



AIAA
Dayton-Cincinnati Section

*AMERICAN INSTITUTE OF
AERONAUTICS AND ASTRONAUTICS
DAYTON-CINCINNATI SECTION*



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SYMPOSIUM GUIDE

The Forty-Fifth Annual
Dayton-Cincinnati
Aerospace Sciences Symposium



*An SR-71 refueling from a KC-135Q Stratotanker
Public Domain Image Courtesy of Wikipedia*

3 March 2020
Sinclair Conference Center
Dayton, Ohio
www.aiaa-daycin.org/dcass

Greater Ohio Chapter



Dayton Section



Ohio Valley Section



Human Factors and
Ergonomics Society



Society for the Advancement
of Material and Process



Welcome

to the
45th AIAA Dayton-Cincinnati Aerospace Sciences Symposium
(DCASS)

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For four and a half decades, the AIAA Dayton-Cincinnati Aerospace Sciences Symposium has provided a unique venue for technical interchange with members of our regional aerospace community. The symposium showcases cutting-edge research with a one-day program that includes technical presentations across multiple areas of aerospace science and technology.

The symposium program includes over 120 technical presentations in both morning and afternoon sessions. Our invited keynote speaker is Charlie Thomas Vono, USAF Colonel (Ret), an AIAA Associate Fellow. Col. Vono has been writing and presenting extensively on the sustainment of complex systems, but his most popular presentation relates back to his first USAF assignment in 1977 as a tanker pilot supporting the world-wide SR-71 mission during the Cold War.

This event has been organized by a group of dedicated volunteers who team throughout the year to make this meeting a success. This meeting would not be possible without their sustained effort. We thank the local leaders supporting DCASS as general co-chairs, and our co-sponsoring professional societies listed within this program. This meeting is also made possible by our corporate and educational sponsors shown on the back of this program. We thank them for their generous support.

Finally, we encourage folks to submit their votes for best art-in-science submissions. The best presentation and best art-in-science award winners will be recognized at the annual Dayton-Cincinnati Section Awards Banquet scheduled for May 26, 2020.

We hope you enjoy today's symposium, and we look forward to seeing you again next year!

Harok Bae and Brian Bohan
2020 DCASS Executive Co-Chairs

45th AIAA Dayton-Cincinnati Aerospace Sciences Symposium

Keynote Program

Welcome and Announcements:

Dr. Harok Bae

2020 DCASS Executive Chair

Keynote Address:

Cold War Lessons for the 21st Century

Charlie Thomas Vono

USAF Colonel (Ret)



Col. Vono, an AIAA Associate Fellow, is a retired USAF Colonel and retired defense contractor senior manager. In his 45-year career, he has been an operator, e.g., KC-135 aircraft commander; he has been an engineer, e.g., F16 structures; and he has been a sustainer, e.g., ICBMs. He has a Bachelor of Science from the USAF Academy in Astronautical Engineering, a Master of Science in Systems Management from the University of Southern California, and a Master of Science in Mechanical Engineering from Utah State University. He is a graduate of Air War College. Charlie has 13 years full time active duty in Air Force and Joint assignments and 12 years part time duty in Air Force Reserve assignments. Since retiring from a major defense contractor in 2014, Charlie has been writing and presenting extensively on the sustainment of complex systems; his most popular presentation harks back to his first USAF assignment in 1977 as a tanker pilot supporting the world-wide SR-71 mission during the Cold War. Charlie's Dad, Mike, was a WWII B-24 ball turret gunner in Europe and his Uncle Chuck was a Navy gunner engaged in every major combat operation in the Pacific.



2020 DAYTON-CINCINNATI SECTION AWARDS
CALL FOR NOMINATIONS

Recognize the achievements of your colleagues. The local Awards Banquet, to be held on May 26, 2020 at the Kennedy Union Ballroom, University Of Dayton, is fast approaching. Nominations are sought for several local awards. These include:

Outstanding Technical Contribution - Science Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] to recognize a significant scientific achievement during the past year.

Outstanding Technical Contribution - Application Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] to recognize a significant development or application achievement during the past year.

Outstanding Management Contribution Award: Presented to a Dayton-Cincinnati AIAA Section member(s) [limit of 2 people] for outstanding management contributions made during the past year.

There is no specific format required. Simply complete the attached form and E-mail the information. Award selections will be made by an expert panel of judges. Submit nominations (by E-mail) by 24 April 2020 to:

Dr. Marc Polanka

Tel: (937) 255-3636 x4714

E-mail: marc.polanka@afit.edu

NOMINATION FORM

(Nomination Package Must be Limited to 2 Pages)

CATEGORY:

Nominee:

Affiliation:

Address:

Tel:

E-mail:

Nominator:

Affiliation:

Address:

Tel:

E-mail:

Symposium Schedule At-A-Glance

Registration 7:00 AM – 2:00 PM

Corporate Exhibits 9:00 AM – 4:00 PM

Art in Science Competition 9:00 AM – 4:30 PM

First Block 8:10 AM – 9:30 AM

1	Fuels	Room 116
2	CFD Applications and Methods I	Room 119
3	Space I	Room 120
4	Materials, Fatigue, and Fracture I	Room 127
5	Turbomachinery	Room 133
6	Thermal Protection Systems I	Room 171
7	Experimental Methods I	Room 231
8	Uncertainty Quantification & Data Analytics I	Room 282

Second Block 9:50 AM – 11:10 AM

9	Heat Transfer and Thermal Management	Room 116
10	Fluid Dynamics I	Room 119
11	Optimization for Space	Room 120
12	Metal Additive Manufacturing	Room 127
13	Humans & Humanoids	Room 133
14	Unmanned Aerial Systems	Room 171
15	Flight Dynamics and Control I	Room 231
16	Combustor Design	Room 282

Keynote Program in Frederick C. Smith Auditorium (Room 150) 11:20 AM – 12:30 PM

Lunch in Great Hall 12:30 PM – 1:40 PM

Third Block 1:40 PM – 3:20 PM

17	Turbine Heat Transfer	Room 116
18	CFD Applications and Methods II	Room 119
19	Thermal Protection Systems II	Room 120
20	Materials, Fatigue, and Fracture II	Room 127
21	Plastics Additive Manufacturing	Room 133
22	Experimental Methods II	Room 171
23	Fluid Dynamics II	Room 231
24	Fundamental Combustion I	Room 282

Fourth Block 3:30 PM – 4:50 PM

25	Uncertainty Quantification & Data Analytics II	Room 116
26	Acoustics	Room 119
27	Optimization	Room 120
28	Composite Materials	Room 127
	Room Not Used	Room 133
29	Space II	Room 171
30	Fundamental Combustion II	Room 231
31	Flight Dynamics and Control II	Room 282

The abstracts for the talks presented today may be found on the AIAA Dayton-Cincinnati Section website: www.aiaa-daycin.org/dcass. The Executive Committee encourages the use of this website. The abstracts can be located under the "Attending" menu at the top of the Aerospace Sciences Symposium website.

