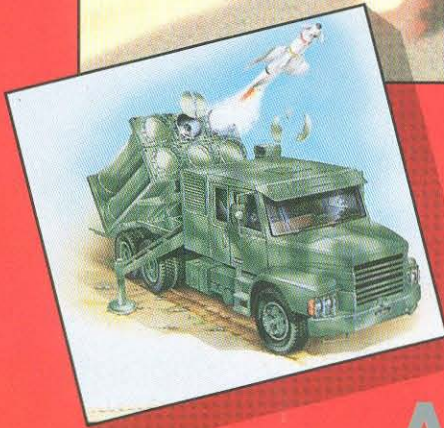
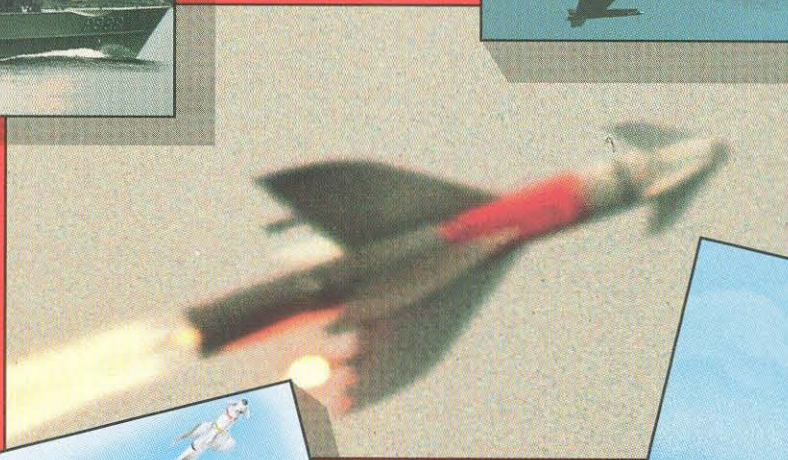


The PENGUIN Anti Ship Missile System



**A Common Missile For
Different Roles**

BACKGROUND

The Penguin anti-ship missile was conceived in the early 1960's as an anti-invasion defence system. It was developed as a joint program by The Royal Norwegian Navy, The Norwegian Defence Research Establishment and

a.s Kongsberg Våpenfabrikk, and became operational in 1972 as the first fire-and-forget anti-ship missile system in the Western world. Since then, continuous development programs have adapted the concept to the technical evolution of surface warfare. The ship-launched Penguin is now operational on several frigates and fast-attack

craft in several navies. The air-launched Penguin AGM-119 has been developed for fighter aircraft, and is chosen as the standard anti-ship missile for the F-16 Fighting Falcons of the Royal Norwegian Air Force. The latest version, Penguin with folding wings, is presently being adapted to the SH-60B Seahawk helicopter of the US Navy LAMPS III program.

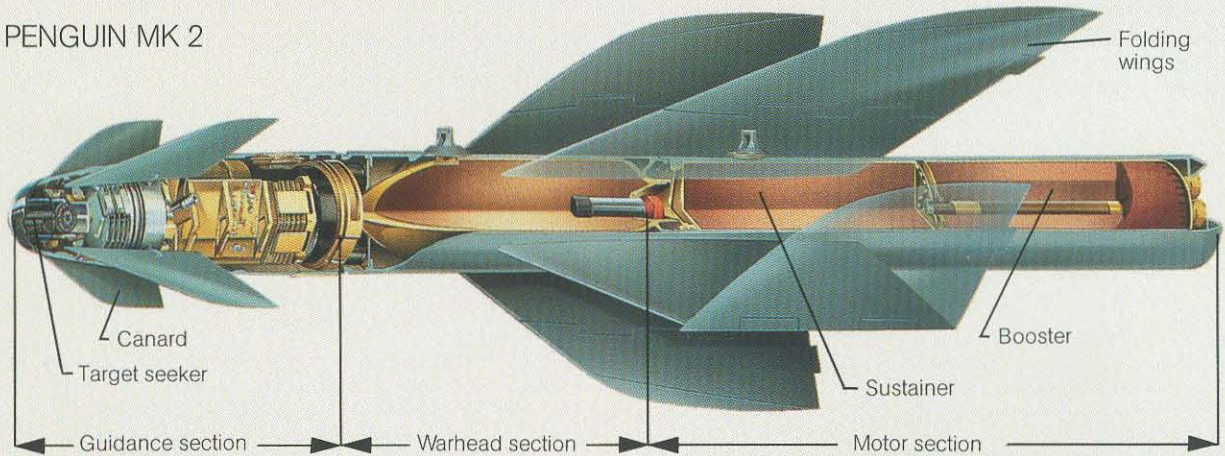
GENERAL DESCRIPTION

Penguin is a sub-sonic missile with canard control. The high resolution, passive infrared seeker provides a high degree of discrimination and target selection, and ensures efficient opera-

