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AIRLINES



Are Airline Cabin Changes Needed For COVID-19 Protection?

"How big will the changes need to be in commercial aircraft ventilation to minimize transmission of the coronavirus? Transmission can be minimized by downflow ventilation in the cabin—could this be a fast retrofit? How would it be verified that air inside an airplane cabin is safe?"

Source: Aviation Week

REGIONAL INSIGHTS

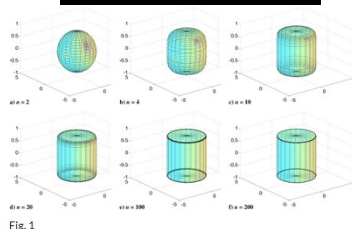


Boeing could produce Loyal Wingman fighter-like drone by middle of decade: executive

"Boeing Co sees mass production of its unmanned, fighter-like jet developed in Australia likely happening by the middle of the decade, an executive said on Tuesday, as it rolled out the first of three prototypes.."

Source: Reuters

AIR NAVIGATION



Incorporating Stochastics into Optimal Collision Avoidance Problems Using Superquadrics

"Collision avoidance modeling methods vary between nonoptimal deterministic approaches to more challenging optimal probabilistic approaches [1]. To efficiently "model" these time-varying probability regions for use in an optimal control problem, this paper applies a novel approach using superquadrics. This paper determines optimal flight paths for the ownship, such as minimum flight path deviation, given different time-varying 3D uncertainty regions placed around the ownship and multiple intruder aircraft."

Source: Journal of Air Transportation

Near-Optimal Methodology for In-Flight Synthesis of Trajectory Options Set

"This paper presents an algorithm for in-flight synthesis of near-optimal trajectory options sets in the presence of time-varying airspace constraints during the en route phase of an aircraft flight to support NextGen trajectory-based operations."

ECONOMIC DEVELOPMENT & IMPACT



Coronavirus: impact on the aviation industry worldwide

"This dossier presents graphs and tables about the economic impact of the coronavirus (COVID-19) pandemic on the aviation industry worldwide. The dossier focuses on passenger aviation as well as air cargo and follows up with data on airlines and airports, and gives a public opinion on the outbreak worldwide."

Source: Statista

MAR 2020: Air Transport Monthly Monitor

"ICAO produces an Air Transport Monthly and Yearly Monitor that provides a snapshot and analysis of economic and aviation indicators."

Source: ICAO

APRIL 2020: Air Transport Monthly Monitor

"ICAO produces an Air Transport Monthly and Yearly Monitor that provides a snapshot and analysis of economic and aviation indicators."

Source: ICAO

USAF Launches Effort to Engage in Vertical Flight Market; Will Roper Quoted

"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: Executive Gov

Boeing Completes First Flight of Second 777X

"Boeing on Thursday conducted what it called a productive and successful first flight of the second 777X airplane. Designated WH002 and the second of four 777-9 flight test articles, the big widebody will test handling characteristics and airplane performance, the company said."

Source: AIN online

Meet NASA's air taxi simulator

"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: Aerospace America

Electric Aircraft Will Arrive Sooner Than People Think

"A Business Insider analysis reports that "electric aircraft are coming – and they'll be here sooner than you think." Lux Research analyst Chloe Holzinger said, "We expect to see that market really start to take off this year."

Source: AIAA

DoD Releases Global RFI, Identifies 11 Modernizing Areas Including Hypersonics, Space Technologies

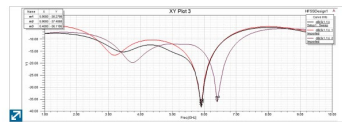
"The World Robotics report shows that Europe is the region with the highest robot density globally, with an average value of 114 units per 10,000 employees in the manufacturing industry. For more facts about robots watch IFR's video news about Europe in one minute."

Source: AIAA

AIRPORTS

Source: Journal of Air Transportation

AIR TRAFFIC MANAGEMENT



A CPW Fed Patch Antenna Design for Weather Monitoring, Air Traffic Control and Defense Tracking Applications

"Modern era require modern solutions and modern technologies. Thereby modernizing such in the domain of antennas, a new type of patch antenna intended for C-band applications is designed printing over a FR4_epoxy substrate. whose dimensions, is W1×L1×h as 35mm ×30 mm ×1.6 mm the simulations results showed that the antenna works at a single resonant frequency 5.9Ghz, hence covering the applications like military, weather forecasting, defense tracking and air traffic control. The antenna feed with co-planar wave guide (CPW) is a simulation-based design and the parameters of antenna designed are optimized by making use of ANSYS HFSS software.."

