



12th Facilitation Division

The Impact of the A380

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SAFETY, OPERATIONS and INFRASTRUCTURE

Introduction

- **Significant change will be required to many aspects of existing airport infrastructure and present new challenges for airport and airline security – not only on the airfield, but also within the terminal.**



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It's happening



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Agenda

- **A380 – Airport compatibility**
- **Demand/capacity studies**
- **Passenger terminal**
 - **Number of doors**
 - **Passenger flow simulations**
 - **Conclusions**



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A380-Airport compatibility

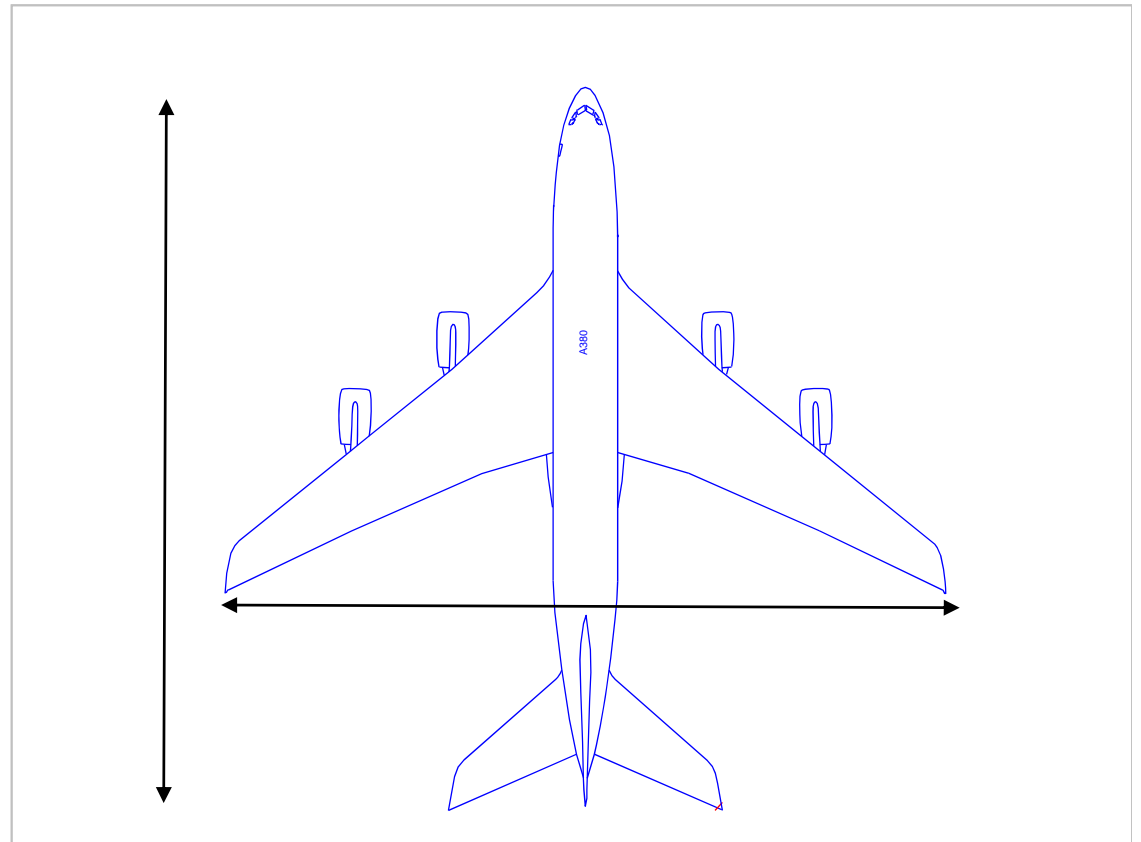


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The A380

Wing span: 79.6 m

Length: 72.7 m



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Compare to other aircraft

	<u>Length (m)</u>	<u>Wing span (m)</u>
● B747-400:	70.7	64.5 (E)
● A380-800:	72.7	79.6 (F)
● A340-600:	75.3	63.5 (E)
● B777-300:	73.9	60.9 (E)



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Demand/capacity studies



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Airport facilities or systems

- Airports are inter-related systems that process aircraft, passenger (pedestrian), baggage and vehicle flows.
- Assess the potential impact of operational restrictions on airport capacity.
- Computer simulation can identify potential choke-points, as well as helping to identify workable solutions - design safe and efficient aerodromes.



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Key airport systems

- Runways
 - Taxiways
 - Aprons
- } Aircraft flows
- Aircraft stands (gates): Interface
 - Passenger terminal
 - Arrivals
 - Departures
- } Passenger flows



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“555 tonnes of fun !”

