

z – Snapper 3D camera

3rd dimension for machine vision



The use of three-dimensional surface contour data instead of a two-dimensional intensity picture offers significant advantages for both machine vision solutions and life science applications. Frequently, the desired information can be detected much better from the object height than from its brightness. In the past, task specific illumination and evaluation techniques were necessary to solve such kind of testing problems; they may cause considerable development costs. The *z-Snapper* is closing this gap; it provides standard CCD camera. The high density of data points per measurement reveals even small object features with high reliability.



The *z-Snapper* sensing principle is based upon the well-known fringe projection methodology combined with sophisticated phase measuring algorithms. A sequence of patterns is projected and recorded by a precisely synchronized camera. Optimized algorithms are provided for the fast and reliable evaluation of the intensity patterns; the user benefits from the powerful application programming interface (API).

The *z-Snapper* line of products takes advantage of the novel opportunities of the DMD Discovery™ digital micromirror device of Texas Instruments. ViALUX developed the *ALP* high-speed controller for DMD Discovery™, a key component to make use of the unique DMD properties in optical metrology. Based upon DMD projection, the short recording time of 40 ms is one of the outstanding *z-Snapper* properties enabling not only hand-held operation or fast in-line applications but also the recording of living objects. The recording of 3D videos is also supported as a special operating mode with up to 20 fps VGA. There are two basic *z-Snapper* configurations: *compact* and *vario*.

z-Snapper vario (right) consists in two items, projector and camera, that can be mounted independently and thus provides high flexibility in system integration.

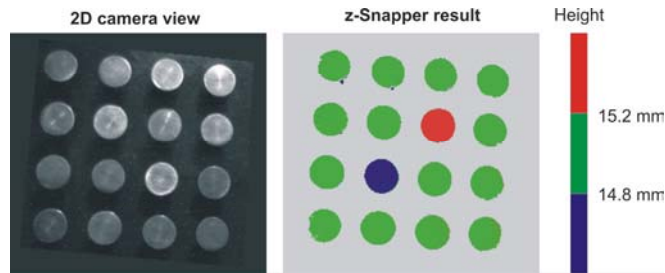
z-Snapper compact (left) comes as a single plug & play unit enabling high mobility. The compact device features three fields of view: *standard*, *midi*, *mini*. An additional novelty is the LED based DMD projector. The replacement of commonly used UHP arc lamps by a solid state light source eliminates a number of restrictions. At first, the device is self-contained (no fibre-bundle input) and does not need a cooling fan so that the housing is completely closed and dust protected. Secondly, in contrast to the arc lamp based systems, the *z-Snapper* can be tilted and is operating in any desired position. And finally, the LED does not require high voltage so that the whole system may be battery powered.



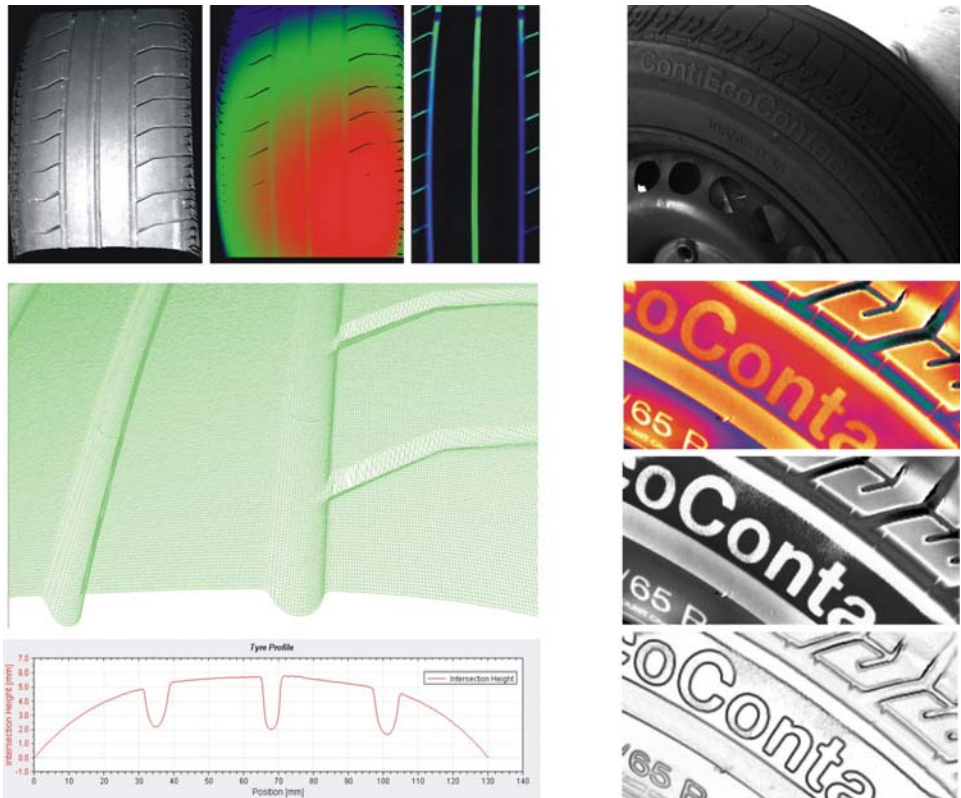
The *ALP* controller interfaces via USB2.0 and the digital camera plugs into an IEEE1394b (FireWire) port so that the *z-Snapper* connects to standard laptop computers yielding a high degree of mobility together with the battery option.

Two software packages are supplied with the device, the *z-Snapper* program for instant use and the SDK, a C++ DLL for integrating the device into a customer's application.

Example 1:
Comparison of
2D and 3D
camera outputs



Example 2:
3D data processing
for a tire



z-Snapper specifications

z-Snapper	compact			vario
	<i>standard</i>	<i>midi</i>	<i>mini</i>	
Measurement				
Data field	full: 640x480 or binning: 320x240			
Field of view	500 mm	150 mm	10 mm	200-800 mm
Height resolution*	20-50 µm	7-30 µm	1-5 µm	50 µm
Recording time**	40-200 ms			
Interface				
Projection	USB2.0			
Camera	IEEE1394b (FireWire)			
Power	max 20W@12V			max 20W@20V
General				
Dimensions	230x130x115 [mm]	330x220x250 [mm]	330x220x270 [mm]	230x130x115*** [mm]
Packaging	single aluminium housing			two housings
Weight	2,0 kg	5,3 kg	4,9 kg	1,6 kg
Requirements	PC or laptop, Windows® XP/Pro, 1Gbyte RAM			

* depends upon surface properties

** depends upon accuracy level

*** projector unit

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