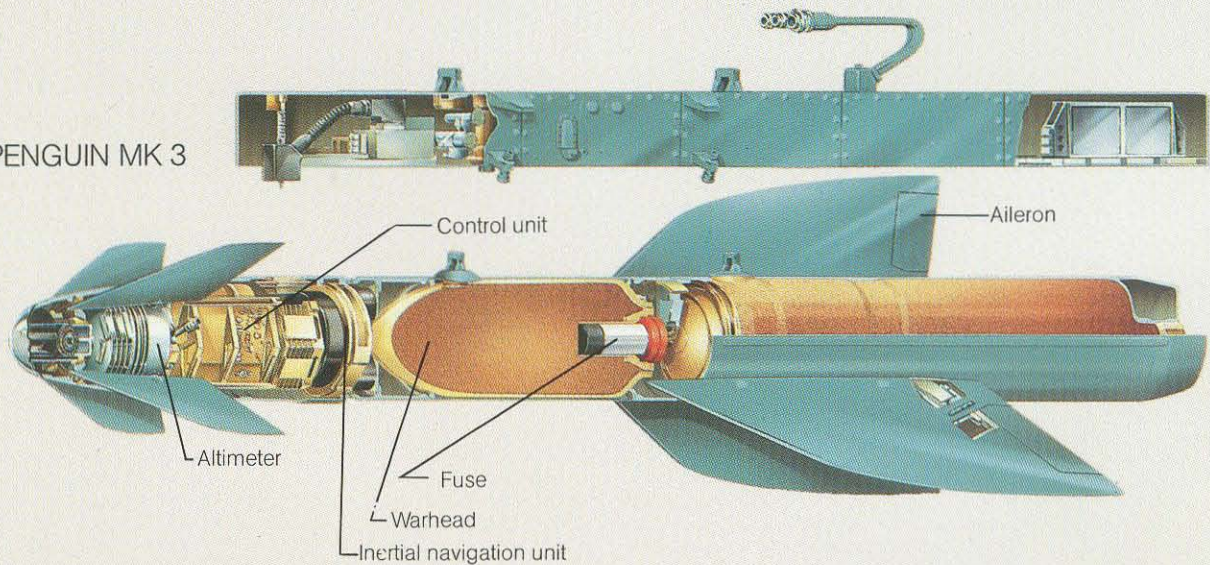
tion in confined, as well as open waters. The high accuracy, inertial navigation system ensures the missile's capability of target selection, and provides the flexibility of midcourse trajectory via operator-designated waypoint. An efficient, 120kg warhead, with an impact point close to the target water-

line, will inflict serious damage to medium-size surface combatants and other potential targets. The missile is powered by a solid-propellant rocket motor, which contains a booster and a sustainer motor, or a sustainer only, when the missile is launched from a fighter aircraft.

PENGUIN MK 2



PENGUIN MK 3

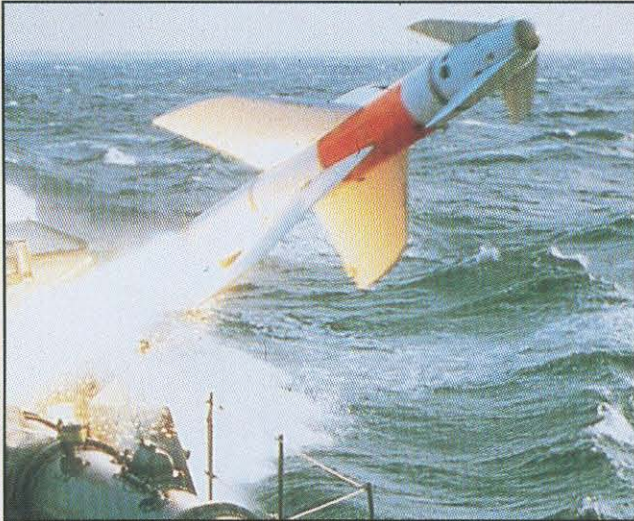


COMMON MISSILE FOR DIFFERENT PLATFORMS

The Penguin missile consists of common guidance and warhead sections, and an interchangeable motor and wing section for the various applica-

