# DIGITAL BROCHURE – TOTAL AIRPORT
## INCONTROL SIMULATION SOLUTIONS

**SOLUTION** TOTAL TERMINAL SIMULATION
**SOLUTION** BAGGAGE HANDLING SIMULATION
**SOLUTION** PASSENGER FLOW SIMULATION
**SOLUTION** SECURITY PROCESS SIMULATION
**PRODUCT** PEDESTRIAN DYNAMICS® AND ENTERPRISE DYNAMICS®
**SHOWCASE** AMSTERDAM AIRPORT SCHIPHOL
**SHOWCASE** BRISBANE AIRPORT
**COMPANY PROFILE** INCONTROL SIMULATION SOLUTIONS

INCONTROL
Simulation Solutions

# TOTAL TERMINAL SIMULATION

## Be prepared for the future: apply simulation to analyze and plan your terminal processes on strategic, tactical and operational level.

### KEY FEATURES

Our airport simulation suite offers you the perfect toolset to model passenger, baggage and security processes in your terminal, with:

- The ability to model large–scale systems and buildings
- Terminal specific building blocks for quick and easy modelling
- Detailed reporting
- Amazing 3D visualization
- Applicable in many areas

### TOTAL TERMINAL SIMULATION

Airports are dynamic environments that have to deal with increasing capacity demands, stricter safety requirements and a continuing focus on improving the overall passenger experience. This demand seems to raise challenges in both the design and operational phase at airport terminals.

Airport designers and planners have to cope with long–term capacity demands, while changes in security standards, aircraft types and technological developments require flexibility. Overall, the airport operations face challenges such as frequent changes to flight schedules, disruptions and staffing issues, which need to be solved to prevent long waiting times or even missed flights. Resulting in achieving the ambition to increase overall customer satisfaction.

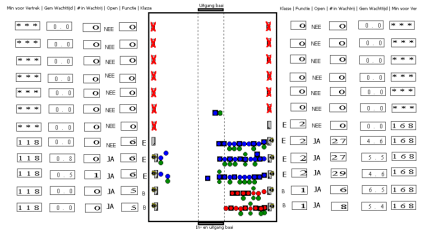
In order to prepare for the future: analyzing and planning the airport terminal facilities at strategic, tactical and operational level, seems to be the key. Simulation will be an important tool to support achieving these goals!

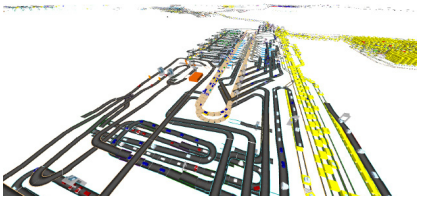
The INCONTROL airport terminal simulation software is based on the simulation software Enterprise Dynamics® and Pedestrian Dynamics®. Simulation models are used to continuously evaluate and improve the performance of environments, test strategies, identifying bottlenecks an support decision making about solutions.

The INCONTROL software suite offers solutions for challenges in capacity and operational management in the following application areas:

- Passenger terminals
- Baggage handling systems
- Terminal security

Visualization in 2D and 3D


Check in strategy


Simulation model of baggage handling system


Pedestrian flow on an airport

The above mentioned topics cover the passenger movements from arrival at the airport, to the gate and exits, baggage flows from drop–off or transfer unloading to make–up positions and all related security processes for hold–, cabin baggage and the passenger. The interdependencies wamongst the mentioned issues provide interesting results.

The INCONTROL simulation software is user–friendly, allowing several stakeholders to easily assemble various interfaces, creating a total airport simulation platform, that is second to none.

## KEY BENEFITS OF THE INCONTROL SUITE

- Save time and money by evaluating and optimizing the safety and performance of the airport terminal design at strategic and tactical level
- Provide capacity analyses and insight into the entire terminal infrastructure; passenger and baggage flows, waiting times, resources, staff utilization and potential bottlenecks;
- Determine required operational staffing schedules;
- Support the development of maintenance and contingency plans of evacuation scenarios;
- Ability to present the capacity utilization of the airport terminal in attractive 2D and 3D visualization to the stakeholders;

The INCONTROL software is successfully applied by:

- Airport architects, planners and engineers
- Airport capacity managers
- Airport Logistics and System engineers

## INCONTROL SIMULATION SOLUTIONS

INCONTROL offers its state–of–the–art simulation platform Enterprise Dynamics® and Pedestrian Dynamics® for the total terminal simulation. The hands–on project experience and knowledge of our developers and engineers is used for the ongoing development of our software. With the software, expertise and network of INCONTROL we support every customer in achieving the best results in solving difficulties within the entire airport terminal. Amsterdam Airport Schiphol is one of our customers who uses our software and simulation services extensively in order to keep its performance and quality at high standard.

*Simulation is part of the operation: "No structural modifications without using simulation."* – Amsterdam Airport Schiphol

Are you experiencing difficulties in the field of baggage handling, passenger flow or safety & security? Simulation provides the solution.

