



In this Issue...

- Chair Chat
 - Membership Report
 - History in Aviation: November & December
 - Section Survey Results
 - Aerospace Link of the Month
 - STEM Corner
 - October Dinner Meeting
 - Upcoming Events
 - AIAA St. Louis Council Members
-

Chair Chat

St. Louis Section Chair – Mark Kammeyer



When I went to college, I decided to major in aerospace engineering because I liked airplanes. I didn't really know what "engineering" meant, but I liked the sound of "aerospace". I knew there were other engineering disciplines. Electrical or chemical engineering had some appeal, I suppose, but civil? Industrial? To me they sounded boring. So I started in on the curriculum. After three semesters I finally got a course about airplanes, and I was hooked. Eventually I finished school and got a job in the aerospace industry, where I discovered that aerospace encompasses all of the engineering disciplines, and is on the leading edge of many. We have all heard of the "space dividend"; that's aerospace, that's us, that's AIAA.

Over time I came to realize that there is a lot of good and interesting engineering being practiced outside of aerospace. My daughter is a mechanical engineer, and as a student she had two internships in the food industry. Her first job was with Cargill, in packaging at a vegetable oil plant. I must admit that I hoped she wouldn't be bored out of her mind. But my prejudices were dispelled by the excitement in her voice when she telephoned after her first day and described the mechanical systems and automation of the line that bottled, capped, boxed, and shrink-wrapped vegetable oil in unbelievable quantities. Her second job was at a Frito Lay plant. Did you know that each potato chip is scanned by a camera as it flies out of the oven, to see if it is burned? If it looks suspicious, a puff of air knocks it out of the stream and routes it back for a second look! Only after it has failed the test twice is it rejected. I don't know what impresses me more, the mechanics and pneumatics of the line, the computer programming of the image processing, or the fact that it is economical to go to all of that trouble for one potato chip. Aerospace does not have a monopoly on interesting engineering problems that are important to society.

We saw another example of great non-aerospace engineering at our September technical specialist event. Christian Tabor of BAF discussed large diameter ceiling fans**. His company may have a catchy name and a clever logo, but his presentation showed that BAF takes their motto of "Exceptionally Engineered" very seriously. Mr. Tabor

** A "large diameter" fan has a diameter over seven feet.

touched on an array of engineering disciplines, from heat transfer and automatic controls to human factors and safety. Their use of computational fluid dynamics to visualize air flows in industrial and office spaces was every bit as flashy as the CFD we see in Aviation Week or Aerospace America. At the end of the presentation, Mr. Tabor showed how BAF couples their expertise in airflow with ultraviolet purification systems to disinfect airborne pathogens. It was a great talk, and another case of our aerospace profession making an impact on society. And it was brought to you by your friendly St. Louis Section technical programs chair, John Schaefer. Thanks, John.

Mark Kammeyer

Membership Report

Alex Friedman – Membership Chair

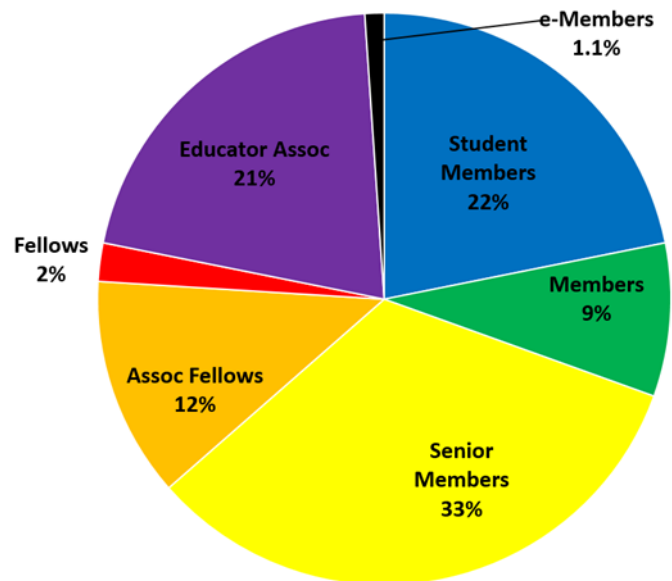
The Section membership is at 555 members. The distribution breaks down as shown in the table below and the pie chart at the right.

