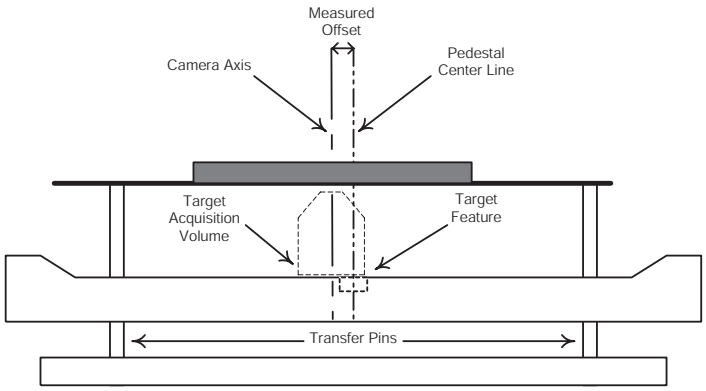
WaferSense™ Auto Teaching System Theory of Operation

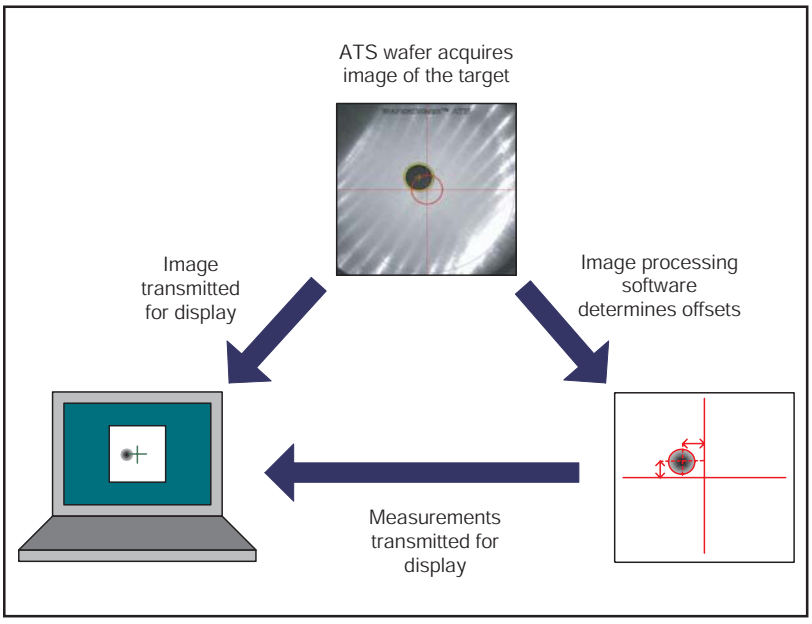
WaferSense ATS is a calibrated "eye" that helps you teach wafer transfer coordinates to your robot. The ATS sensor measures offsets from its center to the center of a feature on your pedestal, plate, end effector or chuck. Now, any engineer can accurately teach wafer transfer coordinates. The ATS sensor is shaped like a wafer so it can be handled like a process wafer. ATS can be used inside your equipment to measure robot handoffs at hard to reach stations like: pre-aligners, load locks and process chambers. Tool availability, uniformity and yield are improved when wafer transfer coordinates are taught faster and more accurately.

WaferSense ATS Used to Measure Wafer Placement Offset

The ATS sensor may be placed on raised transfer pins to view a feature on the pedestal or ATS sensor may be held in a pincette to view the feature. A set of Light Emitting Diodes properly illuminates the area underneath the ATS so that the downward facing camera inside the ATS can obtain images of the pedestal's target feature.



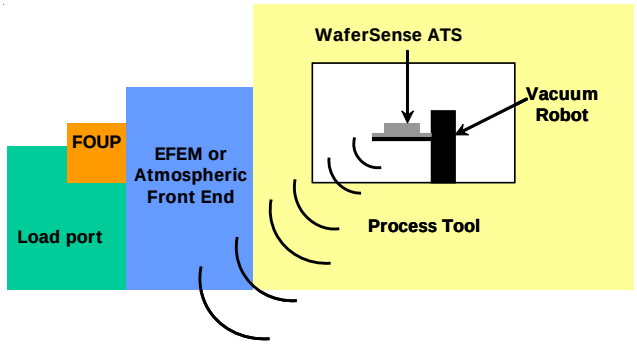
ATS learns to recognize a wide variety of circular target features. For example: a central hole in the pedestal or chuck; a central support pin of a bake plate; or a vent hole in a screw. Target features should be stable in size, appearance and location with respect to the station being taught.



