



# Aviation Safety Program

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# Outline

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- Objective and Research Thrusts
- Technical Accomplishments
- NASA Research Announcement Status
- Industry Coordination
- Technical Plans



# Objective

Develop tools and methods for aircraft designers to incorporate revolutionary safety technologies and capabilities into their vehicles:

- Conduct long-term, cutting-edge research that will produce tools, methods, and technologies to improve the intrinsic safety attributes of current and future aircraft.
- Overcome safety technology barriers that would otherwise constrain full realization of the Next Generation Air Transportation System.

## Research Thrusts



Integrated Vehicle  
Health  
Management



Integrated  
Intelligent Flight  
Deck



Aircraft Aging  
& Durability



Integrated  
Resilient Aircraft  
Control



# Project Goals

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## Integrated Vehicle Health Management



Reduce system and component failures as causal and contributing factors in aircraft accidents and incidents.

## Integrated Intelligent Flight Deck



Produce tools, methods, concepts, principles, guidelines, and technologies for revolutionary adaptive flight deck systems that improve safety.

## Aircraft Aging and Durability



Detect, predict and mitigate or manage aging-related hazards for future aircraft.

## Integrated Resilient Aircraft Control



Provide onboard control resilience to ensure flight safety during adverse flight conditions.

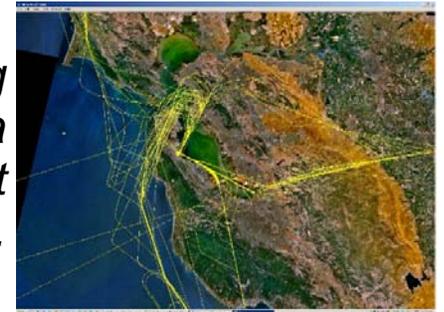


# Technical Accomplishments



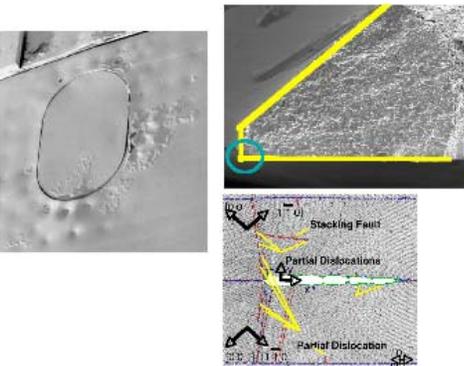
*Improved Icing Research Tunnel to enable research on super-cooled liquid droplets.*

*Demonstrated new data mining tools to query information from a distributed archive of flight operational data.*



*Converted NASA S-3 Viking aircraft for icing flight research.*

*Completed the Airborne Subscale Transport Aircraft Research testbed to be used to flight test technologies that will require highly unusual attitude.*



*Conducted computer modeling of crack growth in aging aircraft to develop failure mitigation techniques and the design of more damage-tolerant materials.*



# NRA Status

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- Round 1:
  - IIFD: 5 Selected and Awarded
  - IVHM: 8 Selected for Negotiation for Award
  - AAD: 7 Selected for Negotiation for Award
  - *All Round 1 awards anticipated by end of January*
- Round 2:
  - IIFD plans to release mid-January
  - IVHM and AAD plan to release early February
- IRAC will release later in 2007



# Industry Coordination

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Program works with **Commercial Aviation Safety Team (CAST)** and **International Helicopter Safety Team (IHST)** at systems design level for needs and requirements.

Projects work with **Industry Working Groups** at fundamental level for knowledge and capabilities:

## Principles:

- Facilitate knowledge transfer between working group and the Aviation Safety Program.
- Ensure that fundamental knowledge and understanding underpins new technology development.

## Working Groups:

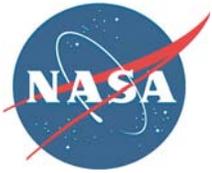
- Databases
- Modeling and Simulation
- Sensors
- Verification & Validation
- Algorithms and Signal Processing
- Vehicle State Awareness, Recovery & Control
- Flight Deck
- Aircraft Aging Challenges



# Technical Plans

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- Establish baseline for state-of-the-art aircraft safety concepts and flight deck information management systems. ('07)
- Complete feasibility study for assessment of active operator assistance in approach and landing task, including active attention management. ('08)
- Develop a framework that integrates Aircraft Aging and Durability technologies to detect, predict, and mitigate aging-durability related hazards and insert current state-of-the art methods in framework to establish a baseline. ('08)
- Develop and validate Integrated Vehicle Health Management sensor fusion, fault detection, and isolation methods, using aircraft landing gear system as a testbed. ('08)



# Find out more...

- Aviation Safety on the web...

The screenshot displays the NASA Aeronautics and Space Administration website. The header includes the NASA logo, the text "National Aeronautics and Space Administration", a "Contact NASA" link, and a search bar with the text "FIND IT @ NASA:" and a "+ GO" button. Below the header is a navigation menu with tabs for "ABOUT NASA", "NEWS & EVENTS", "MULTIMEDIA", "MISSIONS", "POPULAR TOPICS", and "MyNASA". The main content area features a large image of a person in a flight suit and a close-up of a cockpit instrument. The page title is "Aeronautics Research Mission Directorate". The "AVIATION SAFETY PROGRAM" section describes NASA's unique capabilities in aviation safety research, focusing on improving the safety of current and future aircraft. It lists several key areas: Aircraft Aging and Durability, Integrated Intelligent Flight Deck Technologies, Integrated Vehicle Health Management, and Integrated Resilient Aircraft Control. The page also includes a "Related Links" section with links to the Fundamental Aeronautics Program, Airspace Systems Program, Aviation Safety Program, Aeronautics Test Program, Timeline, and Summary POC. At the bottom, there is a "MORE NASA SITES:" section with a search bar and a list of links, including "2004 Vision for Space Exploration", "FY 2005 Budget Request", "2003 Strategic Plan", "Freedom of Information Act", "The President's Management Agenda", "FY 2002 Agency Performance and Accountability Report", "NASA Privacy Statement, Disclaimer, and Accessibility Certification", "Freedom to Manage", and "Erasmus Executive Dashboard (NASA Only)".

[http://www.aeronautics.nasa.gov/programs\\_avsp.htm](http://www.aeronautics.nasa.gov/programs_avsp.htm)