6th International Symposium on Ultrasonic Doppler Methods for Fluid Mechanics and Fluid Engineering (6 ISUD)

Prague, Czech Republic
9–11 September 2008

Ultrasound Doppler shift based measurement of velocity profiles and flow mapping has become important to fundamental research, fluid and hydraulics engineering, environmental flow, and industrial and biomedical applications. One of the great advantage of the method is a possibility of estimation of velocity vector in opaque liquids. Thus the ultrasonic Doppler based velocity measurements can be applied on many rheological investigations of slurries and suspensions, certain polymer solutions, liquid metals, muds and clays, heavy oils, cosmetic creams, liquid chocolate and some pastes.

From the 9th to 11th September 2008, a 6th Symposium was held in Prague, a wonderful city in the heart of Europe. The ISUD symposiums are biannual meetings being organized since 1996. Previous conferences have been held in Villigen, Switzerland (1996, 1999), Lausanne, Switzerland (2002), Sapporo, Japan (2004). The meeting in Prague follows on the highly successful 5th Symposium that was held in Zurich, Switzerland, 2006, and helps our understanding of ultrasonic Doppler methods by bringing together the researchers from all over the world and to enable the exchange of latest knowledge on the appli-

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Figure 1 (left): Poster session.

Figure 2: Participants of ISUD 6.

cation of the ultrasound Doppler technique. In addition, the symposium helps not only to understand the wide spectrum of applications in this field but also to exchange the challenges to be met in order to fulfill the needs specific to different applications.

A total number of 65 researchers participated to the event with 3 keynote lectures, 30 oral and 10 poster presentations. The keynote lectures were delivered by (i) Sébastien Manneville, Professor, Laboratoire de Physique, École Normale Supérieure de Lyon, France: "Ultrasonic velocimetry and the rheological investigation of complex fluids" (ii) Sven Eckert, Senior researcher, Department of Magnetohydrodynamics, Froschungzentrum Dresden-Rosendorf, Germany: "Velocity measurements in liquid metal flows using the Ultrasonic Doppler Method: examples and perspectives" and (iii) Michitsugu Mori, Senior Researcher, Research and Development Center, Tokyo Electric Power Company, Japan: "Series of calibration tests at national standard loops and industrial applications of new type flow-metering system with Ultrasonic Pulse- Doppler Profile-Velocimetry for power plants". The program of the conference covered a wide range of applications of the ultrasound technique – fundamental flow, environmental flow, applied flow, signal processing and methodology.

Several interesting contributions with rheological investigation were presented. Its scope can be summarized as follows:High-frequency ultrasonic velocimetry was used explore the rheological behaviour of complex fluids sheared between concentric cylinders. The technique is based on time-domain cross-correlation of speckle signals backscattered either by the fluid microstructure or by contrast agents dispersed in the material. The technique can be applied to various complex fluids that show shear banding or shear-induced fractures. Ultrasonic velocimetry applying for the line measurement in a sudden spinning of fluid in a cylindrical container was used to estimate the rheological properties of visco-elastic liquid. Ultrasonic Velocity Profiling combined with pressure difference measurement, was applied for the in-line rheological characterization of different concentrations of opaque non–Newtonian mineral slurries. It was demonstrated that the non-Newtonian fluid flow behavior of a shear thinning aqueous xanthan solution in inflatable and collapsible elastic tubes can be measured by the ultrasound Doppler method.

Apart from scientific program the participants enjoyed a very nice atmosphere in the evenings during the boat trip and the conference dinner which was held in Strahov Monasterial Brewery. The symposium has been a great success. The conference was organized by the Department of Sanitary and Ecological Engineering, Czech Technical University in Prague (CTU in Prague); Institute of Hydrodynamics, Academy of Sciences, Czech Republic and International Association for Hydraulic Engineering and Research (IAHR). Special thanks go to the industrial sponsors (Met-Flow SA, Nortek AS, Nivus GmbH) as well as to Grant Agency of CTU in Prague, project CTU 0813911. All scientific contributions including posters have been published in the Proceedings with following ISBN: 978-80-87117-05-7. On-line version of proceedings can be found at http://isud6.fsv.cvut.cz. The next Symposium on Ultrasonic Doppler Methods will be organized in Göteborg, Sweden, 2010.

Vojtech Bares
Czech Technical University in Prague
Department of Sanitary and Ecological Engineering
Czech Republic
isud6@fsv.cvut.cz

Zdenek Chara
Academy of Sciences of the Czech Republic
Institute of Hydrodynamics

Yasushi Takeda
Hokkaido University
Japan

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