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# SEA COMBAT

VOL. 1, NO. 4 AUGUST 1978 PDC $2.50

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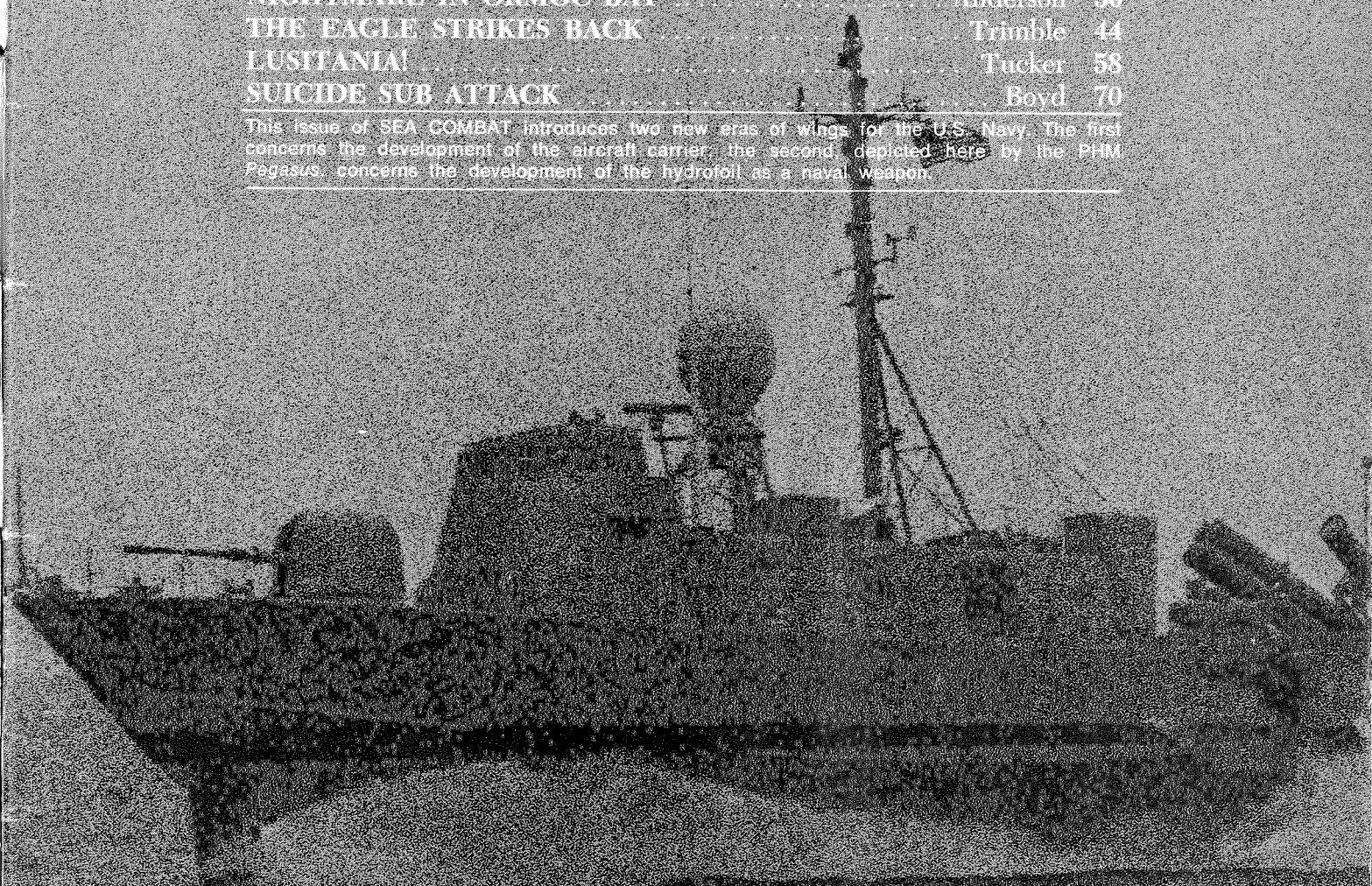
This issue of SEA COMBAT introduces two new eras of wings for the U.S. Navy. The first concerns the development of the aircraft carrier, the second depicted here by the PHM *Pegasus*, concerns the development of the hydrofoil as a naval weapon.