Awards Information: The Dayton-Cincinnati Section of the AIAA is proud to continue its long-standing tradition of recognizing the best work presented at this symposium, as judged by the Session Chairs. This year, awards will be made in the following technical categories:

Category	Sessions	Category	Sessions
Combustion Science	1, 16, 24, 30	Air Vehicles, Dynamics, and Control	14, 15, 31
Heat Transfer and Turbomachinery	5, 9, 17	Space Science	3, 11, 29
Materials, Manufacturing & Structures	4, 12, 20, 21	Experimental Methods, Measurement, & Acoustics	7, 13, 22, 26
Fluid Mechanics	2, 10, 18, 23	Ceramics & Thermal Protection Materials	6, 19, 28
Uncertainty Quantification, Data Analytics, & Optimization	8, 25, 27		

Session Chairs will provide scores based on the quality of the abstract, innovation and magnitude of effort, technical contribution, and presentation style. One winner will be selected for each technical category, and the presenters will be invited to the AIAA Annual Awards Banquet (free ticket!) to receive their awards!

For online access to the Program-at-a-glance, please visit: <http://www.aiaa-daycin.org/dcass/glance.php>

Room	116	119	120	127
	SESSION 1 Fuels	SESSION 2 CFD Applications and Methods I	SESSION 3 Space I	SESSION 4 Materials, Fatigue, and Fracture I
Time	Chair: Marc D. Polanka <i>AFIT</i>	Chair: Donald Rizzetta <i>AFRL</i>	Chair: Joshua Hess <i>AFIT</i>	Chair: Robert Lowe <i>UD</i>
8:10 AM	<i>45DCASS-075</i> Characterization of Non-reacting Swirling Flow in a Gas Turbine Fuel Injector <i>Mohamad Ghulam - UC</i> <i>Yazhou Shen - NCEPC</i> <i>Ephraim Gutmark - UC</i> <i>Rodrigo Villalva - UC</i> <i>Christophe Duwig - KTH</i>	<i>45DCASS-004</i> Multi-fidelity, Multidisciplinary Analysis of an Efficient Supersonic Air Vehicle <i>Madeline Lickenbrock - UD</i> <i>Markus P. Rumpfkeil - UD</i> <i>Philip S. Beran - AFRL</i> <i>Raymond M. Kolonay - AFRL</i>	<i>45DCASS-024</i> Space-based localization of radio frequency transmitters <i>Jessica Wightman - AFIT</i> <i>Joshuah Hess - AFIT</i>	<i>45DCASS-038</i> Computational Modeling for High Strain Rate Impacts <i>Derek Spear - AFIT</i> <i>Anthony Palazotto - AFIT</i>
8:30 AM	<i>45DCASS-094</i> A GCxGC Tier Alpha and Combustor Figure-of-Merit Approach on Sustainable Aviation Fuels Prescreening <i>Harrison Yang - UD</i> <i>Joshua Heyne - UD</i>	<i>45DCASS-047</i> Numerical Investigation of Droplet Induced Vibration on Fiber: A hybrid CLSMOF and Immersed Boundary Method Implementation <i>Ahmed Islam - UL</i> <i>Mark Sussman - FSU</i> <i>Yongsheng Lian - UL</i>	<i>45DCASS-049</i> An Approach to Coordinated Multi-Robot Search and Extraction of Resources for In-Situ Resource Utilization <i>Sujeet Kashid - UC</i> <i>Catharine McGhan - UC</i>	<i>45DCASS-060</i> Materials Characterization of Solder Creep Specimens <i>Cherish Lesko - CDU</i> <i>Dan Young - WSU</i> <i>Eric Stang - WSU</i>
8:50 AM	<i>45DCASS-097</i> High-Performance Jet Fuel Optimization and Aircraft Performance Analysis Considering O-ring Volume Swell <i>Shane Kosir - UD</i> <i>Joshua Heyne - UD</i> <i>John Graham - UDRI</i> <i>Michelle Kirby - GIT</i>	<i>45DCASS-071</i> High-Speed Snow Plowing Safety and Efficiency: Investigation of Sustainable Design Methods <i>Murat Dinc - MU</i>	<i>45DCASS-059</i> Development of the Grissom CubeSat Project <i>Andrew Keys - AFIT</i> <i>Robert Bettinger - AFIT</i> <i>Sean Miller - AFIT</i> <i>Chris Sheffield - AFIT</i>	<i>45DCASS-103</i> Simulation-Aided Design of Novel Ductile Fracture Experiments for Aerospace Metals <i>Robert Lowe - UD</i>
9:10 AM	<i>45DCASS-100</i> In Investigation into the Relative Impact of Fusel Alcohol Mixtures from Biomass Feedstocks on Gasoline Blends <i>Lily Behnke - UD</i> <i>Eric Monroe - SNL</i> <i>Ryan W. Davis - SNL</i> <i>Anthe George - SNL</i> <i>Katie Opacich - UD</i>	<i>45DCASS-098</i> Assessment of Turbulence Closure Models for Corner Flow at High Mach Numbers <i>Logan Riley - AFRL</i> <i>Nick Bisek - AFRL</i>	<i>45DCASS-082</i> Spacecraft Propulsion Using a Radioisotope Heat Exchanger <i>Jeremy Touma - AFIT</i> <i>Nathan A. Clark - AFIT</i> <i>Fred Schauer - AFIT</i>	<i>45DCASS-115</i> Designing New Generations of Body-Centered Cubic (BCC) Lattice Structures Based on an Optimization of the Strut Orientation and Length <i>Hasanain Abdulhadi - WSU</i> <i>Ahsan Mian - WSU</i>
9:30 AM	Break			

Abbreviations:

ABU = Auburn University
 AFIT = Air Force Institute of Technology
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 CBU = California Baptist University
 CCH = Cincinnati Childrens Hospital
 CDU = Cedarville University
 CRFT = Combustion Research and Flow Technology, Inc.
 DSTL = Defence Science and Technology Laboratory (UK)

FLLC = Folderol, LLC
 FSU = Florida State University
 GIT = Georgia Institute of Technology
 HA = Honeywell Aerospace
 HS = Home School
 ISSI = Innovative Scientific Solutions Inc.
 KTH = KTH Royal Institute of Technology
 MISU = Mississippi State University
 MU = Miami University

