

Gateway News



American Institute of Aeronautics and Astronautics, St. Louis Section

<http://www.aiaa.org>

<http://www.me.wustl.edu/ME/orgs/aiaastl/>

NOVEMBER 2000

CHAIRPERSON'S REMARKS

INSIDE THE SECTION

Since Thanksgiving is right around the corner, it is appropriate to reflect on the many things for which we are thankful. I hope you also include your AIAA membership as one of those things. In our fast paced world it is easy to take much for granted. In fact that is the very point for being thankful for the AIAA. As long as we continue to support this organization, we can take it for granted that AIAA, the premier aerospace technical society, will continue to provide the extensive list of services (i.e. Career Opportunities, Conferences, Professional Development Courses, Journals, Textbooks, Workshops, etc.) that we use throughout our careers. When you stop and think about it, the AIAA makes it easy to stay current in a constantly changing, challenging, and rewarding profession.

Congratulations to Thomas Mroczkowski, the recipient of our first Young Professional Award this year. The award was presented at the October Dinner Meeting in recogni-

tion of excellent technical contributions to evolving low observable technology within The Boeing Company - St. Louis.

Our programs are currently defined through January 2001, and planning for the rest of the year is well underway. Let us know if there are any specific Technical Specialist or Dinner Meeting topics which you would like to see presented in February - May 2001.

One of our upcoming activities, relative to the Evolution of Flight Campaign, is an Aerospace Trivia Night to be held in March 2001. Consider joining the fun as an individual or get a team together.

Included in this issue is the current list of Technical Committee members in the St. Louis Section. Please consider supporting one of the Committees by contacting the member and offering your assistance.

Larry Brase

TECHNOLOGY MEETING



A joint AIAA, INCOSE, & Parks College Technical Tour of the Boeing Flight Simulator took place November 1st. About 60+ people attended the tour which featured a video, explanations, and demonstrations of various Boeing fighter cockpits. Individuals had the opportunity to fly the dome simulators for F-18 E/F & F-18 C/D in air-to-air, air-to-ground, or carrier cat & trap.

In addition, a reconfigurable cockpit was available for F-15 flight and demonstrations of pilot eye tracking and evolution of cockpits. Special thanks to the Flight Simulation volunteers that made for a memorable evening.



October Evening Meeting

Our monthly dinner meeting addressed Life Cycle Customer Support (LCCS). Mr. Jay Kappmeier, General Manager of LCCS at Boeing briefed the gathering on the concept. An aerospace product and its' development costs the customer approximately 30% of the budget. However, maintaining the delivered product amounts to 70% of the budget. This division of cost is eating up funds that could be applied to modernization. To relieve this funding pressure, improve readiness, and gain a new market; Boeing has developed LCCS.



LCCS provides the customer a single point accountability, risk sharing, performance contracting, and rapid delivery of capability. Boeing provides;


- Supply chain management
- Maintenance, mods & overhauls
- Information management
- Sustaining engineering and logistics
- Quick part availability

Customers gains;

- Performance based contracting
- A program champion
- Favorable policies and regulations

LCCS was institute on the C-17 and has achieved a 96% departure rate and mission capability of 85%. The T-45TS program is a LCCS program that provides all aircraft maintenance, except flying. The program has reduced flight hour costs 39%, saved on engine repair, and increased efficiency with an Inventory Control Hub.

Future applications of LCCS will be the F/A-18 E/F & V-22. These programs will target technology improvements throughout the product life and save the customer huge costs in manpower and inventory.





International Space Station: The World's Project

Dr. Sandra H. Magnus
NASA Astronaut - Mission Specialist

This Joint Society Dinner Meeting at Planet Hollywood, November 21, will feature Dr. Sandra H. Magnus, NASA Astronaut and Mission Specialist. Dr. Magnus is from the St. Louis area, graduating from Belleville West High School in Belleville, Illinois. She received her bachelors and masters degrees from the University of Missouri-Rolla. After working for several years at McDonnell Douglas Aircraft, she went on to receive her doctorate from the Georgia Institute of Technology in 1996. That same year, Dr. Magnus joined NASA.

**Joint Society
(AIChE,
ASME, AIAA,
SAE, SWE)
Dinner
Meeting
Tuesday
November 21,
2000
Planet Hollywood
Laclede's
Landing**






Dinner Menu

Menu

- Choice of
Chicken/Beef/Pasta
- Dinner Salad
- Vegetable
- Dessert
- Non-Alcoholic Drink

Social Hour 5:00-6:00 pm
Dinner 6:00-7:30 pm
Program 7:30 - ?

Ticket Prices

\$22.00 *Included Parking Fee*
 (Park in lot just south of restaurant and bring ticket in when registering)
 Please purchase tickets prior to Nov. 20

Ticket Sellers

John Mohr	567-3398	(Retirees and Public)
Mike Swartwout	935-6077	Washington University
Kay Bopp	977-8240	Parks College of St. Louis University
Fred Nelson	341-4613	University of Missouri-Rolla



Ground Demonstration of the Smart Inlet

Jim Dunne, Boeing Co., St. Louis, MO

AIAA 2000-1630

The emergence of smart structures makes variable geometry inlet systems possible to optimize military and commercial jet performance. Smart materials can provide variable inlet capture area through cowl rotation and lip deflection for optimal airflow ingestion. Another application might be variable lip blunting to minimize the drag associated with the inlet. This paper describes the application of smart materials to a full-scale Smart Inlet and subsequent ground tests in support of an upcoming wind-tunnel demonstration of this shape-changing inlet.

