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Exploring Perceived Usability and Interpretability of Aviation Weather Products Among GA Pilots

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Exploring Perceived Usability and Interpretability of Aviation Weather Products Among GA Pilots

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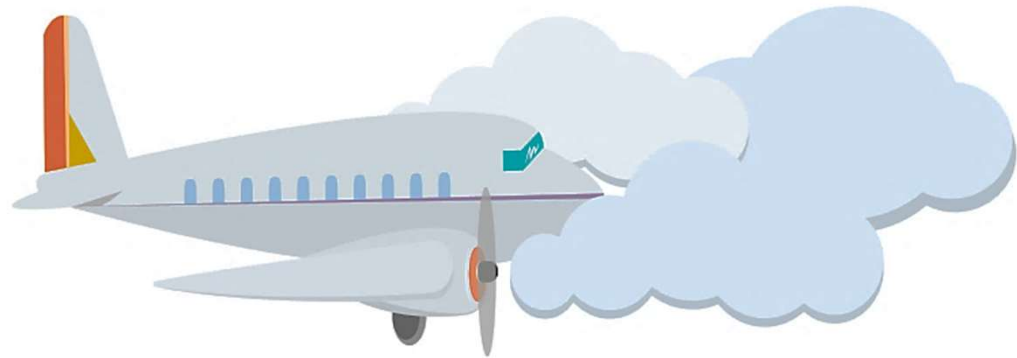
Agenda

- Introduction
- Results
- Discussion
- Current Investigations

Introduction

General Aviation Weather Accidents

- 480 weather-related accidents from 2008-2017 (AOPA, 2019)
- Majority of these accidents due to flying VFR into IMC



Aviation Weather Products

- Preflight weather planning is an essential step to determine if route is safe
- Pilots must look at a variety of weather products to create a holistic picture

