BEYOND DIGITAL. **INTELLIGENT.**

One platform to manage your airside ecosystem

INTELLIGENT
AiPRON

ADB
SAFEGATE

AIRSIDE4.0®

DIGITAL TRANSFORMATION

The power of data and predictability

The digital transformation wave has impacted all industries in one way or another by allowing greater automation, optimization and business transparency.

It can be compared in scale to the huge changes brought about by the Industrial Revolution that led to improved productivity, lower costs and new markets. As such, airport digitalization should result in higher levels of automation and intelligent solutions that bring value to all stakeholders, focusing on cost reduction, additional revenue streams and improved safety.

It is a process defined by three distinct, yet intertwined drivers: digitization, connectivity, and data.

ADB SAFEGATE brings an unrivaled understanding of the airside, from tower to airfield to apron, and our industry-leading solutions are adopted widely. We are proud to be leading the way with smart Airside 4.0® solutions that turn airports into intelligent, connected ecosystems of processes and solutions leveraging advanced digital technologies and analytics to unleash the power of data and predictability.

We're helping airports, airlines and their partners gain actionable insights to accelerate post-covid recovery and facilitate a future-proof digital transformation toward enhanced performance, exceptional passenger experiences and a safe and sustainable future for aviation.

THE INTELLIGENT APRON

The next big gains in airport and airline performance

Investment in digital projects is increasingly connected to the key performance indicators (KPIs) airports and airlines consider core to operations. For example, on-time performance remains the core measurement across all airports and airlines and is the main driver in business cases for airside and landside digital environments.

According to the Frost & Sullivan paper "Digital Transformation of Airport Airside Operations" the major areas of underperformance at airports are vehicle fuel consumption, pushback errors, runway occupancy times, gate departure delays, and stand availability.

These are indicators that the next big performance gains will be achieved during apron operations as aircraft approach and depart from the gate. To realize these gains, a scalable plan for providing operational elasticity is required.

Airports and airlines have collaboratively and continuously improved operations on the apron by advancing technology and procedures. These improvements focus on safety, efficiency and capacity. Elasticity has emerged as the need for today and tomorrow, which includes all previous focus areas and emphasizes the new challenge to successfully manage market volatility.

To answer this need, ADB SAFEGATE has introduced the Intelligent AiPRON, an exciting new platform for managing apron operations in the face of today's challenges. This holistic, intelligent approach to apron management provides better predictability of operations and brings the elasticity required to ensure a consistent level of safety, productivity, efficiency, and passenger experience.

Sustainability

Sustainability is a high priority for everyone in the aviation industry. Reducing the amount of time an engine is in operation reduces both CO_2 emissions and fuel costs. By increasing efficiency through AI- driven analytics systems, sensors and IoT solutions, apron operations can be managed to meet environmental regulations and airport and airline sustainability goals.

> " *Airports consider their performance in the apron and gate areas as lacking and are now making investments to modernize IT systems together with key airline stakeholders.* "
>
> *Digital transformation at airports*
> *ADB SAFEGATE study conducted*
> *by Frost & Sullivan*

ADB SAFEGATE'S **INTELLIGENT AiPRON**

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Managing the apron holistically provides better predictability of operations.

ADB SAFEGATE's Intelligent AiPRON revolutionizes apron management by automating docking and turnaround processes to ensure optimal safety and efficiency. Leveraging machine learning within a unified ecosystem, it streamlines operations from taxiing to pushback ensuring timeliness and reducing conflicts.

As part of ADB SAFEGATE's Airside 4.0 strategy, Intelligent AiPRON offers a modular, easily deployed software suite that enhances operational decision-making through real-time data analytics and augmented intelligence.

Key offerings include:

- **Integrated Real-Time Data:** Harmonizes flight schedules and essential operations data.
- **AI-Enabled Surveillance:** Allows remote monitoring of apron activities.
- **Dynamic Situational Awareness:** Uses augmented aerial maps for immediate operational insights.
- **Conflict Resolution:** Streamlines management of operational incidents.
- **Predictive Analytics:** Enhances planning and performance with forward-looking insights.