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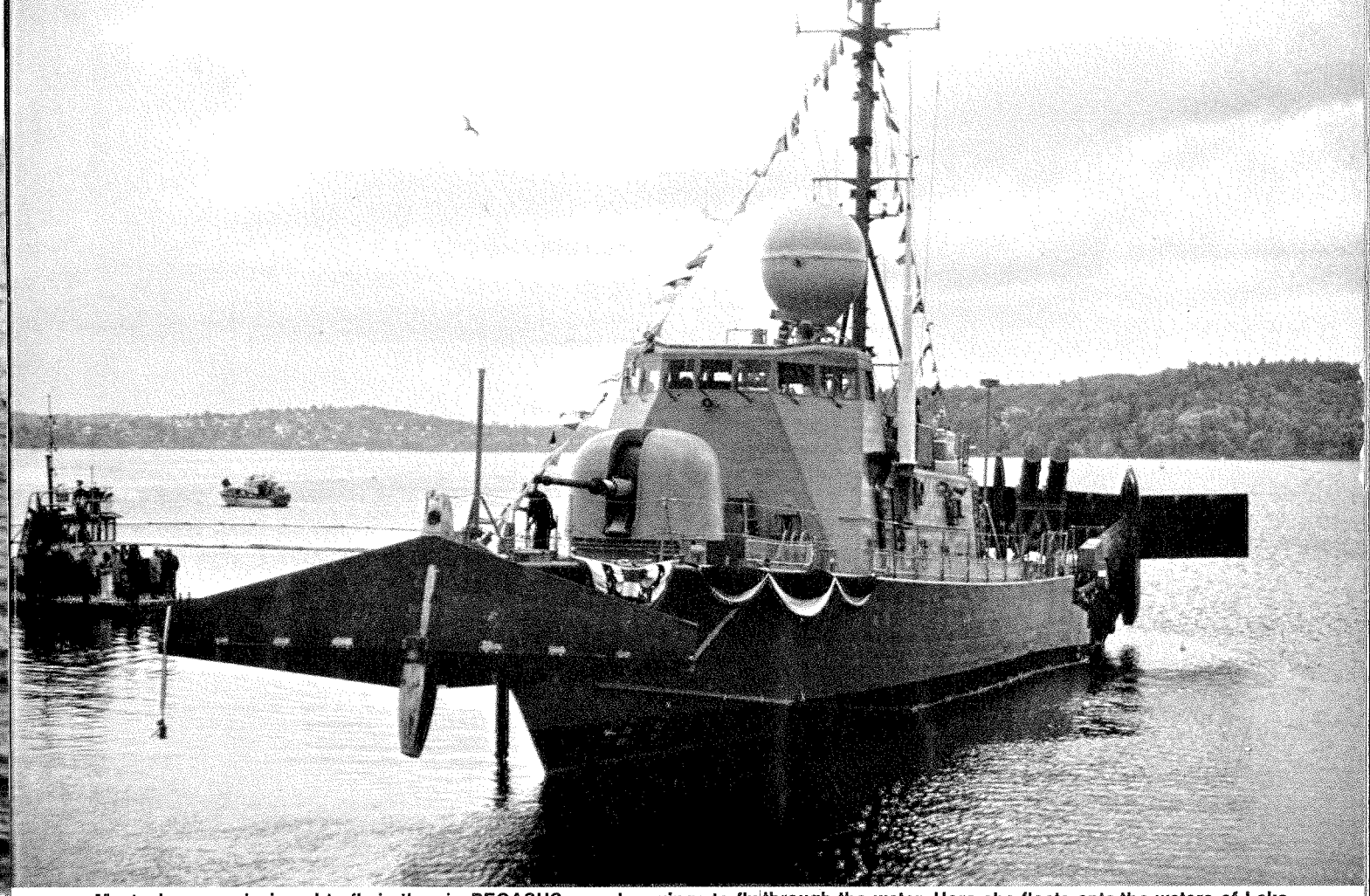
PEGASUS



**Most wings are designed to fly in the air. PEGASUS uses her wings to fly through the water. Here she floats onto the waters of Lake Washington to begin testing her wings.** Photos courtesy U.S. Navy

# USS PEGASUS (PHM-1): Flight Of The Winged Stallion

## This ship literally "flies" through the water on wings of polished stainless steel.

By Scott Day

When Navy Lt. Cmdr. William Erickson welcomes you aboard *USS Pegasus*, you almost expect him to say, "Hope you enjoy your flight."

