ZERO G

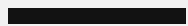# DeepTurnaround
A smoother, safer and fairer collaboration on the apron

Manuel van Esch

Our company in data:

Founded
2015

Size
50 Data Experts
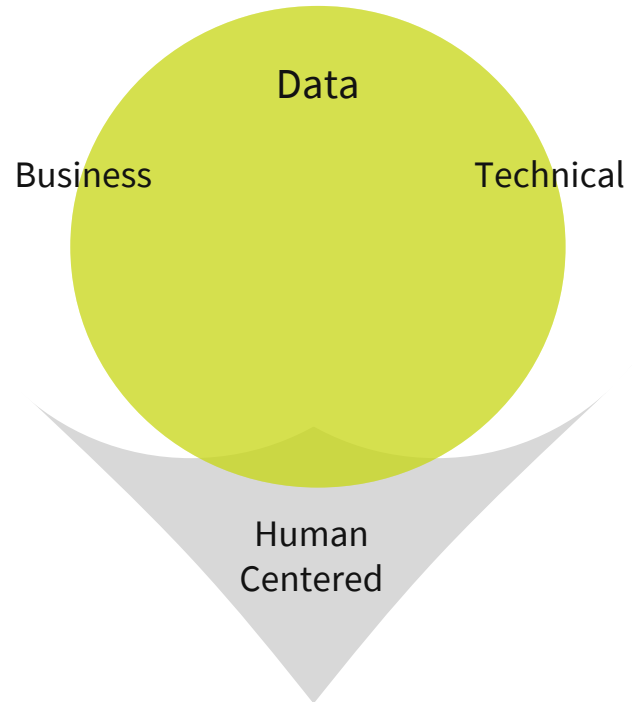
Projects:
50+

Innovation:
5 Awards and Patents

Taking a human-centered approach in combining aviation know-how with data science expertise

Aviation Expertise

We have extensive experience with aviation organizations and processes and understand the real benefits of data.

Data

Business

Technical

Data Expertise

Our data professionals are experts in data solutions, analytics and machine learning. We build customized solutions to meet client needs.

Human Centered

Approach

Technology should serve humanity, so we put your people and your customers at the heart of our technological solutions.

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Enable fairer, smoother and safer collaboration on the apron **through automatically generating real-time reliable data of what is happening on the apron at any time**

APPLICATIONS:

➡ **Turnaround Timestamps**

➡ **Safety Monitoring**

➡ **Aircraft Security Surveillance**

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Apron processes are
a data black box

