2016 NASA AIRLINE OPERATIONS WORKSHOP

MTSU NASA FOCUS LAB

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MT AEROSPACE

Agenda

- Explain the need for the lab- there was a "Gap"
- Provide an overview of the concept & implementation of the NASA focus lab
- Describe how the lab is used in the MTSU aerospace program
  - Students
  - researchers
- Elaborate on the benefits of the simulation-based training for the students and the aviation industry
- Questions/comments from the audience

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THERE WAS A GAP…

- Surveys of industry experts revealed that newly-minted aviation professionals required 5-10 years of experience to fully understand their role and impact within an organization

- Research revealed that new aviation professionals lacked:
  - operational understanding of others' roles in the organization
  - basic understanding of how their decisions and job performance impacts others
  - the ability to communicate and coordinate effectively with others to meet organizational objectives
  - the use of foresight, planning, and time management in making decisions and performing tasks

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FOCUS concept first proposed in 2009 by Dr. Paul A. Craig

Received NASA grant in 2010 to study team decision-making

CONCEPT

- MTSU Aerospace program has 6 concentrations:
  - Aerospace Administration
  - Flight Dispatch
  - Maintenance Management
  - Professional Pilot
  - Technology
  - Unmanned aircraft systems
- All concentrations take aerospace core classes
- After specializing in their chosen concentrations, students return to take a capstone course
- Prior to the FOCUS lab, capstone course only addressed industry topics, résumé, and interview preparation

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LET THE STUDENTS PRACTICE WHAT WE PREACH

- The NASA FOCUS lab is an ongoing collaborative educational and research project between the MTSU Aerospace and Psychology departments

- Designed to address teamwork deficiencies

- Students are placed in a realistic simulated airline flight operations control center

- Teams run a virtual airline and work towards organizational goals
  - safety, on-time performance, efficient operations, customer satisfaction, and disruption management

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IMPLEMENTATION

- A high-fidelity replication of a Part 121 regional airline operations control center
    - Express Jet, Endeavor, Republic, etc.
- Students participate in a 3 hour simulated workshift working for a virtual airline we call "Universal E-Lines"
- Universal E-Lines operates 30 CRJ-200 aircraft on routes throughout the southeastern United States.
- Utilizing a hub and spoke system, Nashville and Jacksonville act as the airline's hubs
- Students manage up to 80 flight events in a 3 hour simulation session

UNIVERSAL eLINES

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Overview of the Lab

These panoramic photos illustrate the layout of the FOCUS lab. Each student has a specific role that supports the simulation.

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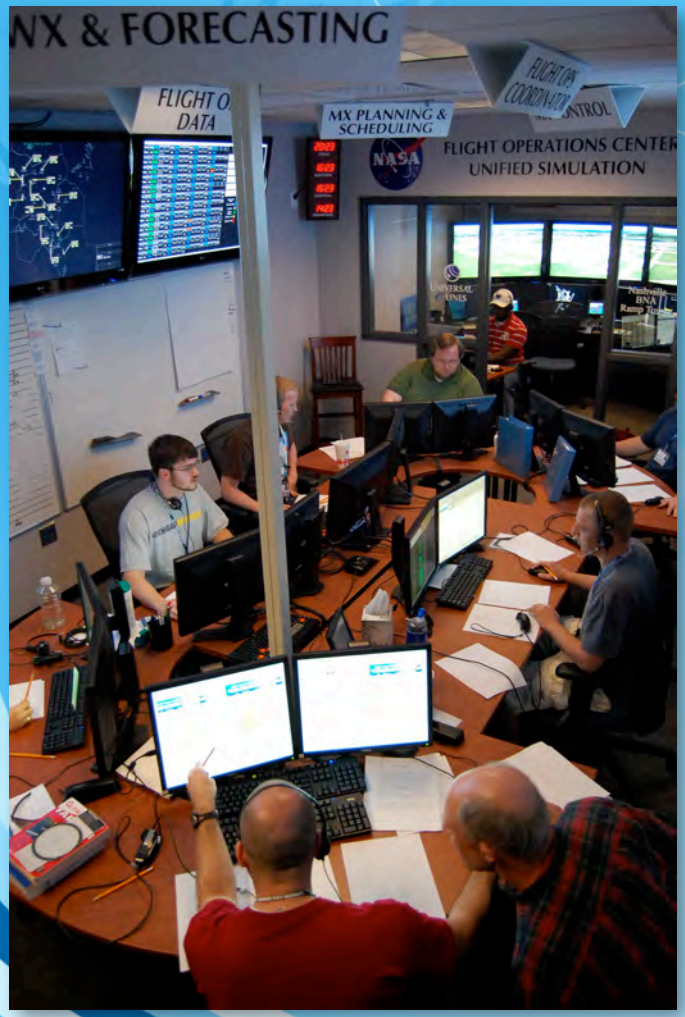
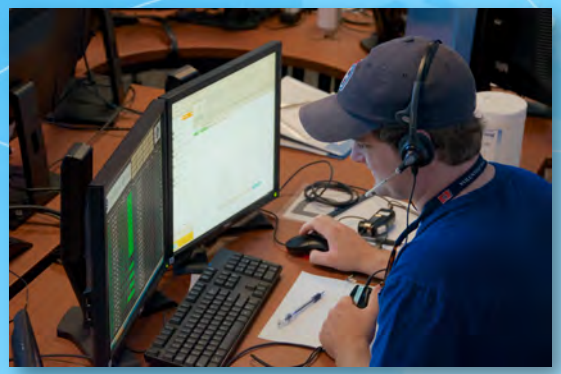
POSITIONS IN THE LAB





