

TOPICAL REPORT

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AIRPORTS



Nearly a decade late, Berlin's Brandenburg Airport finally opens (during a pandemic)

"Happy Halloween to Berlin's beleaguered Brandenburg Airport, which finally opens its doors this Saturday. The massive 1,470-hectare site in the Schönefeld region southeast of Berlin aims to be the state-of-the-art transportation hub that the German capital has always lacked, and will open up connections to more long-haul destinations."

Source: CNN

Optimising airport operations during a pandemic

"Airport operators need to remain nimble and responsive to manage the evolving control, such as screening measures, during this uncertain environment and be prepared for the upturn when it does come."

Source: International Airport Review

Nearly 200 airports in UK and Europe could go bust due to collapse in air travel

"Airports Council International Europe (ACI Europe), which represents airport operators, said it estimated that 193 out of Europe's 740 commercial airports face "insolvency in the coming months if passenger traffic

AIR TAXI



Air taxi service for urban mobility: A critical review of recent developments, future challenges, and opportunities

"By adopting an electric vertical takeoff and landing concept (eVTOL), air taxis could be operational from skyports retrofitted on building rooftops, thus gaining advantage from an implementation standpoint. Motivated by the potential impact of ATS (Air Taxi Service), this study provides a review of air taxi systems and associated operations."

Source: Elsevier

Air Taxi Flight Sharing

"This article investigates possibilities of synchronizing passenger orders. The proposed passenger pooling model replaces specific flight timing on order with constraints: latest arrival and earliest departure to provide room for coordination of orders, backed by web-based ICT. Theoretical test cases calculations verify the concept and compare it with traditional full on-demand and scheduled operations."

Source: Sciendo

INSIGHT



World Economic Forum White Paper October 2020: Joint Policy Proposal to Accelerate the Deployment of Sustainable Aviation Fuels in Europe A Clean Skies for Tomorrow Publication

"This proposal was initially developed prior to the COVID-19 pandemic. The aviation industry finds itself in a difficult economic situation due to the exceptional circumstances caused by the global pandemic, which has brought most major economies to a standstill. The immediate priority for the sector is to navigate this challenge."

Source: World Economic Forum

Accenture: Commercial Aerospace Insight Report 2020

"What keeps Aerospace executives up at night? Ongoing pandemic and economic-related challenges pose the greatest threats. Supply chain and production are near-term priorities, with liquidity and financing major areas of focus over the next six 6 to 12 months."

Source: Accenture

FORECAST

does not start to recover by the year-end".

Source: The Guardian

INTERNATIONAL TRAVEL

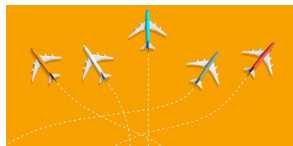


Here's how to rebuild trust in international travel

"The issue of trust was especially clear in Europe during the summer peak, when many chanced flying to holiday destinations...The evolution of quarantine measures has become increasingly complex for travellers to follow, as individual states, sub-regions, cities and towns emerge as risk zones. To avoid these situations, the world needs a unified digital infrastructure and health trust framework, where health data can be shared securely across borders, as well as with airlines and other stakeholders."

Source: World Economic Forum

ATM



SESAR DM launches portal to support European ATM modernisation

"The new online portal provides all of the most up to date information about European ATM modernisation and the 343 SESAR DM deployment projects."

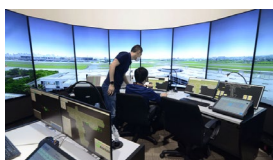
Source: International Airport Review

Can ATM/UTM learn from autonomous vehicles?

"ATM recently had the opportunity to speak with Auterion to learn more about their project work to leverage tools used in the world of autonomous driving that can be transitioned into aviation. More specifically drones. The idea is that the concept of vehicle-to-vehicle (V2V) communications for autonomous vehicles could be leveraged to enable drone-to-drone (D2D) communications."

Source: Air Traffic Management Magazine

AIR TRAFFIC CONTROL

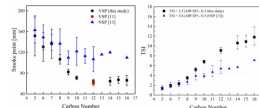


User Base Estimation Methodology for a Business Airport Shuttle Air Taxi Service

"This paper presents a methodology to estimate the potential user base of a business airport shuttle service operated by electric vertical takeoff and landing air taxis. The user base of the air taxi service is estimated using a discrete choice model that estimates the probability an individual will use the air taxi service given his/her income level and the time savings compared to driving."