Intelligent AiPRON embodies ADB SAFEGATE's vision for a smarter, safer and seamless apron operation, contributing significantly to the efficiency of airport operations.
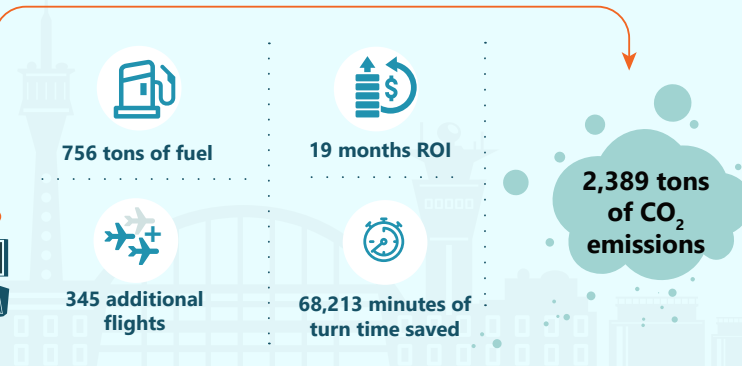
Improvements at DFW Airport with the Intelligent Apron
Airport Digitization proof of concept at Dallas Ft. Worth International Airport led by the American Association of Airport Executives (AAAE), ADB SAFEGATE and other partners to demonstrate the feasibility of the Intelligent Apron; 2022.

ANNUAL BENEFITS FORECAST
for a large hub airport with 50% consideration

Safedock A-VDGS
- pre-arrival safety checks
- conflict resolution
- extended integration

+

AI Camera and Intelligent Apron
- turnaround planning/tracking
- PIBT/POBT prediction
- ground crew communication

98.5%
REDUCTION IN HOLD TIME

756 tons of fuel

19 months ROI

345 additional flights

68,213 minutes of turn time saved

2,389 tons of CO$_2$ emissions

Imagine if your airport could achieve even half ...

AiPRON CONNECT
Integration solution for scheduling and tracking usage of ground service equipment.

AiPRON MANAGER
Collects and presents real-time intelligence for apron operational performance.

AiPRON FINANCE
Apron-focused aeronautical revenue calculation and invoicing solution.

AiPRON RESOURCE
AI-driven and KPI-focused stand and gate resource management solution.
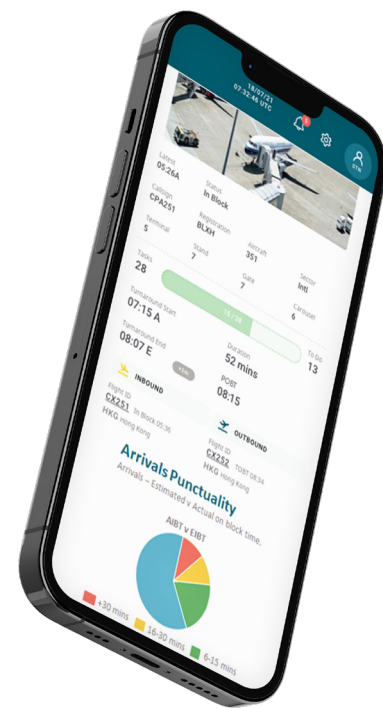
SAFEDOCK
A-VDGS
Automation for safer, faster aircraft parking in all conditions.

AiPRON 360
Smart solution to manage aircraft turnaround activities from landing to take off.

INTELLIGENT
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AiPRON 360

Visibility to improve collaboration, safety and performance

A key module in the Intelligent AiPRON suite is AiPRON 360, a comprehensive solution to monitor and manage aircraft turnaround activities from landing to takeoff. This holistic tool offers a true 360° view of the turnaround process and is flexible enough to be used by airports, airlines and ground handlers, who each have different priorities but ultimately one shared goal – to operate safely and on time.

AiPRON 360 uses an agnostic approach to data gathering leveraging a range of technologies – from computer vision or sensorization to machine learning or simple manual data entry – to predict events and create recommendations to mitigate irregularities and avoid disruptions.

The system tracks the progress of turnaround activities and creates timestamps for the start and completion and reports milestones in support of Airport Collaborative Decision Making (A-CDM).

- Gives stakeholders an accurate and real-time view of activities and statuses including AI- generated predicted off block time
- Alerts when adherence to target off block time is at risk and presents solutions to avoid delay
- Reacts to changes in resources and task progress indicators by responding in a timely manner
- Uses machine learning to provide recommendations to improve turnaround planning

Managing the time aircraft are on the ground has never been more important. Intelligent turnaround management shortens the time aircraft are on the ground allowing airports to accommodate more flights with existing infrastructure and helping airlines improve aircraft utilization and the passenger experience.

