



Presented by

Herbert Gielen
Manager Airport Safety
AIRBUS S.A.S.



Next Generation Aircraft

The Airbus View

London, 22nd of April, 2009



Yesterday's Future, Today's Reality

- A380-800 Service Experience

Future to come

- The A350 Family
 - Airport Operability Design Objectives
 - A350 Basic Aircraft Characteristics
 - A350-900 Service points
 - Conclusion



Yesterday's Future, Today's Reality

- A380-800 Service Experience

Future to come

- The A350 Family
 - Airport Operability Design Objectives
 - A350 Basic Aircraft Characteristics
 - A350-900 Service points
 - Conclusion

A380-800 In Service Experience



Building up commercial flights

● 13 aircraft delivered

● Singapore Airlines

- 6 aircraft: SIN to SYD, LHR and NRT

● Emirates

- 4 aircraft: DXB to JFK, LHR, SYD and AKL

● Qantas

- 3 aircraft: SYD and MEL to LAX, SIN, LHR

● 33700 Flight Hours, 3500 Take Offs

Very smooth ground operations from the start

A380-800 In Service Experience

Visited Airports



Status April 2009



Rem: Commercial service

From small airports to major hubs



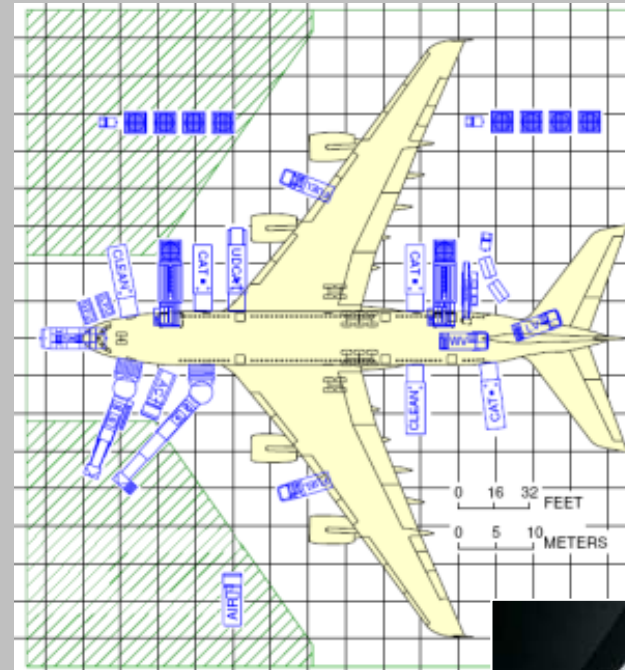
A380-800 In Service Experience

Ground Support Equipment (GSE)



All GSE available:

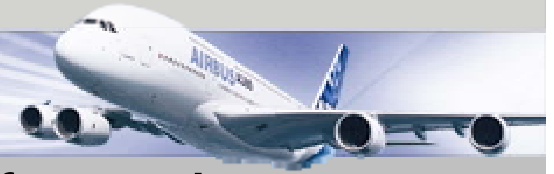
- Validated during flight test period
- Mainly Standard GSE
- Only 2 typical “A380” GSE*
 - Developed in industry working groups led by Airbus
 - Upper Deck catering truck
 - Tow tractor (70t)
- Large choice of GSE manufacturers



* New A380 capable equipment also compatible with other wide-body aircraft

A380-800 In Service Experience

Ground Handling



- Ground operations have been uneventful from the start
- Excellent airline/ground handlers preparation
 - Early airport visits used to check ground service interfaces
 - Technical root proving flights to check ground service procedures and to train ground staff
 - Training material (videos) prepared during airport visits
- GSE and processes ready
 - No difficulties with various ramp layouts used
 - GSE staging/approach important to ensure safe and quick TRT
- All GSE performing satisfactory
 - UD catering truck docking shows steep learning curve

Often heard comment on the ramp:

A380 can be handled like any other wide body aircraft

A380-800 In Service Experience

Quick Turn Round Time



Some TRT examples

Singapore

90min transfer

London Heathrow

130min TRT

*To be reduced to
120min next month*



Sydney

135 min TRT

Dubai

105 min TRT

Minimum observed time = 84 min

A380-800 In Service Experience

Encountered Issues (1): GPUs



- Ground Power Units availability & performance:
 - GPU availability at London Heathrow terminal 3
 - Only 3 FEGP connectors available, sometimes only 2 connectors operational
 - Results in load shedding on the aircraft
 - Additional mobile unit required
 - One case of GPU connector with bend pins
 - One cable from FEGP found too short
- Airbus recommends to supply the A380 with four external connectors delivering 90kVA each

A380-800 In Service Experience

Encountered Issues (2): Passenger Boarding Bridges



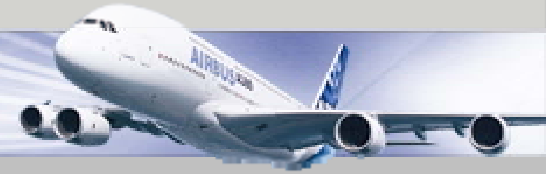
- Passenger bridge head, canopy and anti collision sensor settings (M2 & U1)
 - To avoid spurious collision detections:
 - Fine tuning required of bridge sensors
 - Training of operator



- Bridge head
 - Sealing of upper canopy at door U1L
 - Canopy at rain gutter at door M2L
 - Platform dimension at door M2L
 - Door handle clash with operator station at door M2L

A380-800 In Service Experience

Encountered Issues (3) : UD Catering Trucks



- **UD catering truck platform side guards**

- Some modifications recommended to avoid risk of loose objects dropping down

- **Ref AHM 926 chapter 5.3**

“For over wing operation adequate means shall be provided to prevent any fluid spillage and objects from falling.”

Modified side guards



Available documentation



- Limited access (Airlines only)
 - Aircraft Maintenance Manual
 - Ground Handling Manual (integrated into AMM)
 - SIL 24- for GPU usage
 - SIL 09-002 for towbarless towing
 - SIL 09-003 for towbar towing
- Aircraft Characteristics
- A380 Ground Handling poster



Available documentation

Aircraft Characteristics (AC)



A380

AIRPLANE CHARACTERISTICS

AC

The content of this document is the property of Airbus.
It is supplied in confidence and commercial security; its contents must be maintained.
It must not be used for any purpose other than that for which it is supplied, nor may
information contained in it be disclosed to unauthorized persons.
It must not be reproduced in whole or in part without permission in writing from the owners of
the copyright. Requests for reproduction of any data in this document and the media authorized
for it must be addressed to Airbus.
© AIRBUS S.A.S. 2005. All rights reserved.