Our showcases can be found at www.incontrolsim.com/support/ or contact one of our experts for more information.

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# BAGGAGE HANDLING SIMULATION

## Looking to further reduce high baggage mishandling rates? Use Enterprise Dynamics® baggage simulation models to improve your baggage handling performance!

### KEY FEATURES

- Simulate over 100.000 bags per day
- Detailed controls for routing through the Baggage Handling System
- Applicable to every airport environment
- Specific baggage modeling elements
- Realistic 3D visualization
- Adjustable detailed output about transport times and utilization of infrastructure
- Import drawings & models based on industry standards
- Runs on standard PC

### BAGGAGE HANDLING SIMULATION

Airports, airlines and passengers all share the opinion that the rate of missing checked luggage should be zero. Mishandled bags are expensive for airlines, airports and above all aggravating for passengers. Nevertheless, it happens frequently that baggage is either too late for (un)loading in the airplane resulting in delayed pick-ups for the customers. Either way, all the above does not contribute to an increasing NPS.

The ever-shorter available handling times – a result of late check-in at self-service desks and shorter transfer connections – make it increasingly harder to deliver the baggage in-time. At the same time, the international authorities impose stricter screening requirements to keep flying safe. Explosive Detection Systems and Explosive Trace Detection equipment restrict the rapid dispatching of the baggage.

The design of a baggage handling system sets the transport times, the minimal originating times and connecting times. New technologies and advanced automation, such as Destination Coded Vehicles and automated storage buffers, reduce transport times and create new opportunities. In order to estimate the added value of such an investment, a clear understanding of the consequences is required. The only way to validate these KPI's is by executing various simulations.

While using a baggage system, the optimal results are largely dependent on the differentiation in arrival time of bags. A thorough analysis of the operational processes and infrastructure is required to get proper understanding of the flexibility in the system and the effects of changes in strategies. Optimal allocations of baggage insertion points and baggage make-up positions can result in significantly improved results.

Using simulation software provides the solution to improve baggage handling performance, decrease mishandled bag rates, create commitment from all stakeholders and most importantly; increase the customer satisfaction!

## SIMULATION SOLUTIONS

The INCONTROL simulation software Enterprise Dynamics® is THE solution for understanding and improving complex and dynamic baggage systems. Simulation models are used to continuously evaluate and improve the performance of environments, test strategies, identifying bottlenecks and support decision making about solutions. At Amsterdam Airport Schiphol we implemented and maintain one of the world's largest simulation models for baggage handling, covering the complete Baggage Handling System. The simulation is used for every structural modification in infrastructure and flight schedule.

The INCONTROL Simulation software is user–friendly, allowing several stakeholders to easily assemble various interfaces, creating a platform for the baggage handling system, that is second to none.

Applying simulation software has many benefits during the design and operations of the Baggage Handling System:

- Save time and money by evaluating and optimizing the design of your Baggage Handling System during the design stage;
- Gain insight into the performance of the baggage infrastructure, occupation of buffers, transport times, potential bottlenecks, and mishandled bag rates.
- Test alternative strategies or modifications to improve the performance;
- Quantify the needs for investments in new equipment
- Increase redundancy and support the development of maintenance and contingency plans;
- Present the infrastructure of the airport in a 2D and 3D visualization to share the insights with your stakeholders;

## USERS

Simulation for baggage handling systems is applied by engineers, BHS suppliers, airports and baggage handling companies. Each stakeholder has individual intentions and approaches, yet, the answers provided by simulating with Enterprise Dynamics® all deal with capacity management, finding answers to solve bottlenecks in these complex environments and ultimately increasing overall satisfaction for the customer.

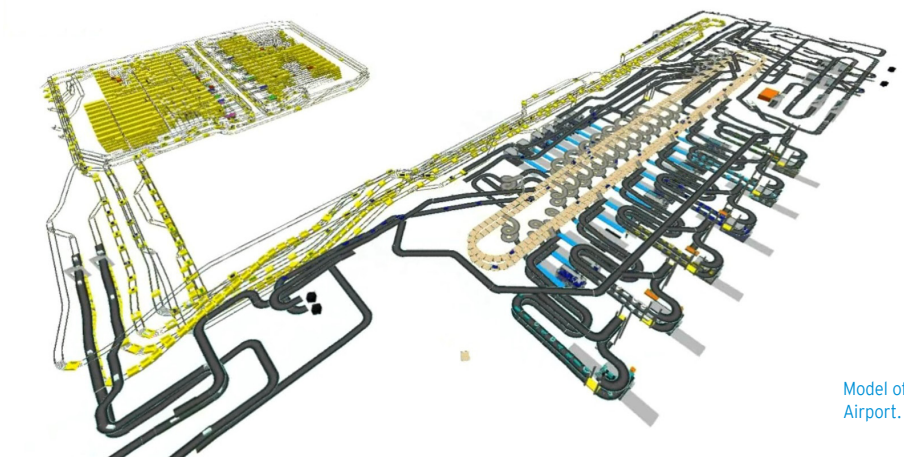
## INCONTROL SIMULATIONS SOLUTIONS

INCONTROL offers its state–of–the–art simulation platform Enterprise Dynamics® for baggage handling simulation. The hands–on project experience and knowledge of our developers and engineers is used for the ongoing development of the software. With the software, expertise and network of INCONTROL we support every customer in achieving the best results in solving difficulties with the baggage handling system.

