AMTAS/JAMS Administration and Status

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The FAA Joint Advanced Materials & Structures (JAMS) Center of Excellence

Dec. 2003: FAA announced the Joint Advanced Materials & Structures (JAMS) Center of Excellence; University of Washington (UW) and Wichita State University (WiSU) are co-lead universities

Both UW and WiSU have since established their respective programs:

- UW: Center for Advanced Materials in Transport Aircraft Structures (AMTAS)
- WiSU: Center of Excellence for Composites and Advanced Materials (CECAM)

The FAA Joint Advanced Materials & Structures (JAMS) Center of Excellence

To avoid confusion, both AMTAS and CECAM are to be described as being a part of JAMS:

- AMTAS/JAMS: http://depts.washington.edu/amtas/
- CECAM/JAMS: http://www.niar.twsu.edu/newniar/coe/cecam.asp

AMTAS Participants

- AMTAS currently consists of:
  - Four academic partners
  - Nine (soon to be 10!) industrial partners
- All partners are located or have a significant presence within the Pacific Northwest
- Additional academic/industrial partners will be added as appropriate and as opportunities arise

AMTAS Participants

Administered by the UW

- Prof. Mark Tuttle, Director
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- Prof. Kuen Lin, Co-Director
  206-543-6334
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- Ms. Ellen Barker, Assistant to the Director
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FAA Center of Excellence
AMTAS
Advanced Materials in Transport Aircraft Structures

AMTAS Participants

Academic Partners

- **University of Washington (UW)**
  - main campus in Seattle, WA
  - 35,000 students
  - http://www.washington.edu/
- **Washington State University (WaSU)**
  - main campus in Pullman, WA
  - 22,500 students
  - http://www.wsu.edu/
- **Oregon State University (OSU)**
  - main campus in Corvallis, OR
  - 18,000 students
  - http://oregonstate.edu/
- **Edmonds Community College (EdCC)**
  - Lynnwood, WA
  - 11,000 students
  - http://engr.edcc.edu/

FAA Center of Excellence
AMTAS
Advanced Materials in Transport Aircraft Structures

AMTAS Participants

Current Industry Partners

BOEING®

Composite Solutions

HEATCON® COMPOSITE SYSTEMS
Composite Repair Solutions

HEXCEL®

intec

NWC
NORTHWEST COMPOSITES

Stoddard International

'TORAY'
TORAY GROUP

Triumph Group, Inc.

AMTAS Participants

Our newest Industry Partner!

Excerpts from the Cytec website:

http://www.cytec.com/business/EngineeredMaterials/index.shtm

"Cytec Engineered Materials is a global technology leader in advanced materials for aerospace and other extreme-demand environments...Cytec Engineered Materials is a wholly-owned subsidiary of Cytec Industries, Inc., one of the world's leading specialty chemicals companies. "

AMTAS

Summary of current status

- ~$1.3M first-year budget (cash and in-kind)
- A total of 7 AMTAS projects initiated (1 administrative, 5 research, and 1 education/training)
- Executive Advisory Board partially established:
  - Larry Ilcewicz, FAA
  - Al Miller, Boeing
  - Walter Jones, AFOSR
- Topics of future projects currently under consideration

AMTAS Administrative activities

Website updated more-or-less continuously:
http://depts.washington.edu/amtas

Formal AMTAS meetings held:

- 29 Jan ’04: UW campus, ~35 attendees
- 10 Nov ’04: UW campus, ~ 40 attendees
- 14 April ’05: EdCC campus, ~53 attendees

AMTAS Administrative activities

Informal working meeting every 2-3 weeks…most frequent participants:

- Ilcewicz (FAA), Coe, Miller (Boeing), Casterline (Heatcon), Seaton (EdCC), Tuttle, Lin, Barker (UW)
- Location rotated between UW, Boeing, FAA, EdCC

Reports provided to Curt Davies, JAMS Program Manager:

- Monthly progress reports (just initiated)
- Quarterly fiscal reports (thus far: Dec ’04 and Feb ’05)

AMTAS Administrative activities

Represented AMTAS at 4th Annual COE Mtg:

- 14-16 March, Melbourne and Orlando, FL
- Representatives from 6 FAA COE's present
- AMTAS/CECAM booth (included poster from each of 16 PIs)
- Davies (FAA), Tuttle (UW), and Tomblin (WiSU) gave joint presentation
- Proceedings available: http://www.coe.faa.gov/4thmeeting.htm

AMTAS (future) Administrative activities

1st Annual AMTAS/CECAM Joint Mtg (May 24-26, Wichita, KS)

- Although hosted by WiSU, Barker will coordinate AMTAS participation
- All PIs and many students will attend
- Presentation of research results
- 2nd AMTAS/CECAM Joint Mtg will be hosted by UW in Spring 2006

AMTAS Research Projects

Reliability-based Damage Tolerant Composite Design Methodologies

- Overall objective: Develop a probabilistic method to estimate structural component reliabilities
- UW personnel:
  Prof. Kuen Lin, PI
  Acting Assist Prof. Andrey Styuart
  Mr. John Moore, MS student
  Ph.D student being recruited
- Boeing personnel: Drs. Cliff Chen, Razi Hamid, Mathew Miller, and Fritz Scholz

AMTAS Research Projects

Combined Global/Local Variability and Uncertainty in Integrated Aeroservoelasticity of Composite Aircraft

- Overall objective: Develop analytical, computational, and experimental capabilities to address aeroservoelastic effects
- UW personnel:
  Prof. Eli Livne, PI
  Post-doc Research Fellow, Dr. Luciano Demasi
  Mr. Levent Coskuner, Ph.D student
- Boeing personnel: Dr. Kumar Bhatia and Mr. Carl Niedermeyer

AMTAS Research Projects

Improving Adhesive Bonding of Composites through Surface Characterization

- Overall Objective: Evaluate effects of co-bonding surface preparation processes on surface chemistry and bond performance
- UW personnel:
  Prof. Brian Flinn, PI
  Prof. Fumio Ohuchi, Co-PI
  Ms. Molly Phariss, Ph.D student
  Mr. Bjorn Ballien, senior
- Boeing personnel: Peter Van Voast, Will Grace, and Paul Shelley

AMTAS Research Projects

The Effects of Surface Pretreatment on the Degradation of Composite Adhesives

- Overall objective: Use accelerated test methods to study effects of surface pretreatments on long-term durability of bonded composites
- WaSU personnel:
  Prof. Lloyd Smith, PI
  Prashanti Pothakamuri, MS student

AMTAS Research Projects

AF555 Hot/Wet Creep Response

- Overall Objective: Investigate behavior of composite lap-shear specimens subjected to creep loadings under hot/wet conditions
- Project entirely funded by Boeing (i.e., does not receive matching FAA funding)
- WaSU personnel:
  Prof. Lloyd Smith, PI

AMTAS Education/ Training Project

Develop Short-Course: Maintenance/Repair of Composite Aircraft Structures

- Objectives:
  - Organize workshop to define needs (held Dec 2004)
  - Develop curriculum (prototype Aug '05)
  - Present outcome at workshop (Oct. 2005)
- EdCC personnel:
  Mr. Charles Seaton, PI
  Mr. Dennis Vincent
  Mr. Peter Smith (consultant)
- Boeing personnel:
  Mr. Joe Hafenrichter

AMTAS
Next Steps & Goals

- Broaden industry support (cash and in-kind support) and involvement
- Add Executive Advisory Board members
- Explore cross-industrial applications and collaboration

AMTAS
Concluding Comments

- AMTAS provides an opportunity for industry to leverage R&D expenditures by utilizing 1:1 matching FAA funds
- Industry can also collaborate directly with AMTAS faculty/students (i.e., without FAA matching funds)
- Agreements to protect intellectual properties can be developed on a case-by-case basis