

ARCHIVED REPORT

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Kongo Class

Outlook

- No new ships of this class are planned
- Declining Japanese economy and defense budget preclude further procurement
- Future AAW ship construction likely to be of new class
- This report will be archived next year

Orientation

Description. Guided missile destroyer tasked with anti-aircraft defense of warship groups.

Sponsor

Japan Maritime Self-Defense Force (JMSDF)
Japan Ministry of Defense
7-45 Akasaka 9-chome
Minato-ku
Tokyo 107
Japan

Japan Ministry of Defense
Technical Research and Development Institute
Tokyo
Japan

Status. In service.

Total Produced. Six ships in service.

Pennant List

<u>Name</u>	<u>Builder</u>	<u>Launch Date</u>	<u>Commission Date</u>
DDG-173 <i>Kongo</i>	Mitsubishi, Nagasaki	9/1991	3/1993
DDG-174 <i>Kirishima</i>	Mitsubishi, Nagasaki	8/1993	3/1995
DDG-175 <i>Myoko</i>	Mitsubishi, Nagasaki	10/1994	3/1996
DDG-176 <i>Chokai</i>	Ishikawajima-Harima	8/1996	4/1998
DDG-177 <i>Atago</i>	Mitsubishi, Nagasaki	8/2005	3/2007
DDG-178 <i>Ashigara</i>	Mitsubishi, Nagasaki	8/2006	3/2008

Mission. The Kongo class destroyers are designed to assist in the aerial defense of Japan and to act as anti-aircraft escort for task forces. The Kongos are also tasked with the control of surface-to-air missiles launched by the slightly smaller Murasame class destroyers.

Price Range. The cost of the fourth ship of the series was quoted in 1993 at about \$1.12 billion, including the AEGIS combat and weapon system. The price of the hull and equipment alone was about \$374 million. The *Atago* cost JPY147.5 billion (\$1.3 billion).

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Contractors

Prime

IHI Marine United, Yokohama Shipyard	http://www.ihimaru.co.jp/ihimu/english/index-e.html , 12,Shinsugita-cho, Isogo-ku, Yokohama-shi, Kanagawa, 235-8501 Japan, Tel: + 81 45 759 2643, Fax: + 81 45 759 2914, Prime
Mitsubishi Heavy Industries Ltd (MHI)	http://www.mhi.co.jp/en/ , 16-5 Konan 2-chome, Minato-ku, Tokyo, 108-8215 Japan, Tel: + 81 3 6716 3111, Fax: + 81 3 6716 5800, Prime

Subcontractor

Boeing Defense, Space & Security	http://www.boeing.com , PO Box 516, St Louis, MO 63166 United States, Tel: + 1 (314) 232-0232, Fax: + 1 (314) 777-1096 (AWG-19 3 Harpoon Launch Control System)
GE Transportation - Marine Engines	http://www.getransportation.com/na/en/marineengines.html , 1 Neumann Way S-156, Cincinnati, OH 45215 United States, Tel: + 1 (513) 552-5465, Fax: + 1 (513) 552-5005 (LM2500 Marine Gas Turbine)
Lockheed Martin Electronic Systems, Division HQ	http://www.lockheedmartin.com , 6801 Rockledge Dr, Bethesda, MD 20817 United States, Tel: + 1 (301) 897-6000 (SPY-1 Continuous Wave Transmitter)
Lockheed Martin Maritime Systems & Sensors (MS2)	http://www.lockheedmartin.com/ms2/ , 199 Borton Landing Rd, PO Box 1027, Moorestown, NJ 08057-0927 United States, Tel: + 1 (856) 722-4100 (Mk 41 VLS)
Mitsubishi Electric Corp	http://global.mitsubishielectric.com , Tokyo Bldg, 2-7-3, Marunouchi, Chiyoda-ku, Tokyo, 100-8310 Japan, Tel: + 81 3 3218 2111, Fax: + 81 3 3218 2185 (OPS-24)
NEC Corp	http://www.nec.co.jp , 7-1, Shiba 5-chome, Minato-Ku, Tokyo, 108-8001 Japan, Tel: + 81 03 3454 3388, Email: webmaster@nec.co.jp (OQS-102)
Oto Melara SpA	http://www.otomelara.it , Via Valdicocchi 15, La Spezia, 19136 Italy, Tel: + 39 0187 5811 11, Fax: + 39 0187 58266, Email: press-office@otomelara.it (127mm L54)
Raytheon Missile Systems	http://www.raytheon.com , 1151 E Hermans Rd, Tucson, AZ 85706 United States, Tel: + 1 (520) 794-3000, Fax: + 1 (520) 794-1315 (SM-2 Missiles)

