



# A predictable turnaround, every time

with Deep Turnaround

aviation  
solutions

Schiphol  
Group



## The Turnaround process – A source of delays and misalignment

The turnaround process is at the heart of airport processes and is mostly managed externally by airlines and ground handling third parties. For many airports, there is limited real-time information on the aircraft turnaround process. Every day, this is causing delays, capacity inefficiencies and challenges in collaboration with sector partners.

At most airports, between 40-50% of delays occur during the turnaround process. Delays usually lead to more delays: delays in the turnaround of one aircraft can lead to a last-minute gate change for another, which again could cause delays in ground handling leading to a missed runway slot. Throughout this process, there is a lot of misalignment between all involved sector partners, with different perspectives of the truth.

## Deep Turnaround: enable proactive turnaround management

Using AI image-based processing, the Deep Turnaround algorithm detects and reports all activities on the apron. A breakthrough use of Computer Vision, an AI technology, enables low maintenance and rapid optimisation. It provides out-of-the-box performance at new stands and the data-centric AI dramatically reduces implementation time at your airport.

### Capture

Video footage of the full turnaround process is captured by two cameras placed at the apron.

### Interpret

This video footage is translated to data so it can be analysed by AI and shared in real-time.

### Visualise

Interpreted data is visualised to create a real-time overview of the turnaround process, or accessed through an API.



## Optimise the Turnaround process: past, present, and future

Deep Turnaround captures over 70+ unique turnaround events in 30+ turnaround processes. Delays are detected as early as 40 minutes before the targeted off-block-time, allowing for informed decisions to improve processes. Automatically generated alerts can be sent to specific roles to share critical information about anomalies, incidents or expected delays in real-time.

Past	Present	Future
Analyse past performance to find inefficiencies. Work with handlers, and other stakeholders, from a single source of truth.	Real-time registration of current turnarounds, allowing you to catch irregularities as soon as they occur.	The trained AI model continuously updates a predicted TOBT, allowing you to manage expected delays.
<ul style="list-style-type: none"> <li>Always a single source of truth</li> <li>Recognise bottlenecks to optimise</li> </ul>	<ul style="list-style-type: none"> <li>Always know what is happening</li> <li>Live alerts of any deviations</li> </ul>	<ul style="list-style-type: none"> <li>More accurate TOBT predictions</li> <li>Intervene and change slots in time</li> </ul>
<b>Used by:</b> Ground handlers, APOC, airlines	<b>Used by:</b> ATC, handlers, gate personnel, baggage personnel, airlines	<b>Used by:</b> ATC, handlers, gate planners, airlines

## Deep Turnaround brings clarity and performance

Decrease the number and duration of delays	More predictable turnarounds	A single source of truth for all stakeholders
Deep Turnaround gives insight into what before was a blind-spot in data. Historical insights provide the opportunity to change processes structurally.	Based on over 150.000 turnarounds, Deep Turnaround's predictive capabilities detect delays before anyone else can.	Effective communication is key for effective airport processes. Objective turnaround data facilitates a base for constructive discussion and cooperation

## Optimising the turnaround

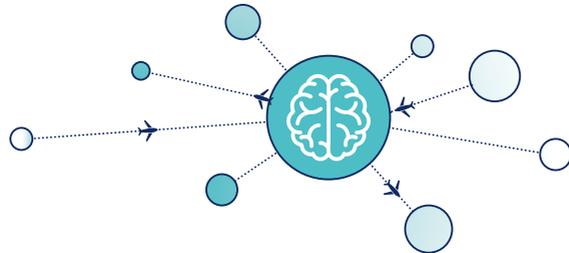
Ultimately, Deep Turn around was developed to increase the efficiency, transparency and safety of the turnaround process. And we can proudly say that we have. In fact, the success of Deep Turnaround was one the main reasons that we are making the solution available to other airports and airlines: this is a product that needs to be shared with other players in the aviation industry.

Allocation of resources	Runway slot usage	Passenger experience
		
<b>-20%</b> pushback idle time	<b>-50%</b> TSAT expirations	<b>-25%</b> last minute gate changes
<b>-10%</b> personnel idle time		<b>-12%</b> tow movements



## Deep Turnaround uses a community learning model, allowing all users to benefit from learnings across airports

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### Ready to scale

Our model comes pre-trained by data collected at Schiphol and other airports, so it creates value quicker than competitors

### Learnings across airports

When an event is interpreted at one airport (e.g. new type of stairs, or snow), it is available for all other airports in real-time

## Choose the right product for your airport

Deep Turnaround can be used standalone using our dashboard and/or app. Alternatively, data can be accessed through an API. This allows you and third parties to access the same data, but within your existing software platforms. This integrated approach centralises your turnaround insights in a way that suits your current operations.

### Standalone

Deep Turnaround offers a full user interface – ensuring access to all data and insights from day one. This web-based & mobile interface was built in-house by a team of developers led by operational experts at Schiphol. Using operations as our starting point ensures every data point, feature, and visualisation has operational value.

### Integrated

All data points and analyses generated by Deep Turnaround can be accessed through Kafka or via a Push/Pull API, allowing you to integrate

turnaround insights into your existing data and integration platform. This data can also be used by APOC, ground handlers or third-party software to work from a single, real-time source of truth.

## Built by aviation experts

Deep Turnaround was created and continues to be developed by Schiphol: one of the world's most innovative airports. Partnering with Schiphol means partnering with aviation experts. Every feature in Deep Turnaround was developed by our in-house development team, in direct collaboration with operational experts at Schiphol, and our active users such as KLM, TUI, Transavia, Easyjet, Menzies and Viggo. Operational value for airports, airlines and handlers will always be our primary driver. This aviation expertise is what defines our product and our team.

