CAPABILITIES BROCHURE

Advancing the state of the art in the entire data collection process because better information means better results

SeaLandAire TECHNOLOGIES, INC.

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HISTORY & OBJECTIVE

SeaLandAire Technologies, Inc. was founded in 1997 as an engineering services company with expertise in the development and testing of unattended sensor systems, particularly air deployed sonobuoys for airborne anti-submarine warfare (ASW). SeaLandAire has grown from its original few employees to over fifteen while broadening its expertise to include advanced energy technologies and unmanned sensor platforms such as unattended ground sensors and autonomous vehicles.

SeaLandAire is committed to advancing the current state of the art in the entire data collection process, enabling those in leadership roles to make informed responsible decisions. Whether in industry or the scientific community, we believe better information means better results.

Persistent Ocean Surveillance Station Keeping Buoy (POS-SKB) Deployed in Monterey Bay, CA

LEADERSHIP

We live in a world where reliable, real-time data provides leaders with critical information needed to make decisions. Advancing the state of the art in sensor systems is a critical step in properly addressing the issues that threaten our future, both militarily and environmentally. SeaLandAire strives to lead this market in engineering solutions to provide decision makers with the information they need to make our world a better place.

MISSION

SeaLandAire is an experienced engineering services company that specializes in sensor systems, advanced energy, and unattended platforms for challenging air, land, and sea environments. We work each day to bring advancements in these technologies to the market.

VISION

Our vision is to combine our ingenuity and experience with other businesses and universities to deliver reliable data collection systems to warfighters and researchers, providing the information they need to make responsible, proactive decisions.

technologies

SENSOR SYSTEMS

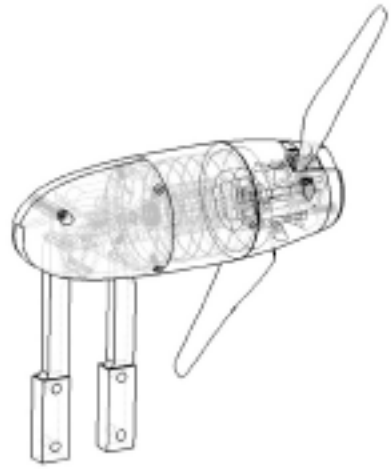
Monitoring and surveillance sensor systems form the core of SeaLandAire's technology base. We have built on our experience in underwater acoustics to improve the entire data collection process, from sensor implementation and sampling to data communication, storage, and processing.

* Both passive and active underwater acoustic tools for general ISR, naval ASW, and marine mammal mitigation
* Gunshot detection and localization through data fusion of air acoustics and optical sensing techniques
* Detection and tracking of walking humans using seismic sensors
* Optical and acoustic imaging systems for surveillance and navigation applications
* Data communications, including: over the horizon satellite modems (e.g. Iridium) and line of sight digital transceivers (900 Mhz & 2.4 GHz FreeWave® and Digi® as well as VHF/ UHF and acoustic modems
* Data storage, processing, & visualization

ADVANCED ENERGY

Most of our sensor systems are unattended and self powered. To take full advantage of this strategic position, we extend their operational life by implementing innovative energy systems solutions. Our strong background in battery powered systems has naturally evolved to include renewable energy technologies such as solar, wind, current, tidal, and wave energy harvesting.

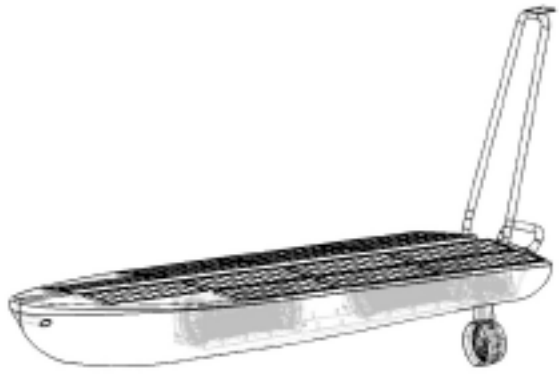
* Energy storage (batteries, fuel cells)
* Energy (power) harvesting / harnessing / scavenging (solar, wind, current, tide, wave, thermal, & vibration)
* Energy conversion (DC/DC, AC/DC, DC/AC, electrical to mechanical, mechanical to electrical, etc.)
* Energy management (vehicle systems and simulation tools to optimize mission performance with respect to energy availability, consumption, and replenishment)



