

**A380 Marketing**  
CWZM

# **A380 Airport Operations**

December 2015



# A380 benefits for airports



## **More passengers per stand and slot**

Highest infrastructure efficiency of any wide body aircraft for immediate congestion relief



## **Higher maximum take-off weight**

Higher aeronautical revenue (landing fees etc)



## **Higher passenger throughput**

Higher non-aeronautical revenue (passenger charges and duty free spend)



**Network effect for stronger hubs** & increased traffic to the region boosting the economy with direct & indirect benefits (tourism spend...)



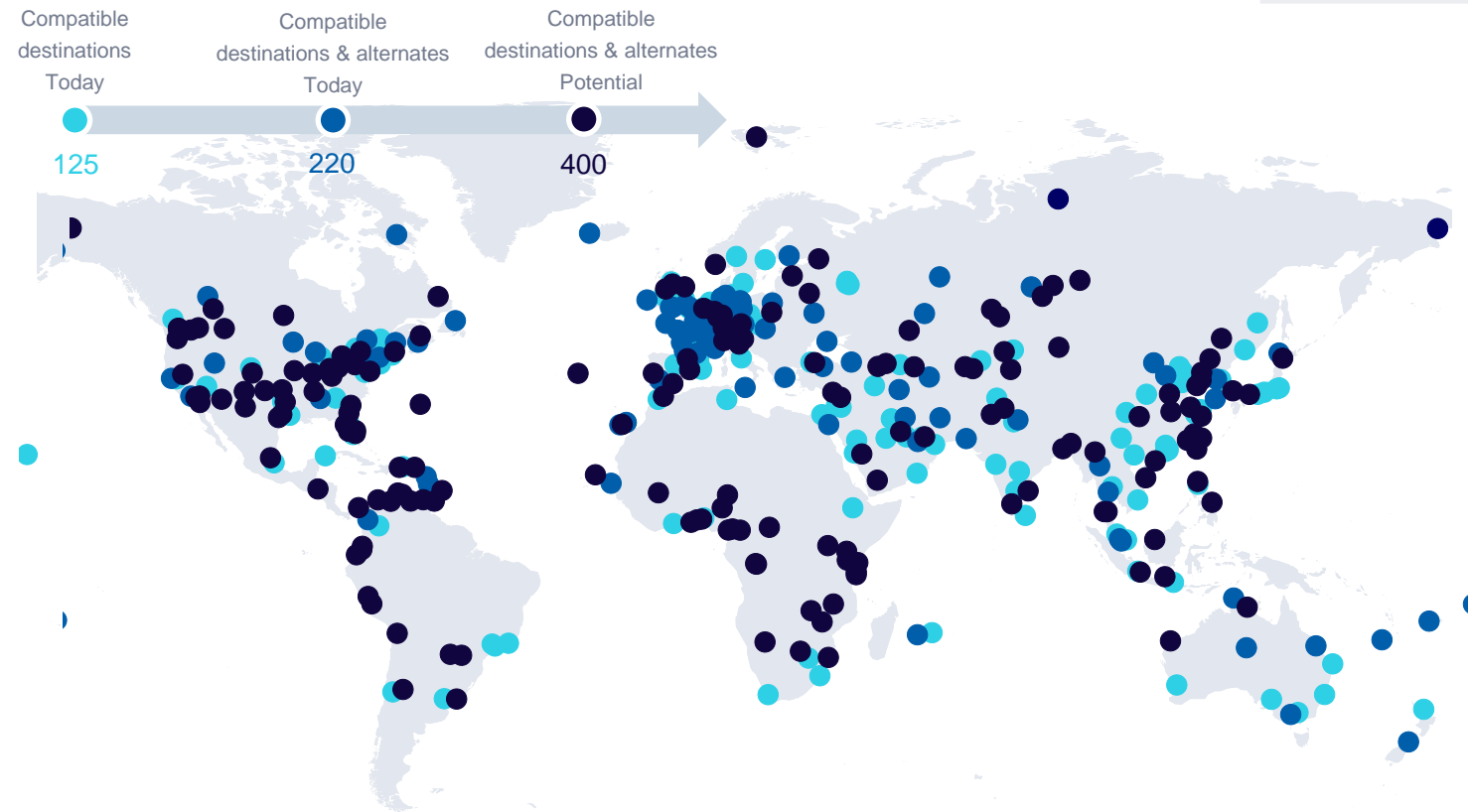
## **The lowest overall environmental impact**

Half the noise of the 747, 40% less CO2 emissions per passenger

## **A380**

Offers a significant return on investment

# A380 airport compatibility network



**Proven airport compatibility**

**Expanding the power of the A380**

# 125 destination compatible airports today for the A380

## Approved now or by 2016

## Compatible\*

Abidjan	Brisbane	Guangzhou	Los Angeles	Moscow Domodedovo	Rio de Janeiro	Taipei	Addis Ababa	Cairo	Durban	Istanbul (new airport)	Nagoya	Tashkent
Abu Dhabi	Buenos Aires	Hong Kong	Madinah	Moscow Vnukovo	Rome	Tokyo Narita	Adelaide	Cancun	Enfidha	Jakarta	Orlando	Tel Aviv
Amsterdam	Copenhagen	Houston	Madrid	Mumbai	Salalah	Toronto	Almaty	Cape Town	Erbil	Jinan	Oslo	Tianjin
Atlanta	Dallas/Fort Worth	Jeddah	Manchester	Munich	San Francisco	Vancouver	Amman	Casablanca	Hamburg	Khabarovsk	Palma de Mallorca	Tokyo Haneda
Auckland	Delhi	Johannesburg	Mauritius	New York	Sao Paulo	Washington	Bahrain	Chengdu	Hangzhou	Lagos	Punta Cana	Toulouse
Bangkok	Doha	Kuala Lumpur	Melbourne	Nottingham	Seoul	Zurich	Baku	Chicago	Hanoi	Las Vegas	Riyadh	Vienna
Barcelona	Dubai	Kunming	Mexico City	Osaka	Shanghai Pudong		Bali	Colombo	Ho Chi Minh City	Manila	Santiago	Vladivostok
Beijing	Dusseldorf	Kuwait	Miami	Paris	Shenzhen		Bangalore	Denver	Honolulu	Medan	Sao Paulo	Xian
Birmingham	Frankfurt	London Gatwick	Milan	Perth	Singapore		Bogota	Dubai DWC	Hyderabad	Moscow Sheremetyevo	Shanghai	Zhuhai
Boston	Glasgow	London Heathrow	Montreal	Prague	Sydney		Brussels	Dublin	Islamabad (new airport)	Muscat	Stockholm	

November 2015  
 Airside and parking/bridges are A380 compatible, RFF may have to be upgraded - Final approval of operations is under local CAAs (Civil Aviation Authority) responsibility

