OMB Control No. 0694-0119
Expiration Date: April 2013

DEFENSE INDUSTRIAL BASE ASSESSMENT:
U.S. Infrastructure for Underwater Acoustic Transduction Systems

Company Survey

SCOPE OF ASSESSMENT

The Bureau of Industry and Security (BIS), Office of Technology Evaluation (OTE), in cooperation with the Department of the Navy, Office of Naval Research (ONR), is conducting an assessment of the U.S. Underwater Acoustics Transduction industry. The purpose of this assessment is to analyze the health and competitiveness of the industry and to develop recommendations to ensure the ability of the industry to support Navy missions and programs.

RESPONSE TO THIS SURVEY IS REQUIRED BY LAW

A response to this survey is required by law (50 U.S.C. app. Sec. 2155). Failure to respond can result in a maximum fine of $10,000, imprisonment of up to one year, or both. Information furnished herewith is deemed confidential and will not be published or disclosed except in accordance with Section 705 of the Defense Production Act of 1950, as amended (50 U.S.C App. Sec. 2155). Section 705 prohibits the publication or disclosure of this information unless the President determines that its withholding is contrary to the national defense. Information will not be shared with any non-government entity, other than in aggregate form. The information will be protected pursuant to the appropriate exemptions from disclosure under the Freedom of Information Act (FOIA), should it be the subject of a FOIA request.

Not withstanding any other provision of law, no person is required to respond to nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a currently valid OMB Control Number.

BURDEN ESTIMATE AND REQUEST FOR COMMENT

Public reporting burden for this collection of information is estimated to average 14 hours 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 to BIS Information Collection Officer, Room 6883, Bureau of Industry and Security, U.S. Department of Commerce, Washington, D.C. 20230, and to the Office of Management and Budget, Paperwork Reduction Project **(OMB Control No. 0694-0119)**, Washington, D.C. 20503.

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

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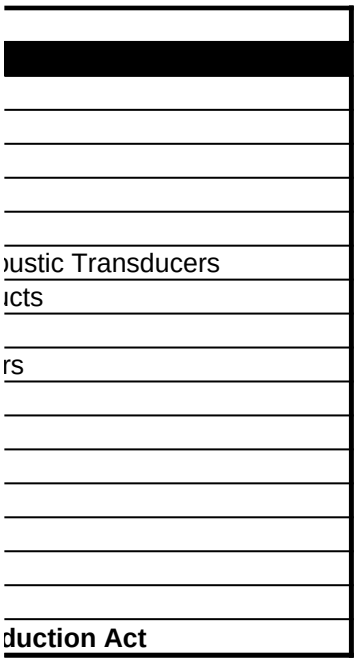
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Section	General Instructions
A.	Your company is required to complete this survey using an Excel template, which can be downloaded from the BIS website: *http://www.bis.doc.gov/underwater_acoustics/index.htm*. At your request, BIS staff will e-mail the Excel survey template directly to your company. For your convenience, a PDF version of the survey is available on the BIS website to aid internal data collection. DO NOT submit the PDF version of your company's response to BIS.
B.	Respond to every question. Surveys that are not fully completed will be returned for completion. Use comment boxes to provide any information to supplement responses provided in the survey form. Make sure to record a complete answer in the cell provided, even if the cell does not appear to expand to fit all the information. **DO NOT COPY AND PASTE RESPONSES WITHIN THIS SURVEY.** Survey inputs should be made manually, by typing in responses or by use of a drop-down menu. The use of copy and paste can disrupt the data collection process. If your survey response is corrupted as a result of copy and paste responses, a new survey will be sent to you for immediate completion.
C.	**Do not disclose any classified relationships in this survey form.** However, aggregated financials, employment, R&D expenditures, etc. are permitted.
D.	Questions related to this survey should be directed to: Matthew Sigmund, 202-482-0634 - matthew.sigmund@bis.doc.gov; Laura DeMaria, 202-482-7804 - laura.demaria@bis.doc.gov; or Mark Crawford, 202-482-8239 - mark.crawford@bis.doc.gov.
E.	If information is not available from your records in the form requested, contact our office to see if you may furnish estimates.
F.	Upon completion, review and certification of the survey, transmit the survey via e-mail to: underwater_acoustics@bis.doc.gov.
G.	For letter correspondence to the Office of Technology Evaluation (OTE), please write to: Brad Botwin, Director, Industrial Studies Office of Technology Evaluation, Room 1093 U.S. Department of Commerce 1401 Constitution Avenue, NW Washington, DC 20230 Please do not submit completed surveys to this address; all surveys must be submitted electronically.

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Section III	Who Must Respond	
A.	Has your company manufactured underwater transducers and/or sonar systems from 2008-2012?	
B.	Has your company directly or indirectly supplied the United States Navy underwater transducers and/or sonar systems from 2008-2012?	
C.	Has your company produced and/or assembled materials or sub-assembly components for underwater transducers and/or sonar systems from 2008-2012?	
D.	Has your company designed underwater transducers and/or sonar systems from 2008-2012?	

Exemption From Survey

If your organization was not engaged design, manufacturing, and/or research activities in the past 10 years that can support the design or production of materials, parts, or subsystems used in underwater acoustic transducers, it may be exempt from having to complete this survey. Please call one of the contacts listed in General Instruction "D" for a determination as to whether your organization must complete the survey.

Comments:	

Section - Definitions	Definitions
ACOMMS	Short for Acoustic Communications. An underwater acoustic system designed to communicate (transmit or receive) acoustical data via an acoustic medium (water or air).
Acoustic Vector Sensor	A device that concurrently measures acoustic pressure and acoustic particle velocity for the purpose of estimating intensity and direction of propagation of sound at a point in an acoustic field.
Active SONAR	An underwater acoustic system relying on both a user transmitted probe signal and the subsequent detection of returning acoustic signals.
Air-Deployed Sonar Systems	Any transducer-based system used for underwater acoustic signal generation or detection and installed on or deployed from aircraft.
Applied Research	Research for the purpose of applying knowledge or technologies to improve specific problems, devices, methods, or systems. Applied research often has a known potential application.
Basic Research	Research resulting in new knowledge or improved understanding of subject area. Such research may also result in new discovery or invention of ideas, methods or devices.
Basic Research Underwater Acoustic Systems	Any transducer-based system or subsystem components used in basic research and/or testing for underwater acoustic signal generation or detection.
Calibration	The process of testing a tranducer to determine its performance including but not limiting to its transmit or receive sensitivity, impedance in water, directional factor, and electroacoustic efficiency.
Calibration Facilities	Specialized facilities designed for measuring various transducer system responses to specific inputs (acoustic, shakers, signal telemetry, etc).
Ceramic	Any piezoelectric, polycrystalline material based on ferroelectric oxides, such as lead zirconate titanate (PZT) ceramics.
Command Organization	Primary military organization (e.g., NAVSEA, NAVAIR, SPAWAR, etc).
Company	A for profit organization including sole proprietoryship, partnership, company, or corporation.
Division Facilities	Specialized facilities under the direction of a division within a larger command organization.
Educational Institution	Any institution providing college-level courses for academic credit.
Educational Program	A combination of courses from an educational institution leading to a certificate or degree.
Electrode Adhesion	The degree of adhesion of the electrode (e.g. silver, nickel, etc.) to the piezoelement
Electro-Dynamic Actuators and Force Drivers	Piezoelectric and other electromechanical actuators with the prinicple functioin of delivering a force or displacement as opposed to the radiation of sound.
Environmental Parameters	Environmental parameters influencing acoustic propagation, e.g., temperature, pressure, density, bulk modulus, shear speed, attenuation, salinity, sound speed, etc.
Environmentally Controlled Facilities	Specialized measurement facilities in enclosed areas capable of manipulating environmental factors (e.g., temperature, pressure, etc).
Facility	A physical space for performing specific work or activity.
Institutional Facility	A specialized design/manufacturing facility directly managed/owned by an educational institution.
Integrated Electronics	The collection of electronic components on an electronic circuit board, membrane or other medium.
Lake/Ocean Facilities	Specialized measurement facilities in lakes or open ocean ranges (e.g., Lake Pend Oreille, AUTEC, etc).
Magnetics Design	The steps, procedures, and results associated with designing inductive tuning elements and impedance (step-up and step-down) transformers that are often necessary in an acoustic transducer subsystem.
Magnetostrictive materials	Ferromagnetic materials alter in shape when subject to magnetization.