Source: Aerospace Research Central

JET AVIATION FUEL

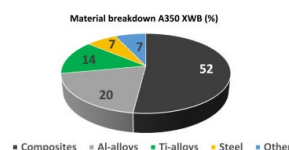


Sooting Propensity Estimation of Jet Aviation Fuel Surrogates and Their n-Alkane Components by the Virtual Smoke Point Method

"Jet aviation fuels are composed of various hydrocarbon mixtures, which can have increasingly complex and diverse chemical structures as the carbon number increases. For the purpose of both assessing performance of these complex liquid fuel mixtures and predicting their performance in applied settings, various mixture formulation methods have been proposed since at least the early 2000s to prescribe surrogate fuel compositions to emulate real fuel behaviors."

Source: ACS Publications

AIRCRAFT MATERIAL



Trends in aviation: rebound effect and the struggle composites x aluminum

"This piece presents in five acts the historical unfolding of two deeply interwoven players of the 20th century, aviation and aluminum, whose explosive worldwide growth evidences signs of the 'backfire' phenomenon fulfilling the basic logic of the Jevons' paradox, and has designed the contours of globalization as we know it today."

Source: Elsevier

ELECTRIC AVIATION



MITRE Air Traffic Update: Predicting the Future

"As we look for signs of near-term recovery in commercial aviation, published schedules may be misleading"

Source: Mitre

Commercial Market Outlook 2020-2039

"Our long-term outlook is informed by decades of analysis and insights into airline strategies and passenger demand, including how the industry has responded to market shocks. Six months into the COVID-19 crisis, the picture remains dynamic and still subject to many unknowns, from the trajectory of the virus and potential vaccines or therapies to economic recovery regionally and globally."

Source: BOEING

REVIEW



KPMG The Aviation Industry Leaders Report 2020: Steering the Supercycle

"We are delighted to present you with our Aviation Industry Leaders Report 2020: Steering the Supercycle. The report captures the views of over 40 industry leaders across the leasing, airline and banking markets and includes the views of the rating agencies and analysts covering the sector"

Source: KPMG

Post-pandemic Growth Opportunity Analysis of the Global Airport & Airline Industry, 2020 Report

"The 'Post-pandemic Growth Opportunity Analysis of the Global Airport & Airline Industry' report has been added to ResearchAndMarkets.com's offering."

Source: PRNewswire

Aviation Industry Leaders Report

"For this report, rather than rely on an online survey engine to collect the maximum amount of responses, Airline Economics and KPMG focused on personally interviewing major aviation industry leaders in a series of in-personal in-depth interviews to delve deeper into the real issues impacting the market."

Source: Airline Economics

A dynamic and versatile simulator solution for complete ATC training

"The World Robotics report shows that Europe is the region with the highest robot density globally, with an average value of 114 units per 10,000 employees in the manufacturing industry. For more facts about robots watch IFR's video news about Europe in one minute."

Source: International Federation of Robotics

AIRLINES



Airlines suffering from business class blues in age of COVID-19

"The COVID-19 pandemic has ushered in the era of video meetings. But can Zoom really replace in-person meetings that require business executives to travel? US airlines have suffered a steep decline in this lucrative category of travel. They do expect a rebound – just not right away."

Source: Channel New Asia

Do airlines have the management to thrive in the post-crisis market?

"While industry analysts have been busy predicting how airlines might navigate their way through the crisis, Peter Davies, founder of Airline Management Group, argues the big challenge will be finding the exceptional talent and imagination in leadership needed to deliver on plans in the new normal"

Source: Flight Global

PRIVATE AVIATION



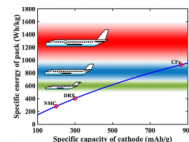
The real jet set: How private aviation is beating the Covid slump

"Although commercial airlines have seen a huge decline in passengers in recent months, private aviation is flourishing more than ever,"

Source: Aviation Business News

Private jet bookings soar as wealthy flee second England lockdown

"Charter firm 'overwhelmed' by demand for flights to second homes overseas, with Canary Islands top of the list"

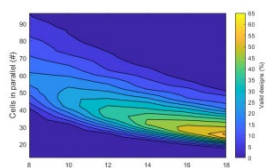


Beyond Transition Metal Oxide Cathodes for Electric Aviation: The Case of Rechargeable CFx

"In this work, we use density functional theory calculations to build a fundamental understanding of possible reaction mechanisms. The direct formation of LiF and graphite seems unlikely because of the sluggish kinetics of F diffusion in CFx. The discharge occurs likely via lithium ion diffusion into the CFx host to form an LiCF ternary compound."

