

KEY

NSMMS & CRASTE Focused Sessions

CRASTE Focused Sessions

NSMMS Focused Sessions

**Sunday, 23 June 2019**

1600 - 2000 Early Registration

**Monday, 24 June 2019**

0700 - 0745 Speaker Meeting (with Light Breakfast) for Monday's Tutorial & Workshop Presenters

0700 - 0800 Attendee Light Continental Breakfast

0700 - 1730 Registration Open

1000 - 1630 Exhibitor Move-In

1330 - 1630 Poster Move-In

1200 - 1330 Lunch Break

(On Your Own - See Registration Desk for Area Restaurants)

1730 - 1900 Welcome Reception and Exhibit & Poster Kick-Off

Co-Sponsored by Materials Research & Design, Inc. and Southern Research

**NSMMS & CRASTE Tutorials & Workshops**

Organizers: Mr. Nickolas Demidovich, Federal Aviation Administration; Mr. Kenneth Knittel, Raytheon Missile Systems; Dr. Gerald Russell, Integration Innovation, Inc. & Mr. Tim Stewart, Ultramet

0800 - 0845 Keynote Presentation: Overview of NASA's Hypersonics Program

Mr. Charles Leonard, NASA Langley Research Center

0845 - 0930 Keynote Presentation: Mars Sample Return, Mission Overview

Mr. Brian Muirhead, NASA Jet Propulsion Laboratory

0930 - 0935 Transition to Multi-Track Tutorials, Workshops, & Small Business Forum

	Track One	Track Two	Track Three	Track Four
	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops</b>	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops</b>	<b>Integrated Vehicle Health Management (IVHM) &amp; Integrated System Health Monitoring (ISHM) Workshop</b> Workshop Chair: Mr. James Larkin, Aerojet Rocketdyne Co-Chair: Dr. Andrej Zagrai, New Mexico Institute of Mining and Technology	<b>Small Business Forum One-On-Ones</b>
0935 - 1035	<b>TPS Manufacturing &amp; Industrial Base Issues</b> Dr. Bruce Moylan, U.S. Army Combat Capabilities Development Command Aviation & Missile Center	<b>Comprehensive Overview of Small Launch Vehicles</b> Mr. Michael Fuller, Northrop Grumman Innovation Systems	0935 - 1005 <b>Sensors in Metal 3D Printed Structures</b> Mr. Mark Norfolk, Fabrisonic, LLC 1005 - 1035 <b>3D Printing and Laser Curing of Al/<math>\alpha</math>-Fe<sub>2</sub>O<sub>3</sub> Nanothermites for Gas and Strain Sensing</b> Mr. Curtis Hill, NASA Marshall Space Flight Center	<b>Small Business Forum One-On-Ones with:</b> Aerojet Rocketdyne Ball Aerospace The Boeing Company DARPA SBIR Program Lockheed Martin MDA SBIR Program Northrop Grumman Corporation Raytheon Company
1035 - 1100	<b>Break</b>			
1100 - 1200	<b>Working the Academia for Workforce Development and Innovation in Hypersonics</b> Mr. John Schmisser, University of Tennessee Space Institute	<b>Parker Solar Probe</b> Ms. Elizabeth Congdon, Johns Hopkins University, Applied Physics Laboratory	1100 - 1130 <b>Advances in Electro-Mechanical Impedance Structural Health Monitoring for Space Systems</b> Dr. Andrej Zagrai, New Mexico Institute of Mining and Technology 1130 - 1200 <b>Advancements in the Development of a Non-Invasive Environmental Sensing System for Lifecycle Management</b> Mr. Jeremy Senne, San Diego Composites	<b>Small Business Forum One-On-Ones, cont.</b>
1200 - 1330	<b>Lunch Break</b> (On Your Own - See Registration Desk for Area Restaurants)			
	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops, cont.</b>	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops, cont.</b>	<b>IVHM/ISHM, cont.</b>	
1330 - 1530	<b>Flight Instrumentation for TPS Technologies</b> Mr. M. Carter Johnson, U.S. Army Combat Capabilities Development Command Aviation & Missile Center	<b>Characterizing Antennas in Harsh Environments</b> Mr. Thomas Lewis, Air Force Research Laboratory	1330 - 1400 <b>Status of the Spacecraft Structural Health Monitoring Experiment</b> Dr. Derek Doyle, Air Force Research Laboratory	