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Technical Data

	<u>Metric</u>	<u>U.S.</u>
Dimensions		
Length	161 m	528.2 ft
Beam	21 m	68.9 ft
Draft	6.2 m	20.3 ft
Draft, including sonar	9.97 m	32.7 ft
Displacement		
Light	7,250 tonnes	
Full load	9,485 tonnes	
Fuel capacity	1,000 tonnes	
Performance		
Speed (est)	60 kmph	33 kt
Range	8,300 km at 37 kmph	4,500 nm at 20 kt
Crew	25 officers, 285 enlisted	

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	<u>Type</u>	<u>Quantity</u>
Armament		
Guns	Oto Melara 127mm L54	1
CIWS	Mk 15 Phalanx (20mm)	2
Missiles		
SAM	Standard SM-2 MR Block III	90
ASW	ASROC with Mk 46 payload	
SSM	RGM-84C Harpoon	2x 4
Missile launcher	Mk 41 VLS	1x 29 forward, 1x 61 aft
Torpedo tubes	Type 68 324mm	2x 3
Torpedoes	Mk 46 Mod 5 NEARTIP	24
Helicopter capability	Platform, fueling for SH-60J	1
Electronics		
Radars		
Antenna array	SPY-1D	4 (each covering 90 degrees)
Surface/air search	OPS-28C or D	1
Missile fire control	SPG-62 (Mk 99) illuminator	3
Gun fire control	Type 2-21 or 2-23	1
Navigation	OPS-20	1
IFF	UPX-29	1
Sonars		
Low-frequency, hull-mounted	OQS-102	1
Towed array (passive, VLF)	OQR TACTASS (SQR-19A(V))	1
Command and control		
Command system	OYQ-8	1
Air warfare combat system	AEGIS	1
Datalinks		
Satcom	NTDS Links 11/14 (16)	
Helicopter datalink	WSC-3/OE-82 UHF antennas	2
ASW control	SQQ-28	
EW	Mk 116 Mod 7	
Wideband ESM	NOLQ-1&2 Melko	1
Narrowband ESM	NOLR-8	1
Noise jammer	OLT-3	2
Deception jammer	OLT-5	2
Decoys, launchers	Mk 36 SRBOC, Mk 137	4
Torpedo decoy (towed)	SLQ-25 NIXIE	
TACAN	ORN- (number unavailable)	1
SIGINT	OPN-11B	1
Machinery		
Main propulsion – gas turbines	GE/IHI LM2500	4x 25,540 shp
Auxiliary propulsion	Diesel generator	1
Propellers	Controllable pitch	2
Electricity generation	6,000 kW total	

Design Features. The Kongo class bears a superficial resemblance to the U.S. Arleigh Burke class destroyers. However, the Kongo class ships are 300 tons heavier, 20 feet longer, and about 2 feet wider than the U.S. design. Draft is slightly less than on the U.S. ships; this, combined with greater engine power, makes them about 3 knots faster. The Kongo class ships incorporate additional internal volume for future equipment. They are built to mercantile standards instead of warship specifications.

Internally, the Kongo class ships are drastically different from their U.S. counterparts. The use of mercantile construction standards means that internal volume is not

used as efficiently as in the U.S. design, a factor that could have an adverse effect on the life of the ship. The double-hull construction used in the U.S. design is retained by the Kongo class, but the value of the double hull is negated by the use of the space between the layers to run electrical cables and other components.

The most obvious visual difference between the Arleigh Burke class and the Kongo class is the replacement of the tripod mast on the former with a heavy lattice mast. The Arleigh Burke's radar cross-section (RCS) was carefully designed with exaggerated bow and stern sections along with suppressed amidships in order to deflect radar-guided missiles. The meticulously

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designed minimum RCS tripod was an important feature of this layout. A high RCS lattice mast has been installed on the Japanese versions amidships, in essence eliminating much of the value of the RCS manipulation.

