

Innovation



ICAO

# 40<sup>th</sup> ASSEMBLY

24 SEP – 04 OCT  
2019

ICAO2019



75 YEARS  
OF CONNECTING THE WORLD

ICAO2019



75 YEARS  
OF CONNECTING THE WORLD

INNOVATION

A41

RESILIENCE

THE 41<sup>ST</sup> ICAO  
TRIENNIAL ASSEMBLY

RECONNECTING THE WORLD



# Strategic Plan

## 2026-2050



ICAO





## ICAO Vision

A safe, secure and sustainable international civil aviation system that connects the world for the benefit of all nations and people.

### THREE ESSENTIAL ASPIRATIONS CRYSTALLIZE THIS VISION



The goal of Zero fatalities in international aviation from accidents and acts of unlawful interference.



The long term global aspirational goal of Net-zero carbon emissions by 2050 for international civil aviation operations.



The goal of aviation to serve as an integral part of a thriving, connected, accessible, inclusive, and affordable transport system for people and goods, contributing to socio-economic development, while ensuring no country is left behind.

## ICAO Mission

To lead international civil aviation as a key driver of social and economic development while enhancing aviation safety, security, economic development and environmental sustainability for a growing aviation system by advancing air law, developing policies, plans and standards, monitoring and auditing, and supporting States' capabilities for the benefit of all nations and people.

ICAO provides a leadership role and forum for all matters relating to international civil aviation, which Member States and the wider aviation community expect, particularly in times of major challenges when international leadership is needed. In the spirit of leaving no country behind, ICAO consistently responds to the needs of Member States by delivering services and support where required. This includes, to the extent of its mandate, resource mobilization and capacity building, often in partnership with other institutions and collaborators. ICAO provides multiple instruments

and services to Member States in several shapes and forms, including the international law instruments and regulatory frameworks necessary to underpin effective member state implementation of standards, recommended practices and guidance material that takes into account the socio-economic benefit for all Member States.

Our mission is supported by our three main processes of work: policy development and standard setting, monitoring and auditing, and implementation support.



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Where we will be in  
2050

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# ICAO Mission

To lead international civil aviation as a key driver of economic development while enhancing aviation's contribution to economic development and environmental sustainability. To lead a growing aviation system by advancing air law, standards and plans and standards, monitoring and auditing Member States' capabilities for the benefit of all nations.

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and services that shape and form the legal instrument necessary to implement practices and into account the all Member States.

Our mission is to lead processes of standard setting and implementation.





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## High Priority Enablers

To successfully achieve the Strategic Goals outlined in this plan, ICAO has identified a set of High Priority Enablers. These enablers are critical cross-cutting factors that underpin the successful implementation of the Strategic Goals and ensure that the benefits of aviation are realized across all strategic areas. The High Priority Enablers focus on key areas which are essential for addressing the complex challenges facing the aviation industry. By prioritizing these enablers and integrating them into the implementation of the Strategic Goals, ICAO aims to create a more resilient, sustainable, and inclusive international civil aviation system. The progress and impact of the High Priority Enablers will be regularly monitored and assessed to ensure their effective contribution to the overall success of the Strategic Plan.



**ICAO Continuous Organizational Improvement** – focused on enhancing organizational efficiency to ensure the greatest possible efficiency and effectiveness in the operations of ICAO to meet the strategic goals, including Human Resource Management, Digitalization, Financial Management, Multilingualism, Governance and Accountability, and Business Operations and process management.



**Innovation** – recognizing the real and potential benefits and challenges that innovation can bring to the air transport sector and providing Member States with the tools, knowledge and mindsets to realize these benefits in a manner that leaves no country behind. Innovation actively promotes new solutions that support the Organization's Strategic Goals and increase the efficiency and effectiveness of ICAO. The aim is to encourage innovation to be embedded throughout ICAO's work.



**Gender Equality and Attracting New Talent to Aviation** – ICAO will expand on its ambition to achieve ICAO's Strategic Goals, and contribute to the UN Sustainable Development Goals, by achieving gender equality. Viewing international aviation as a vital enabler within the UN SDGs and to address multisector challenges affecting aviation, ICAO aims to expand opportunities for all as we seek out the best possible talent including the next generation of aviation professionals. By promoting and fostering fairness and impartiality for a sustainable, resilient, diverse and inclusive future of the aviation sector ICAO seeks to remove gender, diversity, equity and inclusivity barriers so as to optimally support sustainable expansion of the aviation sector, as well as the human resources needs of the Organization.



**Partnerships, Resource Mobilization and Financial Sustainability** – ICAO acknowledges partnerships as being intrinsically intertwined to aviation and to resource mobilization for States and the Organization, facilitating ICAO to achieve its Strategic Goals in support of the UN Sustainable Development Goals. ICAO will unite Member States, UN system organizations, agencies, funds and programmes, international associations and other stakeholders to leverage the diverse capabilities, resources and knowledge of ICAO's partners, while ensuring alignment to the Organization's principles, objectives and values, and the financial sustainability and flexibility of the Organization.





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Innovation as an enabler





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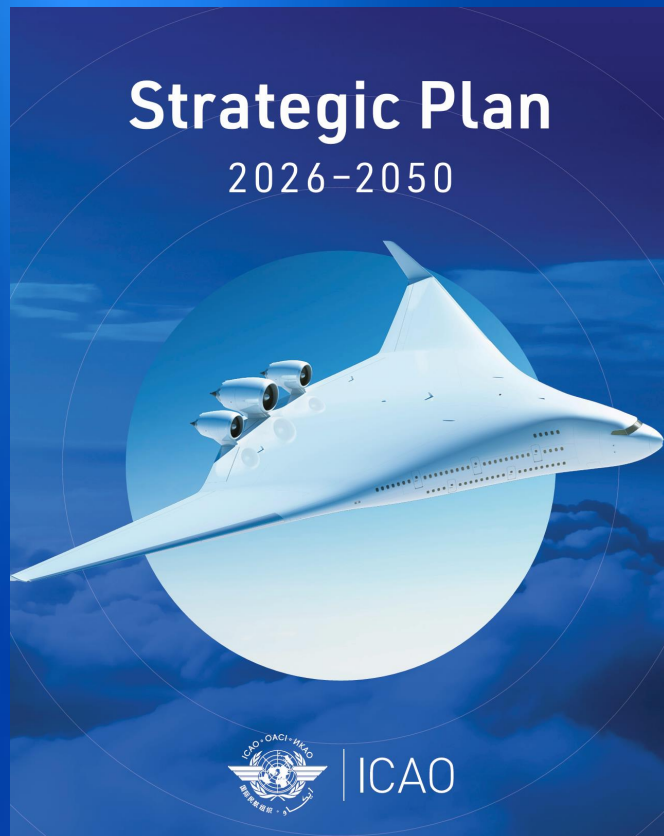
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ICAO 

# ICAO POLICY ON INNOVATION 2025



## Introduction

This policy is founded on Assembly Resolution A40-27: Innovation in aviation, which refers to articles 37 and 44 of the Chicago Convention and recognized the nature and pace of innovations. The policy is based on Council action taken on A40-27 in particular its consideration of the results of the independent assessment of innovation undertaken by the United Nations System Staff College (UNSCC).

### 1. OBJECTIVES

1.1. This policy is designed to enhance ICAO's role to assist Members States to benefit from innovation in the aviation sector, to address related challenges and for ICAO to develop, as needed policies, standards, other provisions<sup>1</sup> and tools that support the continuing improvement of safety, efficiency, security, facilitation, economic and environmental sustainability of international air transport in a timely and technology agnostic manner, and in accordance with the strategic goal of No Country Left Behind (NCLB).

1.2. This policy facilitates the development and deployment of innovation in international aviation by Member States and ensure that all States have a fair opportunity to develop and deploy innovations in aviation.

1.3. This policy also guides the identification and implementation of innovation to increase the effectiveness and efficiency of the Organization.

*Note.— This policy is linked to the High Priority Enabler on “Innovation Strategy” contained in the Strategic Plan of ICAO)*

1.4. This policy aims to:

- a) *Provide a strategic vision of the role of ICAO on innovation.* Outline what ICAO intends to achieve through its innovation initiatives, and how it identifies, communicates and builds strategic relationships.
- b) *Ensure the timely development of global policies and standards related to innovations.* Provide a framework that will help ensure the timely analysis of the need to develop global policies, standards, and other provisions in a technology agnostic manner, and tools that support the continuing advancement of innovation in the international aviation sector, while avoiding the adoption of premature innovations
- c) *Promote an environment where innovation in aviation can flourish in all ICAO regions* in line with the No Country Left Behind (NCLB) initiative.
- d) *Make innovations known and accessible to all States.* Proactively engage with all States on potential benefits of innovation in aviation and support their implementation and interoperability, taking into account national and regional circumstances.
- e) *Strengthen ICAO's engagement with stakeholders* to facilitate innovation in pace with the rapid nature of its development in the aviation sector.

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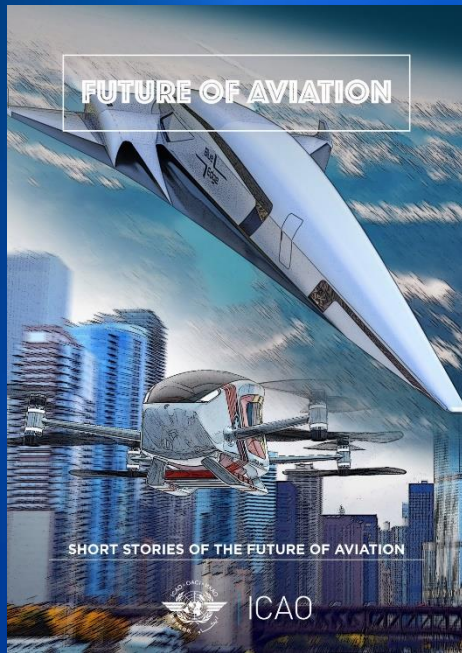
THE FORTY-SECOND ICAO ASSEMBLY

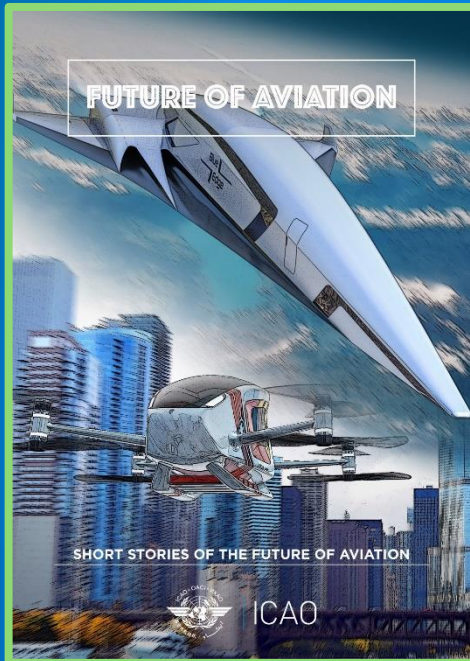


SAFE SKIES. SUSTAINABLE FUTURE.

