Solving Airport Operation Challenges
With Advanced Digital Solutions

Innovative Technologies Such As AI, Big Data, Digital Twin, and Automation Are Key to Enhancing Passenger Experience and Operational Performance

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Key Airport Trends

Driving More Efficient Operations and Enhancing Passenger Experience Stimulates Innovation

Changing Passenger Dynamics

Passenger demand is not only rebounding, but rising, creating a need for scaling airport infrastructure and enhancing the passenger experience.

Automation & IoT

There is an increasing need for automating passenger and operational processes to increase capacity and efficiency and have a connected airport.

Connected Travellers

Passenger demand is increasing for connected and mobile solutions for in-airport delivery/shopping, terminal navigation, and more.

Increasing Air Passenger Demand

Rising demand creates a need for airports to optimize operations for a greater passenger capacity handling capability.

Sustainability

The increasing need to achieve net zero is driving airports to adopt sustainable solutions/technology.

Non-aero Revenue

Given the growing importance of non-aero revenue, airports are looking at finding new non-aero revenue streams and enhancing existing ones.

Big Data and AI

Airports are leveraging AI and big data to better predict and manage airport operations in real time.

Intelligent Airports

Enhancing digital quotient to make airports more digitally enabled across the segments that are digitally connected and sustainable.

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Source: Frost & Sullivan

Key Challenges of Airport Operators

Siloed Operations, Increasing Operation Costs, Workforce Scarcity, and Delays and Difficulty in Gathering and Processing Data Are Some of the Key Challenges Faced by Airport Operators Globally

01
SILOED DATA AND TEAMS
Isolated data/teams and the resulting lack of communication between various stakeholders and systems create many manual processes, obsolete data, and increased workflows.

02
NON-STANDARDIZED DATA
Non-standardized data makes it difficult to achieve complete control over airport management.

03
DISCONNECT BETWEEN STRATEGY AND EXECUTION
Limited collaboration between stakeholders results in discrepancy between strategy and execution.

04
INFRASTRUCTURE LIMITATIONS
Infrastructure limitations lead to difficulties with real-time data sharing between stakeholders, which results in the inability to make real-time changes in users' operational requirements.

05
IMPACTED EFFICIENCY AND EFFECTIVENESS
Airports are unable to experience their full potential in terms of the efficiency and capacity offered by modern automation solutions.

06
REGULATORY HURDLES
Regulatory limitations hinder the deployment of TAM solutions, especially at the airside.

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Source: Frost & Sullivan

Need for Deploying Advanced Digital Solutions

Airports Are Working to Become Adaptable, Efficient, and Sustainable in Order to Dynamically Manage Operations in Real Time and Gain a Holistic View of the Airport, Which Will Reduce Costs and Increase Efficiency

MANAGE OPERATIONS DYNAMICALLY
Airport operators are keen on the ability to dynamically manage processes across the various airport stakeholders, which would lead to more efficient and real-time process and operation handling.

PERFORMANCE-BASED AIRPORT MANAGEMENT
The ability to provide real-time insights into performance projects enables accurate monitoring and assessment of all projects in various stages.

PREDICTIVE ANALYTICS
Leveraging AI and big data to gain greater insights into past events and real-time operations will offer predictive information that can help avoid disruptions.

RESOURCE OPTIMIZATION
Dynamically allocate and manage resources, including assets and workforces, across the airport based on demand fluctuations, resource availability, and urgency (among other aspects) to reduce inefficiencies.

ROBUST PHYSICAL AND CYBERSECURITY
Robust security ecosystems at the airport include physical and cybersecurity solutions that can autonomously detect incursions and predict instances using AI, big data, and video analytics.

ENHANCE PASSENGER EXPERIENCE AND OPS PERFORMANCE
Airports aim to offer passengers a seamless experience, even before arriving and after departing the airport, with minimal time spent on airport processes. This results in increased passenger spending.