*"By simulating first, Amsterdam Airport Schiphol has been able to save 10 Million Euro and reduce the total construction time by 8 months."* – Amsterdam Airport Schiphol

Looking to further reduce high baggage mishandling rates? Simulating provides the solution.

Our showcases can be found at www.incontrolsim.com/support/ or contact one of our experts for more information.



Model of a baggage handling system at Amsterdam Schiphol Airport.

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# PASSENGER FLOW SIMULATION

## Facing great challenges at an airport terminal regarding capacity management, passenger security or commercial revenues? Analyze the passenger flows with Pedestrian Dynamics® simulation software!

### KEY FEATURES

- Simulate up to 100,000 individuals
- Realistic crowd movement and behavior with unique passenger properties
- Quick & easy modelling
- Applicable to every airport environment
- Amazing 3D visualization
- Adjustable detailed output about passenger processes and utilization of infrastructure
- Import drawings & models based on industry standards
- Runs on standard PC

**PASSENGER TERMINAL SOLUTIONS**

In an airport terminal everything should be perfectly tuned in order to provide passengers an enjoyable time. Traveling by plane should be a pleasant experience, so numerous waiting lines and overcrowded areas must be avoided.

The above mentioned is a challenging and complex task for airport operators as they have to deal with many uncertainties such as differentiations in arrival– and departure times and fluctuations in passenger numbers. Still, all these ten thousands of passengers per day have to use the same facilities and follow the same safety procedures within a short time. Therefore it is important to use the available infrastructure of the airport in the most efficient way.

A thorough analysis of passenger forecasts, operational processes and infrastructures are required to make optimal allocations of resources for departures, arrivals and create efficient duty–rosters for airport staff. Achieving all of these objectives can be accomplished through the use of simulation.

Designers and architects also face major challenges when developing the infrastructures of airport terminals. Departure halls, lounges, corridors and gate areas should provide sufficient capacity and must be positioned logically. In addition, the infrastructure must meet all safety requirements. Trends like creating Smart Airports and new technologies set new demands and create new opportunities.

## Using simulation software will guarantee ROI by improving terminal utilization, maximizing sales, create commitment from all stakeholders and most importantly; increase the passenger satisfaction!

### SIMULATION SOLUTIONS

The INCONTROL simulation software Pedestrian Dynamics® is THE solution for understanding and improving dynamic passenger environments. By continuously simulating passenger flows in complex infrastructures, the evaluation and improvement of the safety and performance of the environment contribute positively to the perception of the passenger.

The INCONTROL simulation software is user–friendly, allowing several stakeholders to easily assemble various interface, creating a platform simulating the passenger flows, that is second to none.

Applying simulation software during the design and operational phase of an airport offers many benefits:

- Save time and money by evaluating and optimizing the safety and performance of the terminal during the design phase;
- Gain insight into the complete infrastructure, passenger flows, waiting times, process times and potential bottlenecks to improve the performance;
- Provide basis for staff schedules based on expected arrival times, pedestrian flows and process times;
- Support the development of evacuation and contingency plans;
- Optimize commercial attractive areas on the airport, based on pedestrian flows.
- Present the infrastructure of the airport in a 2D and 3D visualization to share the insights with your stakeholders;

### PASSENGER FLOWS

Simulating passenger flows gains ground. Important reasons are the increasing attention for safety and security, the implementation of new technologies for identification and self–service facilities. With the use of Pedestrian Dynamics®, INCONTROL supports in finding the best solutions.

Simulation provides answers to complex issues related to capacity management and determining the optimal locations for commercial facilities at airports. Many different organizations such as airports, architects, authorities and emergency services are already using Pedestrian Dynamics® simulation software to support their mission.

### INCONTROL SIMULATION SOLUTIONS

INCONTROL offers its state–of–the–art simulation platform Pedestrian Dynamics® to simulate passenger flows. The hands–on project experience and knowledge of our developers and engineers is used for the ongoing development of the software. With the software, expertise and network of INCONTROL we support every customer in achieving the best results in solving difficulties with passenger flows.

Examples of passenger flow simulations include our projects at Amsterdam Airport Schiphol and Brisbane Airport. Both airports use the INCONTROL software and simulation services extensively in order to optimize transferring passenger flows and to determine the best design option for the new terminal.

*"Analyze bottlenecks, identify potential improvements and perform what–if analysis."*

Facing great challenges at an airport terminal regarding capacity management, passenger security or commercial revenues? Simulating provides the solution.