Airlines, airport and ground service providers come together to realize a smooth turnaround for passengers.
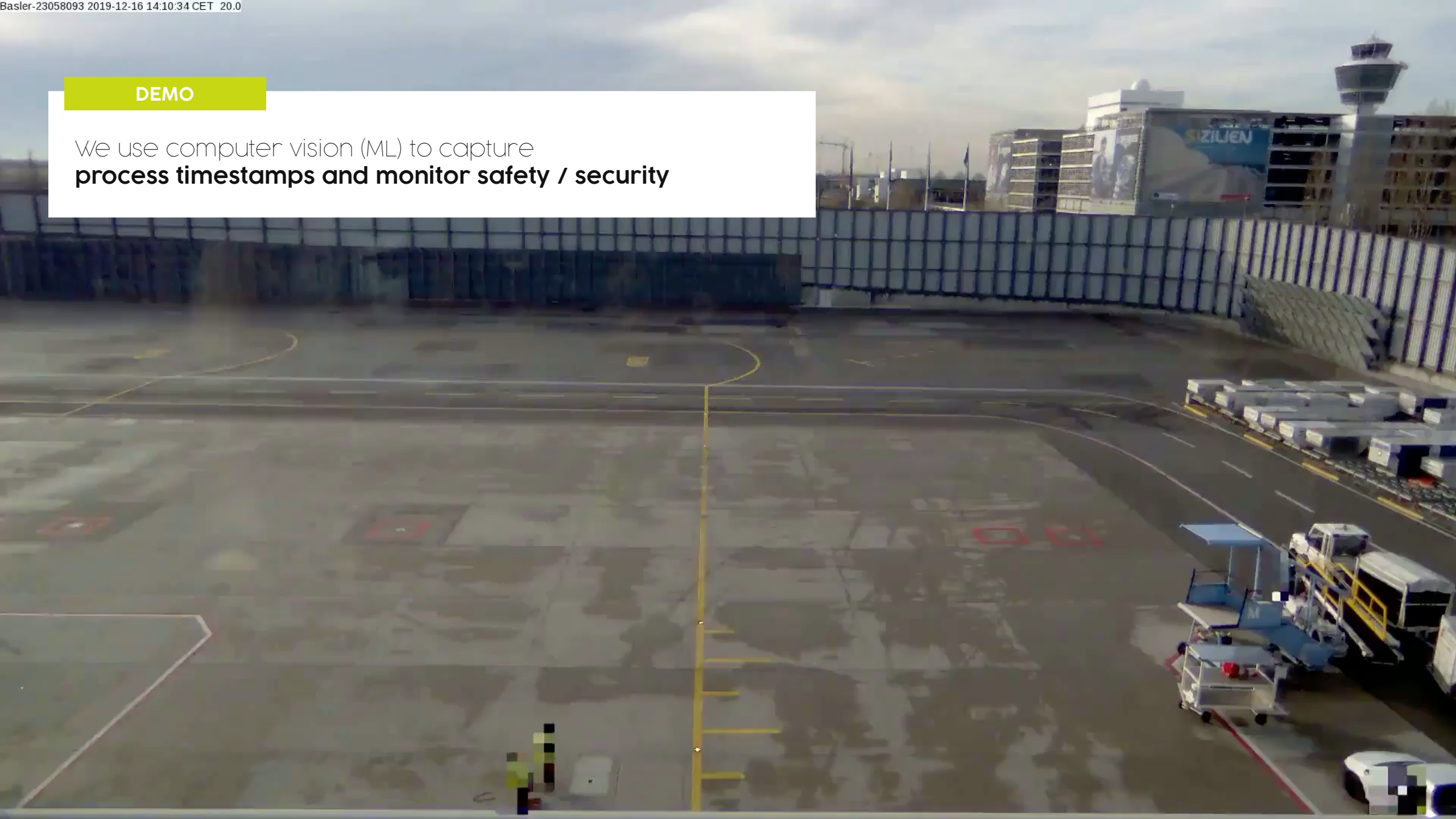
However due to many unclarities, this process and others aren't always as smooth, safe and fair as it can be.

➡ **$7.4 Billion** delay costs (2019) due to TA

➡ **15 - 20%** of delays are turn-related

➡ **Est. $4 - 8 Billion** in damages by unsafe AC handling

DEMO

We use computer vision (ML) to capture
process timestamps and monitor safety / security

Apron Intelligent Edge:
How it works

The model is edge-deployed – on premise – for most **efficient and secure** processing.

The solution is **GDPR-conform**, anonymizing all people on the video.

A 10-second **snapshot of events** can be stored on the edge – if necessary.

Generated **data is transmitted directly into client's back-end system** - zeroG doesn't see this data.

Solution is **remotely monitored and updated** - no interference with client's existing IT infrastructure.

Client CCTV

Client (User) Interfaces

GDPR

AI

Client Backend

zeroG's **Remote Solution Management**

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Industry Development Partner for **Azure Stack Edge**

An AI-enabled edge computing
appliance with network data transfer
capabilities

Network Storage Gateway

Network data transport to Azure while retaining local access to files

Edge Compute

Use IoT edge compute modules to analyze, filter, and transform data as it moves to Azure

FPGA powered by Azure Machine Learning

Accelerate ML inferencing of images and video streams to get results close to the data source

Cloud managed

Easily manage your fleet from Azure portal

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Automated Use Case **Timestamps**

