



Harpoon *Block II*

MCDONNELL DOUGLAS

Tough Decision, Smart Choice

Harpoon

The
Decisions
Are
Tough

On the one hand, a demand for a more effective weapon system. A weapon system that does its job, that's not restricted by the operational environment, that offers a margin of safety to crews and platforms.

On the other hand, a demand for a weapon system that gives you full value for money spent.

And it's not a matter of meeting one demand or the other; you've got to meet both.

The decisions are tough. But there's a smart choice—Block 1 D Harpoon.

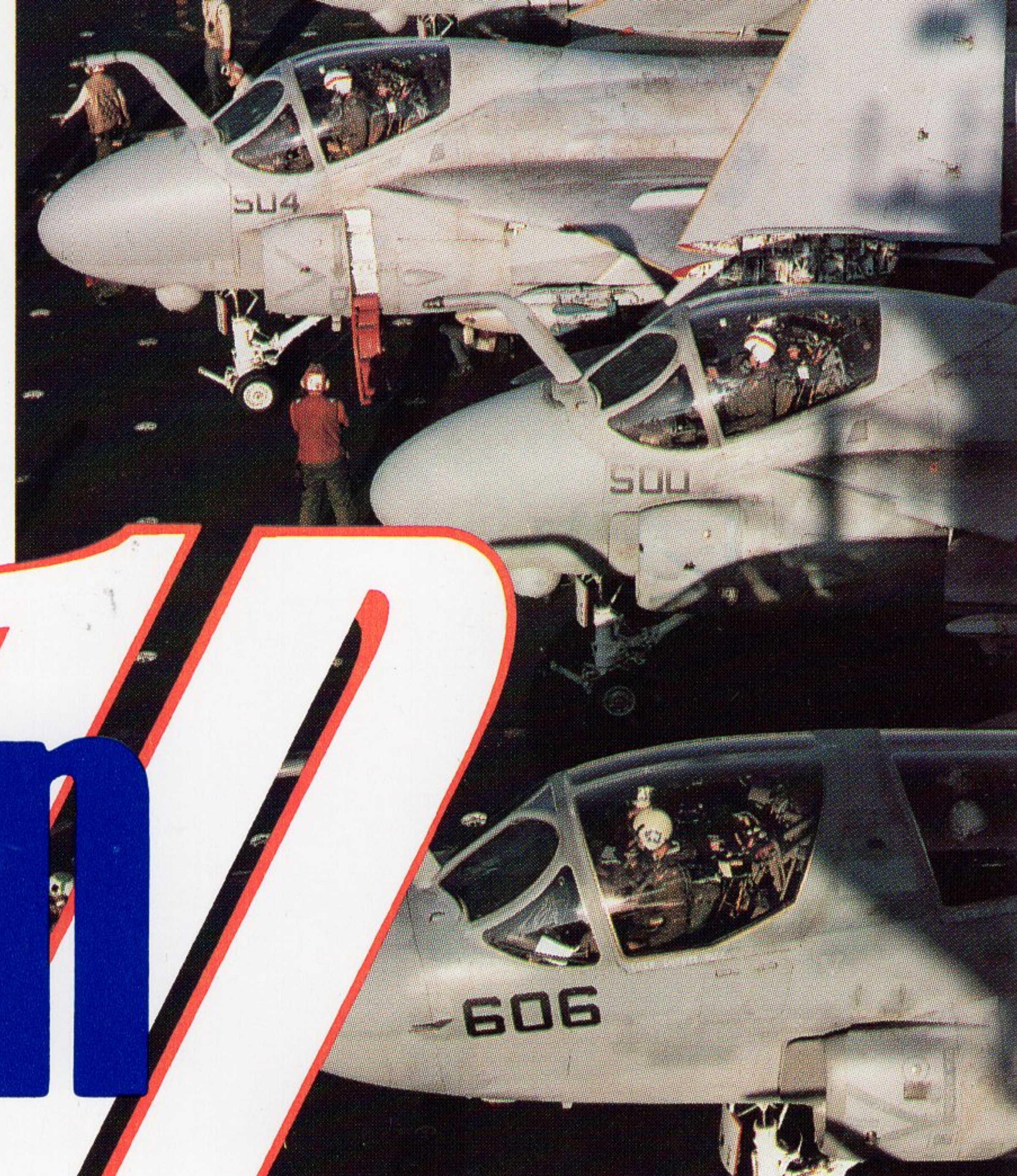
A weapon system that does the job

The Block 1D Harpoon will do the job. It has an active, frequency-agile radar seeker that provides the capability to attack targets in adverse weather and in severe electronic countermeasure environments.

Because Harpoon is an over-the-horizon weapon, platforms can launch the missile with minimum exposure to the enemy's defenses. Programmed before launch, Block 1D Harpoon flies autonomously to the target.

And it has logistic support—the support system necessary to keep Block 1D Harpoon fully operational is in place worldwide.

Block 1D Harpoon is a result of the on-going product improvement program at McDonnell Douglas, a program that ensures Harpoon effectiveness against evolving threats.



A significant step forward

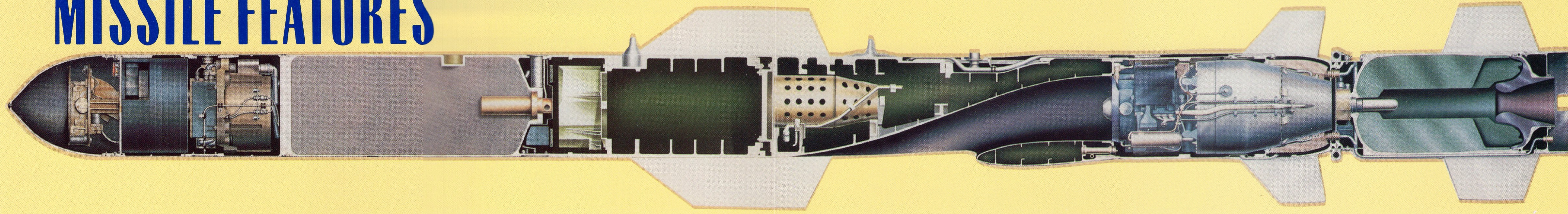
Block 1D Harpoon is a significant step forward in missile weapon systems. Guidance enhancements provide a unique reattack capability, a structural modification provides additional volume for fuel, thus, doubling range. If it does not acquire a target on its first approach, it can reattack.

Block 1D modifications are available via a retrofit kit so existing missiles can be economically modified to have the additional Block 1D capabilities.

