SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

19 February – 16 March 2020

TOPICAL REPORT

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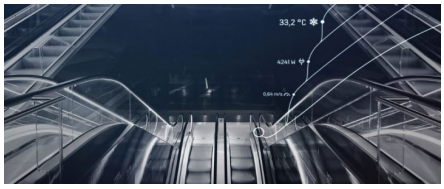
AIRPORTS



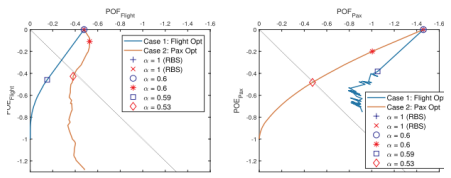
Improved passenger experience through the use of People Flow Intelligence in airports

"Progresses in technology, including the Internet of Things (IoT), sensors, and data analytics have dominated the discussion around the developments of airports; from security, check-in, and luggage handling, to retail, dining, and entertainment- all these areas are subject to adopting the latest trends, in the interest of increasing the passenger experience."
Source: ACI Insights

Accenture Helps Changi Airport Group Establish and Operate a Digital Factory to Drive and Sustain Continuous Innovation

"Accenture has helped Changi Airport Group (CAG) which operates the world's seventh busiest airport for international traffic establish and operate a digital factory to continuously re-invent the airport's passenger experience and transform operations. Known as DIVA - for digital, innovation, ventures and analytics, the factory is designed to help CAG develop, experiment and launch new digital products and

AIR TRAFFIC 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 Air Traffic Flow Management (ATFM) delay pre-tactically (on-ground at origin airport) due to reduced airport capacity at destination."
Source: Journal of Air Transport Management

Enhanced Conflict Resolution Maneuvers for Dense Airspaces

"This work presents a comprehensive algorithm for potential en-route conflict resolutions that could be conducted with both constant as well as variable altitudes. The resulting trajectories are expected to be near-optimal in the sense that they consider geometrically minimum deviation from the original aircraft flight-path. The proposed approach is devised to be compatible with the so called 'Free Flight' concept as well as ADS-B users toward 'air traffic control process automation'."
Source: IEEE Transactions on Aerospace and Electronic Systems

Opportunistic-Target-Measurement-Based

ECONOMIC DEVELOPMENT & IMPACT

IATA Updates COVID-19 Financial Impacts -Relief Measures Needed

"The International Air Transport Association (IATA) updated its analysis of the financial impact of the novel coronavirus (COVID-19) public health emergency on the global air transport industry. IATA now sees 2020 global revenue losses for the passenger business of between $63 billion (in a scenario where COVID-19 is contained in current markets with over 100 cases as of 2 March) and $113 billion (in a scenario with a broader spreading of COVID-19)."
Source: International Air Transport Association

Regional Economic Briefing: Asia-Pacific (February 2020)

A holistic overview of the economic, market, and industry performance of the aviation sector in Asia-Pacific regions in February 2020.
Source: International Air Transport Association

FEB 2020: Air Transport Monthly Monitor

ICAO produces an Air Transport Monthly Monitor that provides a snapshot and analysis of economic and aviation indicators, including

services - from conceptualization to market launch, using new ways of working."
Source: Accenture

OUTLOOK

Predicting 2020 trends and disruptors for the aviation industry

"For the first edition in *International Airport Review*'s magazine series of 2020, we spoke to a few of our prestigious advisory board members for a review of 2019, predictions for 2020, and exclusive advice for airports."
Source: International Airport Review

REGIONAL INSIGHTS

Parliament: Aviation development fund extended for 5 more years to meet growing air travel demand

"A $280 million fund to help aviation firms boost their productivity will be extended for another five years till 2025, to meet the growing demand for air travel in the coming years."
Source: The Straits Times

CAAS, FAA and IATA Sign Milestone Tripartite Agreement To Enhance Data Analytics Capabilities

"The Civil Aviation Authority of Singapore (CAAS), United States Federal Aviation Administration (FAA), and International Air Transport Association (IATA) have signed a Collaborative Arrangement (CA) to further develop data analytics capabilities to improve aviation safety."
Source: CAAS

5G

Narrowband Statistical Modeling of Civil Aviation Surveillance Signal at 1090 MHz

