Missile Boat Warfare: Israeli Style

By Commodore Eli Rahav, Israeli Navy (Retired)

The victim of the first successful antiship kill, the Israeli Navy responded by building a small but formidable Sa'ar missile boat flotilla of its own. These ships and their missiles proved themselves in the 1973 Arab-Israeli War in numerous engagements—including attacks on shore facilities like the oil storage tanks at Baniyas, Syria (inset).
Following the 1956 Sinait Campaign, the Israelis began to realize that floating a small number of platforms with neither qualitative superiority nor quantitative advantage in the combat zone was not the solution to their navy’s problems. Surface-to-surface missiles did not need as large a ship as conventional guns required. Instead, the navy needed small craft, which could be acquired in adequate numbers within the budget restrictions of the time.

Considering the number of vessels in the enemy fleets, at least a dozen ships were needed. The Israeli Defense Force (IDF) General Staff, however, was not enthusiastic about investing its limited resources in its navy; it was more concerned about the growing land and air threats. So strengthening Israel’s ground and air combat capabilities became the highest defense priority. During the competition for the limited defense resources, there was a tendency to discount the damage that a naval blockade or attacks against Israel might cause.

When the IDF General Staff finally authorized the acquisition of 12 vessels equipped with Gabriel missiles and three new submarines, it stated that the navy’s mission was to secure the coasts of Israel in cooperation with the air force.

The Sa’ar-class Missile Boats

Operational Considerations: In determining how to build the Sa’ars for superiority in surface warfare, the navy learned from the development of destroyers at the beginning of the 20th century. The adaptation of the torpedo to small fast boats led to the torpedo boat destroyers carrying two weapon systems: torpedoes to use against larger combatants, and guns to use against torpedo boats. Similarly, the Sa’ar missile ships would be armed with Gabriel missiles to use against Egypt’s Skoryy destroyers, and with automatic guns to use against the Soviets’ missile-carrying Komar boats. The similarity to destroyers ended there—the Sa’ars had no escort duties, and they were to be used only for surface warfare. The operational requirements for the Sa’ars included the following:

- The Sa’ar had to have a combat advantage over any enemy unit she would be likely to meet on a one-to-one basis, particularly the Skoryy destroyers, and the Komar and Osa missile boats.
- The Sa’ar had to be as small as possible, yet still be able to fulfill her functions, so the navy could obtain enough boats for numerical superiority.
- To avoid the risks involved in developing a new prototype, the Sa’ar and her systems would have to be based on the design of existing and proven craft.
- The Israelis had to settle for the current level of development and build the vessels in one production series to save time. There was a potential for conflict in the near future, and having a small advantage over a likely opponent right away was more important than having a larger advantage in the distant future.

Weapon Systems: Gabriel surface-to-surface missiles produced by the Israeli Aircraft Industry were to be the core of the surface fleet’s firepower. Basing the Sa’ar’s primary weapon system on a missile that was in development and required major technical advances was a high-risk venture.

Yet, there was no real alternative to the Gabriel. German and Swedish torpedo boats were equipped with long-range torpedoes, but these were not available to Israel. Originally, the Gabriel was intended for use against large ships, such as destroyers. For the smaller targets, the navy had good experiences with the 40-mm. Bofors gun and had acquired the 40-mm., 70-cal. weapon for the Sa’ar.

Later, the navy decided the Sa’ar needed a more powerful gun, and half of the craft were armed with the 76-mm. automatic Oto Melara gun. The gun’s limited capabilities against aircraft did not matter because the Sa’ar would not be used for escort duties, would refrain from daylight operations in areas where there were hostile aircraft, and would work in cooperation with the shore-based aircraft.

Size: The Israeli Navy had an additional motive for keeping the Sa’ar small, other than the requirement for an economical design which could be acquired in greater numbers. It needed to present the smallest possible target to enemy weapons. The transition from heavy guns to lighter guided missiles dispensed with the need for large warships to absorb recoil stresses. The determinant of the Sa’ar’s size was not the weapons she had to carry, but the sea conditions in the area of operations and distances from the naval bases. Because of the vessel’s essential task of coastal defense, the generally good weather and the distances in the eastern Mediterranean, the craft’s size should be much smaller than the 2,000-ton Z-class destroyers then in use. The Navy had difficulties operating the 50-ton torpedo boats in moderate sea conditions. Therefore, a 200-ton fast patrol boat seemed to be the most suitable platform. The German Navy’s Jaguar was the platform closest to the size the Israeli Navy needed.