Source: 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC)

The Reliability Analysis of Air Traffic Network Based on Trajectory Clustering of Terminal Area

"The development of civil aviation has led to flight operations generating massive datasets. Derived from Automatic Dependent Surveillance-Broadcast technology, an eigengap-based automatic hierarchical clustering algorithm is proposed, aiming to overcome the human intervention requirement of hierarchical clustering to determine the number of track clusters in the terminal area."

Source: IEEE Access

Stochastic Runway Scheduling Problem With Partial Distribution Information of Random Parameters

"Air traffic flow management is one of the most important operations in terminal airports heavily relying on advanced intelligence transportation

Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis

"The latest estimates indicate that the possible COVID-19 impact on scheduled international passenger traffic for the full year 2020, compared to Baseline (business as usual, originally-planned)."

Source: ICAO

State of the region: Africa & Middle East

"A summary of the latest available data and current issues across a number of key economic, market and industry variables in Africa & Middle East."

Source: IATA

State of the region: The Americas

"A summary of the latest available data and current issues across a number of key economic, market and industry variables in the Americas."

Source: IATA

State of the region: Asia Pacific

"A summary of the latest available data and current issues across a number of key economic, market and industry variables in Asia Pacific."

Source: IATA

State of the region: Europe

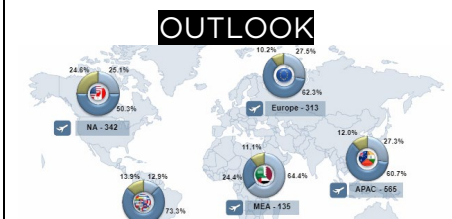
"A summary of the latest available data and current issues across a number of key economic, market and industry variables in Europe."

Source: IATA

State of the region: North Asia

"A summary of the latest available data and current issues across a number of key economic, market and industry variables in North Asia.."

Source: IATA



IATA Annual Review 2019

"IATA's annual review is a complete report on the successes, issues and state of commercial air transport. It is released each year for IATA's Annual General Meeting taking place early June."

Source: IATA



Innovation expansion at Edmonton International Airport continues

"Tara Mulrooney, Vice President of Technology at Edmonton International Airport (EIA), details how even though COVID-19 has created challenges, the airport can continue to innovate through its unique strategy."

Source: International Airport Review

Visualising the sky better at Jersey Airport's remote air traffic control tower

"With air traffic control on the cusp of a digital revolution involving remote towers, Jersey Airport's Air Traffic Controller, Peter Moore, explains how the airport overcame some of the challenges involved, including the use of eye-tracking technology."

Source: International Airport Review

Remote ATC towers and the changing airport landscape

"RC Raman, Manager of Airport Safety and Operations at ACI World, provides an overview on the evolution of remote digital towers."

Source: International Airport Review

Advanced disinfection technology implemented at Hong Kong

"In the battle against COVID-19, Airport Authority Hong Kong is using antimicrobial coating and autonomous cleaning robots at Hong Kong International Airport."

Source: International Airport Review

Innovation expansion at Edmonton International Airport continues

"Tara Mulrooney, Vice President of Technology at Edmonton International Airport (EIA), details how even though COVID-19 has created challenges, the airport can continue to innovate through its unique strategy."

Source: International Airport Review

Avalon Airport is first Australian airport to introduce touchless check in

techniques. This work considers a two-stage runway scheduling problem given a set of flights with uncertain arrival times."

Source: IEEE Access

Exploring Dynamic Characteristics of Multi-State Air Traffic Flow: A Time Series Approach

"Understanding the dynamics of air traffic flow is important to achieving advanced air traffic management. This work explores the dynamic evolution and fluctuation characteristics of multistate air traffic time series from a complex network perspective, which is essential for understanding the nature of an air traffic system."

Source: IEEE Access

Ant Colony Systems for Optimizing Sequences of Airspace Partitions

"In this paper, we introduce an Ant Colony System algorithm which finds optimal or near-optimal sequences of airspace partitions, taking into account some constraints on the transitions between two successive airspace configurations."

Source: 2020 International Conference on Artificial Intelligence and Data Analytics for Air Transportation (AIDA-AT)



Design and Evaluation of a Tool to Support Air Traffic Control with 2D and 3D Visualizations

"Air traffic control officers (ATCOs) are specialized workers responsible to monitor and guide airplanes in their assigned airspace. Such a task is highly visual and mainly supported by 2D visualizations. In this paper, we designed and assessed an application for visualizing air traffic in both orthographic (2D) and perspective (3D) views."