Our showcases can be found at www.incontrolsim.com/support/ or contact one of our experts for more information.

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# SECURITY PROCESS SIMULATION

## Interested in improving the performance of your security checks? Examine the security solution with INCONTROL's simulation software Pedestrian Dynamics® and Enterprise Dynamics®!

### KEY FEATURES

- Simulate passengers, cabin– and hold baggage
- Detailed representation of processes
- Quick & easy modelling
- Applicable to every airport environment
- Realistic 3D visualization
- Adjustable detailed output about throughput, waiting and utilization of equipment
- Import drawings & models based on industry standards
- Runs on standard PC

### SECURITY PROCESS SIMULATION

Airports make every effort to improve the experience and safety of passengers. Integration and simplification of processes, implementing new (self–service) technology and ever more off–airport actions are applied to strive for increasing overall passenger satisfaction.

At the same time, threats and incidents have forced governments and the international aviation community to demand ever increasing requirements on security systems and safety procedures. Airports invest in costly new hardware and equipment for security filters. Screening equipment for hold– and cabin baggage is becoming more sophisticated and complies with the new Explosive Detection System and Explosive Trace Detection standards; passenger scanners with advanced imaging technology are introduced. Complete new security checkpoints arise. Is this advanced, extensive screening conflicting with the airport's objective of better service and improved passenger experience? Not necessarily: It is often used to redesign the security system, the infrastructure and the operational procedures in such manner that the efficiency of using these expensive systems increases, while the passengers experience a faster and more convenient security check. Major changes in screening concepts and operational procedures are invented; developments such as biometrics and risk assessment are introduced to improve identification, traceability and operating procedures. All of this in order to reduce the risk of safety incidents in aviation. Simulation delivers a valuable contribution to this objective.

Developing new, smart layouts and screening concepts requires a thorough analysis of the processes and infrastructure to be able to realize the impact and make the correct decisions. At operational level the allocation of passengers and baggage, making efficient duty–rosters for security staff are very important factors for an optimal passenger experience.

Using simulation software will pay off by increasing security lane throughput, reduce waiting times, improve deployment of security agents but more importantly; increase the sense of security for passengers.

## SIMULATION SOLUTIONS

The INCONTROL simulation software Pedestrian Dynamics® and Enterprise Dynamics® provide THE solution for testing and improving security in airport terminals. Simulating passenger and baggage flows in complex environments is used to evaluate and improve the safety and performance, to identify potential bottlenecks and support solutions.

The INCONTROL simulation software is user–friendly, allowing several stakeholders to easily assemble various interfaces, creating a platform to test the terminal security and safety, that is second to none.

Applying simulation software during the design and operational phase of an airport offers many benefits:

- Save time and money by evaluating and optimizing the layout and performance of the security checkpoints during the design phase;
- Gain insight into the complex interaction between passenger flows, process and waiting times, reject rates and service levels;
- Determine required staff schedules and reduce operational costs;
- Evaluate the consequences of introducing new types of equipment and new procedures;
- Present the infrastructure in a 2D and 3D visualization to share the insights with all stakeholders;

## SECURITY PROCESSES

A modified security solution should not only guarantee safety, but also be efficient, flexible, reliable, robust and cost–effective. The system must be able to deal with variables such as eg. different passenger– and baggage profiles, peak and off–peak periods or foresee changes in legislation. The degrees of freedom in the solutions include alternative detection methods, dimensioning of screening facilities, Centralized Image Processing rooms, automation, staff allocation and many more. These result in a large number of scenarios that can be evaluated using simulation models. Simulation enables evaluation of the performance of existing and imaginary systems under any condition. In this way you can distinguish the promising solutions, which can be further developed and tested.

## INCONTROL SIMULATION SOLUTIONS

INCONTROL offers the state–of–the–art passenger simulation platforms Pedestrian Dynamics® and Enterprise Dynamics® for testing and improving security in airport terminals. The hands–on project experience and knowledge of our developers and engineers is used for the ongoing development of the software. With the software, expertise and network of INCONTROL we support every customer in achieving the best results in solving difficulties in the airport security area.


Examples of security implementations include our projects at Amsterdam Airport Schiphol. The simulation software and expertise is used to optimize the security checkpoints, determine consequences of replacing HBS–equipment and to support the best layout solutions.

Interested in improving the performance of your security checks? Simulating provides the solution.

Contact one of our experts for more information.

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# PEDESTRIAN DYNAMICS®

## Pedestrian Dynamics® crowd simulation software is the ultimate tool to model, analyse, optimize and visualize pedestrian crowds in any infrastructure.

