## EV30: Structural Design and Analysis Division NASA's Marshall Space Flight Center



Bldg. 4600, Martin Rd., Marshall Space Flight Center Redstone Arsenal, Huntsville, Alabama

**EV30** provides support to customers with structural design, analysis, and definition of induced environments. These disciplines are responsible for assuring the structural integrity of spacecraft and launch vehicle primary structures, subsystems, mechanisms, and components to ensure designs for this hardware meet structural requirements and performance goals.



### Specializing in cutting-edge, disruptive solutions for technology innovation, development and evolvability.

In-space robotics design, analysis, and testing for operations.



**Optical enhancement implementation for** blue-green algae growth detection.



LOX-Methane mixing and detonation analysis for new vehicle safety requirements.

### **CONTACT INFORMATION**

EV32 Branch Chief

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## **ENVISIONING OUR FUTURE IN SPACE**

### National Aeronautics and **Space Administration**



EV31 provides dynamic loads development and integration support, structural modeling, vehicle coupled load analysis, vibroacoustic analysis, and integration to support the design process.

We also perform structural dynamic analyses to define dynamic behaviors such as sloshing, structural responses, and frequencies.

**AREAS OF EXPERTISE** Finite Element Modelling Shock and Vibroacoustic **Environment Definition Slosh Analysis and Baffle Design Integrated Coupled Loads Analysis** 





Integrated Modal Test

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EV32 provides structural/mechanical and assembly design and component integration for launch vehicle and spacecraft engineering and development.



### **AREAS OF EXPERTISE**

**Design & Analysis of Metallic and Composite Spacecraft Structures Component Design and Cable Routing, Integration** Management/Maintenance/Delivery of Model Files for Creation of Interface Control Documents and Inner & Outer Mold Lines Finite Element Modeling and Analysis Structural Sizing and Strength & Stability Analysis Fracture and Fatigue Life Prediction







### **AREAS OF EXPERTISE**

**Aerodynamic Databases and Loads Aeroacoustic and Compartment** Venting Environments **Aerodynamic Heating, Plume Flow Field Characterization and Soil** Iteration, Impingement, **Radiation, and Convective** Heating Environments, Thermal **Protection System Test Support Plume – Surface Interaction** Analysis, Surface Crater Reconstruction **Blast Wave, Fragmentation and Ascent/Liftoff Debris Impact Modeling and Testing for** Launch Vehicle, Spacecraft and **Pressurized Volumes.** 



National Aeronautics and **Space Administration** 

EV33 provides launch vehicle ascent and stage re-entry aerodynamics, induced environments, blast/debris analyses and plume/soil interactions.

EV34 provides analytical predictions for thermal control/protection system design processes using computational tools for modeling steady state, transient multi-mode heat transfer and fluid flow in terrestrial, ascent, orbital, and inter-planetary environments.



Cryogenic Propellant Stage and Transfer

Blast Wave Testing

Thermal Design and Analysis for Ground, Ascent, **Orbital and Re-entry environments Thermal Protection Sizing for Insulators/Ablatives** MLI, Heaters and Active Thermal Control Design and **Analysis including Heart Pipes,** Heater/Thermostats, Forced Convection, and **Cold Plates/Pumped Loops** 

Plume Induced Heating

**ENVISIONING OUR FUTURE IN SPACE** 

Volatiles Investigating Polar Exploration Rover (VIPER)





### **AREAS OF EXPERTISE**

