

WILLIAM T. ELLISON

Education:

Ph.D., Acoustics, Massachusetts Institute of Technology, Cambridge, MA

M.S., Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA,

NavE., Naval Architecture, Massachusetts Institute of Technology, Cambridge, MA,

B. S., Naval Science, U.S. Naval Academy, Annapolis, MD,

Professional Experience:

As President and Chief Scientist, of Marine Acoustics, Inc., Dr. Ellison has established MAI as a principal contributor in a wide range of engineering and scientific efforts. MAI serves as the primary test and at-sea evaluation agent for a number of the Navy's key development programs for surface, submarine and air ASW systems. He served as a primary scientific advisor for two of the Navy's most extensive multi-year research programs, the Critical Sea Test and Low Frequency Active programs.

MAI has also played a major role in the Navy's research program with regard to whale behavioral research and acoustic environmental issues. Since 1996 MAI has been at the forefront of environmental noise issues in the ocean, helping design and implement experimental plans to investigate these issues as well as formulate new national standards in this rapidly emerging field.

Recognized as a leading expert in theoretical modeling of acoustic processes, he has developed numerous computer-based models in active use by the US Navy including the Naval Undersea Warfare Center (NUWC) high frequency target strength model and the first elastic resonance model for mines. Based on his extensive field experience in the high Arctic, he developed the NUWC high frequency under-ice acoustic scattering model. Most recently he has authored the Acoustic Integration Model (AIM), a state of the art real-time virtual model for assessing the net impact of sound from a variety of sources (moving or stationary) on a dynamic population of marine wildlife. This model can be adapted to any sound source, but was originally designed for high-powered low frequency sound sources with the potential to transmit over long distances. AIM is recognized by NOAA/NMFS as an acceptable methodology for environmental assessments, and is the primary analysis tool for numerous environmental investigations as well as two National Oceanographic Partnership Program (NOPP) awards in 2007 and 2008 where MAI is teamed with Cornell University and U. South Florida respectively.

In 1983, together with Dr. C. W. Clark, he designed, constructed, tested, and deployed the first field portable acoustic transient localization system. This sonobuoy-based system was designed for tracking whales in the Arctic ice pack and has become the benchmark system for marine mammal acoustic research worldwide. His published contributions to all aspects of the bowhead studies sponsored by the North Slope Borough are highlighted in Fifty More Years below Zero: Tributes and Meditations for the Naval Arctic Research Laboratory's first half century at Barrow, Alaska, D.W. Norton, Ed., Arctic Institute of North America, Fairbanks AK, 2001. In recognition of his many years of scientific research in the Arctic he was elected a Fellow of the Explorers Club.

In 1999, teamed with Dr. Peter Stein of Scientific Solutions, Inc., he led a pioneering effort to design, build and demonstrate a real-time high frequency active sonar system for tracking deep diving whales at ranges out to 1.5 miles. This PC based system towed system recently completed successful engineering trials, and is installed in the U.S. Navy's new TAGOS vessel, T-23, and the new class of SWATH hull ships deploying the SURTASS CLFA System.

In recognition of his exploits in the study of marine mammals, he has served on the U.S. Delegation to the

Scientific Committee of the International Whaling Commission, has served as an Expert Witness before the National Energy Board of Canada as well as other landmark environmental issues, and is a past member of the Scientific Advisory Committee of the North Slope Borough, Alaska. He also served on the Advisory Board to the Marine Mammal Research Program of the Acoustic Thermometry of the Ocean Project at the Scripps Institution of Oceanography, including duties as Acting Chairman. He also served as an expert advisor to the Executive Board for the development of the LFA SURTASS Environmental Impact Statement, and as an expert advisor to the High Energy Seismic Source working group of the California Coastal Commission. He has been an invited expert at national workshops sponsored by the Office of Naval Research and the National Marine Fisheries Service, and a featured speaker in the NOAA Sponsored National Acoustics Lecture Series. He serves on the working groups of two ANSI Standards panels under the auspices of the Acoustical Society of America focused on the impact of noise on marine animals, fish and turtles and the associated metrics standards. He is a co-author of the 2007 benchmark publication, Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations. He has served on the review and oversight board for numerous major international oil and gas development projects and currently serves on the Technical Advisory Panel for the Oil and Gas Producers Joint Industry panel. In 2007 he was elected as a Fellow of the Acoustical Society of America for his contributions to research on the impact of noise of marine mammals.