45th Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
SESSION 5 Turbomachinery	SESSION 6 Thermal Protection Systems I	SESSION 7 Experimental Methods I	SESSION 8 Uncertainty Quantification & Data Analytics I	
Chair: Rolf Sondergaard AFRL	Chair: John Maddox UKY	Chair: Jose Camberos AFRL	Chair: Rick Graves AFRL	Time
<p><i>45DCASS-064</i></p> <p>Modeling the sensitivities of grid nodes to design parameters with Machine Learning in an adjoint framework.</p> <p><i>Matteo Ugolotti - UC</i> <i>Paul Orkwis - UC</i> <i>Benjamin Vaughan - UC</i></p>	<p><i>45DCASS-041</i></p> <p>Evaluation of the anisotropic radiative conductivity of fibrous material from realistic microscale imaging</p> <p><i>Mingping Zheng - UKY</i> <i>Alexandre Martin - UKY</i> <i>Nima Nouri - UKY</i></p>	<p><i>45DCASS-003</i></p> <p>Investigation of Doppler Lidar for Velocity Measurements in Wind Tunnels</p> <p><i>Samuel Barnhart - UD</i> <i>Sidaard Gunasekaran - UD</i></p>	<p><i>45DCASS-019</i></p> <p>Data Requirements and Use Cases for a Digital Hangar Construct</p> <p><i>Rick Graves - AFRL</i></p>	8:10 AM
<p><i>45DCASS-063</i></p> <p>Design, Analysis, and Testing of a Low-Cost, Additively-Manufactured, Single-Use Compressor</p> <p><i>Aaron Bauer - AFIT</i> <i>Frederick R. Schauer - AFIT</i> <i>Ryan A. Kemnitz - AFIT</i> <i>Brian T. Bohan - AFIT</i> <i>Gabriel R. Walker - UC</i> <i>Daniel L. Gillaugh - AFRL</i> <i>Adam T. Holley - AFRL</i> <i>John L. Hoke - ISSI</i></p>	<p><i>45DCASS-056</i></p> <p>Finding the change of effective thermal conductivity as ablative insulation chars</p> <p><i>Gabriella Marie - UKY</i> <i>Alexandre Martin - UKY</i> <i>John F. Maddox - UKY</i></p>	<p><i>45DCASS-006</i></p> <p>Non-Linear statistical photo-calibration of photo-detectors</p> <p><i>Stephen Cain - AFIT</i></p>	<p><i>45DCASS-029</i></p> <p>Explainable Artificial Intelligence Tool for Multidimensional Problems with Application to NACA 0012 Airfoils Self-Noise Data Set</p> <p><i>Javier Viana - UC</i> <i>Kelly Cohen - UC</i></p>	8:30 AM
<p><i>45DCASS-087</i></p> <p>Swirling Flow Boundary Conditions for Assessment of Compressor Stability Models</p> <p><i>Marcus Acton - WSU</i> <i>Mitch Wolff - WSU</i> <i>Mike List - AFRL</i></p>	<p><i>45DCASS-057</i></p> <p>Mesoscale thermo-structural analysis of inhomogeneities in ablative materials using statistical distribution of properties derived at the microscale</p> <p><i>Sean McDaniel - UKY</i> <i>Matthew Beck - UKY</i> <i>Jonathon Wenk - UKY</i> <i>Alexandre Martin - UKY</i></p>	<p><i>45DCASS-034</i></p> <p>Infrared Temperature Measurements of the Blade Tip from a Turbine Operating at Corrected Engine Conditions</p> <p><i>Louis Christensen - OSU</i> <i>Richard Celestina - OSU</i> <i>Spencer Sperling - OSU</i> <i>Randall Mathison - OSU</i> <i>Hakan Aksoy, Jong Liu - HA</i> <i>Hakan Aksoy, Jong Liu - HA</i></p>	<p><i>45DCASS-002</i></p> <p>Multi-Fidelity, Gradient-enhanced, Sparse Polynomial Chaos and Kriging Surrogate Models Applied to Benchmark Problems</p> <p><i>Markus Rumpfkeil - UD</i> <i>Philip Beran - AFRL</i></p>	8:50 AM
<p><i>45DCASS-101</i></p> <p>Characterization of the Unsteady Behavior of an Endwall Vortex</p> <p><i>Molly Donovan - UD</i> <i>Christopher R. Marks - AFRL</i></p>	<p><i>45DCASS-058</i></p> <p>Testing Ablation Chemistry Model Based on Molecular Beam Experiments</p> <p><i>Ares Barrios-Lobelle - UKY</i> <i>Savio J. Poovathingal - UKY</i> <i>Alexandre Martin - UKY</i></p>	<p><i>45DCASS-073</i></p> <p>Experimental Investigation of Contraction Ratio Influence on Scramjet Inlet Performance at Mach 6</p> <p><i>Megan Linton - AFRL</i> <i>Brendan Rooney - AFRL</i> <i>Heidi Wilkin - AFRL</i> <i>José A. Camberos - AFRL</i> <i>Markus P. Rumpfkeil - UD</i></p>	<p><i>45DCASS-096</i></p> <p>Adaptive Sampling and Classification Decision Boundary Optimization for Mode Shape Emulation</p> <p><i>Ian Boyd - AFIT</i> <i>Harok Bae - WSU</i> <i>Jeff Brown - AFRL</i></p>	9:10 AM
Break				9:30 AM

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 NLRC = NASA Langley Research Center
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 UCO = University of Colorado
 UD = University of Dayton

UDRI = University of Dayton Research Institute
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Room	116	119	120	127
	SESSION 9 Heat Transfer and Thermal Management Chair: Rydge Mulford UD	SESSION 10 Fluid Dynamics I Chair: Mark Reeder AFIT	SESSION 11 Optimization for Space Chair: Robert Bettinger AFIT	SESSION 12 Metal Additive Manufacturing Chair: Ryan Kemnitz AFIT
9:50 AM	45DCASS-033 Modeling Nonlinear Heat Transfer for a Pin-on-Disc Sliding System Brian Boardman - AFIT Anthony Palazotto - AFIT William Baker - AFIT	45DCASS-111 Tailoring Lift Distribution Through Trailing Edge Extension Twist Rachael Supina - UD Sidaard Gunasekaran - UD	45DCASS-008 Numerical Optimization of Six Degree-of-Freedom, Path-Constrained Satellite Skip Entry Trajectories Brian Erickson - AFIT Robert Bettinger - AFIT	45DCASS-018 Tuning the Laser Powder Bed Fusion Process for Pure Tungsten Ryan Kemnitz - AFIT Cayla Eckley - AFIT Carl Hartsfield - AFIT Travis Shelton - AFIT
10:10 AM	45DCASS-039 Coupled Radiation-Conduction model Mohammad Khaleel - UKY Alexandre Martin - UKY	45DCASS-001 Numerical Investigation of Transition Delay by Dynamic Surface Deformation Donald Rizzetta - AFRL Miguel Visbal - AFRL	Towards Optimally Incorporating Non-Traditional Sensors into the Space Domain Awareness Architecture Albert Vasso - AFIT	45DCASS-069 Bending Fatigue Performance of Additively Manufactured Inconel 718 with Through Channel Wesley Eidt - WSU Joy Gockel - WSU Philip Johnson - AFRL Onome Scott-Emuakpor - AFRL
10:30 AM	45DCASS-051 Experimental Model of Heat Loss and Turn-Down Ratio for a Nature-Inspired, Dynamic Radiator Nicholas DeBortoli - UD Calvin Callahan - UD Rydge Mulford - UD	45DCASS-062 Numerical reconstruction of spalled particle trajectories in an arc-jet environment Raghava S. C. Davuluri - UKY Sean C. C. Bailey - UKY Kaveh A. Tagavi - UKY Alexandre Martin - UKY	45DCASS-028 Autonomous Constrained Spacecraft Inspection via Model Predictive Control Justin Becker - AFIT Costantinos Zagaris - AFIT	45DCASS-072 Quality Control for Selective Laser Melting Powder Bed Fusion Additive Manufacturing Chance Baxter - AFIT Nicholas Herr - AFIT Ryan Kemnitz - AFIT Christopher Rice - AFIT
10:50 AM	45DCASS-055 Multi-Mode Rankine Cycle for Aircraft Power Generation and Thermal Management Nathaniel Payne - WSU Jared McCoppin - UDRI Rory Roberts - WSU Mitch Wolff - WSU Levi Elston - AFRL	45DCASS-112 Low Reynolds Number Aerodynamic Verification of Ice Shape Scaling Method and LEWICE Simulated Ice Accretions Eric Insana - UD	45DCASS-085 Structural Optimization of Space Transit Vehicle Concept, Hercules James Rogers - UKY Alexandre Martin - UKY D. R. Komar - NLRC	45DCASS-131 Image Processing Methods for Defect Characterization in Additively Manufactured Parts Sabrina D'Alesandro - WSU Joy Gockel - WSU Andrew Harvey - WSU
11:10 AM	Break			
11:20 AM	Room 150 - Frederick Smith Auditorium Welcome & Announcements Dr. Harok Bae, 45 th DCASS General Chair			
12:30 PM	Networking Lunch			