# 220 destination and alternate compatible airports today

Abidjan	Bogota	Dresden	Honolulu	Madinah	Oakland	Sao Paulo VCP	U-Tapao
Abu Dhabi	Bordeaux	Dubai Al Maktoum	Houston	Madrid	Ontario	Sapporo	Vancouver
Addis Ababa	Boston	Dubai Intl'	Hyderabad	Malta	Orlando	Seoul GMP	Vienna
Adelaide	Bremen	Dublin	Iqaluit	Manchester	Osaka	Seoul ICN	Vladivostok
Aktobe	Brest	Durban	Islamabad (new)	Manila	Oslo	Seville SVQ	Warsaw
Al Ain	Brisbane	Dusseldorf	Istanbul (new)	Manston	Ottawa	Stewart	Washington
Alice Springs	Bristol	Edmonton Intl'	Jakarta	Mauritius	Pago Pago	Shanghai PVG	Windsor Locks
Almaty	Brussels	Enfidha	Jeddah	Medan	Palma de Mallorca	Shanghai SHA	Xian
Amman	Budapest	Ekatrinburg	Jeju	Melbourne Avalon	Pantnagar	Shannon	Zahedan
Amsterdam	Buenos Aires	Erbil	Jinan	Melbourne Intl'	Paris CDG	Sharm el Sheikh	Zhuhai
Anchorage	Cairo	Faleolo (Apia)	Johannesburg	Mexico City	Paris XCR	Shenzhen	Zurich
Ankara	Cancun	Fort de France	Johor Bahru	Miami	Paris ORY	Shijiazhuang	
Ashgabat	Cape Town	Frankfurt FRA	Kailua-Kona	Milan	Paya Lebar	Shiraz	
Athens	Cardiff	Fuerteventura	Karachi	Milwaukee	Perpignan	Simferopol	
Atlanta	Casablanca	Gander	Karlsruhe	Minneapolis	Perth	Singapore	
Auckland	Chateauroux	Geneva	Khabarovsk	Montreal	Philadelphia	Stockholm	
Bahrain	Chengdu	Glasgow	Kiev	Moscow DME	Pointe à Pitre	Stuttgart	
Baku	Chiang Mai	Gran Canaria	Kuala Lumpur	Moscow SVO	Prague	Sydney	
Bali	Chicago	Guangzhou	Kunming	Moscow VKO	Punta Cana	Tahiti	
Bangalore	Christchurch	Halifax	Kuwait	Mumbai	Reykjavik KEF	Taipei	
Bangkok BKK	Cincinnati	Hamburg	La Reunion	Munich	Rio de Janeiro	Tarbes	
Bangkok DMK	Cologne	Hamburg Finkenwerder	Lagos	Muscat	Rionegro MDE	Tashkent	
Bangor	Colombo	Hangzhou	Las Vegas	Nadi	Riyadh	Tehran IKA	
Barcelona	Copenhagen	Hannover	Leipzig/Halle	Nagoya	Rockhampton	Tel Aviv	
Batam	Dakar	Hanoi	Linz	Nantes	Rome	Tianjin	
Beijing	Dallas/Fort Worth	Helsinki	London LGW	New York	Salalah	Tokyo HND	
Berlin Schönefeld	Darwin	Hilo Hawaii	London LHR	Nice	Salt Lake City	Tokyo NRT	
Berlin Tegel	Delhi	Ho Chi Minh City	London STN	Nottingham	San Francisco	Toronto	
Birmingham (USA)	Denver	Hohhot	Los Angeles	Noumea	Santiago	Toulouse	
Birmingham	Doha	Hong Kong	Lyon	Novosibirsk	Sao Paulo GRU	Trabzon	

## A380 Airports

**220**  
Compatible  
airports for  
passenger  
operations  
(scheduled airports  
and alternates)

November 2015

\* Destinations & Alternates

# Additional compatible alternate airports potential



Albuquerque	Chennai	Great Falls	Learmonth	Norilsk	Shenyang
Abuja	Chongqing	Guayaquil	Liege	Oostende/Brugge	Spokane
Accra	Ciudad del Este	Haikou	Lilongwe	Panama City	St. George
Amarillo	Cleveland	Hakodate	Lima	Phoenix	Stavanger
Anadyr	Cochin	Hambantota	Lisbon	Phuket	Surabaya
Angeles City	Cold Bay	Harare	Lome	Pisco	Svalbard
Aruba	Colorado Springs	Harbin	Long Beach	Pittsburg	Taif
Astana	Cotonu	Hiroshima	Louisville	Port of Spain	Taipei TSA
Asuncion	Curacao	Indianapolis	Lusaka	Portland	Tampa
Atyrau	Dalian	Iquique	Luxembourg	Portsmouth	Tenerife
Austin	Dallas DAL	Istanbul SAW	Malabo	Qingdao	Turin
Baltimore	Dammam	Jacksonville	Malaga	Queretaro	Turkmanbashi
Bamako	Danang	Jakarta	Mandalay	Quito	Urumqi
Bangui	Dar Es Salaam	Kano	Maputo	Rabat	Valencia
Barbados	Dayton	Kansas City	Maracaibo	Riga	Venice
Barnaul	Detroit	Kaohsiung	Margarita	Sacramento	West Palm Beach
Barranquilla	Dhaka	Karaganda	Memphis	Saint Louis	Will Rogers
Basel/Mulhouse	Douala	Kashi	Mendoza	Saint Petersburg	Windhoek
Beirut	El Paso	Katherine	Minsk	Sal	Winnipeg
Belfast	Entebbe/Kampala	Katowice	Mombosa	Samarkand	Wuhan
Bishkek	Fairbanks	Kemerovo	Moncton	San Antonio	Xiamen
Bologna	Fort Lauderdale	Kilimanjaro	Montevideo	San Bernardino	Yantai
Borneo	Fort Myers	Kinshasa	Moses Lake	San Diego	Yaounde
Brazzaville	Frankfurt HHN	Kolkata	Multan	San Juan	Yerevan
Brescia Montichiari	Fuzhou	Krabi	Nairobi	San Salvadore	Zanzibar
Busan	Gaborone	Krasnoyarsk	Nanjing	Sanaa	Zaragoza
Calcuta	Ganja	Lahore	Navoi	Santo Domingo	Zhengzhou
Calgary	Gimhae	Lajes	Newcastle	Savannah	
Caracas	Glasgow	Larnaca	Niagara Falls	Seattle	
Cebu	Goose bay	Latacunga	Ningbo	Sharjah	

## A380 airports

Up to **400**  
compatible  
destination &  
alternate airports in  
a near future

November 2015

# A380 – Facilitating sustainable growth



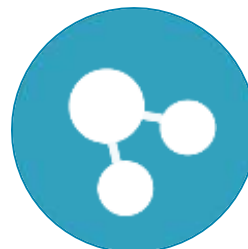
## Congestion

- **More passengers per flight** = growth with limited extra flights
- The **easiest solution for growth** at congested airports around the world



## Noise

- A friendly neighbour: **half the noise of a 747** with 60% more passengers
- **Even quieter than much smaller aircraft**



## Emissions

- **Low emission engines**
- The lowest fuel burn per seat of any large aircraft, **reducing CO<sub>2</sub>** emissions significantly

**A380**

**Is part of the solution**



# Congestion is recognized by all major players



“The airport **capacity challenge** is as strong as ever.”

*(Eurocontrol - Challenges of Growth 2013)*



“Growth of air transport will also be influenced, by major challenges such as **airport and airspace congestion.**”

*(ICAO Outlook for Air Transport to the year 2025)*



“Airspace congestion will continue to be a **major constraint** on traffic development”

*(ACI Global Traffic Forecast 2010-2029)*



“The main reason for a lack of capacity in the aviation system is that there are **not enough runways and terminals** to cope with demand.”

*(IATA 2012 Annual Review report)*

A380

Relieves  
congestion



# Technology for lower noise



## Engines

New high by-pass ratio engines



GP7200



Rolls-Royce

Trent 900



## Airframe/Nacelles

Optimisation of high lift systems

Innovative acoustic treatment of nacelles



## Performance

Better take off and climb performance

Lower approach speed

Automated and customised noise abatement procedure

**A380**

Half the noise energy of a 747

# Aircraft noise – A380

Aircraft		A380-800		A380-800		A380-800		A380-800	
MTOW (t)		510t		560t		569t		575t	
MLW (t)		395t		386t		391t		394t	
Engine	Type	Trent 970	GP7270	Trent 970	GP7270	Trent 970	GP7270	Trent 970	GP7270
	Thrust	70,000lb	70,000lb	70,000lb	70,000lb	70,000lb	70,000lb	70,000lb	70,000lb

## ICAO Annex 16, Chapter 3 noise levels (EPNdb)

Lateral	Level	94.6	94.8	94.3	94.5	94.2	94.4	94.2	94.4
	Limit	103	103	103	103	103	103	103	103
	Margin	+8.4	+8.2	+8.7	+8.5	+8.8	+8.6	+8.8	+8.6
Flyover	Level	91.9	91.6	95	94.8	95.6	95.4	96	95.9
	Limit	106	106	106	106	106	106	106	106
	Margin	+14.1	+14.4	+11	+11.2	+10.4	+10.6	+10	+10.1
Approach	Level	98.1	97.3	97.9	97.1	98	97.2	98	97.3
	Limit	105	105	105	105	105	105	105	105
	Margin	+6.9	+7.7	+7.1	+7.9	+7	+7.8	+7	+7.7
Cumulative	Level	284.6	283.7	287.2	286.4	287.8	287	288.2	287.6
	Limit	314	314	314	314	314	314	314	314
	Margin	+29.4	+30.3	+26.8	+27.6	+26.2	+27	+25.8	+26.4