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23 SEPTEMBER - 3 OCTOBER 2025 | MONTRÉAL, CANADA









# FUTURE OF AVIATION

SHORT STORIES OF THE FUTURE OF AVIATION



ICAO





# FLIGHT 417



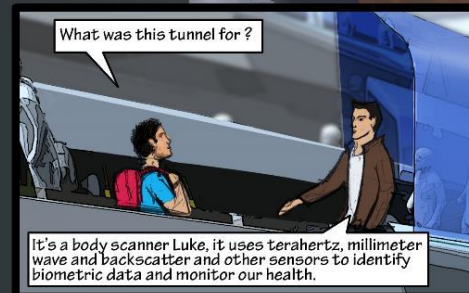
A SHORT STORY ON THE FUTURE OF AVIATION



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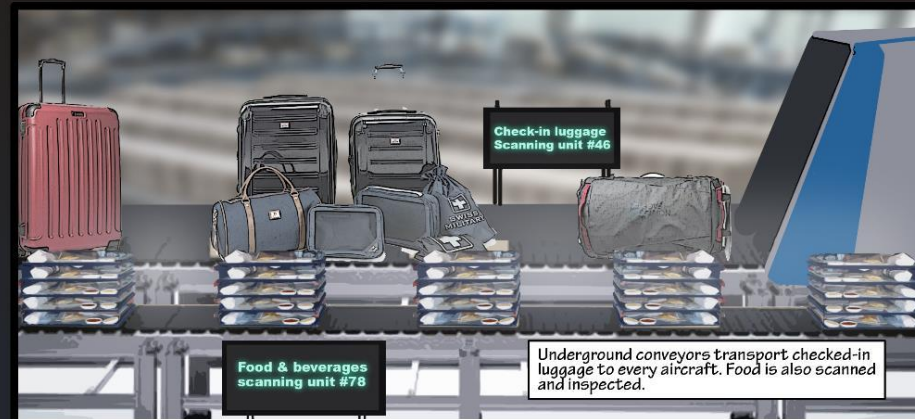
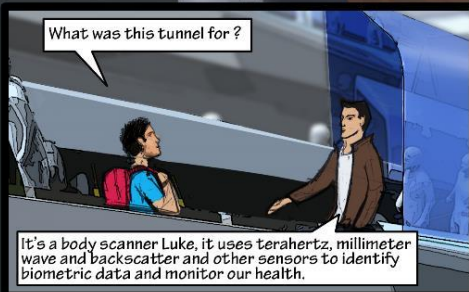
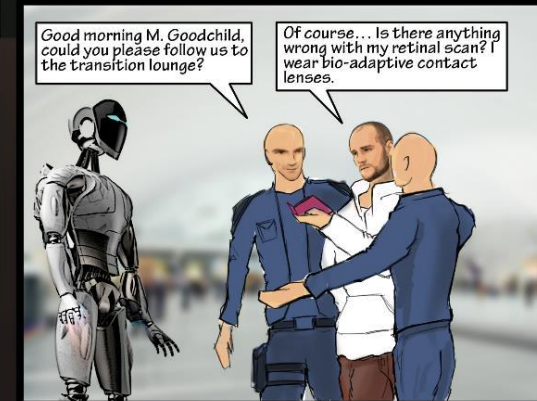
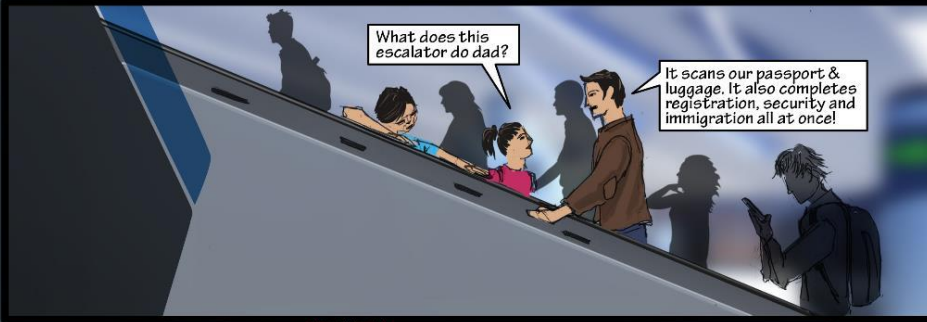
Montreal, Sept 21 2035, 4 pm



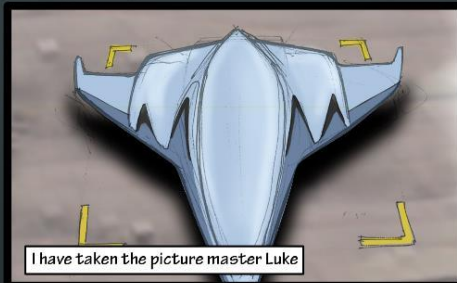
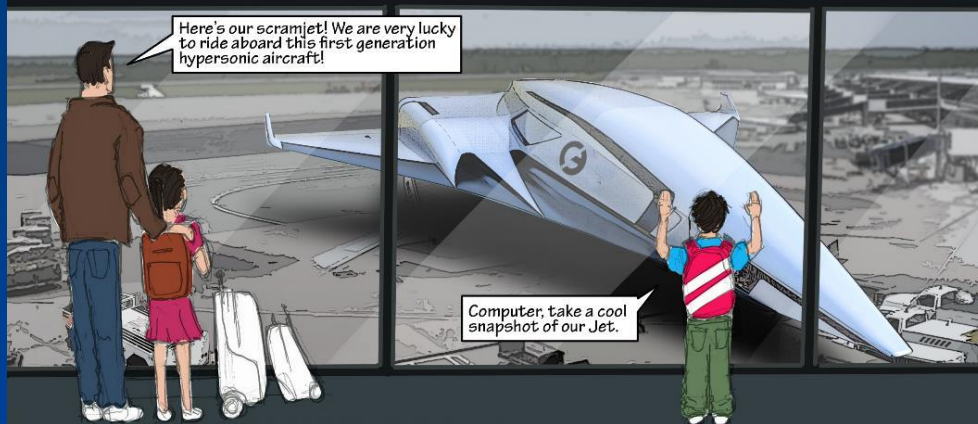
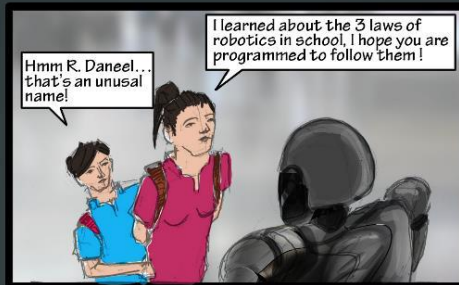
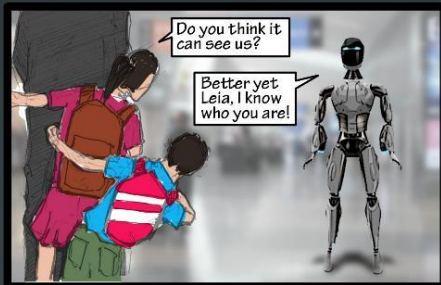




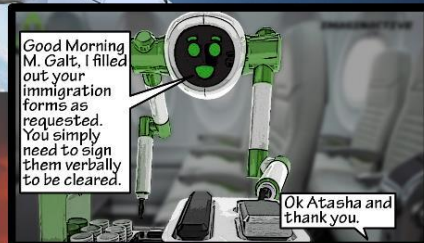
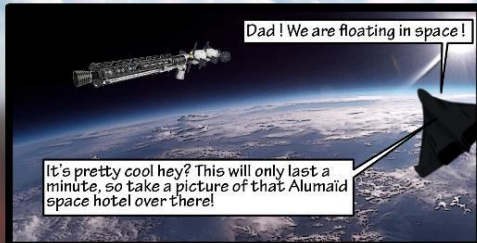
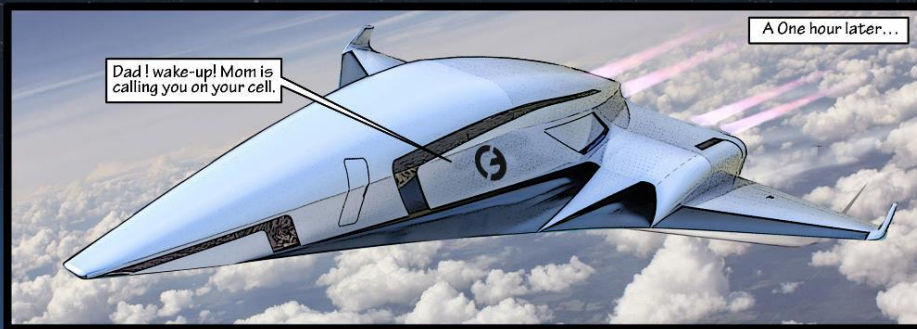
In the meantime, airport security is monitoring the automated check-in process. Machine learning programs are improving efficiency on a daily



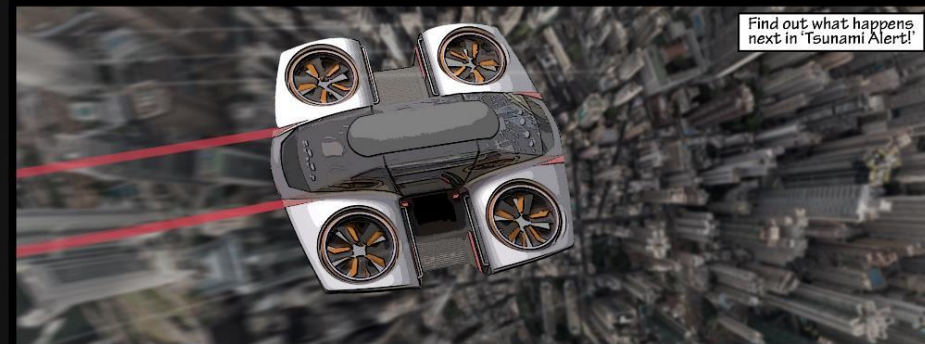
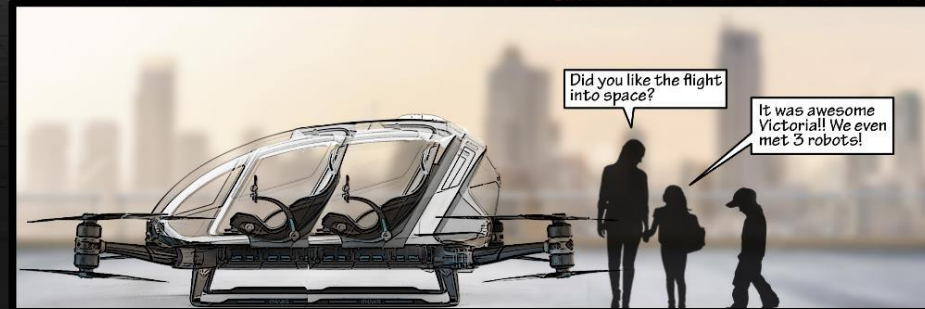








Perth, Australia 7:30 AM







ICAO INNOVATION

# TSUNAMI



A SHORT STORY ON THE FUTURE OF AVIATION



ICAO



# PROLOGUE

Sensors on the ground, in the atmosphere and space, constantly monitors our planet to assess the risks natural disasters.

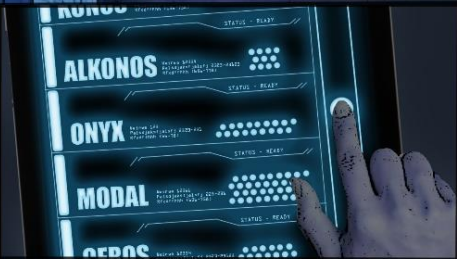


Data is collected by intelligent agents and analysed by machine learning software.

Algorithms determine where relief supplies should be stored.



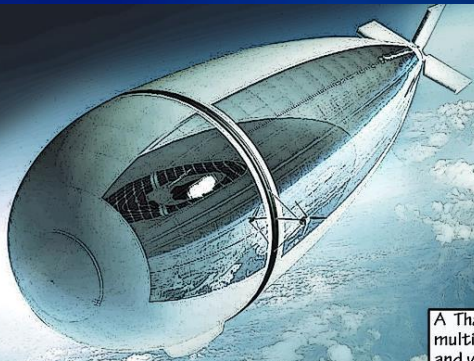
A modified AI updates asset location lists of UAVs, helicopter, aircrafts, and other aircrafts to respond to crisis scenarios based on availability, capacity, and performance history.



Surveillance systems are on standby alert until a 'real' event unfolds.



A day before the disaster...

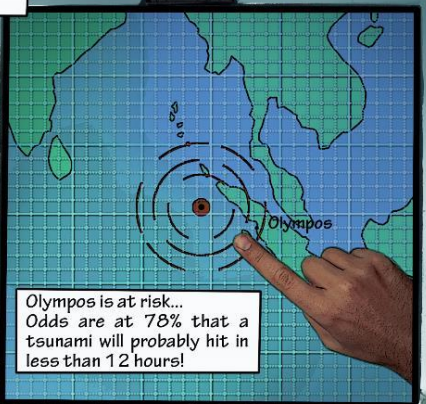


A Thales Stratobus flies over the ocean and captures multiple data streams. The AI predicts strong seismic and volcanic activity over the Indian Ocean.