While tethered to her pier, Erickson's ship hardly resembles an airplane as she bobs gently in the water, her aluminum hull glistening. Then, the piercing whine of her turbine engine shatters an otherwise placid day and PHM-1 is flying above the waves, or "foilborne."

Once outside San Diego Bay, the swift hydrofoil can easily be compared to her mythological namesake—a winged stallion—gracefully gliding across the ocean at speeds of more than 40 knots.

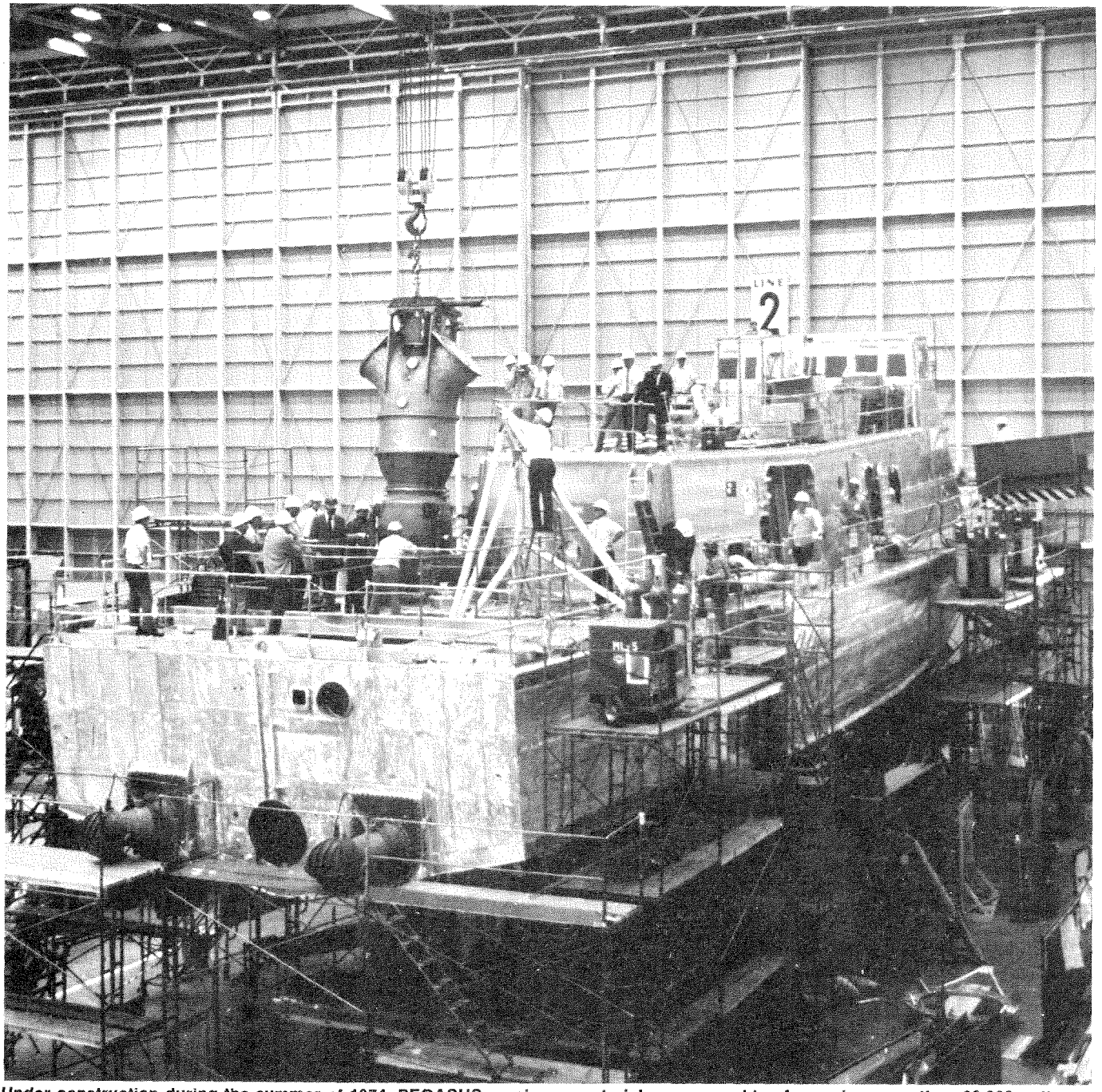
In *Pegasus*' cockpit-style pilot house, Erickson, the ship's commanding officer, describes his ship in terms that pilots can certainly appreciate.

