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13. SUPPLEMENTARY NOTES This is Master's thesis work by Jonathan Tovar in fulfilment of graduate school requirements at the University of California Los Angeles. PA Clearance #15682 Clearance Date 11/24/2015					
14. ABSTRACT This work examines the three main aspects of bluff-body stabilized flames: stationary combustion, lean blow-out, and thermo-acoustic instabilities. For the cases of stationary combustion and lean blow-out, an improved version of the Linear Eddy Model approach is used, while in the case of thermo-acoustic instabilities, the effect of boundary conditions on the predictions are studied. The improved version couples the Linear Eddy Model with the full-set of resolved scale Large Eddy Simulation equations for continuity, momentum, energy, and species transport. In traditional implementations the species equations are generally solved using a Lagrangian method which has some significant limitations. The novelty in this work is that the Eulerian species concentration equations are solved at the resolved scale and the Linear Eddy Model is strictly used to close the species production term. In this work, the improved Linear Eddy Model approach is applied to predict the flame properties inside the Volvo rig and it is shown to over-predict the flame temperature and normalized velocity when compared to experimental data using a premixed single step global propane reaction with an equivalence ratio of 0.65. The model is also applied to predict lean blow-out and is shown to predict a stable flame at an equivalence ratio of 0.5 when experiments achieve flame extinction at an equivalence ratio of 0.55. The improved Linear Eddy Model is, however, shown to be closer to experimental data than a comparable reactive flow simulation that uses laminar closure of the species source terms. The thermo-acoustic analysis is performed on a combustor rig designed at the Air Force Research Laboratory. The analysis is performed using a premixed single step global methane reaction for laminar reactive flow and shows that imposing a non-physical boundary condition at the rig exhaust will result in the suppression of acoustic content inside the domain and can alter the temperature contours in non-physical ways. It can be concluded from this work that it is important to include the proper exhaust configuration for reacting thermo-acoustic calculations so that non-physical boundary conditions do not compromise the solution.					
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