Type	Number
Professional	319
Student	121
Educator Associate	115

If you want to help someone get connected with AIAA events in St Louis, please pass along a couple of social media groups related to our St. Louis Section. We advertise our events on Facebook through the group “[I Fly St Louis](#)” and through the Boeing inSite group “[AIAA – St Louis Section](#)”. Both of these groups are free to join and do not require AIAA membership.

Please feel free to forward any membership questions to [Alex Friedman](#).

The next recruiting event will be on Zoom, and will be scheduled for next year.



History in Aviation: November & December

Historian - Colin Thiele

10 November 1988



After many years of public speculation of the US Air Force having a stealth fighter aircraft, officials revealed

photos along with some basic details of the F-117 “Nighthawk” stealth fighter in a Pentagon press briefing.

20 November 1963



The US Air Force accepts its first two McDonnell Douglas F-4C *Phantom II* jet fighters. Defense Secretary Robert McNamara wanted a

unified fighter jet for all branches, choosing the F-4 and designating the F-4B for the Navy and F-4C the Air Force.

28 November 1995

A McDonnell Douglas MD-11 lands without the need for a pilot to manipulate the flight controls by using only engine



power for control. This becomes the first airliner to complete an automated landing using only engine control. The Propulsion Controlled Aircraft design was initially sketched on a TWA napkin by NASA Dryden Engineer, Bill Burcham, on a flight to St. Louis in the early 1990s.

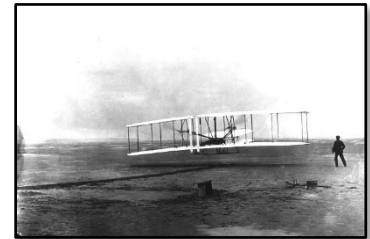
1 December 2001

TWA flight 220 is the ceremonial last flight of TWA. The flight was from Kansas City to St. Louis, with CEO Captain William Compton at the controls of a MD-80.

17 December 1903

Orville and Wilbur Wright became the first to demonstrate that sustained flight of a heavier-than-air aircraft under control of a pilot is possible.

Orville piloted the first flight for a time of 12 seconds and covered a distance of 120 feet.



Christmas Eve 1968



The crew of Apollo 8, Frank Borman, Jim Lovell and Bill Anders enter into orbit around the Moon, becoming the first humans to do so. This was televised on what is famously referred to

as *The Christmas Eve Broadcast to Earth*.

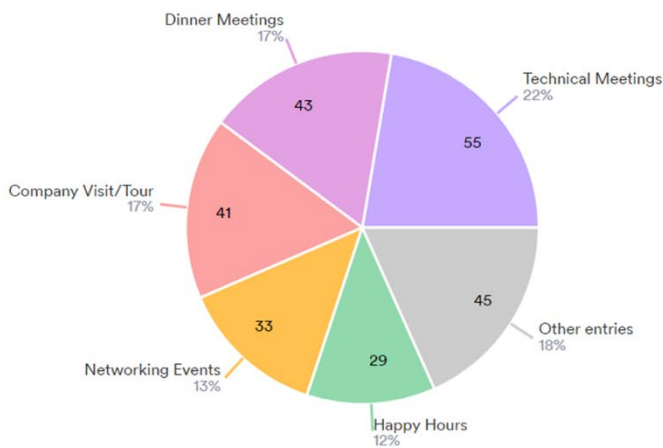
AIAA St. Louis Section Survey Results

Jim Guglielmo

Thank you to everyone that completed our 2020 AIAA St. Louis Section Survey. Out of our 554 person membership, the response rate was 70, or about 13%. While lower than expected for our initial survey, it still provided some good insights and some excellent feedback for how we can better serve our membership. Some of the results are highlighted below. We plan to have additional surveys in the future, so if you missed out, there will be additional opportunities. You can always email our Section Chair, Mark Kammeyer, at any time with feedback and suggestions as well. The results are also on our [Section Engage Website Library](#).