"Automatic dependent surveillance-broadcast (ADS-B) is one of the next-generation aeronautical surveillance systems for air traffic control. ADS-B requires an aircraft to periodically broadcast its own position to other aircraft and ground stations, thereby enabling high-performance surveillance. In this study, the received signal strength (RSS) of the ADS-B signal was measured and characterized for opportunistic flights."
Source: IEEE Transactions on Antennas and Propagation

Ontology-Based Data Integration for Semantic Interoperability in Air Traffic Management

"In this study, we construct domain ontologies based on flight, aeronautical, and weather information exchange models. Further, we develop a common ontology that uniformly defines the inconsistent representation in terms of the 4D, 3D, and 2D concepts and their inclusion relations and propose an integration method for heterogeneous domain ontologies. Moreover, we apply the proposed ontologies to a SWIM test system. The applicability and efficiency of the proposal are demonstrated through a case study in the SWIM environment."
Source: 2020 IEEE 14th International Conference on Semantic Computing (ICSC)

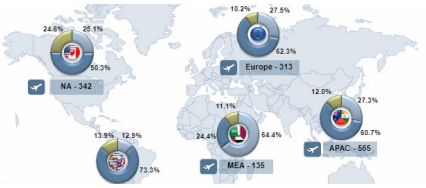
A system for effectively predicting flight delays based on IoT data

"Due to the highly dynamic environments of the aviation industry, relying only on historical datasets of flight delays may not be sufficient and applicable to forecast the future of flights. The purpose of this research is to study the flight delays from a new angle by utilising data generated from the emerging Internet of Things (IoT) paradigm. Our primary goal is to improve the understanding of the roots and signs of flight delays as well as discovering related factors."
Source: Computing

Classification of air traffic control scenarios using decision trees: insights from a field study in terminal approach radar environment

"We conducted a field study using qualified air traffic controllers, who participated in simulator sessions of terminal radar approach control in a variety of scenarios. The aim of the passenger traffic, capacity, freight traffic, top airports and airline groups.
Source: International Civil Aviation Organization

OUTLOOK



2020 Global Commercial Aerospace Outlook

"This outlook consolidates 2020 projections for deliveries and tallies up the score card from 2019. Global regions are profiled by aircraft type – namely widebody, narrow body and regional jets; airlines by region; as well countries that are taking deliveries of new aircraft. Major platforms, including backlog data and lifecycle status, are also profiled."
Source: Frost & Sullivan

AIRPORTS

Can your airport survive an infrastructure upgrade?

"Aviation is a massive industry, contributing $2.7 trillion to the global economy. But industry size and growth projections do not necessarily translate into business success for airports. Many struggle with infrastructure challenges, both physical and technological in nature. This paper examines the critical infrastructure changes airports need to consider, explores why they are important, and offers recommendations for how to perform upgrades with minimal disruption."
Source: International Airport Review

TECHNOLOGY & INNOVATION

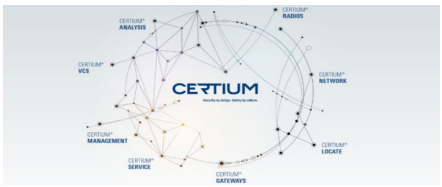
Global; Technology Innovation Award - Airline Flight Operations

"The company's weather intelligence software provides aviation teams with the most accurate weather data that consists of global historical, real-time, and forecasting capabilities. The platform offers continuous weather updates to not only operations teams

Aviation In The 5G Era: Seamless Connections From Ground Crews To Aircraft

"When every second matters, connectivity matters. Vast strides in airport connectivity in recent years—likely to be amplified in the 5G era—are driving the evolution of operations. Here are a few of the use cases that could go even farther with next-gen mobile networks."
Source: Forbes

AIR TRAFFIC MANAGEMENT



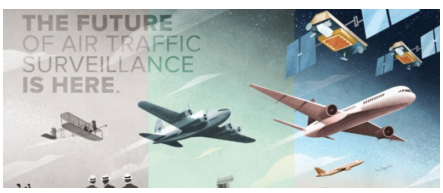
Rohde & Schwarz introduces an advanced ATC communications suite – from the microphone to the antenna

"As part of the CERTIUM universe, Rohde & Schwarz launches a new solution at World ATM Congress 2020: a next generation radio with a revolutionary security-by-design architecture that surpasses existing market standards. This new radio addresses increased security requirements and the ANSP's operational challenge to remain efficient when handling increasing flight volumes."
Source: Air Traffic Management