			1400 - 1430	High Temperature Instrumentation for use in Hypersonic Applications Ms. Shelby Massey, Southern Research	
			1430 - 1530	Overview of AFRL Technology Development in Aging and Surveillance of Solid Rocket Motors Mr. James Singleton, Air Force Research Laboratory	
1530 - 1600	Break				
	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops. cont.</b>	<b>NSMMS &amp; CRASTE Tutorials &amp; Workshops. cont.</b>	<b>IVHM/ISHM, cont.</b>		
1600 - 1730	Rocket Propulsion - 21st Century Mr. Drew DeGeorge, Air Force Research Laboratory	Nondestructive Characterization of Composite Materials Mr. James Tucker, Southern Research	1600 - 1630	AFRL Software Tools for Aging and Service Life Estimation of Solid Rocket Motors Mr. Geoffrey Trapp, Air Force Research Laboratory	
			1630 - 1700	Optical Combustion Analysis System (OCAS) – Recent Advances for Liquid Rocket Engine Health Management Systems Dr. Tait Pottebaum, Opto-Knowledge Systems, Inc.	
			1700 - 1730	Challenges with Integrated Vehicle Health Management Implementation into Enhanced Weapon Systems Mr. Derek DeVries, Northrop Grumman Innovation Systems	
1730 - 1900	Welcome Reception and Exhibit & Poster Kick-Off <i>Co-Sponsored by Materials Research &amp; Design, Inc. and Southern Research</i>				
1915 - 2100	Student Grant Dinner (Invitation Only)				
<b>Tuesday, 25 June 2019</b>					
0700 - 0745	Speaker Meeting (with Light Breakfast) for Tuesday Afternoon Presenters				
0700 - 0800	Attendee Light Continental Breakfast <i>Sponsored by COI Ceramics</i>				
0700 - 1730	Registration Open				
1200 - 1330	Lunch Break <i>(On Your Own - See Registration Desk for Area Restaurants)</i>				
1330 - 1730	Exhibits and Poster Session Open				
1800	Buses Depart for the Offsite Dinner from the Main Lobby				
1830 - 2030	Networking Dinner Offsite <i>Sponsored by Northrop Grumman Corporation</i>				
<b>NSMMS &amp; CRASTE Plenary Session</b>					
0800 - 0815	Opening Remarks, National Anthem & Plenary Session <b>Announcements:</b> Mr. Eric Becker, Materials and Manufacturing Directorate, Air Force Research Laboratory <b>Moderator:</b> Dr. Shery Welsh, Deputy Director, Science & Technology, Advanced Technology Directorate, Missile Defense Agency				
0815 - 0900	<b>Keynote:</b> Mr. Stephen Jurczyk, SES, Associate Administrator, NASA Headquarters				
0900 - 0935	Mr. Barry Pike, SES, Director, Weapons Development and Integration Directorate U.S. Army Combat Capabilities Development Command Aviation and Missile Center				
0935 - 1010	Dr. Douglas Blake, SES, Department Head, Aviation, Force Projection and Integrated Defense, Office of Naval Research				
1010 - 1040	Break <i>Sponsored by Dynetics, Inc.</i>				
1040 - 1115	Dr. Mark Rosker, SES, Director, Microsystems Technology Office, Defense Advanced Research Projects Agency				
1115 - 1150	Ms. Jane Kinney, Director of Business Operations, Commercial Spaceflight Federation				
1150 - 1200	Lifetime Achievement Award				

