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A New Carrier Race?

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A NEW CARRIER RACE?

Strategy, Force Planning, and JS *Hyuga*

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On 18 March 2009 JS *Hyuga* (DDH 181) was commissioned and delivered to the Japan Maritime Self-Defense Force (JMSDF). The unique characteristic of this ship is its aircraft-carrier-like design, with a "through" flight deck and an island on the starboard side. *Hyuga* was planned in the five-year Midterm Defense Buildup Plan (MTDBP) of 2001 and funded in Japanese fiscal year (JFY) 2004 as the replacement for the aging first-generation helicopter-carrying destroyer (DDH), JS *Haruna* (DDH 141), which was to reach the end of its service life of thirty-five years in 2009. The second ship of the new class, JS *Ise* (DDH 182), of the JFY 2006 program, was commissioned 16 March 2011. A third DDH, an improved sister of the *Hyuga*-class ships, was funded in the JFY 2010 budget. The fourth and last DDH, most likely to be a second ship of the improved type, is to be built in the next five-year program, from JFY 2011 to 2015 (see figure 1 and sidebar).

Several navies have built ships of this type since the mid-1990s. These ships and their navies include HMS *Ocean* (L 12) of the Royal Navy, the *Mistral* (L 9013) and sisters of the French navy, *Cavour* (C 550) of the Italian navy, *Rey Juan Carlos I* (L 61) of the Spanish navy, and two amphibious assault ships (LHDs) of the *Canberra* class in the Royal Australian Navy. In addition, the Republic of Korea Navy also operates *Dok-do* (LPH 6111), which clearly belongs in this category, and it is reported that two more of the class will be built.

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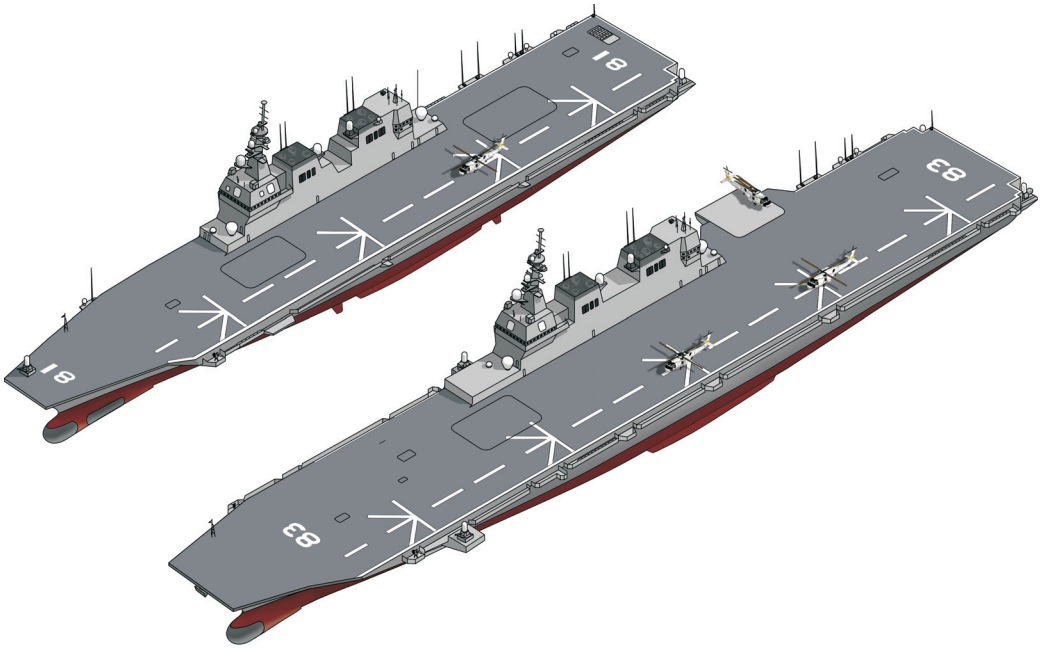
FIGURE 1



Hyuga (left) and improved sister ship
Sekai no Kansen

There are also aircraft carrier programs of other types in various navies. These other carriers are intended more for the strike mission than for other military roles. It is reported that the Royal Navy and French navy are jointly pursuing a new carrier program. At the same time both the People's Liberation Army Navy of China and the Indian navy are on track to build their own strike carriers.

This article focuses on multipurpose through-deck carriers—not strike carriers, which will not be discussed here. Specifically, it examines the related maritime and naval strategy and force-planning concept of the JMSDF, using JS *Hyuga* as the focus of the analysis.

Hyuga realizes a long-lasting dream and goal of the JMSDF, which has wanted to be a truly capable maritime force, with escort—that is, antisubmarine warfare (ASW)—carriers. As we will see, the concept of "escort carrier" in the JMSDF changed several times in the process that led to the construction of *Hyuga.*

In 1952, seven years after the end of the Second World War, the Japan Maritime Guard (JMG) was established as a rudimentary defense organization for the nation. The leaders of the JMG were determined that the organization would be a navy, not a reinforced coast guard. Most were combat-experienced officers (captains and below) of the former Imperial Japanese Navy, and they had clear understanding of the difference between a coast guard–type law-enforcement force and a navy. Two years later, the JMG was transformed into the JMSDF, and

with leaders whose dream to build a force that had a true naval function was stronger than ever.[1] However, they also knew the difficulty of rebuilding a real navy, in light of strict constraints imposed by the new, postwar constitution.[2]

Nonetheless, the JMSDF has built its forces and trained its sailors vigorously, with this goal in view, and it is today one of the world's truly capable maritime forces in both quality and size. The commissioning of *Hyuga* represents another step in its growth during the fifty-seven years since its origins in the JMG. The ship also reflects the service's strategy, the rationale of its force planning, and the operational concepts of its well-balanced fleet. As background, it is necessary to understand the relationship between the defense strategy of Japan and the JMSDF.

THE DEFENSE STRATEGY OF THE JMSDF

Since the founding of the Japan Self-Defense Force (JSDF) and within it the JMSDF, in 1954, the defense strategy of Japan has been based on the Japanese-U.S. alliance. This posture was clearly established by article 4 of Japan's Basic Policy for National Defense, which was adopted by the National Defense Council and approved by the cabinet on 20 May 1957.[3] The three major defense policy documents that have appeared since then—National Defense Program Outlines of 1977 and 1996 and the National Defense Program Guideline of 2005—have all confirmed that the bases of Japan's national security and defense are the capability of the JSDF and the Japanese-U.S. alliance.[4]

SELF-DEFENSE FORCE BUILDING PROGRAMS

Four years after the foundation of the Self-Defense Force, the government of Japan began midterm defense buildup programs to provide for systematic force building and transparency for Japanese taxpayers. Data through 2009 are drawn from *Boei Handbook of 2009* [Handbook for Defense 2009] (Tokyo: Asagumo Shinbunshya, 2009), pp. 17–146.

1954–57: four single-year budgets
1958–60: First DBP (three-year program)
1961: Single-year budget
1962–66: Second DBP (five years)
1967–71: Third DBP (five years)
1972–76: Fourth DBP (five years)
1977–79: Three single-year budgets (Post–Fourth DBP)
1980–84: 1978 Five-year JDA draft (not government program; to be reviewed at the fourth year, 1983)
1983–87: 1981 Five-year JDA draft (not government program, to be reviewed at the fourth year, 1986)
1986–90: 1986 MTDBP (five years)
1991–95: 1991 MTDBP (five years; amended in 1993)
1996–2000: 1996 MTDBP (five years; amended in 1998)
2001–2005: 2001 MTDBP (five years; amended in 2005)
2005–2009: 2005 MTDBP (five years; amended in 2009)
2010: Due to the political situation in Japan, a single-year budget was accepted by the cabinet on 17 December 2010, together with a 2010 National Defense Program Guideline, in lieu of a five-year (2011–2015) MTDBP.

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Fully complying with this concept, the military strategy of the JSDF has been to build and maintain the defense posture of the nation through cooperation with U.S. forces under the alliance. Exceptions would be the outbreak of military conflict or limited aggression against Japan, in which case the JSDF would be solely responsible for appropriate military measures. Thus the operational concept of the JSDF with respect to the U.S. armed forces has been one of complementary mission-sharing, in which U.S. forces concentrate on offensive operations, while the JSDF maximizes its capability for defensive operations. In other words, the two forces form what is known as a "spear and shield" relationship.

For instance, under this policy the Japan Ground Self-Defense Force (JGSDF) remains on Japanese territory and prepares for enemy invasion, while U.S. Army and Marine Corps forces prepare for and conduct expeditionary operations against enemy forces outside Japan. In case of an invasion, these three ground forces would fight together on Japanese soil.