AIRBUS S.A.S.
Customer Services
Technical Data Support and Services
31707 Blagnac Cedex
FRANCE

Issue: Mar 30/05

Rev: Jan 31/08

- AC provides A380 technical data for airports, ground handlers, airlines and GSE manufacturers, to prepare for the A380:

- airplane dimensions
- take off and landing distances
- ground operations data
- taxiing, parking, and pavement requirements

- Document available free of charge via Airbus homepage

http://www.content.airbusworld.com/SITES/Technical_Data/docs/AC/DATA_CONSULT/AC_A380.pdf

Available documentation

Ground handling poster



Handling the A380: what's new?

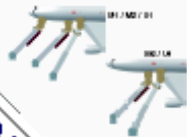
Passenger Boarding Bridge positioning

The A380 is the only aircraft offering direct upper deck access with passenger bridges. It enables more comfort and additional service to passengers sitting on the upper deck. Up to three bridges can serve the A380 simultaneously.

Several scenarios exist for passenger access:

- 3 bridges at M1L, M2L and U1L.
- 2 bridges at M1L and M2L.
- 2 bridges at U1L and M1L or M2L.

Sequencing and/or pre positioning of bridges may be required depending on bridge configuration, refer to specific gate procedure applicable.



Passenger door operation

Electrical opening or closing for easier operations.

Manual opening is possible as well (similar to other Airbus aircraft).

- 1 - Door and Slide Indication Panel (DISP).
- 2 - Red Cabin Pressure Visual Warning Indicator.
- 3 - Door Control Handle.
- 4 - Door Assist Handle.



Pushback/Towing

Like any other type of widebody aircraft, the A380 requires a specific towbar.

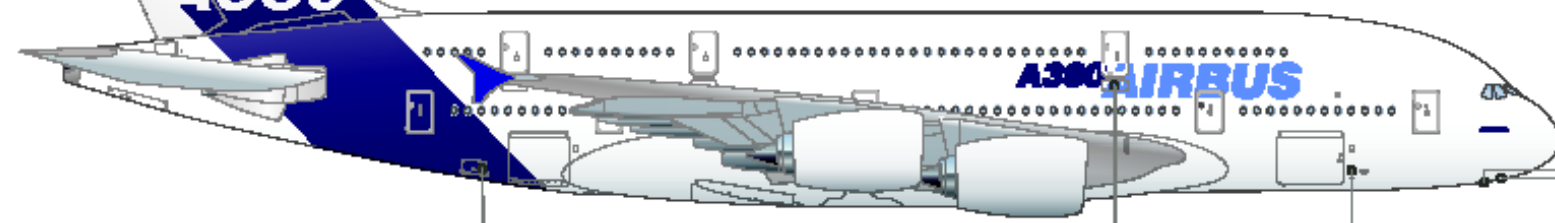
For conventional tow tractors:

When surface is DRY, a 50t tractor is always sufficient, up to the worst case conditions (Max. Ramp Weight (MRW), slope 2%, 2 engines idle).
When surface is WET, because of its size and MRW, an adapted tractor may be required. In the worst case conditions, a 70t tow tractor is needed.

For Towbarless Tractors, refer to SIL 09-002 for qualified vehicles.

For additional information refer to:

- ACAP section 5.8 for tractor weight calculation.
- SIL 09-003 for towbar characteristics.

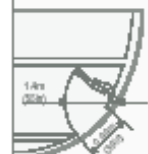


Bulk cargo compartment access

The bulk cargo door, is positioned in a curved area of the lower fuselage.

As a result, a section of the bulk cargo compartment has a sloped floor and a step in the door sill area.

The clear opening is 1.13m x 0.99m (44in x 39in) and the specific shape of the bulk entrance means some voluminous items may have to be treated specifically.



Upper Deck Catering at door U1R

To reduce the catering time, it is possible to directly access the galleys on the Upper Deck with a specific catering truck.

Contact with slide raft cover to be avoided. In case of contact, an inspection is required (AMM task).



A visual marking is available for additional vehicle positioning aid, (camera assisted vehicles): "H" in landing taxi lights (standard on all A380).



Forward cargo door

To offer more loading flexibility of the forward lower deck hold, the forward cargo door is 0.3m (12.4in) wider than the rear cargo door.

Thus, it is preferable to use a cargo loader with an adaptable platform width thus avoiding any gap between the loader platform and the cargo door.

For a seamless door opening, pull the handle fully down with a quick and continuous movement.

Ground Power Units (GPU)

The A380 requires, in normal operation, 4 GPU that can deliver 90kVA for each receptacle.

Details of loads and backup configuration, in the event of GPU non availability, are given in SIL 24-76.

To use ground servicing mode a 90kVA unit has to be connected to EXT 1.

For towing with GPU connected use EXT 3 or Ext 4.



For information only. Refer to Aircraft Maintenance Manual (AMM) or Aircraft Characteristics for Airport Planning (ACAP) for details.

Summary



- **A380 commercial operations are building up (10 airports)**
- **More than 80 airports already handled the A380 so far**
- **The A380 ground handling is very successful as a result of:**
 - Early and thorough preparation by all involved stakeholders
 - Aircraft design taking into account existing GSE and procedures
 - Readiness of the new A380 GSE (UD catering truck and towing vehicles)



Yesterday's Future, Today's Reality

- A380-800 Service Experience

Future to come

- The A350 Family
 - Airport Operability Design Objectives
 - A350 Basic Aircraft Characteristics
 - A350-900 Ground Handling and Servicing
 - Conclusion

Airport Operability Design Objectives



- Allow seamless replacement of existing LR aircraft
 - same airports
 - same slots
 - same processes & equipment
- Commonality
 - maintain proven operability of A330/A340 & A380
 - within A350 XWB family
- Operational flexibility for daily operations
- Sustainability of operation within an evolving regulatory framework