> " *"The FAA estimates the annual cost of delay, including direct cost to airlines and passengers, lost demand, and indirect costs, to be $33 billion, or about 10% of U.S. aviation industry revenue."*
>
> *FAA APO-100 – Cost of Delay Estimates 2019* "
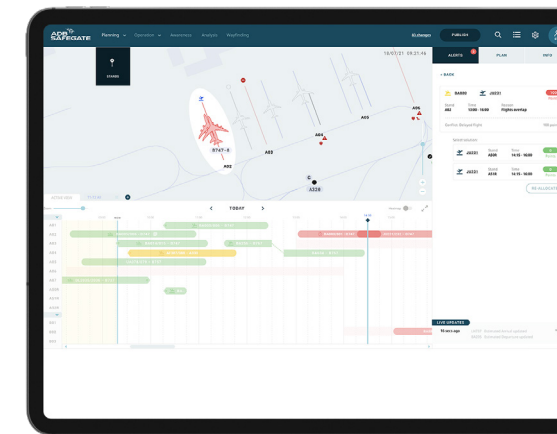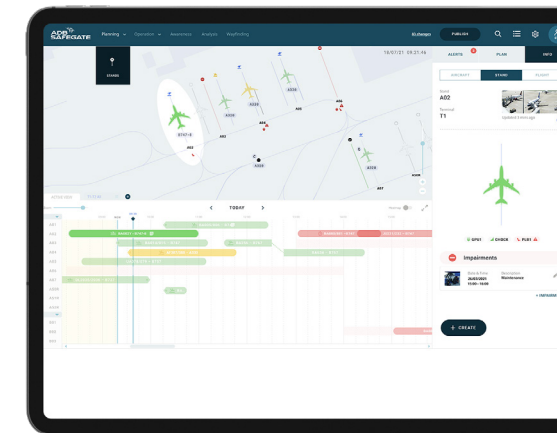
AiPRON RESOURCE

AI-driven and KPI-focused stand and gate management

Developed in collaboration with experts from some of the world's busiest airports, AiPRON Resource allows airports and airlines to plan, control and optimize the use of expensive and in-demand assets such as aircraft parking stands and gates. What sets AiPRON Resource apart from traditional resource management systems, are its closed-loop optimization algorithms which utilize machine learning to analyze the operational environment in real-time and improve resource usage accordingly.

- Offers the full spectrum of planning scenarios
- Ability to manage stands and gates as well apron vehicles, towing and ground support equipment
- Evaluates changes and disruptions and automatically integrates resolutions into tactical planning
- Measures and tracks key performance indicators

The cloud-based solution is quick and easy to employ and scalable for continuous growth and sustainable capacity management. Predictive and prescriptive analytics enable airport operators to forecast the impact of infrastructure improvement or maintenance works on capacity, enhancing both operational and commercial decision-making.

With AiPRON 360, AiPRON Resource, AiPRON Manager and AiPRON Connect on the same platform they can enable an unprecedented level of control of apron operations. From seasonal planning to daily and weekly scheduling to predictions for taxi time and in-block/off-block operations – airports and airlines truly benefit from the augmented intelligence provided by the platform.

> " *"15% of the time, operations on the ground do not match schedule and a smart tool to manage irregular operations could help."*
>
> *Anonymous Ground Handling Official*
>
> *Digital transformation at airports – ADB SAFEGATE study conducted by Frost & Sullivan.* "

AiPRON MANAGER

Smart, automated solutions adapt quickly to change

Together with ADB SAFEGATE's Safedock advanced visual docking guidance systems (A-VDGS), our web-based AiPRON Manager software is designed to support A-CDM and a more elastic apron operation. It provides a platform to increase efficiency and situational awareness to all stakeholders involved in the aircraft turn through automation of the aircraft docking process and digitalization.

AiPRON Manager is the natural intelligent hub for controlling, merging, storing, analyzing and predicting for operational performance in an ever-changing environment. All operationally important data is collected in one view and presented in an understandable way, remotely or via a mobile device, allowing users to respond quickly when overseeing the operations.

All of which equals faster, safer and more predictable turnarounds that boost the customer experience.

Safedock A-VDGS

Our Safedock A-VDGS ensure safe and precise aircraft stops every time, even in low visibility.

The A-VDGS double as a Ramp Information Display System (RIDS), receiving critical updates from the AiPRON Manager and displaying the information clearly to flight and ground crews to help deliver on-time departures.

AiPRON Manager uses the A-VDGS as intelligent surveillance sensors to track aircraft movement within the gate/stand area on arrival and during pushback. Position details are automatically sent to the surveillance service eliminating black spots and improving coverage.

- Automation enhances safety and addresses staffing concerns
- Receive alerts to potential issues before an aircraft arrives
- Keep personnel updated on turnaround progress, TSAT/TOBT and more
- Update AODB with the latest gate/flight information
- Automatically send actual block IN/OFF times to AODB
- Integrate with cameras for a live feed of gate areas

Our AiPRON 360 seamlessly integrates with existing Safedock A-VDGS and AiPRON Manager solutions installed on more than 12,000 gates around the world, allowing airports and airlines to further capitalize on existing investments. AiPRON 360 can also be implemented where A-VDGS are not present.

