Sunday, 25 Ju 1600 - 2000	ine 2023 Early Registration Check-In					
Monday, 26						
	Registration Open					
0700 - 0745	Speaker Meeting and Light Breakfast for Mo Sponsored by Momentive	nday Presenters				
0700 - 0800	0800 Attendee Light Continental Breakfast					
	Sponsored by RTCS, LLC					
	Exhibitor Move-In					
1150 - 1300	Lunch Break (On Your Own - See Registration Desk for Area	a Restaurants)				
	Student Networking Lunch - Invitation Only	The staurants,				
1330 - 1630	Poster Move-In					
1700 - 1830	Welcome Reception and Exhibit & Poster Kid	k-Off				
NSMMS & CE	Sponsored by Hexcel Corporation RASTE Tutorials & Workshops					
NOTIVITY & CI	MOTE TURbrials & Workshops					
Organizers:	Mr. Nickolas Demidovich, Federal Aviation Adn	ninistration; Mr. Carter Johnson,				
	arch; Dr. Gerald Russell, RTCS, LLC; & Mr. Tim	Stewart, Ultramet				
	Welcome & Announcements NASA's Lunar Construction Project (MMPAC)	r)				
2003 - 0033	Dr. Raymond "Corky" Clinton, NASA Marshall					
0835 - 0905	Hypersonics Materials and Manufacturing Ch					
0005 005-	Mr. John W. Otto, Raytheon Missiles & Defen					
0905 - 0935	Stratolaunch's Talon-A Hypersonic Testbed Material Testing Capability Dr. Daniel Millman, Stratolaunch					
0935 - 0940	Transition to Multi-Track Technical Sessions	& Workshops				
	Track One	Track Two	Track Three	Track Four		
	NSMMS & CRASTE	NSMMS & CRASTE	NSMMS	NSMMS & CRASTE		
	Spacecraft & Space Mobility	Workforce Development Workshop	Ground & Flight Test Methodologies	Oak Ridge National Laboratory Capabilities Overview		
	Session Co-Chairs: Mr. Andrew Jimenez & Mr. Ethan Sichler, Air Force Research Laboratory Co-Organizers: Dr. Garth Wilks, Raytheon Missiles & Defense & Mr. Andrew Haaland, Northrop Grumman Corporation	Lead Organizers: Dr. Gerald Russell, RTCS, LLC & Dr. Eric Wuchina, Naval Surface Warfare Center Carderock Division	Session Chair: Mr. Kegan Miller, 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; &	Lead Organizer: Dr. James Klett, Oak Ridge National Laboratory		
0940 - 0945	Session Introduction	Workshop Introduction	Session Introduction	Workshop Introduction		
	Modular Propulsion Unit Maneuvering Requirements for Cislunar Space Mr. Michael Hanlon, Sierra Lobo, Inc.	0945 - 0955 Dr. Lori Stiglitz, Naval Surface Warfare Center 0955 - 1005 Mr. Doug Freitag, U.S. Advanced Ceramics Association 1005 - 1015 Dr. John Schmisseur, The	Multi-Service Advanced Capability Hypersonic Test Bed (MACH TB) Mr. Kegan Miller, Naval Surface Warfare Center	Overview of the Manufacturing Demonstration Facility at the Oak Ridge National Laboratory and the Relevance to Missile and Aerospace Applications Dr. Michael Kirka, Oak Ridge National Laboratory		
1010 - 1035	Solid Propulsion Engineered for CubeSat Kinetic Operations (SPECK-Ops) Mr. Elias Wilson, Exquadrum, Inc.	University of Tennessee Space Institute 1015 - 1030 Mr. Daniel Marren, TRMC 1030 - 1035 Moderator Wrap Up	Multi-Service Advanced Capability Hypersonic Test Bed (MACH-TB) Novel Flight Experiment Test Capability Dr. Gerald Russell, RTCS, LLC	Additive Manufacturing of Metallic Components and AI Qualification/Certification during Production Dr. Michael Kirka, Oak Ridge National Laboratory		
1035 - 1100	Coffee & Soda Break					
1100 - 1125	Sponsored by Aerojet Rocketdyne The ELECTRA Quick Disconnect Coupling: A	Workforce Development Workshop, cont.	Hypersonic Weather Encounters using	Additive Manufacturing of Ceramic and		
	Common Fluid Transfer Element for In- Space and On-Surface Applications Dr. Leslie Woodger, Aerojet Rocketdyne	1100 - 1110 Dr. Steve Dunn, NASA Langley Research Center 1110 - 1130 Dr. Ragini Acharya, The	Electromagnetic Launch Assets Mr. Michael Libeau, Naval Surface Warfare Center	Polymeric Composites for Missile and Aerospace Applications Dr. Vlastimil Kunc, Oak Ridge National Laboratory		
1125 - 1150	Accelerated Aging Analysis of Catalyst Materials for Advanced Monopropellant Rocket Engines Mr. Andrew Jimenez, Air Force Research Laboratory	Univeristy of Tennessee Space Institute 1130 - 1140 Dr. Barry Bauer, Lockheed Martin Corporation 1140 - 1150 Moderator Wrap-up	Weather Effects Ground Test Results Mr. Tyler Stovall, Applied Technology Solutions, Inc.	Integrating Intelligent Machining with Additive Manufacturing Dr. Scott Smith, Oak Ridge National Laboratory		
1150 - 1300	Lunch Break (On Your Own - See Registration Desk for Area Student Networking Lunch - Invitation Only	ı n Restaurants)	1			