Propulsion and Speed: Because the number of Sa’ars was limited, they needed to have high continuous speed in order to be deployed efficiently with short reaction times. Combat tactical situations, such as gunfights with fast patrol boats or the need to use the slightly longer range Gabriel missiles against destroyers carrying 130-mm. guns, called for exceptionally high speeds for short periods.

At the time, the gas turbine was an innovation not yet proven in naval use. The high-speed diesel engines were much better in overall power-to-weight ratio. The Jaguar system of four Motoren and Turbine Union (MTU) motors, each driving its own propeller, produced a continuous speed of 34 knots and a top speed, for short periods, of more than 40 knots.

Crew Size: The crew size was kept to a minimum. The risk of putting 250 men on one platform, as in a destroyer, together with the need to economize and the navy’s limited manpower dictated a crew of 40 men per boat.

Survivability: The assumption that the Sa’ar would not be an eligible target was short lived. The Soviet Styx missile’s much longer range, compared to naval gunfire ranges, made it clear that the Sa’ar would be vulnerable before she could fire her own weapons. Nevertheless, her small size and high maneuverability helped in working out various methods of antimissle countermeasures.

Antisubmarine Warfare (ASW): Although the Sa’ar was

108

Proceedings / March 1986
not designed to execute escort duties, the scheduled retirement of the destroyers threatened to leave the navy without an antisubmarine capability. Therefore, detection equipment was installed on the first six Sa’ars, and, subsequently, they were armed with Mk-44 antisubmarine torpedoes acquired from the United States, which enabled limited action against submarines.

Development and Acquisition: Two guidelines were followed during the Sa’ar project. First, time was short. The Israeli Naval Command was keen to make do with a small technical advantage attainable in a short time. Second was the method of evaluating the risk involved in development of only one or two new systems—putting all the eggs in one basket and then watching the basket very carefully to make sure the eggs don’t break. This practice is the opposite of what good businessmen would do with their capital assets.

The Sa’ar project progressed along two parallel lines. The Gabriel missile and weapon systems were being developed in Israel as the vessels were being constructed in Europe. The weapons were installed and integrated into the Sa’ars in Israel.

The Gabriel Weapon System: The first venture into surface-to-surface missile development began in the 1950s at Rafael (Israel Defense Development Authority). It got as far as shore-to-sea firing tests. Various technical problems then arose, and further development was curtailed. Nevertheless, two electronics engineers—Uri Eben Tov