Manufacturing Standards	The standards and expectations associated with quality and tolerances associated with a particular manufacturing process.
Material Bonding	The bonding of two materials.
National Security	A collective term encompassing national defense and homeland security, including the military, civilian intelligence agencies, border security, etc.
National Security Systems	Any transducer-based system that utilizes underwater acoustics for purposes of national security.
Oceanographic Systems:	Underwater acoustic systems designed to measure oceanographic features, e.g., acoustic Doppler profilers, hydrographic systems, bathymetric systems, etc.
Passive SONAR	An underwater acoustic (SOund, Navigation, And Ranging) system used to detect acoustic signals with receivers only (the system does not genearate a probing acoustical signal).
Piezoceramic element	A piezoelectric ceramic element (such as a bar, plate, cylinder, etc.) made from a ceramic based compositioin exhibiting piezoelectric properties.
Piezocrystal element	A piezoelectric crystal element (such as a bar, plate, disk, etc.) made from a crystaline composition (such as quartz or PMN-PT single crystal) exhibiting piezoelectric properties.
Piezoelectric	The physical property of a material that converts mechanical energy into electrical energy (electromechanical piezoelectric effect) or mechanical energy into electrical energy (mechano-electric piezoelectric effect).
Potting	The process of enclosing (or so called potting) an acoustic transducer with a waterproof solid layer, usually comprised of polyurethane, rubber, or plastic.
Process Control	Methods and controlls associated with manufacturing (or processing) piezoelectric materials and/or transducers.
R&D	Research and Development: All steps associated with the research and/or development of a product.
RDT&E	Research, Development, Test and Evaluation.
Single Crystal	Any relaxor-based, piezoelectric single crystal material, such as lead magnesium niobate-lead titanate (PMN-PT).
Sonar Transducer Relability Improvement Program (STRIP)	A US Navy program with emphasis on reliability improvement of sonar transducers and support of devices used in the Fleet (currently administered by NAVSEA/NUWC).
Sub-assembly	Any component of a system, which may or may not work independently.
Submarine Sonar Systems	Any transducer-based system used for underwater acoustic signal generation or detection and installed on or deployed from submarines.
Surface Ship Sonar Systems	Any transducer-based system used for underwater acoustic signal generation or detection and installed on or deployed from surface vessels.
Technical Personnel/Engineering Force	Technically trained/educated workforce directly involved with aspects of design and/or manufacturing of transducer products and SONAR systems.
Telemetry	Systems and subsystem components that involve the transmission of acoustic signals by wire, air, or water. Such systems may include conversion of signals to higher carrier frequencies or to different forms of energy such as electromagnetic, light, mechanical or acoustical.
Tons	2000 pounds (0.907 metric ton)
Transducer	Any device that converts acoustical energy into electrical energy, and vice-versa.
Transducer Design	The design and description of acoustical transducers (projectors and recevers) and related performance pedictions or estimates
Transducer Manufacturing	The building or production of acoustic transducers with commercialization as the goal or end purpose.
Transducer Products	Any transducer device or subsystem comprising an electroacoustic transducer that may be commercially available or made available to a navy or research application or demonstration.
Underwater Acoustic Communication Systems	Any transducer-based system used for underwater acoustic communications.
Underwater Imaging or Scanning Systems	Any transducer-based system used for underwater scanning applications.

Section 1		Company Information			
A.	Company Name				
	Business Unit/Division Name (if applicable)				
	Street Address				
	City				
	State				
	Zip Code				
	Phone Number				
	Fax Number				
	Website				
B.	Point of Contact(s) regarding this survey:				
	Name	Title	E-mail	Phone Number	
Comments:					

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Section 1.b	Company Ownership Information				
A.	My company is headquartered in:				
	My company is:				
	Parent Company Name	Address	City	State/Province	Country
	My company is Public/Private:				
	My parent company is Public/Private:				
B.	From 2008-2012, has one or more foreign governments invested, directly or indirectly, in your company and control 5 percent or more of stockholder voting shares?				
	If you answered "Yes," please explain the type of investment and identify the foreign government(s).				
	Type of Investment		Foreign Government		
	1.				
	2.				
	3.				
	4.				
	5.				
Comments:					

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Section 1.c **Company Structure and Operations**

A. State the number of underwater transducer or sonar system fabrication or design facilities that your company operated in the following locations from 2008-2012:

	2008		2009		2010		2011		2012 - Estimate	
	Number of Facilities									
Facility Function	Inside U.S.	Outside U.S.	Inside U.S.	Outside U.S.	Inside U.S.	Outside U.S.	Inside U.S.	Outside U.S.	Inside U.S.	Outside U.S.
Design										
Sonar System Fabrication										
Transducer System Fabrication										

B. Indicate the number of underwater **sonar system fabrication facilities** that your company currently operates with security clearances:

Indicate the number of underwater **transducer system fabrication facilities** that your company currently operates with security clearances:

Enter the CAGE numbers for each cleared facility below - #1:		Enter the CAGE numbers for each cleared facility - #2:	
CAGE 1:		CAGE 1:	
CAGE 2:		CAGE 2:	
CAGE 3:		CAGE 3:	
CAGE 4:		CAGE 4:	

Indicate the number of underwater transducer and sonar system fabrication facilities that your company currently operates with security clearances:

Enter the CAGE numbers for each cleared facility below - #3:		Enter the CAGE numbers for each cleared facility - #4:	
CAGE 1:		CAGE 1:	
CAGE 2:		CAGE 2:	
CAGE 3:		CAGE 3:	
CAGE 4:		CAGE 4:	

Indicate the number of underwater transducer and sonar system fabrication facilities that your company currently operates with security clearances:

