

Reliable real-time data and AI-enabled prediction and staff notifications continue to help airports improve on-time performance during peak periods, despite physical constraints

# STAR TURN





YVR plans to feed its Aircraft Turnaround data into its digital twin, so an AI agent can automatically improve on-time performance



**I**t's a year since *PTW* last looked at how AI and new technology are being harnessed to radically improve aircraft turnaround, and the rate of innovation and level of interest among airports shows no signs of slowing.

Put simply, every second counts during peak periods for airports and airlines – even small delays or gate changes can prove costly, with the disruption reverberating across schedules and affecting flights yet to arrive.

Amsterdam Airport Schiphol began using Aviation Solutions' Deep Turnaround at the end of 2020. Since then, the airport's head of airside operations process management, Jasper Daams, has found that the benefits of better turnaround data and stand visibility go beyond happier passengers and airlines.

"We're investing heavily in measuring emissions," he notes. "We take the health of our airside workers seriously at Schiphol, where we have spent money to ensure every stand has its own pre-conditioned air (PCA) unit and electrical equipment, so we can switch off the aircraft's auxiliary power unit (APU)."

The airport has begun using what Daams describes as "noise cameras" alongside its turnaround monitoring equipment to better police APU use at the gate. "The camera sees the vibrations of the air [caused by an active APU], and we are establishing a full sensor network around the airport to measure the ultra-fine particles (UFP)," he says. "In combination with our turnaround monitoring, this will help us trial different pushback procedures to get real data to see if they actually work and to calculate the UFP reduction."

## Healthy outlook

Daams shared his thoughts on the wider benefits of improved turnaround procedures and gate monitoring at the PTE World Conference in April. During his presentation, titled 'Creating the new standard for airside operations', he highlighted how legacy airports in Europe are at a crossroads and must reinvent themselves to operate more sustainably, creating a healthier working environment while maintaining standards of service and still offering growth, all within the constraints of their existing legacy infrastructure.

"For anyone working outside, it's also much quieter when the APUs aren't running, as they make a lot of noise," he says now. "Some of the older staff joke that they love the smell of kerosene in the morning, but for the future of our industry we need to ensure that everyone has a healthy workplace. If we don't, it will become more and more difficult to find people who want to work here."

Another benefit of better gate and turnaround monitoring is less self-docking by pilots. "Sometimes, if the handler is late, some pilots make the wrong decision to park the aircraft themselves," explains Daams. "Normally, during a supervised docking, the active aircraft engines are closely monitored by the workers, with procedures in place to mitigate the risk and ensure it is safe, whereas the pilot doesn't always have a complete overview of everything that's going on."

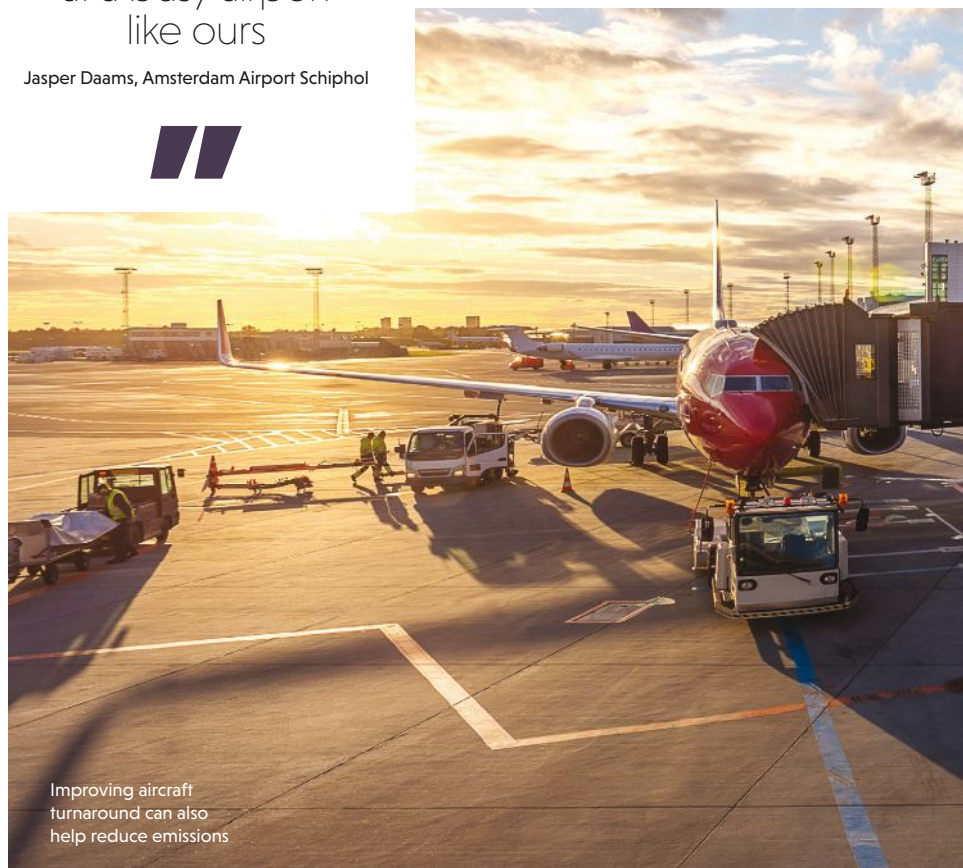
The same monitoring technology can also ensure there is no obstruction that will prevent the aircraft moving onto the stand. "We're working on using cameras to carry out an automatic FOD [foreign object detection] and GSE [ground support equipment] check, which will ensure there are no vehicles, boarding stairs or other equipment preventing an aircraft from docking," says Daams.

