TLD

HIGHLIGHTS 2017-2018

LOCAL SUPPORT
TOTAL COMMITMENT
TLD is a Group totally dedicated to the design, assembly, distribution and after-sales support of aviation Ground Support Equipment (GSE), with a history of 60 years in the industry.

- Over 120 R&D engineers and 10 MUSD spent on R&D each year
- Over 150 employees dedicated to after sale support through spare part and field technical service
- Group spare parts inventory of 35 MUSD
- 5000 motorized units delivered in 2017
- 690 customers in 133 countries

7 factories in 3 continents
1300 employees

40 SALES AND SERVICE OFFICES IN 20 COUNTRIES

Revenues : Alvest Group in MUSD

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>400</td>
</tr>
<tr>
<td>2013</td>
<td>440</td>
</tr>
<tr>
<td>2014</td>
<td>465</td>
</tr>
<tr>
<td>2015</td>
<td>485</td>
</tr>
<tr>
<td>2016</td>
<td>550</td>
</tr>
</tbody>
</table>

Sales and support offices
Manufacturing facilities
Sales and service partners
The TLD factory located in Sorgny, France, which specializes in Taxibot as well as Towbarless and Conventional Tractor assembly, is being extended in 2017. The initial construction phase began in July 2014, after the decision was made to commence construction following a desperate need to expand. The Sorgny facility is a state-of-the-art production plant, dully adapted to the challenges of tractor development, assembly and testing, allowing the production of our heaviest units (70T conventional tractor) in a safe and efficient work environment. The existing 6,000 m² facility includes a unique vehicle testing capacity, with an in-house test track to perform pre-delivery live-tests.

The extension consists of an additional 5,500 m² of workshop and warehouse space and 1,000 m² of office space, doubling the initial capacity.

Ultimately, this facility, built on a property of 73,000 m², will have a total assembly and warehousing capacity of 11,500 m², equipped with 12 cranes with up to 60 ton capacity, and a dedicated test track to qualify 100% of the production units, including an integrated test bench, equipped with a data acquisition tool. The delivery of phase 2 is scheduled for the end of 2017.

This project has been designed with the goal of developing a high-performance assembly space, allowing a step-change in environmental and safety working conditions, and providing the latest testing capabilities to increase the reliability of its end products. This is also a social project, with the implementation of several facilities for our employees and partners, including a restaurant and a child-care service, as well as several transportation options (car sharing and public transport) to limit our carbon footprint.

The legacy factory, established in Montlouis-sur-Loire in the late 1960s, some 20 km away from the new factory, remains within the group and is now dedicated to an equipment overhaul activity. Well equipped with all its existing machinery and facilities (cranes, paint shop, testing tools), this has allowed us to develop an efficient and robust overhaul activity for our customers. The TLD Overhaul proposal offers 3 levels of intervention, allowing an extended lifetime with a TLD warranty at a cost-efficient price.
TLD WUXI LAUNCHES NEW PRODUCTION LINE TO MEET GROWING JST TRACTOR DEMAND

➢ TLD sales of Diesel Baggage Tractors (JST) are increasing year over year, requiring the implementation of specific industrial means in order to maintain quick lead times and continue to optimize quality.

➢ In order to meet these necessary requirements, the TLD Wuxi factory is transferring the JST production line to its newly built extension. These changes will allow for up to 1,000 units per year to be produced.

➢ The brand new 1100m² production area will include 2 tractor assembly lines, supported by side-line material storage areas, and a dedicated 200 m² area for the preparation of the sub-assemblies. Of course, the manufacturing operations will also make use of the state-of-the-art sandblasting, painting and testing facilities available at the TLD Wuxi site.

➢ This new production line fully applies the TLD quality system of process & inspection on line (PIO), which is a concept similar to Industry 4.0, and also the concept of value stream design (VSD).

TLD’S NEWBORN TMX-50 IS A POPULAR ADDITION TO TRACTOR FAMILY

➢ TLD has extended its range of tractors with the introduction of the TMX-50, a brand new conventional pushback tractor, launched in October 2016 at the International Airport GSE Show in Las Vegas. The TMX-50 is a compact, low profile pushback tractor, designed to serve a large range of aircraft from private business aircraft and regional aircraft, up to single aisle aircraft, including the B-737 and A-321 series.

➢ This versatile pushback tractor is available in 3 weight configurations of 4.5 tons, 6 tons and 7.8 tons, with a drawbar pull ranging from 3600 daN (7900lbs) to 6300 daN (13900 lbs).