### APPLICATION AREAS

Pedestrian Dynamics® is applicable in a wide scale of domains:

- Stadiums & Arenas
- Museums & Exhibitions
- Events
- Theme Parks
- Shopping Malls
- Cities
- Airports
- Railway Stations
- Passenger ships

Pedestrian Dynamics® Crowd Simulation Software

## INTRODUCTION

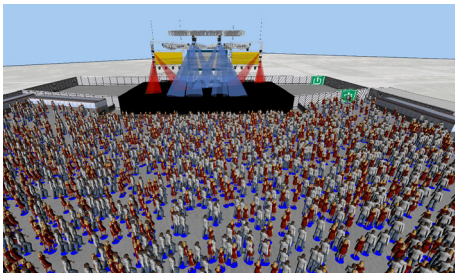
Pedestrian Dynamics® is an extensive and user friendly crowd simulation software application. It is designed for the creation and execution of large crowd simulation models in complex infrastructures. It can be used to evaluate the performance and safety of your environment in every phase of the life cycle; from design to operations.

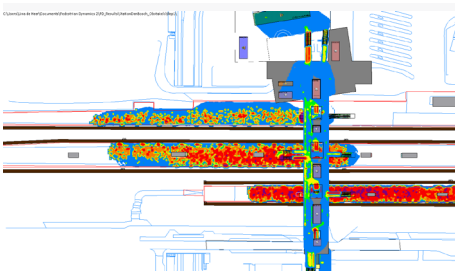
Pedestrian Dynamics®:

- Offers a rapid model building environment which saves time and costs. Only a few steps are required to model most complex operations.
- Is flexible, robust and easy to use.
- Has been used widely used in many large scale projects in most critical infrastructure environments including stadiums, airports, public transport terminals, mega events and urban planning.

## Contact us for more detailed information or a demonstration of Pedestrian Dynamics®.


- www.pedestrian-dynamics.com
- www.twitter.com/pedestriandynam
- siminfo@incontrolsim.com





With Pedestrian Dynamics® you can easily simulate large crowds and determine the density within the infrastructure.

## BENEFITS

Pedestrian Dynamics® crowd simulation software has a proven track record to analyze and optimze large crowd flows. Crowd simulation enables you to:

**Decrease costs:** by optimizing the infrastructure during the design phase, high additional costs can be avoided during the operations.
**Regulation compliance:** help evaluate and address regulatory compliance with local and international safety mandates and norms.
**Predict & anticipate:** the model enables you to predict the crowd flows and anticipate.
**Analyze the risk:** analyze the risk and the safety of people and infrastructures in every phase of the life–cycle; from design to operation.
**Optimize Evacuation:** Develop, test and optimize evacuation and data–driven response plans.
**Answer "What If":** Quickly compare alternative designs and scenarios on–the–fly.
**Improve commerce:** Increase customer satisfaction by improving pedestrian flows, experiences and comfort and identify the commercial attractiveness of locations by flow measurements.
**Present & convince:** Effectively communicate with all stakeholders in the decision making process.
**Operate efficiently:** Optimize and increase operational efficiency within the given environment and with available resources.

## KEY FEATURES

Pedestrian Dynamics® offers:

- Import of industry standards (CAD/CAD 2015, XML, CityGML and many more)
- Integrated 2D&3D models
- Fast simulation runs
- Simulation of large realistic crowds up to 100,000
- Explicit Corridor Mapping (ECM)
- Extensive set of model drawing tools
- Unique agent properties
- Domain specific elements
- Easy scenario definition
- Intelligent dynamic routing
- Microscopic and mesoscopic
- Integrated output module with automatic report generation.
- Easy movie playback and recording

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# ENTERPRISE DYNAMICS®

## Enterprise Dynamics® is a leading simulation software platform for business modeling; quick and easy.

**APPLICATION AREA'S**

Enterprise Dynamics® is used by top 500 companies in:

- Manufacturing & Production
- Warehousing & Distribution
- Material Handling
- Supply Chain
- Rail

## INTRODUCTION

Enterprise Dynamics® is a comprehensive enterprise simulation software platform that offers a fully configurable, scalable and easy-to-use simulation environment. Enterprise Dynamics® is a state-of-the-art modular object oriented simulation platform to help solve any complex people, process, technology and infrastructure related challenges with data-driven answers for most commercial, governmental, education and industrial applications. The Enterprise Dynamics® simulation model enables you to fully analyze, visualize and optimize the performance of your assets and investments. Enterprise Dynamics® can be utilized throughout the entire lifecycle of your investment, from design-build to operation and continuous improvements. Enterprise Dynamics® enables you to cope with resources, costs, time, reliability, safety and sustainability.

Enterprise Dynamics® offers a wide range of comprehensive, branch-specific simulation object libraries. The flexible and perfectly matched simulation objects provide the user the ability to represent both simple and highly complex processes and systems. If required, the objects can be created and / or modified individually to fit specific needs. Enterprise Dynamics® can be integrated with external data source and third party systems, if needed. Enterprise Dynamics® is a proven simulation software and been widely used around the world. There is virtually no limitation within the software platform.