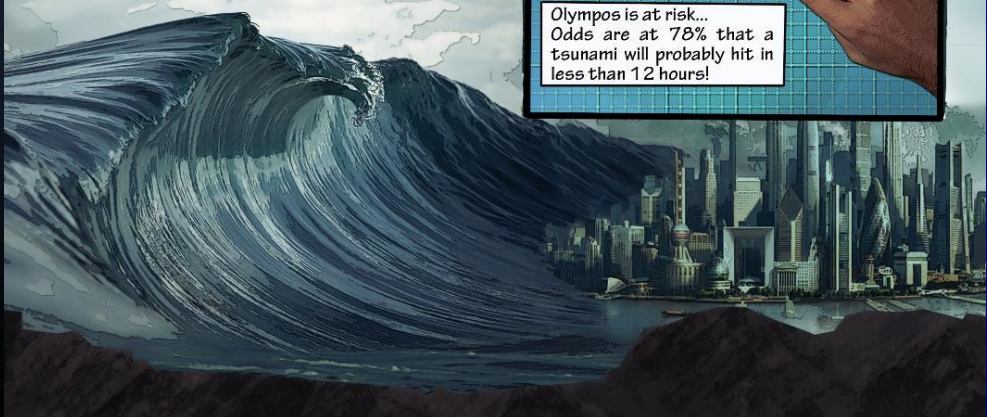


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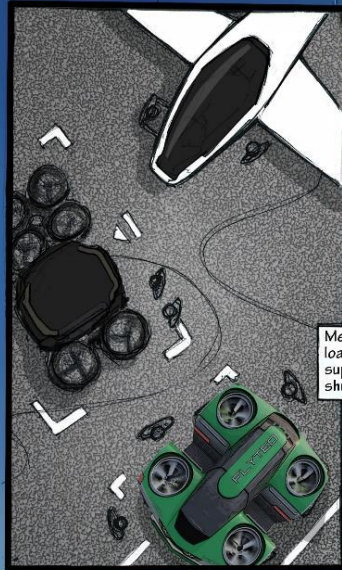


Olympos is at risk... Odds are at 78% that a tsunami will probably hit in less than 12 hours!





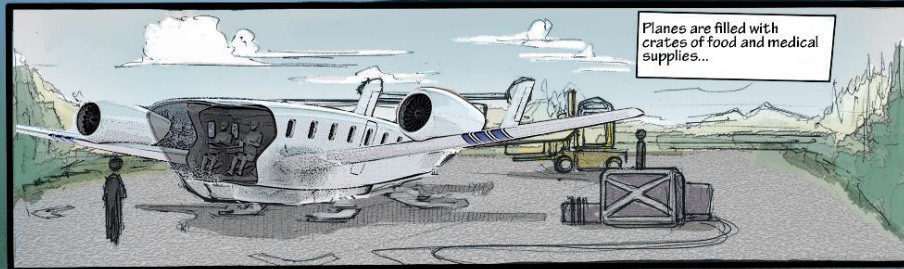
Six hours before the disaster...



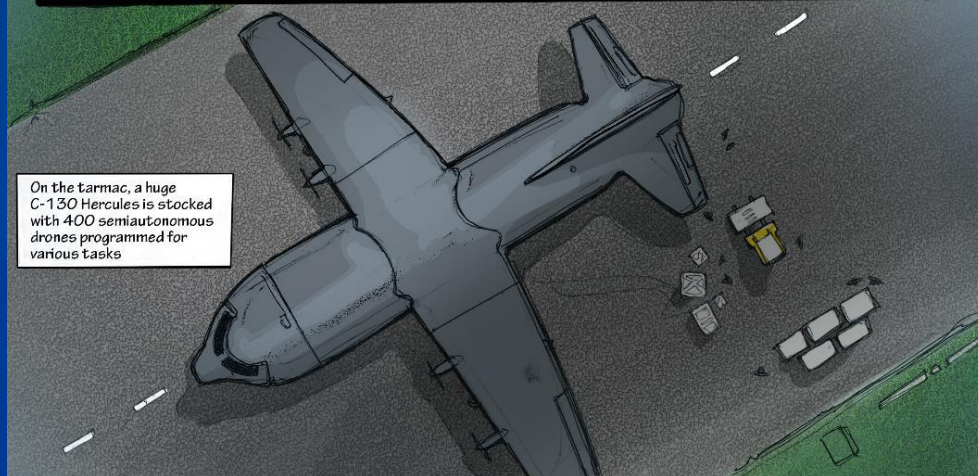
Meanwhile, Airships are loaded with equipment, supplies and flying shuttles.



Planes are filled with crates of food and medical supplies...



On the tarmac, a huge C-130 Hercules is stocked with 400 semiautonomous drones programmed for various tasks



The Hercules drops its cargo of autonomous emergency drones...

Less than an hour AFTER the Tsunami...



Great job Victoria! please locate seriously wounded with Squad 'B'. Deploy squad 'C' to deliver food, clothing and clean water.

100 drones are in position!! Mobile phones work!!! Wi-Fi coverage is restored to 80%...

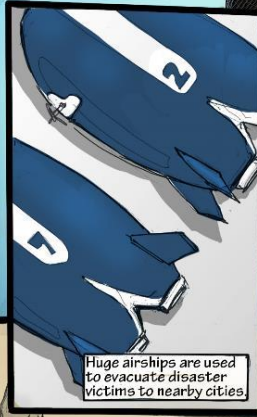


At 100 meters above sea level, drone squad 'A' is forming an aerial mesh.



After 6 hours of flight, the first airship finally deploys the first personnel aircraft. These will be used to transport rescuers, technicians and engineers around the zone.

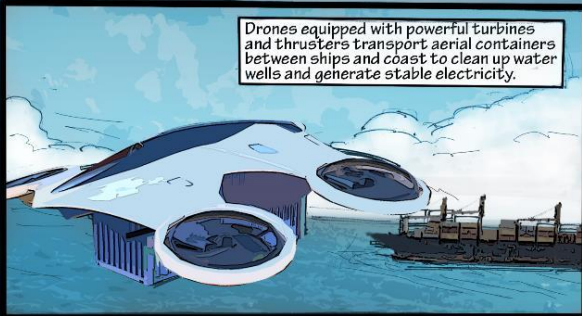




Huge airships are used to evacuate disaster victims to nearby cities.



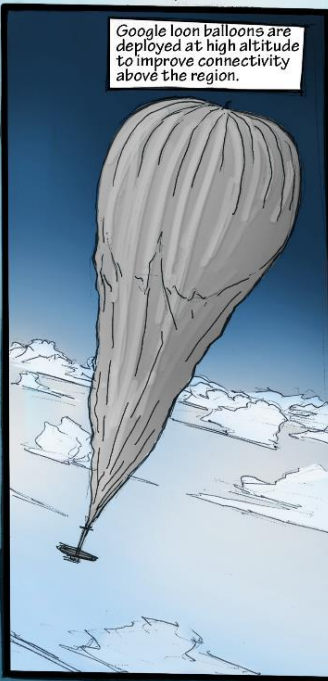
Each airship is equipped with a full dispensary, wheelchairs, and all-terrain stretchers.



Drones equipped with powerful turbines and thrusters transport aerial containers between ships and coast to clean up water wells and generate stable electricity.



Smaller air conditioned drones bring blood and medicine to the right people.



Google loon balloons are deployed at high altitude to improve connectivity above the region.



Progress reports are sent directly to coordination teams, government agencies, and media from around the world.

Gradually communications is restored ... Food and water are available again without having to waiting in line.



100% of all critical medical cases were treated.



Meanwhile the ballet of drones and aircraft continues ...

The locals feel reassured, cared for and supported by the international community. The challenges are still there but it's definitely a victory worth celebrating today!





# HYPERGRAFT



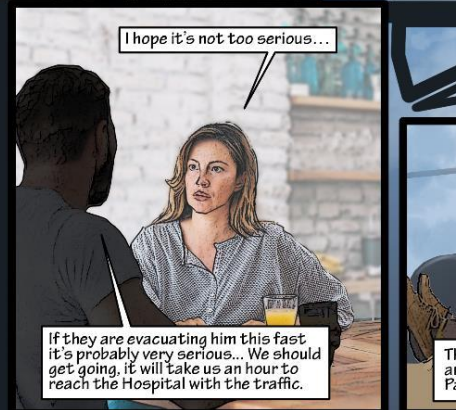
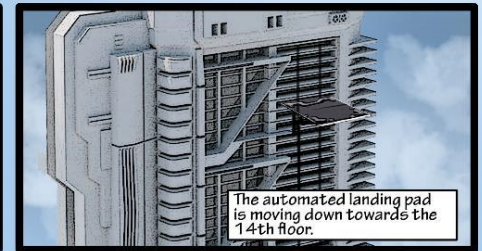
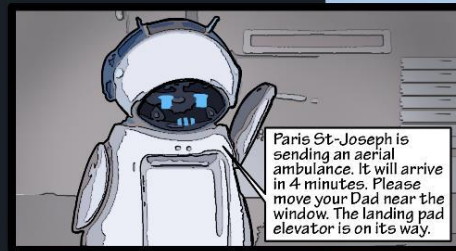
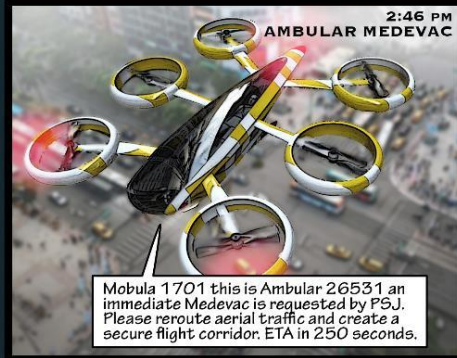
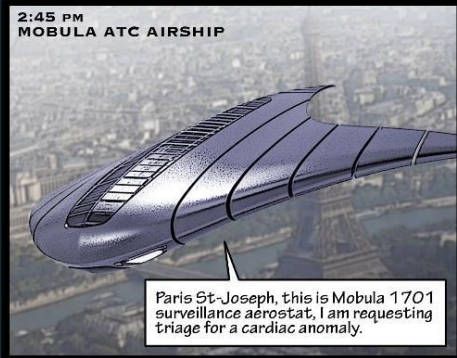
A SHORT STORY ON THE FUTURE OF AVIATION



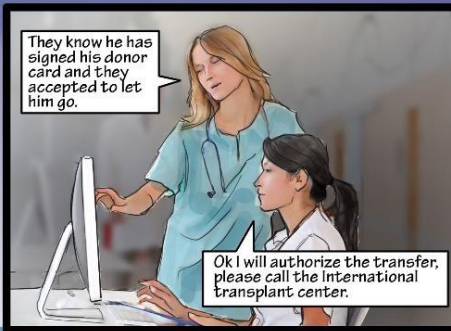
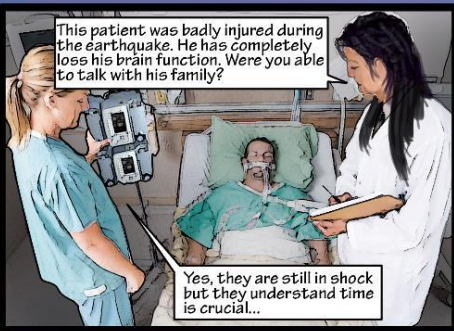
ICAO



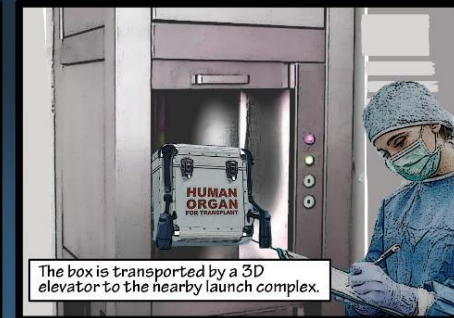
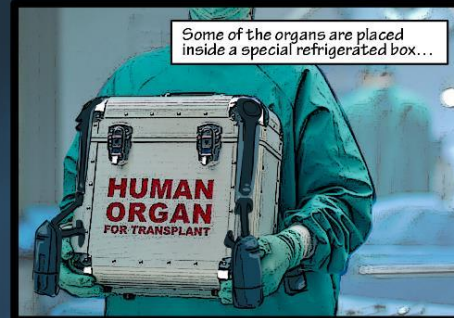
PARIS JULY 14, 2:40 PM



