



**CAPABILITY STATEMENT**  
**GUIDE STAR ENGINEERING, LLC**  
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**GUIDE STAR ENGINEERING CAPABILITY STATEMENT**

Guide Star Engineering, LLC (GSE) is a service-disabled, veteran-owned, small business (SDVOSB), specializing in systems engineering, hardware/software development and integration, physics-based modeling, simulation, and testing. GSE's supports customers in the following domains: developing expendable ocean sensors that communicate data remotely, developing advanced signal processing and analysis, supporting, and encouraging healthy oceans and actionable environmental monitoring.

GSE provides subject matter expertise ranging from infrasonics and acoustics, through electro-magnetic, electro-optical and RF technologies. We have primed on complex hardware and software projects with industry leaders.

The GSE staff applies over 100 years of combined expertise towards deconstructing complex technical challenges and effectively solving challenges facing underwater and hi-altitude airborne systems; intelligence, surveillance and reconnaissance (ISR); data acquisition systems; industrial automation; operator interfaces; electromechanical systems; signal processing; safety, and security. SBIR Phase I and Phase II technologies are ready for transition.

The core capabilities and services of GSE include systems engineering; research and development (R&D); modeling, simulation; engineering design; prototype development and limited manufacturing, and program management. Since its inception GSE has provided clients with a level of expertise that exceeds industry standards. GSE remains at the forefront of engineering research and development, and prides itself on delivering and advancing high-technology Engineering services. Over the years, GSE has established a solid reputation in the public and private sectors for specializing in hardware and software engineering design, R&D, systems testing, and systems integration in diversified industrial and government markets.

We are proud to support a diverse clientele that encompasses Private and Public, the Construction, Industrial Automation, Defense/Aerospace, Information/Communication Technology, and Marine Engineering fields with engineering services that include management, design, research and development, and prototyping.

Capability Area / Technology	Experience Description
<b>Program Management</b>	<ul style="list-style-type: none"> <li>• GSE successfully applies the earned value (EV) method to track progress and meet delivery; costs; technical, and financial objectives resulting in consistent on time delivery</li> <li>• Works closely with customers to evaluate need statements, analyze specifications and requirements, for hardware and software development</li> <li>• Manages interdisciplinary teams of technical and non-technical professionals of 20+ personnel</li> <li>• Recognized for innovative engineering development and on time, budget compliant deliverables</li> <li>• GSE completed the SBA's Emerging Leaders Initiative a federal training program aimed specifically at helping business owners poised for growth in historically challenged communities</li> <li>• Has grown its business revenue to \$5M+ over four years by applying new technologies that focus on meeting customer goals</li> </ul>
<b>Hardware Technology</b>	<ul style="list-style-type: none"> <li>• Analog and Digital Circuits</li> <li>• Electro-Optics</li> <li>• Sonar and Transducers</li> <li>• RF Communications Hardware</li> <li>• Special Optical Windows</li> <li>• Computational Fluid Dynamics</li> <li>• Research in nuclear engineering</li> </ul>
<b>Software Technology</b>	<ul style="list-style-type: none"> <li>• High Performance Computing experience leading and contributing to software development project, and supporting: Fortran; C/C++; Python; Mathcad; <a href="#">MATLAB®</a>; modern Fortran</li> <li>• Expert in developing test suites for each of the above software packages</li> </ul>



	<ul style="list-style-type: none"> <li>• Expert with automated documentation generation using <a href="#">FORD</a> and <a href="#">Doxygen</a></li> <li>• Expert with visualization using <a href="#">ParaView</a>, including the creation of VTK files</li> <li>• Expert in developing custom applications modeling and simulation and test suites</li> <li>• Expert use of <a href="#">COMSOL Multiphysics®</a> software in electromagnetic; electromechanical; thermal, and the structural behavior modeling of engineered systems</li> </ul>
<b>Applied Technology Areas &amp; Solutions</b>	<ul style="list-style-type: none"> <li>• Acoustic and Non-Acoustic Technologies</li> <li>• Electro-optical and Infrared (EO/IR) Sensors for Marine Platforms</li> <li>• GPS/GNSS Assisted Positioning</li> <li>• Miniature Laser Data/Power over Fiberoptics for Sonobuoys and Unmanned Systems</li> <li>• RF and Electromagnetic Sensor Technologies, Radar Cross-section (RCS) Analysis</li> <li>• Sensor Platforms – Surface Vessels, Submarines, Aircraft, High-Altitude Balloons</li> <li>• Sensor Technology – Vector Sensors, Sensor Array Signal Processing, Automated Detection Classification and Localization (DCL) and Tracking</li> <li>• Signal Processing, Data Acquisition, Storage Systems, Artificial Neural Networks (ANN), Machine Learning (ML)</li> <li>• Single Board Computers (SBCs) including Arduino and Raspberry Pi</li> <li>• Sonar Technologies for Deep Sea and Sonobuoy Platforms</li> </ul>

<b>Prime Contractor Experience:</b> <ul style="list-style-type: none"> <li>• Naval Air Systems Command (NAVAIR)</li> <li>• Space and Naval Warfare Systems Command (SPAWAR)</li> <li>• Nuclear Regulatory Commission (NRC)</li> <li>• Battelle</li> <li>• LightWorks (EEO)</li> <li>• SAIC</li> <li>• Teledyne</li> <li>• USSI (Ultra)</li> </ul>	<b>Subcontractor Experience:</b> <ul style="list-style-type: none"> <li>• Battelle</li> <li>• LightWorks</li> <li>• Lockheed Martin Corp.</li> <li>• Navmar Applied Sciences Corp.</li> <li>• Neany, Inc.</li> <li>• SPAWAR</li> <li>• URS (EG&amp;G)</li> </ul>
<b>North American Industry Classification System (NAICS):</b> 334290 – Other Communications Equipment Manufacturing 334310 – Audio and Video Equipment Manufacturing 334511 – Search, Detection, Navigation, Guidance, Aeronautical, Nautical System & Instrument Manufacturing	<b>Business Codes:</b> DUNS: 785149787 DBE: Yes Minority Owned: Yes VOB: Yes CAGE Code: 4K0S3