**So why speculate your situation, simulate and get answers with Enterprise Dynamics®.**

Enterprise Dynamics®
Logistic Simulation Software

# With Enterprise Dynamics® you can analyze and optimize the current and future behavior of your system or infrastructure. Don't speculate... Simulate!

## BENEFITS

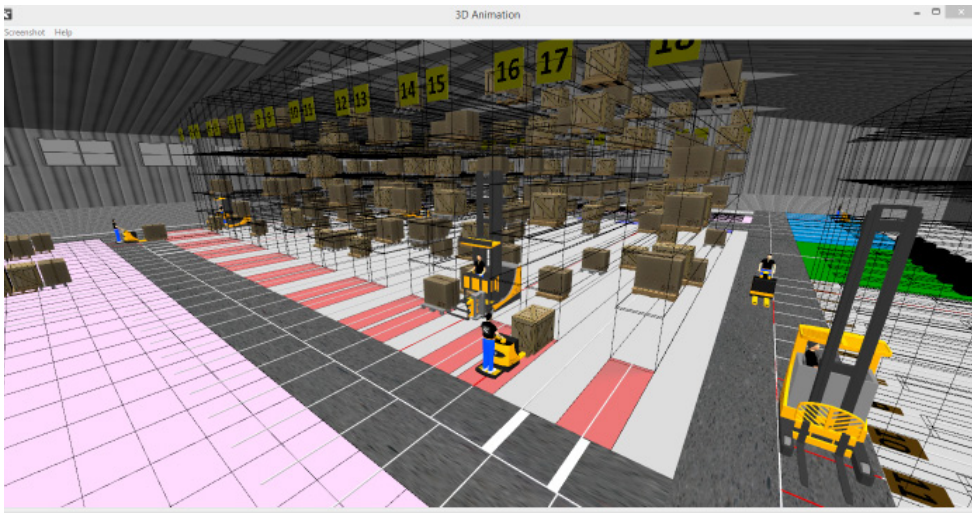
The main benefits of simulation with Enterprise Dynamics® are:

- Virtual optimization: you can virtually test and improve any scenario throughout the entire system lifecycle without disrupting the actual system and also decrease the implementation period.
- Manage complexity & variation: large scale systems are difficult to manage. Enterprise Dynamics® offers you the perfect tool to create insight in your system.
- Improve communication: state-of-the-art 2D and 3D visualization enables you to communicate effectively and supports you in convincing stakeholders.
- Planning & preparation: with simulation you can answer all your "what-if" questions and optimize you resource planning.
- Return on investment: simulation software enables you to evaluate your potential and / or future resource investments.

## KEY FEATURES

Enterprise Dynamics® offers:

- A powerful simulation platform for large-scale systems.
- Easy "drag & drop" model building.
- Extended object libraries and additional packages for different application areas.
- Extended set of pre-defined and user-defined control rules.
- Create your own object library and modify existing objects.
- State-of-the-art 2D & 3D visualization.
- Easy to use graphical user interface.
- Import your own 3D models.
- Extended result reporting module and standard output.
- Experiment wizard for fast and easy experiment design and reliable results.
- Open architecture; input and output connection based on all industry standards.
- No model limitations.




Enterprise Dynamics® has an easy to use graphical user interface and state-of-the-art 3D visualization.

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# BAGGAGE HANDLING SIMULATION FOR OVERALL CAPACITY PLANNING

Schiphol Amsterdam Airport

**INDUSTRY**
Airport

**APPLICATION AREA**
Baggage handling

**COUNTRY**
The Netherlands

**CHALLENGE**
Provide insight in the capacity of the baggage handling system under all circumstances.

**RESULT**
Investigate system capacity constraints / efficiency during maintenance or (re-) construction operations.
Create support for (future) business cases and investments.

**KEY TO SUCCESS**
Baggage handling is executed by a very complex system in which investigations cannot be performed within the live operation. A simulation model creates an environment in which numerous efficiency measures can be executed without any risk.

## Simulation has become part of the baggage operation at Amsterdam Airport Schiphol "No structural modifications are done without using simulation".

### AMSTERDAM AIRPORT SCHIPHOL

Amsterdam Airport Schiphol is one of the largest European airport hubs. Currently, it handles over 55 million passengers annually of which about 40 percent is transferring. Within the airport infrastructure the baggage handling system is an important part. The system transports, screens and sorts the bags of all passengers. The available time is limited: all bags have to be ready 10–15 minutes before flights are departing. For the next years, the airport foresees a further increase in traffic. To accommodate this traffic, and to deal with new, more strict, EU baggage screening regulation, the baggage handling system needs to be expanded. The goal is to handle 70 million bags per year around 2020.

### BAGGAGE HANDLING SIMULATION

More than a decade ago, simulation projects for baggage handling at Schiphol were initiated to evaluate capacity requirements of a system part. A simulation model was developed for this specific part, and some simulation experiments were performed. After the results were reported, the project ended and the model was not used anymore.
A few years later, most of the baggage handling system was available as independent models. The capacity of the systems was reaching its limits due to a large increase in baggage flow. Simulation was used to find short term and long term solutions to increase and optimize the capacity and performance of the systems. Optimizing separate subsystems was not an option, because this could result in bottlenecks in other subsystems. Therefore, the existing models were all connected together. This overall model SIMBAX reflects the current situation of the baggage handling system in detail.