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133	171	231	282	Room
SESSION 13 Humans & Humanoids Chair: Bryan Little <i>AFIT</i>	SESSION 14 Unmanned Aerial Systems Chair: Markus Rumpfkeil <i>UD</i>	SESSION 15 Flight Dynamics and Control I Chair: Donghoon Kim <i>UC</i>	SESSION 16 Combustor Design Chair: Darius Sanders <i>AFRL</i>	Time
<i>45DCASS-076</i> Continued Development of an Intelligent and Modular Control Architecture for Humanoid Robots <i>Matthew Verbryke - UC</i> <i>Catharine McGhan - UC</i>	<i>45DCASS-054</i> Real-time autonomous navigation and path planning for Quadrotor UAV <i>Jason Gauthier - WSU</i> <i>Max Gilson - WSU</i> <i>Kaylee Garcia - CBU</i> <i>Cory Kienzle - CBU</i> <i>Kyle McGrath - UCO</i>	<i>45DCASS-052</i> Aircraft waypoint navigation using reinforcement learning <i>Justin Merrick - AFIT</i> <i>Donald Kunz - AFIT</i> <i>Joseph Curro - AFIT</i>	<i>45DCASS-022</i> Detonation Confinement in a Radial Rotating Detonation Engine <i>Kavi Muraleetharan - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>Fred R. Schauer - AFIT</i> <i>Riley Huff - AFRL</i>	9:50 AM
<i>45DCASS-050</i> Training Recurrent Neural Networks for Semi-Autonomous Robotic Surgery in Remote Environments Using Surgeon Tool-Trajectory Data <i>Christopher Korte - UC</i> <i>Catharine McGhan - UC</i>	<i>45DCASS-005</i> Development of a Multi-Purpose Flap and Spoiler Mechanism for High Endurance Unmanned Aerial Vehicles <i>Lucas Hung - HS</i> <i>Jielong Cai - UD</i> <i>Neal Novotny - UD</i> <i>Sidaard Gunasekaran - UD</i>	<i>45DCASS-084</i> An Explainable AI-based Collision Avoidance Model for UAVs <i>Anirudh Chhabra - UC</i> <i>Daegyun Choi - UC</i> <i>Donghoon Kim - UC</i> <i>Kelly Cohen - UC</i>	<i>45DCASS-014</i> Development of a Small Scale RDE <i>Joseph Dechert - AFIT</i> <i>Fred Schauer - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>S. Alexander Schumaker - AFRL</i> <i>Brian C. Sell - ISSI</i>	10:10 AM
<i>45DCASS-118</i> DEJI Systems Model for Human-Systems Integration in Product Design and Development <i>Adedeji Badiru - AFIT</i> <i>Jinan Andrews - AFIT</i>	<i>45DCASS-090</i> A Near-Real-Time Near-Optimal Shortest Path Solution for an Unmanned Aerial System (UAS) in a Highly Constrained Environment <i>Kyle Matissek - AFIT</i> <i>Richard G. Cobb - AFIT</i> <i>David R. Jacques - AFIT</i> <i>David J. Grymin - AFRL</i> <i>Michael D. Zollars - AFLCMC</i>	<i>45DCASS-106</i> Effect of Airfoil-Preserved Undulations on Wing Performance <i>Faith Loughnane - UD</i> <i>Michael Mongin - UD</i> <i>Sidaard Gunasekaran - UD</i>	<i>45DCASS-021</i> Analysis of a Compact Combustor for Use in a JetCat P90 RXi <i>Daniel Holobeny - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>Brian T. Bohan - AFIT</i>	10:30 AM
<i>45DCASS-067</i> Study of vortical structures' variation with aortic valve morphology in human aorta through 4D MRI <i>Raghuvir Jonnagiri - UC</i> <i>Elias Sundstrom - UC</i> <i>Ephraim Gutmark - UC</i> <i>Iris Little-Gutmark - CCH</i> <i>Justin Tretter - CCH</i>	<i>45DCASS-042</i> Safe Optimization of Time-Critical Medical Delivery Operations for UAV Teaming in a Dynamic Urban Airspace <i>Ponaravind Muthaiah - UC</i> <i>Catharine McGhan - UC</i>	<i>45DCASS-124</i> Lift Coefficient Prediction of Distributed Blown Wings <i>Sidaard Gunasekaran - UD</i> <i>Samuel Barnhart - UD</i> <i>Katherine Opacich - UDRI</i> <i>Barath Narayanan - UDRI</i>	<i>45DCASS-086</i> Design and Analysis of a Disk-Oriented Engine Combustor <i>Bennett Staton - AFIT</i> <i>Marc D. Polanka - AFIT</i> <i>Brian T. Bohan - AFIT</i>	10:50 AM
Break				11:10 AM
Room 150 - Frederick Smith Auditorium				11:20 AM
Keynote Address Cold War Lessons for the 21st Century <i>Chalie Vono, USAF Colonel (Ret)</i>				
Networking Lunch				12:30 PM