Similarly, the Japan Air Self-Defense Force (JASDF) is to be engaged solely in the defense of Japanese airspace, providing overall safety and security to the Japanese people and to U.S. forces in Japan. Thus the JASDF relieves the U.S. Air Force of the heavy burden of defense around Japan. This enables Air Force units to allocate extra assets for strike and other operations conducted against the enemy.

As for maritime operations, ensuring the safety and security of the waters around Japan is the most important mission of the JMSDF. In this way the JMSDF ensures that Japan can receive American reinforcements from across the Pacific Ocean, guarantees the safety of U.S. naval forces operating around Japan, and enables U.S. carrier strike groups (CSGs) to concentrate on strike operations against enemy naval forces and land targets. At the same time, for Japan, as a country with few natural resources and little domestic food production, the safety of merchant shipping is a matter of national survival in crisis or wartime. All of these operations are grouped under the heading of protection of sea lines of communication (SLOCs) in the northwestern Pacific. The JMSDF has accepted these simple realities as the essence of its strategic objectives.

Proceeding from this defense strategy, the main missions of the JMSDF have consistently been defined as the protection of SLOCs and the defense of the homeland in case of direct invasion. In support of this defense strategy and its two main missions, in turn, the JMSDF has set antisubmarine warfare as its main task. The operational concept under the Japanese-U.S. alliance is that in case of a national or regional contingency, the U.S. Navy would deploy CSGs into the seas surrounding Japan, to provide the strike capability lacking in the JMSDF to oblige the enemy to give up its intention of invading Japan or attacking its SLOCs. It would be necessary to exclude firmly the enemy's submarines,

which could pose the greatest threat to CSG operations in Japanese waters and to the safety of the SLOCs around Japan. As a result of this logic, ASW was made the main pillar of JMSDF missions. Even in the present security environment, twenty years after the end of the Cold War and the threat of invasion from the Soviet Union, two factors are unchanged—the Japanese-U.S. alliance and Japan's dependence on imported natural resources. Therefore the protection of SLOCs has continued to be a main mission of the JMSDF.

Homeland defense, of course, remains as a mission as well, however unlikely its occurrence. It is based on the assumption of a direct invasion into Japan by an enemy ground forces. This would certainly be a state of national emergency, and each branch of the JSDF would do its best to repel the enemy. At the same time, homeland defense operations would involve many unforeseeable factors, such as how and where enemy forces invade and how U.S. forces would assist the JSDF; projecting countermeasures and courses of action for all possible cases is complicated. In any case, certain operations associated with the protection of SLOCs—for example, establishing and maintaining conditions necessary for U.S. forces arriving in the waters around Japan—contribute also to homeland defense.

In other words, it is inappropriate to consider separately the operations required for each mission. Accordingly, the JMSDF has made it a basic policy to address the homeland-defense mission by giving full priority to the warfare capabilities, especially ASW, required for the SLOC-protection mission, in the belief that it can best contribute to Japan's homeland security by defeating invasion forces at sea.

SHIPBORNE HELICOPTERS, DESTROYERS, AND FRIGATES OF WORLD NAVIES

In addition to the JMSDF defense strategy, some discussion of the historical development of naval helicopters, destroyers, and frigates generally is necessary to understanding the rationale of JMSDF's force buildup, especially in destroyers and helicopters.

Various navies paid close attention after World War II to the improvement of submarine capabilities, numbers, and quality, as well as to the development of helicopters. They made sustained efforts to combine helicopters and surface vessels in order to improve antisubmarine effectiveness. Various combinations were tested, notably with helicopter-capable surface vessels, mainly in the United Kingdom, by the Royal Navy. Directly and indirectly influenced by such efforts, many European navies started in the 1960s to operate small helicopters on board destroyers (DDs) and the smaller, more specialized frigate (FF) type.

The biggest issue was to limit the movement (mainly rolling) of surface ships of only two or three thousand tons—a typical size in those years—enough to make it possible to handle and operate helicopters on board. The Royal Navy had developed successful fin stabilizers for ship's hulls, and their use spread very quickly. As for the shipboard helicopter, small aircraft like the Wasp and Bell 204 were used initially, followed by the Bell 212 and Lynx, with their improved performance. In recent years, however, the growth of the submarine threat and the diversification and complexity of navy missions have led naval force planners to recognize the limitations of small helicopters, such as poor endurance and insufficient combat systems. Therefore, most world navies are today introducing helicopters of medium to large size, like the EH-101 and NH-90. Simultaneously, the Royal Canadian Navy has undergone a unique process in this area. In the 1960s, it developed a concept for the embarkation of a large helicopter, the HSS-2 (later redesignated in the U.S. Navy as the SH-3), a cutting-edge aircraft in those days, on board its 2,500-ton destroyers. Even with fin stabilizers, a destroyer-sized ship could not safely handle, launch, or recover the larger HSS-2 in rough seas. An engineering team from Canada's navy and industry produced an onboard helicopter-handling/arresting system called Beartrap, which became indispensable. In the 1970s, the Canadian navy built four *Iroquois*-class DDHs of 4,500 tons, larger than previous Canadian destroyers; each could carry two HSS-2s. This class underwent modernization in the 1990s, and three units, aged more than thirty-five years, remained in active service as of December 2010.[5]

The U.S. Navy, in contrast, did not for a long period after World War II form a clear concept of combining DD/FF types with helicopters for antisubmarine warfare. Instead, in 1960s and 1970s it used *Essex*-class aircraft carriers as ASW carriers (CVSs), with S-2 antisubmarine maritime-patrol aircraft and HSS-1 (later known as the H-34) and HSS-2 helicopters on board. This was a superb ASW capability, but as the Soviet Union's submarine threat became increasingly prominent, the U.S. steadily endeavored to strengthen its ASW capability, especially that of surface ships in conjunction with P-3 aircraft and state-of-the-art technologies. By the early 1960s, U.S. Navy ships could project Mark 44 homing torpedoes as far as ten thousand yards away, using the ASROC (antisubmarine rocket) system. To extend this range to match longer detection distances, the Americans developed the radio-controlled DASH (drone antisubmarine helicopter); however, the system was abandoned due to technological limitations and poor reliability.[6]

With the failure of DASH, the U.S. Navy started to embark small, multipurpose, manned helicopters on surface vessels. The Navy also introduced the AN/SQR-18A variable-depth-sonar towed-array sonar system (VDS-TASS) and added it to the existing AN/SQS-35 VDS system to detect the relatively noisy

first-generation Soviet nuclear-powered attack submarines (SSNs)—for example, the Hotel, Echo, and November classes—and snorkeling, conventionally powered boats. By this time the Mark 46 torpedo, with substantially improved performance over the previous Mark 44, had become operational too.

The U.S. Navy's concept of ASW operations was now to get initial acoustic ("passive," or listening) contact by VDS-TASS on board destroyers or frigates and then develop the approximate position of the target submarine by continuous tracking. The passive-detection range of TASS is in general much greater than that of a ship's hull-mounted sonar used in an active mode, but also several times greater than the maximum firing range of the ASROC. It thus gives surface units the safety of greater distance, but without an appropriate attack weapon, they cannot take advantage of this long-range detection. It was for this reason that the concept of pairing ships with light helicopters was developed in the U.S. Navy.

In a tactical ASW situation, a surface unit deploys helicopters against the contact to determine whether it is really a submarine. If it is, the helicopter fixes its position using sonobuoys; if the submarine is identified as an enemy, the helicopter attacks it with a Mark 46 torpedo. A new helicopter was developed for not only this sequence and type of operation but also antisurface surveillance and targeting, search and rescue, and transport—the Light Airborne Multi-Purpose System (LAMPS), of which the SH-2 became known as the "Mark I."

Due to its size, the LAMPS Mark I was equipped not with dipping sonar but with magnetic-anomaly-detection (MAD) gear, along with sonobuoys, to fix the location of a submerged boat. Other than ASW systems, the Mark I was also equipped with surface-surveillance radar. This radar system made LAMPS indispensable for over-the-horizon targeting of the new Harpoon surface-to-surface missile (SSM), which had just become operational in the U.S. Navy.

The operational record of the LAMPS Mark I was highly satisfactory. All forty-six frigates of the *Knox* (FF 1052) class, initially planned for DASH, were converted to LAMPS, through redesign of their hangars and installation of sonobuoy data-processing systems. These ships were a mainstay of American ASW through the 1970s and 1980s.

The successor to LAMPS I, known as LAMPS Mark III, was based on the SH-60 helicopter, a standard helicopter in all U.S. services at the time. More than 140 surface vessels embarked the SH-60, ranging from *Oliver Hazard Perry*–class guided-missile frigates to "Flight IIA" *Arleigh Burke*–class guided-missile destroyers (DDGs), and to aircraft carriers. On board Aegis guided-missile cruisers and DDGs equipped with the Aegis combat system, the SH-60 is an indispensable asset. It supports the AN/SQQ-89 comprehensive ASW system, which in turn combines the AN/SQR-19 Tactical TASS (TACTASS), the

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AN/SQS-53 hull-mounted sonar, and ASW-related software. The SQQ-89 is considered to be the most advanced surface-ship ASW system in the world today.