Enter the CAGE numbers for each cleared facility below - #5:		Enter the CAGE numbers for each cleared facility - #6:	
CAGE 1:		CAGE 1:	
CAGE 2:		CAGE 2:	
CAGE 3:		CAGE 3:	
CAGE 4:		CAGE 4:	

Comments:

C. Please specify the technology sectors that your company serves through the provision of design and/or fabrication services for underwater transducer and sonar system products:

Company Capabilities >	Sonar Design	Sonar Fabrication	Transducer Design			Transducer Fabrication
Air-Deployed Sonar Systems						
Basic Research Underwater Acoustic Systems						
Distributed Netted Systems						
Object Detection Systems						
Submarine Sonar Systems						
Surface Ship Sonar Systems						
Underwater Acoustic Communication Systems						
Underwater Scanning Systems						
UUV/AUV Acoustic Systems						
Geophysical Exploration Systems						
Hydrographic Survey Systems						
Object Detection Systems						
Other National Security Systems (Specify)						

Other National Security Systems (Specify)

Other (Specify)

Other (Specify)

Comments:

Section 2.a **Current Product Types - U.S. Customers**

A. State whether your company designs and/or manufacturers underwater acoustics, vibration, or sonar systems-related products for each class of **U.S. customer** listed below . Respond to each cell.

Product Type	DoD/National Security	Oil Industry	Fishing	Hydrographic Surveying	Non-DOD Object Detection	Oceanographic	Other (specify)
Piezoceramics for transducers							
Other piezoelectric materials for transducers (e.g., crystals, polymers, etc.)							
Magnetostrictive materials for transducers							
Transducers based on piezoceramic materials							
Transducers based on piezoelectric materials other than ceramics (e.g., piezocrystals such as PMN-PT or other single crystals, polymers, or other)							
Transducers based on magnetostrictive materials							
Telemetry for transducers							
Packaging materials for sonar systems (encapsulants, connectors, other parts)							
Other Underwater Vibration Sensors							
Other (specify)							
Other (specify)							

B. If your company currently manufactures and/or designs piezoceramic or non-piezoceramic transducers, or vibration sensors, as indicated above -- then state the percentage of each business line that utilize each of the material types below. Indicate this percentage for each type of **U.S. customer**, as applicable. Select "N.A." if this question is not applicable to your company. Respond to each cell.

		DoD/National Security	Oil Industry	Fishing	Hydrographic Surveying	Non-DOD Object Detection	Oceanographic	Other (specify)
Piezoceramic Transducers	Using PZT ceramic materials (Lead-Zirconium-Titanate)							
	Using non-PZT ceramic materials (Barium-Titanate or other)							
Non-Piezoceramic Transducers	Using piezocrystal materials (PMN-PT or other relaxor type single crystals)							
	Using magnetostrictive materials							
	Other materials (e.g., polymers)							
Other Underwater Vibration Sensors	Using PZT ceramic materials							
	Using non-PZT ceramic materials							
	Using piezocrystal materials							
	Using magnetostrictive materials							
	Other materials (e.g., polymers)							
Other (specify)								

Comments:

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Section 2.b **Current Product Types - Non-U.S. Customers**

A. State whether your company designs and/or manufacturers underwater acoustics, vibration, or sonar systems-related products for each class of **Non-U.S. customers** listed below . Respond to each cell.

Product Type	Non-U.S. Defense/ National Security	Oil Industry	Fishing	Hydrographic Surveying	Non-DOD Object Detection	Oceanographic	Other (specify)
Piezoceramics for transducers							
Other piezoelectric materials for transducers (e.g., crystals, polymers, etc.)							
Magnetostrictive materials for transducers							
Transducers based on piezoceramic materials							
Transducers based on non-piezoceramic materials other than ceramics (e.g., piezocrystals such as PMN-PT or other single crystals, polymers, or other)							
Transducers based on magnetostrictive materials							
Telemetry for transducers							
Packaging materials for sonar systems (encapsulants, connectors, other parts)							
Other Underwater Vibration Sensors							
Other (specify)							
Other (specify)							

B. If your company currently manufactures and/or designs piezoceramic or non-piezoceramic transducers as indicated above, identify the percentage of each business line that utilize each of the material types below. Indicate this percentage for each type of **Non-U.S. customer**, as applicable. Select "N.A." if this question is not applicable to your company. Respond to each cell.

Product Type		Non-U.S. Defense/ National Security	Oil Industry	Fishing	Hydrographic Surveying	Non-DOD Object Detection	Oceanographic	Other (specify)
Piezoceramic Transducers	Using PZT ceramic materials (Lead-Zirconium-Titanate)							
	Using non-PZT ceramic materials (Barium-Titanate or other)							
Non-Piezoceramic Transducers	Using piezocrystal materials (PMN-PT or other relaxor type single crystals)							
	Using magnetostrictive materials							
	Using materials (e.g., polymers)							
Other Underwater Vibration Sensors	Using PZT ceramic materials							
	Using non-PZT ceramic materials							
	Using piezocrystal materials							
	Using magnetostrictive materials							
	Other materials (e.g., polymers)							
Other (specify)								

Comments:

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Section 2.c		Non-U.S. Defense/National Security Customers			
A.	If your company indicated that it supplied any of the product types listed in the previous section to **Non-U.S. Defense/National Security-related customers**, then provide the names of companies/organizations, their location, and a description of the products supplied.				
		Customer Name	City	Country	Product Description
	1.				
	2.				
	3.				
	4.				
	5.				
	6.				
	7.				
	8.				
	9.				
	10.				
Comments:					

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Section 3.b **Manufacturing of Piezoelectric Material and Elements for Underwater Acoustic Transducers**

A. State whether your company can design and/or manufacture transduction materials for underwater acoustic transducers for each technical property designated below. If so, indicate the percentate (%) for DoD/National Security, bio-medical, or commercial (e.g., fishing, oil industry, etc.)."

Technical Property	General Purpose/R&D	Passive SONAR Sensor	Active SONAR Element	Mine-Hunting	Doppler Profiling	Side-Scan SONAR	Acoustic Comms
Capable of operation in surf zone (< 20m)							
Capable of operation in littorals (< 200m)							
Capable of operation in deep ocean (> 3000m)							
Operational below 500 Hz							
Operational between 500 Hz - 2 kHz							
Operational between 2 kHz - 10 kHz							
Operational between 10 kHz - 50 kHz							
Operational between 50 kHz - 2 MHz							
Omnidirectional							
Directional							
Power/Energy requirements							
Size, Weight, or Packaging Constraints							
Capable of measuring vector acoustic field							
Other capabilities							

B. Specify which geometries your company considers as unique or special capabilties of your manufacturing process:

Type of Geometry	Unique/Special Capability?	Maximum Diameter (in centimeters)	Description of Unique/Special Capabilities		
Bar					
Plates					
Hollow Cylinders					
Tubes					
Other (specify)					
Other (specify)					

C.

