

Take a Global Tour of Automation Manufacturing

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MH&L recently had the pleasure of touring the Detroit-area manufacturing operations of [Fori Automation](#), which makes specialized guided vehicles for the aerospace and automotive industries. During our tour we learned about how Fori leverages its global supply chain to sync up with its clients' global supply chains. This gallery is a tour of how those chains interlink.



Fori Korea - Vina Mazda Automobile Company, Vietnam

Fori Korea has designed and installed a set of EOL test equipment to Vina-Mazda Automobile Company in Vietnam. The systems include: wheel aligner, headlamp aimer, side slip tester and a roll and brake tester with a static brake testing function. The systems are designed for the Mazda 2, 3, 6, CX-9 & BT 50 at 8 jph. This company is a joint venture of Mazda Motor Corporation in Japan and complies with the standard fixed by Japanese regulation. Fori has met and exceeded Mazda's expectations and looks forward to expanding our presence within the Japanese OEMs.



Fori China - GM Shanghai

Fori China has designed, built, and installed three (3) wheel alignment systems with gantry style digital headlamp aimers for GM Shanghai Dongyue plant in Yantai China that produces the Excelle. The 3-D system is capable of a 60 jph rate. A gear centering system was utilized to fulfill the customer's requirements.



Fori Brazil - Fiat Betim

Fori Brazil delivered a wheel alignment machine with integrated headlamp aiming to Fiat Betim Brazil assembly plant in December 2011. The machine features Fori's latest technology 3-D measuring system with digital headlamp aiming. It also includes a vehicle loading system with servo driven actuators that locate into the body location slots, and pull the vehicle down to a known load. This process is used for the adjustment of the rear brake valve on the Doblo, Idea and Punto vehicles. The system also features a direct communication to the vehicle ECU via OBDII for identifying and controlling the setting of various options such as, Xenon Lamps, ABS/ VDS Brakes, Hill-Hold and Side-View Sensors.

Fori Automation India Pvt. - TATA - Jaguar / Land Rover



Fori Automation India Pvt. designed and supplied an air-bearing based chassis marriage system (Air Guided Vehicle / Air GV) to Tata Motors for their prestigious Jaguar Land Rover project in Jan 2011. The concept design was provided by Fori USA. Fori India detailed the design of the system and tooling, etc. The marriage system included a pair of electro-hydraulic scissor lifts moving in tandem for front & rear assemblies at 2 jph. The front, center & rear tooling assemblies are all mounted on a common base plate so that they all lift and lower together. The Air GV moves with minimal push-pull effort and is operated by only 1-2 operators while moving from the Air GV Cart for the Freelander loading area to the decking area.



Fori Automation - Ford Worldwide

Fori Automation Shelby Twp in coordination with Ford Motor's "ONE Process - Team Strategy" is expanding the Fori Global RGV Decking Technology with installation in Europe, Brazil, and Asia. Originating in 2003 with Ford's acceptance of Fori's Patented Electric Chain Lift Technology for implementation in Hermosillo Mexico, systems have multiplied annually in North America to include Oakville Ontario, Chicago Illinois, Cuautitlan Mexico, and most recently Michigan Assembly Plant. Initiated by award of a Ford Global Bundle Buy Agreement in 2010, Fori RGV installations now include additional systems for Thailand, Romania, Spain, and Brazil. Specification additions/changes to accept Europe Certifications (CE), Component

Standards, Safety Redundancy, and High Speed Part Deliveries (EMS) for volumes exceeding 100 jph and 20+ Vehicle/Powertrain combinations have pushed Fori to gain Regional Acceptance. Ford Vehicles produced using Fori's RGV – Chain Lift Technology today include Fiesta, Fusion, Mustang, Taurus, Edge, Explorer, and Flex with soon additions of Mondeo, S-Max, C-Max, KA, Passport among several others set for introduction. Fori's RGV Chain Lift positions Fori as a World Class Supplier of Process Assembly Systems in terms of critical Safety, Reliability and Flexibility.