Employment Summary:

1983 – Present – Chief Executive Officer, President and Chief Scientist, Marine Acoustics, Inc.

1974-1983 - Vice President and Senior Scientist, Cambridge Acoustical Associates.

1974 – 1986 – Commissioned Officer, U.S. Naval Reserve, Retired Captain, USNR, 1986.

1963 – 1974 - Commissioned Officer, Engineering Duty, U.S. Navy.

Honors and Recognition's:

- 1968 Elected to Tau Beta Pi, MIT Chapter
- 1970 Elected to Sigma Xi, MIT Chapter
- Fellow of the Acoustical Society of America
- Fellow of the Explorer's Club
- Distinguished Alumni of the Year, The Breck School, 2001
- Board of Directors, Laboratory of Ornithology, Cornell University
- Marquis' Who's Who in: America, The World, Science and Engineering, Finance and Industry, & the East.
- Work has been recognized in numerous publications including:
 - National Geographic
 - Omni Magazine
 - Natural History
 - U.S. News and World Report
 - Discovery Channel Productions

Membership in Scientific or Cultural Institutions, Societies, etc.

- Explorers Club
- Acoustical Society of America
- Arctic Institute of North America
- Marine Technology Society
- Philosophical Society of Washington

WILLIAM T. ELLISON
RECENT PUBLICATIONS
(2006 to Present)

K.J. Vigness-Raposa, C. Damon, A.S. Frankel, W.T. Ellison, C. La Bash and P.V. August, "Marine wildlife behavior database for predicting and minimizing environmental impacts," MIT Conference on GIS, with Apr 2006.

Frankel, A., Love, R.H., Monjo, C.L., Newhall, B.K., Arvelo, J.I., and Ellison, W.T., "Physics-based volume clutter from GeoClutter biological distributions," J. Acoust. Soc., Am., **119**, 3437 (2006).

"Validating physics-based clutter from seafloor roughness and biologic scattering (A),"
Juan Arvelo, Charles Monjo, Bruce Newhall, Adam Frankel, Richard Love, and William T. Ellison , J. Acoust. Soc. Am. **120**, 3381 (2006)

Adam Frankel, Richard H. Love, Charles Monjo, Bruce Newhall, Juan I. Arvelo, Jr., and William T. Ellison , "Physics-based volume clutter from GeoClutter biological distributions (A)," , J. Acoust. Soc. Am. 119, 3437 (2006)

John Davidson, Adam Frankel, William Ellison, Steven Summerfelt, Arthur N. Popper, Patricia Mazik, and Julie Bebak, "Minimizing noise in fiberglass aquaculture tanks: Noise reduction potential of various retrofits," , Aquaculture Engineering, (37), p 125-131, 2007.

Lidia Eva Wysocki, John Davidson, Michael E. Smith, Adam Frankel, William Ellison, Patricia M. Mazik, Arthur N. Popper, Julie Bebak, "The effects of aquaculture noise on hearing, growth and disease resistance of rainbow trout *Oncorhynchus mykiss*," Aquaculture (in press)

Brandon L. Southall, Ann E. Bowles, William T. Ellison, James J. Finneran, Roger L. Gentry, Charles R. Greene Jr., David Kastak, Darlene R. Ketten, James H. Miller, Paul E. Nachtigall, W. John Richardson, Jeanette A. Thomas, and Peter L. Tyack, "Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations," , Aquatic Mammals 2007, 33(4).

