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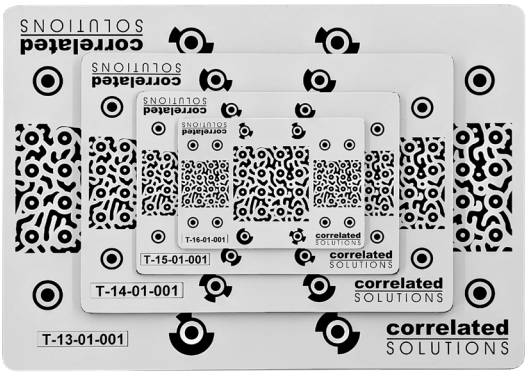
Calibrate with Confidence

# Calibration Perfected

## Laser-Marked Precision for DIC

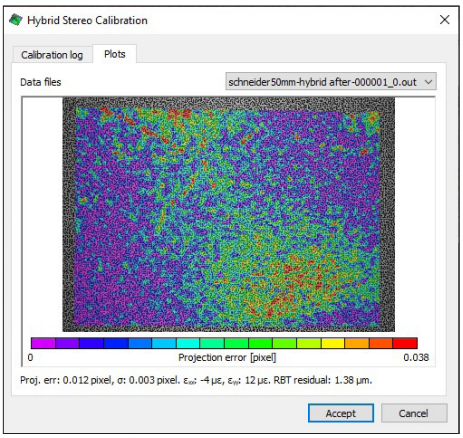
VIC-3D's calibration procedure is favored by both beginner and power users for its ease of use, reporting, and flexibility. Below are a few reasons that calibration with VIC-3D is so versatile:

- No input is required by the user. VIC-3D calibration is as simple as a click of button.
- No precision positioning/alignment of targets required. VIC-3D simply requires a series of calibration images with completely arbitrary tilts in each direction.
- No reaching for the keyboard for image capture. Calibration images may be taken using any iOS or Android device and the free VIC-Snap App.
- No unnecessary redundancy. Calibration may be performed within the acquisition software in real-time.



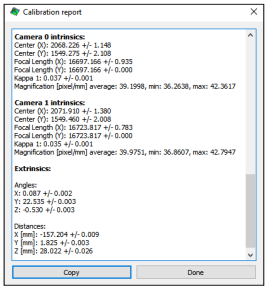

### VDI 2626 Integration

VIC-3D now supports VDI 2626 Calibration Panels, which verify that the system is within international standards. The VDI 2626 directive provides an industry standard to add traceability to DIC measurements.



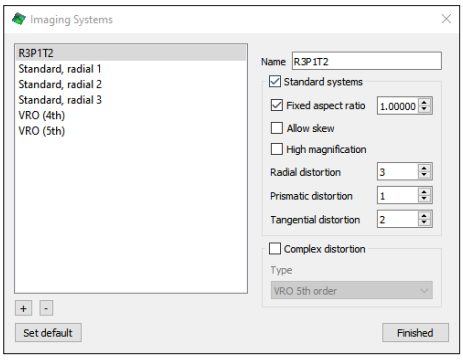

### Hybrid Calibration

Hybrid calibration reduces bias by using both the standard calibration target and speckle correlation data to improve calibration results. This method leverages thousands of points in speckle images, rather than relying on the tens or hundreds of fiducials in calibration target images, in order to improve the calibration model. Hybrid calibration provides many advantages compared to traditional calibration methods and may be used with any project (even old/existing project files). This is a powerful tool that not only reduces or removes bias but provides the user with additional metrics that were previously not available.




### Calibration Reports

For every project, VIC-3D automatically reports all intrinsic extrinsic calibration parameters with confidence intervals. Each calibration parameter along with its reported confidence provides the end user with insight into their optical and stereo setup.




