NSMMS & CRASTE Focused Sessions | CRASTE Focused Sessions | NSMMS Focused Sessions

Sunday, 26 June 2022

1600 - 2000	**Early Registration**

Monday, 27 June 2022

0700 - 0745	**Speaker Meeting (with Light Breakfast) for Monday Presenters** *Sponsored by Ball Aerospace*
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**

NSMMS & CRASTE Tutorials & Workshops

Organizers: Mr. Nickolas Demidovich, Federal Aviation Administration; Mr. Carter Johnson, ReLogic Research; Dr. Gerald Russell, RTCS, LLC; & Mr. Tim Stewart, Ultramet

0800 - 0845	**Keynote Presentation: Emerging Technology Horizons for Space Nuclear Systems** Dr. Anthony Calomino, NASA, Space Technology Mission Directorate
0845 - 0930	**Dream Chaser Spacecraft and Vision for the Emerging Commercial LEO Economy** Mr. Thomas Crabb, General Manager, Sierra Space
0930 - 0935	***Transition to Multi-Track Tutorials, Workshops, & Small Business Forum***

	Track One	Track Two	Track Three
	NSMMS & CRASTE Tutorials & Workshops	**NSMMS & CRASTE Tutorials & Workshops**	**NSMMS & CRASTE Tutorials & Workshops**
0935 - 1035	**The Path to Flight: Maturing New Hypersonic Technologies** Organizer: Dr. William Carter, Defense Advanced Research Projects Agency	**Small Business Engagement in Hypersonics Workshop** Session Chair: Dr. Dean Modroukas, Innoveering, LLC Organizers: Dr. Keith Bowman, Innoveering, LLC; Mr. Glenn Liston, ABDA, Inc.; & Dr. Gerald Russell, RTCS, LLC **-Workshop Objective and Products** Dr. Keith Bowman, Innoveering, LLC **-The Value of Small Businesses in Innovation** Keynote: Col Jake Porter, Air Force Research Laboratory **-Rapid Transition of TPS Technologies into Hypersonic Systems** Dr. Bruce Moylan, Lockheed Martin	**Critical Material Property Databases: Current Status and Future Needs** **-Background and Need for Accessible Databases** Mr. Thomas Lewis, Air Force Research Laboratory **-CMH-17 CMC Volume 5** Mrs. Rachael Andrulonis, Wichita State University -**High Temperature Antennas for Hypersonics: Data Needs** Mr. Curtis Martin, Naval Surface Warfare Center -**MOC3HA Data** Dr. Brent Carey, Battelle -**Panel Discussion**
1035 - 1100	**Break** *Sponsored by Aerojet Rocketdyne*		
1100 - 1200	**Utilizing Low Cost Alternative Facilities for Preliminary Flight Material Validation** Mr. Alex Conley, Lockheed Martin HEAT; Mr. Carter Johnson, ReLogic Research; & Mr. Tim McKechnie, Plasma Processes	**Small Business Engagement in Hypersonics Workshop, cont.** **Focus Topic Sessions** **-Materials/Structures** Mr. Tim Stewart, Ultramet - **Air-Breathing Propulsion** Dr. Dean Modroukas, Innoveering, LLC **-Ground and Flight T&E Facilities** Mr. Roger Herdy, CFD Research Corporation **-M&S** Mr. Gary Tiscia, Materials Research & Design, Inc.	**Space Servicing, Assembly, and Manufacturing** Mr. Jeramie Broadway, NASA Marshall Space Flight Center
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*		

	Track One	Track Two		Track Three
	NSMMS **Missiles & Missile Defense** Session Chair: Ms. Danielle Gerstner, Naval Surface Warfare Center Lead Organizer: Dr. Joseph Sheeley, PERIKIN Enterprises Co-Organizers: Mr. Jason Calvert, U.S. Army Space and Missile Defense Command; Mr. Aaron Cossey, Missile Defense Agency; Mr. Paul Marchol, Aerojet Rocketdyne; & Dr. Gerald Russell, RTCS, LLC	**NSMMS & CRASTE** **Tutorials & Workshops, cont.**		**NSMMS & CRASTE** **Small Business Forum** *Sponsored by Lockheed Martin*
1330 - 1335	**Session Introduction**	**1330 - 1430**	**Small Business Engagement in Hypersonics Workshop, cont.** **-Open Floor Q&A** **-Present Summary of Focus Topic Sessions and Future Engagement Planning**	**Small Businesses Forum One-on-Ones**
1335 - 1400	**Technology Maturation - Windows and Materials Overview** Mr. Mark Glenn, Missile Defense Agency			
1400 - 1425	**RF Aperture Materials Needs** Mr. Curtis Martin, Naval Surface Warfare Center			
1425 - 1450	**Testing and Optimization of Windows** Mr. Brian Tucker, Mainstream Engineering	**1430 - 1435**	**Transition to Other Tutorials, Workshops, & Sessions**	
1450 - 1515	**Multilayered MAX Phase Coating for High-Temperature Oxidation Protection of Missile Control Surfaces** Dr. Jessica DeBerardinis, Ultramet	**1435 - 1540**	**Workshop on Ensuring the Future through Workforce Development** Session Chair: Mr. Dan Marren, SRC Organizers: Dr. Gerald Russell, RTCS, LLC & Dr. Eric Wuchina, NSWC **-JHTO Expanding Workforce Strategies from STEM Pipeline through Existing Workforce** Dr. Lori Stiglitz, NSWC Crane **-University Consortium for Applied Hypersonics - Overview** Mr. Dan Marren, SRC	**Small Businesses Forum One-on-Ones**
1515 - 1540	**Carbon Foam Lightning and Thermal Protection System** Mr. Matthew Przybysz, Touchstone Research Laboratory			
1540 - 1600	**Break** *Sponsored by Ultrame*			