Source: ACS Publications

MACHINE LEARNING

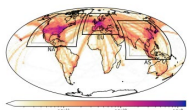


Machine Learning Enabled Fast Multi-Objective Optimization for Electrified Aviation Power System Design

"This paper proposes a machine learning (ML) enabled constrained multi-objective optimization solver to drastically reduce the amount of design iterations required for Pareto set discovery for power systems. The process contributes significantly to design automation. A heavy-duty vertical-takeoff-landing (VTOL) unmanned aerial vehicle (UAV) power system is selected to demonstrate the efficacy and limitation of ML enabled optimization."

Source: IEEE Xplore

SUSTAINABILITY



Regional sensitivities of air quality and human health impacts to aviation emissions

"In this study, we quantify the differences in the regional air quality responses to aviation emissions, and analyze their drivers. Specifically, we use the GEOS-Chem atmospheric chemistry-transport model to quantify the regional fine particulate matter (PM_{2.5}) and ozone sensitivity to aviation emissions over Asia, Europe, and North America for 2005. Simulations with perturbed regional aviation emissions are used to isolate health impacts of increases in aviation emissions originating from and occurring in different regions."

Network Tracker: the global market (w/e Nov. 1)

"As airlines and airports around the world recover from the challenges created by the COVID-19 pandemic, Routes' latest infographic looks at the current state of the global aviation market."

Source: Routes Online

ATM

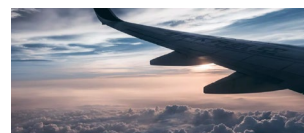


Interdependencies within ATM: Time to reconsider the present for a more robust and flexible regulator

"Key Messages of the Workshop: The workshop raises the important question of interdependencies within ATM at the right moment in time as the pandemic forces us to reassess whether existing models, metrics and methodologies used are the right ones to manage ATM performance. Interdependencies within ATM performance areas are highly relevant and influence decision-making."

Source: CAPA Centre for Aviation

SUSTAINABILITY



Here's how sustainable aviation fuel can take off in Europe

"Sustainable aviation fuels – produced from feedstock ranging from agricultural residue to carbon removed directly from the air – are an essential pillar of aviation's decarbonisation journey. When responsibly sourced, they offer massive gains in lifecycle carbon reductions vs traditional fossil jet fuel and are fully compatible with existing airplane and airport infrastructure."

Source: World Economic Forum

AEROSPACE RESEARCH



Safe Flight: New Method Detects Onset of Destructive Oscillations in Aircraft Turbines

TECHNOLOGY



Airbus Plans Hydrogen-Powered Carbon-Neutral Planes by 2035. Can They Work?

"Imagine that it is December 2035 – about 15 years from now – and you are taking an international flight in order to be at home with family for the holidays. Airports and planes have not changed much since your childhood: Your flight is late as usual. But the Airbus jet at your gate is different. It is a giant V-shaped blended-wing aircraft, vaguely reminiscent of a boomerang."

Source: IEEE Spectrum

UAS



AI-Powered Drone Learns Extreme Acrobatics

"Now researchers from the Robotics and Perception Group at the University of Zurich and ETH Zurich, in collaboration with Intel, have developed a neural network training method that "enables an autonomous quadrotor to fly extreme acrobatic maneuvers with only onboard sensing and computation." Extreme."

Source: IEEE Spectrum

Drones that patrol forests could monitor environmental and ecological changes

"Researchers at Imperial College London's Aerial Robotics Lab have developed drones that can shoot sensor-containing darts onto trees several meters away in cluttered environments like forests. The drones can also place sensors through contact or by perching on tree branches."

Source: Imperial College London

INDUSTRY INSIGHT



International alignment key to recovery and safety of aviation

"Montréal, 20 October 2020 – Ensuring that States coordinate and sufficiently

From aviation to aviation: Environmental and financial viability of closed-loop recycling of carbon fibre composite

"In this study, aircraft interior applications of recycled carbon fibre (rCF) replacing virgin glass fibre are examined over the full life cycle in terms of environmental and financial viability. The viability of rCF for closed-loop aviation applications are demonstrated across rCF conversion (papermaking; fibre alignment) and composite manufacture (compression moulding; injection moulding)"

Source: Elsevier

Integrated C-C coupling/hydrogenation of ketones derived from biomass pyrolysis for aviation fuel over Ni/Mg-Al-O/AC bifunctional catalysts

"Aldol condensation of biomass-deriveds coupled with hydrogenation is a promising route for the production of renewable aviation fuel. In this study, a bifunctional catalyst was prepared to integrate the aldol condensation of cyclopentanone and hydroprocessing for aviation fuel in one pot."