### Advanced Imaging Systems

The advanced imaging systems in VIC-3D give the user the ability to select and combine multiple distortion orders from various models such as radial, prismatic, and tangential. These advanced distortion parameters are helpful for lens tilt and decentering, which varies and can be significant depending on lens vendor and quality. Additional options are useful for complex optical setups, such as high-magnification or when imaging through complex medium. Once the calibration configuration has been optimized for the optical setup, it can be saved as imaging systems for future use.


**Contact our Sales Team to explore the range of industry-leading digital image correlation systems from Correlated Solutions.**

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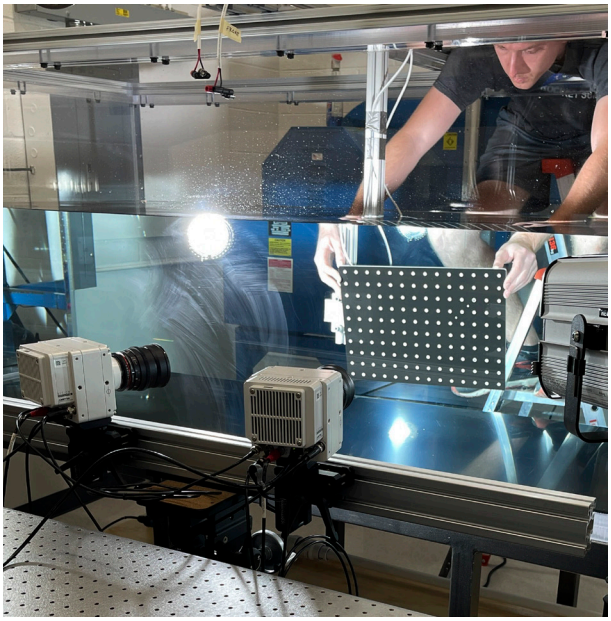
Calibrate for *(almost)* Anything

## Calibrating Advanced Applications

In an ideal DIC world, all test setups would follow a pinhole camera model and include low-noise cameras, each with a low distortion lens, that are rigidly mounted in a stereo rig that remains undisturbed. Correlated Solutions understands that not all applications allow for this setup and has integrated features to help users calibrate for non-traditional setups. This flexibility allows for DIC to be used in more applications, many of which the traditional pinhole camera calibration model results in significant bias and error in shape, displacement, and strain data.



## Calibrating through Windows or in Liquids

Variable Ray Origin **(VRO)** calibration feature corrects for changes in the refractive index between the speckle pattern and a stereo camera pair. This is especially useful when viewing a specimen through a view port or in bio-medical applications, where the sample is oftentimes submerged in a liquid. While a standard pinhole calibration model cannot remove the bias that leads to significant errors in shape, deformation, and strain data, implementing the VRO calibration model leaves data with no discernible bias.


## Micro-Scale

Correlated Solutions has developed and patented an easy-to-use calibration procedure that corrects for the complex distortion fields present in stereo-microscope DIC systems. These distortions cannot be modeled accurately using traditional stereo-calibration techniques due to the unique optical paths imaging through a single high-magnification objective lens. Without this correction, severe bias shape and deformation data will result. The stereo-microscope distortion correction algorithm solves this problem. This distortion correction can be used in other non-traditional optical situations as well.

## System Disturbance Correction

In 3D digital image correlation, it is paramount that the calibration model accurately reflects the optical model of the test images, including the precise location of the sensors relative to one another. In situations where camera locations have been disturbed, VIC-3D includes a **Calibration Disturbance Correction** feature that automatically recalculates the stereo cameras' positions after a disturbance occurs before or during testing. Because the disturbance correction feature uses information from the acquired speckle images from the test, it does not require any additional calibration images and can be performed after the system has been dismantled.

## Long-term fatigue testing

In some cases, it is necessary to dismantle the camera system between the time that the reference images and the deformed images are taken. This is common for long fatigue tests, where the deformed images may be weeks, months or years after the reference images have been taken. VIC-3D has a feature that allows a separate calibration to be used between the reference and deformed states.

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