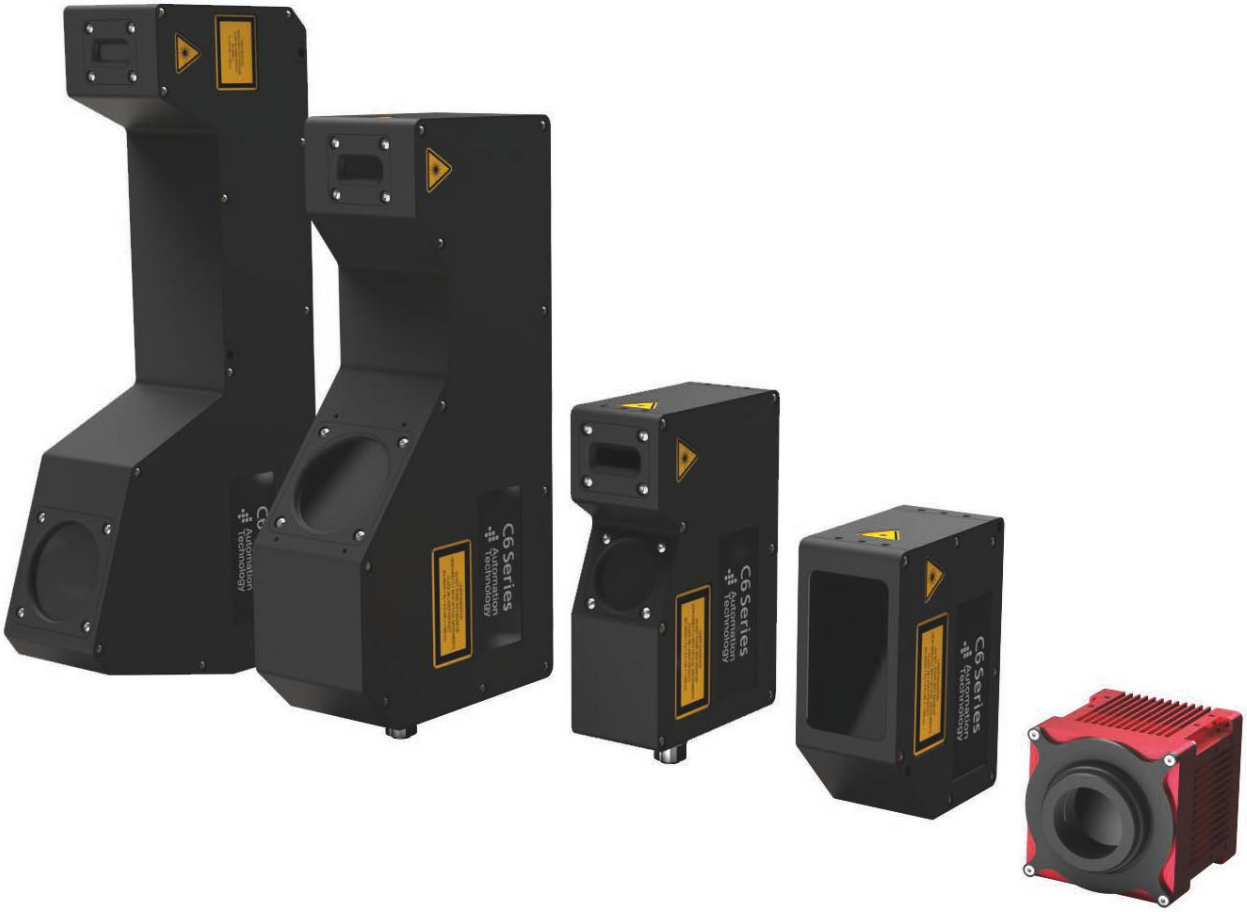
Automation Technology

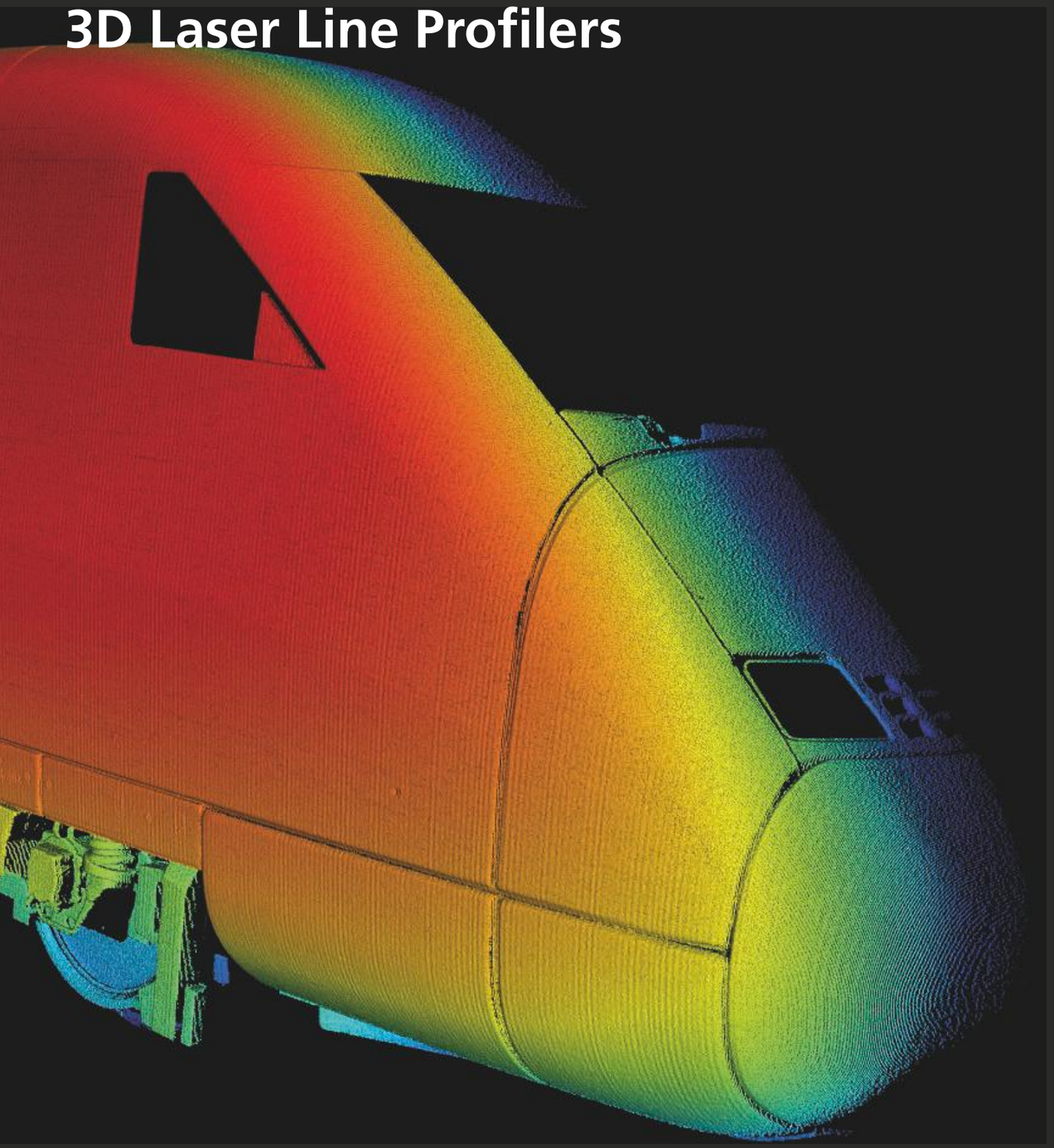


C6 Series

3D Sensors

TAILORED

3D Laser Line Profilers



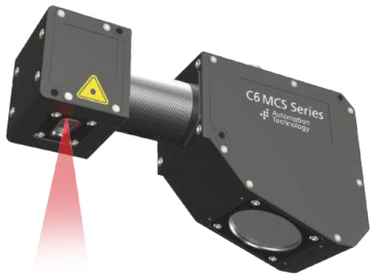
SOLUTIONS

3D Vision Portfolio

The new C6 Series of 3D sensors from AT is based on a new sensor platform that supports the latest industry standard GigE Vision / GenICam 3D with 1 Gbit/s. The new laser profilers offer an impressive combination of extremely high-speed and high-precision resolution, enabling the C6 Series to enter worlds that 3D imaging has not seen before. They feature profile resolution up to 4096 points per profile and profile speed up to 200 kHz as well as high dynamic range 3D image acquisition. Available as compact sensor, MCS and 3D camera.

Compact Sensors

- ✔ Factory calibrated 3D sensors
- ✔ Wide range of models with X-FOV 7 - 1290 mm
- ✔ Four different sensor resolutions available (1280, 2040, 3070, 4090)
- ✔ High industrial protection class IP67
- ✔ Available with various laser configurations
- ✔ Resolution Z up to 0.2 µm



Modular Compact Sensors (MCS)