NATS Intelligent Approach: Using Runways Efficiently

"Thanks to innovative technology, Britain's busiest airport has been able to operate more efficiently during challenging conditions. Now other major air passenger hubs like Schipol are looking to take advantage of NATS's Intelligent Approach. Andrew Tunnicliffe speaks to NATS head of queue and capacity management solutions Andy Shand."
Source: Airport Industry Review

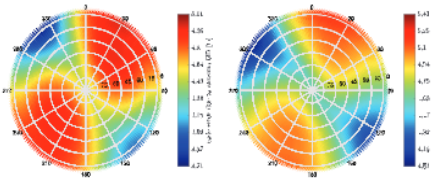
AIR NAVIGATION



Aireon and Searidge Technologies Partner to Integrate Space-Based ADS-B into Digital Tower

"Aireon and Searidge Technologies announced today that they will partner to bring space-based ADS-B data to Searidge's air navigation study was twofold, firstly to explore how decision trees and classification rules can be used for realistic classification of air traffic scenarios and secondly to explore which factors reflect better operational complexity."
Source: Cognition, Technology & Work

AIR NAVIGATION



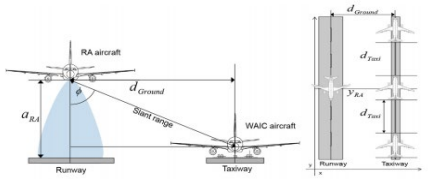
Development of the dual-frequency dual-constellation airborne multipath models

"This paper presents a methodology to build multipath models for aviation use of new Global Positioning System (GPS) and Galileo signals … A new method for removing the ambiguities from the multipath estimation is presented. The method is suitable for measurements from flight data and is able to exclude measurements highly affected by multipath from the estimation by using a derived standard deviation based on the receiver thermal noise only."
Source: Navigation

An innovative analytic redundancy approach to air data sensor fault detection

"This article presents a potential analytic redundancy approach to detect faults in the air data sensor of an aircraft … A simple mathematical model is developed, which does not consider the forces and moments acting on aircraft and uses measurements only from the Inertial Measurement Unit (IMU) and Navigation System Data (NSD)."
Source: The Aeronautical Journal

AVIONICS



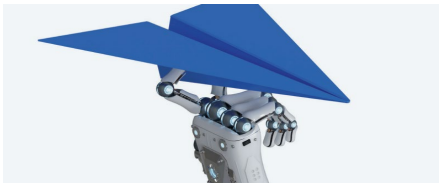
Challenges in implementing a wireless avionics network

"This paper aims to look at various aspects of implementing a wireless network including issues related to wired network, aircraft channel, interference issues, suitable wireless protocols for aircraft applications and security aspects."
Source: Aircraft Engineering and Aerospace Technology

AIR TRANSPORT NETWORK

but also streamlines data channels between airports and pilots, enabling airlines to gain access to critical weather information."
Source: Frost & Sullivan

ARTIFICIAL INTELLIGENCE



The FLY AI Report

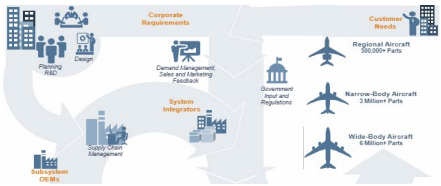
"The first Fly AI report provides an overview of the many ways that artificial intelligence is already applied in our industry and assesses its potential to transform the sector."
Source: EUROCONTROL

CLOUD COMPUTING

Airports in the cloud: dispelling the myths and charting the progress

"The paper has been informed by a series of interviews with Amadeus' airport IT, security and cloud computing experts, as well as the experiences we've had helping to introduce cloud computing to the sector."
Source: Amadeus

SUPPLY CHAIN



Global Commercial Aerospace Supply Chain Restructuring, 2019

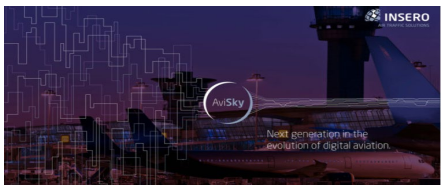
"This study will serve as a starting point for understanding the transformation that is taking place in the supply chain by identifying the factors behind it and the long-term impact of the current scenario, highlighting commercial aerospace market trends and other global trends. The report also identifies which technologies are accelerating the transformation."
Source: Frost & Sullivan

service providers (ANSP) and airport customers around the world in 2020."
Source: Air Traffic Management