Observation



Reports of current weather

- Radar
- Satellite

Forecast



Reports of future weather

- Prognostic Chart
- Winds Aloft

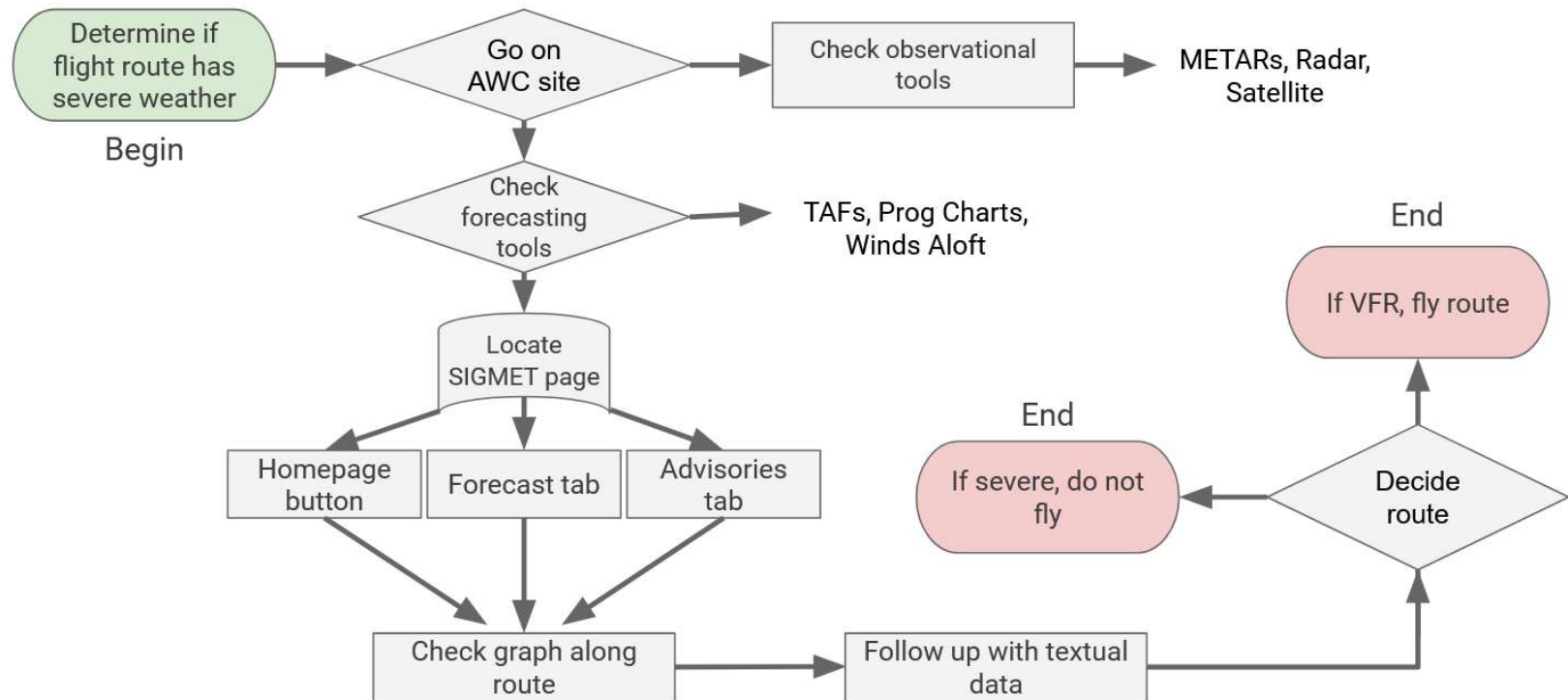
Advisory



Warnings for severe weather

- SIGMET
- AIRMET

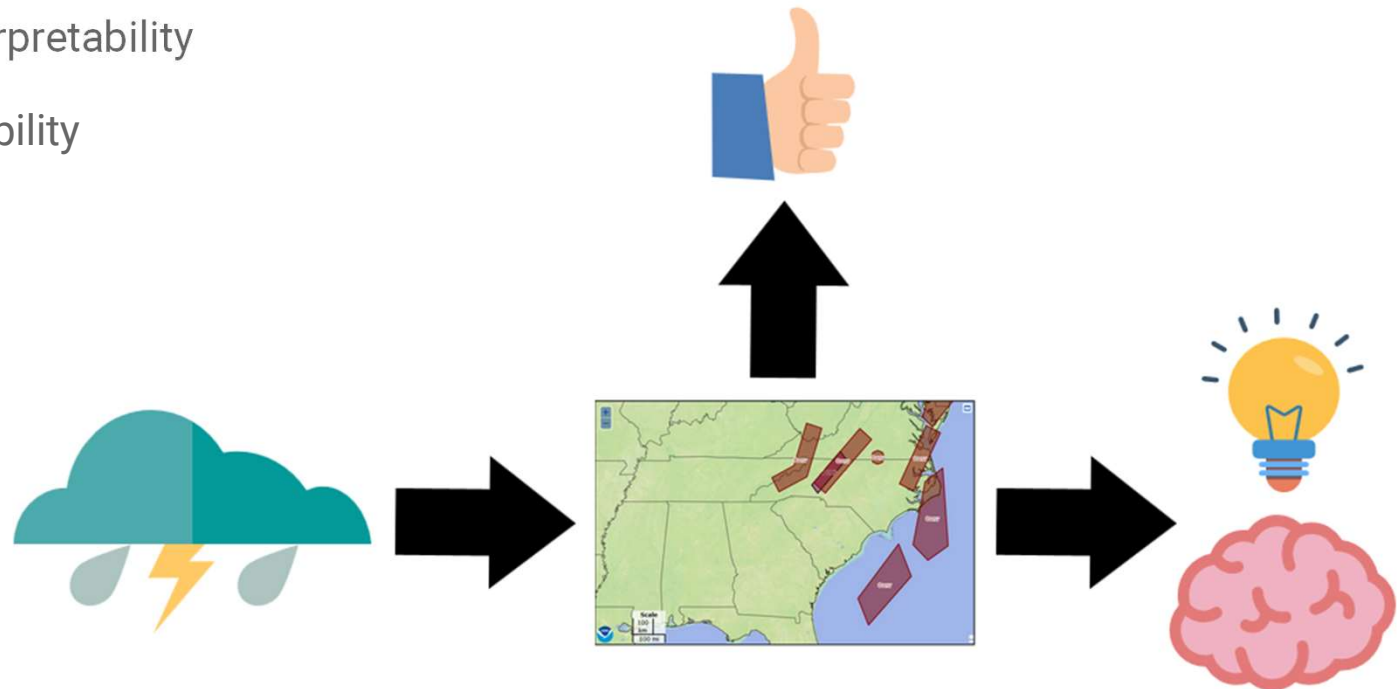
Example: SIGMETs



McSorley, 2018

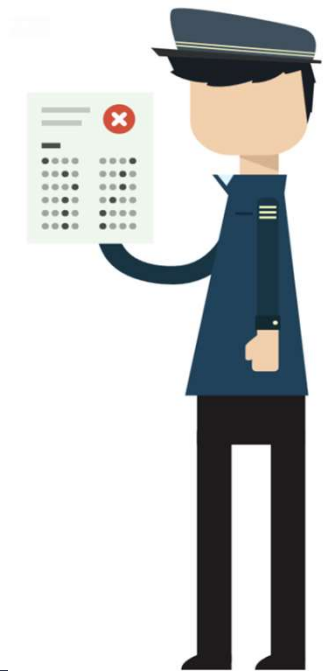
What could be causing problems?

- Product interpretability
- Product usability



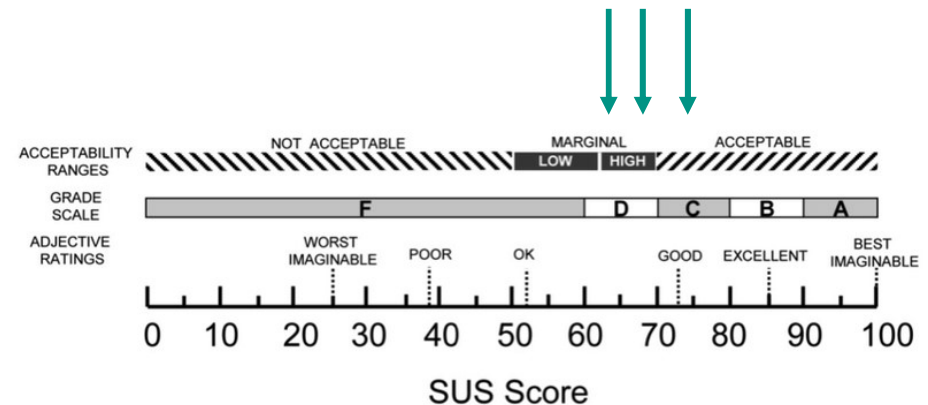
Interpretability

- Study conducted by Blickensderfer et al. (2017) tested pilots on their aviation weather knowledge and product interpretability
- 95 questions
