

Shuttle/Centaur G-Prime Dedication Ceremony

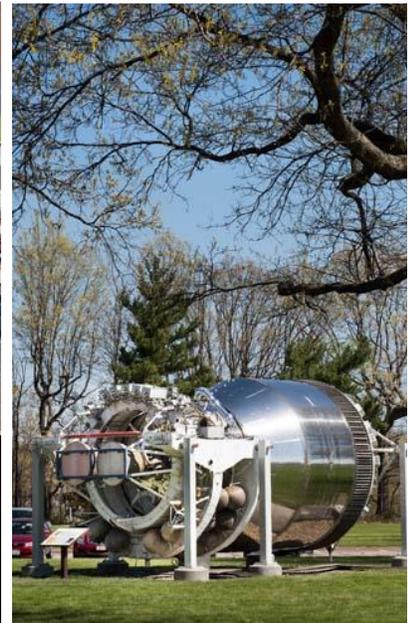
A Shuttle/Centaur G-Prime upper stage was recently relocated to the Glenn Research Center for public display. The upper stage was developed by GRC and the USAF in the 1980's and launched 16 times on the Titan IV booster. A dedication ceremony and ribbon cutting event was held on Friday May 6th. Center Director Janet Kavandi provided opening remarks. Guest speakers included former GRC Director Larry Ross, former USAF integration manager (now current GRC employee) Don Palac, and former Titan IV mission manager (now Vice Commander of 88th Air Base Wing) Colonel Elena Oberg from WPAFB. A standing room only audience included GRC retirees of the Shuttle/Centaur program, other VIP's, as well as current GRC staff from Shuttle/Centaur and the Titan IV/Centaur (G-Prime) launch of the Cassini mission to Saturn. Group photos were taken and a reception followed. *(Text and photos courtesy of Craig Williams)*



From left to right: Tom Hartline (Director of Facilities, GRC), Larry Ross (former GRC Director), Dr. Janet Kavandi (Director, GRC), Col. Elena Oberg (Vice Commander 88th Air Base Wing USAF), Craig H. Williams (aerospace engineer GRC).



Much of GRC's propulsion heritage is reflected in this Centaur, including designing, developing, and integrating the Centaur G-Prime upper stage for the Shuttle/Centaur Program, as well as eventually launching it as the upper stage on Titan IV for the Cassini mission to Saturn.



AIAA NOS Supports NASA Glenn's 75th Anniversary Open House Event

The NASA John H. Glenn Research Center at Lewis Field celebrated its 75th anniversary by opening its main campus to over 25,000 visitors on May 21 & 22, 2016. Attendees were able to tour NASA Glenn's world-class facilities, meet astronauts and talk with scientists, engineers and technicians working on the nation's premier space and aeronautics programs. The AIAA NOS contributed \$1,000 to help sponsored the event which was free of charge to the public. Additionally, many AIAA NOS members who are affiliated with NASA Glenn supported the event in roles large and small. Some of those members are shown in the pictures below. The successful event was well received by visitors, both young and old, and helped generate much public good will toward the Center, NASA, the AIAA, and the aerospace community.



NOS Vice Chair, Peggy Cornell, working at the NASA Aeronautics booth of the Glenn Open House.



Over 25,000 visitors visited NASA Glenn Research Center's many world-class facilities on May 21 & 22, 2016.

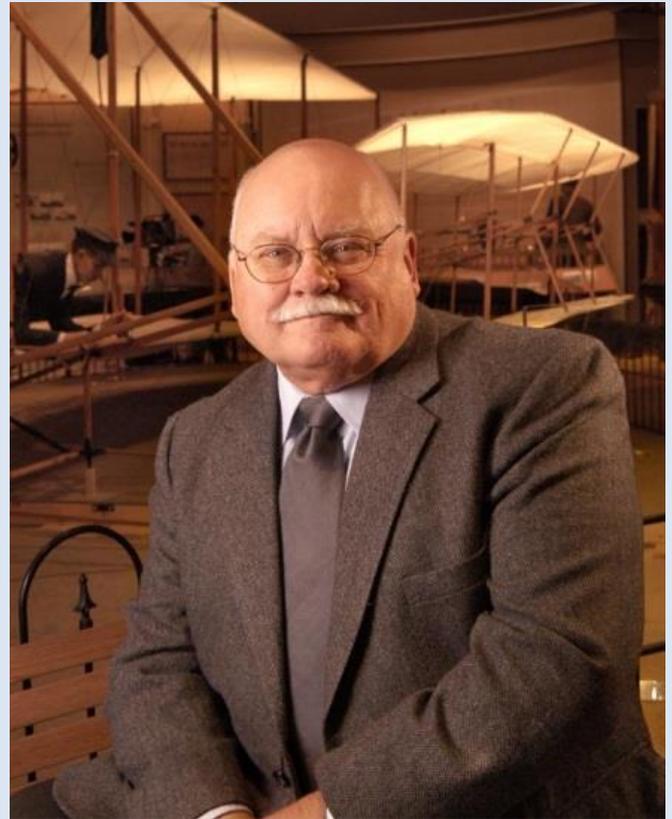
Smithsonian Historian Tom Crouch Presents Wright Brothers Lecture