	Track One	Track Two		Track Three
	NSMMS **Missiles & Missile Defense, cont.**	**NSMMS & CRASTE** **Tutorials & Workshops, cont.**		**NSMMS & CRASTE** **Small Business Forum, cont.**
1600 - 1625	**Modeling and Optimization of Strategic and Tactical Rockets; MONSTR Program Overview** Dr. Timothy Gallagher, United States Air Force	**1600 - 1730**	**Workshop on Ensuring the Future through Workforce Development, cont.** **-Workforce Requirements and Development for the Advanced Ceramics Industry** Mr. Doug Freitag, USACA **-Investing in the Future Workforce for Hypersonics** Dr. Brett Hauber, UDRI **-Activities in Work Force Development for Thermal Protection Systems used in Hypersonics and Reentry** Dr. Tim Ferguson, Kratos SRE	**Small Businesses Forum One-on-Ones**
1625 - 1650	**Case-on-Propellant Manufacturing of Composite Rocket Motor Cases from High Temperature Resins** Dr. Jared Morrissette, Air Force Research Laboratory			
1650 - 1715	**Design and Testing of Articulated Thermal Protection** Mr. Eric McGill, University of Dayton Research Institute			
1715/1730 - 1900	**Welcome Reception and Exhibit & Poster Kick-Off**			
1930 - 2130	**Student Networking Reception** *(Invitation Only)*			

Tuesday, 28 June 2022	
0700 - 0745	**Speaker Meeting (with Light Breakfast) for Tuesday Afternoon Presenters** *Sponsored by Momentive*
0700 - 0800	**Attendee Light Continental Breakfast** *Sponsored by Spirit AeroSystems*
0700 - 1730	**Registration Open**
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*
1330 - 1730	**Exhibits and Poster Session Open**
1800 - 2100	**Madison Mallards Baseball Game Reception** *Sponsored by Northrop Grumman Corporation*