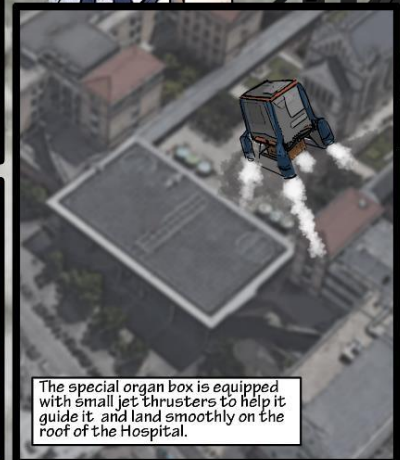
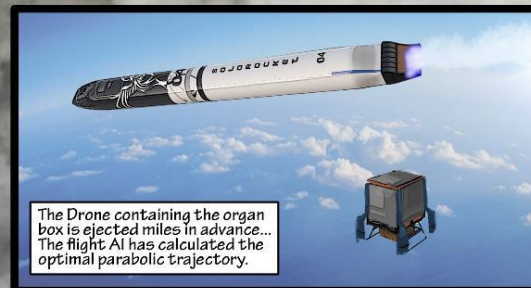




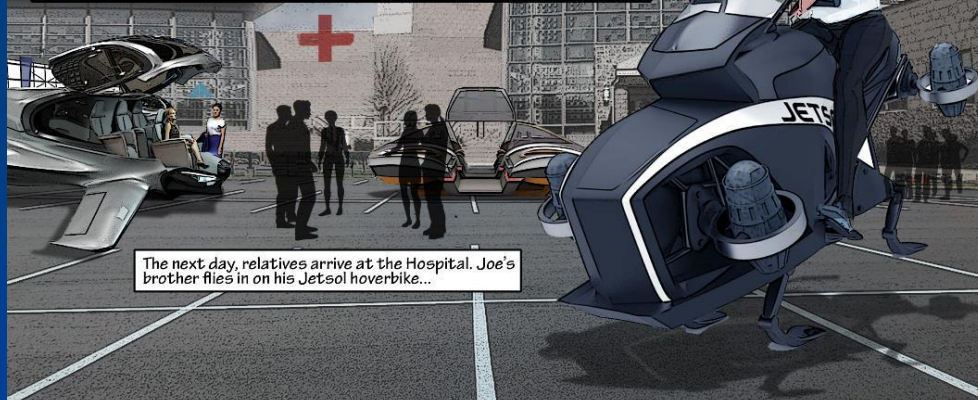
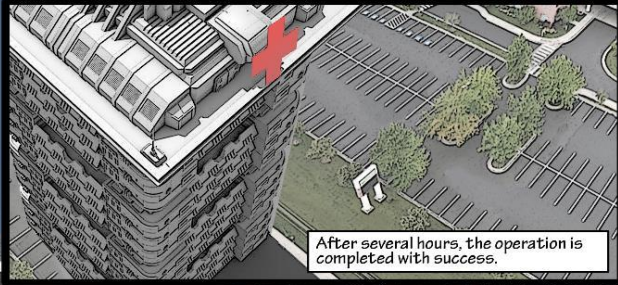
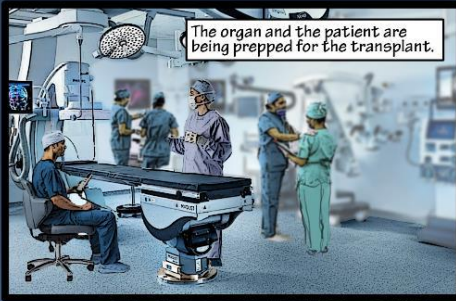
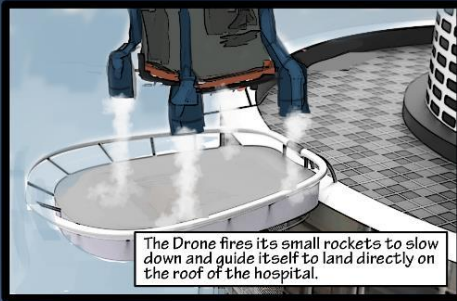
Twenty minutes later a modified Ehang equipped with life support systems lands inside the makeshift medical site.



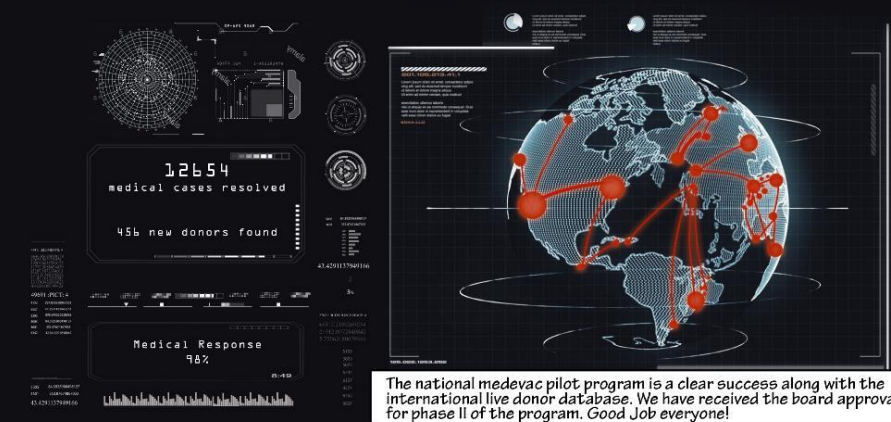
The organ transplant box is fitted inside a rocket powered drone. Both Box & Drone will travel to Paris inside a medium sized rocket.







3 DAYS LATER, AT THE  
WORLD TRANSPLANT  
COORDINATION  
CENTER...







A SHORT STORY ON THE FUTURE OF AVIATION



ICAO



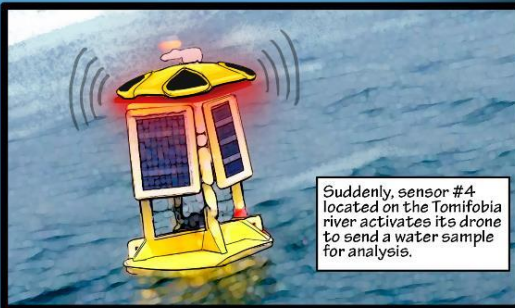
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People are enjoying a day on the Wemotaci water reservoir...



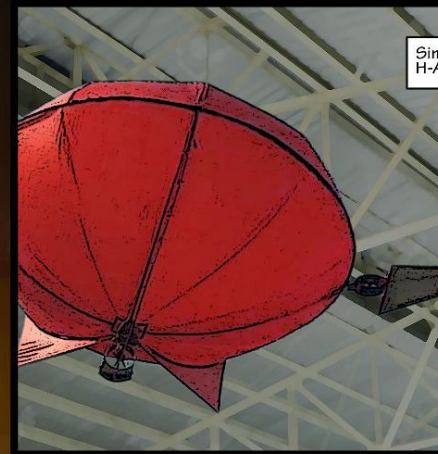
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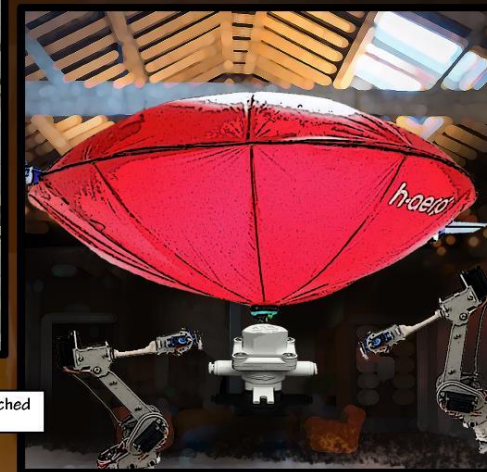
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The small autonomous aircraft climbs up to 3 000 feet and flies towards the Tomifobia river to investigate.



SOURCE IDENTIFIED





At the nearest airport, technicians are flown to board autonomous private aircraft rented under a new national emergency protocol.



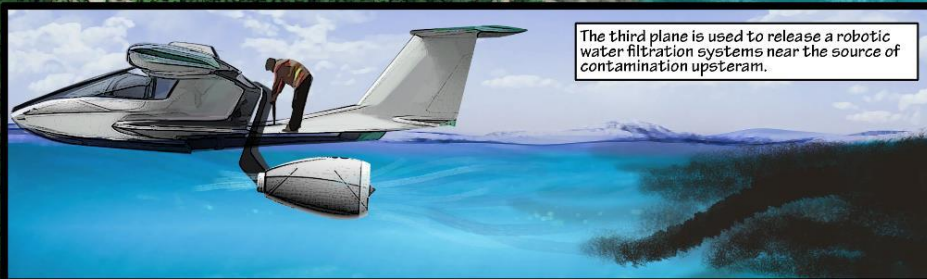
The planes take off autonomously, flying towards the contaminated river...



On board, the specialized technician prepares his emergency deployment procedure.



Each technician instructs its plane where to fix its position near the river shore. Automated water barrier are deployed to filter floating debris.



The third plane is used to release a robotic water filtration systems near the source of contamination upstream.



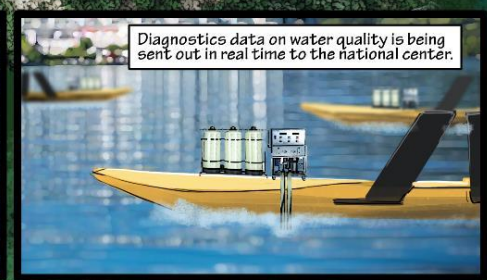
The third plane is used to release a robotic water filtration systems near the source of contamination upstream.



Each boat is positioned in strategic locations along the river...



The survey boats unfold solar power panels.



Diagnostics data on water quality is being sent out in real time to the national center.

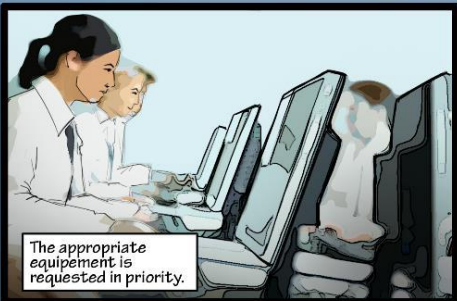


In the meantime the H-AERO one continues to conduct visual checks at various altitudes around the lake.





Another H-AERO one is already upstream and broadcasting images of the broken pipe to the national emergency center.



The appropriate equipment is requested in priority.

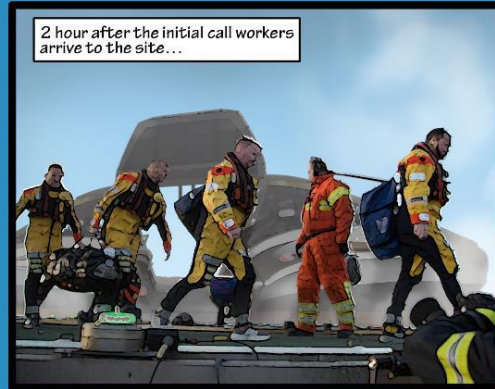


At the supplier the parts are prepped to be delivered by air



The PVC sewer tube are then delivered by air using the Modal cargo drone

Trained workers are alerted by SMS and they are picked up around the region by Dekatone air taxi and transported directly on site.



2 hour after the initial call workers arrive to the site...



The replacement parts are delivered almost simultaneously.



The problem is fixed efficiently...

Less than 8 hours after the incident, the levels are back to normal and the water quality is safe again to enjoy the Wemotaci reservoir!







