A Center of Excellence
AMTAS
Advanced Materials in Transport Aircraft Structures

Update on AMTAS/JAMS

Summary prepared by

Mark Tuttle, UW
AMTAS Director

FAA Center of Excellence Program

Background for 1ST Time Attendees

FAA Centers of Excellence (CoEs):

- CoE program administered by FAA personnel housed in W. J. Hughes Res Ctr (Atlantic City, New Jersey)
- 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 CoEs currently exist: http://www.coe.faa.gov/

"Acronyms," etc

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 in Phase II of the ~10-yr funding cycle
- 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
  tuttle@u.washington.edu

- Prof. Kuen Lin, UW
  AMTAS Co-Director
  lin@aa.washington.edu

- Ms. Ellen Barker, UW
  Assistant to the Director
  nelle@u.washington.edu

AMTAS Administrative Activities

- Website updated more-or-less continuously:
  http://depts.washington.edu/amtas
- Monthly technical progress reports from all AMTAS PI's 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 700 persons, presently)
- Oversee 5-day short course and (potentially) facilitate new ones
- Organize-schedule-host meetings

AMTAS/JAMS Meetings

- Semi-annual AMTAS meetings
  - Spring & Fall; typically 60-80 attendees
  - One-day mtg, usually (but not always) held on UW campus
  - 81 registrants for today's meeting

- Annual JAMS meetings
  - Four held since initiation (WiSU→UW→Hughes Res Ctr→UW)
  - Typically ~100 attendees, representing all JAMS universities and many industrial partners
  - 2009 JAMS Meeting will be hosted by WiSU:
    21-22 July (Technical Program = 1½ day)
    Additional details announced 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 held four times:
  - 18-22 Sept '06 (21 attendees)
  - 19-23 Mar '07 (25 attendees)
  - 17-21 Sept '07 (14 attendees)
  - 23-27 Mar '09 (12 attendees; administered within UW-ME Dept)
- If sufficient interest, offered in late summer/early fall 2009

Objectives During Semi-Annual AMTAS Meetings

"Generally":

Autumn Meeting agenda devoted to

- Overall status of AMTAS-JAMS
- Research results, presented by AMTAS PIs

Spring Meeting agenda devoted to

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

The Meeting Today

Early Morning Agenda

- 9:00-9:15 am: FAA Report — Larry Ilcewicz, FAA
- 9:15-10:45 am: 1st year AMTAS Projects

  (~20-minute presentations followed by 10 min Q/A)

  - Simplifying Certification of Discontinuous Composite Materials Forms for Aircraft Structures — Bruno Boursier, Hexcel
  - Education Strategy Development — Charlie Seaton, EdCC; Larry Ilcewicz, FAA
  - Inverse/Optimal Thermal Repair of Composites Surface Characterization — Ashley Emery, UW

10:45-11:00 am - Coffee Break

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The Meeting Today

"1st Year Projects"-Clarification

Abbreviated Title	PI	Initiated
Damage Tolerant Structural Design Methodology	Kuen Lin	Aug '04
Global/Local Aeroservoelasticity of Composite Aircraft	Eli Livne	Aug '04
Improving Adhesive Bonding via Surface Characterization	Brian Flinn	Aug '04
Crashworthiness-Energy Adsorption of Composite Materials	Paolo Feraboli	Aug '07
Course Development: Maintenance of Composite Aircraft	Jerrilee Mosier	Sept '04
Failure of Notched Laminates Under Out-of-Plane Bending	Tim Kennedy	July '07
Analytical Chemistry Methods for Detecting Surface Contamination	Dwayne McDaniel	Aug '07
Fracture Mechanics Test Methods For Sandwich Composites	Dan Adams	July '06
Advanced Materials & Manufacturing Training Innovation Center (AMMTIC)	Jerrilee Mosier	Sept '08
Certification of Discontinuous Fiber Composites	Paolo Feraboli	Sept '08
Inverse/Optimal Thermal Repair of Composites	Ashley Emery	Jan '09
Training Strategy – Composite Materials Education	Charlie Seaton	Mar '09

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Not discussed today (results will be presented at JAMS '09 and AMTAS Fall '09 Mtgs)

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Projects just getting underway – will be discussed today

The Meeting Today

Mid-Morning Agenda

(10-minute presentations followed by 10 min Q/A)

11:00am-12:00 pm – Potential New Projects

• Improved Composite Process Using a Pressurized Repair Clave	Kuen Lin, UW
• Effects of Moisture Diffusion in Sandwich Composites	Mark Tuttle, UW
• Consideration of the Maximum Strain as a General First Ply Failure Criterion in Laminated Composites	Lloyd Smith, WSU (M. Tuttle)

12:00-12:45 pm - Lunch

The Meeting Today

Early Afternoon Agenda

(10-minute presentations followed by 10 min Q/A)

12:45-1:50 pm – Potential New Projects (continued)

• Development of Quality Verification Methods for Adhesively Bonded Joints	Brian Flinn, UW
• Crack Development in Cyclically Loaded Pressurized Cylindrical Carbon-Fiber Shell Structures	Dwayne McDaniel, FIU
• Bird Strike Simulation	Mostafa Rassaian, Boeing

1:50-2:10 pm - Break

Feedback Requested

Especially on new projects

- Please:
  - Complete evaluation for each (potential) new project
  - Prioritize/rank all six new project ideas
- All presenters have been informed that:
  - There may be no funds for new projects next year, or
  - Available funds may be insufficient to initiate all otherwise worthy new projects

The Meeting Today

Late Afternoon Agenda

(20-minute presentations followed by 10 min Q/A)

2:10-3:10 pm – Non-Aerospace Application of Composites

- Northwest National Marine Energy Research Center: Tidal Energy — Brian Polagye, UW
- Composite Flywheels — Brian Fabien, UW

3:10 pm: Next Steps/Wrap-up — Mark Tuttle, UW

~ 3:30 pm: Adjourn