Weather Self-briefings in General Aviation: A Human Factors Perspective

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Weather Self-briefings in General Aviation: A Human Factors Perspective

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Background: Pre-flight Briefing for Weather

• FAA requires GA pilots to obtaining information prior to flight; GA pilots should gather all information vital to the nature of the flight.

• This includes a weather briefing obtained by the pilot from an approved weather source, via the Internet, and/or from a Flight Service Station (FSS) specialist.
*In the event of an incident or accident, investigators can review what information was presented to the pilot.

*Currently contracted to Leidos.

**Note:** There are no requirements in CFR to review specific products it is up to the Pilot In Command (PIC) to review whatever they deem necessary before flight. It is good practice however, that the PIC uses a method of obtaining weather information that records a log of their preflight weather briefing.
Pre-flight process:

Call-in Briefing vs. Self-Briefing

CALL-IN BRIEFING

- Pilot has a voice conversation with a live Flight Service Specialist (FSS)
- FSS is responsible for: obtaining and interpreting weather observations and forecasts and conveying that information to the pilot.

SELF-BRIEFING

- Pilot performs a weather pre-flight process on their own.
- Pilot is responsible for accessing the weather observations and forecasts, interpreting the information, and applying it to their flight plan.
Conceptual Model

Ortiz, King, & Blickensderfer
Inflight Weather Scenario: Lowering Ceiling During Cruise
Does GA pilots’ understanding and performance differ depending on type of weather pre-flight?

Ortiz, King, & Blickensderfer
Trend 1: GA Pilots are increasingly Self-Briefing for Weather

AOPA 2020 Study (n = 3000)

- Aviation applications were the most reported source used for initial pre-flight planning by pilots.
- What is your primary source of pre-flight weather information (CONUS)?
  - 46% aviation application (e.g., ForeFlight or Garmin Pilot)
  - 23% Flight services (Trending down from 2017, 2018, 2019)
  - 12% Aviation Weather Center website
Trend 2: Pilots are still using FSS

- 15% of all pilots reported **not** contacting Flight Services.
- Of those that did contact Flight Services, about 51% always conducted self-service planning activities beforehand.
Trend 3: Research indicates that flight experience has a limited effect on a pilots’ capability to interpret weather.

(Blickensderfer et al., in press)
Trend 4: GA Pilots have misconceptions about weather radar displays

Pilots exhibited more hazardous behavior when using high resolution radar displays (Beringer and Ball (2004); Latorella & Chamberlin (2002, 2004)).

Radar displays fail to communicate to pilots (Knecht, 2016)

GA pilots performed poorly on weather radar interpretation questions (Blickensderfer et al., 2017, in press).
Trend 5: Aviation Weather Products differ on ease of interpretability by GA pilots
Trend 6: Human-in-the-loop simulation studies of weather self-briefings indicate weaknesses in GA pilots’ weather understanding.

Two Human-in-the loop, simulation-based studies
- High fidelity preflight weather scenarios
- Mock-up of Aviation Weather Center website

Pilots held incorrect weather expectations for most of the route including the destination airport (Ortiz, 2018). Errors may include:
- Accessing the correct/issued valid time for weather products
- Not reading/interpreting the weather information in its entirety
- Calculating weather condition heights incorrectly

GA Pilots who used a performance support tool for weather self-briefing spent less time in IMC than those who did not have assistance during the self-brief. (King, 2020)
Conclusions and research directions

- General Aviation is undergoing a tremendous shift from weather call-in briefings to independent, self-briefings.
- Survey research shows that many pilots are shifting away from call-in briefings.
- Existing literature indicates pilots misinterpret aviation weather products (e.g., weather observations and forecast displays).
- Additional research is needed to understand possible performance decrements and provide design and training recommendations.
- As a first step, ERAU researchers are currently conducting a controlled, laboratory study comparing Weather Self-briefing to Call-in briefing.

*To improve flight safety, we must understand the impact of the technology change and design user centered interventions.*
Thank you!

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