tions, which will provide for a common logistics system for all users. With a weight of only 380kg, Penguin can be adapted to most weapon carriers. It's all-digital guidance and control system with an internal data bus, facilitates the integration into all modern fire-control systems.

Penguin can provide a common, efficient, stand-off anti-ship missile for a wide variety of platforms, such as large and small ships, land-based coastal defence systems, patrol aircraft, fighter aircraft and helicopters.



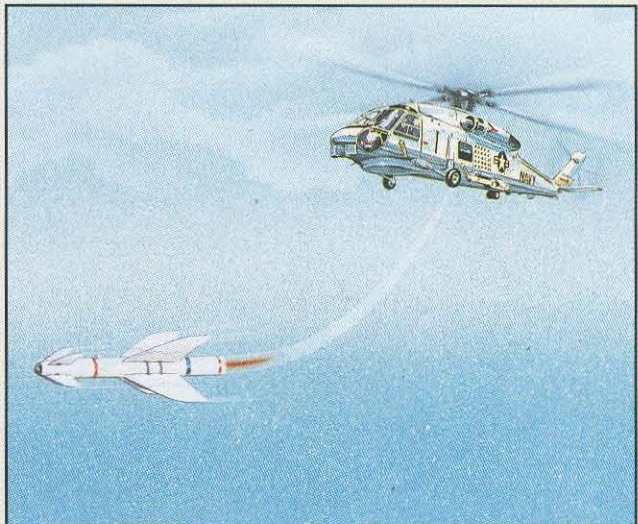
Penguin Anti-Ship Missile



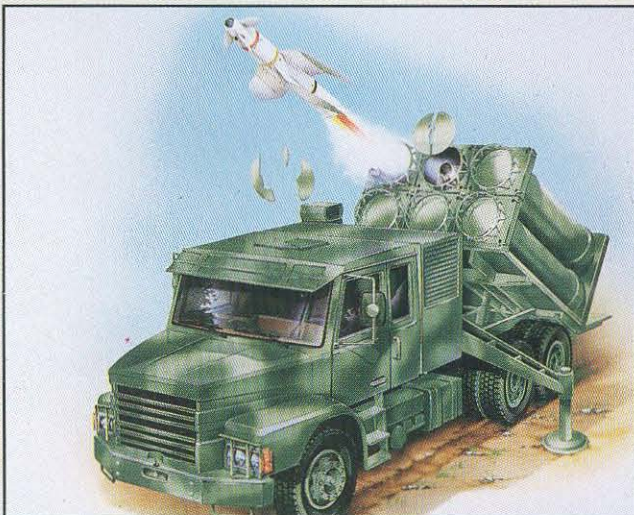
Shipboard Installation



Fighter Aircraft



Helicopter borne



Mobile Coastal Defence



Maritime Aircraft

PENGUIN FOR
 FIXED WING AIRCRAFT



Penguin can be adapted to fixed-wing patrol aircraft as well as fighter aircraft. The Penguin/AGM-119 has been adapted to the F-16 Fighting Falcon. The missile system has been software-integrated into the aircraft avionic system, with the use of existing equipment for control and operation. Target acquisition can be performed with the aircraft radar, or in a completely passive mode of operation with the head-up display.



RADAR ATTACK MODE



The missile, which is ejector-launched from the aircraft, will cruise at altitude varying from sea-skimming to high for terrain clearance when launched over land.

It is capable of approaching the target via a waypoint, which may be designated by the pilot, to avoid obstructions and to attack the enemy in his most vulnerable sectors.

