Newsletter

Newsletter Archive | Subscribe | Unsubscribe | Edit Email

Volume 2, Issue 4

http://ffc.arc.nasa.gov

October 2002

TABLE OF CONTENTS

5. **CVSRF, Where Pilots Test Innovations**
   In this issue we profile our sister facility, the Crew-Vehicle Systems Research Facility (CVSRF) designed for the study of human factors in aviation safety. The facility includes two flight simulators: an FAA certified Level D Boeing 747-400 and an Advanced Concepts Flight Simulator (ACFS) and a simulated Air Traffic Control (ATC) System.

6. **Thinking of Doing Business With FutureFlight Central?**

---

1. FutureFlight at ATCA 2002

NASA FutureFlight Central will be participating in the Air Traffic Control Association (ATCA) 47th Annual International Technical Program & Exhibits, “ATCA 2002: Aviation in Recovery - Meeting New Challenges,” November 3 – 7, 2002 in Washington, D.C.

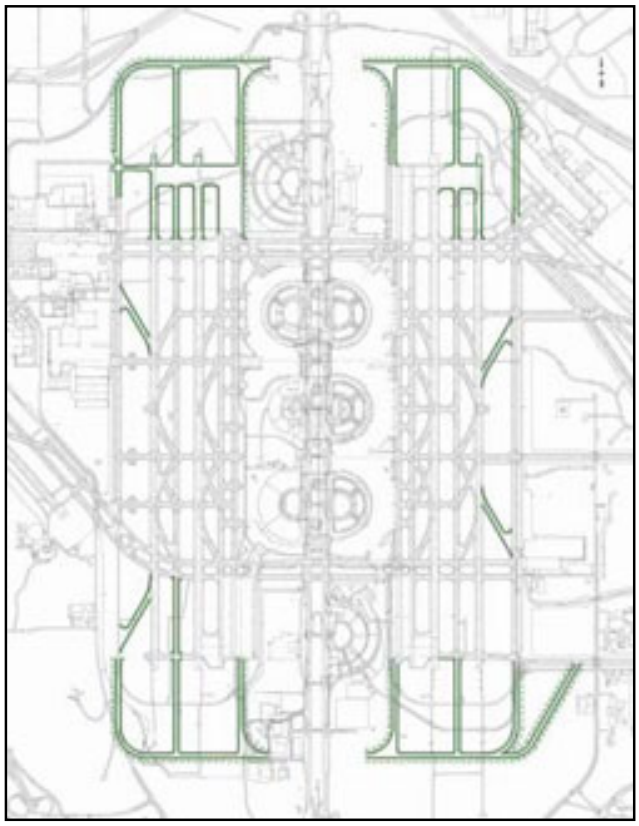
Our booth number is 317-319; we are exhibiting with our NASA partner simulation facilities: the Crew Vehicle Systems Research Facility, housing the B747-400 cockpit simulator, and the Vertical Motion Simulator.

Registrants may visit us from 6:00 p.m. to 7:30 p.m. Monday evening. Exhibits open for the public on Tuesday, Wednesday, and Thursday. For the complete conference schedule, please see the ATCA web site, http://www.atca.org, under “Events.”

This year's ATCA conference will focus on new challenges: “... In this year's technical program, aviation and public policy experts will explore the evolving air transportation environment and discuss concepts, programs, and technologies to foster recovery and reinvigorate aviation.”

If you are attending the conference and would like to a book an appointment in advance to speak with us, please call Nancy Tucker at 650.604.5575 or send an e-mail to: ntucker@mail.arc.nasa.gov

2. Waiting in the Wings: DFW Perimeter Taxiway Demo



The proposed perimeter taxiway system at DFW outlined in green.

In February 2003, Dallas/Fort Worth International Airport (DFW) will demonstrate its proposed perimeter taxiway system using the combined simulation capabilities of NASA's FutureFlight Central (FFC) and the Crew Vehicle Systems Research Facility (CVSRF). In collaboration with NASA, the FAA William J. Hughes Technical Center Simulation and Analysis Group is providing the simulation design, data analysis, and technical report.

DFW will simulate a proposed perimeter taxiway system in order to show a safer airport through the reduction of runway crossings and communications congestion associated with runway crossings.

The simulation will give pilots and air traffic controllers the opportunity to experience perimeter taxiways within the realistic working environment of both the B747 cockpit simulator in the CVSRF and FutureFlight's control tower simulator. Both facilities will be linked in real-time. Pilot and controller observations regarding safety, workload, and communication will help realize the full operational potential of the new taxiway system.

