

Polytec Limited: Users Group and Technical Meeting Report

19th & 20th September 2011



The 2011 Autumn UK User Group Meeting was held for the first time at The Heritage Motor Centre Motor Museum in Gaydon, home to the world's greatest collection of British Cars! This central location provided easy access from most areas of the country, but also proved to be an excellent choice of venue with its modern facilities and the added interest from the museum's collection of over 180 exciting cars.

Over 60 delegates enjoyed 11 speakers over the two day event. The first day began with a talk from Roger Traynor, who has 18 years experience with laser Doppler vibrometers. Melanie Gerard gave an excellent demonstration of a 3D scanning laser vibrometer and explored the complexities and advancement of new software features and functions. She concluded that the new instrument advancements are helping to drive technological developments within both the aerospace and automotive industries.

Joe Armstrong gave us reason to remember the importance and nature of surfaces and their functions, with his talk on surface measurement systems principles and practices. Contact and non-contact measurement techniques were considered in terms of application suitability, describing both advantages and disadvantages for white light interferometers and chromatic confocal scanning.

Joerg Sauer described the process of how a suitable vibration measurement setup can provide measurement data for comparison, with simulation and aid modal extraction to be part of a solution to enhance and speed up new product development, and help improve final product performance.

Professor Steve Rothberg, of Loughborough University, made a key note, titled "*Applications and interpretations in LDV: confident steps in the light direction*". The talk took us on a journey to consider the uses of laser vibrometers and how, with a little thought, this simple to apply technology could be used to resolve challenging to measure rotating structures.

Polytec introduced its new long range remote sensing vibrometer the RSV-150, with a measurement range of 100m, example applications given included the measurement of difficult to reach structures like high voltage cables and the measurement of the Humber Bridge. Other talks included automotive brake measurements and the need for 3 dimensional measurements on this complex structure. Some new exciting measurement

capabilities were introduced, such as the extraction of dynamic stress and strain using 3D vibration data. This technique allows the possibility of large area high density stress and strain information.

Roger Traynor took a look at how non contact vibration measurements are used for hearing applications. Uses range from diagnostic measurements for the outer ear/inner ear, right through too in vivo measurements during surgery for middle ear implants. This presentation was followed up with a fascinating presentation by Professor Peter Brett titled “*Biomedical – Measuring Cochlear Dynamics*”. Where an insight was given on how medical advancements for automated robotic surgical procedures for Cochlear implants are being developed with the aid of laser Doppler vibrometry.

Dr James Windmill talked about “*Insect Bioacoustics: the Vibratory Mechanics of Miniature Insect Ears*” and explained how he was interested to measure these really small creatures and incorporate what we learn from nature into engineering systems and develop new micro/nano technology, e.g. new MEMS sensors.

Professor Margaret Lucas burst onto the stage with her refreshing style to share her research group’s very interesting work on the Mars rover; titled “*Ultrasonic Drilling and Coring for Planetary Astrobiological Sample Retrieval*”. She described the development of power ultrasonic cutting tools with tight design parameters, e.g. must be light weight, low power consumption and high reliability.

Jenny Wooldridge made a presentation on the study and characterisation of Piezo metrology and new MEMS based tools. The penultimate presentation was made by Jaap Verheggen. Jaap talked about his experiences with measuring both static and dynamic measurements using his micro system analyser, and measurement instrument that combines laser Doppler vibrometry for out of plane measurements, with stroboscopic measurements for in plane dynamic measurement with that of white light interferometry for surface topography measurements.

The final presentation by Polytec Limited was on the new microscope based ultra high frequency 1.2GHz laser Doppler vibrometer, the motivation for developing such an instrument, its theory of operation and its application for micro/nano technology. Applications examples included the measurement of SAW devices and ultra sound transducers used in acoustic microscopy.

