

# WheelTug demonstration shows off wide range of benefits

In mid-September, the WheelTug taxi system was put through its paces at Memphis International Airport. The innovative aircraft tow technology was being shown off publicly for the first time in a live airport environment

As described in the autumn issue of *Airside* (<https://www.airsideint.com/issue/autumn-2020/>), WheelTug has continued to grow in popularity during its development and trials process, though it is not yet in serial production.

A WheelTug unit, installed on to the nose wheel of an aircraft, can drive the aeroplane forward and backward when approaching or leaving a gate. Using the power of the aircraft's own auxiliary power unit (APU), WheelTug drives the machine either on to or away from a stand, obviating the need for the engines of the aircraft to run on power – they can remain on 'idle' – or for a separate tow tug to be used at that point.

The aircraft's pilot or co-pilot controls the movement of the aircraft from the flight deck. A camera system can be fitted as part of the WheelTug product – as it was in the Memphis demonstration – to offer the aircrew all-round visibility from near ground level.

WheelTug is said to save between seven and 20 minutes per flight in terms of turnaround times, as well as reducing aircraft fuel burn, minimising engine and brake wear, cutting harmful emissions and significantly lowering pushback costs. The system also offers a high degree of manoeuvrability in the ramp area, something that is of significant benefit on today's crowded ramp areas.

## Test Drive 2020

The Test Drive 2020 demonstration at Memphis took place in front of invited guests, some of whom were on the



aircraft, and was then presented to a wider online audience as part of a 75-minute Zoom video meeting (followed up by a Q&A with WheelTug CEO Isaiah Cox).

As well as footage of an AlbaStar B737NG moving on to and off-stand using the WheelTug system, the presentation also included a number of interviews with

project partners and potential customers, as well as other interested parties, offering insight into the capabilities and benefits of the technology.

### **Improved operational performance**

While Cox introduced Test Drive 2020, Scott Brockman, CEO and president of Memphis International Airport, said the gateway was delighted to be involved in the demonstration, being as it is keen to help in any effort that might make the aviation industry safer and more efficient.

He described WheelTug as a “visionary and revolutionary system” that will potentially give many airlines a major leg-up in their operational performance.

The first interviewee was Arlie Stonestreet, vice president engineering

at project partner Ultra Electronics. WheelTug brings together numerous technological disciplines – mechanical and electrical, hardware and software – he said, and the demonstration was an ideal opportunity to see all these disciplines come together in a working product.

“We have been able to address and overcome so many challenges” in the development of WheelTug, he added, to produce a system that many did not think was possible.

Mike Silvius was next to share his thoughts on the importance of the technology. Silvius, an MRO services advisor on the programme, said that, “An incredible team has been involved in developing WheelTug.”

Together, that team has made full use

of aircraft’s own capabilities in order to provide the power required for the WheelTug system. By, adapting what is already available, it has been possible to minimise the changes needing to be made to any aircraft during WheelTug installation.

In fact, he noted, WheelTug can be installed on a single-aisle aircraft like a B737 in a surprisingly short amount of time – perhaps in a two-phased process over two nights to avoid any aircraft having to be taken out of revenue service, he suggested. Moreover, removal is just as easy as installation; this might be an important factor given the business offering that WheelTug is making: that prospective customers can trial the system, once it is operationally ready, but have it removed similarly free of charge if they are not happy with it.



WheelTug has no impact on an aircraft’s airworthiness, Silvius insists, because the installation of the system does not require significant structural alterations to an aircraft, while any maintenance to WheelTug can be performed during an aircraft’s regular line maintenance schedule.

**Moving in**

The first part of the demonstration saw the AlbaStar B737 move on to a Memphis stand without its engines running – in fact, they were covered over – and come to a stop at the appropriate apron line marking. A jet bridge then moved to the aircraft to simulate passenger offloading. Subsequently, the jet bridge withdrew, and the aircraft could move off stand, again under pilot control of the WheelTug system.

Camera views were available from the terminal gate, from the stand and from WheelTug’s own 360° camera system.

Two subsequent demonstrations showed off WheelTug’s ‘twirl’ and ‘twist’ capabilities. The first of these is an almost 180° turn by an aircraft, manoeuvred by WheelTug, once it is clear of the gate; this allows the aircraft to be driven forward away from the gate and into the start of

its taxi to the runway (where the main engines can be used to achieve a much greater speed than the 8 miles per hour permitted by WheelTug).