SUSTAINABLE OPERATIONS
Airports globally are working to become sustainable and achieve net zero operations across 3 scopes. Airport operators are looking for support in identifying emission sources, measuring, and then addressing them

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Key Priorities of Airport Operators

From a Future-Proofing Aspect, Airports Are Prioritizing Automation and Digitalization That Support Advanced Collaborative Decision-Making

SEAMLESS DATA AVAILABILITY AND PROCESSING

Having data from across the airport available that can be efficiently assimilated by a community of stakeholders in real time

MONITOR AND MANAGE KPIs

A system that manages key performance indicators and combines and transposes them into a result that guides an appropriate tactical and strategic action

PROACTIVE RATHER THAN REACTIVE MANAGEMENT

Identify potential situations and/or disruptions based on accurate, updated data that enables stakeholders to optimize operations and resource management

COLLABORATIVE DECISION-MAKING

Centralize operations that support multiple stakeholders across the organization by empowering collaborative efforts with real-time data

SINGLE NODAL POINT

Current systems provide fragmented intelligence after an event occurs; a centralized operations center supported by multiple stakeholders would receive data from all over and be able to make real-time and collaborative decisions

AUTOMATED AND CONNECTED PROCESSES

Drive efficient processes with airport infrastructure data and resources connected in a live environment that leverages analytical tools and promotes data accessibility

Addressing Airport Operator Challenges, Needs, and Priorities

Technology Providers Are Continuously Working on Developing Solutions by Leveraging Advanced Technology That Supports the Various Needs, Challenges, and Priorities of Airport Operators

1 **INNOVATIVE PRODUCTS AND SERVICES**

Digitization is changing the way technology suppliers develop, bundle, and provide products and services to align with airports across regions and tiers. Regardless of the business model, size, or level of technology maturity, technology players are working on developing/deploying customized, specialized, and advanced digital solutions.

2 **DATA COLLECTION AND ANALYTICS**

Data collection and management are critical to optimizing passenger experience and operational performance and to making the entire airport ecosystem much more efficient. Advanced digital solutions can analyze historical events and events in real time to offer predictive insights.

3 **COLLABORATIVE DECISION-MAKING**

Sharing data seamlessly across stakeholders and in real time is crucial to realizing the full potential of digital transformation initiatives. Stakeholders across the airport ecosystem (internal and external) need to share data on a single platform, leading to the visibility of all of their operations.

4 **REAL-TIME VISIBILITY**

Solutions and systems that give operators a live view of all stakeholder performance and then share these with all participants enables transparency. It also enables bottlenecks and disruptions to be immediately identified and addressed, enhancing operational efficiency and the passenger experience.

5 **RESOURCE OPTIMIZATION**

Systems and solutions that minimize human intervention help reduce manual dependency and linked challenges and risks. Automating tasks to reduce manual dependency addresses manpower shortages and reduces operating costs.

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Elements of Advanced Airport Digital Solutions

Certain Key Elements, Such As Automation, AI, Big Data, 5G, and IoT,
Are Critical to Deploying and Adopting Advanced Airport Digital Solutions and
Realizing the Full Potential of These Solutions
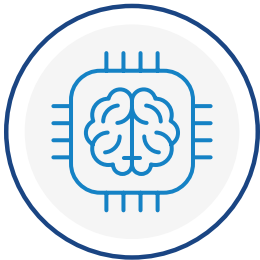
ARTIFICIAL INTELLIGENCE

Using AI and big data to analyze historic events and gather real-time analysis provides an in-depth assessment of situations and helps offer predictive insights.

ACCESSIBILITY & AVAILABILITY

Efficient operations rely on the ability to monitor all airport operations from a single point. Giving all stakeholders easy access to this information, when and where required, will enable optimal decision-making.

CLOUD

Cloud computing enables airports to deploy advanced digital solutions without making large investments, as it eliminates the need to invest in expensive local processing and storage.

