INNOVATION FAIR

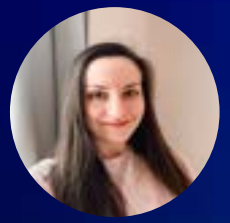
12 | 14 MARCH 2024

My Thesis in 180 Seconds

Gladys Mercan

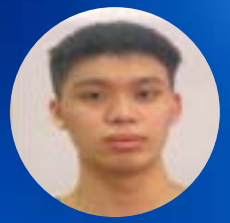
Associate Innovation Officer, ICAO

Panel Speakers



Katerina Grotschelova

Czech Technical University



Eugene Ng

Embry-Riddle Aeronautical University Asia

Sara Dabbas

Al Hussein Technical University (HTU)

Muhammad Danial Azraf Bin Muhammad Mazlan

Temasek Polytechnic

Andras Galffy

CEO, Head of Research & Technology,
Turbulence Solutions

Katerina Grotschelova

Czech Technical University

Aviation safety and security laboratory

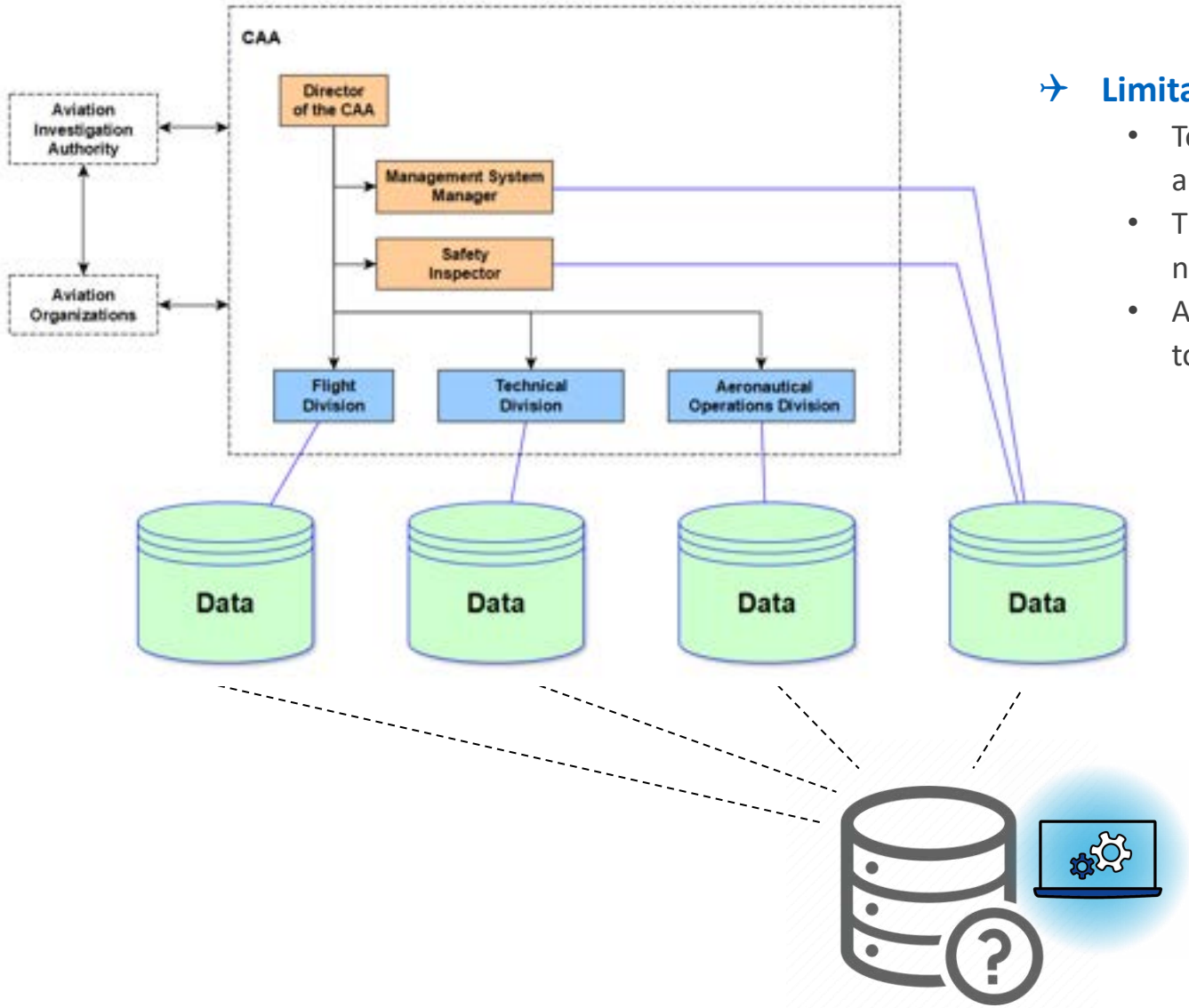
CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE

Development of Knowledge Management System for Safety Oversight of Civil Aviation Authorities

Kateřina Grötschelová

12.3.2024

Motivation



✈ Limitations of the Current State

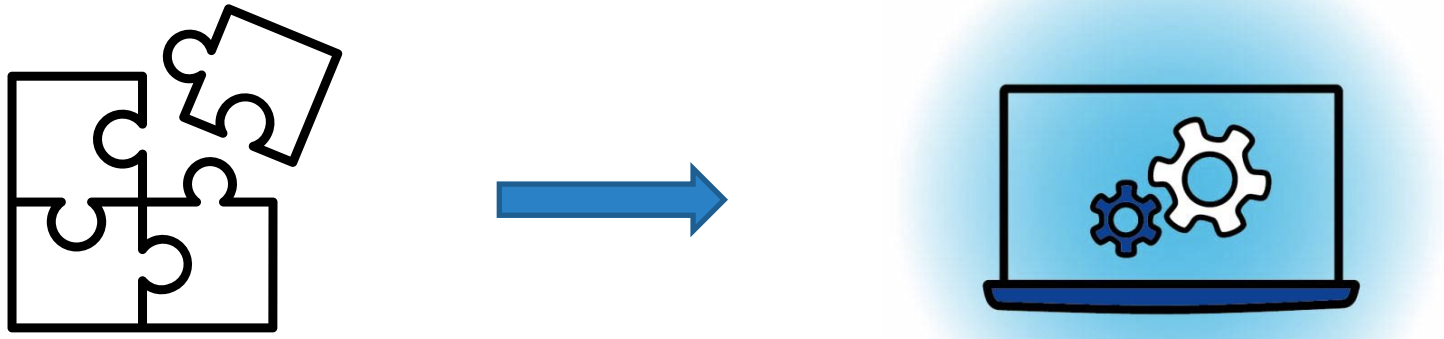
- Today's tools/systems only work with some types of data and information
- The tools/systems are always used by only a limited number of individuals
- A "fragmented system" can cause important information to be lost or duplicated

✈ Problem Statement

✈ **Current tools and systems based on safety perfor mance monitoring for state safety oversight are fragmented and unable to store the knowledge available among different civil aviation authority departments.**

