

Ground force

Henry Canaday takes a closer look at the army of vehicles and equipment that will be required to accommodate the A380 on the ground.



The biggest challenge in being prepared for the A380 is infrastructure, such as jetbridges, runways and taxiways," summarises Bernhard Scholz, senior manager for ground service equipment (GSE) and known as 'Mr A380' at Fraport. "Compared to that, operating and handling the A380 is easy."

That is easy for Scholz to say. He has spent seven years thinking about the A380. For others, the big jet still poses some puzzles, but many puzzles are really trade-offs between costs and handling efficiency.

In all, a typical A380 turnaround will require about 21 separate pieces of ground equipment, about the same number and generally the same types as for other widebody aircraft. Scholz ticks off some specific items airports need to check

- Jetbridges and their configuration
- Catering trucks
- Tow tractors
- Cargo loaders for A380 passenger jets
- De-icers
- Fueling and power
- Cargo loaders for A380 freighters

New jetbridges must accommodate the different contour of the A380's fuselage and its wider door; plus be able to swing to the left and, for upper-deck loading, reach a height of more than eight metres. The length of the bridge's own landing gear is thus longer.

The real choice is in the number of jetbridges and how they connect gates

with airplanes. Scholz says adding a third jetbridge is mostly a matter of convenience for passengers and separating premium-class passengers from economy travellers. The critical factor in boarding time is usually the number of economy passengers aft of the second main-deck door; of which the A380 will usually have the same total as for the B747. Scholz estimates that a third jetbridge for the A380 might save only two or three minutes in boarding.

Paul Pierroff, marketing manager for FMC Technologies, believes that time savings will depend on the cabin configurations. Some A380 operators will offer premium seating throughout the upper deck, while others put these seats in the front of both upper and lower decks. Some airlines will have three classes of service, others only two.

And some will isolate premium service from economy service, while others allow the classes to mingle. In one particular configuration, Pierroff estimates that a third jetbridge might save up to seven minutes in boarding. But in other layouts, savings are less, and in extreme cases, three jetbridges could actually be slower than two.

Airports must also decide whether certain gates will be dedicated exclusively to the A380 or serve other aircraft that do not need the third bridge. That in turn depends on the volume of A380 service. And airlines, configurations and volume will all change over time.

Major airports appear to be aiming for the three-bridge approach, but at different paces and in different ways. For example, Fraport will start operations with two jetbridges made by Thyssenkrupp Airport Systems at a couple of gates in Terminal 2. In mid-2007, more gates will be added and all A380 gates will get three bridges each.

Melbourne International has already installed two FMC jetbridges at each of two gates. Both gates will be used for a single A380, loading the upper deck through one bridge and the main deck through two. Then these two gates can be used separately to serve two smaller aircraft. Sydney International is planning on having three FMC jetbridges at each of five gates, one for the upper deck and two for the main deck of a single A380.

Aéroports de Paris (ADP) has ordered 18 jetbridges for six gates at Paris-CDG's Satellite 3 from Thyssenkrupp. The same firm will make A380 jetbridges for the new Dubai International, which ADP International Engineering helped to design and build. At both CDG and Dubai, there will be two jetbridges for the main deck and one for the upper deck.

In any case, supply should be plentiful. Canada's Dewbridge Airport Systems, China's TianDa and several other companies are also interested in making jetbridges for the A380.

An upper-deck catering truck, while not essential, is necessary for handling the A380 in both a timely and efficient

manner: "It is possible but horrible to have to take the food up the stairway," says Scholz. And the stairway approach is slow. At Fraport and other main hubs, airlines want a 90-minute turntime, which upper-deck loading can satisfy, while loading only through the main deck requires almost 40 more minutes.

Upper-deck loading is tricky, however. The front door of the A380's upper deck is above the wing root, so the approach of a catering truck to this door must be very precise. The final distance to the fuselage must be a little over 4m, while distance to the inboard engine must be nearly a metre. Once the truck's body elevates to 8m, it must shift forward to dock with the upper-deck door.

Global catering firm, Gate Gourmet, has been looking at three prototypes of high-loaders for the A380's upper deck, from Inutsuka, FFG Fahrzeugwerkstätten Falkenried and Doll Fahrzeugbau. Doll also has a subsidiary in Bangkok that will make equipment for the Asian market. Experts at Gate Gourmet plan to test the Doll prototype in Frankfurt in early 2006.

Catering the A380 not only requires high loading, but larger capacity, according to Martin Riecken, vice president of LSG Lufthansa Service. Both capital and operating costs are major considerations. "We are also looking closely at manoeuvrability, since handling the truck must be easy to learn for the drivers," Riecken adds.

By early January 2006, LSG was talking to a number of potential suppliers, including FFG and Doll, to meet its European requirements. "Requirements vary from country to country, so LSG will probably not source from just one supplier," Riecken notes. "Generally, US and Asian requirements are not as high as here in Germany."

FFG presented its A380 catering vehicle in Toulouse in July 2005. Weighing 26 tonnes, the FFG truck is 11m long and

capable of delivering 4,500 kilogrammes of supplies, equivalent to 53 catering trolleys. FFG has developed a new docking procedure and special electronic controls to meet the sensitive approach challenge, and the truck is designed to remain stable in winds of up to 60 knots.

Doll's X Cat L high-loader catering truck has a payload of four to six tonnes, equivalent to more than 46 full-size trolleys. Complete with refrigeration units and a closed platform, the new truck has been designed for stability at winds up to 52 knots in a fully raised position.

