suspended. In 1997, Halter Marine president John Dane said the ship would be launched in August of that year; however, it was not launched until in April 1998. In the third quarter of 1998, the ship was scheduled to be handed over to the Navy in December of that year.

A second ship will not be ordered until sea trials of the first are completed (presumed to be continuing). No change in this status has occurred, but we believe a new ship will still be ordered sometime in the future. Only one or two additional ships of this type are expected to be procured in the future at best, funding permitting. On the other hand, it is beginning to appear that whatever the successor class to these ships will be, it is going to replace the existing AGOS types.

**Conversion of T-AGOS 13 to Charting Vessel.** In support of NOAA, M Rosenblatt & Son Inc (MR&S) prepared a contract design for conversion of this ocean surveillance ship to a charting vessel. The conversion affected virtually all aspects of the HM&E plant, with major changes required to mission deck systems and scientific spaces. A description of all mission work to be conducted was developed to track the data acquisition and data processing flows through each phase of equipment deployment, towing and retrieval.

An integrated mission deck system analysis was conducted to ensure that all scientific systems were served by the proper deck equipment. Ship checks were conducted and each working space on the ship was discussed with operating personnel to determine the optimal layout with respect to work flow, equipment cluster foundations and equipment selection.

**USNS Worthy (T-AGOS 14).** For the US Geological Survey, MR&S provided engineering services to convert T-AGOS 14 to an oceanographic research vessel. Accomplishments for the conversion included installation of cranes and other mission deck equipment, upgrading of stability, changes to subdivision bulkheads, and the addition of mission spaces.

## Program Review

**Background.** The Ocean Surveillance Ship (T-AGOS) was designed to satisfy the Navy's need to expand and refine its ocean acoustic surveillance capability in anti-submarine warfare. It reflected growing concern that the existing network of static SOSUS receptors was vulnerable to counter-attack. A deployable and reconfigurable equivalent was needed to maintain sonar coverage of chokepoints and to allow surveillance coverage in areas that cannot be covered by existing moored undersea surveillance systems.

According to the US Navy, the long-term nature of planned surveillance efforts and the slow towing speeds make the use of small, dedicated platforms essential.

Between 1974 and 1977, six frigates of the FF-1037 Bronstein and the FF-1040 Garcia class were modified to carry the SQR-15 TASS (Towed Array Sonar System). The SQR-15 TASS achieved excellent results with these systems, and ships so equipped were regarded as the US Navy's premier ASW platforms during the late 1970s and early 1980s. While the US Navy was developing this system for tactical use by operational warships, research was continuing on another towed array with a considerably longer range. This system would be towed by small civilian-manned ships and used in conjunction with the US Navy's SOSUS seabed hydrophone arrays for detecting hostile

submarines. This emerged as the UQQ-2 Surveillance Towed Array Sensor (SURTASS).

The US Navy requested the first three ships in a planned 12-ship program in FY79 at a cost of US\$98 million. At that time, the service anticipated that five more ships would be funded in FY80 and the final four in FY81. Congress reduced the FY79 T-AGOS budget from three ships to two because of technical problems with SURTASS. The system did not have the sensitivity expected, and its maximum detection range was not as great as had been planned. The US Navy requested US\$154 million for five ships in the FY80 budget, but Congress cut this back to one ship. While Congress debated the budget, the US Navy was finishing technical development of SURTASS. Technical evaluation of the system was completed in March 1980; operational testing was completed by July of the same year.

The keel for the first T-AGOS ship, USS *Stalwart*, was laid in November 1982. The ship was launched in July 1983 and commissioned in April 1984. Tacoma built the *Stalwart* and the following T-AGOS ships using a zone outfitting method. In this method, each ship is divided into 45 zones, each of which can be a compartment, a portion of a large compartment or several compartments. Each zone is assembled under shop conditions, with the shop taking care of the maximum amount of welding, cable runs and machinery being fitted. Several zones are fitted together on the shipways to form a module. Each ship has 15 modules.

Tacoma experienced problems with the zone outfitting method while building the first three T-AGOS, and the *Stalwart* was delivered 13 months behind schedule. These delays, plus financial problems, caused Tacoma Boatbuilding to declare bankruptcy in early 1984. In early 1984, several other West Coast shipyards, sensing the troubles at Tacoma, sent the US Navy unsolicited bids for T-AGOS construction.