Here's why we are the right turnaround solution partner for you:

### First-hand expertise

We don't just talk to users – we are the users. Deep Turnaround is a product of Schiphol's operational staff, and our in-house developers.

### Vision driven

Schiphol is a frontrunner airport. That means our products are not a quick fix for today's problems, but are fit for the future of aviation.

### We use it too

We use Deep Turnaround every day, so we want the product to always excel. That's how we know every feature we add has operational value.





## The value at Schiphol explained

### Optimal slot usage

Runway slot allocation is used in congested airports to share scarce airport resources. Runway slots can be missed due to turnaround delays, waiting for the next available slot can take a long time. Deep Turnaround gives decision-makers timely information on predicted delays. This allows airports and airlines to optimise available airspace, reduce the duration of delays, and improve on time performance by up to 2%.

### Fewer last-minute gate changes

Looking forward to fewer airplanes with long buffer times and fewer last-minute passenger flows in the terminal? The predictive features of Deep Turnaround can reduce the need for last-minute gate changes by 25-50%. It does so based on the availability of more accurate and timely information to initiate a gate change, as well as better-informed decision by gate planners to buffer an aircraft. This directly impacts on-time performance.

### More efficient asset & workforce utilisation

Resources are scarce in the turnaround process and idle time is costly. Yet it's hard to plan realistically, as operations coordinators often have limited information on all current turnarounds. By providing real-time and predictive information about the turnaround process, Deep Turnaround allows you to plan more realistically and replan when necessary. Improving asset usage, resulting in lower idle time, and lower peak pressure for employees.

## Here's how to make this work at your airport

Once you've made the decision to implement Deep Turnaround at your airport there are a few things to get done. Based on our own experience as an airport, here's how we make sure Deep Turnaround delivers the value you expect it to at your airport.

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<b>Step 1: Preparation</b>	First, we determine which package (product, support module, add-ons) is most suitable for your airport. In addition, we will jointly develop a camera plan for your airport, allowing a clear view of the aprons in scope, and we validate the technical requirements.
<b>Step 2: Deployment</b>	During deployment, cameras will be mounted on site (with your local contractor), The full system architecture is deployed including any physical or virtual infrastructure and integrations with input data is established. The AI model will be calibrated and tested.
<b>Step 3: Validation and go-live</b>	The system is made live in a production state and all stakeholders are offered role specific demonstrations and training. To make the deployment of Deep Turnaround a success, user onboarding is key and is always included.
<b>Step 4: Support</b>	During the first months we monitor performance closely and improve the predictive model based on the first data collected at your airport. In addition, we ensure users and stakeholders get confident in using the solution and improving the processes.

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## Frequently asked questions:

### Who are the typical users of the Deep Turnaround solution?

At Schiphol, the main users of the Deep Turnaround solution are Airport Gate Planners, Air Traffic Control, Ground Handlers, Flight Officers, Apron Controllers and Operational Excellence Managers. In the future, we expect to include features which can benefit safety and sustainability officers/managers as well.

### How many turnaround events are included in your model?

There are over 70 turnaround events included in our model, giving insight in over 30 turnaround processes. If you choose to implement Deep Turnaround at your airport, all turnaround events which we have access to at Schiphol are included automatically.

### Is Deep Turnaround suitable for my airport?

Deep Turnaround is suitable for most airports, small and large, and irrespective of apron design. Whether you plan to integrate Deep Turnaround in your own dashboarding using the data stream, or whether you plan to use the Turnaround Insights Dashboard. Deep Turnaround is especially suitable for capacity constrained airports.

### Can Deep Turnaround work with our own cameras?

Yes, that is possible. Cameras have to be IP cameras, as the Deep Turnaround solution needs to be able to connect to them through an HTTP(S) protocol. Furthermore, there are some requirements for how the cameras should be positioned on the apron (approx. 20 meters high), as well as for the image resolution of a minimum of 1280 x 720 pixels.

### How long does it take to implement the Deep Turnaround solution?

As our Deep Turnaround solution uses a single model approach, wherein one AI model learns more every time it processes an image, we do not need to start from scratch at your airport. The algorithm instead can build on what it already knows. From the moment the cameras are installed on the aprons, implementation is expected to take around six weeks. That includes setting up and configuring the Deep Turnaround system, integrating different data sources into the Deep Turnaround algorithm, performing security assessments, and training users.



## What others say

“The turnaround process used to be a black box. With Deep Turnaround, we generate the necessary data and insights. By looking at the same transparent, real-time and historical data with all our partners, we can collaborate to focus even more closely on efficient planning and execution with a better OTP as a result. And ultimately, a higher customer satisfaction.”

Frédérique Portheine – Manager Operational Excellence – Eindhoven Airport

“Finally, we have an accurate overview of the turnaround process. This allows us to optimise day-planning, and it makes it a lot easier to remotely change or set an accurate TOBT (Target Off-Block Time). In turn, this improves the information provision towards the airport and Air Traffic Control.”

Wouter van der Voort, Lead Coördination Schiphol, Viggo (Ground Handling)

## Partners



We strongly believe in collaboration across the aviation industry. Airports face similar challenges and can speed up innovation by learning from best practices across the sector. We are therefore bringing our most innovative airport solutions, with proven business value at Amsterdam Airport Schiphol and other airports, to market. We develop solutions in-house or work closely together with industry leaders to tackle our common challenges head on.

[schiphol.nl/aviation-solutions](https://schiphol.nl/aviation-solutions)

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The logo for Schiphol Group, featuring the word "Schiphol" in a bold, sans-serif font with a small crown icon above the letter "h", and the word "Group" in a smaller font below it.

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