NSMMS & CRASTE Plenary Session					
0800 - 0815	**Opening Remarks, National Anthem & Plenary Session** **Announcements: Dr. Garth Wilks,** Lead Air Force Advisor to NSMMS & CRASTE, Air Force Research Laboratory **Moderator: Col Daniel Gallton**, Chief, Science & Engineering Division, Air Force Office of Scientific Research				
0815 - 0855	**Keynote: Mr. Tom Lockhart,** SES, Director of Engineering and Technical Management, Air Force Nuclear Weapons Center				
0855 - 0930	**Dr. Sharon Cobb,** SES, Associate Program Manager, Space Launch System Program, NASA Marshall Space Flight Center				
0930 - 1005	**Dr. William Carter**, Program Manager, Defense Advanced Research Projects Agency				
1005 - 1035	**Break** *Sponsored by RTCS, LLC*				
1035 - 1110	**Mr. Kelsey Haynes**, RCCTO speaking on behalf of **Mr. Robert Strider,** SES, Deputy Director, Army Hypersonic Project Office				
1110 - 1145	**Dr. Eric Wuchina,** NSWCCD speaking on behalf of **Dr. Knox Millsaps, SES,** Division Director, Aviation, Force Projection and Integrated Defense, NSWCCD				
1145 - 1200	**Awards Ceremony:** Col Daniel Gallton, Chief, Science & Engineering Division, Air Force Office of Scientific Research; Dr. Raymond Clinton, NASA Marshall Space Flight Center; & Mr. Tim Stewart, Ultramet				
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*				
	Track One	**Track Two**	**Track Three**	**Track Four**	
Students are marked with *	**NSMMS** **Hypersonics** Session Chairs: Mr. Curtis Martin, Naval Surface Warfare Center & Dr. Jesse Maxwell, U.S. Naval Research Laboratory Lead Organizer: Mr. Mitch Petervary, The Boeing Company Co-Organizers: Mr. Dan Hladio, Materials Research & Design, Inc.; Mr. Tod Palm, Northrop Grumman Aeronautics Systems; Dr. Suraj Rawal, Lockheed Martin Space Systems; Dr. Sandra Walker, NASA Langley Research Center; & Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company	**NSMMS** **Development, Processing & Testing of Advanced Materials** Session Chair: Dr. Dan Thoma, University of Wisconsin Lead Organizer: Dr. David Witkin, The Aerospace Corporation Co-Organizers: Mr. Jimmy Allen, Dynetics; Prof. Greg Hilmas, Missouri University of Science and Technology; Dr. Garth Wilks, Air Force Research Laboratory; & Dr. Eric Wuchina, Naval Surface Warfare Center	**NSMMS** **Novel Spaceflight Payloads, Instruments, & Mission Operations** Session Chair: Dr. Samir Singh, Ball Aerospace Lead Organizer: Mr. Michael Fuller, Northrop Grumman Space Systems Co-Organizers: Mr. James Tucker, Kratos SRE; & Mr. John Vasquez, U.S. Naval Research Laboratory	**CRASTE** **Emerging Entry, Descent, and Recovery Systems & Technologies** Session Chair: Prof. Joseph Koo, The University of Texas at Austin Co-Chair: Dr. Andrei Zagrai, New Mexico Institute of Mining and Technology	
1330 - 1335	**Session Introduction**	**Session Introduction**	**Session Introduction**	**Session Introduction**	
1335 - 1400	**Surface Morphing and Adaptive Structures for Hypersonics (SMASH)** Dr. Jesse Maxwell, U.S. Naval Research Laboratory	***Thermogravimetric Analysis as an Indicative Tool of Ablation Performance for Low-Density Flexible Thermal Protection Systems Material for Hypersonic Vehicles** Mr. Steven Kim, The University of Texas at Austin	**Adhesive Formulation for use in Cryogenic Applications** Dr. Samir Singh, Ball Aerospace & Mr. Joel Stray, Gentex Corporation	**Development of Domestic Lyocell Based Phenolic Impregnated Carbon Ablator (PICA-D) and Conformal PICA for Future NASA Missions** Dr. Matthew Gasch, NASA Ames Research Center	
1400 - 1425	**Morphing Ceramic Matrix Composites for Hypersonic Wind Tunnels** Dr. Sergio dos Santos e Lucato, Teledyne Scientific	***Low-Density Flexible Thermal Protection Systems Material for Hypersonic Vehicles** Mr. William Fahy, KAI, LLC	**Timely and Cost Effective Cryo-Mechanical Testing** Mr. James Tucker, Kratos SRE	***Comparison of Material Response Models of Low-Density Thermal Protection System Materials for Hypersonic Applications** Ms. Samantha Bernstein, The University of Texas at Austin	
1425 - 1450	**Material Maturation for Hypersonics – A Program to Transition Advances in C/C Materials Technology to Industry** Dr. Dennis Buchanan, University of Dayton Research Institute	**The Processing and Evaluation of Polyarylacetylene Resin as a Substitute Matrix for Modern Phenolic Composites used in Ablative Applications** Dr. Vanessa Arredondo, The Aerospace Corporation *Updated presentation title to "Evaluation of Polyarylacetylene Resin as a Matrix Material in Carbon-Carbon Composites for High Temperature Applications"*	**Update on Improved Precision of CTE Measurements for Space Structure Materials** Mr. James Tucker, Kratos SRE	**Development and Qualification of PICA-D Thermal Protection System to Support Mars Sample Return and Dragonfly Missions** Dr. Steven Violette, Spirit AeroSystems	
1450 - 1515	**Investigation on the Effects of Pyrolysis on the Structure of Carbon-Carbon Composite Materials for Hypersonic Aircraft** Prof. Jacqueline Johnson, The University of Tennessee Space Institute	***Computational Model of Carbon Fiber Zirconium Carbide Composite Oxidation under Hypersonic Conditions** Ms. Allison Rzepka, University of Illinois Urbana-Champaign	**Burst Test of Composite Cryogenic Tank** Dr. William Keith, The Boeing Company *Updated presentation title to "4.2M Composite Cryotank Validation"*	**An Initial Study for the Design of a Recoverable Distributed Black Box for Spacecraft** Mr. Dale Amon, Immortal Data, Inc.	
1515 - 1545	**Root Beer Float Break** *Sponsored by Plasma Processes, LLC*				