## London Quota Count

Take Off									
noise level	93.25	93.2	94.65	94.65	94.9	94.9	95.1	95.15	
Quota Count value	2	2	2	2	2	2	2	2	
Margin to QC *rating limit	2.65	2.7	1.25	1.25	1	1	0.8	0.75	
Landing									
noise level	89.1	88.3	88.9	88.1	89	88.2	89	88.3	
Quota Count value	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Margin to QC *rating limit	0.8	1.6	1	1.8	0.9	1.7	0.9	1.6	

## A380 Noise

Compliant with  
ICAO Chapter 14

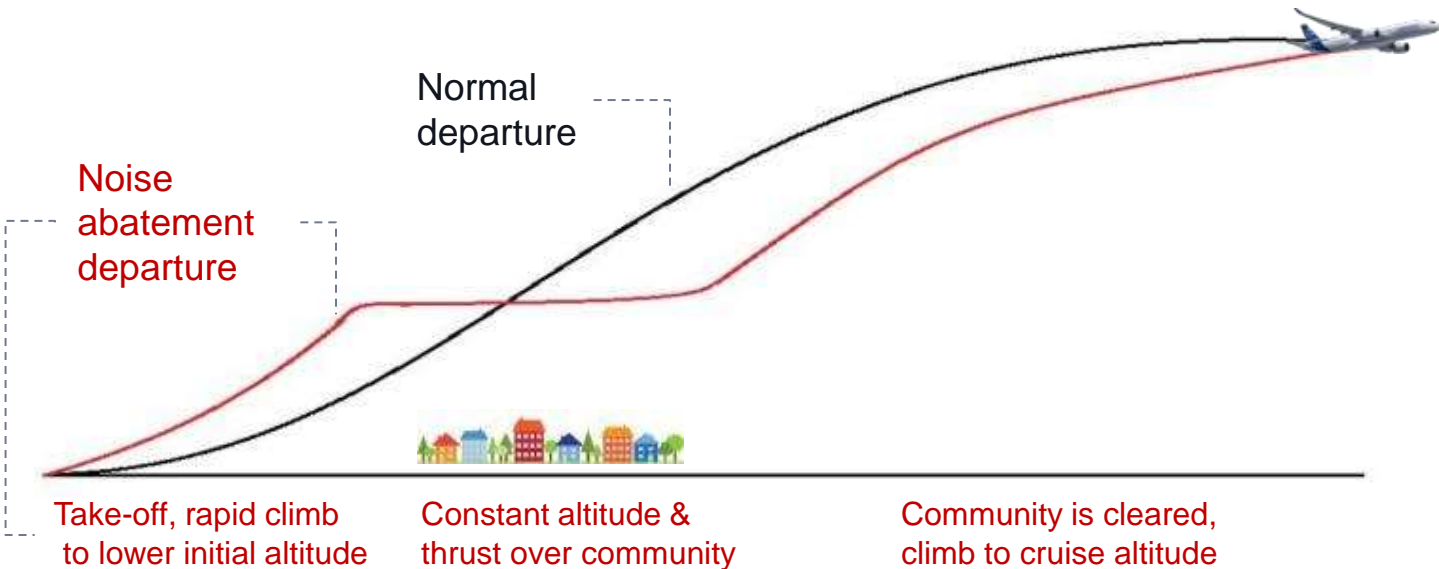
Source: TCDSN Jet aeroplanes (issue 22 of 26/06/2015)

\*Quota Count

# Noise abatement departure procedure (NADP)

Constant altitude lower thrust setting can be used over communities  
Thrust directed away from population

NADP for  
even lower  
community  
noise



# Unprecedented consultation from an early stage

## Consultation with:



Airports Council  
International

Regulatory Authorities



GSE Manufacturers

Over 100 Airports

Ground Handlers

30+ Airlines

## has resulted in:



### **Airport optimized family design**

Approved operational plan based  
on AACG guidelines less  
stringent than Annex 14\*



### **All ground equipment available**

Similar equipment count to 747



### **A friendly neighbour**

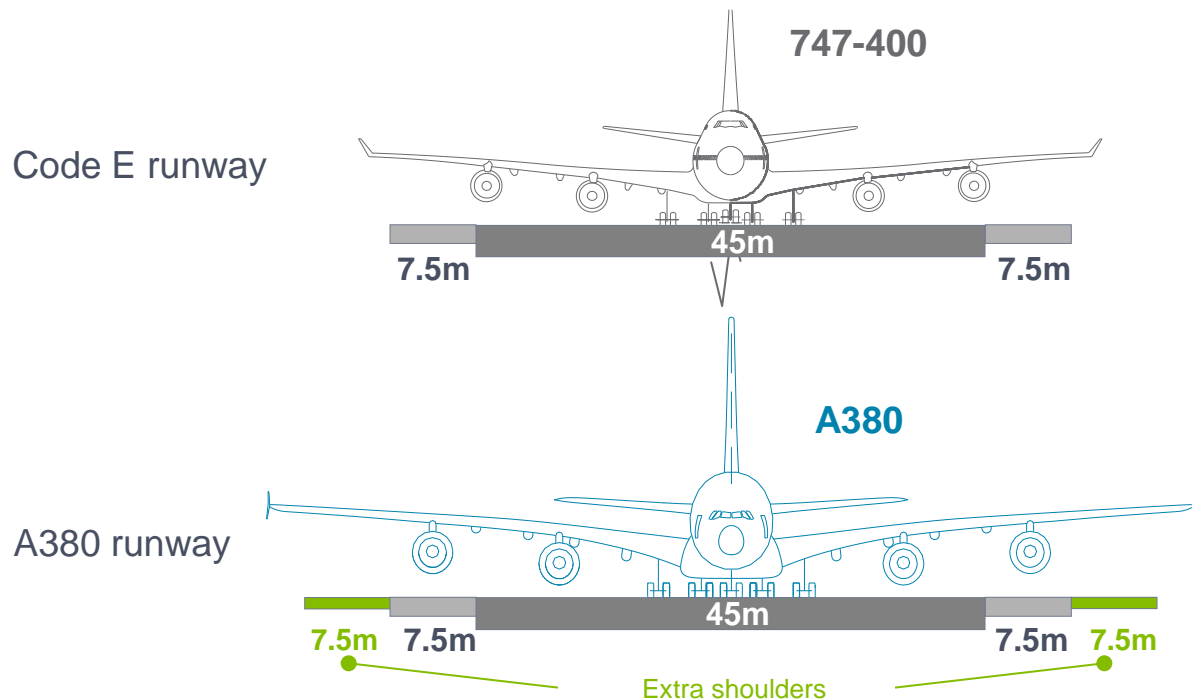
Half the noise  
Less movements

# Large Aircraft classification : alignment ICAO/EASA code F on AACG

Items	ICAO Code E	ICAO Code F	AACG A380 Agreement
RWY width (+shoulder)	45m (+ 2x7.5m) = 60m	60m (+ 2x7.5m) = 75m	45m (+ 2x15m) = 75m
TWY width (+shoulder)	23m (+ 2x10.5m) = 44m	25m (+ 2x17.5m) = 60m	23m (+ 2x18.5m) = 60m
TWY width of taxiway/taxilane strip	47.5/42.5 m	57.5/50.5 m	49/47.5 m
RWY/TWY separation	182.5m	190m	190m seen as conservative value
OFZ width	120m	155m	120m
TWY/TWY separation	80m	97.5m	91m with proper taxi guidance
TWY/Taxilane/Object separation	47.5m - 42.5m	57.5m - 50.5m	49m - 47.5m with proper taxi guidance
Taxiway bridge width	44m	60m	49m +11m for jet blast protection
Clearance at gate	7.5m	7.5m	< 7.5m with appropriate measure