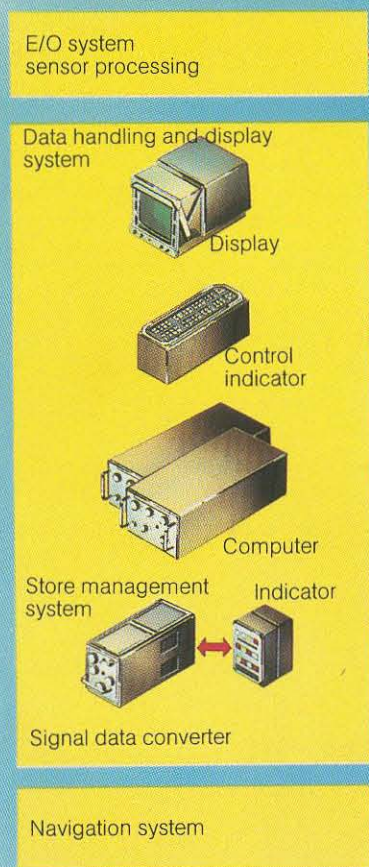
With its range of more than 40km, Penguin will provide fighter/attack aircraft with a most effective and versatile stand-off weapon against surface-ship targets.

PENGUIN FOR HELICOPTER

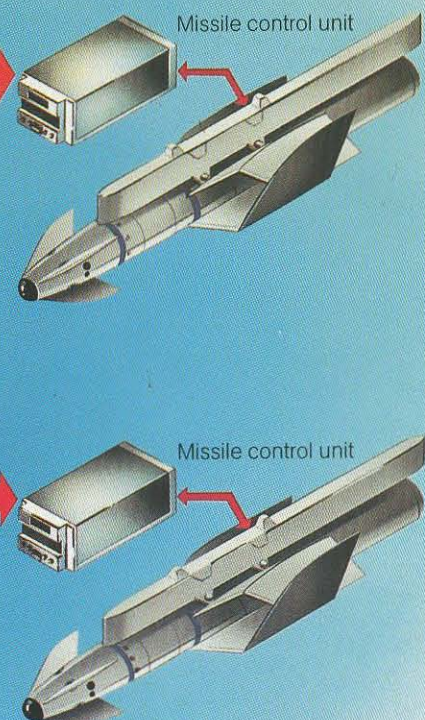


SYSTEM INTEGRATION ON HELICOPTER

HELICOPTER AVIONICS

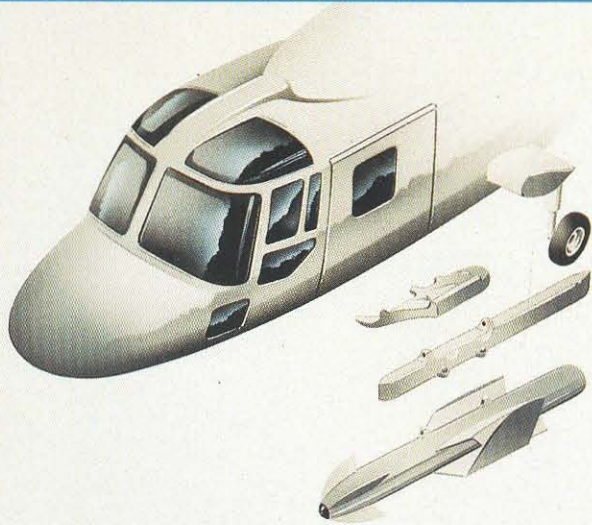
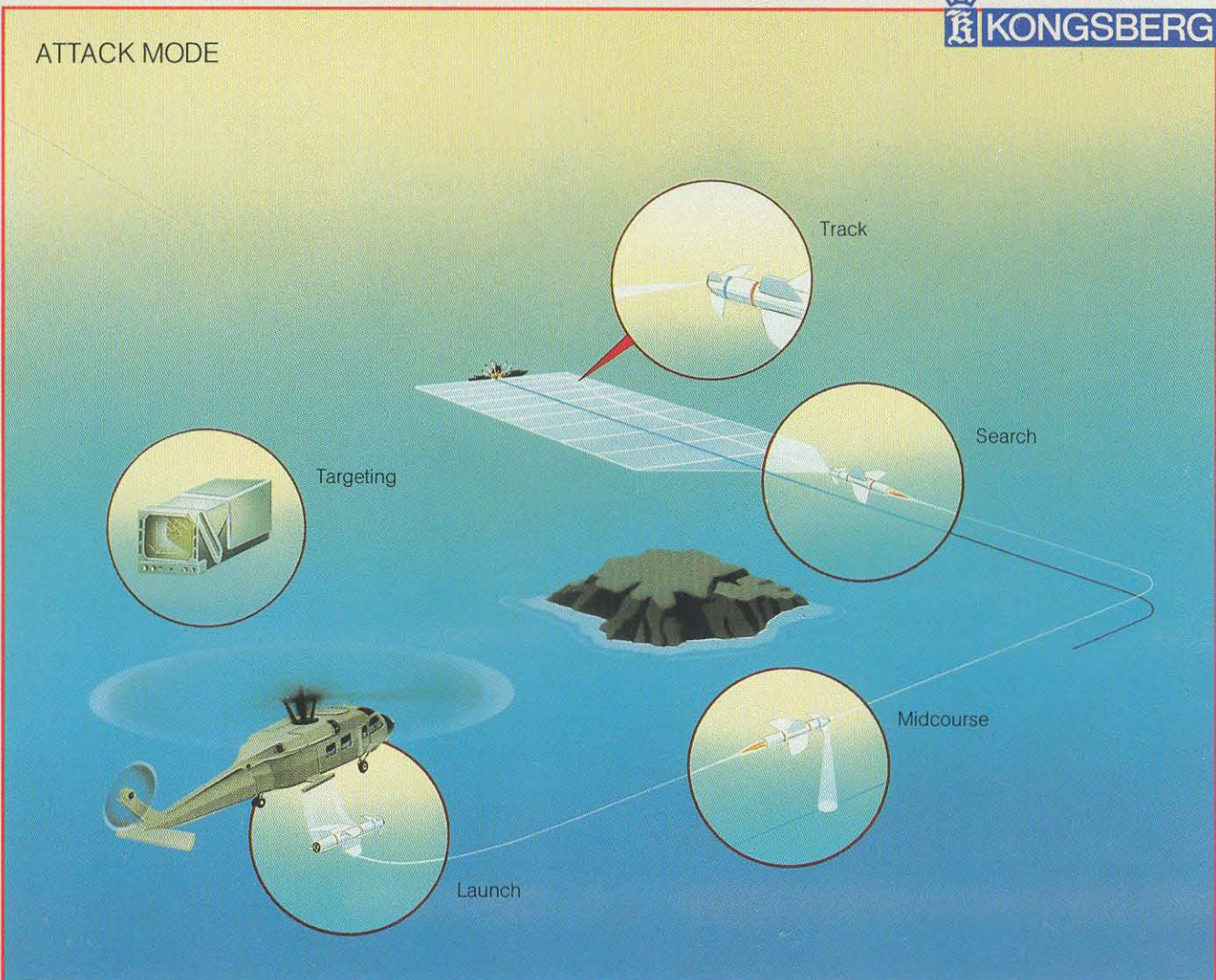


MISSILE SYSTEM



Penguin is presently being adapted to the SH-60B Seahawk of the US Navy LAMPS III program. Penguin is integrated into the helicopter avionic system, utilizing existing equipment for missile control and operation.

ATTACK MODE



As Penguin is a fire-and-forget system, the helicopter exposure time can be reduced to a minimum, with a corresponding reduction in helicopter vulnerability.

The Penguin-equipped helicopter may operate autonomously or in coordinated attack with ship-launched, over-the-horizon missiles for cost-effective suppression of enemy defence systems. Penguin will thus provide the Seahawk and other similar helicopters with an efficient stand-off weapon for the anti-surface vessel role.