In contrast to earlier gas-turbine-powered JMSDF ships that have Rolls-Royce Olympus or Spey turbines, the Kongo class ships are fitted with four General Electric LM2500s, each developing 25,540 horsepower. The turbines are made locally by Ishikawajima Heavy Industries (IHI).

An emergency diesel generator and a small emergency turbine are included as well. The two propellers have controllable pitch. The ships' maximum speed is 33 knots, and they have an operating range of about 4,500 nautical miles at 20 knots.

The primary sensor/weapon system is the AEGIS anti-air warfare (AAW) combat direction system. AEGIS is a surface-to-air weapon system designed to detect, track and destroy aircraft and air-to-surface cruise missiles. Its four phased arrays give continuous, comprehensive 360-degree coverage of the air picture for more than 250 nautical miles. The primary AEGIS radar is the SPY-1D, which is a three-dimensional air search radar operating in the E/F-bands with a range in excess of 250 nautical miles. The AEGIS also includes three Mk 99 missile fire-control radars and UYK-43 computers. The destroyers are also equipped with the OPS-28D surface search radar. The gun fire-control system is the Type 2-21.

The key difference between the Kongo class and the Arleigh Burke class in terms of electronic systems is that on the Japanese ships, the OYQ-8 fully integrated command management system is superimposed over the AEGIS, SQQ-89 and EW systems. This completely integrates the functions of those systems and results in improved combat efficiency.

The sonar suite includes the OQS-101C and QQR-1 TASS. The OQS-101C, a bow-mounted low-frequency active/passive system, is functionally equivalent to the U.S. Navy's SQS-53C. The electronic support measure (ESM) systems suite includes the NOLQ-2 ESM equipment, an optimized OTH-T NOLR-8 ESM system, the OLT-3 and OLT-5 noise and deception jammers, and the OPN-7B COMINT system. An additional system, OPN-11B, provides SIGINT targeting data.

The primary armament is carried in two Mk 41 vertical launch systems (VLS). The forward VLS has 32 cells, while the aft VLS has 64 cells (in each case three cells are occupied by a strike-down crane). The VLS carries 90 Standard SM-2MR (medium-range) surface-to-air missiles, which have a range of more than 25 nautical

miles. Terminal defense is provided by two 20mm Phalanx Mk 15 close-in weapons systems (CIWS).

The primary surface-to-surface armament is the Harpoon, eight of which are carried in two quadruple launchers. Gun armament is a single 127mm L54 Otobreda gun forward. This is a dual-purpose weapon with a significant anti-air capability.

Operational Characteristics. The Japanese AEGIS destroyers have some capabilities that distinguish them from their American half-cousins. Their fully integrated combat systems, for instance, give the Kongos a better capability to control operations in complex multi-environment tactical situations. U.S. ships do not have such capabilities, and progressive upgrading of the AEGIS is only now providing the U.S. Navy with the type of fully integrated, fully distributed warship combat systems necessary to handle this kind of environment.

The Japanese destroyers use the SPY-1D version of the U.S. combat and weapon control system developed for the U.S. Navy's DDG-51 destroyers. This unit has all four arrays on one deckhouse and uses only one transmitter, instead of the two used by the SPY-1A. Four UYK-43 digital computers direct the radar antennas and missile fire control system. The SPY-1D can track multiple targets since the radar does not have to control the missile continuously.

The AEGIS has four operational modes: automatic special, automatic, semi-automatic, and casualty. In automatic special, the system automatically fires at targets meeting certain threat criteria unless the system is manually overridden. In all other modes, the operator must initiate the firing sequence. The system has a burn-through capability, allowing it to operate against electronic countermeasures jamming.

During action, AEGIS's UYK-43 computers choose targets from an engagement list of all contacts being tracked. Certain Standard SM-2MR missiles are designated to engage these targets. Upon designation, the missile activates its autopilot. The missile receives directions from the computer just prior to launch. Upon launching, the missile uses its inertial guidance navigation unit and semi-active radar for in-flight course changes. The missile's semi-active radar enables it to track the target independently of the AEGIS platform. AEGIS can provide mid-flight course correction and terminal homing guidance to the target.