Session Lead Org Army Sp Co-Orga Defense Rocketd Dr. Joses 1300 - 1305 Announ 1305 - 1330 Hyperso Dr. Yazm 1330 - 1355 Next Get Technole Dr. Yazm 1355 - 1420 Mechan CMC for Dr. Aver Solution 1420 - 1445 Additive Property Beam M Mr. Kurt Texas at 1445 - 1510 Alternat Hyperso Mr. Mat 1510 - 1540 Coffee & Sponsore NSMMS	s & Missile Defense I Chair: Dr. Brent Carey, Mach-20, LLC rganizer: Mr. Jason Calvert, U.S. pace and Missile Defense Command anizers: Mr. Aaron Cossey, Missile e Agency; Mr. Paul Marchol, Aerojet dyne; Dr. Gerald Russell, RTCS, LLC; & eph Sheeley, PERIKIN Enterprises incements & Session Introduction ionic Test Bed Program min Carroll, Missile Defense Agency min Carroll, Missile Defense Agency inical Behavior of a Thin, All-Oxide or an Articulating Rigid Structure erry Samuel, ARCTOS Technology ins ie Manufacture and Material ty Analysis of Crack-Free Electron Melted Pure Tungsten rtis Watanabe, The University of	Announcements Workforce Development Workshop, cont. Moderator Directed Q&A, Solutions Discussion NDE of Composites: Advances in Ultrasonic Spectroscopy Tutorial Mr. James Tucker, Kratos SRE Considerations for Improved Optical Pyrometry of High Temperature Materials Tutorial Dr. Kendall Johnson, Space Dynamics	Announcements Announcements Wireless Hight Temperature Sensor Array System for Hypersonic Applications Dr. Cheryl Xu, North Carolina State University Ground Testing of High Temperature Hypersonic Thermal Protections System Materials Dr. Erica Corral, The University of Arizona Advancements and Characterization of Oxy-Propane Torch for Low-Cost Material Screening Mr. Derrick Talley, Kratos SRE Low-Cost Torch Testbed for Developing High-Temperature Materials and Systems Mr. Alex Conley, Lockheed Martin Corporation	Small Business Forum Sponsored by Lockheed Martin Corporation Small Businesses Forum One-on-Ones With: Aerojet Rocketdyne Ball Aerospace The Boeing Company Kratos Lockheed Martin Corporation Missile Defense Agency Northrop Grumman Corporation Raytheon Technologies
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Hyperso Mr. Mat 1510 - 1540 Coffee 8 Sponsore NSMMS	IL EI F d SU	Laboratory & Mr. Gordon Scriven, ATA		
Mr. Mat 1510 - 1540 Coffee 8 Sponsore NSMMS	ate Aeroshell Development for	Engineering	Understanding the Arc Heater Flow Field with	
1510 - 1540 Coffee 8 Sponsore NSMMS			Implications to Material Testing	
Sponsore NSMMS	tthew Blenis, ReLogic Research		Dr. Joseph Sheeley, PERIKIN Enterprises	
	red by Scot Forge			
Missiles		NSMMS & CRASTE	NSMMS	NSMMS & CRASTE
	s & Missile Defense, cont.	High Altitude/Sub-Orbital Platforms & Experiments	Ground & Flight Test Methodologies, cont.	Small Business Forum
		experiments		Sponsored by Lockheed Martin Corporation
		Session Chair: Mr. Nickolas Demidovich,		Sponsored by Edenniced Martin Corporation
		Federal Aviation Administration		
1540 - 1545 Annound		Announcements & Session Introduction	Announcements	Small Businesses Forum One-on-Ones With, con
	Nosetip Design, Analysis, and Flight	NASA Flight Opportunities Panel	In-Situ Spectral Emissivity Extraction using COTS	
Testing		Mr. John Kelly, NASA Flight Opportunities	Pyrometers during Arc Heater Testing	Aerojet Rocketdyne
Mr. Seth	th Fincher, ReLogic Research	Program, Armstrong Flight Research Center	Dr. Jon Cox, Axient, LLC	Ball Aerospace
1610 - 1635 High Ter	emperature Fin, Wing and Control		Design Challenges in Stagnation Heat Flux	The Boeing Company
Surfaces			Calorimetry for Arc-Heated Test Facilities at AEDC	Kratos
	bert Hardesty, The Peregrine Falcon		Dr. Justin Myrick, Axient, LLC	Lockheed Martin Corporation
Corporat				Missile Defense Agency
_	and Testing of Articulated Thermal	The MK-II Aurora Spaceplane	Simultaneous Convective and Radiative Heating of	Northrop Grumman Corporation
Protection	_	Ms. Khaki Rodway, Dawn Aerospace	Materials with the 200-kW Laser Enhanced Arc Jet	Raytheon Technologies
	tion	ivis. Kilaki Koaway, bawii Acrospace	Facility (LEAF)	
Research	t ion c McGill, University of Dayton	ivis. Kitaki Nodway, Bawii Acrospace	1	
1700 1020 Walcom	tion	wis. Milaki Nouway, Bawii Acrospace	Dr. Megan MacDonald, NASA Ames Research	
Sponsore	t ion c McGill, University of Dayton		1	

Tuesday, 27	June 2023
0700 - 1730	Registration Open
0700 - 0745	Speaker Meeting and Light Breakfast for Tuesday Afternoon Presenters
	Sponsored by Ball Aerospace
0700 - 0800	Attendee Light Continental Breakfast
	Sponsored by New Mexico State University Department of Mechanical and Aerospace Engineering
1200 - 1330	Lunch Break
	(On Your Own - See Registration Desk for Area Restaurants)
	Exhibits and Poster Session Open
1745 - 1930	On-site Networking Reception
	Sponsored by Northrop Grumman Corporation
NSMMS & C	RASTE Plenary Session
0800 - 0820	Opening Remarks, National Anthem & Plenary Session Announcements:
	Dr. Eric Wuchina, Lead Navy Advisor to NSMMS & CRASTE, Naval Surface Warfare Center Carderock Division
	Moderator: Ms. Danielle Gerstner, Branch Head, Materials for Hypersonics and Advanced Systems Branch, Naval Surface Warfare Center Carderock Division
0820 - 0900	Dr. James Weber
	Principal Director for Hypersonics, Office of the Under Secretary of Defense for Research and Engineering, Critical Technologies
0900 - 0940	Mr. Stan Stafira, Jr., SES
	Chief Architect, Missile Defense Agency
0940 - 1020	Coffee & Soda Break
	Sponsored by Solvay
1020 - 1100	Dr. Michael Gregg, SES
	Director, Aerospace Systems Directorate, Air Force Research Laboratory
1100 - 1140	Mr. Stephen Creech
	Assistant Deputy Associate Administrator, Moon to Mars Program Office, Advanced Exploration Systems at NASA Human Explorations and Operations Directorate, NASA Headquarters