"The principles of *Pegasus*' flight are similar to those of an airplane," he says, "except you're flying through a medium that is rougly 800 times heavier than air, and you don't have as far to come down when you're landing."

Only seven feet separate *Pegasus* from the sea, but comparisons between this hydrofoil and an airplane are inevitable. The latest hydrofoil designed and built by Boeing Aerospace Company, *Pegasus* has a hydraulics system and pumps similar to a 747 jumbo jet. Her gas turbine engine is the one that powers the huge C5A Galaxy military jet transport and the DC-10 commercial jetliner.

As *Pegasus* speeds above the sea, Erickson explains how the foils work. He's an expert at such explanations.

Since 1970, the Naval Academy graduate has been involved in hydrofoil design. He was officer-in-charge of a research and development hydrofoil, the



**Under construction during the summer of 1974, PEGASUS receives a waterjet pump capable of pumping more than 90,000 gallons of water per minute. This pump, powered by a jet turbine, will provide the main propulsion system for the PHM.**

*Plainview*, and was slated to become commanding officer of the second *Pegasus*-class hydrofoil before being assigned to *Pegasus*.

"About 25 knots will actually lift the ship out of the water," explains Erickson. "Since the lifting foils stay completely submerged, an automatic control system is used to maintain foilborne flight.

"This unique system provides trim and altitude control, automatic banking turns, and makes allowances for ocean turbulences."

In an emergency landing, the ship will "land" on her hull within about 200 meters. Hullborne, she is driven by two Mercedes V-8 diesel engines and can travel at speeds reaching about ten knots.

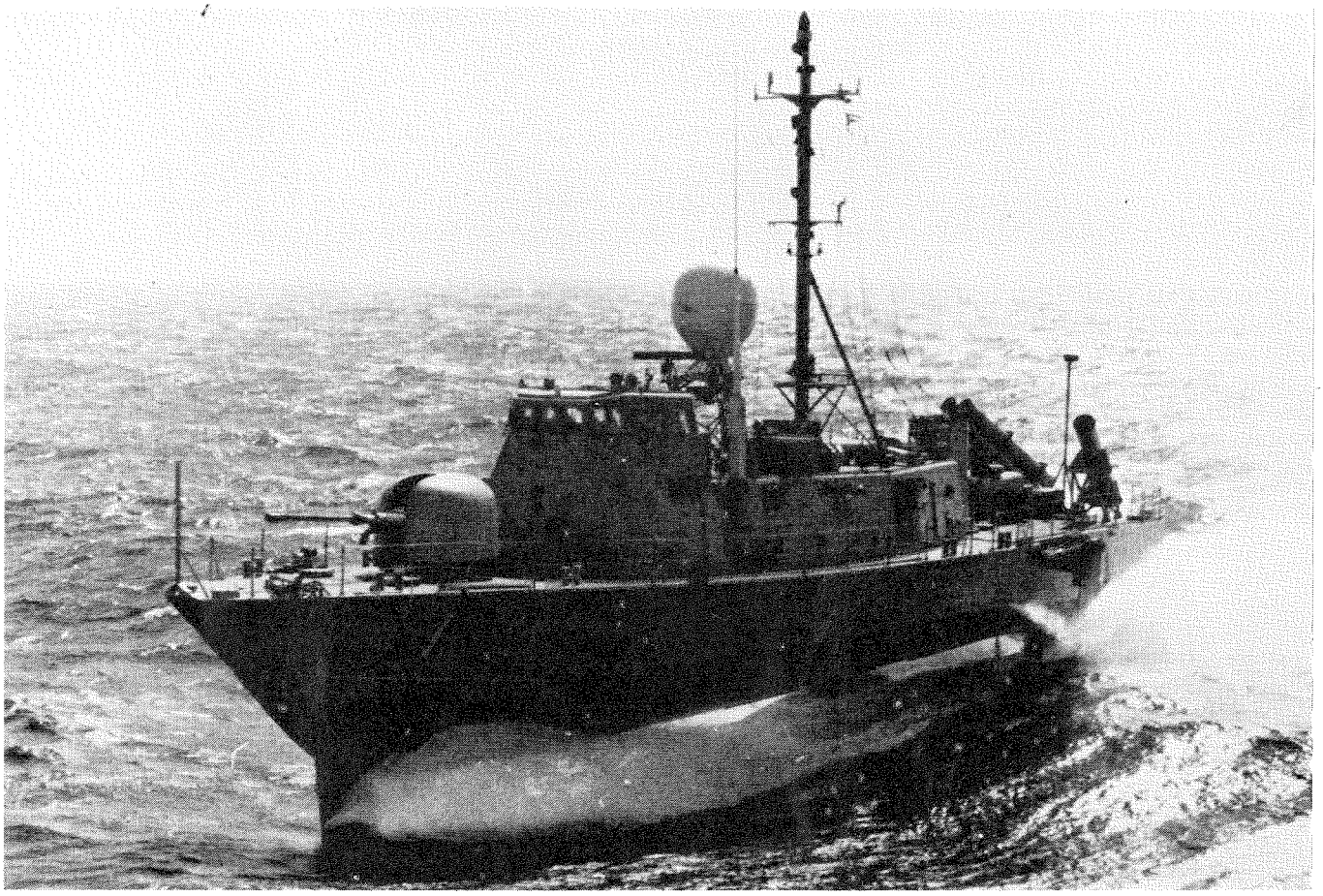
According to Erickson, *Pegasus* is the Navy's first commissioned combat-capable hydrofoil. He says that the ship has the potential of changing the Navy's outlook on surface warfare within the next few years.