A350 Basic Aircraft Characteristics

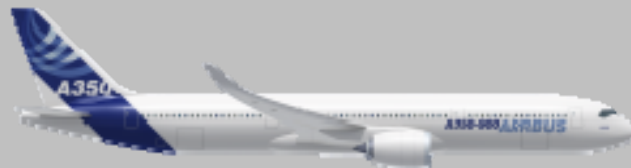


A350-1000



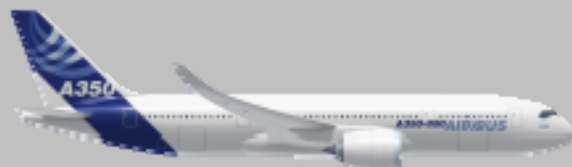
Span	64.00 m
Fuselage Length	72.20 m
Height	17.05 m
Fuselage Height	6.09 m
Fuselage Width	5.96 m
MTOW	298 t

A350-900



Span	64.00 m
Fuselage Length	65.30 m
Height	17.05 m
Fuselage Height	6.09 m
Fuselage Width	5.96 m
MTOW	268 t

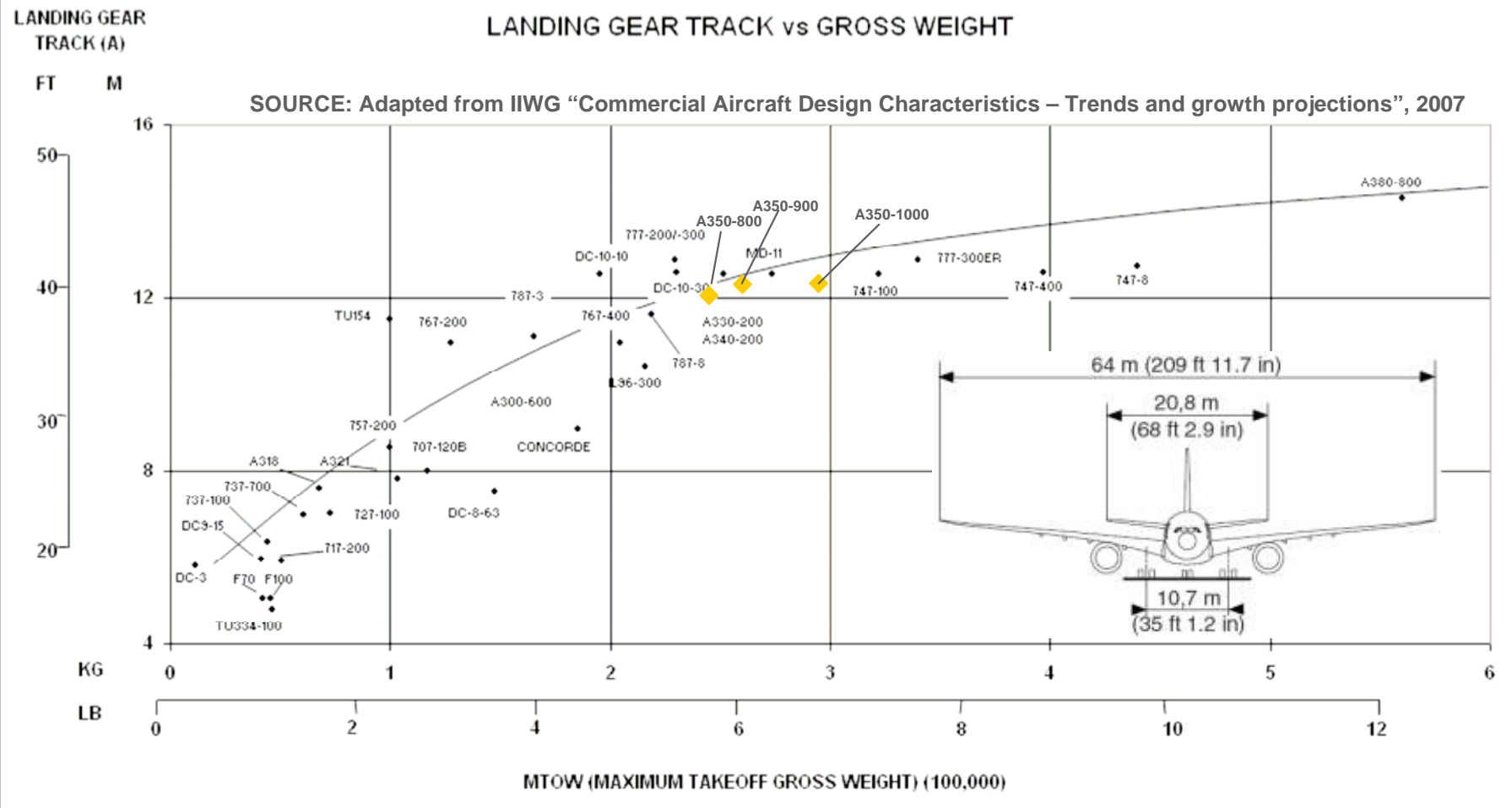
A350-800



Span	64.00 m
Fuselage Length	58.90 m
Height	17.05 m
Fuselage Height	6.09 m
Fuselage Width	5.96 m
MTOW	248 t

