

# R&D on Single-Pilot Cockpit Safety Tools and Decision Aids

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**John Helleberg**

**May 3, 2019**

**Business Aviation Safety Summit**

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established  
**1958**

**not-for-profit**

**conflict-free**  
environment

science &  
technology

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To serve the public interest by advancing the **safety, security, effectiveness, and efficiency** of aviation in the **United States and around the world** by conducting a continuing program of research, development, and engineering **in collaboration with the aviation community**

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# Research and Development of Digital Copilot

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# Single-Pilot Cockpit Safety Challenge

**Solo flight is riskier than flight with a crew**

**Single-pilot accident rate is  
~ 3 times higher than crew rate**

**Single-pilot fatal accident rate is  
~ 13 times higher than crew rate**

**Second set of eyes improves safety**

Robert E. Breiling and Associates' 2010

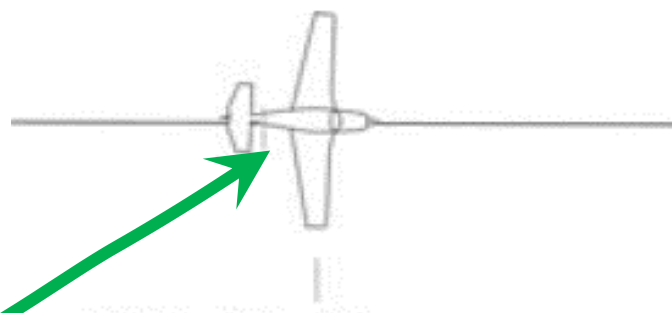
# Information Overload



# Support for Single Pilots

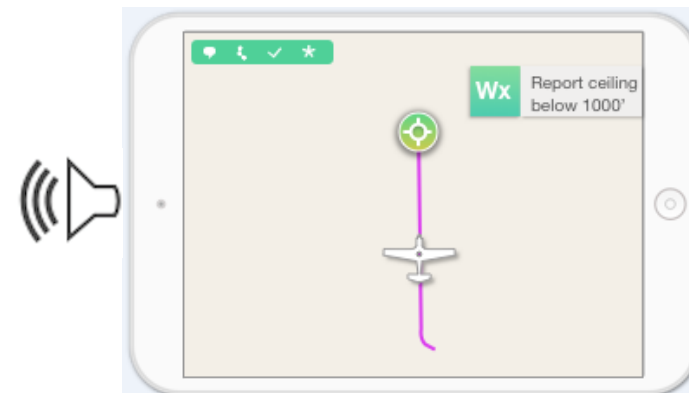


**Right Information**



*ATIS Frequency for Manassas is  
125.175*

**Right Time**

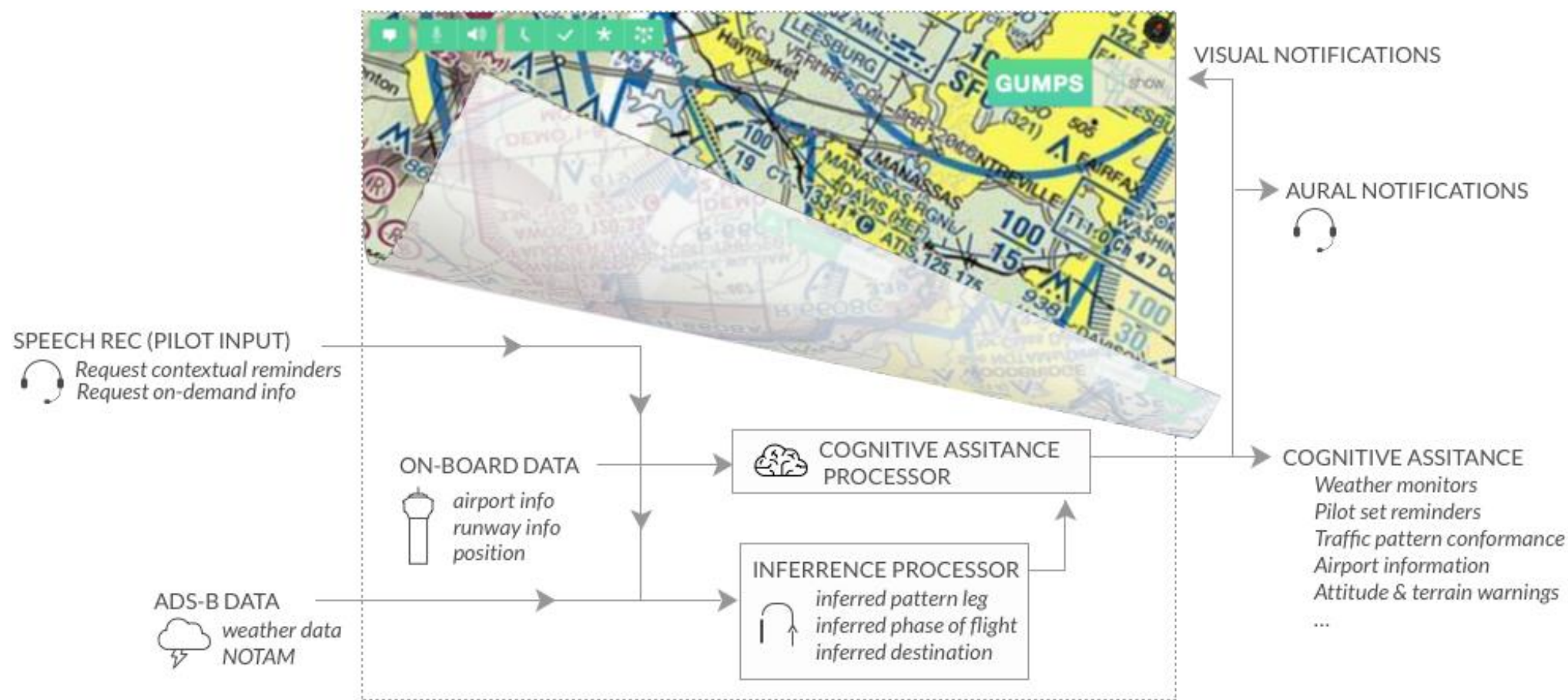


**Right Format**





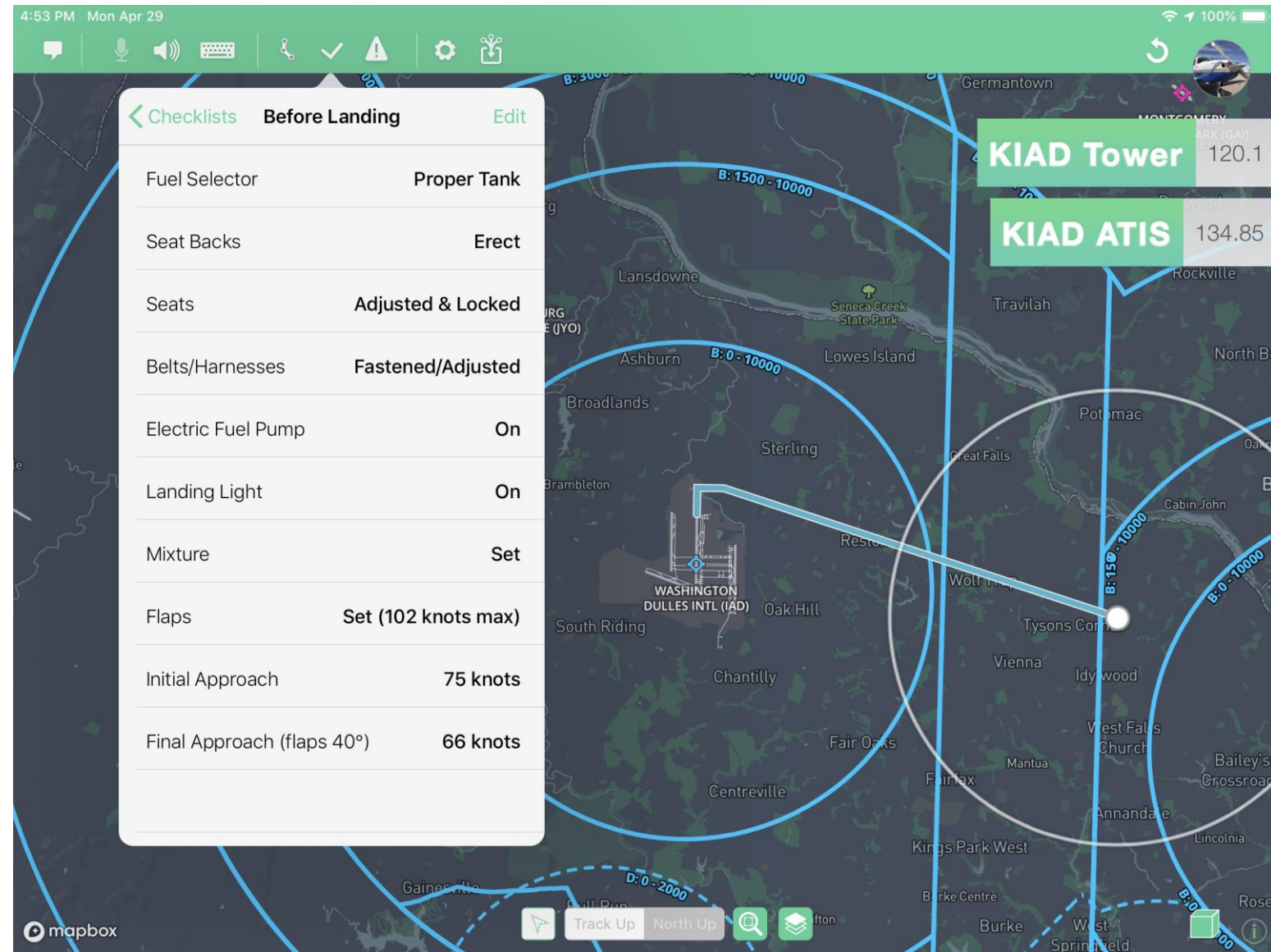
# What is Digital Copilot?