Does your company have the capability to do high-field testing of ceramics?			
If "Yes," what is the maximum voltage you high-field (> 1 kvolts/cm) testing can achieve? Provide your answer in kilovolts (kV).			
If "Yes," what is the minimum electrode separation your high-field testing can achieve? Provide your answer in centimeters.			

D.

Identify the types of inventory of manufacturing materials and/or finished piezoelectric material products that your company maintains.			
On average, what is the average supply level of finished piezoelectric material products kept in inventory?			
On average, what is the average supply level of manufacturing materials kept in inventory?			

Does your company manufacture its own piezoelectric powders?		If "Yes" state your production capacity and the locations of your production facilities	
Total Number of Production Facilities		Annual Production Capability -U.S. Locations	
Total Number of Production Facilities		Annual Production Capability - Non-U.S. Locations	

E.	Production Facility Name		City	Country	
	State the percentage of materials produced annually that is attributed to your Non-U.S. piezoelect+C17ric powder manufacturing facilities				
	State the percentage of the piezoelectric materials that your company uses in any given year that is imported (excluding production from company-owned Non-U.S. facilities)				
	State the number of Non-U.S. suppliers from which you currently import piezoelectric materials				
F.	Identify the locations of the production facilities for your company's Non-U.S. Suppliers of piezoelectric materials.				
	Production Facility Owner	Production Facility Name	City	Country	
	Comments:				
G.	Identify the procedures your company routinely uses to insure that piezoceramic materials identified below meet U.S. Navy-type specifications for ceramics. Select all practices that apply.				
	Material Type			***Testing Processes Utilized for Designated Materials***	
	Navy Type I			Test received samples for impedance data and compare to previous products for consistency	
	Navy Type II			Evaluate samples received per purchase specification: size, capacitance, and/or dissipation	
	Navy Type III			Rely on suppliers statements/representations that their materials are equivalent	
	Navy Type IV			Measure the piezoelectric properties of sample materials according to IEEE standards No 176 on piezoelectricity	
	Navy Type V			Measure the piezoelectric properties according to other methods	
	Navy Type VI			Measure completed transducers to ensure they meet specs	
	Polyvinylidene flouride (PVDF)			Other (describe below)	
	Single Crystal PMN-PT				
	Single Crystal PIN-PMN-PT				
	Galfenol				
	Terfenol-D				
	Lithium Sulfate				
	Comments:				
H.	Does your company have the capability to design and develop improved piezoceramics?				
	Comments:				

Section 3.c Capacity Utilization Rate for Materials Production

A. Report your company's average manufacturing capacity utilization rate for transduction materials (ceramics, crystals, etc) at your U.S.-based facilities for 2008-2012.

	2008	2009	2010	2011	2012 Estimated
Utilization Rate					

B. State the actual transduction material elements possible per month at your U.S.-based manufacturing facilities in 2011.

C. Indicate the number of transduction material elements produced at your facilities for each type of geometry in 2011.

Type of Geometry	Number of Elements		
	Piezeo-Ceramics	Single Crystals	Other
Tubes			
Disks			
Rings			
Plates			
Hemispheres			
Made from Ceramics			
Single Crystals			
Other (specify)			
Other (specify)			

D. State the maximum number of transduction material elements possible per month at your U.S.-based manufacturing facilities in 2011.

D. How long would it take (in months) to achieve this maximum capacity rate?

E. Indicate whether all of your transduction material manufacturing facilities will be operating through 2015. If "No," explain below.

F. In what year did your company achieve the maximum number of transduction material elements per month? Provide that maximum number.

Year

Max. Number

G. What are the critical issues (technology, materials, workforce, etc) needed to maintain this capability at your production facilities to manufacture at the maximum utilization rate?

H. Does your company have a long-term plan to increase or reduce the number of product lines that is produces? If "Yes," describe below 1) the product lines changes and 2) reasons for change. Yes/No

I. Does your company have a long-term plan to increase or reduce the volume of production for certain product lines? If "Yes," describe below 1) the affected product lines and 2) the reasons for change. Yes/No

J. Do your company's commercial business (non-military) demands severely limit your company's ability to supply materials or products to the military or vice versa? If "Yes," describe these limitations below Yes/No

K. Do your company's military business (non-commercial) demands severely limit your company's ability to supply materials or products to the commercial/industrial sectors? If "Yes," describe these limitations below. Yes/No

Comments:

Section 4.b Capability to Design/Manufacture Underwater Acoustic Transducer Products

A. State whether your company from 2008-2011 designed and/or manufactured underwater acoustic transducers and vibration sensors with each of the following technical parameters:

	General Purpose/R&D	Passive SONAR Sensor	Active SONAR Element	Mine-Hunting	Doppler Profiling	Side-Scan SONAR	Acoustic Comms	Other?	Other?
Capable of operation in surf zone (< 20m)									
Capable of operation in littorals (< 200m)									
Capable of operation in deep ocean (> 3000m)									
Operational below 500 Hz									
Operational between 500 Hz - 2 kHz									
Operational between 2 kHz - 10 kHz									
Operational between 10 kHz - 50 kHz									
Operational between 50 kHz - 2 MHz									
Omnidirectional									
Directional									
Power/Energy requirements									
Size, Weight, or Packaging Constraints									
Capable of measuring vector acoustic field									
Other (indicate)									

Comments:	

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Section 4.c Capacity Utilization Rate for Transducer Product Production

A. Report your company's average manufacturing capacity utilization rate for underwater transducer and vibration products at your U.S.-based facility for 2008-2011.

	2008	2009	2010	2011
Transducer Production Utilization Rate	%	%	%	%
Vibration Production Utilization Rate	%	%	%	%

B. State the actual transducer and vibration product units per month (average) at your U.S.-based manufacturing facility in 2011.

C. Indicate the number and types of transducer and vibration product units produced at your facility in 2011:

D. State the maximum number of transducer and vibration product units possible per month that your U.S.-based manufacturing facility was capable of in 2011.

How long would it take (in weeks) to achieve a maximum capacity rate?

E. Indicate whether all of your underwater transducer and vibration product manufacturing facilities will be operating through 2015. If "No," explain below.

F. In what year did your company achieve its highest transducer product units per month? Maximum production number achieved? State the number of 8-hour shifts operated per day used to achieve this production rate.

Year	
Max. Number	
Number of Shifts Per Day	

G. What are the critical issues (technology, materials, workforce, access to capital, etc) needed to maintain this capability at the maximum utilization rate?

H. Does your company have a long-term plan to increase or reduce the number of transducer and vibration product lines that it produces? If "Yes," describe below 1) the product lines changes and 2) the reasons for change.