Source: 2020 IEEE Conference on Virtual Reality and 3D User Interfaces (VR)

Expanding airport capacity of cities under uncertainty: Strategies to mitigate congestion

COVID-19 Impact on Asia-Pacific Aviation Worsens

"The situation is deteriorating. Airlines are in survival mode. They face a liquidity crisis with a US\$61 billion cash burn in the second quarter. We have seen the first airline casualty in the region. There will be more casualties if governments do not step in urgently to ensure airlines have sufficient cash flow to tide them over this period," said Conrad Clifford, IATA's Regional Vice President, Asia-Pacific. He identified India, Indonesia, Japan, Malaysia, the Philippines, Republic of Korea, Sri Lanka and Thailand as priority countries that need to take action."

Source: IATA

More Asia-Pacific States Urgently Need to Support their Airline Industry

"Based on a scenario in which severe travel restrictions last for three months, the Asia-Pacific region as a whole will see passenger demand reduced by 37% this year, with a revenue loss of US\$88 billion. While each country will see varying impact on passenger demand, the net result is the same – their airlines are fighting for survival, they are facing a liquidity crisis, and they will need financial relief urgently to sustain their businesses through this volatile situation," said Conrad Clifford, IATA's Regional Vice President, Asia-Pacific."

Source: IATA

IATA April 2020 SURVEY AIRLINE BUSINESS CONFIDENCE INDEX

"Our April 2020 survey of airline CFOs and Heads of Cargo confirmed the sharp weakening in the Q1 business environment amid the spread of COVID-19. The challenging business backdrop – including weakness in profitability – is expected to be maintained through the next twelve months."

Source: IATA

More Asia-Pacific States Urgently Need to Support their Airline Industry

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"Australia's Avalon Airport is working to ensure world-class passenger safety and experience when the airport recommences flights."

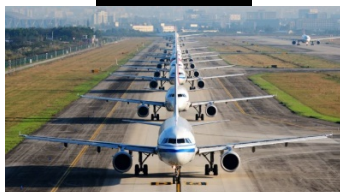
Source: International Airport Review

COVID-19 operational practices examples published by ACI World

"As airports work to limit the impact of COVID-19, ACI World has published examples of operational practices in order to support airports' responses during the pandemic."

Source: International Airport Review

OUTLOOK



Analysts expect a slow, steady comeback for airline industry once virus is contained

"Aerospace America reports that aerospace-focused consultancy Brian Foley Associates Founder Brian Foley said, "it's not going to be a rapid bounce back" for the airline industry once the coronavirus outbreak is contained. Foley said, "There won't be a rush back [to the airlines] to go on vacation" by consumers once travel restrictions are lifted.."

Source: AIAA

Bold predictions and seeds of optimism from aviation leaders

"The global aviation industry came together yesterday for a unique all-day broadcast event to encourage collaboration during the most challenging and unpredictable time in its history. FlightPlan: Charting a Course into the Future, hosted by Inmarsat Aviation and the Airline Passenger Experience Association (APEX), saw more than 50 leading voices exchange views on the present and future of aviation. Over 3,000 viewers tuned in from almost 100 countries worldwide for a series of live debates, interviews and news analysis."

Source: Air Traffic Management

Aerospace Industry Reshaping Begins To Deal With COVID-19 Effects

"The COVID-19 pandemic is reshaping aerospace and, about two months into the sector's worst crisis ever, its future shape is becoming

"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: Journal of Air Transport Management

Airports' role as logistics centers in humanitarian supply chains: A surge capacity management perspective

"The purpose of this study is to investigate the key factors of airport logistics surge capacity and the relationships between these elements. The findings show that successful airport surge capacity management is closely related to prioritizing the flights and operational activities; considering the influx of local people to airports and local infrastructure capacity in the planning phase; developing suitable methods to encourage people to take part in surge operations; providing uninterrupted communication in and out of airport.."

Source: Journal of Air Transport Management

Energy performance analysis of airport terminal buildings by use of architectural, operational information and benchmark metrics

"The purpose of this research is to propose benchmark metrics to investigate the energy performance of existing and future airport terminal buildings."

Source: Journal of Air Transport Management

Flight and passenger efficiency-fairness trade-off for ATFM delay assignment

"This paper studies trade-offs between efficiency (performance) and fairness (equity), when assigning ATFM delay pre-tactically (on-ground at origin airport) due to reduced airport capacity at destination. Delay is assigned as the result of the optimisation of a deterministic multi-objective problem considering flight and passenger perspectives when defining objectives of performance and fairness."