The Kongo class destroyers cannot carry any helicopters on board, but they do have a flight deck for the landing or refueling of a helicopter during operation. The sole inherent ASW capability of the ship resides with two Type 68 lightweight torpedo launchers. The Type 68 is

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a Japanese version of the U.S. Navy's Mk 32 triple-tube torpedo launcher. It can handle Mk 46 or Mk 50

lightweight torpedoes, which have speeds of about 45 knots and ranges of six nautical miles.

Variants/Upgrades

Flight One Kongo Class. At this time, there are no formal variants of the existing Kongo class ships. Flight One is an informal nomenclature given to the first four ships of this class. The Standard Missile SM-3 Block 0 will be installed on these ships later.

Flight Two Kongo Class. This is an informal designation given to the two additional ships included in the 2001-2005 expenditure plans. These two ships are equipped for defense against tactical ballistic missiles. An illustration released as part of the 2001 Japanese Defense White Paper shows the ship to have significant differences from the Flight One Kongo class. The most obvious are the replacement of the lattice mast by a low-RCS pylon and the addition of a large hangar aft. The aft VLS has apparently been moved into the roof of this hangar structure, with a Phalanx gun on the aft edge of the hangar roof. Both VLS groups have had their capacity increased by three due to the deletion of the at-sea reloading crane.

Unlike the U.S. Flight IIA Arleigh Burke class, the Flight Two Kongo class remains flush-decked, and the hangar structure is, as a result, much more prominent.

This has obvious implications for RCS, but the added volume aft may allow for the retention of a towed array. Finally, the Oto Melara 127mm L54 gun has been replaced by a U.S. 5-inch L62 Mk 45 Mod 4.

Atago Class. Formal Japanese Navy nomenclature for the Flight Two Kongo class.

Kongou. This is an incorrect spelling of the name for the Kongo class. The misspelling apparently arises from an assumption that the ships were named after provinces in Japan, the spelling of which was changed after WWII. In reality, these ships honor six World War II Japanese warships. *Kongo* and *Kirishima* were battle cruisers sunk in 1944 and 1942, respectively. *Myoko*, *Chokai*, *Atago* and *Ashigara* were heavy cruisers. *Chokai* was sunk on October 25, 1944, during the Battle of Samar. *Myoko* survived World War II and was scuttled off Singapore in 1946. On October 23, 1944, the cruiser *Atago* was torpedoed and sunk by the submarine USS *Darter* during the Battle of Leyte Gulf. *Ashigara* was torpedoed and sunk by HMS *Trenchant* on June 8, 1945.

Program Review

Background. The Japanese government announced in 1983 that it planned to build a class of destroyers equipped with the AEGIS anti-air combat system. From 1983 through 1987, Japan held discussions with RCA to acquire the necessary rights and technology. The JMSDF began detailed design studies on the new ships in 1985 to explore which engineering systems and propulsion plants would equip the new ships. Most of the design work was completed by late 1986.

Going to AEGIS

In 1987, the JMSDF announced plans to order one AEGIS destroyer in 1988 and one in 1990. The Japan Defense Agency's Central Procurement Office estimated at the time that each ship would cost JPY160 billion (\$1.05 billion). In early 1988, the JMSDF said that it planned to have a total force of four AEGIS ships. After the U.S. Congress approved the AEGIS sale, the JDA's Central Procurement Office announced that Mitsubishi Heavy Industries Shipyard would build the first ship, and that Ishikawajima-Harima Heavy Industries would produce the LM2500 gas turbines under license from General Electric. Ishikawajima-Harima also might be a second-source shipyard. The

JDA also said that at the mid-1988 exchange rate, RCA would receive JPY63.2 billion (about \$510 million) for each AEGIS. Technicians for these ships would be trained in Japan and the United States.

Japan made a formal request to the United States for the transfer of AEGIS in 1987. The request engendered considerable controversy in that the Japanese government would not be able to prevent the technology from being leaked to the Soviet Union. There were also fears that Japanese industry would be able to break down the system, reverse-engineer it, and produce it for foreign sale. Finally, there were also objections because the ships would be built in Japan when U.S. shipyards were desperate for work. The U.S. government strongly supported the sale, noting that it was an important element in building up the Japan Self-Defense Forces. In August 1988, under strong pressure from the administration, Congress approved the sale of AEGIS to Japan. The bill required the systems to be built in the United States.