AUTOMATION

Automating passenger processes and operations will be a key factor in any advanced digital solutions at the airport. Increased automation will lead to enhanced efficiency and effectiveness.
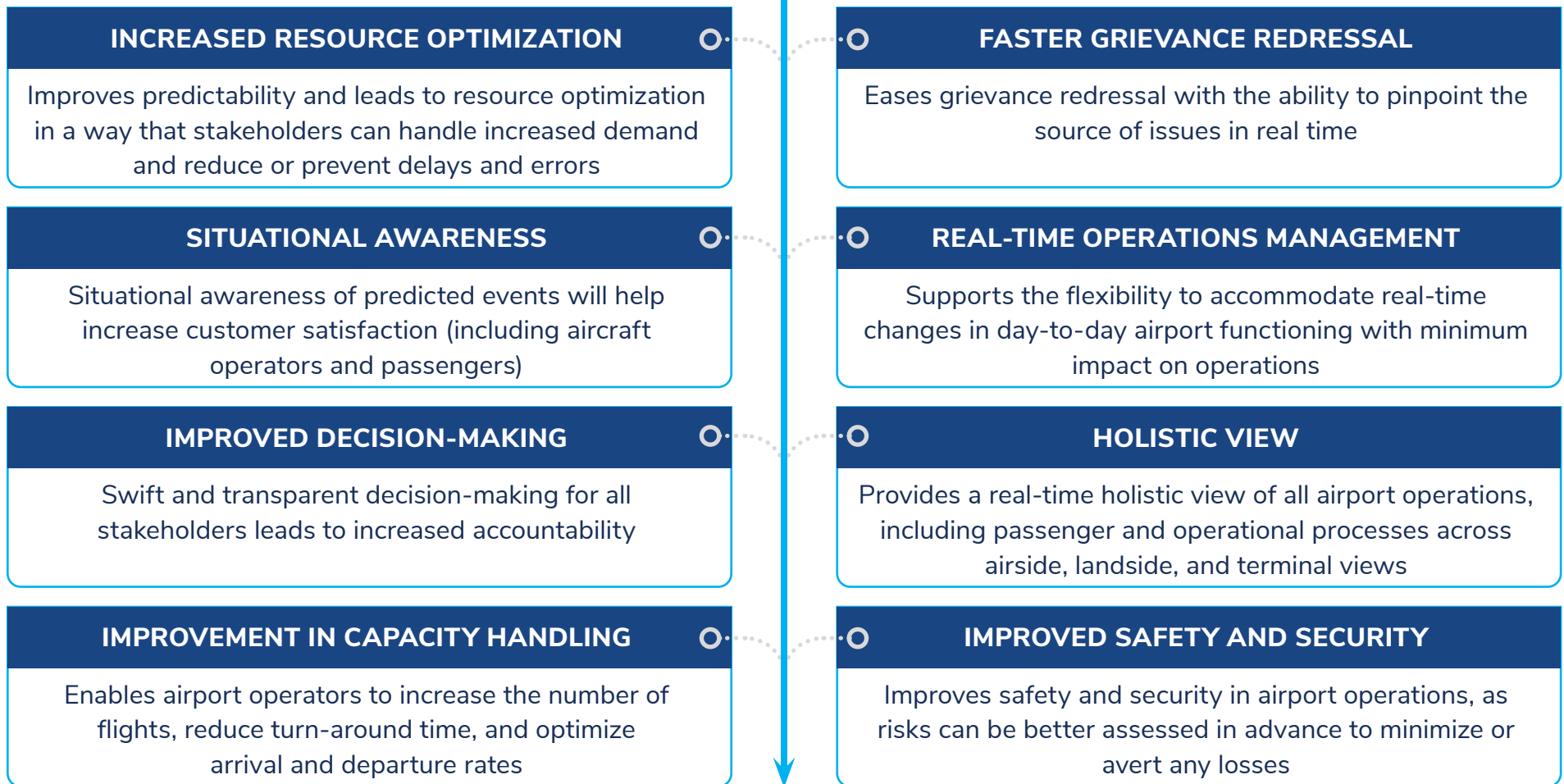
INTERNET OF THINGS

IoT is a key enabler for connecting and integrating the entire airport ecosystem, and it provides the ability to collect data and make real-time changes to operations.

Source: Frost & Sullivan

Benefits of Deploying Advanced Airport Digital Solutions

Deploying Advanced Digital Solutions Will Have Immense Benefits, Such As Improved Resource Optimization, Situational Awareness, and Decision-Making, That Result in Increased Efficiency and Reduced Costs

AIRPORT DIGITIZATION

INCREASED RESOURCE OPTIMIZATION

Improves predictability and leads to resource optimization in a way that stakeholders can handle increased demand and reduce or prevent delays and errors

FASTER GRIEVANCE REDRESSAL

Eases grievance redressal with the ability to pinpoint the source of issues in real time

SITUATIONAL AWARENESS

Situational awareness of predicted events will help increase customer satisfaction (including aircraft operators and passengers)

REAL-TIME OPERATIONS MANAGEMENT

Supports the flexibility to accommodate real-time changes in day-to-day airport functioning with minimum impact on operations

IMPROVED DECISION-MAKING

Swift and transparent decision-making for all stakeholders leads to increased accountability

HOLISTIC VIEW

Provides a real-time holistic view of all airport operations, including passenger and operational processes across airside, landside, and terminal views

IMPROVEMENT IN CAPACITY HANDLING

Enables airport operators to increase the number of flights, reduce turn-around time, and optimize arrival and departure rates

IMPROVED SAFETY AND SECURITY

Improves safety and security in airport operations, as risks can be better assessed in advance to minimize or avert any losses

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Frost & Sullivan Recommendation to Airport Operators

While Airports Will Be Able to Increase Capacity, Reduce Costs, and Become Sustainable, There Are a Few Key Elements That Operators Need to Consider

CRITICAL SUCCESS FACTORS

Making Airport Operations Agile

Airport operators should focus on making their airport operations agile and flexible by developing an ability to adapt dynamically to real-time demand changes. This will minimize losses and make operations more robust.

