IISE ANNUAL CONFERENCE & EXPO 2017

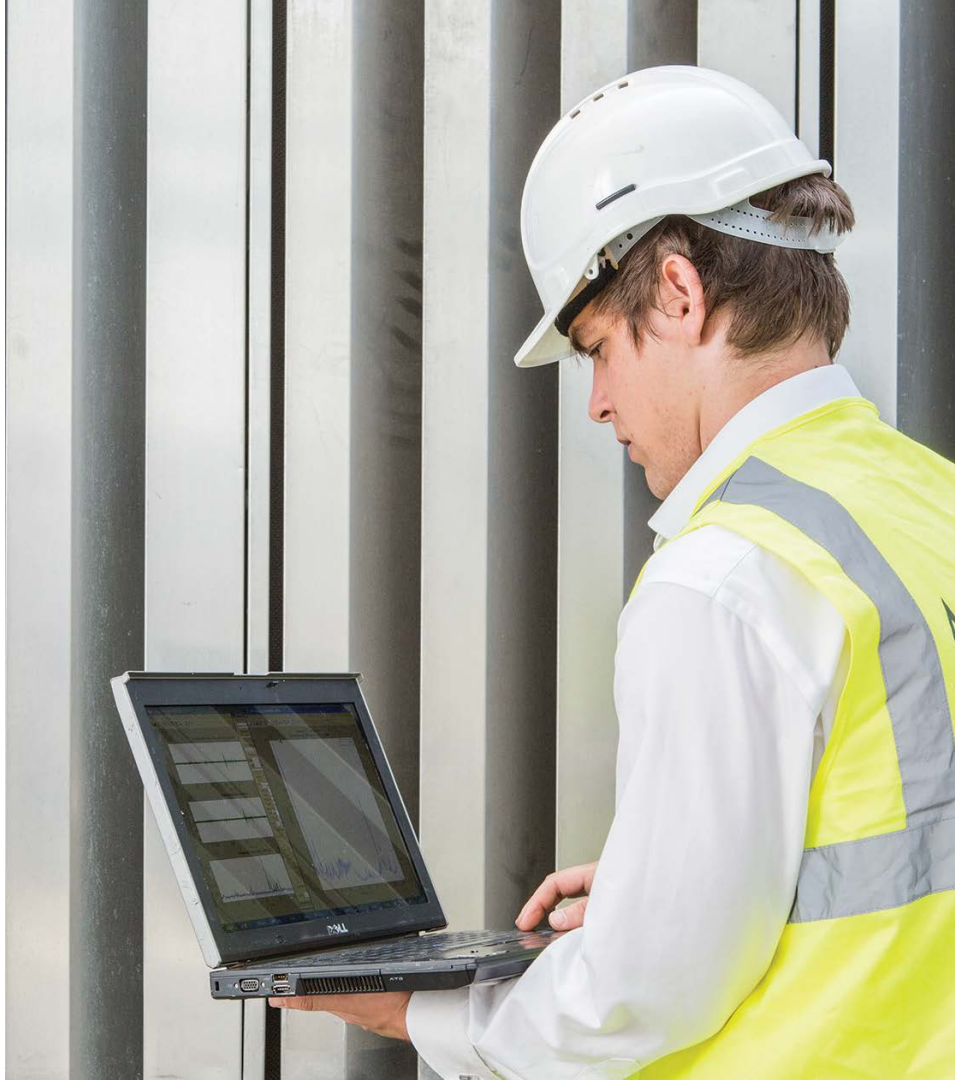
Simulating Airport Terminals: Implementations Around the Globe

Aarshabh Misra, P. Eng., *Senior Airport Analyst, Arup*
Daley Mikalson, P. Eng., *Senior Airport Analyst, Arup*

Introduction
Growth in Aviation
Space Programming
Terminal Simulation
Policy Implications

Simulation Inputs and Case Studies
Terminal Layout
Demand
Show-Up Profile
Passenger Type
Process
- Check-In
- Security
- Passport Control
- Baggage Claim

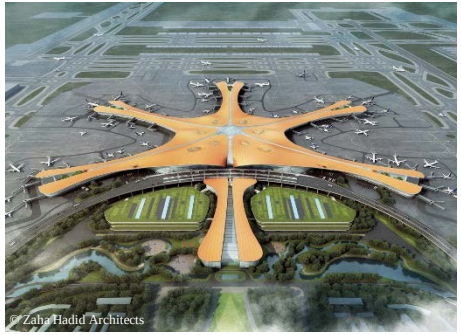
Integrated Simulation Modelling



Introduction

Passenger Satisfaction =
(Experience – Expectation)

Technology
Regulatory Environment
Airline and Industry Strategy
Infrastructure



Top: Abu Dhabi Midfield Terminal

Bottom: Montreal Airport

Top: New Beijing Airport

Bottom: New Istanbul International Airport

Top: JFK T5

Bottom: Toronto Pearson International Airport

Top: Taoyuan Airport T3 Taiwan

Bottom: Hong Kong International Airport

connections
curb
check-in
landside
departures
office
carousels
gate
checkpoint
retail
food-court
lounge
immigration
transfer
storage
holdroom
maintenance
emigration
airline
duty-free
groundside
arrivals
ground-service
flight
terminal
secondary
security
baggage

Space Programming

Aspects of Terminal Simulation

Passenger Processing

Check-In

Security

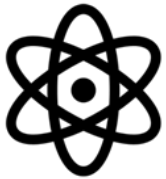
Passport Control

Baggage

Congestion Modelling

Vertical Circulation

GTC Integration



Concessions Planning

Policy Implications

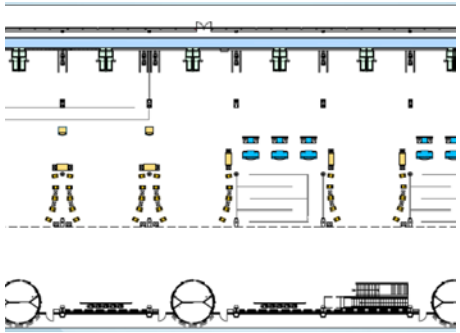
Stakeholders
Federal agencies / airports / airlines
Optimal design amidst competing priorities

Level of Service
What it means to different people?