### Chronology of the Israeli Navy

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>Work begins on surface-to-surface guided weapons at Rafael (Israel Defense Development Authority).</td>
</tr>
<tr>
<td>Jun. 1956</td>
<td>Two Z-class destroyers arrive from Britain.</td>
</tr>
<tr>
<td>31 Oct. 1956</td>
<td>Sinai Campaign—An Egyptian frigate shells Haifa at night and surrenders following battle with Israeli destroyers and aircraft.</td>
</tr>
<tr>
<td>1956</td>
<td>Development begins on the surface-to-surface missile at Rafael.</td>
</tr>
<tr>
<td>May 1959</td>
<td>Destroyers conduct surface-to-surface missile experiments.</td>
</tr>
<tr>
<td>1960</td>
<td>Israel seeks small combatant craft in Europe.</td>
</tr>
<tr>
<td>Mar. 1961</td>
<td>Missile development transfers from Rafael to Israel Aircraft.</td>
</tr>
<tr>
<td>1963</td>
<td>The IDF General Staff authorizes five-year plan providing for the acquisition of 12 Sa’ars and three subs.</td>
</tr>
<tr>
<td>Mar. 1963</td>
<td>Negotiations begin with Lürssen Werft Shipyards (West Germany) to build Sa’ar-class boats.</td>
</tr>
<tr>
<td>1965</td>
<td>The German Government suspends work on Israeli project.</td>
</tr>
<tr>
<td>May 1965</td>
<td>CMN Cherbourg Shipyards (France) signs contract to build six Sa’ars.</td>
</tr>
<tr>
<td>Feb. 1966</td>
<td>CMN signs contract to build an additional six Sa’ars.</td>
</tr>
<tr>
<td>Jul. 1967</td>
<td>The Israeli destroyer Eilat and torpedo boats sink two Egyptian P-6 torpedo boats off the Sinai Coast.</td>
</tr>
<tr>
<td>21 Oct. 1967</td>
<td>Two Egyptian Komars firing Styx missiles sink the Israeli destroyer Eilat.</td>
</tr>
<tr>
<td>22 Oct. 1967</td>
<td>The first Sa’ar from Cherbourg arrives in Haifa.</td>
</tr>
<tr>
<td>26 Jan. 1968</td>
<td>The Israeli submarine Dakar vanishes without a trace on route from Britain to Israel.</td>
</tr>
<tr>
<td>1968</td>
<td>The IDF authorizes construction of six larger Sa’ar ships (Reshef class) to be built in Israel Shipyards Industries (ISI).</td>
</tr>
<tr>
<td>31 Dec. 1968</td>
<td>The French Government widens the scope of its embargo to include five remaining Sa’ars under construction at Cherbourg.</td>
</tr>
<tr>
<td>1 Apr. 1969</td>
<td>A Sa’ar fires Gabriel missile.</td>
</tr>
<tr>
<td>25 Dec. 1969</td>
<td>Israeli spirit the embargoed Sa’ars out of Cherbourg and head for Haifa.</td>
</tr>
<tr>
<td>13 May 1970</td>
<td>A Styx missile fired from an Egyptian Komar patrolling off the Sinai Coast sinks a small Israeli fishing boat.</td>
</tr>
<tr>
<td>17 Feb. 1973</td>
<td>The first Reshef launches, becoming the first combatant produced by ISI.</td>
</tr>
</tbody>
</table>
The Sa’ar-1 configuration, this page, had no missiles, carrying instead two 40-mm. antiaircraft guns; in 1971, the Sa’ar-11, facing page, left, had then-standard armament of two 40-mm. antiaircraft guns and five Gabriel missiles; and the Sa’ar-111 is distinguished by its 76-mm. OTO Melara gun forward and five Gabriel missiles aft.

and Yoav Simon, who had worked on the project at Rafael—decided to continue their work. They moved to the Israel Aircraft Industries (IAI) with their ideas on how to solve the problems that plagued the first models.

IAI’s entry into the weapons development field resulted from a revolutionary decision by the manager of the firm’s light industries department, Hyman Shamir. He was enthusiastic about the challenge and the possibilities for expansion in a new direction. Moshe Kashiti, who became General Manager of the Ministry of Defense, decided to expand development beyond Rafael and encouraged IAI to work on the Gabriel missile project.

IAI incorporated work done for the original model, such as the aerodynamic body, the rocket motor, and the head. A new method was developed for guiding the missile by using radar beams directed at the target or reflected from it. A radio altimeter kept the missile at a preplanned height, governed by its distance from the target. This eliminated the need for vertical guidance.

Although the missile was created exclusively in Israel, the fire control system required cooperation with electronics firms abroad. The Sa’ar’s radar equipment optical director and fire control computer were manufactured abroad. Subsequently, the missile project was organized as a subsidiary of IAI (later named Mabat) to facilitate the move from development to production.

The Gabriel’s planned flight range in the 1950s—to exceed the range of the Skory destroyed vessels’ 130-mm. guns—was 20,000 yards. But the appearance of the Styx missile, with its 25-mile range, created a wide gap favoring the Styx. The Israeli Navy and IAI discussed the possibility of developing a better motor for the Gabriel to close that gap. However, the navy command decided to make do with the already developed shorter firing range, in order to accelerate production of the urgently required missiles.