1140 - 1200	Lifetime Achievement Award & Sponsor Thank You
1200 - 1330	Lunch Break
1	(On Your Own - See Registration Desk for Area Restaurants)

	Track One	Track Two	Track Three	Track Four
	Track One	Track Two	Track Inree	Track Four
Finalists for	NSMMS Hypersonics	NSMMS Missiles & Missile Defense	NSMMS Ground & Flight Test Methodologies	NSMMS Novel Spaceflight Payloads, Instruments & Mission Operations
the Student	Session Chairs: Dr. Allan Katz, Air Force	Session Chair: Dr. Yazmin Carroll, Missile	Session Chair: Mr. Daniel Ogg, Arnold Engineering	
Oral Award are marked with an *	Research Laboratory & 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. Curtis Martin, Naval Surface Warfare Center; Mr. Tod Palm, Northrop Grumman	Defense Agency Lead Organizer: Mr. Jason Calvert, U.S. Army Space and Missile Defense Command Co-Organizers: Mr. Aaron Cossey, Missile Defense Agency; Mr. Paul Marchol, Aerojet Rocketdyne; Dr. Gerald Russell, RTCS, LLC; & Dr. Joseph Sheeley, PERIKIN Enterprises	Development Complex 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	Co-Organizers: Dr. Amjad Almansour, NASA Glenn Research Center; Dr. Raymond Clinton, NASA Marshall Space Flight Center; Ms. Kaia David, The Boeing Company; Mr. Michael Fuller, Northrop Grumman Space Systems; Mr. James Tucker, Kratos SRE; & Mr. John Vasquez, Naval Research Laboratory
	Corporation; Dr. Suraj Rawal, Lockheed Martin Space Systems; Dr. Sandra Walker, NASA Langley Research Center; & Mr. Brian Zuchowski, Lockheed Martin Aeronautics Company		561.01.01.01.01.01.01.01.01.01.01.01.01.01	
1330 - 1335	Announcements & Session Introduction	Announcements & Session Introduction	Announcements & Session Introduction	Announcements & Session Introduction
	SMASH Program Update Dr. Jesse Maxwell, U.S. Naval Research Laboratory	Post-Processed Ceramic Modification to Carbon/Carbon Composites Dr. Samuel Swan, Sandia National Laboratories	Force Measurement Technique using Laser Interference Patterns (aka "Optical Balance") Mr. Joseph Herdy, CFD Research Corporation	Development of Radioluminescent Tritium Polymeric Material for High Visibility Applications Ms. Meghan Carrico & Ms. Lauren Fisher, NASA Marshall Space Flight Center
	Design and Analysis of Bay Concepts for AFRL's Hypersonic Flight Research Vehicle Mr. Anthony Bazler, University of Dayton Research Institute	*Aerotherm Chemical Equilibrium (ACE Modeling) Ms. Kayla Stark, ReLogic Research & The University of Alabama in Huntsville	Adventures In and New Paradigm for Heat Flux Gauge Development in Hypersonics Dr. Jay Frankel, New Mexico State University	Lithium-Based Deferred-Action Batteries Dr. Danny Liu, Faraday Technology, Inc.
	Multi-Service Advanced Capability Hypersonic Test Bed (MACH-TB) Subscale Test Capability Mr. Stephen Williams, RTCS, LLC	Developments on Fabrication and Characterization of Silicon Nitride Fibers by LCVD Mr. Jeff Vervlied, Free Form Fibers, LLC	Oxyacetylene Torch Test Bed Development with Computed Tomography (CT) Damage Characterization Mr. James Wagnon, Dynetics	Adhesive Formulation for Cryogenic Applications Dr. Samir Singh, Ball Aerospace & Mr. Joel Stray, Gentex Corporation
	Multi-Service Advanced Capability Hypersonic Test Bed (MACH-TB) Full Scale Test Capability Mr. Brent Sims, M Technical Services	Transparent CVC SiC® for Windows and Radomes Dr. William Fischer, ASCM Technologies	Capabilities for the RF Characterization of Materials Under Extreme Heat Fluxes Dr. Gregory Neher, Riverside Research	Development and Testing of Innovative Radiation Shielding Materials Mr. John O'Dell, Plasma Processes, LLC
	Root Beer Float Break Sponsored by Plasma Processes, LLC			
	NSMMS	NSMMS	NSMMS	NSMMS
	Hypersonics, cont.	Missiles & Missile Defense, cont. Session Chair: Ms. Mandy Schaeffer, Naval	Ground & Flight Test Methodologies, cont.	Novel Spaceflight Payloads, Instruments & Mission Operations, cont.
1545 1550	Announcements	Surface Warfare Center	Announcements	Announcements
	Announcements Enhancing Service Temperatures of	Announcements Advancements in High-Temperature	Announcements Laser Power Profile Shaping for Thermal	Announcements Additive Manufactured Parts Printed for Use in
	Composites in Hypersonic Defense Applications Dr. Garrett Poe, Blueshift	Characterization of Low-Loss Dielectrics for RF Sensors Mr. Christopher Howard, Georgia Tech Research Institute	Simulation Ground Tests Dr. Thomas Robbins, UES, Inc.	ESD Sensitive Environments Mr. Ean Ludtke & Ms. Jordan Shonka, Ball Aerospace
1615 - 1640	High-Order Thermal Simulations for	Novel Performance Enhancements of RIPS	High Temperature Emissivity Measurement	Plasma-Jet Self-Sintering of Gold for In-Space
	Hypersonics with Optimization of Trajectories (HOTSHOT) Dr. Jesse Maxwell, U.S. Naval Research Laboratory	Silicon Nitride Mr. Mark Hawthorne, ATC Materials, Inc. Exploratory Electron-Beam Curing Studies	System (HiTEMS) Ms. Meghan Carrico, NASA Marshall Space Flight Center	Manufacturing of Electronics Prof. Harish Subbaraman, Oregon State University
		of Carbon Composite Precursor Phenolic Resin Ms. Ariel Parker, UES, Inc.		
