



**Aviation Safety Program**  
**System-Wide Accident Prevention**  
*FY 2001 Human Error Modeling Workshop*  
**October 18, 2001**



**Dr. Tina Beard**  
**Systems Safety Research (IHS)**  
**Human Factors Division**  
**Information Sciences and Technology Directorate**



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**FINAL REPORT  
TO  
PRESIDENT CLINTON**

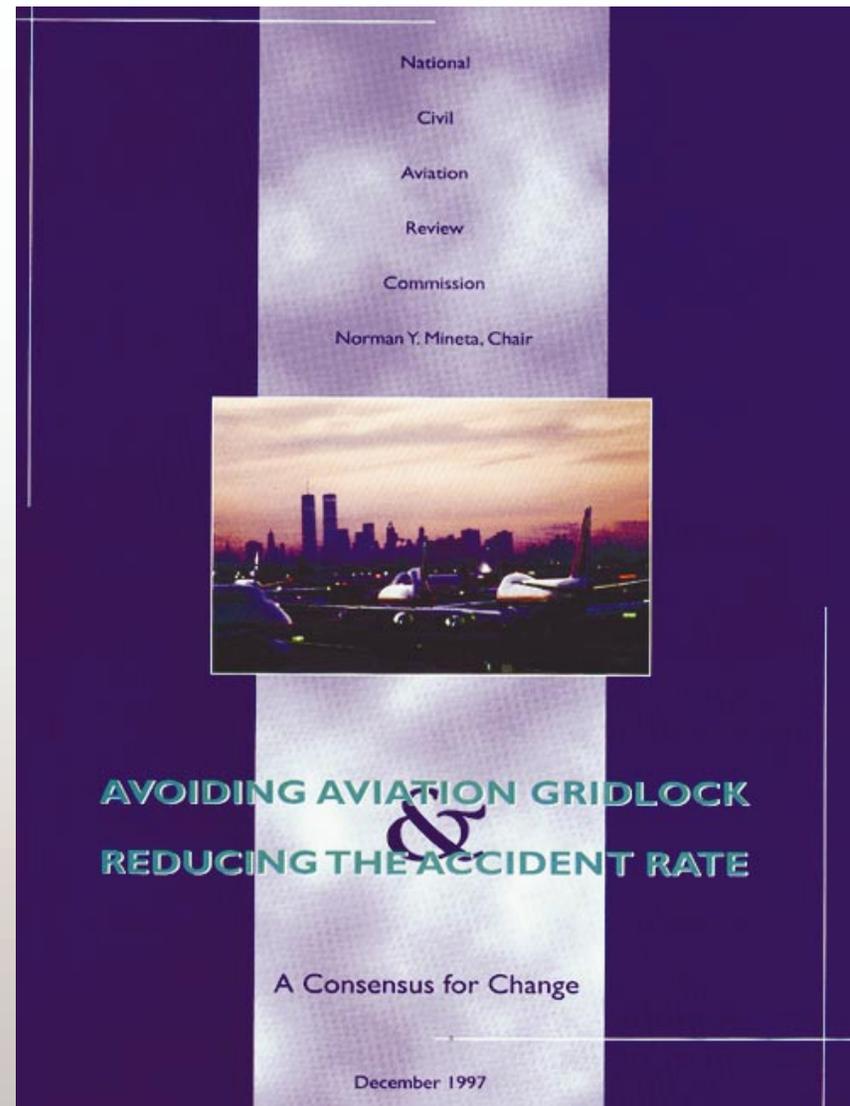


**White House Commission on  
Aviation Safety and Security**



**VICE PRESIDENT AL GORE, CHAIRMAN**

**FEBRUARY 12, 1997**



**“We will achieve a national goal of reducing the fatal aircraft accident rate by 80% within 10 years.”**

*President William J. Clinton, February 12, 1997*



# NASA's Response to National Goal



National goal of reducing the fatal aircraft accident rate by

- 80% within 10 years and by
  - 90% within 20 years
- 
- NASA Aviation Safety Investment Strategy Team (ASIST)  
Research needs to reach national goal defined
  
