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LES of Tilted Rayleigh-Taylor Using a Moment Closure DANIEL ISRAEL, Los Alamos National Laboratory — Traditional RANS closures solve directly for the mean statistics. For most canonical flows this reduces the problem to a set of 1-d steady, 1-d unsteady, or 2-d steady equations. All information about the unsteady turbulent structures is contained in a few (typically two) turbulent field variables. There are two situations that require switching to full 2- and 3-d time-dependent methods: first, a need to characterize details of the flow structures (perhaps due to complex initial or boundary conditions), and second, problems where the geometry itself is more complex. Conventional RANS has been found to sometimes produce unsteady structures for such flows, but if and when such structures appear does not seem to be linked to any physical process of the flow. A rational procedure for applying moment closure equations to such problems is under development and has been applied to the Rayleigh-Taylor unstable flow. In the current work the same method is applied to Rayleigh-Taylor in which the interface is tilted with respect to gravity. To simulate tilted Rayleigh-Taylor, the large scale overturning must be resolved in 2-d. The bubbles and spikes are likely to be amenable to a statistical treatment away from the wall, but may need to be explicitly resolved near the wall. The capabilities of the new closure are evaluated in the tilted Rayleigh-Taylor geometry, and compared to conventional RANS.

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