1640 - 1705	Weather Analysis and Survivability Prediction for High Speed Vehicles Mrs. Sierra Craig, Lockheed Martin Corporation	Nitroxy Ceramic Material Properties: Hot Isostatic Press Mr. Will Retersdorf, Kratos SRE	Coupling Coupon Level Materials Modeling, Test and Evaluation into a Single Process Mr. Matthew Thomas, CFD Research Corporation	*Colloidal Nanomaterial Inks for Extreme Environment Sensors and Devices Ms. Katelyn Wada, Boise State University
	Efficient Thermal Simulation for High-Speed System Analysis	Effects of Oriented Boron Nitride Reinforcement of Polysiloxanes on	Digital Transformation for Large Scale Thermostructural Test Design Mx. Nic Heersema, NASA Armstrong Flight	Space Environmental Effects on Additively Manufactured (AM) Parts on MISSE-9/10
	Dr. Robert Tramel, Falcon Dancer, Inc. On-site Networking Reception	Thermal Performance Dr. Jessica Cash, Naval Air Warfare Center	Research Center	Mr. Justin McElderry, NASA Marshall Space Flight Center

wednesday.	28 June 2023					
	Registration Open					
	Speaker Meeting and Light Breakfast for We	dnesday's Presenters				
	Sponsored by Textron Systems	•				
0700 - 0800	Attendee Light Continental Breakfast Sponsored by Leidos					
1200 - 1330	Lunch Break					
0945 - 1200	(On Your Own - See Registration Desk for Area Restaurants) Exhibits and Poster Session Open					
1300 - 1900						
1730 - 1900	Poster Session and Networking Reception Sponsored by The Boeing Company					
1900 - 2030	Exhibit Booth and Poster Dismantle					
	Track One	Track Two	Track Three	Track Four		
	NSMMS Hypersonics	NSMMS Additive Manufacturing for Space &	NSMMS Development, Processing & Testing of Advanced	NSMMS & CRASTE Space Access & Propulsion		
Finalists for	Session Chairs: Mr. Jonathan Boston, Air	Missile Materials	Materials	Session Chair: Dr. Ragini Acharya, The University of		
	Force Research Laboratory; Dr. David Glass,	Session Chair: Dr. Brock Birdsong, Auburn	Session Chairs: Dr. Carmen Carney &	Tennessee Space Institute		
Oral Award are	NASA Langley Research Center; & Mr. Chris Kostyk, NASA Armstrong Flight	Applied Research Center Lead Organizer: Dr. Amjad Almansour,	Mr. Ian Wolford, Air Force Research Laboratory Lead Organizer: Dr. David Witkin, The Aerospace	Lead Organizer: Mr. Anthony Brinkley, Lockheed Martin - HEAT		
marked	Research	NASA Glenn Research Center	Corporation	Co-Organizers: Mr. Alan Brown, Aerojet		
with an *	Lead Organizer: Mr. Mitch Petervary, The Boeing Company	Co-Organizers: Dr. Raymond Clinton, NASA Marshall Space Flight Center;	Co-Organizers: Mr. Jimmy Allen, Dynetics; Prof. Greg Hilmas, Missouri University of Science	Rocketdyne; Mr. Timothy McKechnie, Plasma Processes, LLC; & Mr. Tim Stewart, Ultramet		
	Co-Organizers: Mr. Dan Hladio, Materials	Ms. Kaia David, The Boeing Company;	and Technology; Dr. Garth Wilks, Raytheon			
	Research & Design, Inc.; Mr. Curtis Martin, Naval Surface Warfare Center;	Mr. Michael Fuller, Northrop Grumman Corporation; Dr. Suraj Rawal, Lockheed	Missiles & Defense; & Dr. Eric Wuchina, Naval Surface Warfare Center			
	Mr. Tod Palm, Northrop Grumman Corporation; Dr. Suraj Rawal, Lockheed	Martin Space Systems; Dr. Samir Singh, Ball Aerospace; Mr. James Tucker, Kratos SRE; &				
	Martin Space Systems; Dr. Sandra Walker,	Mr. John Vasquez, Naval Research				
	NASA Langley Research Center; & Mr. Brian Zuchowski, Lockheed Martin	Laboratory				
0800 - 0805	Announcements & Session Introduction	Announcements & Session Introduction	Announcements & Session Introduction	Announcements & Session Introduction		
0805 - 0830	CMC Hot Structures for Reusable	Summary of Additively Manufactured	*Assessment of Precursor-Derived Quaternary	AFRL Rotating Detonation Rocket Engine Program		
	Hypersonic Vehicles Dr. David Glass, NASA Langley Research	Thermal Protection System (AM TPS) Workshop 2.0	Ceramic Matrix Composites: Toward Lightweight, High-Temperature, and High-Strength Structural	Overview for 2023 Mr. Eric Paulson, Air Force Research Laboratory		
	Center	Mr. Stan Bouslog, NASA Johnson Space Center	Material Mr. Mohammed Rasheed, Kansas State University			
0830 - 0855	NASA Investments in High Temperature	Automated Manufacturing of Advanced,	Rapid Manufacturing of SiC PDCs with High	TopFuel Propulsion Technology		
	Durable Materials for Hypersonic Applications	Ablation Resistant Thermal Protection Systems	Thermal Shock Resistance	Dr. Marlow Moser, Exquadrum, Inc.		
	Mr. Chris Kostyk, NASA Armstrong Flight	Mr. Garrett Yoder, Cornerstone Research	Dr. Zhibin Yu, Florida State University			
0855 - 0920	Research Center NASA Marshall Space Flight Center	Group *Additive Manufacturing of Forebody and	Design and Testing of an Air-Coupled Ultrasonic	ARMR Component Optimization for Derivative		
	Capabilities that Support Hypersonic	Backshell Thermal Protection Materials	Scanning System for C-C Composites	Engine Scaling		
	Technologies Ms. Savannah Metz, NASA Marshall Space	Mrs. Tane Boghozian, Analytical Mechanics Associates & Mississippi State University	Dr. Dathan Erdahl, University of Dayton Research Institute	Mr. Brenden Reeds, Sierra Lobo, Inc.		
	<u> </u>			Mr. Brenden Reeds, Sierra Lobo, Inc.		
0920 - 0945	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic	Associates & Mississippi State University Development of Carbon-Carbon and	Institute Using Deep Learning to Quantify CMC	*High Temperature X-Ray Diffraction of Sputtered		
0920 - 0945	Ms. Savannah Metz, NASA Marshall Space Flight Center	Associates & Mississippi State University	Institute	*High Temperature X-Ray Diffraction of Sputtered		
0920 - 0945	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X-	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates		
0920 - 0945	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research &	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates		
	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc.	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies,	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates		
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0945 - 1015 1015 - 1020	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc. Coffee & Soda Break Sponsored by Toray Advanced Composites Announcements	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies, Inc. / Keraskjold Materials Development, LLC	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques Dr. Ashley Hilmas, Air Force Research Laboratory Announcements	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates Ms. Chloe Skidmore, Penn State University Announcements		
0945 - 1015 1015 - 1020	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc. Coffee & Soda Break Sponsored by Toray Advanced Composites	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies, Inc. / Keraskjold Materials Development, LLC	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques Dr. Ashley Hilmas, Air Force Research Laboratory	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates Ms. Chloe Skidmore, Penn State University		
