

3D Structure camera comparison

Hanswell VS2000&VS2024

Keyence XR 015/040

Keyence XT 024/060

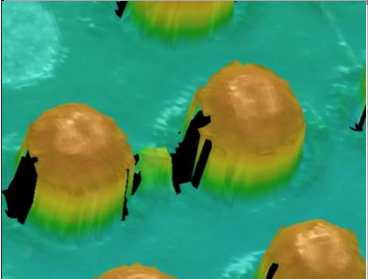
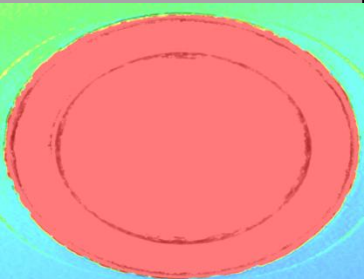
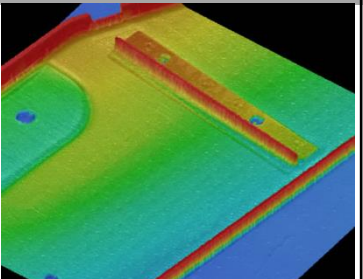
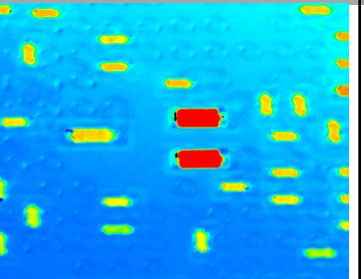
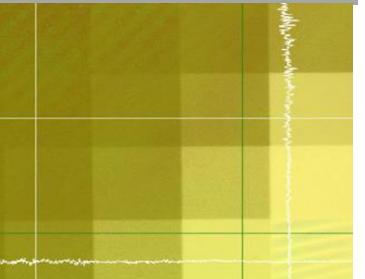
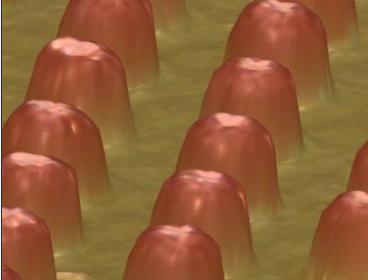
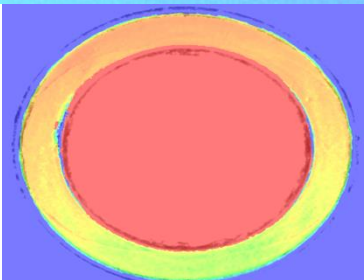
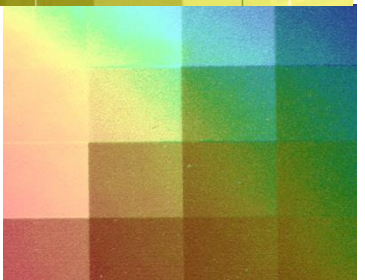
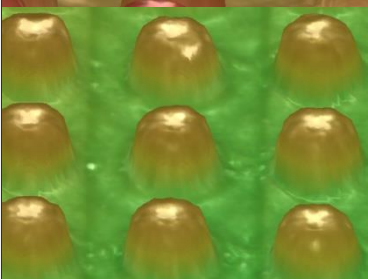
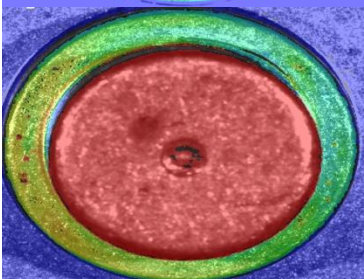
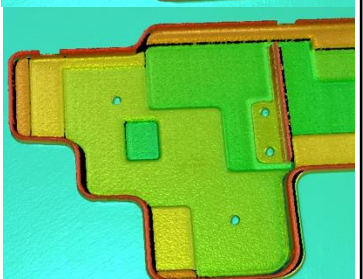
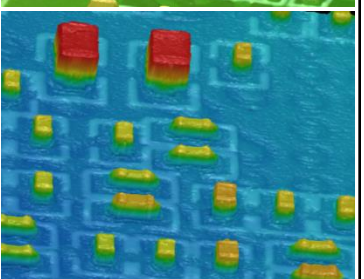
Comparison of specifications and indicators

