**Model Validation for Bigelow Expandable Activities Module (BEAM) with Stowage**

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**Topic Area:** Passive Thermal

The Bigelow Expandable Activities Module (BEAM) was a collaboration between NASA and Bigelow Aerospace to develop an expandable habitat technology that could be used for future space exploration missions such as the Artemis program. On April 26, 2016, the Bigelow Expandable Activities Module (BEAM) was launched and berthed to the International Space Station on the aft port of Node 3. The present work builds on the previous 2017 model validation to flight data that demonstrated that BEAM could generally accommodate cargo stowage without adversely affect BEAM thermal control, primarily for condensation management. After the originally planned two-year mission life, BEAM was approved for utilization as a stowage module for a 109-cargo transfer bag equivalent (CTBE) to alleviate stowage limitations onboard the ISS. Once stowage was configured in early 2019 model validation efforts resumed. The thermal model revisions included the CTBE stowage and updated CFD-derived heat transfer coefficient for various intra-module ventilation (IMV) flow rates. The coefficients were provided by the Crew and Thermal Systems Division (EC) at NASA JSC and Jacobs Technology. The model is now revalidated and able to predict minimum temperatures with good agreement to flight temperatures (within 1 °C) for both historic and recurring minimum values. Additionally, the model is partially validated for reduced flow rates. With this model, the team was able to provide new flight rule recommendations for condensation and IMV operations management.

**No ITAR material is included**