

MATCHID NEWS

Material Characterization and Image Correlation Newsletter 3

June 2017

Good news everyone... ...There is a DIC-WIKI!!!

We are proud to present the third edition of our newsletter where we want to put specific attention on our brand-new interactive MatchID wiki webpages that contain information for our customers about our latest software releases.

What's more, the **wiki documentation** enables the users to have full access to interactive user manuals, learn all about DIC and VFM using the manual modules and tutorials, request technical support, and even obtain **intense training materials** such as educational DIC courses, and intensive **webinar videos**. Hereby, we underline our tagline of the company "Metrology beyond colors" by paying specific attention to the training and quantitative interpretation capacities of our users.

We also offer demo materials and free trial package for those new to MatchID, and who want to get a feel of what we do.

Further on, discover our highly anticipated new release MatchID 2017.2 where we introduce, among other exciting upgrades, a completely redesigned VFM module, which is largely extended by integrating new material properties including hyperelasticity, viscoelasticity and viscoplasticity with intuitive spider charts indicating the parameter sensitivity of your test setup.

Additionally, we put our finite element validation module into the picture. This unique feature generates validation maps for your simulation in the blink of an eye, both for 2D and Stereo DIC.

Finally, we would also like to thank Dr. Oren Rijensky and Technion- Israel institute of Technology for their contribution into this newsletter, and articulating their application of MatchID.

Read on for more news on what we have been up to this year and enjoy!

- The MatchID team

More than just a software package...



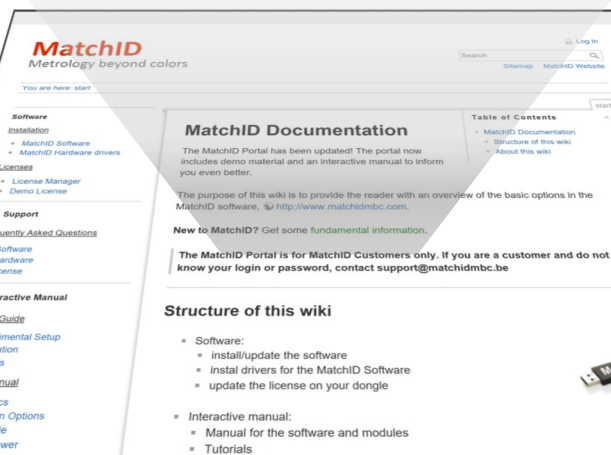
Webinars



Training materials



Interactive manuals



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MatchID 2017.2:

What's new??

Our new MatchID release 2017.2 includes the following latest available features:

MI2D/Stereo

Along with the generic filtering options for better control of project parameters, the new features include actual 3D rigid body motion correction, with GUI optimization for 4K screens.

Grabber

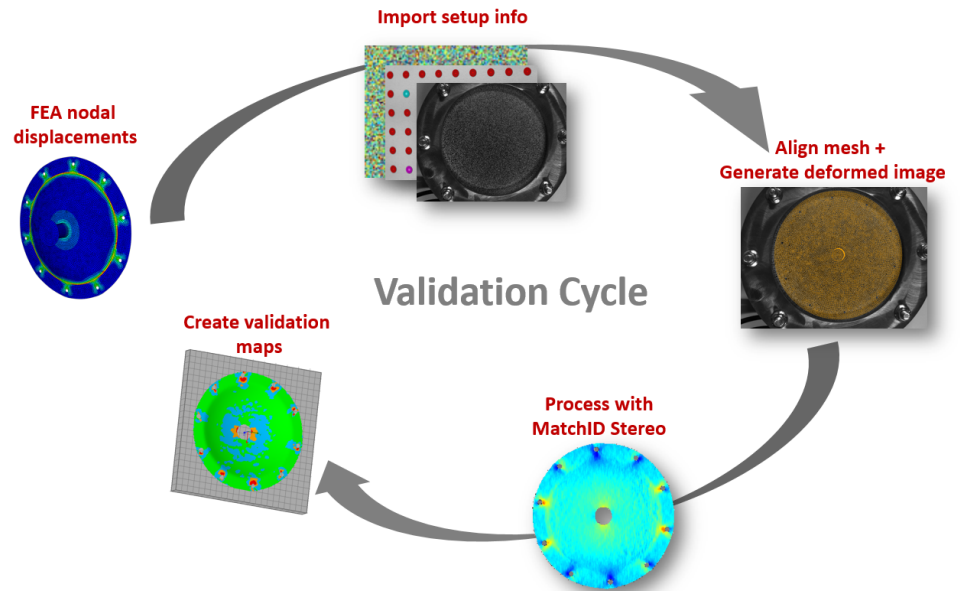
Now supporting Allied Vision and Point Grey cameras, as well as new hardware trigger mode. Introducing intelligent speckle pattern analysis, helping users to avoid aliasing, and obtain consistent speckle dimensions. Also includes stabilized image capturing ability for "high-speed" quasi-static analysis.