Dr. Tom D. Crouch, senior curator of aeronautics at the National Air and Space Museum of the Smithsonian Institution and 2016 AIAA Distinguished Service Award recipient, was the featured speaker at the ASME History & Heritage and Awards Banquet on April 26, an event jointly sponsored by AIAA and ASME. Dr. Crouch spoke to 64 attendees, including 12 CSU students, on "Why Wilbur and Orville?" Starting with the Wright brothers' family background and their engineering processes, Crouch described what set them apart from other aeronautical experimenters of the time, and how this led them to identify and solve the technical problems that other experimenters scarcely realized existed. Dr. Crouch brought to life the excitement of the period with heavier-than-air machines. Following his lecture, Dr. Crouch entertained many questions from the audience, displaying the breadth of his knowledge of the Wright brothers and their engineering achievements.



Dr. Tom D. Crouch speaking to an audience of 64 attendees about Orville and Wilbur Wright's background and their engineering achievements.

Tom Crouch Selected to Receive 2016 AIAA Distinguished Service Award



The AIAA has selected Tom D. Crouch, senior curator of aeronautics at the National Air and Space Museum of the Smithsonian Institution, to receive the 2016 AIAA Distinguished Service Award in recognition of his leadership and efforts in promoting the public understanding of the history of AIAA and the aerospace achievements of its members. The AIAA Board of Directors established the Distinguished Service Award in 1968 to give unique recognition to an individual member of AIAA who has provided distinguished service to the Institute over a period of years.

Dr. Tom Crouch has strong ties to Ohio, having earned a Doctorate in American History from The Ohio State University. Prior to joining the Smithsonian in 1974, he was the director of education for the Ohio Historical Society and Director of the Ohio American Revolution Bicentennial Advisory Commission. He was appointed by President Clinton as Chairman of the First Flight Centennial Federal Advisory Board, where he helped organize the celebration of the first hundred years of powered flight. He also made

substantial contributions to AIAA's "Celebration of 100 Years of Flight" campaign as well. Crouch is the author or editor of fifteen books, including *The Bishop's Boys*, a work considered by most historians to be the definitive work on the Wright brothers.

The ASME History & Heritage and Awards Banquet was held at Cleveland State University's historic Fenn Tower, a fitting venue for the event. The evening began with a meet and greet where guests could mingle, followed by a buffet dinner and presentation of awards. ASME board member Ken Gregg presented plaques for outstanding mechanical engineering projects at the Northeast Ohio Science & Engineering Fair. Recipients included Daniel Kotrebai, who did a project on powering a LED with heat from the human hand, and Rahul Jagetia, who studied the effect of empennages on aircraft drag and efficiency. ASME's Garrett Morgan Scholarship was presented by board member Greg Orloff to Jordan Takumi Davis, a senior at the John Hay Cleveland School of Architecture and Design.

(Text and photos courtesy of ASME Cleveland Chapter)

John Shannon Talks Space Launch System Update

On Monday, April 11, 2016, the AIAA NOS partnered with the Ohio Aerospace Institute to present a distinguished lecture by John Shannon entitled, "Space Launch System Update." Shannon was named the Vice President and Program Manager in charge of Boeing's Space Launch System work on April 23, 2015. During the presentation, Shannon talked, somewhat informally, about the motivation for building the Space Launch System and the current development status of the core stage and interim cryo propulsion stage for EM-1. He also discussed some of the challenges associated with a trip to Mars, including the difficulty in supplying a mission that, using current technology. In Shannon's example, a successful human mission would take on the order of 32 months for a round trip. This includes 15 months in orbit around Mars or on the planet waiting for Earth and Mars to be correctly positioned for the return trip. Following his well-received presentation, Shannon fielded questions from the audience.



From left to right: Peggy Cornell (Vice-Chair, AIAA NOS), Tom Crouch, Ed Lewandowski (Chair, ASME Cleveland Chapter).

Prof. Tom I-P. Shih Presents “Thermal Management of Aircraft Systems – Challenges and Opportunities”

On May 29, 2016, Prof. Tom Shih, Head of the School of Aeronautics and Astronautics at Purdue University, returned to Cleveland, having worked at NASA Lewis Research Center thirty four years ago, to talk about his recent studies into the fundamentals of heat transfer from both the experimental and theoretical standpoints. He covered such key concepts as the definition of “bulk temperature” in experiment and modeling, the effects of geometry in determining key transport properties. From this basic level, he also extended the discussion to the systems level, to address the effective interactions among multiple components. Some of the results he presented had only recently been submitted for publication. The audience was able to get additional updates into both the experimental and calculation requirements to allow effective comparison between the two, with computational example of the sensitivity of the comparison to the defined parameters input into the model.

The talk was an installment of the Distinguished Lecture series, a joint effort between AIAA-NOS and the Ohio Aerospace Institute. Because of Prof. Shih’s standing at Purdue University, the Cleveland area Purdue Alumni Association was also invited. AIAA NOS provided cookies and coffee for the audience following the afternoon lecture, which allowed everyone to connect and pursue additional questions on this fundamental topic.



