



## Newsletter

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### NASA FutureFlight Central First Quarterly Newsletter

*January 2001*

*This is our inaugural issue of the NASA FutureFlight Quarterly News. In this issue we provide you with an update on some of our more exciting recent achievements.*

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#### 1. The LAX Story: Full Frontal Attack on Runway Incursion

Scheduled for February 2001, the FAA, Los Angeles World Airports, United Airlines and the NASA FutureFlight Central team are gearing up for a simulation of Los Angeles International Airport. LAX is the nation's fourth busiest airport, moving over 70.5 million passengers per year.

Jane Garvey, FAA Administrator, has declared the runway incursion problem at U.S. airports as its top priority. Out of 779,000 takeoffs and landings in 1999, LAX, experienced 10 runway incursions; almost all of LAX's runway incursions were attributed to pilot deviation or air traffic controller error. (Note in 2000, LAX succeeded in reducing the number of runway incursions to 8.)

To address the issue, the FutureFlight team in collaboration with Adacel Technologies has created a high fidelity visual model of LAX. FutureFlight will reproduce a full LAX operation focusing on the two runways on the South Side of the airport. The SGI image generators at

FutureFlight will be operating at "full throttle." Under Visual Approach Procedures (VFR), LAX sustains arrival levels of 72 to 84 aircraft per hour.

Greatly aiding FutureFlight's true-to-life realism will be the hands-on participation by LAX-based pilots and ramp operators provided by United Airlines, American Airlines, and Southwest Airlines. LAX-based ATCs familiar with the airport procedures are also participating. (To ensure further compliance to ATC standards, the National Air Traffic Controllers Association (NATCA) is monitoring and advising the project).

All simulation participants will be communicating via radio headsets, much as they do in normal day-to-day LAX operations. The 25-foot diameter FutureFlight tower cab is being set up to physically duplicate the LAX tower cab.

The first phase of the project in February will recreate LAX operations during arrival and departure rushes under both Visual Approach and Instrument Approach conditions with all airport, airline and FAA participants in the loop, controlling aircraft. The goal of this first phase is to validate that the simulation is accurately recreating conditions at LAX. Simply put, is it as real as it gets at LAX?

The second phase will review different ATC procedures. Some of the issues, which have been identified as potential factors in LAX runway incursions, include communications between the tower and pilot and evaluation of arrival use of the outboard vs. inboard runways.

Quantitative measures of aircraft ground movements will include FutureFlight's capabilities in measuring runway occupancy time, inbound and outbound taxi times, non-movement area time, hold times and arrival and departure rates. These measures will allow the project team to assess the impact of new potentially safer ATC procedures and runway usage on ground traffic flow and airport capacity.

Human factors are a key component in runway incursions. NASA experts, working with the FAA Volpe Technical Center, will review controller-to-controller and controller-to-pilot radio communications. The goal is to understand whether taxi instructions are simplified or made more complex under the different ATC test scenarios. (See the press release at [http://ffc.arc.nasa.gov/newsroom/press\\_releases/000825\\_lax.html](http://ffc.arc.nasa.gov/newsroom/press_releases/000825_lax.html)).

Strap on your headsets and stay tuned...

## **2. SFO's New Tower Siting Study Benefits from Using FutureFlight Central**

In late September 2000, NASA FutureFlight completed its first tower siting project with San Francisco International Airport (SFO) and HNTB, their Master Plan airport consultants. "With our upcoming \$30 M new tower construction investment, SFO found the \$100,000 cost for the NASA study more than justified," said Matt Mead, Planning Manager at SFO's Airfield Development Bureau. "NASA helped us reduce the total number of technical decisions in a much shorter period of time than conventional methods would allow."

NASA in collaboration with SFO and HNTB, studied five potential tower locations for SFO's new Master Plan alternatives, as viewed under both VFR and IFR conditions. FutureFlight's capability in depicting day/night and different visibility conditions was critical to SFO, an airport that has significant weather-related delays.

Using FutureFlight as a collaborative visual evaluation environment, SFO airfield planners, FAA air traffic controllers and other airport planning experts were able to visually evaluate the best location for a new tower using FAA visibility criteria.

"NASA's FutureFlight Central allows SFO to preview potential tower locations before any concrete is poured," said Peg Divine, Deputy Airport Director for SFO's Air Field Development Bureau. "This is part of SFO's continuing commitment to deploy the appropriate technology advances to address our rising air passenger levels as well as decrease delays.

As of this report, the final SFO new tower location is still being evaluated on primarily non-technical grounds. Beyond the tower-siting project, SFO plans to use FutureFlight to test

new runway configuration and aircraft movements before new construction begins.

### 3. FutureFlight Central Honored as an Award Winner in Popular Science Magazine's "Best of What's New 2000"

Joining the ranks of the cell phone, recordable compact disk (CD) player and the Pentium chip, NASA FutureFlight Central was among 100 inventions and products awarded Popular Sciences review of the "Best of What's New in the Year 2000." The prestigious Popular Science Award, created in 1988, is granted to those products and innovations that are regarded as most likely to change people's lives.

