Thomas Richard Dodge

Sr. Thermal Engineer

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EDUCATION

July 2015	**M.S. Aerospace Engineering**
	University of Maryland, College Park, MD

May 2012	**B.S. Mechanical Engineering**
	University of Delaware, Newark, DE

EXPERIENCE

01/17 - Present

JPSS-2

Thermal Engineer

- Responsible for performing the satellite level Thermal Desktop™ and SINDA/FLUINT thermal model analysis and documenting results
- Develop and modify thermal geometric math models (GMM) and thermal math models (TMM) at spacecraft, mechanism, box, and test levels
- Develop and evaluate thermal vacuum (TV) and thermal balance (TB) test configurations and evaluate temperature and heat flows
- Evaluate spacecraft thermal design against verification acceptance and protoflight requirements
- Support TV/TB testing, pre-test thermal modeling & analysis and evaluate test data against pre-test predictions
- Perform thermal model correlation to TV/TB test data
- Introduce design concepts, thermal control options and negotiate interfaces between subsystems
- Review component level, instrument level and observatory level Thermal Desktop™ thermal models and thermal analysis reports
- Support thermal and project engineering meetings, trade studies and design reviews
- Knowledge of thermal coatings, thermal control system (TCS) hardware and thermal design techniques
- Perform thermal analysis and evaluate instrument and box level components temperatures and power requirements
- Perform satellite level thermal analysis and evaluate interface temperatures, heat flows and power requirements
- Perform component thermal model correlation and backload analysis at spacecraft, instrument, box, and mechanism levels for all mission phases
- Coordinate large analysis tasks across organizational lines
- Software tool development for real-time TVAC tracking and post-test correlation
- TVAC test procedure evaluation and modification
- Instrument and Spacecraft thermal fault analysis
- Prepare thermal analysis reports using MS Word, PowerPoint and Excel

08/20 - Present

Dragonfly

Thermal Engineer

- Model construction to determine conductive and convective heat losses through rotorcraft body (bus) extrusions
- Bus Reduced Thermal Model development for provision to instrument thermal teams
- Thermal test procedure development and review
- Thermal model delivery guideline development
- Coordination of technical solutions to thermal problems and concerns between Instrument and Bus thermal teams; instrument interface thermal liaison

07/15 – 01/17   **Tracking Data Relay Satellite (TDRS)**

   Thermal Analyst

- Develop Thermal Desktop™ models of the spacecraft
- Responsible for performing the satellite level Thermal Desktop™ model analysis and presenting the thermal analysis results to Systems Engineers
- Support thermal and project engineering meetings, trade studies and satellite on-orbit anomaly (SOAR) resolution
- Knowledge of thermal coatings, thermal control system (TCS) hardware and thermal design techniques
- Correlated solar array, batteries, propulsion system, radiators and other components to flight data for Winter, Summer and Equinox seasonal variations
- Prepared satellite TCS status to Senior Thermal Engineer

Additional Thermal Engineering Support

Instrument TVAC Support

- OMPS Integrated System Suite (ISS)
  - Thermal shift lead
  - Tool development to track Balance and Cycle progress real-time

Component Level Thermal Support:

- Moog Antenna Pointing Assembly (APA) TVAC
  - Developed thermal model for TVAC test configuration
    - Included test chamber and test configuration Thermal Desktop geometry, LN2 and test heater modeling, and unit under test to chamber conduction/radiation interfaces
  - Analyzed temperature predicts against test data to verify thermal model accuracy of thermal mass, conduction, radiation exchange and power dissipation
  - Qualification unit TVAC model construction, analysis, test procedure input, and shift support
- Moog Solar Array Drive Assembly (SADA)
  - Developed thermal model for TVAC test configuration
    - Includes test chamber and test configuration Thermal Desktop geometry, LN2 and test heater modeling, and unit under test to chamber interface modelling
  - Correlated SADA thermal model to TVAC test data

- - Updated satellite model with correlated model and updated on-orbit temperature predicts
- JPSS-2 Battery correlation
  - Updated Satellite model to include correlated battery thermal model and updated flight temperature and heat flow predictions
  - Determined necessary radiator adjustments needed to meet battery temperature requirements with correlated thermal model

Instrument Level Thermal Analysis:
- Develop detailed instrument thermal models
- Integrate detailed and reduced thermal models into spacecraft models
- Support instrument and mechanism level thermal testing (TV/TB)
- Instrument thermal model reduction
- Instrument TVAC pre- and post-test analysis
- Analysis of GSE failure impact on thermal performance
- Instrument interface heat flow and radiation backloading analysis
- Review test plans, procedures and write thermal reports

Additional tasks include:
- ICON model correlation, model reduction, TVAC testing support on-site and Space Dynamics Lab
- MMS post-launch model correlation and evaluation of on-orbit heat flow and temperature predictions
- Destiny optical head instrument model development

Proposal Support:
- Instrument model generation with spacecraft model integration and support the development of the component thermal design
- Developed thermal design and analysis results tables and graphics to support proposal writeup

SKILLS

- Proficient in Thermal Desktop™ and SINDA/FLUINT
- Proficient in AutoCAD, MATLAB, VBA
- Experience using composite materials processing techniques, mechanical testing, scientific paper drafting, part design.
- Proficient in Microsoft Word, Excel and PowerPoint