Numerical Simulation of F/A-18A/B/C/D Probabilistic Analysis of an Advanced Fighter/Attack Aircraft Composite Wing Structure

Herb Smith, Boeing Co., St. Louis, MO

AIAA 2000-1567



Probabilistic design methods are explored using an advanced fighter / attack aircraft to identify benefits over conventional deterministic structural design methods. Recently a composite fighter design was developed using advanced lightweight aircraft structure development program as a benchmark. The study employed key aspects of the wing structural design to assess the benefits of a probabilistic approach. Structural models of a post-buckled wing box lower cover with a local model of the co-bonded joint attaching the wing box cover to the wing spars. A severe maneuver load case is applied. Analysis was performed with the co-bonded joint modeled as an independent test structure and compared with experimental results. Probabilistic design study offers improvements to the current deterministic concepts applied to advanced lightweight aircraft composite wing design.

Limit Cycle Oscillations (LCO) and an Active Oscillation Controller (AOC)

Professor-Dr.-Ing. David Manor, P.E. Parks College of Engineering and Aviation, St. Louis, MO



This paper outlines the use of standard linear tools to develop a multi-input multi-output state space model that can be used to simulate LCO and consequently the design of a controller. A "closed loop" simulation was performed with a 16 Lb. LCO force providing the required lateral acceleration at the pilot seat. With the AOC actuated the response was decreased with the commanded aileron inputs from the AOC. The AOC was commanding an aileron deflection of ± 0.15 degrees. This predicted value of aileron deflection agreed very well with the actual value measured during flight testing of $\pm 0.2-0.4$ degrees. The simulated suppression qualitatively and quantitatively agreed with the flight test measured suppression.



PACKS (Parametric Composite Knowledge System) – An Affordable Structural Definition Process for Composites

Virginia Vasey-Glandon, Boeing Co., St. Louis, MO

AIAA 2000-1478

PACKS is an affordability initiative aimed at reducing costs for composite structural definition by 50 percent or better. A patented process and tool, PACKS, exceeded its goal by developing links to manufacturing early in the design cycle, eliminating redefinition. PACKS is currently deployed throughout the Boeing Corporation and available for licensed commercial use. PACKS can be applied to either military or commercial aircraft composite structural development and has achieved 60+ percent cost and cycle time reduction. Furthermore, this process and tool are robust & the techniques will be applicable to composite development in any industry. Information linkage within PACKS prevents cost shifting from design / analysis to manufacturing.

St. Louis Section Technical Committee Members

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Visit the AIAA Website: [HTTP://www.AIAA.org/](http://www.AIAA.org/)



Evolution of Flight

Do you think that Orville and Wilbur Wright imagined that in less than 100 years from their first flight, man would fly faster than sound? Airlines would span the globe and millions of passenger would travel to distant cities and lands? Man would walk on the moon or live in space?

AIAA is celebrating the advancements of aerospace since the Wright Brothers first flight December 17, 1903. "Evolution of Flight" is a series of activities and events directed toward youth, our future visionaries in the flight sciences. Activities will include guest speakers, museum tours, flight contests and more. To learn more about "Evolution of Flight" visit the AIAA website at <http://www.flight100.org/index.cfm>.

Over the next three years many volunteer opportunities for AIAA members will be available to organize or participate in fund-raisers, activities and events. A Trivia Night is currently being planned for March of 2001. If you are interested in participating in the "Evolution of Flight" program, please notify Karen Copper, 314-234-5742 or e-mail her at kkcopper@aol.com.

Interesting Web Sites

<http://www.spaceflight.com/news/>
Spaceflight news, astronomy, and science.

<http://www.bester.com/satpasses.html>
Satellite, shuttle, Mir, and international space station observation times and azimuth for various U.S. cities.

<http://www.johnstark.com/publs>
Discount engineering books for Boeing employees through the intranet

<http://www.spacefuture.com/vehicles/designs.shtml>
Early space vehicle concepts plus X-prize entries

<http://www.webcreations.com/ptm/apr/apr.htm>
Aerospace Projects Review: A Journal Devoted to the Untold Tales of Aerospacecraft Design.

Newsletter and meeting announcements late?? The St. Louis section is working to cost-effectively speed announcements to our members. If you have an external Boeing e-mail address, please forward that to : dianne.chong@boeing.com and david.e.morgan@boeing.com. We are compiling an e-mail list for timely meeting announcements.

New address?? Forward newsletter address corrections to; David E. Morgan, Boeing m/c S106-7250, 314-234-1919, david.e.morgan@boeing.com

American Institute of Aeronautics and Astronautics St. Louis Section 2000 - 2001 Council Roster

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November 2000

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Mark Johnson

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Walt Reschke

Charlie Saff

AIAA FUTURE EVENTS

JOINT MEETING

**“INTERNATIONAL SPACE STATION:
THE WORLD'S PROJECT”**

with Local Astronaut

Dr. Sandra H. Magnus

November 21, 2000

Planet Hollywood

on Laclede's Landing

6:00 pm until ??

AIAA Council Meeting

Monday, 4 December 2000

5:00 PM to 7:00 PM