Simulation has proven to be successful. At Schiphol SIMBAX is being used to gain insight in the overall performance of the system and in the flows for the upcoming season. Further, to decrease in system times by reducing bottlenecks, to optimize the available capacity, to improve the redundancy of the system, and to validate future capacity requirements. This results in a better performing baggage handling system and allows the capacity managers at Schiphol to anticipate on future situations.

Simulation has also become a design supporting tool. When developing costly and complex systems it is important to validate and improve the design as soon as possible so management can be convinced that the system will meet the requirements. Simulation is also used to test new ideas and to assist in operational management. Simulation has become part of Baggage operation "No structural modifications are done without using simulation".

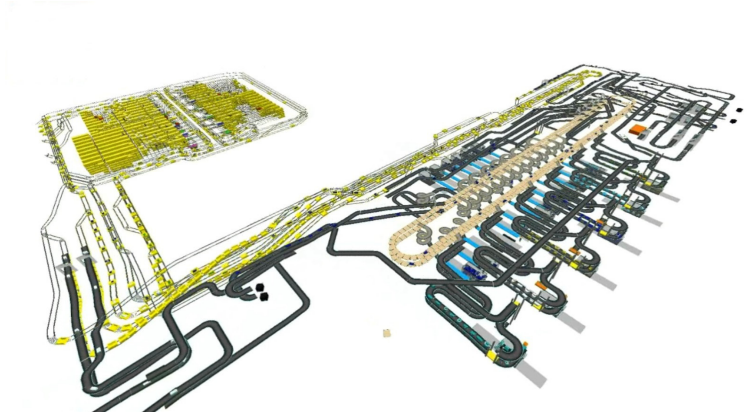
**OUTPUT**

The output is presented in Excel, making it easily accessible, using the same subdivision as in the model. So, the performance of the overall system and performance of the different sub–systems are presented in different sheets. Within ED bags can be individually approached, which allows to store information about individual bags. This is the bases for the output. Bags are logged when they pass a specified location. Using this information in combination with the bag properties (e.g. outbound / inbound flight number, routing destinations, etc.), most of the desired output can be extracted.

Examples are:

- Flows
- Transportation times on certain routes
- Transportation times on certain routes for specific groups
- Buffer occupancy
- Totals over the day
- Routes of single bags

Additional required output is logged separately. All data is stored in a database and is extracted in Excel by using SQL queries, keeping the excel sheets clean from excessive data. This flexible method gives detailed information about the system and also turned out to be extremely useful when addition output is required when investigating odd behavior without re–running the simulation.




**INDUSTRY**
Crowd Simulation & Infrastructures

**APPLICATION AREA**
Airport

**COUNTRY**
Australia

**CHALLENGE**
Improve and support the decision making process, in order to maintain the desired service level while capacity is increasing.

**SOLUTION**
INCONTROL modeled a current and future situation for the terminals and analyzed pedestrian flows.

**KEY TO SUCCESS**
With simulation software you can analyze bottlenecks, identify potential improvements and perform what–if analysis.

## For the sixth year Brisbane Airport was ranked as the best Australian Airport. They chose INCONTROL's simulation software to keep this position!

### BRISBANE AIRPORT

Brisbane Airport, situated in South East Queensland is the third largest in Australia (on passenger numbers) and ranked 61 in the World. For the sixth year in a row Brisbane Airport was ranked by the ACCC as the best Australian Airport for overall quality of service, standard and availability of facilities. The airport consists of two terminals, domestic and international, two runways and is operational 24 hours a day 7 days a week. In the year 2009 the international terminal served approximately 4 million international passengers and 14.5 million domestic passengers. By 2015 the international terminal is predicted to host more than six million passengers.

### EXPANSION TERMINALS

Major project works were planned for both the domestic and international terminal to be able to host the growing number of passengers. Recently the international terminal has been extended with more capacity at all levels. Capacity increased in the check–in areas as well as in security, customs and reclaim areas. Also at the domestic terminal plans are ready for big renovation works and extension of the terminal and car park facilities.

