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# Personal Safety Culture: A New Measure for General Aviation Pilots

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## Presenter Information

Bradley S. Baugh, Kimberly M. Bracewell, Urara Takano, Mattie N. Milner, Emily C. Anania, Nadine K. Ragbir, Mudhur Bharat Gupta, Diego M. Garcia, Drishti O. Valecha, Daniel A. Marte, Scott R. Winter, and Stephen Rice

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# Personal Safety Culture: A New Measure for General Aviation Pilots

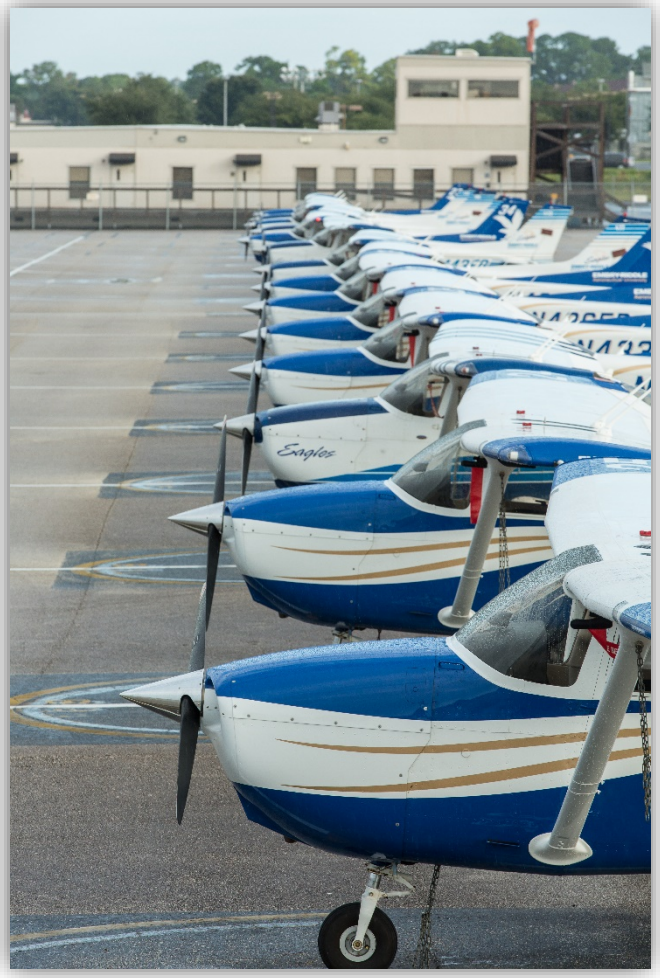
Presentation at the National Training Aircraft Symposium

August 14, 2018

Presented by: Bradley S. Baugh, Kimberly M. Bracewell, Urara Takano, Mattie N. Milner, Emily C. Anania, Nadine K. Ragbir, Madhur Bharat Gupta, Diego M. Garcia, Drishti O. Valecha, Daniel A. Marte, Scott R. Winter, Stephen Rice

# Presentation Overview

- Why did we do it?
- How did we do it?
- What is next?

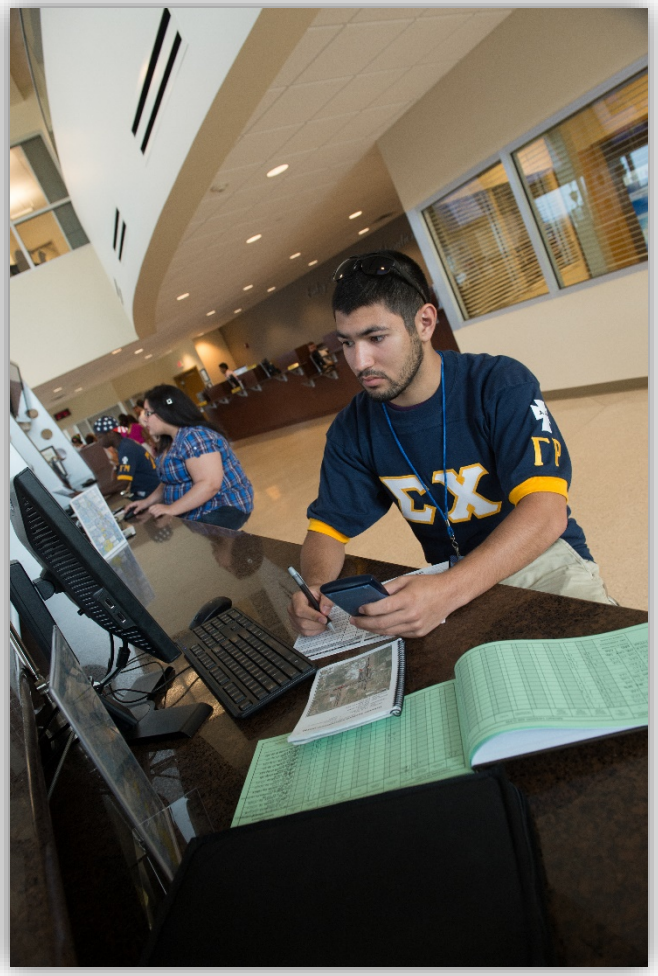


# Why did we do it?

- Loss of Control Working Group
  - Two-year review
  - Multiple safety recommendations

