AXIOMETRIX SOLUTIONS

Axiometrix Solutions Acoustic Applications – Consolidated List

Axiometrix Solutions

APPLICATION NOTE // By Lars Winberg

Axiometrix Solutions Acoustic Applications – Consolidated List

	APPLICATION	Army	Navy	Air Force	Space	General Other
Health & Safety And Speech & Communication	Hearing Protection Testing & Development	✓	✓	✓		✓
	Hearing Aid & Implant Development	✓	✓	✓		
	Military Communication Systems	✓	✓	✓		
	Aviation & Tactical Communications	✓		✓		
	Occupational Noise Monitoring	✓	✓	✓		✓
	Range & Test Facility Monitoring	✓	✓	✓	✓	✓
	Aircrew Hearing & Performance			✓		
Characterization & Optimization of Noise Performance	Blast & Ordnance Characterization	✓	✓	✓		
	Weapon Bay & Ordnance Acoustics	✓	✓	✓		
	Vehicle Acoustic Signatures	✓				
	Unmanned System Noise Optimization	✓	✓	✓		
	Aircraft Acoustic Fatigue Testing			✓	✓	
	Aircraft & Engine Acoustic Characterization			✓	✓	
	In-Flight Acoustic Measurement			✓		
	Launch Vehicle Acoustic Testing				✓	
	Naval Vessel Acoustic Characterization		✓			
Acoustic Detection, Signature & Tracking	Acoustic Source Localization & Identification	✓	✓	✓		
	Acoustic Threat Detection	✓	✓	✓		
General Test & Measurement	Acoustic System Calibration & Verification	✓	✓	✓	✓	✓
	Reference Standards & Field Calibration	✓	✓	✓	✓	✓

Health & Safety / Speech & Communication

APPLICATION	EXPLANATION
Hearing Protection Testing & Development	Evaluation and development of earplugs, earmuffs, and active hearing protection systems. Includes standardized testing using acoustic test fixtures (ATFs) and head-and-torso simulators (KEMAR), measurement of protection against steady-state and impulse noise, and validation for military, industrial, and recreational applications.
Hearing Aid & Implant Developmen	Acoustic testing of hearing aid components and implantable hearing devices using anthropomorphic test fixtures. Validates frequency response, microphone/speaker performance, and compatibility with real-ear conditions.
Military Communication Systems	Testing of military communication equipment including headsets, microphones, speakers, and radio systems. Validates speech intelligibility, background noise suppression, and performance under high-noise operational conditions (aircraft, vehicles, field operations).
Aviation & Tactical Communications	Specialized testing of aircraft communication headsets, tactical headsets for squad-level operations, and dual-function systems providing both hearing protection and communication capability.
Occupational Noise Monitoring	Continuous measurement of noise exposure in operational environments (cockpit, vehicle compartments, engine rooms, submarines). Assesses crew hearing protection adequacy, tracks cumulative exposure, and ensures occupational safety compliance.
Range & Test Facility Monitoring	Real-time acoustic monitoring during weapons testing, aircraft certification, engine tests, and explosive ordnance disposal operations. Ensures personnel safety, validates hearing protection, and characterizes acoustic hazards. Includes acoustic monitoring of high-level test facilities.
Aircrew Hearing & Performance	Assessment of hearing protection effectiveness in flight operations, measurement of noise-induced fatigue effects on crew, and verification of communication intelligibility in cockpit environments.

Characterization & Optimization of Noise Performance

APPLICATION	EXPLANATION
Blast & Ordnance Characterization	Acoustic and pressure measurement of explosions, grenades, artillery, mines, and pyrotechnic devices. Characterizes impulse noise (peak pressure, rise time, frequency content), blast wave propagation, and overpressure effects. Includes confined space explosions where blast effects are magnified.
Weapon Bay & Ordnance Acoustics	Measurement of acoustic environment inside weapons storage bays and characterization of acoustic loading on stored munitions and electronic components. Assesses acoustic fatigue effects on ordnance and fuling systems.
Vehicle Acoustic Signatures	Acoustic measurement of armored vehicle pass-by noise including engine, drivetrain, tracks/suspension, and weapon systems. Used for acoustic signature optimization, threat detection and classification, and vehicle design improvements. Includes both terrestrial and amphibious vehicles.
Unmanned System Noise Optimization	Acoustic measurement and optimization of drone/UAS noise signatures including propeller design, motor noise reduction, and airframe modifications. Balances stealth requirements with operational performance.
Aircraft Acoustic Fatigue Testing	Exposure of aircraft structures and components to high-level acoustic fields to assess fatigue crack initiation and growth. Uses controlled acoustic test facilities to simulate service conditions from engine noise and sonic vibration.
Aircraft & Engine Acoustic Characterization	Comprehensive acoustic measurement of aircraft noise including jet engines, rotorcraft, boundary layer effects, and unmanned aircraft. Characterizes noise sources across frequency range and flight conditions. Critical for stealth optimization, environmental compliance, and noise abatement.
In-Flight Acoustic Measurement	Acoustic measurement aboard aircraft during actual flight operations to characterize in-service noise environment, engine performance acoustics, structural acoustic response, and crew performance in acoustic conditions.
Launch Vehicle Acoustic Testing	High-level acoustic testing of space launch vehicles including engine acoustic characterization, structural acoustic qualification, payload protection validation, and acoustic environment simulation. DFAN testing facilities characterize engine noise and thrust reverser performance.
Naval Vessel Acoustic Characterization	Measurement of naval vessel acoustic signatures including machinery noise, propulsion, hull vibration radiation, and stealth characteristics. Assessment of crew hearing protection needs and occupational safety compliance. Validation of noise reduction and vibration isolation systems.

Acoustic Detection, Signature & Tracking

APPLICATION	EXPLANATION
Acoustic Source Localization & Identification	Use of microphone arrays and advanced techniques (beamforming, holography) to locate and classify acoustic sources. Detects and identifies vehicles, aircraft, weapons platforms, and sniper positions based on acoustic signatures. Critical for surveillance and force protection.
Acoustic Threat Detection	Real-time detection, classification, and localization of military threats (approaching vehicles, gunfire, aircraft, explosions) using distributed acoustic sensor networks. Enables force protection and operational awareness.

General Test & Measurement

APPLICATION	EXPLANATION
Acoustic System Calibration & Verification	Primary calibration of measurement microphones, sound level meters and complete acoustic measurement systems with full traceability to national standards. Includes frequency response validation, sensitivity verification, environmental compensation, and intercomparison testing. Generation of calibration certificates.
Reference Standards & Field Calibration	Provision of portable acoustic calibration standards for field measurement validation, equipment cross-checks, and on-site verification. Ensures consistency of measurement systems in operational environments.

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