# Extra runway shoulders to be assessed for scheduled A380 operations

## Runway configuration comparison



## AACG recommendations

When the existing surface is not suitable

Grass, netting, chemical binding or asphalt covering can be used

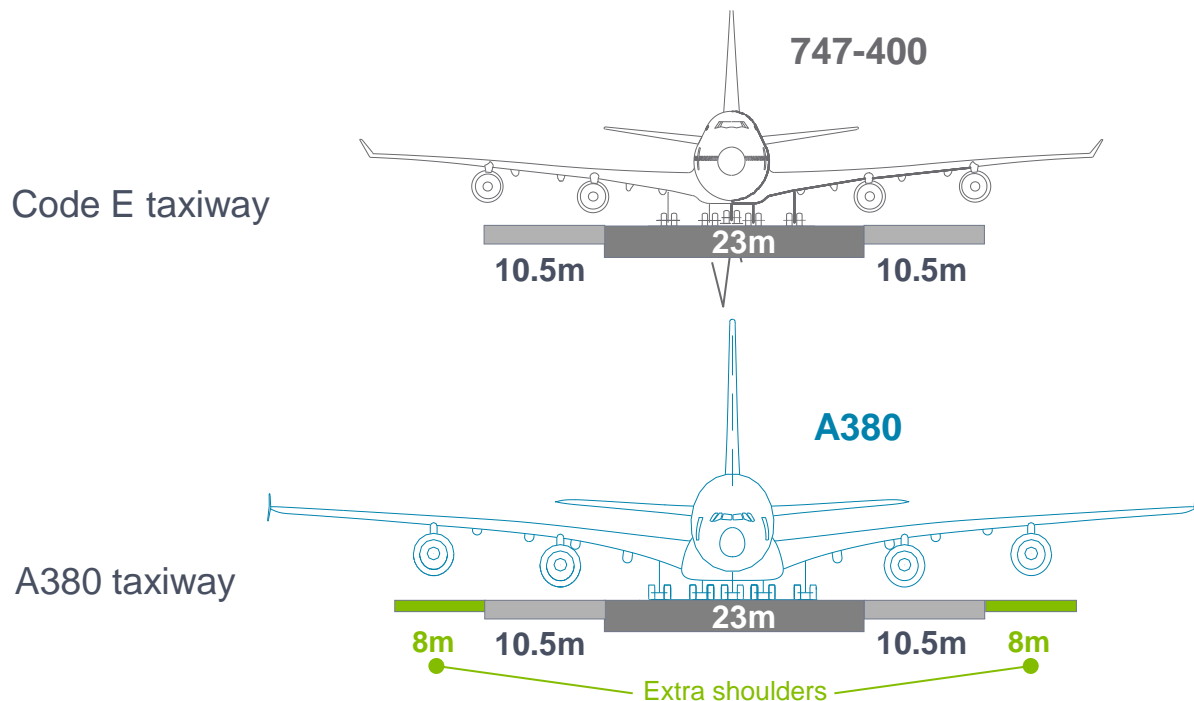
# Grass outer runway shoulder area: Manchester Airport





# Extra taxiway shoulders to be assessed for scheduled A380 operations

## Taxiway configuration comparison



## AACG recommendations

When the existing surface is not suitable

Grass, netting, chemical binding or asphalt covering can be used

\* Operational procedures (only inner engines used for taxi) can mitigate the need for outer taxiway shoulders

