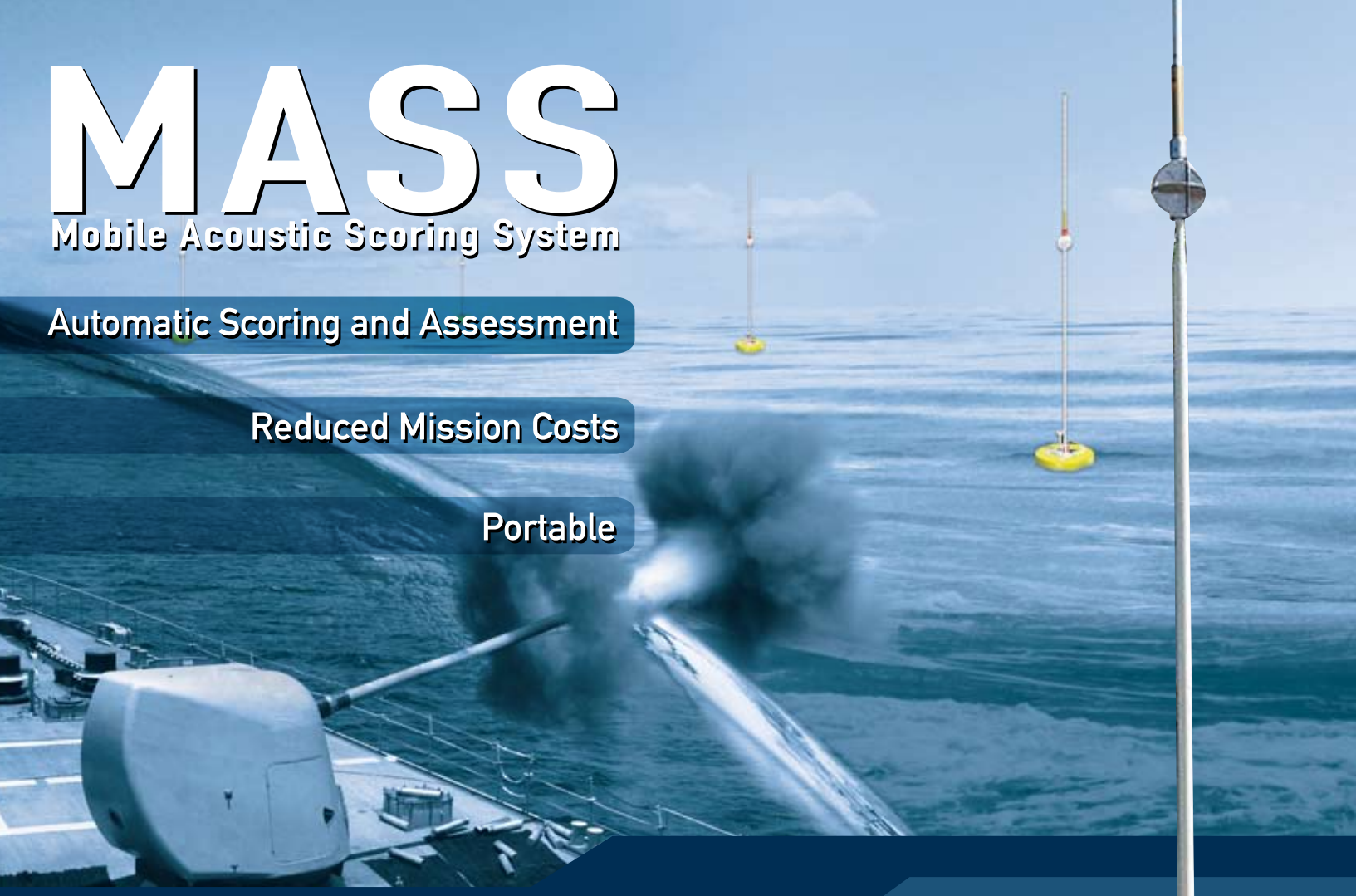
MASS

Mobile Acoustic Scoring System

Automatic Scoring and Assessment

Reduced Mission Costs

Portable



The Mobile Acoustic Scoring System is a waterborne, portable, ship-deployable/recoverable range and training tool. MASS scores and analyzes live-fire surface gunnery exercises, air-to-ground weapons exercises, and other test and evaluation events.