Designed to operate in areas like the Mediterranean, Baltic Sea and Sea of Japan, *Pegasus* has two clusters of four Harpoon surface-to-surface missiles and an automatic 76mm gun which can fire at a rate of more than one round a second.

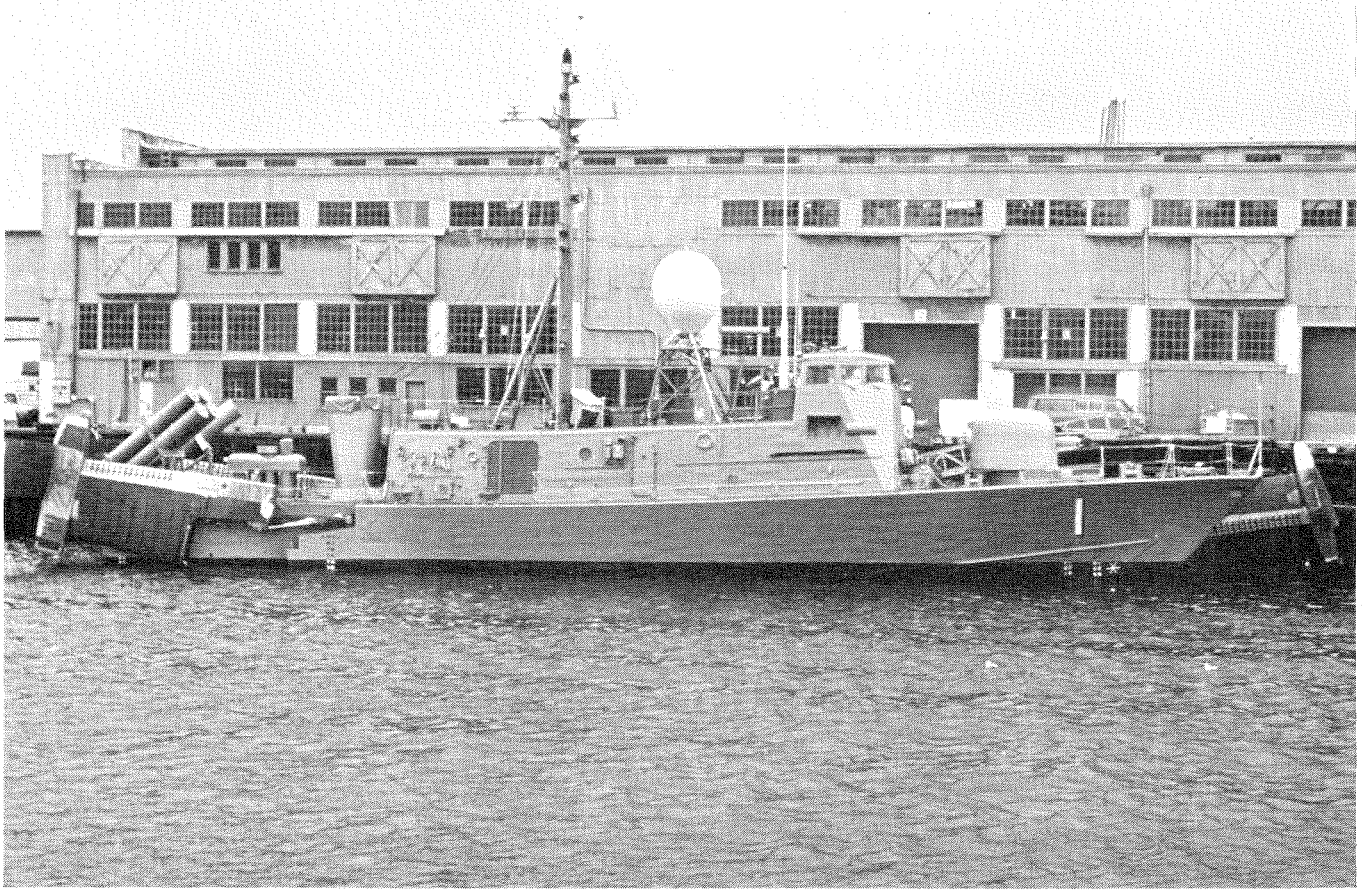
In *Pegasus'* combat information center (CIC)—the ship's main command center—are housed a mini-computer gyro navigational system and a fire control system that can track air and surface targets simultaneously. CIC is also equipped with electronic support equipment which intercepts and classifies electronic emissions, and a television camera system which superimposes a navigational chart over radar and gives the conning officer an exact location of his ship.

