# Extreme Precision Upgrade

## Paragon™ Software

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TEST & INSPECTION

# Quality Is Paramount

The Extreme Precision Upgrade is a software option that enables stage mapping in Paragon™ software. Stage mapping improves the X-Y table positioning to submicron levels. This new feature is available on Nordson's most-advanced Bondtester platforms.


## Why do I need an extreme precision upgrade?

Quality is paramount in high tech industries like wafer testing and precision electronics manufacture. If left unchecked, very small programming and human errors build up on any high accuracy systems.

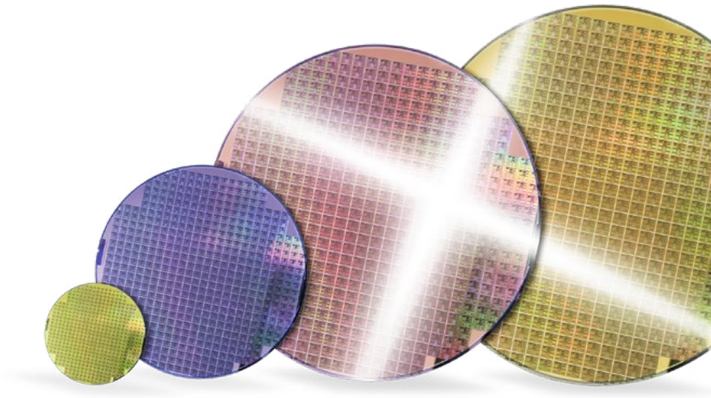
Your test process could begin to see forces slowly drift from good to bad without warning. This could be a disaster if the system does not calibrate itself and avoid these issues.

In addition, if you intend to copy automation recipes from one Bondtester to another, you will not benefit from the true accuracy of the machine and you will see bad results from the very beginning.

You can eliminate both of these issues with the extreme precision upgrade.

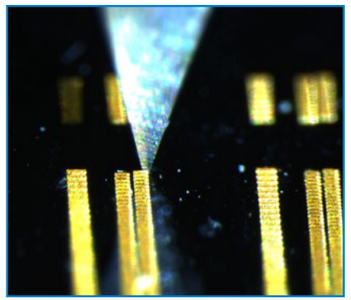
## Finding the source of the problem

All large motion systems have very small physical imperfections due to orthogonal misalignment and warpage. This manifests as a small change in physical offset observed at a given location when moving two fixed positions to the same location: i.e. moving from camera to tool tip at a bond. This becomes apparent when traversing large area devices such as 300mm wafers, long lead frames & large area PCBAs. Nordson has the unique solution to this problem called a stage map calibration.

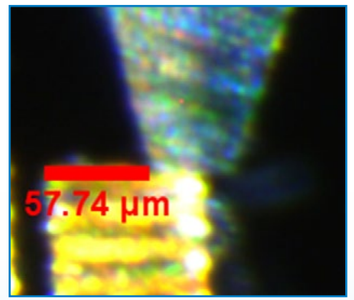


## How would I know if there's a problem with my test process?

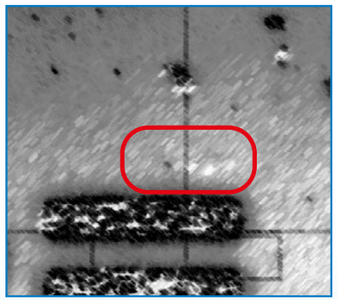
You can observe this physical offset with the trinocular camera (left) showing what an operator would see. If we zoom into the trinocular many times (middle) we can see an X-offset of approximately 60 microns. The edited image capture image shows the tool witness mark (right) confirming the offset. This example is exaggerated as typical offsets are <10 microns and virtually imperceptible.



Operator view using the trinocular camera.




X-offset of approximately 60 microns.

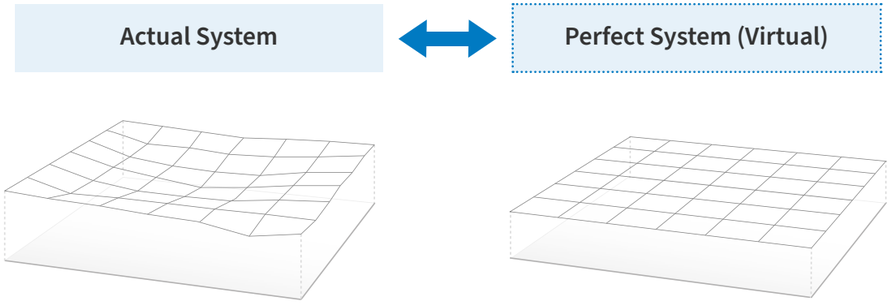


Tool witness mark confirming the offset.

# How Does It Work?

## Stage mapping

The calibration technique called Stage Mapping corrects for physical imperfections. A cartridge camera with an image capture camera and a series of points across the axes is used to create a 3D map of the X-Y offsets. Image matching algorithms then detect and redefine the location of the camera cartridge position. The resulting vectors are stored by Paragon™ software.



