Passenger-centric Intermodal Traffic Management involving Airports and Railways

CTRF 51st Annual Conference

Toronto, May 1-4, 2016

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DLR

DLR German Aerospace Center
Research Areas

- Aeronautics
- Space Research and Technology
- Transport
- Energy
- Defence and Security
- Space Administration
- Project Management Agency

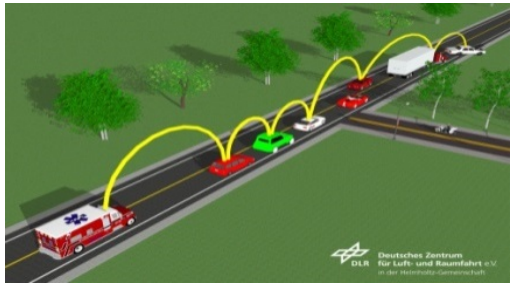
DLR

Challenges in Transport

- Achieving sustainable mobility with balance between
  - economy
  - society
  - ecology

by

- ensuring the mobility of people and goods
- protecting the environment and resources
- improving safety



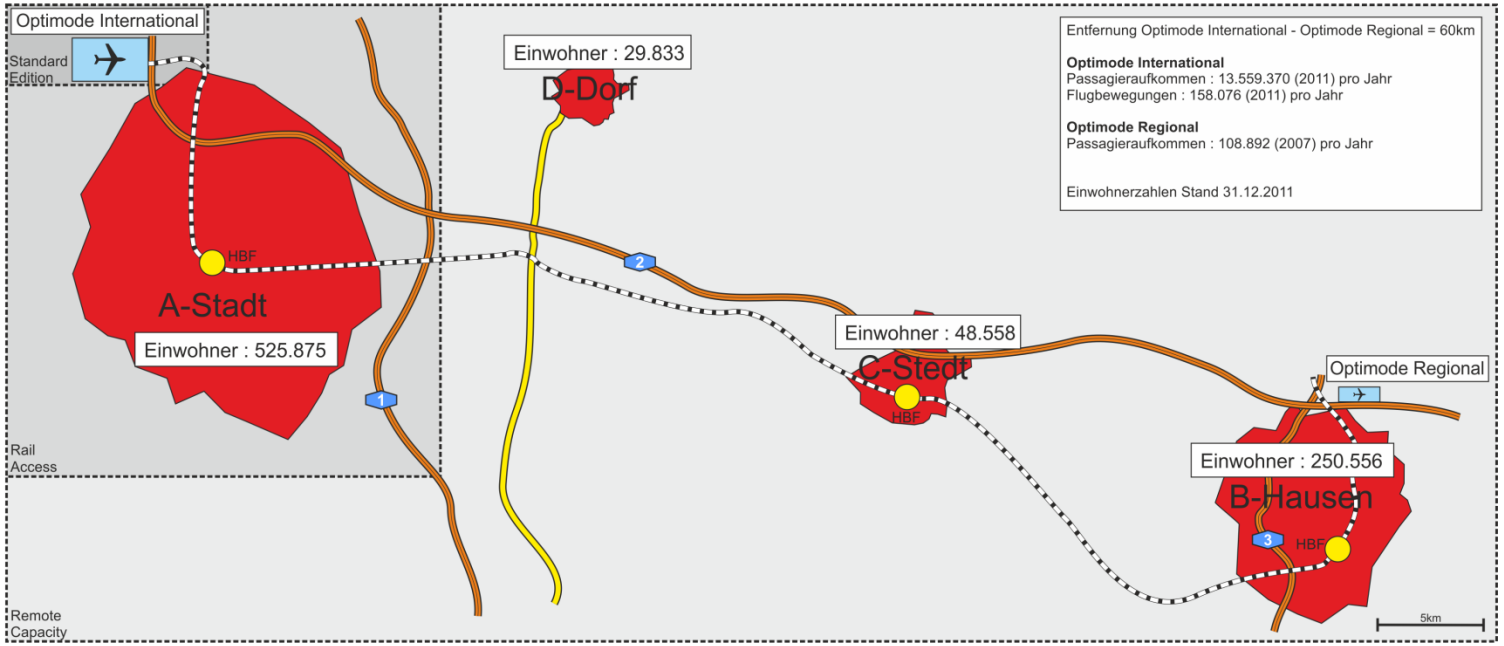
Portfolio of Transport

Transport Research Area Mobility, environment, safety, economy		
Terrestrial vehicles	**Traffic management**	**Transport systems**
• Road vehicles • Rail vehicles	• Road traffic management • Rail traffic management • Airport management • Sea traffic management • Traffic management for major events and disasters	• Transport development and the environment