# FUTURE OF AVIATION

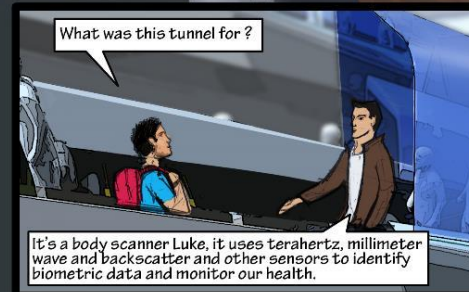
SHORT STORIES OF THE FUTURE OF AVIATION



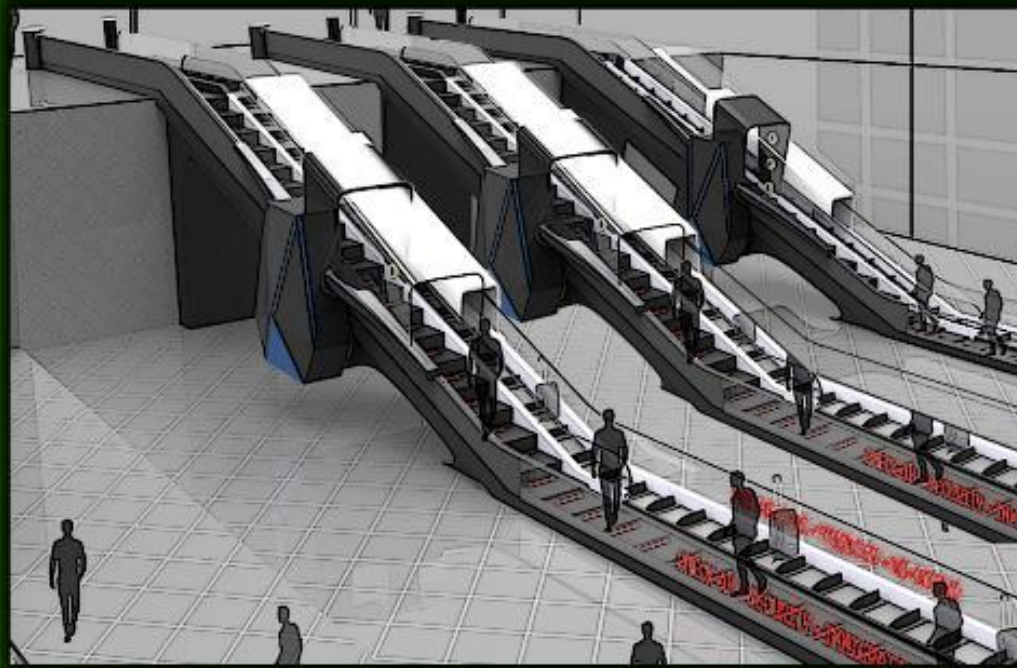
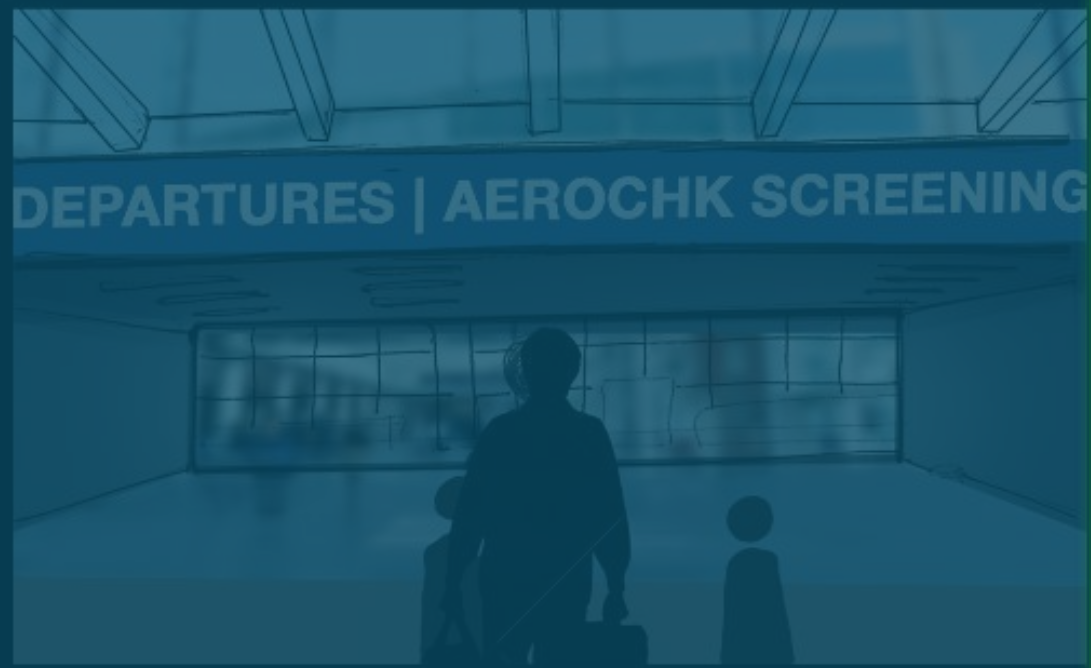
ICAO



Montreal, Sept 21 2035, 4 pm

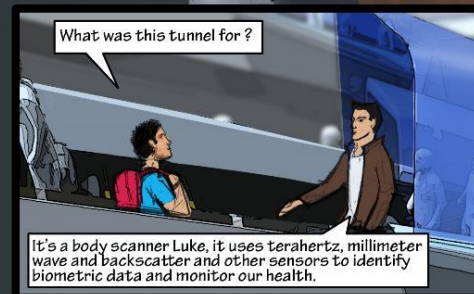




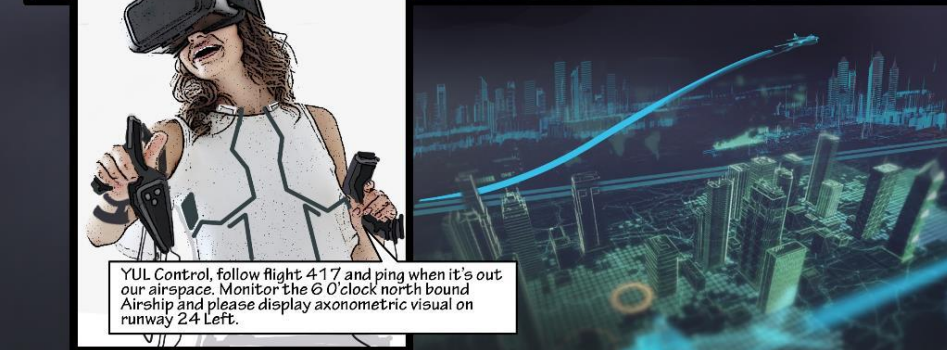
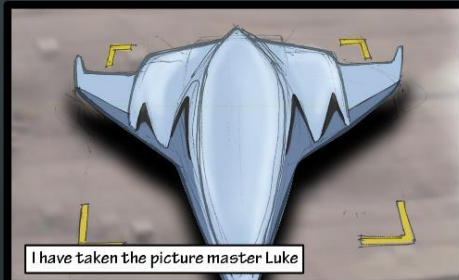
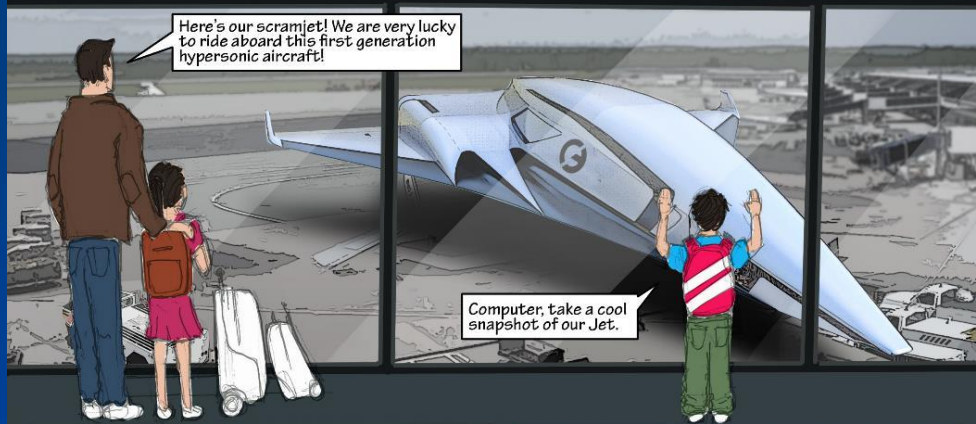
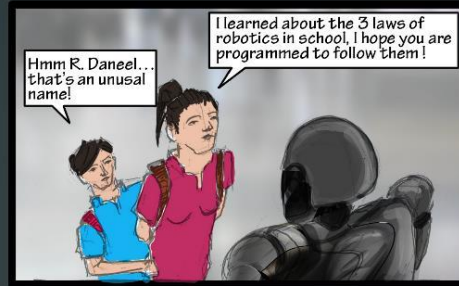
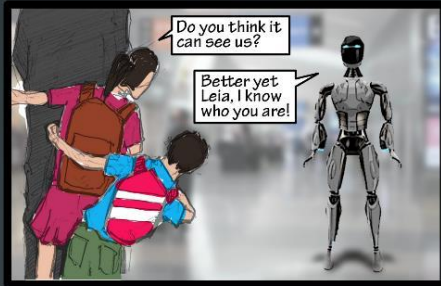




Montreal, Sept 21 2035, 4 pm











I learned about the 3 laws of robotics in school, I hope you are programmed to follow them!

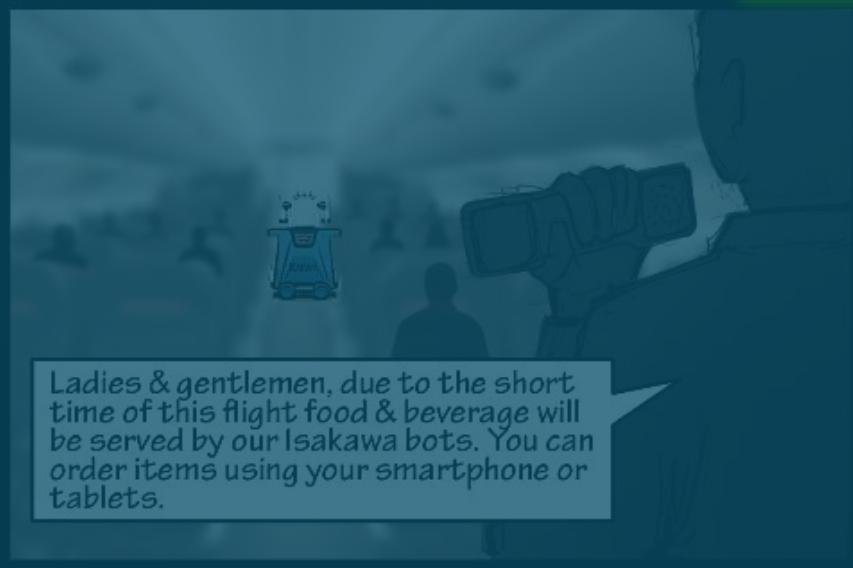


All passengers are checked in, the BA4 is fueled, stocked and ready for boarding.

Thanks David. I will initiate the optimal boarding sequence row call...