	Track One	Track Two	Track Three	Track Four
Students are marked with *	**NSMMS** **Hypersonics, cont.**	**NSMMS** **Development, Processing & Testing of Advanced Materials, cont.**	**NSMMS** **Novel Spaceflight Payloads, Instruments, & Mission Operations, cont.**	**CRASTE** **Reducing Cost, Increasing Safety, & Improving Reliability** Session Chair: Mr. Max Vozoff, X-Bow Systems Co-Chair: Mr. Nickolas Demidovich, Federal Aviation Administration
1545 - 1550	**Announcements**	**Announcements**	**Announcements**	**Session Introduction**
1550 - 1615	**Development of Ultrasonically Absorptive Materials for Boundary Layer Transition Delay** Mrs. Kerry Howren, Materials Research & Design, Inc. *Presentation to be given by: Mr. Jack Saffian, Materials Research & Design, Inc.*	***Aerothermal Evaluation of Novel and Modified Ablative Composite Systems for Hypersonic Applications** Mr. Colin Yee, The University of Texas at Austin	**Response of Ablative Thermal Protection Materials to Degradation in Low Earth Orbit – Characterization of Specimens from MISSE-13** Dr. Peter Marshall, Analytical Mechanics Associates, Inc.	**Polymer Radiation Shielding for Lightweighting Spacecraft** Mr. Brad Thomas, NanoSperse
1615 - 1640	**Nondestructive Evaluation Methods for Manufacturing Quality Assessments of Carbon/Carbon Structures** Dr. Victoria Kramb, University of Dayton Research Institute	***Influence of Silicon Carbide on Laser Powder Bed Fusion Molybdenum** Maj Nathan Ellsworth, Air Force Institute of Technology	**Orbital Access using MISSE** Mr. Langston Wesson, Aegis Aerospace	**Effective Risk Management of Electrostatic Discharge Machining Processes** Mr. John Renbarger, Ball Aerospace
1640 - 1705	**SiC-SiC Ceramic Matrix Composite Material for Reusable Hypersonic Vehicle Hot Structures** Mr. Derek Caputo, Materials Research & Design, Inc.	**Graded Alloy Transition Deposition (GRATD) Process Development** Dr. Daniel Driemeyer, Boeing Research & Technology	**Analysis of Materials International Space Station Experiment-10 (MISSE-10) Thin-Film Solar Cells** Ms. Meghan Carrico, NASA Marshall Space Flight Center	**Application of Base-Bleed and Propellant Grain Optimization for Range Extension of a Rocket-Assisted Projectile** Mr. Farid Rafla, Air Force Research Laboratory
1705 - 1730	**SiC-Based CMC for Hypersonics & Space** Mr. Michael Peretti, GE Edison Works	***Development of a Novel Molybdenum-Chromium-Aluminum Alloy for Hypersonic Service** Mr. Michael Niezgoda, University of Wisconsin Madison	**Regolith-Derived Extensible Feedstocks for Orbital Manufacturing of Materials and Structures** Dr. Michael Miller, Southwest Research Institute	**Enabling Powerful Suborbital Missions with Rocket Lab's Electron Launch Vehicle** Mr. Richard French, Rocket Lab
1800 - 2100	**Networking Reception at the Madison Mallards Baseball Game** *Sponsored by Northrop Grumman Corporation*			
Wednesday, 29 June 2022				
0700 - 0745	**Speaker Meeting (with Light Breakfast) for Wednesday's Presenters** *Sponsored by Textron*			
0700 - 0800	**Attendee Light Continental Breakfast** *Sponsored by Dynetics*			
0700 - 1730	**Registration Open**			
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*			
0700 - 1200 **1330 - 1900**	**Exhibits and Poster Session Open**			
1730 - 1900	**Poster Session and Networking Reception** *Sponsored by The Boeing Company*			
1900 - 2030	**Exhibit and Poster Dismantle**			

	Track One	Track Two	Track Three	Track Four
	NSMMS **Hypersonics** Session Chairs: Dr. Bill Carter, Defense Advanced Research Projects Agency & Mr. Curtis Martin, Naval Surface Warfare Center Lead Organizer: Mr. Mitch Petervary, The Boeing Company Co-Organizers: Mr. Dan Hladio, Materials Research & Design, Inc.; Mr. Tod Palm, Northrop Grumman Aeronautics Systems; Dr. Suraj Rawal, Lockheed Martin Space Systems; Dr. Sandra Walker, NASA Langley Research Center; & Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company	**NSMMS** **Development, Processing & Testing of Advanced Materials** Session Chair: Dr. Paul Kladitis, University of Dayton Research Institute Lead Organizer: Dr. David Witkin, The Aerospace Corporation Co-Organizers: Mr. Jimmy Allen, Dynetics; Prof. Greg Hilmas, Missouri University of Science and Technology; Dr. Garth Wilks, Air Force Research Laboratory; & Dr. Eric Wuchina, Naval Surface Warfare Center	**NSMMS** **Additive Manufacturing for Space & Missile Materials** Session Chair: Dr. Jim Stott, NASA Marshall Space Flight Center Lead Organizer: Dr. Amjad Almansour, NASA Glenn Research Center Co-Organizers: Dr. Raymond Clinton, NASA Marshall Space Flight Center; Ms. Kaia David, The Boeing Company; Mr. Michael Fuller, Northrop Grumman Space Systems; Dr. Suraj Rawal, Lockheed Martin Space Systems; Mr. Michael Renbarger, Ball Aerospace; Dr. Samir Singh, Ball Aerospace; Mr. James Tucker, Kratos SRE; & Mr. John Vasquez, U.S. Naval Research Laboratory	**CRASTE** **Orbital Access for Small Payloads** Session Chair: Dr. Sandra Walker, NASA Langley Research Center Co-Chair: Mr. Nickolas Demidovich, Federal Aviation Administration
0800 - 0805	**Session Introduction**	**Session Introduction**	**Session Introduction**	**Session Introduction**
0805 - 0830	**Hypersonic Window & Aperture Needs** Mr. Curtis Martin, Naval Surface Warfare Center	**High Temperature Microwave Performance Characterization of Hypersonic Radome Materials** Mr. Glen Hilderbrand, Applied Research Associates	**Overview and Findings of an Additively-Manufactured TPS Workshop** Mr. Stan Bouslog, NASA Johnson Space Center	**Expanding Suborbital Testing: NASA Flight Opportunities and Commercial Partners Advance New Capabilities** Mr. John Kelly, NASA Armstrong Flight Research Center
0830 - 0855	**Historical Aperture Data for Current Hypersonic Needs** Dr. Wesley Chapkin, Textron Systems	**Advanced Ceramic Matrix Composite Design Toolkit** Dr. Sergio dos Santos e Lucato, Teledyne Scientific		**Geo Belt Surge Logistics: An Application of the Capacitated Orbital Vehicle Routing Problem for Propulsive Requirements** Mr. Finn O'Brien, Air Force Research Laboratory
	NSMMS **Hypersonics, cont.**	**NSMMS** **Development, Processing & Testing of Advanced Materials, cont.**	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.**	**CRASTE** **Orbital Access for Small Payloads, cont.**
0855 - 0920	**Thermal and Mechanical Testing of a 3D Woven Reinforced Oxide-Oxide Window Subcomponent** Mrs. Kerry Howren, Materials Research & Design, Inc. *Presentation to be given by: Dr. Brian Sullivan, Materials Research & Design, Inc.*	**Presentation to be Announced**	**NASA's Efforts in Lunar Construction, Manufacturing and Outfitting** Dr. Raymond Clinton, NASA Marshall Space Flight Center *Updated presentation title to "An Overview of NASA's Initiatives in Lunar Construction, Manufacturing and Outfitting".*	**Launch Site Identification for Tactically Responsive Space Access: Impact of Austere Sites** Ms. Theresa Sitter, Sierra Lobo, Inc.
0920 - 0945	**Oxide / Oxide CMC Materials for Hypersonic Radomes and Thermal Protection Systems** Mr. John Dignam, Mentis Sciences, Inc.	**Developments on Fabrication and Characterization of Silicon Nitride Fibers by LCVD** Mr. Jeff Vervlied, Free Form Fibers, LLC	**Advanced, High-Temperature, Polymer-Derived Ceramics as Structural Insulating Materials for Thermal Protection Systems** Dr. Kevin Harsh, Sporian Microsystems, Inc.	**Theater Persistent Coverage Analysis** Mr. Victor Christopher Ong, Sierra Lobo, Inc.
0945 - 1015	**Break** *Sponsored by Momentive*			

