Cognitive Walkthrough with a Commercial Pilot for Preliminary Single Pilot Operations Experiment
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Introduction

History of the Commercial Cockpit
- 50 years ago – 5 crew members
  15x accident versus today
- 1980s – 3 crew members
  10x accident rate versus today
- Today – 2 crew members
  Highest traffic density
- Future – 1 crew member?

Why a Single Pilot?
- $$$ - Commercial airlines want it
- Changing role of pilots to becoming “monitors”
- Technology has been demonstrated with UAVs

My Task as an Intern
- Work directly with a subject matter expert (commercial pilot) to develop a cognitive walkthrough to examine the specific details of current cockpit verbal and nonverbal communication
- The results of this cognitive walkthrough were decisive in providing information for scenario development in Single Pilot Operations (SPO) studies.

Alignment with NASA Research

How Did I Assist in NASA Research?
My cognitive walkthrough helped to create challenging (computer-based) scenarios for trained pilots. These scenarios will be used in an experiment to test cockpit operations in the following 3 conditions:
- Solo
- Beside a co-pilot
- With a co-pilot located in a different room

Purpose
To conduct a semi-structured interview with an experienced commercial and ex-military pilot to gather essential information that will be used in scenario development for future SPO experiments.

Methods
- Semi-structured interview
- Voice recorder
- Scenario Prototype

Example Questions
- For what would you rely on your co-pilot before and after receiving the holding instructions?
- What would be the first thing you would do when the airborne weather system fails?
- What would be your expectations of the ATCs during each phase of flight?

Results
- Prototypical Scenario and flowchart of events created as the basic template for future SPO experimental scenarios in the Flight Deck Display Research Laboratory at Ames
- Identified key verbal and nonverbal communication transfere issues from current day to single pilot operations
- Recyclable Cognitive Walkthrough questions created

Future Work
- Perform Cognitive Walkthroughs and Task Analysis with multiple pilots in high-fidelity (777 simulator) and low-fidelity (desktop computers) environments to identify, reduce, and control differences between the two environments
- This will drastically reduce costs and improve efficiency in all future SPO studies