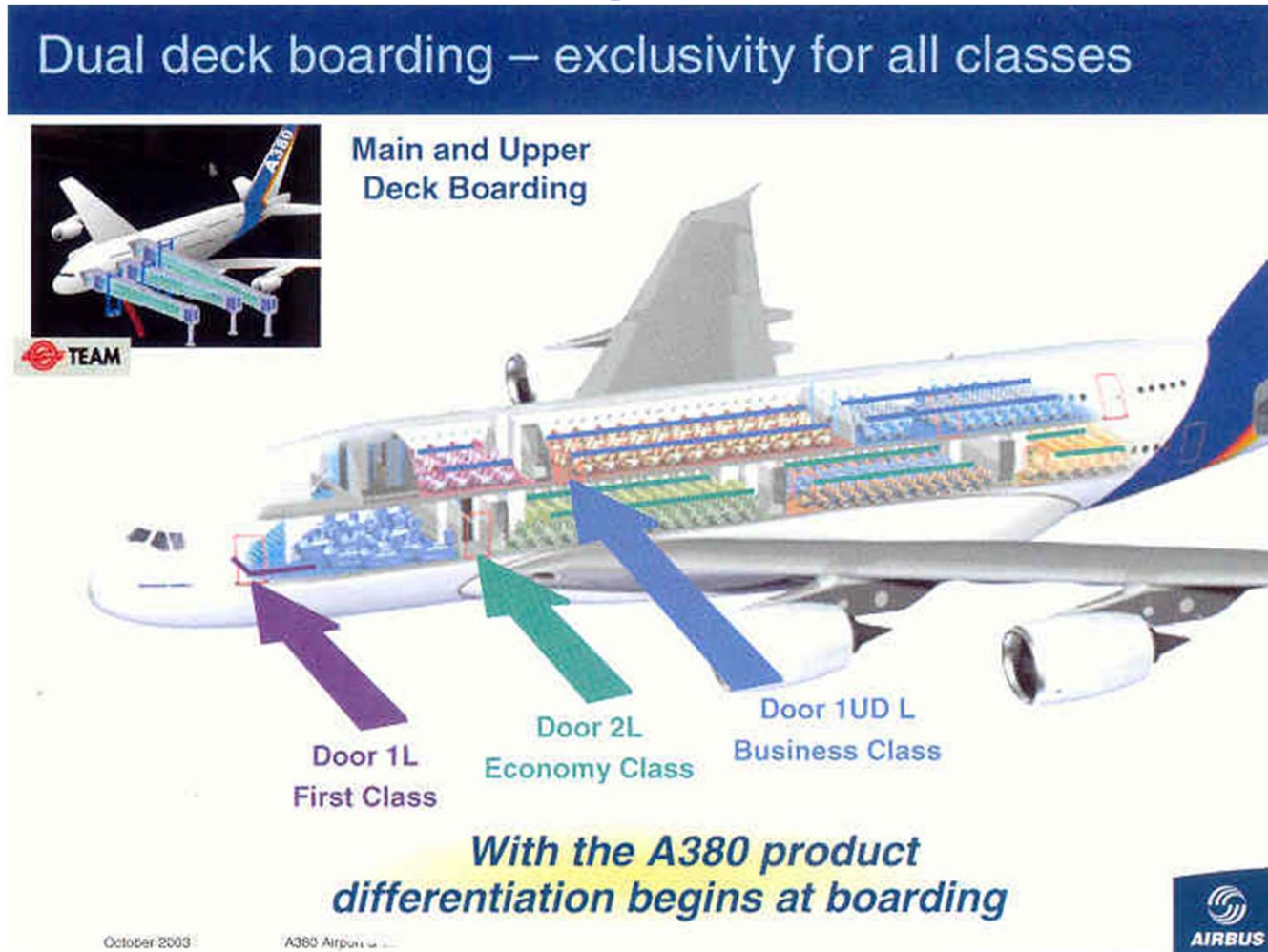
Passenger terminal



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555 passengers in typical 3-class configuration

Dual deck boarding – exclusivity for all classes



The diagram illustrates the boarding process for an Airbus A380 aircraft. It shows a side view of the aircraft with three boarding doors highlighted by colored arrows: a purple arrow for Door 1L (First Class), a green arrow for Door 2L (Economy Class), and a blue arrow for Door 1UD L (Business Class). An inset image in the top left shows a smaller aircraft with boarding stairs extended, labeled 'Main and Upper Deck Boarding' and 'TEAM'. The main diagram also shows the interior seating arrangement on both decks. At the bottom, the text reads 'With the A380 product differentiation begins at boarding'. The Airbus logo is in the bottom right corner.

Main and Upper Deck Boarding

Door 1L
First Class

Door 2L
Economy Class

Door 1UD L
Business Class

With the A380 product differentiation begins at boarding

AIRBUS



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Passenger terminal capacity

- Unlike runways, which have a “hard” capacity definition, the capacity of a passenger terminal relates directly to the extent of congestion that will be tolerated.
- Performance and level of service are based on operating conditions and rules but also upon passenger behavior and characteristics.



