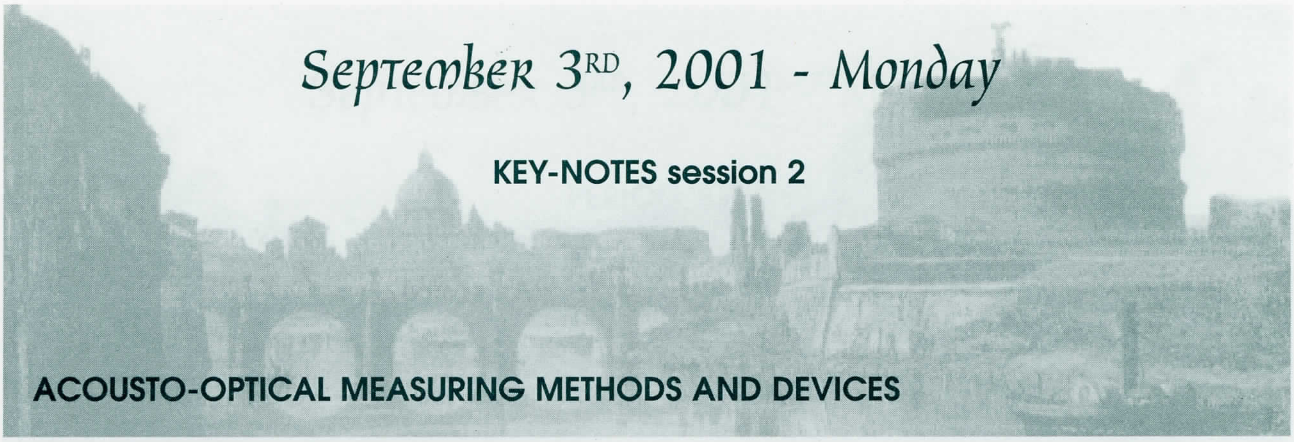

September 3RD, 2001 - Monday

KEY-NOTES session 2

ACOUSTO-OPTICAL MEASURING METHODS AND DEVICES

3KN2.01 - Quantitative sound field investigations by means of acousto-optics

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Light-diffraction tomography is a non-invasive measuring technique for the quantitative mapping of ultrasonic fields. Provided that there is weak acousto-optical interaction, data acquisition at normal light incidence is the appropriate technique. In the range of strong acousto- optical interaction, data acquisition and evaluation are as easy to perform as for weak acousto-optical interaction provided that Bragg incidence is used. Usually it is assumed that the ranges of weak (Raman- Nath Regime) and strong (Bragg Regime) acousto-optical interaction are clearly separated, the link between both ranges being represented by the so called intermediate range. From the point of view of quantitative sound field investigations both techniques are, however, complementary to each other in a sense that no complex data evaluation for the intermediate range is needed. In this way a frequency range is covered which has not been accessible so far. Experimental results of the acousto-optical technique will be shown for sound field measurements in water and air for the frequency range from 300 kHz to 14 MHz. The efficiency of the technique as a quantitative tool will be demonstrated by means of a reference measurements using a calibrated piezo-electric hydrophone.

PHYSICS AND TONAL DESIGN IN PIPE ORGANS AND AIR-JET MUSICAL INSTRUMENTS

3KN2.02 - Transients in flue organ pipes: experiments and modeling

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Attack transients are known to be very important for the perception of the tone quality of flue organ pipes. This may be related to the complexity of the physical phenomena that can take place during the transient. This complexity turns the physical understanding and modeling to a challenge. Experimental investigation of the attack transient shows phenomena that can be related to an edge-tone oscillation or to a pipe-tone oscillation. The oscillating frequencies and amplitudes in an edge-tone geometrical configuration will be compared to those obtained in an organ pipe configuration. It appears that an edge-tone like oscillation can take place during the attack transient. The perceptive influence of this part of the transient will be discussed. The limits of the physical modeling of the attack transient will be discussed. The flow simulation is, at the present time, limited to the very beginning of the transient. On the other hand, jet oscillation can only be analyzed during steady-state oscillation, leaving a big time gap between those two periods of the flue pipe sound.