Modern Ultrasonic Transducers

Including Phenomenally High Sensitivity, High Frequency Non-Contact Transducers

Non-Destructive Analysis of Solids, Liquids, and Gases

ultran

Redefining the
limits of ultrasound

WELCOME TO ULTRAN

Ultran is a team of scientists and skilled technicians that works closely with our clients. Together we are dedicated to high quality and cost-effective materials production and applications through Ultrasonic Non-Destructive Characterization. Ultran accomplishes this by focusing on the heart of ultrasound: the transducer.

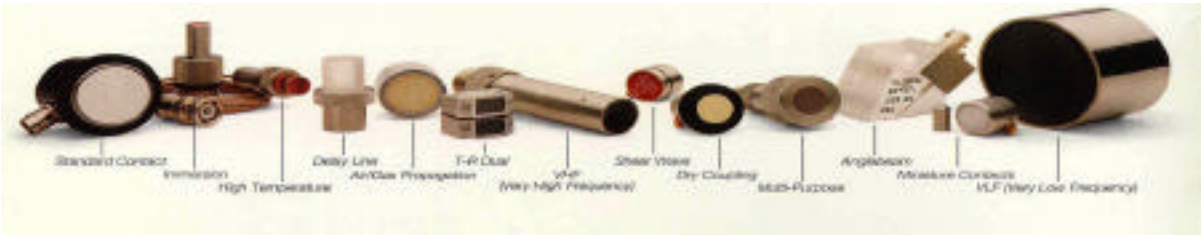
Long ago we realized that for ultrasound to rival other wave-based methods, we had to first develop the field. Proper acoustic characteristics are needed to achieve the desired materials test objectives. Proper techniques are essential to the test environment and the condition of a material. These goals are possible only through transducers with the right acoustics that perform under given conditions of testing.

Twenty years of non-stop R&D in transducers and applications allows us to share Ultran's milestones with you.

…a team of scientists, engineers, skilled technicians, and clients.

YEAR	MILESTONE
1977	Unipolar λ-series transducers for extremely high resolution and spectroscopy.
1978	Dual damping mechanism for high signal-to-noise ratios.
1979	Optimum development of broad-band (W-series), medium-band (P-series), and narrow-band (K-series) transducers from 500kHz to 25MHz.
1980	Very High Frequency (M-series) transducers from 30MHz to ~200MHz. 0° shear wave propagation transducers from 250kHz to 20MHz.
1983	Dry Coupling longitudinal and shear wave transducers from 250kHz to 25MHz. Introduction of air/gas propagation transducers from 100kHz to 5MHz.
1985 & 1992	High Temperature transducers from 250kHz to 5MHz for operation >800°C.
1986	Introduction of Wideband Ultrasonic Spectroscopy.
1988	Very High Numerical Aperture transducers up to 150MHz.
1989 to present	Very High Power transducers for biomedical and industrial applications from <500kHz to 100MHz. Introduction of transducer libraries for materials characterization.
1993	Very Low Frequency transducers from 30kHz to 250kHz.
1995 to present	Phenomenally High Air/Gas Transduction transducers from <100kHz to 10MHz for practical NON-CONTACT ULTRASOUND mode for industrial and bio-medical applications.
1988 to present	Guidance, education, and training for ultrasound users in industrial, medical, food, horticulture, construction and other fields.

Always labeled as being ahead of our time, we at Ultran continue to provide innovative solutions to very complex problems.



TECHNICAL SERVICES

Ultran has achieved an authoritative position in the ultrasonic industry by continually introducing innovative solutions to very complex problems. This is the result of combining two critical elements. The first element is Ultran's inter-disciplinary team of scientists and engineers in a comprehensive laboratory facility. Equally important is a very close and confidential working relationship with our customers.

Analytical & Feasibility Services

Ultran provides services for the ultrasonic nondestructive analysis of materials and components. We are equipped to perform analysis for defects, elastic and mechanical properties, micro-structure, interfacial, dimensional imaging and other test objectives. Each customer's inquiry is evaluated on its own merit and answered accordingly. We complete a project by providing a technical report describing objectives, techniques, observations, and results.