➢ The TMX-50 incorporates a 4-wheel steering and 4-wheel drive system and uses the same reliable design and components found in other models of the TLD conventional tractor range. Featuring an exceptional maneuverability, the TMX-50 also incorporates a new ergonomic control station that can easily accommodate 3 people. One of main advantages of this machine is the direct view of the front hitch, even with the addition of a cab for optimal operational comfort and safety. Rear visibility is also excellent thanks to its very low profile.

➢ Like all TMXs, the TMX-50 features a complete list of options including a 3-seater cab, multiple hitches, inching buttons at front and rear and much more.

➢ The TMX-50 can already be seen in action in various airports around the world.
Operator comfort is becoming more and more important, and its impact on operational safety, reliability and efficiency is now recognized. For many years, TLD has addressed the challenge of balancing comfort and robustness in its cabin features. In 2015, TLD decided to go a step further by redesigning the cabin for its heavy conventional tractor range (TMX-450, TMX-550 and TMX-650).

The 2015 project was launched with the support of designers and ergonomists, auditing real operations and working at merging performance and efficiency, together with esthetics and comfort. This new cabin now offers a greater visibility for the driver, improved sound and heat insulation, optimal driver positioning and a very ergonomic dashboard, which is now a standard feature for TLD products.

Following this project, a second development has been launched for a new cabin which will be common to almost all other vehicles of the TLD range. From Light Conventional Tractors to Baggage and Cargo Tractors, and from Lavatory & Water Trucks to Passenger Steps, the TLD fleet will feature a common face.

This development will offer the latest developments in ergonomics and comfort, with a much wider and taller cabin, and will improve the overall esthetics of the product line. With a common set of parts to maintain all machines concerned, this common approach will also bring significant improvements in maintenance, and will facilitate operator training thanks to the same look and feel of the different dashboards.

This very transversal project also includes a revamping of the Human-Machine interface, including a standard color-screen on all our machines that will ensure that critical data is made available to the operator, as well as to maintenance staff. This monitor will also be the interface with the new electronic CAN-based engines.

This new cabin will be progressively installed on our equipment and introduced in the market over the coming months.
Preventing aircraft damage on the ramp has always been an extremely important objective, and the increasing number of composite aircraft (such as Boeing 787 or Airbus A350) in operation all over the world is making that objective even more challenging. Impacts, currently identified during the pilot’s aircraft check, may not always be visible, transferring this major safety-related responsibility to the Ground Handling Staff. The risk becomes unfortunately now a reality as, in the past, some aircraft have taken off with unreported impacts.

Improving safety in handling operations is presenting a much broader challenge than anticipated, and avoiding any aircraft impact or damage is a priority for all. As part of its innovation culture, TLD developed a new solution several years ago offering GSE a higher level of safety during operations with the ASD (Aircraft Docking System).

Recently, IATA has decided to increase this safety level with several sets of norms and recommendations. The ARP1558 requires all GSE to operate at a turtle speed (5Km/h) in the Aircraft area and at a snail speed (0,7Km/h) in the last few meters to the aircraft. An Aircraft proximity detection is also required, as well as a system that records all excessive contact with the Aircraft. A direct coupling between the contact recorder and an alert system must be put in place.

On top of that, the well-known AHM 910/913 requires an all new level of automation, with automatic systems to engage the snail speed and to stop the unit at contact. For the loaders, the AHM 931/932 goes even further, with a snail speed engaged as soon as the bridge raises from the lower position. A comfortable driver position during the approach must also be provided, allowing for the operator’s feet to be steady on the ground.

All new GSE shall be in accordance with the above requirements starting July 2018, and the retrofit of the existing GSE fleet, where feasible, shall be done before 2020.

ASD (Aircraft Safe Docking) meets all these requirements and beyond. All our belt loaders, passenger stairs and loaders can be equipped with ASD. It is a supervision system where the electronics ensure that the operators follow the correct process, driving at the expected speed when close to the aircraft. The ASD sets the maximum speed, depending on the distance, to potential objects. Easy to say, not so easy to implement, especially when you want the same system on all types of units, all types of drivelines (electric, hydrostatic or diesel) and with the ability to retrofit most of the existing fleet. However, the ASD system specificity is based on its sensor technology. A single 3D camera is TLD’s answer to proximity detection, a choice driven by the absolute necessity of having a failsafe system. The camera, with an image, can determine whether it works in normal conditions or not, which a radar cannot do. But this choice is also “future ready”: Today the camera is used only to evaluate distances; tomorrow the same camera will recognize the aircraft and allow a dock-assist system, similar to car park-assist.

Many customers (both Airlines, handlers and lesers) have already selected the ASD system, which is installed on hundreds of units around the world.

