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- February History in Aviation
- February Technical Specialist Meeting
- STEM Corner
- January Dinner Meeting
- Upcoming events!

Calendar of Events
March 5: Technical Specialist Meeting: Developments in Advanced Materials - Opportunities and Challenges for Insertion in Aerospace Structures, KK Sankaran, PhD

March 21: Dinner Meeting: Vertical flight topic

April 21: Dinner Meeting: Public Policy topic

May 2: Dinner Meeting: Annual Honors and Awards Dinner, Orlando’s in Maryland Heights

February Technical Specialist Meeting
Technical Specialist Chair- John Schaefer
On February 5, 2018, Matt Glascock joined the St. Louis section to discuss his PhD research regarding the characterization of a novel green electric solid propellant for electric propulsion. Matt provided some excellent background information about chemistry and electrical engineering, which in turn led to his description of the electric mode of a dual-mode plasma thruster. His experimental results indicate improved performance (in terms of specific impulse) of the new propellant compared to existing electric propellants for similar thruster design. An optimized thruster using the new electric solid propellant may be useful for future cubesat applications. The meeting was attended by 14 people.

Aerospace Link of the Month
It would appear that there is light at the end of the tunnel for one of the most controversial corporate decisions in aviation history...and it is on a locomotive.


Image Courtesy of Bloomberg

Congressional Visit Day
Public Policy Chair- Frank Youkhana
The 2019 Congressional Visit Day will take place on Wednesday, March 20 in Washington, D.C. Brad Sexton and I will be representing the St. Louis Section (as well as the State of Missouri). We are reaching out to both House and Senate staffers to set up appointments to discuss key issues and recommendations related to the aerospace industry. The three overarching topics of discussion will be:
1) Funding Stability and Competitiveness
2) R&D and Innovation
3) Workforce Development and Enhancement

Look for a summary of the trip in the next newsletter.
History in Aviation: February

Historian- Colin Thiele

9 February 1963 – First flight of the Boeing 727.

9 February 1969 – The Boeing 747 has its first flight. The 747 “Jumbo Jet” began its storied 50-year history with Pan Am as the launch customer, and over the years has also come to be known as the “Queen of the Skies.”

17 February 1904 – The Wright brothers inspect the grounds of the upcoming World’s Fair in St. Louis, where the first Aeronautical Exposition occurred.

18 February 1977 – The Space Shuttle “Enterprise” gets a lift on the first flight of the converted Boeing 747 Space Shuttle Carrier.

20 February 1998 – A new time-to-height world speed record is set by US Air Force Major R. Smith by flying an F-15A to 30,000 m (98,425 feet) in 207.80 seconds.

22 February 1978 – Navstar-1 is launched, which is the first satellite in the Global Positioning System (GPS).
January Dinner Meeting: A First for the U.S. Navy & Boeing

The AIAA St. Louis section council and Boeing REACH co-sponsored the January dinner meeting at Ferguson Brewery with speaker John Harnagel, chief engineer for MQ-25. Providing essential support was Ashlee Erwin of MQ-25 Communications.

The event was a great success, drawing a crowd of over 60 people AIAA members, REACH Members, students and guests. John covered the background of the unmanned vehicle, its unique mission capabilities and presented on some of the ground testing already performed on the program. The Question & Answer session was especially entertaining, with the attendees gently pushing the boundary of what vehicle characteristics and capabilities John was allowed to acknowledge.

The section greatly appreciated John and the MQ-25’s team support of the event and we look forward to having him back soon—perhaps after first flight!

Membership Report
Nic Moffitt – Membership Chair

The section membership is holding at 529 members. The distribution breaks down as shown in the table below and pie chart:

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New AIAA e-Membership

AIAA is offering a new e-Membership that may be of interest to your engineer and scientist colleagues. An e-Membership is a free one-year membership available to anyone who has a professional degree in sciences or engineer and has never been an AIAA member (student, professional, or otherwise). During the one-year e-Membership, the member receives the international aerospace news in AIAA Daily Launch emails and online access to the monthly Aerospace America magazine. An e-Member also has access to AIAA Engage, Career Center, and discounts on live DirectTech webinars. All e-Members are also included on the St Louis Section roster and receive advertisements for local meetings and our local newsletter. The new e-Membership can be used to introduce your colleagues to AIAA without having to convince them to pay dues for the first year. After the trial year is over, they can continue their membership at the standard dues rate. The e-Membership allows a non-member free, electronic access to AIAA before deciding.
AIAA St Louis Section on Boeing inSite

If you have Boeing colleagues who are thinking about joining AIAA or want to get engaged locally, we have a Boeing inSite page for the St Louis Section of AIAA. This inSite group was created to give all Boeing employees limited access to the St Louis Section. We distribute advertisements for all Dinner meetings and Technical Specialist meetings to the inSite group. This is a good way to encourage a Boeing colleague to get involved in AIAA locally and who have stopped being active within the Section.

Making a change?
Are you graduating and moving? Planning to retire soon? Making a career move? If you are leaving the St. Louis Section area, please update your AIAA profile, so you will continue to receive accurate AIAA correspondence.

Go to "My AIAA" http://www.aiaa.org/myAIAA and, upon logging in, go to "My Account" and select "Edit Contact Info."