1200 - 1205	<b>2020 NSMMS &amp; CRASTE Location Announcement</b>			
1205 - 1330	<b>Lunch Break</b> (On Your Own - See Registration Desk for Area Restaurants)			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Missiles &amp; Missile Defense</b>  Session Chair: Mr. Rob Esslinger, U.S. Army Aviation and Missile Research Development and Engineering Center  Lead Organizer: Mr. Jason Calvert, U.S. Army Space and Missile Defense Command/Army Forces Strategic Command Co-Organizers: Dr. Douglas Deason, Deason Research LLC; Mr. Robert Haack, Missile Defense Agency; Mr. Paul Marchol, Aerojet Rocketdyne; Mr. Curtis Martin, Naval Surface Warfare Center; Dr. Bruce Moylan, U.S. Army Combat Capabilities Development Command Aviation & Missile Center; Dr. Gerald Russell, Integration, Innovation, Inc. & Dr. John Shigley, Northrop Grumman Innovation	<b>NSMMS Additive Manufacturing for Space and Missile Materials</b>  Session Chair: Dr. LaNetra Tate, NASA Kennedy Space Center  Lead Organizer: Dr. Russell Lipeles, The Aerospace Corporation Co-Organizers: Dr. Amjad Almansour, NASA Glenn Research Center; Mr. Eric Becker, Air Force Research Laboratory; Mr. Alan Brown, Aerojet Rocketdyne; Dr. Raymond Clinton, NASA Marshall Space Flight Center; Ms. Kaia David, The Boeing Company; Mr. Michael Fuller, Northrop Grumman Innovation Systems & Dr. Suraj Rawal, Lockheed Martin Space Systems Company	<b>NSMMS Ground Test &amp; Evaluation</b>  Session Chairs: Dr. Brian Gockel, Air Force Research Laboratory & Mr. Tyler Neale, Arnold Engineering Development Complex  Lead Organizer: Dr. Joseph Sheeley, Quantitech, Inc. Co-Organizers: Dr. Bruce Moylan, U.S. Army Combat Capabilities Development Command Aviation & Missile Center; Dr. Gerald Russell, Integration, Innovation, Inc. & Mr. Andrew Swanson, Air Force Research Laboratory	<b>CRASTE Emerging Propulsion Systems</b>  Session Chair: Mr. Robert Taylor, Air Force Research Laboratory Co-Chair: Mr. Anthony Brinkley, Integration Innovation, Inc.
1330 - 1335	<b>Session Introduction</b>	<b>Session Introduction</b>	<b>Session Introduction</b>	<b>Session Introduction</b>
1335 - 1400	<b>Manufacturing of Complex Shaped 2D C-C Composites</b> Dr. John Shigley, Northrop Grumman Innovation Systems	<b>The VULCAN Advanced Hybrid Manufacturing System</b> Mr. Doug Marsh, Made In Space, Inc.	<b>An Analysis of the Hypervelocity Impact Response of Graphite and an Overview of Weather Capabilities at the NASA WTSF-RHTL Facility</b> Mr. Ben Carmichael, Southern Research	<b>Sensitivity of Modular Aerospike Thrust Chamber Size Across Various Engine Thrust Classes</b> Mr. Nils Sedano, Air Force Research Laboratory
1400 - 1425	<b>Design of Tooling to Accommodate Carbon/Phenolic Processing Deformations</b> Mr. Kent Buesking, Materials Research & Design, Inc.	<b>Archinaut Technology Development: Ground-Based Results for External In-Space Additive Manufacturing and Assembly</b> Mr. Lawrence Huebner, NASA Langley Research Center	<b>Low Cost Light Weight High Speed Structure (LCLWHSS) Full Scale Component Test</b> Mr. Jonathan Boston, Air Force Research Laboratory	<b>Refined Monte-Carlo Uncertainty Analysis of the Hydrocarbon Boost Sub-Scale Oxygen-Rich Preburner</b> Mr. Ethan Sichler, Sierra Lobo, Inc.
1425 - 1450	<b>Composites and Advanced Materials (CAM) Testing and Characterization</b> Mr. Ian Allen, Integration Innovation, Inc.	<b>Archinaut: A Path to Flight Demonstration</b> Mr. Simon Patané, Made In Space, Inc.	<b>Aerothermal Simulation using Radiant Heating in AFRL Combined Environment Acoustic Facility</b> Mr. Travis Wyen, Air Force Research Laboratory	<b>Summary of Carbon/Carbon Development for Modular Architecture Propulsion Systems</b> Mr. Iddrisu Seidu, Air Force Research Laboratory
1450 - 1515	<b>Novel Polymer Nanocomposite Ablatives for Naval Missile Launcher</b> Mr. William Fahy, The University of Texas at Austin	<b>Solid State Metal Additive Manufacturing for ISS</b> Mr. Mark Norfolk, Fabrisonic, LLC	<b>Non-Contacting Instrumentation: Methods and Outcomes of Full Trajectory Mission Cycle Testing of a Hypersonic Vehicle Panel</b> Ms. Melissa Hall, Air Force Research Laboratory	<b>Numerical Investigation of a Truncated Modular Aerospike Vehicle</b> Dr. Farhad Davoudzadeh, Air Force Research Laboratory
1515 - 1545	<b>Root Beer Float Break</b> <i>Sponsored by Plasma Processes, LLC</i>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Missiles &amp; Missile Defense, cont.</b>	<b>NSMMS Additive Manufacturing for Space and Missile Materials, cont.</b>	<b>NSMMS Ground Test &amp; Evaluation, cont.</b>	<b>CRASTE Emerging Propulsion Systems, cont.</b>
1545 - 1550	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>
1550 - 1615	<b>Experimental Testing and Failure Analysis of Polycrystalline Graphite in a Rapid Thermal Strain Environment</b> Mr. James Hawbaker, Southern Research	<b>Microgravity Multiple Materials Additive Manufacturing (M3AM) Technology for In-Space Manufacturing</b> Dr. Nathanael Kim, Interlog Corporation	<b>Developing Local Heating Methods on a Curved Panel</b> Dr. Brian Gockel, Air Force Research Laboratory	<b>Maturation of Sierra Nevada Corporation's VR35K-A Upper Stage Engine System</b> Mr. J. Arthur Sauer, Sierra Nevada Corporation
1615 - 1640	<b>Update on the Development and Demonstration of Material Systems for High Performance Solid Rocket Motors</b> Dr. Sandra Tomczak, Air Force Research Laboratory	<b>Development of Fiber Reinforced Composite Feedstock for In-Space Manufacturing of High Strength Parts</b> Dr. Sunil Patankar, GeoComposites, LLC	<b>Investigating the Shape Change of 3D Carbon-Carbon Nosedip Materials in Transitional Flow using Computer Vision Techniques</b> Mr. Ben Carmichael, Southern Research	<b>Chemistry and Space Propulsion Applications of Room-Temperature Ionic Liquids</b> Dr. Ghanshyam Vaghjiani, Air Force Research Laboratory