Due to delivery delays with the T-AGOS ships, the US Navy asked for only post-delivery and outfitting funding in FY83 and FY84. Three ships were requested in the FY85 budget, but Congress cut this to two. The US Navy announced that the shipyard receiving the FY85 contract also would receive the contracts for the FY86 and FY87 ships. Several shipyards submitted bids for this contract. Since the T-AGOS was based on a commercial design, many shipyards saw it as a lucrative opportunity.

Halter Marine of New Orleans, a subsidiary of Bell Textron, was chosen over Peterson Builders, Robert Derecktor Shipyards and Marinette Marine. On April 5, 1985, Halter Marine received a US\$85.4 million contract for the construction of T-AGOS-13 through

T-AGOS-18. Although Congress had approved only T-AGOS-13 and T-AGOS-14 in the FY85 budget, Halter was, in effect, guaranteed nearly all T-AGOS construction through FY87. In late 1985, the US Navy and Tacoma Boatbuilding made arrangements for the completion of the two T-AGOS ships farthest along in their construction. By the end of 1986, the first nine T-AGOS ships had been commissioned.

In 1987, Congress determined that three of the ships should be of conventional monohull construction, while the fourth should be a SWATH ship. Congress also decided to rescind FY86 funds for a SWATH T-AGOS ship. In the SURTASS program, the Navy initiated coding for computer software for the UYS-2 processors and began cost and concept studies and development of an off-board sensor system. When the Navy asked for bids for construction of a SWATH T-AGOS ship, it received 10. In October 1986, McDermott Shipyards of Amelia, Louisiana, received a US\$25.4 million contract to build T-AGOS-19, a SWATH ship. The US Navy's FY88 Five Year Shipbuilding Plan also called for three ships in FY90 and two ships in FY91. This would have brought the total of T-AGOS ships to 27.

In November 1987, the US Navy ordered several transducers used in the ATAS system, and used them to research and develop new active sonar transducers. It was thought that this was the precursor of a US procurement of the ATAS system, but the Navy decided to integrate an active component within its existing array designs.

In 1989, Japan joined the T-AGOS program with a proposal to build five ships of the Victorious class. Some reports suggest that this may have been partial compensation for Japanese participation in the Kongsberg-Toshiba leakage of sensitive industrial equipment to the Soviet Union. In 1990, however, this program was reduced to two ships, which were completed in 1991/92.

Construction of the first ship of the Impeccable class began in 1992, but work proceeded very slowly. The US Navy issued a cure notice in November 1993. Due to financial problems, work on this ship and two oilers (Henry J Kaiser class) was stopped. The construction contract was eventually canceled and Tampa Shipyards filed for bankruptcy. In early 1995, the ship was still 40 percent incomplete. In September of that year, Halter Marine Inc was awarded a contract to take over and complete the construction of the ship.

In FY93, the US Navy continued R&D funding for improvements to the SURTASS system used by the T-AGOS ships. The work included the completion of a follow-on product improvement program and the developmental and operational testing of the SURTASS

Block Upgrade Package. FY94 Long Range Acquisition Estimates stated that the two final ships of the program (pennant number 23 and the new one, 24) would be funded in FY96 and FY97, respectively.

In FY96, two Stalwart class ships were released for transfer to Portugal and New Zealand. There is currently no information regarding which ships will be transferred or the tactical role they will fulfill for their new owners. A compensation of US\$7.7 million was to be obtained for the one transferred to New Zealand, while Portugal's was transferred as a grant. These and a number of other T-AGOS ships have been inactive and stored at various naval inactive-ship maintenance facilities.

Although Western navies regard towed arrays as ASW systems, they also have an excellent capability in the long-range detection of surface ships. Indeed, the Russian Victor III class (Type 671RTMK) submarines tasked with anti-ship operations used their towed arrays for just this purpose. In this case, the Brigade Flagship uses its towed array to determine the course and speed of the target force so that the three battalions can close on the forward flanks and engage with 65 cm wake-homing torpedoes and P-100 missiles. It is, therefore, easy to envisage a US ocean surveillance ship performing analogous functions for a friendly task group.

