2018

The correlation between Human Physiology with Advancement of Technology in Aviation

FINAL YEAR PROJECT

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Statement of Submission:

This is to certify that I ‘Numra Mir (ID: 14006001004)’ has successfully submitted the final year disquisition on January 09, 2018 highlighting “The correlation between Human Physiology and Advancement of Technology in Aviation” at University of Management and Technology as a part of partial requirement of the Bachelor’s degree in Aviation Management (BS.AM)

Capt. Imran Saeed

Director Institute of Aviation Studies (IAS).

Resource Person:

The project has been completed under the continual support, motivation and assertion of **Air Commodore Mr. Khalid Chisti (Retd.)**. I extend my heartiest regards to him as his visionary perspective of doing things has helped me to work with sheer dedication and flexibility while focusing on quality output.

Achievements:

Sitara -e- Imtiaz (Military), Sitara -e- Basalat.

Profile:

With theexperience and learning from the PAF, he has served in various squadrons as a leader after joining PAF as fighter pilot in 1977. With more than 3000 flying hours, he has also determinedly served as an Instructor Pilot for Mirage, F-6 and FT- 5 fighter jets. The role of Assistant to Air Force Chief on Training and Education at Air Headquarters and Base Commander of a training base are just the few highlights of his life achievements.

After being retired from PAF as an Air Commodore in 2012, his role in commercial aviation has also been significant. He has been the part of ‘Shaheen Airport Services’ as a General Manager for four years.Also a successful entrepreneur in food industry and motivational and educational leader in different universities and plat forms.

Signature Supervisor.

Dedication:

In the name of Allah, The most Merciful and The most Benevolent.

I would like to extend the acknowledgement of all my work and achievements in these years to all those praying hands whose blessings had made me grow and achieve the things with honor.

This would have been incomplete without the support of Allah - Al -Mighty, my parents, teachers and all those friends whose continuous assurance about my work has developed a sense of motivation in me to achieve my goals.

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List of Abbreviations:

Below given is the list of abbreviations that will be used throughout the research and its significance with the entitled page numbers.

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LCD	Liquid Crystal Displays	25
MAC	Mean Aerodynamic Cord	
PH	Power of Hydrogen	17
RCBS	Red blood cells	15
SID	Standard Instrument Departure	25
STAR	Standard Terminal Arrival Route	25
TUC	Time of Useful Consciousness	15
TCAS	Traffic Collision Avoiding System	25
VFR	Virtual Flying Rules	11
VOR	Very High Frequency Omni Directional Range	25
VNAV	Vertical Path Navigation	34

1. Abstract

Aviation has always been a focus especially after the establishment of the importance of air transport within the people. Analysts have been always in the pursuit to seek knowledge of aviation and implement the latest research. One such focus has been the technology that is always changing within the field. Initial research in the field of aviation in advancement discovered new avenues and changed the whole concept of flying from visual to instrumental and then glass cockpit variations.

1.1. Purpose of Study:

The purpose of this study is to analyze the human cognitive and physiological limitations and its correlation withadvancement in commercial aviation.

Will majorly emphasize on:

- What to automate and to what level because the final input depend on human cognition and physiology.
- How much the current automation allows the operator to remain engageat higher altitudes as technology is going faster than a human to predict?

1.2. Problem Identification:

Increasing the technology in aviation after a certain level is not a source of increased productivity and compromise safety as there is a limit to human physiology at high altitude whereas high altitude can be defined as anything which is 5000ft above mean sea level. This man- machinery interaction still needs human input to carry out activities so their limitations have direct impact on advancement and operating the technology.

Although technology has been evolutionary in aviation but the active role of human has been changed to supervisory flux on automation due to advancement making operator reluctant to use their own abilities.

1.3. Project Goal:

- To determine a fit between technological advancements, human cognition and physiologicallimits in aviation.
- Establishing the need of human centered automation approach rather than technology centered.

2. Executive Summary

As we all know the growth of advance in technology helped aviation to flourish in the world transporting people from one place to other with the efficient and safest means in the early 1970 to late 90s. It helped pilots to maintain a more precise and accurate view of flight dynamics onboard lowering the risks of human error that contributed to major accidents in aviation resulting the loss of lives but this explains one side of the story.

The purpose of me to undertake this study is to highlight the unanticipated issues that arises due the non-correlation of human physiology because of the fast pace advancement of technology in aviation. The latter half of the study will discuss the details of human physiology and its limitations that were taken into consideration initially before designing and implementing the new parameters that proved to be successful in the evolutionary era up to a certain level of technology changes.

However, the next half of the project will highlight the important preview of automation phases and the unanticipated issue establishing the fact that increasing automation up to a certain level in aviation industry doesn't contribute to any significant growth in safety and efficiency anddoesn't relate with the human philology as it has failed to create a fit between man and machinery interaction.

The conclusion will discuss the relatable cockpit interface and training and safety solutions to prevent these issue and promoting the active status of humans rather than supervisory role.

3. Introduction

The advancement in automation in commercial aviation on a higher level is just a myth about the technology that it contributes to productivity and efficiency. The incorporation of technology with human reasoning lead to huge changes in the field of aviation. That do resulted in reduced human error at certain level but gave rise to unanticipated problems because it fails to create a fit between human cognition and physiological limitations with technology.