



OE-538/BRC

COMMUNICATION MAST
ANTENNA SYSTEM



ocean systems division

If the communication antennas currently in use aboard your submarine do not satisfy your current or future requirements, you need to consider replacing those antennas with a modern, highly capable Multifunction Mast Antenna (MFM) system from Sippican, Inc. Sippican offers standard MFM antennas and custom variations to meet your specific communications requirements.

The OE-538/BRC Antenna was designed and is manufactured for the U.S. Navy by the Spears Communications Group of Sippican, Inc. It is a high performance, mast-mounted, communication and navigation antenna that is intended for new construction or as a replacement upgrade for antennas on existing submarines. The OE-538/BRC system supports communications in several operating bands which include VLF/LF receive (10kHz to 170kHz), MF/HF Transceive (10kHz to 170kHz), MF/HF Transceive (2MHz to 30MHz), VHF LOS Transceive (30MHz to 174MHz), VHF/UHF LOS Transceive (225MHz to 400MHz), VHF/UHF SATCOM Transceive (240MHz-400MHz), IFF Transpond and GPS receive. The

MF/HF capabilities include both conventional narrowband and broadband modes. When used for satellite communications, the antenna is capable of full duplex UHF DEMAND ASSIGNED MULTIPLE ACCESS (DAMA) communications with the FLTSATCOM, AFSATCOM, UFO AND MILSTAR (LDR) satellites.

The individual antennas of the OE-538/BRC system are housed in a hydrodynamically faired, non-penetrating mast assembly. The system is capable of simultaneous transmission and reception for all functions. The spatial coverage is excellent, allowing communication from low angle, line of sight assets to high and low angle satellite assets. The external mast is an extremely rugged hydrodynamically optimized assembly, allowing use from a submerged submarine operating at high speeds and in severe weather and sea-state conditions. The volume of the erectable mast is smaller than that of competitive units, allowing the impressive communications capabilities to be offered in a compact mast.



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The OE-538/BRC Antenna System comprises five units. Unit 1, the Antenna/Radome Assembly, is a pressure-proof radome that houses all required antenna elements and associated outboard electronics. Unit 5, the Antenna Control Unit (ACU), provides control of the Antenna/Radome Assembly and the RF input/output ports for external receivers and transceivers. Units 2, 3 and 4 provide connectivity between the Antenna/Radome and the ACU.

The Antenna/Radome contains four higher frequency antenna elements (HF/VHF, UHF, IFF and GPS) utilized for the capture and transmit of RF signals. Signals are routed to/from these antenna elements via appropriate matching networks, bandpass filters, and amplifiers. All RF signals are multiplexed onto a single, coaxial RF line by diplex filter units. VLF/LF reception is accommodated via a VLF/LF crossed loop antenna

with integral preamplifiers. The VLF/LF signals appear on a dedicated set of signal lines at the base of the antenna. Operating power, control and status information to and from the antenna radome is routed to and within the radome via separate, dedicated conductors. The RF, VLF/LF and power/control/status signals are routed through a single connector at the base of the Antenna/Radome to the external cable assembly (Unit 2) and then to the hull penetrator (Unit 3). The Junction Box (Unit 4) may be mounted either directly at the hull penetrator or within seven feet of the penetration point. The Junction Box provides for distribution of the VLF/LF and other antenna/radome signals.

Antenna RF signals and control/status signals are routed from the Junction Box to the Antenna Control Unit. The ACU separates the single, RF signal into four separate signals: HF/VHF, UHF, IFF and GPS. It also provides for both local and remote

control of the Antenna/Radome Assembly and for presentation of the system status on front panel system status displays or at a remote location via a control/monitoring port. The remote control presently utilized is an RS-422 port. Alternately, a different bus controller port, such as an RS-232 port, can be implemented if requested.

The Spears Communications Group of Sippican, Inc. has over 25 years of dedicated experience in the field of submarine communications. Our background and experience in the development of antennas and associated couplers in the ELF through UHF range has led to our being recognized as the world leader in submarine antenna systems. This background and experience assures you that Sippican can provide custom variations of their standard MFM systems to meet your specific communication needs and the physical requirements of your submarine and its environment.

ANTENNA SYSTEM PERFORMANCE

POWER HANDLING FUNCTION	BAND OF OPERATION	POLARIZATION	RADIATION PATTERN:		
			AZIMUTH	ELEVATION	CAPACITY
VLF/LF Receive	10kHz-170kHz	Vertical Linear	Crossed Figure-8	Similar to Monopole	Receive Only
HF Transceive	2MHz-30MHz	Vertical Linear	Omni	Similar to Monopole	1KW
VHF Transceive	30MHz-174MHz	Vertical Linear	Omni	Similar to Monopole	100W
UHF LOS Transceive	225MHz-400MHz	Vertical Linear	Omni	Similar to Monopole	200W
UHF SATCOM Transceive (SAFS, FLTSATCOM)	240MHz-400MHz	Circular	Omni	Hemispherical See Note 1	200W
IFF Transpond	980MHz-1120MHz	Vertical Linear	Omni	Similar to Monopole	1KW peak
GPS Receive	1227.6MHz ± 10MHz 1575.42MHz ± 10MHz	Circular	Omni	Hemispherical	Receive Only

Notes:

1. System provides both high angle and low angle modes for SATCOM operation. Elevation pattern is hemispherical in either mode, but gain is optimized at high (30° to 90° elevation) or low (horizon to 30° elevation) angles.

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