AC Arrival / Departure	Accessibility	GSE Interaction	Baggage/Cargo	
Chocks-On Time (time)	PAX doors (total)	GPU CONNECTED (time)	Cargo doors (total)	Container unload DOOR POS. END (time)
Chocks-Off Time (time)	PAX Door POSITION OPEN (time)	GPU DISCONNECTED (time)	Cargo DOOR POSITION OPEN (time)	Container load DOOR POS. START (time)
Pushback Tug moving-in (y/n)	PAX Door POSITION CLOSED (time)	Fueling START LW (time)	Cargo DOOR POSITION CLOSED (time)	Container load DOOR POS. END (time)
Pushback Tug moving-out (y/n)	Aerobridge DOOR POS. CONNECT (time)	Fueling END LW (time)	Belt Loaders (total)	Container unload rate (#/time)
Pushback Tug CONNECT (time)	Aerobridge DOOR POS. DISCONNECT (time)	Fueling START RW (time)	Belt loader DOOR POS. CONNECT (time)	Container load rate (#/time)
Pushback START (time)	Air stairs (total)	Fueling END RW (time)	Belt loader DOOR POS. DISCONNECT (time)	Bags (total)
Pushback (speed)	Air stairs DOOR POS. CONNECT (time)	Fueling Type (Hydrant or Tank)	High loader (total)	Bags load rate (#/time)
Pushback (path)	Air stairs DOOR POS. DISCONNECT (time)	Catering total	High loader DOOR POS. CONNECT (time)	Dollies (total)
Pushback END (time)	Ambulifts (total)	Catering START DOOR POS. (time)	High loader unload DOOR POS. START (time)	Pallets (total)
Pushback Tug DISCONNECT (time)	Ambulift DOOR POS. CONNECT (time)	Catering END DOOR POS. (time)	High loader unload DOOR POS. END (time)	
Towbar CONNECT (time)	Ambulift DOOR POS. DISCONNECT (time)	Water START (time)	High loader load DOOR POS. START (time)	
Towbar DISCONNECT (time)	Buses (total)	Water END (time)	High loader load DOOR POS. END (time)	
	Position of Buses	Sewage CONNECT (time)	High loader DOOR POS. DISCONNECT (time)	**Emergency Services - Beta**
	Bus loading START (time)	Sewage DISCONNECT (time)	Bags unload DOOR POS. START (time)	Firefighting Vehicles (total)
	Bus loading END (time)	ACU CONNECT (time)	Bags unload DOOR POS. END (time)	Police Vehicles (total)
	Bus unloading START (time)	ACU DISCONNECT (time)	Bags load DOOR POS. START (time)	Ambulances (total)
	Bus unloading END (time)	ASU CONNECT (time)	Bags load DOOR POS. END (time)	Unclassified Vehicles (total)
	Bus Type (PAX, Crew, PRM)	ASU DISCONNECT (time)	Containers (total)	
			Container unload DOOR POS. START (time)	

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Increase Safety and Security

1. Increase Safety of Personnel

Understand where the biggest safety risks (e.g. speed, objects) are and establish measures to increase your team's safety

2. Position is Available and Cleared

No objects are within safety envelope of position and all objects are within designated space

3. FOD Check

Check position for any foreign objects to efficiently enable a safe and secure work environment

4. Enhanced Security Efficiency

Support security team in their work, with smart sensors that alert them when something is off