I. Does your company have a long-term plan to increase or reduce the volume of production for certain transducer and vibration product lines? If "Yes," describe below 1) the affected product lines and 2) the reasons for change. Yes/No

Comments:

Section 4.d		Suppliers for Transduction Materials					
A.	Identify your company's top suppliers for **piezo-ceramic materials**. Provide the location of the supplier, a description of the product(s) supplied, and the average lead-time to receive your piezo-ceramic products from each supplier in weeks.						
		Supplier Name	City	State/Province	Country	Material Type	Average Lead-Time (in Weeks)
	1.						
	2.						
	3.						
	4.						
	5.						
	6.						
	7.						
	8.						
	9.						
	10.						
		Comments:					
B.	If your company utilizes non-U.S. suppliers for piezo-ceramic and/or other piezo-materials, is there an equivalent U.S.-based supplier available? If "Yes," describe your reasoning for not utilizing the U.S.-based supplier below.						
Comments:							

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Section 4e	U.S. National Security Products		
A.	Report the percentage of your company's U.S.-based underwater transducer and vibration technology design and manufacturing capacity that was utilized to produce national security-related products in 2011:	Design	Manufacturing
B.	Indicate the percentage of your company's U.S.-based transducer design and manufacturing capacity that it would be willing to make available for, or otherwise commit to, future national security-related production for underwater acoustics and vibration technologies, assuming fair cost and profit?	Design	Manufacturing
C.	Report the percentage of your company's non-U.S. based transducer design and manufacturing capacity utilized to U.S. produce national security-related products in 2011:	Design	Manufacturing
Comments:			

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 5.b	Division Facilities Information					
A.	How many years has your company been involved in transducer calibration?					
B.	State the number of transducer calibration facilities that your company operated from 2008-2012:					
		2008	2009	2010	2011	2012
	Total number of facilities					
	Number of lake and/or ocean facilities					
	Number of environmentally controlled facilities					
	Comments:					

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 5.c **Current Testing/Calibration Facilities - Lake/Ocean Facilities**

A. Please provide information about **lake and/or ocean facilities** managed by your company/organization.

	Name of Facility	Street Address	City	State	Physical Dimensions *(Meters)*			Usable Frequency Range (in Hz)	Appropriate for Individual Sensor Testing/Calibration?	Appropriate for Full-Scale System Testing/Calibration?	Environmental Factors Controlled at this Facility - Select All That Apply	Number of Technical Support Staff Assigned to Facility	Status of Facility Infrastructure	Challenges to Maintaining this Facility
					Usable Length	Usable Width	Usable Depth							
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Comments:

B. For each lake and/or ocean facility mentioned above, identify any critical and/or recommended updates to each facility's infrastructure below.

Note: Only provide descriptions of **physical upgrades**. Do not list cost estimates.

	Name of Facility	Type of Facility	Critical Updates		Recommended Updates
1.	0				
2.	0				
3.	0				
4.	0				
5.	0				
6.	0				
7.	0				
8.	0				
9.	0				
10.	0				

C. Identify any other lake and/or ocean facilities that your company operates for **testing/calibrating** underwater transduction devices.

	Name of Facility	Street Address	City	State	Physical Dimensions *(Meters)*			Usable Frequency Range (in Hz)	Appropriate for Individual Sensor Testing/Calibration?	Appropriate for Full-Scale System Testing/Calibration?	Environmental Factors Controlled at this Facility - Select All That Apply	Number of Technical Support Staff Assigned to Facility	Status of Facility Infrastructure	Challenges to Maintaining this Facility
					Usable Length	Usable Width	Usable Depth							

Comments:

Section 5.d **Current Testing/Calibration Facilities - Environmentally Controlled Facilities**

A. Please provide information about **environmentally controlled facilities** managed by your company.

	Name of Calibration System	Street Address	City	State	Physical Dimensions (Meters)			Usable Frequency Range (in Hz)	Appropriate for Individual Sensor Testing/Calibration?	Appropriate for Full-Scale System Testing/Calibration?	Environmental Factors Controlled at this Facility - Select All That Apply	Number of Technical Support Staff Assigned to Facility	Status of Facility Infrastructure	Challenges to Maintaining this Facility
					Usable Length	Usable Width	Usable Depth							
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

B. Identify any critical and/or recommended updates to the infrastructure your company's facilities on a facility-by-facility basis.
Note: Only provide descriptions of **physical upgrades.** Do not list cost estimates.

	Name of Calibration System	Environmental Parameters Controlled			Critical Updates	Recommended Updates
1.		Ambient Pressure				
2.		Attenuation				
3.		Bulk Modulous				
4.		Density				
5.		Salinity				
6.		Shear Speed				
7.		Sound Speed				
8.		Temperature				
9.						
10.						

Comments:

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 5.e **Capacity Utilization Rate - Lake/Ocean Facilities**

A. Indicate your company's average capacity utilization rate at each of your **lake/ocean calibration facilities** for 2008-2012.

	Name of Facility	2008	2009	2010	2011	2012 Estimated
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

B. State the **maximum** number of sensor or system calibrations possible per month at each **lake/ocean calibration facilities** in 2011.

	Name of Facility	Max Individual Sensor Calibrations	Max Individual System Calibrations
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

C. State the **actual** number of sensor or system calibrations possible per month at each **lake/ocean calibration facilities** in 2011.

	Name of Facility	Actual Individual Sensor Cals	Actual Individual System Cals
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

D. Indicate whether each of your **lake/ocean calibration facilities** will be operating through 2015. If "No," explain below.

	Name of Facility	Yes/No	If No, provide primary reason.
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Comments:	

BUSINESS CONFIDENTIAL - Per Section 705(d) of the Defense Production Act

Section 5.f **Capacity Utilization Rate - Environmentally Controlled Facilities**

A. Report your company's average capacity utilization rates for its **environmentally controlled** calibration facilities for years 2008-2012.

	Name of Facility	2008	2009	2010	2011	2012 Estimated
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

B. State the maximum number of sensor or system calibrations possible per month at each **environmentally controlled** calibration facilities in 2011.

	Name of Facility	Max Individual Sensor Calibrations	Max Individual System Calibrations
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

C. State the actual number of sensor or system calibrations possible per month at each **environmentally controlled calibration facilities** in 2011.

	Name of Facility	Actual Individual Sensor Cals	Actual Individual System Cals
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

D. Indicate whether each of your **environmentally controlled calibration facilities** will be operating through 2015. If "No," explain below.

	Name of Facility	Yes/No	If No, state the primary reason.
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Comments:	

Section 5.g Capability to Calibrate Specific Underwater Acoustic Transducer Products

State whether your company/organization/university can test and/or calibrate underwater acoustic transducers in accordance with each of the following technical specifications. Do you plan to retain your capabilities through 2015, or will you develop this capability by 2015?

A.