- ✔ Factory assembled and calibrated 3D laser triangulation sensors consisting of sensor module, laser module and link module
- ✔ Customized 3D sensor designs without NRE or MOQ
- ✔ Four different sensor resolutions available (1280, 2040, 3070, 4090)
- ✔ Configurable according to application requirements like X-FOV, working distance, triangulation angle, number of points per profile, laser wavelength and laser safety class
- ✔ Dual-Head configuration possible for occlusion-free 3D scans
- ✔ High industrial protection class IP67

3D Cameras

- ✔ Designed for flexible laser triangulation setups with user-defined lasers and lenses
- ✔ Four different sensor resolutions available (1280, 2040, 3070, 4090)
- ✔ High industrial protection class IP67
- ✔ Available with various lens mounts and Scheimpflug adapters
- ✔ Lens protection tubes

C6 KEY FACTS

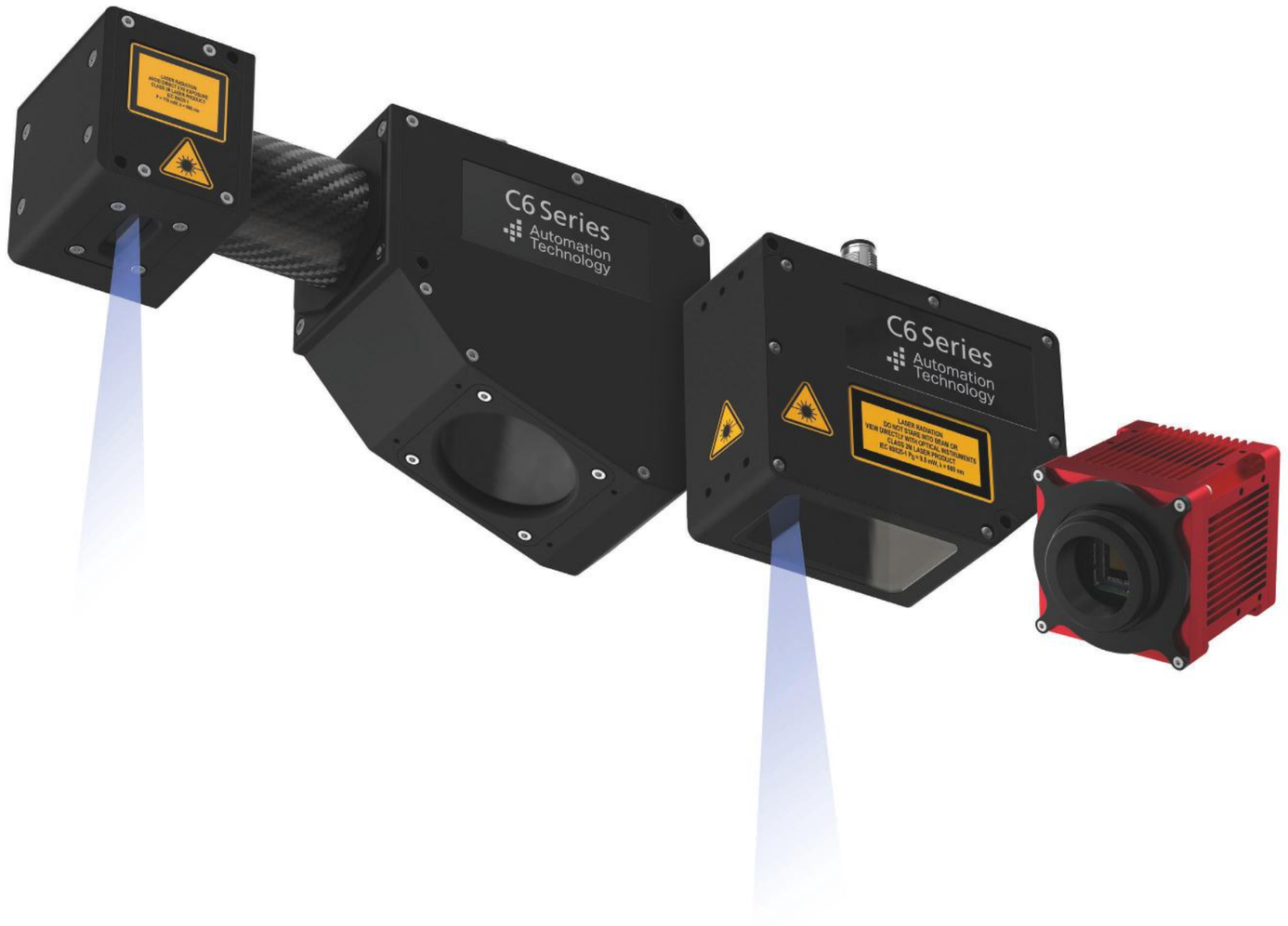
By Professionals for Professionals

Highest Resolution

- ✔ Profile resolution up to 4096 points/profile
- ✔ Sophisticated 3D line detection algorithms for every application (FIR-PEAK, MAX, COG, TRSH)
- ✔ Resolution X: up to 5 µm
- ✔ Resolution Z: up to 0.2 µm

