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## **C4Or1C-05: Propellant Liquefaction Modeling and Comparison to Test Results**

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Current proposed NASA missions to Moon and Mars involve producing cryogenic propellant in-situ to reduce launch mass and requirements. One technique for liquefaction of the gases produced through electrochemical processes is to circulate cold gaseous neon or helium through broad area cooling tubes attached to the outside of the propellant tanks. To determine the performance of this liquefaction process, tests are being conducted at NASA-Marshall Space Flight Center in a 4.25 cubic meter tank with a broad area cooling network. A transient computational fluid dynamic code coupled with a thermal model of the tank and its cooling loops is developed in Thermal Desktop to compare against the results of these tests. Details of the model and the model predictions and comparison to experimental data from recent liquefaction tests are presented here.

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