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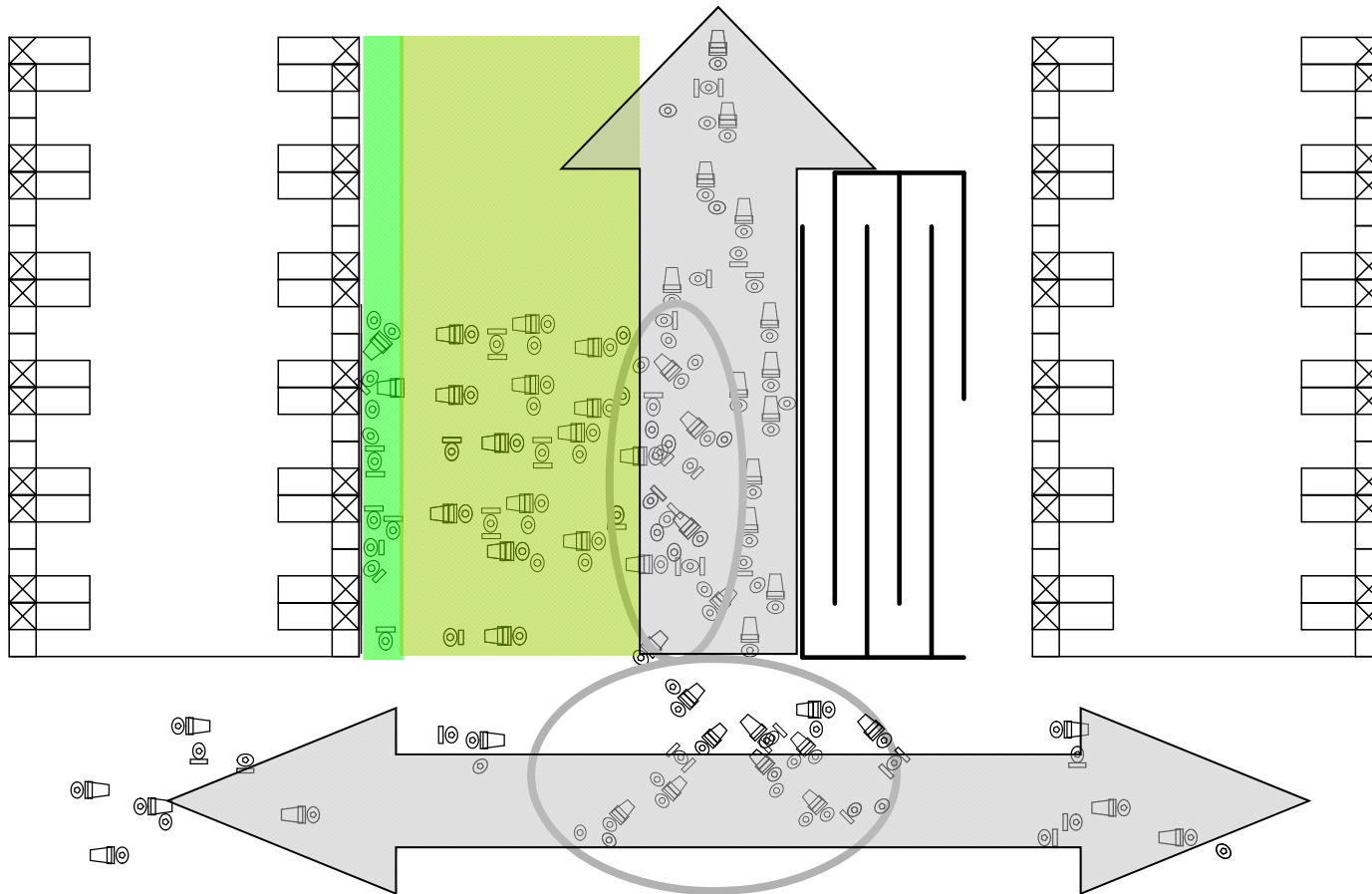
Aircraft turnaround time (in minutes)

	Pax load	Loading time	Unloading time	Aircraft servicing	Turnaround flight
B747-400					
• 1 door	350	40	25	45	110
• 2 doors	350	25	15	45	85
A380					
• 2 doors	470	30	20	80	130
• 3 doors	470	-	-	-	115 (1)

- Savings in de-boarding/boarding times do not transfer into reduced turnaround time
- Example catering for up to 100 trolleys will be problematic
- Third door saves only 10-15 minutes
- The need for a 3rd door is a quality of service issue