	Track One	Track Two	Track Three	Track Four
Students are marked with *	**NSMMS** **Hypersonics, cont.**	**NSMMS** **Development, Processing & Testing of Advanced Materials, cont.**	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.**	**CRASTE** **Innovative Test Methodologies & Platforms** Session Chair: Mr. Jeramie Broadway, NASA Marshall Space Flight Center Co-Chair: Mr. Gary Tiscia, Materials Research & Design, Inc.
1015 - 1020	**Announcements**	**Announcements**	**Announcements**	**Session Introduction**
1020 - 1045	**High Temperature Antennas** Mr. Jeff Duce, The Boeing Company	**Diagnostic Spectroscopy Tools for Improved Understanding of UHTC Material Interactions with Testing Environments** Dr. Samuel Frueh, Air Force Research Laboratory	**Nickel Based Super Alloy Laser Powder Bed Fusion Printing Optimization for High Temperature Structures** Ms. Chappell Alex, U.S. Army DEVCOM Aviation & Missile Center	**Accelerated DIC Displacement and Strain Measurement for Hypersonics Applications** Dr. Michael McGaw, McGaw Technology, Inc.
1045 - 1110	**Integrated RF-Transparent Aperture for Hypersonics** Ms. Vann Heng, The Boeing Company	**Novel Processing Approaches towards Ultra-High Temperature CMCs with Enhanced Oxidation and Ablation Resistance** Dr. Zlatomir Apostolov, Air Force Research	**Rapid and Flexible TPS and Ablation-Resilient Coating Fabrication with Selective Laser Heating** Dr. Albert Darling, Battelle Memorial Institute	**Combined Thermal/Acoustic Testing of Thin Additive Inconel Shell Demonstration Article** Dr. Ricardo Perez, Air Force Research Laboratory
1110 - 1135	**Low-Ablation Composites for Thermal Protection Systems** Dr. Justin Hendrix, Naval Surface Warfare Center	***Phase Evolution during Oxidation of HfC at Extreme Conditions** Mr. Jonathan Scott, Missouri University of Science and Technology	**An Approach to Critical Component, Flight Certification** Dr. Mark Patterson, Kratos SRE *Updated presentation title to "Procedure to Determine Component Flight Confidence".*	**High Temperature Emissivity Measurement System (HiTEMS) Analysis of Smooth and Textured Molybdenum** Ms. Meghan Carrico, NASA Marshall Space Flight Center
1135 - 1200	**Multi-Layer Metal Insulation: A Thermal Protection System with Integrated Structure** Miss Kelsey Parker, Peregrine Falcon Corporation	**Oxidation Kinetics of Sub-Stoichiometric ZrC_x via Furnace Testing to 2500 °C / 1 ATM Air** Dr. Mark Opeka, Kratos SRE	**Influence of Reduced Carbon Content on Microstructure and Mechanical Behavior of Inconel 718 Prepared by Laser Powder Bed Fusion (LPBF)** Dr. Tait McLouth, The Aerospace Corporation	**Commercial Dual Use Technology for Planetary Scale Multi-Modal Automated Advanced Analytics through Commercial Persistent Surveillance Low Earth Orbit Satellites** Dr. Shawana Johnson, Global Marketing Insights, Inc.
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*			