The MASS concept is based on the recognition that a projectile will generate a detectable acoustic event when it impacts water. The characteristics of this type of acoustic event can be detected and accurately located with an in-water array of acoustic sensors and digital signal processing technology.

The MASS system consists of acoustic sensors, which are incorporated into five sensor buoys. When an acoustic event occurs the buoys triangulate the location of the impact. Global-Positioning Satellite (GPS) receivers provide precise positioning data of the buoys and firing platforms. Upon impact detection, the buoys transmit the data to the system controller unit located on the supporting platform. The system controller calculates and displays the projectile's impact location in real-time allowing immediate feedback to the firing platform.

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MASS

MOBILE ACOUSTIC SCORING SYSTEM

System Components

	Vessel base station comprising of standard laptop computer and radio transceiver
	Vessel based radio repeater
	Buoy operating array, typically 5 units
	Each buoy equipped with GPS, radio, hydrophone, radar reflector and flashing warning beacon

Vessel Based Component Specifications

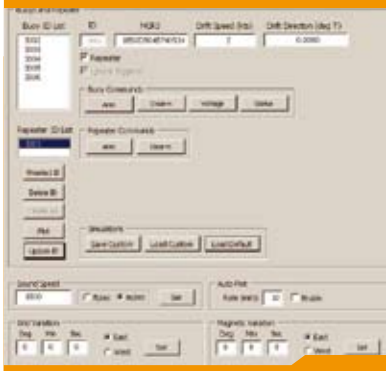
BASE STATION	
Personal Computer	
Size	30 cm X 23 cm X 7 cm
Features	Provides acoustic event location data in numerical and graphical form. Map overlays are optional.
Radio	
Size	23 cm X 10 cm X 5 cm plus 10 cm omni-directional antenna.
Features	900 MHz spread spectrum radio, 1 watt RF power. Powered from vessel, 110/220 V
Repeater	
Size	Approximately 38 cm X 38 cm X 15 cm plus 50 cm omni-directional antenna
Operating Time	48 Hours on internal battery
Weight	Approximately 9 kg
Features	Mast mounted at a minimum of 15 meters height above water for range. Self contained in environmentally sealed enclosure, +12 V rechargeable battery, 900 MHz spread spectrum radio, 1 watt RF power

Buoy System Specifications

RF range	At least 20000 m line of sight, maximum depending on conditions and repeater height, 900 MHz spread spectrum radio, 1 watt RF power
Buoy GPS self location accuracy	Less than 10 m 99% of locations Less than 2 m for 1 standard deviation
Buoy accuracy for reported time of arrival of acoustic event	150 microsec (equivalent to spatial resolution of 23 cm)
Acoustic event detection range	At least 5000m in open ocean (low sea state conditions)
Buoy acoustic projector range	Maximum 2000 m
Active operating time	48 hours with fully charged battery pack
Flotation collar	Diameter: 61 cm, depth 20 cm Materials: ionomer foam; colour: yellow
Hull	Diameter: 15 cm, length 120 cm Materials: stainless steel. Weight: 36 kg
Antenna mast	Diameter: maximum 5 cm. Length: 390 cm Materials: marine grade aluminum and stainless steel. Colour: white Weight: 3.1 kg
Hydrophone	Diameter: 14 cm and suspension cable Length: 6.6 m Materials: piezoelectric ceramic. Colour: black Weight: 10.5 kg in protective cage

BUOY DEPLOYMENT

TEST FIRE



SYSTEM CONTROLLER DISPLAY

BUOY RECOVERY

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