Overflow and bottlenecks



Overflow and bottlenecks

Total Airport*Sim*

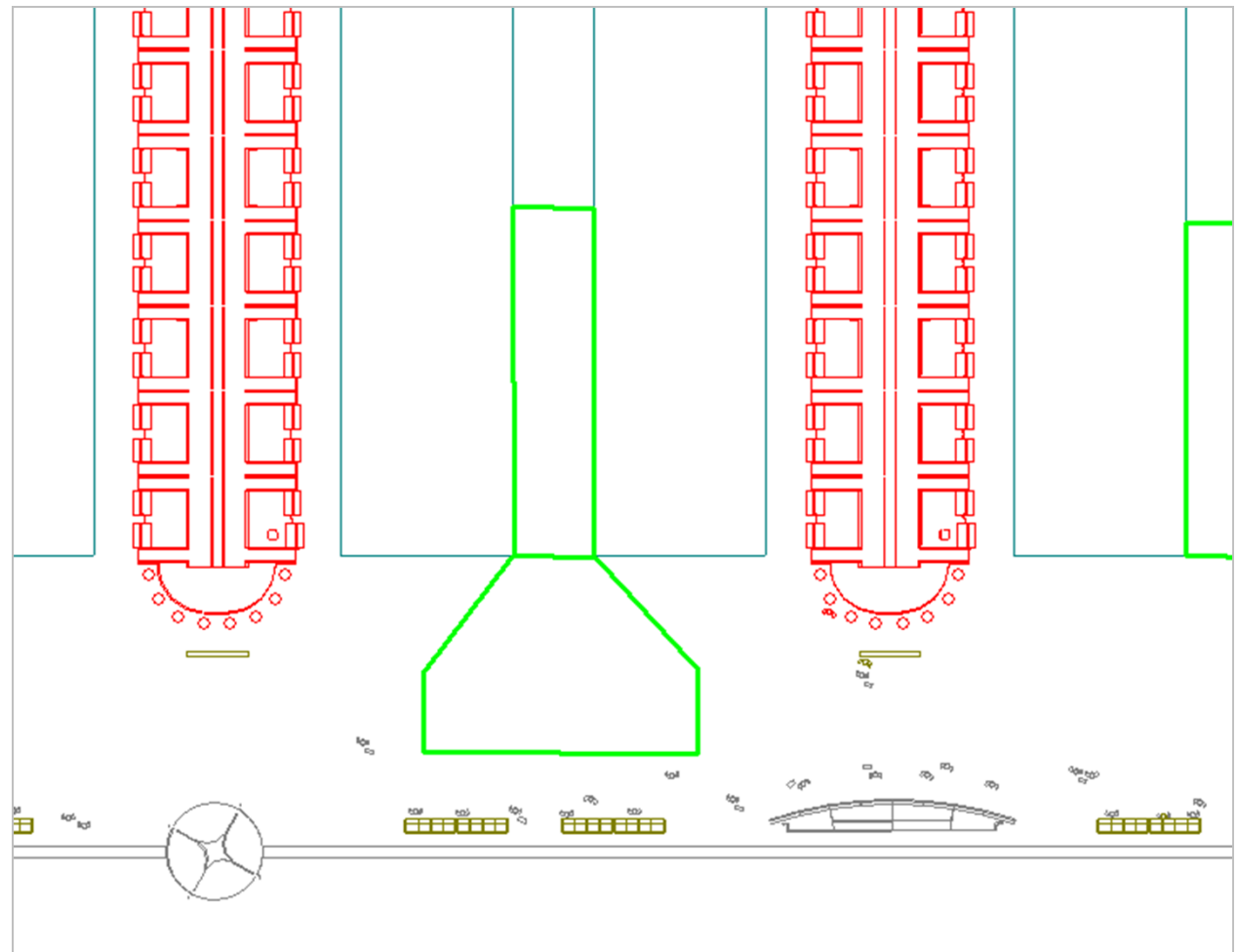
A : Excellent

B : High

C : Good

D : Adequate