# On Demand Information

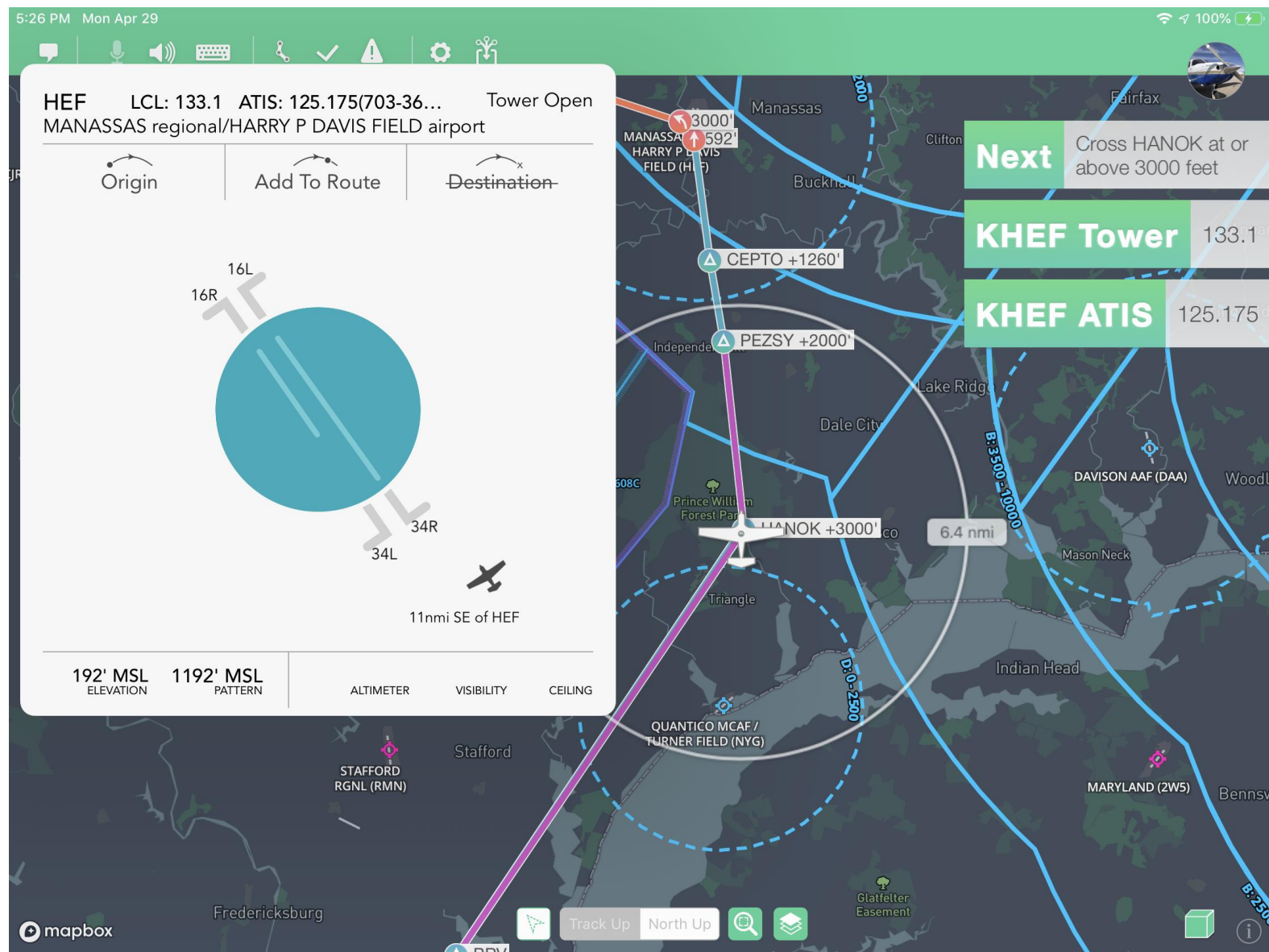


# Checklists





# Destination Summary





# Automatically Provided Information



Visibility decreasing  
34 miles ahead



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# Progressive Approach

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# Lining up for the Wrong Airport

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# Lining up with the Wrong Surface

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# Flying Toward Rising Terrain

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# Research and Development