	Track One	Track Two	Track Three	Track Four
Students are marked with *	**NSMMS** **Hypersonics, cont.**	**NSMMS** **Development, Processing & Testing of Advanced Materials, cont.** Session Chair: Dr. Daniel Driemeyer, Boeing Research & Technology	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.** Session Chair: Mr. Stan Bouslog, NASA Johnson Space Flight Center	**NSMMS** **Ground & Flight Test Methodologies** Session Chair: Mr. Marshall Polk, United States Air Force Lead Organizer: Dr. Joseph Sheeley, PERIKIN Enterprises Co-Organizers: Mr. Jason Calvert, U.S. Army Space and Missile Defense Command; Mr. Aaron Cossey, Missile Defense Agency; Mr. Paul Marchol, Aerojet Rocketdyne; & Dr. Gerald Russell, RTCS, LLC
1330 - 1335	**Announcements**	**Announcements**	**Announcements**	**Session Introduction**
1335 - 1400	**Teaching Old Materials New Tricks: Architected Materials for Hypersonics and Space** Dr. William Carter, Defense Advanced Research Projects Agency	***Near Net Shape Fabrication and Characterization of Cermet Nuclear Thermal Propulsion Fuel Forms** Mr. Nathaniel Blatt, Missouri University of Science and Technology	**Developing Ablative Materials for Additive Manufacturing of TPS** Dr. Adam Sidor, NASA Johnson Space Center	**Project Phoenix: A Large-Scale, Clean Air, Variable Mach Freejet Hypersonic Test Facility** Mr. Stuart Steen, PERIKIN Enterprises
1400 - 1425	**Additive Manufacturing for Tailorable Transpiration Cooling of Hypersonic Leading Edges** Dr. Christopher Roper, HRL Laboratories, LLC	**Fabrication of Spark Plasma Sintered ZrC with WC Additions for Nuclear Thermal Propulsion** Dr. Jeremy Watts, Missouri University of Science and Technology	**Design, Production and Arc-Jet Testing of Additively Manufactured Thermal Protection Systems and Hot Structure** Dr. Bill Goodman, Goodman Technologies, LLC	**Aerothermal Materials Response Test and Evaluation Methods – You CAN Get There From Here!** Dr. Gerald Russell, RTCS, LLC
1425 - 1450	**Additive Manufacturing: Enabling Technology for Hypersonic Missions** Dr. Youping Gao, Castheon, Inc.	**Characterization of Advanced Polyimide Composites** Mr. Matthew Opliger, Wichita State University	**Technology Development Enabling Direct Ink Writing of Solid Propellant Grains** Mr. Jeremy Snyder, Jacobs/Exquadrum	**High Temperature Dynamic Instrumentation Evaluation** Mr. Samuel Tilmann, Air Force Research Laboratory
1450 - 1515	**AFRL's Leading Edge Experimentation Fixture Development** Mr. Jonathan Boston, Air Force Research Laboratory	**Modeling Volume Yield and Gas Evolution in Preceramic Polymers During Pyrolysis** Dr. Thomas Key, UES, Inc.	**The Use of 3D Printed Parts Printed on the HT2 Gearbox as Ground Support Equipment** Ms. Jordan Shonka, Ball Aerospace	**Analysis of PICA-NuSil at the Hypersonic Materials Environmental Test System (HyMETS)** Dr. Brody Bessire, NASA Ames Research Center
1515 - 1545	**Break** *Sponsored by ReLogic Research* *Poster Voting Cards Due to Registration Desk*			

	Track One	Track Two	Track Three	Track Four
	NSMMS **Hypersonics, cont.**	**NSMMS** **Development, Processing & Testing of Advanced Materials, cont.**	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.**	**NSMMS** **Ground & Flight Test Methodologies, cont.**
1545 - 1550	**Announcements**	**Announcements**	**Announcements**	**Announcements**
1550 - 1615	**Testing of Sharp Carbon Carbon Composite Leading Edges with Oxidation Protection** Mr. Tim McKechnie, Plasma Processes, LLC	**Quantification of SiC/SiC CMC Microstructure and Damage Evolution under Increasing Tensile Loads** Dr. Ashley Hilmas, Air Force Research Laboratory	**Fabrication of Radiatively Cooled Thruster Chambers using Additive Manufacturing and Advanced Joining Techniques** Mr. John O'Dell, Plasma Processes, LLC	**High-Op Tempo for Hypersonics (H4H) Testbed for Tech Maturation** Mr. Scott Wilson, Naval Surface Warfare Center *Presentation to be given by: Dr. Gerald Russell, RTCS, LLC*
1615 - 1640	**High-Fidelity Design, Analysis, and Testing of a 1X Scale Flight-Weight C/C Wing for the AFRL Flight Research Vehicle** Mr. Daniel Clemens, University of Dayton Research Institute	**Effect of SiC Filler Concentration and Size Distribution on SiOC CMCs** Mr. Ray Blotteaux, Transition Composites	**Additively Manufactured Window Frames** Mr. Brian Tucker, Mainstream Engineering	**Evolution of Skin Materials from Benchtop Studies to Sled Testing for Supersonic Missiles with Articulating Nose Technology** Dr. Benjamin Dickinson, Air Force Research Laboratory
1640 - 1705	**Fabrication of a 1X Scale Flight-Weight C/C Wing for the AFRL Flight Research Vehicle** Mr. Anthony Bazler, University of Dayton Research Institute	**Thermal Conductivity Measurements on Carbon-Carbon** Mr. James Hawbaker, Kratos SRE	***Activated Carbon Cermet Heat-Exchange Material Structures to Minimize Bremsstrahlung Emission** Mr. Andrew Mason, Air Force Institute of Technology	**MIL-810 Test Operations Procedure for Hypersonic Weather Encounter** Mr. Marshall Polk, United States Air Force
1705 - 1730	**Hybrid Ceramic-Metal Control Fin for Hypervelocity Projectiles** Mr. Craig Iwano, Materials Research & Design, Inc.	**Carbon/Carbon Rocket Nozzles Made using Net-Shaped Tailored Fiber Placed 3D Preforms with High-Strength Carbon Nanotube Thread Stitching – Part 2** Dr. Paul Kladitis, University of Dayton Research Institute	**Thermo-Structural Optimization of Robust Multi-Material Additive Hot Structures** Mr. Evan O'Connor, HRL Laboratories, LLC	**Update on VAT and VacTGA (Low Pressure) IR&D at SR up to 2000-2500 °C** Mr. Bhavesh Patel, Kratos SRE
1730 - 1900	**Poster Session and Networking Reception** *Sponsored by The Boeing Company*			

