

# Airline Manufacturer Improves Accuracy of Testing with New Touch Probe Certification System

A major airline manufacturer needed a reliable test to recertify touch probes used in OEM production of airplane parts and assemblies.

## Main Objective

The project goal was to design and build a three-axis test system for recertifying touch probes used in the production and assembly of airplane parts and assemblies. The touch probes are ultra-accurate, ruby-tipped sensors used to verify machining and assembly tolerances on all aircraft to .0001 inch. The yearly recertification of the probes is required to meet current Federal Aviation Administration (FAA) specifications, and the OEMs do not provide secondary testing or recertification services.

## Customer Results

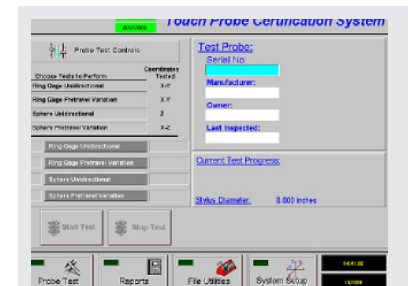
All test data are logged and provided to the FAA for tracking purposes. Because the touch probes are used to test parts and assemblies to .0001-inch accuracies, they are successfully tested and recertified to a minimum accuracy of .000030 inch with the new touch probe certification system (TPCS).

## Application Description

The manufacturer contracted MAVERICK to provide a turnkey electrical and mechanical test system. The TPCS configuration comprises an air-bearing machine table with precision linear ways and scale for the x, y and z axes, a PC-based controller running Windows NT operating system, a three-axis DSP-series motion controller, Wonderware FactorySuite 2000, Visual C++ and Crystal Reports software. The technical scope of responsibility included the design and installation of the three-axis CNC subsystems, PC subsystems, operator interface and programming subsystems, motion control subsystems, servo drive, and probe subsystems and panel enclosures.

The touch probe recertification is accomplished by moving the probe from an index or home position acquired at initial test start to a 1-inch sphere, where it must find the top center point perpendicular to the circumference. The probe is then moved around the circumference of the sphere, touching test points at predetermined increments perpendicular to the surface. The test sequence is then run at 45- and 90-degree angles of incident. Next, the probe is moved to a 1-inch OD ring gage, with a half-inch ID. The probe is moved around the outside circumference and the inside circumference, touching test points at predetermined increments parallel to the surface. Each test is run multiple times to test unidirectional variation and pre-travel variation.

Each probe is tested to a minimum required specification for recertification. At the completion of the automatic test cycle, the results are graphed and compared automatically to a set of minimum base results. The recertification system then determines if the probe passed or failed the testing. All standard and special probe devices are logged into a testing database by serial number along with OEM specifications. All test data are logged and provided to the FAA for tracking purposes. Since the touch probes are used to test parts and assemblies to .0001-inch accuracies, they are tested and recertified to a minimum accuracy of .000030 inch.



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