FactSheet

National Aeronautics and
Space Administration

Langley Research Center
Hampton, Virginia 23681-2199

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Runway Incursion Prevention

Cockpit displays could help reduce accidents

Runway incursion incidents and near accidents on airport runways, taxiways and ramps are on the rise. That greatly concerns national aviation safety officials.

These close calls between aircraft and other planes, ground vehicles and hazards have grown steadily. In the past five years there has been a 60 percent increase in runway incursions. In 1999, 320 incidents were reported. For the first half of 2000, incursions were on a record setting pace.

A NASA 757 aircraft was used to test advanced cockpit display systems at DFW Airport.

Various screen sizes were assessed.

The Federal Aviation Administration has launched a special initiative to improve airport surface operations safety and NASA is working to develop technology that will dramatically aid the FAA's efforts.

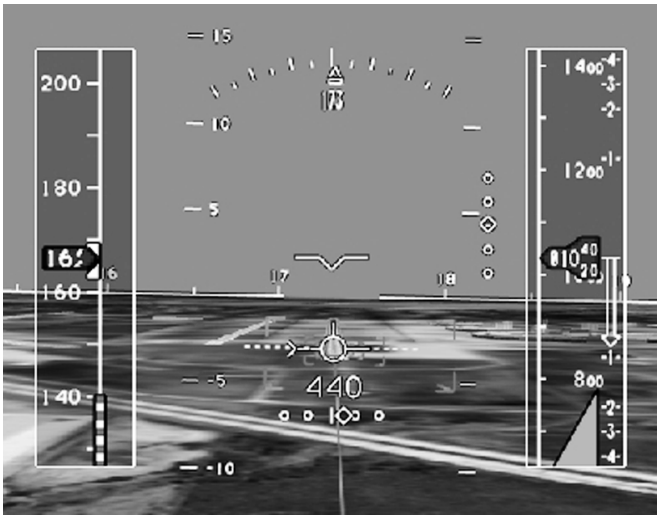
With the help of industry teams the NASA Aviation Safety Program, headquartered at the Langley Research Center in Hampton, Va., is designing advanced flight deck display systems.

Components of the systems include technologies that will provide flight crews with vital airborne and ground information, including terrain, ground obstacles, air traffic, landing and approach patterns and detailed airport surface maps.

These systems would improve aviation safety and efficiency by:

- alerting pilots to conflicting traffic in the air and on runways, taxiways and ramps
- allowing more aircraft to land safely on time in bad weather
- improving communication between pilots and air traffic controllers
- virtually eliminating the world's greatest cause of aviation fatalities-controlled flight into terrain or CFIT accidents

Flight tests at Dallas/ Fort Worth International Airport have provided data on NASA's concepts. Technicians equipped a NASA 757 aircraft with experimental cockpit displays and computer systems.



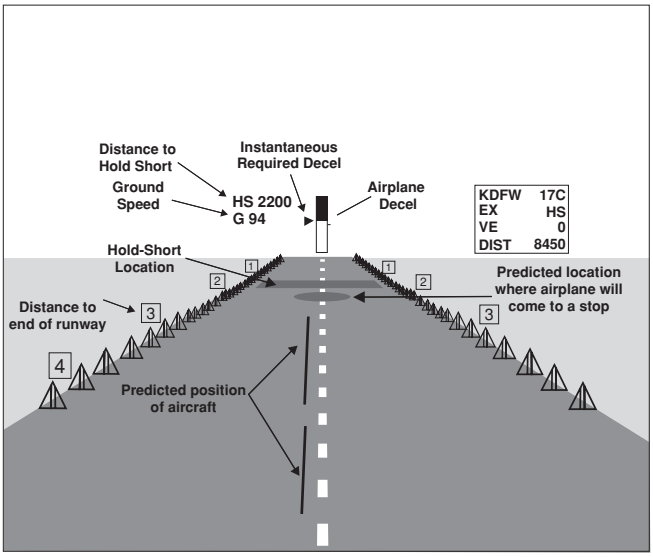
Runway Incursion Prevention System

NASA's Runway Incursion Prevention System (RIPS) integrates several advanced technologies into a surface communication, navigation and surveillance system for flight crews and air traffic controllers.

RIPS combines a head-down cockpit display of an electronic moving map of airport runways and taxiways with a head-up display that gives the pilot real-time guidance.

The system shows and sounds an alert if another plane or vehicle is about to encroach onto the runway.

RIPS also uses specially developed computer software, GPS signals and ground technologies developed by the FAA's Runway Incursion Reduction Program.



Synthetic Vision System

NASA's Synthetic Vision System combines Global Positioning System (GPS) signals, three-dimensional terrain databases and advanced sensors to give pilots revolutionary cockpit information.

Synthetic Vision would offer flight crews a clear electronic picture of what's outside, no matter what the weather or time of day.

NASA engineers and industry partners will test display sizes and concepts to determine which synthetic vision system configurations will be most effective in preventing accidents caused by limited visibility.

Hold Short Advisory Landing Technology

NASA's Hold Short Advisory Landing Technology (HSALT) is a guidance system that would increase the safety of land and hold short operations.

That's when air traffic controllers ask pilots who are about to land to come to a stop before a specific runway intersection.

On approach to landing, HSALT computes and displays information on a head-up and head-down display that can help a pilot decide if the plane can decelerate in time.

The system also gives the pilot information after touchdown to help safely stop the plane before the approved hold-short location.