Denmark's Naviair embraces IP technology

"Naviair, the air navigation service provider for Denmark and the North Atlantic airspace, including Greenland, recently selected Rohde & Schwarz to supply a full IP voice communications system (VCS) for backup radio purposes. The highly modular and flexible architecture of the reliable and resilient R&S VCS-4G system, will allow Naviair to seamlessly integrate it into their networking, management and security environments and connect both VoIP and legacy radios to it."
Source: Air Traffic Management

DATA SCIENCE



Insero Air Traffic Solutions introduces AviSky

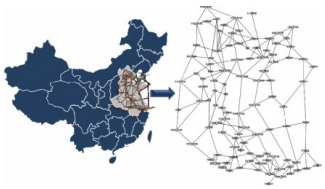
"With air traffic data often scattered across multiple data systems, efficient operations are often prevented because data is hard to access – and even harder to manage and secure. The answer to the rising problem is AviSky, a real-time information management platform that connects all aviation data seamlessly in one platform."
Source: Air Traffic Management

SECURITY

Designing the future of airport security

"The Smart Security project continues to promote concepts and solutions that strengthen security, take a more risk-based approach, increase efficiency and enhance the passenger experience. It does so by bringing together a coalition of leading airports, regulators and airlines that not only look at the technology and processes available today but also looks much further ahead."
Source: ACI Insights

Is it right to use artificial intelligence in aviation security?



Identification of key nodes and vital edges in aviation network based on minimum connected dominating set

"Identification of key nodes and vital edges are of great importance in aviation network … The binary particle swarm optimization (BPSO) algorithm is adopted to solve the minimum connected dominating set (MCDS) problem. Immune mechanism was introduced to guide the search direction of particle nodes to improve the convergence speed of the algorithm."
Source: Physica A: Statistical Mechanics and its Applications

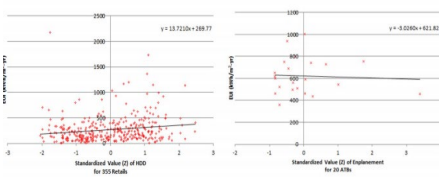
SUPPLY CHAIN

Source: Britannica ImageQuest

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

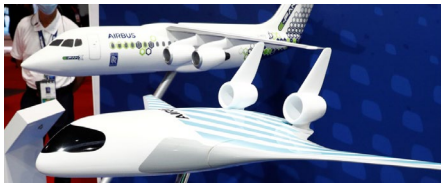
AIRPORT DESIGN



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

"HEXWAVE, a new security imaging system supported by artificial intelligence (AI), will soon be tested in aviation. The Greater Toronto Airports Authority plans to conduct a week-long trial at Pearson International Airport. The Authority's Dwayne MacIntosh tells Andrew Tunnicliffe why he hopes the trial will be a success and why AI shouldn't be feared."
Source: Airport Industry Review

SUSTAINABILITY



Could this aircraft be the future of sustainable aviation?

"Airbus on Tuesday unveiled a curvaceous aircraft design that blends wing and body, designed to slash carbon emissions by some 20%."
Source: World Economic Forum

"The purpose of this research is to propose benchmark metrics to investigate the energy performance of existing and future airport terminal buildings. By using measured data of total 30 existing ones in North America and simulated results of total 90 specific space type models, a more improved multivariate regression model can refine the values for average of energy use."
Source: Journal of Air Transport Management

SAFETY

Source: Britannica ImageQuest

Developing a systems failure model for aviation security

"This paper presents an entirely new perspective to explain aviation security failure. Aviation security failure is conceptualised by analysing the official report by the National Commission on Terrorist Attacks Upon the United States. The National Commission report is an authoritative and data-rich account of aviation security failure that, hitherto has never been made available for scientific research …"
Source: Safety Science

A support system for civil aviation navigation equipment security management

"Civil aviation navigation equipment system has many weaknesses, which easily causes serious problem to air transportation safety. This paper focuses on a support system for civil aviation navigation equipment security management."
Source: Safety Science