Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

Epiglottal Flow Physics[1] ANDREW POLLARD, Queen's University, ABDUL-MONSIF SHINNEEB — PIV measurements have been made at three locations in the pharynx/larynx region in the ETA model, one along the central sagittal plane and two cross-sectional planes. The measurements were made at a flow rate of 9.04 l/min which corresponds approximately to 10 l/min in the prototype. The corresponding Reynolds number Re based on the inlet condition is 716. Two thousand images were acquired at each location at a framing rate of 2 Hz. The mean velocity fields were then calculated. In addition,the data was analysed by the proper orthogonal decomposition (POD) technique to expose vortical structures. Only few modes were used for the POD reconstruction which recovered about 60% of the turbulent kinetic energy. The results showed that the flow is characterised by regions of re-circulation, jet-like, and sink-like flows. In addition, the POD-reconstructed fields revealed some interesting features that occur in the human pharynx/larynx region near the epiglottis such as tearing and pairing processes, as well as the interaction between the flows induced by the structures.

[1]Funded by NSERC

Andrew Pollard
Queen's University

Date submitted: 02 Aug 2011 Electronic form version 1.4