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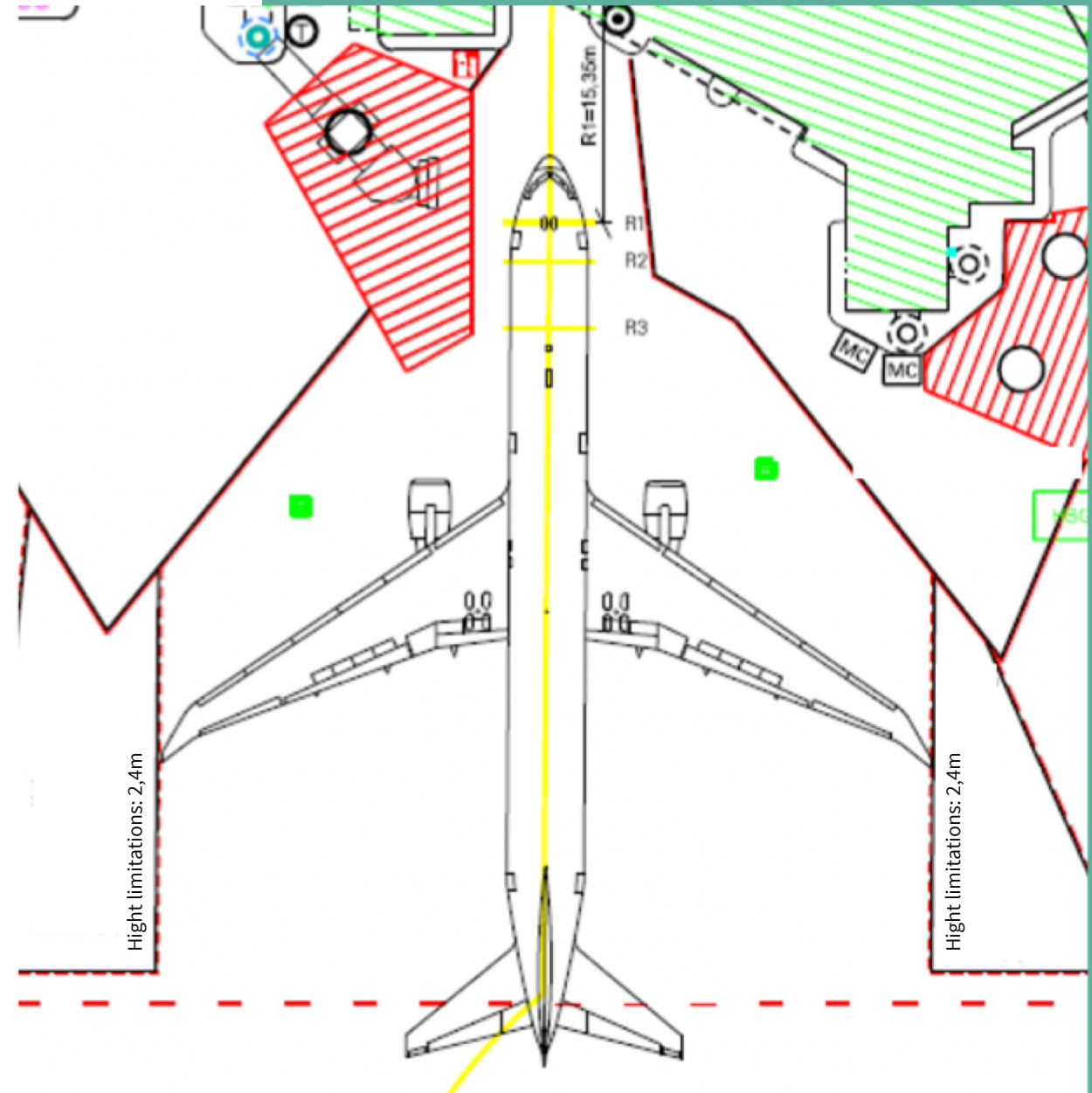
A **shared-source-of-truth** that benefits all involved parties

1. AIRPORT

Increase productivity within current infrastructure, by creating optimal processes

- Excellence-as-a-service

- Know when gates become available, by determining a realistic and dynamic TOBT

- Act before delays occur, based on real-time insights

- Optimize processes by understanding what causes delays

- Automated trouble-hooting

2. AIRLINE

Optimize flight and crew operations by foreseeing operational irregularities

- Know when flight will be delayed in real-time

- Pro-actively act (fresh crew / equipment change / …) to avoid delays

- Increased turnaround performance

- Create leaner flight and crew plans, based on realistic historical data and analytics

- Automated troubleshooting

- Fact-based collaboration with partners

3. GROUND HANDLER

Sustainable and safe handling through foreseeing and reducing stress situations

- Automate processes; e.g. invoicing, position clearance, etc.

- Increase safety by reducing unpredictability and foreseeing upcoming irregularities

- Develop most optimal handling process, based on real-time operational insights

- Design most effective handling processes based on data and analytical insights

- Fact-based collaboration with partners

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Turning data into intelligent solutions that optimize turnarounds

Three Development Horizons over Time

3. Intelligence driven and automated processes

2. Analytics

1. Monitoring Real Time

▪ **Performance monitoring**	▪ **Predict Events**	▪ **Automated trouble shooting**
▪ **Management by exception**	▪ **Process simulation**	▪ **Intelligent Decision Support**
▪ **Pro-active trouble shooting**	▪ **Understand root causes**	
▪ **Alerting System**	▪ **Optimize processes**	
▪ **Quality and safety**		

Fact/data driven insights for fair collaboration and solid operations that serve the passenger

Data is the only reliable information for eliminating delays and improving efficiencies

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Quick Solution Deployment

Step 1
Collect video material

Store video material of turnarounds at selected positions for ten days on a hard drive, including local time in top left.

Step 1.1
(Anonymization)

zeroG receives hard drive and anonymizes video material, blurring out all people on apron.

Step 2
Annotation & Calibration

zeroG **annotates** material and **calibrates** ML model to detect and track objects at airport.

Result
Solution Integration

Clients' receives data from TA use cases in their back-end system at selected MVP gates.

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Thank you!

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