Unique Features

- ✔ GeniCam 3.0: support of latest 3D standards
- ✔ MultiPart: parallel output of different features (e.g. range, reflectance, scatter) at maximum profile speed with optimized pixel formats
- ✔ MultiPeak: output of up to four different peaks for even more robust 3D data and for scanning transparent or shiny objects
- ✔ Region search and tracking: automatically finds and tracks the laser line in the detector image



Unmatched Profile Speed

- ✔ Profile speed up to 200 kHz
- ✔ 3D data rate up to 128 million 3D points per second
- ✔ Increase profile speed by defining detector regions
- ✔ Support up to four regions

Various Models

- ✔ Wide range of compact sensors with X-FOV 7 - 1290 mm and numerous laser configurations
- ✔ Wide range of detectors with different resolutions (1280 - 4096 pixel/profile)

Modular Concept

- ✔ Modular Compact Sensors (MCS): individual design optimized for your requirements
- ✔ No additional development costs
- ✔ Without minimum order quantity
- ✔ Short delivery time

C6 3070

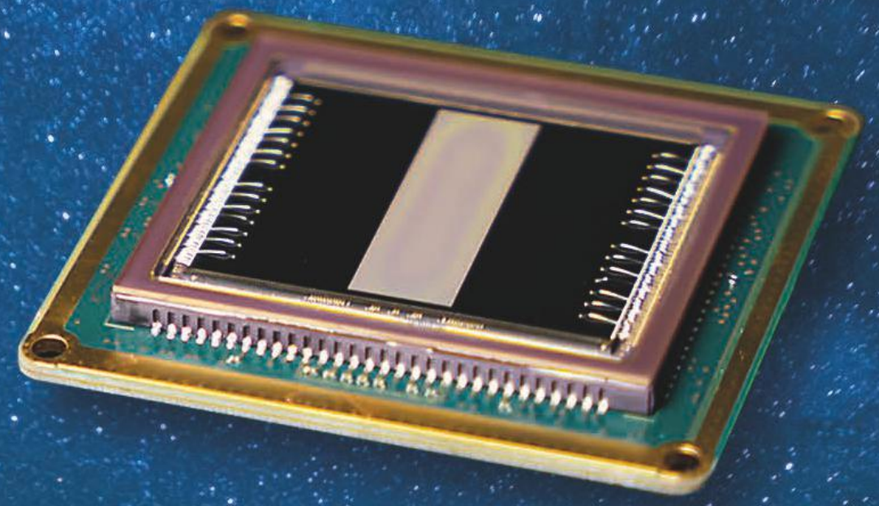
World's Fastest 3D Image Sensor

WARP Speed

- ✔ Widely Advanced Rapid Profiling (WARP)
- ✔ Unmatched profile speed
- ✔ Three different speed levels

On-Chip Processing

- ✔ Internal processing speed of 29 gigapixels/s
- ✔ 3D profile pixel output rate of 128 mega-pixels/s



AT's Sensor Technology

- ✔ Exclusive 3K imager design developed by AT
- ✔ High sensitivity and high dynamic range pixel design
- ✔ Integrated on-chip processing

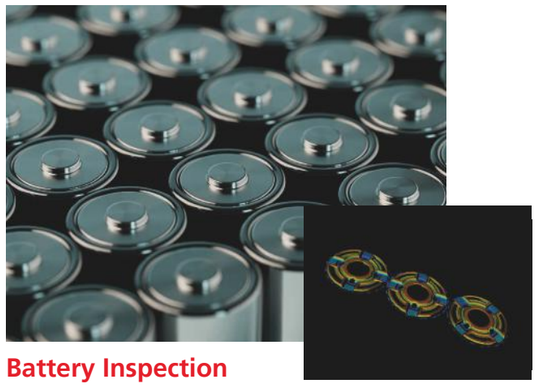
World's Fastest Profiling

- ✔ Worldwide fastest 3D image sensor in the combination of speed and resolution
- ✔ Intelligent line detection algorithms with advanced filtering and validation for highly accurate scans

Available soon in various models...

APPLICATION VARIETY

Suitable for All Industries

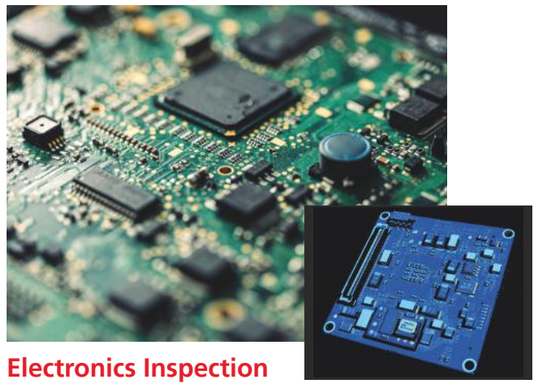


Battery Inspection

- ✔ Inspection of the inner foil structure of the battery during assembly
- ✔ Inspection of the electrical contact surface of the battery

Logistics and Packaging

- ✔ Sealing inspection
- ✔ Package quality inspection

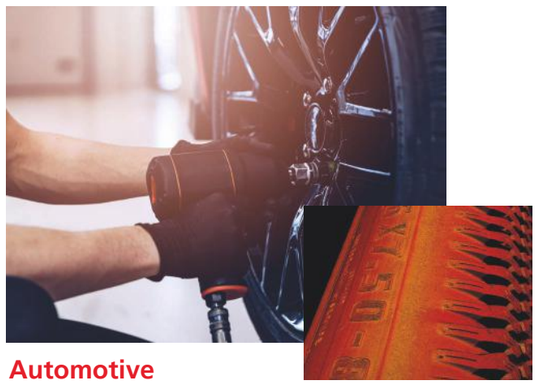


Electronics Inspection

- ✔ PCB Automated Optical Inspection (AOI)
- ✔ Solder Paste Inspection (SPI)

Food and Beverages

- ✔ Inline food packaging inspection
- ✔ Food branding, decoration, counting and volume measurement