AiPRON CONNECT

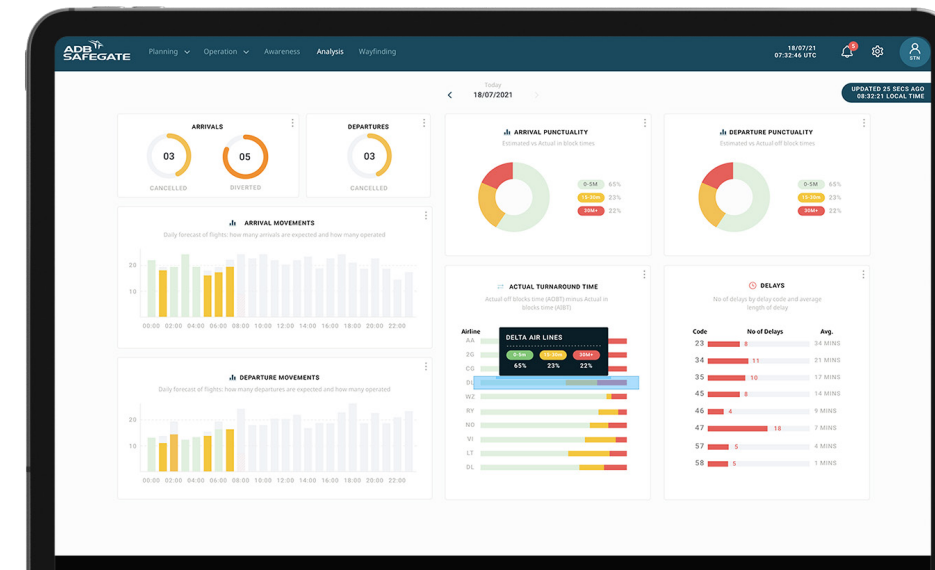## Connecting to share gate intelligence in actual time

AiPRON Connect is the data broker for all equipment used to service an aircraft. It integrates ground service equipment (GSE) such as passenger boarding bridges, pre-conditioned air, ground power units, flood lighting and many others to schedule and monitor their usage, while collecting data for operational analysis and aeronautical billing.

AiPRON Connect consumes and normalizes data from fixed ground support equipment and sensors, as well as mobile equipment in an IoT set up, making it available to other Intelligent AiPRON applications. Datapoints are used for turnaround management, trending and technical monitoring of all equipment, as well as evaluation of KPIs. When combined with AiPRON Finance, the system enables automatic calculation of customer charges and dynamic billing.

AiPRON Connect is also a gateway between the stand, GSE and AiPRON Manager. Using the Safedock A-VDGS as intelligent sensors at the gate, the system collects and distributes real-time gate intelligence and accurate flight information between airport, airline, ground handler and air traffic control systems. Matching data from the flight information system with real-time gate/stand status and monitoring capabilities, leads to minimized disturbances, interruptions or incidents at the apron and gate area.

Through enhanced integration and data sharing capabilities, AiPRON Connect increases safety, efficiency and productivity to:

- Shorten turnaround times
- Reduce operational costs
- Reduce damage risks
- Enable prediction analysis and more effective planning
- Measure and track key performance indicators

BEYOND DIGITAL. **INTELLIGENT**

ADB SAFEGATE's Airside 4.0, supported by the Intelligent Platform, showcases our unwavering dedication to innovation and leadership in advancing airport operations. This transformative approach encapsulates a future-driven vision where efficiency, safety and sustainability are paramount. Through the adoption of AI, machine learning and data analytics, the Intelligent Platform meticulously integrates ADB SAFEGATE's diverse solutions for Airfield, Apron, Tower, Terminal and Weather.

The platform heralds significant advancements in airport functionality:

- **Seamless Integration:** Unifying data and operations across air traffic, airfield services, apron operations and terminals for smoother workflows and informed decision-making.

- **Analytics & Automation:** Empowering airports with predictive insights for strategic planning and automating mundane tasks to focus on high-priority activities.

- **Boosted Efficiency & Safety:** Streamlining processes and delivering real-time analytics cuts delays and bolsters throughput while ensuring operator and passenger safety.

- **Sustainability Focus:** A commitment to eco-friendly operations underpins the platform, driving down emissions through smart resource management.

- **Elevated Passenger Experience:** The result is a frictionless journey for passengers, characterized by shorter wait times and dependable service.

Airside 4.0® by ADB SAFEGATE redefines aviation standards, embodying an innovative leap towards a more efficient, safer and sustainable future in airport operations.

www.adbsafegate.com

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