UNATTENDED PLATFORMS

A key factor in a successful surveillance or monitoring mission is proper positioning within and interaction with the surrounding environment. Whether the need is for mobility to measure fine scale spatial gradients or robust delivery and deployment in harsh environments, our unattended platforms can meet your most demanding data collection needs.

* Autonomous / unmanned vehicles
    - ~ Autonomous Surface Vehicles (ASVs) including the Persistent Utility Mobile Autonomous (PUMA) vehicle class
    - ~ Autonomous Underwater Vehicles (AUVs)
* Hydrodynamic / aerodynamic design including propulsion and control surfaces
* Basic guidance, navigation, and control (GNC) capabilities
* Drifting buoys (sonobuoys, drifters)
* Lightweight, rapidly deployed moored buoys
* Unattended Ground Sensors (UGS)

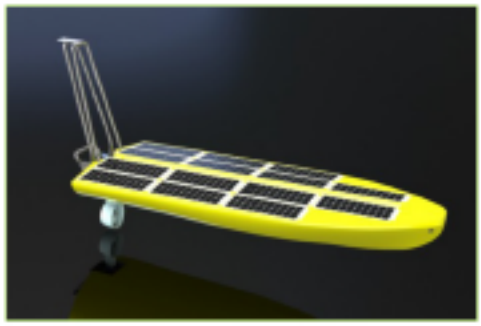


products

hydrophones

Hydrophone technologies were the basis for the founding of our business. We have over 250 man-years of collective experience in acoustic sensor development and system integration. Based on the needs of the market, we offer both OEM and integrated / ruggedized solutions.

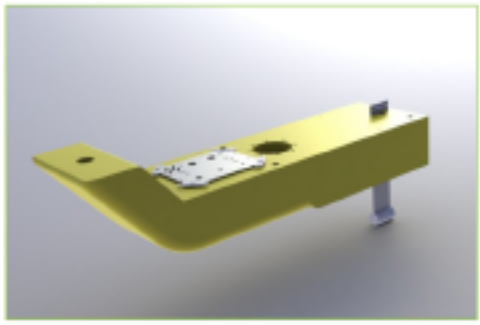
SeaLandAire hydrophone solutions are highly customizable to your specific needs.



PUMA surface vehicle

The PUMA surface vehicle is the first commercialized version of several previously developed DoD autonomous surface vehicles. Its modular mechanical and electrical architectures, two man portability, and advanced feature list make it an ideal sampling platform for both scientific and military applications with a focus in shallow waters.

The PUMA vehicle is currently under development and is available for cost-sharing testing opportunities specific to your applications. Complete vehicles will be available in 2012.



low drag modular floats

Low drag floats are a simple and elegant solution to an urgent marine sensor need. Constructed of an extremely durable expanded polypropylene and designed to provide stability in high current environments, these floats can quickly be shaped to serve as rugged instrumented platforms for various sensor system integration requirements; whether shallow water moored or free drifting.

Low drag floats are offered as blanks, or cut and shaped to your specific payload requirements. Site specific moorings and cables are also available.

moored acoustic reference system

Moored acoustic reference systems are rapidly fieldable units based on our low drag float platform. They feature a DIFAR lower unit with a constant shallow omni, o.6 kW-hr onboard energy, and VHF transmitter (UHF receive). When used in conjunction with a standard sonobuoy reciever, high fidelity directional acoustic data is made simple, transportable, and reusable.