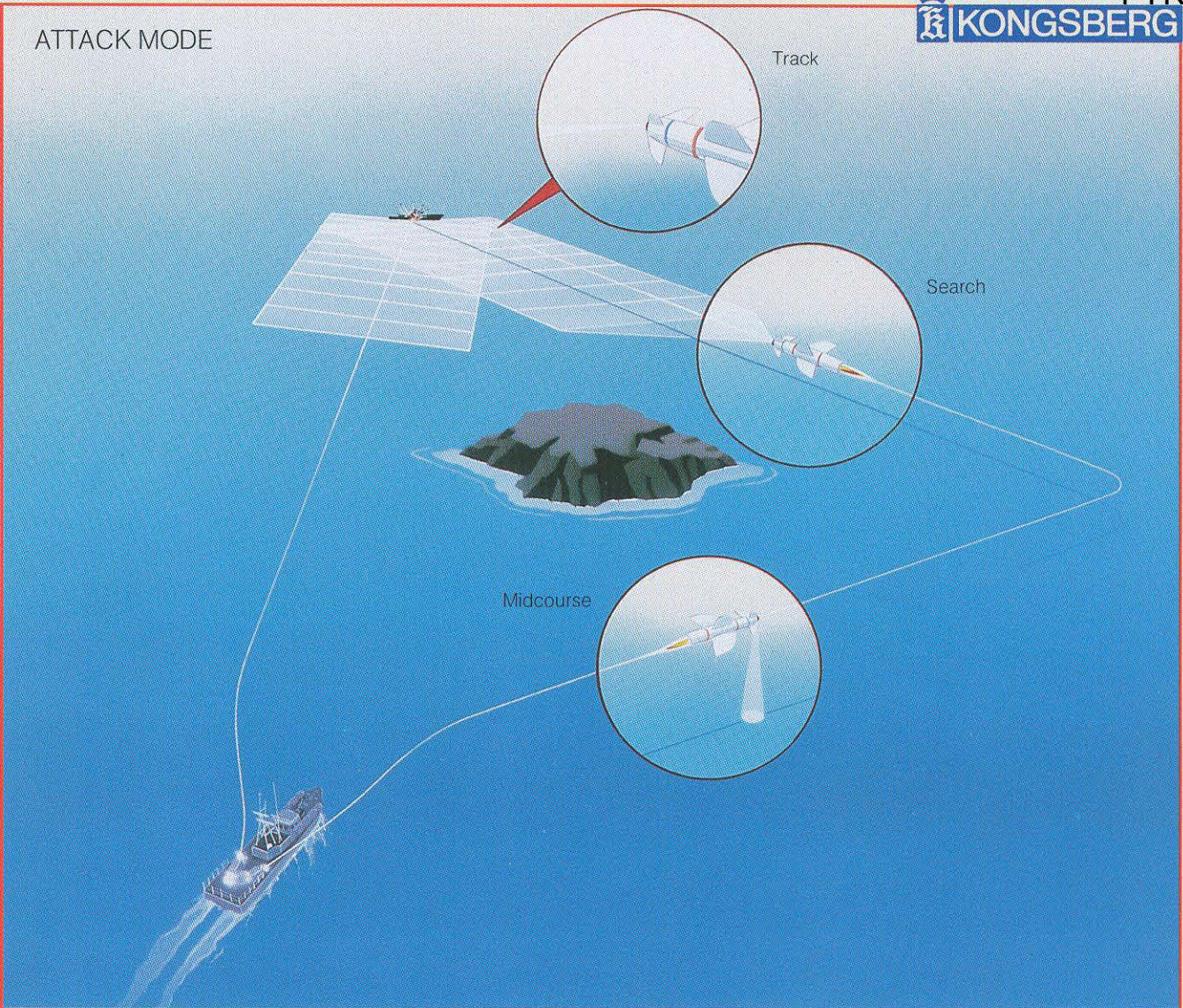
PENGUIN FOR
 SHIPBOARD INSTALLATION



The ship-launched Penguin is now operational on 76 ships in 4 navies. With a maximum range matched to the surface radar coverage of the ship, and with the combination of passive operation and dog-leg maneuvers, Penguin will provide small and medium size ships with an effective, offensive weapon against most surface ship targets.

