NASA/MARSHALL SPACE FLIGHT CENTER

JOINT COUNSELING SESSION

March 22, 2018
## Background

**COMPANY NAME:** CRM SOLUTIONS  

**ADDRESS:** 4092 Memorial Parkway SW, Suite 200  
Huntsville, Al 35802

<table>
<thead>
<tr>
<th>COMPANY NAME</th>
<th>ADDRESS</th>
</tr>
</thead>
</table>
| CRM SOLUTIONS | 4092 Memorial Parkway SW, Suite 200  
Huntsville, Al 35802 |

<table>
<thead>
<tr>
<th>OWNER</th>
<th>CONTACT NAME</th>
</tr>
</thead>
</table>
| Rhonda Mclaurin | Rhonda Mclaurin  
Les Hall  
Jeb Orr |

<table>
<thead>
<tr>
<th>EMAIL</th>
<th>YEARS IN BUSINESS</th>
</tr>
</thead>
</table>
| Rhonda@crmsolutionsinc.com  
Les.hall@crmsolutionsinc.com  
Jeb.orr@crmsolutionsinc.com | 21 |

<table>
<thead>
<tr>
<th>CAGE CODE</th>
<th>DUNS NUMBER</th>
</tr>
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<tbody>
<tr>
<td>1ZEF0</td>
<td>071361120</td>
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<table>
<thead>
<tr>
<th>WEB SITE</th>
<th>NAICS CODES</th>
</tr>
</thead>
</table>
| www.crmsolutionsinc.com | 541330, 541511  
541715, 927110 |
### Business Size & Classifications

<table>
<thead>
<tr>
<th>TOTAL EMPLOYEES:</th>
<th>15</th>
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<tbody>
<tr>
<td>AVERAGE SALES:</td>
<td>$3.3 million annual</td>
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<table>
<thead>
<tr>
<th>CLASSIFICATIONS (select from list below):</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMALL BUSINESS</td>
<td>Yes</td>
</tr>
<tr>
<td>SMALL DISADVANTAGED BUSINESS</td>
<td>No</td>
</tr>
<tr>
<td>NATIVE AMERICAN-OWNED</td>
<td>No</td>
</tr>
<tr>
<td>ALASKAN NATIVE CORPORATION</td>
<td>No</td>
</tr>
<tr>
<td>WOMEN OWNED</td>
<td>Yes</td>
</tr>
<tr>
<td>ECONOMICALLY DISADVANTAGED WOMEN OWNED</td>
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</tr>
<tr>
<td>VETERAN-OWNED</td>
<td>No</td>
</tr>
<tr>
<td>SERVICE DISABLED VETERAN OWNED</td>
<td>No</td>
</tr>
<tr>
<td>HUBZONE CERTIFIED</td>
<td>Yes</td>
</tr>
<tr>
<td>8(A) CERTIFIED</td>
<td>No</td>
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<tr>
<td>8(A) EXPIRATION DATE (if applicable)</td>
<td>No</td>
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</table>
Quality Systems

- AS9100 Compliant
- DCAA Compliant Accounting System
Computational Fluid Dynamics ; NASA

- NASA SLS core stage and SRB nozzle force/moment database development
- Stage separation
- Store separation / SM panel jettison
- Propulsion multi-species chemically reacting flow
- SLS LVSA purge ring design and thermal environments
- Vent design; NASA SLS LVSA
- Haz-Gas analysis; LVSA
- 700 processor in-house computing cluster
Computational Fluid Dynamics; DoD

- Store separation
- Stage separation
- Tube launch
- Auto-pilot coupling with moving control surfaces
- Spinning Missiles with dithering canards / spinning tail fins
- Rotorcraft; Apache, Blackhawk
- Laser Modeling
Vibro-Acoustics, Structural Analysis
Thermal, Debris Impact

- Vibro-Acoustics
  - Aerodynamic loading; SLS LVSA, NASA SLS future flight configurations
  - Internal Acoustics; SLS LVSA acoustic blanket design and analysis
- Structural Design and Analysis
  - Lead of structural team NASA SLS LVSA
  - Static/Dynamic stress analysis
  - Linear/Nonlinear analysis
  - Linear/Nonlinear buckling
  - Fracture / Fatigue analysis
- Thermal design and analysis
  - NASA SLS
    - LVSA Purge ring design
    - LVSA TPS design
    - LVSA Ice accumulation
- Debris transport and impact analysis
  - Provided debris impact assessments for all debris sources which might impact the NASA SLS LVSA
CRM GN&C Capabilities

- Complete suite of design, modeling, simulation, and analysis capabilities in GN&C and related disciplines

- Extensive staff program experience:
  - NASA Space Shuttle Orbiter, Ares I, SLS
  - MDA Ground Based Interceptor (GBI)
  - NASA CCP Dream Chaser
  - NASA F/A-18 FAST Flight Test Platform
  - USN and USAF Ballistic Missiles
  - USN UUV and Submarine Navigation
  - AFRL Reusable Booster System (RBS)
Navigation Design and Analysis

  - Extensive experience with tactical, space, and naval hardware and software
  - Ground-up capabilities for navigation algorithm development including GPS/INS integration, error modeling, and covariance analysis

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SLS RINU Induced Environment Aliasing Prediction

Spacecraft ADCS With Low-Grade IMU
Flight Control and Guidance Design and Analysis

- Extensive suite of tools and processes for design of aerospace vehicle autopilots
  - Nonlinear, optimal, and adaptive control techniques with certifiable algorithms
  - Advanced control allocation for over-actuated systems
  - Human factors and piloted system design
  - Boost vehicle, lander, and reentry guidance

![Stability and Robustness Analysis of SLS PEG](image)

![Launch Vehicle Stability Analysis](image)

![Optimal Bending Filter Design](image)
Test Design and Analysis

- Demonstrated Experience in Test and Data Analysis
  - Test plan and test profile development
  - Data fitting and model parameter estimation
  - System & instrumentation noise process analysis
  - Frequency response methods for nonlinear systems
  - Flight test and real-time mission operations

MSFC 2-Axis TVC Response Testing

NASA FAST F/A-18

Advanced Process Noise Modeling
Customers

- NASA
- Missile Defense Agency
- Missile and Space Intelligence Agency
- Department of Homeland Security
- Jacobs
- Teledyne Brown
- Orbital ATK
- General Dynamics
- Coleman Research
## Principle Point(s) of Contact

<table>
<thead>
<tr>
<th>NAME</th>
<th>TITLE</th>
<th>PHONE</th>
<th>EMAIL</th>
</tr>
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<tbody>
<tr>
<td>Rhonda McLaurin</td>
<td>President and CEO</td>
<td>256-885-1577</td>
<td><a href="mailto:Rhonda@crmsolutionsinc.com">Rhonda@crmsolutionsinc.com</a></td>
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<tr>
<td>Les Hall</td>
<td>Director of Engineering</td>
<td>256-653-6853</td>
<td><a href="mailto:Les.hall@crmsolutionsinc.com">Les.hall@crmsolutionsinc.com</a></td>
</tr>
<tr>
<td>Jeb Orr</td>
<td>Chief Technology Officer</td>
<td>256-479-1716</td>
<td><a href="mailto:Jeb.orr@crmsolutionsinc.com">Jeb.orr@crmsolutionsinc.com</a></td>
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