Arvelo, J.I., Newhall, B.K., Monjo, C.L., Frankel, A., Love, R.H., and Ellison, W.T., "Ambient Noise and Reverberation Modeling," , Invited talk to the special session at the 8th International Conference on Theoretical and Computational Acoustics, Heraklion, Crete, 2-6 July 2007.

Kathleen J Vigness Raposa, Adam S Frankel, Geoff Sisson, William T Ellison, Christopher Damon, "Marine wildlife behavior database for estimating environmental impacts" ., J. Ac. Soc. Am., 122 (5):3059 (2007)

W.T. Ellison and C.W. Clark , "Tracking the Bowhead Whale: Photos and Underwater Sounds from Field Studies in the 1980's off Point Barrow, Alaska," Invited Presentation to the New England Chapter of the Explorers Club, 18 Mar 2008.

Brandon L. Southall, Ann E. Bowles, William T. Ellison, James J. Finneran, Roger L. Gentry, Charles R. Greene Jr., David Kastak, Darlene R. Ketten, James H. Miller, Paul E. Nachtigall, W. John Richardson, Jeanette A. Thomas, and Peter L. Tyack, "Proposed Marine Mammal Exposure Criteria: Current Database Limitations, and Research Needs," , J. Acoust. Soc. Am. (A) 123(5) Pt2, 2988(2008)

"Marine mammal noise exposure criteria: initial scientific recommendations," Southall, B.L., Bowles, A.E., Ellison, W.T. Finneran, J.J., Gentry, R.L., Greene, C.R.Jr., Kastak, D., Ketten, D.R., Miller J.H., Nachtigall, P.E., Richardson, W.J., Thomas, J.A., and Tyack, P.L., in Underwater Noise Measurement, Impact and Mitigation, 2008, Edited by: Paul Lepper, Ross Compton, Simon Dible, Trevor Guymer, Ed Harland, Simon Richards and Stephen Robinson., . Proceedings of the Institute of Acoustics Conference on Underwater Noise Measurement, Impact and Mitigation. Southampton, UK 14-15 October, 2008. Published by the Institute for Acoustics: St Albans, UK. Pages 13-16. 2008.

“Underwater Acoustic Scene Analysis: Exploration of Appropriate Metrics,” William T. Ellison, Adam S. Frankel, David Zeddies, Kathy Vigness-Raposa, Cheryl Schroeder, “Invited Presentation Fall mtg ASA, Nov 2008.

“Acoustic masking in marine ecosystems: intuitions, analysis, and implication,” Clark CW, Ellison WT, Southall BL, Hatch L, Van Parijs SM, Frankel A, Ponirakis D, MEPS 395:201-222, 2009.

Full Listing
Peer-Reviewed Publications:

1. "Transmission Loss Measurements of Soda-Straw Banks," J. Acoust. Soc. Am., 42, 530-531 1967.
2. "Low ka Target Strengths of Naval Mines," (with E.G. McLeroy), U.S. Navy Journal of Underwater Acoustics, July 1984.
3. "Utilization of Acoustic Location Data in Determining a Minimum Number of Spring-Migrating Bowhead Whales Unaccounted for by the Ice-Based Visual Census," (with D. Ko, J.E. Zeh, C. W. Clark, B.D. Krogman, and R. Sonntag). Rep. Int. Whal. Comm. 36:325-38, 1986.
4. "A Preliminary Account of the Acoustic Study Conducted During the 1985 Spring Bowhead Whale, *Balaena mysticetus*, Migration Off Point Barrow Alaska" (with C. W. Clark, and K. Beeman). Rep. Int. Whal. Comm. 36:311-16, 1986.
5. "A Description of a Tracking Algorithm and Its Application to Bowhead Whale Acoustic Location Data Collected During the Spring Migration near Point Barrow, Alaska 1984-1986, (with R.M. Sonntag, C. W. Clark, D. R. Corbitt, B. D. Krogman). Rep. Int. Whal. Comm. 36:299-310, 1986.
6. "Potential Use of Surface Reverberation by Bowhead Whales, *Balaena mysticetus*, in Under-Ice Navigation: Preliminary Considerations", Rep. Int. Whal. Comm. 37:329-332, 1987.
7. "A Simulation Model for High-Frequency, Under Ice Reverberation", (with G.C. Bishop and L.E. Mellberg), J. Acoust. Soc. Am., 82(1), 275-86, 1987.
8. "Comparison of Measured Bowhead Whale, *Balaena mysticetus*, Migration Parameters with Results from the Tracking Algorithm", (with R.M. Sonntag, and C. W. Clark), Rep. Int. Whal. Comm. 37:309-311, 1987.
9. "Refraction Effects in the Arctic Environment Applied to the Visual Censusing of Bowhead Whales, *Balaena mysticetus*," (with R.M. Sonntag, Robert Hodges and B. D. Krogman). Rep. in Whal. Comm. 37: SC/39/PS9 1987.
10. "The Target Strength of a Mock Model Submarine", U.S. Navy Journal of Underwater Acoustics (with F.P. Fessenden and J. Holland) 1988.
11. "Observations on the Ice-Breaking and Ice Navigation Behavior of Migrating Bowhead Whales Near Point Barrow, Alaska, Spring 1985", (with J.C. George, C.W. Clark, and G.M. Carroll), ARCTIC, 42 (1), 24-30, March 1989.
12. "Acoustic Tracking of Migrating Bowhead Whales", (with C. Clark and K. Beeman) Oceans '86, IEEE Oceanic Eng. Society, New York, pp 341-346
13. "A High Frequency Under-Ice Scattering Model (U)", U.S. Navy Journal of Underwater Acoustics (with C. J. Albanese and S. E. Chellis), 39:1051 October 1989.
14. "The Low-Frequency Bistatic Response of a Submarine-like Structure (U)", U.S. Navy Journal of Underwater Acoustics (with C.M. Godoy and C.E. Rosenthal), 41:353, April 1991.
15. "An Investigation of Acoustic Tracking and Data Fusion Errors in the Cue-To-Kill Process (U)", Invited Paper, U.S. Navy Journal of Underwater Acoustics, [with D. G. Kaiser, Stanley J. Labak and R. L. Watters) 45:669, July 1995.
16. "LFAA "LFAA Shallow Water At-Sea Performance Assessment to Date", Invited Paper, U.S. Navy Journal of Underwater Acoustics, 46(1): 351-371, Jan 1996.
17. "Undersea Warfare Products and Systems Implications," in Critical Sea Test Final Report 1996, principal co-author with J. Zittel (Ed.), U.S. Navy Space and Naval Warfare Systems Command, Sep 1996.
18. "Calibration and comparison of the acoustic location methods used during the spring migration of the bowhead whale, *Balaena mysticetus*, off P. Barrow, Alaska, 1984-1993," with C.W. Clark, J. Ac. Soc. Am. 107(6), 3509-3517, June 2000.
19. "Effect of anthropogenic low frequency sounds on the distribution, abundance, diving behavior, and vocal behavior of *Balaenoptera* whales," with D. Croll, C. Clark, J. Calambokidis, and B. Tershy, Animal Conservation, 2001.

20. "Potential use of low-frequency sounds by baleen whales for probing the environment: evidence from models and empirical measurements," with C. Clark in Echolocation in Bats and Dolphins, (J. Thomas, C. Moss, and M. Vater, eds.) The University of Chicago Press, 2004. p.564-589.
21. "Minimizing noise in fiberglass aquaculture tanks: Noise reduction potential of various retrofits," John Davidson, Adam Frankel, William Ellison, Steven Summerfelt, Arthur N. Popper, Patricia Mazik, and Julie Bebak, *Aquaculture Engineering*, (37), p 125-131, 2007.
22. "The effects of aquaculture noise on hearing, growth and disease resistance of rainbow trout *Oncorhynchus mykiss*," Lidia Eva Wysocki, John Davidson, Michael E. Smith, Adam Frankel, William Ellison, Patricia M. Mazik, Arthur N. Popper, Julie Bebak, *Aquaculture* (in press)
23. "Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations," Brandon L. Southall, Ann E. Bowles, William T. Ellison, James J. Finneran, Roger L. Gentry, Charles R. Greene Jr., David Kastak, Darlene R. Ketten, James H. Miller, Paul E. Nachtigall, W. John Richardson, Jeanette A. Thomas, and Peter L. Tyack, *Aquatic Mammals* 2007, 33(4).
24. "Acoustic masking in marine ecosystems: intuitions, analysis, and implication," Clark CW, Ellison WT, Southall BL, Hatch L, Van Parijs SM, Frankel A, Ponirakis D, *MEPS* 395:201-222, 2009.