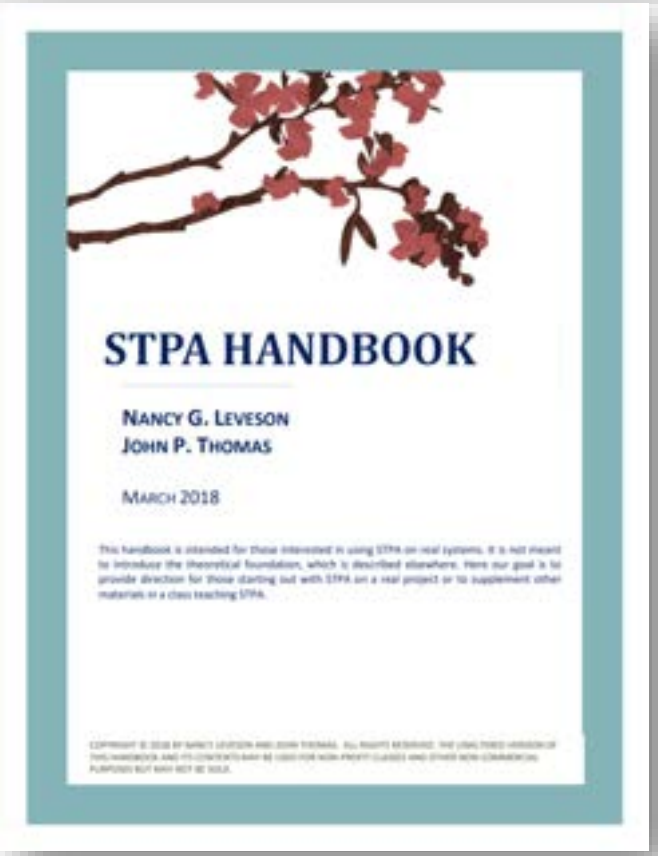
Goal

- **Goal is to propose the concept of single, integrated knowledge management system for state safety oversight based on safety performance monitoring that will store knowledge available among different civil aviation authority departments.**



Model STAMP

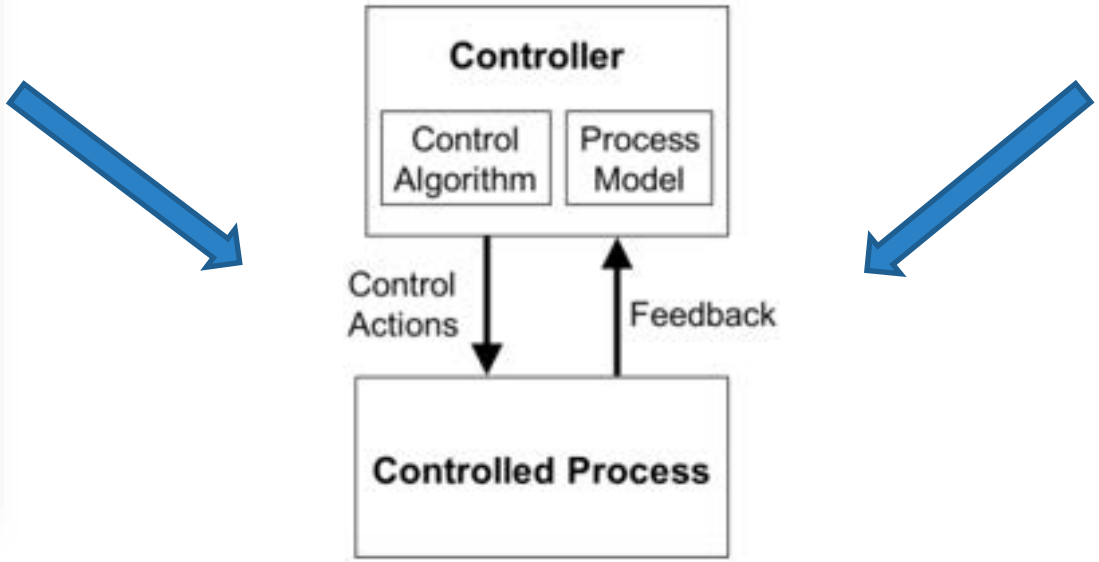
(System-Theoretic Accident Model and Process)



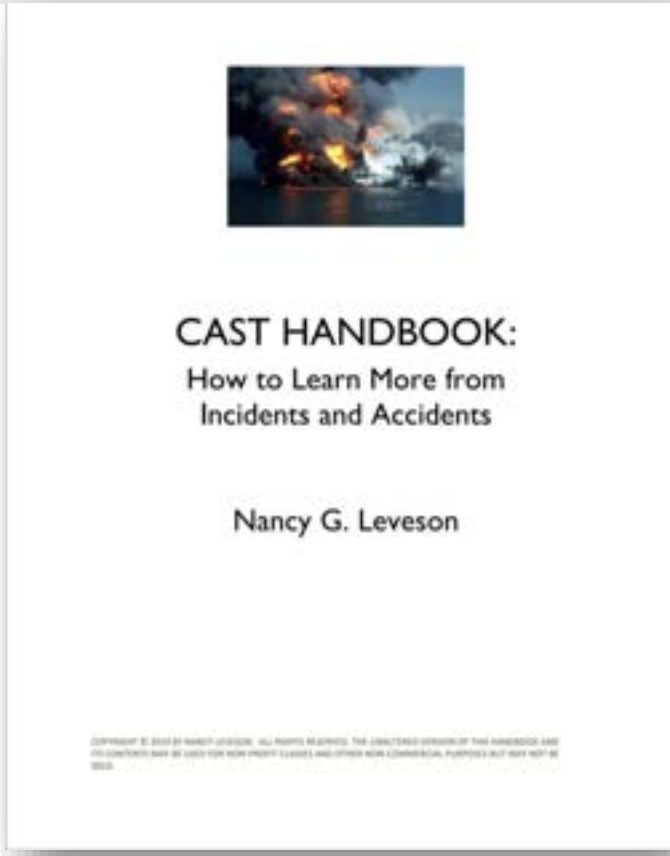
System-Theoretic Process Analysis (STPA)

Safety study
generates losses, hazards…

Investigation
of accidents and incidents



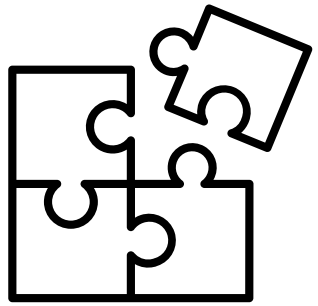
Control loop (or control structure) is the basis of both analyses



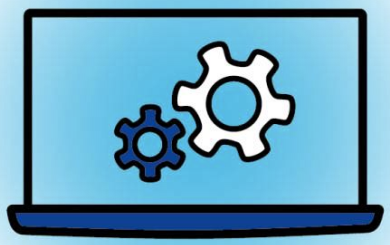
Causal Analysis based on STAMP (CAST)

Systemic Concept

- Goal is to propose the concept of single, integrated knowledge management system for state safety oversight b ased on safety performance monitoring that will store knowledge available among different civil aviation autho rity departments.



- **Concept of the knowledge management system (systemic)**
  - Collection, storage and processing of various types of safety data (data conceptualization, system as a whole)
  - State safety oversight based on comprehensive knowledge of the syste m



