Helios™ 2+

Factory Tough™ HDR Imaging and High Speed Time-of-Flight (ToF)

- **High Dynamic Range imaging**
- **High Speed Time-of-Flight, up to 103 fps**
- **IP67 Protection, Industrial Immunity**
- **Sony DepthSense IMX556 Sensor**
- **Superior 3D Depth Data with Sub-millimeter Precision**

Depth Map and Intensity

3D Point Cloud

Model	MP	Resolution	FPS	Sensor	Format	Pixel Size	Shutter	Output	GigE Interface
Helios2+ ToF HTP003S-001	0.3 MP	640x480 px	30 FPS (Normal) 10 FPS (HDR) 103 FPS (High Speed)	Sony DepthSense™ IMX556PLR CMOS	1/2"	10 µm	Global	3D Point Cloud, Intensity and Confidence	M12

Physical, Interface, and Power Information	
Digital Interface	1000BASE-T GigE, M12 X-coded, PoE
GPIO Interface	8-pin M8 connector
I/O ports	1 input (2.5V-24V and 10.5V-24V) 1 output
Dimension	60 x 60 x 77.5 mm
IP Rating	IP67 (Must use IP67 cabling)
Ambient Light Filter	Yes, integrated on-camera
Weight	398 g
Power Requirement	PoE+ (IEEE 802.3at) or 18-24 V through GPIO
Power Consumption	12-24Vdc, Pavg <12W, <30W peak power

Camera Features	
User Sets	1 default and 2 custom user set
Exposure Control	HDR: Auto ; Manual 3 settings: 62.5 µs, 250 µs, or 1000 µs
Gain Control	Manual, 2 settings: High or Low
Output Formats	Binary .PLY file (via Arena SDK)
OS Support	Windows and Linux
Flying Pixel Filter	Yes
Communication Channels	5 Channels. Allows users to operate up to 5 Helios2 cameras without interference between cameras.

Standard and Certifications	
Standard	GigE Vision v2.0, GenICam 3D
Compliance	CE, FCC, RoHS, REACH, WEEE, Eye Safety Class 1 IEC 60825-1:2014
Shock and Vibration	DIN EN 60068-2-27, DIN EN 60068-2-64*
Industrial Immunity	EN 61000-6-2
Operating Temperature	-20° C to 50° C (case temperature)

*Listed specification testing in progress and is subject to change

Imaging Properties	
Working Distance	0.3 m up to 8.3 m
Operating Distance Modes	6 Modes: (1) 1250 mm, (2) 3000 mm, (3) 4000 mm, (4) 5000 mm, (5) 6000 mm, (6) 8333 mm High Speed ToF, 3 Modes: (1) 625 mm, (2) 1250 mm, (3) 2500 mm
Accuracy	See next page
Precision	See next page
Lens Field of View	69° x 51° (nominal)
Illumination	4 x VCSEL laser diodes @ 850nm, Class 1, Eye Safe

Pixel Formats	
Range Data	(All unsigned)
Coord3D_ABCY16	4-ch point cloud XYZ + Intensity, 16 bits per channel
Coord3D_ABC16	3-ch point cloud XYZ, 16 bits per channel
Coord3D_C16	Depth map Z plane, 16 bits
Coord3D_C16Y8	Depth Map Z plane, 16 bits + Intensity, 8 bits, unsigned
Coord3D_CY16	Depth Map Z plane + Intensity, 16 bits for each channel, unsigned
Intensity Image	
Mono8	8 bit per pixel monochrome raw image
Mono12Packed	12 bit per pixel monochrome raw image
Mono12p	12 bit per pixel in bit stream, monochrome raw image
Mono16	16 bit per pixel monochrome raw image
Confidence Data	
Confidence16	Confidence map, 16 bits

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Helios2+ Accuracy*

Distance (m)	Accuracy
1250mm Mode (up to 1.25m)	± 4 mm
3000mm Mode (up to 3.0m)	± 10 mm
4000mm Mode (up to 4.0m)	± 10 mm + 0.25% of depth
5000mm Mode (up to 5.0m)	± 4 mm + 0.1% of depth
6000mm Mode (up to 6.0m)	± 10 mm + 0.5% of depth
8300mm Mode (up to 8.3m)	± 4 mm +0.2% of depth

Accuracy and Precision Test Conditions:

- Target: White paper mounted on bar attached to motion stage
- Helios2 positioning: mounted on tripod, laser distance meter used to measure distance from case front to stage zero position
- Camera setting: Coord3D_C16 Pixel Format, bilateral filtering OFF, camera warmed up for 20 minutes.
- Imaging environment: Room light on during testing, black material used to minimize reflections off floor
- Motion stage moved in 50mm steps, for each step measure depth over 10×10 pixel ROI at image center, repeat 32 times at each position
- Accuracy measured as difference between camera's average measured depth across the ROI and 32 images and the ground truth depth (stage zero distance + stage position)

Helios2+ Precision*

*Accuracy and Precision data is preliminary, therefore subject to change

Distance (m)	1250mm Mode	3000mm Mode	4000mm Mode	5000mm Mode	6000mm Mode	8300mm Mode
0.5*	1.0 mm	1.9 mm	2.1 mm	0.7 mm	3.6 mm	0.8 mm
1	0.8 mm	1.3 mm	2.1 mm	0.6 mm	2.7 mm	0.6 mm
1.5	1.1 mm	2.5 mm	2.9 mm	0.9 mm	4.0 mm	1.1 mm
2	1.8 mm	3.7 mm	4.9 mm	1.4 mm	7.8 mm	1.7 mm
3		5.7 mm	8.6 mm	2.2 mm	10.0 mm	2.5 mm
4			12.3 mm	3.3 mm	15.7 mm	4.1 mm
5				5.1 mm	28.1 mm	6.1 mm
6					30.1 mm	7.9 mm
7						11.8 mm
8						14.48 mm

*0.5 m distance precision measured with 250 µs exposure time, all other distances using 1000 µs exposure time measured with white paper target.

NORMAL MODES - MAXIMUM FRAMERATES

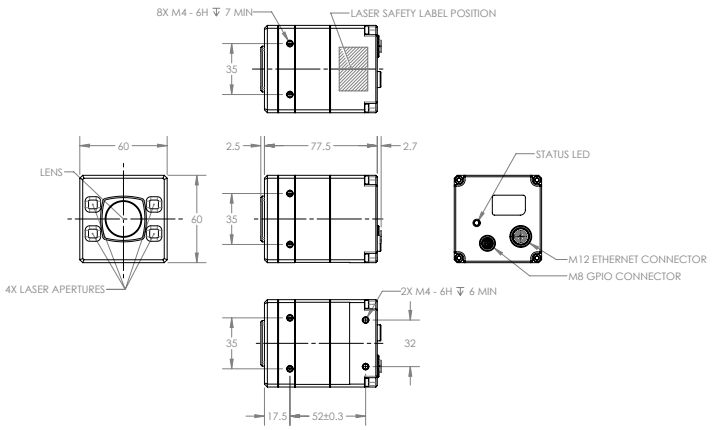
Mode	Frequency	FPS
1250mm	120 MHz	30 FPS
3000mm	50 MHz	30 FPS
4000mm	37 MHz	30 FPS
5000mm	120 + 90 MHz	30 FPS
6000mm	25 MHz	30 FPS
8300mm	90 + 72 MHz	30 FPS

HIGH-SPEED MODES - MAXIMUM FRAMERATES

Mode	Frequency	FPS (Pixel Format: Coord3D_ABCY16)	FPS (Pixel Format: Coord3D_ABC16)	FPS (Pixel Format: Coord3D_CY16)	FPS (Pixel Format: Coord3D_C16Y8, Coord3D_C16, Confidence16, Mono8/12p/16)
625mm	100 MHz	45 FPS	60 FPS	90 FPS	103 FPS
1250mm	50 MHz	45 FPS	60 FPS	90 FPS	103 FPS
2500mm	25 MHz	45 FPS	60 FPS	90 FPS	103 FPS

HDR MODES - MAXIMUM FRAME RATES

HDR Mode	Description	Number of Depth Frames	FPS
Standard HDR	Exposure fusion of: • 1 x 62.5 µm • 1 x 250 µm • 1 x 1000 µm (x2 in multi-frequency modes)	3 (x2 in multi-frequency modes)	10
Low Noise HDR (4x1000us)	Exposure fusion of: • 1 x 62.5 µm • 1 x 250 µm • 4 x 1000 µm (x2 in multi-frequency modes)	6 (x2 in multi-frequency modes)	5
Low Noise HDR (8x1000us)	Exposure fusion of: • 1 x 62.5 µm • 1 x 250 µm • 8 x 1000 µm (x2 in multi-frequency modes)	10 (x2 in multi-frequency modes)	3



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