Machinery also dominates the lower decks, and an Engineering Operating Station is the pride of *Pegasus'* engineers. From this console, one person can control the ship's fuel systems, DC (direct current) power, generators, fresh water and hydraulic systems, plus the lighting-off, running and securing of *Pegasus'* turbines.

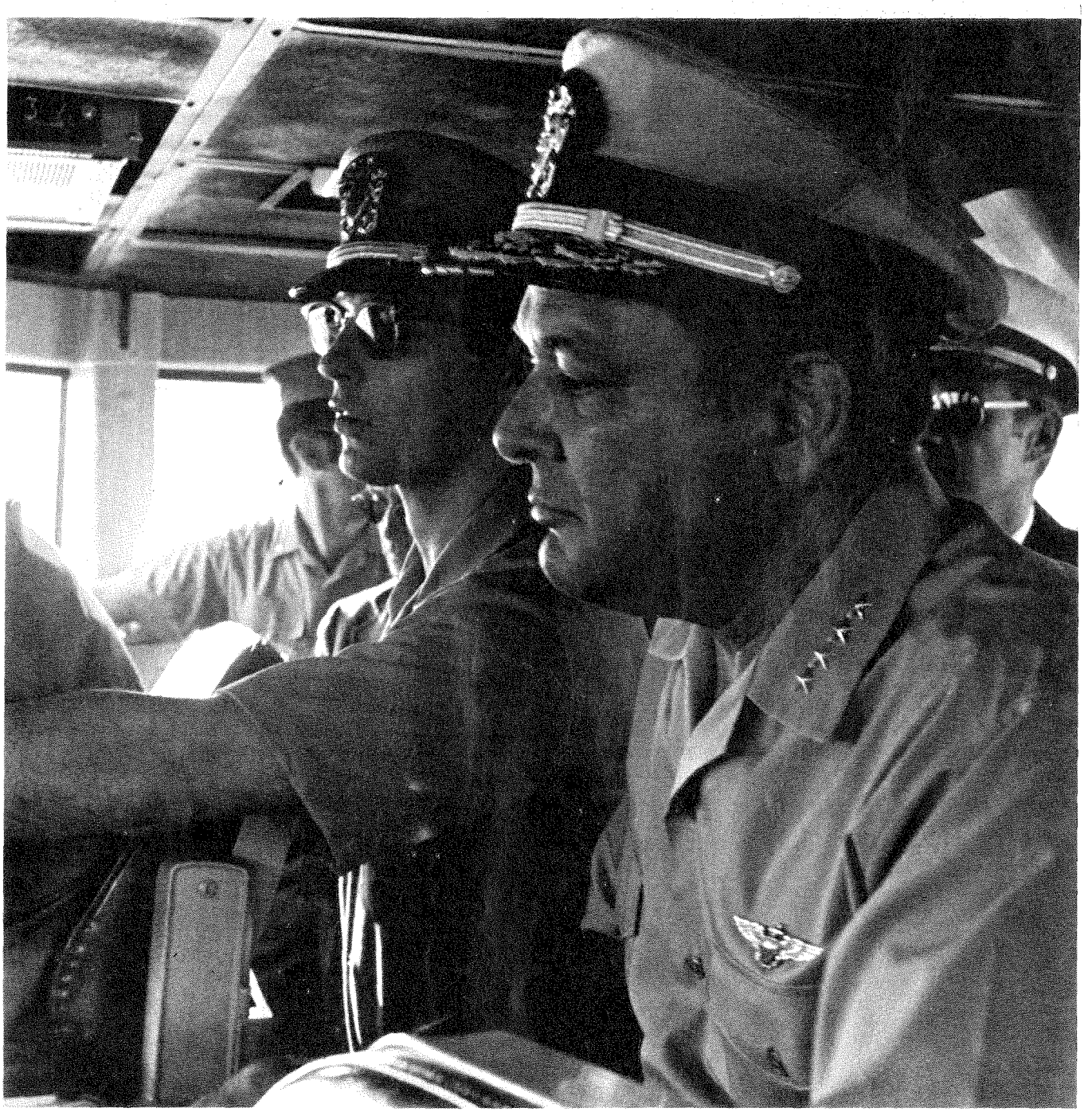
On a ship whose forte is speed, all this equipment has to be lightweight and compact. Thus, creature comforts are a secondary priority on the 131-foot ship.