The first Gabriel system was fitted on the fifth Sa’ar, the Hafifa. On 7 April 1969, the Hafifa conducted successful firing tests.

Construction: The Israeli shipyard industry did not have the capability to build warships at that time. Therefore, a team of naval officers, headed by an experienced torpedo boat commander, was sent to Europe in 1960 to examine the options available and to recommend a suitable craft. The team recommended the German Jaguar, produced by Friedrich Lürssen Werft Shipyards at Bremen-Vegesack. The 40-knot, wooden-hulled boat was armed with 40-mm. guns and torpedoes. The German Navy had had solid experience at sea with this craft. Earlier versions (the E-boats) had served in World War II. The Israeli Navy asked the Federal Republic of Germany for assistance. The concept of the missile boat as a warship capable of striking with missiles and guns and performing antismissle countermeasures was coolly received by the German Defense Ministry.

The Lürssen Shipyard, however, was enthusiastic, and proposed a vessel of steel construction based on the Jaguar but stretched to 45 meters in length. Her four diesel engines would allow for 34 knots continuous speed, with a maximum speed of more than 40 knots. The Israeli Navy examined this combination and discovered that it fulfilled all its operational requirements. In the early stages before construction, however, Arab intelligence became aware of the project and provoked a diplomatic situation that made the German Government halt work.

Seeking alternatives, the Israeli Navy settled on Constr. Mec. de Normandie (CMN) shipyards in Cherbourg, France. The owner, Felix Amiot, was enthusiastic about the project. He reached an agreement with Lürssen, and, in 1965, CMN signed a contract to build six vessels.

The navy planned to build a second series of six boats in Israel, to eliminate the possibility of political restrictions abroad. However, when the Israeli Shipyards Industry (ISI) still had not gained enough expertise to build the vessels, Felix Amiot offered to construct six more vessels at a low cost, ensuring rapid delivery. The offer was impossible to refuse.

In 1965, the Israeli Government decided on an economic policy of recession, which required the IDF to make drastic cuts in its budget. Among the list of sacrifices were four Sa’ars, then on order. If this were to happen, the Israeli Navy would never be able to enjoy local combat supremacy. The navy commander persuaded the IDF to make the necessary cuts in other equipment, production of which had been slowed for technical reasons.

In June 1967, during the Six-Day War, President Charles de Gaulle imposed an embargo on the sale of French weapons to Israel. The Sa’ars, which were unarmed and of German design, were not included in this embargo. The boats were anchored at the French Navy arsenal, however—and formal notification was still needed before departure. The first vessel reached Israel on 25 December 1967, and four more boats departed from France upon completion, during 1968. In December 1968, the IDF mounted a reprisal raid on Beirut Airport in which the navy took part. The French embargo was then widened to include the remaining ships at Cherbourg. At the time, the sixth ship was en route to Israel, and the seventh ship
had been able to put to sea before the embargo was enforced, but five vessels were still in Cherbourg.

Clearly, the already delivered Sa’ars would not yet constitute a credible surface force. Rear Admiral Avraham Botser, the new navy commander, came up with a plan with a legal basis to obtain the remaining five vessels. With the aid of Rear Admiral Mordechai Limon, then head of the Israeli Defense mission in France, the complicated plan was executed on 24 December 1969. The five vessels were spirited from Cherbourg and joined their sisters in Haifa. The French authorities had no legal grounds
to complain, but they nevertheless declared Rear Admiral Limon persona non grata and subsequently punished several officials in their own defense ministry. But Israel had attained its full complement of 12 ships, and work continued to equip them with weapon systems and ready them for combat operations.

The Reshev-class Missile Boats

Following the Six-Day War, the Israeli Navy was called upon to operate in the Red Sea from the Bay of Sharm el Shiekh. The Straits of Bab el Mandeb, an obvious choke point, are 1,000 miles south of Sharm el Sheik. They were considered critically important to Israel’s use of the sea.

The navy was given the tasks of guaranteeing free passage for Israeli ships and of securing the continued flow of oil from the Persian Gulf. These tasks required more ships, and the rough seas required larger vessels. In 1968, General Moshe Dayan, the Minister of Defense, approved the construction of six larger Sa’ars, to be armed with Gabriel missiles and deployed to the Red Sea.

