**Boiling Channel Modeling in Generalized Fluid System Simulation Program (GFSSP)**

The present study aims to enhance the two-phase conjugate heat transfer capabilities of NASA’s Generalized Fluid System Simulation Program (GFSSP). In its current state, GFSSP contains a single correlation to model all boiling processes. Since many boiling regimes exist with varying degrees of heat transfer effectiveness, it is desired to create a more robust boiling model to improve the accuracy of boiling channel thermal analysis. The model-in-development consists of liquid coolant flowing through a uniformly heated channel, with particular interest in hydrogen, methane, and oxygen coolants. Well-tested boiling heat transfer correlations are incorporated for the subcooled boiling, saturated boiling, and post-critical heat flux liquid deficient boiling flow regimes. GFSSP’s iterative pressure-based solver results are numerically validated against a stand-alone Fortran program, which utilizes a finite difference marching approach with finer spatial resolution. Solutions from both solvers are compared against experimental data for validation of the results. The model is still being developed, but preliminary test cases show reasonable agreement between GFSSP predictions and select cases from experimental data of hydrogen. An ongoing study at the Georgia Institute of Technology involves compiling all available experiments and correlations pertinent to the cryogenic fluids of interest to NASA. A critical assessment of these data will be conducted, and fluid-specific flow boiling correlations will be identified and incorporated into GFSSP. The implementation of these boiling channel algorithms will allow GFSSP to more accurately model the cooling processes of LOX/Methane engines.