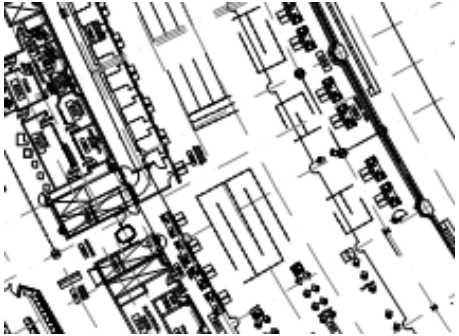
Operator / Driver
Airport or the Airline, P3

Short Term / Long Range
Operational improvements or step change in infrastructure

Simulation Inputs and Case Studies

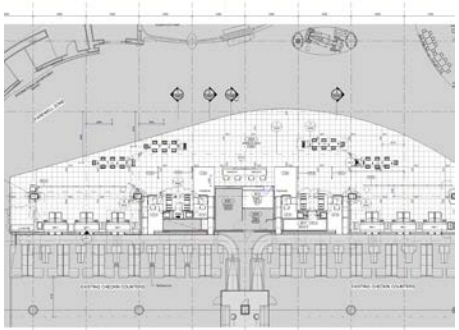


Terminal layout

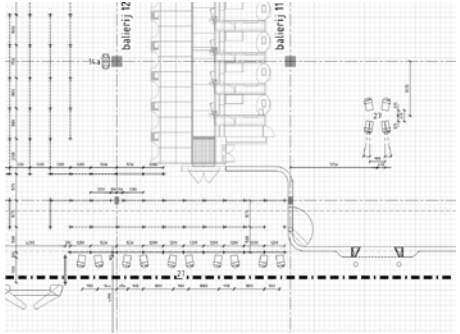


Cyclic

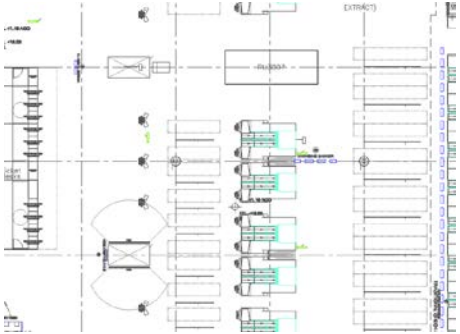
Reactive



Proactive



Planning

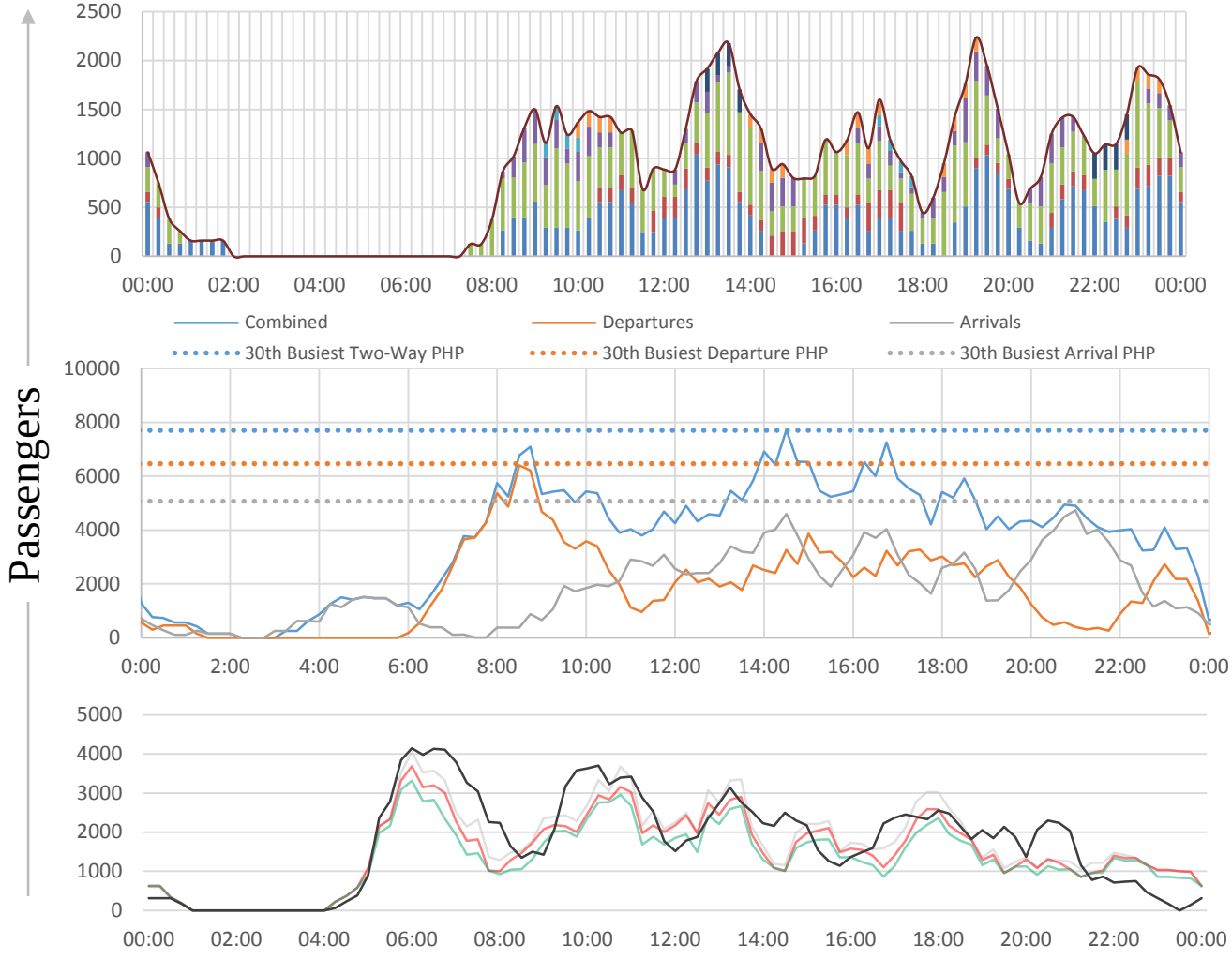


Operations

Demand

Type
- Passenger
- Bags
- Aircraft

Key drivers
- Planning Day
- Flight Schedule
- Peak Hour
- Peak Spreading
- Terminal Capacity
- Runway Capacity