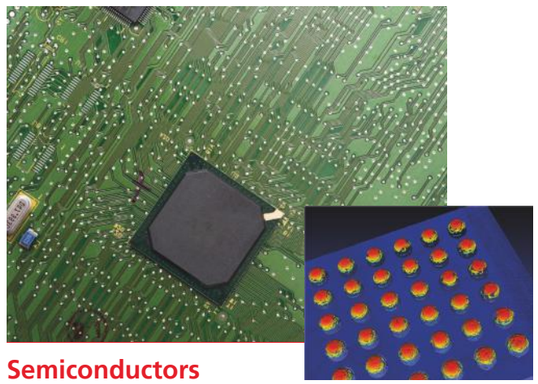


Automotive

- ✔ Tire inspection
- ✔ Electric vehicle motor assembly inspection

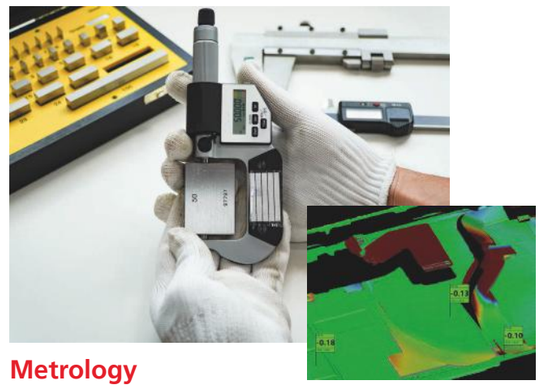
Wood and Lumber

- ✔ Sawmill production optimization
- ✔ Wood furniture quality inspection



Semiconductors

- ✔ Inspection of electronic components (BGA, QFP)
- ✔ Silicon wafer inspection

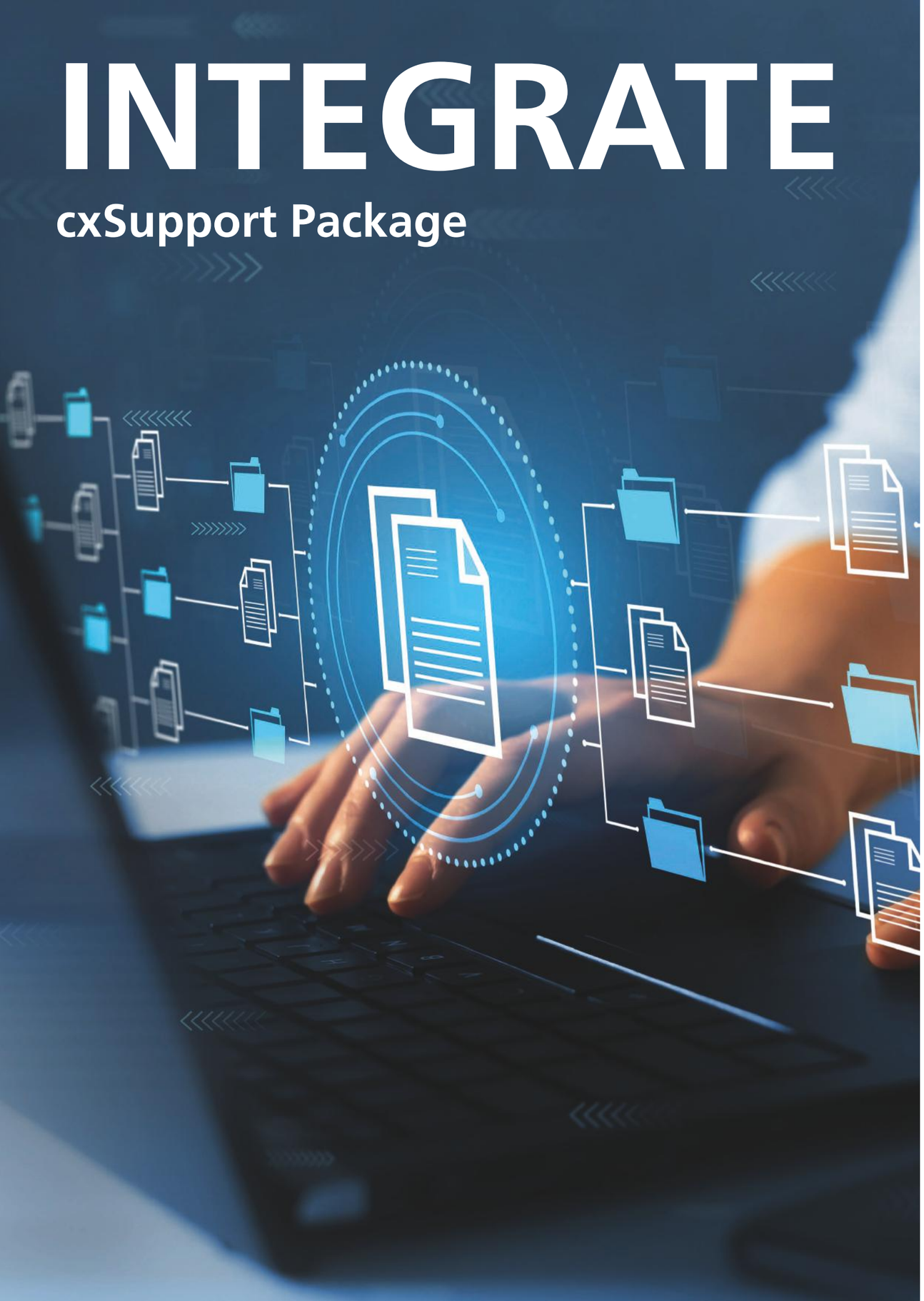


Metrology

- ✔ Inspection of dimensional properties and geometrical features
- ✔ Comparison to the CAD model

INTEGRATE

cxSupport Package



EASILY

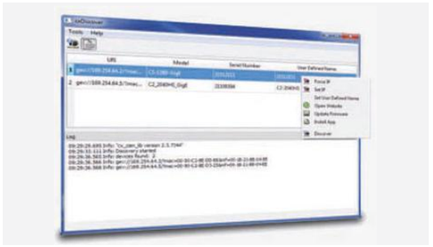
The cxSupportPackage consists of a variety of tools that can be used to acquire 3D images, configure the 3D camera and provide 3D data in the form of range maps or point clouds, among other things.

cxCamLib

- ✔ SDK for image acquisition and camera configuration

cx3DLib

- ✔ SDK for intrinsic and extrinsic calibration
- ✔ 3D point cloud and ZMap generation