HELICOPTER OPERATIONS IN THE JMSDF: THE MID-1950S AND 1960S

Naval helicopters were introduced in 1953, one year after the foundation of the JMG. In those days, all efforts were focused on obtaining a large number of surface vessels, such as the World War II–vintage patrol frigates and landing support ships, transferred from the U.S. Navy. Emphasis was also placed on training shipboard personnel to meet the rapidly growing requirements of this force.

However, consideration was also given to maritime aviation, in order to pave the way for its future development. This was a legacy from the Imperial Japanese Navy, whose naval aviation force had been the second-largest in the world during World War II but had totally disappeared by the end of the war. In addition to fixed-wing aircraft, such as PV-2s, TBMs, and PBYs—all of which were also of World War II vintage—initial attempts to introduce several types of helicopters, including the Bell 47, were made. This was the period of the Korean War, so it was difficult for the JMG to get helicopters from the U.S. Navy. Therefore, secondhand S-51 and S-55 helicopters were imported from the United Kingdom. These two types were mainly used for pilot training and for establishing operational concepts for the future helicopter force. Later, two squadrons were established, each equipped with eight HSS-1 and nine night-capable HSS-1N helicopters, then cutting-edge U.S. Navy aircraft. Finally the helicopter force of the JMSDF was ready for missions, but its inventory was still very small. At that time, the deployment concept for helicopters in the JMSDF envisioned the defense of vital local areas, such as major ports, straits, and channels; it presumed operation from shore air bases—not from ships.

Beyond these practical matters of force planning and building during its early days, the JMSDF had an independent strategic concept, an ambitious plan to build an innovative ASW group, formed around a helicopter carrier. In outline, that concept recognized that surface vessels have natural limitations in antisubmarine warfare; submarines, whether conventionally or nuclear powered, maneuver cunningly and aggressively to avoid detection by surface units before attacking, and nuclear submarines can retreat at high speed after attacking. The inherent limitations of surface ships against these "invisible adversaries" include low probability of detection, difficulty of classification and identification of contacts, short detection range relative to that of a submarine against a surface ship, and the submarine's tactical advantages in tactical use of the ocean environment. To make up for these handicaps, JMSDF planners considered it

indispensable to employ helicopters, with their prominent ASW capabilities, in combination with surface ships. The abilities of helicopters to conduct wide-area surveillance and search and to detect and track fast and hard-maneuvering contacts were especially attractive characteristics. In addition, if a surface force could conduct ASW by helicopters at a distance, its own safety and survivability would substantially increase.

So, on the basis of this thinking, the JMSDF devised a concept for an ASW—or "hunter/killer" (HUK)—group, a small-to-medium-sized ASW helicopter carrier with escort destroyers. To realize this concept, the JMSDF Maritime Staff Office (MSO) in Tokyo developed a plan for two variants: "CVH-a," of twenty thousand tons, with eighteen helicopters and four to six S-2 fixed-wing maritime patrol aircraft; and "CVH-b," of ten thousand tons, with eighteen helicopters (see figure 2).

It was decided that CVH-b would be more suitable for the JMSDF, and the Japan Defense Agency (or JDA, the predecessor of the present Ministry of Defense) decided to request one CVH-b in the JFY 1961 budget. But this decision was caught up in political turmoil originating from stiff opposition to the revision of the Japanese-U.S. Security Treaty in 1960. This political friction, caused by relatively minor opposition groups, escalated into nationwide social chaos. In order that this controversial CVH not become a symbolic target for these opponents, the JDA withdrew its proposal. At the same time, due to the chaotic situation, the second of the JDA's Defense Buildup Plans (DBPs) was postponed by one year; to fill the one-year gap, an independent, single-year budget, for JFY

FIGURE 2

The CVH-b (conceptual image)

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1961, not part of a five-year DBP, was requested. CVH construction was not included and was never discussed again in later years. This was the first demise of the JMSDF helicopter carrier.[7]

In the late 1950s and early 1960s, the JMSDF started receiving the seven destroyers of the *Ayanami* class (2,200 tons, ASW, three-inch guns) and the three sisters of the *Murasame* class (2,400 tons, antiair warfare [AAW] and antisurface warfare, five-inch guns). These were the JMSDF's first generation of DDs, planned from 1955 to 1958. Construction of its first state-of-the-art DDG, of 4,500 tons, with the Tartar surface-to-air missile (SAM) system, was approved in the 1961 JDA budget. For the JMSDF, a DDG was too expensive to build in large numbers, so the JMSDF traded quantity for its superb AAW capability. This request was regarded as something of a "leap in the dark," one that might have eaten up the other shipbuilding programs. Only one, JS *Amatsukaze* (DDG 163), was built, and it took the JMSDF ten years to request a second Tartar DDG.

These were the realities of Japan and the JMSDF around 1960. In retrospect, in those days of the infancy of the force buildup, if the CVH had been approved, whatever its cost, it would certainly have caused serious negative impacts upon almost all sections of the JMSDF. It might have become a hard-to-remove (and self-imposed) obstacle for future force planning. Additionally, if we take into account the performance and quality of helicopters around 1960 and the state of passive acoustic sensors in the JMSDF at that time, it is doubtful if this HUK group could have achieved its mission.

Having said that, however, the point here is that the idea of a CVH, or some form of helicopter carrier, had become a feature of JMSDF force planning and would remain so through the coming decades.

THE THIRD AND FOURTH DBPS AND THE FIRST STANDARD TACTICAL UNIT

In 1964 the JMSDF started introducing U.S.-developed HSS-2 ASW helicopters. But the operational concept of helicopter force still remained the same—local vital-area defense, conducted from air bases ashore.

It was during its preparatory study for the Third DBP (1967–71) that the MSO concluded that helicopters were indispensable assets for the ASW operations of surface forces. The presumed threat at that time was a conventional submarine (SS) attempting a torpedo attack against a surface force. The threat from the air was, in those early Cold War days, considered to be scattered air raids, mainly free-fall bombing by small numbers of long-range bombers. Of course, SSNs, SSMs, and air-to-surface antiship missiles (ASMs) were examined as well; however, in the mid-1960s, in the northwest Pacific, these threats were estimated to be secondary.

The JMSDF conducted extensive mathematical operations-research analyses of these threat scenarios and came to the following conclusion: a surface force of eight destroyers with six shipboard ASW helicopters would be the most effective against a single SS attempting to make torpedo attacks, supported by sporadic bombing by long-range bombers.

The six ASW helicopters in total—four available for operations at any one time—were to be used as "reaction assets"—that is, to investigate contacts gained or to conduct counterattacks. They were not considered to be primary search assets against the enemy SS. Instead, once contact was gained, the four were to be sent to the contact area to track the submarine and eventually to kill it, when tactical conditions were met.

One issue to be resolved in this concept was how to embark the six helicopters. The JMSDF thought it impracticable to embark the large HSS-2 on board 2,500-ton DDs. The options left were to build either two helicopter-carrying destroyers of seven thousand tons full load (FL), which would carry three helicopters each, or a single, larger DDH, of nine to ten thousand tons, capable of carrying all six. The latter would most likely be a through-deck design, but that was too controversial politically. It was still too early to make a serious argument for a ship that looked something like an attack carrier, even if it was in fact simply an ASW helicopter platform. Thus the decision was made to build two seven-thousand-ton DDHs, conventional destroyers with large hangars for three ASW helicopters, and wide flight decks extending from the midsection to the stern.

On this basis, the JMSDF's antisubmarine warfare concept was reflected in the composition of a new type of "escort flotilla": one DDG, with the Tartar SAM, to be responsible for force air defense; two DDHs, each of 6,500 tons and carrying three ASW helicopters; and five DDs for general operations. Two DDHs were included in each of the next two DBPs, the third and fourth, for a total of four. One of the technical premises for this concept was, needless to say, the successful development and diffusion of Beartrap and of fin stabilizers.

The escort flotilla, whose main mission was ASW, was expected to improve the fleet's antisubmarine capability substantially.[8] Its conceptual composition, as described above, was implemented: the escort flotilla of eight ships and six antisubmarine helicopters became a standard tactical unit for the first time.[9] There had been escort flotillas in the JMSDF before, but those were, in general, the spiritual descendants of the traditional destroyer flotillas of the Imperial Japanese Navy, which had been used as heavy torpedo-assault forces, without aircraft and without a thought-out operational concept.