Other aviation products and innovations cited in Popular Science's Aviation and Space category include France's Airbus A3XX, the Boeing 777-200LR, the Adam M-309, the Joint Strike Fighter and the Swiss-made Libelle G-suit.

For details, please visit [http://ffc.arc.nasa.gov/latest\\_news/pop\\_sci\\_news.html](http://ffc.arc.nasa.gov/latest_news/pop_sci_news.html)

### 4. New Talent Round-Up at FutureFlight Central

FutureFlight just celebrated its first birthday on December 13, 2000. We are happy to report that since the grand opening in December 1999, the FutureFlight staff has expanded its talent from our startup crew of 12 to 18. New staff members joining the FutureFlight team include:

**Debbi Ballinger**, Deputy Manager

Debbi joins FutureFlight from the Crew Vehicle Systems Research Facility at NASA Ames, bringing 15 years of experience and a background in ISO 9000 certification for flight simulator facilities.

**Ken Christensen**, Aviation Safety Specialist

With 20 years combined experience in Aviation, Ken has 13 years of flying experience as a General Aviation Commercial Pilot, and as a Navigator with the military. Ken also worked with NASA Space Shuttle Independent Assessment Team (SIAT) and as an Aviation Safety Specialist- NASA Aviation Safety Reporting System (ASRS). Ken has an MBA and B.S. in Aviation.

**Ayhan Frager**, Web Site Developer

After earning a degree in Graphic Design from the Fine Arts School, Istanbul, Turkey and working as a free-lance graphic designer, Ayhan has joined our staff, contributing a new look to our web pages.

**Claudine Herbelin**, Assistant Facility Engineer

Claudine brings over 12 years' experience in military aircraft maintenance (engine mechanic, production controller and crew chief on C-130).

**Mike Madson**, Simulation Engineer

Contributing a B.A. in aeronautics, a pilot's license, and over 18 years at NASA Ames in aerodynamics and wind tunnel testing, Mike recently served as the project manager on the FutureFlight ramp tower training project for the Airport Group International (AGI).

**Greg Pisanich**, Task Manager,

QSS Group Besides having an instrument-rated pilot's license, Greg has worked with Jane's Combat Simulation Group and as a Senior Computer Scientist at Raytheon. Greg has a Masters in Aeronautical Science from Embry-Riddle Aeronautical University and an M.S. in Computer Engineering from Santa Clara University.

**Betty Silva**, Simulation Engineer

With a B.S. in Mathematics, Betty has extensive experience with NASA Ames Wind Tunnel projects, serving as the Project Manager for the NFAC Data Acquisition Systems.

To meet the complete FutureFlight team, visit us at:

[http://ffc.arc.nasa.gov/about\\_us/ffc\\_team.html](http://ffc.arc.nasa.gov/about_us/ffc_team.html)

## 5. Techno Innovations at FutureFlight Central; Connecting to the Cockpit

In preparing for the LAX runway incursion study, FutureFlight Central has developed a link to a B-747 flight simulator within the Crew-Vehicle Systems Research Facility also at NASA Ames. This will enable measurements of pilot performance, key to understanding the role of pilot human factors in runway incursions. Studies have shown that human error plays a part in 95% of all aviation accidents.

The 747 pilots will control their own aircraft and communicate with the FutureFlight air traffic controllers in a real-world setting using radio headsets, each viewing the same 3-D computer-generated model of LAX. The two simulators are being connected via a High Level Architecture (HLA) interface. As the Department of Defense (DoD) standard simulation protocol, HLA will allow FutureFlight Central to connect other airline-owned and military-owned flight simulators.

The NASA Ames Boeing 747-400 simulator represents a state-of-the-art glass cockpit aircraft, maintained to FAA standards of certification for airplane simulators. Like FutureFlight Central, the NASA cockpit simulator is equipped with programmable displays, which can be modified to enhance situational awareness and thus improve system safety.

### Recent studies using the NASA Ames cockpit simulators include:

- Free Flight simulations using advanced air to air data link and communications, providing enhanced air traffic separation and decreased time en route
- Converging approaches and multiple parallel approach studies by the FAA to improve airport capacity
- Taxi navigation and situation awareness studies, including a heads up display and electronic airport map to improve traffic flow on the airport surface.

The combined research power of merging NASA FutureFlight's ATC tower simulator, ramp tower and TRACON environments with the NASA cockpit simulators will enable one of the most sophisticated human-in-the-loop airport simulation in the world.

More details of the NASA Ames flight simulators can be found at <http://www.simlabs.arc.nasa.gov/cvsrf/cvsrf.html>

## 6. Thinking of Doing Business with FutureFlight Central?

Contact **Nancy Dorighi**, FutureFlight Central Manager, [Nancy.S.Dorighi@nasa.gov](mailto:Nancy.S.Dorighi@nasa.gov) or **650.604.3258** for more information and to explore what we can do for your airport or airline needs.

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<http://ffc.arc.nasa.gov>