0945 - 1015 1015 - 1020	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc. Coffee & Soda Break Spansored by Toray Advanced Composites Announcements AFRL's Leading Edge Experimentation Fixture Development Mr. Jonathan Boston, Air Force Research	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies, Inc. / Keraskjold Materials Development, LLC Announcements Design and Fabrication of Next Generation Shape Memory Alloy Actuators Dr. Morgan Trexler, The Johns Hopkins	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques Dr. Ashley Hilmas, Air Force Research Laboratory Announcements 3 Cycle Carbon Carbon using MG High Char Resin	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates Ms. Chloe Skidmore, Penn State University Announcements Assessment of Potential Landing Surface Materials		
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0945 - 1015 1015 - 1020 1020 - 1045	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc. Coffee & Soda Break Sponsored by Toray Advanced Composites Announcements AFRL's Leading Edge Experimentation Fixture Development Mr. Jonathan Boston, Air Force Research Laboratory Aerothermal Evaluation of a C-ZrC Composite in a Full-Scale Leading Edge Configuration	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies, Inc. / Keraskjold Materials Development, LLC Announcements Design and Fabrication of Next Generation Shape Memory Alloy Actuators Dr. Morgan Trexler, The Johns Hopkins University Applied Physics Laboratory Post-Processing Optimization of Laser Powder Bed Fusion Nickel Alloys for High Temperature Applications	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques Dr. Ashley Hilmas, Air Force Research Laboratory Announcements 3 Cycle Carbon Carbon using MG High Char Resin and Autoclave Infusion Dr. Ryan Toivola, Karman Space & Defense Boron-Carbon Fiber Hybrid Composites for High- Temperature Applications Ms. Monica Rommel, Global Materials, Inc. DBA	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates Ms. Chloe Skidmore, Penn State University Announcements Assessment of Potential Landing Surface Materials Dr. Malissa Lightfoot, Air Force Research Laboratory Recent Developments in Silicon Carbide and Zirconium Carbide Technologies for Extreme Environments		
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0945 - 1015 1015 - 1020 1020 - 1045 1045 - 1110	Ms. Savannah Metz, NASA Marshall Space Flight Center Seeker Window Attachment for Hypersonic Flight Systems Mr. Steven Nigro, Materials Research & Design, Inc. Coffee & Soda Break Sponsored by Toray Advanced Composites Announcements AFRL's Leading Edge Experimentation Fixture Development Mr. Jonathan Boston, Air Force Research Laboratory Aerothermal Evaluation of a C-ZrC Composite in a Full-Scale Leading Edge Configuration Mr. Benjamin Carmichael, Kratos SRE Evaporative Transpiration Cooling of Additively Manufactured Hypersonic Leading Edges	Associates & Mississippi State University Development of Carbon-Carbon and Carbon-Silicon Carbide Materials and Heat Treatment Processes for Fused Fiber and Powder Bed Fusion Additive Manufacturing Mr. Ken Fosaaen, Blue Force Technologies, Inc. / Keraskjold Materials Development, LLC Announcements Design and Fabrication of Next Generation Shape Memory Alloy Actuators Dr. Morgan Trexler, The Johns Hopkins University Applied Physics Laboratory Post-Processing Optimization of Laser Powder Bed Fusion Nickel Alloys for High Temperature Applications Ms. Chappell Alex, U.S. Army Combat Capabilities Development Command Aviation & Missile Center Directly Deposited-Interconnected Carbon	Using Deep Learning to Quantify CMC Microstructure and Damage Evolution from 3D X- Ray Tomography Techniques Dr. Ashley Hilmas, Air Force Research Laboratory Announcements 3 Cycle Carbon Carbon using MG High Char Resin and Autoclave Infusion Dr. Ryan Toivola, Karman Space & Defense Boron-Carbon Fiber Hybrid Composites for High- Temperature Applications Ms. Monica Rommel, Global Materials, Inc. DBA Specialty Materials	*High Temperature X-Ray Diffraction of Sputtered Thermite Reactive Nanolaminates Ms. Chloe Skidmore, Penn State University Announcements Assessment of Potential Landing Surface Materials Dr. Malissa Lightfoot, Air Force Research Laboratory Recent Developments in Silicon Carbide and Zirconium Carbide Technologies for Extreme Environments Mr. Alden Moore, General Atomics *Processing of ZrC with Coarse WC and Fabrication of Cooling Channels Mr. Jacob Stacy, Missouri University of Science and		
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1330 - 1335	Announcements	Announcements	Announcements	Announcements & Session Introduction
1335 - 1400	Micromachining for Enhanced Coating- Substrate Adhesion in Hypersonic Environments Dr. Ken Kane, The Johns Hopkins University Applied Physics Laboratory	AM Powder Flowability Capabilities at NASA Marshall Space Flight Center (MSFC) Mr. Justin McElderry, NASA Marshall Space Flight Center	Hybrid CVI and Polymer Infiltration and Pyrolysis Process for the Production of Carbon Carbon Composites Dr. Daniel Knorr, U.S. Army Combat Capabilities Development Command Army Research Laboratory	Calorimetry of a Cascading Arc Plasma Source as Potential Material Screening Facility Mr. Avery Carrico, Kratos SRE
1400 - 1425	Investigating Thermal and Optical Properties of Novel Rare Earth Zirconates for Radiative Barrier Coatings Mr. William Riffe, The University of Virginia	High-Temperature Niobium Base Alloys Produced with Directed Energy Deposition Dr. Francisco Medina, The University of Texas at El Paso	Protocol for Screening High Char Resins for Next Gen C/C Materials Dr. Chenggang Chen, University of Dayton Research Institute	Advancing Hypersonic Vehicles through Commercial Space Reentry Dr. Marat Kulakhmetov, Varda Space Industries
1425 - 1450	Synthesis and Hardness of Thin-Film High Entropy Transition Metal Ceramics Mr. Nathan McIlwaine, Penn State University	Characterization of Inconel 718 and Inconel 625 Cladding Using Laser Powder Directed Energy Deposition Mr. Dajalma Garcia, The University of Texas at El Paso	Results from Optimization of Materials and Processes for C/C Based on a Novel Resin Mr. Bhavesh Patel, Kratos SRE	Use of Hydrogen / Oxygen Rocket Thrust Chamber Assembly for High Temperature Materials Testing Mr. Jacob Ahrenholtz, Sierra Space Corporation
1450 - 1515	Evaluation of Advanced Materials and Coatings for Improved Performance of High- Temperature Seals and Thermal Barriers Dr. Scott Lattime, The University of Akron	Parameter Set and LPBF-Specific Post- Processing Development for Nickel Alloy 718 for Elevated Temperature Applications Mr. Joel White, Wichita State University	The Effect of Heat-Treatment Temperature on the Carbon Matrix Development of Both Polyarylacetylene and Phenolic Derived Carbon- Carbon Composites Dr. Alina Martinez, The Aerospace Corporation	Black Boxes and Big Bangs Mr. Dale Amon, Immortal Data, Inc.