Brand-New VFM module

Complete new module on VFM that performs intuitive sensitivity analysis. The module now integrates elasticity, plasticity with new material properties such as hyperelasticity, viscoelasticity, and viscoplasticity, along with flexible boundary conditions.

MultiCam

Performs back-2-back stereo set-up measurements, with new automated calibration system, based on one single calibration target that transforms all multiple cameras into one global frame.



MatchID FEA Validation Module: Robust and efficient model validation through digital image correlation

Module in the picture: FEA validation

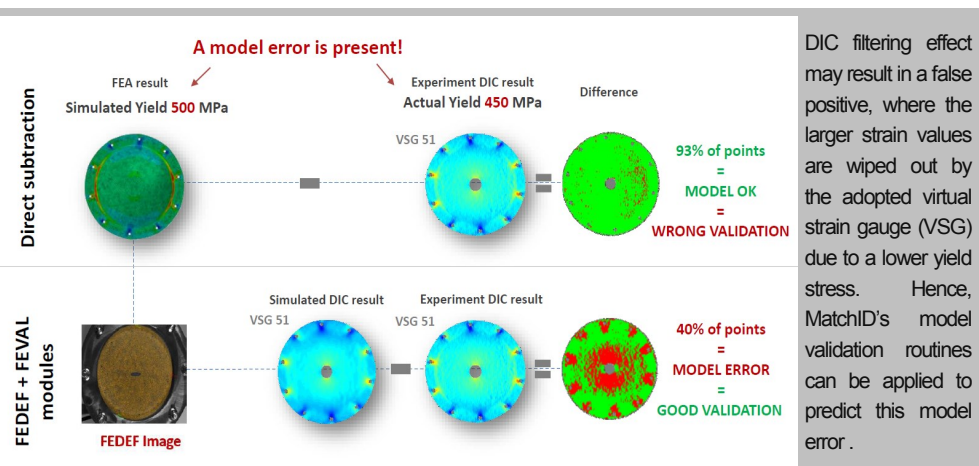
Model validation through full-field measurements can often be a daunting task. Hereby, one can distinct three major problem sources that hamper a direct subtraction of simulation values from experimental data:

1. *Frame alignment*: retrieve accurate rotation and translations that express DIC data in an identical frame as the model values.
2. *Location issue*: DIC data points and FEA values generally do not coincide.
3. *Filtering problem*: The adopted mesh densities in DIC and FEA differ. Indeed, experimental data generally go through a low-pass filter to reduce the impact of noise. Moreover, identical DIC data may result in very different outcomes when processed via a large variety of smoothing parameters.

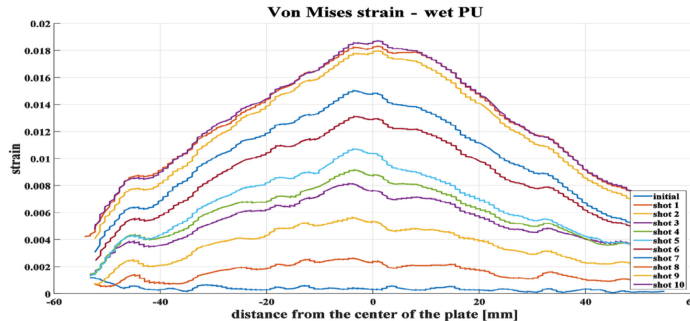
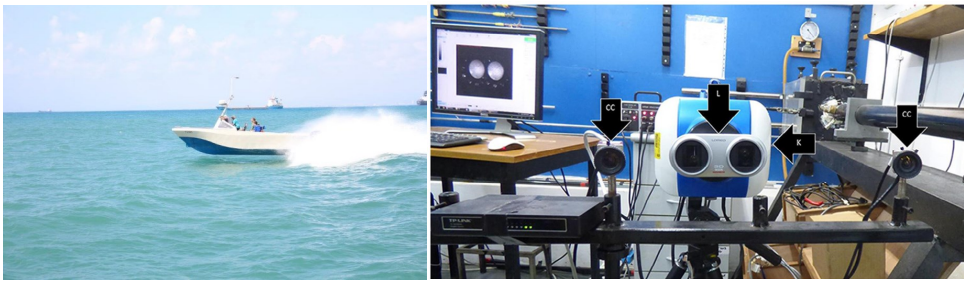
So, which DIC settings to choose to optimally compare with my model?