A350 Basic Aircraft Characteristics

Landing Gear Track Comparison



Minimized MLG track for optimized manoeuvrability

A350 Ground Handling & Servicing

Objectives

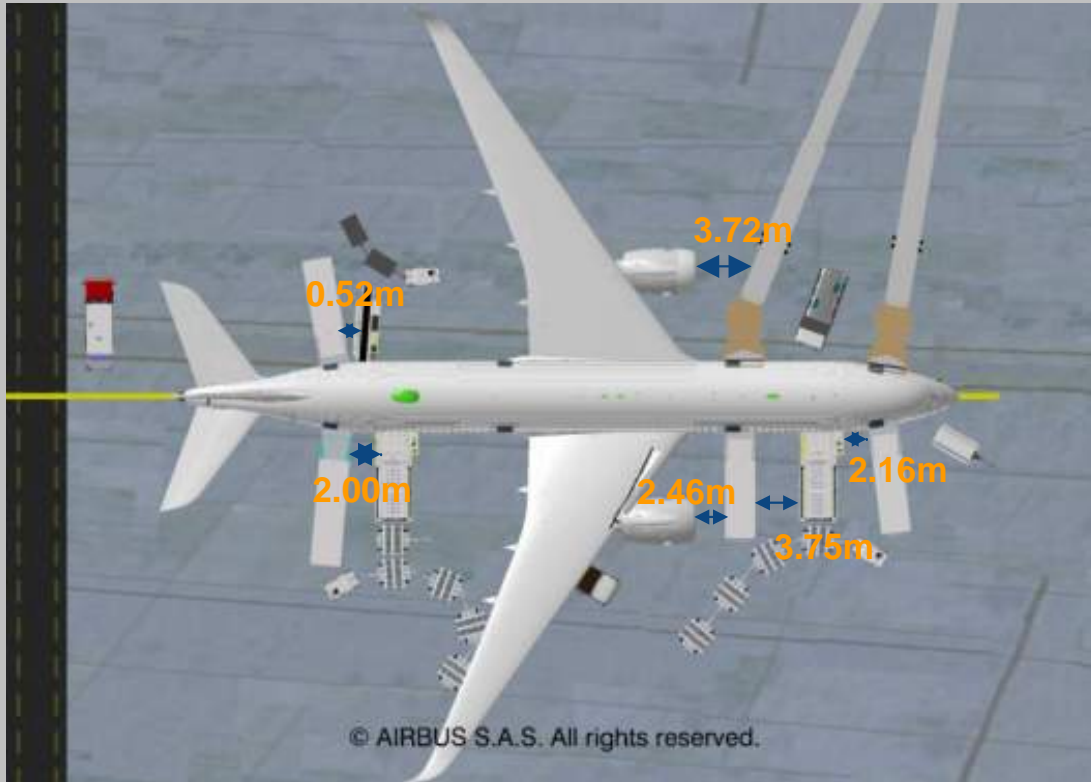


- Efficient aircraft ground handling important to achieve:
 - optimized aircraft and staff utilisation
→ cost!
 - high level of efficiency of airline and airport
→ capacity!
- A350 XWB standard aircraft servicing arrangement shall:
 - be in accordance to applicable rules and regulations
 - IATA Airport Handling Manual
 - SAE, ISO, JAR,
 - etc...
 - allow to meet minimum TRT
 - allow to perform all activities in parallel
 - allow use of existing GSE and procedures
 - minimize the risk of ramp damage

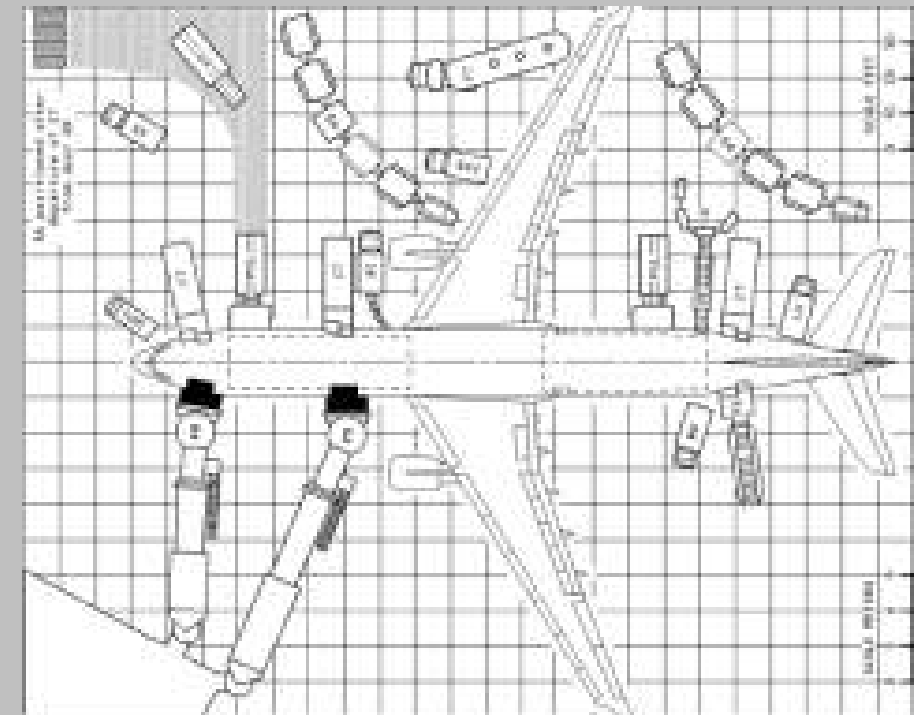


A350 Ground Handling & Servicing

A350-900 Typical Ramp Arrangement



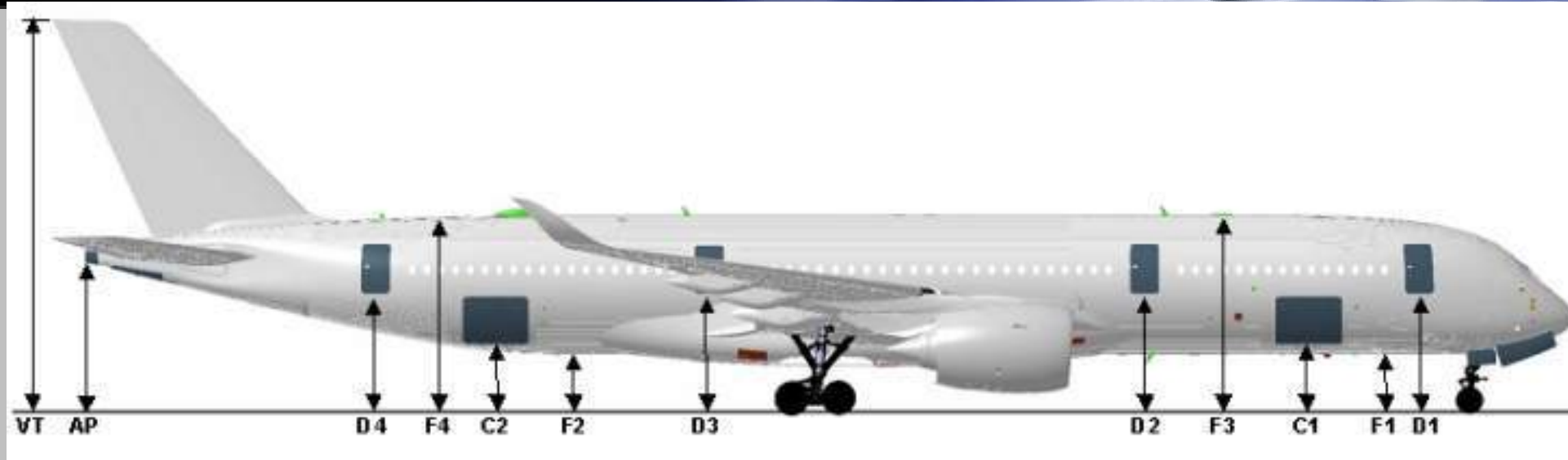
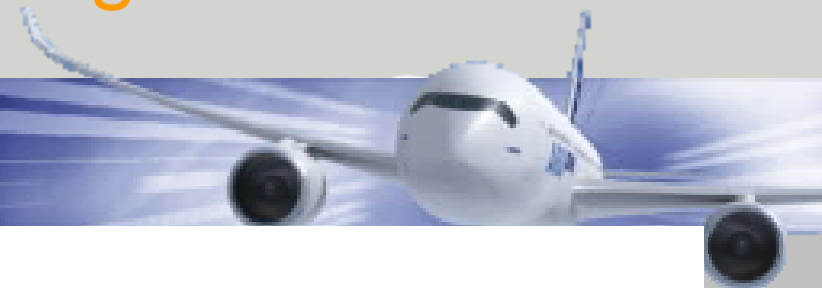
→ Similar to A330