1515 - 1545	Coffee & Snack Break Sponsored by ReLogic Research Please Turn in You Poster Voting Card to the	Registration Desk		
	NSMMS Hypersonics, cont.	NSMMS Additive Manufacturing for Space & Missile Materials, cont.	NSMMS Development, Processing & Testing of Advanced Materials, cont. Session Chair: Dr. Joseph Koo, The University of Texas at Austin	CRASTE Advances in Ground System & Range Operations 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	Pyrolysis Behavior of Cyanate Ester Derived CMCs Mr. Gary Tiscia, Materials Research & Design, Inc.	VR35K Directed Energy Deposition Nozzle Fabrication Mr. Jon McCabe, Sierra Space Corporation	Development of Advanced Conformal and Soft Pica for Future NASA Missions and Commercial Space Dr. Matthew Gasch, NASA Ames Research Center	Analysis of Kennedy Space Center Tropospheric Doppler Radar Wind Profiler Measurement Accuracy Ms. Meghan Carrico, NASA Marshall Space Flight
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1615 - 1640	Asymmetric 4-Point Bend Test for Measurement of Interlaminar Shear Modulus and Strength of Refractory Composite Materials Dr. Brian Sullivan, Materials Research & Design, Inc.	Graded Alloy Transition Deposition (GRatd) Leading Edge Fabrication and Testing Dr. Daniel Driemeyer, The Boeing Company	Recent Results from 3MDCP Thermal and Mechanical Testing and Future Testing Plans in Support of Mars Sample Return Earth Entry Vehicle (MSR EEV) Mr. Rafael Gonzalez, Kratos SRE	Center Relative Wind Speed Sensor for High Altitude Trajectory Control Dr. Daniel Bivolaru, General Electric
	Measurement of Interlaminar Shear Modulus and Strength of Refractory Composite Materials Dr. Brian Sullivan, Materials Research & Design, Inc.	(GRatd) Leading Edge Fabrication and Testing Dr. Daniel Driemeyer, The Boeing Company *Processing and Properties of Zirconium Carbide Manufactured by Ceramic On- Demand Extrusion Ms. Clare Sabata, Missouri University of	Mechanical Testing and Future Testing Plans in Support of Mars Sample Return Earth Entry Vehicle (MSR EEV)	Relative Wind Speed Sensor for High Altitude Trajectory Control
1640 - 1705	Measurement of Interlaminar Shear Modulus and Strength of Refractory Composite Materials Dr. Brian Sullivan, Materials Research & Design, Inc. Damage Investigation in Bending of Thin C/SiC Ceramic Matrix Composites Dr. Alicia Rossi, University of Dayton Research Institute	(GRatd) Leading Edge Fabrication and Testing Dr. Daniel Driemeyer, The Boeing Company *Processing and Properties of Zirconium Carbide Manufactured by Ceramic On- Demand Extrusion	Mechanical Testing and Future Testing Plans in Support of Mars Sample Return Earth Entry Vehicle (MSR EEV) Mr. Rafael Gonzalez, Kratos SRE Ablative Silicone Materials in Development	Relative Wind Speed Sensor for High Altitude Trajectory Control Dr. Daniel Bivolaru, General Electric HALAS High Altitude Lidar Atmospheric Sensing Enabling Improved Range Operations

Thursday, 29	June 2023					
0700 - 1730	Registration Open					
	speaker Meeting and Light Breakfast for Thursday's Presenters					
0700 - 0800	0 - 0800 Attendee Light Continental Breakfast Sponsored by Materials Research & Design, Inc.					
1200 - 1330	sponsorea by Materials Research & Design, Inc. U Lunch Break					
	(On Your Own - See Registration Desk for Area	Restaurants)				
1730	2023 Poster & Student Oral Excellence Award					
	Sponsored by Northrop Grumman Corporation Grand Prize Give-Away					
	Sponsored by Textum					
	Track One	Track Two	Track Three	Track Four		
	NSMMS Hypersonics	NSMMS Additive Manufacturing for Space &	NSMMS Development, Processing & Testing of Advanced	NSMMS & CRASTE Integrated Vehicle Health Management (IVHM) &		
Finalists for	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Missile Materials	Materials	Integrated System Health Monitoring (ISHM)		
	Session Chairs: Dr. Carmen Carney, Air Force					
Excellence Oral Award	Research Laboratory & Dr. Matthew Dickerson, Air Force Research	Session Chair: Dr. Daniel Driemeyer, The Boeing Company	Session Chairs: Dr. Erica Corral, The University of Arizona & Dr. Allan Katz, Air Force Research	Workshop Chair: Mr. James Larkin, Aerojet Rocketdyne		
are	Laboratory	Lead Organizer: Dr. Amjad Almansour,	Laboratory	Co-Chair: Mr. Derek DeVries, Northrop Grumman		
marked	Lead Organizer: Mr. Mitch Petervary, The	NASA Glenn Research Center	Lead Organizer: Dr. David Witkin, The Aerospace	Corporation		
with an *	Boeing Company Co-Organizers: Mr. Dan Hladio, Materials	Co-Organizers: Dr. Raymond Clinton, NASA Marshall Space Flight Center;	Corporation Co-Organizers: Mr. Jimmy Allen, Dynetics;			
	Research & Design, Inc.; Mr. Curtis Martin,	Ms. Kaia David, The Boeing Company;	Prof. Greg Hilmas, Missouri University of Science			
	Naval Surface Warfare Center;	Mr. Michael Fuller, Northrop Grumman	and Technology; Dr. Garth Wilks, Raytheon			
	Mr. Tod Palm, Northrop Grumman Corporation; Dr. Suraj Rawal, Lockheed	Corporation; Dr. Suraj Rawal, Lockheed Martin Space Systems; Dr. Samir Singh, Ball	Missiles & Defense; & Dr. Eric Wuchina, Naval Surface Warfare Center			
	Martin Space Systems; Dr. Sandra Walker,	Aerospace; Mr. James Tucker, Kratos SRE; &				
	NASA Langley Research Center; &	Mr. John Vasquez, Naval Research				
	Mr. Brian Zuchowski, Lockheed Martin	Laboratory				
0800 - 0805 0805 - 0830	Announcements	Announcements	Announcements	Announcements & Workshop Introduction Progress with Smart Fibers for Nuclear Fuel and		
0805 - 0830	Progress in the Development of Compliant High-Temperature Materials and Thermal	Optimized Laser Powder Bed Fusion Processing Parameters for Novel High	Ultra-High Temperature CMCs with Enhanced Oxidation and Ablation Resistance	ISHM		
	Protection Systems	Temperature Nickel Alloy Structures	Dr. Zlatomir Apostolov, Air Force Research	Dr. Joseph Pegna, Free Form Fibers, LLC		
	Dr. Matthew Dickerson, Air Force Research Laboratory	Mrs. Carissa Russell, Materials Sciences, LLC	Laboratory			
0830 - 0855	·	Evaluation in Defect Formation of LPBF	Development of a Computational Model of	Fiber-Optic Sensor Networks to Enable Next-		
	Performance Assessment for Hypersonic	Oxide Dispersion-Strengthened Inconel 738	Cf/ZrC Composite Oxidation At Elevated	Generation Hypersonic Vehicle Monitoring and		
	Components	Mrs. Carissa Russell, Materials Sciences, LLC	Temperatures	Control		
	Mr. Joshua Steele, Spirit AeroSystems		Ms. Allison Rzepka, University of Illinois at Urbana-Champaign	Mr. William Price, IFOS Corporation		
0855 - 0920	,	Material Property Dependence of	Thermodynamic Modelling of the Three	Investigation of Laser Sintering for Direct Write		