Here's a solution: MatchID's FEA validation module

Our MI-FEVAL and MI-FEDEF modules help avoid these problems by numerically deforming images according to displacement fields obtained via FEA. As such, one can process FEA data through the same filters (subset, shape functions, interpolation, etc.) as the true experimental data. Incorporating the calibration parameters establishes an automatic frame alignment. Furthermore, full-field error and validation maps indicating possible model errors are generated in the blink of an eye.



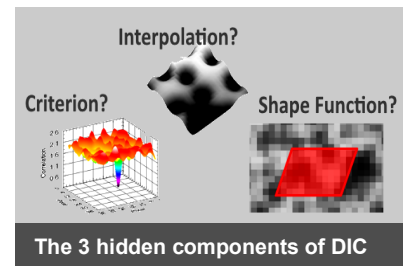
DIC filtering effect may result in a false positive, where the larger strain values are wiped out by the adopted virtual strain gauge (VSG) due to a lower yield stress. Hence, MatchID's model validation routines can be applied to predict this model error.



Webinars:

MatchID now conducts live interactive webinars every 2 months, starting from the fundamentals of DIC, suitable for anyone with or without any prior DIC knowledge.

Our latest webinar, broadcasted live on May 31st, 2017, introduced the fundamental principles of DIC, where we uncovered the hidden modules of DIC, among other topics, in an intense 1 hour of live broadcast. Followed by one-2-one questionnaire with the attendees.



For more information on our webinars, and future broadcasts, please visit:

<http://matchidmbc.com/Webinars>

Short course:

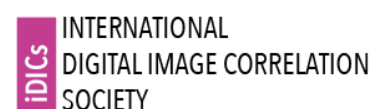
Model Validation and material identification via full-field data

Do you want to learn more about our procedures to validate finite element simulations via DIC? Are you triggered by our integrated material identification routines? Come along and discover them at our conference course at the annual IDICs conference 2017, with well-illustrated practical examples.

Required skills: basic knowledge of DIC

IDICs November 6 2017, Barcelona, Spain

<http://www.idics.org>



L-R: Dganit boat; Camera configuration – ultra high speed Kirana equipped with Loreo split lens; Bottom right: Accumulated Von Mises strains of the wet PU plate

Application in the picture: Polyurea coated aluminum plates under hydrodynamic loading

A new concept for designing high speed planning boat was conceived at the Technion-Israel Institute of Technology. As a part of the new concept, we needed to assess the effects of polyurea coating on the response of aluminum plates under hydrodynamic loading. For that purpose, we designed and built a setup capable of mimicking wave slamming conditions to test the performance of the coated plates. We used Matchid Stereo to capture the out-of-plane displacement of a polyurea coated aluminum plate as it deforms during a shock. This process was based on using a high-speed Kirana camera with split lens, thereby saving the use of 2 separate cameras.

“The flexibility of MatchID Stereo enabled us to perform complex DIC measurements under problematic high speed lighting and with one camera acting as two.”

*- Prof. Dr. D. Richter and Dr. O. Rijensky
Technion – Israel Institute of Technology*



This was our first experience with DIC and many other followed, as DIC proved to be a very effective and accurate tool. It was the efficient calibration process and the flexibility of MatchID Stereo that enabled us to perform such complex DIC measurements under problematic high speed lighting and with one camera acting as two.

The use of DIC in this applicative research enabled us to obtain insights which could not be obtained by any other measurement tool. aside from published papers, the most significant outcome of this research is the Dganit prototype research boat, a high-speed vessel built according to our ideas and findings.

Details about the experimental work can be found at: O. Rijensky, D. Rittel, *Polyurea coated aluminum plates under hydrodynamic loading: Does side matter?*, International Journal of Impact Engineering, Volume 98, December 2016, Pages 1-12, ISSN 0734-743X, <https://doi.org/10.1016/j.ijimpeng.2016.07.006>.

Video of the boat: https://youtu.be/P4_CSaDYMVQ

Meet MatchID at:

- SEM Annual Conference and exhibition XIV, Indianapolis, USA 12-14 June, 2017
- International seminar on metal plasticity, Rome, Italy on 19 June, 2017
- BSSM Sheffield, UK, 29-30 August, 2017
- iDICS at Barcelona, Spain, 6-9 November, 2017

MatchID team is expanding...

... and we are even looking for more candidates. If interested please contact us.



Our team is now joined by two new recruits: our software engineer, and business development and sales engineer

Our international team



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Our international team in North America, Asia and Europe