

NAVSEA-241-264
Advanced Acoustic Hailing
PEO Ships, PMS 300 Boats & Combatant Craft

Acoustic Hailing Device (AHD) SBIR requirements

Requirements Documents:

Capability Production Document (CPD) for the Acoustic Hailing Device (AHD), Version 2.4, approved 21 December 2009.

Summary: The table below is intended to help development threshold requirements for SBIR effort aimed at improvements to acoustic hailing devices. Current COTS systems do not effectively transmit sound over required engagement range over water. I separated the requirements into Key Parameters and Additional Attributes which corresponds with the Army CPD.

Key Parameters	Key Performance Parameters	Threshold
Resilient/Knowledge Empowered	Force Protection - Voice Transmission	Clearly intelligible 1000 meters over water
Precise	Horizontal Beam Width	The device shall have two modes of operation: Narrow and Wide mode. The narrow mode shall have a 20 degree (+/- 10 degrees of center) beam width and the Wide mode shall have a 40 degree (+/- 20 degrees of center) beam width.
Precise	Vertical Beam Width	The AHD shall have an acoustic beam width in the vertical plane of at least 30 degrees (+/- 15 degrees of center) in both Narrow and Wide modes.
Adaptable/Tailorable	Warning Tones	Clearly audible at 1000 meters over water.

Additional Attributes	Threshold
Universal Adjustable Mounting	Pan / Tilt / Folding / Locking
Tunable / Continuous Averse Sound	Annoying and deterrent sound out to 1,000 meters in open water.
Hard Stops	Left and Right Limit Locks.
Visual Aiming	Integrated Fixed Sight.
Language Translation	Ability to integrate one way voice translation.

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Multimedia	Ability to load and store digital files
Optical Warning, distraction, and Suppression	Optional Mount
High Intensity Light	Optional Mount
Power Supply	The device shall be capable of operating on available shipboard power and have a selectable power supply capable of operating on voltages of 110/120 and 220/240 VAC, 50-60 Hertz, and single phase.
External Constructions	The external surfaces of the AHD shall be resistant to the effects of land and sea operational conditions including temperature extremes, ultraviolet radiation, corrosion, sand and dust IAW MIL-STD-810G.
Weight Ground and Large Water Vessel	<= 70 pounds.
Multiple Platform Integration	Must be compatible with tripod mounting on various Naval vessels.

TABLE VI. Intelligibility criteria for voice communication systems

COMMUNICATION REQUIREMENT	SCORE		
	PB	MRT	AI ¹
Exceptionally high intelligibility; separate syllables understood	90%	97%	0.7
Normal acceptable intelligibility; about 98% of sentences correctly heard; single digits understood	75%	91%	0.5
Minimally acceptable intelligibility; limited standardized phrases understood; about 90% sentences correctly heard (not acceptable for operational equipment)	43%	75%	0.3

¹ The Articulation Index (AI) should not be used to measure intelligibility of synthetic speech because some key acoustic features are not present in non-human "speech." Instead, intelligibility of synthetic speech should be measured using representative panels of talkers and listeners.

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Other Resources:

From MIL-STD-1472F

The information and table below shows criteria for measuring intelligibility. The Articulation Index (AI) is least complicated method used for system performance in the concept and design phase which would be applicable to the SBIR effort. However, you cannot use this test for synthetic speech which might be the case for some of the warning signals.

5.3.14 Speech intelligibility.

5.3.14.1 General. When information concerning the speech intelligibility of a system is required, three recommended methods are available, with the appropriate selection being dependent upon the requirements of the test.

a. The modified rhyme test (MRT) described in ANSI 3.2 should be used to measure the communication performance of most military communication systems. It is easy to administer and requires only a short training time of 1-2 hours.

b. The phonetically balanced (PB) word test should be used when the highest accuracy and sensitivity are required. It is difficult to administer accurately and requires a long training time (typically 20-40 hours) before the responses of the listeners have peaked and are stable.

c. The articulation index (AI) and/or the speech transmission index (STI) are predictive estimators of intelligibility. They should be used to estimate system performance during the concept and design phase but not as a substitute for intelligibility test when system hardware is available.

5.3.14.2 Criteria. The intelligibility criteria shown in Table VI shall be used for voice communication. The efficiency of communications needed and the type material to be transmitted shall determine which of the three communication requirements of Table VI is to be selected.