ZIN Technologies

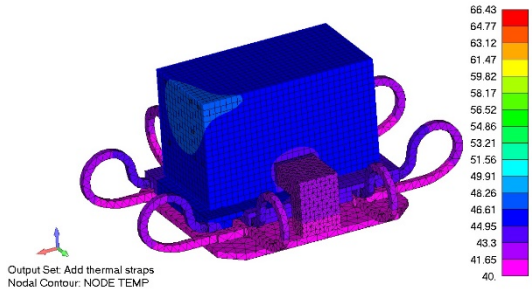
Structural, Thermal, and Dynamics Capabilities

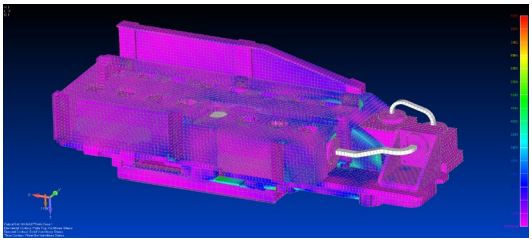
Multi-Disciplined Engineering: Structural, Thermal, and Dynamics Capabilities

ZIN performed structural and thermal analysis for the NEXT-C Power Processing Unit (PPU), a ZIN designed, fabricated and verified system to support the DART mission. Structural analysis included random and sine vibration, random response and modal analysis and PWB component level vibratory fatigue analysis per the Steinberg criteria. Thermal analysis was performed to assess component worst case temperature margin and data from this served as inputs to the system level reliability and FMEAs.

TOOLS:

- FEMAP: Pre/Post Model Processing
- NX NASTRAN: Structural Analysis
- Hypersizer: Structural Sizing
- Maya TMG: Thermal Analysis
- MATLAB and Simulink
- MSC Adams: Rigid body and flex body dynamic systems



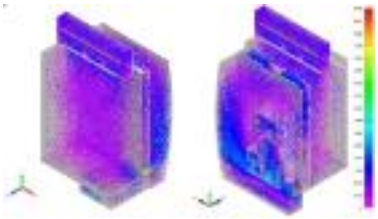


ZIN is comprised of experienced industry experts specializing in hardware designed for space flight including deep space missions, facilities on ISS, payloads, satellites, satellite sub-systems, and launch vehicle elements.

Separate static and dynamic models are often developed to correctly capture the specific conditions being assessed. Results from the FE models are used to further analyze fracture control, fastener margins, and margins on primary structures. FE model validation checks are made based on FEMCI (NASA GSFC). PWB components are analyzed for vibrational fatigue using the Steinberg model.

Thermal analysis is used in conjunction with thermal testing to verify hardware. The thermal analyses are also helpful in determining special/unique tests needed to verify thermal performance. Thermal modeling has also been used to assess science requirements on ISS experiments.

- **Structural Analysis is performed using a proven analytical method. FEMAP and NX NASTRAN are the primary tools used to develop and solve Finite Element (FE) models.**
- **The geometry used to develop the structural models comes from CAD models of the hardware. Loads and boundary conditions are carefully assessed to ensure appropriate model behavior is considered.**
- **FEMAP and MAYA TMG (FEMAP Thermal) are the primary tools used to develop thermal models.**
- **MAYA TMG has the ability to run coupled thermal/flow analyses. Generally, the thermal analyses are used to verify adequate cooling of electrical/electronic components in a micro-gravity environment.**



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