Have Ideas for Programs?
The St. Louis AIAA council organizes a wide range of events including dinner meetings, technical specialist presentations, outreach events, and other STEM activities. To provide its members with the most stimulating and educational programs, all members are encouraged to propose topics, speakers, or other event ideas they might have to the council. We are always looking for new and fun ideas for programs and events so suggestions are welcome and appreciated! If you have any ideas or would like to become more involved, please contact either our Programs Chair Bob Dowgwillo or Council Chairman, Thomas Rehmeier.
Overview

As Pi-Day (March 14) approaches, get your future engineers and scientists excited about $\pi$ in the sky. As a celestial body passes between the Earth and the Sun, that body blocks some of the light passing to the Earth. The shadow may be small or unnoticed by the casual observer, in the case of a Mercury or Venus transit. The shadow can block out the entire Sun over a portion of the Earth, in the case of a solar eclipse. We will look at both instances and use the mathematics of $\pi$ to explore our Solar System.

Mercury Transit

When Mercury or Venus passes between the Earth and the Sun, a decrease in the amount of solar energy that reaches the Earth. The percent loss in solar energy can be calculated using:

$$B\% = 100 \left( \frac{\pi r^2}{\pi R^2} \right)$$

where $B$ is the percentage drop in brightness from the Sun, $r$ is the radius of the planet as it appears from Earth, and $R$ is the radius of the Sun as it appears from the Earth. What percentage less energy reaches Earth when Mercury ($r = 12$ arcseconds) transits the Sun ($R = 1909$ arcseconds)? If 1360.8 W/m$^2$ of solar energy reaches the top of the Earth's atmosphere, how much less energy reaches the Earth during a Mercury transit.

In the Shadow of the Moon

During the total solar eclipse on August 21, 2017, the Moon created a cone-shaped shadow. The base of the cone has a radius equal to the radius of the Moon (1738 km) and a length to its vertex of 377,700 km. The closest distance between the Earth and Moon during the solar eclipse was 372,027 km. How big was the shadow of the moon on the surface of the Earth (radius = 6,378 km)? Hint: Use the ratio of triangles to determine the radius of the shadow on the Earth.

References and Solutions

This page was adapted from the originals on the NASA JPL website, which has handouts with much better graphics. See the NASA JPL website for more information, on Mercury transit and its solution, Shadow of the Moon and its solution, and other ideas for home or classroom demonstrations. The pictures were taken from websites about the Mercury in transit and solar eclipse. The JPL website has several other math problem from the 2016 and 2017 Pi-in-the-Sky events.
# St. Louis Section Council

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*The Boeing Company, P.O. Box 516, St. Louis MO 63166

If you are interested in joining one of the committees, please contact Chair Thomas Rehmeier or the committee chairperson.
Tuesday, March 5, 2019
Boeing Bldg. 100 Briefing Center
6300 James S. McDonnell Blvd
Berkeley, MO 63134

Developments in Advanced Materials
Opportunities and Challenges for Insertion in Aerospace Structures

Presented by Dr. Krishnan K Sankaran, Retired Boeing Senior Technical Fellow

Materials have played an enabling role in advancing technologies throughout history. For aerospace structures, advances in materials and manufacturing techniques have kept pace with the evolving requirements for improved performance and reductions in cost and environmental impact. Using examples from commercial airplanes and aerospace systems, the presentation will link the historic development of materials with the evolving requirements for aerospace structures. The increasing use and dominance of composite materials, the promise of additive manufacturing and the opportunities to apply computational modeling grounded in the Materials Genome Initiative will also be discussed.

Krishnan K Sankaran (Ph.D. metallurgical engineering, MIT, 1978) is an adjunct professor of materials science and engineering at the University of North Texas in Denton. He retired as a Boeing Senior Technical Fellow in 2014. His expertise is in metallic materials, processes and related technologies encompassing areas germane to aerospace products through their conception, design, manufacture, service and retirement. He has four patents and has published a book titled “Metallurgy and Design of Alloys with Hierarchical Microstructures” (Elsevier, 2017). He is a member ASM, TMS and AIAA and was elected Fellow of the Academy of Science of STL in 2007.

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Reservation by **10 AM Friday, March 1**
Send reservation by email*: sliaiaa@gmail.com
Contact **John Schaefer** for questions
* In email, please include name, # tickets, and # non-Boeing employees
Wednesday, March 27, 2019
O’Fallon Brewery
45 Progress Pkwy,
Maryland Heights, MO 63043

Young Professionals 2019 Kick-Off Social

Learn how to get involved with AIAA YP and other committees!

Network with aerospace professionals in the St Louis region!

Come network with other young aerospace professionals in the St Louis region at O’Fallon Brewery! This event will be the kick-off event for 2019 with remaining events for the year still being planned out. A perfect time to provide inputs into future events you would like to see!

Students and non-AIAA members welcome – bring a friend!

Provide inputs to future YP events!

Schedule
4:00-7:00 Social/ Networking

Menu
Light Appetizers

Tickets
Free

Reservation by 12 noon Wednesday, March 20
Send reservation by email*: stlaiiaa@gmail.com
Contact Steve Clark for questions
* In email, please include name and # tickets
RSVP’s appreciated, but not required