Performance Analysis of FLDI Technique using Turbulent Jets

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ABSTRACT

Focused Laser Differential Interferometry (FLDI), a non-intrusive optical diagnostic technique was set up and characterized using turbulent jets. A 90° phase shift interferometry setting, a key requirement to remove phase ambiguity is obtained by traversing the second Wollaston prism perpendicular to the beam axis. The spatial resolution along the beam axis is obtained by traversing a compressed air jet. The result shows the FLDI system is spatially sensitive up to 10 ±.5 mm on either side of the beam focal point. In addition, the density and temperature distributions through the jet from a hot-air gun were measured using this technique. The results obtained from the laboratory test helped in understanding the system prior to implementing it in the shock tunnel for scramjet testing.