<p>541712 – Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)</p> <p>517919 – All Other Telecommunications</p> <p>541512 – Computer Systems Design Services</p> <p>541330 – Engineering Services</p> <p>541519 – Other Computer Related Services</p> <p>541990 – All Other Professional Scientific, and Technical Services</p> <p>541690 – Other Scientific and Technical Engineering Consulting Services</p> <p>237130 – Power and Communication Line Related Structures Construction</p> <p>517410 – Satellite Telecommunications</p> <p>541620 – Environmental Consulting Services</p>	<p><b>Point of Contact: SEIBERT MURPHY</b></p> <p>Title: CEO</p> <p>Direct: 808-497-0144</p> <p>Fax: 866-462-3824</p> <p><b>Business Locations:</b> Hawaii, California, Illinois, Texas, Pennsylvania, New Mexico, Washington, DC</p> <p>E-mail: <a href="mailto:smurphy@gsellc.com">smurphy@gsellc.com</a></p>
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**Key Personnel**

<p><b>Don Smith, Lead EE, and RF Systems Engineer</b></p>	<p>Mr. Smith has over 35 years of expertise in systems engineering, hardware design, specification, and development of military and commercial communications products. He has held positions with Magnavox Electronic Systems Company (now Raytheon), Texas Instruments Semiconductor, and Raytheon - Crossspan Network Access Technologies Division. Mr. Smith was responsible for design and specification for the next generation of software defined radios. He led extensive analysis and simulations to make system trade decisions for commercial digital cellular air-ground phone system. He received B.S. and M.S. Electrical Engineering degrees from the Ohio State University.</p>
<p><b>Michael Mullen, Lead Scientist</b></p>	<p>Dr. Mullen applies over 35 years of research and applied engineering experience to problems involving modeling and simulation, physics-based analysis, and remote sensor technologies. Dr. Mullen is a subject matter expert in underwater sensor technology and has led and managed numerous SBIR and internal research and development efforts while with ITT, Magnavox Government Electronics (now USSI), Progeny Systems, ITT Aerospace &amp; Communications Division, principal in and cofounder of ECS Technology (now incorporated into MasterSports). As a project manager, Dr. Mullen successfully managed internal Research &amp; Development programs of Phase I and Phase II magnitude, including principal investigator of several multiyear development programs. Dr. Mullen holds a B.S. Physics, University of Nebraska, and Ph.D. in Solid State Physics from Rutgers University, specializing in physical acoustics.</p>
<p><b>Neal Baitcher, Industrial Engineer</b></p>	<p>Mr. Baitcher has over 30 years of industrial experience and expert program management skills. He specializes in program management, developing communications systems and related production, test, and quality assurance systems of acoustic transducer manufacturing for high volume automotive, commercial and government clients. Mr. Baitcher has held technical and senior management positions at Fibre Form, Motorola, Industrial Composites Inc., and Material Innovation Technologies. He has 5 issued patents and has managed SBIR projects and ISO 9000 facilities. He has a B.S. in Design from Illinois Institute of Technology.</p>



<b>Seibert Murphy, Systems Engineer, and CEO</b>	Mr. Murphy has over 25 years of progressive development, project management, and business development expertise; He began his career in the US Navy and held technical and management positions at Magnavox Government Electronics (now USSI), Automation Engineering, Johns Hopkins University APL, and Progeny Systems. His technical specialization includes acoustics, underwater sensors, remote systems, and signal analysis and processing. Since 2006, Mr. Murphy has led Guide Star Engineering, successfully performing programs for commercial and government customers. His priority is to maximize value to the customer. He has a B.S. in Physics from Purdue University, and a M.S. in Systems Engineering from Catholic University.
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### Relevant Publications

Damian Rouson, Jim Xia, Xiaofeng Xu, Scientific software design: the object-oriented way, June 2014, ISBN: 9781107415331

Daniel C Bowman, Sarah Albert, Darielle Dexheimer, Seibert Murphy, and Michael Mullen. *A Low Cost, Multi-hour Flight System for Lightweight Scientific Instrumentation Packages*, (241963), Solar Hot Air Balloons. American Geophysical Union (AGU) 2017

Alexis Rudd, Whitlow Au, Eva-Marie Nosal, Seibert Murphy. *Marine Mammals Localization of Humpback Whale Signals With Two Directional Frequency Analysis and Recording Sonobuoys*. The Journal of the Acoustical Society of America, 2013. DOI: 10.1121/1.4830466

Seibert Murphy. *Modeling the Hydrodynamic Performance of Sonobuoy Arrays using SEADYN90*. Masters Thesis, Catholic University of America. 2001

S.L. Murphy ; S.I. Sayegh, Application of neural networks to acoustic screening of small electric motors, Neural Networks, 1992. IJCNN., International Joint Conference, DOI: 10.1109/IJCNN.1992.226943

C. Litchfield, R. Karol, M. E. Mullen, J. P. Dilger, B. Lüthi. Marine Biology. *Physical Factors Influencing Refraction of the Echolocative Sound Beam in Delphinid Cetaceans*, September 1979, Volume 52, Issue 3, pp 285-290.

M. E. Mullen, B. Lüthi, and M. J. Stephen. *Sound Velocity in a Nematic Liquid Crystal*. Phys. Rev. Lett. 28, 799 – Published 27 March 1972