Intermodal airport management with passenger trajectories

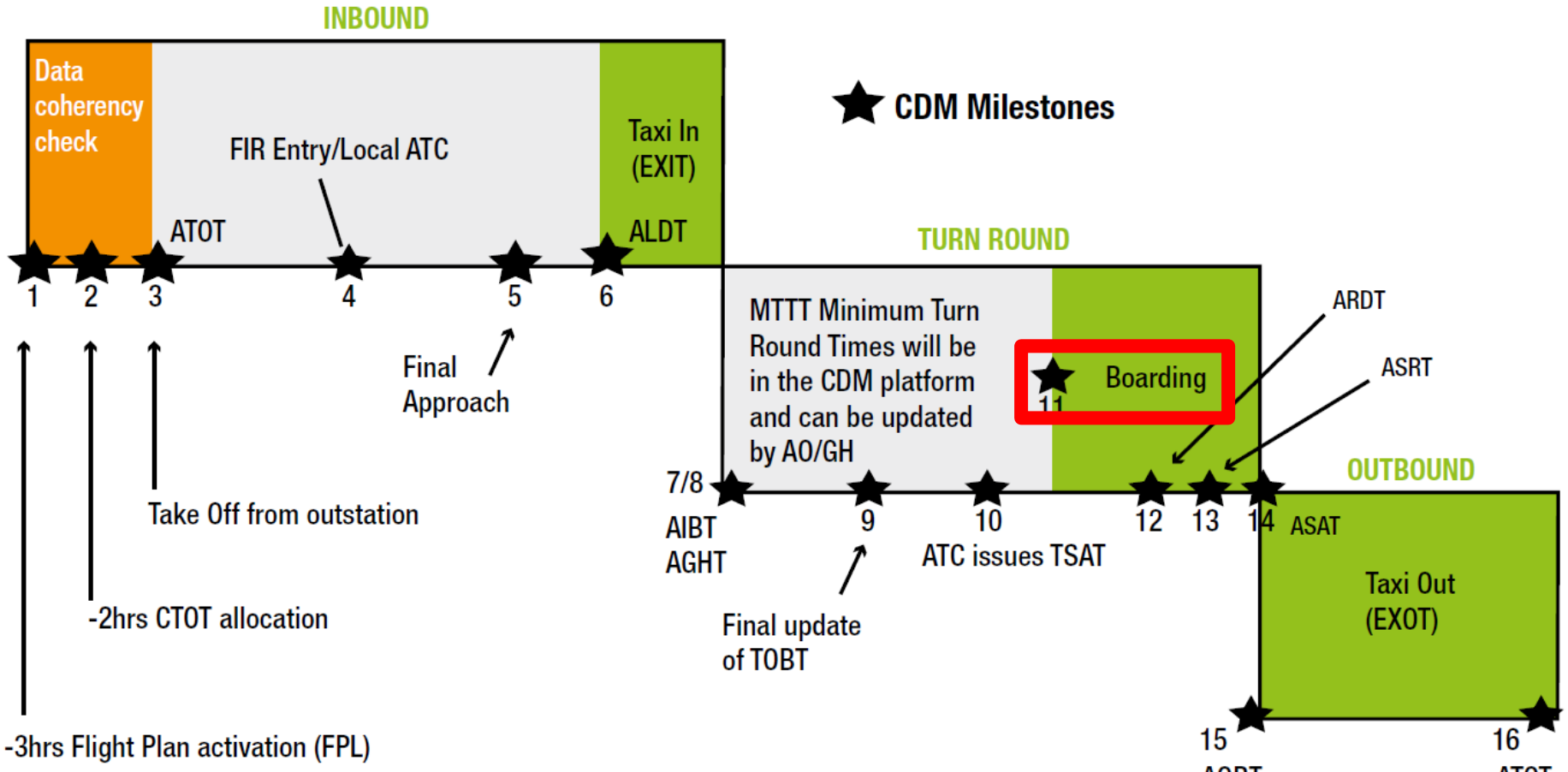
- Project Optimode + Optimode.net
- Collaborative Decision Making CDM
- Multimodal Control Centre MCC
- Key Performance Indicators driven management
- Door-to Door (D2D) - oriented operational re-scheduling

Die Welt von OPTIMODE



Intermodal airport management
State of the Art: A-CDM

Source: Eurocontrol

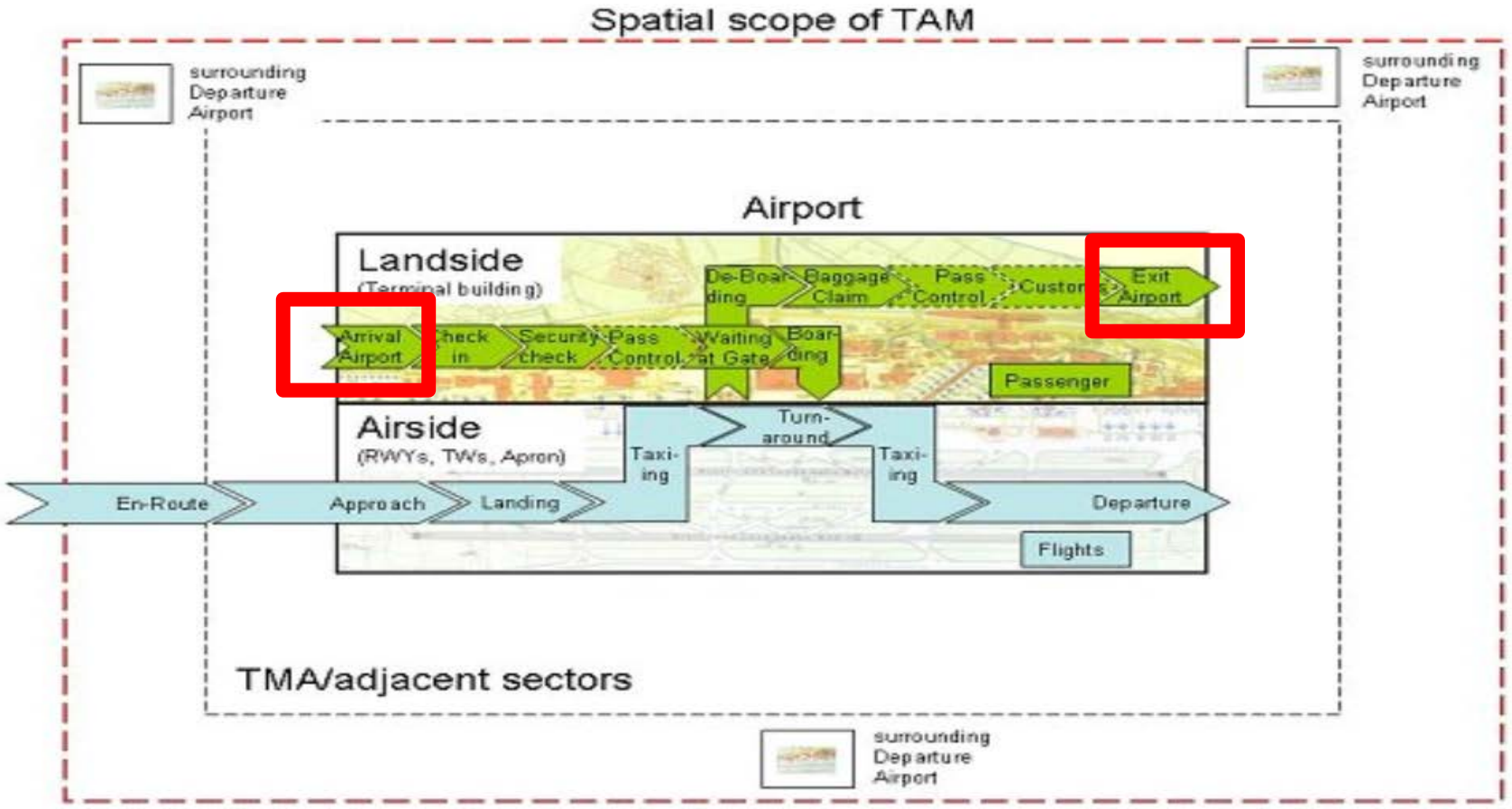


Number	Milestones
1	ATC Flight Plan activation
2	EOBT – 2 hr
3	Take off from outstation
4	Local radar update
5	Final approach
6	Landing
7	In-block
8	Ground handling starts
9	TOBT update prior to TSAT
10	TSAT issue
11	Boarding starts
12	Aircraft ready
13	Start up request
14	Start up approved
15	Off-block
16	Take off

