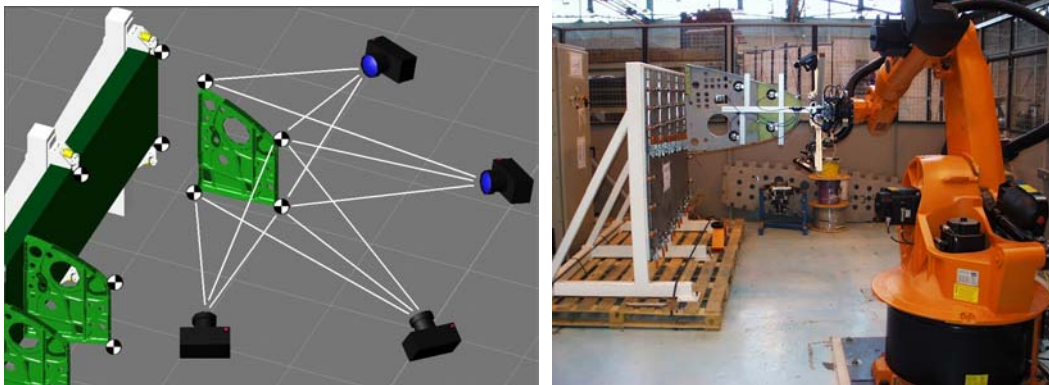


World Class Result

British Aerospace and the Optical Metrology Centre won the prestigious Metrology for World Class Manufacturing award for 1998 in the innovative metrology section. The awards were supported by Mitutoyo and many of the UK trade organizations including the DTI and CBI.

How do you use a robot with an accuracy of around a millimetre to drill holes or position components to an accuracy of less than 50 μm . The answer is to use an optical measuring system to guide the robot. This works because robots have the ability to adjust their relative position with a resolution that greatly exceeds the absolute accuracy of the robot. This development may have many applications in aerospace, automotive, medical, entertainment, process, and production areas. A prototype system is being used to show how robotic drilling and assembly can be performed within the tight tolerances required by the aerospace industry. There is more to the technology than enhancing the position capability of the robot; object recognition connects CAD data, the manufactured product, and the manufacturing tolerances.



Photogrammetry is used to provide relative position information by measuring many points simultaneously

How it works

The system uses digital photogrammetry to perform 3-D measurement of component locations. Intelligent cameras using DSP electronics perform 2-D image processing at up to 20 milliseconds per image with almost no latency. Data from each camera are communicated via Ethernet for 3-D processing. The 3-D measurements are linked to CAD data using object recognition and co-ordinate transformations. Relative positions of components and tooling can be determined. Robot and actuators can be controlled within a real-time feed back loop. Once the desired positions have been achieved, manufacturing tolerance requirements are checked.