Thursday, 30 June 2022

0700 - 0745	**Speaker Meeting (with Light Breakfast) for Thursday's Presenters** *Sponsored by Toray Advanced Composites*
0700 - 0800	**Attendee Light Continental Breakfast** *Sponsored by Scot Forge*
0700 - 1600	**Registration Open**
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*

	Track One	Track Two	Track Three
Students are marked with *	**NSMMS** **Hypersonics** Session Chair: Mr. Jonathan Boston, Air Force Research Laboratory Lead Organizer: Mr. Mitch Petervary, The Boeing Company Co-Organizers: Mr. Dan Hladio, Materials Research & Design, Inc.; Mr. Curtis Martin, Naval Surface Warfare Center; Mr. Tod Palm, Northrop Grumman Aeronautics Systems; Dr. Suraj Rawal, Lockheed Martin Space Systems; Dr. Sandra Walker, NASA Langley Research Center; & Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company	**CRASTE** **Aerospike Rocket Integration and Sub-Orbital Experiment (ARISE)** Session Chair: Dr. Shawn Phillips, Air Force Research Laboratory Co-Chair: Mr. Cory Gainus, Air Force Research Laboratory	**NSMMS** **Additive Manufacturing for Space & Missile Materials** Session Chair: Mr. Adam Schaut, The Boeing Company Lead Organizer: Dr. Amjad Almansour, NASA Glenn Research Center Co-Organizers: Dr. Raymond Clinton, NASA Marshall Space Flight Center; Ms. Kaia David, The Boeing Company; Mr. Michael Fuller, Northrop Grumman Space Systems; Dr. Suraj Rawal, Lockheed Martin Space Systems; Mr. Michael Renbarger, Ball Aerospace; Dr. Samir Singh, Ball Aerospace; Mr. James Tucker, Kratos SRE; & Mr. John Vasquez, U.S. Naval Research Laboratory
0800 - 0805	**Session Introduction**	**Session Introduction**	**Session Introduction**
0805 - 0830	**Integration of ThERmal StructurE ConcepTs (INTERSECT) Program Update** Mr. Jonathan Boston, Air Force Research Laboratory	**Ablative, Carbon-Carbon and Copper Ramp Hot Fire Testing in Support of Aerospike Nozzle Environment and Candidate Material Characterization** Ms. Jennifer Martin-Velazquez, Air Force Research Laboratory	***Additive Manufacturing of Continuous Carbon Fiber Reinforced Polysiloxane for Thermal Protection** Mr. Steven Kim, The University of Texas at Austin
0830 - 0855	**Accommodating CTE Differences in Mixed Material Joints using Additively Manufactured Structures** Mr. Kurtis McIntosh, University of Dayton Research Institute	**Guidance, Navigation, Control, and Mission Management for the ARISE Launch Vehicle** Mr. Jade Pomerleau, Air Force Research Laboratory	***Additively Manufactured Functionally Graded Radomes for Hypersonic Vehicles** Mr. William Fahy, KAI, LLC
0855 - 0920	**Testing of Mechanically Fastened Similar and Dissimilar High Temperature Joints** Mr. Kurtis McIntosh, University of Dayton Research Institute	**ARISE Instrumentation Design to Gather Modular Aerospike Engine In-Flight Performance** Mr. Jade Pomerleau, Air Force Research Laboratory	**3D Printing of Continuous Fiber C/C for Hypersonic Nose Sections** Mr. Ryan Dunn, Mantis Composites
0920 - 0945	**CMC Fastener Evaluation for Hypersonics and Space** Mr. Michael Peretti, GE Edison Works	**ARISE Modular Aerospike Hot Fire Testing** Mr. Jade Pomerleau, Air Force Research Laboratory	**High Temperature Properties of Polymer-Derived Ceramic Matrix Composites Fabricated via Additive Manufacturing** Dr. Tobias Schaedler, HRL Laboratories, LLC
0945 - 1015	**Break** *Sponsored by Materials Research & Design, Inc.*		