Scholz calls both the FFG and Doll vehicles "excellent solutions" to the A380's upper-deck catering requirement. "This problem is very well solved." Tesco Equipment in the US, France's Sovam and four other manufacturers are also expected to make catering trucks for the A380.

Because of its weight, the A380 generally requires more powerful towing tractors for pushback and possible maintenance. There are a number of models available, each with different characteristics.

Towing in dry conditions requires a less powerful tractor than is necessary for wet or icy terrain, and it is even possible for conventional widebody tractors to tow an A380 below its maximum ramp weight in dry conditions. But airports will usually have to buy a new tractor, either a standard tractor with tow bars or the more expensive towbarless tractor.

A standard A380 tractor will run from €300,000 to €400,000, while a towbarless model will cost close to €1 million. "You need a towbarless tractor only for high-speed towing at 30 to 40kph," claims Scholz. "If all you want is pushback, you would be nuts to use towbarless, you would be wasting money."

Fraport has chosen the million-euro option, Goldhofer's AST-1 X 1200 towbarless tractor, because it needs the speed and power. Lufthansa is building its A380 maintenance base on the airport's south side, and there will be plenty of long-distance towing of the big jet. In all, Goldhofer is offering four towbarless tractors for the A380, the 1200, 800, 680 and 400. Airbus is currently using a Goldhofer 400 and an 800 in Hamburg.

The Goldhofer model numbers indicate rough horsepower and thus speed. For example, the 1200 has 1180 horsepower and can tow an A380 at 32kph or push back at 15kph. The 800 has about a third less power and is slightly slower in both towing and pushback. The 680 and 400 are similarly less powerful and less quick.

FMC's towbarless entry for the A380, the 530-horsepower Expediter 600, is expected to secure all its technical approvals by August 2006. Schopf makes a less expensive standard tractor with towbars. Schopf has already delivered 25 of this new A380-capable tractor, the F396P, to customers in Europe, the Middle East, Africa and Asia-Pacific.

Douglas-Kalmar makes both standard and towbarless tractors. The standard model for the A380 is the DC12-600 with 535 horsepower, while the towbarless model is the TBL-600 with





750 horsepower: The first TBL 600 has already been delivered to Emirates Airlines in Dubai.

Douglas sales director, Mike Doane, argues that towbarless tractors, apart from moving jets faster, have operating advantages that may make them more economic than standard tractors in the long run. He cites a recent study at a major European airport that estimated ground handling costs would be 50% lower over operational life with a towbarless tractor. These gains came chiefly from a 40% reduction in workers and a 25% reduction in tractor numbers, but the airport may not be typical.

In all, Airbus says eight manufacturers will offer A380-capable tractors, either standard or towbarless.

The lower deck cargo compartment of the A380 passenger jet can be loaded with standard cargo loading equipment. But Scholz says slightly different equipment is necessary to do the job most efficiently. Trepel Airport Equipment makes a wider version of its conventional cargo loader especially designed for the A380.

The need for new de-icing equipment depends partly on airport climate. Where icing is possible, airports should obtain new or modified de-icers, due to the taller height of the A380's tail.

FMC's current Tempest de-icer works well on all portions of the A380, except for the upper tail. The company's new Tempest xr de-icer has a telescopic main boom, giving it the needed working height of 16.7m. The xr will be ready for testing in August 2006 for service at London-Heathrow.

FMC is also offering to retrofit older Tempests with the telescopic boom to accommodate the A380. FMC recommends that customers use two to four regular Tempests to de-ice each A380, plus one xr, or retrofitted Tempest, for the upper tail section.

If an airport can fuel common widebodies like the A340 or B777, it will be able to fuel the A380. The A380 will require at least 180 kVA of ground power and may need up to 360 kVA. Airports will generally have to upgrade power systems with either mobile or ground units.

The A380 freighter will need special equipment for loading its upper deck, but the need is still in the future and the most efficient approach to meeting it is uncertain, depending partly on the requirements of individual airlines.

FMC Technologies has already patented its new upper-deck loader, the Commander xr, and expects it to enter service in early 2007. The new loader will load and unload the upper deck of A380 freighters in the same time required by other large cargo aircraft.

The xr has three platforms, a lower platform that moves between 0.5 to 5.6m, a transfer platform that elevates between 4.1 and 8.4m and a bridge that also rises from 4.1m to 8.4m to match the upper deck loading door of the A380F. FMC recommends using its Commander 30 Main Deck loader for the right-rear main-deck door; reserving the xr for the A380's upper deck. While not serving the A380, the xr can also load other common widebody freighters.

Trepel managing director Klaus Pfeiffer says his company applied for a patent on its upper-deck loader in 2002 and expects to publish the design shortly. The Trepel equipment will operate jointly with existing main-deck loaders.

"It will be positioned between the front end of the conventional main-deck loader and the A380F," Pfeiffer explains. The Trepel design has two loading platforms, one of which docks to the upper-deck door and forms a bridge to the second platform. Pfeiffer says the approach will enable a two-hour turn around time for the A380F.

Airlines have been thinking about speed, reliability and economy in operating the A380 for a long time. Now that their requirements are becoming clearer, airports must start thinking in the same terms. Partly, that requires making difficult trade-offs between cost and operating efficiency. But airports must also get the most out of whatever equipment they purchase.

DHF Airport Systems has introduced a new product, Apron Controller, to improve the reliability of systems critical to A380 ground handling.

Apron Controller is a module in DHF's Airport Fault Detection System that interfaces with equipment such as visual docking, jetbridges, power and fuelling, and aims to promptly identify 100% of faults, rather than the 5-10% common to traditional fault detection. **AW**