Intermodal airport management
State of the Art, next step: TAM

Source: Eurocontrol, DLR

- **Total Airport Management** (Performance based Airport Management)



Intermodal airport management as part of ITS (Intelligent transportation system)

- Customer-centric approach
- Passenger information
- Stakeholder information
- Passenger’s preferences and choices
- Infrastructure and schedules adoption
- Airport fully embedded in main catchment area
- Link between service provider, infrastructure provider, and customer
- Digitalized reality

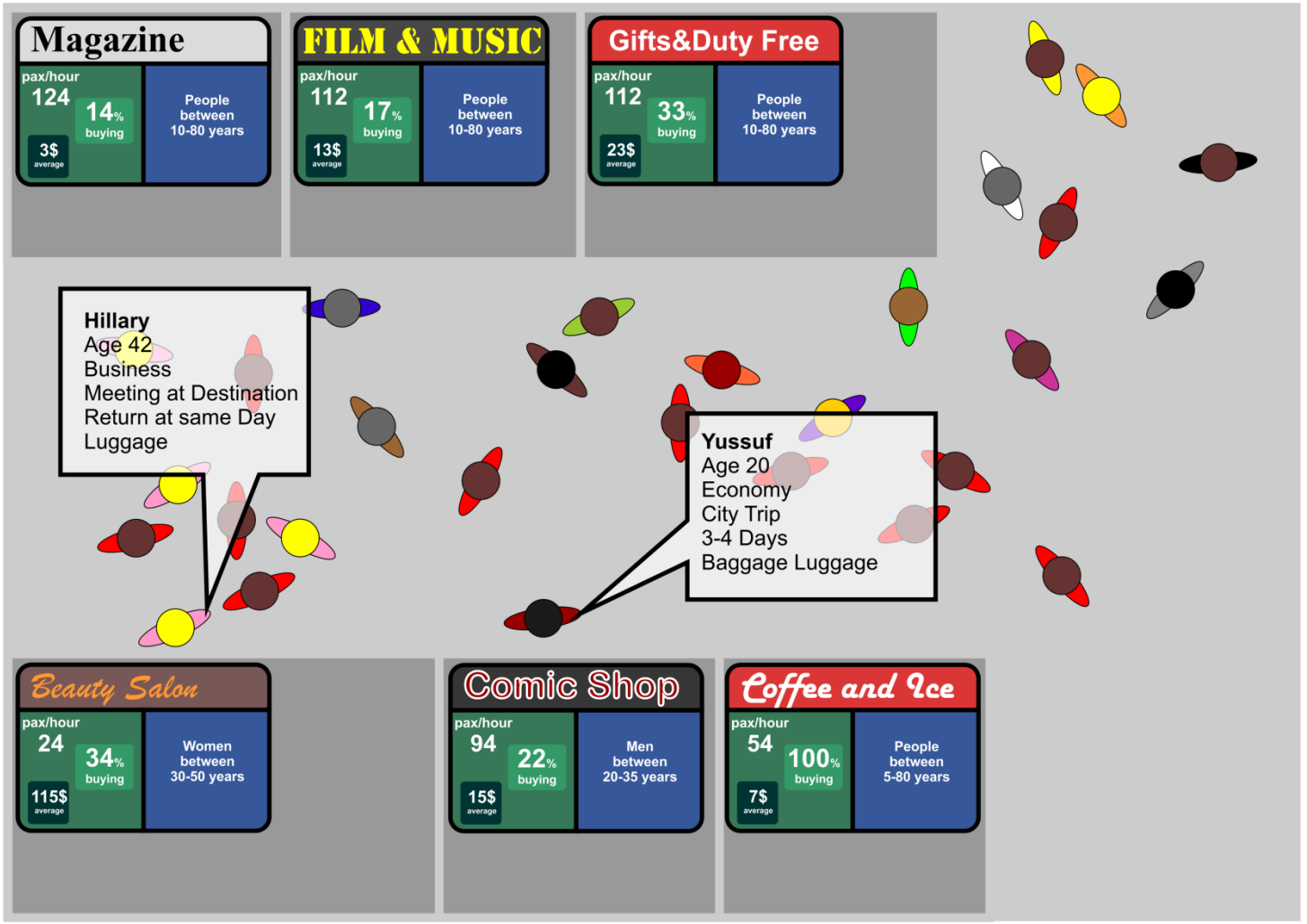
Intermodal airport management
Use case example 1

