CASE STUDY – CENTROPE_TT VOUCHER

Cooperating organisations			
Sobriety s.r.o.	South Moravian Region, Czech republic	**Brno University of Technology**	South Moravian Region, Czech republic

SME beneficiary	
Sobriety s.r.o. (www.sobriety.cz)	
Seat	Loosova 579/10, Brno , 638 00, Czech Republic
Field	Mechanical engineering – numerical simulations
Size	Small company
Profile	Sobriety s.r.o. provides since 2002 services in engineering numerical simulations that can be effectively utilized in a wide variety of mechanical engineering applications. Their analytical results supplement or replace measuring in laboratories, testing rigs and aerodynamic tunnels. The purpose of the analyses is the accelerating of new products development, fault diagnostics, control and innovation of existing products and technologies. Their main clients are ŠKODA a.s and Honeywell s.r.o. More at www.sobriety.cz

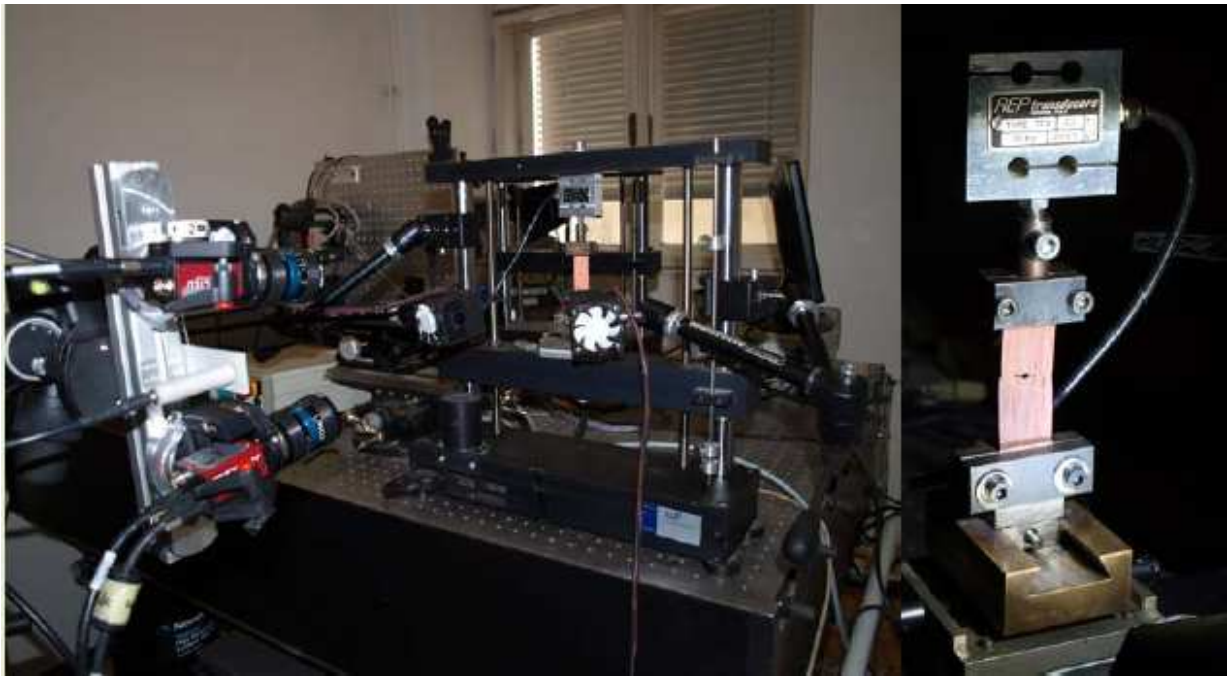
R&D service provider	
University of Vienna Faculty of Physics Physics of Nanostructured Materials (http://physnano.univie.ac.at/)	
Profile	The group studies the fundamental physics of novel materials under dimensional constraints. This includes investigations of their formation, structural evolution and of the physics of their unique properties. Multiscale phenomena of metals, alloys and polymers with nanocrystalline structures (grain size < 100 nm), with nanoscale free surfaces, and with geometrical dimensions smaller than 100 µm are studied using state-of-the-art complementary experimental methods such as atomic resolution transmission electron microscopy, scattering with synchrotron radiation, atomic resolution scanning probe microscopy, and contact-free laser speckle correlation. The scientific expertise and the unique facilities developed by the research group enable the analysis of thermomechanical properties of materials with small dimensions. Investigations are carried out to analyse the physical mechanisms of phase stability, disordering, nanocrystallization and amorphization. The experimental results are modelled in terms of the size constraints, internal stresses and lattice defects. The results are used to optimize the thermomechanical, magnetic and electric properties especially of bulk nanocrystalline materials obtained by severe plastic deformation, and of microelectro-mechanical systems. Knowledge on the important physical aspects shall lead to new micro and nanosystems for innovative future applications.

Responsible researcher	Mag. Dr. Golta Khatibi

Cooperation	
Implementation period	12/2010 – 06/2011
Value	4.900 EUR without VAT
Subject	Experimental verification of the applicability of the Vic 3D optical correlation system to the deformation measurement on the nano and micro structures
Output	The research project provided Sobriety with a methodology on measurement of micro- and nano-structured materials. Tests were conducted both in 2D and 3D and therefore cover the whole application field of optical measurement systems in possession of the company. Apart from specific calibration and processing procedures, also micro-speckle pattern deposition technology was developed during the project, which significantly broadens the applicability field of the measurement method. The aforementioned procedures were developed and tested on the following specimens: 1- Solder-joint specimens of selected lead free alloys (Cu/SAC-alloy/Cu) with various gap sizes (100µm-400µm). 2- Nano-structured miniaturized Cu specimens processed by high pressure deformation (gauge section 200 µm x 600 µm) 3- Electrodeposited Cu foils with a thickness of 15µm with a central notch. As can be seen above, various types of specimen involved in this project cover wide range of possible real-world applications.
Use and benefits	The measurements results demonstrate that the Vic 3D method is a suitable and powerful tool for analysis of strain fields in small scaled structures with high local resolution and this method can be applied for determination of local strain-strain response of these structures under various loading modes. The measurements was also verificated by FEM simulations. The research results will help Sobriety to serve the industry with extended portfolio of measurement services. This much appreciated enlargement of company know-how in the optical measurement area is about to facilitate new contracts for services. The know-how in the field of micro- and nano-measurement brings competitive advantage to the company and renders Sobriety the partner of choice for local high-tech companies.

Cooperation evaluation – Ing. David Ševčík, Ph.D., Project manager of R&D department	
The collaboration with the researchers at the University of Vienna was performed at a very high standard and thanks to their interest and commitment the project went according to plan and the set objectives were achieved. Above all, it is necessary to emphasize the cooperation with the JIC staff who helped significantly to the success of the project, from the project design to its completion.	
Has the company cooperated with any research institute in the past?	*Yes, company cooperated with Czech research institutes especially VUT Brno, VŠB-TU Ostrava*
Would you cooperate also without centrope_tt voucher?	*Yes.*

PHOTOS from cooperation



Experimental set-up for VIC 3D measurements on thin foil specimens and image of the fracture foil after tensile testing