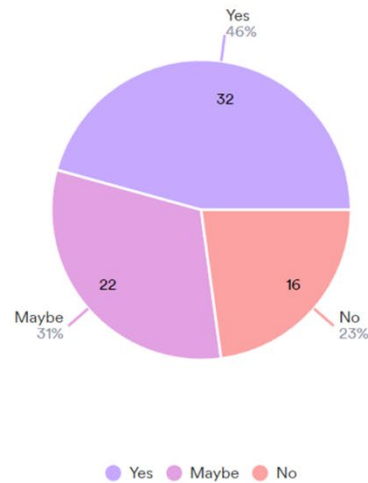
Outside of the COVID-19 environment, what types of activities are you be most interested in attending? (Select all that apply)

246 Responses



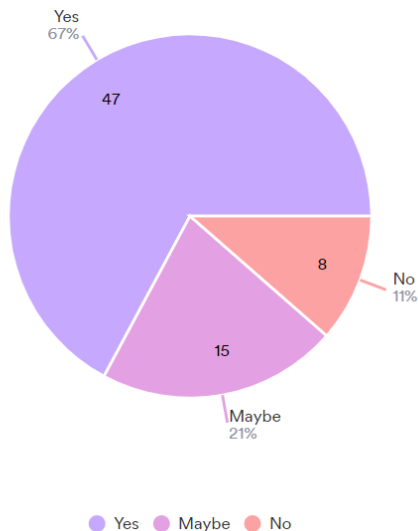
Given the current COVID-19 environment, would you be willing to attend an in-person event (such as a Dinner meeting) if CDC-recommended guidelines were followed?

70 Responses



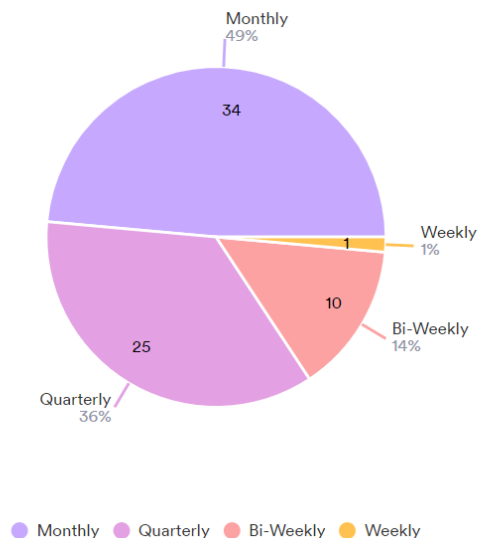
Are you interested in attending virtual events?

70 Responses



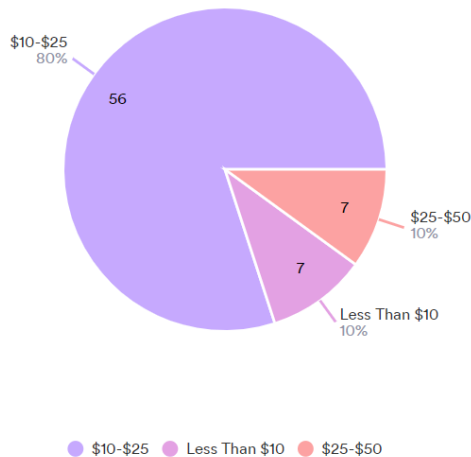
On average, how frequently would you attend AIAA events if they were available?

70 Responses



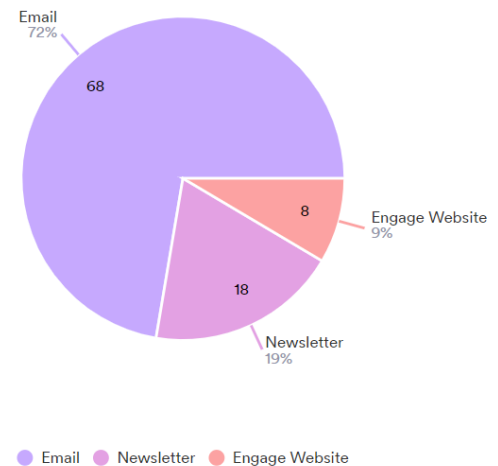
What would you consider a reasonable cost to attend a typical AIAA event?