The first DDH was *Haruna* (see figure 3), commissioned in February 1973; in November 1974, when the second, JS *Hiei* (DDH 142), was commissioned,

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FIGURE 3

JS *Haruna* (DDH 141)

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Escort Division 51 was organized; *Hiei* and *Haruna* joined its Escort Flotilla 1. The third DDH, of a slightly larger (seven-thousand ton) class, was JS *Shirane* (DDH 143), commissioned in March 1980; with the commissioning of the fourth, JS *Kurama* (DDH 144), the next year, Escort Division 52 was formed, and the two *Shirane*-class DDHs were assigned to its Escort Flotilla 2.

So by 1981 the JMSDF had four flotillas, of which two had completed the transition to an eight ships/six helicopters composition. The other two flotillas remained in a premodernized state at that point. One thing to be noted here was the time elapsed from the concept's original development, in 1965, to its realization —it had taken over fifteen years to realize the concept, and then only halfway. This is the reality of the time-consuming nature of naval force building.

POST-FOURTH DBP AND A NEW CONCEPT

Due to the fourth Middle East war, in October 1973, a quick and substantial jump in the price of crude oil, the "oil shock," hit the world. Its negative effects were felt in almost all sectors of the economy in Japan and led to unprecedented and rapid inflation. Japan's defense industry was no exception, and some disruption, like the cancelations of several shipbuilding contracts for new vessels, was proposed by industry and reluctantly accepted by the government. In this situation, the midterm financial estimate, the basis for next five-year DBP, became unclear. As a result, the government and the JDA gave up formulating a new DBP; instead, three consecutive single-year budgets were adopted. This interval, from JFY 1977 through 1979, where no defense buildup plan was in effect,

was called the "Post–Fourth DBP" (P-4) period. Eventually, and ironically, the P-4 period had a remarkable significance for the JMSDF. In these years, in the middle of the Cold War, the JMSDF developed a new operational concept to meet growing threats. This concept became the centerpiece and theoretical main pillar of JMSDF force planning, and it remains so today, over thirty years later. The new concept was to form large tactical units of eight DDG/DDs and eight antisubmarine helicopters.

During the P-4 period, the MSO recognized the limits of a surface flotilla with eight ships and six ASW helicopters against the Soviet Union's increasing numbers of new-generation SSNs and its growing naval aviation arm. An SS with torpedoes remained a fearsome opponent, but now SSNs with an SSM capability posed a new and serious threat to surface forces. As for the air threat, air-to-surface missile attack had totally replaced conventional bombing. The tactics of air attack had also switched, from scattered bombing to controlled and repeated assaults by waves of ASM-loaded bomber formations, over waters distant from the mainland of the USSR. In general, new intelligence on Soviet naval capabilities changed the threat perception of the JMSDF quickly and substantially. It was full recognition of these changes in the threat that led the MSO to review the existing concept of eight ships with six helicopters.

With regard to ASW, coping with highly maneuverable SSNs, with their great submerged speed and endurance, requires detection, tracking, and attack at longer ranges from surface units. That made the shipboard passive acoustic sensor —the tactical towed-array sonar—essential. Together with TACTASS, the passive sonobuoy was thought to be effective in initial search against SSNs. For this reason, two more helicopters were added to the original six, for reactive operations.

As for AAW, one Tartar DDG was considered insufficient to protect the unit against fierce ASM and SSM attacks, delivered in volume. So the number of DDGs was increased to two, replacing one of the DDHs, and a domestically developed, short-range SAM, which would launch the NATO-developed Sea Sparrow, was to be installed on all the unit's DDHs and DDs for point defense. As a result of this review, a new "eight ships with eight helicopters" initiative was adopted.[10]

There was a further attempt to improve the ASW capability of the JMSDF. It was obvious ASW by surface units, even with helicopters, had limitations, so in addition to the eight ships/eight helicopters concept, the JMSDF decided to obtain a hundred P-3C maritime patrol aircraft. Of these, eighty would be allocated to wide-area surveillance and twenty for direct support to surface units. This integrated antisubmarine warfare posture has been the real force-building rationale of the JMSDF since 1980.

The biggest issue was embarking an ASW helicopter on a four-thousand-ton destroyer; each of the flotilla's five DDs (of a new class, to be designed for the

purpose) would have to carry one. To meet fully the operational requirement of the new concept, each aircraft would need sonobuoy and dipping-sonar systems, as well as MAD. Additionally, a surface surveillance radar would be desirable. However, the small-to-medium-sized helicopters suitable for DDs were limited to the U.S. Navy's SH-2 and the Royal Navy's Lynx, which were both too small and had too little payload. The idea of two different types of helicopters —large and small helicopters, for DDHs and DDs, respectively—was abandoned as operationally inefficient. Only a large helicopter could meet the need, but it had to be small enough to be stored in a hangar and to take off from and land on the flight deck of a four-thousand-ton DD.

After intensive and in-depth research, the MSO concluded that only the HSS-2, which was in current use, could meet these conflicting requirements. But the HSS-2 was equipped only with a dipping-sonar system. At that time, the U.S. Navy had had a similar idea (except for use on carriers) and had started development of a new HSS-2 variant—what would become the SH-3H—but the JMSDF learned of difficulties in that program.

For this reason, the JMSDF decided to install domestically developed equipment on the existing HSS-2. The development effort went well, and a new member of the globally popular HSS-2 family—with a completely different capability, including a surface-search radar in an extendable "radome"—was introduced into the JMSDF, the HSS-2B (see figure 4). Given this success in developing the HSS-2B, the JMSDF was finally able to design and build the new destroyer to handle it, the *Hatsuyuki* (DD 122) class. Eventually the *Hatsuyuki* class paved the way to the realization of the eight ships/eight helicopters concept. The JMSDF now started forming its escort flotillas anew; each would be composed of one DDH with three ASW helicopters, five destroyers with one helicopter each, and two Tartar DDGs.

Since then, destroyer-borne helicopters in the JMSDF have switched to the new-generation SH-60J (1989), followed by the improved and enlarged SH-60K (2003). Equipment has also been improved, together with technology and tactics. For instance, later production models of the SH-60J were equipped with a forward-looking infrared system and a chaff/flare dispenser for self-defense. The SH-60K has a ship-landing guidance system, for operations in poor visibility. Provision is also made for installation of a machine gun and short-range air-to-surface missile. However, their basic operational concept, originating with the HSS-2B, has remained the same. In the same way, more modern and larger destroyers have appeared—*Asagiri* class (4,500 tons, eight ships), the *Murasame* class (6,300 tons, nine ships), then the *Onami* class (6,500 tons, five ships)—but their operational concept is that associated with the first-generation *Hatsuyuki* class.

FIGURE 4

HSS-2B with MAD and radome extended

JMSDF

In the eight ships/eight helicopters composition, only one aircraft was embarked on each DD. However, to provide operational flexibility, the enlargement of their hangar bays to accommodate two ASW helicopters (a type known generically as HS) was attempted; the hangar on board JS *Asagiri* was modified during construction. That attempt was not satisfactory; however, in the next class, beginning with JS *Murasame,* provision was made in the design phase to accommodate two SH-60J/Ks at one time. This is officially known as the "one HS embarked and one HS carried" design, and it greatly improved flexibility in missions in the Indian Ocean (supporting ENDURING FREEDOM) and off the coast of Somalia (antipiracy). However, these operations are considered to be variations, adaptations of the fundamental eight ships/eight helicopters concept.

THE MID-1980S: "AT-SEA AIR-DEFENSE POSTURE STUDY" AND THE DDV

In response to the growing threat posed by Soviet Long-Range Aviation in the late 1970s and 1980s, the JDA in 1986 launched an intra-agency research project called the At-Sea Air-Defense Posture Study.[11] This study, which continued until 1987, was conducted in a period of sharp confrontation between the West and East, the final years of the Cold War. The MSO proposed two systems: the "DDV" (a through-deck carrier for air-interceptor fighters) and an Aegis DDG.

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It estimated the Soviet naval-aviation threat as one of concentrated ASM attacks by bombers like the Tu-22M Backfire, in about three groups, each aircraft carrying two AS-4 or AS-6 long-range missiles. The proposed Aegis DDG would be able to shoot down large numbers of incoming ASMs but would be unable to deal with the bombers themselves, attacking from beyond the maximum range of the SM-2 surface-to-air missile of the JMSDF's Aegis system. For this reason, if the tempo of combat increased or the campaign was prolonged or repeated, the bombers would survive and their attacks would continue forever, in theory, while surface units would suffer accumulated losses to missiles "leaking through" in every assault and might ultimately be destroyed completely.