# Grass outer taxiway shoulder area: Paris CDG Airport



**Paris CDG, 22m wide taxiway  
+ 5m shoulder**

**Grass without  
loose gravel**

# A380 – Lower pavement loading

**Nose gear**



**Wing gear**



**Body gear**

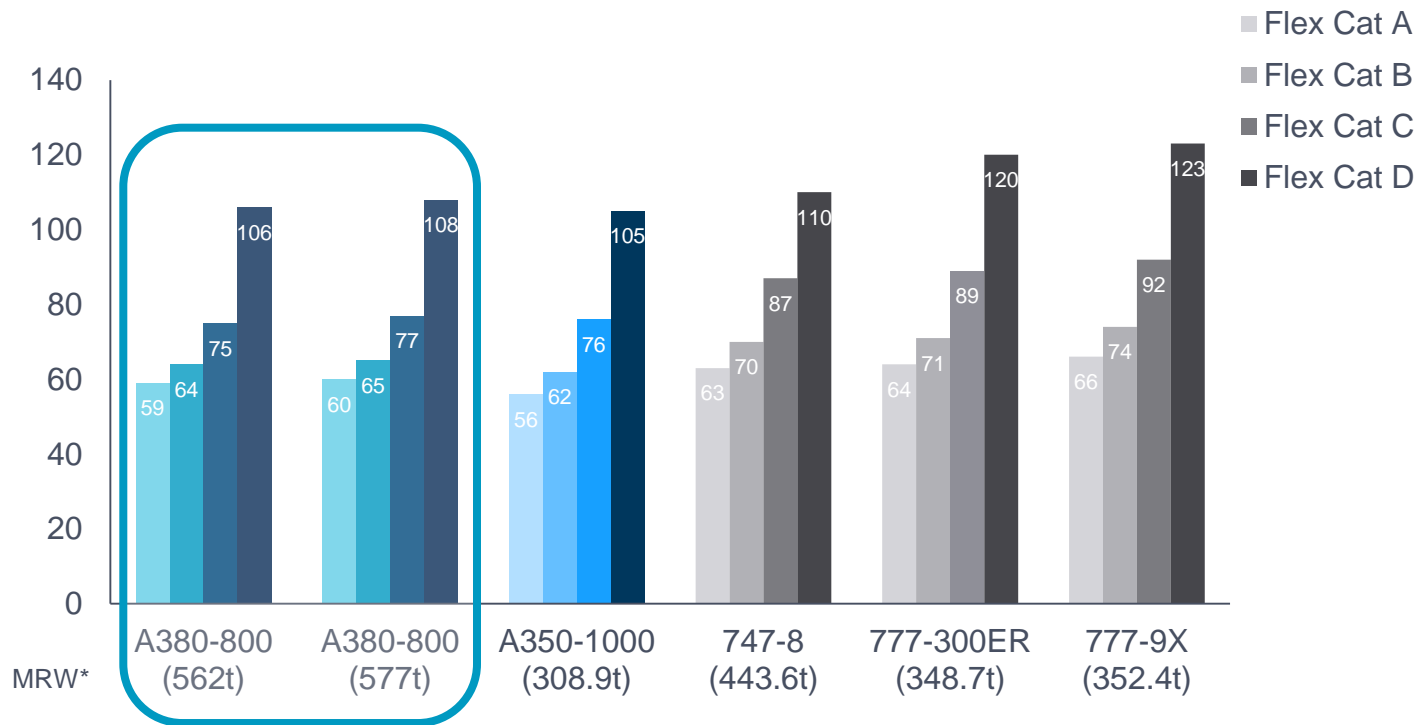


**A380 has lower  
pavement loading**

Advanced main  
landing gear  
design for  
superior weight  
distribution

# Pavement loading comparison

## Aircraft Classification Number (ACN) – Flexible Pavement



**A380 pavement loading**

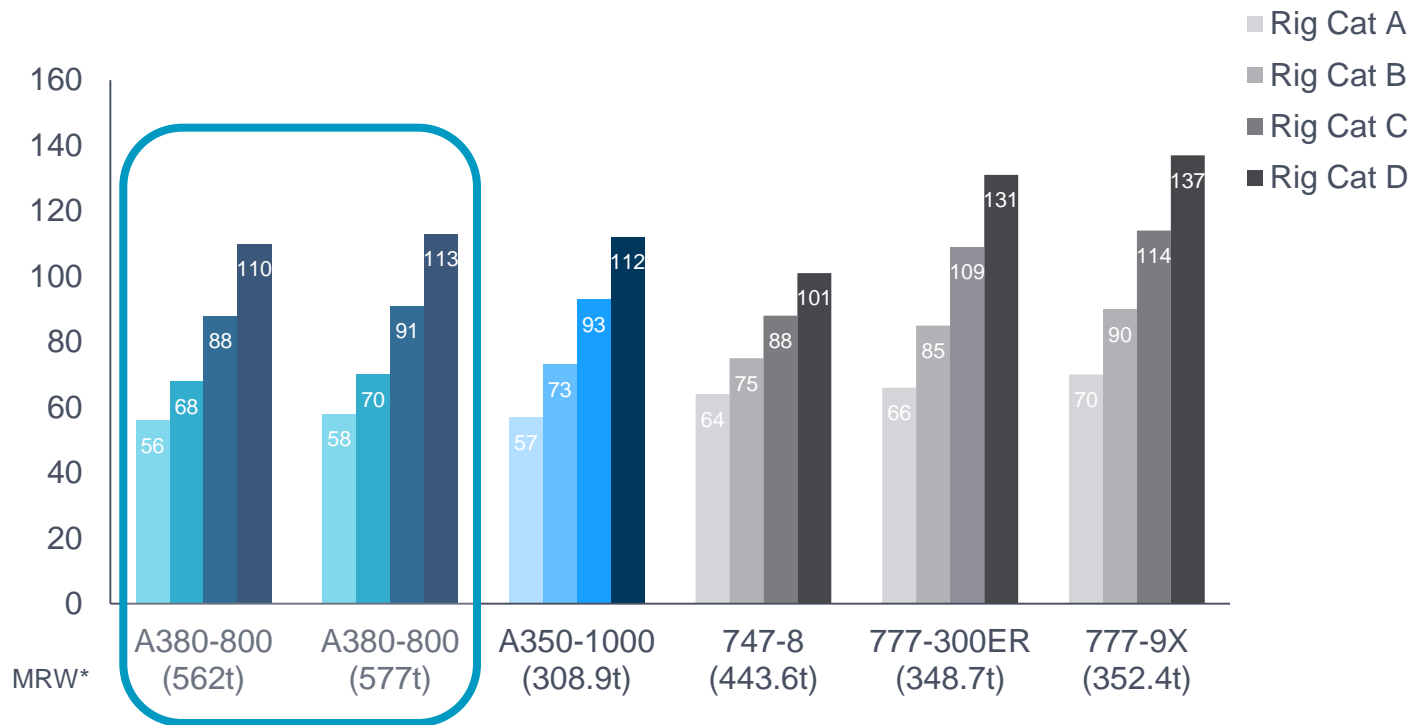
Less or comparable than other wide-bodies

\* ACN at Maximum Ramp Weight

\* 777-9X numbers estimated by Airbus internal studies – 4% higher than 777-300ER

# Pavement loading comparison

## Aircraft Classification Number (ACN) – Rigid Pavement



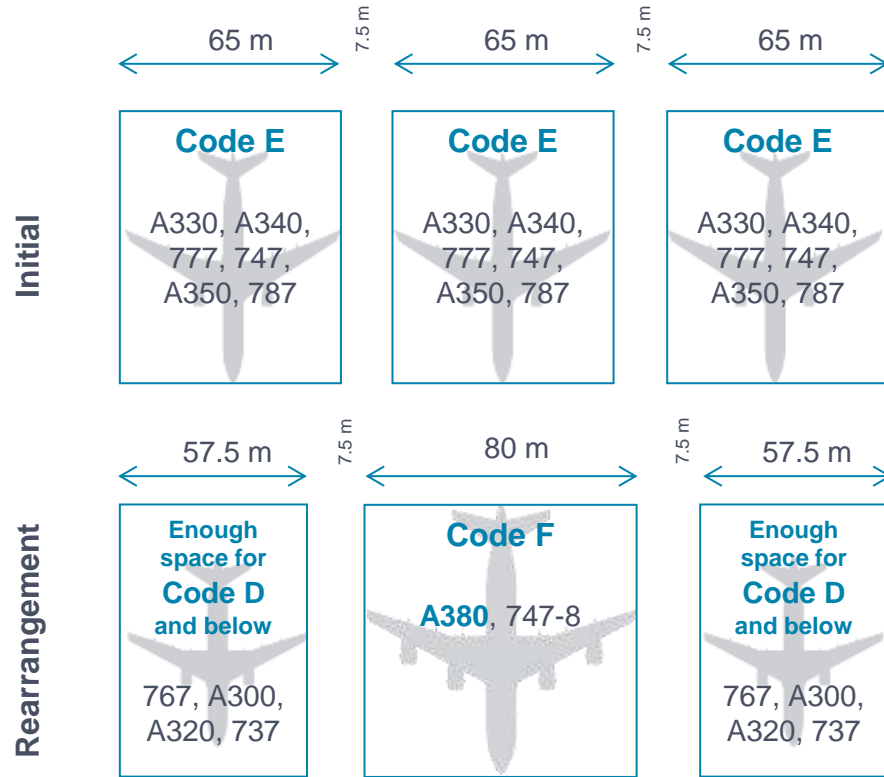
**A380 pavement loading**

Less or comparable than other wide-bodies

\* ACN at Maximum Ramp Weight

\* 777-9X numbers estimated by Airbus internal studies – 4% higher than 777-300ER

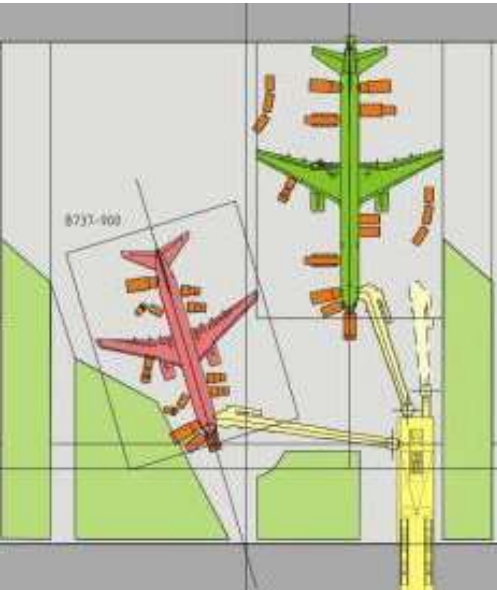
# The A380 can be parked at existing stands



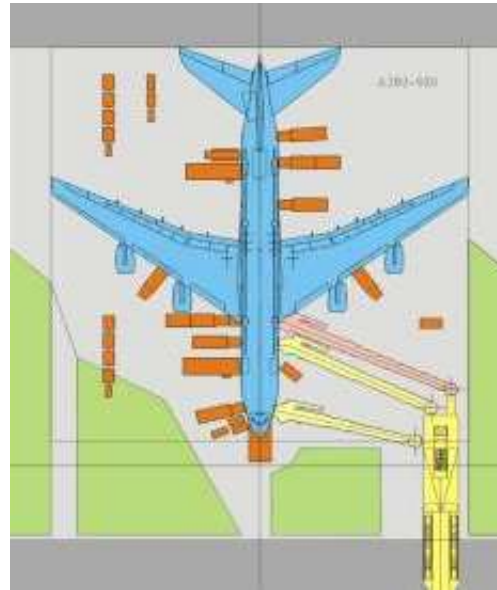
## A380 stands

Code E stands can be rearranged to accommodate A380

# Code F Multiple Aircraft Ramp System (MARS) provides great stand flexibility for airports globally



OR



**A380 stands**

**Code F  
stands offer  
flexibility for  
optimal  
utilisation**



GSE Pre-Arrival & Parking Areas



GSE Vehicles



Service Roads

Diagram: Courtesy Naco Foster Arup



# Ground operations- Handling equipment, turn-around-time

A380 flies scheduled operations from Code E airports with minimum changes

**No new equipment needed  
for remote stand operations**



The A380 can be handled using existing wide-body ground equipment

**Upper deck boarding is  
not mandatory**



Superior cabin architecture means upper deck bridge not mandatory

**Only 1 new piece of equipment  
for contact stands & 90 min. TAT\***



1 upper deck catering vehicle cuts TAT to less than 747.  
50t tow tractor for push back mostly sufficient \*\*