1640 - 1705	<b>Advanced Rocket Technology, Additively Manufactured Solid Post-Boost Control System Components for Lower Cost and Higher Performance</b> Mr. Adam Ebnit, Air Force Research Laboratory	<b>Reclaimable Materials and Processing for In-Space Additive Manufacturing</b> Dr. Ryan Snyder, Cornerstone Research Group	<b>Low Cost TPS Design and Development</b> Mr. M. Carter Johnson, U.S. Army Combat Capabilities Development Command Aviation & Missile Center	<b>Embedded Sensing for Additively Manufactured Fuel Grains in Hybrid Rockets</b> Dr. Pavan Narsai, Interlog Corporation
1705 - 1730	<b>An Emerging Field Assisted Sintering Technology (FAST) for the Manufacturing of Net-Shaped Rocket Nozzles for Hypersonic Applications</b> Dr. Jogender Singh, Applied Research Laboratory, Penn State University	<b>Additive Manufacturing of PEEK and Fiber-Reinforced PEEK for NASA Applications and Custom Medical Devices</b> Dr. Roger Bagwell, Actuated Medical, Inc.	<b>Gradient Heating of a Graphite Elliptic Cone</b> Mr. James Hawbaker, Southern Research	<b>Hydrocarbon Boost Full Scale Oxidizer-Rich Preburner Assembly and Component Test Preparation</b> Mr. Robert Taylor, Air Force Research Laboratory
1800	<b>Buses Depart for the Offsite Dinner from the Main Lobby</b>			
1830 - 2030	<b>Networking Dinner Offsite</b> <i>Sponsored by Northrop Grumman Corporation</i>			
<b>Wednesday, 26 June 2019</b>				
0700 - 0745	<b>Speaker Meeting (with Light Breakfast) for Wednesday's Presenters</b> <i>Sponsored by Ultramet</i>			
0700 - 0800	<b>Attendee Light Continental Breakfast</b>			
0700 - 1730	<b>Registration Open</b>			
1200 - 1330	<b>Lunch Break</b> <i>(On Your Own - See Registration Desk for Area Restaurants)</i>			
0700 - 1200 1330 - 1900	<b>Exhibits and Poster Session Open</b>			
1730 - 1900	<b>Poster Session and Networking Reception</b> <i>Sponsored by The Boeing Company</i>			
1900 - 2030	<b>Exhibit and Poster Dismantle</b>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Hypersonics</b>  Session Chairs: Dr. William Carter, Defense Advanced Research Projects Agency & Dr. Paul Jero, Air Force Research Laboratory  Lead Organizer: Mr. Craig Ohlhorst, NASA Langley Research Center Co-Organizers: Mr. Tod Palm, Northrop Grumman Aerospace Systems; Mr. Miklos Petervary, The Boeing Company; Mr. Brian Sullivan, Materials, Research & Design, Inc.; Mr. Andrew Swanson, Air Force Research Laboratory & Mr. Brian Zuchowski, Lockheed Martin Aeronautics	<b>NSMMS Additive Manufacturing for Space and Missile Materials</b>  Session Chair: Dr. LaNetra Tate, NASA Kennedy Space Center  Lead Organizer: Dr. Russell Lipeles, The Aerospace Corporation Co-Organizers: Dr. Amjad Almansour, NASA Glenn Research Center; Mr. Eric Becker, Air Force Research Laboratory; Mr. Alan Brown, Aerojet Rocketdyne; Dr. Raymond Clinton, NASA Marshall Space Flight Center; Ms. Kaia David, The Boeing Company; Mr. Michael Fuller, Northrop Grumman Innovation Systems & Dr. Suraj Rawal, Lockheed Martin Space Systems Company	<b>NSMMS Ground Test &amp; Evaluation</b>  Session Chairs: Dr. Brian Gockel, Air Force Research Laboratory & Mr. Tyler Neale, Arnold Engineering Development Complex  Lead Organizer: Dr. Joseph Sheeley, Quantitech, Inc. Co-Organizers: Dr. Bruce Moylan, U.S. Army Combat Capabilities Development Command Aviation & Missile Center; Dr. Gerald Russell, Integration Innovation, Inc. & Mr. Andrew Swanson, Air Force Research Laboratory	<b>NSMMS &amp; CRASTE Space Access and Propulsion</b>  Session Chairs: Dr. Raymond Clinton, NASA Marshall Space Flight Center & Dr. Shawn Phillips, Air Force Research Laboratory  Lead Organizer: Mr. Anthony Brinkley, Integration Innovation, Inc. Co-Organizers: Mr. Alan Brown, Aerojet Rocketdyne; Mr. Timothy McKechnie, Plasma Processes, LLC; Mr. Tim Stewart, Ultramet & Mr. Robert Taylor, Air Force Research Laboratory
0800 - 0805	<b>Session Introduction</b>	<b>Session Introduction</b>	<b>Session Introduction</b>	<b>Session Introduction</b>
0805 - 0830	<b>Flight Research Vehicle Trajectory Analysis and Loads Development</b> Mr. Alex Elsbrock, University of Dayton Research Institute	<b>Benefits of Additive Manufacturing in Satellite Propulsion</b> Mr. Leo Gard, Aerojet Rocketdyne	<b>Leading Edge Experimental Development</b> Mr. Jonathan Boston, Air Force Research Laboratory	<b>Hot-Fire Testing of an Oxide-Lined Iridium/Rhenium Combustion Chamber With AF-M315E</b> Mr. Phu Quach, Ultramet
0830 - 0855	<b>Hypersonic Material Flight Test Opportunities with the X-60A</b> Mr. Barry Hellman, Air Force Research Laboratory	<b>Tailored Nanolayer Powders for Liquid Rocket Engine Component Additive Manufacturing</b> Mr. Dean Baker, Advanced Powder Solutions, Inc.	<b>Extended Life, High Mach Throats for AEDC Tunnel-9</b> Mr. Gary Tiscia, Materials Research & Design, Inc.	<b>Hot-Fire Testing of a 22-N SiC Foam Igniter for AF-M315E</b> Mr. Phu Quach, Ultramet
0855 - 0920	<b>Aerodynamic Heating Coupled with Structural Temperature Response Analysis for Hypersonic Flight Vehicles</b> Mr. Farid Rafla, Air Force Research Laboratory	<b>Development of an Early-Stage Additive Manufacturing Cost Model for Modular Rocket Engines</b> Mr. Caleb Williams, SpaceWorks Enterprises, Inc.	<b>Hypersonic Flight in Weather – Ground Test Support for Weather Performance Modeling and Simulation</b> Mr. Dean Polk, Integration Innovation, Inc.	<b>Capabilities and Initial Results from Cryogenic Methane &amp; LNG Heat Transfer &amp; Thermal Stability Experiment</b> Mr. Benjamin Hill-Lam, Johns Hopkins University