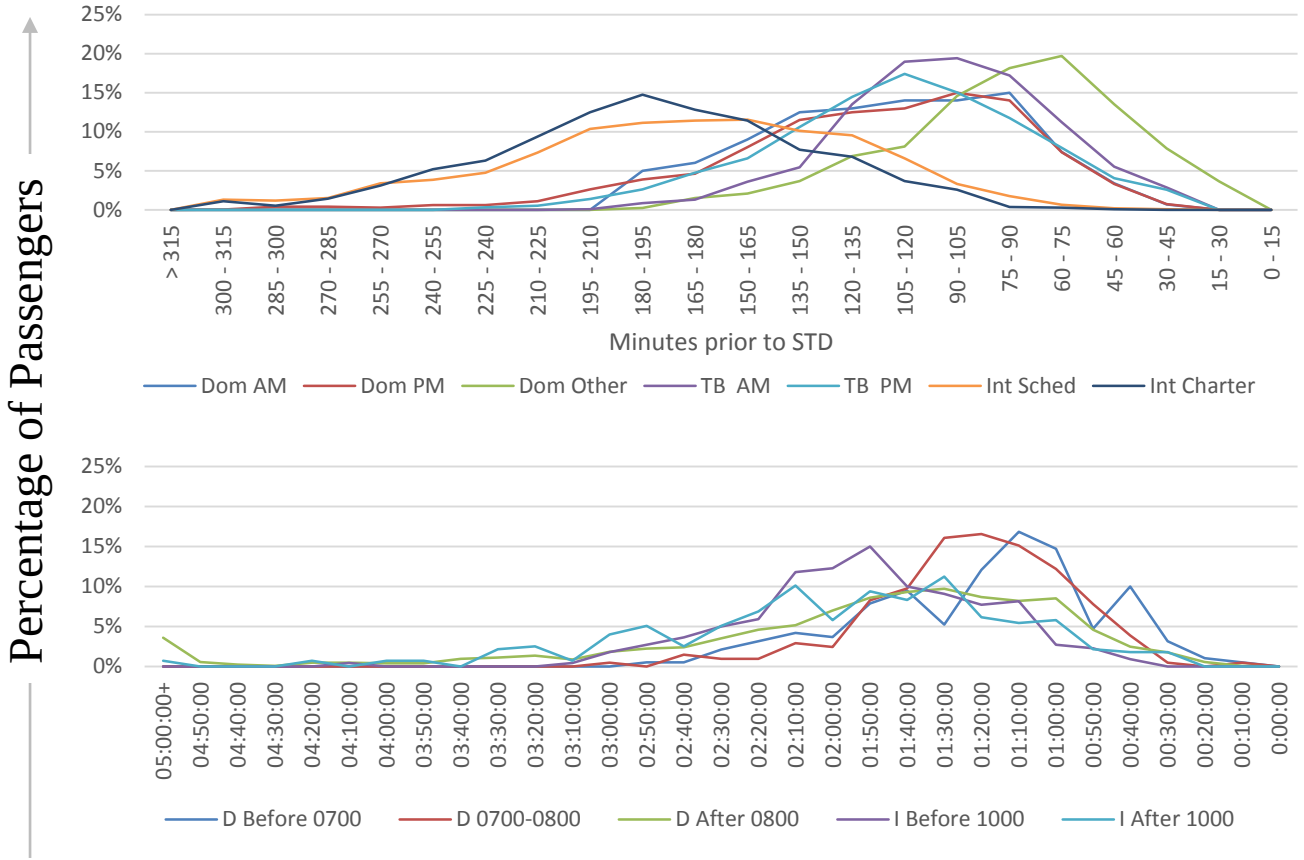
Show-Up Profile

Key drivers

Passenger Type

Time of Day

Sector



Passenger Type

Travel Type
Arrival
Departure
Transfer

Ticket
Premium
Economy

Check-In Method
Web
Kiosk
Full Service
Curbside

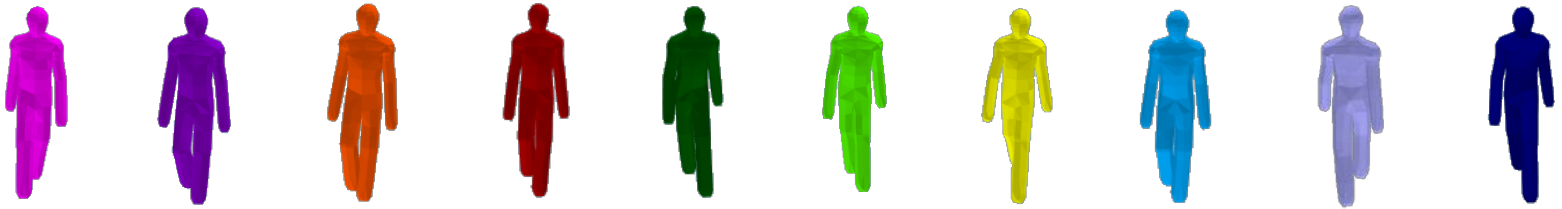
Frequent Flyer
Lounge Access
Regular

Bags
No Checked Bags
Checked Bags

Passport
Domestic
International
US Pre-cleared

Other Programs
Nexus
TSA PreCheck
Regular

Other
Aircraft Crew
Airport Employees
Staff

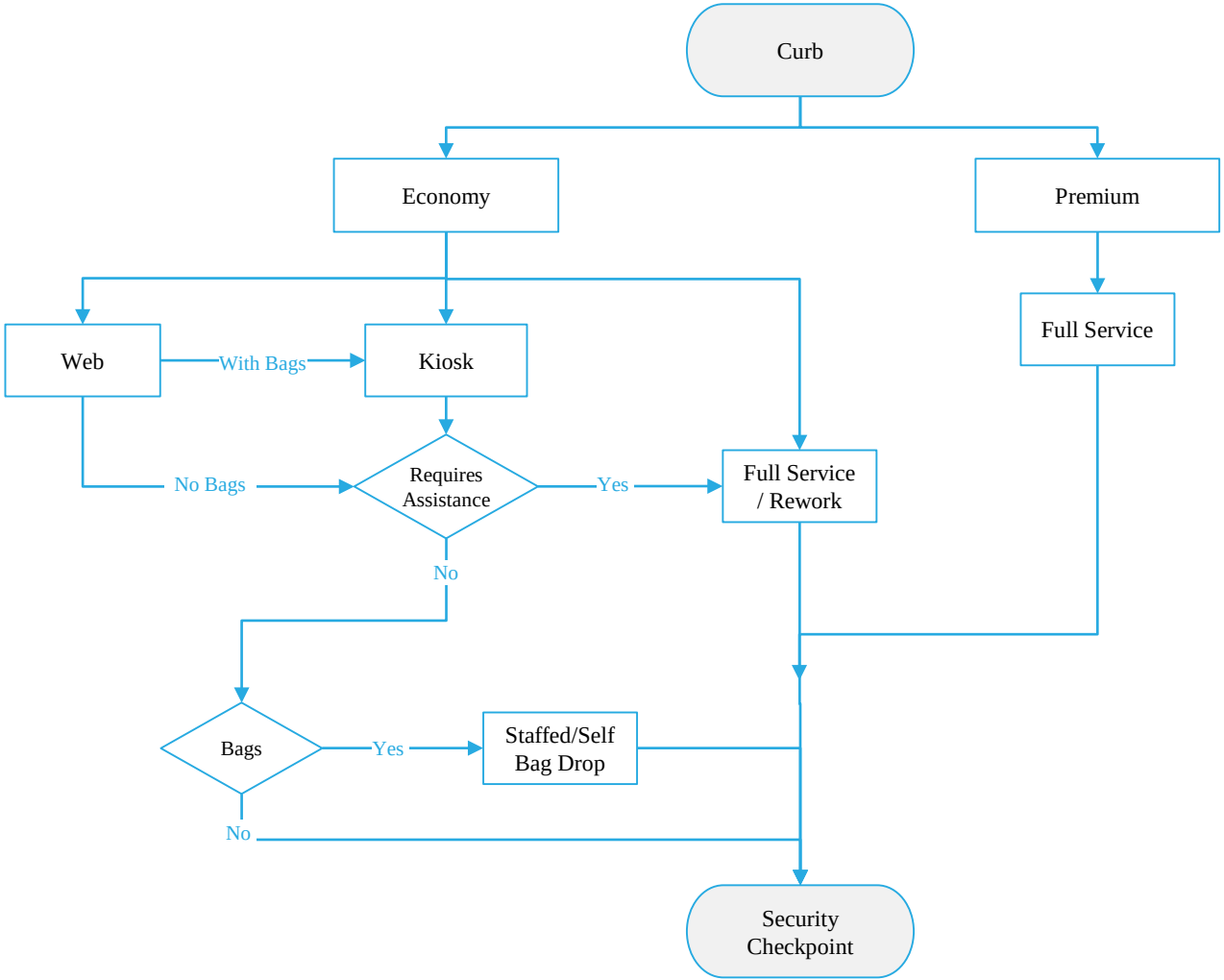


Check-In