**PEGASUS demonstrates her stable platform capability during a rough water test off Southern California. During testing, the PEGASUS successfully launched Harpoon missiles while foil-borne at over 40 knots.**



**Waiting for someone to loose her reins, the "flying stallion" rests at Pier 91 in Seattle. The primary steering control in the hullborne mode is provided by stern rudders that are positioned by an electrohydraulic actuator in response to helm position commands.**



**Admiral James Holloway, Chief of Naval Operations, observes the operation of the PEGASUS during a trial run in October 1975.**

Crew's quarters are small, with three to four bunks in each compartment. Passageways are narrow, and the galley has but two tables.

"We're a small ship and much more informal than the larger U.S. Navy ships," Erickson says.

*Pegasus* also has a small but elite crew—four officers and 17 enlisted men. Most of them have gone to specialized vocational and technical Navy schools, as well as completing a 12-week hydrofoil indoctrination course taught by Boeing in Renton, Wash.

Erickson relies heavily on his crew. *Pegasus*' men are similar to a submarine crew. While each *Pegasus* man is a specialist in one field, he can also do the job of another crewman if someone is injured.

"I think the competence of the crew is what makes this ship so successful," Erickson says. "We have three chief petty officers and nine first class petty officers. With a ship as sophisticated as this, you've got to have experience. You can't afford taking people out to sea who don't know about the ship and how it works. Where else can you find a boatswain's mate first class standing officer of the deck watches during a major fleet exercise?

"This crew is becoming more operationally proficient each day. What they do now will set the way for other hydrofoils in the future."

Meanwhile, as *Pegasus* returns to her Naval Air Station, North Island berth, across the bay from San Diego, Erickson smiles at the small boats and Navy ships he hurriedly passes.

"After being out at sea traveling at 40 knots, it's going to be hard to return to routine Navy operations," he says. "It's like being the first kid on the block with a new toy. Everybody wants to see what it can do."

He recalls the time at sea when the captain of a nuclear powered ship sent him this signal: "This is sort of like the tortoise and the hare. Your speed sure is impressive in the short haul, but I feel my engines would take you in the long run."

Erickson's response?

"Yes," he signalled back, "but I'll be back in port for dinner tonight." ⚓

**A PO1 operates the Mark 94 fire control system on board the PEGASUS. The system embodies a combined fire control and search antenna system mounted on a single stabilized platform and enclosed in a fiberglass radome.**

**A Boeing plant towing vehicle positions the PEGASUS for the launching ceremony in Renton, Washington, in November, 1974.**

Full speed, the PEGASUS makes a high speed run at the coast of San Diego. The foil-borne control surfaces are trailing edge flaps on each of the foils, plus the outboard forward strut which acts as the foil-borne rudder.