



MM DESIGN SERVICES LLC

DESIGNING THE FUTURE

# MM Design Services, LLC Capability Briefing

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Michael Murdock

(256) 756-9038 (Office)

(256) 306-4614 (Mobile)

[murdockm@yahoo.com](mailto:murdockm@yahoo.com) (Email)

[mmdesignservice.com](http://mmdesignservice.com) (Website)



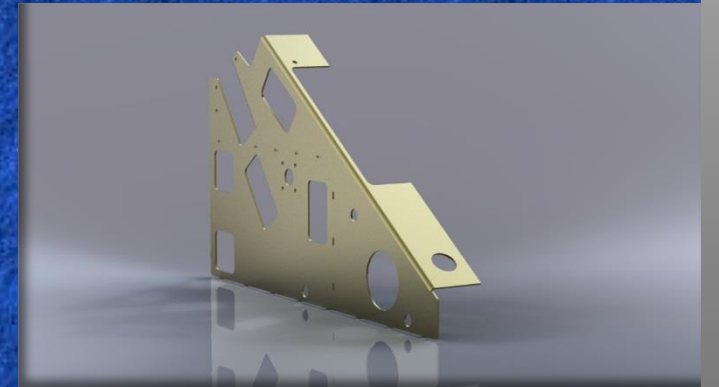
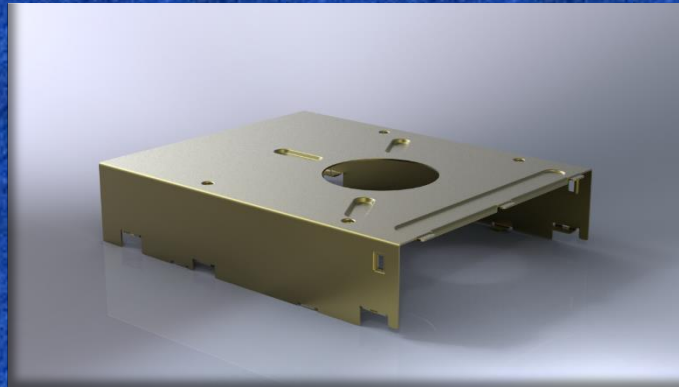
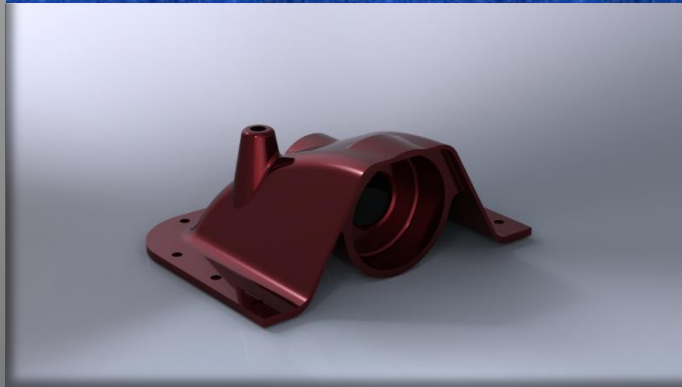
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## Capability Briefing

[mmdesignservice.com](http://mmdesignservice.com)

MM Design Services has over 30 plus years' experience in mechanical design, evaluation of destructive and nondestructive testing for product evaluation and assembly of aerospace flight vehicles for NASA and MDA.





## Core Competencies – Layout & Design

- Developed Several Reentry Vehicles for MDA and SMDC
- Designed, Built, and Flew 6 Different Reentry Vehicles
  - FM-5, FM-6, and FM-7 for the AEGIS Flight Test Program
  - MBRV-1 for PATRIOT-3
  - MBRV-2 for THAAD
  - SRALT – Air Launched Missile
  - Hit Grid Sensor Layout – Piezo Flash Detectors
  - Hit Grid Break-Wire Layout to Fabrication
  - Hit Grid Fiber Optics Layout and Design
  - Ground Based Telemetry Collection and Data Reduction
  - Field Operations – Resent Support for the Army at the SKI Challenge and SKII Challenge at Dugway Proving Ground in Utah
  - Animations of Test Results for Clients