70 Responses



How do you prefer to receive communications about AIAA St. Louis Section events? (Select all that apply)

94 Responses



Aerospace Link of the Month

The shape of Things to Come: Boeing Completes Successful In-Flight Demonstration of Autonomous Teaming Operation of Five Aircraft.

<https://boeing.mediaroom.com/news-releases-statements?item=130777>

Boeing recently completed flight tests with five high-performance surrogate jets operating autonomously in a team at the new Queensland Flight Test Range in Cloncurry, Australia.

Boeing's advanced autonomy technology, including on-board command and control and data sharing capabilities, were tested using the 3.4-meter (11-foot) aircraft.

"The tests demonstrated our success in applying artificial intelligence algorithms to 'teach' the aircraft's brain to understand what is required of it," said Emily Hughes, director of Phantom Works International. "The data link capabilities enabled the aircraft to communicate with the other platforms so that they could collaborate to achieve a mission."

Testing lasted 10 days, with aircraft incrementally added until the five operated together. During testing, the aircraft reached speeds of 270 kilometers (167 miles) per hour.

Technology and capabilities proven under this program will form part of the Boeing Airpower Teaming System and future Boeing autonomous platforms.



STEM Corner – Design Challenge

STEM Chair- Jackie Blumer

Interested in doing a STEM Engineering Design Challenge with your children, grandchildren, and other young loved ones? We will be holding a fall challenge for students in grades K-12. The challenge will be to build a candy desktop catapult from common household items. The performance of the catapult will need to be proven by video submission, and prizes will be awarded. If you are interested in participating please fill out the following [Jotform](#).

The challenge is for children as individuals (no teams), but a single AIAA member may sponsor multiple child's submissions. The event started on October 11th, when the official challenge details were sent, and the final submission will be due on January 1st. The winner will be announced after judging in mid-January 2021.

JotForm Submittal Link: <https://form.jotform.com/202886380070152>

STEM Corner – Activity

Build and Launch a Foam Rocket

STEM Chair- Jackie Blumer

Overview: Students will construct rockets made from pipe insulating foam and use them to investigate the trajectory relationship between launch angle and range in a controlled investigation.

Background: The foam rocket flies ballistically. It receives its entire thrust from the force produced by the elastic rubber band. The rubber band is stretched. When the rocket is released, the rubber band quickly returns to its original length, launching the foam rocket in the process. Technically, the foam rocket is a rocket in appearance only. The thrust of real rockets typically continues for several seconds or minutes, causing continuous acceleration, until propellants are exhausted. The foam rocket gets a quick pull and then coasts. Furthermore, the mass of the foam rocket doesn't change in flight. Real rockets consume propellants and their total mass diminishes. Nevertheless, the flight of a foam rocket is similar to that of real rockets. Its motion and course are affected by gravity and by drag or friction with the atmosphere. The ability to fly foam rockets repeatedly (without refueling) makes them ideal for classroom investigations on rocket motion.

NASA Link: <https://www.jpl.nasa.gov/edu/teach/activity/foam-rocket/>



Hypersonics Kicks off the 2020-21 "Dinner" Meeting Season

Program Chair – Bob Dowgwillo

There was no dinner, drinks, or socializing, but the October "Dinner" Meeting still provided an entertaining and informative update about the world of hypersonic flight. This was the Section's first attempt at hosting the dinner meeting format via ZOOM. To our great surprise, over 100 people signed up, making it the largest registration for a section event in memory. By the end of the comprehensive question and answer session, over 40 guests were still logged on. And all this for FREE!