0920 - 0945	<b>Generating Material Properties from Flight-Representative Structures</b> Mr. John Podhiny, Materials Research & Design, Inc.	<b>Booster Turbopump Additive Manufacturing Technology Development</b> Mr. Jacky Calvignac, Northrop Grumman Aerospace Systems	<b>A Direct Comparison of RVAP Noretip Material Performance in the H1 and H3 Arc Jets</b> Mr. Nate McGillivray, Southern Research	<b>Energetic Liquid Ion Thruster Experiment (ELITE)</b> 1st Lt Karson Roberts, Air Force Research Laboratory
0945 - 1015	<b>Break</b>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Additive Manufacturing for Space and Missile Materials, cont.</b>	<b>NSMMS Ground Test &amp; Evaluation, cont.</b>	<b>NSMMS &amp; CRASTE Space Access and Propulsion, cont.</b>
1015 - 1020	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>
1020 - 1045	<b>Hypersonic Structurally Integrated CMC Skins (HySICS): Results of Subelement Testing</b> Dr. Brian Sullivan, Materials Research & Design, Inc.	<b>Manipulation of Additive Manufacturing Features for Increased Engine Chamber Cooling Efficiency</b> Mr. Iddrisu Seidu, Air Force Research Laboratory	<b>Update on the Improved Rain Erosion Test Capability at the Holloman High Speed Test Track (HHSTT)</b> Mr. Bryan Sinkovec, United States Air Force, 846 Test Squadron	<b>Duct Cooled, Composite Thrust Chamber Technology Maturation</b> Mr. Jacky Calvignac, Northrop Grumman Aerospace Systems
1045 - 1110	<b>Structural Response of a Compliant Panel in Mach 4 Flow</b> Mr. Daniel Ogg, Air Force Research Laboratory	<b>Additive Manufacturing for High-Performance Propellants</b> Dr. Joseph Mates, Air Force Research Laboratory	<b>Expanding Durability, Stability and Accuracy of Thin-Film Temperature Gauges (and Slug Calorimetry) for Estimating Heat Flux in Hypersonics Impulsive (and Arc-Jet) Ground Test Studies</b> Dr. Jay Frankel, University of Tennessee	<b>Duct-Cooled Composite Thrust Chamber Technology Maturation: Design, Fabrication, and Testing</b> Mr. Gary Tiscia, Materials Research & Design, Inc.
1110 - 1135	<b>ATAC Modernization Project: Material Thermal Response and Shape Change Improvements</b> Dr. Conrad Patton, CFD Research Corporation	<b>3D Printing Ablative Heat Shields</b> Mr. Stan Bouslog, NASA Johnson Space Center	<b>Ultra-High Temperature Capable Sensor for Dynamic Flow Measurements</b> Dr. George Papadopoulos, Innoveering, LLC	<b>Testing and Test Development for Two Types of Carbon Carbon Nozzle Extensions</b> Mr. Jacques Cuneo, Southern Research
1135 - 1200	<b>Composite Isolator Component Development</b> Mr. Chris Kogstrom, Northrop Grumman Corporation	<b>Binder Jet Additive Manufacturing of a Prototype Silicon Carbide Optical Support Structure</b> Mr. Jesse Blacker, ExOne	<b>Bulk Enthalpy Uncertainty in the AEDC Arc-Heated Test Cells</b> Dr. Jon Cox, QuantiTech	<b>Composite Nozzle Extension Development and Testing for In-Space, Lunar Lander, and Upper Stage Liquid Rocket Propulsion Systems</b> Mr. Peter Valentine, NASA Marshall Space Flight Center
1200 - 1330	<b>Lunch Break</b> <i>(On Your Own - See Registration Desk for Area Restaurants)</i>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Additive Manufacturing for Space and Missile Materials, cont.</b>	<b>NSMMS Mission Operations &amp; Experiments in Space</b>  Session Chair: Dr. Jonathan Arenberg, Northrop Grumman Aerospace Systems  Lead Organizer: Mr. James Tucker, Southern Research Co-Organizers: Dr. Derek Doyle, Air Force Research Laboratory; Mr. Michael Fuller, Northrop Grumman Innovation Systems; Ms. Beth Kelsic, Ball Aerospace & Mr. John Vasquez, Naval Research Laboratory	<b>CRASTE Responsive Access for Pico/Nano/Small Payloads</b>  Session Chair: Mr. Robert Seibold, The Aerospace Corporation Co-Chair: Mr. Nickolas Demidovich, Federal Aviation Administration
1330 - 1335	<b>Announcements</b>	<b>Announcements</b>	<b>Session Introduction</b>	<b>Session Introduction</b>
1335 - 1400	<b>Materials for Extreme Environments</b> Dr. William Carter, Defense Advanced Research Projects Agency	<b>Development of High Temperature Alloys for Additive Manufacturing</b> Dr. Jake Hundley, HRL Laboratories	<b>Testing, Modeling and Correlation of Non-Dimensional Correlations for the Optimization of Micro Pin Fin Arrays</b> Mr. Sean Cohen, Ball Aerospace	<b>LauncherOne: Making Launch Easy for CubeSats</b> Mr. Wade McElroy, VOX Space
1400 - 1425	<b>A Comparative Study of the Thermal Responses of Coated Leading Edges in an Oxidizing Hypersonic Environment</b> Dr. Michael Brupbacher, Johns Hopkins University, Applied Physics Laboratory	<b>Cold Spray Additive Manufacturing of Nb Tubular Components</b> Dr. Tyler Kaub, Plasma Processes, LLC	<b>Deployment Repeatability Testing of SWOT Satellite</b> Mr. James Tucker, Southern Research	<b>Air Force Space Command (AFSPC) Range of the Future (ROTF)</b> Mr. John Mann, Air Force Space Command
1425 - 1450	<b>The i3 Hypersonic Wing Leading Edge Material Coating Evaluation Program</b> Mr. Dean Polk, Integration Innovation, Inc.	<b>Additive Manufacturing of Metal Refractory Alloys for Missile and Space Applications</b> Dr. Youping Gao, Castheon, Inc.	<b>Collimating Electrons: Leveraging AM to Probe Jupiter's Icy Moons</b> Dr. Michael Presley, Johns Hopkins University, Applied Physics Laboratory	<b>Path to the First Flight of the SL-OMV</b> Mr. Christopher Loghry, Moog, Inc.