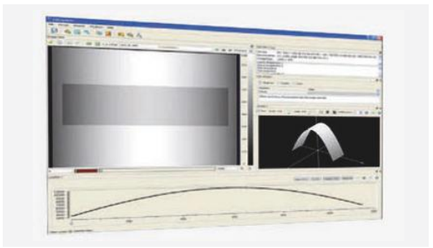


cxDiscover

- ✔ GigE Vision device discovery tool
- ✔ Network settings configuration

cxShow3D

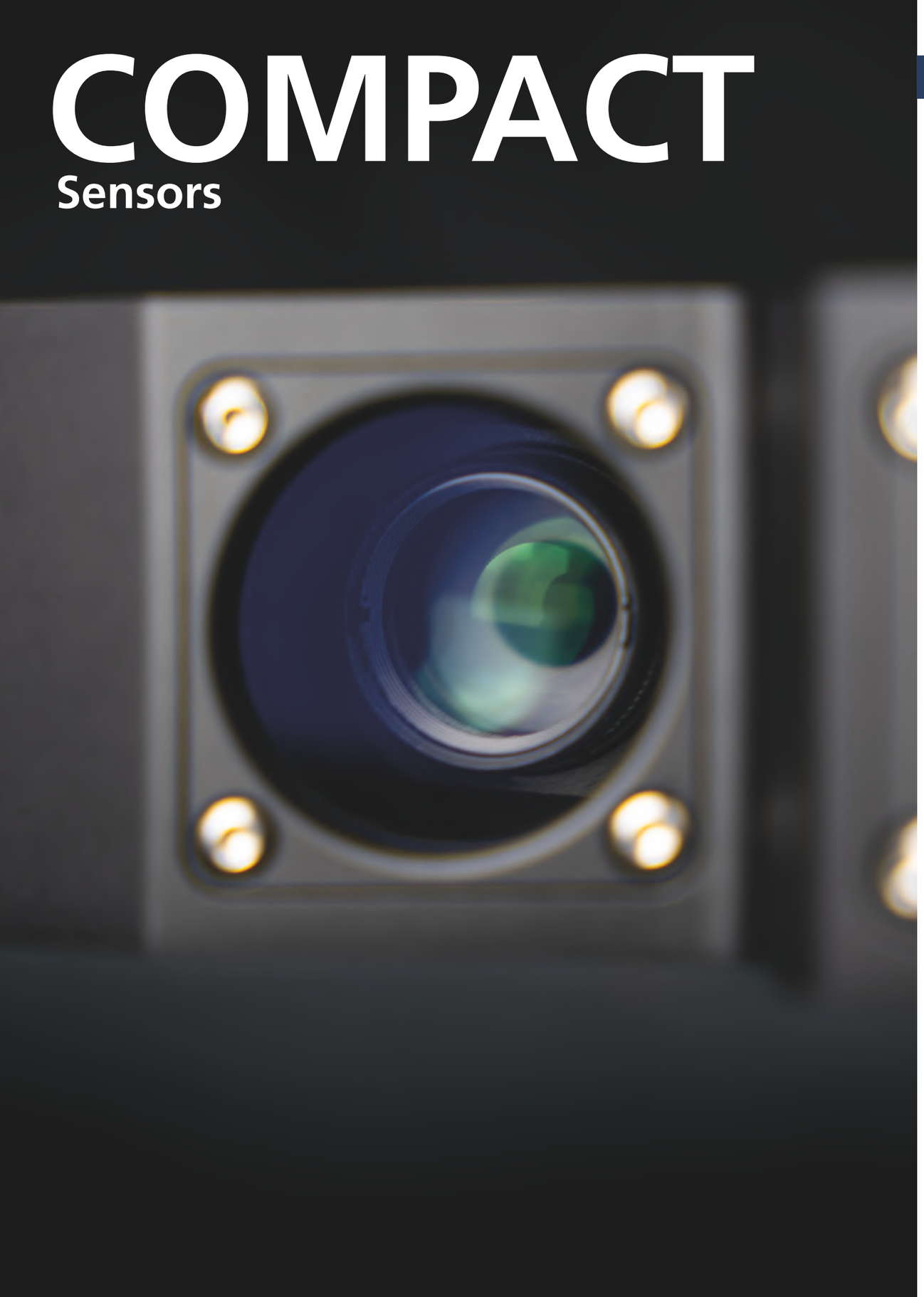
- ✔ Sample tool with GUI for 3D point cloud visualization and ZMap generation



cxExplorer

- ✔ Software for 3D image acquisition, device configuration and data analysis

COMPACT
Sensors



Product Overview

3D Compact Sensor C6 CS X-FOV 7-53 mm

- ✔ Profile resolution up to 2048 points / profile
- ✔ Profile speed up to 200 kHz
- ✔ Wide range of models with X-FOV 7 - 53 mm
- ✔ Nominal working distance: 31 - 90 mm
- ✔ Resolution X: 5 - 26 µm
- ✔ Resolution Z: 0.2 - 1.2 µm
- ✔ Z-Range 5 - 46 mm
- ✔ Linearity Z: +/-0.01 % of Z-Range
- ✔ Repeatability Z: 0.1 - 0.5 µm

3D Compact Sensor C6 CS X-FOV 29-160 mm

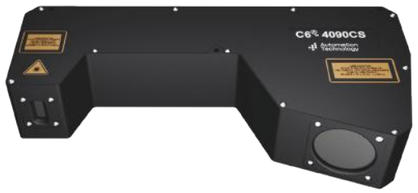
- ✔ Profile resolution up to 2048 points / profile
- ✔ Profile speed up to 200 kHz
- ✔ Wide range of models with X-FOV 29 - 160 mm
- ✔ Nominal working distance: 106 - 197 mm
- ✔ Resolution X: 19 - 78 µm
- ✔ Resolution Z: 0.8 - 5.9 µm
- ✔ Z-Range 40 - 80 mm
- ✔ Linearity Z: +/-0.01 % of Z-Range
- ✔ Repeatability Z: 0.4 - 6.6 µm

3D Compact Sensor C6 CS X-FOV 82-145 mm

- ✔ Profile resolution up to 4096 points / profile
- ✔ Profile speed up to 25 kHz
- ✔ Wide range of models with X-FOV 82 and 145 mm
- ✔ Nominal working distance: 172 mm
- ✔ Resolution X: 20 - 35 µm
- ✔ Resolution Z: 0.5 - 0.9 µm
- ✔ Z-Range 15 mm
- ✔ Linearity Z: +/-0.01 % of Z-Range
- ✔ Repeatability Z: 0.4 - 0.7 µm

3D Compact Sensor C6 CS X-FOV 182-1290 mm

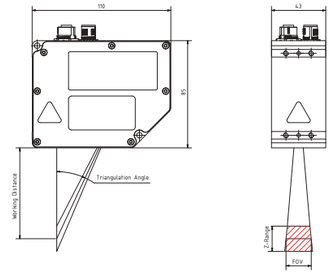
- ✔ Profile resolution up to 4096 points / profile
- ✔ Profile speed up to 200 kHz
- ✔ Wide range of models with X-FOV 182 - 1290 mm
- ✔ Nominal working distance: 400 - 944 mm
- ✔ Resolution X: 44 - 586 µm
- ✔ Resolution Z: 1.4 - 35.3 µm
- ✔ Z-Range 250 - 1090 mm
- ✔ Linearity Z: +/-0.01 % of Z-Range
- ✔ Repeatability Z: 2.1 - 10.0 µm