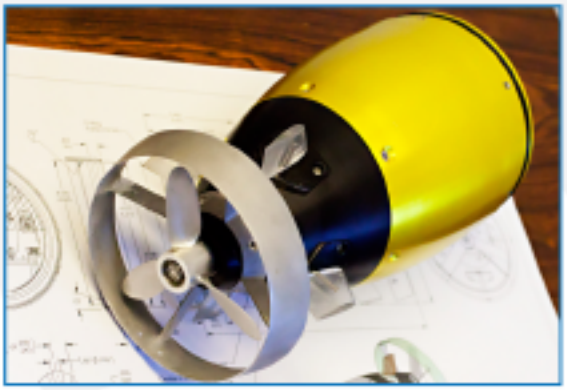
These systems are built to order and are highly configurable. Delivery times are generally 3-4 weeks.

services

SeaLandAire can provide your organization with a full spectrum of customized engineering services to meet your unique needs. Our expertise is developing robust, specialized data collection solutions for challenging environments. Whether you need a team member with our unique resume, help overcoming a specific design hurdle, or a partner to lead a complete development cycle from concept to production, SeaLandAire can deliver that service at exceptional value.

PROTOTYPE DESIGN

* Feasibility analysis
* Circuit design & analysis
* Requirements formation
* PCB layout and schematics
* Piezoelectric transducer design
* Environmental interaction analysis
* Hydrostatic & hydrodynamic design
* Software development for user interfaces
* Developing mathematical models & simulation



PROJECT CONSULTATION

* Scheduling
* Government contracts
* Cost estimation & tracking
* Statement of Work (SOW) formation
* Coordination of multi-disciplined teams
* Work Breakdown Structure (WBS) formation

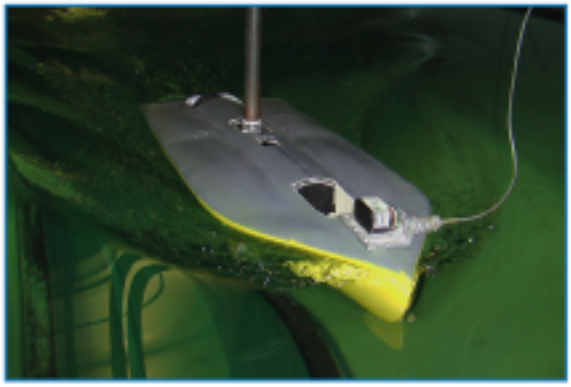
SYSTEM ENGINEERING

* Risk assessment & mitigation
* Failure Modes and Effects Analysis (FMEA)
* Transitioning systems from concept to reality
* Use of off the shelf hardware for cost reduction

We specialize in hydrophone performance testing, and have extensive equipment to traceably characterize hydrophone technologies.

* Frequency response and horizontal beam patterns tested
* Actran low frequency acoustic calibrator
  - ~ Automated NI LabView interface
  - ~ Pressures from 20psia to 500psia
  - ~ Frequency range 20 Hz to 1000 Hz
  - ~ 6in x 6in x 12in max size of unit under test
  - ~ Reference hydrophones traceable to Navy standards
* Fast turnaround times (5 day standard)

SeaLandAire has experience testing complex systems across the globe, including Hawaii, British Columbia, Monterey Bay, the Florida Keys and the Great Lakes. We also have worked with a variety of University labs to conduct more controlled testing. Since everything we do revolves around data collection, we feel that test preparation and execution are fundamental to who we are as a company. If you have a challenging testing requirement you would like our input on or even help conducting a test, please contact us.



TESTING

* Field trials
* Controlled laboratory testing
* Test planning, coordination, and support
  - ~ Identification of variables
  - ~ Data acquisition system design
  - ~ Manpower for field test support
  - ~ Multi-team field tests and experiments
  - ~ Vessel / facilities arrangements (UNOLS)