Presentations, Symposia, Patents and Major Technical Reports

1. "An Analysis of the Response of Cylindrical Ducts to Internal Zero Mean flow, Air-Carried Acoustic Excitation" Master's Thesis, MIT 1968.
2. "Variational Formulation for the Fully Coupled Problem of a Vibrating Circular Plate in a Rigid Wall," Presentation to the Annual Spring Meeting, J. Acoust. Soc. Am., 48, 83a, 1970.
3. "Finite Membranes and Plates Vibrating in a Dense fluid: An Analysis of the Fully Coupled Problem," Ph.D. Thesis, MIT, ONR Report 71476-2, 1970.
4. "Calculations of Baseline Self-Noise Goals," CAA Report C-502-243-3, Prepared for NAVSEA, April 1976.
5. "Target Strength of Double Hull Submarine," CAA Report S-S 12-342.7, Prepared for NAVSEA, April 1976.
6. "Partial Coatings, Analysis and Applications," CAA Report C-526-2 10, Prepared for ONR, February 1977.
7. "Self Noise Reduction," CAA Rpt TM/C-530-243, Prepared for NAVSEA, April 1977.
8. "Sonar Dome Self Noise Mechanisms," CAA Report C-539-243.3, Prepared for NAVSEA, August 1977.
9. "Echoes from Absorptive Targets," CAA Report U-532-249, Prepared for NAVSEA, May 1977.
10. "Feasibility of Thin Viscous Absorbers," CAA Report C-549-243.9, Prepared for NAVSEA, December 1977.
11. "Comparison Between Plate and Shell Models for Scattering from a Framed Elastic Cylinder," Presented at the 94th Meeting, J. Acoust. Soc. Am., (with J. M. Garrelick, 62, 567A, 1977.
12. "Acoustic Research Requirements in Support of Under-Ice Weapon Effectiveness," Proc. 32nd Navy Symposium on Underwater Acoustics, New London, 203, 1978.
13. "Evaluation of Target Strength Prediction Models," CAA Report C-551-242, Prepared for NAVSEA, January 1978.
14. "Analysis of Submarine Wake Target Strength," CAA Report C-555-210, Prepared for ONR, February 1978.
15. "Scientific Plan for Project WHALES (RU-179) Spring 1979," CAA Report U-598-267, Prepared for Naval Arctic Research Laboratory, February 1979.
16. "Research Requirements in Support of Under-Ice High Frequency Acoustic Studies," CAA Report C-596-256, Prepared for ONR, January 1979.
17. "Summary Outline of Studies to Date and Anticipated Research Requirements in the Seasonal Ice Zone," CAA Report U-599-267, Prepared for Naval Arctic Research Laboratory, February 1979.
18. "Target Strength Studies of Free-Flooded Spaces," CAA Report C-699-281, Prepared for NUSC NLON, July 1980.
19. "Simulation Studies of Under-Ice Acoustic Scattering," CAA Report C-7 14-270, Prepared for ONR, October 1980
20. "Beaufort Sea Underwater Sound Propagation" Invited Presentation, San Diego Workshop on the Interaction between Man-Made Noise and Vibration and Arctic Marine Wildlife, Acoust. Soc. Am., 24-29 February 1980.
21. "An Analysis of a Buckled Element Concept for Acoustic Baffles," CAA Report U-274-280, Prepared for NUSC NLON, November 1980.
22. "Target Strength Studies of SSN 637 and SSBN 616/640 Class Fairwaters," CAA Report S-763-296, Prepared for NUSC NLON, May 1981.
23. "Results of Low KA Target Strength Analysis for Two Model Configurations and Comments on Experimental Procedure," CAA Report S-764-288.1, Prepared for NCSC, Panama City, May 1981
24. "Low KA Acoustic Scattering Studies," CAA Report U-789-288.1, Prepared for NCSC, Panama City, September 1981.
25. "Environmental Noise Studies in the Arctic," The Northern Engineer (With W.C. Cummings and D.V. Holliday), 13, 1, 14-20, 1981.
26. "The Target Strength of a Mock Model Submarine," Proceedings of the 34th Navy Symposium on Underwater Acoustics (With F.P. Fessenden and J. Holland), San Diego, 363, 1981.