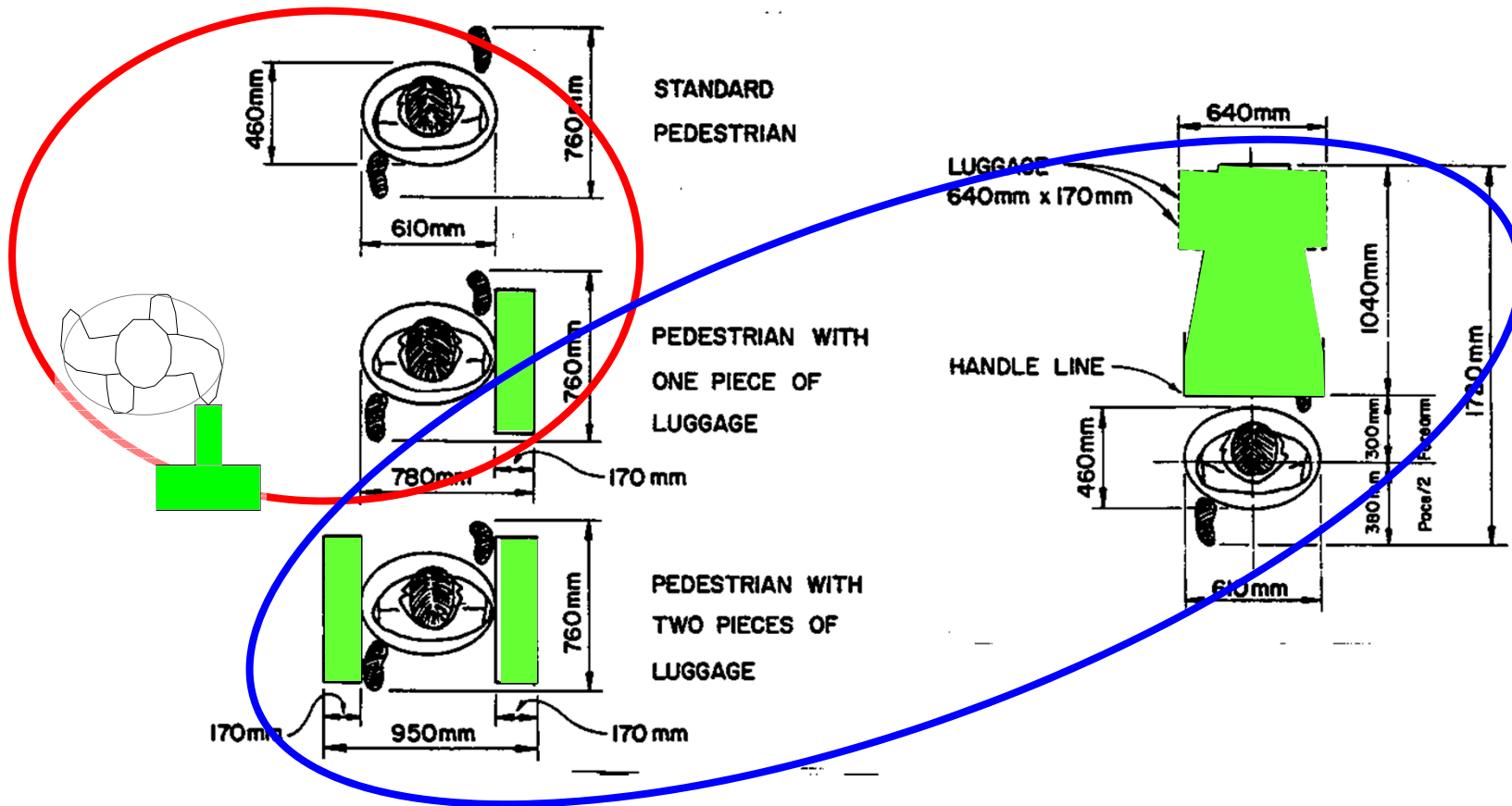
E : Unacceptable



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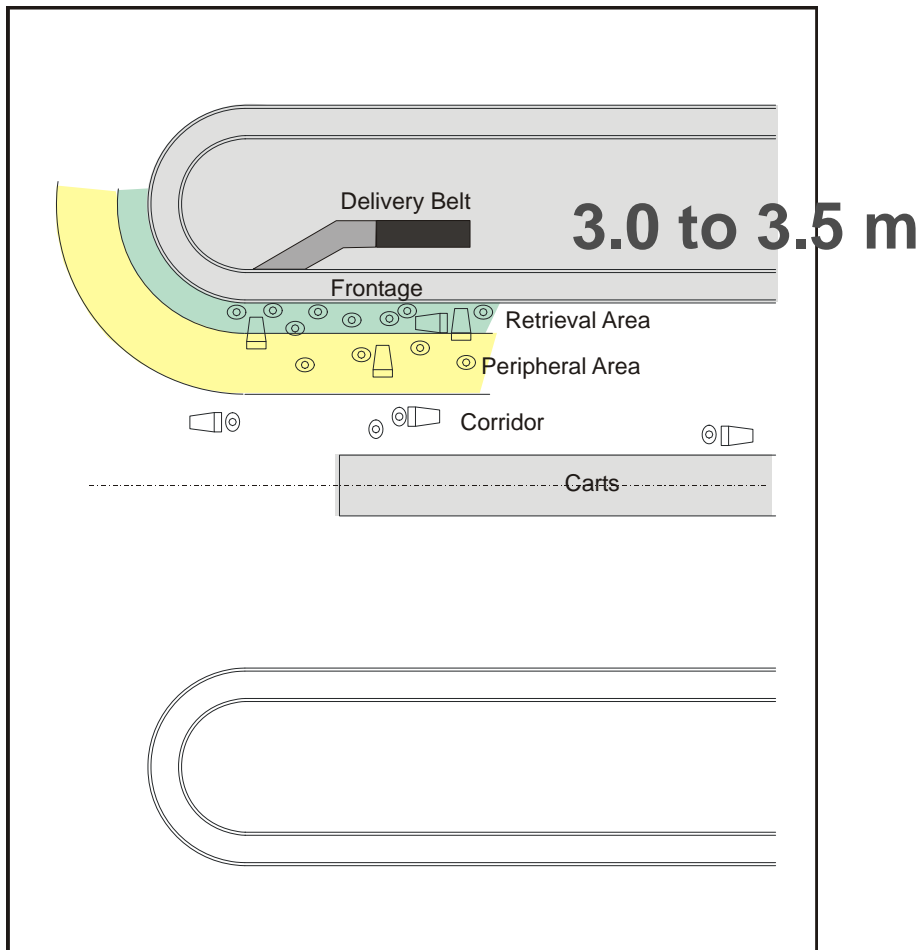
Physical characteristics