1450 - 1515	<b>High Temperature Oxidation Protection Coatings for Carbon/Carbon Composites</b> Mr. William Erwin, Plasma Processes, LLC	<b>Build Orientation and Focal Shift Dependence of Microstructural Evolution, Precipitation, and Mechanical Properties in SLM Inconel 718</b> Mr. Tait McLouth, The Aerospace Corporation	<b>Radioluminescence and Photoluminescence Investigations of GaN Materials for Extreme Condition Optical and Radiation Detection</b> Dr. Ke-Xun Sun, University of Nevada, Las Vegas	<b>Chameleon 12U to 27U Flexible Bus for Rapid Payload Integration and High On-Orbit Reliability</b> Mr. Edmund Burke, Space Information Laboratories
1515 - 1545	<b>Break</b> <i>Poster Voting Cards Due to Registration Desk</i>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	<b>Track Four</b>
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Additive Manufacturing for Space and Missile Materials, cont.</b>	<b>NSMMS Mission Operations &amp; Experiments in Space, cont.</b>	<b>CRASTE High Altitude/Sub-Orbital Experiments and Capabilities</b>  Session Chair: Mr. Nickolas Demidovich, Federal Aviation Administration Co-Chair: Mr. Robert Seibold, The Aerospace Corporation
1545 - 1550	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>	<b>Session Introduction</b>
1550 - 1615	<b>Advanced MI CMCs for Expendable Hypersonic Vehicles</b> Mr. Tim Stewart, Ultramet	<b>Testing of AM Tungsten at Very High Strain-Rates</b> Dr. Sidney Chocron, Southwest Research Institute	<b>Highly Variable Radiators for Improved Spacecraft Thermal Control</b> Mr. Sean Cohen, Ball Aerospace	<b>Aerospike Rocket Integration &amp; Suborbital Experiment (ARISE) Program Overview</b> Mr. Robert Bernstein, Air Force Research Laboratory
1615 - 1640	<b>Hybrid Ceramic-Metal Control Fin for Hypervelocity Projectiles</b> Mr. Craig Iwano, Materials Research & Design, Inc.	<b>Optimization of Computed Tomography for Additive Manufacturing</b> Dr. Scott Poveromo, Northrop Grumman Corporation	<b>Development of PICA-D Heatshield Components for Planetary Entry Applications</b> Dr. Steven Violette, Fiber Materials, Inc.	<b>Data Recovery Devices for Hypersonic Vehicles</b> Dr. William Ailor, The Aerospace Corporation
1640 - 1705	<b>Field Assisted Sintering- Leading Edges and Nose Cone</b> Dr. Lawrence Matson, Air Force Research Laboratory	<b>Investigation of the Molybdenum – Titanium System with Additive Manufacturing Methods</b> Mr. Michael Niezgoda, University of Wisconsin Madison	<b>The Role of Materials and Metrology for Space Systems: Past, Present and Future</b> Dr. Jonathan Arenberg, Northrop Grumman Aerospace Systems	<b>Opening the Aperture: Research Opportunities on Blue Origin Commercial Space Platforms</b> Mr. Stefan Coburn, Blue Origin
1705 - 1730	<b>Activities in High Speed Flight Weather Effects Performance Assessment Modernization</b> Mr. Brandon Osborne, Integration Innovation, Inc.	<b>NASA's Efforts for the Development of Standards for Additive Manufactured Components</b> Mr. Richard Russell, NASA Kennedy Space Center		<b>F-104: Current and Future High-Performance Capabilities</b> Mr. Rick Svetkoff, Starfighters Aerospace
1730 - 1900	<b>Poster Session and Networking Reception</b> <i>Sponsored by The Boeing Company</i>			
<b>Thursday, 27 June 2019</b>				
0700 - 0745	<b>Speaker Meeting (with Light Breakfast) for Thursday's Presenters</b> <i>Sponsored by Ultramet</i>			
0700 - 0800	<b>Attendee Light Continental Breakfast</b>			
0700 - 1730	<b>Registration Open</b>			
1200 - 1330	<b>Lunch Break</b> <i>(On Your Own - See Registration Desk for Area Restaurants)</i>			
1800 - 2000	<b>Scot Forge Happy Hour</b> <i>Sponsored &amp; Hosted by Scot Forge Company</i>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	