Aviation safety and security laboratory

CTU
CZECH TECHNICAL UNIVERSITY IN PRAGUE

You can contact me for more information

Kateřina Grötschelová – grotskat@fd.cvut.cz

Andras Galffy

CEO, Head of Research & Technology,

Turbulence Solutions

Turbulence Solutions

making flights
turbulence-free

Turbulence in Aviation

CLIMATE Turbulence Cancelling **AVIATION**

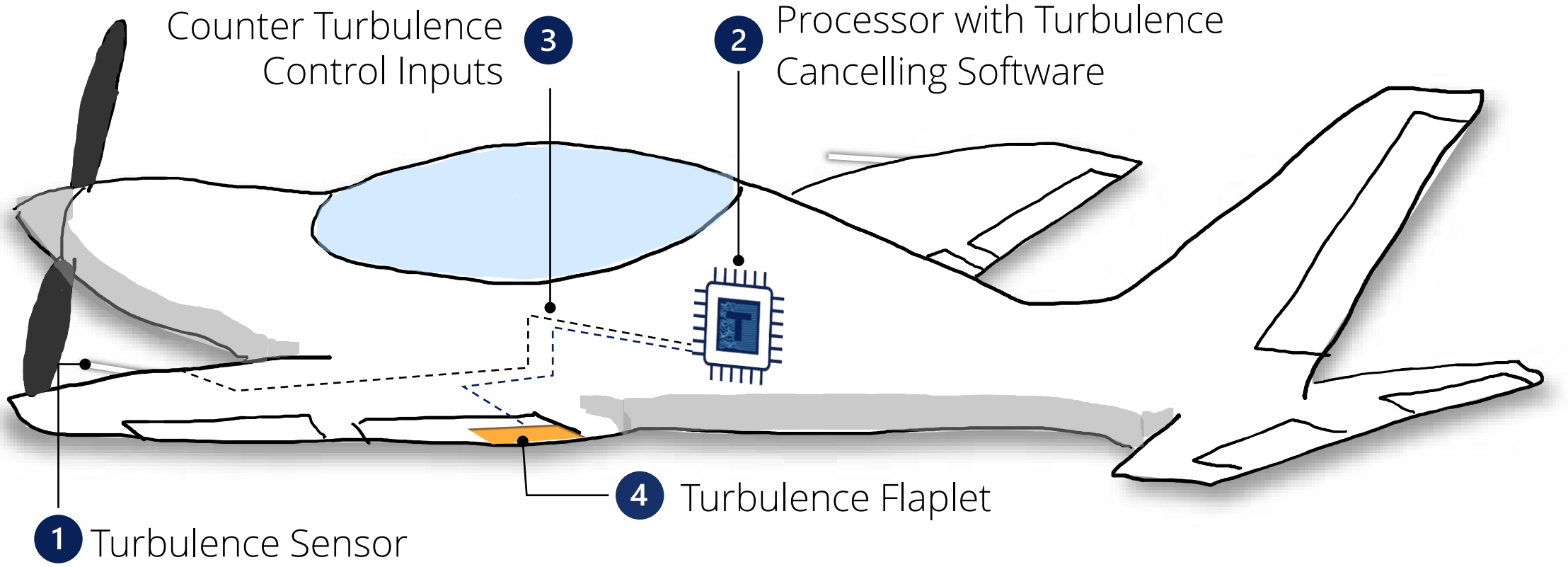
Turbulence Emissions

- More than 10% preventable climate impact from aviation.
- Sustainable AAM operation unlikely to succeed.
- Aircraft deliver only 80% of potential customer value.
- AAM deliver less than 40% of potential customer value.


Turbulence
Solutions
make flights turbulence-free
Turbulence
Cancelling OFF
Turbulence
Cancelling ON