- Door and service point location to allow simultaneous operation during aircraft turnaround (exception waste/potable water)
- Safety clearances allow safe turn around

A350 Ground Handling & Servicing

A350-900 Ground clearances

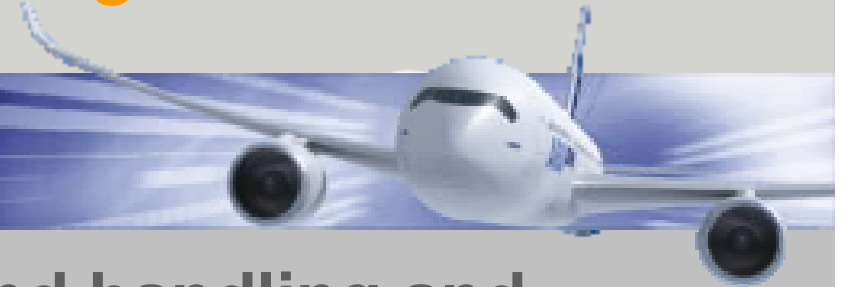


	265t, CG34%	140t, CG14%	140t, CG48%
D1	5.12	5.13	5.48
D2	5.13	5.20	5.38
D3	5.15	5.33	5.23
D4	5.16	5.43	5.11
C1	3.12	3.15	3.45
C2	3.15	3.38	3.17
C3	3.16	3.41	3.13
F1	2.47	2.50	2.80
F2	2.50	2.72	2.53
VT	17.08	17.42	16.92

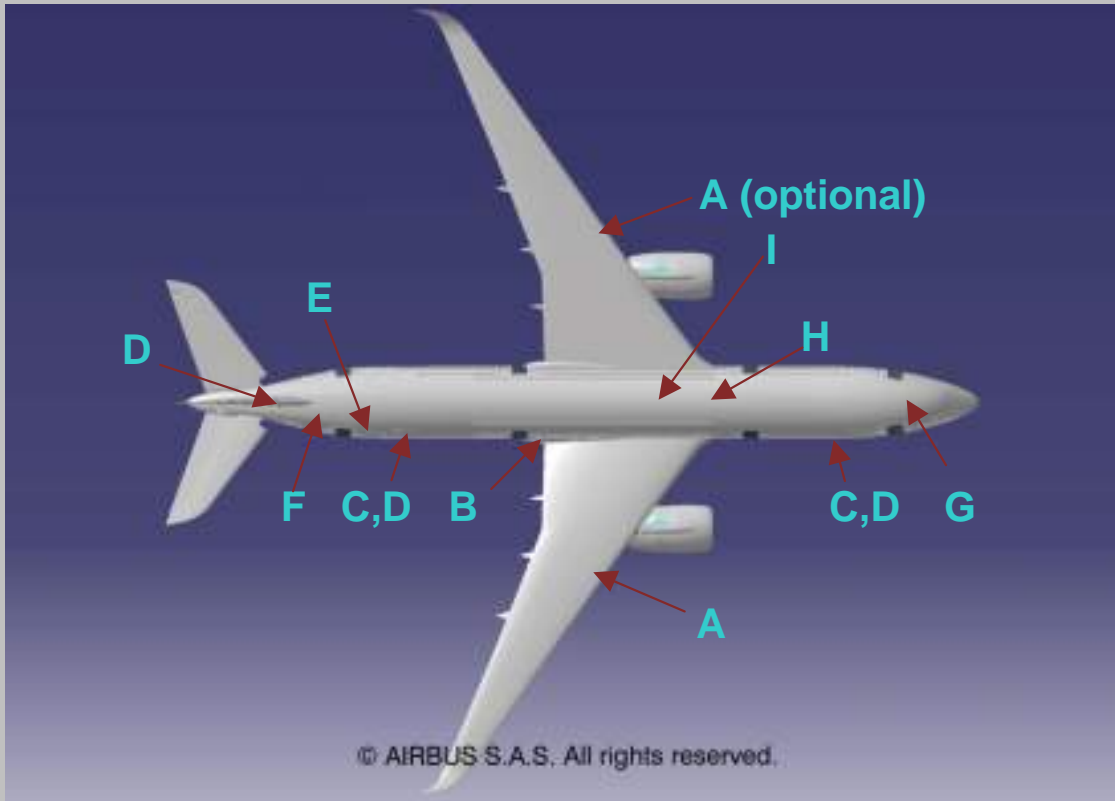
All dimensions in meters

A350 Ground Handling & Servicing

A350-900 Service Points



Compatible with conventional ground handling and servicing equipment

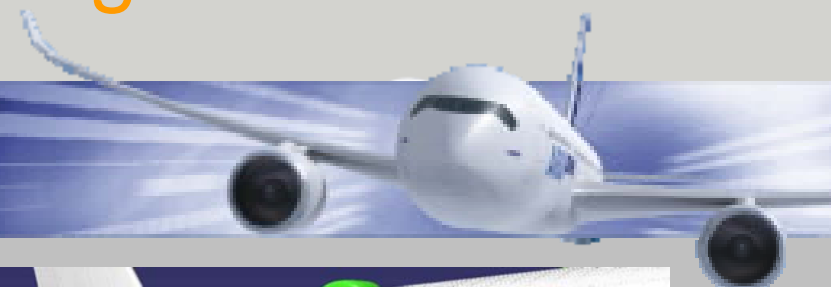


Ground connections

- A. Fuel
- B. Refuel panel (TBD)
- C. Cargo door control panel
- D. Cargo control panel
- E. Potable water
- F. Waste water
- G. Electrical Ground Power
- H. Low Pressure Air
- I. High Pressure Air

A350 Ground Handling & Servicing

A350-900 Service Points: refuelling



**Connector max. height
≈ 5.77m (OWE, AFT CG)**



Fuel panel on belly fairing.