	<b>NSMMS Hypersonics</b>  Session Chairs: Dr. Brett Hauber, University of Dayton Research Institute & Mr. Craig Ohlhorst, NASA Langley Research Center  Lead Organizer: Mr. Craig Ohlhorst, NASA Langley Research Center Co-Organizers: Mr. Tod Palm, Northrop Grumman Aerospace Systems; Mr. Miklos Petervary, The Boeing Company; Mr. Brian Sullivan, Materials, Research & Design, Inc.; Mr. Andrew Swanson, Air Force Research Laboratory & Mr. Brian Zuchowski, Lockheed	<b>NSMMS Emerging Materials &amp; Novel Processing Technologies</b>  Session Chair: Dr. Amjad Almansour, NASA Glenn Research Center  Lead Organizer: Mr. Eric Becker, Air Force Research Laboratory Co-Organizers: Ms. Kaia David, The Boeing Company; Prof. Greg Hilmas, Missouri University of Science and Technology; Mr. Kenneth Knittel, Raytheon Missile Systems; Prof. Joseph Koo, The University of Texas at Austin; Mr. John Vickers, NASA Marshall Space Flight Center & Dr. Eric Wuchina,	<b>CRASTE Reducing Cost, Increasing Safety, and Improving Reliability</b>  Session Chair: Mr. Barry Hellman, Air Force Research Laboratory Co-Chair: Mr. Robert Taylor, Air Force Research Laboratory	
0800 - 0805	<b>Session Introduction</b>	<b>Session Introduction</b>	<b>Session Introduction</b>	
0805 - 0830	<b>Materials and Processing for Expendable Hypersonic Vehicles</b> Dr. Paul Jero, Air Force Research Laboratory	<b>Characterizing Damage Accumulation in CMCs</b> Ms. Bhavana Swaminathan, University of California, Santa Barbara	<b>An Evaluation of Low-Cost High-Denier Fabrics for High-Temperature Oxide-Oxide Ceramic Matrix Composites</b> Mr. Wylie Simpson, Axiom Materials, Inc.	
0830 - 0855	<b>Fabrication and Testing of Interlaminar Strength of Ceramic Matrix Composites (CMC)</b> Dr. Alex Shih, Allcomp, Inc.	<b>Characterization of SiC Fiber Creep and Oxidation</b> Dr. Amjad Almansour, NASA Glenn Research Center	<b>Development of Lyocell Based Phenolic Impregnated Carbon Ablators (PICA-D) for Future NASA Missions</b> Dr. Mairead Stackpoole, NASA Ames Research Center	
0855 - 0920	<b>Properties and Applications of SiC-Based CMC Materials</b> Mr. Michael Peretti, GE Aviation	<b>Rapid Evaluation of Fiber Coatings for Better CMC Properties</b> Dr. Ming Chen, Air Force Research Laboratory	<b>In-Situ Monitoring by Multi-Parameter Imaging for In-Space Additive Manufacturing</b> Dr. Araz Yacoubian, Ler Technologies, Inc.	
0920 - 0945	<b>Low-Cost, High-Temperature Composite Materials for Hypersonic Applications</b> Mr. Brandon Powell, U.S. Naval Research Laboratory	<b>UHTC Material Systems using R-LCVD Fiber Reinforcements</b> Dr. Shay Harrison, Free Form Fibers	<b>Modular Aerospike Rocket Engine Component Sensitivity Study</b> Dr. John Bradford, SpaceWorks Enterprises, Inc.	
0945 - 1015	<b>Break</b>			
	<b>Track One</b>	<b>Track Two</b>	<b>Track Three</b>	
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Emerging Materials &amp; Novel Processing Technologies, cont.</b>	<b>CRASTE Reducing Cost, Increasing Safety, and Improving Reliability, cont.</b>	
1015 - 1020	<b>Announcements</b>	<b>Announcements</b>	<b>Announcements</b>	
1020 - 1045	<b>Oxide CMC Mechanical and RF Properties for High Temperature TPS and RF Applications</b> Mr. Steven Atmur, COI Ceramics, Inc.	<b>Characterization and Exploration of Fusion Welds in the SiC-ZrB<sub>2</sub>-ZrC System</b> Mr. Jecce Jarman, Missouri University of Science and Technology	<b>A Clearer View of Orbital Debris</b> Mr. Joseph Carroll, PlaneWave Instruments	
1045 - 1110	<b>Advanced Manufacturing of Oxide Ceramic Composites</b> Ms. Mary Litwinski, The Boeing Company	<b>Mechanical and Thermal Properties of Zeta Phase Tantalum Carbide at Room and Elevated Temperature</b> Mr. Evan Schwind, Missouri University of Science and Technology	<b>Reliable, Cost Effective Actuators and Electric Motors for Very High and Low Temperature Environments</b> Dr. George Holling, Electric Drivetrain Technologies, LLC	
1110 - 1135	<b>Multi-Layer Metal Insulation: An Integrated Thermal Protection System with Aerostructure for Hypersonic High Mach Vehicles</b> Ms. Kelsey Parker, Peregrine Falcon Corporation	<b>Mechanical Properties of Borothermally Synthesized ZrB<sub>2</sub> with WC and SiC Additions</b> Mr. Alec Murchie, Missouri University of Science and Technology	<b>Material Compatibility Apparatus Design and Testing of AF-M315E According to NASA-STD-6001B Test 15 Guidelines</b> Mr. Alex Bishop, Johns Hopkins University, Energetics Research Group	
1135 - 1200	<b>Actively Cooled Structurally Integrated Metallic Thermal Protection System (TPS)</b> Dr. Scott Poveromo, Northrop Grumman Corporation	<b>Synthesis and Thermal Properties of ZrB<sub>2</sub>, HfB<sub>2</sub> and TaB<sub>2</sub></b> Mr. Austin Stanfield, Missouri University of Science and Technology	<b>Residual Stress Measurement for Space and Missile Applications</b> Mr. Taylor Thompson, Proto Manufacturing	
1200 - 1330	<b>Lunch Break</b> <i>(On Your Own - See Registration Desk for Area Restaurants)</i>			

