

Abstract Submitted  
for the DFD06 Meeting of  
The American Physical Society

**A New Sensor for Image Based Skin Friction and Pressure Measurements.** JIM CRAFTON, SERGEY FONOV, GRANT JONES, LARRY GOSS, ROBERT FORLINES, Innovative Scientific Solutions, Inc, INNOVATIVE SCIENTIFIC SOLUTIONS, INC TEAM — A new material for distributed measurements of pressure and skin friction has been developed. The active element for this sensor is a thin film made of an elastomer with known thickness and shear modulus. The film deforms under load but does not compress or yield. The measurement is accomplished by monitoring the normal and tangential deformations of the film and then converting these deformation fields into pressure and skin friction using a physical model of the film. This technology is currently being utilized in wind tunnels, water tunnels, and biological flows. Several quantitative and qualitative experimental results will be presented including measurements of pressure and skin friction; in sub-sonic and supersonic wind tunnels, shock-boundary layer flow control with a plasma actuator, flow near a strut end-wall junction in a water tunnel, skin friction validation measurements in a fully developed channel flow, skin friction measurements in an artificial heart model (non-Newtonian fluid), and contact force measurements. These experiments demonstrate the ability of this sensor for quantitative measurements in a variety of fluids and flows.

Jim Crafton  
Innovative Scientific Solutions, Inc

Date submitted: 03 Aug 2006

Electronic form version 1.4