ASD is the best, most advanced, and largely implemented solution existing on the market to address the AHM 910 challenge, and it is ready now.
TLD is excited to be expanding our product presence in the Regional Aircraft handling and general aviation/FBO markets. Several months ago we launched a new development project for a Regional Belt Loader which offers competitive advantages over current towable/walk behind units. The TLD RBL is a self-propelled electrical unit with limited speed (up to 10km/h), inspired by forklift design concepts. This 3 wheel design has a simple and reliable front axle, with a driving and steering wheel at the back of the unit, positioned just behind the driver’s standing position. This electrical-powered unit is environmentally friendly and assembled with standard components commonly found in other TLD products.

The RBL services all regional and narrow body aircraft and is particularly effective on restrictive ramps areas. Of course, the new TLD RBL has TLD DNA and is designed to be a simple, reliable and easy to maintain unit, with some additional innovative concepts! The controller is the same used in most other TLD units and the brushless motor reduces the cost of maintenance. The rear steering wheel, as well as the external dimensions of the unit, provide excellent maneuverability, and the operator station is designed for immediate access to control all boom lift functions. For long distance driving, the RBL offers quick disconnection of the driving wheel and electrical motor, and is easily towed with a baggage tractor.

The optimization of current consumption allows operational autonomy of a full day, and the onboard charger, delivered upon request, enables easy recharging. Though it is a simple machine, this unit meets all the requirements of the IATA’s and EC certifications concerning belt loaders.

Eight years after the delivery of the first TXL-838-reGen, this 7 ton, battery-powered loader is increasingly becoming the market reference for performance and autonomy, thanks to its innovative concepts and the input from our customers.

The original goal of the TXL-838-reGen project was to operate an electric loader with the speed and power of a diesel loader for a full day of heavy operation, capable of handling up to 250 containers before needing to recharge the battery, in addition to driving between stands.

Now, with reGen loaders on all continents, this machine has demonstrated its impressive capabilities in various situations and environments. TLD customers around the world using this technology agree that the TXL-838-reGen delivers its promises.

The TXL-838-reGen is more than just a diesel loader containing a battery in place of an engine. The entire system has been designed to reduce any power loss. TLD engineers have carefully studied the science of battery technology and the aspects of their use that limit their autonomy and longevity. The reGen system monitors the current draw and particularly the peak current draws that are the unavoidable effect when lifting an elevator. It is actually these current peaks that limit the battery’s capacity between charges, and define the period before it must be replaced due to degradation. This energy flow management system, patented by TLD, also features supercapacitors that allow the energy generated when the rear platform goes down and when the loader brakes to be reused (regeneration), rather than wasting it as the other electric loaders do today.

The TXL-838-reGen also features an electric driveline and a simplified and optimized hydraulic system to ensure maximum efficiency and deliver more out of a single battery charge.

The TLD TXL-838-reGen has proved that it is an effective green alternative to diesel loaders that does not reduce operational performance, and that comes with optimized maintenance costs, resulting in a lower total cost of ownership.
2017 will be another busy year in Windsor. The outstanding growth of 2016 saw the birth of two business units - Windsor Commercial and Windsor Military, construction of new offices, as well as optimization of the organization in the warehouse and shop floor to better support these two businesses due to their unique customer and product line requirements.

TLD Windsor spent several years working to develop and win the Lockheed Martin (LMCo) contracts to support the GSE program for the Joint Strike Fighter (JSF or F35) and Raptor (F22) at the same time that the commercial product lines were experiencing record demand levels. The significant and rapid growth of this business, along with the specialized engineering, testing and compliance requirements of the military programs, grew the organization beyond its original capacity and required a division of management.

TLD Windsor Military division was created to address the specialized needs of our military customers around the world. In addition to the LMCo orders, military orders for commercial products have been increasing at a steady rate. Commercially available units such as the ACE-401, 814 and 802-329 have been seeing higher demand, in addition to new requirements to support today’s militaries around the world.

TLD Windsor Commercial division remains committed to the design, manufacture and support of commercial GSE products, with new developments such as quieter, more fuel efficient ACUs, lower TCO GPUs and many Tier 4F/Stage 4 options to suit customers’ power conversion needs.

As TLD Windsor grew, the additional space created by the recent building extension was much needed. This also gave TLD the opportunity to grow its conference and office space to better suit the needs of the organization.

TLD Windsor continues to evolve as it leads the industry with innovative GPU, ASU and ACU technologies for the military and commercial markets. Management team expansion, as well as sales and facility growth, have built a solid foundation for the years to come in Windsor.