"We have six ground handling companies at Schiphol. If the stairs belong to another handler, the protocol is to ask the other handler to remove the stairs as you are not allowed to do it yourself."

All of this would reduce the number of occasions when an aircraft

Ensuring **seamless flow is paramount** at a busy airport like ours

Jasper Daams, Amsterdam Airport Schiphol



Improving aircraft turnaround can also help reduce emissions

that has just landed has to wait off the stand. “This produces a lot of emissions that are harmful to the workers and to the environment,” explains Daams. “What we want is what we call ‘seamless inbound flow’, where we use tools such as Deep Turnaround to help predict when each stand is ready, and to alert us if we need to send a marshal to help guide the aircraft in. Currently, we have a percentage of aircraft that cannot dock seamlessly, and we want to get that to zero.”

Beyond reducing emissions, smoother docking also leads to a “punctuality efficiency gain, because you reduce the disturbance in your flow”, according to Daams. “Also, if an aircraft is not fully in the bay, it will be blocking the pushback of another aircraft because of how densely packed the gates are at Schiphol,” he continues. “So ensuring seamless flow is paramount at a busy airport like ours.”

#### LEFT

Menzies Aviation has seen a 16% increase in turnaround punctuality using Deep Turnaround

#### BELOW

Screenshot showing Assaia's ApronAI and Turnaround Control in use at Seattle-Tacoma International (SEA)



ALASKA  
AIRLINES SAW A  
17% OTP INCREASE  
AT SEATTLE-TACOMA  
(USING ASSAIA'S  
APRONAI)

Source: Assaia

#### London bound

Another legacy airport familiar with many of these issues is London Heathrow. Equally keen to secure its future, in June 2025 LHR began deploying an AI-based turnaround monitoring system at Terminal 5, in partnership with IAG, Assaia and Fujitsu. By the end of this year, the airport aims to have full coverage across all T5A stands at Terminal 5.

Eventually, the technology will be rolled out across 116 gates at Heathrow's Terminals 2, 3 and 5. The deployment is part of the airport's £2.3bn (US\$3.1bn) capital investment program to modernize infrastructure, increase operational efficiency and deal with the growth in passenger numbers. A major focus of the program is ensuring timely take-offs and landings.

Central to the initiative is Assaia's ApronAI, an AI-powered video analytics platform that monitors aircraft turnarounds, tracking tasks such as baggage unloading, refueling and boarding in real time. Each stand typically uses three or four cameras to capture ground activity. These feed into a network that transmits video and timestamps to the Assaia platform, so the airport can visualize each turnaround in real time.