The JMSDF strongly felt the need for an adequate antibomber (that is, anti–ASM platform) asset. One idea was to operate short-takeoff/vertical-landing (STOVL) interceptor fighters from a mother ship, a DDV. That concept envisioned a through-deck ship of fifteen to twenty thousand tons with about ten radar-equipped Sea Harrier all-weather interceptors and about four airborne-early-warning aircraft. However, on New Year's Day in 1988, a sensational article titled "JMSDF to Build Light Aircraft Carrier" was front-paged by nationally circulated newspapers and became somewhat controversial politically.[12]

The MSO turned down the DDV concept due to the negative resonance of the phrase "aircraft carrier" for political and public opinion and within the study panel itself. Then, the senior leaders of the JMSDF decided to focus on the Aegis DDG; after heated discussions about funding, the ship was included in the JFY 1988 budget.[13] The feeling within the MSO was bittersweet: the JMSDF finally obtained the most advanced antiair-warfare ship but had had to trade away, in the DDV, its long-hoped-for air-capable ship.[14]

At least the JMSDF had been able to put a carrier-like combatant—though far different from the once-envisioned ASW helicopter carrier in task and mission—on the agenda again. So this, the second demise of the carrier in the JMSDF, became another important milestone along the road to JS *Hyuga*. The CVH and DDV had been only JMSDF concepts, not government-approved programs, and so had ended as mere dreams. However, it was a stark reality that replacements for the *Haruna*s would have to be laid down in the first decade after 2000, when they would reach the end of their service lives.

THE *OOSUMI*-CLASS LST: A SIGNPOST TO THE FUTURE

A ship somewhat related to the *Haruna*-class DDH follow-on—known as the Next-Generation DDH, or Next DDH, program—was a new transport ship in the JFY 1993 budget, JS *Oosumi* (LST 4001). *Oosumi* was a fundamental departure from the previous *Miura*-class LST (landing ship, tank).[15] Its operational requirement, which called for a maximum speed of more than twenty knots,

inevitably narrowed its design. The traditional, World War II design based on a bow door and ramp for direct beaching was abandoned, and a narrower, higher-speed hull form was introduced. At the same time, in order to fulfill the basic requirement for beach landing, as military transport, the MSO decided to embark on this ship what was at the time a cutting-edge amphibious vehicle, the U.S. Navy's Landing Craft, Air Cushion (LCAC).

The MSO also looked into the possibility of conducting landing operations by helicopters from this ship. However, there was some tacit resistance within the JDA regarding carrier-like through-deck designs, so the MSO had to be careful on this point. The MSO argued the necessity of a through-deck design for the safety of helicopter operations and efficiency of embarkation and debarkation of troops. After heated discussions within the JDA, the MSO finalized *Oosumi* (see figure 5) as a through-deck transport, designating it as an LST. The JMSDF did not adopt the traditional concept of amphibious assault, in which the ship would operate helicopters in a combat environment. Instead, the JMSDF introduced a substantially different idea, "Maritime Operational Transport."[16] The MSO strongly advocated the through-deck design in support of such a capability. Needless to say, however, the crux of the debate was whether to adopt a

FIGURE 5

JS *Oosumi* (LST 4001)

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through-deck structure. Ultimately the design was accepted by the JDA and the government of Japan.

All this time, during these heated JDA discussions, there was a strong awareness in the minds of officers in the MSO that the Next DDH project was waiting in the wings.

THE NEXT-GENERATION DDH

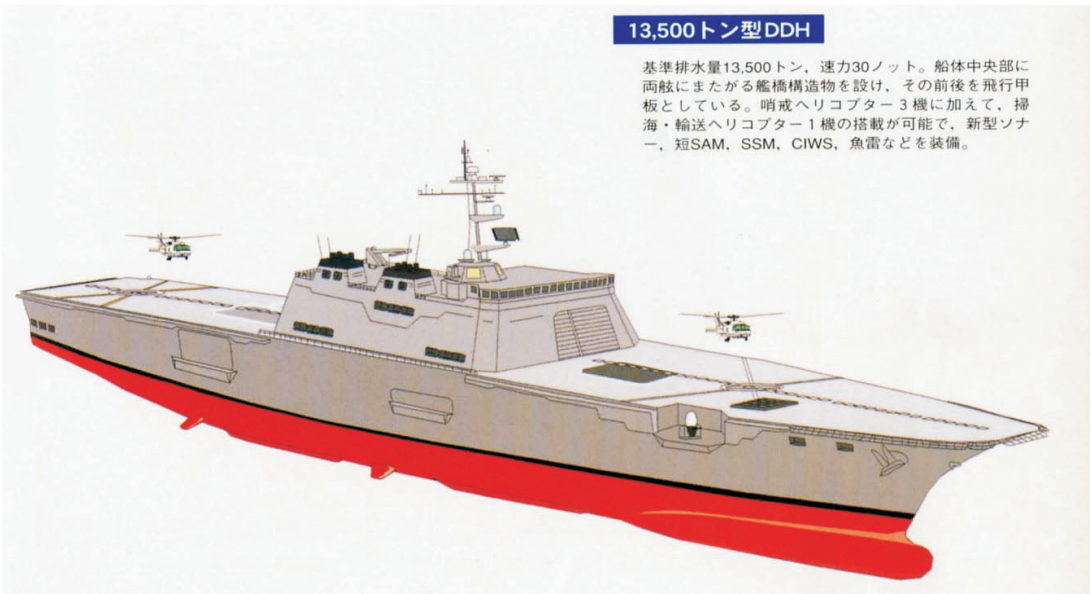
A complicated, two-year-long effort produced a new, five-year Midterm Defense Buildup Plan (the 2001–2005 MTDBP). In it, for 2001, was the Next DDH (see figure 6), a "destroyer with sophisticated command and communication capability, as well as improved helicopters operational capability."[17]

Operational Concept

As one proposed configuration for this vessel, the JDA had released to the mass media a conceptual picture of a ship with a superstructure amidships and a divided forward-and-aft flight deck. This seems to have been done to offset potential public objections rooted in the offensive image of aircraft carriers.[18]

This ship was planned as a replacement for the existing DDHs for the new JMSDF eight ships/eight helicopters concept, based on a threat perception of SSNs/SSs and ASM-equipped bombers. The concept was considered an optimum posture, based on the enormous amount of mathematical operations-research

FIGURE 6



Next DDH (conceptual image)

Sekai no Kansen

analysis conducted since the Post–Fourth DBP. What the analysts tried to determine was the best composition of a JMSDF flotilla to survive intensive enemy air-to-surface attacks while continuing effective antisubmarine warfare for a certain duration of time.

When the MSO started to develop the operational concept for the Next DDG, the force-planning rationale of ASW as the main mission of the JMSDF was still a given. It followed that SSM-capable submarines and ASM-carrying bombers were (and remain) the most relevant and realistic threats. In other words, the JMSDF thought then, thinks today, and expects to think in the future that the "best" surface force is one that has true capabilities against air-to-surface and surface-to-surface missiles and against submarines.

Here, the importance of continuity of defense concept should be emphasized. The eight-ship/six–ASW helicopter concept of the Third DBP was only partially realized, even fifteen years after its initial development. At that point, only two out of four flotillas conformed to it. This, as noted, reflects the time-consuming nature of assembling a surface force, building at the rate of only one or two vessels per year. Frequent changes of defense or operational concepts would have brought few positive results and caused confusion and ultimately meant failure to achieve force-building objectives. Accordingly, since the Post–Fourth DBP period no fundamental change that could reverse the premises of the estimate has been accepted; the eight ships/eight ASW helicopters concept has been upheld for about thirty years. By 1998, about twenty years after this composition was formulated, all four JMSDF destroyer flotillas were organized in line with it: one DDH, five DDs, two DDGs, with eight HS aircraft. These flotillas, in turn, have been the rationale for modernization. Today the JMSDF has four fully organized flotillas that are probably second in quality only to the U.S. Navy—world-class surface units with the most capable helicopters. This is a result of more than a quarter-century of continuity in defense concept within the JMSDF.

A Carrier-like Ship

In line with that defense concept, the MSO decided that the basic characteristic of the Next DDH, its bottom line, would be an ability to operate three helicopters. However, though it was committed to the eight ships/eight helicopters concept, extensive fleet experience eventually convinced the MSO that even three helicopters would not meet real-world ASW needs.

The operations-research mathematical model used in the development of eight ships/eight helicopters had postulated broad and universal conditions, assuming a simplified scenario of ASW against one submarine (nuclear or conventional) whose presence in an area had been confirmed. The model's output,

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then, answered to this specific condition, which had been the basis for the doctrine then existing. The gaps between the force-planning rationale and the reality of widely diverse operational environments and conditions are obvious. The JMSDF has long and wisely exercised flexibility, especially at the fleet level, to bridge this gap.