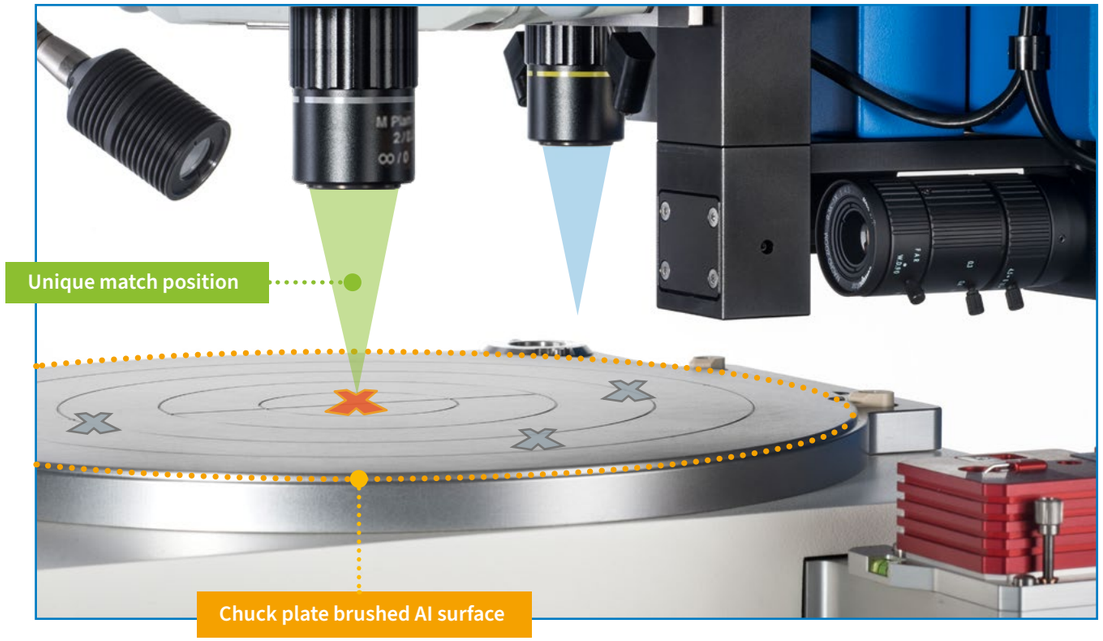

The 3D correction map is applied to the X-Y coordinate system so that any given move is corrected, resulting in a move to the true position with superior accuracy.

## Fully automatic 3D mapping

A cartridge camera (CALCAM) and image capture camera move in synchrony to unique regions of any brushed aluminium surface e.g. 4800 vacuum chuck plate. We have two variants to suit our two cartridge offerings, one for a multi-function cartridge (MFC) and the standard camera to suit singulated cartridges. These both simulate the tool tip position in their respective load cartridges.


## No expensive calibration plates required

The benefit of the Nordson method is that it just works. Any brushed aluminium surface can be used to calibrate. Scratches are unique and cannot be matched up elsewhere so there is no need for a custom and expensive calibration plate.