The navy command decided it needed a 340-ton, 52-meter craft, and it again called on Lürssen Werft. The designers used plans they had already made, which lengthened the hull to 58 meters while retaining the same power system. The ship would displace 450 tons, and the speed would be reduction of maximum speed from 40 to 35 knots. This concept had the great advantage of being based on the existing Sa’ars. The first ship would be called Reshev. The idea of converting to gas turbines was suggested, but once again rejected.

The new Sa’ar ship was to be armed with seven Gabriel missiles and two 76-mm. guns. Air defense missiles were needed, but there was no operational system small enough to fit the Reshevs. They had to make do with guns.

Building Warships in Israel: In the wake of the French embargo, the German-designed ships had to be built entirely in Israel by ISI. But the operational experience gained from the Cherbourg-built ships was invaluable in reorganizing and relocating equipment on board the Reshevs. Most of this equipment was manufactured in Israel.

The first of the new series, the Reshev, was launched by Prime Minister Golda Meir on 17 February 1973. The Kidon was the second, launched at the end of August 1973. The pair was made ready for the voyage around the African continent to the Red Sea. But the October 1973 War started before they sailed, and they were instead prepared for combat in the Mediterranean. They became the first ships to score hits in that war deterring Egyptian destroyers from molesting Israeli shipping in the region.

Preparing the Navy for Missile Warfare

Introducing the Sa’ars—small vessels carrying sophisticated weapons—required changes in the concepts and organization of many aspects of naval operations.

Operating integrated weapon systems against fast missile threats requires rapid reaction from the entire crew. Accordingly, the Sa’ars were manned by active-duty ser-

vicemen—as opposed to destroyer and frigate crews, which included reservists. The crews trained continuously, in order to maintain the ability to respond rapidly in combat situations.

As they tested the new Gabriel missiles, the navy was pleased to learn that they could be used against small targets as well as large ones. This had its effect on the combat doctrine developed by the Sa’ar flotilla commanders.

The naval shops and yards were reorganized to provide maintenance and repairs for the Sa’ar’s complex systems. Rigid standards were set to keep the ships in seaworthy condition, ready for combat duties at all times.

In the complex and innovative Sa’ar project, start-up problems were inevitable. Some of them took years to correct, even after the 1973 War. These included:

1. The cylinder heads of the main motors began cracking. Every crack required cooling down the engine and replacing the cracked head—a difficult job requiring several hours work, usually in port. At first, the engineers concluded that the ships were too heavy, and prescribed actions to reduce by half the peacetime load of missiles and ammunition. Some years later, it was found that the cracks were actually caused by the extreme changes in the tem-

Proceedings / March 1986
111
In 1973, the Reshevet-class missile boat came on the scene; she was a bigger, bolder version of the Sa’ar. During the 1973 War, the 450-ton Reshevet were armed with six Gabriel missiles, two 76-mm. guns, and lighter antiaircraft weapons.

perature of the heads, caused by changes in the ships’ speed. The problem was solved after the war, by using steel cylinder heads and changing the ships’ propellers.

> There were difficulties with the 76-mm. automatic gun. Sometimes the ammunition charge was too weak to expel the empty cartridges. When inexperienced technicians attempted to expel cartridges by hand, they sometimes made the situation worse. The trouble was solved by changing the ammunition and improving the gun technicians’ training, and by making some mechanical modifications to the gun itself.

The Israeli Naval Command, located in Haifa for many years, was moved to IDF Headquarters in Tel Aviv at the end of 1972. Here, it was in close contact with the General Staff and with the headquarters of the Israeli Air Force. This relocation enhanced the navy’s influence and forged a new understanding among the commands, which resulted in closer cooperation.

The October 1973 War

The fleet was on alert and ready for action when the Yom Kippur War broke out on 6 October 1973. A large-scale exercise that had taken place on the night of 4-5 October had brought most of the ships to full operational readiness.