Technical Specifications for Receiver Calibration	Mode of Calibration*	Currently Capable?	Capable Through 2015?
Free Field Voltage Sensitivity (FFVS) Primary Calibration Methods			
Conventional / Free Field Reciprocity (Bobber 2.3.1)			
Two Transducer Reciprocity (Bobber 2.3.2)			
Self Reciprocity (Bobber 2.3.3)			
Cylindrical Wave Reciprocity (Bobber 2.3.4)			
Plane Wave Reciprocity (Bobber 2.3.5)			
Tube Reciprocity - Propagating Wave (Bobber 2.3.6)			
Coupler Reciprocity (Bobber 2.3.7)			
Transfer Coupler Reciprocity (Zalesny)			
Two Projector Null Method (Bobber 2.3.8)			
Free Field Voltage Sensitivity (FFVS) Secondary Calibration Methods			
Comparison Calibrations	Calibration Comparison		
	Calibrated Projector Calibration (Bobber 2.2.1)		
	Calibrated Hydrophone Calibration (Bobber 2.2.2)		
	Tank Calibration (Bobber 2.2.3)		
Impedance Method Calibrations			
Static (Low Frequency) Calibration Methods	Compliance Controlled (Bobber 2.5.1)		
	Mass Controlled (Bobber 2.5.2)		
	Dunking machine (Bobber 2.6.2)		
	Reciprocity calibrator (Bobber 2.6.3)		
Pressure Gradient / Particle Velocity Measurements			
Free Field Calibration (Bobber 2.10)			
Standing Wave Calibration			
	Rigid walled tube (Bobber 2.10)		
	Compliant / Slow wave tube (Bastyr, Lauchle and McConnell)		
Electrical Impedance / Admittance			
Efficiency			
Direct Method (Bobber 2.14.1)			
Impedance Method (Bobber 2.14.2)			
Dynamic Range - Hydrophone (Bobber 2.15)			
Linearity - Projector and Receiver (Bobber 2.15)			
Equivalent Noise Pressure (Bobber 2.16.2)			
Directivity Patterns			
Far Field			
Near Field			
Uniform Radiator			
Non-uniform Radiator			
Beam Width			
Minor Lobe Level			
Directivity Factor / Index			
Parameter Ranges			
Frequency range and resolution			
Temperature range			
Pressure range / resolution for beam patterns			
Nominal uncertainty			
Magnetic Characteristics	Degree of Accuracy		
Magnetic orientation	+/- 1		
Inertial orientation	+/- 5		
Magnetic orientation	+/- 10		
Inertial orientation	+/- 15		

Indicate whether your company can test and/or calibrate underwater acoustic transducers in accordance with each of the following technical specifications. For each, indicate whether your company plans to retain this capability through 2015, or will develop this capability by 2015.

B.

Technical Specifications for Projector Calibration	Mode of Calibration*	Currently Capable?	Capable Through 2015?
Transmit Voltage Response			
Transmit Current Response			
Source Level Maximum			
Efficiency			
Direct Method (Bobber 2.14.1)			
Impedance Method (Bobber 2.14.2)			
Linearity (Bobber 2.15)			
Electrical Impedance / Admittance			
Directivity Patterns			
Far Field			
Near Field			
Uniform Radiator			
Non-uniform Radiator			
Beam Width			
Minor Lobe Level			
Directivity Factor / Index			
Parameter Ranges			
Frequency range and resolution			
Temperature range			
Pressure range			
Angular resolution for beam patterns			
Nominal uncertainty			
Magnetic Characteristics	**Degree of Accuracy**		
Magnetic orientation	+/- 1		
Inertial orientation	+/- 5		
Magnetic orientation	+/- 10		
Inertial orientation	+/- 15		

Comments:

*Physics-based calibration from first principles on devices using an approved method. Comparative measurements from to the device to those taken simultaneously from a device certified by the U.S. Navy or other U.S. Government entity.

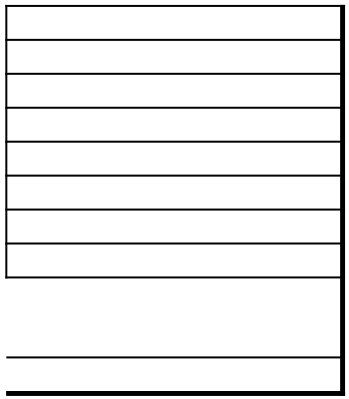
Section 5h Capability to Calibrate Specific Underwater Acoustic Transducers and Transducer Arrays

A. By type of application, indicate whether your company/organization can test and/or calibrate underwater acoustic transducers in accordanc specifications discussed in Section 5. For each device/system, state whether your company/organization plans to retain this capability thro this capability by 2015.

				Capability/Maintenance of Capability Through 2015	Testing/Calibration Capability by Type of Application
Acoustic Receivers					
Reference	Standard Hydrophones	(Primary Calibration)			
Hydrophones	(Secondary Calibration)				
Hydrophone Arrays					
	Line Array				
	Planar Array				
	Cylindrical Array				
	Spherical Array				
	Other Array				
Acoustic Vector Field Sensors					
	Acoustic particle displacement				
	Acoustic particle velocity				
	Acoustic particle acceleration				
	Pressure gradient sensor				
Seismic Accelerometer Sensor					
Seismic Velocity / Geophone Sensor					
Vector Field Array					
	Line Array				
	Planar Array				
	Other Array				
Hybrid Sensors (e.g. ocean bottom seismometer with hydrophone)					
Acoustic Projectors					
Piezoelectric Ceramic Projectors					
Flextensional Projector					
Slotted Cylinder Projector					
Moving Coil Projector					
Impulsive Sources					

		Air Gun				
		Combustive Sound Source				
	Projector Arrays					
		Line Array / Seismic streamer				
		Planar Array				
		Cylindrical Array				
		Spherical Array				
		Other Array				
Comments:						

e with any of the technical ugh 2015, or will develop
For "Will Lose Capability" Responses - Select one or more Explanations



Section 6.a **Transducer/Sub-Assembly Manufacturing Steps**

A. State whether your company 1) **is capable** of performing each of the following transducer manufacturing steps at U.S-based and/or non-U.S. based facilities it owns and/or operates, 2) indicate whether it plans **to retain** each identified capability through 2015, and 3) identify the company's three most important non-U.S. facilities.

Manufacturing Steps	Company-Controlled U.S.-Based Capability	Retain Through 2015?	Number of U.S.-based employees experienced in this process	Company-Controlled Non-U.S. Based Capability	Retain Through 2015?	Non-U.S. Company Facilities - Top Three Countries By Production ($$$)		
						1	2	3
Formulation and firing of piezoceramic materials								
Application of electrodes on piezoceramics								
Polarization of piezoceramic materials								
Determination of piezoelectric properties in piezoceramics (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).								
Growth of piezocrystal materials								
Application of electrodes on piezocrystals								
Testing of electrode adhesion in piezocrystals								
Polarization of piezocrystal materials								
Determination of piezoelectric properties in piezocrystals (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).								
Bonding of similar and dissimilar materials								
Hermetic Sealing of Pressure Vessels								
Integrated electronics								
Magnetics design (tuning and matching circuits)								
Miniature Electronics Assembly								
Transducer build								
Potting for submerged use								
Testing of handling requirements								
Telemetry wiring								
Calibration								

B. Report the number of **U.S.-based and/or non-U.S. based vendors** your company uses to perform each of the following transducer manufacturing steps. For each, indicate whether this utilization of U.S.-based and Non-U.S. vendors will increase, decrease, or remain the same through 2015.