- LATE COMMUTING PASSENGERS


AIRPORT

Intermodal airport management
Use case example 2

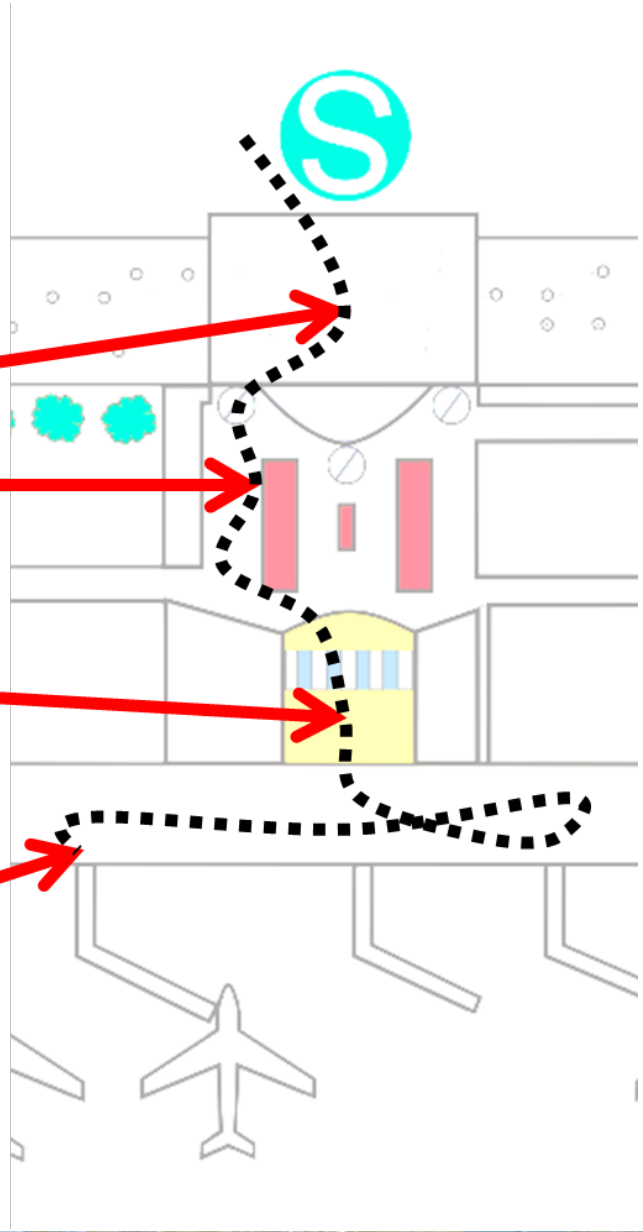
- GATE CHANGE
  - Revenue optimised gate re-assignment
  - Arriving / departing passengers (separated shopping experience/offers)
  - Estimated willingness to buy, depending on availability, dwell time, and of course on the ability to pay – optimisation task!



Intermodal airport management
Passenger trajectory

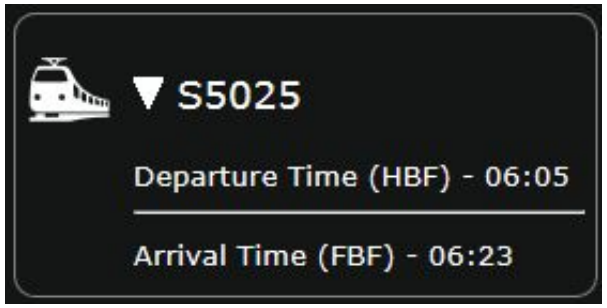
- Scheduled, calculated, estimated, and actual tasks
- Standardisation is the key to reduce development efforts to include additional partners and stakeholders

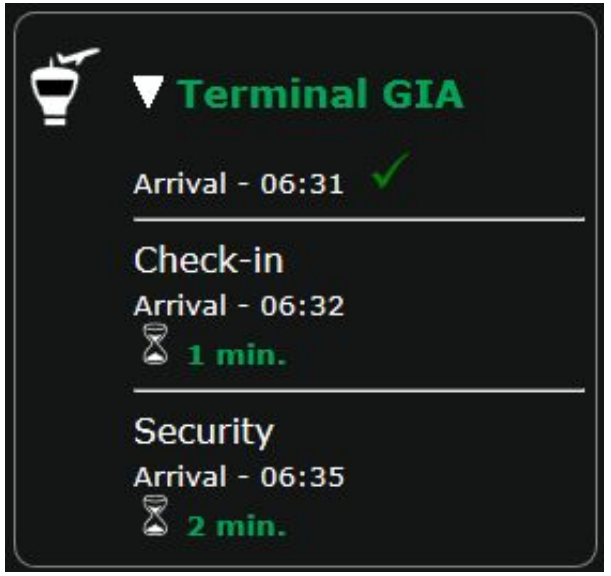
Task station (point in time & event)
OPAT Outbound Passenger at Airport Entrance Time
OPCT Outbound Passenger at Checkin Time
OCCT Outbound Checked at Checkin Time
OPST Outbound Passenger at Security Time
OCST Outbound Checked at Security Time
OPET Outbound Passenger at Emigration Time
OCET Outbound Checked at Emigration Time
OPGT Outbound Passenger at Gate Time
OCGT Outbound Checked at Gate Time