R&D Services & Transducer Prototyping

If your inquiry or problem requires in-depth analysis, new techniques, or a prototype transducer device, then our focus is on providing a practical solution by considering all operational factors. This is beneficial for establishing a strategy for assessing risk factors and cultivating a problem-solving mode. R&D projects include non-destructive characterization of special materials and processes, novel transducer designs, and other diagnostic or non-diagnostic uses of ultrasound.

We keep you up-to-date with the progress of your project. On completion of a project we give you a technical report describing objectives, techniques, observations, conclusions, and recommendations. As you would expect, science and technology transfer -- including education, training, and consultancy -- becomes an extremely significant part of our services.

…We are dedicated to exceeding the expectations of our customers.

A few of our special applications transducers

Customers & Publications

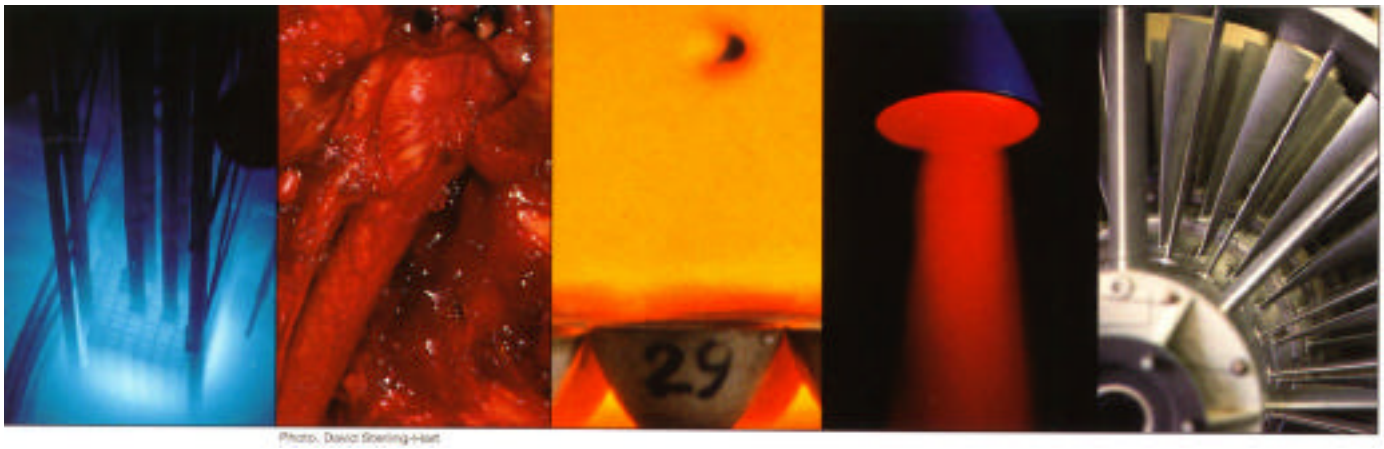


Photo: David Sterling-Hart

Some Customers

Westinghouse
Schlumberger-Doll
Bell Helicopter
ALCAN
BP America
Defelsko
Raytheon
Sofratest
Institute of Paper Science & Technology
Sofratest, France
NPL, UK
U.S. Air Force, Army, & Navy
Penn State University
University of West Virginia
Virginia Polytechnic Institute & University
Boeing
Katholieke Hogeschool, Belgium
Fraunhofer Institute, Germany
Siemens
Corning
General Electric
Hitachi
KAIST, Korea
Thiokol Propulsion
NASA
Lockheed-Martin
Weyerhaeuser
DOW Chemical
Johns Hopkins University
University of Penn
Smithkline-Beecham
Marion Composites
Electricite du France
Babcock & Wilcox
Framatome
CISE, Italy
EXXON

Some Publications

Our staff has authored or co-authored several important papers inspired by our novel advancements in ultrasound. Here is a partial list.