Commander in Chief, JMSDF Fleet (CinC SDF) normally forms flotillas with compositions most suitable to achieve given missions in given situations. For example, where a flotilla's mission is relatively uncomplicated mission, CinC SDF may allocate fewer ships to its commander—and, of course, the reverse is also true. In the case of a difficult mission requiring larger forces than the standard, CinC SDF may reinforce the flotilla.

Most ordinary training, exercise, and operations are carried out with the normal eight ships/eight helicopters organization. But practical fleet ASW experience has taught an important lesson—that the number of ASW helicopters on a single DDH and in an entire flotilla is insufficient. In a real-world scenario, ships and helicopters may gain several contacts at once and have to categorize each as a submarine or a false detection. Then the real submarines, or most submarine-like contacts, are tracked and identified as friendly or enemy; finally, adversaries are attacked. In short, actual ASW engagements start with large numbers of uncertain contacts, to which the flotilla commander should be able to project helicopters to investigate. In fact, the MSO postulated a simultaneous projection of three or four helicopters for each contact.

Additionally, for other roles, the MSO also decided to add one MCH-101 helicopter, for airborne mine countermeasures and transport. But three ASW helicopters on board the Next DDH was a bottom line; the ship was to represent a concentrated helicopter capability in various tactical ASW situations. Thus, a rationale for the maximum number of aircraft on the Next DDH was developed based on the thinking that as a member of a flotilla of eight ships and eight ASW helicopters, the ship would normally carry three ASW *and* one mine-warfare/transport helicopters—that is, three HS and one MCH. To cope with real-world ASW operations, in fact, the ship might need to embark about ten HS.

All this made it natural and reasonable for the MSO to adopt a carrier-like hull design, with a through flight deck, a starboard island structure, and a large hangar bay under the flight deck. The design accommodated three HS plus one MCH under normal conditions and about ten HS in case of expanded helicopter operations.

However, as Next DDH development continued, another problem arose. In the past, the JMSDF had fielded four antisubmarine helicopter squadrons for shipboard operations—one for each flotilla—and four squadrons for vital/local-area defense from air bases. The shipboard squadrons each had twelve aircraft,

enough to deploy eight to the ships in a flotilla. The land-based HS squadrons were not intended or fully trained for shipboard operations. So there were forty-eight HS helicopters, with about a hundred aircrew teams, available for shipboard operation in all. In order to allow embarkation of as many as ten HS aircraft on the Next DDH, additional HS strength would be necessary.

The MSO decided to make all land-based HS squadrons shipboard capable. Concrete measures were implemented in the JFY 2007 program, as part of a reorganization of the JMSDF decreasing the number of destroyers but increasing the number of helicopters to be embarked on board both DDs and the Next DDH. A gradual transition of land-based squadrons from land to shipboard operation got started. It is now estimated that by around 2015, all HS helicopters in the JMSDF—that is, about eighty aircraft—will become shipboard capable. This number is considered to be right to meet the requirements of maximum shipboard operations in case of necessity.

Another reason as well drove the MSO strongly toward the through-deck design. That was an operational requirement for simultaneous takeoffs by multiple ASW helicopters, preferably at least three. This would solve a limitation of the first-generation DDHs, from which only one helicopter could take off at one time. Thanks to the Beartrap (in later years, the Recovery Assist Securing Traversing, or RAST, system), the time needed for the second aircraft to take off was acceptable, to some extent, but it really took a long time for the third. The problem was the constrained size of the flight deck, which occupied only one-third of the ship's overall length, and the limited number of arresting-traverse systems —that is, two RASTs for three helicopters. The same was also true for landings. The MSO was afraid that this inherent handicap might become a serious problem in a real-world multicontact environment. To the MSO, the best (and only) way to resolve it was to adopt a through-deck design for the Next DDH.

Additionally, the MSO placed emphasis on the importance of an elevator that would lift an SH-60 helicopter with its rotors unfolded and of sufficient height in the hangar to allow rotor-related work on an MH-53E, the largest helicopter in service. The JMSDF especially wanted such an elevator in the Next DDH, because a traditional destroyer-type hangar does not allow repair work on a helicopter whose rotor cannot be folded. The only option in such a case is to send the helicopter to a land base and embark a replacement. This meant not only a temporary decrease in the number of HS on board and in the flotilla, but also, in some cases, a destroyer off its station, while it rushed to a point that placed the air base within the endurance arc of the aircraft. This posed a far greater restriction on force operations than previously thought, and therefore the JMSDF particularly sought a suitable elevator in the Next DDH.

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Command and Control

The Next DDH was planned not only as one of the eight ships in a flotilla but also as the flotilla commander's flagship. It would need a sophisticated Flag Information Center (FIC) in addition to an ordinary Combat Information Center (CIC). Provisions of various sorts would have to be made to accommodate a larger number of staff officers and enlisted men and women than before, to fully carry out a wide range of missions, from operations other than war to the conventional and fierce combat at sea.[19] The MSO planned to provide optimum space and state-of-the-art equipment and systems for the FIC, taking full account of the lessons learned in the four-ship *Kongo* (DDG 173) and two-ship *Atago* (DDG 177) classes of Aegis DDGs, which were equipped with the first generations of the FIC. The latest improvements were incorporated into the Next DDH.

A new requirement for joint operations also emerged in the planning phase. In 2002 the JDA launched an intra-agency, preparatory study on how to change the JSDF from an independent, service-driven, operational posture to a joint operational one. It was subsequently decided to shift to the new joint posture in March 2006. Since the budget request for the ship was projected for JFY 2005, the JMSDF had to make some provision in its design for joint operations, especially for embarkation of a joint task force (JTF) headquarters, or JTFHQ. It would be inappropriate to have the JTFHQ and FIC in the same compartment, because the JTFHQ would command on a strategic level, while the FIC would mainly focus on tactical command of the flotilla. For this reason the MSO planned a JTFHQ space, separate from the FIC. The MSO designated it as a "multipurpose compartment," envisioning its use also as a command post for both military and civilian elements sectors in humanitarian-assistance and disaster-relief operations, in Japan or abroad. The multipurpose compartments reflected these diverse requirements.

With respect to communications, especially antenna locations, the ship would have a large number of various types of antennas, including for satellite communications and different radiofrequency bands. The MSO sought optimum positions, expecting that the larger size of the Next DDH would ease competition. Placing antennas had been a common problem in destroyer designs.

Weapons Systems

JS *Hyuga,* as the first ship of the Next DDH program, employs the FCS-3 (with surveillance and fire-control functions), the Mark 41 Vertical Launching System (VLS), and the Evolved Sea Sparrow Missile as its antiair weapon systems. It has two sets of the 20 mm close-in weapons that are standard on other JMSDF ships. The FCS-3 is a state-of-the-art fire-control system, with four sets of phased-array

multifunction radars. It also has a combat-direction capability to support the ship's CIC and FIC.

Antisubmarine warfare, however, is of course the ship's primary mission. The biggest issue when the eight ships/eight helicopters concept was first discussed was the role of the first-generation DDH in ASW—that is, whether it should devote itself to being a command ship, with its own operational capabilities limited to those of its three helicopters, or should conduct prosecution of contacts along with other ships in the formation. The first-generation DDH was a large ship (seven thousand tons) but retained the general characteristics and capabilities of ordinary destroyers. So this problem was resolved then quite easily. This time the story was a little more complicated. Since the Next DDH was a large, carrier-like combatant (twenty thousand tons), with enhanced helicopter operations capability and improved command functions, its role could be considered to be similar to that of nuclear-powered aircraft carriers (CVNs) of the U.S. Navy.

But the main missions of a U.S. Navy CSG are strike and power projection, not antisubmarine warfare. If a CSG gains an ASW contact, its CVN is supposed to leave the area to continue its mission. Carrier-borne helicopters, destroyers and frigates with antisubmarine helicopters on board, and a supporting SSN may take measures against the contact, but the remainder of the force leaves the area to protect the CVN. In contrast, the main mission of the JMSDF is ASW; when a flotilla gains contact, designated ships, whether DD, DDG, or DDH, rush to the detection site and conduct a prosecution, together with HS assets. Needless to say, no JMSDF unit, including the Next DDH, has the luxury of leaving a contact site to other ships' aircraft. The missions of the Japanese and U.S. forces are completely different. In the most severe case, in fact, a JMSDF flotilla might send two or three groups of destroyers to multiple contacts (two to three ships each), together with their helicopters, and the Next DDH would have to operate alone, or nearly so, in the possible proximity of an enemy submarine.

For this reason, the ASW weapons systems of *Hyuga* are similar to those of a DD. These are a hull-mounted, very-low-frequency sonar (active/passive) as the primary sensor, ASROC (launched vertically in the Mark 41 VLS), two sets of triple torpedo tubes, and countermeasure systems. Of course, its optimum role on a submarine contact spot, in a real operation, would be support of the flotilla commander. In fact, it has been asked since the start of the program, "Is there really a need to install short-range triple torpedo tubes on the Next DDH, which is substantially a light carrier?" But if we compare the mission of a JMSDF flotilla with that of a U.S. Navy CSG, the answer is very clear.

