

measurement and the resolution in position and time are deeply related to the selection of frequency of ultrasound, its pulse structure and electronic constants for data acquisition. They can be adapted to the requirements of various different cases. The limitations of the method arise first from the fundamental properties of ultrasound, namely that the measurable depth is limited by the attenuation of ultrasound. Furthermore, the method requires some amount of reflecting particles suspended in the liquid, which may disturb its flow or change its fundamental properties.

Although the device was developed for measurement of one-dimensional flow, profiles can also be successfully obtained for flow which is essentially multi-dimensional. Considering its principle, it would be promising to apply the same method to opaque fluids such as liquid metals.

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## References

1. **Meister J. J.** Mesure par echographie Doppler et modelisation theorique de l'effet de troubles cardiaques sur la pression et le debit arteriels. *Thèse No. 504, 1983, Ecole Polytechnique Federale de Lausanne*
2. **Alziary de Roquefort T. and Grillaud G.** *Computers and Fluids*, 1978, 6, 259



### 1987

<b>Valve technology</b>	26–28 January 1987 Amsterdam, The Netherlands	The Center for Professional Advancement, Palestrinastraat 1, 1071 LC Amsterdam, The Netherlands
<b>Pressure vessel design and analysis</b>	16–19 February 1987 Amsterdam, The Netherlands	The Center for Professional Advancement, Palestrinastraat 1, 1071 LC Amsterdam, The Netherlands
<b>10th BPMA Technical conference on pumps</b>	24–26 March 1987 Cambridge, UK	BHRA Fluid Engineering Centre, Cranfield, Bedford MK43 0AJ, UK
<b>Large scale applications of heat pumps</b>	25–27 March 1987 Oxford, UK	BHRA Fluid Engineering Centre, Cranfield, Bedford MK43 0AJ, UK
<b>11th international conference on fluid sealing</b>	8–10 April 1987 Cannes, France	BHRA Fluid Engineering Centre, Cranfield, Bedford MK43 0AJ, UK
<b>International meeting on heat transfer</b>	13–17 April 1987 Lyon, France	Professor J. F. Sacadura, INSA de Lyon, LMFT Bat. 302-20 Ave. Albert Einstein, 69621 Villeurbanne Cedex, France
<b>1987 IEA Heat pump conference</b>	28–30 April 1987 Orlando, Florida, USA	Ms Pamela J. Lewis, Oak Ridge National Laboratory Building 9102-2, PO Box Y, Oak Ridge, Tennessee 37831, USA
<b>International conference on flow induced vibrations</b>	12–14 May 1987 Bowness-on-Windermere, UK	BHRA Fluid Engineering Centre, Cranfield, Bedford MK43 0AJ, UK
<b>3rd international conference on multi-phase flow</b>	18–20 May 1987 The Hague, The Netherlands	BHRA Fluid Engineering Centre, Cranfield, Bedford MK43 0AJ, UK
<b>32nd ASME International gas turbine conference and exhibit</b>	31 May–4 June 1987 Anaheim, California, USA	IGTC, 4250 Perimeter Park South, # 108 Atlanta, Georgia, 30341, USA
<b>Twentieth Midwestern mechanics conference (20th MMC)</b>	31 August–2 September 1987 Indiana, USA	Professor Hamilton, School of Mechanical Engineering, Purdue University, West Lafayette, Indiana 47907, USA
<b>1987 ASME cogen-turbo</b>	2–4 September 1987 Montreux, Switzerland	IGTC, 4250 Perimeter Park South, # 108 Atlanta, Georgia 3041, USA
<b>6th turbulent shear flow symposium</b>	7–9 September 1987 Toulouse, France	Professor F. W. Schmidt, Secretary, Dept of Mechanical Engineering, The Pennsylvania State Univ., University Park, PA 16802, USA
<b>Second international conference on laser anemometry</b>	21–23 September 1987 Glasgow, Scotland, UK	Dr S. M. Fraser, LDA Conference, Mechanical and Offshore Engineering, University of Strathclyde, Glasgow G1 1XJ, UK
<b>International symposium on natural circulation</b>	15–20 November 1987 New York, NY, USA	Dr J. H. Kim, Electric Power Research Institute, PO Box 10412, Palo Alta, California 94303, USA
<b>1988</b>		
<b>International fluid power exhibition</b>	18–22 April 1988, Birmingham, UK	Mr Mike Wells, International Fluid Power, Exhibition, Station Approach, Long Lane, Hillingdon, Middlesex UB10 9NR, UK