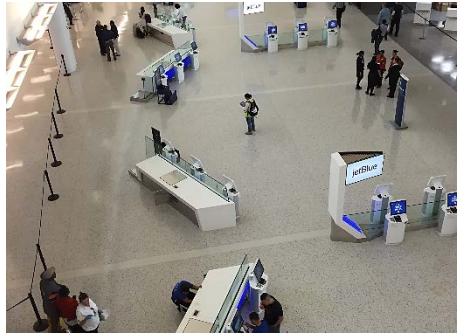
Process

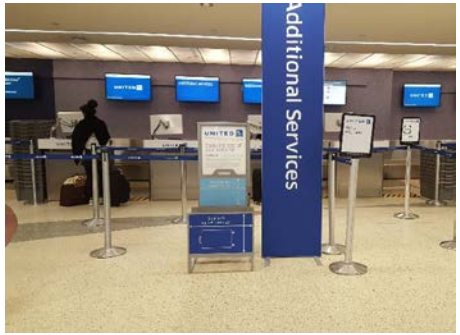
Airline Specific

Conventional vs Self-Serve



SOUTHWEST


JetBlue

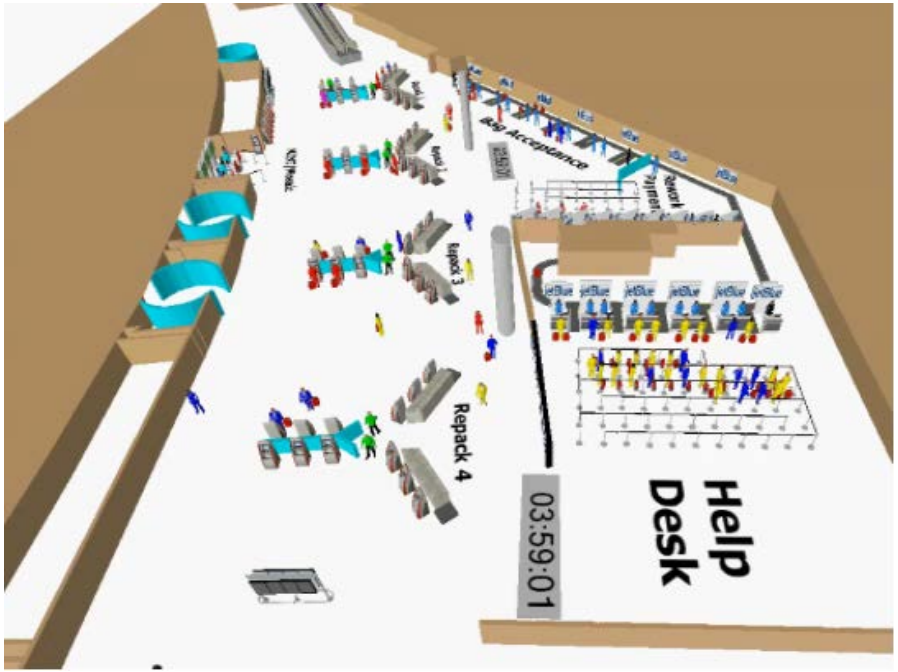

Additional Services

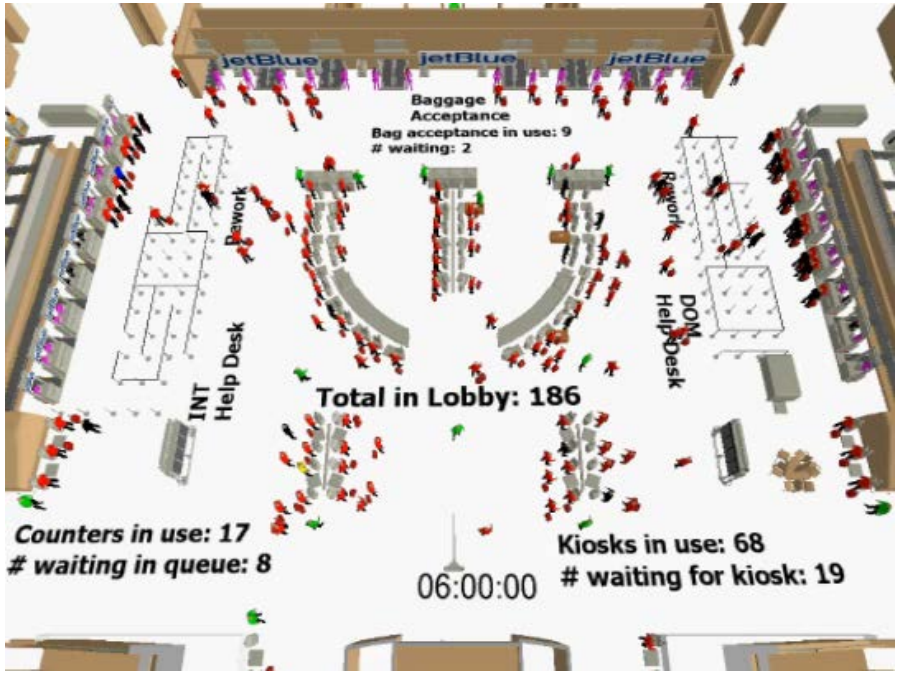
2
BAG DROP
KIOSK ASSISTANCE

SPEEDY BOARDING
SPEEDY BOARDING

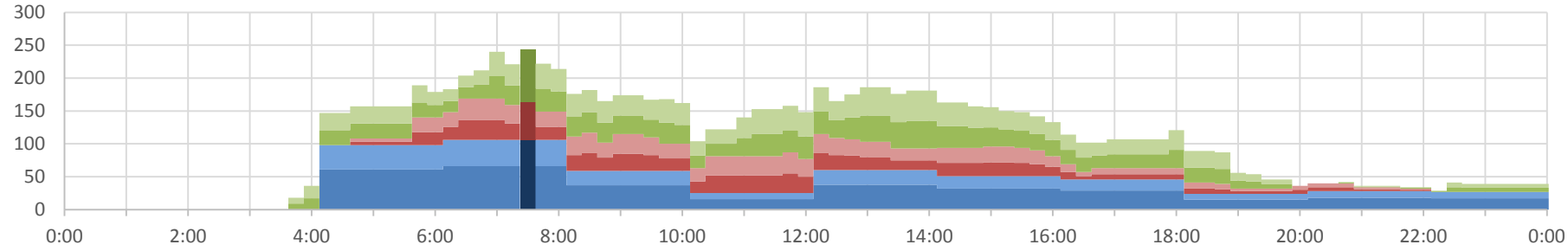
230
231

BAG DROP





Check-in Hall Counter Requirements



Self Serve
Self Serve
Other Airlines
07:30:40

Security

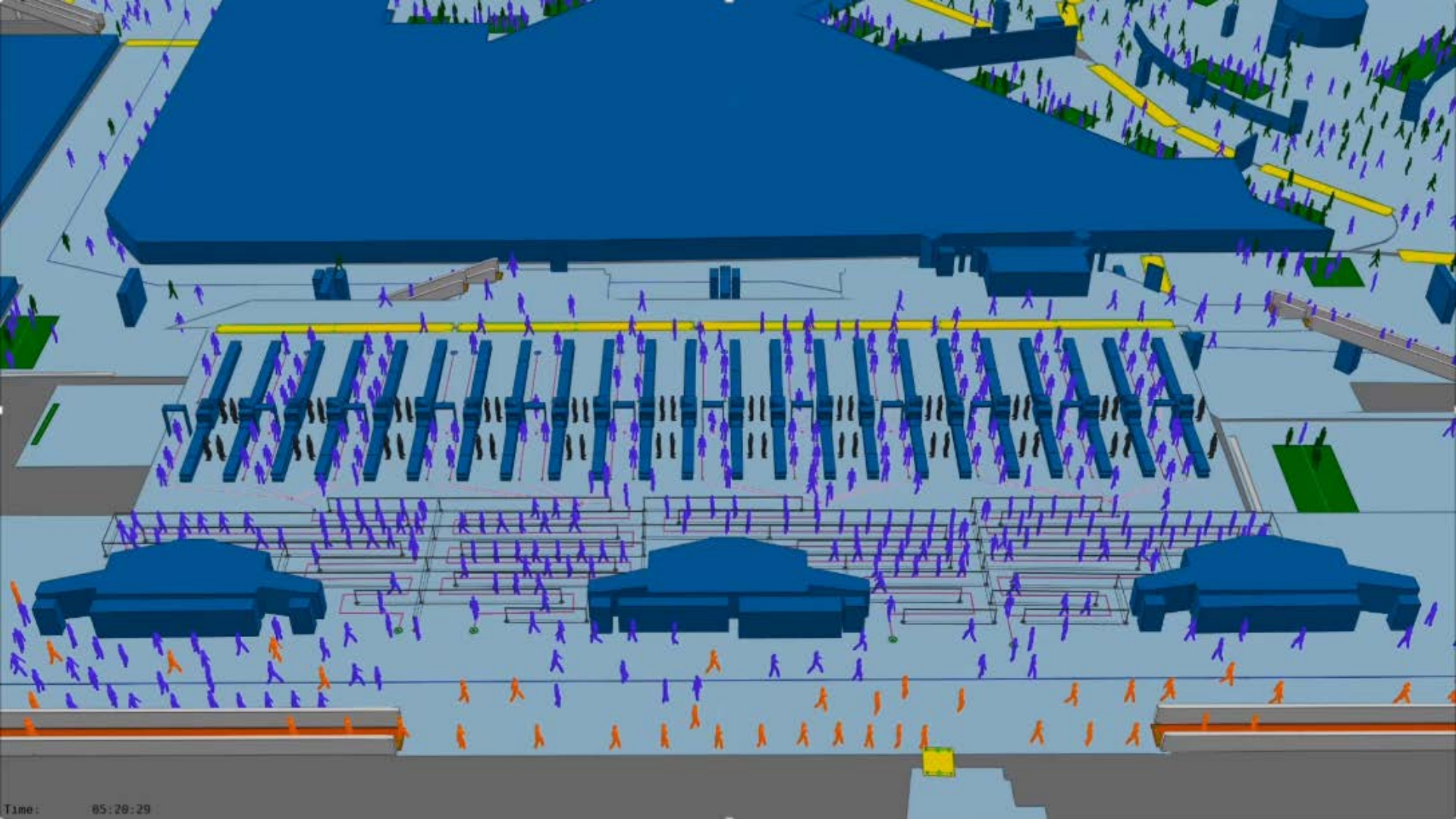
Types