Exact location TBD effect of noise, LG design

Max height 2.30m ⇒ steps required

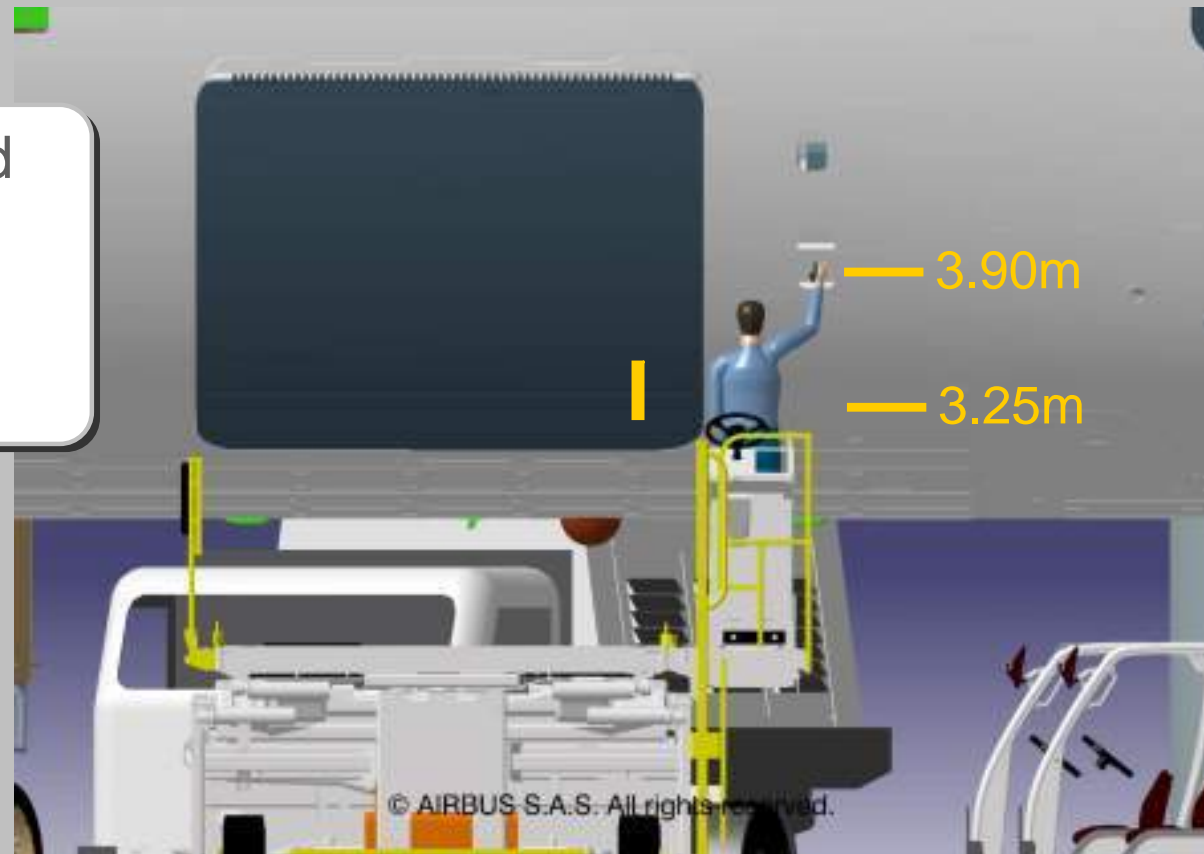
A350 Ground Handling & Servicing

A350-900 Service Points: Cargo Doors



- Lever on cargo door at RH bottom corner
- Cargo door control panel max. height: $\approx 4.10\text{m}$ (OWE)

- Type of GSE required
 - cargo loader
 - belt loader
 - access steps



A350 Ground Handling & Servicing

A350-900 Service Points: Cargo Doors (cont.)



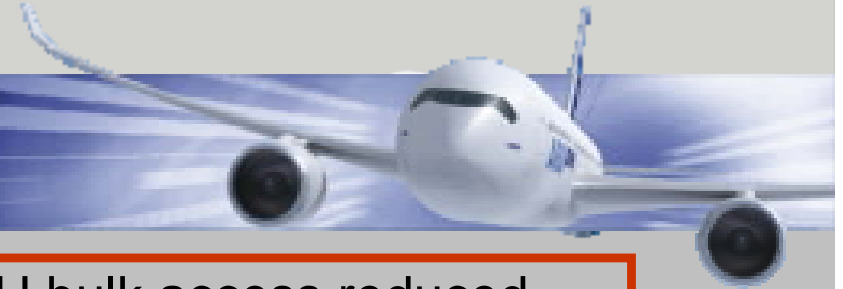
- **Cargo loading control panel max. height: \approx 4.70m (OWE)**



- Type of GSE required
 - lower deck and universal loaders

A350 Ground Handling & Servicing

A350-900 Service Points: Bulk Cargo Door



With R/H bulk access reduced clearance to adjacent GSE below IATA and Airbus standard

→ SAFETY Issue ←

Consequences

- Insufficient clearance between belt loader and cargo loader
 - Increases risk of ramp damage and ramp accidents considerably
- Acceptable clearance between catering high-lift vehicle and belt loader achievable only with alignment to fwd door frame
 - Acceptable but not best practice
 - Imperfect positioning of catering truck will further reduce clearance



A350 Ground Handling & Servicing

A350-900 Service Points: Bulk Cargo Door Relocation to L/H Side



- Bulk access on LH side :
 - Unobstructed access to bulk cargo compartment
 - reduced risk of ramp damage during GSE positioning
 - Optimizes simultaneous handling
 - supports shortest turnaround times
- Changes resulting from bulk access on LH side:
 - Cargo activities on both side of the aircraft for cargo staging and delivery
 - no principal showstopper
 - No activity free zone
 - to be considered for ramp emergency situations
 - but sufficient number of emergency exits exist at all times
 - Airlines / Handlers not yet operating aircraft with bulk left may need to modify their operating procedures and manuals

A350 Ground Handling & Servicing

A350-900 Service Points: GPU receptacles



- **Standard receptacles**
- **Connector height: \approx 3.11m (OWE, AFT CG)**
 - **access steps required**