The twirl can be undertaken on pretty much any regular airport stand, while the twist requires a larger gate area – that for a B757 aircraft or larger. The twist comes into play as an aircraft approaches nose-on into a gate before turning on the spot through 90 degrees such that it stands parallel with the terminal gate. In that position, any gate with two jet boarding bridges can be used concurrently to enable much faster deboarding (and subsequent boarding) from an aircraft’s front and back doors.

Many gates are equipped with two boarding bridges, says Cox, especially in Asia, and enabling passengers to get off and onto an aircraft through both of its doors represents a significant potential time saving for any aircraft turnaround.

**Savings**

Test Drive 2020’s third interview involved Professor David West of East Carolina University, located in Greenville, North Carolina. He talked about the importance that airlines attach to minimising turnaround times and, with WheelTug

promising significant improvements in this regard, described it as “a significant and important innovation” in the airline industry.

Next, Stefan Kracht, a pilot and technology consultant, discussed the many potential benefits of WheelTug as regards airport operations. He talked about the various problems associated with using an aircraft’s jet engines during pushback on to and off a stand: namely, it entails fuel consumption and so is costly, represents a potential danger to people or equipment in terms of jet backwash, is noisy and is environmentally damaging.

The fact that WheelTug avoids jet wash use also means that taxiing aircraft near stands can be closer together, separated only by the safety distances required between aircraft moving on a ramp with their engines only idling.

WheelTug is usable in all weathers and – with the Northern Hemisphere winter not far away – it was pointed out that using WheelTug as opposed to main engine power will also offer greater safety and flexibility during de-icing procedures.

Captain Ashim Mittra, senior vice president flight operations at IndiGo, the Indian airline that has expressed its interest in the electric tow technology, added his thoughts on the time savings WheelTug enables. Moreover, the fact that the system does away with the need for a separate tow tractor when an aircraft is leaving the gate represents a significant benefit, he suggests, perhaps especially so in a country like India where there is sometimes little spare cash to spend on GSE.

Using WheelTug will allow airlines such as IndiGo to substantially reduce turnaround times and improve on-time performance, Mittra declared. “The fuel-saving opportunity is substantial,” he continued, while the environmental benefits are important too.

Test Drive 2020 also included discussion with the pilot of the demonstration

aircraft, Jose Lorenzo. Having shown off WheelTug's prowess in the various demonstrations, the AlbaStar B737NG's pilot said he had been impressed by the smoothness of the manoeuvring that the technology allows, as well as its ease of use.

Training of aircrew on WheelTug is a fairly quick and painless process, the company insists. No special simulator is necessary, although computer-based training will be used. The hardest part, it has been suggested, is getting used to using the wheel nose camera, a process somewhat similar to the thinking required when reversing a car.

The chat with the AlbaStar pilot was followed by a brief discussion with the Palma de Mallorca, Spain-headquartered airline's CEO, Michael Harrington. AlbaStar handles a large volume of pilgrimage traffic and, as many pilgrims are elderly and/or infirm, handling passengers with restricted mobility

(PRMs) is an important part of its business.

Harrington is therefore "excited" by the way that use of WheelTug and its 'twist' capability facilitates the use of two jet bridges to quickly carry passengers onto or off an aircraft quickly.

AlbaStar tries to take passenger steps out of the equation in its aircraft turnarounds, he says, as they are not ideal for any passengers but are especially troublesome for PRMs. Avoiding the use of steps also cuts down on incidents of ramp rash, Using WheelTug could represent "an absolute revolution" in this context, Harrington enthuses.

### **The future**

WheelTug expects to gain B737NG Supplemental Type Certificate (STC) approval from the Federal Aviation Administration (FAA) by the end of next year, with certification on the A320 to follow sometime later.

Cox explains that airlines can already reserve "a place in the queue" for WheelTug. An interesting leasing option offers much that might attract them, he says: a carrier customer would lease WheelTug and both the airline and WheelTug would then share in the savings which the airline derived from its use.

If the carrier were not happy with the product, it would be uninstalled and removed for no charge. (WheelTug can be fitted as standard to new-build aircraft or retrofitted to operational machines.) Thus, the customer need make no long-lasting commitment to WheelTug in order to test its efficiency, its developer notes.

As well as the narrowbody aircraft types that WheelTug is currently focusing on – particularly the B737 and then the A320 family of aircraft models – longer term plans envisage modifying the system for widebodies or for possible use with regional aircraft types.