IAF MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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# DYNAMIC RESPONSE AND BEHAVIOR SIMULATION OF A THERMAL BOOT EMPLOYED IN A HEAVY LIFT LAUNCH VEHICLE

**Abstract**

Success of any launch vehicle system is a grand result of the series of successful concurrent activities happening in different subsystems. These subsystems that are working simultaneously have a defined operating environmental conditions like temperature, pressure, humidity etc. During the ignition of booster stage of launch vehicle, transient pressure waves get reflected from the launch pad and can affect the launch vehicle structure. Control actuators, sensitive electronics packages and actuators are placed within a close proximity of its Nozzle. These systems are to be shielded from the extreme heat of the plume and hot gases by a thermal boot, which serves as a thermal blanket and also shall allow the nozzle to move. The boot will experience the transient loads and hence needs to be dynamically characterized. The present study focuses on the structural aspects of this thermal boot which is a stack up of thermal and structural materials and simulating its behavior under the application of dynamic transient pressure loads experienced by it. Study also focus on the development of a new material model which can be used to model the properties of a cloth material as a single fabric as well as a stack-up of multiple layers of different materials.