MTS Systems Corporation
Sensors Division
3001 Sheldon Drive
Cary, NC 27513
Phone 919-677-0100, Fax 919-677-0200

IMMEDIATE RELEASE
January 21, 2008 *MTS452*

For More Information, Contact:
Matt Hankinson
Marketing Manager
919-677-2347
matt.hankinson@mts.com

Patricia Staino, BtB Marketing
Public Relations Executive
919-872-8172
patricia@btbmarketing.com

R-Series with SSI provides accuracy in positioning...

MTS Sensors Ensure Precision in Airbus Wing Assembly

CARY, N.C. (January 21, 2008) - MTS Systems Corp., Sensors Division is providing the R-Series SSI encoder position sensor to Electroimpact, Inc., for its material handling solution designed to provide a stable control system in the wing assembly of the Airbus A380. The Temposonics® RH SSI linear transducers measure vertical position in panel loader arms that are designed to guarantee precise and accurate measurements when positioning wing panels.

"The MTS R-Series SSI sensor is ideal for this application," said Charles Hopper, engineer for Electroimpact, Inc. "By burying the sensor inside the hydraulic cylinder it remains completely protected. The SSI interface eliminates issues with noise and the package integrates nicely with the HNC servo hydraulic controller. We have had no issues with this equipment in the field."

Electroimpact was charged with designing a solution that would establish panel form in the oversized wing panels as they were lifted off the ground and provide a stable control system that would enable operators to control the position of the skin assembly as the stringers were engaged into the ribs.

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Electroimpact's system includes six telescoping panel loader arms that attach to the wing panels at discrete lift points and enable operators to manage the panel position and form. Such a configuration of the distributed support points creates a system that is statically indeterminate, so the design team created a two-point lift system by setting two of the panel loader arms to control position. The other arms are set to seek a predetermined load. Only two panel loader arms control position, while the remaining arms chase load adjust according to the vertical height of the position arms.

The accuracy and reliability of the controller is key to the operation due to the immense size of the wing panel and the number of stringer-to-rib interfaces. Since the entire system is digitally controlled, the position is accurate to 1mm, force to 50 lbs. with a 4 millisecond scan time.

The panel loader arms included several parts that guarantee precise and accurate measurements when positioning panels, including:

- A servovalve and Rexroth HNC 100 servohydraulic controller from Bosch Rexroth Corp. that provided close-loop control;
- A Honeywell Sensotec Model 41 load cell to read vertical force; and
- A Temposonics RH SSI linear transducer from MTS Sensors to measure vertical position.

The Temposonics transducers are contained in a large hydraulic cylinder that drives the vertical axis. The servovalve and HNC controller maintain pressure on each side of the cylinder and also communicate with the load cell and transducer. The RH SSI linear sensors are ideal for applications that require continuous use under extreme conditions. The rod housing around the sensor enables it to withstand high pressures, like those from the hydraulic cylinder. The sensor is double-shielded to ensure EMI protection for unsurpassed reliability and operating safety.

In the case of the Airbus A380, the SSI linear transducer allowed for superior measurements and control compared to other hydraulic sensors. The main feature of synchronous serial interface (SSI) is synchronized data transfer. In the close-loop system designed for the wing assembly, the HNC controller provided a means of monitoring position and force.

Synchronization in this close-loop system was made much simpler with the MTS RH linear transducer. A clock pulse train from the HNC controller is used to gate out sensor data: one bit of position data is transmitted to the controller per one clock pulse received from the sensor. The absolute position data is continuously updated by the sensor and converted by the shift-register into serial information. The pulses occur milliseconds apart, allowing for real time data for operators. The HNC was also set up to the SSI scales directly, meaning no conversions were needed.

The magnetostrictive technology employed by MTS Temposonics sensors was specially suited for this application because it eliminates wear and guarantees the best durability and output repeatability.

For more information on Temposonics R-Series Sensors, please contact: MTS Systems Corp, Sensors Division, 3001 Sheldon Drive, Cary, NC 27513.Phone: (919) 677-0100. E-mail: info@mtssensors.com <mailto:sensorsinfo@mts.com> or visit their web site at http://www.mtssensors.com <http://www.mtslinearsensors.com> .

MTS Sensors, a division of MTS Systems Corp., is the global leader in the development and production of magnetostrictive linear-position and liquid-level sensors. Based on MTS' patented Temposonics® technology, the Sensors Division is continually developing new ways to apply magnetostrictive sensing technology to solve critical applications in a variety of markets worldwide. With facilities in the U.S., Germany and Japan, MTS Sensors Division is an ISO 9001 certified supplier committed to providing innovative sensing solutions that deliver customers with reliable, cost effective sensing devices.

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