Specifications

X-FOV 7-53 mm

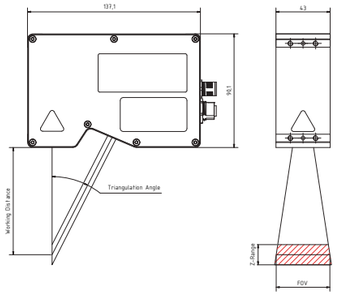
Model Name	Nominal X-FOV (mm)	Z-Range (mm)	Nominal Working Distance (mm)	Resolution X (µm)	Resolution Z (µm)	Points per Profile	Profile Speed (kHz)	Laser Wavelength (nm)	Laser Safety Class
C6-1280CS35-7	7	5,2	31	5	0,2	1280	200	405, 450	2M, 3R, 3B
C6-1280CS35-12	12	8	31	10	0,2	1280	200	405, 450	2M, 3R, 3B
C6-1280CS25-20	20	20	72	16	0,5	1280	200	405, 450	2M, 3R, 3B
C6-1280CS21-40	40	46	90	31	1,2	1280	200	405	2M, 3R, 3B
C6-2040CS21-53	53	46	90	26	1	2048	25	405	2M, 3R, 3B



X-FOV 7-53 mm

X-FOV 29-160 mm

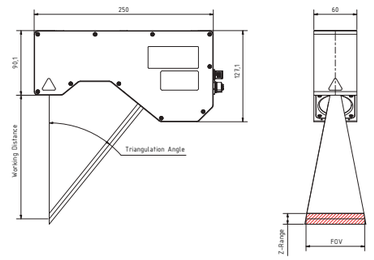
Model Name	Nominal X-FOV (mm)	Z-Range (mm)	Nominal Working Distance (mm)	Resolution X (µm)	Resolution Z (µm)	Points per Profile	Profile Speed (kHz)	Laser Wavelength (nm)	Laser Safety Class
C6-1280CS23-29	29	40	106	23	0,8	1280	200	405, 660	2M, 3R, 3B
C6-2040CS23-38	38	30	106	19	0,7	2048	25	405, 660	2M, 3R, 3B
C6-1280CS23-47	47	40	106	37	1,4	1280	200	405, 660	2M, 3R, 3B
C6-2040CS23-63	63	40	106	31	1,2	2048	25	405, 660	2M, 3R, 3B
C6-1280CS23-75	75	40	106	59	2,3	1280	200	405, 660	2M, 3R, 3B
C6-1280CS14-76	76	80	197	59	3,5	1280	200	405, 660	2M, 3R, 3B
C6-2040CS14-100	100	120	197	49	2,9	2048	25	405, 660	2M, 3R, 3B
C6-2040CS23-100	100	60	106	49	1,9	2048	25	405, 660	2M, 3R, 3B
C6-1280CS14-120	120	120	197	94	5,9	1280	200	405, 660	2M, 3R, 3B
C6-2040CS14-160	160	80	197	78	4,9	2048	25	405, 660	2M, 3R, 3B



X-FOV 29-160 mm

X-FOV 82-145 mm

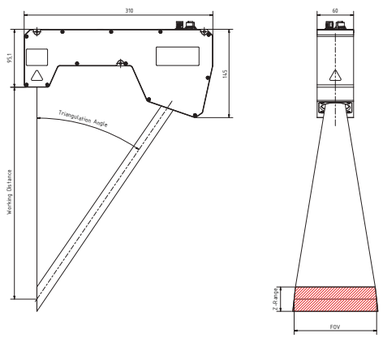
Model Name	Nominal X-FOV (mm)	Z-Range (mm)	Nominal Working Distance (mm)	Resolution X (µm)	Resolution Z (µm)	Points per Profile	Profile Speed (kHz)	Laser Wavelength (nm)	Laser Safety Class
C6-4090CS39-82	82	15	172	20	0,5	4096	20	405, 660	2M, 3R, 3B
C6-4090CS39-145	145	15	172	35	0,9	4096	20	405, 660	2M, 3R, 3B



X-FOV 82-145 mm

X-FOV 182-1290 mm

Model Name	Nominal X-FOV (mm)	Z-Range (mm)	Nominal Working Distance (mm)	Resolution X (µm)	Resolution Z (µm)	Points per Profile	Profile Speed (kHz)	Laser Wavelength (nm)	Laser Safety Class
C6-4090CS30-182	182	150	400	44	1,4	4096	25	405, 660	2M, 3R, 3B
C6-1280CS30-248	248	200	400	194	6,1	1280	200	405, 660	2M, 3R, 3B
C6-4090CS30-288	288	250	400	70	2,2	4096	25	405, 660	2M, 3R, 3B
C6-2040CS30-330	330	200	400	161	5,0	2048	25	405, 660	2M, 3R, 3B
C6-2040CS18-1060	1060	800	744	518	26,2	2048	25	405, 660	2M, 3R, 3B
C6-2040CS15-1290	1290	1090	920	630	38,0	2048	25	405, 660	2M, 3R, 3B

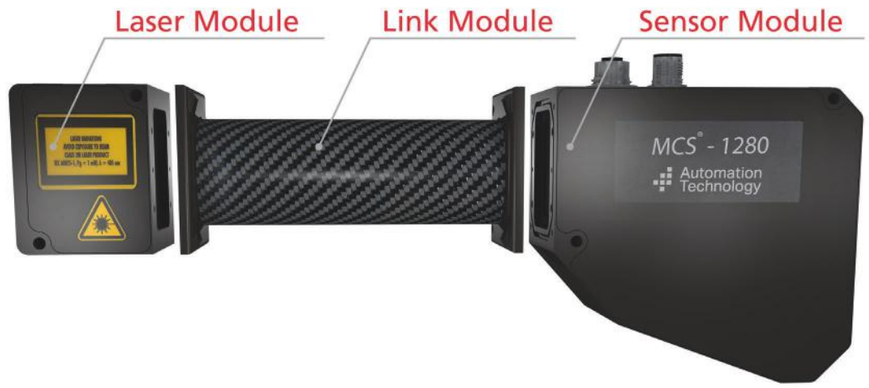


X-FOV 182-1290 mm

Specs for sensor models based on 3070 detector coming soon...