“One of the long-standing challenges during aircraft turnaround has been the ‘black hole’ of data between an aircraft's arrival on stand and its subsequent departure,” explains Neil Pritchard, program lead at Heathrow Airport. “While we have excellent tracking data during flight and landing, visibility during the turnaround process is limited. This lack of insight makes it difficult for airports, airlines and ground handlers to influence or even understand the factors affecting on-time performance. Delays in turnaround can lead to missed departure slots, which not only affect the punctuality of the delayed aircraft but can also impact others in the network. Although we don't quantify turnaround-related delays as a specific percentage, it is clear they significantly influence overall performance and passenger experience.”

Heathrow wanted to gain precise insight into whether turnaround activities were being completed efficiently and within the required time window. By understanding when specific events occur, such as fueling or baggage loading, it can now begin to influence them and improve performance. The goal is to identify delays, trends and opportunities to optimize each phase of the turnaround, ensuring aircraft depart on time.

“Previously, we tracked departure performance using standard industry metrics, such as whether an aircraft departed within 15 minutes of its scheduled time,” admits Pritchard.

“This gave us a view of punctuality but offered no real insight into the individual events contributing to that outcome.”

The new system will show whether key turnaround activities such as fueling, baggage handling and disembarkation are happening on time and in the right sequence.

Pritchard says that as a result, the airport will be able to identify consistent bottlenecks, spot trends across stands or operators and address recurring issues. “Just as importantly, we'll highlight areas where things are going well, so we can replicate best practices across the airport – it's about using the data to drive both accountability and improvement,” he reports.

“AI doesn't just predict delays, it detects and timestamps key turnaround events, highlights trends and



## SCHIPHOL & PARTNERS INCREASED OTP BY 3.6% USING DEEP TURNAROUND

Source: Aviation Solutions

proactively. "It gives us the flexibility to cope with pressure, even in peak periods or challenging conditions," explains Pritchard.

Like Schiphol, the same technology will also help London Heathrow continue to grow its capacity, despite its physical constraints. "With greater consistency and predictability in

turnarounds, we can reduce inefficiencies and unlock capacity," asserts Pritchard. "Instead of relying on built-in buffers, we can optimize schedules and make better use of our existing infrastructure. This allows us to support growth without needing to expand physical resources such as terminals or stands."

identifies where things are going off track. It provides the situational awareness we've lacked on the ground. This supports better resource allocation, faster decisions and improved safety and sustainability outcomes. AI enhances human decision-making but it doesn't replace it."

The airport will use the new technology to keep a close eye on various KPIs. "We're aiming for a 1.5-2% improvement in overall punctuality, even in challenging conditions," says Pritchard. "Another key metric is reducing variability in turnaround block times – how long it actually takes to complete the process. We want to improve consistency so we can confidently say that a turnaround will take 45 minutes every time, not an hour one day and 70 minutes the next. We're also using the system to monitor APU usage. Reducing unnecessary APU use helps us cut emissions and noise, supporting our net zero and sustainability goals."

### Cut the slack

Currently, airlines often build in extra time to account for variability. By analyzing real-time turnaround data and enhancing visibility at the turnaround, LHR will now be able to reduce these unnecessary buffers, improve schedule adherence and prevent knock-on delays. This level of predictability is essential for both punctuality and resilience, supporting better on-time performance and freeing up capacity across the airport.

"The Assaia platform integrates with our wider airport systems, feeding valuable data into operations control and planning tools," says Pritchard. "When connected with other AI-enabled platforms, the result is a more holistic understanding of airport performance, allowing us to take proactive decisions that enhance efficiency and passenger service."

The data from Assaia's system integrates with LHR's wider operational systems and feeds into planning and decision-making processes. "That connectivity helps us understand performance at a deeper level and supports coordination between airport teams, airlines and ground handlers. It becomes a key enabler for more data-driven and responsive airport operations."

More predictable turnaround times will also help LHR increase its resilience. When disruptions occur, such as weather events or late arrivals, the airport can still maintain performance because it will understand how long turnaround tasks should take and can manage them

### ABOVE

A turnaround at YVR, which has opted for Aviation Solutions' Deep Turnaround

### BELOW

YVR recorded more than 20,000 aircraft runway movements in April 2025



We're aiming for a  
**1.5-2% improvement  
in punctuality, even in  
challenging conditions**

Neil Pritchard, Heathrow Airport



### Twin powers

Digital twins offer another means for airports to unlock further capacity without having to find more physical space, enabling data-driven decision-making, predictive maintenance to reduce airport downtime, and seamless system integration to provide enhanced situational awareness via a unified dashboard.