 - 12 SIGMET (Cronbach's $\alpha = .67$)
 - 5 Surface Prognostic Chart (Cronbach's $\alpha = .59$)
 - 8 Winds Aloft (Cronbach's $\alpha = .61$)
- Results found that pilots scored highest on Winds Aloft, average on Surface Prognostic Charts, and poor on SIGMETs



Usability Analysis

- A modified System Usability Scale was used to assess different aviation weather products (Remy, 2017)
- SUS is used to evaluate perceived usability on a 100-point scale (Brooke, 1986)
- Results indicated
 - Winds Aloft = 74
 - Surface Prognostic Charts = 68.63
 - SIGMETs = 64.13



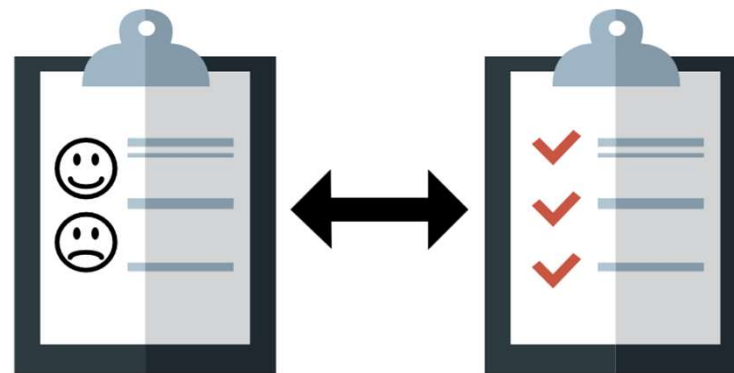
(Bangor et al., 2009)