	Manufacture of Three-Directional Carbon Fiber CMC for Hypersonic Thermal	Nanoparticle Silicon Carbide Alloying in Additively Manufactured Molybdenum	Categories of High-Temperature Oxidation, including Active Oxidation and its Experimental	Printing to Produce In-Space Manufacturing of Fully Flexible Hybrid Electronics Devices		
	Protection Components and Aeroshells	Mr. Andrew Mason, Air Force Institute of	Visualization	Dr. Nirmala Kandadai, Oregon State University		
2022 2045	Mr. David Biolsi, Spirit AeroSystems	Technology	Dr. Mark Opeka, Kratos SRE	5 1 11 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
0920 - 0945	Plexible Thermal Protection System Dr. Rachel Guarriello, Physical Sciences, Inc.	Superior Materials Properties through Additive Manufacturing for High	Evaluation of Thermal Properties of High Entropy Carbide-Boride Candidates for Extreme	Embedding Sensors via Metal 3D Printing Mr. Jason Riley, Fabrisonic, LLC		
		Performance Space & Missile Applications	Temperature Thermal Protection Systems by	,		
		Dr. Jacob Rindler, Castheon, Inc.	Novel Contactless Measurement Technique			
			Mr. Hunter Schonfeld, The University of Virginia			
0945 - 1015	Coffee & Soda Break					
1015 - 1020	Sponsored by Ultramet Announcements	Announcements	Announcements	Announcements		
	Wind Tunnel Testing of Ultrasonically	High Temperature Tensile Properties of	Consideration of Ultra High Temperature	Solid State Electrochemical Temperature and		
	Absorptive Aeroshell Materials for	Additively Manufactured W-24Re	Ceramic Matrix Composites (UHTCMCs) for	Oxygen Sensor for Extreme Environments		
	Hypersonic Boundary Layer Transition Delay Mr. John Saffian, Materials Research &	Mr. Ryan Williams, Kratos SRE	Hypersonic Morphing Structures Dr. Anindya Ghoshal, U.S. Army Combat	Dr. Nicholas Tiliakos, Innoveering - GE Aerospace		
	Design, Inc.		Capabilities Development Command Army			
1045 4116		A Commonstitue Standard Standa	Research Laboratory	Counting the manager's County of Tax 111		
1045 - 1110	Affordable UHT Thermal Protection Systems for Hypersonics and Missile	A Comparative Study of the Mechanical Properties of Heat Treated and Aged	Fabrication of Continuous Polycrystalline Silicon Nitride (Si ₃ N ₄) Fibers	Coupling Hypersonic Ground Test Health Monitoring and Flight Test Operations		
	Defense Applications	Additively Manufactured AlSi7Mg Alloy	Dr. Hyunjun Kim, UES, Inc.	Mr. Matthew Thomas, CFD Research Corporation		
1	Dr. Edward Pope, MATECH	Mr. Cristian Bañuelos, The University of				
1110 - 1135		Texas at El Paso Additive Manufacturing of Critical High	Processing and Mechanical Behavior of ZrB-/C	IVHM-ISHM Application Matrix Review &		
1110 - 1135	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development	Texas at El Paso Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity	Processing and Mechanical Behavior of ZrB ₂ /C _f UHTCMCs	IVHM-ISHM Application Matrix Review & Interactive Update		
1110 - 1135	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing	UHTCMCs Mr. Aaron Ginsparg, Missouri University of	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		
1110 - 1135	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity	UHTCMCs	Interactive Update		
	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection Dr. Justin Hendrix, Naval Surface Warfare Center	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing Dr. Youping Gao, Castheon, Inc.	UHTCMCs Mr. Aaron Ginsparg, Missouri University of Science and Technology	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		
1110 - 1135	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection Dr. Justin Hendrix, Naval Surface Warfare Center Multi-Layer Metal Insulation - A TPS with	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing Dr. Youping Gao, Castheon, Inc. High Performance Novel Welding Wires for	UHTCMCs Mr. Aaron Ginsparg, Missouri University of Science and Technology SiC Treated Carbon Bonded Carbon Fiber	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		
	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection Dr. Justin Hendrix, Naval Surface Warfare Center	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing Dr. Youping Gao, Castheon, Inc.	UHTCMCs Mr. Aaron Ginsparg, Missouri University of Science and Technology	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		
1135 - 1200	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection Dr. Justin Hendrix, Naval Surface Warfare Center Multi-Layer Metal Insulation - A TPS with Integrated Structure Mr. Robert Hardesty, The Peregrine Falcon Corporation	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing Dr. Youping Gao, Castheon, Inc. High Performance Novel Welding Wires for Additive Manufacturing Aluminum Alloy	UHTCMCs Mr. Aaron Ginsparg, Missouri University of Science and Technology SiC Treated Carbon Bonded Carbon Fiber	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		
1135 - 1200	A Novel Resin Transfer Molding (RTM) Design Process Towards the Development of Thermal Metamaterial Composites for Hypersonic Thermal Protection Dr. Justin Hendrix, Naval Surface Warfare Center Multi-Layer Metal Insulation - A TPS with Integrated Structure Mr. Robert Hardesty, The Peregrine Falcon	Additive Manufacturing of Critical High Temperature Refractory for Hypervelocity Testing Dr. Youping Gao, Castheon, Inc. High Performance Novel Welding Wires for Additive Manufacturing Aluminum Alloy Space Structures Dr. Nick Bagshaw, Fortius Metals, Inc.	UHTCMCs Mr. Aaron Ginsparg, Missouri University of Science and Technology SiC Treated Carbon Bonded Carbon Fiber	Interactive Update Mr. Chris Kostyk, NASA Armstrong Flight Research		

Hypersonics, cont.	NSMMS Additive Manufacturing for Space & Missile Materials, cont. Session Chair: Dr. Elaine MacDonald, The	NSMMS Development, Processing & Testing of Advanced Materials, cont.	CRASTE Future Space Architectures Session Chair: Mr. Barry Hellman, Blue Origin, LLC
	Session Chair: Dr. Elaine MacDonald, The		Session Chair: Mr. Barry Hellman, Blue Origin, LLC
	Boeing Company	Session Chairs: Dr. Erica Corral, The University of Arizona & Dr. Garth Wilks, Raytheon Missiles & Defense	Co-Chair: Dr. Ryan Hooper, Dynetics
Announcements	Announcements	Announcements	Announcements & Session Introduction
Composites for Hypersonic Applications	Hybrid Manufacturing: Printing of Functional Prototypes Mr. James Tucker, Kratos SRE	*Machine Learning Material Response Modeling of a Low-Density Ablator for an Oxy-Acetylene Test Bed Using 1dFIAT Ms. Samantha Bernstein, The University of Texas at Austin	AFRL Reference Launch Vehicle Design for Evaluation of Tactically Responsive Missions Mr. Brenden Reeds, Sierra Lobo, Inc.