- Flight Ops. Coordinator
- Weather & Forecasting
- Crew Scheduling
- Fuel/Cargo Management
- Flight Tracking & Schedule Management
- Maintenance Planning
- Maintenance Control
- Ramp Tower
- Pseudo Pilot
- CRJ Simulator Crew

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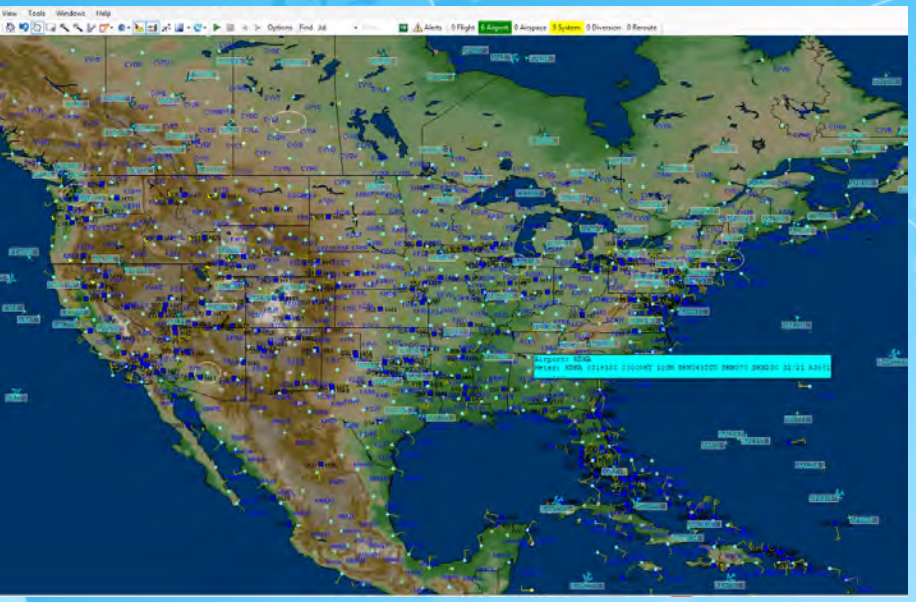
Most recent addition
WSI fusion for the weather position



Southwest Airlines and *The Weather Company*, IBM donated for 5 years!

WSI Fusion is an advanced, proactive flight monitoring application that fuses public and proprietary weather information with real-time flight and airspace data into one common view