Some of the vessels, however, carried only half the design allowance of Gabriel missiles. On the ships, 20-mm. guns had been installed in place of the missiles, to add anti-terrorist firepower. The Israeli Navy’s order of battle included 14 missile ships (12 Sa’ars and two Reshevet). Of these, one was in overhaul and two still had to be equipped with missile systems.

At the first signs of war, the navy assigned two missions to the Sa’ar commanders: first, counter Egyptian operations along the Sinai Coast; second, counter the Syrians in the north. The Commander of the Navy, Rear Admiral Telem, suggested to the Chief of the General Staff to take the offensive at sea and authorize a Sa’ar attack on the Syrian Coast. The Israeli ground forces were on the defensive on both fronts and the General of the Army was willing to take the initiative at sea in order to lessen this frontal pressure. He approved the navy’s assault on Syrian targets. Five Sa’ar ships set out to attack targets along the northern part of the Syrian Coast.

On their way north, about 40 miles from the Syrian port of Latakia, the Sa’ars detected a small radar target, later identified as a P-4-class Syrian torpedo boat on patrol. The P-4 tried to escape, but the Sa’ars destroyed her with gunfire. The chase drew the Sa’ars closer to the Syrian Coast, and another target was detected and identified as an ex-Soviet T-43-class minesweeper, about ten miles from Latakia. But as the Sa’ars closed the T-43, three Syrian Osa boats poised near the coast south of Latakia fired a salvo of Styx missiles. The Sa’ars’ raison d’etre had now been challenged. The first battle outcome would henceforth decide the Israeli Navy’s capability to achieve local supremacy and deter hostile operations.

The training in countermeasures worked well. The Styx missiles did not score one hit. The Sa’ars quickly closed the gap in firing range and began shooting Gabriels. They hit two of the Osas. A third Osa ran aground and was then set on fire by the 76-mm. guns. Gabriels sank the T-43 as well.

This success made the Syrians wary of the Sa’ar force, and their vessels did not venture out of port during the next critical days. On the same night, 6-7 October, the southern task force, consisting of six Sa’ars, encountered several Egyptian vessels that were bombarding Israeli positions in the northern Sinai with rockets. Technical problems arose to make the Gabriel missiles miss their targets. This, combined with difficulties in obtaining a clear picture of the surface conditions, prevented the destruction of the Egyptian force. Nevertheless, an Israeli F-4 Phantom jet, cooperating with the Sa’ars, claimed destruction of one Osa.

The manufacturer’s troubleshooting teams quickly corrected the malfunctions in the weapon systems to make the Sa’ars ready to go to sea again. In the meantime, the Egyptians had seemed to draw false confidence from the initial failure of the Gabriel missiles. They disregarded (or were misled about) the performance in Latakia. Two nights later, on 8-9 October, four Egyptian Osa boats
sorbed from Alexandria to reinforce the detachment at Port Said. They were attacked by six Sa'ar boats. The Egyptians, having the longer range Styx, fired upon detecting the Sa'ars and turned back toward Alexandria at full speed.

The distance to Alexandria was too great for the Osas to evade the much faster Sa'ars. The Osas ran for shore to avoid radar detection, but the Sa'ars closed on their fleeing prey. The first Osa to come within range was hit by four Gabriels from three different Sa'ars. A few minutes later, a second Osa was hit. A third went aground and was destroyed by 76-mm. gunfire. The fourth managed to break radar contact and escape along the coast.

The initial Sa'ar success set the tone for following operations. Open hostilities were too short for the opponents to devise means to counter the Sa'ar's capabilities. They had to return their surface fleets to protected harbors.

The Sa'ars had 15 encounters in the Mediterranean: nine against the Egyptians, and six against the Syrians. The Sa'ars' newly devised antimissile countermeasures were a technical surprise that gave the Egyptians a distinct qualitative advantage. Their limited number, on the other hand, forced the Egyptian command into precise planning, in order to achieve numerical superiority in combat situations. Approximately 50 Styx missiles were fired at the Sa'ars. There were no hits. On the other hand, the Sa'ars fired a similar number of Gabriel missiles. Of the 15 enemy ships claimed sunk, half were lost to Gabriels. After several encounters, however, the opponents began to see the vulnerability in the Sa'ar's shorter range. After firing Styx from the outskirts of their ports, the Arabs would then flee inside for safety. Such tactics seriously curtailed the Sa'ar's capability to hit back and exposed them to fire from shore batteries.