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Room	116	119	120	127
	SESSION 17 Turbine Heat Transfer Chair: James Rutledge AFIT	SESSION 18 CFD Applications and Methods II Chair: Nicholas Bisek AFRL	SESSION 19 Thermal Protection Systems II Chair: Brian Bohan AFIT	SESSION 20 Materials, Fatigue, and Fracture II Chair: Stephen Cain AFIT
1:40 PM	45DCASS-026 Realistic Variation of Cooling Mass Flow Variation and Its Effect On Unsteady Aerodynamic and Heat Transfer Performance of a Rotating Turbine Stage <i>Spencer Sperling - OSU Randall Mathison - OSU Richard Celestina - OSU Louis Christensen - OSU Hakan Aksoy - HA Jong Liu - HA</i>	45DCASS-048 A depletable microlayer model for nucleate pool boiling in microgravity conditions <i>Sandipan Banerjee - UL Mark Sussman - FSU Yang Liu - FSU Yongsheng Lian - UL</i>	45DCASS-068 Strain-Dependent Analysis of Thermal Conductivity in Fibrous Insulation Materials <i>Christopher Barrow - UKY John F. Maddox - UKY Kaveh A. Tagavi - UKY</i>	45DCASS-114 Developing Scaling Laws to Predict Elastic-Plastic Mechanical Characteristics and Geometrical Parameters of Modified BCC Lattice Structures <i>Hasanain Abdulhadi - WSU Ahsan Mian - WSU</i>
2:00 PM	45DCASS-070 Computational and Experimental Investigation of Internal Cooling Passage for Gas Turbine Applications <i>Aditya Kulkarni - OSU Randall Mathison - OSU</i>	45DCASS-032 Computational Fluid Dynamics Study of the Effect of Varying Several Parameters on the Impact of a Drop onto Dry Surfaces <i>Murat Dinc - MU Logan Street - MU Giancarlo Castro - MU</i>	45DCASS-035 Analysis of Spallation Products Using Arc-Jet Experiments <i>Kristen Price - UKY J.M. Hardy - UKY C.G. Borchetta - UKY S.C.C. Bailey - UKY A. Martin - UKY</i>	45DCASS-080 Progressive Failure in bolted Hybrid Composite Joints <i>John Brewer - AFIT Anthony Palazotto - AFIT John Feie - AFRL Michael Gran - AFRL</i>
2:20 PM	45DCASS-027 Film Cooling Superposition Theory for Multiple Rows of Cooling Holes with Multiple Coolant Temperatures <i>Matthew Fuqua - AFIT James L. Rutledge - AFIT</i>	45DCASS-092 Prediction of Hypersonic Boundary-Layer Transition using High-Fidelity Simulation <i>Matthew Tufts - AFRL Matthew Borg - AFRL Nicholas Bisek - AFRL Roger Kimmel - AFRL</i>	45DCASS-040 High Velocity Flow Over Porous Carbon Fiber Material <i>Umran Duzel - UKY Alexandre Martin - UKY</i>	45DCASS-107 An Efficient Iterative Approach for Determining the Post-Necking True Stress-Strain Response of Aerospace Metals <i>Luke Hoover - UD Chris Negri - UD Robert L. Lowe - UD Jeremiah T. Hammer - OSU Jeremy D. Seidt - OSU Amos Gilat - OSU Luke Sheridan - AFRL Onome E. Scott-Emuakpor - AFRL</i>
2:40 PM	45DCASS-031 Effects of High Freestream Turbulence on Film Cooling Effectiveness of Shaped Holes <i>Richard Macias - AFIT Marc D. Polanka - AFIT James L. Rutledge - AFIT</i>	45DCASS-105 A subiteration strategy for improving the robustness of Newton continuation methods <i>Leon Plouviez - DSTL Eric Wolf - OAI Nathan A. Wukie - AFRL Christopher Schrock - AFRL</i>	45DCASS-046 Investigation of In-Depth Penetration of Radiative Heating in Thermal Protection Systems (TPS) <i>Ayan Banerjee - UKY Savio J. Poovathingal - UKY</i>	45DCASS-020 Development of a Material Model for Combining Lattice Cell Structures Involving Vertical and Horizontal Struts using Numerical Approaches <i>Tahseen Alwattar - WSU Ahsan Mian - WSU</i>
3:00 PM		45DCASS-078 Appraisal of CFD discrete-phase models to be utilized for simulating coal particles feeding in a staged-pressurized oxy-fuel combustor <i>Alain Islas - WVU Ansan Pokharel - WVU V'yacheslav Akkerman - WVU Richard Axelbaum - WAU Zhiwei Yang - WAU</i>	45DCASS-125 Using open-source software for modeling and integration of aerospace systems <i>Danielle Massé - WSU Rory Roberts - WSU</i>	45DCASS-095 Alternative Material For High-Speed Projectile Outer Casing <i>Andrew Beard - AFIT Anthony Palazotto - AFIT</i>
3:20 PM	Break			

45th Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
SESSION 21	SESSION 22	SESSION 23	SESSION 24	
Plastics Additive Manufacturing Chair: Carl Hartsfield AFIT	Experimental Methods II Chair: Frank Eastep UD	Fluid Dynamics II Chair: Logan Riley AFRL	Fundamental Combustion I Chair: Joshua Heyne UD	Time
<p><i>45DCASS-015</i> Accelerated Testing of Ultraviolet Radiation Effects on 3-D Printed Polyetherimide Plastic</p> <p><i>William Gallagher - AFIT</i> <i>Carl R. Hartsfield - AFIT</i> <i>Travis Shelton - AFIT</i> <i>Ryan Kemnitz - AFIT</i></p>	<p><i>45DCASS-116</i> Frequency Response of a Shuttered Open Jet Wind Tunnel</p> <p><i>Michael Mongin - UD</i> <i>Sidaard Gunasekaran - UD</i></p>	<p><i>45DCASS-108</i> Determining and linking atomization rates to aerially delivered retardant ground coverage levels using KH-RT instability hybrid atomization models.</p> <p><i>Saad Qureshi - UD</i> <i>Aaron Altman - AFRL</i></p>	<p><i>45DCASS-102</i> An Investigation on Kernel Growth Variations between Conventional Spark Discharges and Nanosecond-Pulsed High-Frequency Discharges</p> <p><i>Katherine Opacich - UDRI</i> <i>Joshua Heyne - UD</i> <i>Timothy Ombrello - AFRL</i> <i>Joseph K. Lefkowitz - AFRL</i> <i>Robert J. Leiweke - UES</i></p>	1:40 PM
<p><i>45DCASS-109</i> Instrumented Impact Behavior of Additively Manufactured ULTEM 9085: Experiments and Modeling</p> <p><i>Alex Elsbrock - UD</i> <i>Robert L. Lowe - UD</i> <i>Thomas J. Whitney - UD</i></p>	<p><i>45DCASS-089</i> Schlieren Imaging of a Cone/Flare Model in the AFRL Mach 6 Ludwig Tube Facility</p> <p><i>Mark Reeder - AFIT</i> <i>David Labuda - AFIT</i> <i>Matthew Borg - AFRL</i></p>	<p><i>45DCASS-129</i> Natural transition to turbulence in hypersonic flat plates</p> <p><i>Hemanth Goparaju - OSU</i> <i>Datta Gaitonde - OSU</i></p>	<p><i>45DCASS-081</i> Morphology and Propagation of Oxy Methane Flames in Obstructed Channels at Sub-Critical and Super-Critical Conditions</p> <p><i>Samuel Ogunfuye - WVU</i> <i>Abdulafeez Adebisi - WVU</i> <i>Vyacheslav Akkerman - WVU</i> <i>Konstantin Kemenov - CRFT</i></p>	2:00 PM
<p><i>45DCASS-091</i> Instability of Additive Manufactured Rings under Compression</p> <p><i>Kevin Greenoe - AFIT</i> <i>Anthony Palazotto - AFIT</i></p>	<p><i>45DCASS-030</i> Three-Dimensional Chemiluminescence Image Reconstruction using Maximum Entropy Deconvolution Algorithm with Multiple Views</p> <p><i>Tyler Owens - UKY</i> <i>Michael Renfro - UKY</i></p>	<p><i>45DCASS-121</i> Turbulent Near Wake Properties at Maximum Aerodynamic Efficiency Condition</p> <p><i>Sidaard Gunasekaran - UD</i></p>	<p><i>45DCASS-077</i> Impact of the Lewis Number on Premixed Flame Oscillations in Open Channels</p> <p><i>Olatunde Abidakun - WVU</i> <i>Vyacheslav Akkerman - WVU</i></p>	2:20 PM
<p><i>45DCASS-113</i> Impact of cDLP Process Parameters on the Tensile Properties of Additively Manufactured ELAST-BLK 10</p> <p><i>Asma Ul Hosna Meem - UD</i> <i>Robert Lowe - UD</i> <i>Kyle Rudolph - UD</i> <i>Allyson Cox - UDRI</i> <i>Kevin Lawson - UD</i></p>	<p><i>45DCASS-074</i> Development of New Single and High-Density Heat Flux Gauges for Unsteady Heat Transfer Measurements for a Rotating Transonic Turbine</p> <p><i>Richard Celestina - OSU</i> <i>Spencer Sperling - OSU</i> <i>Louis Christensen - OSU</i> <i>Randall Mathison - OSU</i></p>	<p><i>45DCASS-016</i> Propeller Partial Ground Effect</p> <p><i>Jielong Cai - UD</i> <i>Sidaard Gunasekaran - UD</i> <i>Michael OL - FLLC</i> <i>Anwar Ahmed - ABU</i></p>	<p><i>45DCASS-120</i> Chemical and Physical Effects on Lean Blowout in a Swirl-Stabilized Single-Cup Combustor</p> <p><i>Jennifer Colborn - UD</i> <i>Joshua Heyne - UD</i> <i>Scott Stouffer - UDRI</i> <i>Tyler Hendershott - UDRI</i> <i>Edwin Corporan - AFRL</i></p>	2:40 PM
<p><i>45DCASS-140</i> Design and Analysis of an Additive Manufactured Supersonic Wind Tunnel</p> <p><i>Scott Chriss - UD</i> <i>Matthew Gazella - AFRL</i> <i>Jonathon Hill - AFRL</i> <i>Sidaard Gunasekaran - UD</i> <i>Austin Abel - UD</i></p>	<p><i>45DCASS-122</i> Compressibility Correction for a Flutter Model Tested in a Low Speed Tunnel</p> <p><i>Frank Eastep - UD</i></p>	<p><i>45DCASS-123</i> 3D flow simulation of a pod in tubes</p> <p><i>Bharadwaj Dogga - UC</i> <i>Steward Sophia - UC</i> <i>Shaaban Abdallah - UC</i></p>		3:00 PM
Break				3:20 PM