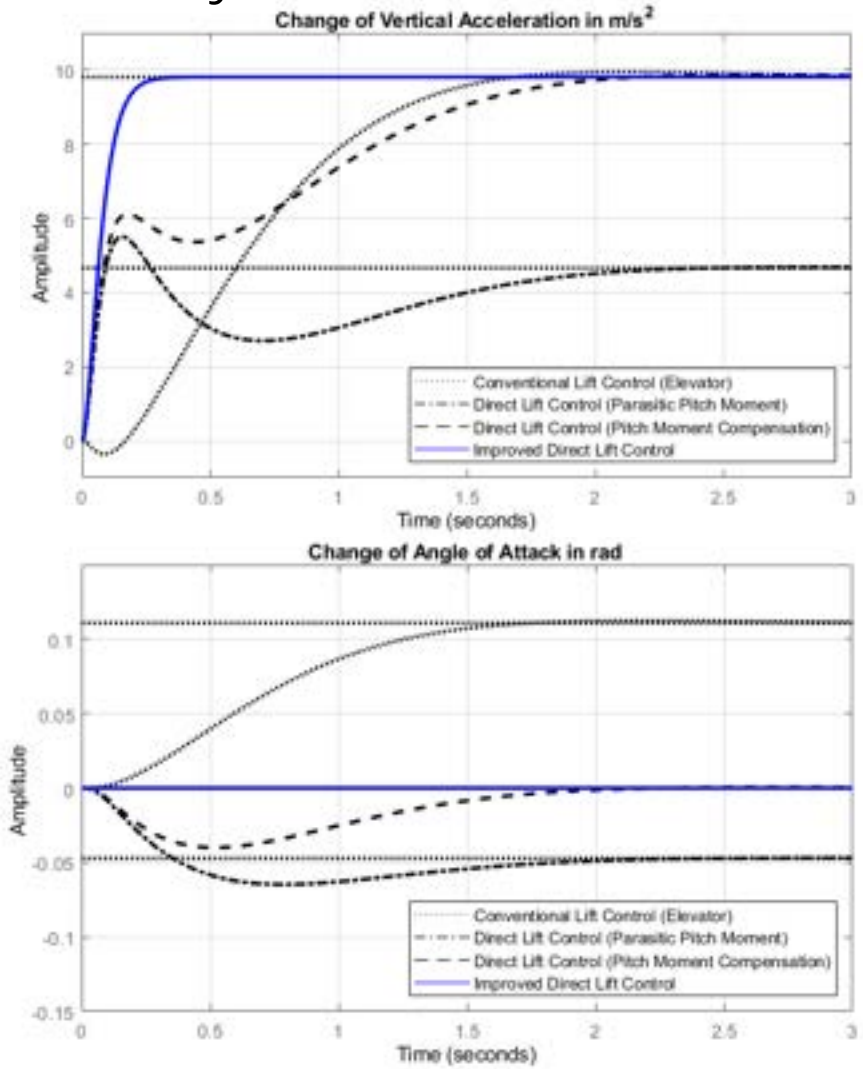
Turbulence Solutions

Turbulence Cancelling Technology



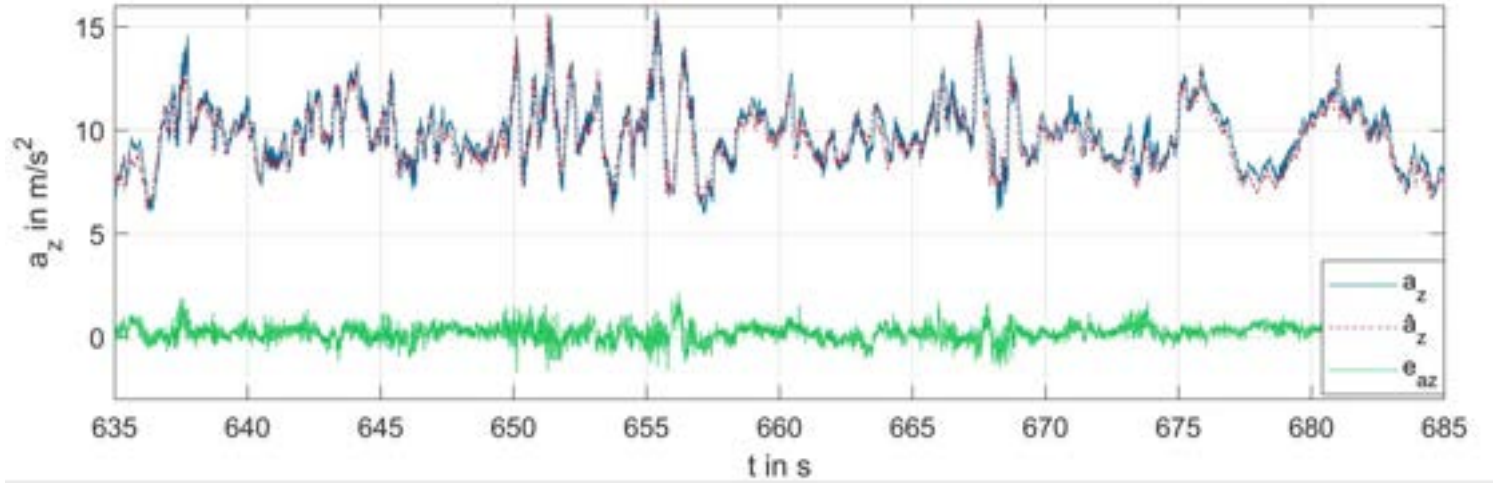
Improved Direct Lift Control

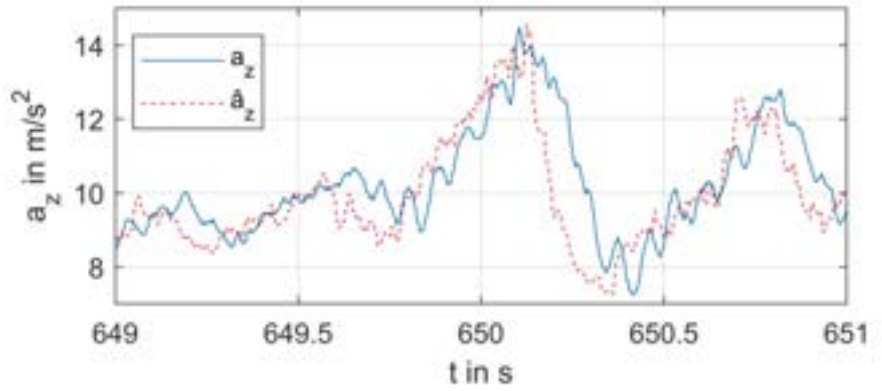
High-dynamic counter-turbulence generation by direct lift control