27. "Measurements of Man-Made Noise off North Slope, Alaska," Presented at the 102nd Meeting, J. Acoust. Soc. Am., 70, 1, 582-3a, (With W.C. Cummings and D.V. Holliday), 1981.
28. "Near Shore Ambient Noise Off the North Slope of Alaska," Presented at the 102nd Meeting, J. Acoust. Soc. Am., 70, 1, 584-5A, (With W.C. Cummings and D.V. Holliday), 1981.
29. "Target Strength and Echo Processing Time," CAA Report U-834-288.1, April 1982.
30. "Results of Experimental Testing of Damping Module," CAA Rpt U-844-3 13.3 Prepared for DTNSRDC, May 1982.
31. "1983 IMSTARP Field Data Acquisition System: Documentation and an Example of Preliminary Results," CAA, Inc. Report U-845-2023, 1982.
32. "Environmental Noise Programs in the Arctic," Invited Presentation 17th Annual Awards Meeting, Narragansett Chapter, Acoust. Soc. Am., 1982.
33. "An Experimental Evaluation of Acoustic Reciprocity Techniques," Vol I & II, CAA Report, C844-318, 1982.
34. "Using Bowhead Underwater Sounds to Determine Spatial Distribution of the Migrating Whales," Invited Presentation at the Second Conference on the Biology of the Bowhead Whale (With W.C. Cummings and D.V. Holliday), Anchorage, 1983.
35. "Passive Localization of Sounds from Bowhead Whales, Balaena Mysticetus: Spring Migration Off Point Barrow in 1982," Presented at the Annual Spring Meeting, J. Acoust. Soc. Am., 73, 51, 556A, 1983.
36. "Feasibility of Passive Acoustic Location of Bowhead Whales in Population Studies Off Point Barrow, Alaska: A Report to the North Slope Borough," (With W.C. Cummings and D.V. Holliday) 1983.
37. "An Under-Ice Scattering Model; Comparison with Measured Results," Proceedings of the 35th Navy Symposium on Underwater Acoustics, (with C. J. Albanese), Wash. D.C., November 1983.
38. "An Analysis of Under-Ice Reverberation Including ADCAP Site Characterization Studies and Development of an Adverse Environment Reverberation Model," MARAC Final Contract Report N(0) 0 140- 83-C-GW36, January 1984.
39. "Real-Time Passive Localization and Spectrum Analysis of Transient Underwater Sounds Using a Field Portable Computer Based System," with C.W. Clark and K. Beeman), J. Ac. Soc. Am., 76(S1), 525A, 1984
40. "Improvements to the Adverse Environment Model, Including Preliminary Concepts for Development of a Mean Level Model," MARAC Final Contract Report, N00140-84-C-BE83, August 1984.
41. "A Mean Level Acoustic Scattering Model for First Year and Multi Year Under-Ice Conditions," MAI Final Contract Report N00140-85-M-UC23, Prepared for NUSC NLON, December 1984.
42. "Acoustic Tracking and Distribution of Migrating Bowhead Whales, Balaena Mysticetus, Off Point Barrow, Alaska in the Spring of 1984", (with C. W. Clark), Paper 5C137IP51 to the IWC Scientific Committee, June 1985 (unpublished).
43. "An Acoustic Study of Bowhead Whales, Balaena Mysticetus, Off Point Barrow, Alaska During the Spring 1984 Migration," (With C.W. Clark and K. Beeman), Final Contract Report to the NSB (draft copy), January 1985(a).
44. "Objectives and Methods for the Acoustic Studies Conducted During the Spring (1984) Migration of Bowhead Whales, Off Point Barrow, Alaska" (with C.W. Clark and K. Beeman), Presented to the Third Conference on the Biology of the Bowhead Whale, Anchorage, Alaska, January 1985(b).
45. "Variations in the Rates and Types of Bowhead Whale, Balaena Mysticetus, Vocalizations During the Spring (1984) Migration Off Point Barrow, Alaska" (with C. W. Clark and K. Beeman), Presented to the Third Conference on the Biology of the Bowhead Whale, Anchorage, Alaska, January 1985(a).
46. "Acoustic Locations and Distribution of Migrating Bowhead Whales, Balaena Mysticetus, Off Point Barrow, Alaska in the Spring of 1984 During Good and Very Good Visual Censusing Conditions,"(With C. W. Clark and K. Beeman), Presented to the Third Conference on the Biology of the Bowhead Whale, Anchorage, Alaska, January 1985(b).
47. "Acoustic Locations and Distribution of Migrating Bowhead Whales, Balaena Mysticetus. Off Point Barrow, Alaska in the Spring of 1984 During Poor Visual Censusing Conditions) (With C.W. Clark and K. Beeman), Presented to the Third Conference on the Biology of the Bowhead Whale, Anchorage, Alaska, January 1985(c).

