

DIGITAL BROCHURE – BAGGAGE HANDLING INCONTROL SIMULATION SOLUTIONS

SOLUTION BAGGAGE HANDLING SIMULATION

PRODUCT ENTERPRISE DYNAMICS®

SHOWCASE AMSTERDAM AIRPORT SCHIPHOL

COMPANY PROFILE INCONTROL SIMULATION SOLUTIONS





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.

APPLICATION AREA BAGGAGE HANDLING SIMULATION



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.

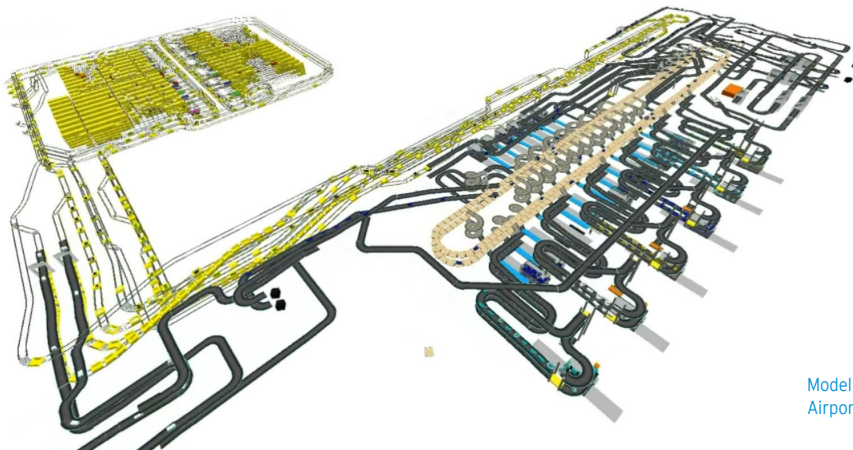
INCONTROL SIMULATIONS SOLUTIONS

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.



APPLICATION AREA'S

Enterprise Dynamics® is used by top 500 companies in:

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



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

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®.



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:

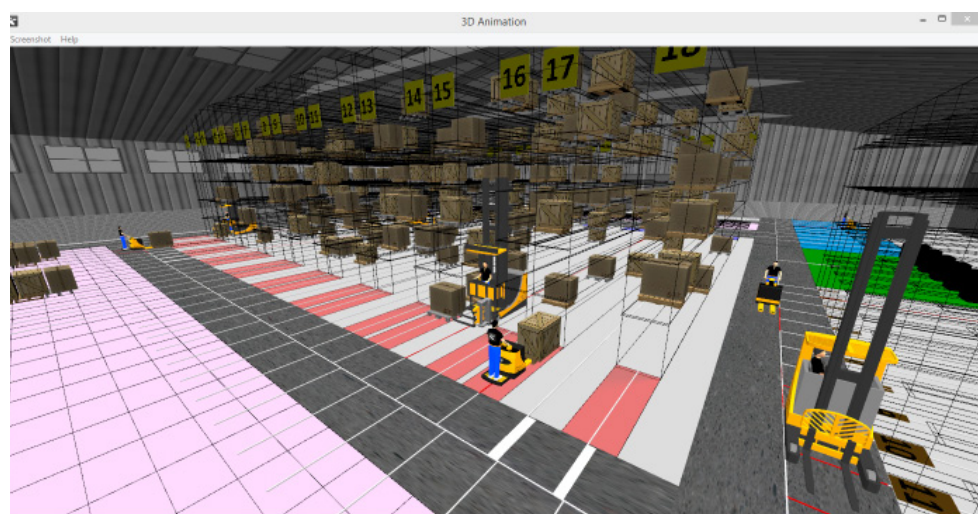
- Virtual optimization: you can virtually test and improve any scenario throughout the entire system lifecycle without disrupting the actual system and also decrease the implementation period.
- Manage complexity & variation: large scale systems are difficult to manage. Enterprise Dynamics® offers you 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 your 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.





BAGGAGE HANDLING SIMULATION FOR OVERALL CAPACITY PLANNING



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".

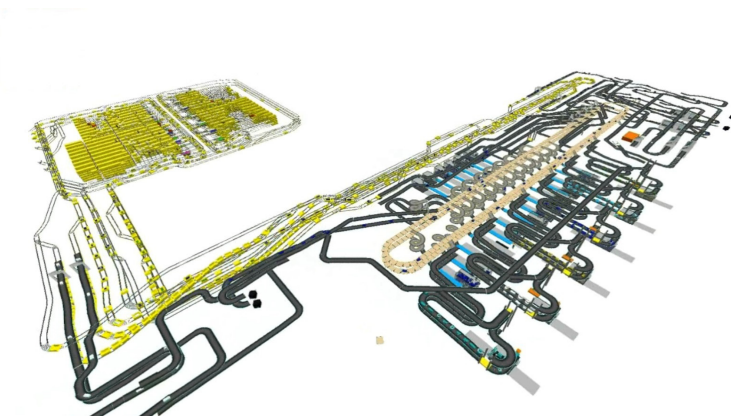
OUTPUT

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.





COMPANY PROFILE

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.

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

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.