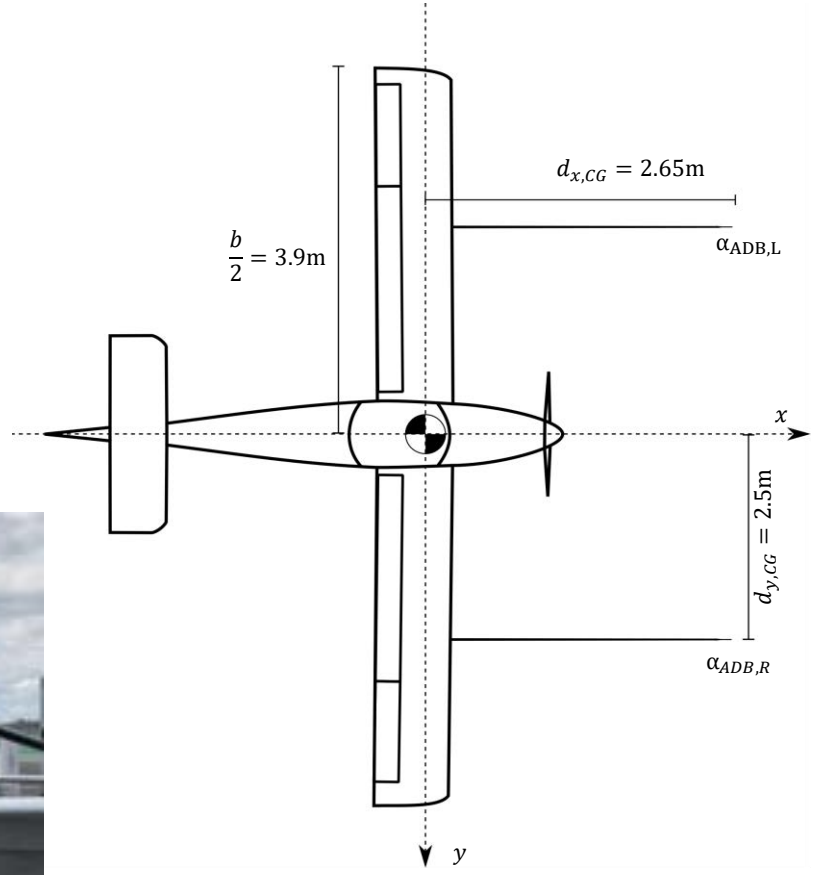


Turbulence Load Anticipation

Anticipate turbulence loads by anticipating sensors in front of wings

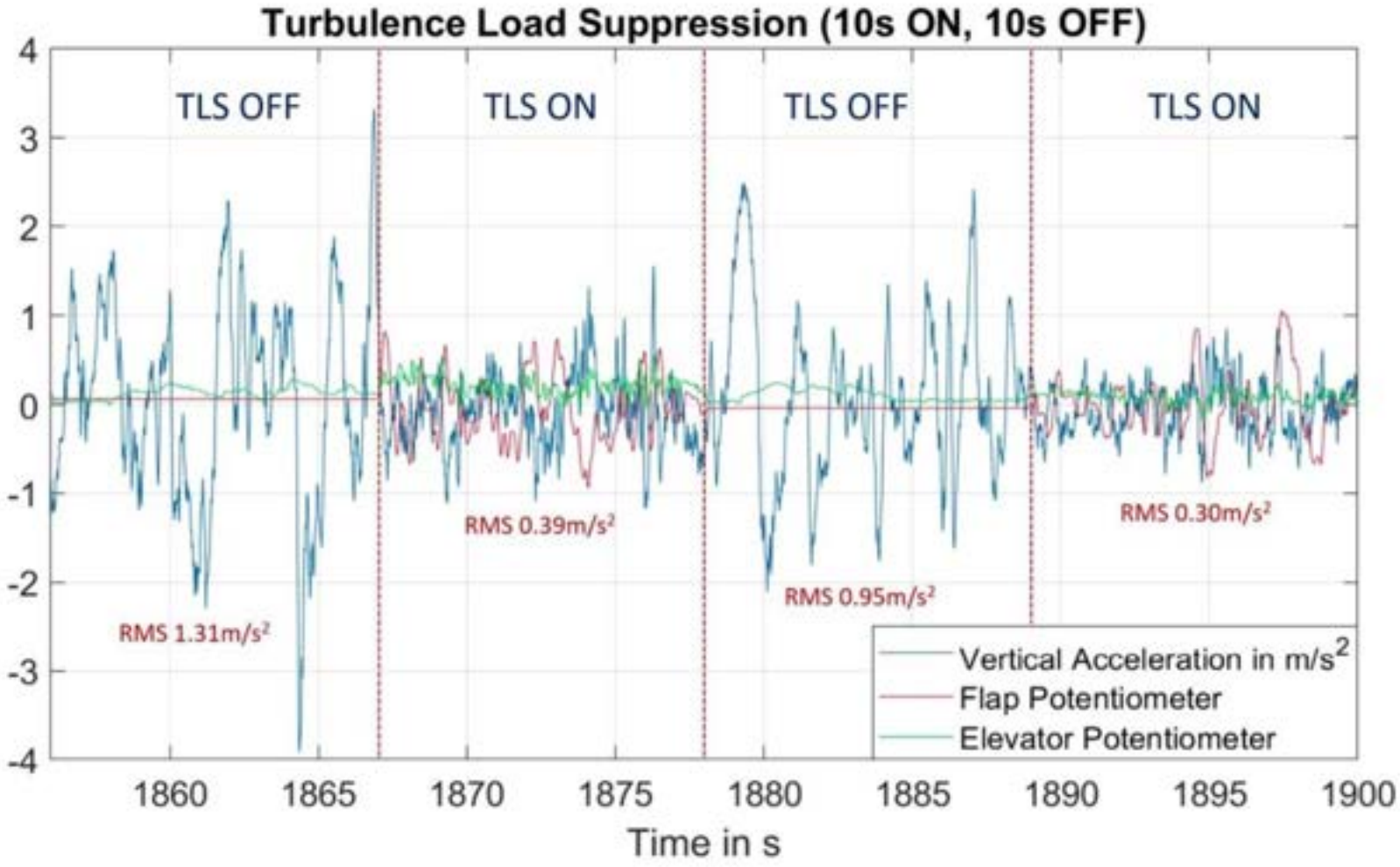




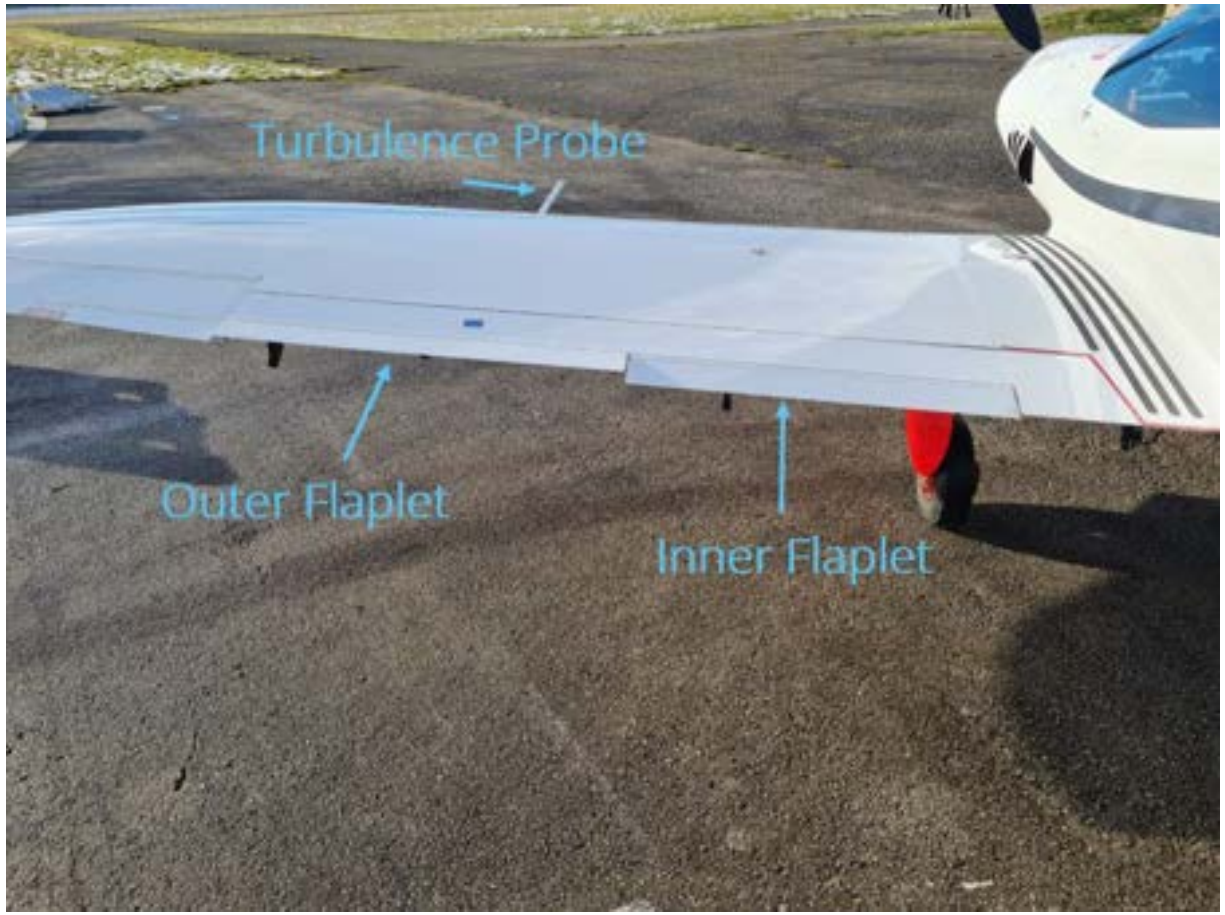


Turbulence Cancelling

Suppress more than 65% demonstrated, more than 80% achievable

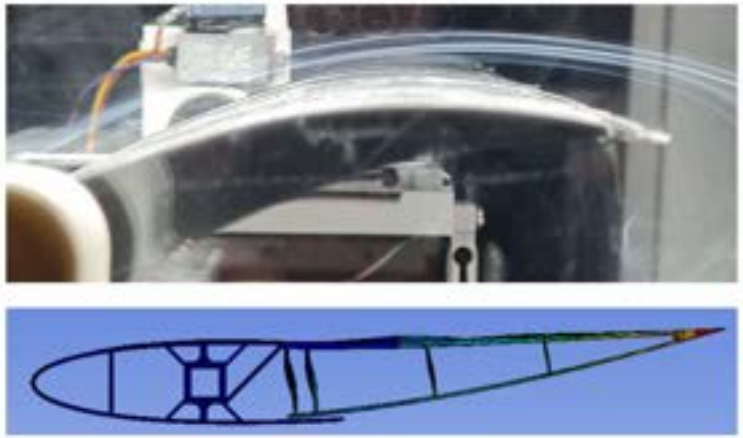


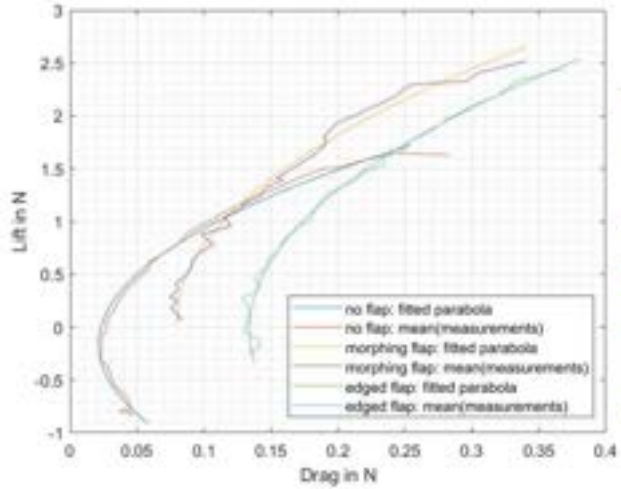
Product Outlook: First 2-seater aircraft equipped

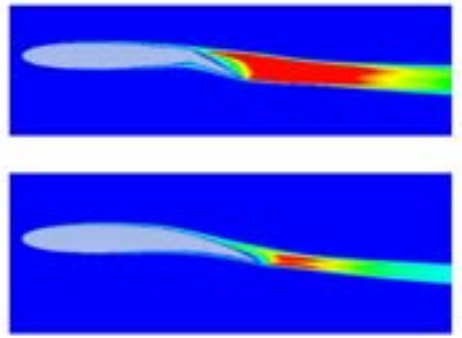


Research Outlook: Advanced Technologies

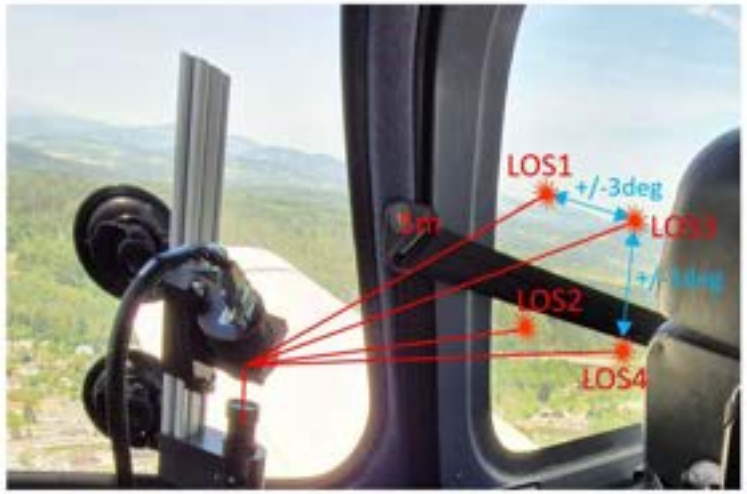
- Morphing Wings:

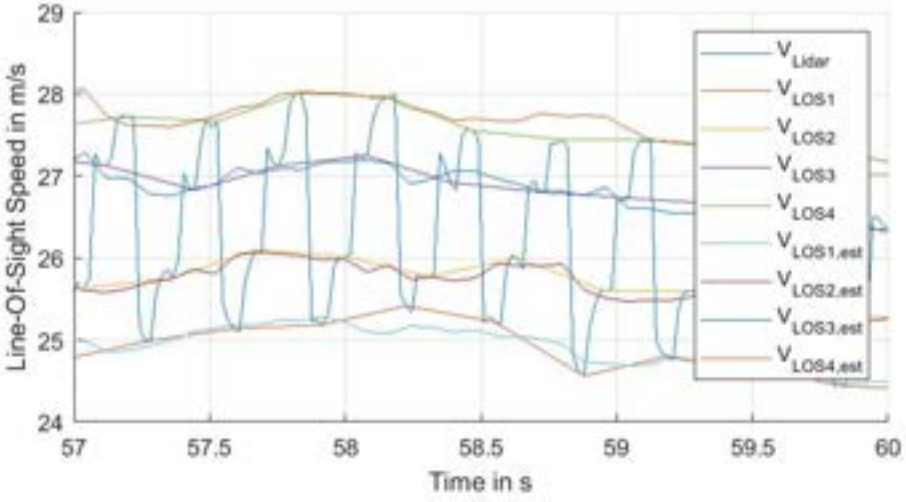






- Wind Lidar:





Turbulence Cancelling

DI András Gálffy
andras.galffy@turbulence-solutions.aero

Sara Dabbas

Al Hussein Technical University (HTU)

جامعة الحسين التقنية
Al Hussein Technical University

3D Printing UAV: Exploring the printing parameters in improving of UAV Fixed Wing

Al-Hussein Technical University

Eng. Sara Dabbas

ICAO INNOVATION

جامعة الحسين التقنية
Al Hussein Technical University

Introduction

- Our project focuses on exploring the potential of 3D printing technology in revolutionizing UAV manufacturing.
- We will discuss how this innovative approach can address current limitations and contribute to the advancement of aerospace technology.
- Last we will be talking about WHY, WHAT, and HOW of investigating 3D printing for UAVs.

جامعة الحسين التقنية
Al Hussein Technical University

Significance of Investigating 3D Printing for UAVs

- Addressing Limitations
- Unlocking Potential
- Enhanced Flexibility
- Cost-Effectiveness
- Advancing Aerospace Technology

ICAO INNOVATION

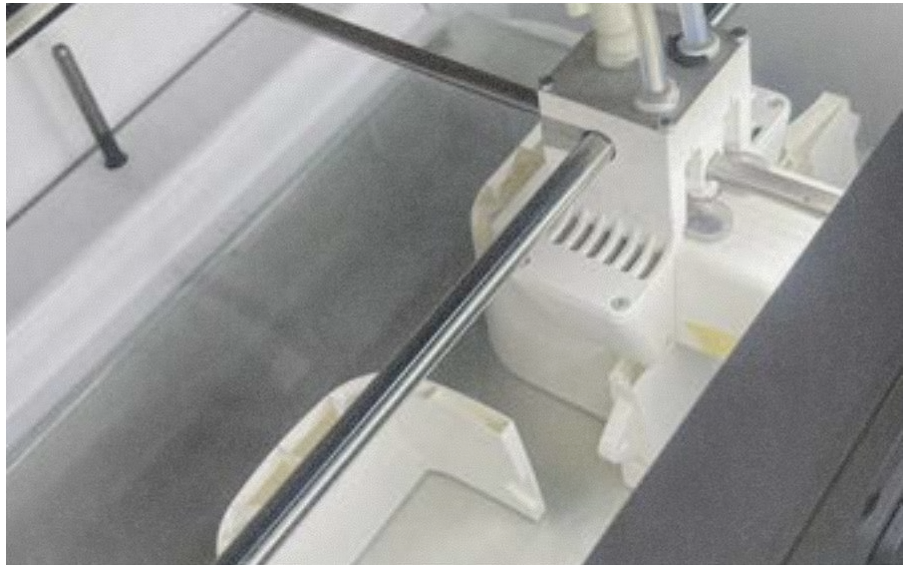
Challenges in UAV Manufacturing

1	Design Constrains	2	Production Time and Costs
3	Impact on performance	4	Need for Innovation

ICAO INNOVATION

جامعة الحسين التقنية
Al Hussein Technical University

Methodology and Approach



- Literature Review
- Experimental Design
- Collaboration
- Prototyping
- Test & Analysis

ICAO INNOVATION

Type of Infill and Material

Infill	1.Cubic	2.Cubic (Subdivision)
Material	1.PLA	2.PLA LW

→ Cubic and PLA LW

Tests

Load Test

Fly Test

جامعة الحسين التقنية
Al Hussein Technical University

Call to actions

- Varied Specimen Testing
- Computational Analysis
- Real-World Heat Endurance

ICAO INNOVATION

جامعة الحسين التقنية
Al Hussein Technical University

Any Question ?

ICAO INNOVATION

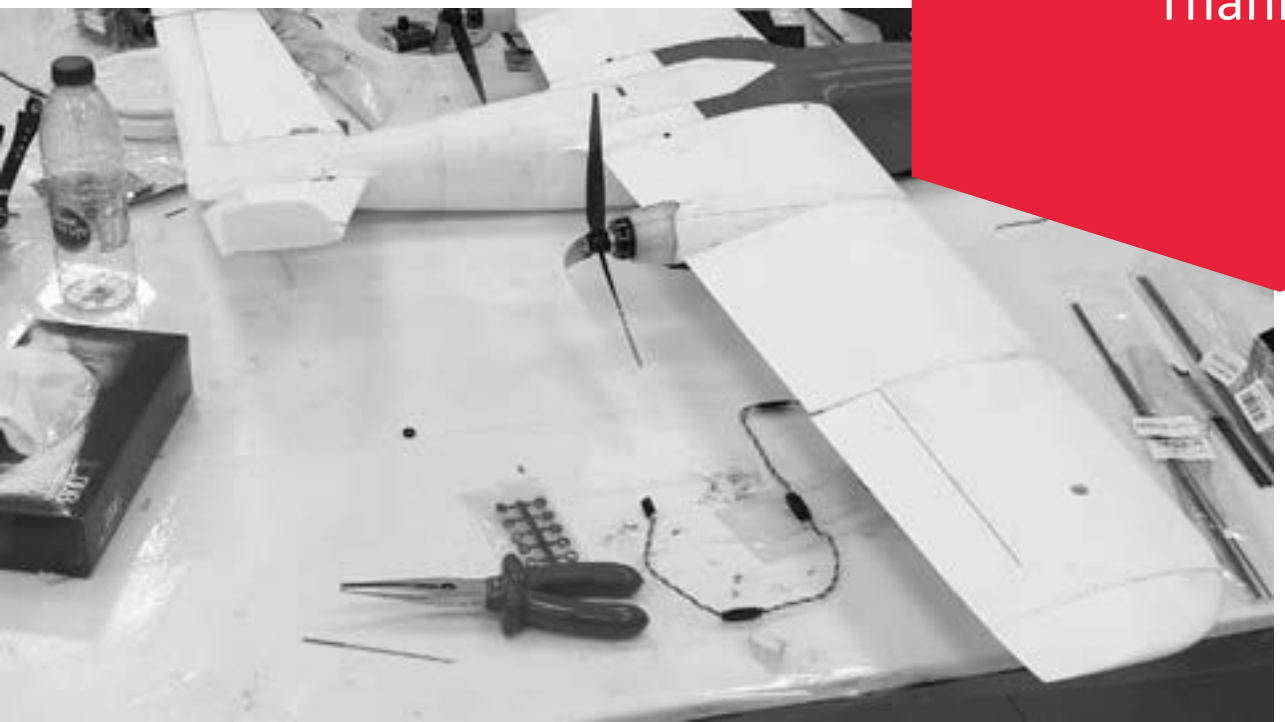
جامعة الحسين التقنية
Al Hussein Technical University