	Track One	Track Two	Track Three
	NSMMS **Hypersonics, cont.**	**CRASTE** **Aerospike Rocket Integration and Sub-Orbital Experiment, cont.**	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.**
1015 - 1020	**Announcements**	**Announcements**	**Announcements**
1020 - 1045	**Revolutionary C-C Composites and Coatings for Leading Edges and Aero-Structure Applications** Dr. Witold Kowbel, Advanced Composites and Coatings	**Optimized Laser Powder Bed Fusion Processing Parameters for Novel High Temperature Nickel Alloy Structures** Mrs. Amaka O'Neal, Materials Sciences, LLC	**Exploring the Ultrasonic Technology for Characterization of Additively Manufactured Parts** Dr. Andrei Zagrai, New Mexico Institute of Mining and Technology
1045 - 1110	**Evaluation of Woven Fabrics for Improved Wear Performance of High-Temperature Seals and Thermal Barriers** Dr. Scott Lattime, The University of Akron	**ARISE Modular Aerospike Thruster 3D Printing Development** Mr. Jade Pomerleau, Air Force Research Laboratory	**Laser-Driven CVD SiC Fiber Performance in SiC-Si3N4 Composite Materials** Dr. Shay Harrison, Free Form Fibers, LLC
1110 - 1135	~~**Stiff Tunable Isolators for High-Performance Environments**~~ ~~Mr. Daniel Edgar, Materials Sciences, LLC~~ **Active Model-Based Control of Laser Heating for Low-Cost Thermal Protective Systems** Dr. Christopher Buurma, Battelle Memorial Institute	**Evaluating the ROCETS Program for Rocket Engine System Modeling and Power Balance Estimation** Mr. Brenden Reeds, Air Force Research Laboratory	**VR35K-A Upper Stage Engine Additive Manufacturing Development of Shear Co-Axial Injectors** Mr. Brian O'Neill, Sierra Space
1135 - 1200	**Arcjet Evaluation of Monolithic Ceramic Materials** Mr. Nate McGillivray, Kratos SRE	**NSMMS & CRASTE** **Integrated Vehicle Health Management (IVHM) & Integrated Systems Health Monitoring (ISHM)** Session Chair: Mr. James Larkin, Aerojet Rocketdyne Co-Chair: Mr. Derek DeVries, Northrop Grumman Corporation **Session Introduction** **Suborbital Test of the Electro-Mechanical Impedance Structural Health Monitoring System** Dr. Andrei Zagrai, New Mexico Institute of Mining and Technology	**Electro-Codeposition of Composite Materials for Enhanced Thermal and Electrical Properties** Dr. Timothy Hall, Faraday Technology, Inc.
1200 - 1330	**Lunch Break** *(On Your Own - See Registration Desk for Area Restaurants)*		

	Track One	Track Two	Track Three	
	NSMMS & CRASTE **Space Access & Propulsion** Session Chair: Mr. Andrew Haaland, Northrop Grumman Corporation Lead Organizer: Mr. Anthony Brinkley, Lockheed Martin HEAT Co-Organizers: Mr. Alan Brown, Aerojet Rocketdyne; Mr. Tim McKechnie, Plasma Processes, LLC; & Mr. Tim Stewart, Ultramet	**NSMMS & CRASTE** **Integrated Vehicle Health Management (IVHM) & Integrated Systems Health Monitoring (ISHM), cont.**	**NSMMS** **Additive Manufacturing for Space & Missile Materials, cont.**	
1330 - 1335	**Session Introduction**	**Announcements**	**Announcements**	
1335 - 1400	**Investigation of Disaggregated Space Logistics for GEO Belt Servicing** Mr. Ethan Sichler, Air Force Research Laboratory	**Fiber Optic Sensors Embedded in Pipe Walls for Temperature and Pressure Measurements** Mr. Matthew Davis, Luna Innovations Inc.	**Development of Advanced Refractory Alloy through Additive Manufacturing for Rocket Propulsion and Hypersonics** Dr. Youping Gao, Castheon, Inc.	
1400 - 1425	**Numerical Simulation of a Rocket Plume During Vertical Landing and its Interaction with the Landing Surface and the Surrounding Environment** Dr. Farhad Davoudzadeh, Air Force Research Laboratory	**Material-Agnostic Additive Manufacturing of Sensory and Motor Structural Fibers** Dr. Shay Harrison, Free Form Fibers	**Additive Manufacturing and Interface Engineering of Colloidal Nanocrystals for Flexible Thermoelectric Generators** Dr. David Estrada, Boise State University	
1425 - 1450	**Rocket Landing Surface Environment and Material Characterization** Dr. Malissa Lightfoot, Air Force Research Laboratory	**Property Monitoring of CMC using Ultrasound NDE** Dr. Ming Chen, Air Force Research Laboratory	**All-Printed Supercapacitor Array for In-Space Manufacturing** Dr. Jennifer Jones, NASA Marshall Space Flight Center	
1450 - 1515	**Military Responsive Launch and In-Space Capabilities Enabled by AFRL's Ascent Propellant** Mr. Nils Sedano, Air Force Research Laboratory	~~**Real-Time Structural Health Monitoring for Space Structures**~~ ~~Mr. Grant Chang, Acellent Technologies, Inc.~~ **Fiber-Optic Sensor Networks to Enable Next-Generation Hypersonic Vehicle Monitoring and Control** Mr. William Price, IFOS Corporation	**OSAM-2: Plans and Progress for the First Demonstration of Structural Manufacturing in Space** Mr. Lawrence Huebner, NASA	
1515	**Grand Prize Give-Away & Adjourn** *Sponsored by Textum*			
1600 - 1930	**Badger Propulsion Test Facility Tour** - *for those registered for the tour* (Bus departs at 1600 and returns at 1930)			