Conventional Lanes
Automated Screening Lanes (ASL)
Matrix Screening

Scan
Magnetometer
Full Body-scanner (Advanced Imaging Technology)

Key Drivers
Regulation
Multiple divesture
Lane length
Random searches
Recompose
Tray Usage
Staff Provision
Trusted Traveler Programs

© TSA Innovation Supplement

© MAG

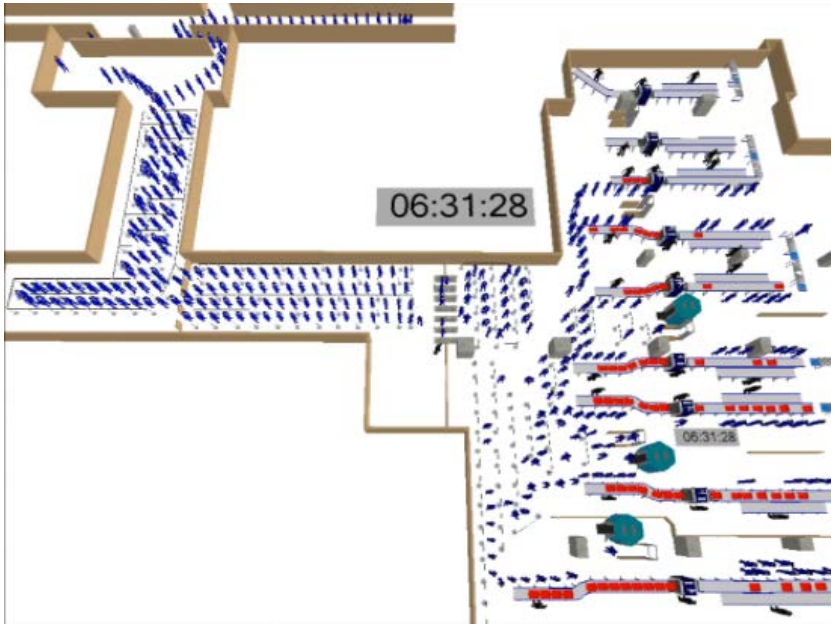

Time: 05:20:29

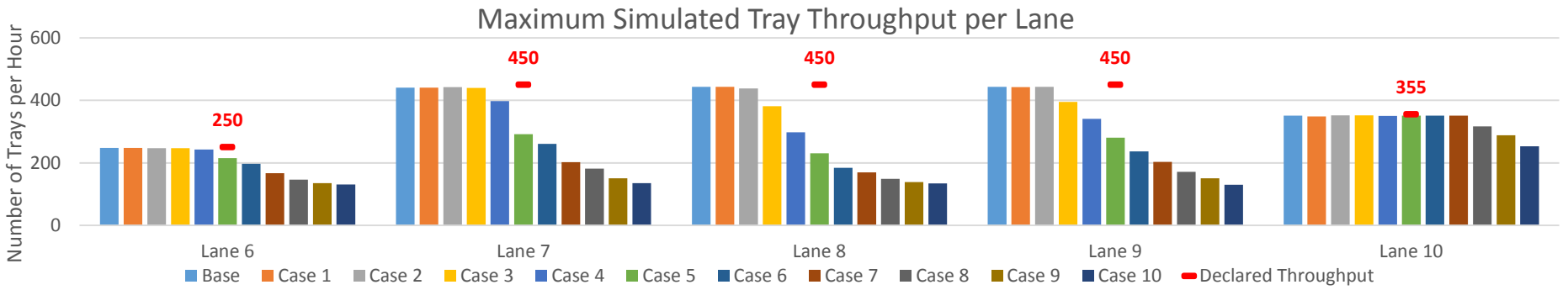
Micro-simulating Trays

Impact of minimum target requirements for Full Body Scanner (AIT) Usage on security checkpoint lane operations