The table gives orders of battle, showing what has changed and not changed in JMSDF ASW flotillas and their destroyers from the days of the original eight ships/six helicopters concept to today.

JMSDF ESCORT FLOTILLAS

	8 Ships/6 HS	8 Ships/8 HS	8 Ships/8 HS *(Hyuga)*
DDH	2 ships (3 HS each) 5-inch guns active hull sonar ASROC/TT 32 knots	1 ship (3 HS) 5-inch guns/CIWSs Sea Sparrow SAM active hull sonar SDPS ASROC/TT 32 knots	1 ship [3 HS + 1 MCH + (10)] JTFHQ compartment Flag Information Center through flight deck CIWSs ESSM (V) active/passive hull sonar SDPS ASROC (V)/TT 30 knots
DD	5 ships (2 types, no HS) 3-inch guns/5-inch guns active hull sonar ASROC/TT 27 knots/32 knots	5 ships (1 HS) 3-inch guns CIWSs Sea Sparrow SAM Harpoon SSM active hull sonar TACTASS/SDPS ASROC/TT 30 knots	5 ships [1 HS + (1)] 3-inch guns/5-inch guns CIWSs Sea Sparrow (V)/ESSM (V) Harpoon/SSM-1 active hull sonar TACTASS/SDPS ASROC (V)/TT 30 knots
DDG	1 ship 3- or 5-inch guns Tartar (SM-1) System active hull sonar ASROC/TT 32 knots	2 ships 5-inch guns CIWSs Tartar (SM-1) Harpoon SSM active hull sonar ASROC/TT 32 knots	2 ships Flag Information Center 5-inch guns CIWSs Aegis (SM-2) Harpoon/SSM-1 active hull sonar TACTASS/SDPS ASROC (V)/TT 30 knots
HS	ASW: active dipping sonar torpedo SAR transport	ASW: active dipping sonar sonobuoy radar/ESM MAD torpedo ASST: radar SAR transport	ASW: active dipping sonar sonobuoy radar/ESM MAD torpedo ASST: radar/ESM ASUW: Hellfire ASM 30 cal. machine gun Self-protection: chaff/flares SAR transport
	2 of 4 flotillas completed	All 4 flotillas completed	All 4 flotillas to be completed

Key: ASST: antisurface surveillance and targeting; ASUW: antisurface warfare; CIWS: Close-In Weapon System; ESM: electronic support measure; ESSM: Evolved Sea Sparrow Missile; SAR: search and rescue; SDPS: sonobuoy data processing system; SSM-1: domestically developed SSM; TT: torpedo tube; (V): vertical launch.

Note: As of December 2010 there were six Aegis DDGs and two Tartar DDGs in the JMSDF Fleet. Expected remaining service life of the two relatively young Tartar DDGs is about 10 more years. So it is right to estimate that the DDG force of the JMSDF will remain the same until the early 2020s.

ISSUES TO SOLVE

When planning the Next DDH, now *Hyuga*, the MSO had studied various options, such as a deck-edge elevator, a port-side exhaust for the port gas-turbine

power plant, and airflow deflectors on the flight deck. Give the limitations of cost and size, the MSO came to the conclusion that the current configuration of *Hyuga* was the best. However, the following issues remain for the future.

Multiple Functions. One of the important characteristics of JS *Hyuga* is its multipurpose command functions—for JTF command and humanitarian-assistance/disaster-relief coordination, as well as ASW flotilla operations. Since before its commissioning, some publications in Japan have emphasized *Hyuga*'s potential goodwill function. In fact, however, the ship's "multipurpose" characteristics, which were added onto its original maritime combat capability, refer to its adaptability as a large, carrier-like combatant for a variety of situations. For instance, it is reported that the JSDF Joint Staff Office and other services of the JSDF have requested that additional accommodation for combat vehicles and troops be built in.

In general, the *Hyuga*-class ship is large enough to accomplish most new tasks that are proposed, even now that its specifications have been determined. However, from a force-planning and operational-requirement viewpoint, precise consideration should be given. *Hyuga* is built as part of the eight ships/eight helicopters concept; its fundamental requirement should be developed under that framework—its capabilities as a flotilla flagship, as a platform for extensive ASW helicopter operations, and as an ordinary combatant capable of ASW and self-defense AAW. New tasks proposed by other services that tend to change the *Hyuga*-class DDH from a combat-oriented destroyer variant to a primarily multipurpose ship, that could trade its original war-fighting capabilities for others, should be carefully examined and if necessary declined. An appropriate balance is necessary.

An Aircraft Carrier? Some say: "If the JASDF employs F-35B [the STOVL version of the Lockheed Martin Lightning II, formerly the Joint Strike Fighter] fighters in the future, *Hyuga* and its sisters should operate them and so achieve any capability as a STOVL aircraft carrier, or 'STOVL-CVX.'" That would be justifiably supported in terms of full exploitation of resources on hand. It is natural for any armed force to plan for the maximal use of its existing systems—in this case, STOVL fighters and through-deck HS carriers that are large enough to operate them. This is the true charm of military planning and execution. In any case, such flexibility is necessary for joint missions. If a military organization cannot so operate when necessary, it cannot be said to possess military expertise. Service personnel cannot and should not say no to a mission that is given them—they have to carry it out, fully utilizing all assets currently available.

Having said that, however, it was quite uncertain whether the JASDF would introduce the F-35B at all. As of December 2010, the JASDF has only made requests

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to the United States and other nations in the joint development group for release of F-35 information necessary for future decisions on next-generation fighters. So, it is fair to say that though JASDF would most likely try to introduce the conventional F-35A for its own mission, it still is unclear whether it and the government will ultimately decide to do that. So the dream of JASDF F-35Bs on the Next DDH remains an improbable one.

And after all, *Hyuga* is primarily an antisubmarine combatant, planned under the eight ships/eight ASW helicopters concept. It is essentially different from an aircraft carrier built for strike or air defense. In the future, should Japan, in a changed security environment, need a (light) aircraft carrier within the scope of the nation's constitution, it should build one. Even then, the government and the JMSDF would be obligated to explain thoroughly its necessity to the Japanese people, to gain their full consensus and support. In terms of healthy civilian control, the introduction of a new system or ship of such significance as a (light) aircraft carrier should be accompanied by thorough and public discussion.

Terminology. Recently, an old, and yet new, naval term, *hachi-hachi kantai* (eight/eight fleet), has been widely spreading within the JMSDF and the Japanese media.

The ostensible reason seems to be simply that *hachi* in Japanese means "eight." But this phrase designated a force-planning concept of the Imperial Japanese Navy in the 1910s—the days of sixteen-inch guns, such as those on the battleship *Nagato* and carrier (converted battle cruiser) *Akagi*.[20] This was a period of tonnage and gun-caliber arms races among the major naval powers. This eight/eight fleet concept was to build up a formation of eight battleships and eight battle cruisers as a core of the Combined Fleet. Eventually, the plan was abandoned under the terms of the Washington Naval Treaty of 1922.

But today's basic tactical unit of the JMSDF, while superficially similar in the numbers involved, is based on the JMSDF's operational concept and so is completely different from *hachi-hachi kantai* posture of the Imperial Japanese Navy. Thus the term *hachi-kan hachi-ki taisei*—eight ships/eight helicopters posture—should be used instead. When the author served at sea in the early days of this posture—as a combat systems officer on board a brand-new *Hatsuyuki*-class DD (1984–86, as a lieutenant commander) and commanding officer of a ship of the class (as a commander, 1990–91)—the expression *hachi-hachi kantai* was strictly prohibited in the JMSDF—as was thought required by a proper understanding of, and respect for, the naval history of Japan.

AN INDISPENSABLE ELEMENT OF SECURITY

The road to *Hyuga* originated in the CVH concept immediately after the foundation of the JMSDF in 1954. It passed the milestone of the first-generation

DDH, then the DDV of the At-Sea Air Defense Posture Study, and the efforts that followed. Finally, fifty-seven years after the foundation of the Japan Maritime Guard, *Hyuga* was realized as a carrier-like helicopter destroyer. Since its commissioning, expectations for *Hyuga* have been increasing inside and outside of the JMSDF. Also, criticism of Japan's possession of an "aircraft carrier" has been made by several surrounding nations. Yes, it is true that this ship has a through-deck and is the largest combatant in the JMSDF's history, but it still is a helicopter destroyer, planned and built under the long-standing operational concept of the JMSDF, and it is not almighty. *Hyuga* is not, for reasons described in this article, a carrier in a traditional sense.

