

Testing Quick Reference Handbooks in Simulators

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Preface

Abstract

This is an abstract.

Declaration

I declare that this dissertation represents my own work except where otherwise stated.

Acknowledgements

This is the acknowledgements.

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Chapter 1

Introduction

Context

- Designing Emergency Checklists is difficult
- Procedures in checklists must be tested in simulators [1], which usually means trained pilots test it, as the tests need to work consistently [2] (making sure it's not lengthy, concise and gets critical procedures)
- Checklists are usually carried out in high workload environments, especially emergency ones

Problem

- Testing procedures in checklists are often neglected [1]
- There are some checklists that may not be fit for certain scenarios - e.g. ditching (water landing) checklist for US Airways Flight 1549 assumed at least one engine was running [3], but in this scenario, there were none
- Some checklists may make pilots 'stuck' - not widely implemented, could be fixed with 'opt out' points. e.g. US Airways 1549, plane below 3000ft, could have skip to later in the checklist to something like turn on APU, otherwise plane will have limited control [3].
- Checklists may take too long to carry out - Swissair 111

Rationale

- Test checklists in a simulated environment to find flaws in checklist for things like
 - Can be done in an amount of time that will not endanger aircraft
 - Provides reproducible results
 - Procedures will not endanger aircraft or crew further (Crew referring to Checklist Manifesto with the cargo door blowout)
- Results in being able to see where to improve checklists

Chapter 2

Background

Chapter 3

Design/Implementation

3.1 Abstraction

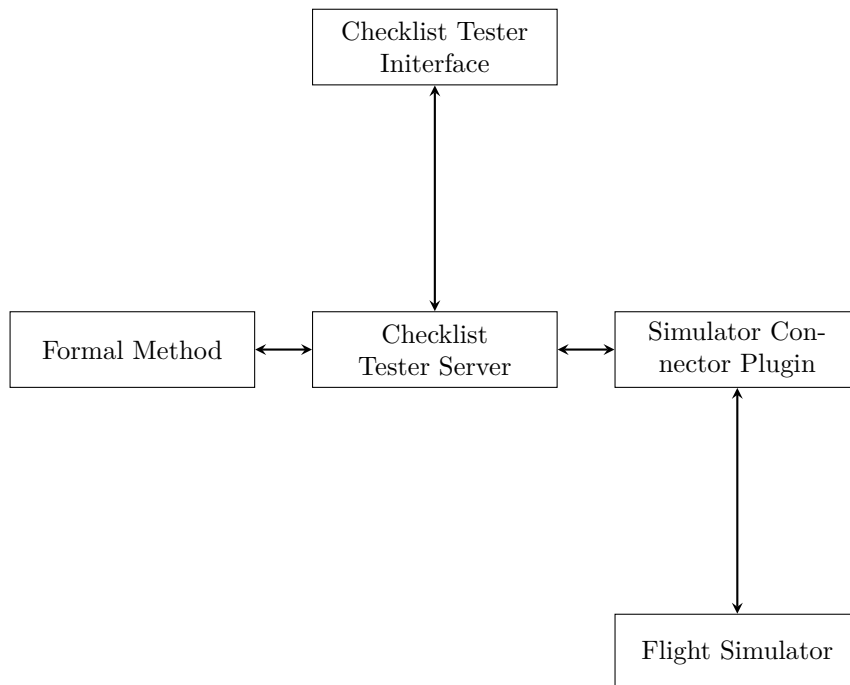


Figure 3.1: Abstract layout of components

Chapter 4

Results

Chapter 5

Conclusion

References

- [1] Immanuel Barshi, Robert Mauro, Asaf Degani et al. *Designing Flightdeck Procedures*. eng. Ames Research Center, Nov. 2016. URL: <https://ntrs.nasa.gov/citations/20160013263>.
- [2] Atul Gawande. *The Checklist Manifesto: How To Get Things Right*. Main Edition. Profile Books, July 2010. ISBN: 9781846683145.
- [3] National Transportation Safety Board. *Loss of Thrust in Both Engines After Encountering a Flock of Birds and Subsequent Ditching on the Hudson River*. Technical Report PB2010-910403. May 2010. URL: <https://www.nts.gov/investigations/Pages/DCA09MA026.aspx>.
- [4] Barbara Burian. ‘Design Guidance for Emergency and Abnormal Checklists in Aviation’. In: *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* 50 (Oct. 2006). DOI: [10.1177/154193120605000123](https://doi.org/10.1177/154193120605000123).
- [5] Quinn Kennedy, Joy Taylor, Daniel Herandez et al. ‘Intraindividual Variability in Basic Reaction Time Predicts Middle-Aged and Older Pilots’ Flight Simulator Performance’. In: *The Journals of Gerontology: Series B* 68.4 (Oct. 2012), pp. 487–494. ISSN: 1079-5014. DOI: [10.1093/geronb/gbs090](https://doi.org/10.1093/geronb/gbs090). eprint: <https://academic.oup.com/psychsocgerontology/article-pdf/68/4/487/1520662/gbs090.pdf>.
- [6] Civil Aviation Authority. *Aircraft Emergencies: Considerations for air traffic controllers*. CAP745. Mar. 2005. URL: <https://www.caa.co.uk/cap745>.
- [7] The Overture Project. *The Vienna Development Method*. URL: <https://www.overturetool.org/method/> (visited on 23/02/2024).