What this means to you

- Increased operational flexibility
- Enhanced probability of hitting the target
- An increased margin of safety for launch platforms

MISSILE FEATURES



GUIDANCE SECTION

The guidance system provides all-weather capability and superior performance in electronic warfare environments.

The guidance section consists of a radome, a frequency agile active radar seeker, a three-axis strapdown attitude reference assembly, a general purpose digital computer, and a radar altimeter.

In combat operations, targeting information may be loaded into the missile via the Command and Launch System using radar, sonar, ESM, third party, and periscope inputs. Various missile launch modes and seeker search patterns are available to increase the probability of hitting the target. The terminal trajectory varies with missile configuration, terminal scenario, and launch platform initialization data.

WARHEAD

Because Block 1D Harpoon uses the latest active radar seeker, there are improvements in producibility, maintainability, and performance against electronic countermeasures. Block 1D Harpoon also uses the latest Harpoon/SLAM digital computer with expanded memory and faster processing.

Because the warhead remains intact after hull penetration, the probability of secondary explosions is increased.

The high explosive, blast-type warhead weighs approximately 500 pounds. It includes a penetration casing, a pressure probe, a safety/arming device, and a contact fuze with delay.

CONTROL SECTION

The missile has a simple, effective control section.

The control section supports four control fins, each driven by an electromechanical actuator which provides ± 30 degrees of fin rotation.

Block 1D Harpoon carries more fuel and a battery with twice the life.

