Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

The Fluid Dynamics of a Pulse Detonation Engine-VI[1] K. KAILASANATH, SALLY CHEATHAM, Naval Research Laboratory — Pulsed Detonation Engines (PDEs) have received considerable attention recently because they have the potential to make a major impact in aerospace propulsion. Previously, several aspects of the fluid dynamics of an idealized PDE, consisting of a tube closed at one end and open at the other have been presented. Typically, gaseous fuels are used in both experiments and simulations. However, for most practical applications, liquid fuels will have to be considered. Previously, we have presented some preliminary results on multiphase detonations in tubes. In this talk, we will present simulations of the single-cycle performance of PDEs operating on JP10-Oxygen and JP10-Air mixtures. Results for a range of fuel droplet sizes, as well as results when some of the fuel is prevaporized will be presented. The implications of these results on the development and potential application of the PDE will also be discussed.

[1]Sponsored by ONR

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Date submitted: 29 Jul 2005 Electronic form version 1.4