Long-range contacts made by sonars are usually classed as being under-the-horizon, to differentiate them from radar contacts (made by ducting, for example), which are referred to as over-the-horizon. The advantages of a towed-array contact for the role are that the target can be more easily classified as to type and speed by its sonar signature, and the contact made is absolutely covert. The problem is that the sonar data are ambiguous as to range and have only limited precision. Nonetheless, surface surveillance in support of UN initiatives, for example, may well be a valuable role for

the T-AGOS ships. Even their ASW function has not declined in importance as much as may be assumed.

The decline in the US submarine fleet also places great emphasis on using the remaining boats as efficiently as possible. A very low but constant level of activity is expected on the T-AGOS program in the future. This will be in form of continuous system upgrades and modernization onboard the existing ships. On the other hand, the number of units in the Stalwart class will drop further over the next several years, with some of the units being transferred to friendly nations overseas. In 1999, for instance, Philippines was scheduled to receive one ship (not confirmed).

Meanwhile, the US Navy has moved and reconfigured three of the original Stalwart class ships to drug interdiction tasks. The sensor suites onboard these particular ships have been modified somewhat to better suit their new mission. This meant, for instance, elimination of the underwater acoustic array, while improving the aerial search capabilities and communications links with other vessels, in addition to unspecified mission-specific equipment installed.

The additional market in this equation of the new priorities is Japan. Thanks to this nation's acquisition of two T-AGOS ships, Japan is in a good position to start an indigenous program for this type of surveillance vessel. The Pacific Rim area is experiencing a significant build-up of naval power and international tensions. These are largely taking place below the surface, but it would not take much to initiate a crisis. In such events, Japan would be threatened by large numbers of relatively noisy, low-technology submarines – exactly the situation where the T-AGOS concept has the best advantage. Furthermore, any possible expansion of Japan's naval capabilities would likely include additional T-AGOS ships.

## Funding

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Early funding history for the T-AGOS program shows the US Navy requested US\$180.8 million for five ships in FY81. Congress approved and authorized these funds. The following year, four ships were requested and approved for US\$155.8 million. Tacoma Boatbuilding had received a US\$146.9 million fixed-price with escalation contract in September 1980 for construction of T-AGOS type ships. Tacoma had bid against Marinette Marine Corp and Marine Power & Equipment Co for the contract. Tacoma quoted a US\$13.8 million cost per ship for a three-ship buy and US\$12.2 million for a 12-ship buy.

In February 1981, Tacoma received a US\$61.2 million follow-on contract for the program. This was followed exactly one year later by a US\$48.9 million face value increase. In January 1983, Western Electric received a US\$3.5 million contract for installation of communications equipment. In the same month, Appleton Marine received a US\$3.2 million contract for 12 array towing winch systems. Hughes Data System was the prime contractor for the towed array, and the hydrophones were supplied by Hydroscience, a Whitehall subsidiary.

The US Navy requested US\$113.9 million in the FY86 budget for two T-AGOS-type ships. Although the House recommended the transfer of US\$28.9 million from FY85 funds, the Senate voted for the Navy's entire request, which Congress approved in December 1985. The Navy asked Congress for US\$148.1 million for three more ships in FY87. Congress voted to increase T-AGOS funding to US\$228 million, to cover four ships. The Navy did not ask for funding in FY88, but its FY89 budget request included US\$169.2 million for three SWATH-style ships.

Single ships were funded in FY90 (value US\$182.6 million) and in FY93 (US\$149.9 million), with the latter only to be ordered when the first of class had run its sea trials.

The mission performed by the T-AGOS ships is acknowledged as a key one for the US Navy, and it is probable that funding for these ships, or their successors, will be found in the US Congress as well. The fleet of monohull ships is already becoming aged, indicating a need for funding for replacement ships. Some of the older units are also being transferred overseas to friendly navies, adding to the need for replacement construction.

The US Navy shipbuilding and procurement budgets for the next few years (up to and including FY05) do not include any requests for the construction of further units in this class. It is widely acknowledged, however, that it will still be necessary to maintain a high degree of ocean surveillance capability in the future – perhaps more so than it was in the former blue-ocean battle scenarios. It is therefore entirely possible that funding for this mission will be added in the outyears of the US defense budget. One AGOS ship is still shown as a “pending” order in the statistics depicting the US Navy current order status. A value of such a ship is pegged at roughly US\$70 million.