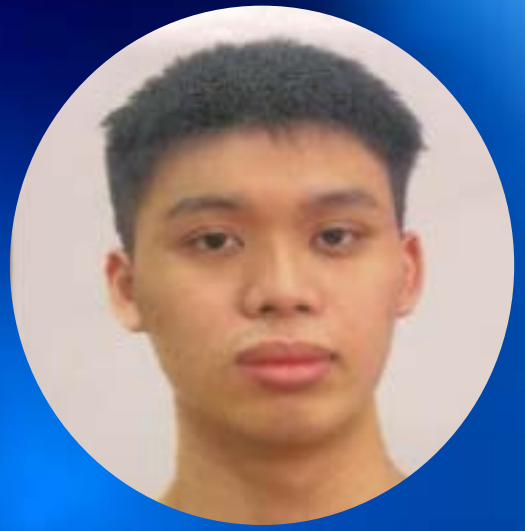
Connect with us.

🌐 Website: https://www.htu.edu.jo/
📧 Email: sara.dabbas@htu.edu.jo
☎ Contact Us: +962 79-1795-882

ICAO INNOVATION

Thank You





Eugene Ng

Embry-Riddle Aeronautical University Asia

Project AI-ICE

Eugene Ng
Embry-Riddle Aeronautical University - Asia

EMBRY-RIDDLE
Aeronautical University

PROBLEM STATEMENT

Airport needs to optimize staff and resources to help manage passenger flow.

AI-ICE

Features

Directional Speakers

Our proposed directional speakers from Neurotechnology will provide passengers with directed, clear and precise instructions while cutting down on unwanted noise levels.

Real Time Language Translation

The Artificial Intelligence baked into the system will enable the system to communicate with all types of passengers in their own native language, providing a hassle-free experience.

Privacy screen and noise cancelling

Increased Efficiency

Better Passenger Experience

POTENTIAL USE CASES

1. **Check in**
   Provide assistance to passengers with check in procedures in their native language

2. **Security checkpoints**
   Provide guidance and assurance to passengers on security procedures with their native language

3. **Retail shops within airport**
   Provide assistance to passengers with way finding in their native language

PROOF OF CONCEPT

1. **Trial at T3 Boarding gates**
   As most bottlenecks occur at security checkpoints, AI-ICE helps to provide guidance and assurance to passengers on security procedures

2. **Estimated Cost**
   USD 1,000 per unit

CONCLUSION

Our project aims to support airports in their push for higher degrees of automation while improving customer experience

References

Civil Aviation Authority. (n.d.). *Environment - Noise - Aviation noise and health*. Civil Aviation Authority. Retrieved October 25, 2023, from https://www.caa.co.uk/consumers/environment/noise/aviation-noise-and-health/

Daiber, A., Prochaska, J. H., Daiber, A., & Muenzel, T. (2019, November 11). *Environmental Noise-Induced Effects on Stress Hormones, Oxidative Stress, and Vascular Dysfunction: Key Factors in the Relationship between Cerebrocardiovascular and Psychological Disorders*. NCBI. Retrieved October 25, 2023, from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6878772/

Goodwin, M., & Millar, H. (2020, December 22). *Noise pollution health effects: Impact on mental and physical health*. Medical News Today. Retrieved October 25, 2023, from https://www.medicalnewstoday.com/articles/noise-pollution-health-effects

Josephs, L. (2021, September 11). *How 9/11 forever changed air travel*. CNBC. Retrieved October 25, 2023, from https://www.cnbc.com/2021/09/11/how-9/11-forever-changed-air-travel.html

Ministry of Transport. (n.d.). *Global Aviation Hub - Singapore*. Ministry of Transport. Retrieved October 25, 2023, from https://www.mot.gov.sg/what-we-do/aviation/global-aviation-hub

G. (2024, February 6). *Natural Language Processing Overview*. GeeksforGeeks. https://www.geeksforgeeks.org/natural-language-processing-overview/

Muhammad Danial Azraf Bin Muhammad Mazlan

Temasek Polytechnic

Project

EcoTag

Won "Most Visionary Award" in the Singapore Airlines App Challenge 2023

& 2nd Place in the Global Youth Summit Vietnam 2023

Temasek POLYTECHNIC

Diploma in Aviation Management

Singapore

Background & Objective

More than 4 Billion baggage tags are wasted every year!!

85 Million tons of paper are wasted in the industry every year.

ICAO LTAG NET-ZERO 2050

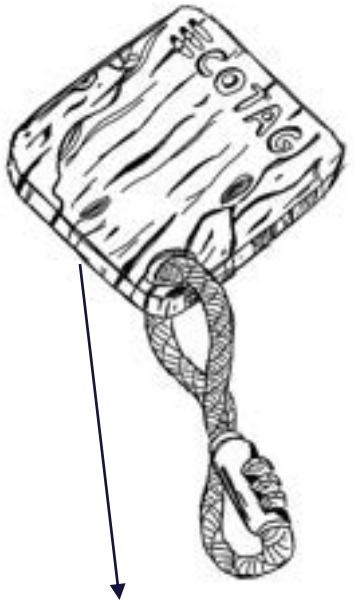
LONG TERM GLOBAL ASPIRATIONAL GOAL FOR INTERNATIONAL AVIATION

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Singapore Sustainable Air Hub Blueprint

Proposed Idea:

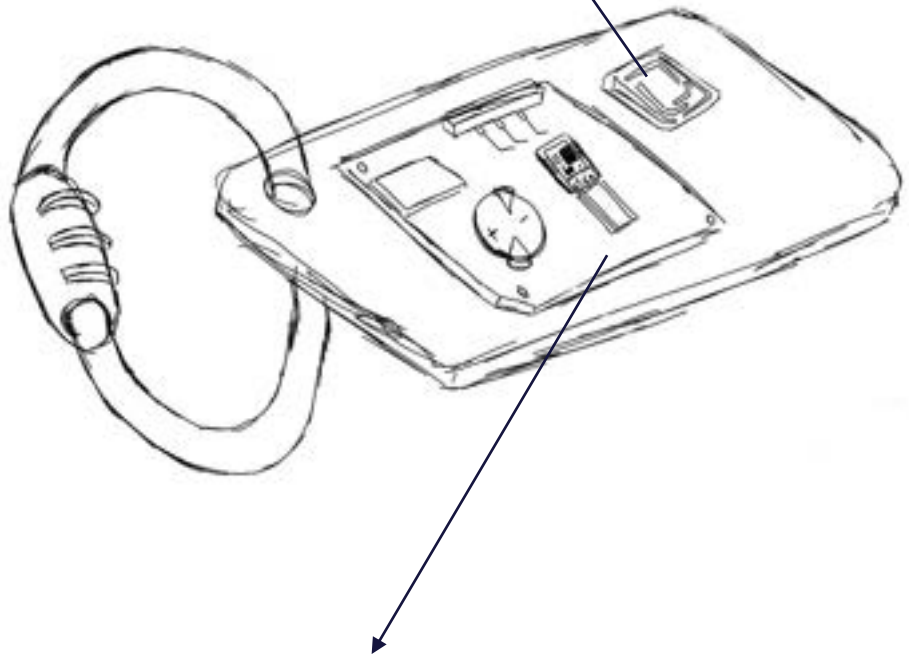
Standards: International Air Transport Association's Recommended Practice 1740c **(IATA RC 1740c)**