Hanswell VS2020&2040: Higher resolution and frame rate

Type	Brand	FOV/mm	Resolution	Single pixel accuracy/ μm	Projections	Color	Depth/mm	Repetition accuracy (standard deviation)	Frame rate (full size)
XT-024	Keyence	24×24	3072×3072	7.85	4	RGB	±2	0.5 μm	<1fps
VS2020	Hanswell	18×15	3072×2560	5.8	2	B	±2.5	0.3 μm	3fps
XR-015	Keyence	12×12	1408×1408	9.5	2	RB	± 1.5	1 μm	1.3fps
XT-060	Keyence	60×60	3072×3072	19.6	4	RGB	±6	1 μm	<1fps
VS2040	Hanswell	48×36	4096×3072	11.7	2	B	± 5	0.6 μm	2fps
XR-040	Keyence	38×38	2048×2048	18.5	2	RB	± 5	2 μm	1fps

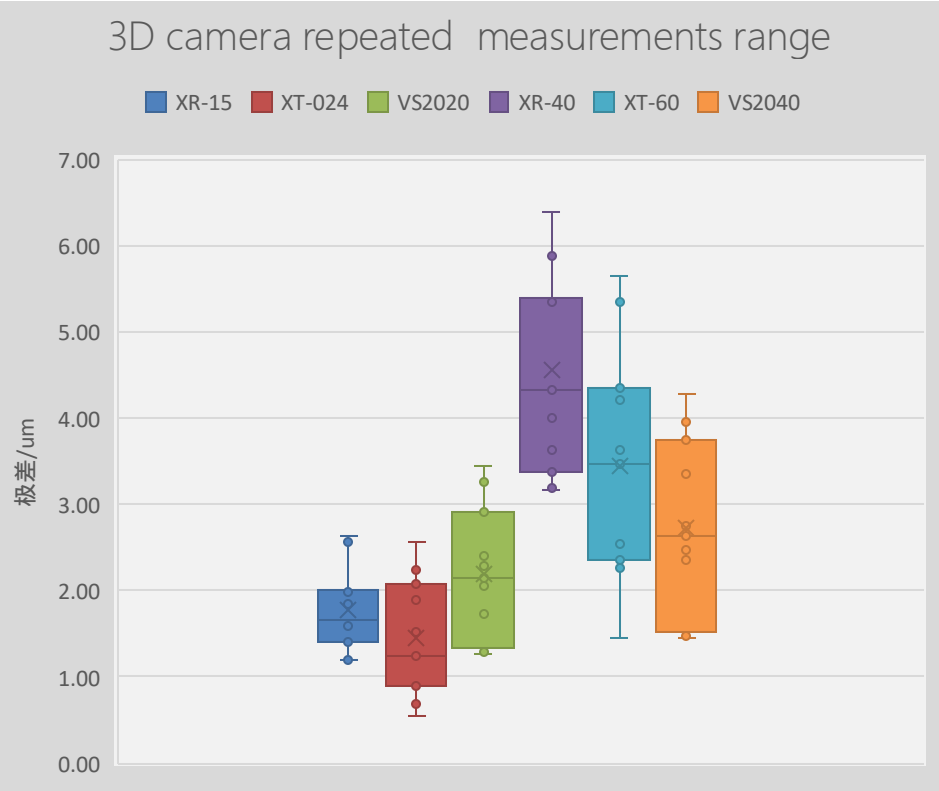
Imaging effect comparison

Hanswell VS-2040: Excellent imaging integrity and high dynamic range

	BGA	Pole cylinder	Shielding cover	PCB	Dynamic range test card
XR-040					
XT-060					
VS-2040					