Our program, "Flying at the edge of space: The challenges and opportunities of hypersonic flight", was presented by Boeing's own Dr. Kevin Bowcutt. Kevin brought a lifetime of hypersonics experience, and is an AIAA Fellow, Boeing Senior Technical Fellow, *and* a Fellow of the Royal Aeronautical Society.

Kevin had been scheduled for a dinner meeting this past spring. However, the program was cancelled due to COVID 19 concerns and restrictions. A lot of work went into re-inventing the format to meet everyone's expectations and constraints.

The highlight of the presentation was Kevin's review of the burgeoning international hypersonics vehicle programs. While the many efforts of the People's Republic of China were expected, we learned that developing countries like Turkey and India also have vehicle programs.

The winner of our attendance prize was Charles "Chuck" Ford. Chuck received a copy of the AIAA book *Eleven Seconds Into the Unknown: A History of the Hyper-X Program*, which describes the history of the X-43 vehicle. On receiving the prize, Chuck related that he had worked with Kevin back in the days of NASP, the National AeroSpace Plane. Back then, he was a propulsion engineer with McDonnell Douglas while Kevin worked for Rockwell. They worked most closely after the government brought all the contractors together and served together on a Performance Tiger Team in Palmdale, California for about 6 months. Aerospace is a big little town!



Dr. Kevin Bowcutt



Artist Conception of a Boeing Hyperliner Configuration

Upcoming Events

Program Chair – Bob Dowgwillo, Technical Specialist Chair – John Schaefer

Date	Topic
Tuesday, 08 December	Technical Specialist Meeting (Virtual) Frank Alex Kalany, ME/AE M.S. Student at Missouri S&T <i>"Digital Reduction of Shock Tube Data"</i>
Thursday, 10 December	Dinner Meeting (Virtual) Annual Member Appreciation Night Don Bingaman & Christian Rice, VPE Aerospace Consulting <i>"Combating Climate Change with the SAIL-01 Aircraft"</i>
Thursday, 15 January	Dinner Meeting (Virtual) Annual AIAA/REACH Meeting Paul Dees, Boeing Commercial Aircraft <i>"Aircraft Design and Career Learnings from Mach 0.024 to 2.4"</i>

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."

AIAA St. Louis Section Website & Twitter Account

Please see the AIAA St. Louis Section website for more information about upcoming events, announcements, and discussions: <https://engage.aiaa.org/stlouis/home>

The AIAA St. Louis Section now has a Twitter account! Please follow us at [@StLAIAA](https://twitter.com/StLAIAA)

AIAA St. Louis Section Council

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Young Professionals	Stephen Clark	314-545-9509	stephen.f.clark3@boeing.com

If you are interested in joining one of the committees, please contact the AIAA St. Louis Section Chair, Mark Kammeyer, or the committee chairperson.



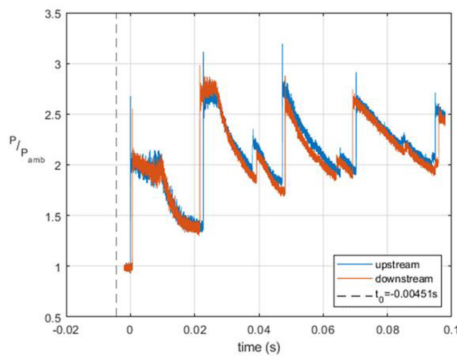
American Institute of Aeronautics and Astronautics
St. Louis Section

Tuesday, December 8, 2020

Virtual Zoom Meeting
Meeting login information will be
distributed via email

Digital Reduction of Shock Tube Data

Presented by Frank Alex Kalany, ME/AE M.S. Student at Missouri S&T



Unsteady high frequency pressure data obtained in the Missouri S&T MAE department's shock tube is reduced using methods that can be applied to multiple reflected shock and expansion waves. Reduction is performed in MATLAB, however methods can be applied to general languages. The method allows the user to obtain shockwave speeds with respect to the laboratory and the pressure ratio across these waves. Potential methods of finding speed and strength of reflected expansion waves are also discussed, with an eye towards the limitations of

the current methodology. In addition to the specifics of the algorithm, a general background on shock tubes is given, as well as discussion of inviscid 1D mathematical modeling techniques.