SUS

1. I think that I would **like to use this weather information frequently** on the Aviation Weather Center website.
2. I found the weather information **unnecessarily complex** on the Aviation Weather Center website.
3. I thought the weather information was **easy to use** on the Aviation Weather Center website.
4. I think that I would **need the support of a technical person** to be able to use this weather information on the Aviation Weather Center website.
5. I found the various functions in this weather information were **well integrated** on the Aviation Weather Center website.
6. I thought there was **too much inconsistency** in using this weather information on the Aviation Weather Center website.
7. I would imagine that most people would **learn to use this weather information very quickly** on the Aviation Weather Center website.
8. I found the weather information **very cumbersome** to use on the Aviation Weather Center website.
9. I **felt very confident** using the weather information on the Aviation Weather Center website.
10. I **needed to learn a lot of things** before I could get going with this weather information on the Aviation Weather Center website.

Purpose

Investigate whether the perceived usability ratings in Remy (2017) are comparable to product interpretability performance scores (Blickensderfer et al., 2017)



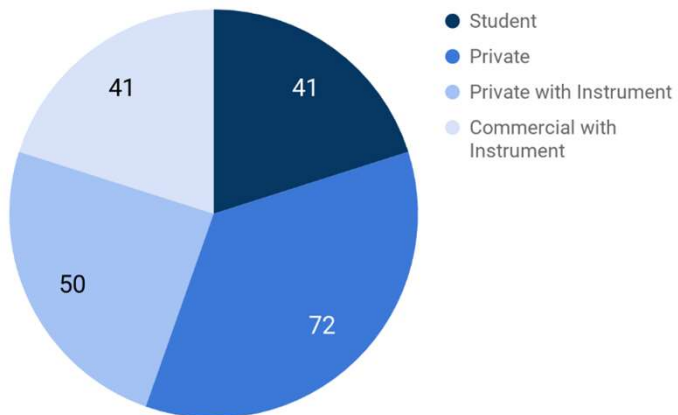
Results

Participants

Blickensderfer et al., 2017

- 204 pilots
- Mean Age = 22.5 ± 2.57
- Mean Flight Hours = 201.4

Pilot Certificate and Rating



Remy, 2017

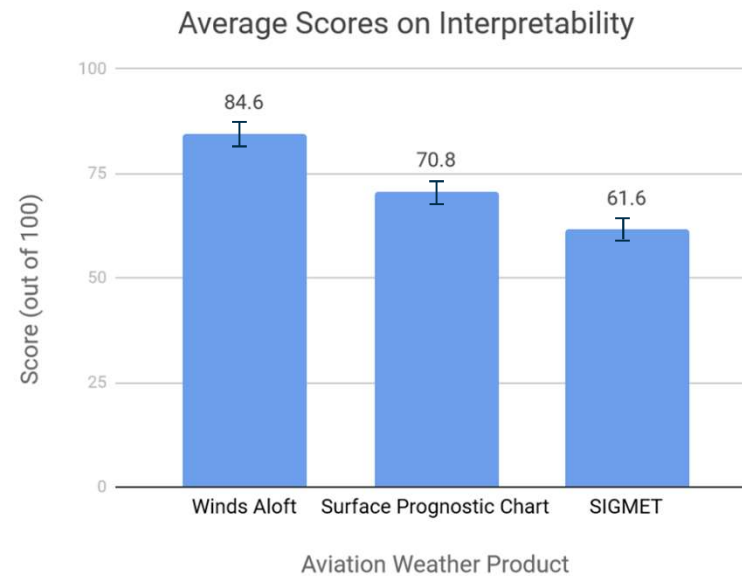
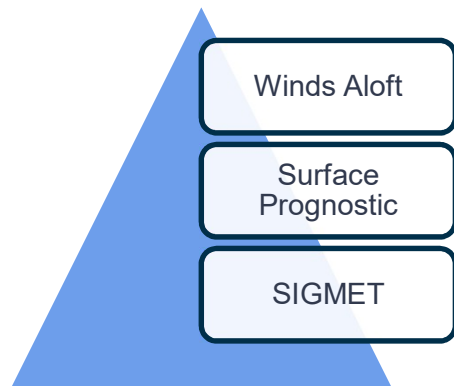
- 20 pilots
- Mean Age = 27.4 ± 9.6
- Mean Flight Hours = 674.4