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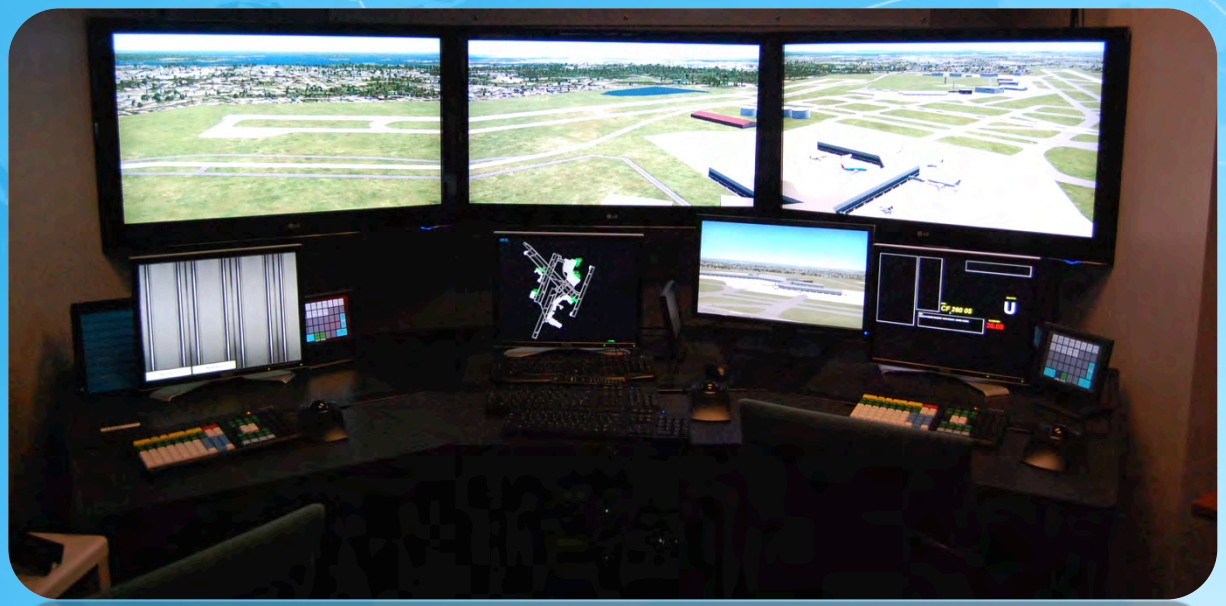
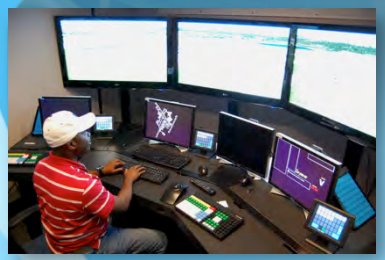
PARTNERSHIPS ARE VITAL TO THE REALISM OF THE LAB





The FOCUS lab also features a realistic ramp-tower simulator so students can practice gate and ramp operations management

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CRJ- 200 Level 5 FTD

Electronically link the CRJ-200 simulator to the FOCUS lab

Pilots in this simulator can communicate with anyone in the operations center

The CRJ simulator even appears on flight tracking monitors and is displayed in the ramp tower as a photo realistic aircraft moving about the airport environment

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How does this all work?

1. Students go through onboarding session
2. OJT training
3. Participate in 3 simulated sessions (3 hours each)
4. After Action Reviews for debriefing

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SCENARIO DESIGN

- ✓ Given scenarios that mimic real-world problems and disruptions
  - ✓ 'triggers' because they have the potential to cause compounding downstream impacts if not handled correctly
- ✓ Our team has developed a library of triggers with varying complexity and potential for disruption
- ✓ Researchers observe each position

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RESEARCH TEAM- FACULTY, GRADUATE, & UNDERGRADUATE

In this photo, graduate students discuss team response to a trigger in play

Researchers, located in offices adjacent to the FOCUS lab, play multiple external roles that enhance interactivity

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AAR- After action review

- After each simulation session, teams participate in After Action Reviews
- Facilitate discussion of the positive and negative behaviors that occurred during the sim
- Closes the educational loop

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BENEFITS

Benefits for the students:

- Improved understanding of the "big picture" in airline operations
- Opportunity to practice CRM/DRM, rather than merely learn in a classroom setting
- Improved performance on scenario-based training FAA exams

Benefits for the industry:

- MTSU Alumni enter more prepared
  - Safety and efficiency are key principles practiced in the NASA FOCUS lab
- Recent alumni stated the lab helped him know "who to ask" as an F.O. at a regional because of his experience in the lab

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A Special Thank You to NASA, Alumni Cody Evans, Southwest Airlines, and the Weather Company!!!

The MTSU Aerospace Department's goal is to prepare the next generation of aviation professionals. We believe that students' exposure to the FOCUS lab enhances their ability to work in team environments and think critically to solve problems. Mastery of these concepts will ultimately contribute to the overall success of the organization.

We are excited about our ongoing partnership with NASA, SWA, and the Weather Company. We feel that by working together, we can improve student training and produce employees ready to take on the challenges and responsibilities in today's aviation industry.

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Please visit our MTSU NASA FOCUS LAB website for more information, videos, publications and more:

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