  - Aviation Safety Initiative
    - Base activities
    - Aviation Safety Program (AvSP)
      - R&T products needed to help the FAA and the aerospace industry reach national goal
      - 3 investment areas



# NASA Aviation Safety Program



## Vehicle Safety Technologies

LaRC Deputy: George Finelli

Single Aircraft Accident Prevention (SAAP) Manager: John White  
*Aircraft specific technologies*  
- LOC  
- Aircraft system/component failures

Synthetic Vision Systems (SvS) Manager: Dan Baize  
*Eliminate low visibility conditions as a causal factor to civil aircraft accidents*

Accident Mitigation (AM) Manager: Bob McKnight  
*Occupant protection technologies*

## Weather Safety Technologies

GRC Deputy: Doug Rohn

Weather Accident Prevention (WxAP) Manager: Shari Nadell  
- Weather information  
- Communication  
- Turbulence prediction and warnings

Aircraft Icing (AI) Manager: Mary Wadel  
*Eliminate icing as a safety hazard*

## System Safety Technologies

ARC Deputy: Brian Smith

Aviation System Monitoring & Modeling (ASMM) Manager: Dr. Irv Statler  
- Tools to analyze and characterize NAS  
- Predictions of system-wide effects of changes

System-Wide Accident Prevention (SWAP) Manager: Dr. Tina Beard  
*Reduction in or mitigation of human error*



# System-Wide Accident Prevention



*Uses current knowledge about human cognition to develop mitigation strategies to address current trends in aviation accident and incident profiles*

## Training

Manager: Dr. Key Dismukes

## Maintenance Human Factors

(MHF)

Manager: Dr. Barbara Kanki

## Program Human Factors

(PHF)

