



**Profilometer *extension***  
for laser triangulation

# Optical Profilometers



Laser triangulation is a non-contact distance measurement technique widely employed for surface inspection applications. We've been working to develop a laser triangulation extension, to provide our customers a fast and reliable solution for their measurement and quality inspection issues. Our Optical Profilometer extension enhances the robust and flexible platform of our standard cameras: you can get all the quality of Alkeria cameras, along with all brand new functionalities!

Discover our new CELERA, CELERA One and ARIA models featuring our new Profilometer extension.

## How it works

In a laser triangulation measurement setup, a laser line is projected onto the entire surface of an object passing through the inspection area.

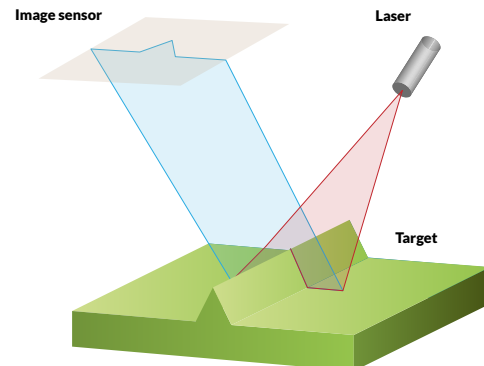
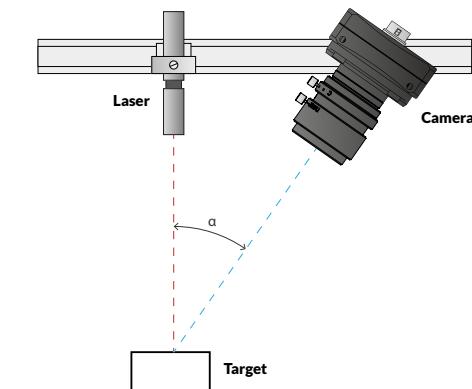
Then, a CMOS camera placed with a predetermined angle, acquires the shape of the laser line reflected from the object. From this shape it is possible to measure the target profile.

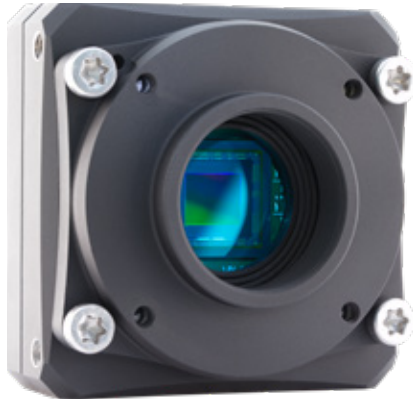
Thanks to a dedicated algorithm and our state-of-the-art FPGA technology, Alkeria cameras can define and extract the line position in every column of the acquired frame, with sub-pixel precision.

In particular, the Profilometer extension enables on-camera acceleration of the line position detection algorithm.

Our cameras can extract and calculate profile coordinates by themselves, greatly reducing the amount of data sent through the USB3 interface.

In this way, users can easily reach maximum sensor frame rate and collect only the data useful for the measurement.





## Powerful platform

We decided to extend our standard area-scan cameras lineup by adding new models equipped with optical profilometer feature: this way our users can take advantage of a reliable and proven system, with the features and specifications of Alkeria standard cameras.

Our system relies on the CELERA, CELERA One and ARIA well-known camera series: with up to 4112 pixels per profile resolution and an acquisition speed up to 3.260 profiles per second, you can easily find the perfect fit for every measurement application.

Check the Technical Specifications tab, to discover all our cameras' specifications.

## Advanced interfaces

All of our cameras features USB3 interface. USB3 provides the most cost effective and widespread interface, pushing speed performances at the top. Then, they are powered directly by the USB3 bus, thus eliminating the need for external power adapters.

Through a versatile I/O interface it's possible to control external devices such as strobe lights, encoders, etc. Depending on camera model, users can rely on 2 input lines with direct encoder interface, 2 output lines and 1 input/output (RS422, RS644 LVDS, LVTTTL)\*. Their multipurpose I/O connector provides user I/O, line/frame triggering and direct encoder interface.

\*on CELERA and CELERA One models



**HALCON**  
COMPATIBLE

**COGNEX**  
COMPATIBLE

## Vision libraries

Image processing libraries represent the most flexible way of developing vision applications: these systems provide a complete range of powerful vision analysis tools, as well as the possibility to develop tailor-made algorithms and functionality to address specific application needs.

That's why our cameras are totally compatible with the major vision libraries, such as MVTech Halcon or COGNEX VisionPro.

### Want to use your own code instead?

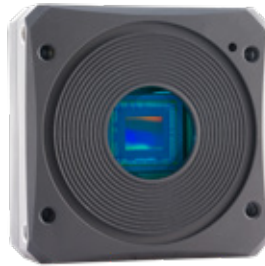
Our cameras come with a comprehensive SDK for Windows and Linux featuring a sample player for live view and setting of the camera, and a rich list of code samples in C# and C++ (WIN32 and Qt).

## Camera line-up



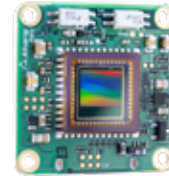
### CELERA

C12SX-PRF  
C5S-PRF



### CELERA One

CO2K-PRF



### ARIA

A15S-PRF

## Features



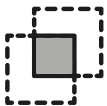
### Dedicated on-board processing

Thanks to a specific algorithm and our state-of-the-art FPGA technology, our cameras can define and extract the line position at very high speed, reducing PC workload.



### Powerful platform

Based on the robust and flexible platform our standard cameras, you can get all the quality of Alkeria cameras, along with all brand new profilometer functionalities.