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Baggage delivery



A : Excellent

B : High

C : Good

D : Adequate

E : Unacceptable

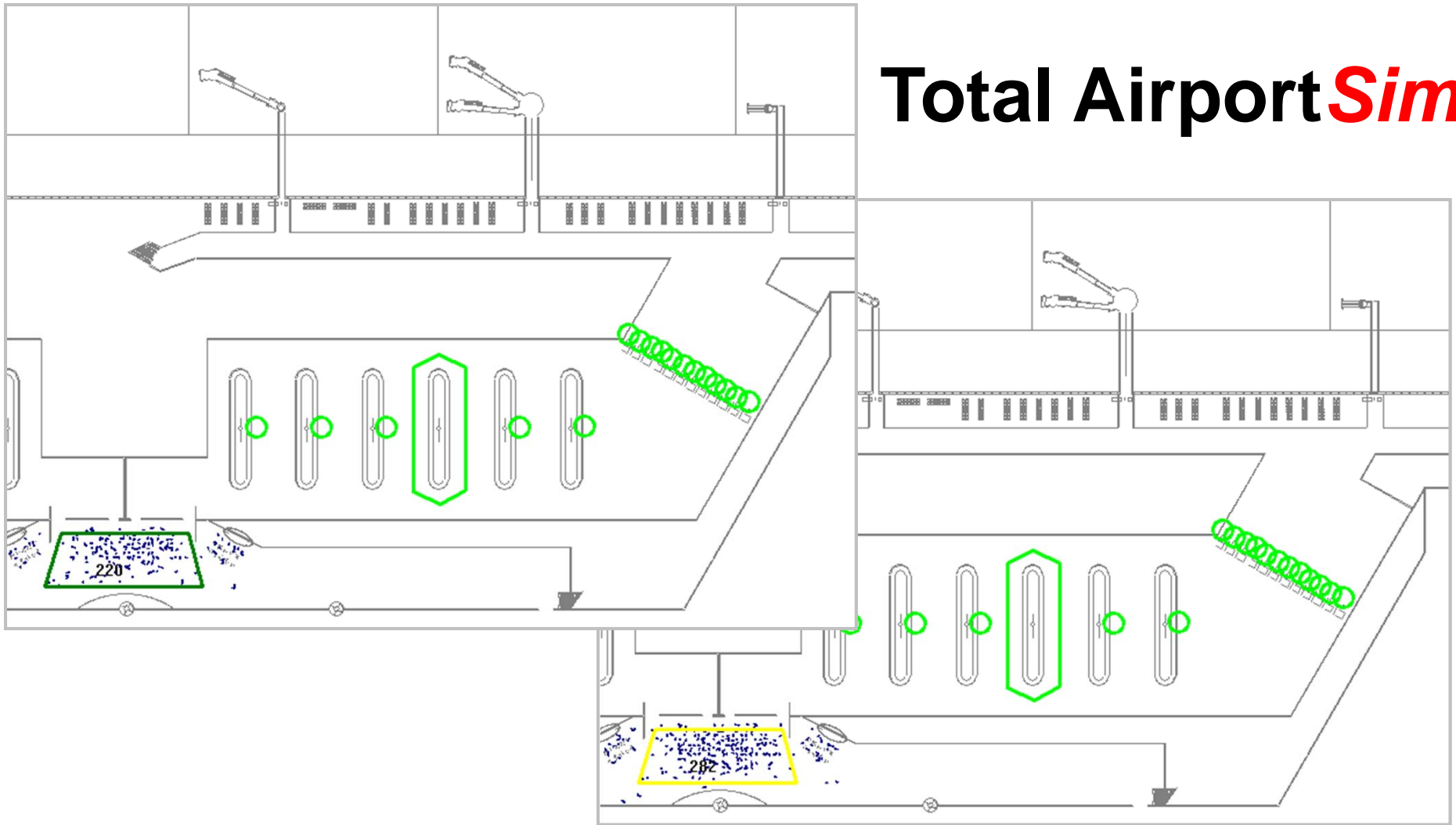


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Arrivals: B747 => A380

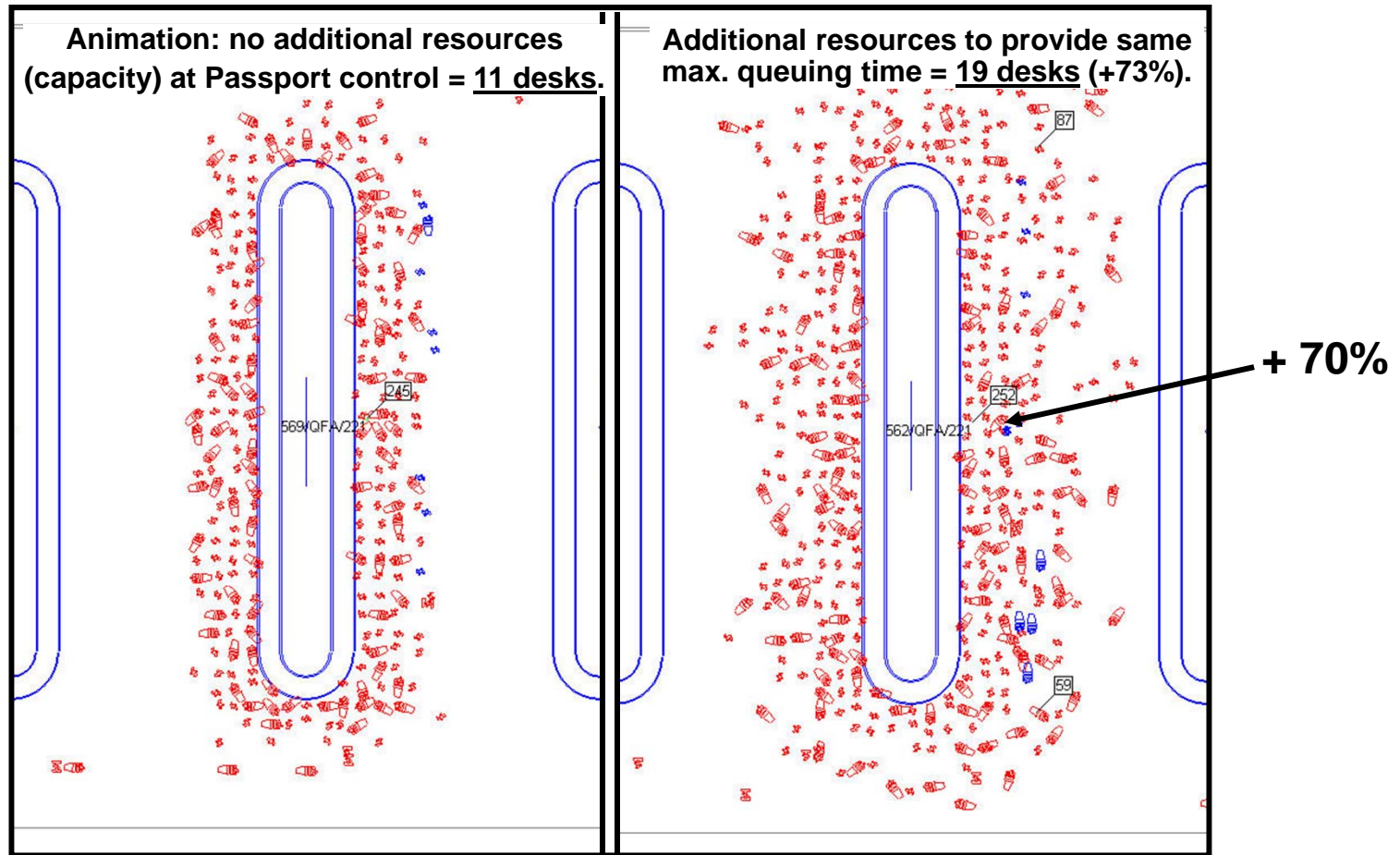
Total Airport *Sim*



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Arrivals: the impact of increasing capacity at passport control



Departures

● Before

- Peak hour: 6 flights including two 747- 400s for a total of 1500 passengers.
- Check-in: maximum queuing time of 30-35 minutes.
- Passport control: 9 desks to meet a maximum queuing time LOS objective of less than 5 minutes.
- Security: 4 X-ray machines to avoid queue backlog reaching passport control.