DESIGN CONSULTATION

* Risk identification
* Requirements formation
* Overall feasibility assessment
* Technical comparison to competitors
* Problem solving throughout the design cycle
* Applications to expand existing market share
* Market research and identification of competitors

projects

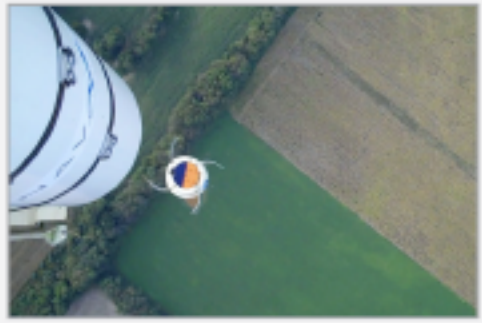
PHASE

Precision High Altitude Sonobuoy Emplacement (or PHASE), is a Phase II SBIR effort investigating sonobuoy hardware and software adaptations to facilitate highly accurate placement from high altitude launches. The project is important because of the expected concept of operations changes associated with the new P-8 Poseidon anti-submarine warfare aircraft.

Within this program, SeaLandAire developed hardware modifications that are immediately interchangeable with the current production sonobuoy parachute housing, limiting costs typically associated with such a design change. The modifications enable passively stable sonobuoy flight paths that can be predicted by a corollary SeaLandAire-developed ballistics model to achieve highly accurate placement locations without the use of GPS or active controls.

Throughout the effort, SeaLandAire tested each hardware revision by instrumenting mechanical sonobuoy mockups with a sensor suite, and deploying them from various airborn platforms, including hot air balloons, helicopters, an d small turboprop aircraft.

PHASE gen 3 hardware



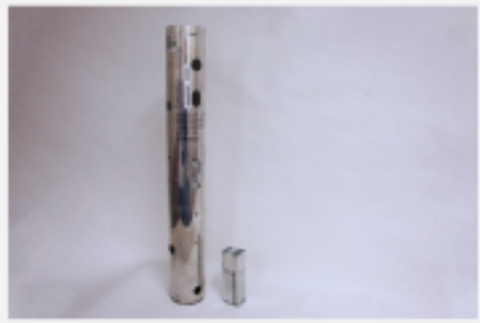
PHASE 3000ft test drop

MDAR / MCIAS

The Miniature Directional Acoustic Receiver (MDAR) and Miniature Commandable Impulsive Acoustic Source (MCIAS)—affectionately termed 'mini buoys'—are SeaLandAire's response to saving volume and weight without sacrificing performance in anti-submarine warfare sensors. These buoys are 1/16th the size of typical A-size sonobuoy and are completely packaged in an MJU-10/B flare housing. Both mini buoys were developed with SBIR funds.

Further development of MDAR and MCIAS miniature sonobuoys will allow deployment from numerous short-range platforms, providing critical information for the warfighter in the unforgiving acoustic environment of littoral waters. Because of their small size, delivery platforms can now include small UAVs and helicopters, while providing fuel savings for platforms that typically carried A-size sensors. Fields of miniature receivers, in conjunction with miniature active sources, could achieve detection capability to counter emerging threats in littoral waters.

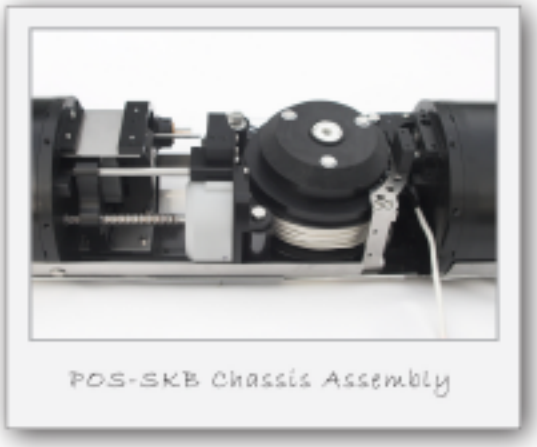
Within the Phase II efforts, SeaLandAire developed and tested fully functional system hardware, furthered by a cost-sharing arrangement with a prime sonobuoy manufacturer in the development of a miniaturized directional acoustic reciever and source.