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## Core Competencies – Layout & Design (continued)

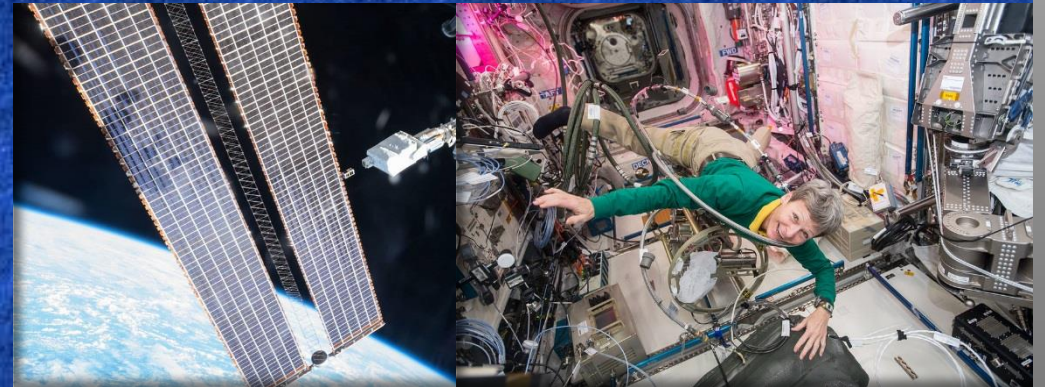
- Performed Initial Layout Design on the Delta II, Delta III and Delta IV Launch Vehicles
- Performed Detailed Design:
  - Upper Stage Iso grid Electronics Layout – Delta III
  - LOX Skirt – Delta IV
  - 3D Cable Routing for Delta III and Delta IV
  - Equipment Layout for ULA plant in Decatur





## Core Competencies – Layout & Design (continued)

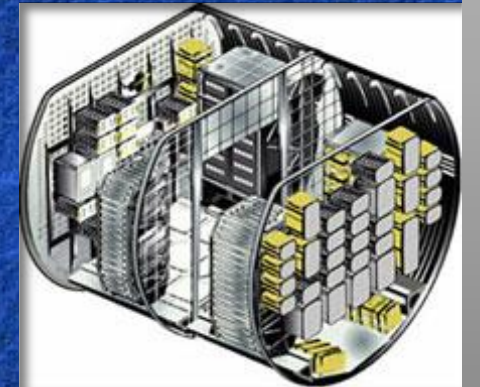
- Performed Initial Layout Design on both Primary and Secondary Structures for the International Space Station Unity.
- Performed Detailed Design:
  - Unity One (node one) – Primary Structure
  - Equipment Racks, Ducting & Closeout Structures – Secondary Structure
  - Equipment Rack Cabling in 3D Computer-Aided Design (CAD)
  - Truss One Drafting and Detail of Drawings
  - Mass Properties Calculation Studies
  - Geometrical Dimensioning and Tolerancing





## Core Competencies – Layout & Design (continued)

- Performed Initial Layout Design on both Primary and Secondary Structures for the First Privately Owned Vehicle to Fly in NASA's Space Shuttle – Space Hab Module.
- Performed Detailed Design:
  - Module– Primary Structure
  - Routing of Ducting for Optimum Air Flows
  - Geometrical Dimensioning and Tolerancing Studies
  - Equipment Racks, Lockers & Closeout Panels – Secondary Structure