Key Drivers
Avoid lane starvation
Mini queues
Tray throughput
Lane length

Case 1: 0% AIT Usage to Case 10: 100% AIT Usage
Lane 6 – 10: AIT Introduced

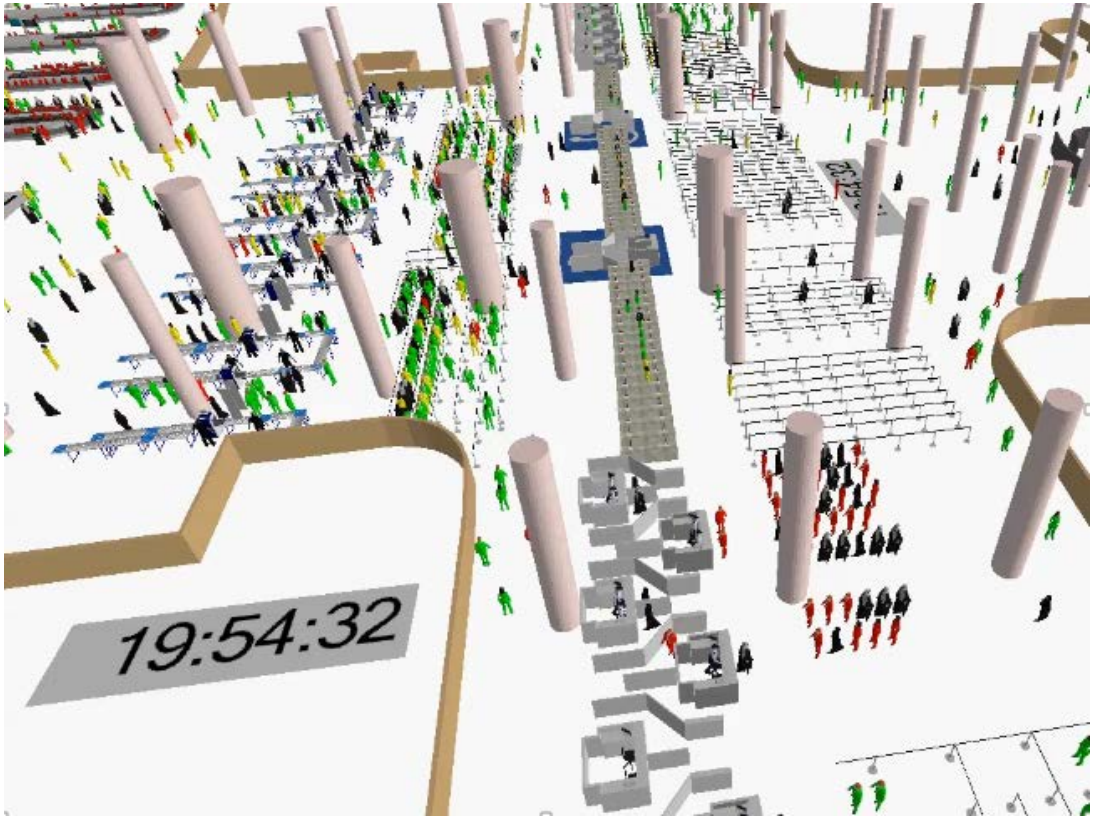




Passport Control

Types
Immigration
Emigration

Key Drivers
Regulation
Staffing
Mini Queues
Self Serve