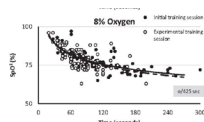
Source: Elsevier

Power-to-Liquid fuels for aviation – Processes, resources and supply potential under German conditions

"The World Robotics report shows that Europe is the region with the highest robot density globally, with an average value of 114 units per 10,000 employees in the manufacturing industry. For more facts about robots watch IFR's video news about Europe in one minute."

Source: Elsevier

AEROMEDICAL



Normobaric Hypoxia Training in Military Aviation and Subsequent Hypoxia Symptom Recognition

"The purpose of this study was to validate the normobaric hypoxia training effect. Data were collected from 89 pilots from the Finnish Air Force. This survey was conducted in a tactical F/A-18C Hornet simulator in two sessions under normobaric

"Flutter" is a complex oscillatory phenomenon that can destroy aircraft turbine blades and has historically been the cause of several plane accidents. Now, scientists at Tokyo University of Science and the Japan Aerospace Exploration Agency explore a novel approach that can be used to early detect the onset of flutter, solving one of the main problems that has been holding back the design of lighter and more efficient turbines."

Source: Tokyo University of Science

resource their aviation strategies will underpin both the continued safety of flight and the global recovery of the aviation network as a whole, ICAO Council President Mr. Salvatore Sciacchitano and ICAO Secretary General Dr. Fang Liu declared at yesterday's Flight Safety Foundation 2020 International Air Safety Summit."

Source: ICAO

Hard hit by virus, airlines push for tests over quarantines

"What will it take to get people flying again? International air traffic is down 92% this year as travelers worry about catching COVID-19 and government travel bans and quarantine rules make planning difficult. One thing airlines believe could help is to have rapid virus tests of all passengers before departure."

Source: TechXplore

Summer Airline Traffic Review Shows International Market Remains Virtually Non-existent

"New Airports Council International (ACI) World data shows the COVID-19 pandemic continued to have a dramatic impact on global passenger traffic during the ordinarily busy Northern Hemisphere summer peak."

Source: CAPA Centre for Aviation

Aerospace industry records worst quarter as Covid halts sales

"The global aerospace industry has endured its worst quarter ever with record low orders for new aircraft and 12,000 UK jobs already lost or at risk because of the collapse in travel caused by the coronavirus pandemic."

Source: The Guardian

Airbus-Boeing WTO dispute: What you need to know

"The spat is in focus with the WTO allowing the EU to impose tariffs on billions of dollars worth of US goods. DW takes a look at the 16-year-old case that has seen the two allies duel over aircraft subsidies."

Source: DW

ENVIRONMENT



Aviation leaders highlight importance of prioritising climate action

"Despite the current crisis facing the global aviation industry, its commitment to pursuing sustainability remains strong, particularly as the sector starts to recover. Speaking at

conditions, in which the pilots performed flight missions and breathed 21% oxygen (O2) in nitrogen, and blinded to the pilot, the breathing gas was changed to a hypoxic mixture containing either 8%, 7% or 6% O2 in nitrogen."

Source: Taylor & Francis

SAFETY AND SECURITY

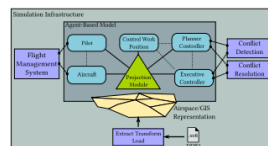


Tourism and Terrorism: Terrorists' Threats to Commercial Aviation Safety and Security

"If aeroplanes and passengers, as well as property and people on the ground are to be protected, potential perpetrators of aviation terrorism must be prevented from breaching security checkpoints and gaining access to 'secure' airport areas and to aircrafts. Given the interconnectedness of the air transportation system, a sufficiently high level of security must be provided throughout the entire system. In this chapter we examine terrorism issues relevant to airline and airport security internationally, a topic that has received much attention since 9/11."

Source: Emerald Insight

ATM



Simulation-Based Evolutionary Optimization of Air Traffic Management

"In this article, we propose the use of computational intelligence techniques, such as Agent-Based Modelling and Simulation (ABMS) and Evolutionary Computing (EC), to design a simulation-based distributed architecture to optimize control plans and procedures in the context of ATM."

Source: IEEE Xplore

Aircraft trajectory prediction and synchronization for air traffic management applications

"This paper reviews research applicable to trajectory prediction throughout the trajectory prediction process, addresses differences in decision-making structures, and considers trajectory synchronization research applicable to TBO (Trajectory-Based Operations). Where possible, operational realities are

the Global Sustainable Aviation Forum, industry leaders reiterated that long-term climate action should be a priority alongside economic recovery in the coming years."

Source: International Airport Review

Airlines committed to a green recovery

"Despite the crisis facing the global aviation industry, its commitment to pursuing sustainability remains strong."