Composites for Hypersonic Applications (MOC3HA)- 2 Ms. Rachael Andrulonis, Wichita State	Energetics & Advanced Rocket Manufacturing Mr. Geoffrey Trapp, Air Force Research	Effect of Fiber Heat Treatment and UHTC Matrix Additions on the Processing, Microstructure, and Mechanical Behavior of Thin C/SiC Ceramic Matrix Composites Dr. Charis Lin, UES, Inc.	Tactically Responsive Constellation Deployment Mission Analysis Status Update Ms. Theresa Sitter, Sierra Lobo, Inc.
Mr. Michael Favaloro, Textron Systems	Thermoelectric Material Processed via Laser Additive Manufacturing Mr. Ryan Welch, The George Washington	A Polymer Based Method of Producing High Entropy Carbide for Hypersonic Hot Structure Dr. Justin Hendrix, Naval Surface Warfare Center	Mission Analysis Updates on Theater-Specific Coverage Mr. Victor Christopher Ong, Sierra Lobo, Inc.
Optimization and Characterization of CNT Stitching for Z-Reinforcement in Carbon-	Additively Manufactured Multi-Material Hot Structures	Phase and Microstructure Evolution of Composite Metallic/Carbide Laminates under Thermal Loads Mr. Michael Large, The University of Alabama	Solar System Wide Data Network Mr. George Tyson, BNRC, LLC
Coffee & Snack Break Sponsored by Momentive			
Hypersonics, cont.	Additive Manufacturing for Space &	NSMMS Development, Processing & Testing of Advanced Materials, cont.	CRASTE Future Space Architectures, cont.
Announcements	Announcements		Announcements
Material Maturation for Hypersonics – A Program to Transition Advances in C/C Materials Technology to Industry Dr. Dennis Buchanan, University of Dayton Research Institute	Characterization of Additively Manufactured Interpenetrating Phase Composite Materials with Refractory Metals, SiC and ZrB ₂ Dr. David Mitchell, Oak Ridge National	Advanced Polysiloxane Nano/Micro-Composites Reinforced with Carbon Fiber: Processing and Properties Characterization Mr. Colin Yee, The University of Texas at Austin	Rapid Maneuverability Requirements for On-Orb GEO Logistics Architectures Mr. Finn O'Brien, Sierra Lobo, Inc.
Application Specific Hypersonic Components Mr. Joshua Steele, Spirit AeroSystems	Lattice Structures Mr. Kurtis McIntosh, University of Dayton	Characterization of Melanin as an Additive in High Temperature Phthalonitrile-Based Resin Blends Dr. Jennifer Dysart, Nova Research, Inc.	Enabling Novel Space Architectures with Nuclear Orbital Transfer Vehicles Dr. Lucas Beveridge, Atomos Space
Composite Processing to Increase Design Flexibility of Hot Structures or Nose Tips	Woven Preforms in Fiber-Reinforced SiC- SiC Composites	Manufacturing Techniques for Improved Laminate Properties in Ablative Phenolic Prepreg Systems for Autoclave Cure Mr. Phillip Twist, Park Aerospace Corporation	On-Orbit Assembly and Manufacturing of Large Apertures Enables Persistent and Timely Cislunar Space Situational Awareness Dr. Stergios Papadakis, The Johns Hopkins University Applied Physics Laboratory
	Continuous Fiber Ceramic Matrix Composites	Char Strength of Low Density Thermal Protection Systems Materials Mr. Ben Rech, Koo & Associates International, Inc.	
NOTIFIED AND TOTAL	Annufacturing of Carbon/Carbon Composites for Hypersonic Applications MOG3HA) - 2 As. Rachael Andrulonis, Wichita State University - NIAR ingle-Cycle Densification of Carbon/Carbon for Hypersonic Applications Ar. Michael Favaloro, Textron Systems Optimization and Characterization of CNT Citiching for Z-Reinforcement in Carbon- Carbon Laminates As. Allison Ruwe, University of Dayton Cesearch Institute Coffee & Snack Break Consored by Momentive ISMMS Companies of Companies of Companies Companies of Companies of Companies of Companies Companies of Companies of Companies Companies of Companie	Announcements Manufacturing for Space & Mossile Materials Technology to Industry Manufacturing of Carbon/Carbon Composites for Hypersonic Applications MOC3HA)- 2 Ms. Rachael Andrulonis, Wichita State Juniversity - NIAR Iniversity - NIAR Mr. Geoffrey Trapp, Air Force Research Laboratory *The Process-Structure-Property Relationship of High-Temperature Thermoelectric Material Processed via Laser Additive Manufacturing Mr. Ryan Welch, The George Washington University Additively Manufactured Multi-Material Hot Structures Mr. Eric Clough, HRL Laboratories Mr. Eric Clough, HRL Laboratories Mr. Eric Clough, HRL Laboratories Mr. Sandt Break Manufactured Multi-Material Hot Structures Mr. Eric Clough, HRL Laboratories Mr. Sille Materials, cont. Manufacturing for Space & Missile Materials, cont. Manufactured Interpenetrating Phase Composite Materials With Refractory Metals, SiC and ZrB ₂ Dr. David Mitchell, Oak Ridge National Laboratory Metals, SiC and ZrB ₂ Dr. David Mitchell, Oak Ridge National Laboratory Mr. Kurtis McIntosh, University of Dayton Research Institute Mr. Manufactured Free Form Fibers, LLC Mr. Manufactured Continuous Fiber Ceramic Matrix Composites Dr. Bill Goodman, Goodman Technologies, Dr. Bill Goodman, Goodman Technologies,	Ms. Samantha Bernstein, The University of Texas at Austin Manufacturing of Carbon/Carbon Composites for Hypersonic Applications McC3HA)- 2 Manufacturing Mr. Geoffey Trapp, Air Force Research Indirectivy - NIME Indirectivy - NIME Indirectivy - NIME Indirective - NIME Interestive - NIME Interestive - NIME Interesting - NIME Interestin

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