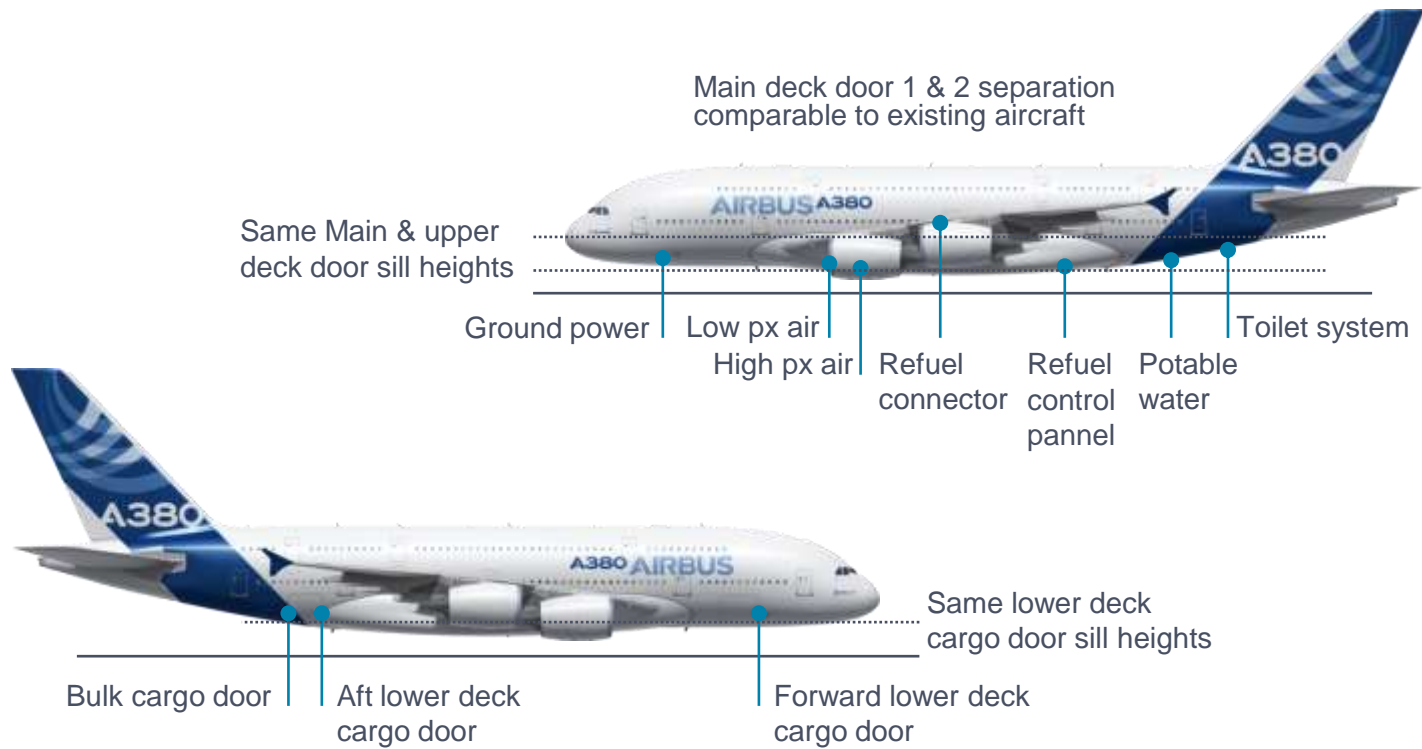
**A380**

Shares many characteristics with smaller aircraft

\*Turn-around-time

\*\* 70t only in specific cases

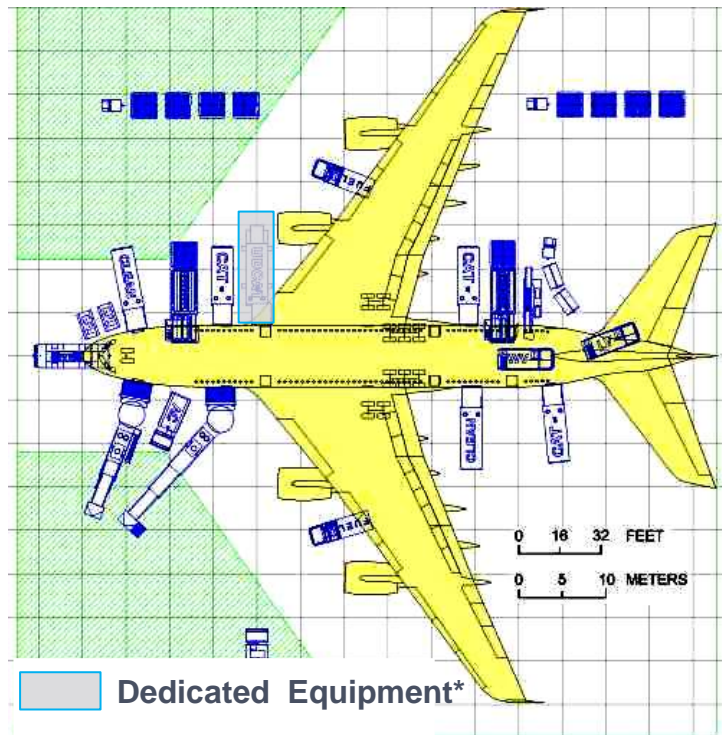
# Designed for compatibility with usual GSE



## Ground operations

From the main deck down, the **A380** requires similar servicing to other wide-body aircraft

# A380 baseline ramp layout



- ✓ **Upper deck catering vehicle**
- ✓ Tow tractor
- ✓ Main deck catering vehicles
- ✓ Passenger boarding bridges
- ✓ Main deck cleaning vehicles
- ✓ Lower deck cargo loader
- ✓ Lower deck bulk cargo loader
- ✓ Ground Power Units
- ✓ Pre-conditioned Air
- ✓ Air start units
- ✓ Potable water Vehicle
- ✓ Lavatory servicing
- ✓ Fuel bowzers

**90min TAT\***

**Only 1 piece of dedicated equipment required for the A380, also compatible with other wide body aircraft**

- \*Turn-around-time
- If TAT > 2 hours, similar equipment as of other wide body aircraft

# Upper deck catering



- Upper deck catering significantly reduces catering critical path
- Many manufacturers offering solutions
- In service world-wide with many catering and ground handling companies
- Compatible with existing wide-body aircraft

## Ground operations

**A380** upper deck catering has been standard since EIS\*

\* Inutsuka, FFG, Doll, Mallaghan, Smith TE, CATCON, HTR, Tesco, TLD, Sovam, Aeromobiles, Estepe

\* Entry Into Service

# A380 tow tractors



- Existing 50t tractors can handle the A380 in most conditions
- For adverse traction conditions a 70t tractor may be required (slope and ramp contamination) – some existing towbar tractors can be ballasted up to 70t
- Many models of A380 capable tow and tow bar-less tractors available\*
- Compatible with existing wide-body aircraft

**Ground  
operations**

**Multiple  
solutions  
available**

\* Such as: Douglas, Goldhofer, TLD, Schopf, Koegel Kamag, FMC, Bliss Fox, GHM Fahrzeuge