Small and compact form factor

Durable & Sustainable **(Bamboo Wood)**

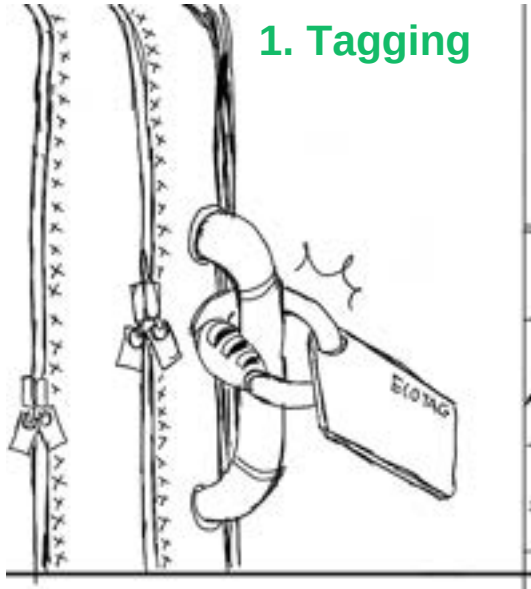
Permanent & Reusable using Radio Frequency Identification **(RFID)**



A larger form factor to include possible Bluetooth tracking components

Expected Passenger Process

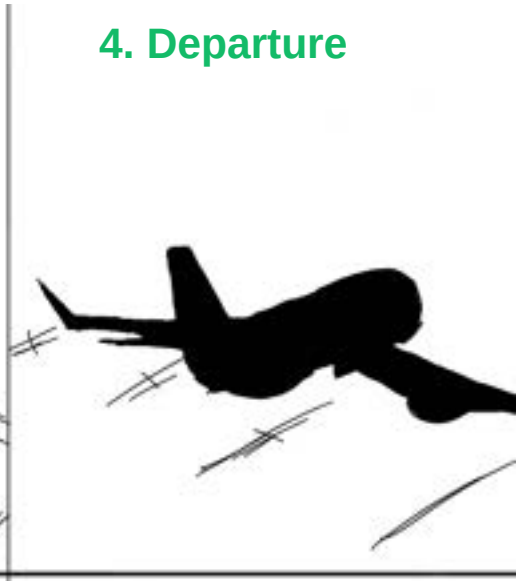
1. Tagging



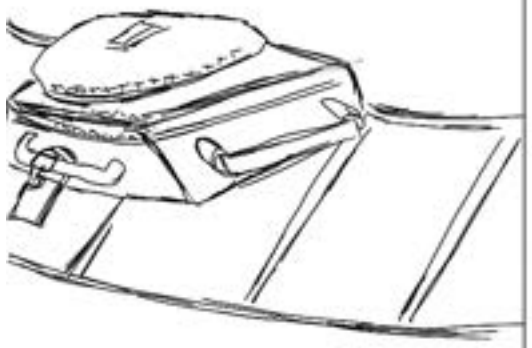
2. Flight Check-In

3. Baggage Handling

4. Departure



5. Reconciliation



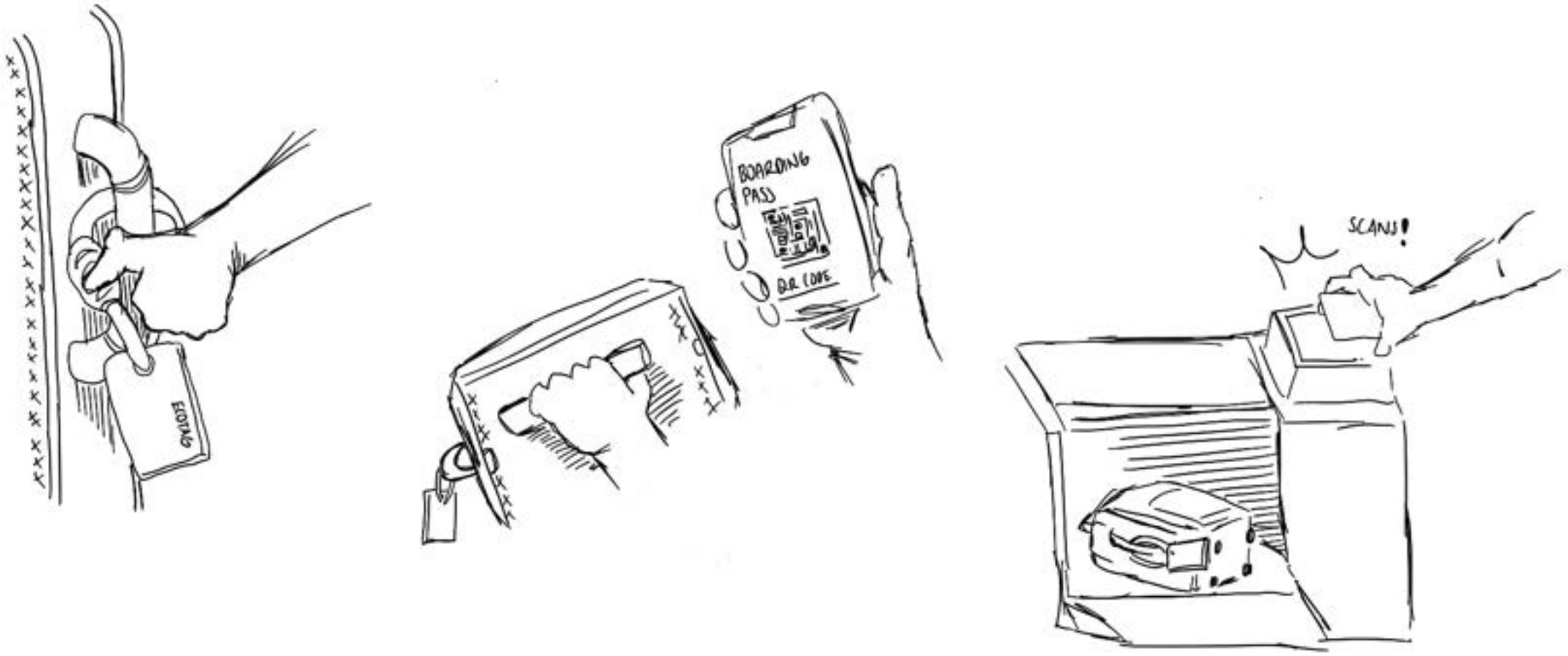
6. Tracking

7. Retrieval

8. Repeat Process

Expected Passenger Process

Further on the Baggage Drop-Off Process:

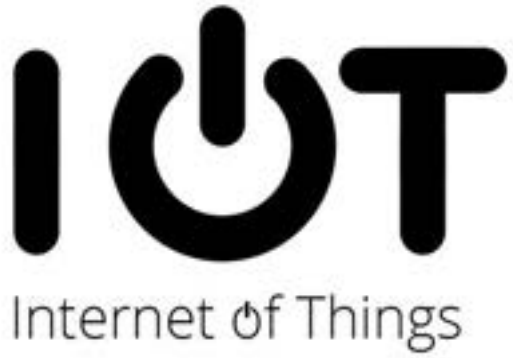


Future Plan

What we will do:

- Further research
- Proper prototype
- Analysing IoT
- Gather support from Civil Aviation Authorities, Airports, & Airlines

This will be done to stay relevant and achieve our sustainable goals in aviation.



THANK YOU!!

Thank You

ICAO | INNOVATION