

# FAA William J. Hughes Technical Center

## The National Aging Aircraft Research Program

***“As a result of accidents in the 1980s, Congress passed the Aviation Safety Research Act of 1988 (Public Law 100-591) and increased the scope of the Federal Aviation Administration (FAA) mission to include research on methods for improving maintenance technology and detecting the onset of cracking, delamination, and corrosion of aircraft structures”.***

In response, the FAA developed the National Aging Aircraft Research Program (NAARP). As a result of concerns relating to the increasing age of the air carrier fleet, the FAA is conducting research to ensure the continued airworthiness of high-time, high-cycle aircraft. The research in the NAARP includes the areas of structural integrity, corrosion, inspection systems, aircraft engines, airborne data monitoring systems, maintenance and repair, and rotocraft structural integrity.

### **Structural Integrity Research**

The research activities in this program area include both transport and small airplanes. Of primary concern is the effect of simultaneous cracks at multiple structural details on the integrity of airframe structures. Predictive methodologies to analyze structural designs are being developed. These developed methodologies are being validated by various laboratory test methods (coupons, sub-components, and full-scale) as well as comprehensive structural teardown and inspections of in-service airplanes. The Full-Scale Aircraft Structural Test Evaluation and Research (FASTER) facility, which is now operational at the FAA William J. Hughes Technical Center, is being used to provide data for methodology validation. Damage tolerance analysis principles are also being extended to commuter category airplanes. For further information, contact Xiaogong Lee at (609)485-6967 or e-mail [xiaogong.lee@tc.faa.gov](mailto:xiaogong.lee@tc.faa.gov)



### **Inspection Systems Research**

The objective of the Inspection Systems Research program area is to conduct research that will develop and validate inspection systems and repair practices that will better enable the aviation community to maintain the commercial aging fleet safely and more cost effectively. To accomplish these objectives, the FAA's research is conducted largely at two major centers that were established to specifically support the inspection and maintenance needs of the NAARP. One center, called the Center for Systems Reliability (CASR) was established in 1990 at Iowa State University to develop new and innovative inspection methods to solve the unique inspection challenges facing commercial aviation. The other center is the Airworthiness Assurance NDI Validation Center (AANC) which was established in 1991 at Albuquerque International Airport for the FAA by Sandia National Laboratories. The purpose of the AANC is to provide the FAA with a capability to conduct independent inspection and maintenance validation, reliability and technology transfer activities to facilitate the use of improved practices into the industry. Both CASR and the AANC serve to make up a significant part of the FAA's Airworthiness Assurance Center of Excellence (AACE) managed for the FAA by Iowa State and Ohio State Universities. For further information, contact David Galella at (609) 485-5784 or e-mail: [david.galella@tc.faa.gov](mailto:david.galella@tc.faa.gov).

**Safety**



### **Aircraft Engine Research**

Research in this program area is focused in two areas. The first will develop a crack growth-based predictive methodology for engine static components and use that methodology to derive a maintenance and inspection management program for commercial pressurized engine cases that may rupture due to fatigue cracks, initial flaws, or weld repairs. The second is developing improvements in titanium billet inspection practices and technology, analysis and enhancement of inspection reliability, and improvements to in-service inspections for engine components. A computer visualization of titanium defect is shown on the right. This research is being done by the Engine Titanium Consortium, which is made up of Iowa State University, General Electric, Pratt & Whitney, and AlliedSignal Engines. For further information, contact Richard Micklos, (609) 485-6531.

### **Airborne Data Monitoring Systems Research**

A video landing data acquisition system has been developed to collect data on typical landing impact conditions for both large and small transport aircraft, and a series of surveys are underway at commercial airports. In addition, flight loads data are being collected for large and small transport aircraft. For further information, contact Thomas DeFiore, (609) 485-5009.



### **Rotorcraft Structural Integrity**

The research in this area is focused on two activities. The first will provide input for an Advisory Circular on health and usage monitoring system certification criteria for rotorcraft. The second will address the use of damage tolerance methods to establish inspection intervals for existing and new rotorcraft designs. For further information, contact Dy Le, (609) 485-4636.

To find out more about the National Aging Aircraft Research Program, contact:

Airport and Aircraft Safety Research  
and Development Division  
Airworthiness Assurance Research  
and Development Branch

Federal Aviation Administration  
William J. Hughes Technical Center  
Atlantic City International Airport, NJ 08405  
Phone: (609) 485-5327  
Fax: (609) 485-4569  
<http://www.tc.faa.gov>

**Safety**