Also, the seemingly stubborn, even inflexible, nature of force building in the JMSDF might be questioned. Is the ASW-oriented rationale that the JMSDF has so long maintained still good enough? Does it meet today's complicated security environment and its diverse and challenging missions? My answer is yes. Except for power projection and strike, which require specialized assets (such as U.S. Navy–style CSGs or amphibious forces), antisubmarine warfare is the most sophisticated and difficult kind of maritime operation. Any navy or maritime force capable of ASW as its primary mission is necessarily able to carry out other missions as well, ranging from traditional at-sea combat to counterpiracy or humanitarian assistance and disaster relief. In other words, a naval force built upon high-end concepts can manage a wider range of missions than can one built upon low-end doctrine. In practice, the JMSDF is able to deal with almost all of the maritime missions, threats, and warfare areas that have emerged during the last two decades. The JMSDF has augmented its capabilities with various new disciplines, such as special operations, cyber warfare, and ballistic-missile defense, beyond the scope of antisubmarine warfare alone.

Over and above all this, the strategic concept of the JMSDF is to maintain a complementary relationship with U.S. naval forces. The current nature of regional submarine forces makes ASW still vital to the security and safety of U.S. naval forces in the area. Even with continuous and uninterrupted effort—operating on a "24/7" basis, in war, contingency, crisis, or peace—we can barely manage to maintain a favorable ASW environment. There is no specific remedy for the submarine threat. As an ally and partner of the United States and its navy, the JMSDF bears a heavy burden in this task, which has been an indispensable element of security of the region and will remain so in the future.

It is important to remember that a characteristic of maritime operations is flexibility. The JMSDF, like many other navies, can organize any type of force for any given mission by combining ships of the most appropriate types. A JMSDF force composed of some optimal combination of ships—perhaps *Hyuga,* the Aegis DDG, other destroyers, an *Oosumi*-class LST, or a *Mashyu*-class fast combat support

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ship—could complete almost any possible mission in any waters on the planet. In *Hyuga* and its sisters the JMSDF has a world-class capability. The key for the future is to make this type truly capable, and to establish an optimal operational posture.

The flood of construction of carrier-like multipurpose ships, like JS *Hyuga,* in the world's navies may cause concern about a new "carrier arms race." However, as we have seen, each navy must formulate, like the Japan Maritime Self-Defense Force, its own strategy and force-planning rationale for this type of ship, taking account of contemporary security circumstances and the tendency toward expanded naval missions. Through-deck multirole ships—not the strike-oriented carriers of several navies—are the most suitable for deepening international coordination and collaboration among navies.

NOTES

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1. The Japan Maritime Guard (JMG) was established in the Japan Coast Guard on 26 April 1952. On 1 July 1954, the JMSDF was inaugurated within the Japan Defense Agency, together with the ground and air self-defense forces. *Boei Hakushyo* [Defense Whitepaper: Defense of Japan], English-language version (Tokyo: Ministry of Defense of Japan, 2008), pp. 542–43.

2. The new constitution of Japan, which replaced the Meiji constitution, came into effect on 3 May 1947 in occupied Japan. Article 9 prohibits Japan from having armed forces: "Aspiring sincerely to an international peace based on justice and order, the Japanese people forever renounce war as a sovereign right of the nation and the threat or use of force as means of settling international disputes.

   "In order to accomplish the aim of the preceding paragraph, land, sea and air forces, as well as other war potential, will never be maintained. The right of belligerency of the state will not be recognized." Available at www.kantei.go.jp/.

   The government's interpretation of article 9 is that the constitution bans "wars of aggression," not "wars of self-defense." Accordingly, the JSDF—designed to act only in the defense of the nation if it is attacked—is purely a constitutional entity; collective view of the Hatoyama cabinet, submitted 22 December 1954, reprinted in *Boei Handbook of 2009* [Handbook for Defense 2009] (Tokyo: Asagumo Shinbunshya, 2009), chap. 12, "Position of Government of Japan on Defense of Japan," p. 604.

3. Ibid., "MTDBP (2001–2005)," document I-1-(4), p. 17.

4. Ibid., pp. 19–50.

5. *Canadian Navy,* www.navy.forces.gc.ca/.

6. The first assignment of the author as a newly commissioned ensign in the JMSDF in 1973 was as main propulsion assistant on board JS *Mochizuki* (DDA 166), which carried two DASH aircraft. One of the ship's DASH officers called himself an "ace" because he crashed three of them in accidents during his tour (apparently considering three friendly drones in exercises equivalent to the five enemy aircraft destroyed in combat traditionally required for that honorific). This gives a good indication of the poor reliability of the system in those days.

7. Hiroshi Nagata, "Kaijojieitai DDH unyokoso no hensen" [History of the DDH Operational Concept in the JMSDF], in *Sekai no Kansen*

[Ships of the World] (Tokyo: Kaijin-shya, July 2001), pp. 69–71.

8. Ibid., pp. 71–72.
9. See Yoji Koda, "Jieikan no Genyu Seiryoku to Shyorai Tenbo" [The Present and Future of JMSDF Ships], in *Sekai no Kansen* (January 2009), p. 125.
10. Ibid., pp. 125–26.
11. *Boei Hakushyo* [Defense Whitepaper: Defense of Japan] (Tokyo: Ministry of Defense, 1987), p. 193.
12. *Yomiuri Shinbun,* 3 January 1988.
13. The *Asagiri*-class DD (JFY 1985) cost 43 billion yen, the newest Tartar DDG (in 1983) about 69 billion yen. In comparison, the cost of the first Aegis DDG, when requested in JFY 1988, was estimated to be 122 billion yen, 2.8 times that of a conventional destroyer and 1.8 times that of a Tartar DDG—a very expensive project for Japan and the JMSDF.
14. When the JFY 1988 budget was passed by the Diet, a captain responsible for plans, policy, and programs within the JMSDF said (the author, then a commander and an action officer in the Aegis DDG program, recalls this remark as if it were yesterday), "This does not mean our loss. It is our great victory to have been able to secure budget for a first Aegis DDG. The next chance will surely come fifteen years from now when JMSDF will replace our first DDH *Haruna.* A lot will be expected of younger generations who are now from lieutenant to captain."
15. The LSTs of the *Miura* class (2,500 tons fully loaded, three ships) and the smaller *Atsumi* class (1,800 tons, three ships) were designed to a World War II concept and were built in Japan. Their main characteristic was their ability to beach. This capability facilitated loading and unloading of vehicles and personnel, at the cost of extremely slow speed. These ships' design maximum speed was fourteen knots; however, their cruising speed was actually about ten knots, due to their flat bottoms. JMSDF LSTs are officially designated "transport ships."
16. See Koda, "Present and Future of JMSDF Ships," p. 129. The concept of Maritime Operational Transport is to deliver JGSDF reinforcement units to an area where an enemy landing is possible or probable, or where an enemy has already landed but that is still under Japanese control. The point is that the landings would be on Japanese territory, not foreign soil. So, in theory, this concept does not involve amphibious assault. The tempo of helicopter transport and the types of helicopters required would be very different from those in an assault amphibious landing.
17. *Boei Handbook of 2009,* p. 128.
18. The author was director general of the Operations and Plans Department in the MSO (having been assigned in January 2001, only a month after the MTDBP was approved). The cabinet decision had fixed only characteristics and numbers, not the ship's design—the through-deck was just one of the JDA's ideas. The government, the JDA, and the MSO agreed that the design would be decided only later, at the time of the budget request. "This irks me!" I told myself; "By all means we will realize the through-deck ship, which has been the long lasting goal of the JMSDF."
19. The authorized personnel strength of flotilla headquarters was calculated on the basis of flotilla operations as a training force in peacetime. In particular, the number of flag watch-standers needed for long-term operations was not considered—only that required for exercises and training evolutions of limited duration. This reality reflected the position and policy of the government until the end of the Cold War—that is, not to deploy the JSDF on any real-world missions other than responses to direct aggression against Japan. With the end of the Cold War, the government reviewed its policy and started deploying forces on various international missions. Even so, due to shrinking budgets and a difficult recruiting environment, only slight increases in flotilla staffs could be managed. To address this gap, the JMSDF decided to form mission-oriented headquarters for each real-world deployment, such as support operations in the northern Indian Ocean/Arabian Gulf and antipiracy off the coast of Somalia. Extra staff members would be added, depending on the given task. Nonetheless, the above-mentioned deployments involved only one or two destroyers and an oiler; the Combat Information Center of a destroyer is adequate for the commander of a force that size. Next DDH is the first ship to

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have a "king size" FIC for full-scale flotilla operations.

20. For a widely read Western account, see David C. Evans and Mark R. Peattie, *Kaigun: Strategy, Tactics, and Technology in the Imperial Japanese Navy, 1887–1941* (Annapolis, Md.: Naval Institute Press, 1997), esp. chap. 6.