Frank Alexander Kalany will be graduating from the Missouri University of Science and Technology in December with a Master's of Science degree in Mechanical Engineering. During his time at S&T he co-authored "Digital Data Processing Method for Shock Tubes" with Dr. K. M. Isaac, which received best Master's category paper at the AIAA Region V Student Paper Competition in April of this year. Frank will be presenting this paper in the International Student Paper Competition at AIAA SciTech in January. Frank looks forward to starting his lifelong career in aerospace in 2021.

Schedule

6:00 – 7:00 CT Presentation
7:00 – 7:30 CT Additional questions or
follow-on conversations

Menu

None – all virtual
for Fall 2020!

Ticket Price

Free

Please RSVP by completing our Jotform

<https://form.jotform.com/203354204080139>

Contact [John Schaefer](#) for questions

MISSOURI S&T





10th AIAA Member Appreciation Night

Please join the St Louis Section as we recognize the membership anniversaries of many of our longtime AIAA colleagues. Come and show your appreciation for these members who have been with AIAA for 25, 30, ...45, and even 60+ years. We will also recognize those Section members who have been elected to the Class of 2020 AIAA Fellows and 2021 Associate Fellows.

December 10, 2020

Virtual Event

Presentation:

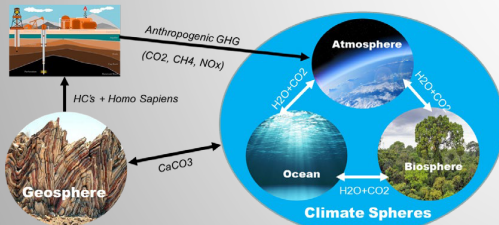
'Combating Climate Change with the SAIL-01 Aircraft'

With Don Bingaman & Christian Rice, VPE Aerospace Consulting

Addressing a topic of wide interest, our program will discuss a new conceptual aircraft designed to provide Stratospheric Aerosol Injection (SAI) for the purpose of altering the Earth's thermodynamic energy balance to offset a portion of anthropogenic global warming. Aircraft design characteristics will illustrate the challenges associated with the lofting and distribution of up to 15 tons of sulfate or calcite aerosol particulates per sortie at 20 Km (~65,000 ft.). Aircraft aerodynamic, propulsion, structural and subsystem concepts and analyses will be presented to validate the aircraft conceptual design. A program plan, schedule and development cost estimate will identify the resources required to field a SAIL aircraft



Mr. Bingaman formed VPE Aerospace Consulting LLC in 2017 to supply engineering and technology investment consulting services to customers in industry, government and academia. Consulting is currently being provided to GE Aviation on combat aircraft design, and to the Harvard University Center for the Environment on new geo-engineering approaches to address anthropogenic global warming. Mr. Bingaman retired from his position as Boeing Directory – Chief Engineer, Phantom Works on December 1, 2016, after 40 years of service. He successfully led the technical effort for an important DoD innovation initiative and served as Director of the Boeing Survivability Design and Integration (SDI) Center of Excellence.



Mr. Rice graduated the Polytechnic Institute of New York in 1976 with an MS in Aerospace Engineering. In 40 years working for both McDonnell Douglas and Boeing, Mr. Rice worked in all TACAIR programs including F-15, AV8B, and F/A-18. In 2000, he became the Department Head for Structural Design. After that assignment, he worked the remainder of his career in Advanced Design on a variety of programs in Leadership positions.

Schedule

Thursday, December 10, 2020

7:00 pm – Greeting, Member Appreciation Program

7:18 pm – Presentation and Q&A

8:48 pm – Adjourn

Where

Online via
ZOOM

Cost

FREE

Membership is NOT required to attend this event. All are Welcome ☺



Given the virtual nature of our meeting, Please use this link to either make a monetary donation or to locate a toy drop-off near you. <https://bridgeton-mo.toysfortots.org/>



Register by 12 noon, December 10th
Use QR code or Use link below:

<https://form.jotform.com/203285946912159>