Manufacturing Steps	Utilize U.S.-Based Vendor?	Change Through 2015	Utilize Non-U.S. Based Vendor?	Non-U.S. Based Vendors - Top Three Countries By 2011 Purchases ($$$)			% Change Through 2015
				1	2	3	
Formulation and firing of piezoceramic materials							
Application of electrodes on piezoceramics							
Polarization of piezoceramic materials							
Determination of piezoelectric properties in piezoceramics (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).							
Growth of piezocrystal materials							
Application of electrodes on piezocrystals							
Testing of electrode adhesion in piezocrystals							
Polarization of piezocrystal materials							
Determination of piezoelectric properties in piezocrystals (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).							
Bonding of similar and dissimilar materials							
Hermetic Sealing of Pressure Vessels							
Integrated electronics							
Magnetics design (tuning and matching circuits)							
Miniature Electronics Assembly							
Transducer build							
Potting for submerged use							
Testing of handling requirements							
Telemetry wiring							
Calibration							

C.1	Describe the process by which final products are calibrated, and what data/analysis are provided in calibration reports to customers.			
C.2	Are these tests performed in house?		Comment:	

C.3	Are Navy calibrations facities required and utilized to support these tests?		Comment:	
D.	Describe what unique tools/machinery (large 4-axis milling machines, large ovens, etc) you utilize in the production of transducers or transducer systems. Indicate any issues with availability of these tools/machinery.			
E.	If large systems are developed, how are these transported to customers? Indicate any issues with transportation scheduling.			
Comments:				

Section 6.b **Process Control and Standards**

Specify the types of process controls and standards your company applies to each of the following transducer manufacturing steps. For each, indicate when the last set of controls and standards were defined.

		Process Controls	Last Updated	Standards Applied	Last Updated	Other Process Controls Applied (specify)	Last Updated
A.	Formulation and firing of piezoceramic materials						
	Application of electrodes on piezoceramics						
	Polarization of piezoceramic materials						
	Determination of piezoelectric properties in piezoceramics (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).						
	Growth of piezocrystal materials						
	Application of electrodes on piezocrystals						
	Testing of electrode adhesion in piezocrystals						
	Polarization of piezocrystal materials						
	Determination of piezoelectric properties in piezocrystals (including d-constants, k electromechanical coupling, elastic properties or frequency constants, dielectric properties, etc).						
	Bonding of similar and dissimilar materials						
	Hermetic Sealing of Pressure Vessels						
	Integrated electronics						
	Magnetics design (tuning and matching circuits)						
	Miniature Electronics Assembly						
	Transducer build						
	Potting for submerged use						
	Testing of handling requirements						
	Telemetry wiring						
	Calibration						

B.	Describe how your company insures that it is meeting Navy standards and repeatability.	
Comments:		

Section 6.d **Current Testing/Calibration Facilities - La**

Please identify and describe the **lake and/or ocean facilities** managed by your company/organization.

A.

	Name of Facility	Street Address	City	State	Physical Dimensions	
					Usable Length	Usable Width
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Comments:

B.

	Name of Facility	Type of Facility	Critical Updates		
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

Comments:

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ake/Ocean Facilities

(Meters) Usable Depth	Usable Frequency Range (in Hz)	Appropriate for Individual Sensor Testing/Calibration?	Appropriate for Full-Scale System Testing/Calibration?	Number of Technical Support Staff Assigned to Facility	Status of Facility Infrastructure	Challenges to Maintaining this Facility

Recommended Updates

ion 705(d) of the Defense Production Act

6.d **Capabilities of Enviromentally Controlled Fa**

A. Please provide information about **environmentally controlled** facilities managed by your company/organization.

	Name of Facility	Street Address	City	State	Physical Usable Length
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

B.

	Name of Facility	Environmental Parameters Controlled			
1.		Ambient Pressure			
2.		Attenuation			
3.		Bulk Modulous			
4.		Density			
5.		Salinity			
6.		Shear Speed			
7.		Sound Speed			
8.		Temperature			
9.		Other (Describe below)			
10.		Other (Describe below)			

Comments:

BUSINESS CONFIDENTIAL -

cilities

Dimensions *(Meters)*		Usable Frequency Range (in Hz)	Appropriate for Individual Sensor Testing/Calibration?	Appropriate for Full-Scale System Testing/Calibration?	Number of Technical Support Staff Assigned to Facility	Status of Facility Infrastructure
Usable Width	Usable Depth					

Critical Updates	Recommended Updates

Per Section 705(d) of the Defense Production Act

Challenges to Maintaining this Facility

Section 7	Outsourcing	
A.	Identify the primary reasons why your company outsources to Non-U.S. entities one or more of the transducer manufacturing steps listed on the previous page outside the United States.	
	No U.S. capability	
	No U.S. contractor found	
	Insufficient U.S. workforce	
	Foreign government subsidies - direct	
	Foreign government subsidies - indirect	
	Lack of tax/financial incentives to product in U.S.	
	Lower costs	
	To assure better market access	
	Competitive pricing pressures	
	Maximize profits	
	To better serve offshore markets	
	Other (specify)	
Comments:		

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Section 8	Competitiveness	
A.	Describe the actions your company has taken in the last five years to improve its competitiveness.	
	Comment:	
B.	Describe the actions your company plans to take to improve its competitiveness over the next five years.	
	Comment:	
C.	Is your company aware of the Navy's Sonar Transducer Relability Improvement Program (STRIP) investments?	
	Does your company hold any of the documentation, or otherwise have access to that documentation, from the STRIP program?	
D.	Are there any changes to U.S. Government policies and/or regulations that would increase your company's competitiveness? Explain below.	
	Comment:	
E.	Based on your **highest unit ordered product** for the U.S. Navy in 2011, how many units must you produce per year to maintain the manufacturing capability (personnel and infrastructure)?	
	Comment:	
	What is the cost to maintain this process?	
	Comment:	
	If this product requirement went away, what would be the cost to re-initiate the process in the future? Explain below.	
	Comment:	
F.	Based on your **lowest unit ordered product** for the U.S. Navy in 2011, how many units must you produce per year to maintain manufacturing capability (personnel and infrastructure)?	
	What is the cost to maintain this process? If this product requirement went away, what would be the cost to re-initiate the process in the future? Explain below.	
Comments:		

Section 9.a **Financial Performance**

Report select line items from your company's financial statement for years 2008-2012. From the drop-down indicate whether the reported income statement and balance sheet select line items are Business Unit/Division or Corporate/Whole Company financials.

Note: Business Unit/Division financials are preferred.
Note: Calendar year data is preferred.