- Safety Enhancement 33 (SE-33)

*Need for a scale to measure safety culture of those general aviation pilots who operate outside of a formal flying organization*



# How did we do it?

- Conducted literature review
  - 167 documents
  - Key theme in literature: organizational safety culture
- Developed an initial instrument
  - Identified 5 themes w/ 5-7 questions per theme
  - Adopted risk perception from Hunter (2006)[2]
  - Enlisted expert review for Face Validity
- Collected data
  - 379 surveys collected
  - Target was 300 for statistical analysis
- Analyzed and provided initial psychometrics
  - Instrument revised based on analysis

# Methods

- Surveyed 379 pilots (45 female); average participant age was 22.03 (*SD* = 5.17) years old
- Minimum requirements; 18 years old and at least private pilot certificate
- Participants reported an average of 377.38 (*SD*= 727.12) total flight hours with an average of 19 (*SD* = 20.97) hours in previous 30 days
- A 33-question instrument was developed using a 5-point Likert scale
- Data gathering occurred during the Spring 2018 semester
- Sample of 300 was the target for the principle components analysis (PCA)[3]

# Results

- 344 of 379 questionnaires were deemed usable due to skipped questions
- Six questions removed; 27 items met criteria for the PCA
  - Three did not meet correlation coefficient requirements
  - One did not meet Kaiser-Myer-Olkin (KMO) requirements
  - Two were incorrectly coded in the instrument design
- PCA pre-checks indicated remaining data could be factorized
- Five components had eigenvalues greater than one suggesting retention[4]
  - This make-up explained 60.94% of the total variance
  - Used Varimax orthogonal rotation; solution was a 'simple structure'[5]
- Bottom line: the components were deemed consistent with safety culture

# Preliminary 5 Factor Scale Sections

**Proposed Factors**

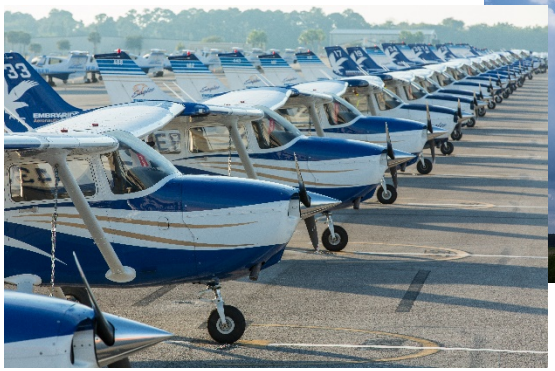
- Personal commitment
  - 5 items
- Risk perception
  - 9 items
- Responsibility
  - 6 items
- Safety reporting
  - 7 items
- Learning
  - 6 items

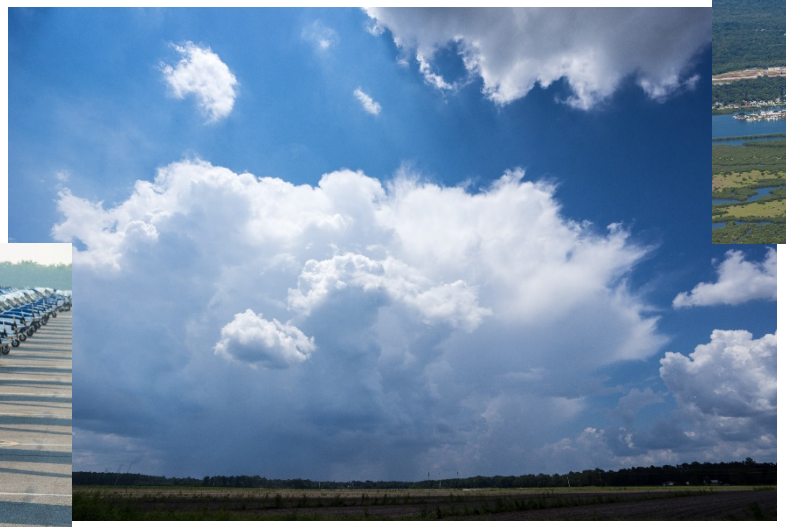
**Identified Factors**

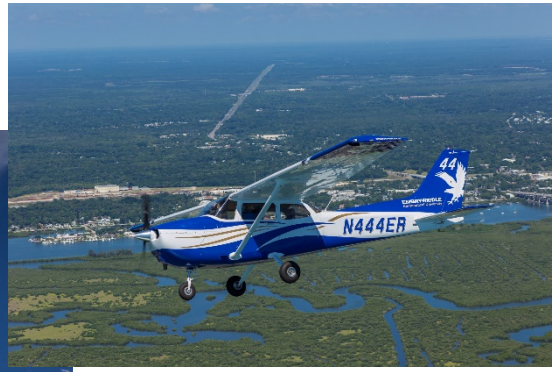
- Safety Attitudes
  - 11 items
- Risk Perception
  - 6 items
- Safety Citizenship
  - 3 items
- Safety Reporting
  - 4 items
- Safety Practice
  - 3 items