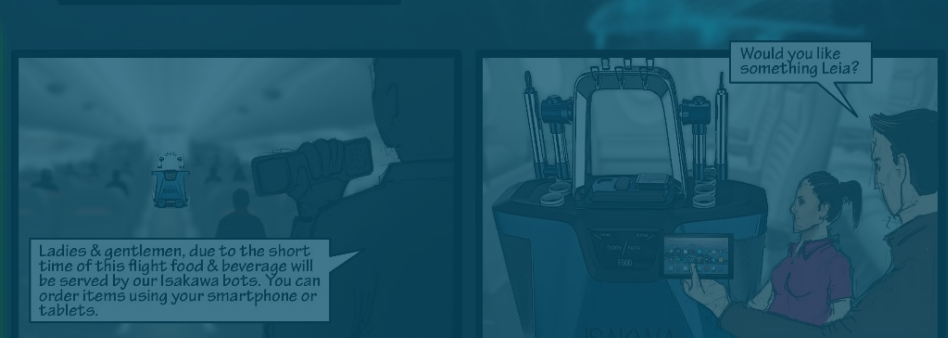
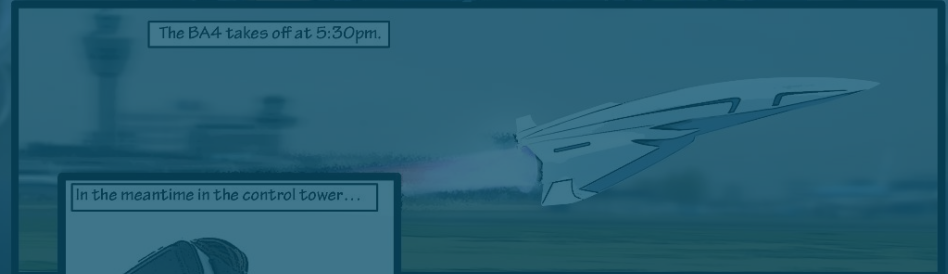
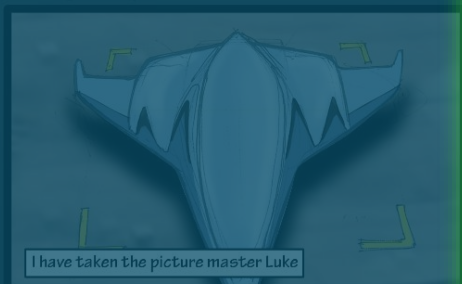
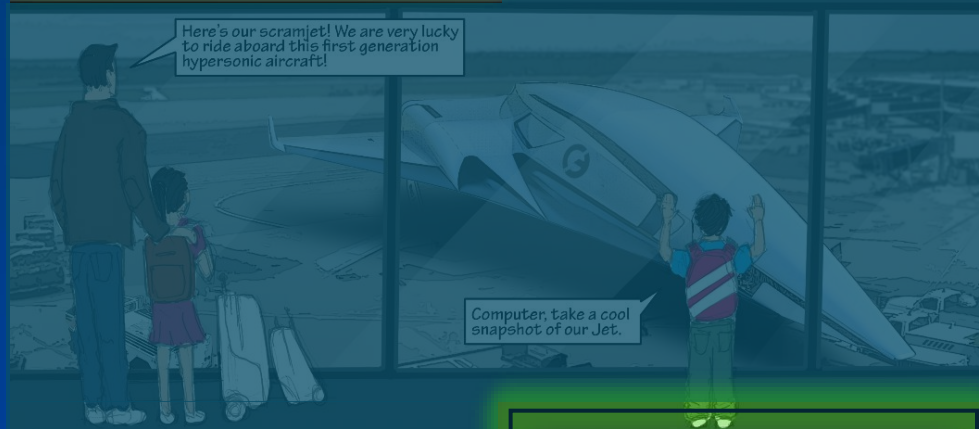
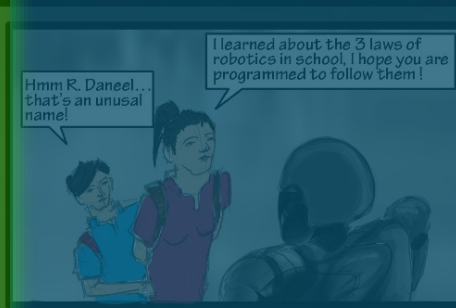
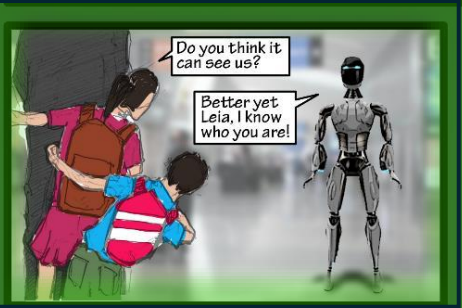
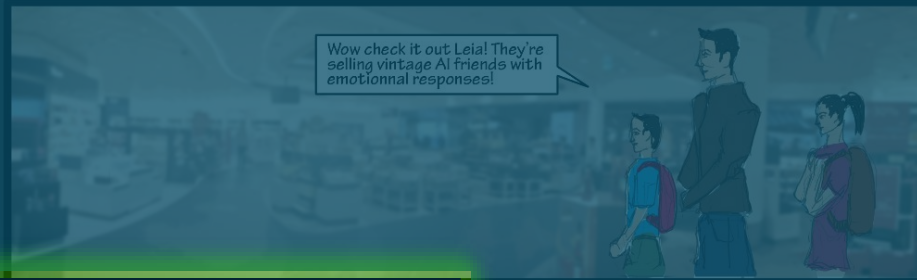
YUL Control, follow flight 417 and ping when it's out our airspace. Monitor the 6 O'clock north bound Airship and please display axonometric visual on runway 24 Left.



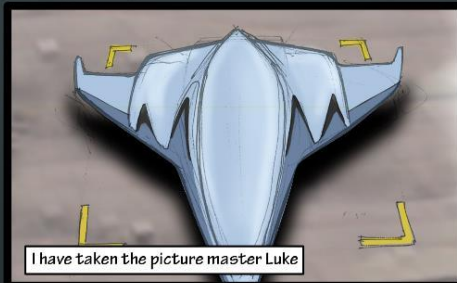
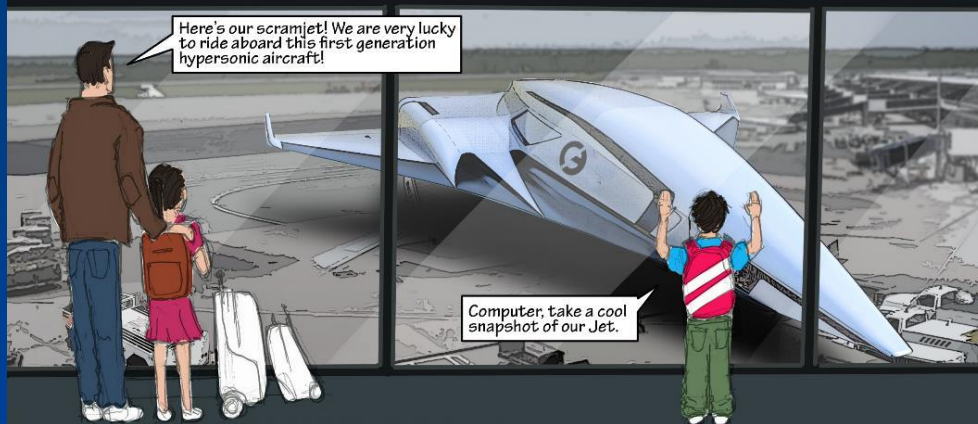
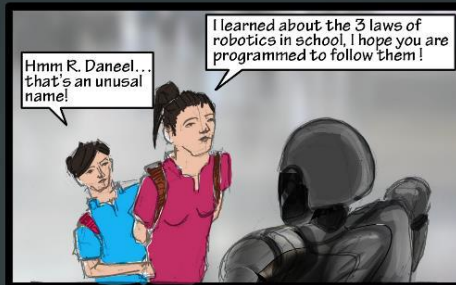
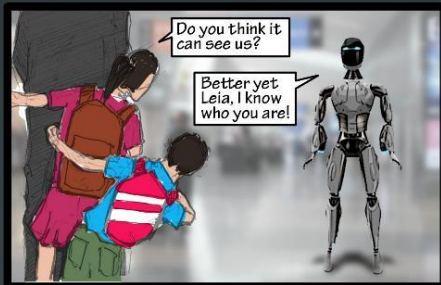
Ladies & gentlemen, due to the short time of this flight food & beverage will be served by our Isakawa bots. You can order items using your smartphone or tablets.



Would you like something Leia?









# PROLOGUE

Sensors on the ground, in the atmosphere and space, constantly monitors our planet to assess the risks natural disasters.

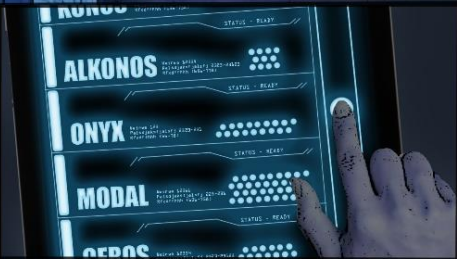


Data is collected by intelligent agents and analysed by machine learning software.

Algorithms determine where relief supplies should be stored.



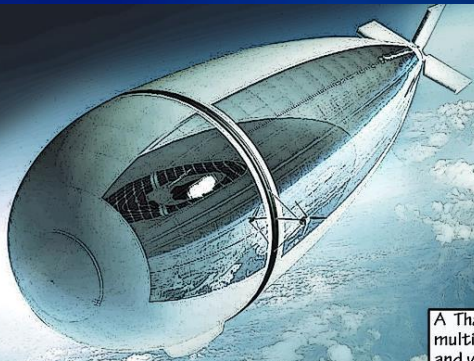
A modified AI updates asset location lists of UAVs, helicopter, aircrafts, and other aircrafts to respond to crisis scenarios based on availability, capacity, and performance history.



Surveillance systems are on standby alert until a 'real' event unfolds.



A day before the disaster...

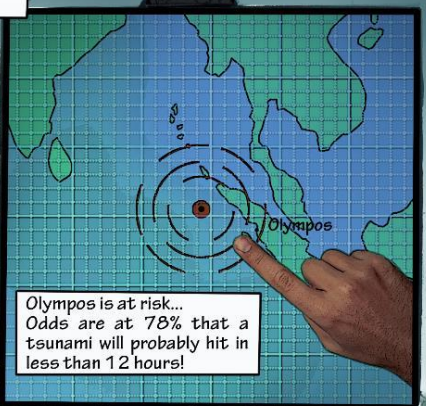


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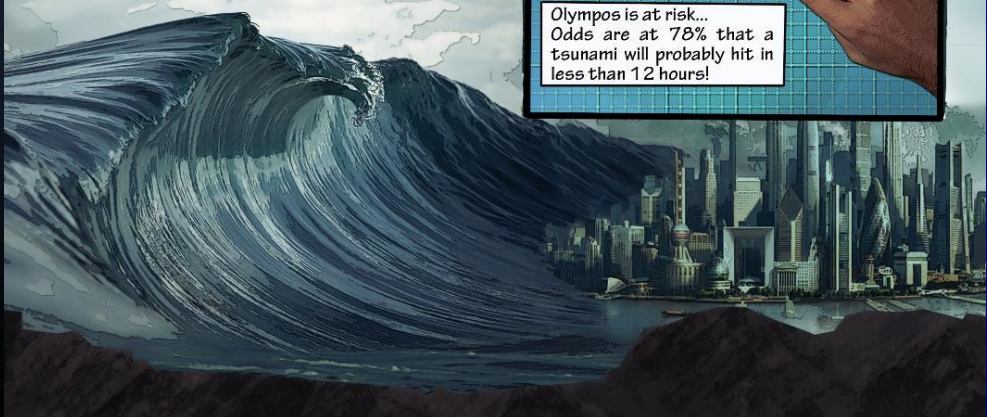


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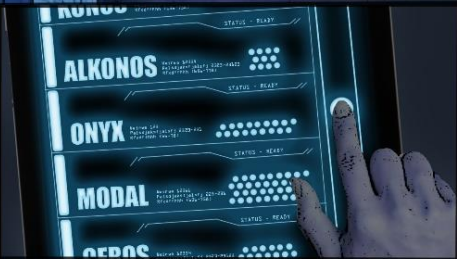


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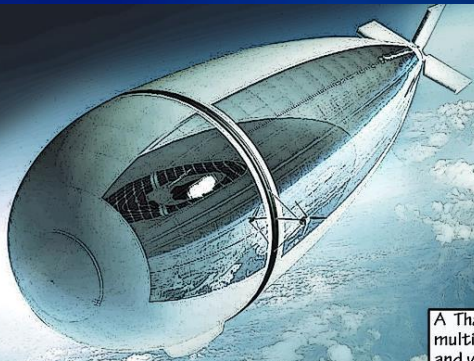
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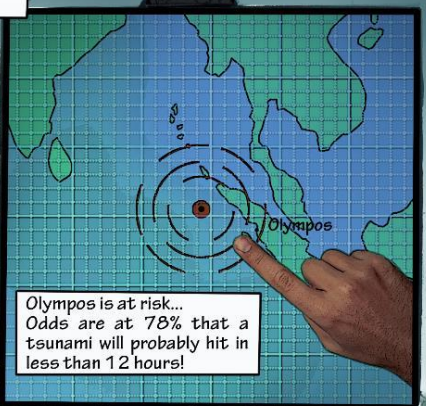