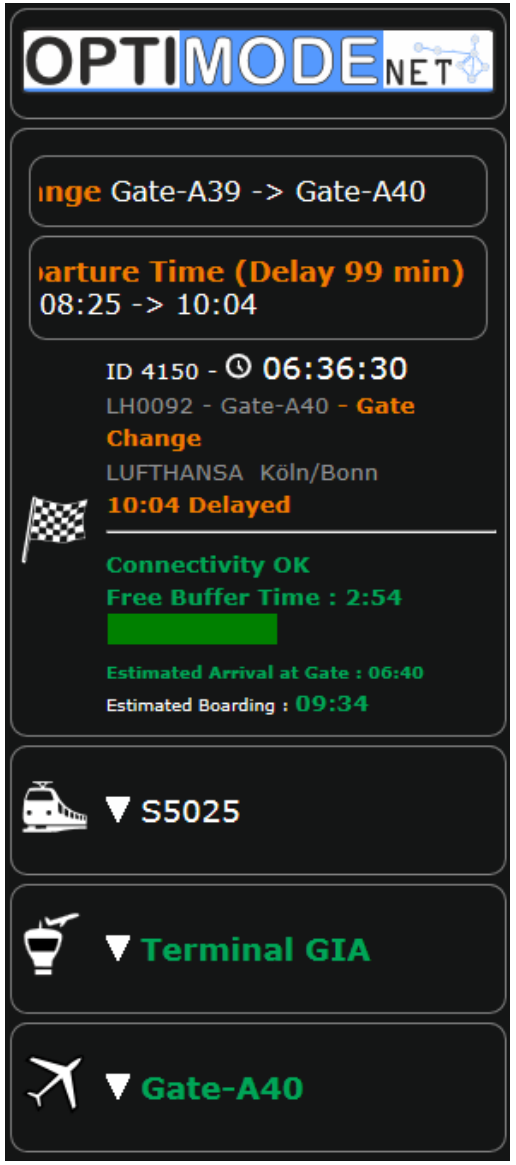


Intermodal airport management
Customized information broadcasting

- Optimode.app







Intermodal airport management
Customized information broadcasting

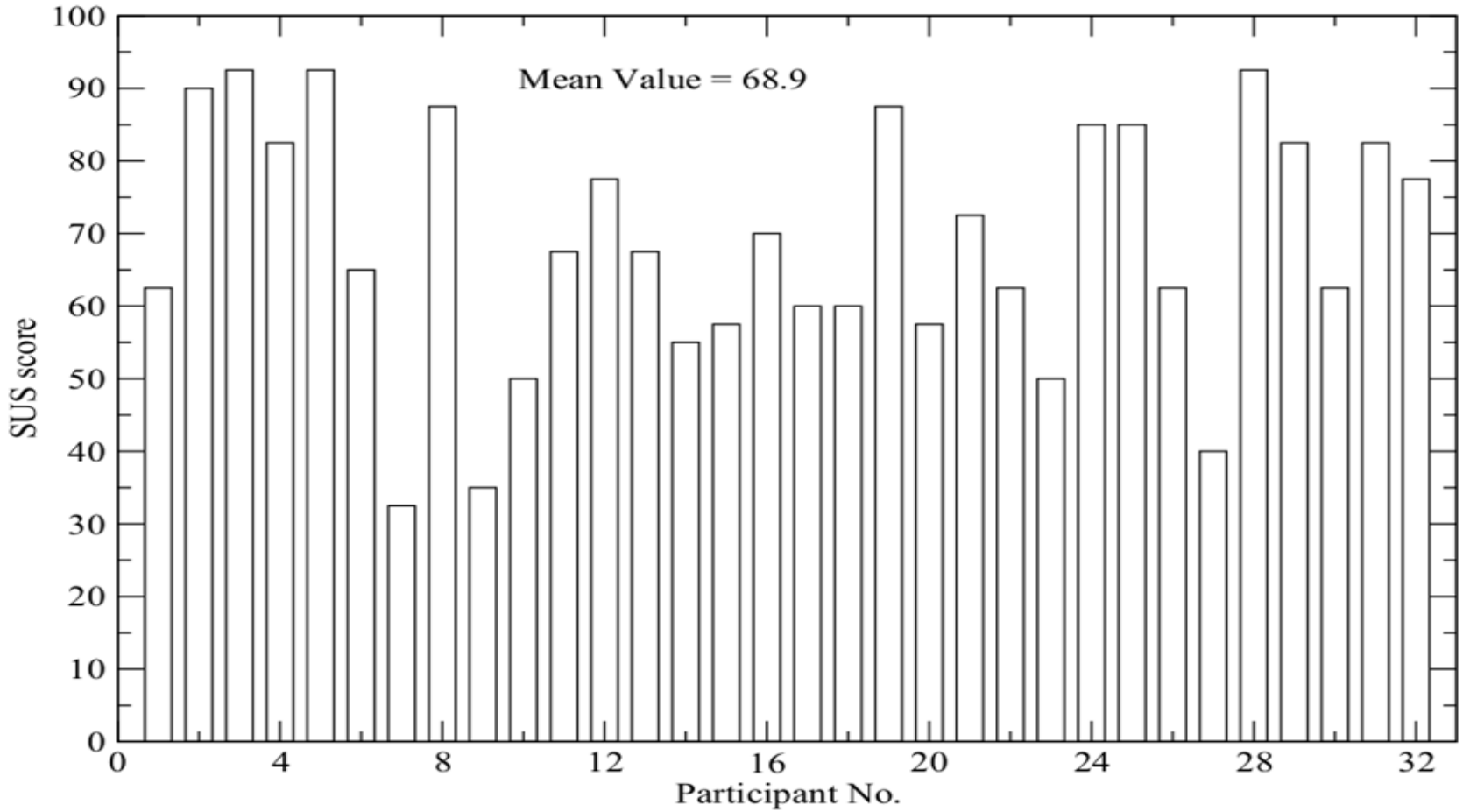
- Optimode.app

Table 1: The statements for deriving the System Usability Scale (SUS)

No.	Statement
1	I think I would like to use this system frequently.
2	I found this system unnecessarily complex.
3	I think the system was easy to use.
4	I think I would need the support of a technical person to use this system.
5	I found the various functions of this system well integrated.
6	I found there was too much inconsistency in the system.
7	I would image most people would learn to use this system very quickly.
8	I found the system very cumbersome to use.
9	I felt very confident using the system.
10	I needed to learn a lot of things before get going with this system.

