Commercial Aircraft Composite Repair Committee (CACRC) Meeting & Workshop for Composite Damage Tolerance & Maintenance

The Federal Aviation Administration (FAA), European Aviation Safety Agency (EASA) and Wichita State University (WSU) invite you to participate in the next Commercial Aircraft Composite Repair Committee (CACRC) Meeting and a related FAA/EASA/Industry Workshop on Composite Damage Tolerance and Maintenance during the week of May 7, 2007.

This workshop will be held in Amsterdam, with the CACRC meeting being held May 7-11 and a joint FAA/EASA/Industry workshop on May 9-11.

As many of you know, an increasing number of aircraft are using composite materials in structures critical to flight safety. Engineers and inspectors involved in certification and continued airworthiness assessments must be familiar with principles of composite damage tolerance and the related maintenance practices, which include inspection and repair.

Since the 1990's, standards organizations such as the SAE CACRC and Composite Material Handbook 17 (CMH-17, a.k.a., Mil-17) have been documenting practical composite educational materials, engineering guidelines and standards. The FAA and EASA have coordinated recent CS&CI efforts to benchmark industry practice with the CACRC and CMH-17.

Our hope is that with this combined meeting we can meet our two goals of 1) increasing the awareness of the important work being performed by the CACRC as related to aviation safety and efficiency within the industry and to 2) engage key field experts on future initiatives related to composite damage tolerance and maintenance. Please see the detailed paragraphs below for more information on each area.

CACRC Meeting

The Commercial Aircraft Composite Repair Committee (CACRC) is an international standards organization established to develop and improve maintenance, inspection and repair practices for commercial aircraft composite structures and components, and to reduce maintenance costs. It was formed in 1991 through the merger of separate Composite Repair Task Forces operating at the time under the Air Transport Association of America (ATA), the International Air Transport Association (IATA), and the Society of Automotive Engineers (SAE).

In addition to ATA/IATA/SAE entities, membership includes representatives from OEM's, regulatory agencies, material manufacturers, and technology experts from the field of composite structure and repair. Since its conception, the CACRC has published more than 25 SAE standards and reports supporting maintenance practices for composite aircraft structures.

Advancements by the CACRC depend on progress by working groups, which are comprised of experts from industry (airlines, maintenance organizations, suppliers and training providers), regulatory agencies and academia. The CACRC membership needs to expand as industry pursues advanced applications and business models change internationally. Please consider joining the organization and contributing to future initiatives for more efficient composite maintenance practices that retain the high levels of safety needed for commercial aircraft.

FAA/EASA/Industry Composite Damage Tolerance & Maintenance

In conjunction with the CACRC meetings, the FAA and EASA have organized a workshop on damage tolerance and maintenance. This is the second in a series of workshops to review aviation industry practices for composite damage tolerance and maintenance, and collect relevant field data to support Composite Safety & Certification Initiatives (CS&CI). The FAA CS&CI, which address composite damage tolerance and maintenance issues, are several years old.

In recent years, the FAA has been working with industry experts on training standards for awareness of critical safety issues in composite maintenance. A working group which includes Airbus, Boeing, FAA and EASA has been addressing related engineering issues over the last two years. Workshops in 2004, 2005 and 2006 were used to coordinate these efforts with the industry. The workshop held in July, 2006 is summarized at http://www.niar.wichita.edu/chicagoworkshop/.

The current workshop will be used to review and expand these CS&CI efforts to include the perspectives of other experts. In time, this interface with the industry will document current industry practices and expand the training, guidance and policy for composite damage tolerance and maintenance.

The FAA Joint Advanced Materials & Structures (JAMS) Center of Excellence has also supported CS&CI in these areas with research on critical technical issues and the development of training standards. Similar to last year's workshop, the 2007 workshop will help direct future JAMS research and training developments. As efforts progress, additional workshops will be held with composite experts from the field to periodically review CS&CI progress in these areas.