“Integrating the perspectives of the pilot and the air traffic controller will provide a complete demonstration of the perimeter taxiway system,” said Jim Crites, Executive Vice President, Airport Operations at DFW.

In 2000, Dallas/Fort Worth was ranked third in the world in number of operations. It has seven runways, including five parallel runways and two diagonal runways. The airport covers more than 29.8 square miles.

3. Skyway to the Future: Revolutionizing the National Airspace System

NASA and the FAA are working together to revolutionize air traffic management for the National Airspace System (NAS). FutureFlight Central and the other Ames simulation labs are playing a significant role in this endeavor through the Virtual Airspace Modeling and Simulation (VAMS) Project. This project is part of the NASA Airspace Systems Program being conducted in cooperation with the Federal Aviation Administration (FAA).

To give some idea of the scope of this undertaking, the NAS represents the entire air transportation system of approximately 18, 345 public and private airports, 14,630 air traffic controllers in all areas of control, 68, 200 pilots and co-pilots, and 635.4 million annual passengers.1

The VAMS Project Plan2 outlines the reasons for overhauling the NAS now:

> "...in the long-term, the current system improvement approach will not meet the projected operational demands on the system. The approach ... is too restrictive: with fixed sectors, aircraft spacing limitations, surveillance gaps, security constraints, and communications bottlenecks, the available degree to which system improvements can help is physically limited. A revolutionary change in the fundamental approach to airspace operations is needed. The time to explore those concepts and define the needed technologies is now!
>
> Accordingly, NASA has proposed and developed an Air Transportation Vision.3 This vision ... is one of providing seamless operations to all vehicle classes across all airspace to provide large increases in movement of people/cargo through:
>
> - Integrated airspace operations
> - Sharing of information from distributed sources (including weather, traffic congestion, hazards)
> - Advanced automation or process mechanization
> - Ability to interoperate with new classes of aerial vehicles with unmanned aerial vehicles (UAVs),the small aircraft transportation system (SATS) and reusable launch vehicles (RLVs)
> - Human interactive system monitoring and goal setting capabilities"

However, new, revolutionary concepts need to be rigorously tested in order to select the most beneficial. For this purpose, VAMS is charged with providing the means for testing the new concepts through advancements in non-real time modeling and simulation and real time, human-in-the-loop simulation.

In January 2003, FutureFlight Central and the Ames B747 cockpit simulator will demonstrate a flexible and expandable architecture between the facilities. The B747-400 simulator is housed within the Crew Vehicle Systems Research Facility (CVSRF) nearby.

How will this connectivity help with the VAMS effort? The goals of the VAMS project, a multi-year project, ending in FY2007, are to:

-"Develop the capability to model and simulate behavior of the air transportation system concepts to appropriate levels of fidelity for the concept being studied.

- Develop a set of analytical and computational models and methods to conduct detailed assessments of candidate operational concepts.

- Create a simulation environment that will enable investigation of safe[4] complex advanced air transportation concepts and develop a deeper understanding of human performance interaction within it."

---

1. U.S. Statistical Abstract, 2001, http://www.census.gov/prod/www/statistical-abstract-us.html

2. Virtual Airspace and Modeling and Simulation: VAMS Project Plan, Version 8.0, November 20, 2001

3. This vision was first presented by Dr. Rosen of the Ames Research Center at the International ATCA 2000 meeting.

4. By 'safe' it is meant that concepts, when implemented, achieve or exceed the safety levels of today's ATS systems.

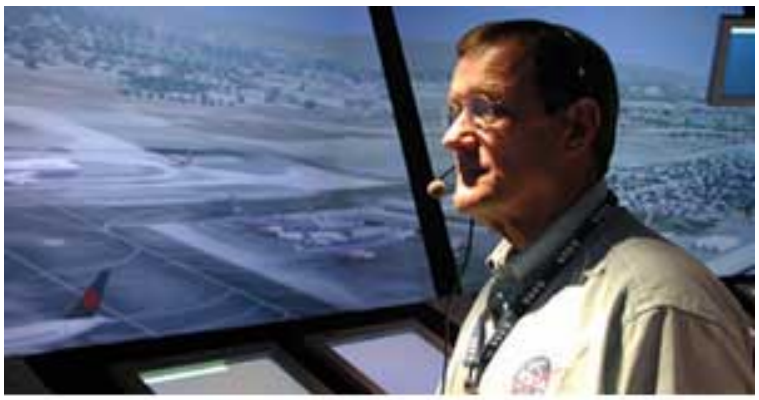
---

4. FutureFlight Staff Changes

As FutureFlight bids a fond farewell to air traffic control analyst Jim McClenahen, the team welcomes Rob Voss.