### Frame combiner feature

Thanks to the Frame Combiner feature it is possible to stack multiple profiles into one single frame: this way data transfer is optimized, in order to preserve processing power for user's application.



### USB3 interface

Up to 5 Gbps USB3 interface allows easy interface to your PC, eliminating expensive frame-grabbers and bulky cables while keeping highest performances.



### Tiny rugged design

Small, ultra-lightweight, rugged aluminum machined high precision case allows maximum installation flexibility even in space constrained environments.



### Dedicated lens adapters

Our C-mount and F-mount lens adapters are specifically built to fit NECTA S: they gives our customers the perfect flexibility in choosing best optics for their applications.

MODEL	C12SX-PRF	C5S-PRF	C02K-PRF	A15S-PRF																																																								
Megapixels	12 MP	5 MP	2 MP	1.5 MP																																																								
Resolution (w x h)	4112 x 3004	2464 x 2056	2048 x 1088	1456x1088																																																								
Sensor	SONY IMX 253	SONY IMX 250	AMS CMV2000	SONY IMX 273																																																								
Format	1.1"	2/3"	2/3"	1/2.9"																																																								
Pixel Size	3.45 x 3.45 $\mu\text{m}^2$	3.45 x 3.45 $\mu\text{m}^2$	5.5 x 5.5 $\mu\text{m}^2$	3.45 x 3.45 $\mu\text{m}^2$																																																								
Profile speed	<table border="1"> <thead> <tr> <th>Rows</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>3004</td> <td>63 Hz</td> </tr> <tr> <td>2048</td> <td>91 Hz</td> </tr> <tr> <td>1024</td> <td>178 Hz</td> </tr> <tr> <td>512</td> <td>339 Hz</td> </tr> <tr> <td>128</td> <td>1.04 kHz</td> </tr> <tr> <td>32</td> <td>2.15 kHz</td> </tr> </tbody> </table>	Rows	Speed	3004	63 Hz	2048	91 Hz	1024	178 Hz	512	339 Hz	128	1.04 kHz	32	2.15 kHz	<table border="1"> <thead> <tr> <th>Rows</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>2056</td> <td>153 Hz</td> </tr> <tr> <td>1024</td> <td>301 Hz</td> </tr> <tr> <td>512</td> <td>581 Hz</td> </tr> <tr> <td>256</td> <td>1.08 kHz</td> </tr> <tr> <td>128</td> <td>1.89 kHz</td> </tr> <tr> <td>32</td> <td>4.35 kHz</td> </tr> </tbody> </table>	Rows	Speed	2056	153 Hz	1024	301 Hz	512	581 Hz	256	1.08 kHz	128	1.89 kHz	32	4.35 kHz	<table border="1"> <thead> <tr> <th>Rows</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>1088</td> <td>337 Hz</td> </tr> <tr> <td>512</td> <td>707 Hz</td> </tr> <tr> <td>256</td> <td>1.37 kHz</td> </tr> <tr> <td>128</td> <td>2.62 kHz</td> </tr> <tr> <td>64</td> <td>4.77 kHz</td> </tr> <tr> <td>32</td> <td>2.15 kHz</td> </tr> </tbody> </table>	Rows	Speed	1088	337 Hz	512	707 Hz	256	1.37 kHz	128	2.62 kHz	64	4.77 kHz	32	2.15 kHz	<table border="1"> <thead> <tr> <th>Rows</th> <th>Speed</th> </tr> </thead> <tbody> <tr> <td>1088</td> <td>242 Hz</td> </tr> <tr> <td>512</td> <td>490 Hz</td> </tr> <tr> <td>256</td> <td>906 Hz</td> </tr> <tr> <td>128</td> <td>1.57 kHz</td> </tr> <tr> <td>64</td> <td>2.48 kHz</td> </tr> <tr> <td>32</td> <td>3.05 kHz</td> </tr> </tbody> </table>	Rows	Speed	1088	242 Hz	512	490 Hz	256	906 Hz	128	1.57 kHz	64	2.48 kHz	32	3.05 kHz
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Pixel format	MONO8, MONO16, RAW8, RAW16																																																											
A / D Conversion	8, 10, 12 bit		10, 12 bit	8, 10, 12 bit																																																								
Synchronization	External trigger, software trigger																																																											
Shutter control	25 $\mu\text{s}$ ÷ 5 s (global shutter)	17 $\mu\text{s}$ ÷ 5 s (global shutter)	15 $\mu\text{s}$ ÷ 5 s (global shutter)	18 $\mu\text{s}$ ÷ 5 s (global shutter)																																																								
Power Supply	< 3 W, powered by USB3 interface																																																											
Inputs / Outputs	2 in (direct encoder interface), 2 out, 1 I/O (RS422, RS644 LVDS, LVTTTL)			2 I/O, LVTTTL levels, 1 in (isolated), 1 out (isolated)																																																								
Interface	2 x USB 3.1 Gen 1		USB 3.1 Gen 1																																																									
Lens adapter	C-mount   F-mount (optional)			Board level   C-mount S-mount   Full casing																																																								
Weight	150 g (with C-mount adapter)		126 g (with C-mount adapter)	< 5 g (board level)																																																								
Dimensions	56 mm x 56 mm x 30.85 mm (with C-mount adapter)			26,4 x 26,4 x 7,8 mm (board level)																																																								
Conformity	CE, RoHS, FCC, IC																																																											
Operative temp	0 ÷ 50 °C																																																											

This chart shows all technical specifications of the current camera product line with Optical Profilometer features. To know more about specifications and prices, please contact our Sales department at [sales@alkeria.com](mailto:sales@alkeria.com): we'll help you finding the right camera for your application.



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