## ANALYZE BOTTLENECKS, IDENTIFY IMPROVEMENTS AND PERFORM WHAT–IF ANALYSIS

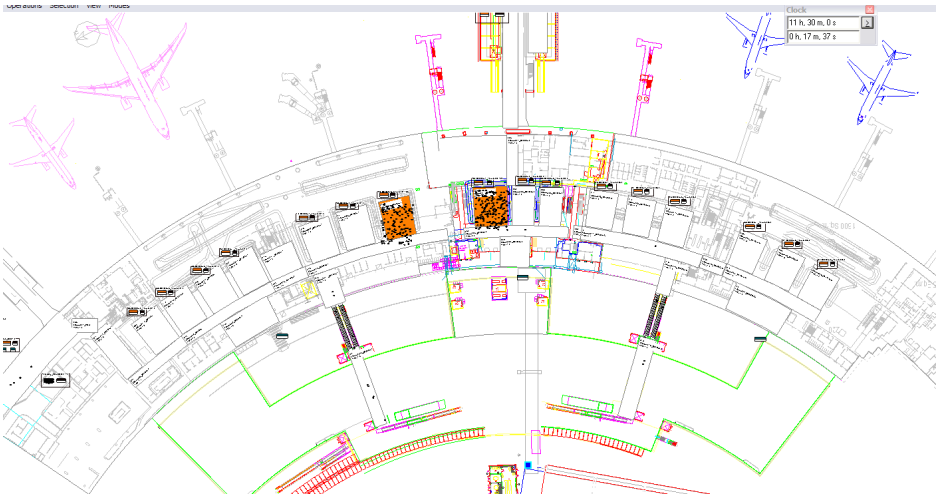
In order to improve and support the decision making process, Brisbane Airport decided to buy INCONTROL's solution for simulation of airport processes. Brisbane Airport was looking for a terminal modeling tool and models for both terminals. INCONTROL developed several models for Brisbane Airport. For both terminal buildings the current and a future situation have been modeled. The models give valuable insights in the passenger flows throughout the terminal buildings. They enable the user to analyze bottlenecks, identify potential improvements and to perform what–if analysis and thus support the decision making process on operational, tactical or strategic level.

## USER TRAINING

Once the models were finished, operation managers at Brisbane Airport have been trained to use the simulation models for further analysis and experiments. The user can edit operational parameters like process times and capacity planning to represent actual or future airport operations. An input module is provided where the flight schedule can be loaded. The input module generates passenger numbers based on aircraft utilization and transfer rates.

## OUTPUT

Besides visual insights when running the models, the solution includes an output module which exports the results to Excel. The output module shows results of resource utilization, throughput times and queue lengths per process and per area. It also shows the dwelling time of passengers in the commercial areas.




## It is our mission to make clients and partners successful by offering the most innovative simulation solutions.

### FACTS AND FIGURES

- Offices in The Netherlands (HQ), Germany, United States of America, Japan and China.
- Offers a worldwide partner network in more than 20 countries.
- 25 years of experience in developing simulation software.
- Successfully implemented more than 5.000 solutions worldwide.

**INCONTROL SIMULATION SOLUTIONS**
INCONTROL Simulation Solutions is the leading manufacturer of simulation software with over 20 years of experience. Our product portfolio contains Enterprise Dynamics®, Pedestrian Dynamics®, ShowFlow® and EDX®. Each product is developed for a specific market and tailored to the users. Key markets include:

- Logistics
- Manufacturing
- Airports
- Harbors
- Rail & Public Transport
- Crowd Safety & Infrastructure

**MISSION**
Our mission is to make our clients and partners successful in their field of application by offering the most innovative simulation solutions. Clients use our simulation software to simulate large scale logistic systems and infrastructures such as baggage handling systems, container terminals, train stations, assembly lines and football stadiums. Our simulation software enables the user to cope with time, costs, resources, reliability, safety and sustainability.

Solutions are implemented at leading companies worldwide. Our intensive educational efforts have led to a successful use of our simulation software at universities, schools and institutes all over the world.

Our offices are located in The Netherlands, Germany, the United States of America and China. Via these offices and a worldwide partner network we provide software, implementation, product training and a 24hr support to our products.

## SOFTWARE

INCONTROL is the owner of various simulation software packages. This software is implemented and distributed by our own offices and our worldwide partner network. Each package has a strong simulation platform with an open architecture. The platform is used in combination with a library of user–friendly objects.

The software can be offered to the clients as:

- Platform; the client uses the platform to develop their own simulation applications and to develop their own library of objects.
- Platform and library of objects; the client uses the existing library of objects to develop a simulation model of their business operations.
- End user application; the client receives a simulation application, which is developed for the business operations of the client.

In consultation with the client it is determined which possibility complies to the client's needs for a successful implementation of our simulation software.

## SERVICES

### Implementation

If the client chooses an end–user application, INCONTROL works together with the client to implement the software. During this project an application is developed based on the client's wishes. INCONTROL has a department consisting of experienced simulation engineers. They will lead the project to a successful implementation.

### Training

INCONTROL offers training for all users of our simulation software; starters as well as advanced users. This training can be followed at one of our training centers, located at our offices, or on–site at the customer. In addition to the standard training INCONTROL also offers customized training courses.

### Maintenance & Support

As after sales service INCONTROL offers maintenance & support on the software. This includes full technical support, user support and product updates.

To evaluate how our simulation software can make you and your organization successful, please contact us or visit our website.

**INCONTROL SIMULATION SOLUTIONS**
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