Source: Journal of Air Transport Management

reduced by 37% this year, with a revenue loss of US\$88 billion. While each country will see varying impact on passenger demand, the net result is the same – their airlines are fighting for survival, they are facing a liquidity crisis, and they will need financial relief urgently to sustain their businesses through this volatile situation," said Conrad Clifford, IATA's Regional Vice President, Asia-Pacific."

Source: IATA

Global Airline Flight Operations—Optimization Opportunities, 2019

"The global concern on rising emissions from the aviation industry has increased airlines' focus on improving their environmental sustainability initiatives. Reducing fuel usage, developing alternative propulsion solutions, and reducing carbon emissions on the ground are key focus areas. Solution providers and start-ups are developing solutions that can deliver maximum optimization of operations."

Source: Frost & Sullivan

Global Commercial UAS Market Outlook, 2020

"The total commercial UAS market size was developed from historical data related to small drone sales, average prices, regional demand, and industry insider estimates. Several additional inputs, including information from primary interviews of industry participants and current as well as forecast sales trends from top competitors, were included to develop a platform market forecast removed from the hype-related estimates promoted by several competing research services. Estimates and competitive landscape information includes."

Source: Frost & Sullivan

Global; Enabling Technology Leadership Award - Autonomous Drones

"Commercial businesses and governments are finding application opportunities for drones—i.e., unmanned aerial vehicles (UAVs)—which are poised to impact multiple industry verticals in various capacities, significantly increasing the benefits to organizations' business operations

clearer. The industry is becoming much smaller than it was just a short while ago. Bankruptcies are almost guaranteed and will not be limited to smaller, weaker firms. State bailouts and the rising influence of governments will soon be commonplace..."

Source: Aviation Week

How is the air cargo industry reacting and responding to the COVID-19 pandemic?

"In this exclusive Q&A with International Airport Review, Vladimir Zubkov, Secretary General of The International Air Cargo Association (TIACA), discusses the COVID-19 pandemic and its impact on the global air cargo industry."

Source: International Airport Review

AIR TRAFFIC MANAGEMENT



Data, data and more data

"Starting with Cirium holistically. They are a business intelligence organisation with a focus on data analytics. Five categories of data sets make up the structure of their offers: Fleet, Flight, Schedule, Trip and Fare (this is actually air traffic). Digital transformation is coming to all industries eventually, some are further down this path than others. But this is a company who is looking to use their data to help the aviation market move there more quickly."

Source: Air Traffic Management

NAV CANADA implements temporary level of service changes at 18 air traffic service facilities

"As part of this response, air navigation services will be temporarily suspended overnight at 18 air traffic service facilities, including air traffic control towers and flight service stations, and locations which receive remote airport advisory services. Transport Canada has approved these temporary changes to levels of service, which will be in effect for a period of 120 days, subject to prevailing conditions of the COVID-19 pandemic."

Source: Air Traffic Management

A multi-objective optimization with a delay-aware component for airport stand allocation

"Airport management is regularly challenged by the task of assigning flights to existing parking positions in the most efficient way while complying with existing policies, restrictions and capacity limitations. However, such process is frequently disrupted by various events, affecting punctuality of airline operations."

Source: Journal of Air Transport Management

Forecasting air passenger demand with a new hybrid ensemble approach

"Analyzing and modeling passenger demand dynamic, which has important implications on the management and the operation in the entire aviation industry, are deemed to be a tough challenge."

Source: Journal of Air Transport Management

Expanding airport capacity of cities under uncertainty: Strategies to mitigate congestion

"Airport capacity constraints are increasingly challenging the growth of air traffic. At the same time, decision-making about airport capacity investments is extremely complex, involving trade-offs. This paper's objective is to optimise a privately owned airport system's capacity investment decision in a city under demand uncertainty."

Source: Journal of Air Transport Management

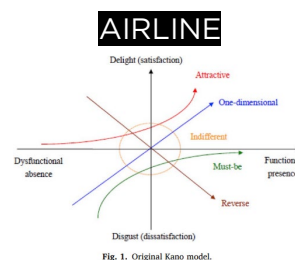


Fig. 1. Original Kano model.