MODULAR
Compact Sensors

Product Overview



Factory assembled and calibrated 3D laser triangulation sensors consisting of:

- ✔ Sensor module
- ✔ Laser module
- ✔ Link module

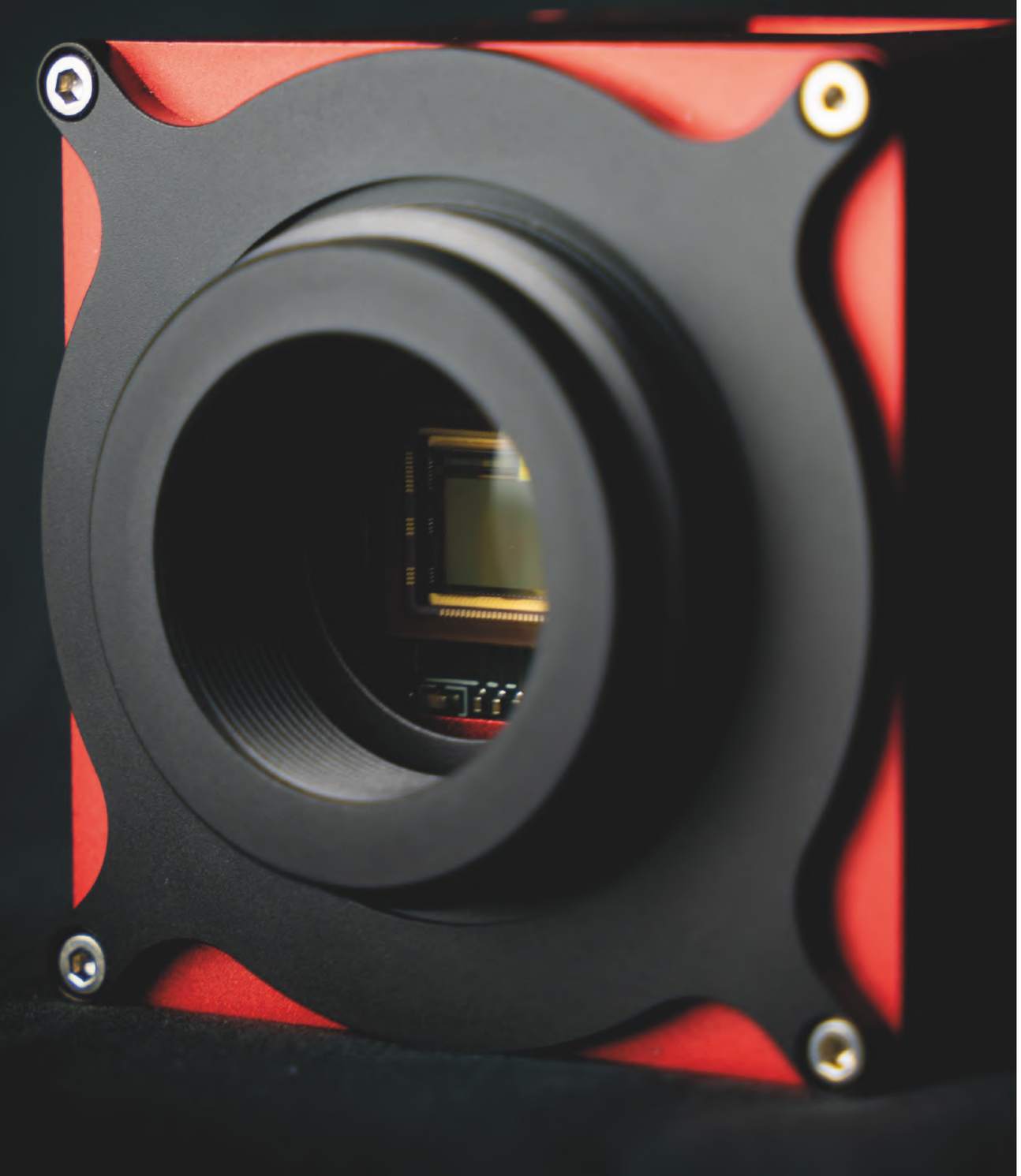
Configurable according to application requirements:

- ✔ X-FOV
- ✔ Working distance
- ✔ Triangulation angle
- ✔ Number of points per profile
- ✔ Laser wavelength
- ✔ Laser safety class

3D Modular Compact Sensors MCS

- ✔ Number of points per profile: 1280, 2048, 3072 and 4096
- ✔ X-FOV: 70 – 1600 mm
- ✔ Triangulation angle: 15°, 20°, 25°, 30°, 40° and 45°
- ✔ Resolution X: up to 17 µm
- ✔ Resolution Z: up to 1 µm
- ✔ Profile speed: up to 200 kHz

CAMERA
For Laser Triangulation



Product Overview

Designed for flexible laser triangulation setups with user-defined lasers and lenses.

Available Models:

- ✔ C6-1280-GigE: 1280 x 1024 pixels
- ✔ C6-2040-GigE: 2048 x 1088 pixels
- ✔ C6-3070-GigE: 3072 x 1020 pixels
- ✔ C6-3070-WARP-GigE: 3072 x 1020 pixels with WARP
- ✔ C6-4090-GigE: 4096 x 3072 pixels