Prof. Tom Shih is welcomed back to Ohio by AIAA NOS Chair, Jim Gilland.

Rodger Dyson Talks NASA Electric Aircraft Test-bed Facility

An informative and timely presentation on coming innovative aircraft propulsion concepts was given by NASA Glenn Research Center’s Dr. Rodger Dyson, project lead engineer for the NASA Electric Aircraft Test-bed (NEAT) facility.

This development stage facility is located at the GRC-Plumbrook station near Sandusky, Ohio. The facility will enable testing distributed propulsion concepts with motor driven propellers or ducted fans, replacing thrust from high velocity exhaust jets from turbine engines. The electric power for the motor drives will be generated by higher power gas turbines with a larger number of axial stages which are capable of driving both the compressor (as current turbines do) but also an electric generator of up to 20 MWe capacity for powering the propeller/or ducted fan motors. It has been shown in previous propulsion tests that accelerating large quantities of air mass by a modest delta-V is more efficient than accelerating a smaller stream of composed of a high temperature air and combustion products.

Therefore, as large airline companies compete to reduce emissions, fuel, noise, and maintenance costs, it is expected that more of their aircraft systems will shift from using turbofan propulsion, pneumatic bleed power, and hydraulic actuation, to instead using electrical motor propulsion, generator power, and electrical actuation. This requires new flight-weight and flight-efficient powertrain components, fault tolerant power management, and electromagnetic interference mitigation technologies. Moreover, initial studies indicate some combination of ambient and cryogenic thermal management and relatively high bus voltages when compared to state of practice will be required to achieve a net system benefit. Developing all these powertrain technologies within a realistic aircraft architectural geometry and under realistic operational conditions requires a unique electric aircraft test-bed. The presentation summarized existing test-bed capabilities located in the U.S. and detailed the development of a unique complementary facilities that industry and government can utilize to further mature electric aircraft technologies.

Dr. Dyson’s talk was followed by an intensive discussion period with relevant questions from the approximately 20 member audience and clarifying responses from our speaker.

AIAA Northern Ohio Section Concludes Pilot Mentoring Program

The AIAA Northern Ohio Section recently concluded a pilot AIAA mentoring program that was developed to help provide guidance to the AIAA student members as they navigate the transition to professional members and to provide an opportunity for more senior AIAA professional members to support the development of the future aerospace workforce.

The program began in September 2016 with an email soliciting interest from student members interested in being mentored and support from professional members willing to serve as mentors. The response to that process was 6 mentees and 6 mentors who were subsequently paired with each other based on a reviews of profiles submitted by each of the participants. An orientation/kick-off event was held on 10/27/2015 at Cleveland State University. Subsequently, mentoring plans were developed, reviewed and accepted, and the mentor-mentee pairs began meeting 1 to 3 times per month to implement their plans. Progress was monitored through monthly status reports submitted by the participants and at a social at the Great Lakes Brewing Company on 1/27/2016. Mid-term tag-up meeting on 2/8/2016 and 2/9/2016 were used to provide feedback to the participants regarding reporting as well as to soliciting feedback about the program processes. Finally, program close-out events were held on 5/11/2016 and 5/16/2016, and an overview of the program goals, demographics, lead observations, and thoughts on moving forward were given.

The pilot program largely accomplished all of the program goals. Although this was the Section's first attempt at a mentoring program and some process improvements are understandably needed, most, if not all, of the student participants felt like they greatly benefited from the

relationship with their mentor and they strongly encouraged us to hold the program again next year. One telling metric regarding the benefit of the program is a significant increase in the value that participants placed on their AIAA membership. This metric is believed to indicate an increased likelihood that students will maintain their AIAA membership as they transition to professional careers. NOS currently plans to continue the Mentoring program in the fall of 2016 with a new group of student mentees. Furthermore, NOS is looking to help other sections create mentoring programs by sharing the Section's experiences and [resources](#) with them.

AIAA Congressional Visits Day 2016

Each spring, AIAA hosts an event in Washington, D.C. called Congressional Visits Day (CVD) to educate members of Congress on public policy issues involving the aerospace community. Ohio had a team of 16 attendees including a strong showing from NOS members: Amber Abbott-Hearn, Colleen Albert, Daniel Cook, John Easton, Dr. Michael Heil, Daniel Londrico, Brian Scullin, Cassandra Spino, Erin Tesny, Maggie Kolovich and David Stranko.

Team Ohio met with Representatives Steve Chabot, Brad Wenstrup, Bob Gibbs, David Joyce, Robert Latta, Marcy Kapture, Bill Johnson, Jim Jordan, Marcia Fudge, and Joyce Beatty as well as Senators Rob Portman and Sherrod Brown. The team spread meetings over Tuesday March 15th and Wednesday March 16th in order to accommodate as many congressmen as possible. Key talking points including reauthorization of the FAA (which passed through the Senate the following Thursday), increased funding of research and development for aerospace in next year's budget, and continued support of STEM education in Ohio.



All CVD 2016 participants gather for a group breakfast at the Capitol before splitting up to meet their respective senators and representatives.

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