Room	116	119	120	127
	SESSION 25 Uncertainty Quantification & Data Analytics II Chair: Costantinos Zagaris AFIT	SESSION 26 Acoustics Chair: Matthew Tufts AFRL	SESSION 27 Optimization Chair: Harok Bae WSU	SESSION 28 Composite Materials Chair: Joy Gockel WSU
3:30 PM	45DCASS-044 UAV-driven Deep Learning-based Structural Health Monitoring <i>Daegyun Choi - UC</i> <i>Donghoon Kim - UC</i>	45DCASS-066 Noise and Flow Characterization of Supersonic Jets Emanating from a Circular and Faceted Nozzles <i>Mohammad Saleem - UC</i> <i>Omar Lopez Rodriguez - UC</i> <i>Ephraim Gutmark - UC</i> <i>Junhui Liu - NRL</i>	45DCASS-061 Coordinated Multi-Robot Movement for Search and Rescue Operations Using a Hybrid Algorithm Combining Levy Search and PSO <i>Sailendra Karra - UC</i> <i>Catharine McGhan - UC</i>	45DCASS-013 Fatigue of an Advanced SiC/SiC Ceramic Matrix Composite with an Environmental Barrier Coating at Elevated Temperature in Air and in Steam <i>Thaddeus Williams - AFIT</i> <i>M. B. Ruggles-Wrenn - AFIT</i>
3:50 PM	45DCASS-011 Statistical Reliability Estimation of Small Satellites <i>Nicholas Tassos - AFIT</i> <i>Robert A. Bettinger - AFIT</i>	45DCASS-083 Study of temperature effect on flow and acoustic behavior of supersonic jet emanating from a faceted nozzle <i>Omar Lopez Rodriguez - UC</i> <i>Mohammad Saleem - UC</i> <i>Ephraim Gutmark - UC</i> <i>Junhui Liu - NRL</i>	45DCASS-025 Expected Effectiveness Based Adaptive Multi-Fidelity Modeling for Efficient Design Optimization <i>Atticus Beachy - WSU</i> <i>Daniel L. Clark Jr. - WSU</i> <i>Harok Bae - WSU</i> <i>Edwin E. Forster - AFRL</i>	45DCASS-043 Creep Performance and Microstructural Mechanisms of Hafnium Diboride + 20 vol% Silicon Carbide at 1600 °C <i>Michael Wilkinson - AFIT</i> <i>Marina B. Ruggles-Wrenn - AFIT</i>
4:10 PM	45DCASS-104 Self Learning Targeting System <i>Jacob Rindler - WSU</i> <i>Seth Brewster - WSU</i> <i>James Burrier - WSU</i> <i>Kimberly Devore - WSU</i> <i>Chris Crabtree - WSU</i>	45DCASS-099 Flow Field & Acoustics of Twin Supersonic Rectangular Jets <i>Aatresh Karnam - UC</i> <i>Florian Baier - UC</i> <i>Prof. Ephraim Gutmark - UC</i>	45DCASS-093 Structural Sizing with the Multidisciplinary-design Adaptation and Sensitivity Toolkit (MAST) <i>David Neiferd - AFRL</i> <i>Joshua D. Deaton - AFRL</i> <i>Philip S. Beran - AFRL</i> <i>Manav Bhatia - MISU</i>	45DCASS-037 Silicon Carbide - Tungsten Diffusion Reactions During Processing of Ceramic Matrix Composites <i>Elizabeth Heckman - AFRL</i> <i>Zlatomir Apostolov - AFRL</i> <i>Michael Cinibulk - AFRL</i> <i>Joy Gockel - WSU</i> <i>Hong Huang - WSU</i>
4:30 PM		45DCASS-130 Towards Wavepacket Models for Rectangular Jets <i>Surya Chakrabarti - OSU</i> <i>Datta V. Gaitonde - OSU</i> <i>Sasidharannair Unnikrishnan - FSU</i>		45DCASS-036 Simulation of Hybrid Composite <i>Candice Roberts - AFIT</i> <i>Anthony Palazzotto - AFIT</i>
4:50 PM	Adjourn			

Abbreviations:

ABU = Auburn University
 AFIT = Air Force Institute of Technology
 AFLCMC = Air Force Life Cycle Management Center
 AFRL = Air Force Research Laboratory
 CBU = California Baptist University
 CCH = Cincinnati Childrens Hospital
 CDU = Cedarville University
 CRFT = Combustion Research and Flow Technology, Inc.
 DSTL = Defence Science and Technology Laboratory (UK)