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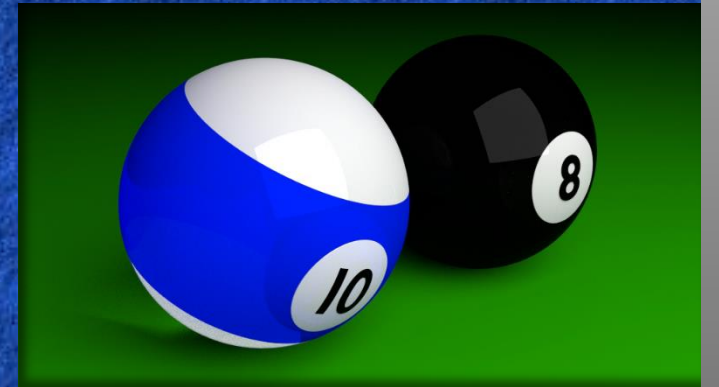
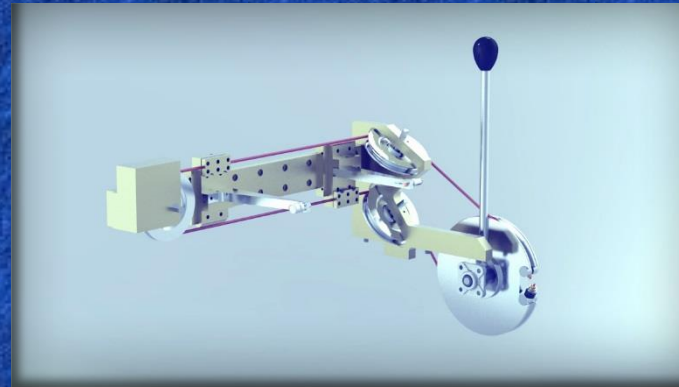
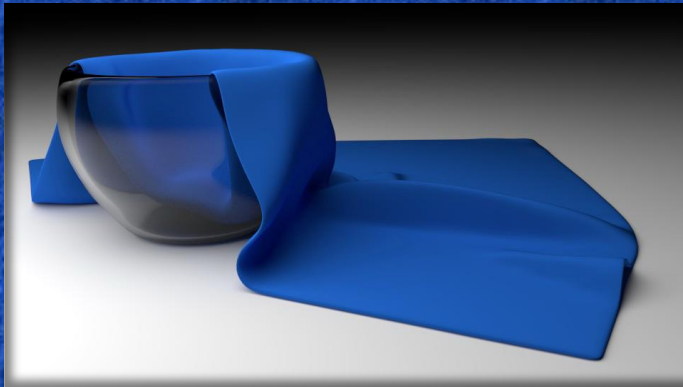
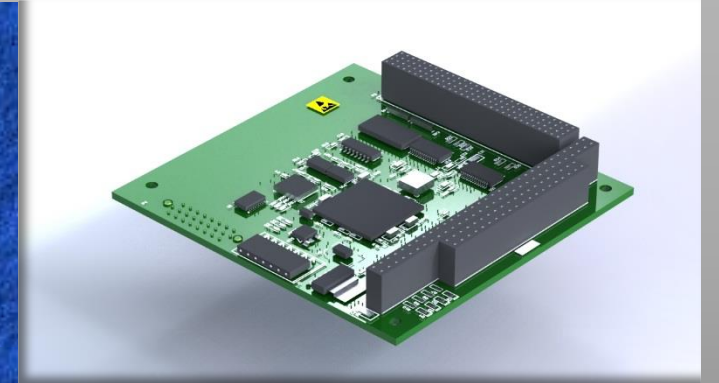
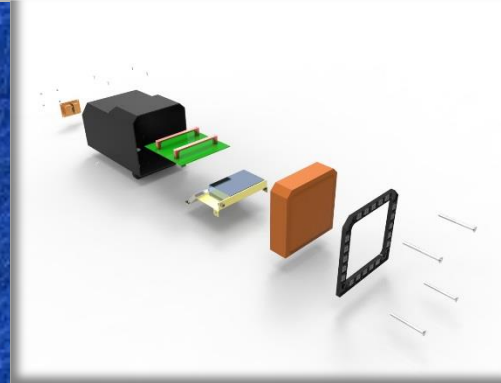
## Core Competencies – Testing

- Developed Test Vehicles for Lethality testing for the SM-2 and SM-3 Interceptors
- Direct Hit Test (DHT) 1 thru 4 for SM-3
- Three Direct Hit Tests for the SM-2 Block 3 Missile