MDAR / A-size comparison

deployed MDAR unit

SLA Team, Monterey Bay, CA



POS-SKB Chassis Assembly

POS-SKB

SeaLandAire completed Phase I and Phase II contracts for Persistent Ocean Surveillance Station Keeping Buoy (POS-SKB) in response to DARPA BAA 04-33 Station-Keeping Energy Harvesting Sensors. The system was intended to provide continuous un-moored acoustic surveillance within a given watch circle for extended periods of time. As such, the primary focus of the program revolved around balancing the competing requirements for station keeping and energy harvesting while still providing a viable acoustic sensor.

SeaLandAire's design, which is foundational to our current PUMA autonomous surface vehicle technology, harvested energy from solar radiation and vertical wave motion and harnessed energy from wind and waves. The heart of the navigation system was a miniaturized 6-DOF Attitude & Heading Reference System (AHRS) coupled with a GPS receiver. The motor and generator used for propulsion and wave energy harvesting were custom designed for small size and high efficiency, supporting the overall effort to provide an efficient, reliable system compatible with tactical sonobuoy logistics. Because it was engineered to be deployed from a B-size sonobuoy tube, many other subsystems were custom designed for the vehicle, including the hull, triple - junction GaAs solar array, anemometer, steering actuators, distributed embedded processor PCBs, and inductive coupler for data and power tranmission across a flooded 'air gap'.

SeaLandAire's hardware successfully maintained station in adverse marine environments for over 120 hours, averaging less than 3 meters deviation from the designated station keeping point.

VIVACE Unit with crane

VIVACE Vortice formation, photo courtesy of Don Boroughs

VIVACE

SeaLandAire provided engineering support services to Vortex Hydro Energy to design, develop, and test a large scale renewable energy device based on the principle of vortex induced vibrations – particularly at resonance of a high mass oscillating cylinder system.

Over the course of the effort, SeaLandAire successfully developed several iterations of the mechanical, electrical, and data collection subsystems, culminating in a 10 ton prototype deployed in a high current river environment. Based on SeaLandAire's understanding and modeling of the resonant system with input from Vortex Hydro, cylinder oscillations were successfullly achieved in the first test run at The University of Michigan Marine Hydrodynamics Lab Physical Modeling Basin. Since that point, Vortex Hydro Energy has utilized this hardware to collect extensive data, discovering new oscillation modes that could make this technology a viable green energy alternative.

(For more information, see www. vortexhydroenergy.com)

affiliations

SeaLandAire has had the opportunity to work with a great number of organizations in a variety of roles. The following is a partial list of these affiliations:

GOVERNMENT

DARPA
ONR
NPS
SPAWAR
NOAA
GLERL
NAVSEA
NAVAIR

ACADEMIC

SPRL Space Physics Research Laboratory
Michigan Engineering
Cedarville University
KML Keys Marine Lab, Florida Keys

CORPORATE

Sparton Electronics
Ultra Electronics
BAE Systems
AAI Advanced Avionics Inc.
RDA Inc.
BlueView Technologies
Maritime Research Associates
CyberNet

PROFESSIONAL ORGANIZATIONS

Acoustical Society of America
IEEE Advancing Technology for Humanity
marine technology society
ASME Setting the Standard

sealandaire advantage

some of what makes us unique

We are an engineering services company composed of people that care about what they do. Born of both big and small businesses alike, we have a very well-rounded engineering staff with extensive experience deploying unattended systems in difficult environments. We are a small and highly versatile group, yet still capable of satisfying even the most demanding support requirements. Although we can easily comply with more regulated contracts, we are not defined by paperwork and still offer a great return on every dollar brought into our facility. From proposal partnerships to contract negotiations to deliverables, you will find SeaLandAire a noteworthy team member.

case study

In the Fall of 2009, we were approached by another business in need of a propulsion and navigation system for 4.875" diameter AUV. The timeline was tight, as they had spent several unnsuccessful months in budget negotiations with a larger firm. SeaLandAire placed a bid which was quickly accepted. By May of 2010, we completed two hardware revisions, completed two full system tests, and delivered two units featuring a tuned propulsion system and a compass based dead reckoning navigation solution. We make it a point not to over promise or under deliver.

Contracts to delivery in 8 months and on budget.

CONTACT US

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