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LES of supersonic combustion in a realistic scramjet combustor JOHAN LARSSON, RONAN VICQUELIN, IVAN BERMEJO-MORENO, JULIEN BODART, Stanford University — Large eddy simulation is used to study the reacting flow in the HyShot scramjet combustor. The H2/air chemistry is modeled using a flamelet/progress-variable approach, which is adapted to the supersonic regime through a parametrized rescaling with pressure of the progress-variable source term. An algebraic wall-model is used to alleviate the need to resolve the inner part of the boundary layers, while still capturing the large momentum and energy losses to the cooled walls. Results are shown for two geometries and compared to the limited experimental data available for each: a model combustor with OH LIF, OH* and wall pressure measurements, as well as the HyShot scramjet combustor with mainly wall pressure data.

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