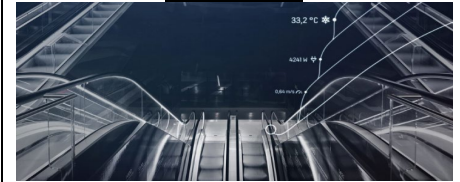
Evaluation of passenger satisfaction with service quality: A consecutive method applied to the airline industry

"Passengers' dissatisfaction with service quality is one of the crucial factors affecting the market share loss of airlines. This study aims to find out how airlines become capable of satisfying their passengers by considering the diversity of pre-purchase expectations."

while enabling them to achieve a high return on investment (ROI)."

Source: Frost & Sullivan

AIRPORT



Deicing Planning Guidelines and Practices for Stormwater Management Systems, second edition

"The TRB Airport Cooperative Research Program's ACRP Research Report 14: Deicing Planning Guidelines and Practices for Stormwater Management Systems, second edition, explores a wide array of practices designed to provide for the practical, cost-effective control of runoff from aircraft and airfield deicing and anti-icing operations."

Source: TRB

Infectious Disease Mitigation in Airports and on Aircraft

"The TRB Airport Cooperative Research Program's ACRP Report 91: Infectious Disease Mitigation in Airports and on Aircraft offers guidance for mitigating the risk of disease spread via droplet, airborne, and contact at airports and aboard aircraft."

Source: TRB

Guidebook for Assessing Collaborative Planning Efforts Among Airport and Public Planning Agencies

"The TRB Airport Cooperative Research Program's ACRP Research Report 216: Guidebook for Assessing Collaborative Planning Efforts Among Airport and Public Planning Agencies offers guidance for enhancing collaboration between airports and metropolitan surface transportation planning agencies."

Source: TRB

INSIDE THE UK'S 'ROADMAP' FOR SUSTAINABLE AVIATION

"A coalition of British aviation stakeholders recently published a 'Decarbonisation Roadmap' that sets out key steps for the industry to become carbon neutral by 2050. The plan is ambitious, but how and where will it get funding, and to what extent

ATC in the Clouds – literally

"Everything is moving to Cloud. Most industries have fully migrated to Cloud supported functionality or at least have a good percentage of their information sharing activities supported in this way. There is one industry that this really has not taken hold in, the air navigation service provider (ANSP) world. The question is – when is the time right to start this migration and what functionality it could impact in order to retain all safety-critical priorities."

Source: Air Traffic Management

Can Cellular Networks Support Aviation Functions?

"Six speakers from different regions and functions addressed this topic. The organisations represented included research, telecommunications and small technology companies in the field of UTM. The companies who participated in the session were University of California – San Diego, Meteomatics, Involi, Qualcomm, Ericsson and Dimetor. Some of these brands are already well-known and some are not."

Source: Air Traffic Management

EASA publishes first rules for safe drone operations in Europe's cities

"The European Union Aviation Safety Agency (EASA) has published the first view worldwide on the use and control of drones in an urban environment, balancing the desire to maximise the commercial and convenience benefits of drones against the need to ensure the safety and privacy of citizens and the potential environmental impact on our cities."

Source: Air Traffic Management

The implications of connectivity in drone operations

"Five speakers from different regions and functions addressed this topic. Starting with the telecommunications providers, there were representatives from KDDI, China Unicom and NTT Docomo. KDDI spoke about the use of 5G in conjunction with 4K video to enable drone operations such as search and rescue procedures that allowed for the drone to help locate missing persons, share a video of their

Source: Journal of Air Transport Management

does the coronavirus pandemic stand in its way? ADELE BERTI highlights five talking points from the scheme."

Source: Airport Industry Review

current situation and speak to them via the drone."

Source: Air Traffic Management

Air Navigation Solutions Launches ATM Services For Airports Package (ASAP)

"Air Navigation Solutions (ANSI) has launched its ATM Services for Airports Package (ASAP) which contains a range of cost-effective solutions designed to help airports manage and recover from the effects of COVID-19.

Source: Air Traffic Management

A new take on ATC Communications

"Rhode & Schwarz unveiled its CERTIUM concept around the World ATM Congress that didn't happen. Doing so through virtual briefings and a webinar, they were able to get the industry on board with this new idea. The idea is that a one-stop-shop for the full lifecycle of ATC Communications systems could enable ANSPs and Airports to more easily plan and implement for the future."

Source: Air Traffic Management

Why are Mobile Network Operators (MNOs) investing in drones?

"The Global UTM Association (GUTMA) recently hosted a webinar to take a look at the topic of MNO investment in the world of drones. This online format replaced the live event originally planned in conjunction with Mobile World Congress. This is the second of six webinars which we will provide a short synopsis of over the next couple of months."

Source: Air Traffic Management