Standard Lens Mount Version with M42x1

Version with Optional C-Mount Adapter

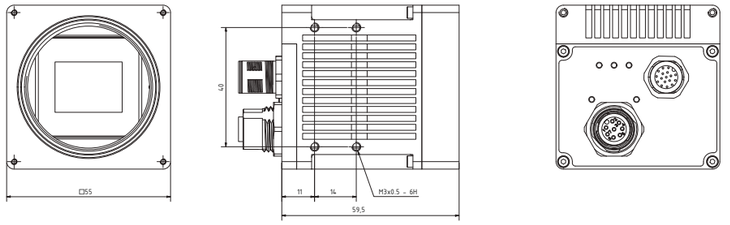
Specifications

Model Name	C6-1280-GigE			C6-2040-GigE		C6-3070-GigE / C6-3070-WARP-GigE			C6-4090-GigE	
Sensor Resolution	1280 x 1024			2048 x 1088		3072 x 1020			4096 x 3072	
Pixel Size	6.6 µm x 6.6 µm			5.5 µm x 5.5 µm		6.6 µm x 6.6 µm			5.5 µm x 5.5 µm	
Dynamic Range (*with HDR-3D)	90 dB			90 dB		90 dB			90 dB	
Digitization	10 Bit			10 Bit		10 bit			10 Bit	
Sensitivity	9.6 V/lux.s @ 525 nm			5.56 V/lux.s @ 550 nm		8 V/lux.s @ 525 nm			4.64 V/lux.s @ 550 nm	
Sensor Algorithm	MAX, TRSH, COG, FIR-PEAK			MAX, TRSH, COG, FIR-PEAK		MAX, TRSH, COG, FIR PEAK			MAX, TRSH, COG, FIR-PEAK	
Profile Length in 3D Mode	1280 Pixels per Profile			2048 Pixels per Profile		3072 Pixels per Profile			4096 Pixels per Profile	
Typical Profile Speed Depending on Number of Sensor Rows Height resolution can be increased by using TRSH (1/2 Pixel) or COG/FIR-PEAK (1/64 Pixel) without loss of speed	Sensor Rows	Profile Speed in kHz (with 1280 Pixels)	Profile Speed in kHz (with 688 Pixels)	Sensor Rows	Profile Speed in kHz (with 2048 Pixels)	Sensor Rows	Profile Speed in kHz (with 3072 Pixels) C6-3070-GigE	Profile Speed in kHz (with 3072 Pixels) C6-3070-WARP-GigE	Sensor Rows	Profile Speed in kHz (with 4096 Pixels)
	1024 256 128 32 16 8	1.07 4.26 8.48 32.80 63.00 116.00*	1.94 7.67 15.05 54.22 95.74 155.17	1024 256 128 32 16 8	0.34 1.40 2.60 9.70 16.0 25.00	1020 384 192 48 12 6	0,99 2.60 5.08 17.84 47.85* 66.49*	7.32 18.51 34.41 96.71* 178.68* 204.92*	3072 512 128 32 16 8	0,15 0,85 3.10 9.70 14.90 20.30

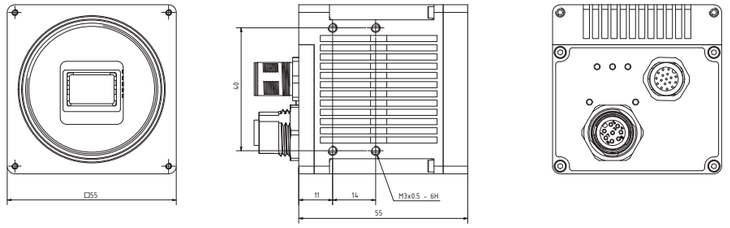
*internal value, limited by the 1 Gbit/s interface

General C6 Camera Specifications	
Interface Specifications	
Digital Input	2 Electrical Isolated Inputs (5-24 V DC)
Digital Outputs	2 Electrical Isolated Outputs (5-24 V DC)
Encoder / Resolver Input	High-Speed Resolver Interface with Signals A,/A, B, /B, Z, /Z
Analog Output	Range: 0-5 V DC
Data Interface	GigE Vision with GenICam Protocol
Power Requirements	
Power Supply	10 - 24V DC
Power Consumption	max. 12 W
Mechanical Specifications	
Lens Mount	M42x1 / optional with C-Mount or F-Mount Adapter
Size	55 mm x 55 mm x 55 mm
Mass (without Lens & Adaptor)	200 g
Housing Mount	M3 + Adaptor Plate with Metric and Inch Threads
Enviromental Specifications	
Operating Temperature	0°C to +50°C (Non-Condensing)
Storage Temperature	-30°C to +70°C
General	
PC Requirements	Gigabit Ethernet NIC
Operating Systems	Windows 10 /11, Linux

With Default Lens Mount M42x1

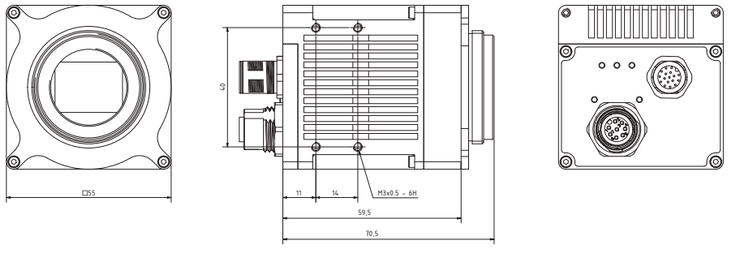


C6-4090-GigE

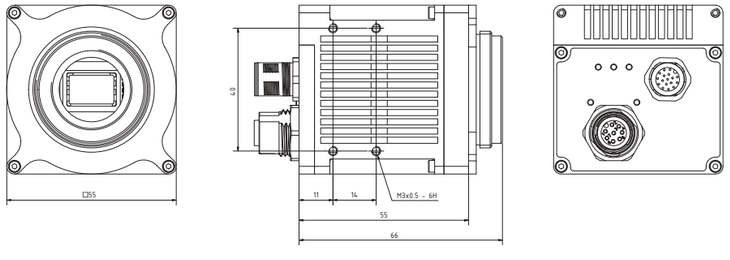


C6-1280-GigE
C6-2040-GigE
C6-3070-GigE
C6-3070-WARP-GigE

With C-Mount Adapter



C6-4090-GigE



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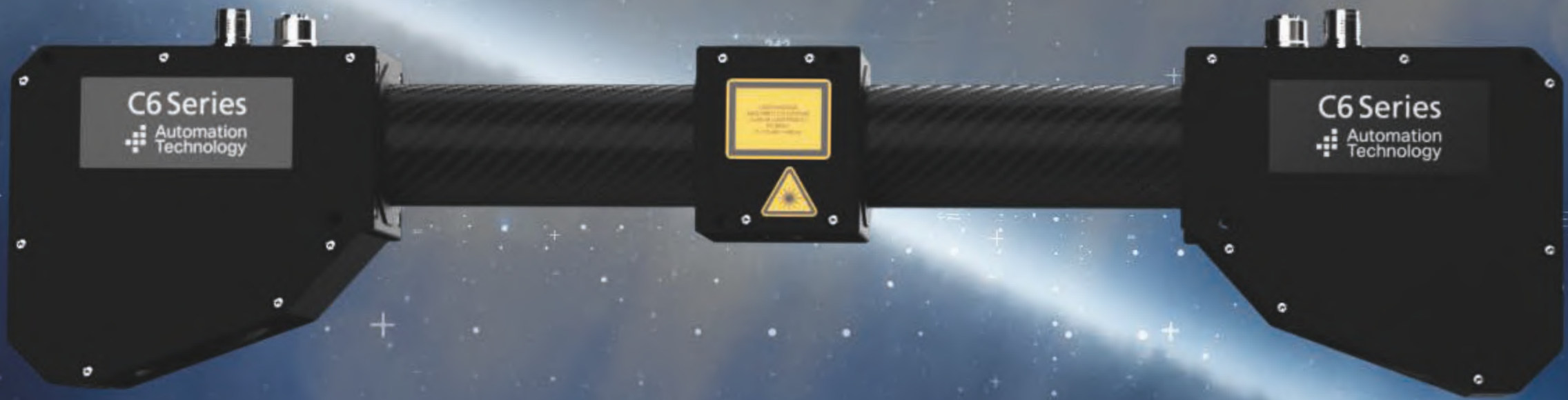
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