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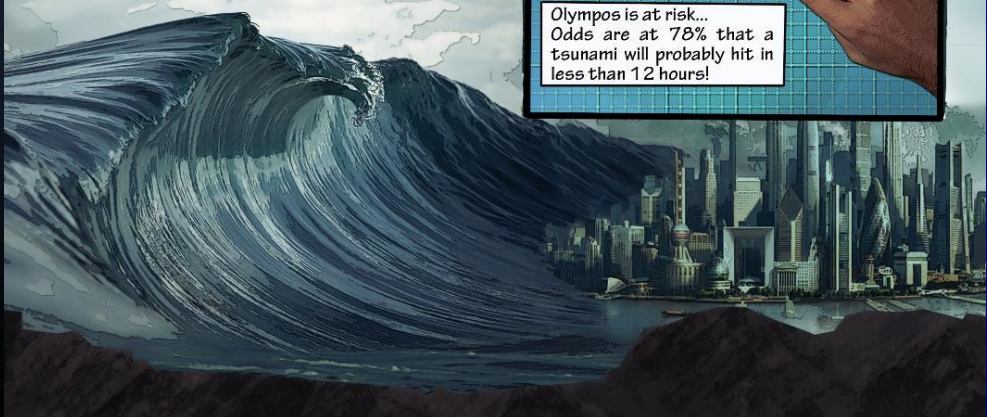


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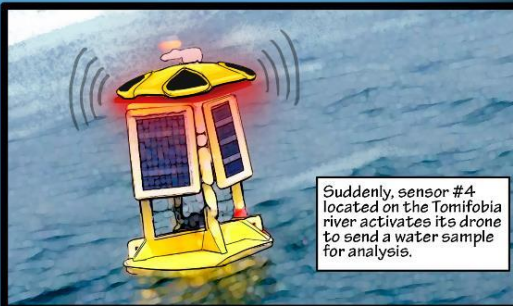
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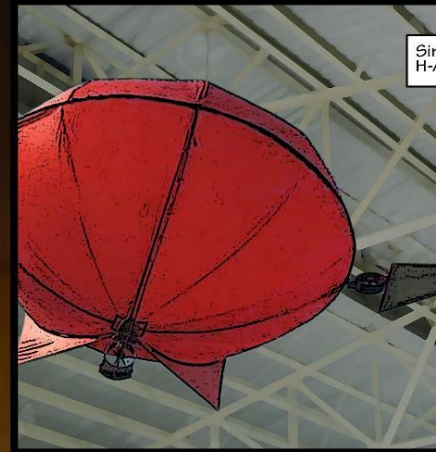
On most creeks & rivers, water sensors are monitoring air and water quality.



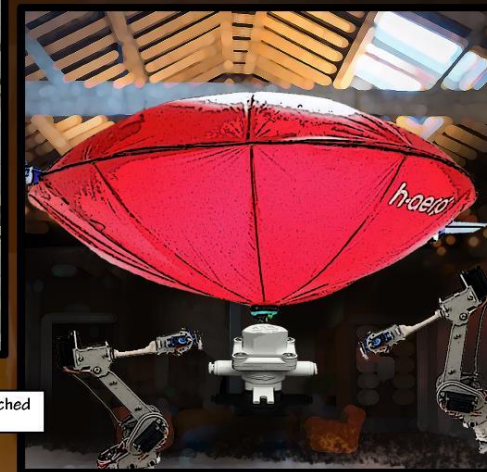
Suddenly, sensor #4 located on the Tomifobia river activates its drone to send a water sample for analysis.



A small water sample is injected in the drone which then flies directly to the local lab.



Simultaneously, a message is sent to an H-AERO One balloon...



A visual water quality sensor is then attached to the Drone



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The small autonomous aircraft climbs up to 3 000 feet and flies towards the Tomifobia river to investigate.



SOURCE IDENTIFIED



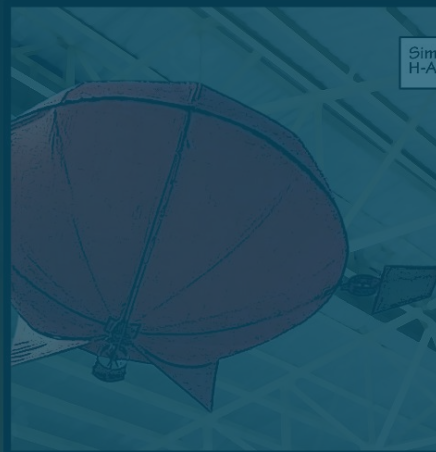
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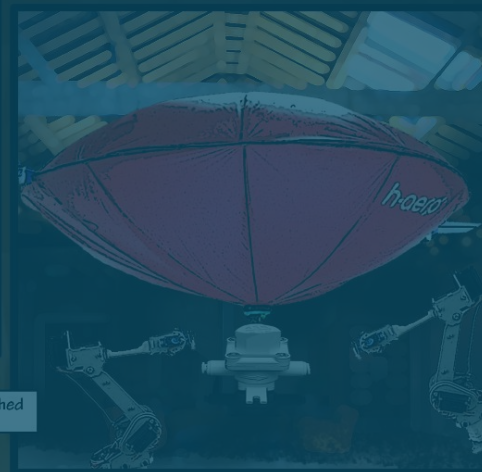
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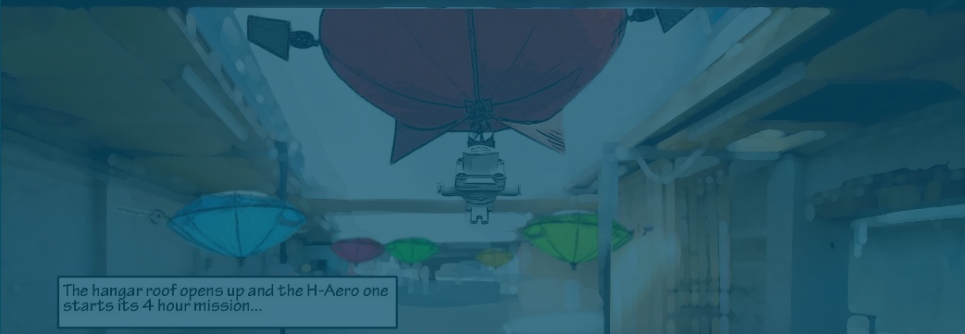
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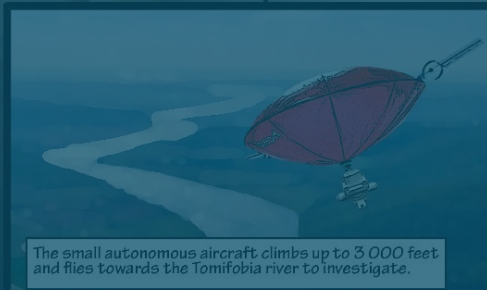
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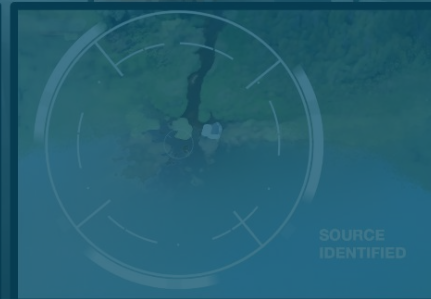
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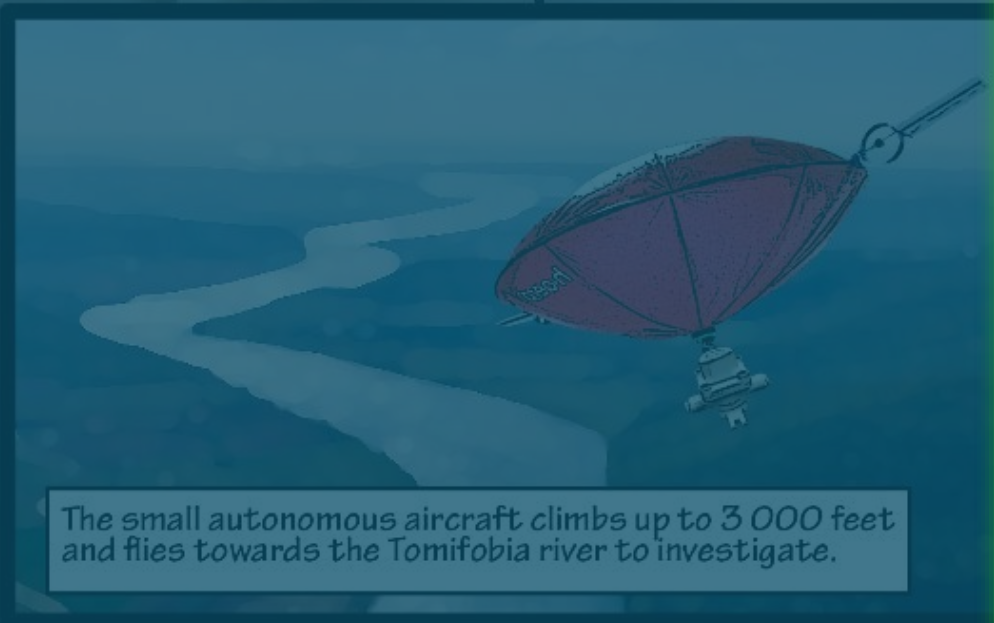
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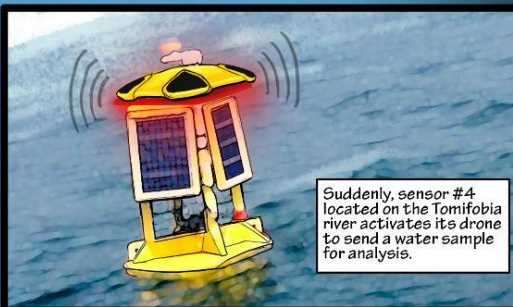
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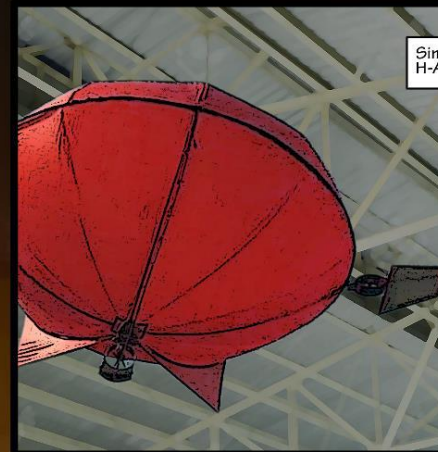
On most creeks & rivers, water sensors are monitoring air and water quality.



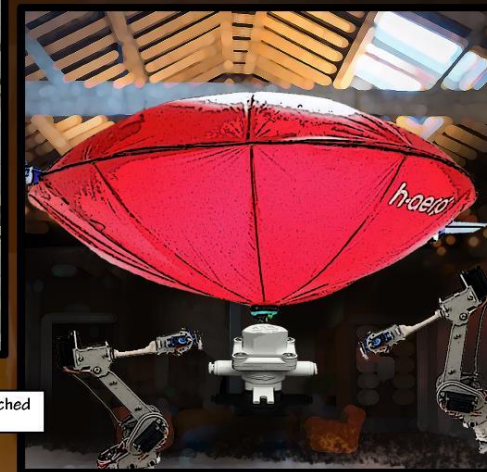
Suddenly, sensor #4 located on the Tomifobia river activates its drone to send a water sample for analysis.



A small water sample is injected in the drone which then flies directly to the local lab.



Simultaneously, a message is sent to an H-AERO One balloon...



A visual water quality sensor is then attached to the Drone



The hangar roof opens up and the H-Aero one starts its 4 hour mission...



The small autonomous aircraft climbs up to 3 000 feet and flies towards the Tomifobia river to investigate.