Source of Financial Line Items:	
Reporting Schedule:	

Income Statement (Select Line Items)		Record in $ Thousands, e.g. $12,000.00 = survey input of $12				
		2008	2009	2010	2011	2012 Estimated
A.	Net Sales (and other revenue)					
B.	Earnings Before Interest and Taxes					
C.	Net Income					

Balance Sheet (Select Line Items)		Record in $ Thousands, e.g. $12,000.00 = survey input of $12				
		2008	2009	2010	2011	2012 Estimated
A.	Inventories					
B.	Cost of Goods Sold					
C.	Retained Earnings					
D.	Total Current Assets					
E.	Total Assets					
F.	Total Current Liabilities					
G.	Total Liabilities					
H.	Total Owner's Equity					

Comments:	

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Section 9.b		Financial Health
Use the space below to qualify with narrative any anomalies, transactions, or non-recurring events reflected in your financial statement line items, e.g. reporting restatement, merger and acquisition, chapter 11, SEC investigation, etc.		
A.	2008	
B.	2009	
C.	2010	
D.	2011	
E.	2012	
Comments:		

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Section 10 **Research and Development**

State your company's: 1) total (internal and external funded) research and development (R&D) dollar expenditures, 2) the type of R&D performed by percent allocation, 3) and the percentage of total R&D expenditures **relating exclusively to underwater transducer and sonar system business lines,** and 4) your company's R&D funding sources by percent of total R&D dollars sources.

Note: If your company's annual Total R&D Expenditures and Total R&D Funding Sources do not match, explain the discrepancy in the space provided.
Note: Calendar year data is preferred.

Source of R&D Data:								
R&D Reporting Schedule:								
	R&D Expenditures		Record $ in Thousands, e.g. $12,000.00 = survey input of $12					
			2008	2009	2010	2011	2012 Estimated	
A.	1.	Total R&D Expenditures						
	2.	Basic Research (as a percent of Line 1)						
	3.	Applied Research (as a percent of Line 1)						
	4.	Product/Process Development (as a percent of Line 1)						
	5.	Total (must equal 100%)	0%	0%	0%	0%	0%	
	6.	% of Line 1 Related to Underwater Transducers						
	7.	% of Line 1 Related to Underwater Sonar Systems						
	R&D Funding Sources		Record $ in Thousands, e.g. $12,000.00 = survey input of $12					
			2008	2009	2010	2011	2012 Estimated	
B.	1.	Total R&D Funding Sources						
	2.	Internal/Self-Funded/IRAD (as a percent of Line 1)						
	3.	Total Federal Government (as a percent of Line 1)						
	4.	Federal funding from SBIR/STTR program (as a percent of Line 1)						
	5.	Total State and Local Government (as a percent of Line 1)						
	6.	Universities - Public and Private (as a percent of Line 1)						
	7.	U.S. industry, venture capital, non-profit (as a percent of Line 1)						
	8.	Non-U.S. investors (as a percent of Line 1)						
	9.	Other (specify)						
	10.	% of Line 1 Related to Underwater Transducers						
	11.	% of Line 1 Related to Underwater Sonar Systems						
Comments:								

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Section 11.a **Employment**

State the number of annual, full-time equivalent (FTE) employees in your U.S. operations by labor type for years 2008-2011. Do not double count personnel who perform cross-operational roles.

Note: "Total in U.S. Operations" should comprise all preceding labor categories. If not, please indicate why in the comment box.

Source of Operational Data:								
Reporting Schedule:								
		Professional Occupations	2008	2009	2010	2011	2012	Current % U.S. Citizens
A.	1.	Administrative Staff						
	2.	Production Managers/Supervisors/Executives						
	3.	Research and Development (R&D) Staff						
	4.	Production Line Workers, Support Technicians						
	5.	Quality Control, Test Operations						
	6.	Sales and Marketing						
	7.	Facility Operations, Maintenance						
	8.	IT/Network Engineers						
	9.	Other (specify)						
	10.	Other (specify)						
		Total in U.S. Operations						
		Percentage of full-time equivalent staff engaged in Underwater Transducer and/or Sonar Systems	%	%	%	%	%	
B.		Total Number of Scientists and Engineers						
		Percentage of FTE Scientists and Engineers Engaged in Underwater Transducer and/or Sonar Systems						
Comments:								

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Section 11.b **Employment (cont.)**

Describe the size of your engineering workforce, the nature of their experience, the number of years of work experience, and the portion of the workforce that are U.S. citizens:

		Applicable Working Experience							
		> 20 Years		10 - 20 Years		5 - 10 Years		< 5 Years	
		# of Employees	% U.S. Citizens	# of Employees	% U.S. Citizens	# of Employees	% U.S. Citizens	# of Employees	% U.S. Citizens
A.	Total technical personnel								
	Experience in piezo-ceramic formulation and process control								
	Experience in piezo-crystal formulation and process control								
	Experience in application of material/element design to systems that primarily operate below 1 kHz								
	Experience in application of material/element design to systems that primarily operate between 1 kHz - 10 kHz								
	Experience in application of material/element design to systems that primarily operate between 10 kHz - 100 kHz								
	Experience in application of material/element design to systems that primarily operate above 100 kHz								
	Experience with electro-dynamic actuators and force drivers								
	Experience in bonding of materials								
	Experience in potting, encapsulation, or filling (under vacuum) of transducers								
	Experience with creating cost-effective, in-process testing capabilities								
	Comments:								

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Section 11.c	Employment (cont.)				
A.	From the drop-down list of professional occupations, indicate what categories of personnel are the most difficult to hire and retain. Explain below			Difficult to Hire	Difficult to Retain
B.	Identify your company's critical personnel skills and competencies, i.e. expertise that is critical to your company's viability and long-term competitiveness.				
	1.				
	2.				
	3.				
	4.				
C.	Indicate the top five universities from which your technical personnel received their terminal degrees (the first university listed should be the one where the most personnel attended).				
	1.				
	2.				
	3.				
	4.				
	5.				
D.	Indicate the distribution (percentages) of your technical personnel's highest education levels.	Technical Training	Bachelors Degree	Masters Degree	Ph.D.
	Indicate % U.S. Citizens				
E.	Does your company have a piezoelectric ceramist on staff? If "Yes," indicate the highest level of academic degree of these individuals.			Yes/No	Highest Degree Level
F.	Does your company have a piezoelectric materials formulator on staff? If "Yes," indicate the highest level of academic degree of these individuals.			Yes/No	Highest Degree Level
G.	What percentage of your technical personnel are expected to retire (or leave their jobs) within the next five years?				
H.	What percentage of your technical personnel are expected to be new hires over the next five years?				
I.	What percentage of your technical personnel are expected to pursue higher education over the next five years?				
J.	What percentage of your technical personnel were hired with necessary basic skills from previous education?				
	What were the primary skills that had to be taught on-the-job?				
Comments:					

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Section 12	Certification
The undersigned certifies that the information herein supplied in response to this questionnaire is complete and correct to the best of his/her knowledge. It is a criminal offense to willfully make a false statement or representation to any department or agency of the United States Government as to any matter within its jurisdiction (18 U.S.C.A. 1001 (1984 & SUPP. 1197))	
Company Name	
Company's Internet Address	
Name of Authorizing Official	
Title of Authorizing Official	
E-mail Address	
Phone Number and Extension	
Date Certified	
If POC is different from the above named, include below:	
Point of Contact Name	
Title of Point of Contact	
E-mail Address	
Phone Number and Extension	
Would you like a free copy of the final report?	
In the box below, please provide any additional comments or any other information you wish to include regarding this assessment.	
How many hours did it take to complete this survey?	

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