Source: IATA

COVID-19



Coronavirus News: Regular Updates on COVID-19's Impact on the Airline Industry

"The circumstances surrounding COVID-19 are continuously evolving. We'll be updating this page regularly with breaking news to help APEX members and others stay up-to-date on how the novel coronavirus is impacting the aviation industry."

Source: APEX The Airline Passenger Experience Association

This airport is using dogs to detect passengers infected with coronavirus

"Dogs trained to detect the novel coronavirus began sniffing passenger samples at Finland's Helsinki-Vantaa airport this week, authorities said, in a pilot project running alongside more usual testing at the airport."

Source: World Economic Forum

COVID-19 could change travel – but not in the way you think

"The long-term impact on the way we travel remains uncertain to some degree, but travel planning data is providing new clues into how consumer comfort levels – and priorities – are changing. Those clues could guide other changes in our industry, changes that have a lasting impact beyond this pandemic."

Source: World Economic Forum

Inside the airline industry's meltdown

"Coronavirus has hit few sectors harder than air travel, wiping out tens of thousands of jobs and uncountable billions in revenue. While most fleets were grounded, the industry was forced to reimagine its future"

Source: The Guardian

identified concluding with future research and validation needs for TBO across the entire process from inputs to a synchronized trajectory."

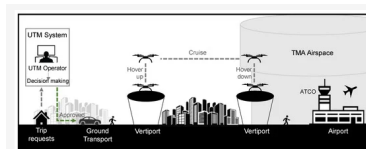
Source: Elsevier

The Analysis of Occurrences Associated with Air Traffic Volume and Air Traffic Controllers' Alertness for Fatigue Risk Management

"Fatigue is an inevitable hazard in the provision of air traffic services and it has the potential to degrade human performance leading to occurrences. The International Civil Aviation Organization (ICAO) requires air navigation services which providers establish fatigue risk management systems (FRMS) based on scientific principles for the purpose of managing fatigue."

Source: Wiley Online Library

UTM



A Performance-Based Airspace Model for Unmanned Aircraft Systems Traffic Management

"This paper presents a novel airspace model for UTM adopting Performance-Based Operation (PBO) criteria, and specifically addressing urban airspace requirements. In particular, a novel airspace discretisation methodology is introduced, which allows dynamic management of airspace resources based on navigation and surveillance performance."

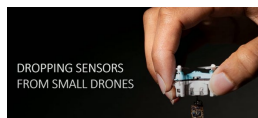
Source: MDPI

Unmanned air-traffic management (UTM): Formalization, a prototype implementation, and performance evaluation

"Our analyses showcase how the de-conflicting and liveness of the system can be proven assuming each aircraft conforms to the deadlines specified by OVs. Through extensive simulations, we evaluate the performance of the protocol in terms of workload and response delays. Our experiments show that the workload on the airspace manager and the response time of each aircraft grow linearly with respect to the number of aircraft."

Source: Cornell University

UAS



Airdropping sensors from moths

"We present the first system that can airdrop wireless sensors from small drones and live insects. In addition to the challenges of achieving low-power consumption and long-range communication, airdropping wireless sensors is difficult because it requires the sensor to survive the impact when dropped in mid-air. Our design takes inspiration from nature: small insects like ants can fall from tall buildings and survive because of their tiny mass and size. Inspired by this, we design insect-scale wireless sensors that come fully integrated with an onboard power supply and a lightweight mechanical actuator to detach from the aerial platform."

Source: ACM Digital Library

The wild west of drones: a review on autonomous UAV traffic-management

"This paper presents a study on autonomous UAV traffic management. As the need for autonomous UAVs grows every year, there must be a system in place for controlling the vehicles. Modern methods of air traffic control may be found ineffective to cope with the expected density of vehicles. Research of UAV is snowballing, but methods of UAV traffic management (UTM) are yet to be kick started."

Source: IEEE Xplore

CYBER SECURITY

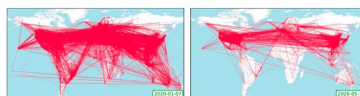


Cybersecurity of the Unmanned Aircraft System (UAS)

"This paper will focus on the potential cyber threats against UASs, providing some examples of cyberattacks from the past."

Source: IEEE Xplore

COVID 19



How did COVID-19 impact air transportation? A first peek through the lens of complex networks

"In this study, we investigate the impact of COVID-19 on global air transportation at different scales, ranging from worldwide airport networks where airports are nodes

and links between airports exist when direct flights exist, to international country networks where countries are contracted as nodes, and to domestic airport networks for representative countries/regions."

Source: Elsevier

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