# What is next?

- Expand data collection
- Conduct confirmatory factor analysis







# Summary

- Improving GA safety is vital; ERAU provided expertise to aid safety efforts
- Project based on comprehensive literature review
- Initial data analysis resulted in development of 5 factor scale
- Next step is to expand data collection

# Acknowledgement

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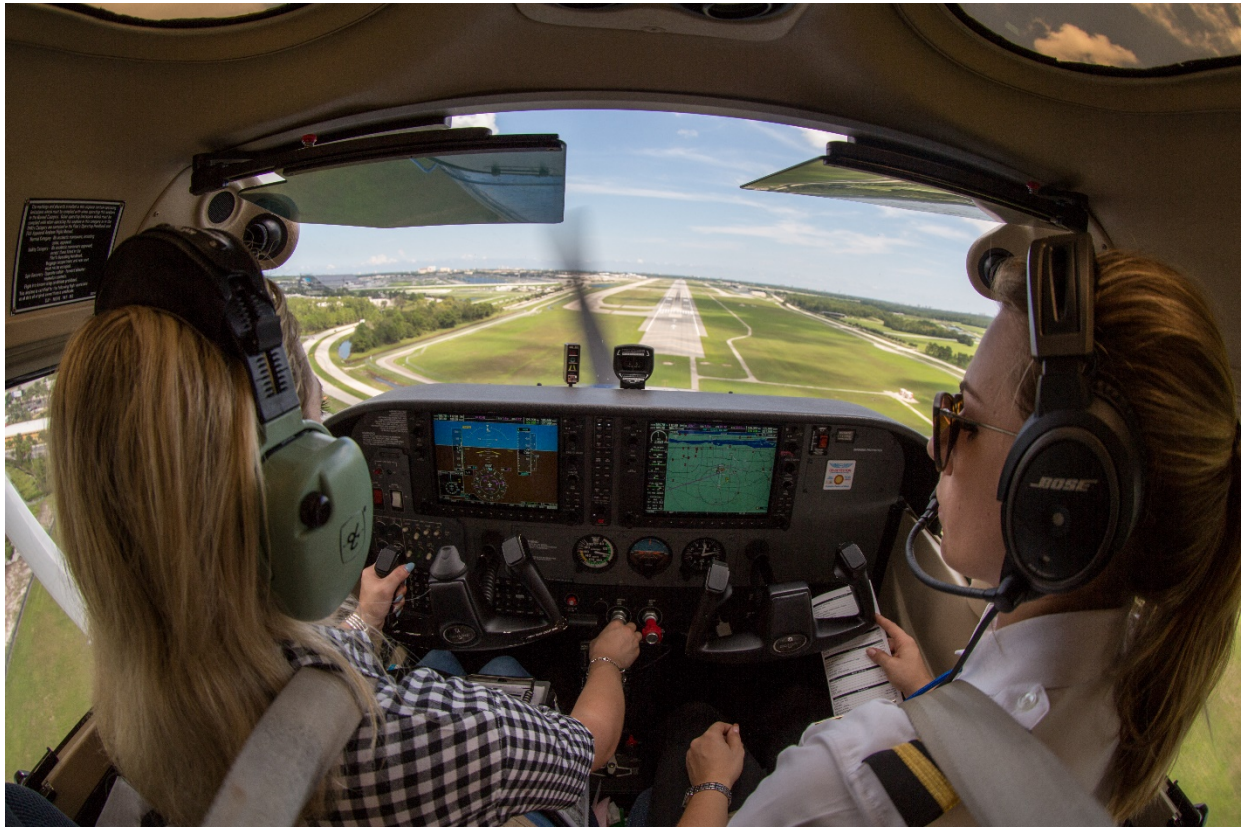
# QUESTIONS?



# References

[1]All photos credited to Embry-Riddle Aeronautical University

[2]Hunter, D. R. (2006). Risk perception among general aviation pilots. *The International Journal of Aviation Psychology, 16*(2), 135-144. doi: 10.1207/s15327108ijap1602_1

[3]Gorsuch, R. L. (1983). *Factor analysis.* Hillsdale, NJ: Erlbaum.983; Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate data analysis 7th edition*. New Jersey: Pearson.; Tabachnick, B. G. (2007). *Using multivariate statistics.* Boston: Pearson Education.

[4]Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, *1*, 245-276. doi: 10.1207/s15327906mbr0102_10

[5]Thurstone, L. L. (1947). *Multiple factor analysis*. Chicago, IL: University of Chicago Press.