FLLC = Folderol, LLC
 FSU = Florida State University
 GIT = Georgia Institute of Technology
 HA = Honeywell Aerospace
 HS = Home School
 ISSI = Innovative Scientific Solutions Inc.
 KTH = KTH Royal Institute of Technology
 MISU = Mississippi State University
 MU = Miami University

45th Dayton-Cincinnati Aerospace Sciences Symposium

133	171	231	282	Room
	SESSION 29 Space II Chair: Andrew Keys AFIT	SESSION 30 Fundamental Combustion II Chair: Michael List AFRL	SESSION 31 Flight Dynamics and Control II Chair: Sidaard Gunasekaran UD	Time
	45DCASS-007 Hypervelocity Impact Vulnerability Assessment for 6U and 12U CubeSat Bus Designs Robert Bettinger - AFIT	45DCASS-079 Flame dynamics of syngas combustion in micro channels Sunita Pokharel - WVU V'yacheslav Akkerman - WVU Mohsen Ayoobi - WASU	45DCASS-110 Modeling and Validation of Pilot-Aircraft Cybernetic Systems Benjamin Moidel - UD Timothy Reissman - UD Megan Reissman - UD Sidaard Gunasekaran - UD	3:30 PM
	45DCASS-012 Limitations of Relative Satellite Motion State Transition Matrix Targeting Algorithms Joshua Hess - AFIT	45DCASS-053 Parametric Study of Flame Liftoff Height in Vitiated Co-flow Burner Brandon Heller - UKY Tyler C. Owens - UKY Michael W. Renfro - UKY	45DCASS-017 Racetrack Pattern Autopilot with Arrival Time and Arrival Velocity Control Shawn Stephens - AFIT David W. Casbeer - AFRL Donald L. Kunz - AFIT William P. Baker - AFIT Joshua A. Hess - AFIT	3:50 PM
	45DCASS-009 Refined Linear Models for Spacecraft Reentry Predictions Rachel Derbis - AFIT Patrick Cunningham - AFIT Darren Thornton - AFIT Robert A. Bettinger - AFIT Christine Schubert Kabban - AFIT	45DCASS-065 Computational Investigation of Symmetric vs Asymmetric Flame Shape Developed on 100kW Staged Pressurized Oxy-Fuel Combustion Reactor. Ansan Pokharel - WVU Alain Islas - WVU Gideon Udochukwu - WVU V'yacheslav Akkerman - WVU Richard Axelbaum - WAU Pan Du - WAU Zhiwei Yang - WAU	45DCASS-045 A Simplex Architecture for UAV Collision Avoidance Zhenyu Shi - UC Catharine McGhan - UC	4:10 PM
	45DCASS-023 Linear Regression Models Applied to Spacecraft Imperfect Information Pursuit-Evasion Differential Games Dax Linville - AFIT Joshua A. Hess - AFIT		45DCASS-126 Simulated and Empirical Vibration Analysis of an Unmanned Multirotor Jared Burton - UC Justin Ouwerkerk - UC Nick DeGroot - UC Kelly Cohen - UC	4:30 PM
Adjourn				4:50 PM

NCEPC = North China Electric Power Company
 NLRC = NASA Langley Research Center
 NRL = Naval Research Laboratory
 OAI = Ohio Aerospace Institute
 OSU = The Ohio State University
 SNL = Sandia National Laboratory
 UC = University of Cincinnati
 UCO = University of Colorado
 UD = University of Dayton

UDRI = University of Dayton Research Institute
 UES = UES Inc.
 UKY = University of Kentucky
 UL = University of Louisville
 WASU = Wayne State University
 WAU = Washington University
 WSU = Wright State University
 WVU = West Virginia University

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Volunteers Wanted!!!

If you are a seasoned, well-connected AIAA Fellow, a scientist with other useful skills (photography? publishing?), an aspiring new graduate, or anything in between, we want your help!!!

We have numerous opportunities on our local council for people of all ages and skills. Get involved! We need your ideas and elbow grease to serve and mentor our technical community.

We are always looking for new Council Members. Contact any of our current officers listed below or via our web site at: <https://engage.aiaa.org/Dayton-Cincinnati/home> and volunteer to lead or help with any of these positions, or any of the others listed on the website:

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Vice Chair	Available			Develop the program agenda for the year and train to become the future chair.
Treasurer	Darius Sanders	AFRL/RQ	937-255-7636	Collect the money and keep the books.
Secretary	Don Rizzetta	AFRL/RQ	937-713-7104	Record the minutes, document the decisions, and assist with official council correspondence.
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Newsletter Editor	Michael List	AFRL/RQ	937-255-7047	Keep our membership informed of our activities, events, and other news of professional interest.
Webmaster	Available			Keep website up-to-date with fresh information by working closely with Newsletter Editor and event planners.
Membership Chair	Caleb Barnes	AFRL/RQ	937-713-7103	Promote membership at meetings and events, including membership upgrades and service opportunities within the sectional, regional, and national communities of the AIAA.