A 23.2 inch extension has been added to the sustainer section to carry the additional fuel and a battery with increased capacity. The sustainer utilizes the proven Block 1C Harpoon flush air inlet, sealed tank approach, and a turbojet engine.

The wings have been moved forward to maintain maneuverability and flying characteristics. Both air launch lugs are located on the sustainer section.

A spring-loaded bellows provides initial fuel pressurization, and compressor bleed-air is used for engine operation. The battery, which supplies all missile power, is activated just prior to launch. The turbojet is a single-spool engine with a combined axial/centrifugal compressor to provide 600 pounds of thrust. It weighs about 98 pounds and has a shaft speed of 41,000 rpm. At nominal altitudes, it is started by redundant propellant cartridges and ignitors. The nominal time from the beginning of the starting cycle to maximum thrust at sea level is approximately seven seconds.

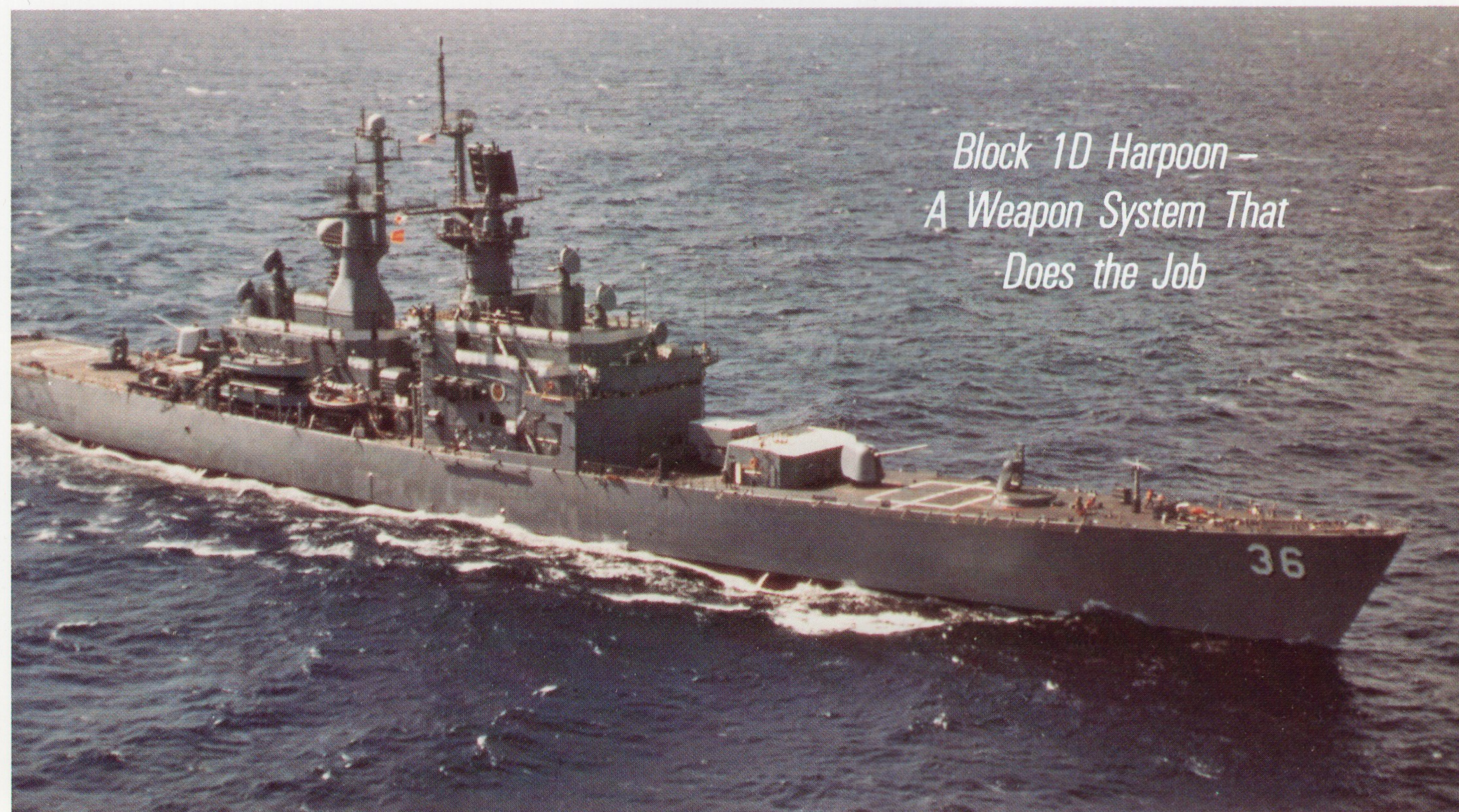
BOOSTER

A solid rocket booster accelerates the missile to cruising velocity from surface platforms.

The booster contains a solid propellant which produces an average thrust of 12,000 pounds for approximately 2.9 seconds. A booster-assisted missile is launched at a medium elevation angle and follows a ballistic trajectory. At approximately three seconds the booster separates; the engine starts automatically; altitude control is established and the missile descends until the flight control system orders pullout. The missile then assumes a cruise altitude and flies at high subsonic speed along the intended flight path.

MISSILE DIMENSIONS & WEIGHTS

Diameter	13.5 in.	(34.3 cm)
Wing Span	36.0 in.	(91.4 cm)
Length		
Air launch	175 in.	(444.5 cm)
Ship launch	206 in.	(523.2 cm)
Weight		
Air launch	1390 lbs.	(631.8 kg)
Ship launch	1757 lbs.	(798.6 kg)



▶ The demands you have to meet are very real.
The decisions you have to make are tough.
Make the smart choice—Block 1D Harpoon.

