Heat Rejection Analysis Process for Early Thermal Assessment

Topic area: Passive Thermal

SNC has developed a Heat Rejection Analysis process for use at the very beginning of space programs or during proposal efforts in order to quantify the heat rejection capability of each spacecraft panel. This analysis is used to provide early identification of likely thermal problems and early inputs on desired spacecraft bus component locations and approximate heater power needs without needing to build a detailed thermal model. This is useful because if thermal engineers begin building their detailed model too early in a program, they end up designing to a moving target. On the other hand, if the detailed thermal model is not started until the spacecraft design has somewhat settled out, this can lead to missed opportunities to get thermal inputs on the design.

This paper will detail the process of building a model for a heat rejection analysis, how to use the results to inform early thermal design inputs, and limitations of the method.