## Pilot Workshops



## Flight Tests



## Modeling and Lab Studies



# Analysis Results

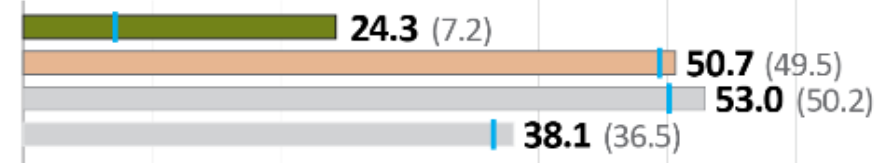
## Pilot Task Times Comparison

Digital Copilot compared to other Electronic Flight Bag (EFB) software

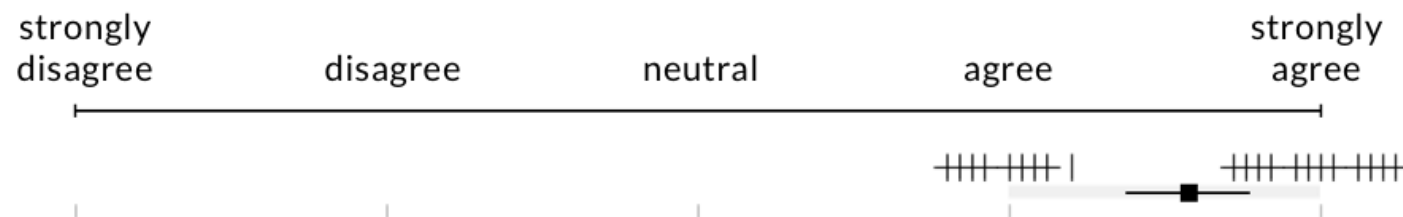


Time in seconds

Review and Follow a Checklist



Digital Copilot has the potential to decrease workload during single-pilot operations

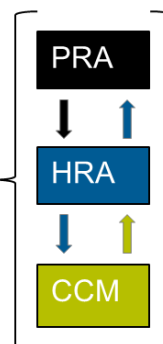


Data



Retrospective  
(Calibration)

Model



Prospective  
(Prediction)

System



↓ 20%

↓ 30%







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