



***System Integration for Optimal
Sensor Performance
for the
Air Coupled Acoustics Sensors Workshop***

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE 25 AUG 1999		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE System Integration for Optimal Sensor Performance				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Lockheed Martin				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES DARPA, Air-Coupled Acoustic Microsensors Workshop held on August 24 and 25, 1999 in Crystal City, VA., The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Facilities



Lexington MA



BUILDING 1

- **284,000 square feet**
- **20,000 square feet of Clean Rooms**
- **ATCF (AIRS Test & Calibration Facility)**
 - **IR Instruments Calibrated Radiometrically to Better than 3%**
 - **Precision Spectral/Spatial Calibration**



BUILDING 2/3

Sonoelectronics Program



ISSUE

Inexpensive contact and influence mines can deny the US Navy access to littoral Waters.

- Optical Imagers are expensive & seriously degraded by turbidity
- Traditional Sonars lack the resolution to Identify mines & suffer from multipath reflections.
- 80% of the time visibility in coastal areas can be expected to be less than 1 meter
- MCM Operations require covert operation. Optical and Sonar based systems are readily detected by conventional means.



TECHNICAL SOLUTION

An acoustical camera can be made small and low power enough to be hand-held or incorporated into small MCM UUVs.

- 1 to 3 MHz operating frequency provides 1 cm resolution @ 4 m with no propagation beyond 100 m .
- MEMs approaches to high frequency transducers promise 10 to 100X improvements over current technology
- High Density Interconnects enable 16K element arrays
- Acoustical lenses provide parallel beamforming with no electrical power at low cost.

PLANS

Provide Technology Demonstration in 2001 With Diver Hand-Held Camera

- Three to Five MEMS Alternatives
- A Single Imaging System Supports all MEMS
- Three Stages of Capability Demonstrations Maintain The Application Focus
 - '99 - 10 X 10 Capability baseline established
 - '00 - 32 X 64 sub array functionality & progress demo
 - '01 - 128 X 128 imaging system demonstrated

Integrated Sniper Location System I-SLS



Lockheed Martin's I-SLS provides a low cost, high reliability means of detecting and locating hostile gunfire