A Center of Excellence
AMTAS
Advanced Materials in Transport Aircraft Structures

AMTAS/JAMS Status and Future Plans

Summary prepared by

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AMTAS Director

FAA Center of Excellence Program

Background for 1ST Time Attendees

FAA Centers of Excellence (COEs):

- Funded through cooperative agreements among academic institutions, their affiliate industrial partners, and the FAA
- FAA provides funds that must be matched 1:1 by non-federal sources
- Funded in three phases over a total period of 3-10 yrs
- Six FAA COE's currently exist:

  http://www.coe.faa.gov/

"Acronyms"

Brief Background for 1ST Time Attendees

- The FAA Joint Advanced Materials and Structures (JAMS) Center of Excellence was formed in 2003 and consists of two university teams:
  - AMTAS ('A'dvanced 'M'aterials in 'T'ransport 'A'ircraft 'S'tructures)
  - CECAM ('Ce'nter for 'C'omposites and 'A'dvanced 'M'aterials)
- Curt Davies is the FAA-JAMS Program Manager
- JAMS is just entering Phase II
- All JAMS projects are related in some manner to safety and/or certification issues

JAMS CoE Member Schools

AMTAS (Advanced Materials for Transport Aircraft Structures)

- University of Washington, Lead
- Washington State University
- Oregon State University
- Edmonds Community College
- Florida International University
- University of Utah

CECAM (Center for Composites and Advanced Materials)

- Wichita State University, Lead
- Northwestern University
- Purdue University
- Tuskegee University
- University of Delaware
- University of California at Los Angeles

AMTAS Administrators

- Prof. Mark Tuttle, UW
  AMTAS Director
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- Prof. Kuen Lin, UW
  AMTAS Co-Director
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- Ms. Ellen Barker, UW
  Assistant to the Director
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AMTAS Administrative Activities

- Website updated more-or-less continuously:
  http://depts.washington.edu/amtas
- Monthly technical progress reports from all AMTAS academic partners assembled and submitted to FAA
- Quarterly financial reports from all AMTAS academic partners assembled and submitted to FAA
- AMTAS “news” - updates on AMTAS/JAMS activities e-mailed to interested persons every 1-2 months (about 650 persons, presently)
- Organize-schedule-host meetings

AMTAS/JAMS Meetings

- Semi-annual AMTAS meetings
  - Spring & Fall; typically 50-70 attendees
  - One-day mtg, usually (but not always) held on UW campus
  - 78 registrants for today's meeting

- Annual JAMS meetings
  - Three held since initiation (WiSU→UW →Hughes Res Ctr)
  - Typically ~100 attendees, representing all JAMS universities and many industrial partners
  - 2008 JAMS Meeting:
    Hosted by UW
    Tues-Thurs, 17-19 June
    Will be held at the Future of Flight (Everett)
    Additional details available soon

Short Course

- AMTAS Institute on Advanced Aircraft Composites
  - Five-day “cover the waterfront” composites course intended for degreed/practicing engineers
  - Organized and led by Kuen Lin
  - ~10 instructors (5 from academia, 5 from industry/gov)
  - Self-sufficient: $2,500 tuition fee
  - Has been offered three times:
    - 18-22 Sept ’06 (21 attendees)
    - 19-23 Mar ’07 (25 attendees)
    - 17-21 Sept ’07 (14 attendees)
  - March ’08 course canceled due to low enrollment
  - Next offering 8-12 September ‘08

Institute on Advanced Aircraft Composites

Sept '07 Curriculum

Monday:

- Overview and New Developments (2 hours): Kuen Lin (UW) and Patrick Stickler (Boeing)
- Materials (4 hours): Bud Das (UW)
- Nondestructive Inspection (2 hours): Dick Bossi (Boeing)

Tuesday:

- Manufacturing Processes (4 hours): Doug McCarville (Boeing)
- Manufacturing Lab Project (4 hours): Brian Flinn (UW)/MSE Lab

Wednesday:

- Tooling (2 hours): Dave Dickson (Boeing)
- Prepreg-based Manufacturing (2 hours): Moe Soleiman (Boeing)
- Testing Methods (2 hours): Mark Tuttle (UW)
- Machining & Testing Demos (2 hours): Mark Tuttle (UW)/ME Labs

Institute on Advanced Aircraft Composites

Thursday:

- Structural Analysis Methods (3 hours): Kuen Lin (UW)
- Design Methodology (3 hours): Chris Eastland (Boeing)
- Damage Resistance & Tolerance (2 hours): Paolo Feraboli (UW)

Friday:

- Repair Techniques (3 hours): John Gokcen (Boeing)
- Repair Analysis (2 hours): Michael Graves (Boeing)
- Repair Demonstration (2 Hours): Eric Casterline (Heatcon)
- Summary and Discussion (1 Hour): Kuen Lin (UW)

Current Research & Educational Projects

Summary

- Damage Tolerant Composite Design (K. Y. Lin, UW)
- Aeroservoelasticity of Composite Aircraft Structures (E. Livne, M. Tuttle, UW)
- Composite Crashworthiness (P. Feraboli, UW)
- Out-of-Plane Loading of Thick Laminates (T. Kennedy, OSU)
- Adhesive Bonding of Composites through Surface Characterization (B. Flinn, UW)
- Analytical Chemistry Methods for Detecting Surface Contamination and Moisture (R. Burton, FIU)
- Maintenance/Repair of Composite Aircraft Structures (C. Seaton, EdCC)
- Fracture Mechanics Test Methods - Sandwich Composites (D. Adams, UoU)

Objectives During Semi-Annual AMTAS Meetings

"Generally":

Spring Meeting agenda devoted to

- Overall status of AMTAS-JAMS
- Discussion/brainstorming of future research & education projects (funding for continuing or new AMTAS projects typically received during summer months)

Autumn Meeting agenda devoted to

- Overall status of AMTAS-JAMS
- Research presentations by AMTAS PIs

The Meeting Today

Morning Agenda

9:00-9:40AM: AMTAS-related initiatives at UW

- Overview of i-AMT, Alex Jen, UW
- Aviation and the Environment, Patrick Stickler, Boeing

9:40-10:20AM: Related Composite Research

- Lightning Strikes, Paolo Feraboli, UW
- Feasible Morphing Aerostructures, Tad Calkins, Boeing

10:40AM-12:10PM: New Directions in Composites

- Braided Composite Structures, Jason Scharf, A&P Tech
- Composite Research at PNNL, Jim Holbery, PNNL
- Composites in Sporting Goods, Dodd Grande, K2 Sports
- Composites Application in Energy, Scott Finn, GE Res Ctr

The Meeting Today

Afternoon Agenda

Devoted to breakout sessions:

Existing/near-term AMTAS Projects (moderators):

- Adhesive Bonding (Will Grace & Peter VanVoast)
- Chopped Fiber Comp (Larry Ilcewicz & Patrick Stickler)
- Education/Training (Rosemary Brester & Charlie Seaton)

Potential Collaborations

- Morphing Structures/Multifunctional Materials (Tad Calkins & Shreeram Raj)
- New Research Directions (Rob Albers & Jim Holbery)

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Concluding Comments

- We need your ideas and suggestions …please participate in discussion!

- Any questions for me?
- Thank you for coming!