# A380 direct upper deck access

## **A unique opportunity to differentiate**

In place at most of A380 destination airports





# Direct from the lounge to the A380 upper deck



Dubai  
T3  
concourse A



Frankfurt  
T1  
Pier A Plus



## Upper deck access

Offering a seamless transition from ground to air



# Upper deck access has limited operational impact



~90  
minutes



## Upper deck access

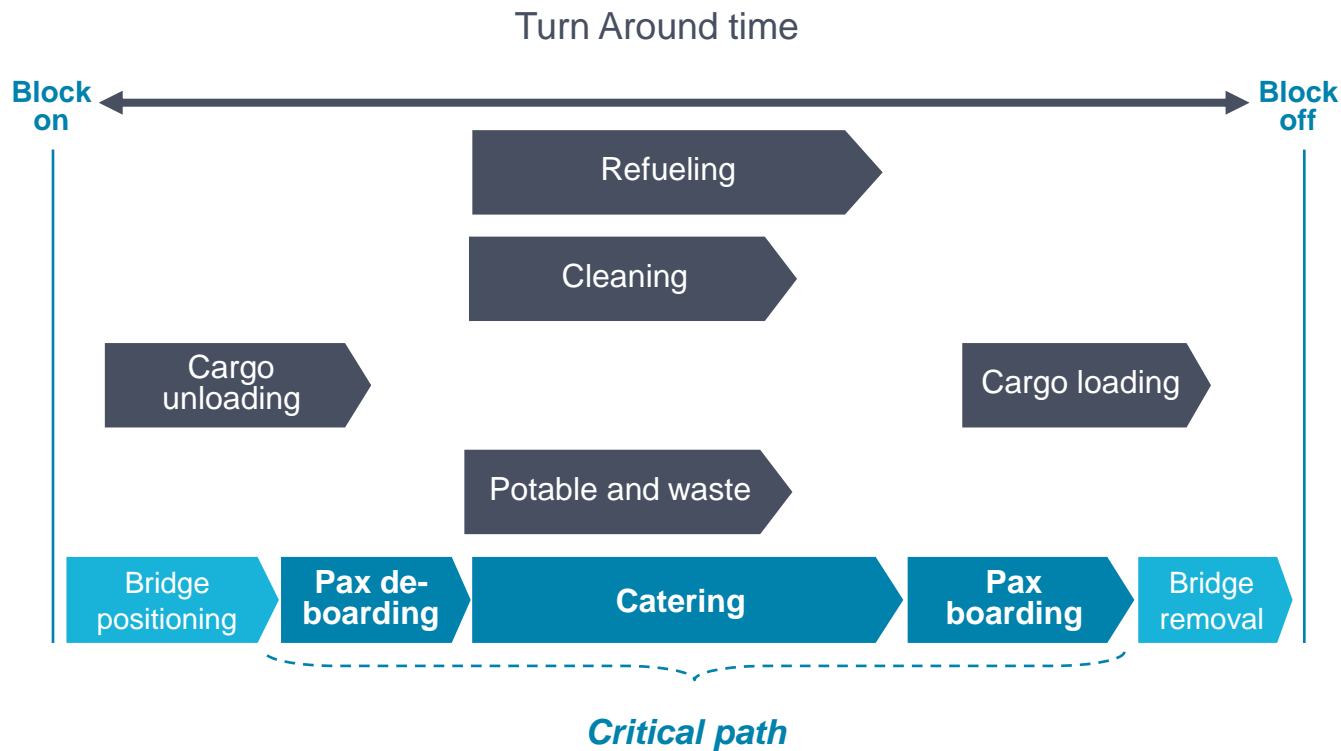
The upper deck offers differentiation to airlines and airports

Airbus 555 seat 3-class layout, with upper deck catering at door U1R

(Ref: Airport planning manual)

4-class standard layout <110min

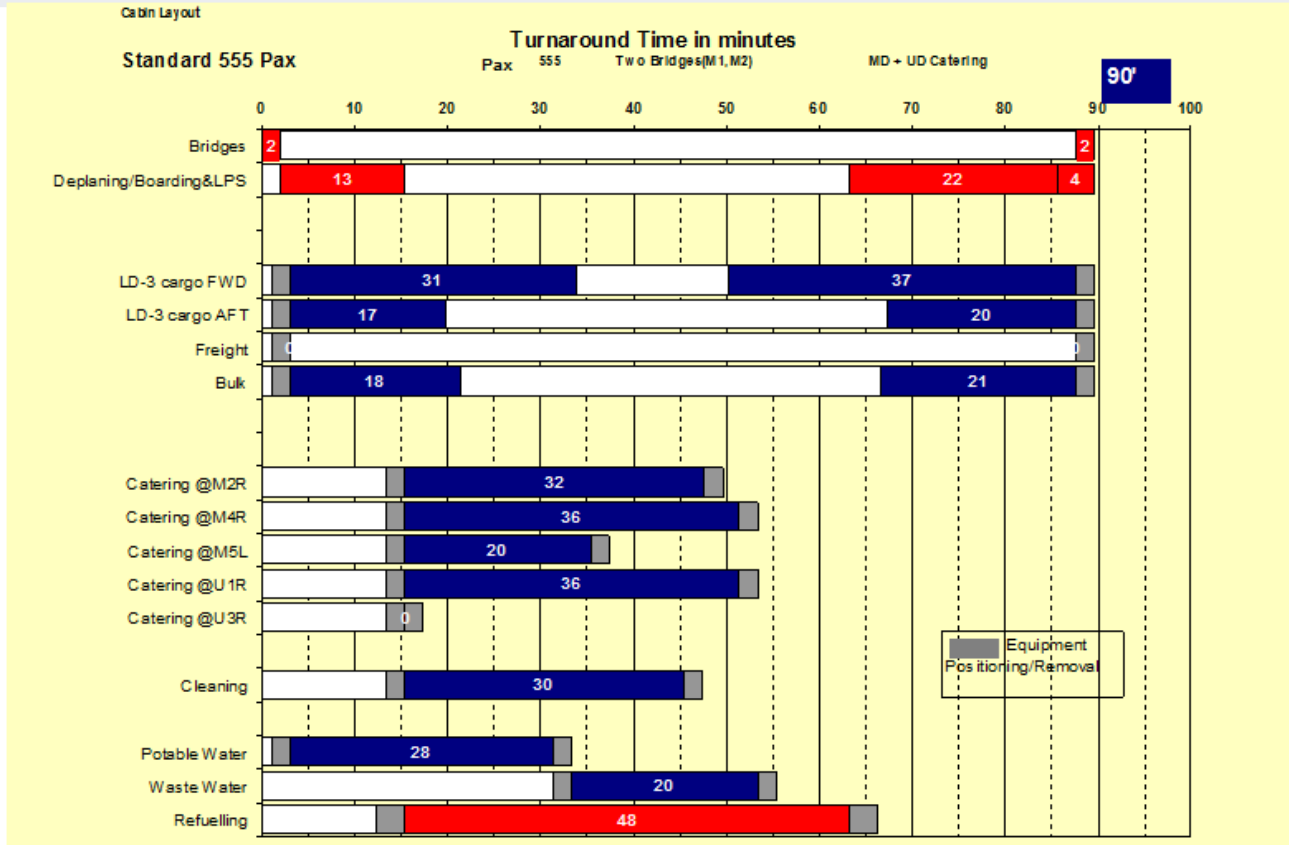
# Critical path for turn around of large aircraft



## Turn around time

A380 is designed to minimise the time of the critical path

# A380 Turn around time – 3 class



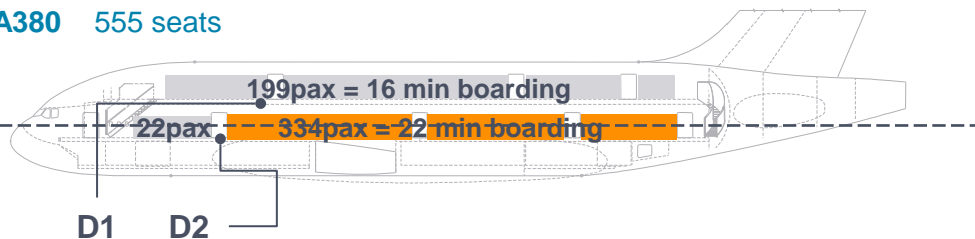
# A380: better cabin architecture allows quick boarding

Two bridge main deck boarding for both aircraft

## A380 Stairs

- Dual Lane
- Optimal Door 1 location
- Balanced door flows

A380 555 seats



## A380 boarding

A more balanced flow between the two doors of the A380 provides **similar boarding times, despite a much greater capacity**

Airbus / Boeing Airplane Characteristics for Airport Planning (ACAP) layouts. Identical assumptions used for all aircraft