Repeated precision comparison test

Hanswell VS2020&2040: Repeatability comparable to similar products



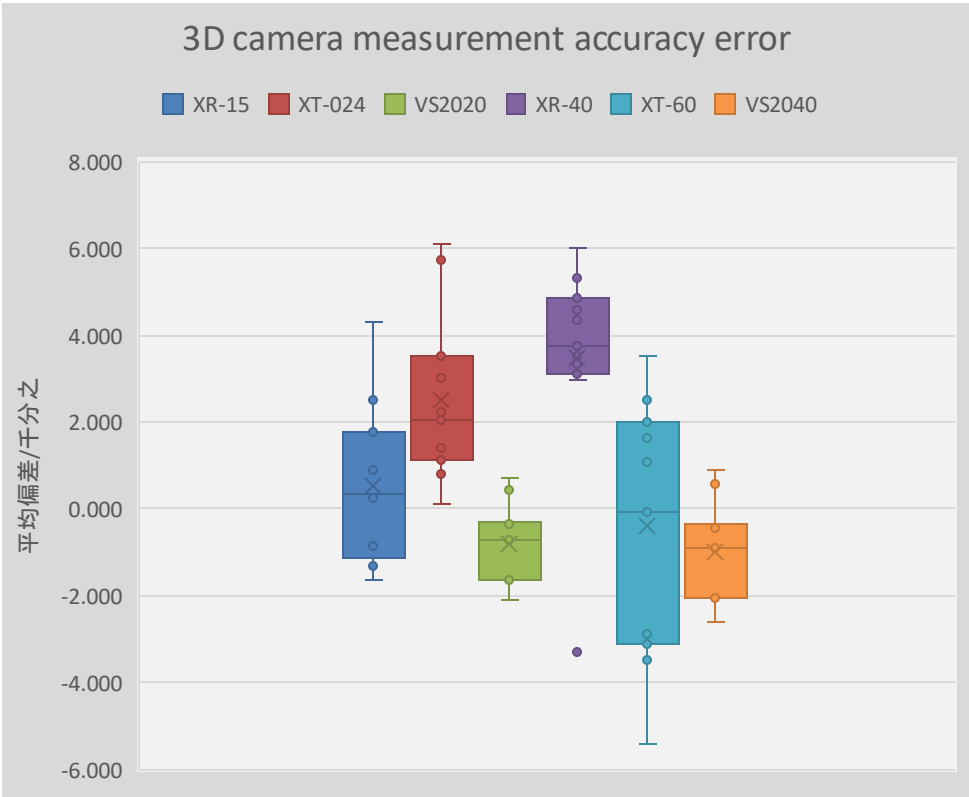
* The repetition range of the standard step block is measured at different locations within the camera's field of view, the smaller the range, the higher the camera's repetition accuracy

Repeated measurement range with test position (unit /um)						
Location	XR-15	XT-024	VS2020	XR-40	XT-60	VS2040
Medial center of visual field	1.99	2.07	3.44	5.89	4.22	2.46
Upper center of visual field	2.02	2.25	2.04	5.36	4.35	1.46
Lower center of visual field	1.41	0.69	2.40	4.32	1.46	1.53
Corner 1	2.56	1.89	1.28	5.39	2.53	2.64
Corner 2	1.42	0.89	2.92	3.37	5.64	3.75
Corner 3	1.59	1.25	1.74	3.18	5.35	4.27
Corner 4	1.21	0.55	2.14	6.39	2.56	3.95
Corner 5	1.20	0.98	1.27	5.36	2.26	2.35
Corner 6	1.85	2.56	1.33	3.16	3.46	2.76
Corner 7	1.66	1.23	2.30	3.63	3.64	1.47
Corner 8	2.64	1.53	3.26	4.00	2.36	3.36

* Measurement method: standard step block (1mm segment difference) is used for measurement, and the value in the table is the range of 64 repeated measurement values;
* Test position: The 8 corners of the camera's imaging field of view cube and the center of the 3 layers of the field of view were repeated range tests

Measurement accuracy comparison test

Hanswell VS2020&2040: Higher measurement accuracy



Measurement accuracy error with test position relation table (unit / μm)

Location	XR-15	XT-024	VS2020	XR-40	XT-60	VS2040
Medial center of visual field	0.330	0.791	-1.575	3.107	1.090	-1.969
Upper center of visual field	0.227	0.090	0.437	5.995	-2.890	0.547
Lower center of visual field	-1.333	3.015	-0.737	3.326	-0.060	-0.922
Corner 1	-0.879	3.537	0.712	3.529	1.640	0.891
Corner 2	1.748	2.246	-1.513	2.956	2.510	-1.891
Corner 3	-1.157	6.123	-2.088	3.759	-3.100	-2.609
Corner 4	0.910	1.415	-0.287	4.861	2.000	-0.359
Corner 5	0.950	1.108	-0.312	-3.301	-5.420	-0.391
Corner 6	-1.651	5.746	-1.638	4.362	3.500	-2.047
Corner 7	2.497	2.061	-1.638	5.294	-3.500	-2.047
Corner 8	4.315	1.508	-0.337	4.567	-0.060	-0.422

* The error of the standard step block is measured at different positions within the camera's field of view, the smaller the absolute value of the error, the higher the accuracy of the camera's measurement (the higher the correlation)

* Measurement method: The standard step block (1mm segment difference) is used for measurement, and the value in the table is the error between the mean value and the standard value of 64 measurements;
* Test position: The 8 corners of the camera's imaging field of view cube and the center of the 3 layers of the field of view were respectively tested for average error

The background is a solid blue gradient. Overlaid on this are several thin, white, stylized lines that form abstract, rounded geometric shapes, possibly representing architectural elements or data paths. These lines are primarily located in the upper right and lower left corners, framing the central text.

Thank you

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