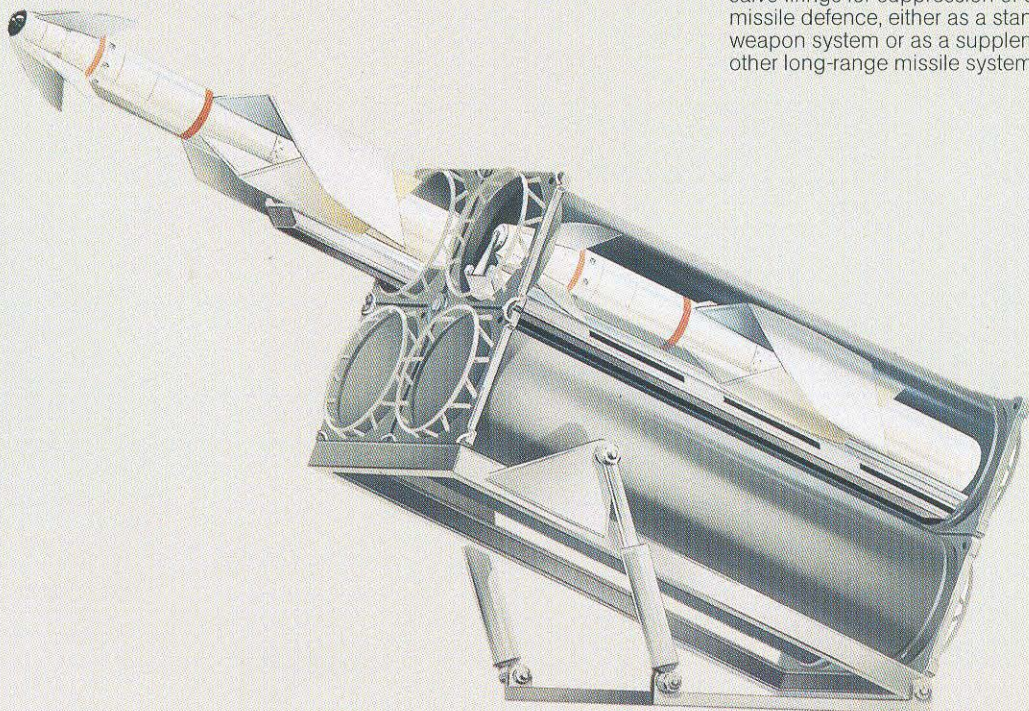


ATTACK MODE



The short reaction time and the very short minimum range of Penguin, also make it suitable as a self-defence missile system for larger high-value ships.

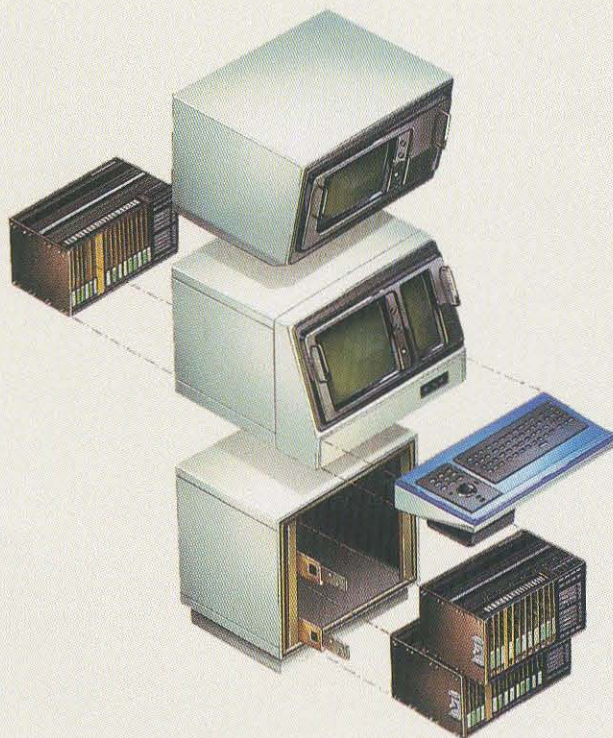
The low weight and low cost of Penguin make it a cost-effective proposition to use a number of Penguin missiles in salvo firings for suppression of enemy missile defence, either as a stand-alone weapon system or as a supplement to other long-range missile systems.



PENGUIN FOR
 COASTAL DEFENCE



FIRE CONTROL



Penguin is adaptable to fixed or mobile coastal defence systems, and can be installed on trucks or tracked vehicles which may be deployed by road or landing craft. A missile battery would typically consist of one truck-mounted firecontrol system and from one to four firing trucks with canister launchers.



The missiles can be launched using data supplied from either the fire-control truck or external sources. Each firing truck can also operate as an autonomous unit, with its own optically derived firing data.

The missiles can be launched from some distance in-land, and set to overfly terrain obstructions, thus making use of the natural terrain screening features.

The



**PENGUIN
TEAM**