

ETEL

A Turnkey Solution Provider for High Precision Motion Technologies

In a historic event, on 9th March 2015, a fully solar-powered airplane, Solar Impulse 2, started its journey to circumnavigate the entire globe. With more than 500 hours of airtime, the aircraft marks a remarkable achievement for the aviation industry and the idea to bring attention toward clean energy as a technical driving force. Weighing about 2.3 tons, the Solar Impulse 2 was designed to have an optimum performance-per-weight ratio, so every component, down to the smallest of screws, was made to be as light as possible. Propelling the plane in the sky was the electrical motors from a Switzerland-based company ETEL that creates state-of-the-art solutions in the high precision and dynamic motion technologies. “Delivering such efficient motors with enormous reliability requirement, which was capable of sustaining very harsh climate conditions (-40° to +60°C) was one of the biggest challenges for us,” says Hervé Stämpfli, Product Manager, Motion Systems at ETEL. He further adds, “When you think about it, besides the motor development, it is amazing to see that more than 80 percent of the semiconductor chips embedded in the electronic devices of the Solar Impulse 2 were also tested in their manufacturing line on machines equipped with ETEL products!”

Established in 1974, ETEL provides a range of linear motors, torque motors, position controllers, motion controllers, and motion systems that helps to meet the process improvement requirements of machine builders. The company has carved a niche in the direct drive technology landscape and delivers solutions ranging from high-end motion systems with nanometer precision to machine tool applications requiring high torque density together with high speed. “We are the only motion system supplier in the world that provides a comprehensive turnkey solution, which includes a motion system with the controls, isolation system, frame, and everything that connects the motion system to the floor,” states Stämpfli. Meanwhile, when other solution providers fail to provide an accurate system together with high throughput, ETEL’s solutions offer immaculate position accuracy with no compromise on throughput that reduces the cost of ownership of machines to a great extent.

Started as a motor company, ETEL today leads the future of high precision and high dynamic motion technologies in industries such as electronics and semiconductors that



Hervé Stämpfli

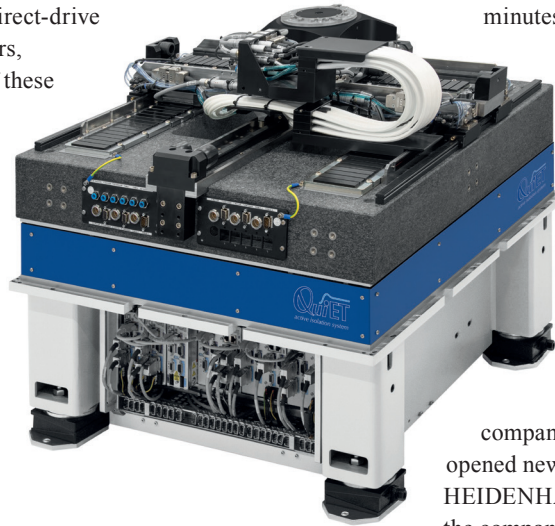
have stringent product requirements for motion systems. For instance, in the semiconductor industry, the company offers solutions in the nanometer level for the validation of lithographic processes, wafer process control, including overlay, thin-film, and critical dimensions metrology, as well as inspection and defect review equipment, and others on the front end side. Also, on the backend side, ETEL offers complete solutions for flip-chip and wire bonders as well as testing handlers for the company performing final tests on the packages, which are then integrated into the production line. “Moving testing handlers from conventional cam-based to direct drive technology allowed to increase the machine throughput by a factor of 4+ over 15 years, from 15 kUPH to

70 kUPH,” informs Stämpfli. Besides, the company develops various critical components for other industries as well that includes standalone products and highly integrated platforms.

When ETEL came up with the direct-drive motors, there was a lack of controllers, which hampered the performance of these motors significantly. This prompted the company to develop its controllers to operate the motors at its maximum efficiency. The architecture of ETEL’s motion control solution is decentralized, sharing the control intelligence among the multiple AccurET controllers while having a unique UltimET motion controller synchronizing all controllers within a nanosecond jitter. This allows machine builders to manage direct drive motors with the highest performance in a minimal footprint. The UltimET solution is the motion controller that provides multiple ways to manage multi-axis movement according to the requirements. On the other hand, the AccurET solutions are position controllers that cover a wide range of voltage and current levels in a compact form factor and help to enhance the throughput of and movement quality on the machines. The position controllers contain integrated protection and diagnostics for detecting temperature, voltage, current, loss of feedback, and so on to help build reliable machines. Additionally, ETEL developed its proprietary real-time, one-gigabit communication bus, TransnET that manages the real-time commands between the UltimET and AccurET controllers that can lead up to 63 motors at the same time. Also, built-in features such as thermal mapping applied to a thermally modeled motion system ensure highly stable positioning accuracy over time. Advanced triggers, fast position capture, trajectory optimization are some of the many other key features serving the high-end application requirements that ETEL deals with.

ETEL always challenges the conventional norms in the product design to come up with innovative products that speak volumes of the company’s value proposition and make it stand apart from other players in the market. One such instance is the recently launched TELICA platform, a dual gantry motion system featuring metrology at the process plane level, thus offering an outstanding 1 μ m global positioning accuracy. “Semiconductor backend is more and more calling for front-end requirements in terms of accuracy enhancement, cleanroom compatibility, and vibration isolation. Hybrid bonding manufacturing processes for example now require

some hundreds of nanometers positioning accuracy at high throughput. ETEL made it possible!” remarks Stämpfli. “The TELICA platform is a game-changer, offering a 10 minutes warm-up time to be back at a fully stable positioning accuracy level and full speed to be compared to a usual 60 minutes required on conventional systems,” Extols Stämpfli.



In 1999, ETEL was acquired by HEIDENHAIN, a leading manufacturer of precision measurement and control equipment with a global presence. This acquisition aimed to make ETEL, the motion system company of the HEIDENHAIN group, which opened new sales channels for ETEL through HEIDENHAIN’s subsidiaries. Furthermore, the company also has implemented the ETEL Technical Competence Center (ETCC) in all the major countries to support clients overcome any challenges and roadblocks.

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The company has won several awards and accolades for its impeccable solutions, which among others include, the Technical Oscar Award –Motion systems in 2004 for the digitization of movies, the gold medal at Industrie tradeshow 2014 in Paris, and the Leap Award in 2019 for the Telica motion platform. Going forward, ETEL plans to further expand its product range and customer support by bringing new products and features, allowing a clear performance upgradability path in the field. Some of the notable developments are new innovative vibration isolation solutions, ISO2 clean compatible backend solutions, force control accuracy enhancement, high-end air bearing stage, multidimensional mapping to improve machine accuracy and yield, and further decrease cost of ownership. 