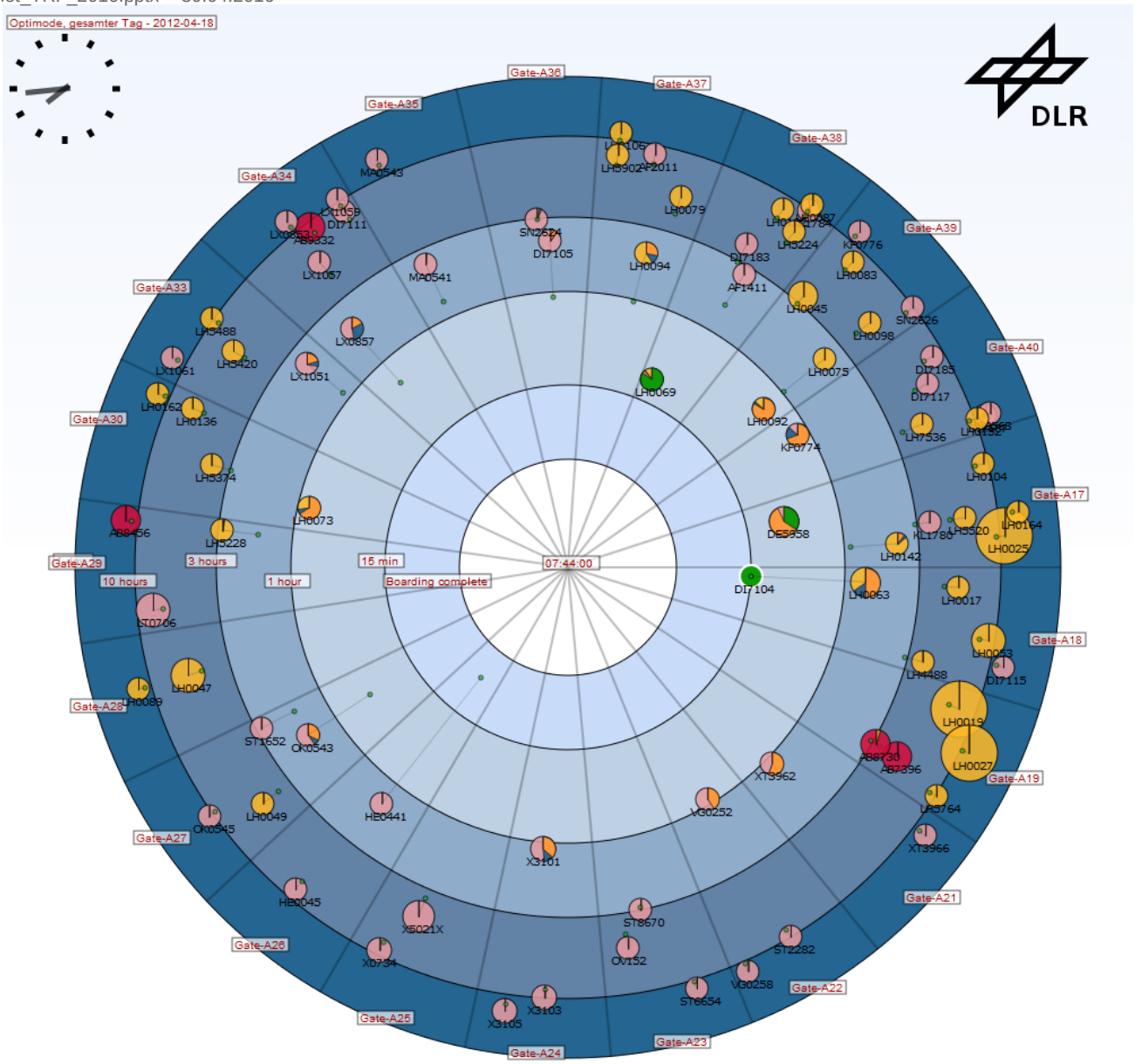
Intermodal airport management
Customized information broadcasting

- Optimode.app



Intermodal airport management
Collaborative decision making (I)

- Pax_radar, full view
- Innovative human-machine-interface
- Situational awareness
- Passenger status
  - Check-In
  - Security
  - Boarding



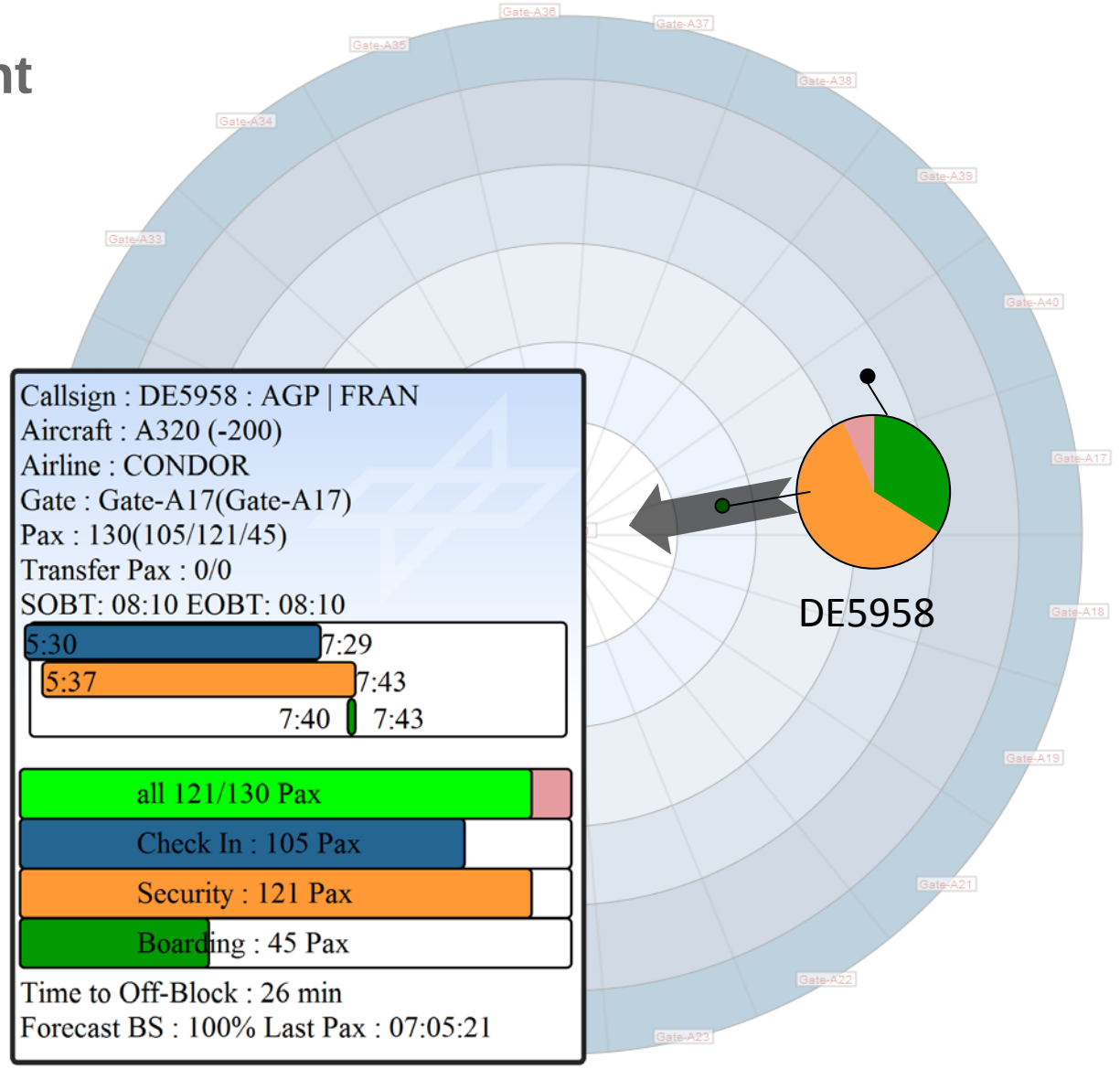
Intermodal airport management Collaborative decision making (II)

