Contribution ID: **1183**   Type: **Invited Oral Presentation**

M3Or4A-03 [Invited]: Large Scale Hydrogen Modeling Efforts and Lessons Learned

Wednesday 24 July 2019 17:05 (25 minutes)

Historically, NASA has performed many large scale hydrogen ground test to measure the performance of technologies such as insulation, pressure control, line and tank chill-down including venting of vapor. More recently, NASA has focused on the development of numerical codes to predict the performance of these systems and the fluid and thermodynamics within the tanks themselves. Development of predictive models has been carried out at both the multi-node and computational fluid dynamics level. These two different numerical tools can capture different levels of physics that occurs within the systems that contain and transport two-phase Liquid Hydrogen. Over the past decade, the predictive models were validated against multiple LH2 experiments and can now be used to predict how future NASA systems requiring LH2 will perform.

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Session Classification: M3Or4A - Joint CEC and ICMC Session: Transportation Overview