Mitsubishi laid down the first-of-class, HIJMS *Kongo*, in the fall of 1990. She was launched in 1991 and began sea trials in October 1992. The ship was formally

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commissioned as expected in March 1993. The second ship, HIJMS *Kirishima*, was ordered in 1990 and began running sea trials in August 1994, with formal commissioning following in September 1994. All four ships of the original program are in service; the third ship was launched in October 1994, and the fourth was ordered from IHI on September 1993 and commissioned in March 1998.

Japan's purchase of these ships has been a topic of substantial controversy in the Japanese defense debate. The ships themselves are slightly larger, more powerful, and faster than their U.S. forebears. Japan's primary air defense focus is now on threats that may emerge from China, Taiwan and North Korea. This threat evaluation and its future consequences are also factors weighing in the country's decision over whether to buy any more Kongo class ships.

Ballistic Missile Defense

In 1994, Japan began to examine its options for instituting a ballistic missile defense program. These options all envisioned using the Kongo class destroyers to intercept targets in the upper tier of the defense structure, while leakers would be blown away by Patriot PAC 3 missiles.

Option A, restricting the system to inventory equipment (the least expensive), would cost around \$4.5 billion in research and development alone, but would be restricted to intercepting the least complex missiles and would remove the Kongo class ships from the duty of protecting Japanese sea lines of communication.

Option B was the most expensive and effective system and would see the procurement of eight additional Kongo class destroyers of a highly modified design, with active array radars and a telescopic helicopter hangar. This option would cost \$16.3 billion.

Option C was effectively Option A with the addition of six land-based THAAD (Terminal High Altitude Area Defense) sites, with Japan joining the U.S. ballistic missile defense program. Option C would cost about \$7.8 billion.

Option D, projected to cost \$13.4 billion, is based on adding four new Kongo class ships to the Option C scenario.

Japan said in the summer of 1997 that it had postponed the decision on its overall defense strategy of the future by about three years. This was not an unexpected announcement considering the financial constraints that were being imposed upon the Self-Defense Forces, compounded by the political sensitivities in the region over China's intentions. (It is still not known whether

the Japanese government has made a clear decision about the country's future defense strategy. There have been indications that Japan is paying greater attention to its self-defense capabilities and is in the process of bulking up its prowess.)

The New Helicopter Carrier

Reports emerged in the summer of 1999 that Japan was planning to build a new class of destroyers of 10,000- to 15,000-ton displacement to replace the 5,000-tonne Haruna and Shirane classes. Funding for all four of these ships and for two additional Kongo class destroyers was to be included in the plans for the 2001-2005 timeframe. The first of the new Kongos was to enter service around 2006.

By July 2000 it was being reported in the Western press that both of the Kongo class destroyers originally requested had been approved and that two more were being added to the program. However, there were also suggestions that the 10,000-ton replacements for the Shirane and Haruna classes would be equipped with AEGIS, leading to speculation that the two projects would be merged and that the Shirane/Haruna replacements would be Kongo class ships enlarged to carry ASW helicopters. This would make them analogous to the Flight IIA Arleigh Burke class in the U.S. Navy.

In mid-2001, the possibility of a merger between the proposed additional Kongo class ships and the DDH replacement program took on additional complexities. The first drawings of the proposed DDH replacement ships were issued by the Japanese Navy. These showed a very large 13,500-ton ship with helicopter decks fore and aft. The superstructure was shown to be a full beam structure, set between the two flight decks, with what appeared to be a hangar set to one side. However, this diagram also showed lifts in both flight decks. This raised immediate doubts about the final superstructure design, and the possibility that these ships could be designed with a partial-beam superstructure allowing a through-flight deck. This is eventually what happened. The first pair of these DDHs was funded in FY04 and FY05 for completion in FY08 and FY09.