- Pax_radar, detail one flight event

Check-In

Security

Boarding



Forecast feature: *When is boarding completed?*

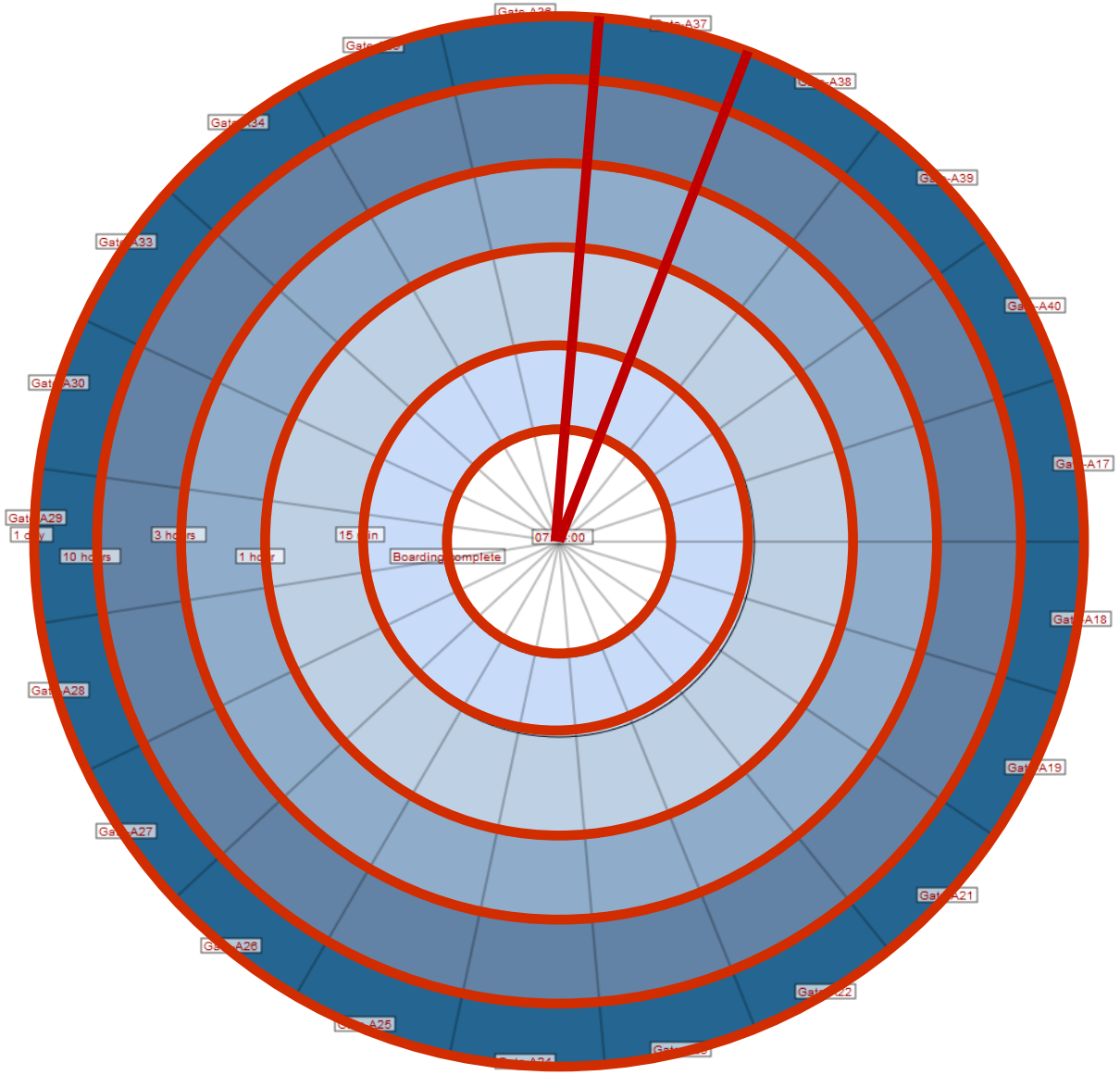
Gate-Change feature

Tooltip feature

Intermodal airport management Collaborative decision making (III)