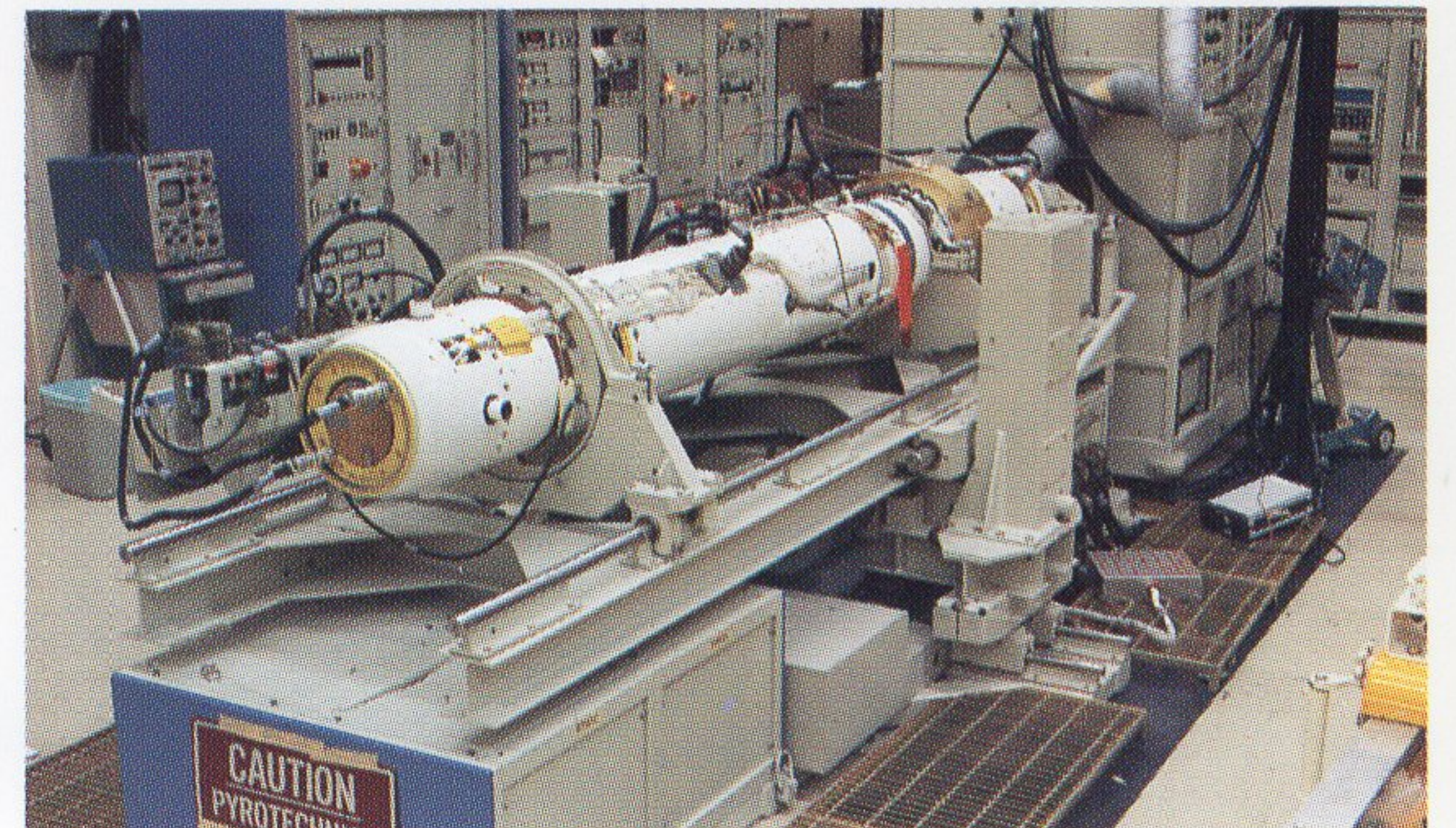
SYSTEM FEATURES

Modified thickwall canisters will accommodate the longer missile body and provide armor protection for the missile.

Large surface ships deploy the missile from thickwall canisters that have been modified to accommodate the longer missile body. The thickwall canister provides armor protection for the missile, which is stowed in the canister with wings and fins folded.

Harpoon Weapon System maintenance and logistics are based on the round-of-ammunition concept.

Initial checkout of the missile is performed at a Naval Weapons Station. Primary support equipment includes the Missile Subsystem Test Set (MSTS) for automated test and fault isolation. Built-In-Test (BIT) is available at operating units to assess status of the missile and command-and-launch subsystems. Except for visual inspections, organization maintenance is limited to the BIT.