48. "A Review of Low Frequency Target Strength: Direct Path and Long Range Measurement Issues," MAI Report 52-02 Prepared for SPAWAR PMW 180-5, 1985.
49. "Backscattering from a Cylinder with Variable Surface Impedance," Presented at the 89th Meeting, J. Acoust. Soc. Am., 57, 559A, 1985.
50. "A Simulation Model for High-Frequency, Under Ice Reverberation", (with G.C. Bishop and L.E. Mellberg, C. Albanese, and S. Overdeep), J. Acoust. Soc. Am., Suppl.1 77, 1985.
51. "A Preliminary Account of the Acoustic Study Conducted During the 1985 Spring Bowhead Whale, Balaena Mysticetus, Migrations" (with C. W. Clark and K. Beeman). Proceedings of the 1985 meeting of the Scientific Committee of the International Whaling Commission. Paper 5C1371B513.
52. "Acoustic Location Techniques and Calibration Methods Used During the Spring 1984 and 1985 Bowhead Whale, Balaena Mysticetus, Migration" (with C. W. Clark and K. Beeman), Proceedings of the 1985 Meeting of the Scientific Committee of the International Whaling Commission. Paper 5C1371P5 10.
53. "An Acoustic Study of Bowhead Whales, Balaena Mysticetus, Off Point Barrow, Alaska During the Spring of 1984", (with C. W. Clark and K. Beeman), Report to the North Slope Borough, 145 pp, Jan. 1986.
54. "Progress Report on the Analysis of the Spring 1985 Acoustic Data Regarding Migrating Bowhead Whales, Balaena Mysticetus Near Point Barrow Alaska" (with C. W. Clark, and K. Beeman), Paper SC/38IP56 to the IWC Scientific Committee, May 1986 (unpublished).
55. "A Simulation Model for High-Frequency, Under-Ice Reverberation", (with G.C. Bishop and L.E. Mellberg), NUSC TR 6268, 1 August 1986, i-vii.
56. "A High Frequency Under-Ice Scattering Model", (with C.J. Albanese), NUSC TR, 1987
57. "An Acoustic Study of Bowhead Whales, Balaena Mysticetus, During the 1985 Spring Migration", (with C. Clark and K. Beeman). A Report to the North Slope Borough, Department of Wildlife Management, P.O. Box 69 Barrow, Alaska, 143 pp.1988.
58. "Acoustic tracks of migrating bowhead whales (Balaena mysticetus; off Point Barrow, Alaska based on vocal characteristics," Proc. IWC Scientific Paper, SC/41/P56, 1989
59. "Introduction to Low Frequency Active (LFA) Operations: An Operator Training Guide", Hughes Aircraft Company, 1991.
60. "Critical Sea Test Seven (CST-7) Phase 1 Final Report: Bistatic Test Conduct and Performance Assessment of the AN/SQR-19IMARS Processor System on Board USS Reuben James (FFG57 (U)", MAI-TR # MAI- 10402-S-92-14, August 1992.
61. "Bistatic Operations Concepts and Issues", Invited Presentation for the Space and Naval Warfare Systems Command Bistatic Interoperability Meeting at the Applied Physics Laboratory, Johns Hopkins University, October 1993.
62. "Bioacoustics of Baleen Whales: From Infrasonic to Complex Songs," (With C.W. Clark) J. Acoust. Soc. Am. 94(3)1830(A), 1993.
63. "Variation in Received Level from Man-Made Low-Frequency Underwater Noise Sources as a Function of Diving Animal Depth," (With K. Weixel and C.W. Clark) J. Acoust. Soc. Am. 94(3) 1850 (A), 1993.
64. "Low Frequency Mechanoreceptors in Man: A Preliminary Investigation into the Acoustical/Physical Basis for Human Physiological Response to Low Frequency Water Borne Noise," (with B. Wooley), MAI 192-U-93-N37, prepared for NCCOSC Code 715, under contract N66601-91-D-0062, 28 Apr 1993.
65. "Considerations for Designing Underwater Acoustical Playback Experiments," (With K. Weixel) J. Acoust. Soc. Am. 96(5) 3316-7(A), 1994.
66. "Low frequency signaling behavior in mysticete whales," with C.W. Clark, J. Ac. Soc. Am. 101(5), 3163, May 1997.
67. "Summary of recommendations made by the expert panel at the HESS Workshop on the effects of seismic sound on marine mammals, [App.5]" Pepperdine University, Malibu CA June 11-12, 1997, Panel Member with J. Calambokidis, et al.
68. "Exploring the form and function of biological sounds in shallow water from the perspective of a systems designer," [Invited Paper], J. Ac. Soc. Am. 104, 1826, 1998.