Manager: Dr. Tina Beard

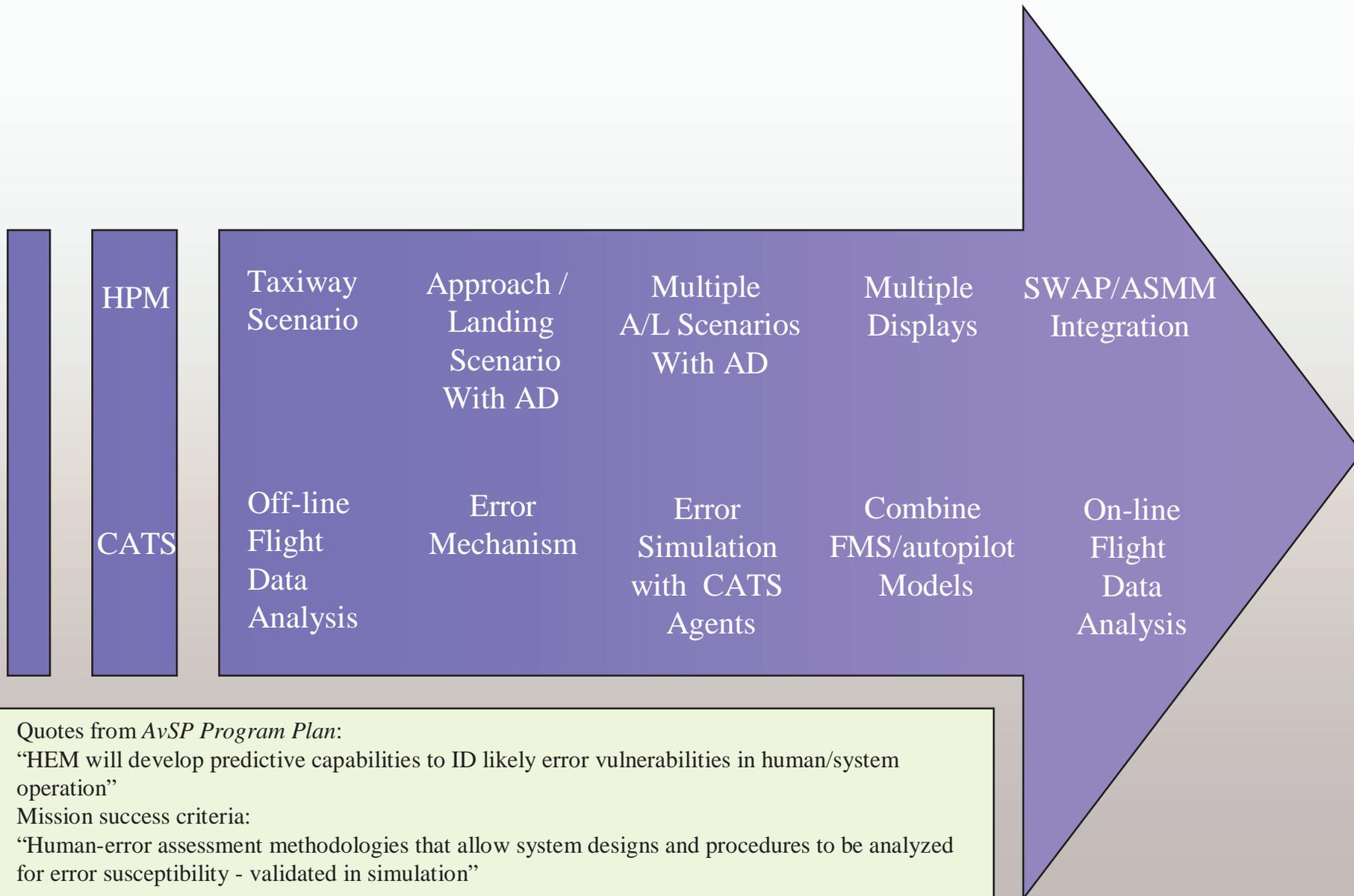
## Human Performance Modeling

(HPM)

Manager: Dr. David Foyle



# Human Performance Modeling





# *Currently Funded Architectures*

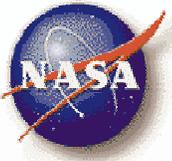


## **Human Performance Models**

- **APEX** - Architecture for Procedure Execution
- **Air-MIDAS** - Man-Machine Integrated Design & Analysis System
- **D-OMAR** - Operator Model Architecture
- **ACT-R/PM** - Adaptive Control of Thought- Rational/Perceptual Motor
- “**Situational Awareness**” model
- **IMPRINT/ACT-R** - Improved Performance Research Integration Tool
- **FAIT** - Function Allocation Issues and Tradeoffs

## **Intent Inferencing Model**

- **CATS** - Crew Activity Tracking System



# Human Performance Modeling Workshop



*Thursday October 17, 2001*

0900	Becky Hooey & Dave Foyle, Monterey Technologies at ARC	A post hoc analysis of navigation errors during surface operations
0930	Allen Goodman, San Jose State University Foundation at ARC Human Error Modeling Team	Outline of TNASA modeling task
1000	Coffee	
1015	Ron Laughery & Ken Leiden Micro Analysis & Design	Review of cognitive modeling systems
1100	Alex Kirlik & Mike Byrne Haskins Laboratory Team ACT-R	Integrated modeling of cognition and the information environment
1200	Lunch	
1315	Chris Wickens & Jason McCarley University of Illinois Team SA	Attention-Situation Awareness (A-SA) model of pilot error
1415	Rick Archer and team Micro Analysis & Design Team IMPRINT	Human Error Modeling: IMPRINT & ACT-R
1515	Coffee	
1530	Entire group	Identification of issues for modeling in FY 2002 & discussion
1615	Close	
1830	Café ProBono	Dinner