1 Bhardwaj, M.C., "Principles and Methods of Ultrasonic Characterization of Materials, " Adv. Cer. Mat., v. 1, n. 4 (1986).
2 Bhardwaj, M.C., "Fundamental Developments in Ultrasonics for Advanced NDC," in Nondestructive Testing of High Performance Ceramics, A. Vary, Editor, Am. Cer. Soc., Westerville, OH (1987).
3 Bhardwaj, M.C., "Advances in Ultrasound for Materials Characterization," Ad. Cer. Mat., v. 2, n. 3A (1987).
4 Brunk, J.A., Valenza, C.J., and Bhardwaj, M.C., "Applications and Advantages of Dry Coupling Ultrasonic Transducers for Materials Characterization and Inspection," in Acousto-Ultrasonics, Theory and Applications, John C. Duke, Jr., Editor, Plenum Press, New York (1988).
5 Bhardwaj, M.C., "Modern Ultrasonic Concepts of NDC," Ad. Mat. Processes, v. 5 (1989).
6 Bhardwaj, M.C., "Simple Ultrasonic NDC for Advanced Ceramics Development & Manufacture," in Advanced Metal and Ceramic Composites, Bhagat, Clauer, Kumar, and Ritter, Editors, Minerals, Metals, and Materials Society, Warrendale, PA (1990).
7 Bhardwaj, M.C., "High-Resolution Ultrasonic Nondestructive Characterization," Cer. Bull., v. 69, n. 9, (1990).
8 Bhardwaj, M.C. and Bhalla, A., "Ultrasonic Characterization of Ceramic Superconductors," J. Mat. Sci. Lett., v. 10 (1991).
9 Bhardwaj, M.C. and Trippett, K., "Nondestructive Characterization of Green and Sintered Ceramics," Proceedings of the First International Symposium of Engineering Ceramics, eds. S. Kimura and K. Niihara, Koda, Aichi-Prefecture, Japan, October 21-25, 1991, The Ceramic Society of Japan.
10 Bhardwaj, M.C., "Evolution, Practical Concepts and Examples of Ultrasonic NDC," Ceramic Monographs, Supplements to Interceram 41 (1992) [7/8] #4.5 and 42 (1993) [1] #4.5 - Handbook of Ceramics, Verlag Schmidt GmbH, Freiburg, Germany.
11 Kulkarni, N., Moudgil, B. and Bhardwaj, M., "Ultrasonic Characterization of Green and Sintered Ceramics: I, Time Domain," Am. Cer. Soc., Cer. Bull, Vol. 73, No. 6, (1994).
12 Kulkarni, N., Moudgil, B. and Bhardwaj, M., "Ultrasonic Characterization of Green and Sintered Ceramics: II, Frequency Domain," Am. Cer. Soc., Cer. Bull, Vol. 73, No. 7, (1994).
13 Bhardwaj, M.C., "Innovation in Non-Contact Ultrasonic Analysis: Applications for Hidden Objects Detection," Mat. Res. Innovat. (1997) 1:188-196.
14 Jones, J.P, Lee, D, Bhardwaj, M., Vanderkam, V., and Achauer, B,, "Non-Contact Ultrasonic Imaging for the Evaluation of Burn-Depth and for Other Biomedical Applications," Acoust. Imaging, V. 23 (1997).
15 Bhardwaj, M.C., "Non-Contact Ultrasonic Characterization of Ceramics and Composites," Proceedings Am.Cer.Soc., V 89 (1998).
16 T. Carneim, D.J. Green & M.C. Bhardwaj, "Non-Contact Ultrasonic Characterization of Green Bodies," Cer. Bull., April 1999.
17 Bhardwaj, M.C., "High Transduction Piezoelectric Transducers and Introduction to Non-Contact Analysis," submitted to the Encyclopedia of Smart Materials, ed. J.A. Harvey, John Wiley & Sons, New York (1999).

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