Jim has capped his 40-year aviation career with his last eight-years work at NASA Ames Research Center. Before coming to Ames, he spent 32 years as an air traffic controller, retiring as deputy manager

at SFO. He has advised FutureFlight Central since 1994, when he joined the project still on the drawing board. FutureFlight opened for business in December 1999.



Jim McClenahen

He has lent his on-the-job experience to the development of new technology, aimed at making the controllers' job more efficient. In addition to FutureFlight, Jim has supported the development of other air traffic control technologies such as the Surface Movement Advisor (SMA), Airport Approach Zone Camera System (AAZCS), and the Center-TRACON Automation System (CTAS).

The team wishes him well in his retirement in Monterey, California and his new “job” as a world traveler. Early next year, he and his wife will visit Australia and New Zealand.

FutureFlight's new air traffic control analyst, Rob Voss, brings operational experience to the facility, having served as a controller at San Francisco, San Carlos, and Santa Rosa towers. His specialties are quality assurance, training, and plans and procedures. Most recently Rob advised SFO about aircraft noise abatement.

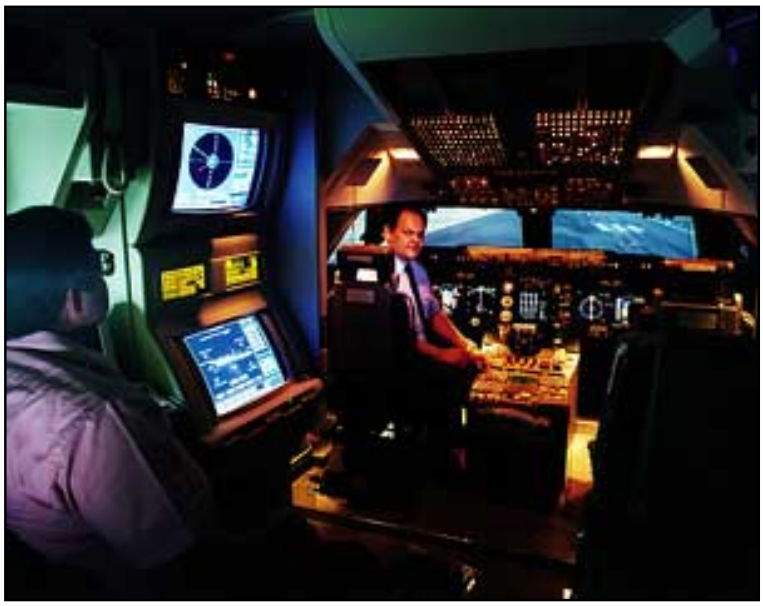
5. CVSRF: Where Pilots Test Innovations

The Crew-Vehicle Systems Research Facility (CVSRF) was designed for the study of human factors in aviation safety. The facility includes two flight simulators: an FAA certified Level D Boeing 747-400 and an Advanced Concepts Flight Simulator (ACFS) and a simulated Air Traffic Control (ATC) System.

Studies have shown that human error plays a part in 60 to 80 percent of all aviation accidents. The Crew-Vehicle Systems Research Facility allows scientists to study how errors are made as well as the effects of automation, advanced instrumentation, and other factors, such as fatigue on human performance in aircraft.

The facility is also used to:

—Analyze performance characteristics of flight crews
—Formulate principles and design criteria for future aviation environments
—Evaluate new and contemporary air traffic control procedures
—Develop new training and simulation techniques required by the continued technical evolution of flight systems



Inside view of the 747 cockpit simulator

Both flight simulators are capable of full-mission simulation. Each has a dedicated experimenter's control lab, capable of monitoring and controlling its simulator. Visual systems provide out-the-window cues in both cockpits.

The scene from the cockpit is highly realistic, with a 180-degree out the window view. The visual, weather radar, and motion systems are tightly coupled to simulate weather effects very realistically during day, night, dawn and dusk.

In experiments using the CVSRF simulators alone, the Air Traffic Control System support area can provide a realistic air traffic control environment, including communication with the cockpits allowing the study of air-to-ground communications systems as they impact crew performance. With connection to the FutureFlight facility, researchers can make use of the very realistic operating environments of both facilities, staffed with live pilots and air traffic controllers.

6. Thinking of Doing Business with FutureFlight Central?

Contact:

Nancy Dorighi, FutureFlight Central Manager,
Nancy.S.Dorighi@nasa.gov , **650.604.3258**

for more information and to explore what we can do for your needs.

The Team at NASA FutureFlight Central http://ffc.arc.nasa.gov

Experience the Future of Your Airport!