The following subjects will be reviewed at the 2007 workshop. Experts from the field are currently being sought to present their perspectives on these subjects.

Candidate Technical Areas

- Field damage findings for sandwich and stiffened-skin constructions
- Mechanisms of fluid ingression into sandwich construction
- Damage tolerance (design criteria, structural test protocol, analysis)
- Reliable field inspection and repair QC (NDI methods, material and process controls)
- Repair design and structural substantiation
  (repair limits, design guidelines, proof of structure)
- Experiences with bonded and bolted repair processes
- Maintenance training standards for an awareness of the critical issues
- Other elements of safety management used to ensure composite structural integrity

Workshop participants will include selected experts from industry, regulatory agencies, academia and other government organizations that are familiar with aviation practices in these areas.

The FAA will open the workshop with a synopsis of active CS&CI for composite damage tolerance and maintenance. In the sessions that follow invited speakers will present information that will benchmark service experiences and industry practices for each subject area. Finally, a working session will be used to collect additional insights in up to four technical areas identified with an asterisk in the agenda below.

Agenda & Logistical Information

In order to maintain proper balance in workshop participants and to pre-assign the associated breakout session groups, you will be asked to select technical areas where you can contribute most to the workshop forum when you register. ***We encourage everyone to register early because of the limited space available.***

In order to participate in the workshop, you must pre-register. We are using a new registration system this year. There will be one registration form for both the CACRC Meetings and the workshop. To register, click the link below and find the "Register" tab on the right side near the login menu. Upon registering, you will receive an email notifying you that you have registered. Within two weeks of registering, a separate email will be sent by Kristin Strole notifying you that your registration status has been changed. At that time, you can log back in and a "Transportation and Hotel" link should appear. You must be accepted before you will receive logistical information. If you need logistical information prior to receiving the acceptance email, please contact us via the Contact link on the website. To register online, visit https://www.niar.wichita.edu/ncampportal/europeanworkshop.

We look forward to seeing you!

Larry Ilcewicz
Chief Scientific and Technical Advisor, Composites
Federal Aviation Administration

Simon Waite
Structures Specialist
European Aviation Safety Agency

Michael Borgman
Chairman of CACRC
Spirit AeroSystems, Inc.

Agenda for 2007 FAA/EASA/Industry Composite Damage Tolerance & Maintenance Workshop

CACRC Task Groups are Meeting Monday and Tuesday

	Wednesday, May 9	Thursday, May 10	Friday, May 11
1st Hour	**SAE Commercial Aircraft Composite Repair Committee** Overview of Progess & Plans	**Session 1 Applications & Field Experiences** *(continued)* Service History of Composite Structure Service Damage & Reliability of Repairs	**Session 5* Field Inspection and Repair QC** Test Standards & Inspector Qualifications Reliable NDI Technology Advances Material & Process Controls
2nd Hour			
Break (15 min.)			
3rd Hour	**Airbus and Boeing** Perspectives on Safe Industry Practices	**Session 2* Damage Tolerance** Design Criteria & Objectives Structural Test Protocol	**Session 6 Technical Breakout Sessions** (*Separate w*orking meetings covering technical subjects from Sessions 2 - 5)*
4th Hour	**Airbus & Boeing (continued)** **SAE CACRC** Active Task Group Reports		
Lunch (1 Hour)		Perspectives on MTS Testing	
5th Hour	**SAE CACRC** Active Task Group Reports	**Session 3* Damage in Sandwich Construction** Fluid Ingression Growth Mechanisms Analysis & Accelerated Tests	**Session 7 Breakout Team Summary Recap/Actions/Closure/Adjourn**
6th Hour	**FAA & EASA Initiatives**		
Break (15 min.)			
7th Hour	**FAA & EASA Initiatives** *(cont.)* Recent Progress/Safety Management	**Session 4* Repair Design and Processes** Repair Limits Design Criteria & Process Guidelines Structural Substantiation	
8th Hour	**Session 1 Applications & Field Experiences**		