## Recent Contracts

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<b>Contractor</b>	<b>Award (\$ millions)</b>	<b>Date/Description</b>
US Marine Management Inc	161.5	<i>July 1990</i> — Maintenance of 18 MSC SURTASS ships. (N00033-90-C-4000)
Tampa Shipyards	58.6	<i>March 1991</i> — Design and construction of the T-AGOS-23 class ocean surveillance ship. (N00024-91-C-2308)
AT&T Corp	13.1	<i>February 1995</i> — Spare parts for four reduced diameter towed arrays deployed on T-AGOS ships.
US Marine Management	63.1	<i>August 1995</i> — Operation of 10 T-AGOS ships between 1995 and 1998 with two one-year options for 1999 and 2000, bringing total contract value to US\$112.7 million.
Halter Marine Inc	60	<i>September 1995</i> — Completion of the suspended T-AGOS-23.
Royal New Zealand Navy	7.7	<i>February 1996</i> — Sale of one T-AGOS to the Royal New Zealand Navy.
Hughes Aircraft	7.5	<i>July 1997</i> — Japanese Auxiliary Ocean Surveillance System contract for the block upgrade of the ship and shore electronics on the two T-AGOS of the JMSDF.
Dyn Marine Services	83.7	<i>July 1999</i> — Operation and maintenance of the oceanographic fleet of survey ships, to be completed by July 2002.

## Timetable

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<b>Month</b>	<b>Year</b>	<b>Major Development</b>
Sep	1980	First construction contract awarded
Nov	1980	<i>USS Stalwart</i> keel laid
Apr	1984	<i>USS Stalwart</i> commissioned
	FY85	Program opened for competition
	1984	Contract awarded to Halter Marine
Oct	1986	Contract awarded to McDermott

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Dec	1987	First SWATH keel laid
Oct	1988	Option for ordering three more T-AGOS 19 class ships exercised
	1989	Japan orders T-AGOS ships
	1991	First SWATH ship enters service
Late	1992	T-AGOS-23 class construction begins
Nov	1993	Cure notice issued relating to T-AGOS-23
Sep	1995	T-AGOS-23 contract re-awarded (sublet) to Halter Marine
Apr	1998	T-AGOS-23 launched
Oct	1999	Estimated service entry for T-AGOS-23

## Worldwide Distribution

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**Japan.** 2

**New Zealand.** 1

**Portugal.** 1

**US.** 14

## Forecast Rationale

The US Navy is reconfiguring the world threat environment, shifting the emphasis from open ocean to littoral regions of the world. The new threat appears to be emerging mainly from countries which operate relatively quiet diesel-electric submarines. Although these submarines, operating in green water, are less suitable subjects for detection than the blue-water nuclear boats, they are good targets for the T-AGOS ships. Considering this, it would be reasonable to assume that more of this ship type will be procured in the foreseeable future.

However, the US Navy's current budgeting for ship procurement through fiscal year 2005 does not include any request for funding such programs. The overall goal of maintaining the naval fleet strength at about 300-305 units in the long term is the driving force, while the funds are increasingly scarce. Consequently, the Navy has prioritized surface combatants such as the DDG-51 and DD-21 classes over oceanographic research vessels in the immediate future.

Right now, the most likely scenario is that the USN will continue to modernize and upgrade its existing fleet of AGOS vessels, while the somewhat related Pathfinder AGS (surveying ship) class will see completion of the two units.

An all-new class of surveying/surveillance ships, presently only known as an AGX concept, will emerge at a later date. How that design ties in with the various platforms now seen among the AGOS and AGS classes is yet to be seen. Still, it is safe to say that, considering the above-described necessity that is acknowledged to these ship types, construction of new ships will surely resume before the end of the decade.

Meanwhile, the Japanese contingency includes the two ships built earlier (their original plans of five ships having been cut down to two). No new orders for Japan are anticipated at this time, although that may change, considering the aforementioned changes in that operating theater.

## Ten-Year Outlook

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No new production of this class is currently foreseen. Until a new class or follow-on units to this class are approved in the outyears of our forecast window, modernization and upgrades of systems onboard the existing ships will be carried out on a continuous basis.

The successor ship type will be produced in the outyears of this forecast or even later.

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