Vancouver International Airport (YVR) will soon begin using Aviation Solutions' Deep Turnaround. The facility is a keen advocate of combining such AI tools with a digital twin to make even greater operational gains via a suite of 'AI agents' that automatically provide real-time staff notifications or detect and prevent system breakdowns before they happen.

"Aviation Solutions recently came over to assess where we need more cameras or better cameras," explains Albert Van Veen, VP, innovation and chief information officer at YVR. "The goal is to implement it at five gates, with the solution up and running before the end of the year. We hope to improve the turnaround times at these five gates by at least 5%."

Once the cameras are in place to deliver the data, YVR can plug Deep Turnaround into its wider operational dashboard. "The cameras are the first thing and then we need to decide which of our other systems it should connect with," notes Van Veen.





## The 5% improvement from Deep Turnaround will provide significant savings

Albert van Veen, Vancouver International Airport



"The primary system we want it to integrate with will be our digital twin, which underpins our total airport management system as it is connected to all the other data sources that we have. Once it's connected, we'll use an AI agent to manage the turnaround time of each plane, just like we use an AI agent to manage a large queue at security or avoid traffic building up outside the terminal."

A situational awareness tool within YVR's digital twin provides a bird's-eye view of the terminal and summarizes information in real time for operational and security staff. Alerts are built into the tool to notify the end user of any data anomalies or potential safety issues. For example, YVR has programmed its cameras to detect if a vehicle has been parked at the terminal curbside for an extended period. Once an incident is detected, an alert is generated and a user can click into the signal to see a live feed of the situation. They can then work with the operations and security teams to address the issue.

"A digital twin can tell you there is a long queue at security, but it will not give you an alert or an action to follow – to do that, you need an AI agent. With YVR's Alert Engine, not only do staff get such a warning, it can even call up the security company to request more staff. Combining a digital twin with the AI modules we have developed ensures staff proactively receive warnings and are supported in taking appropriate actions."



**30+  
OPERATIONAL  
DISRUPTIONS  
PREVENTED IN  
6 MONTHS**

Source: YVR

### ABOVE

The YVR Digital Twin Platform aggregates hundreds of disparate data sources into one intuitive platform

### BELOW

YVR has paired its digital twin with AI agents to provide alerts and notifications

The airport is also working on another AI agent, called end-to-end flow. "This won't just warn when there is a delay at security, it will also tell you the following flights that will be impacted by that delay, hence why we call it end-to-end," explains Van Veen.

"Ultimately, a similar turnaround AI agent will give better warnings and indications on how to improve on-time performance. These AI modules are the brains on top of the digital twin, helping you take the right action and understand the consequences of certain delays. And as Deep Turnaround is used by more and more airports, we will all get to benefit from the data insights it delivers."

As a result, YVR expects to be able to pass on welcome savings to its airline partners: "More passengers will arrive on time, so they can make their connections – meaning the airline won't need to pay for an overnight stay. We are going to fight to get it higher and higher, but even the 5% improvement we expect from when we first begin using Deep Turnaround will provide significant savings for transfer passengers."

Similar to Schiphol and LHR, Van Veen hopes such efficiency will help YVR to grow capacity without expensive construction work. "We're always trying to increase the maximum number of passengers that we can facilitate without big infrastructure investments," he says. "During peak moments, we cannot welcome more flights. However, by improving our on-time performance by 5%, suddenly you get the capability to handle a lot more flights, even during those peak hours. What would the infrastructure investment cost be to deliver an equivalent increase? Digital solutions are a lot cheaper, hence we use the slogan 'Bytes before bricks'. Deep Turnaround is just one example where we are trying to improve the throughput of the airport by investing in the latest technology."

LHR's Pritchard agrees. "If you want different outcomes, better punctuality, stronger sustainability, more resilience, you have to work differently," he concludes. "AI is not a silver bullet on its own, and cameras alone won't solve anything. But when you combine AI with human expertise, you get a powerful tool that can identify trends, inform decisions and support operational excellence. At Heathrow, we see AI as a foundation for the future. It's not about replacing people, it's about equipping them with the insights they need to deliver the best service possible." ■