Fori Automation - Volkswagen Chattanooga

The Volkswagen Group of America is in the process of introducing a new mid-size sedan to the US market. The model is based on the VW411 platform and will be built in a brand new, state of the art assembly facility in Chattanooga, Tennessee. As part of this endeavor, Fori Automation GmbH successfully earned a contract from the Volkswagen Group in Wolfsburg, Germany to build a variety of equipment, tooling and automated systems for this VW assembly plant, which is divided into 7 assembly line segments. Fori Automation is tasked to design, build and integrate state of the art turn-key systems to the specific VW standards utilizing Siemens Controls System, considering DIN, EN and ISO norms, while meeting OSHA

requirements and local electric codes. Although Fori Automation is very familiar with the VW standards, the entire installation system has to be turned over to VW within a very stringent time frame while managing dozens of sub-suppliers located on several continents. The assembly systems supplied are; Doors off – Doors on, Automatic installation of Roof Dampening Reinforcements or DVD, Tilt/slide Sunroof installation or SAD. VIN stamping and Laser Marking, Gluing, Assembly and Installation, Window Gluing Application, Battery Installation, Front End Assembly and Installation, Wheel Installation, Front- and Rear Seat Installation, Transmission AGV system and a Chassis Assembly System.



Fori Automation de Mexico - Chrysler Toluca

Fori Mexico has designed and installed one (1) engine manipulator and one (1) transmission marriage manipulator with eight (8) different end effectors at the Toluca Assembly Plant. The manipulator can handle eight (8) different vehicle transmission models at a 60 jph rate for the Dodge Journey 2.0 Lts. & 3.6 Lts. / Fiat SUV Freemont 3.6 Lts. / Fiat 500 1.2Std , 2.0 Auto & 2.0 Automatic Turbo / Fiat Abarth. The manipulator includes a pneumatic end effector tool changer, and has safety built into it by only allowing the manipulator to function when it is within the work area. Limit switches ensure the manipulator does not interfere with other line components such as the transmission rack elevator.



Fori China - Ford Thailand

Fori China has designed, built, and installed a twelve (12) cart chassis RGV marriage system for Ford Thailand which produces the C346 Focus. Critical to the Fori RGV cart is the patented electric chain lift which includes a single piece aluminum cast housing and internal components including Guide Tubes (3), Worm Gear Drive, Self-Locking Lift Chain and Servo Motor. Redundant Safeties include internal servo brake and anti-backup driving worm gear for any power interrupt and/or mechanical failure.

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Fori Automation do Brasil - Michelin

Michelin and Fori Automation have teamed up to develop a common global platform for Michelin's Robotic Tire Palletizing Cells. Fori's Robotic Palletizer Cell (RPC) for Michelin in Resende Brazil, palletizes 9000 tires per day with rim sizes from 14 to 24 inches and tire section widths from 155mm to 335mm. The equipment is quickly adaptable to other tire size ranges both smaller and larger than the Pau Brazil Program production mix, and the system is developed as a base platform to adapt to all of Michelin's global tire storage pallet configurations. Forklift operators deliver folded storage pallets to the load station of the RPC, the folding pallets are automatically opened and positioned for robotic palletizing, the filled pallet is then

automatically labeled before it is conveyed to the Forklift unload station. The first RPC has been delivered and installed in Brazil and is currently undergoing final validation. Fori's cell design and construction is developed as a global solution that Fori can manufacture, deliver and service from any of our global manufacturing plants to provide local support for Michelin Plants anywhere in the world. The end result is a configurable local solution adapted to the individual plant requirements, environment, systems and utilities, but has globally common network and information interfaces, common personnel interfaces, common spare parts, common operator and maintenance training.



Fori Automation de Mexico - Webasto, Irapuato, Guanajuato Mexico

Fori Mexico has designed and installed a sun roof assembly line for Webasto, Irapuato, Guanajuato Mexico. The assembly system consists of eight (8) assembly stations and one test station for the Ford B299 model at a 30 jph rate. The assembly line has six (6) assembly stations, one test station and shares two (2) robotic cells of TOX and Butyl application from the VW Jetta A6 sun roof assembly line built previously by Fori Mexico in 2009. The work stations are designed for fast tooling change over for future sunroof models. The test bench verifies the motor processor and performs a fully open, partial open and closing force/ object detection.