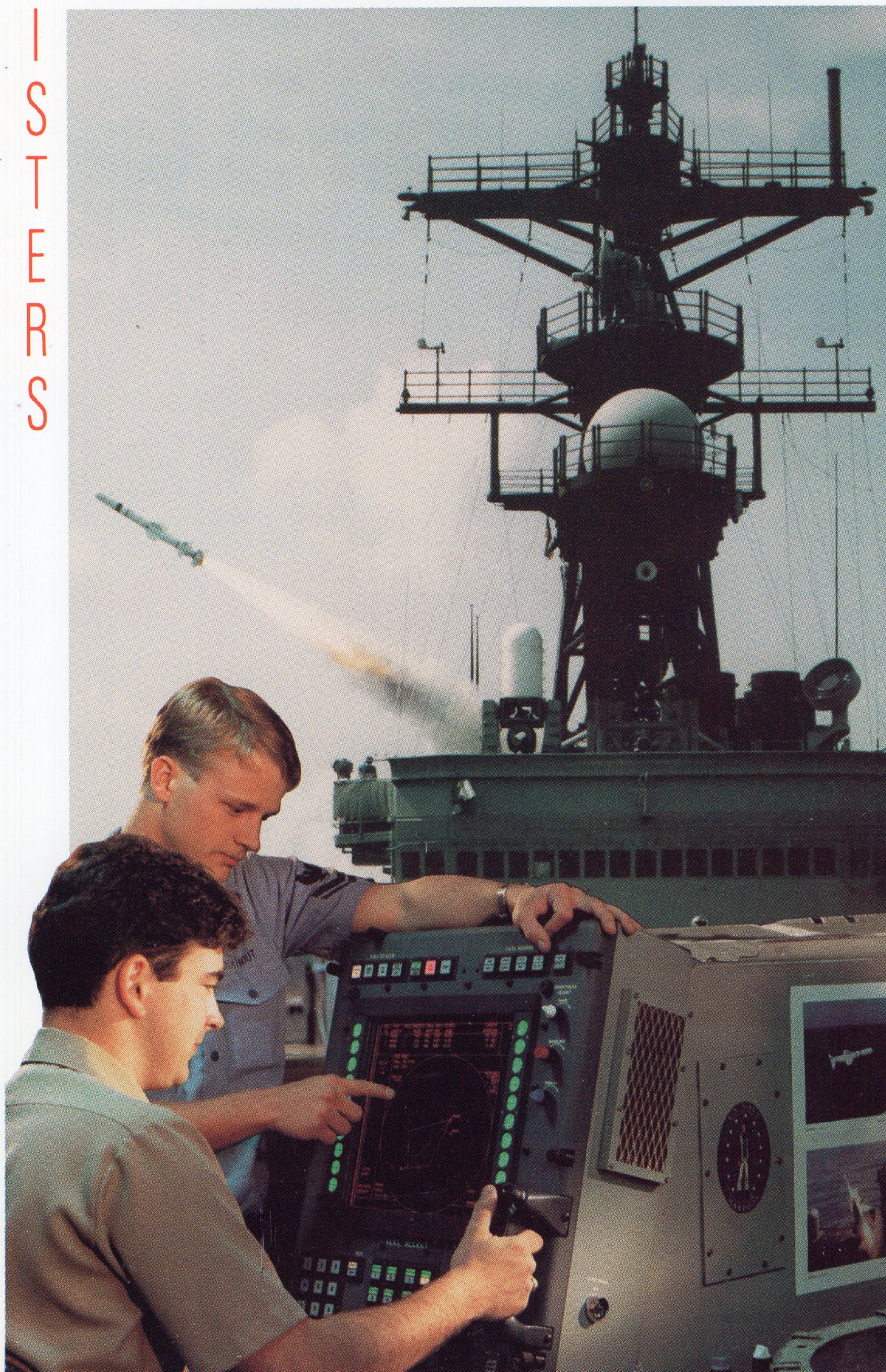


COMMAND & LAUNCH SYSTEMS

Harpoon Command and Launch Systems provide tactical flexibility and optimize performance.

The Harpoon Aircraft Command and Launch System (HACLS) is fully integrated into the existing A-6E Intruder aircraft avionics system. The A-6E mission computer performs launch envelope computations and attitude and targeting calculations. HACLS provides the flexibility to utilize range and bearing targeting data, to select seeker search expansion priorities, and to select the terminal trajectory option for maximum effectiveness. The HACLS gives the aircrew freedom to launch off axis or to execute a waypoint turn in the mission profile.

The Harpoon Ship Command and Launch Control System (HSC LCS), in service worldwide, provides automatic engagement plans and custom features to optimize performance and provides complete utilization of all Block 1D capabilities. Effective graphical presentations are used to facilitate operator participation in executing coordinated salvo engagements. The HSC LCS also provides operational modes to support Harpoon inventory management, operator on-line training, and Built-In-Tests. Interfaces with existing ship systems obtain ship's motion and targeting information and permit integration of Harpoon engagement plans into the ship's fire control system and displays.



SYSTEM SUPPORT

SHIP CANISTERS

Harpoon 10 USA

PLATFORMS

Aircraft

INITIAL DEPLOYMENT:

A-6 Attack

POTENTIAL PLATFORMS:

P-3 ASW Patrol

S-3 ASW Patrol

F/A-18 Attack

B-52 Bomber

P-7 LRAACA

Ships

INITIAL DEPLOYMENT:

DD & DDG Class Destroyers

CG & CGN Class Guided Missile Cruisers

BB Battleships

Submarines

POTENTIAL PLATFORMS:

Classes - SSN 594, 637, 688, 21

Nuclear Attack



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