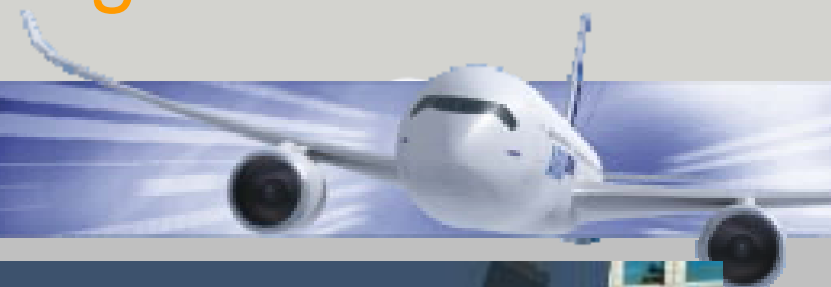
- 2 x 90kVA, 115VAC
 - Units should have power factor (PF) of 0.9 or better
 - Standard plugs in two panels
 - Connectors offset from centre-line for weight reasons



- Ground Service Network powered through one 90 kVA unit to allow
 - Cargo Operation
 - Refuelling
 - Cabin Servicing
 - Water & Toilet servicing
- Activation of GS network inside cabin only

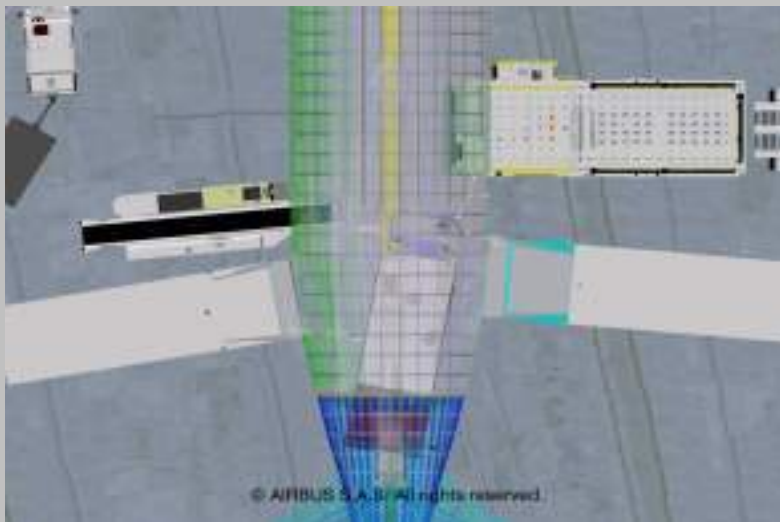
A350 Ground Handling & Servicing

A350-900 Service Points: Potable Water



- Reservoir capacity 1060 liters
 - Option for 1500 liters
- Standard connection
 - ISO 17775
- Connector max. height: $\approx 3.66\text{m}$ (OWE, FWD CG)

- Type of GSE required
 - medium/large vehicle



A350 Ground Handling & Servicing

A350-900 Service Points: Waste Water



- Reservoir capacity 1190 liters
- Standard connections
 - ISO 17775
- Connector max. height: $\approx 3.71\text{m}$ (OWE, FWD CG)

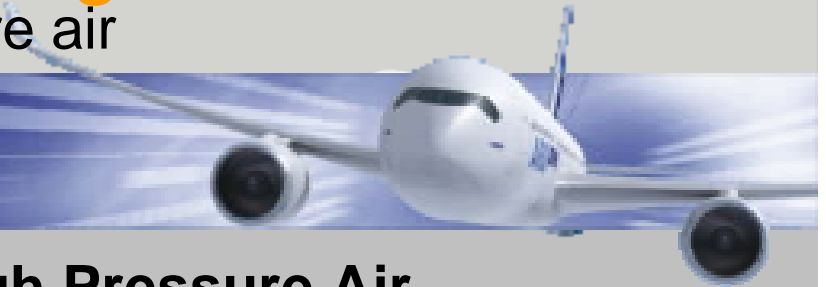


- Type of GSE required
 - medium/large vehicle



A350 Ground Handling & Servicing

A350-900 Service Points: Low and high Pressure air



Pre-conditioned Air

- Standard connections
 - ISO 2026
- Connector max height: \approx 2.62m (OWE, AFT CG)
 - access steps required

● High Pressure Air

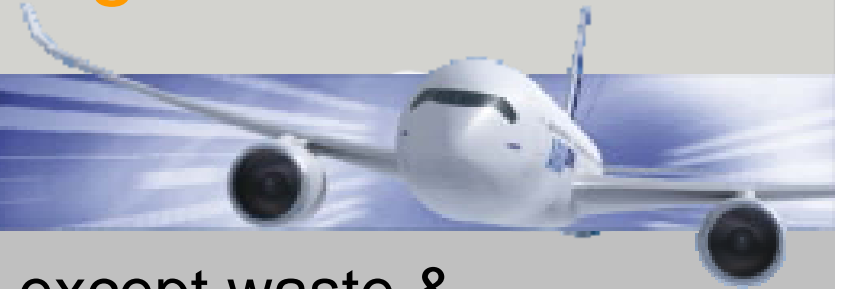
- Standard connections
 - ISO 2026
- Connector height: \approx 2.07m (MRW)

● B777 or A380 capacity recommended



A350 Ground Handling & Servicing

Conclusion



- Ramp layout shows that all activities, except waste & potable water servicing, **can be performed in parallel to shorten Turnaround Time**
- Waste & potable water servicing in sequence has **no impact on Turnaround Time**
- **No special GSE is required**

Thank you



A350 XWB
XTRA WIDE BODY

© AIRBUS S.A.S. All rights reserved. Confidential and proprietary document.

This document and all information contained herein is the sole property of AIRBUS S.A.S.. No intellectual property rights are granted by the delivery of this document or the disclosure of its content. This document shall not be reproduced or disclosed to a third party without the express written consent of AIRBUS S.A.S. This document and its content shall not be used for any purpose other than that for which it is supplied.

The statements made herein do not constitute an offer. They are based on the mentioned assumptions and are expressed in good faith. Where the supporting grounds for these statements are not shown, AIRBUS S.A.S. will be pleased to explain the basis thereof.

AIRBUS, its logo, A300, A310, A318, A319, A320, A321, A330, A340, A350, A380, A400M are registered trademarks.