Future-proofing Airport Operations

Airport operators need to work towards addressing today's needs and future requirements by adopting procedural changes and automation that support the evolution of the airport and reduce dependency on a workforce.

Maintaining a Balance between Passenger Experience and Operational Performance

Airports need to constantly maintain a fine balance between enhancing passenger experiences and efficient operational performance. Both need to evolve simultaneously without impacting each other.

Enhancing Data Accessibility to Support Monitoring and Decision-making

To become more efficient, airports will need to offer stakeholders (internal and external) flexibility in terms of monitoring and accessing real-time airport operations and processes. This will support collaborative and efficient decision-making.

Achieving Net Zero

Globally, airports will be required to become net zero by 2050. As such, operators need to develop and deploy sustainable strategies that incorporate identifying, measuring, and addressing emissions across the airport's 3 scopes.

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Use Case—Bentley Systems at Sydney Airport

The Airport Has Begun Using Bentley's Airport Solutions to Create a Digital Twin, Aiming to Enhance Efficiency, Quality, and Cost Savings

THE CASE

The Sydney Airport, one of the oldest in the world, is eager to position itself among the most cutting-edge, particularly concerning maintenance and management. Nestled on the southern outskirts of Sydney, it spans approximately 906 hectares (2,240 acres) and boasts three runways, three terminals, and over 400 structures. Like many airports worldwide, it functions akin to a miniature city. Its operator, Bentley Systems, endeavors to develop a dynamic digital replica of the entire site to manage vast data, address compatibility challenges, and cater to a diverse user base. Sydney Airport sought an accessible and user-friendly digital platform capable of scalability and accommodating future integrations.

SOLUTION

- In charge of airport planning, design, and development, the spatial information services team (comprising architects, civil engineers, airfield designers, GIS experts, and surveyors) devised a strategy to establish a cloud-based self-service portal for Sydney Airport. This portal aims to offer a comprehensive overview of the airport campus, presenting a blend of CAD, geospatial data, reality capture, and business information accessible on any device. The objective was to enable users to access relevant data swiftly without using printed PDFs or relying on the team for correlated information.

- Opting for the Bentley's Airport solution, the team sought to amalgamate various financial and asset data, metadata, models, and documents sourced from diverse systems to convert existing DGN files into iModels.

- Bentley's Airport solution meticulously captured all buildings, accompanied by links to photos and pertinent documentation for areas like aircraft bays and apron operational protocols. Operational personnel can now seamlessly utilize tablets in the field to locate and retrieve information pertaining to each flight, with access to maintenance sheets indicating cable connections to and from pits. Moreover, all ground services are readily viewable through the portal.

BENEFIT

Through Maps@SYD, project managers gain immediate access to all current and future developments as well as the capability to overlay flood studies, environmentally sensitive areas, and heritage sites. This facilitates a comprehensive understanding of potential impacts on proposed projects, resulting in significant time savings for the spatial team, estimated at around 65 resource hours weekly.

Maps@SYD seamlessly integrates financial application data with GIS information, empowering the airport's commercial leasing team with visually intuitive and real-time insights into tenant details, lease expiration dates, sales metrics per square meter, and liquor license information. This eliminates the need for visits to the digital print room or reliance on the spatial team for data retrieval.

Moreover, Bentley's Airport Solutions has revolutionized workflows for routine audits of firefighting equipment, flight information displays, and confined spaces. Previously, contractors manually recorded audit findings on paper during site inspections, leading to potential errors upon data integration into CAD files. With the implementation of tablets, audits are now conducted digitally, with updates directly synced to the spatial information system. This streamlined approach has slashed the time required for standard audits from 133 to 56 hours.

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YOUR TRANSFORMATIONAL GROWTH JOURNEY STARTS HERE

Frost & Sullivan's Growth Pipeline Engine, transformational strategies and best-practice models drive the generation, evaluation, and implementation of powerful growth opportunities.

Is your company prepared to survive and thrive through the coming transformation?

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