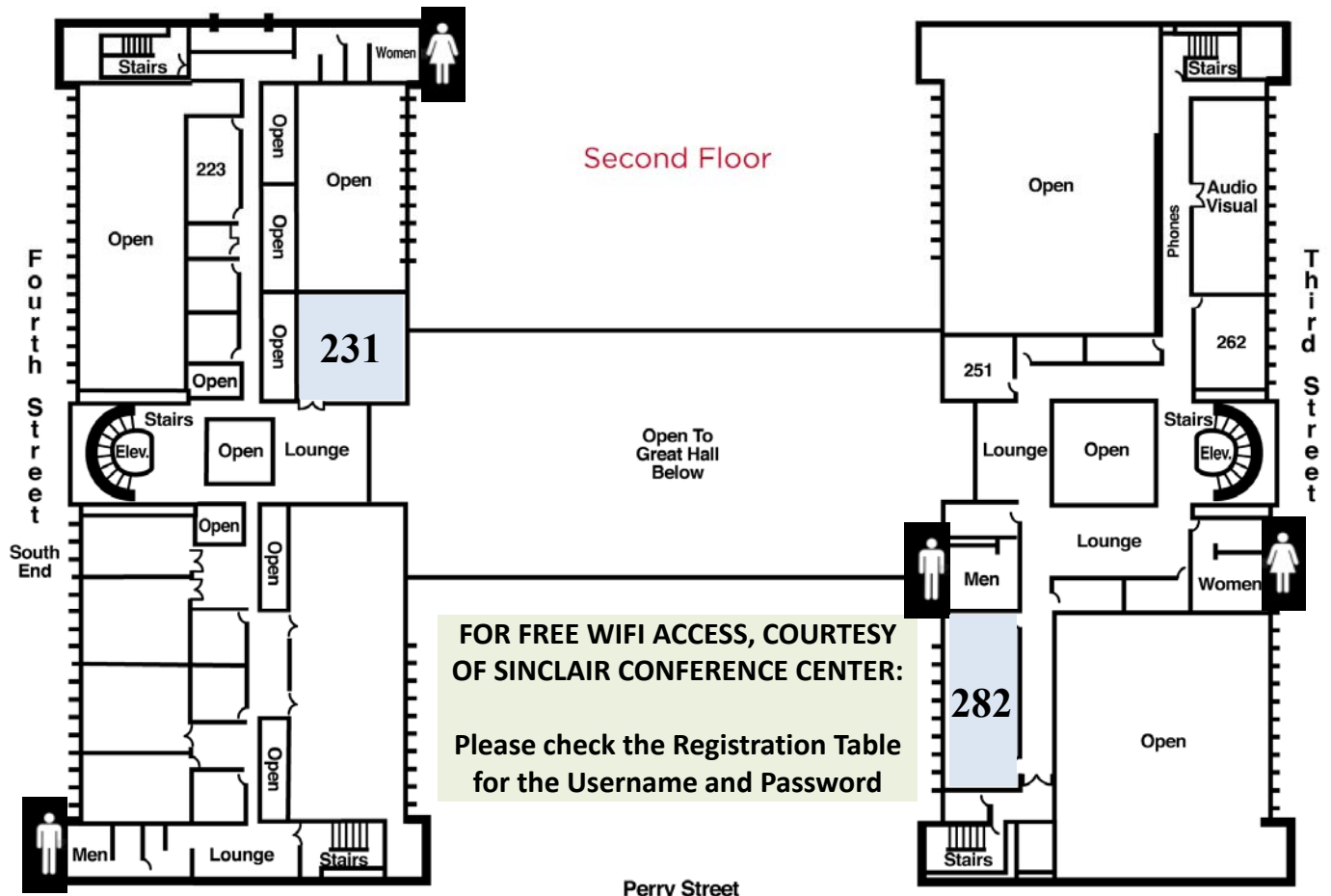
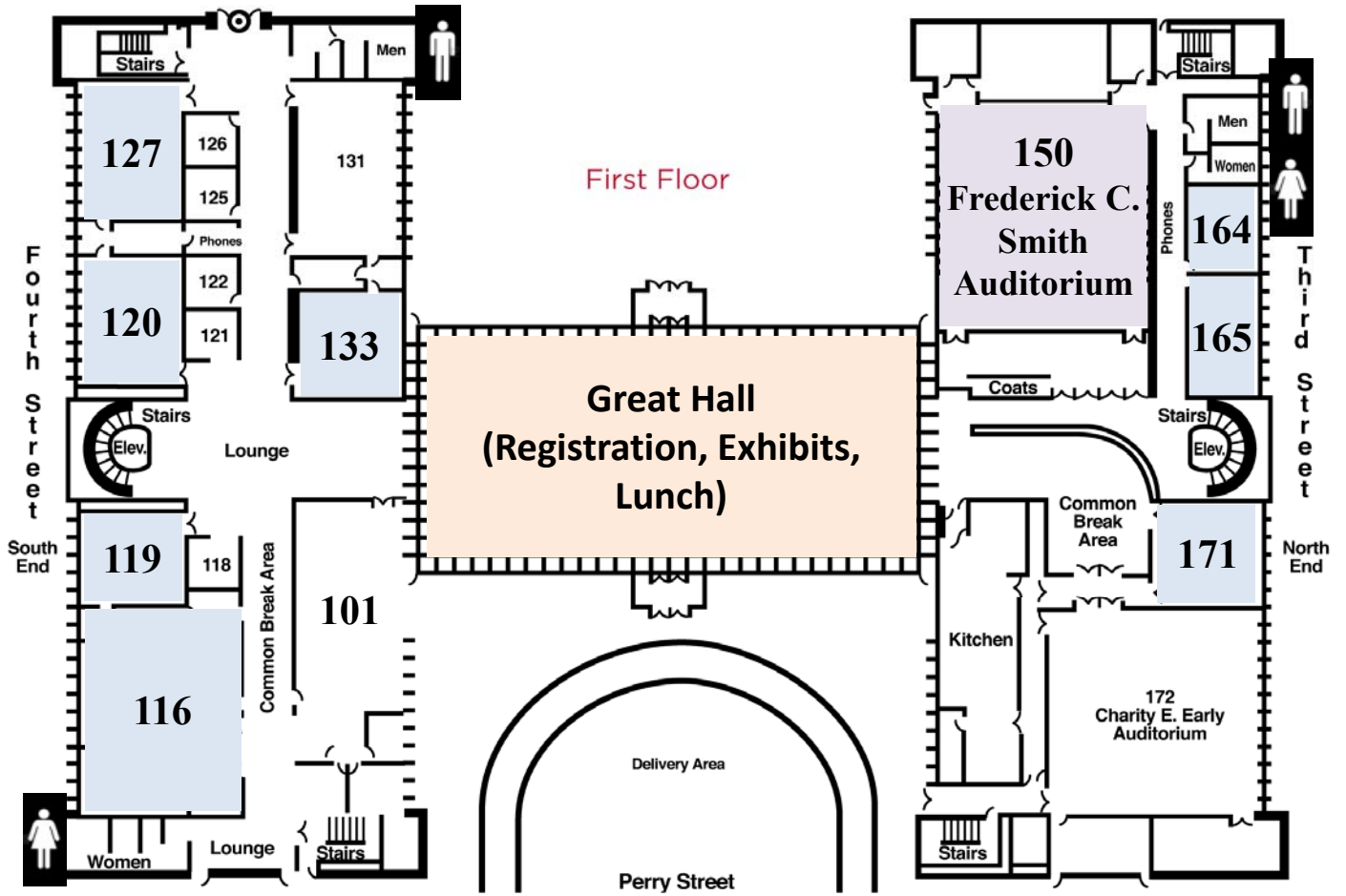
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Public Policy Chairs	Oliver Leembruggen Jayesh Mehta	Sumaria Systems	937-656-8502	Keep the section informed on AIAA, governmental, and public policy issues from all levels that are important to the aerospace community.
Young Professional Chair	Available			Represent the interests and concerns of our future leaders.
STEM K-12 Outreach	Jose Camberos	AFRL	937-713-7055	Advocate the aerospace profession to youth by organizing innovative education activities in the name of AIAA.
Education Chair	Aaron Altman	University of Dayton		Advocated the aerospace profession and membership in the society to our student members.
Technical Committee Coordinator	Available			Coordinates Technical Committee activities with the section
Historian	Marc Polanka	AFIT/ENY	937-255-3636 x4714	Provides historical perspective on Section plans and maintains documentation on Section activity for historical file.
Career and Workforce Development Chair	Rob Mitchell	AFLCMC	937-904-4504	Promote programs for professional development, and keep the section informed of employment opportunities.
Affiliated Societies Delegate & Regional Representatives	Sivaram Gogineni	Spectral Energies	937-266-9570	Liaison between our section and the AIAA Regional Activities Council. Represent the section on Dayton Affiliated Societies Council.
Industry Focal Point	Available			Industry Focal Point
Social Media Outreach	Oliver Leembruggen	Sumaria Systems	937-656-8502	Focal point for providing session news and events through various social media outlets.

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