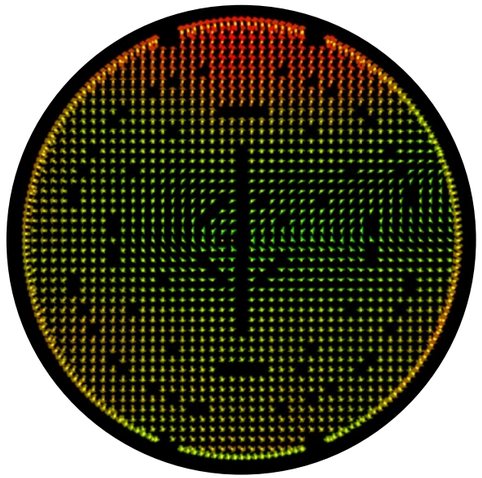
# Advanced AI

## State-of-the-art intelligence built-In

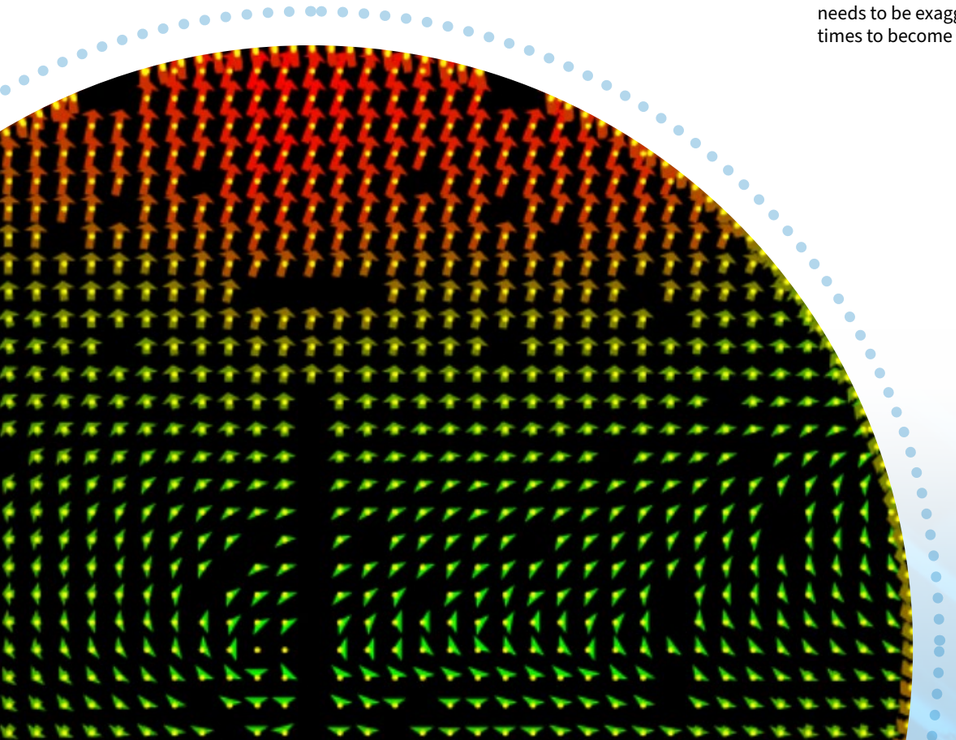
Below is a representation of a stage map for 2000 locations across a 300 mm chuck plate. Each arrow denotes the angle of the offset and magnitude is shown by its colour and arrow length. Typical offsets are < 10 microns.

Some areas are blank as these are the lift pins, vacuum ports & channels. The system automatically discards any data taken from these locations as they're not required and it can extrapolate data from nearby regions.

This data is unique to a particular machine and indicates where X-Y corrections are needed. The vector map is used to create a stage map file and stored behind the scenes.

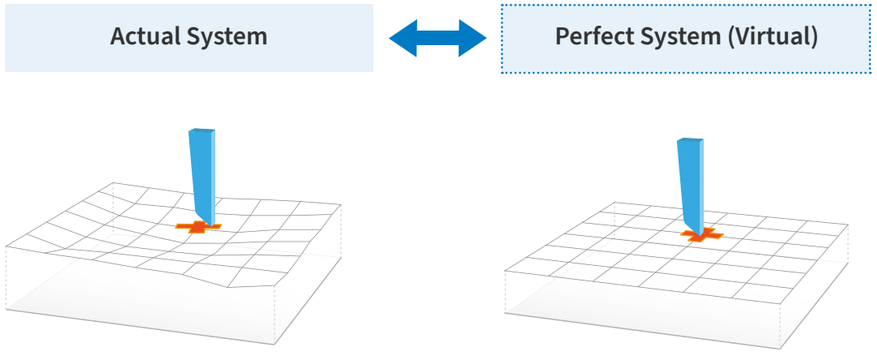


To create this map the vector magnitude needs to be exaggerated thousands of times to become visible.



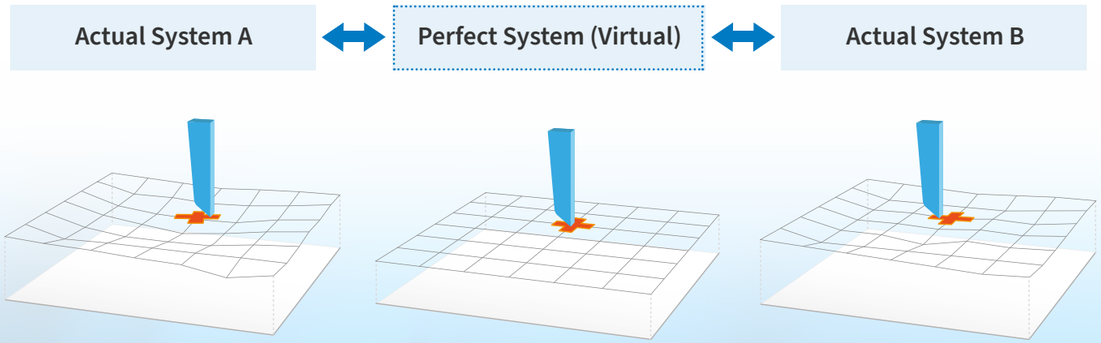
## Correct and adapt

Paragon™ software calculates and accounts for these offsets at all X-Y stage locations. This involves intelligently filling in all the gaps in the 3D mesh. The final result is imperceptible to a user but offers extremely precise test tool positioning at a submicron level.




## New possibilities

The Extreme Position Upgrade improves automation data export or import for users with multiple machines testing the same product. The final result eliminates any issues with transferring patterns between systems. Each machine adapts the perfect data to the actual machine performance seamlessly.



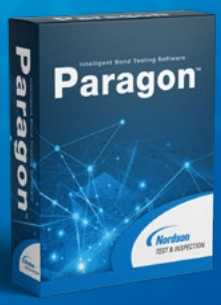
# Compatibility

Request an “Extreme Precision” software license from your Nordson representative.

The system must be using the latest Paragon™ software. Extreme Precision software is available on:

4600


4600-W




4600-LF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4800 INTEGRA™


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BR-BT-08112021-V1


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