Bussing Operations



Baggage Claim

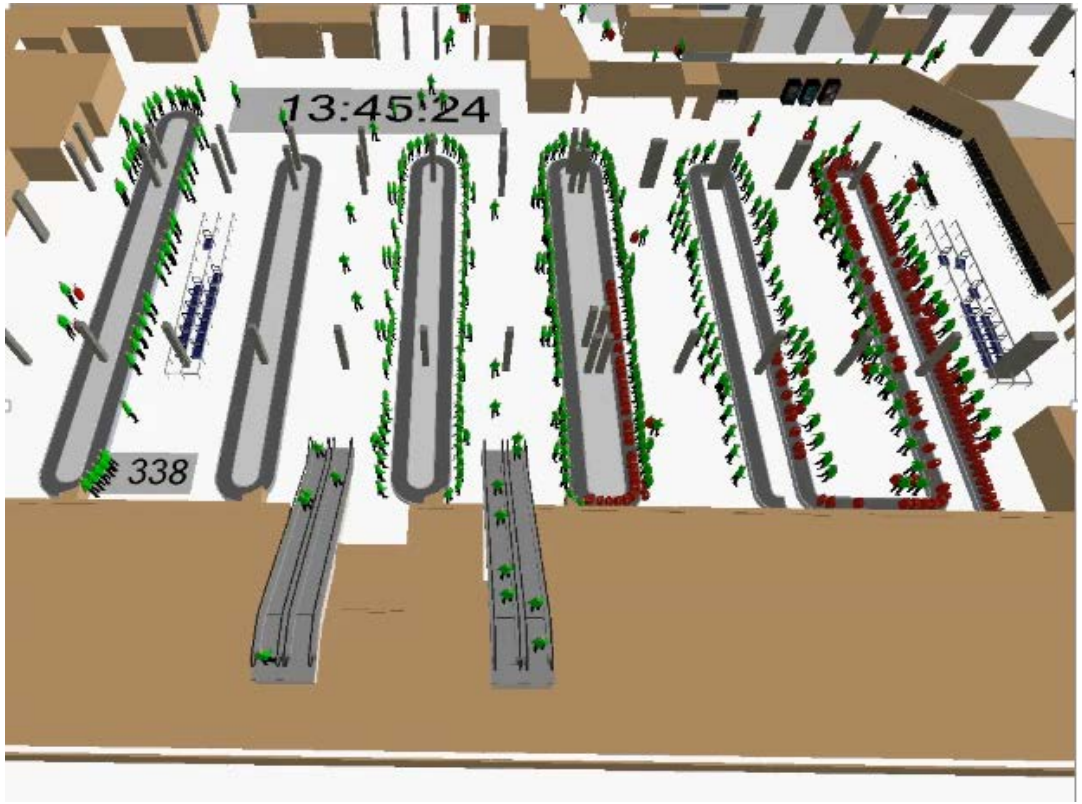
Key Drivers

First Bag

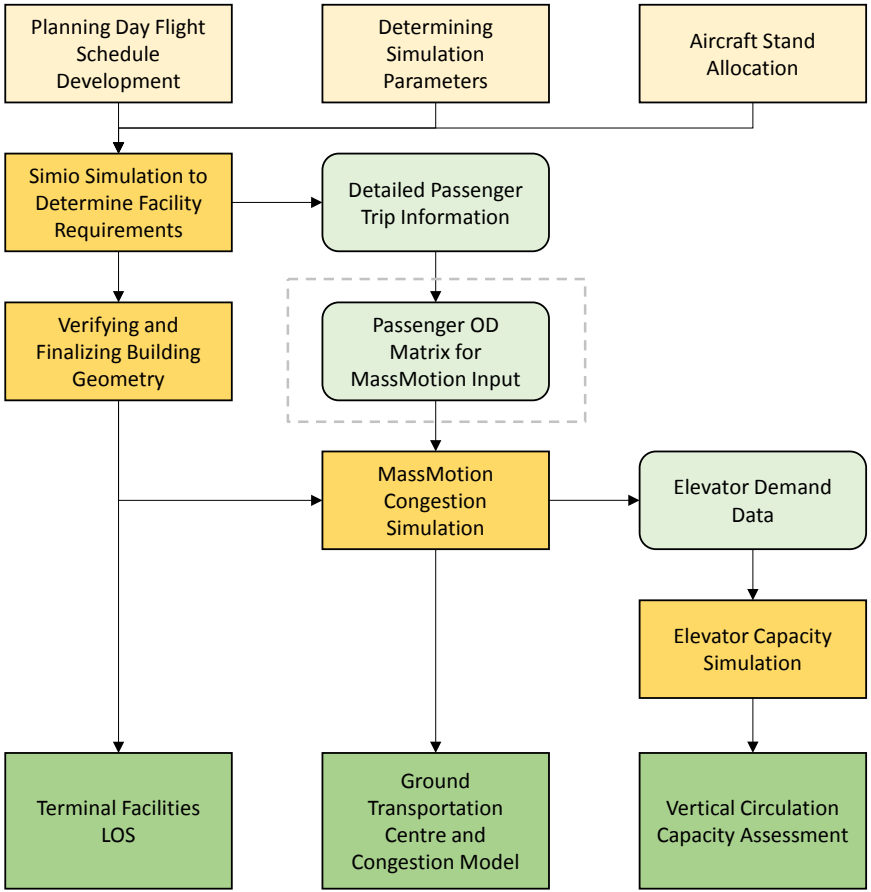
Bags per passenger

Group Size

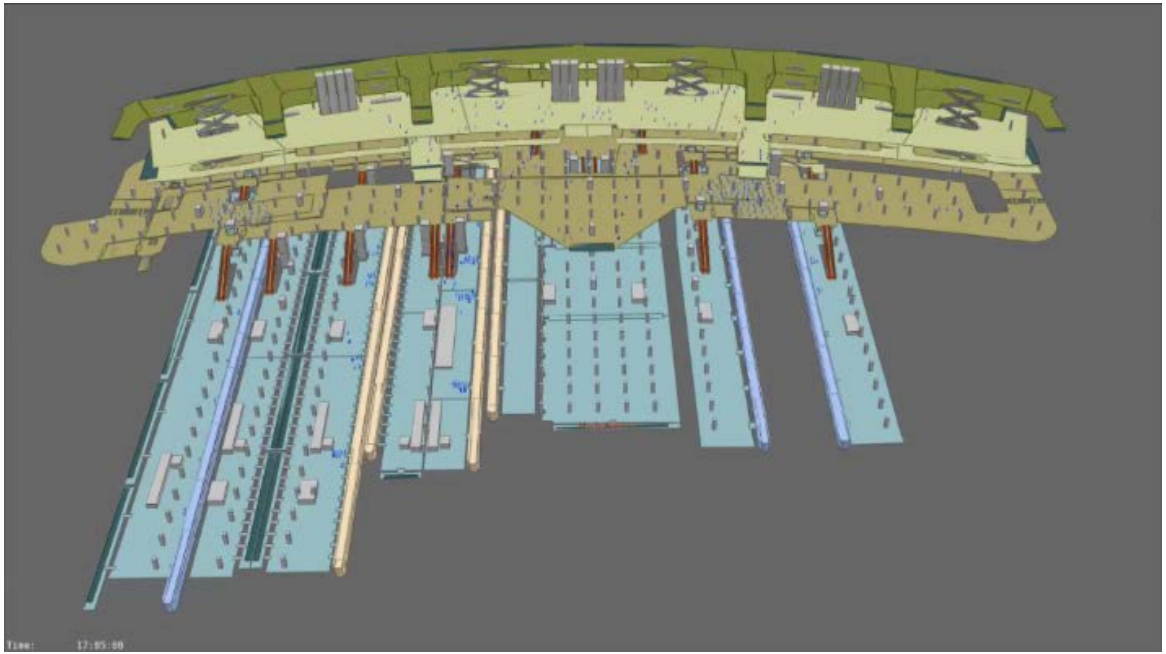
Wide-body Aircraft Arrivals

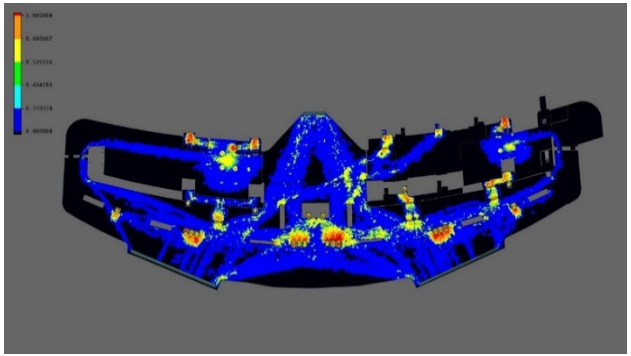