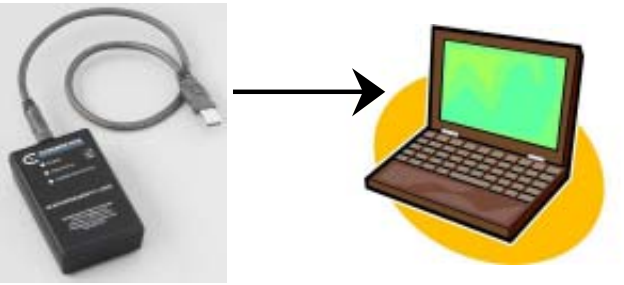
ATS is a complete machine vision system in a wafer-like, wireless package. The ATS wafer uses its on-board DSP to analyze the acquired images and measure the X-Y-Z offset from its own geometric center to the center of the target. You can then decide if this offset is small enough for your equipment or if the robot transfer coordinates need adjustments.

The ATS wafer transmits clear images to a laptop through a radio link. As these images are displayed, you can "see" where the robot moves as you jog it inside your equipment. ATS can help find "lost" wafer and debris during troubleshooting.

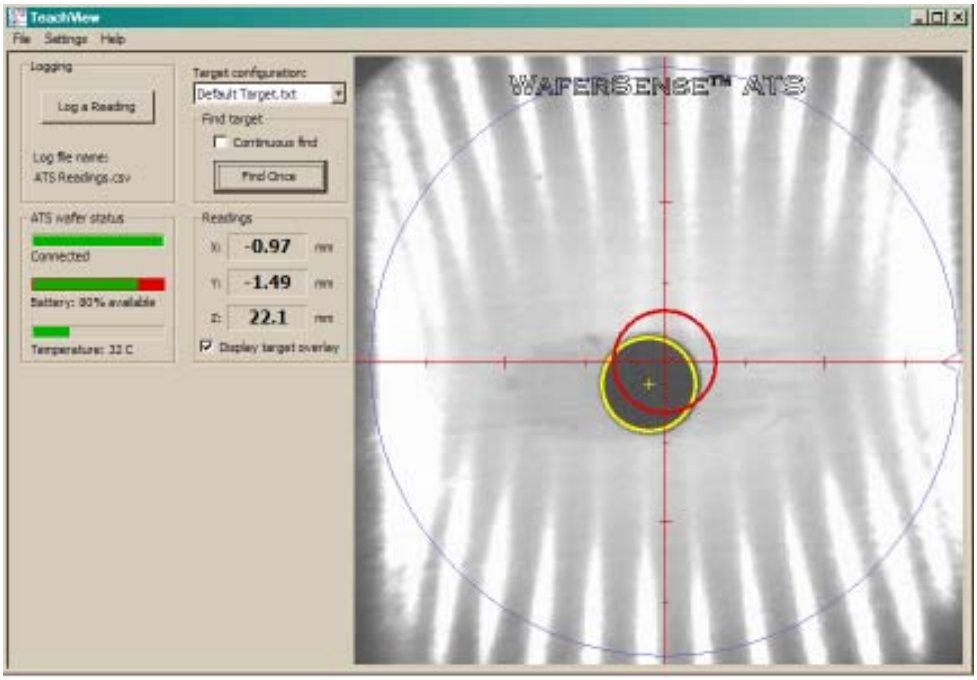
Because it uses on-board image processing, the ATS wafer provides a real-time, high-accuracy offset measurement. Optical artifacts are corrected in real time so accurate, low distortion images are displayed. Advanced image processing software "learns" how to recognize a wide variety of circular features, providing you with flexibility to teach most wafer transfer locations.



Wireless Communication: WaferSense ATS uses 2.4 GHz RF (Bluetooth®) wireless communication between the wafer and the link that is connected to a PC. WaferSense ATS uses a Class 1 Bluetooth device, rated for unimpeded communication up to 100 meters. Metal enclosures specific of a semiconductor use environment do not inhibit this communication.



Link & Laptop: The link is a compact USB 1.1 compliant device that connects to a laptop to enable wireless communication with the teaching wafer.



Software Applications: TeachView™ displays digital X-Y-Z offsets and live video and it may be used to define Go/No Go regions and log data for future reference or analysis. Readouts for battery life, wafer internal temperature, and connection status are also displayed. TeachTarget™ helps the user program teaching of any circular feature as a new target.

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