The Sa'ars' gunnery capability was employed differentially than originally had been intended. The Gabriel missile proved effective against the Komars and Osas, and the guns were employed to destroy Gabriel-damaged targets, plus smaller vessels and targets ashore. The Sa'ars also provided gunfire support for ground forces in the Sinai. The Sa'ars also harassed radar installations, surface-to-air missile batteries, and transportation networks. After the Syrians fired Frog missiles on Israeli towns, the Sa'ars destroyed the oil refineries and tank farms at Latakia, Baniyas, and Tartous.

During this conflict, the Sa'ars' limited antisubmarine capabilities were not put to the test. The continuous raids the Sa'ars conducted on shore facilities and installations forced the Egyptians to deploy their impressive submarine force in defensive roles to protect their harbors.

Egypt and Syria proclaimed a war zone at the beginning of the hostilities to impose a blockade on Israel. The Sa'ars, especially the Reshevs, were most important in transferring the naval supremacy gained in the eastern basin of the Mediterranean to the whole area. The surprise opening of hostilities had saved the Israeli Navy from over-extending the deployment of its limited assets to the Red Sea. The Reshevs' presence in the Mediterranean had also contributed to concentration of power in Israel's most important arena. Their missile systems and their two 76-mm. guns made them useful in the initial battles, and their appearance in the center of the Mediterranean made the Egyptians call back a Skory destroyer that had been sent on commerce raiding from the port of Tripoli, Libya. From the information now available about the deliberations of the U.S. authorities at the time, it is certain that—except for the demonstrated Israeli superiority at sea—shipsments of the needed military provisions to Israel might not have been made.

The U.S. Sixth Fleet was capable of fighting its way in, but the Israeli resolution to defend itself on its own would only have been broken, with grave political consequences.

Hindsight

For the victor enjoying laurels, it is almost impossible to sort out the true reasons for his success. It is more possible 13 years after the war and more than 21 years after the Sa'ar's conception.

During the October 1973 War, the reborn Israeli Navy introduced a new concept of naval warfare—the ability to gain local supremacy with small vessels. This development created interest in both large and small countries, which saw its application as a possible solution to their own naval problems. Israeli defense industry products, especially the Gabriel systems, have subsequently been purchased by nations around the world.

The defense industries have become important elements in Israeli naval power. They proved that they could develop, produce, and install complicated systems on missile boats. Israeli research and development teams also enabled the navy to expedite solutions to unforeseen problems during the hostilities and accelerated improvements after the war.

The Sa'ars were, and still are, a specific solution to a typical set of problems. As a small nation burdened with many difficulties, Israel could not afford a conventional navy. Defense authorities had to take calculated risks with unavoidable consequences.

The fact that the Sa'ars were built to give them one-to-one superiority in combat meant that the Sa'ars would specialize in one kind of warfare. Command responsibility involved deploying the Sa'ars, recognizing their capabilities, and refraining from giving them missions that require a different speciality. This consideration permitted the Sa'ars' superiority in missile warfare.

As we enter the second generation in missile warfare, many nations face limited budgetary resources. I believe that the lessons learned in adversity by the Israeli Navy are even more true today.

Commodore Rahav received a bachelor's degree in economics from the Haifa University and was graduated from the U.S. Navy Command College in Newport in 1977. He joined the navy in 1958. He was MB Commander in the 1967 War. He commanded the first Sa'ar vessel with the Gabriel missile on board. During the October 1973 War, Commodore Rahav commanded the squadron of Reshevs-type Sa'ars and later commanded the flotilla of Sa'ar ships. He was Chief of Staff of the Israeli Navy in Lebanon in 1982. Before retiring in 1985, he was an instructor at the Israeli National Defense College. He is currently a senior consultant on naval matters for a privately owned military technology firm.