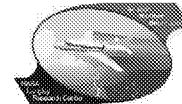
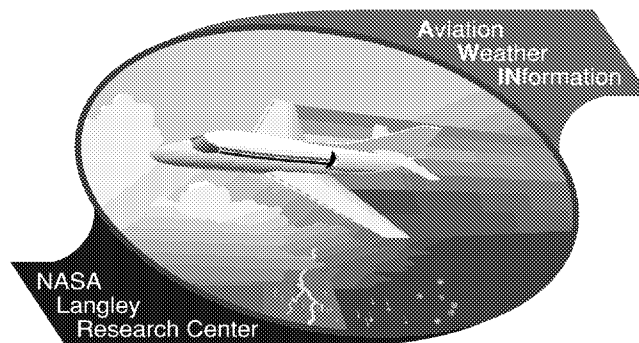


## Aviation Safety Program AWIN B-757 Flight Test



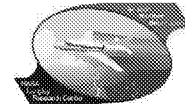
# NASA Langley WINN System Operational Assessment

Jon Jonsson, Ph.D.  
NASA Langley Research Center



## Aviation Safety Program

### AWIN B-757 Flight Test



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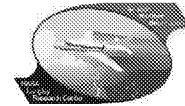
## OBJECTIVES



- ☐ Determine if near real-time weather information presented on the flight deck improves pilot situational awareness of weather.
- ☐ Identify pilot interface issues related to the use of WINN system during test flights.

## Aviation Safety Program

### AWIN B-757 Flight Test



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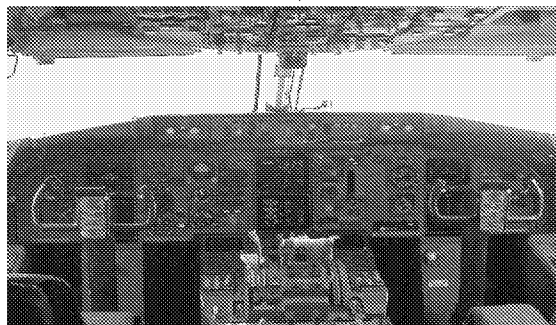
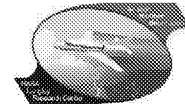
## APPROACH



- ☐ NASA pilots used for test subjects (4).
- ☐ Flights conducted on typical airline routes.
- ☐ Test flights scheduled on days of expected convection along the flight path.
- ☐ Video and audio recording of pilot use of WINN.
- ☐ Situational awareness data (verbal & scaled).
- ☐ Post test questionnaire.

# Aviation Safety Program

## AWIN B-757 Flight Test

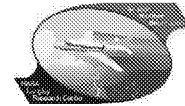


**Flight Deck Research  
Station (FDRS)**

**Conventional B-757**

## Aviation Safety Program

### AWIN B-757 Flight Test

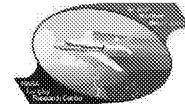


## Near-Time Cockpit Weather Display on NASA B-757



## Aviation Safety Program

### AWIN B-757 Flight Test



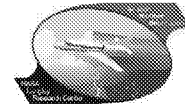
## Selected Post-Test Questionnaire Results



- ✓ Overall WINN interface intuitive to pilots.
  - ✓ Bezel buttons preferable to touch screen to access weather products.
  - ✓ Weather forecast products useful in decision making.
  - ✓ WINN anticipated to save time and fuel.
  - ✓ History feature useful for *strategic* planning.
  - ✓ History feature not useful for *tactical* planning.
- }

## Aviation Safety Program

AWIN B-757 Flight Test



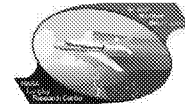
### Selected Post-Test Questionnaire Results

- ✓ *ΔColors on the display appeared clearly and accurately.*
- ✓ *ΔEntering different altitudes to examine CAT wx product.*
- ✓ *ΔMETAR and TAF entry for reporting.*

Δ **Squawks corrected on WINN-Lite Display.**

## Aviation Safety Program

AWIN B-757 Flight Test



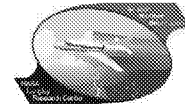
### "Six to One; Half Dozen to the Other"

#### Areas Requiring Further Research

- ✓ Position of display.
- ✓ Ease of determining displayed weather product age.
- ✓ Identification of a precision controller.
- ✓ Ideal time for automated weather updates.

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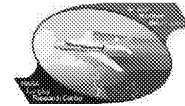
### Tactical versus Strategic Wx Replanning

Generally I think, this [system] can obviously provide some very good strategic weather planning information. I still think that for tactical [flying]--deviating around individual cells--or looking out to about 100 miles, I would probably still prefer [using] my aircraft weather radar. But looking down the road, an hour or two down the road, this system could be very helpful.

**How best to implement new products (NEXRAD, CAT)  
with existing systems?**

## Aviation Safety Program

AWIN B-757 Flight Test



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### Research Issues Emerging from 757 Flight Test



Color schemes with multiple weather products being shown on the display.

Cloud top information **crucial** for decision making.

NEXRAD: Is the db Reflectivity occurring at **my** cruise level or 10,000 feet below me?

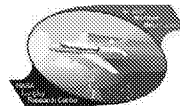
Age of data.

- ▶ Update Rate?
- ▶ How to Display?

# Aviation Safety Program

## AWIN B-757 Flight Test

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Questions and Comments