	Track One	Track Two	Track Three
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Emerging Materials &amp; Novel Processing Technologies, cont.</b>	<b>CRASTE Emerging Entry, Descent, and Recovery Systems and Technologies</b>  Session Chair: Mr. Jeramie Broadway, NASA Marshall Space Flight Center Co-Chair: Mr. Robert Taylor, Air Force Research Laboratory
<b>1330 - 1335</b>	<b>Announcements</b>	<b>Announcements</b>	<b>Session Introduction</b>
<b>1335 - 1400</b>	<b>Ceramic Matrix Composite (CMC) Control Surface Development Effort</b> Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company	<b>Thermo-Mechanical Characterization of Various Benzoxazine Composites up to 2500-4500°F as Alternatives to Phenolics</b> Mr. Bhavesh Patel, Southern Research	<b>Optimized Glider Design for Space Launch using the Towed Glider Air-Launch System</b> Mr. Gerald Budd, NASA Armstrong Flight Research Center
<b>1400 - 1425</b>	<b>Investigation of Durability Enhancements for High-Temperature Seals and Thermal Barriers</b> Mr. Shawn Taylor, The University of Toledo	<b>Novel 2.5D Silica/Polysiloxane Composite for Thermal Protection Systems</b> Mr. Ryan McDermott, The University of Texas at Austin	<b>Overview of the Development and Testing of the Heatshield for Extreme Entry Environment Technology (HEET) TPS</b> Dr. Matthew Gasch, NASA Ames Research Center
<b>1425 - 1450</b>	<b>Ceramic Matrix Composite (CMC) Fastener Development Program</b> Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company	<b>Evaluation of a Modified Fused Filament Fabrication Material for use as Thermal Protection</b> Mr. Steven Kim, The University of Texas at Austin	<b>Lycell-Based Carbon-Carbon for Rayon Replacement</b> Ms. Leslie Weller, Materials Research & Design, Inc.
<b>1450 - 1515</b>	<b>Integrated Computational Materials Engineering (ICME) Analysis and Design of Ceramic Matrix Composite (CMC) Fasteners</b> Dr. Brian Sullivan, Materials Research & Design, Inc.	<b>Material Response Modeling of Glass/Phenolic and Glass/Rubber-Modified Phenolic Ablatives</b> Mr. Jon Langston, The University of Texas at Austin	<b>Recovering Data from High Altitude Rocket Breakup Tests</b> Mr. Dale Amon, Immortal Data, Inc.
<b>1515 - 1545</b>	<b>Break &amp; Osmo Pocket Video Camera with Action Pack Give-Away</b> <i>Break Sponsored by Scot Forge Company &amp; Give-Away Sponsored by Dynetics, Inc.</i>		
	Track One	Track Two	
	<b>NSMMS Hypersonics, cont.</b>	<b>NSMMS Emerging Materials &amp; Novel Processing Technologies, cont.</b>	
<b>1545 - 1550</b>	<b>Announcements</b>	<b>Announcements</b>	
<b>1550 - 1615</b>	<b>A/N720 Push-Through Test and Analysis Comparison</b> Mr. Jonathan Boston, Air Force Research Laboratory	<b>Multi-Scale Material Modeling and Performance Simulation of Hypersonic Ceramic Composite Material Systems</b> Mr. Brian Brown, MSC Software	
<b>1615 - 1640</b>	<b>Integrated Aperture for Hypersonics</b> Ms. Vann Heng, The Boeing Company	<b>Short Fiber Composite Mechanical Property Modeling and Prediction Framework</b> Dr. Ali Gokce, ATA Engineering, Inc.	
<b>1640 - 1705</b>	<b>Design, Fabrication and Testing of 3D Woven Reinforced Oxide-Oxide Materials</b> Dr. Brian Sullivan, Materials Research & Design, Inc.	<b>Composite Material Property Characterization using Multiple Metamodels</b> Mr. Thomas Board, ATA Engineering, Inc.	
<b>1705 - 1730</b>	<b>Design of an Oxide-Oxide Antenna Window Subcomponent Test Article for Hypersonic Applications</b> Mr. William Higginson, Materials Research & Design, Inc.	<b>Nano-Grained Ceramic Radome Fabrication by Suspension Plasma Spray (SPS)</b> Dr. Dajie Zhang, Johns Hopkins University, Applied Physics Laboratory	
<b>1730</b>	<b>Adjourn</b>		
<b>1800 - 2000</b>	<b>Scot Forge Happy Hour</b> <i>Sponsored &amp; Hosted by Scot Forge Company</i>		