69. "Masking: A Discussion of the Underlying Issues," National Marine Fisheries Service (Office of Protected Resources) Workshop on Acoustic Criteria, Silver Spring, MD, September 9-12, 1998.
70. "Low-frequency Sound Scientific Research Program. Phase I: Responses of blue and fin whales to SURTASS LFA, Southern California Bight, 5 September - 21 October, 1997". February 27, 1998, 36p. +Figures, Tables, and Appendices. with C.W. Clark, and Peter Tyack (lead author).
71. "An acoustic integration model (AIM) for assessing the impact of underwater noise on marine wildlife" with K. Weixel and C.W. Clark, [Invited Paper] J. Ac. Soc. Am. 106(4) Pt 2, 2250, Oct 99
72. "Acoustic responses of Baleen whales to low-frequency man-made sounds " with C.W. Clark and P. Tyack, J. Ac. Soc. Am. 106(4) Pt 2, 2279, Oct 99
73. "Responses of Four Species of Whales to Sounds of SURTASS LFA Sonar Transmissions," Cornell University, Woods Hole Oceanographic Institution, Marine Acoustics, Inc. with C. Clark and P. Tyack, P., 1999.
74. "Acoustic Integration Model (AIM) [EQ22]," Navy Applied Research Program (PE 0602121N) ONR Environmental Quality Technical Review Information Exchange, USNA O&F Club Annapolis MD [June 7-8, 2000]
75. "Acoustic Integration Model (AIM), Status to Date," Environmental Consequences of Sound Conference [ONR], Holiday Inn Rosslyn VA [July 19-20, 2000]
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