

Specifications for Semi-Automatic Probe System

1. The Naval Research Laboratory (NRL) has a requirement for a semi-automatic wafer probe station.
 - a. The primary requirement is for a probe station to enable semi-automatic on-wafer measurements of semiconductor devices and integrated circuits. The probe station must be a standard commercial product with demonstrated field use.
 - b. The system must contain a motorized chuck stage capable of accepting a semiconductor wafer up to 200 mm in diameter. The wafer must be held in place with a vacuum chuck. The stage must have a motorized XY movement range of 200x200 mm, a motorized vertical travel range of 25 mm, and a motorized chuck rotation of ± 5 degrees minimum. The stage must have an XY positioning accuracy to within $\pm 1.5 \mu\text{m}$.
 - c. The chuck stage must have an adjustable temperature range of $+25^{\circ}\text{C}$ to $+200^{\circ}\text{C}$ to facilitate testing of a semiconductor wafer at fixed temperatures within this range. The stage must have air cooling. In addition, there must be a small section of the chuck without heating for placement of an industry standard calibration substrate. This substrate must be held down on the stage with vacuum at ambient temperature. Temperature control accuracy should be to within $\pm 0.5^{\circ}\text{C}$.
 - d. The system must have a manually driven probe head platen with a height adjustment range of 20 mm. The platen must be capable of integration with the following load-pull measurement hardware from Maury Microwave:

<u>Part No.</u>	<u>Qty</u>	<u>Description</u>
MT984AU01	2	Programmable Tuner, 8 to 50 GHz, 2.4 mm, USB interface
MT902A05	2	Probe Launch (Airline, dc to 50 GHz)
MT9000N24	1	Linetool XY positioners and all required hardware Maury Z positioners and tuner adapter hardware Mounting plate system and integration with Suss PA200 or Cascade Summit 12000 probe stations.
 - e. The system must have a stereo microscope with an adjustable magnification range of 20 to 400x. The microscope must have two 10x eyepieces and a manual zoom range of at least 2x. There will be multiple objectives (i.e. 2x, 10x, 20x) available such that the full magnification range can be attained. The objectives must have enough working distance to accommodate the Maury airline probe launches and 150 μm pitch CPW probes from Cascade or GGB. The microscope should also have a movement range of 50x50 mm.
 - f. The system must have a digital CCD camera capable of displaying a real time video image of a device under test within a window of the system user interface. The system must be capable of capturing and saving the image to a standard file format.
 - g. The system must include a Windows XP Professional computer-based system for controlling the position and temperature of the motorized chuck stage. The software must allow for precise ($\pm 1.5 \mu\text{m}$) navigation across a wafer, with die and sub die stepping.

- h. The system must be also able to operate semi-automatically via a joystick and positioning control console when there is no computer controller connected.
 - i. A vibration isolation table capable must be included with the probe station. The table must have sufficient load capacity for the probe station and the Maury load-pull hardware listed above.
 - j. There must be software supporting advanced 2-port wafer level calibrations using industry standard calibration substrates. The software must be able to interface with and control Agilent PNA series VNAs.
2. Vendor Demonstration: All system capabilities must be demonstrated by the contractor during the initial installation.
 3. Installation and Training: The contractor shall provide onsite installation of the equipment and demonstrate that the system meets the required specifications. The contractor shall also provide on-site training at the time of the installation and demonstration for two NRL personnel for one day.
 4. Warranty and Support: The contractor shall offer the Government at least the same warranty terms, including offers of extended warranties, offered to the general public in customary commercial practice. The warranty begins at the conclusion of installation and training.
 5. Acceptance is contingent on satisfactory completion of items 2 and 3.