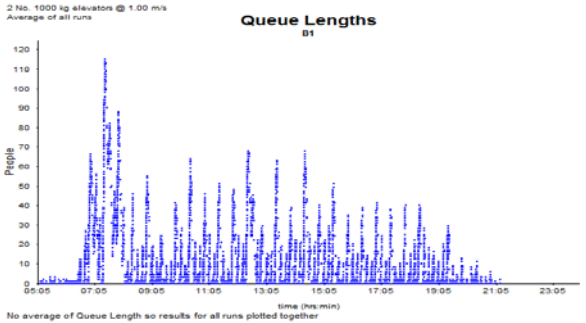
Integrated Simulation Framework

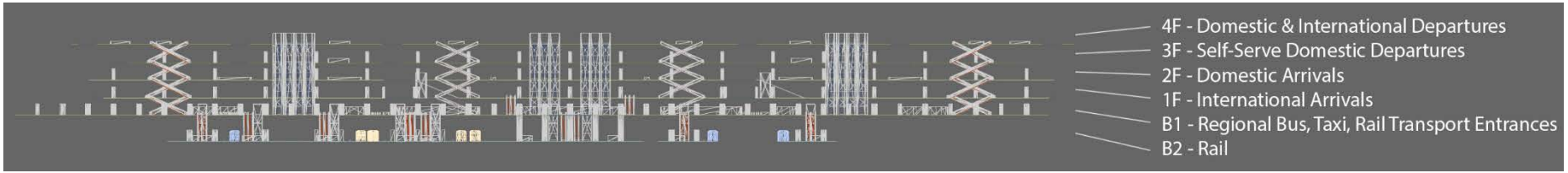


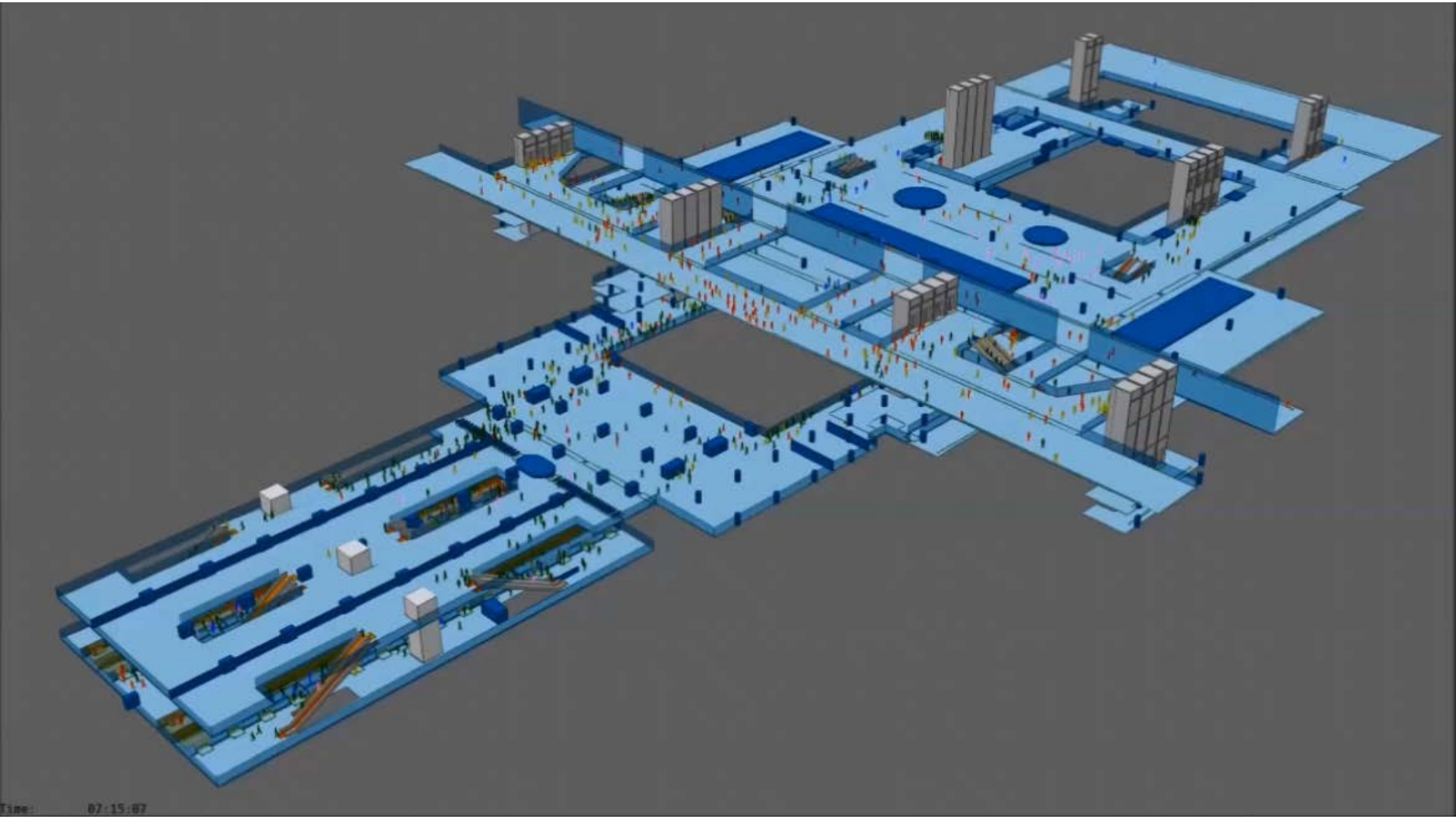
Integrated Simulation Framework



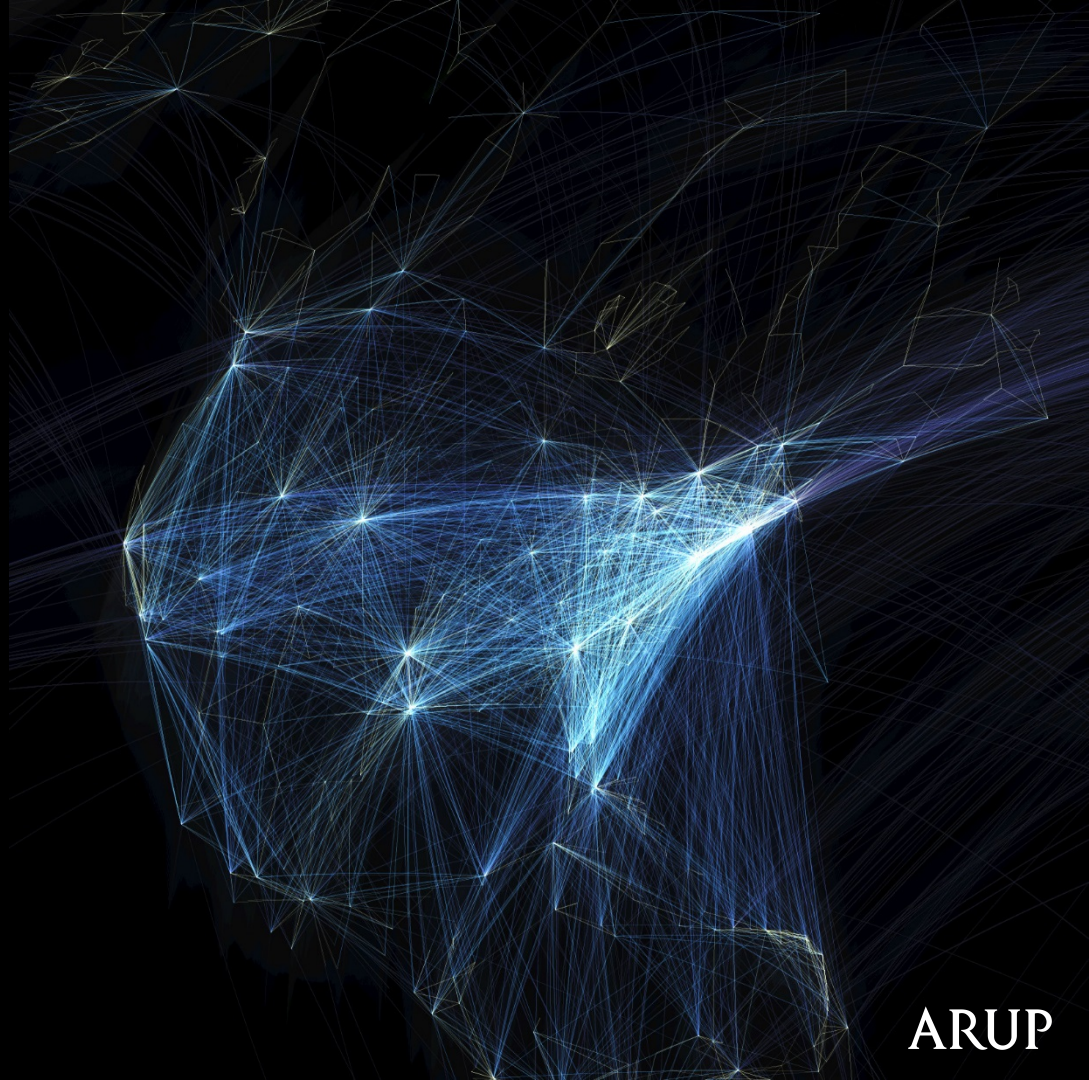







Time: 07:15:07

Thank you



Aarshabh.Misra@arup.com
Daley.Mikalson@arup.com

ARUP