## Core Competencies – Renderings

- Renderings Show Concept
  - Prototyping
  - Sharing Information
- Renderings Sell Products
  - Presentations





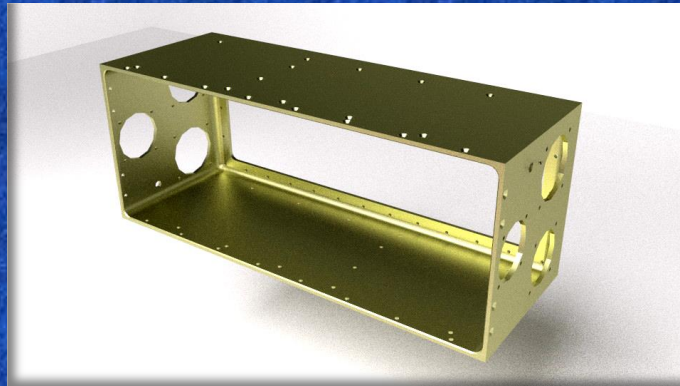


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## Core Competencies - Animations

- Add Mechanics to Models: (click images to animate)
  - Assembly Process for Engineering
  - Product Development for Sales
  - End User Instructions for Products





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## Core Competencies – Geometrical Dimension & Tolerancing

- Certificates:
  - Geometrical Tolerance & Dimensioning ANSI Y14.5 1994
  - Geometrical Tolerance Stack-up Analysis



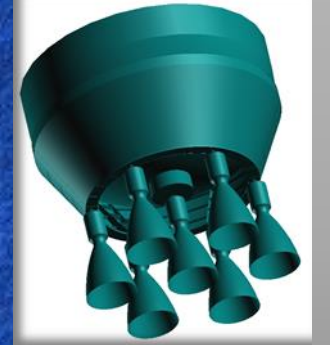
## Core Competencies – Structural Analysis

- Structural Analysis via Subcontractor Support (As Needed to Design and Certification)
- Our Structural Analyst has 10 Years of Experience in the Analysis of Metallic and Composite Structures for Flight Vehicles (Both Primary and Secondary Structures)
- Experience with AED, FAA, and NASA Airworthiness Processes and Procedures for Certification
  - Subject Matter Expertise in the Airworthiness/Flightworthiness of Aerospace Structures:
    - Launch Vehicle Structures (Primary and Secondary Structure)
    - Space Craft Structures (Modules, Satellites, Payloads, etc.)
- Over 10 years experience with FEMAP and NASTRAN
- Over 8 years experience with the vibroacoustic software, VA-One



## Core Competencies – Structural Analysis (continued)

- Isogrid and Orthogrid Fuselage Skins
- Floor Board Structures
- Crew and Passenger Seats
- UH-60 and HH-60 Airframes
- Random Vibration analysis
- Vibroacoustic Analysis for launch vehicle structures
- Modal Testing
- Vibration Qualification Testing





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## Advantages

- Able to Produce Detailed High Quality Design and Drawings
- Experience Taking Initial Designs to Prototype Fabrication Leading to Final Production for the End User





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## NAICS & PSC Codes

- NAICS

- 541330 Engineering Services
- 541430 Graphic Design Services
- 541512 Computer Systems Design Services

- PSC

- AR14 R&D - Space: Aeronautics / Space Systems (Engineering Development)
- AC24 R&D – Defense System: Missile / Space Systems (Engineering Development)
- AJ44 R&D – General Science / Technology: Engineering (Engineering Development)



## Past Performance

- Tyonek Manufacturing
  - Sub contractor supporting commercial contracts;
    - Design and layout of simulator for component isolation
- Battelle Memorial Institute
  - Sub contractor supporting government contracts;
    - Layout and design of a water purifier system for pharmaceutical companies
    - Layout and design of airborne chemical detectors
- Secotec Inc
  - Sub Contractor Supporting Government Contracts;
    - Layout and design of launched targets to support MDA
    - 3D printing prototypes for fit checks



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## Questions & Answers

- Questions & Answers