Gate as partition of circle

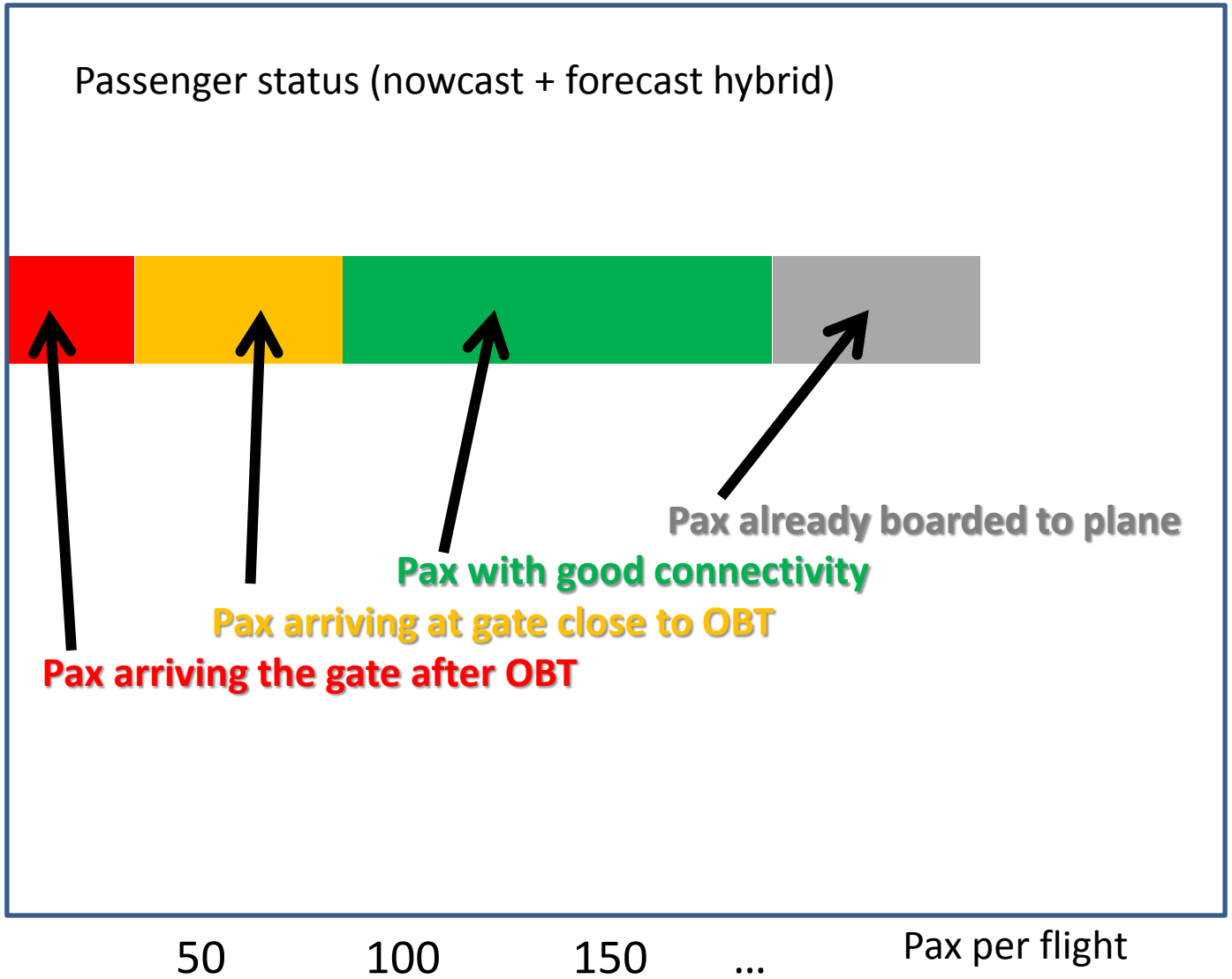
Radius =
time to departure (logarithm)



Intermodal airport management Collaborative decision making (IV)

- Passenger Trajectory Tool PETRA

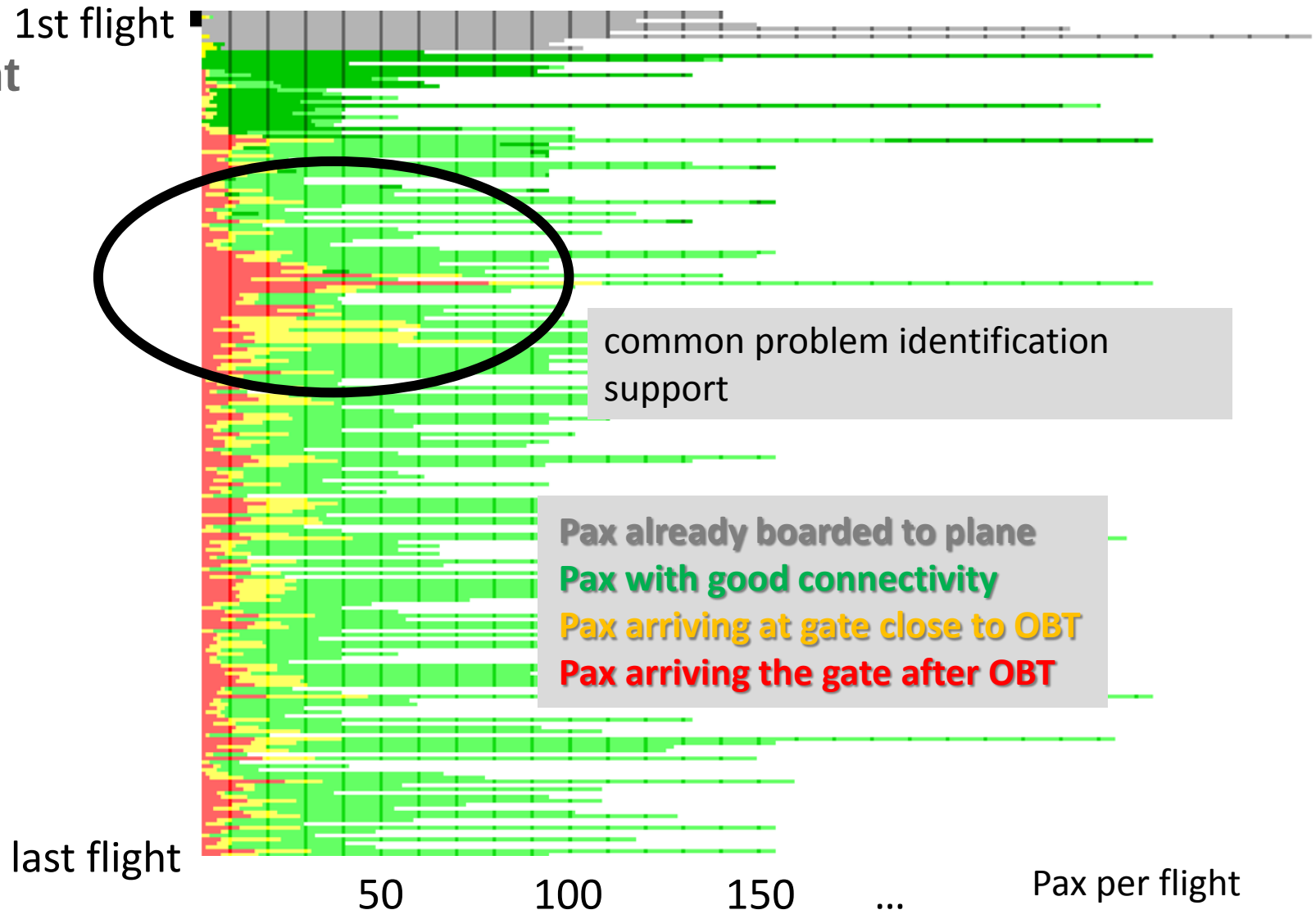
  single flight view



Intermodal airport management Collaborative decision making (V)

- Passenger Trajectory Tool PETRA

all flights view



Optimode

Optimode addresses performance-based intermodal airport management as a **modular toolsuite**.

pax_radar

app

petra

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forecast

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