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Departures

● After

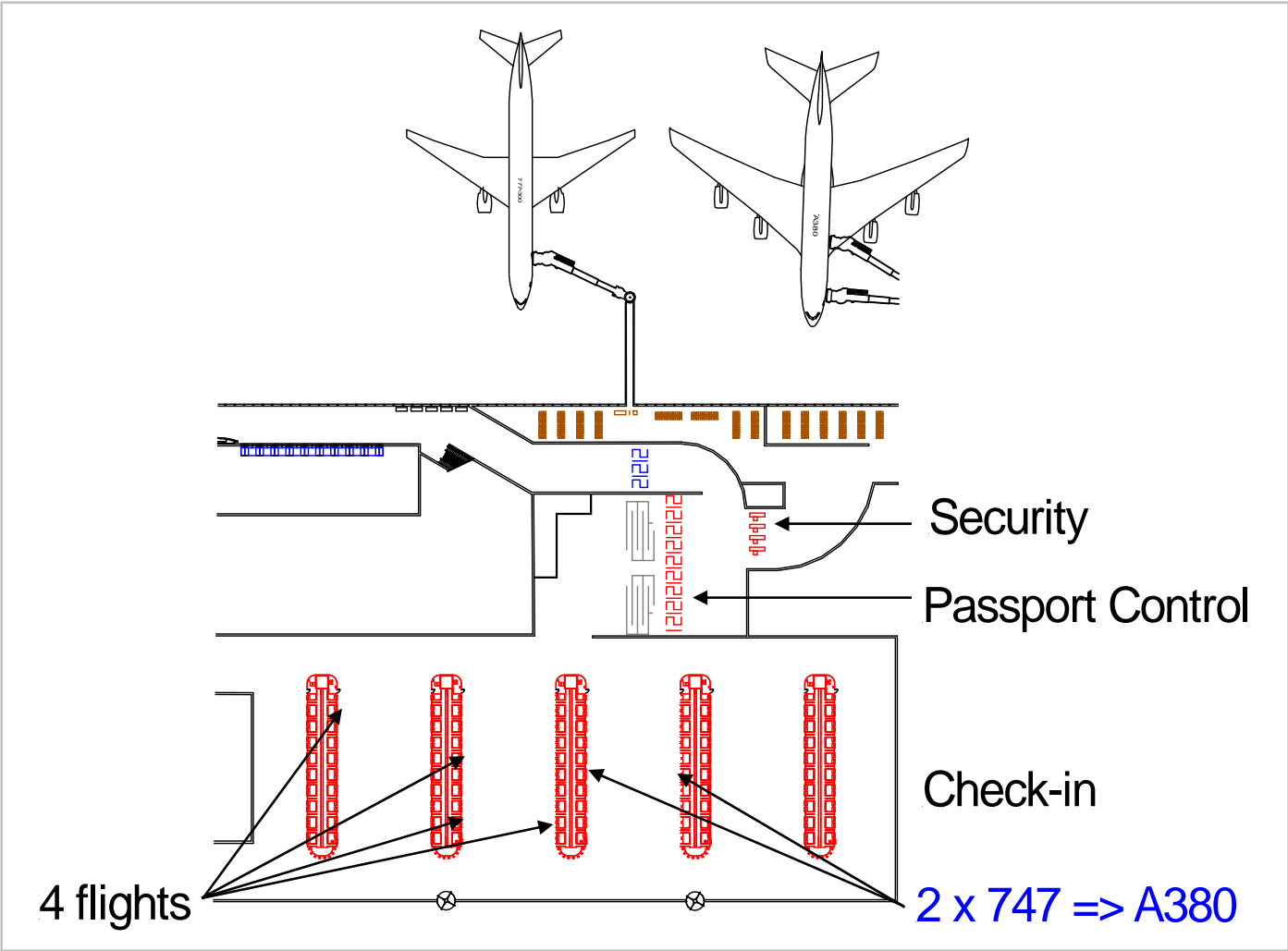
- Peak hour: Replace both 747- 400s with two A380s for a total peak hour passengers of 1740 (+16%).
- Check-in: maximum queuing time of 30-35 minutes.
- Passport control: 9 desks (same as before).
- Security: 4 X-ray machines (same as before).



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Departures



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Departures

Total Airport *Sim*



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Departures - Summary

Simulation results – Queuing at Passport Control (9 desks)

	# Passengers	Maximum Queue Length	Maximum Queuing Time
Before	1,500	24	+/- 3 min.
After (A380)	1,740	150	14 min.
Difference	+16%	+525%	+367%

Simulation results – Facility Requirements to Provide the Same Maximum Queuing Time Before and After the A380

	# Passengers	Passport Control	Security
Before	1,500	9 desks	4
After (A380)	1,740	11 desks	4-5
Difference	+16%	+22%	0 to +25%



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Comments and Conclusions

- **Simulation studies should be used to identify requirements and to validate solutions: (i) preventing passing down congestion to the next sub-system (ii) balance development – site specific.**
- **The A380 is more than a bigger B747. It's a new concept part of a strategy to provide a better service.**
- **Plan for two (2) bridges, one on each level to process the boarding/de-boarding flows. The need for a 3rd door is a quality of service issue – study the impact on arrivals.**



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Comments and Conclusions

- **Queuing (level of service) at passport control arrivals should be carefully studied. This sub-system regulates the downstream demand**
- **The level of service (max. queuing time) and outbound flow at check-in are key factors in determining the impact on passport control departures and security**
- **Unless technology (such as biometric identifiers) is utilised to remove some travellers from check-in queues - up to four additional check-in counters per flight would be required to provide a good level of service and to contain queues.**



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Comments and Conclusions

- **What next -**
- **Prepare for the next series – 650 + passengers...**



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Thank you



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