On December 16, 2002, the destroyer *Kirishima* left the port of Yokosuka for the Indian Ocean, where she would be tasked with supporting the U.S.-led war on terrorism. The deployment increased Japan's military presence in the region and raised fears among some that Japan might be drawn into fighting, particularly if the United States were to attack Iraq, thereby arguably contravening the Japanese Constitution. In any event, Operation Iraqi Freedom took off with such speed that the issue did not arise.

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More Kongos Funded

Two additional Kongo class destroyers were funded in FY02 and FY03 for completion in FY06 and FY07. These ships will replace the older guided missile destroyers *Tachikaze* and *Asakaze*. Construction of the first of the additional Kongo class destroyers was authorized in December 2001, with the ship funded as Job Number 2243. The first metal on the ship was cut late in 2002, and she was formally laid down in April 2004.

The first of the second group of Kongo class destroyers was launched on August 18, 2005. At that time, it was announced that she was the lead ship of the Atago class. She commissioned in March 2007 and deployed for sea trials two months later. The second ship in this group, the *Ashigara*, was launched in August 2006 and commissioned in March 2008. There are no plans to construct additional ships of this class.



DDG-175 Myoko

Source: JMSDF

Funding

This program was funded by the Japan Ministry of Defense (formerly Japan Defense Agency) Central Procurement Office for the Japan Maritime Self-Defense Force (JMSDF). As in many countries, Japan has a five-year defense plan. Under the 2001-2005 defense plan, the JMSDF planned to acquire five surface combat ships, five subs, and 15 support ships. The JMSDF usually equally splits the cost of a warship over four years, meaning that the FY02 Kongo class ship *Atago* was funded in FY02, FY03, FY04, and FY05.

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 Contracts/Orders & Options

<u>Contractors</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Lockheed Martin Gov't Electronic Systems	5.2	Feb 1999 – Overhaul planning, scheduling, and execution, including a review of proposed technical changes, with analysis, studies.
Lockheed Martin Gov't Electronic Systems	164.0	Apr 2003 – AEGIS services for DDG-177.
Lockheed Martin Gov't Electronic Systems	124.0	Jul 2005 – AEGIS ballistic missile defense development for JMSDF.

 Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1983	JMSDF announces intention to order AEGIS-equipped destroyers
	1984	AEGIS Foreign Military Sales (FMS) efforts begin in the U.S.
	1985	Detailed design studies begun for new JMSDF ship
	1987	JMSDF announces detailed design and systems studies
Aug	1988	U.S. Congress approves sale of first AEGIS to Japan under FMS
	1988	JMSDF announces contractors
	1988	JMSDF orders HIJMS <i>Kongo</i>
	1990	HIJMS <i>Kongo</i> keel laid; U.S. authorizes second AEGIS FMS
Sep	1991	HIJMS <i>Kongo</i> launched; U.S. authorizes third AEGIS FMS
Oct	1992	HIJMS <i>Kongo</i> runs trials
Mar	1993	HIJMS <i>Kongo</i> commissioned
Oct	1993	Last ship of original program ordered. U.S. authorizes fourth AEGIS FMS for the series
Mar	1996	Third ship commissioned
Aug	1996	Last ship of original program, HIJMS <i>Chokai</i> , launched
Apr	1998	HIJMS <i>Chokai</i> commissioned
Dec	2001	First of two additional Kongo class authorized
	2003	Second of two additional Kongo class funded
Aug	2005	First of Atago class launched
Mar	2007	First of Atago class completed
Mar	2008	Second of Atago class completed

 Worldwide Distribution/Inventories

Japan. Six ships in service.

Forecast Rationale

The fall from power of the LDP in Japan means that any hope of extending construction of the Kongo class beyond the six existing destroyers of this class has now ended. This being the case, a null forecast is being recorded for the Kongo class.

The Japanese economy remains in an apparently insoluble state of stagnation while political will and ability in Japan to confront the economic problems

afflicting the country are lacking. As a result, there is considerable downward pressure on the defense budget that has only been offset by the declining value of the dollar against the yen. This downward pressure means that the Japan Maritime Self-Defense Force will be hard-pressed to maintain its existing construction plans. Adding additional ships is probably out of the question. As a result, this report will be archived next year.

Ten-Year Outlook

The existing construction program for the Kongo class is complete and the projected construction schedule for the Japanese Navy does not contain additional ships of this class. A null forecast is therefore recorded.

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