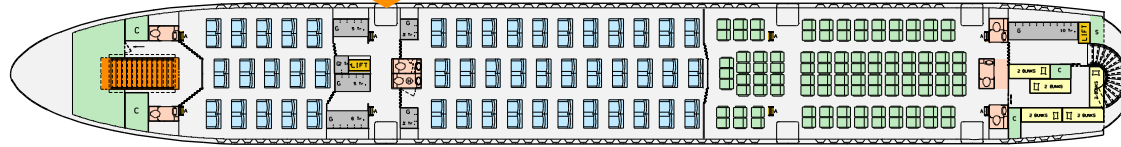
Boarding main deck-Catering upper deck

# Short catering time on the A380

## Upper deck

U1 Catering: 36 Min

U1R



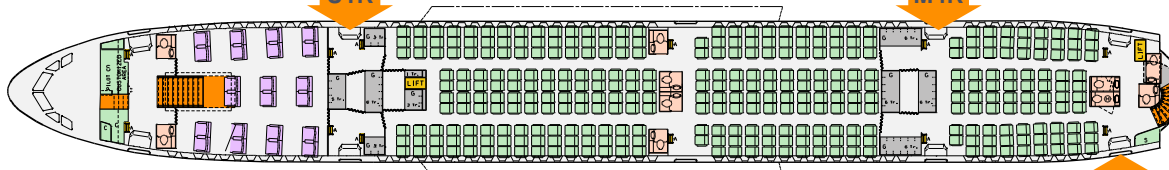
U1 Galley 24 FSTE\*

U3/End Galley 10 FSTE\* (via lift)

## Main deck

M2 Catering: 32 Min

U1R



M2 Galley 21 FSTE\*

M4R Catering: 36 Min

M4R

M4 Galley 24 FSTE\*

M5L

U3 Catering: 20 Min  
(Via M5L and aft galley lift)

## A380 Catering

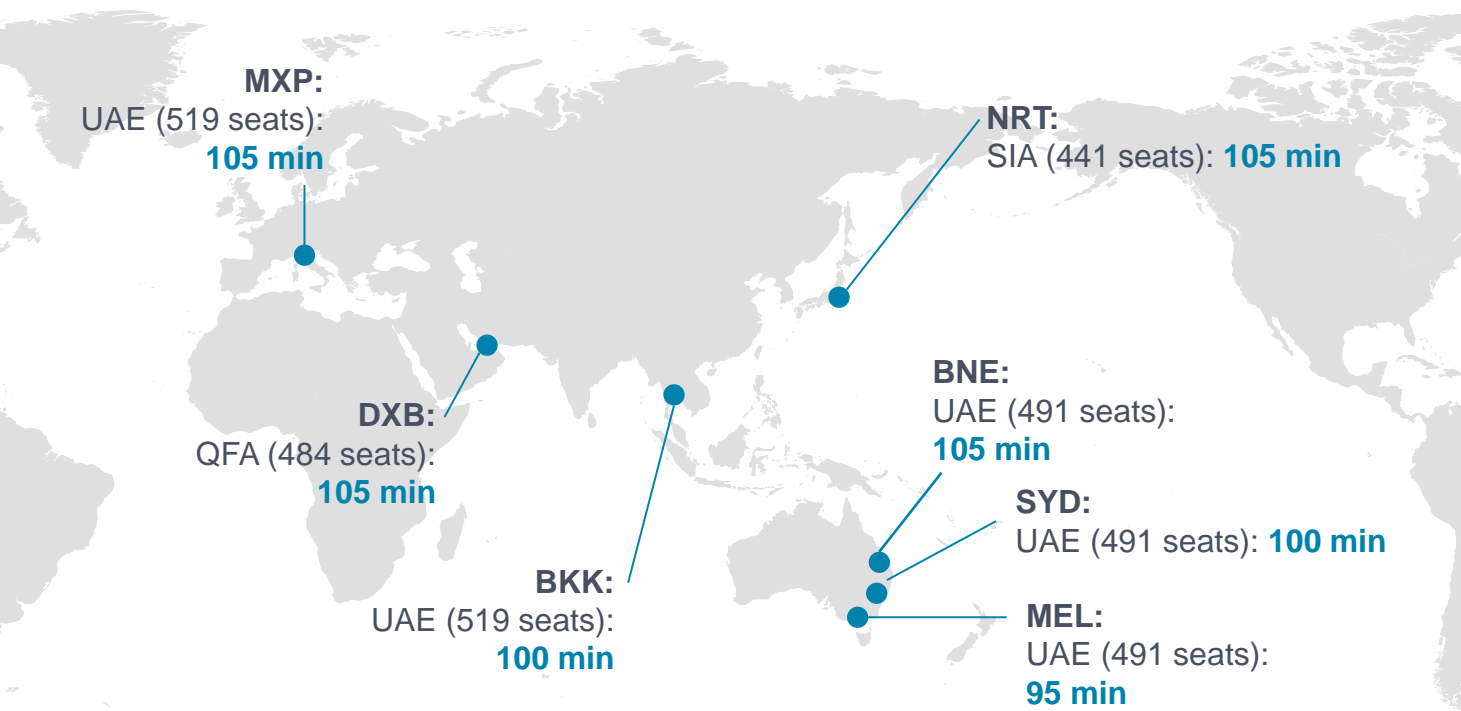
Direct  
servicing  
access to  
upper deck  
galley speeds  
catering

Airbus / Boeing Airplane Characteristics  
for Airport Planning (ACAP) layouts.  
Identical assumptions used for all aircraft.

\*FTSE= Full Size Trolley Equivalent

Boarding main deck-Catering upper deck

# A380 turn-arounds - in-service examples



## A380 in-service

Quick A380  
turnarounds  
everyday  
around the  
world

OAG November 2015

# A good business plan for airports



“The A380 on this route will provide an additional 55,000 seats during the peak summer period. We also estimate that it will contribute an additional NZD 45 million in tourism spend to our economy.”

**Charles Spillane**, Acting General Manager - Aeronautical Commercial, Auckland Airport

**Press release, August 17, 2014**



# A380 traffic booster at London Heathrow



## Heathrow Defies Capacity Cap as A380 Aids Passenger Increase Bloomberg By Kari Lundgren - Jan 13, 2014

London's Heathrow Airport, which has operated close to capacity since the start of the decade, added 2.4 million passengers last year as airlines eked out seats by operating bigger planes including the Airbus A380.

Europe's busiest hub attracted 72.3 million travellers in 2013, up 3.4 percent on 2012's 69.9 million, even as the number of flights stagnated, according to a statement today. **Seats per aircraft increased by 2.8 percent on average.**

Heathrow is fighting for the opportunity to build a third runway after being limited by the flight capacity of its two existing strips. Carriers have responded by **boosting the average size of jets there, led by a surge in A380 operations that have made the airport the third-busiest in the world for the superjumbo**, according to Airbus, up from fourth in 2012.

**January 11, 2016**  
**Full' Heathrow Adds 1.6 Million Passengers Aided by Bigger Jets**  
**2.2 percent gain**, even as **plane movements increased just 0.3 percent**, it said in a statement Monday. By the year's end, more than 20 Airbus Group SE A380 superjumbos were landing every day, helping to lift the average number of seats per flight to 209.

## A380

Strong leverage  
to increase  
traffic at London  
Heathrow

# A380 generates employment & wealth



An additional daily **A380** service from **Dubai to Sydney** would, on an annual basis, contribute an estimated:

- **\$342 million to Australia's GDP**
- **4,400 FTE jobs**  
(2,800 of which are in NSW)

## The New Zealand Herald

The introduction of the **A380** on daily **Dubai-Brisbane-Auckland** route, previously operated with a 777-300ER, would:

- Boost annual capacity by **100,000 seats**
- Inject an extra **\$100 million** into the New Zealand economy

## A380 multiplier effect

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Direct and indirect benefits to airports and the regions they serve

Source:

The economic value of Sydney Airport.  
January 2013

The New Zealand Herald. October 2013