Blickensderfer et al., 2017 Results

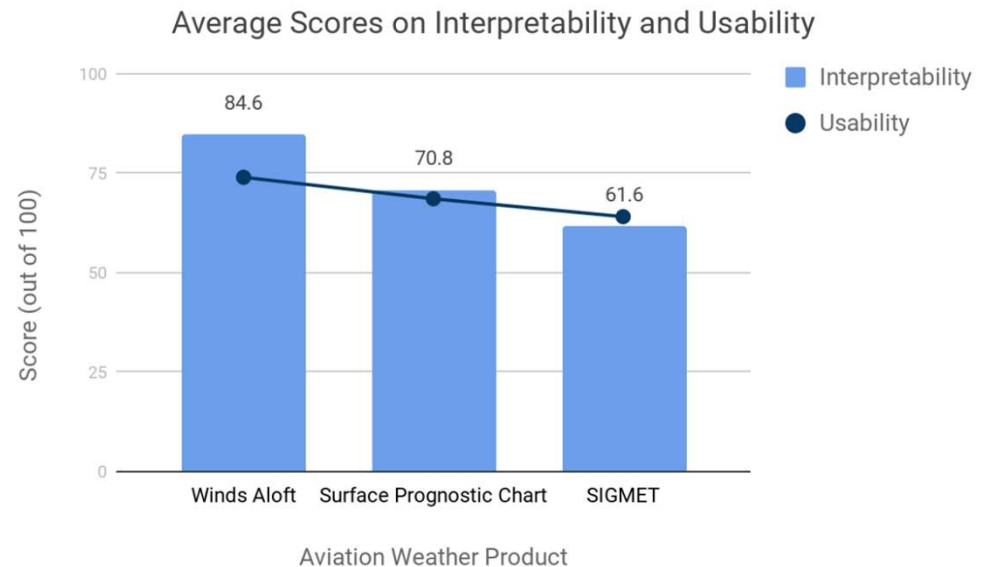
One-way repeated measures ANOVA

- Wilks' $\Lambda = 0.539$, $F(2, 202) = 86.33$, $p > 0.01$, partial $\eta^2 = 0.46$



Comparison of Blickensderfer et al. (2017) and Remy (2017) datasets

- Both datasets trend in the same direction
- No access to usability data to actually conduct statistical tests
- Higher usability scores seem to parallel higher interpretability scores

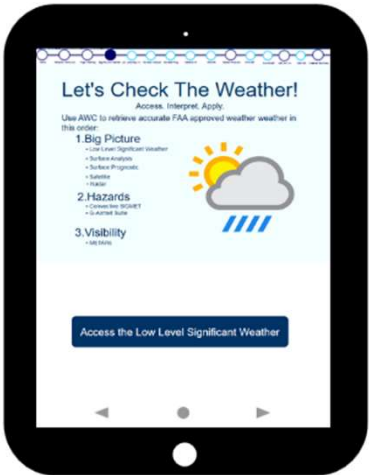


Discussion

Discussion

- **Results Summary:** Interpretability of aviation weather products is comparable to perceived usability in a similar study
- **Limitation: Two different samples**
 - Difference in sample size
 - Don't have access to dataset from Remy (2017)
- **Next Steps:** Identify specific usability characteristics of these weather products to promote understanding of the display and information provided
- **Conclusion:** *Improving usability may improve interpretability of aviation weather products*

Current Lab Investigations



Questions?

References

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Graphics created in **Piktochart**