AIRBUS

AN EADS COMPANY

A380 Ground Support Equipment (GSE)

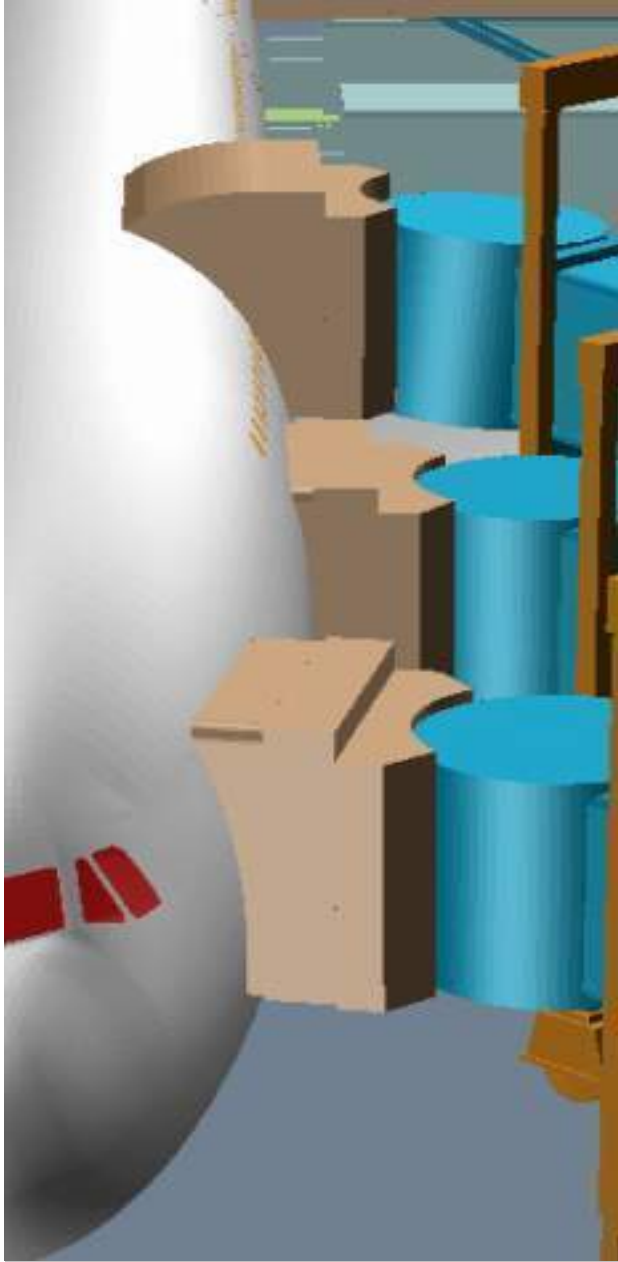
Upper deck catering Vehicles



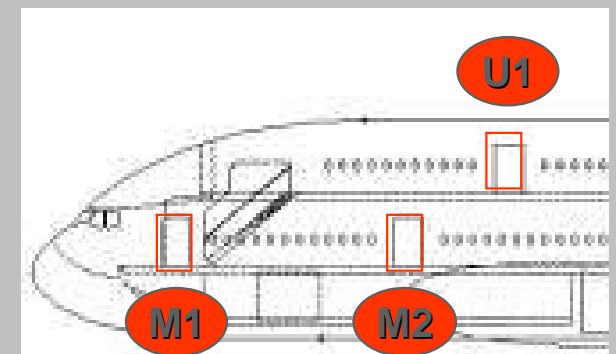
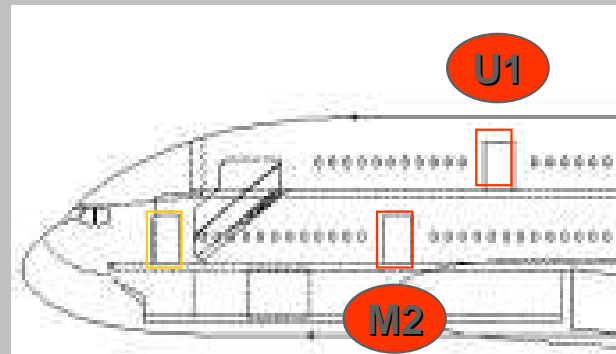
Source: www.airliners.net, copyright Andrew Hunt

Upper deck catering is proven

Direct Upper Deck Access

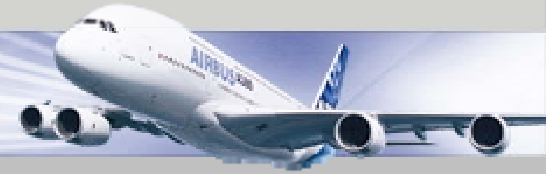


- Upper deck access can be achieved with two or three bridges configurations



- Second MD bridge offers higher comfort for premium passengers
- Impact on Turn Round Time minor

A380 capable tow tractors (70t and towbarless)



- Existing 50t tractors can handle the A380 in good tractive conditions. For adverse tractive conditions (slope, wet surface, 2 engines at idle) a 70t tractor or a towbarless tractor is required



- Note: Some existing towbar tractors can be ballasted up to 70t
- A380 capable tow and tow bar-less tractors available from 9 leading manufacturers, most are already in operation today :
 - Douglas, Goldhofer, TLD, Schopf, Koegel Kamag, FMC, Bliss Fox, GHH Fahrzeuge, Fresia
 - Compatible with existing wide-body aircraft

Towing (towbar & towbarless) is proven

Ground Handling Experience



- Very good experience with first A380 customers
- No difficulties with various ramp layouts used
 - GSE staging important to ensure safe and quick TRT
- All GSE performing satisfactory
- Limited issues experienced



Significant experience, very few issues

A350 Ground Handling & Servicing

A350-900 Service Points: GSE Details for Study



- Ramp layout constructed using existing equipment
 - No special equipment required

- Equipment used in study:
 - Catering truck at door 1R & 2R: Sovam CT40CO
 - Catering truck at door 4R: Sovam CT50CO
 - Cleaning truck at door 4L: Sovam CT40CO
 - Belt loader: TLD NBL
 - Cargo loaders (FWD & AFT): FMC Commander 15i
 - GPU: TLD
 - Airconditioning: Airbus internal
 - Fuel truck: Shell refueling hydrant
 - Water truck: Vestergaard VTS
 - Waste truck: Vestergaard VTS
 - Dolly trains: TLD THy20 (tractor) + Airbus internal (dollies)