

# The 3D SLIM Mapper System

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The 3D SLIM Mapper System is an extension of the capabilities of the current PCS EHD system. The EHD system currently measures the central film thickness of a fluid in a contact. The 3D SLIM Mapper allows a complete three-dimensional map of the film thickness to be generated from digital pictures of the contact.

## Upgrade Of PCS EHD Systems

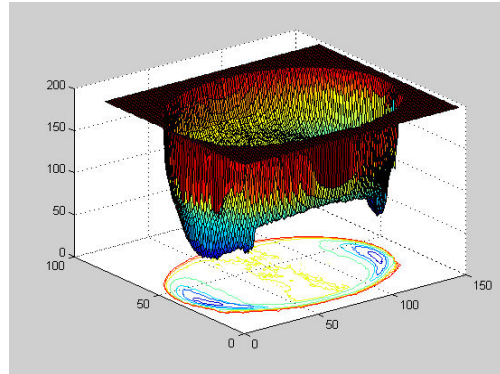
The 3D SLIM Mapper uses the current mechanical and electronics unit. Upgrading simply requires a new PC which includes a colour framegrabber and a digital colour camera (with ancillaries). The 3D SLIM Mapper also uses different spacer layer thickness disks to give good discrimination between colours within its range of up to 300nm.

Calibration is currently done with a calibration oil - allowing user recalibration whenever required.

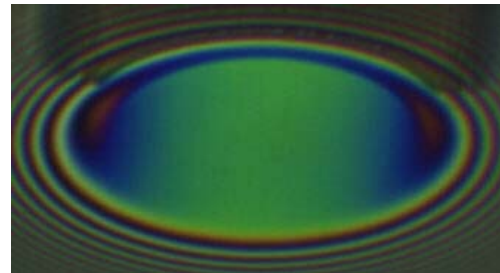
## Example Results

The two maps seen to the right have been generated from the bit-map of the contact seen in the centre. The fluid was a standard mineral engine oil run at 40°C and approximately 0.2 m/s, pure rolling.

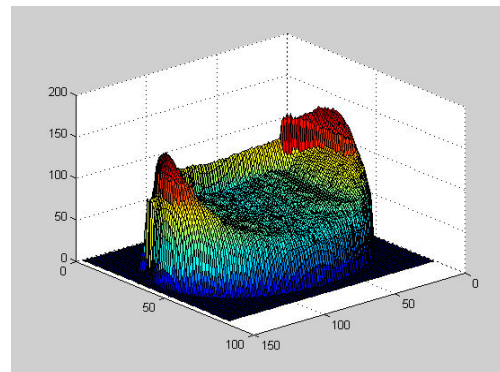
As shown, once the maps have been generated the full form of the contact can be investigated using different viewing angles. In this example the lobes and rear constriction of the EHD contact are easily visible.



Above: - 3D contact with projected contours



Above:- Acquired image during test

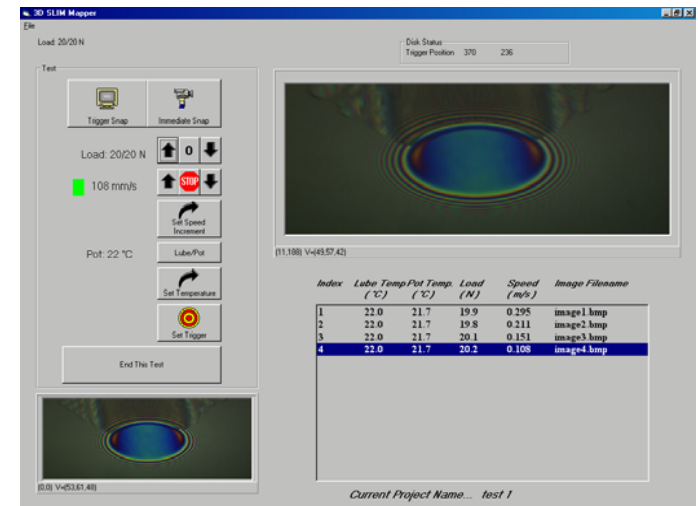


Above:- An inverted image of 3D contact

## Software

The software for the system is comprised of two parts. The first part is the control software which allows the user to conduct a test on the EHD system and acquire images of the contact under user-defined test conditions. The entire test is stored on the PC as a 'Project' and is portable as a subdirectory. The control software can only be used on the EHD PC and a screen shot is shown below.

The second part of the software is the off-line analysis of the images. The user loads the project into the analysis package and can produce 3D maps of any areas of interest - or the whole contact - at various spatial resolutions. The analysis software can be used on other PCs. Post processing of the resultant data (a matrix of film thicknesses) is at the user's discretion and it can be displayed on most commercial 3D Surface graph packages.



Above:- A screen shot of the image acquisition software during a test

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