SOURCE IDENTIFIED



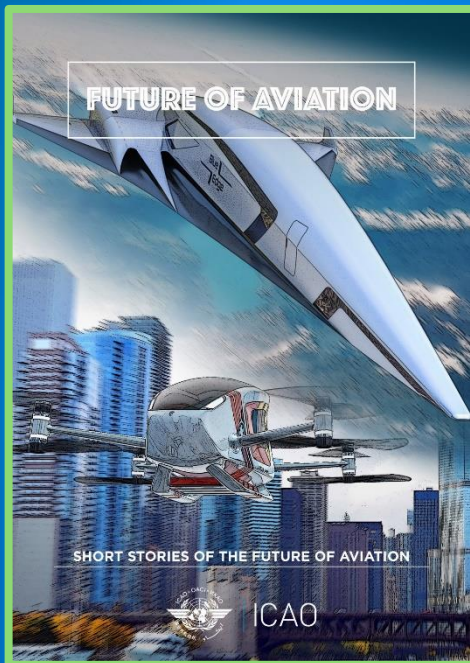


# FUTURE OF AVIATION

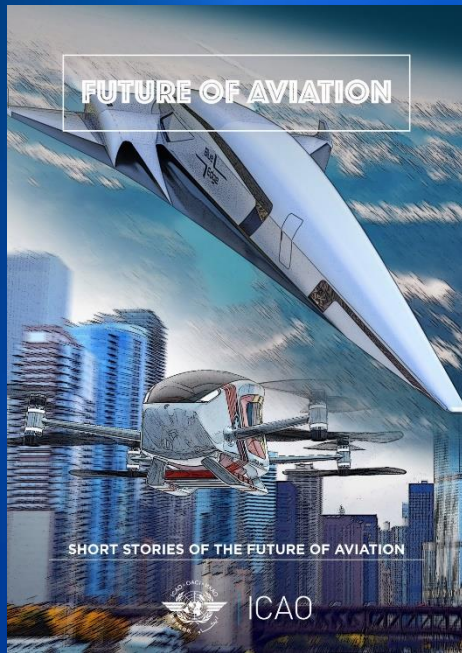
SHORT STORIES OF THE FUTURE OF AVIATION

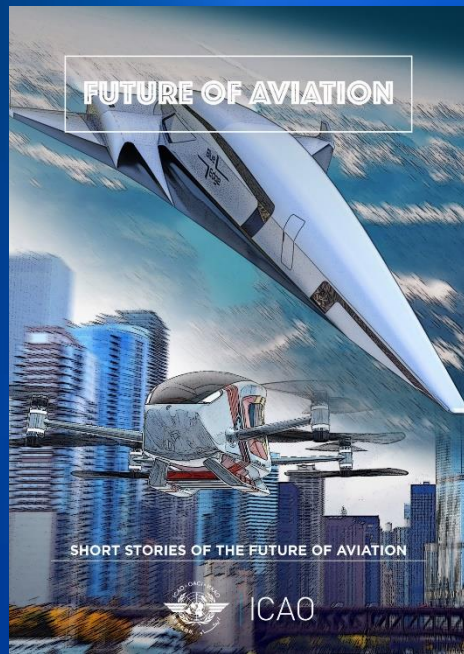


ICAO

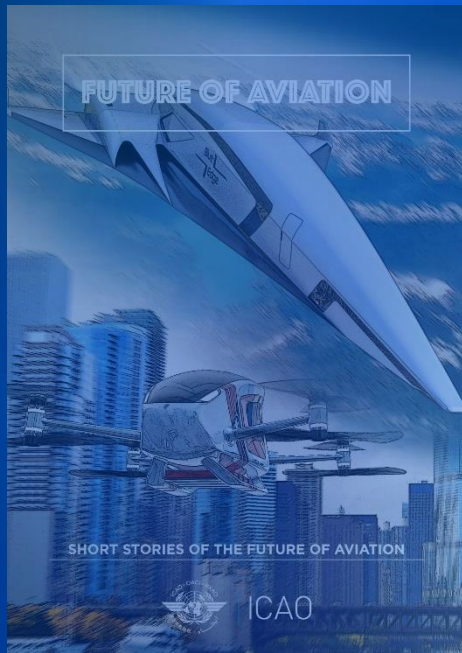














| ICAO iSTARS<sup>4.0</sup>

# Integrated Safety Trend Analysis and Reporting System



A platform to help you make informed decisions



7686

Users

142

Datasets

28

Applications

4

Regional Portals

## Welcome to iSTARS

The Integrated Safety Trend Analysis and Reporting System (**iSTARS**) is a web-based **Modern Analytical Platform** providing a quick and convenient interface to a collection of safety and efficiency datasets and web applications to make safety, efficiency, and risk analyses.



CATALOGUE

INNOVATION

ABOUT iSTARS

iSTARS<sup>4.0</sup>

Integrated Safety Trend Analysis



A platform to help you



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Connecting global aviation stakeholders to foster innovation and collaboration for a safer, more efficient, and sustainable future of flight







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## Strategic Dialogue

Industry collaboration and knowledge sharing

## Inclusive Innovation

Accessibility support for all member states

## Instruments and Tools

Regulatory frameworks and standardization

## Internal Innovation Culture

Internal transformation and empowerment

## Council Innovation Policy Monitoring

KPIs and continuous improvement

## Inclusive Innovation and Accessibility Support

- ✓ Conduct regular horizon scanning
- ✓ Analysis of accessibility of innovation by Member States
- ✓ [Innovation Fair](#)
- ✓ Deploy the various [forums](#) and tools to enable collaboration
- ✓ Support Member States in promoting, accessing, and adopting innovations
  - ✓ [Training](#)



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## Innovation in Aviation - Fundamentals (IIAF EN): Online

ITP/MGT/IIAF/076EN

ICAO Course

● Aviation Management » Management -General

### Goal

The Innovation in Aviation - Fundamentals online course is designed to enhance individual skills and stimulate further thinking within organizations about innovation and integrating advanced solutions to support the civil aviation system.

### Course Description

Developed by:



# ICAO

International Civil Aviation Organization





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# ICAO Standardization Roadmap Guidelines

Understanding the process for evaluating and tracking innovative aviation technologies

[SUBMIT YOUR INNOVATION](#)
[Overview](#)
[Gate Process](#)
[Process Flow](#)
[Entities That Can Submit Innovations](#)
[FAQs](#)

## Roadmap Overview

The ICAO Standardization Roadmap is a rolling timeline that reflects ICAO's assessment of globally suitable innovative technologies and processes at varying levels of maturity in support of its mandate. It serves as a key forward-planning tool by collecting insights on emerging technologies and operational developments. The Roadmap provides a dynamic view of anticipated innovation timelines, highlighting both the readiness and expected entry into service of new solutions. It also helps identify where and when new provisions updates may be required to enable the safe and globally harmonized implementation of these innovations. For more information check the [ICAO Standardization Roadmap Concept Document](#)

### Purpose

The Standardization Roadmap collects information on aviation innovations to

### Scope

Innovative technologies and processes at different levels of maturity that contribute to

### Key Principles

The Roadmap is guided by principles of transparency, independence, neutrality,





Item	Indicated by Submitting Entity		Reviewed by ICAO		
	TRL	EIS	Status	Comment	Ongoing Work
Distributed Fan Aircraft	7	2036	Before Gate 1	due to the insufficient information to validate the maturity	N/A
Flex-fuel	4	2040	Before Gate 1	due to insufficient maturity	N/A
Hybrid Aircraft	7	2029	Passed Gate 1	submission merits inclusion into the Roadmap for monitoring purposes	ADOP.028.01 - Aerodrome compatibility of aircraft powered by alternative energy sources AIRP.017.01 - Electric and Hybrid Propulsion
Hydrogen Aircraft	7/7/5	2035	Passed Gate 1	submission merits inclusion into the Roadmap for monitoring purposes	ADOP.028.01 - Aerodrome compatibility of aircraft powered by alternative energy sources
Hydrogen Fuel Cell APU replacement	6	2036	Before Gate 1	due to the incompleteness of the information available	N/A
Pressure Gain Engine	6	2038	Before Gate 1	due to the incompleteness of the information available	N/A
Small Electric Aircraft	9/7/7	2027	Passed Gate 1	submission merits inclusion into the Roadmap for monitoring purposes	ADOP.028.01 - Aerodrome compatibility of aircraft powered by alternative energy sources AIRP.017.01 - Electric and Hybrid



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SUBMIT YOUR INNOVATION

VIEW ROADMAP

DASHBOARDS

USER GUIDE

to Convention to address the evolving nature of aviation  
ent Council action to create a framework that supports all  
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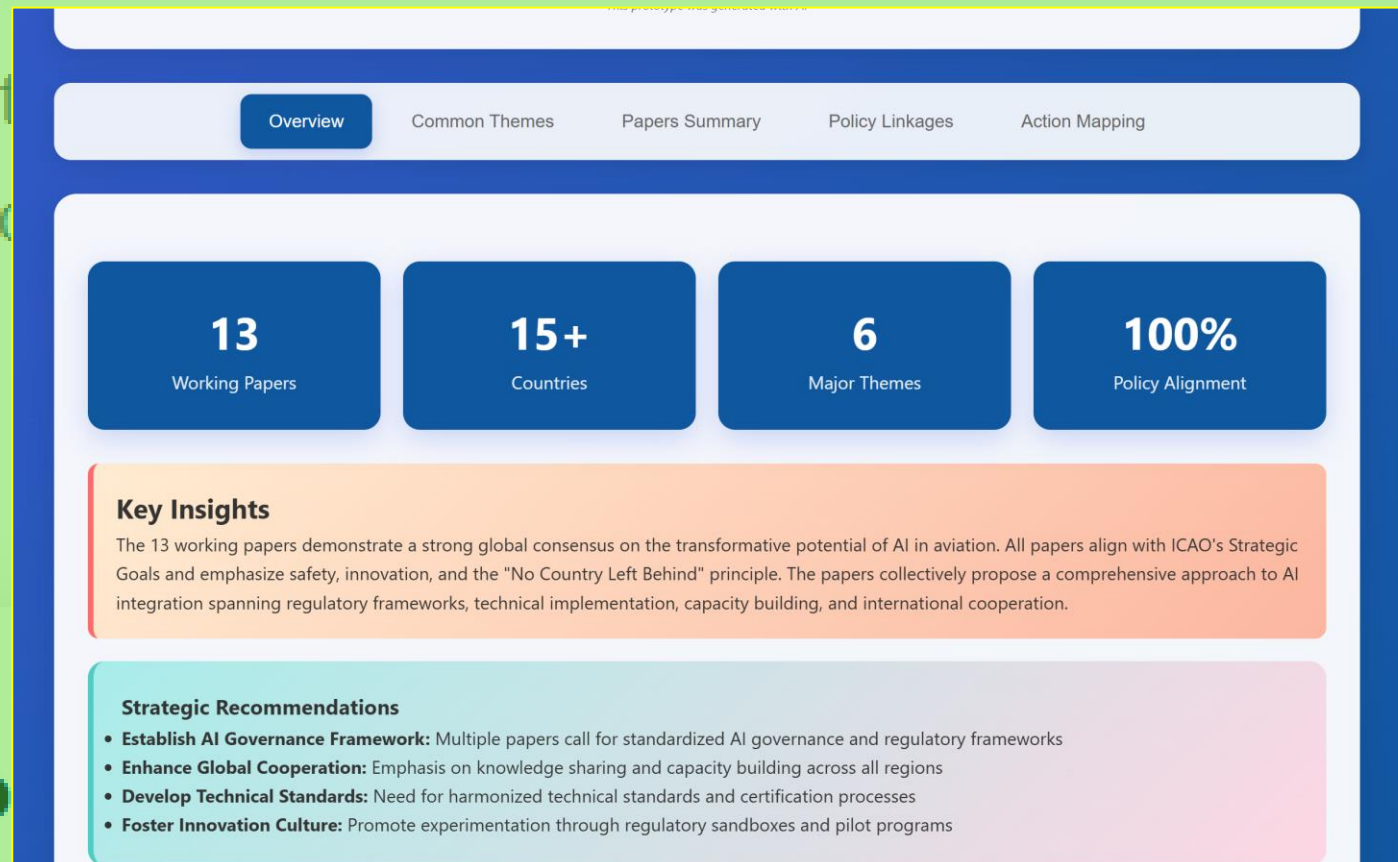
and Tools

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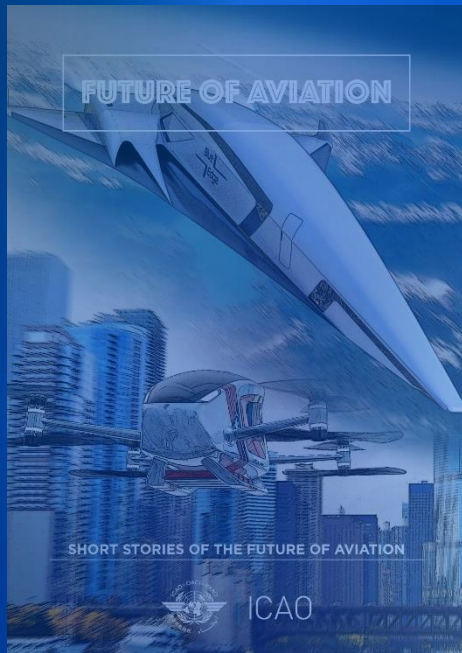




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Thank you