

Camera Overview & Datasheet

The ZED 2i stereo camera combines powerful hardware and intelligent software to create an unrivaled solution in terms of performance, functionality and design.

Designed to function efficiently in harsh environments, the IP66-rated ZED 2i stereo camera with its robust aluminum body withstands severe conditions with high particulate content, and water ingress, making it ideal for industrial applications such as agriculture, manufacturing, pharmaceuticals and many more.

The ZED 2i covers the entire spectrum of applications from robotics and spatial analytics to interactive experiences.



Rev1.2

* ZED 2i Overview

wide-Angle 3D AI camera

Combine long-range depth perception with AI to perceive your environment in 3D with up to a 120° wide-angle field of view.

Multiple Lens Selection with Polarizer

Select a 2.1mm or a 4mm lens depending on your application. Add a built-in CPL polarizing filter when working outdoors.

IP66-rated Enclosure

Resistant to dust, water and humidity, the new ZED 2i is hermetically sealed to sustain IP66 testing conditions or lower, designed for outdoor applications and challenging medical, industrial, agricultural environments.

Multiple Mounting options

With its multiple mounting options and flat bottom, the ZED 2i can be easily integrated in any system and environment.

Built-in IMU, Barometer & Magnetometer

Featuring 9-DoF sensors for spatial and positional awareness. Factory calibrated on 6-axis with robotic arms.

secure USB Type-C connection

Use a highly reliable USB 3.0 type-C cable with thumbscrew locking connectors and ensure a secure interconnection for your systems.

Technical specifications

output Resolution	Side by Side 2x (2208x1242) @15fps 2x (1920x1080) @30fps 2x (1280x720) @60fps 2x (662x376) @100fps
Interface	USB Type C - External cable (up to 10m - 32.80ft)
Baseline	12cm (4.73 in)
RGB sensors	Dual 1/3" 4MP CMOS 2688 x 1520 pixels 2µm x 2µm Rolling shutter YUV 4:2:2 - UYV (8bits)
Motion sensors	Gyroscope, Accelerometer, Magnetometer
Environmental Sensors	Barometer Temperature
warranty	2-year hardware warranty

physical specifications

Dimensions	175.3 x 30.3 x 43.1 mm (6.90 x 1.19 x 1.70")
weight	229g (0.51 lb.)
operating Temp.	-10c to +45° (149F to 113F)
power	380mA/5V USB powered

system Requirements

system	NVIDIA GPU ≥ 2GB Memory NVIDIA GPU architecture: Pascal or later *Maxwell and Kepler architectures are not fully supported NVIDIA Compute capability ≥ 3.0 Compatible with NVIDIA Jetson
CPU	Dual-core ≥ 2.4 GHz processor Minimum 4GB RAM
supported os	Win 10, Win 11 Ubuntu 20 & 22 Debian, CentOS (via Docker) Jetson L4T

* ZED 2i Sensors Specifications

Dual Image sensors

sensors

sensor Type	1/3" 4MP CMOS
Array size	2688 x1520 pixels
pixel size	2um x2um
shutter	Electronic synchronized rolling shutter
Output Resolution (Side by side)	
2x (2208x1242) @15fps - cropping mode	
2x (1920x1080) @15/30fps - cropping mode	
2x (1280x720) @15/30/60fps - binning 2x2 mode	
2x (662x376) @15/30/60/100fps - binning 4x4 mode	
output Format	YU V4:2:2 - UY V(8bits)
Max s/N Ration	38.3 dB
Dynamic Range	64.6 dB
sensitivity	1900 mv/LUX-sec
Baseline	12 cm (4.72")

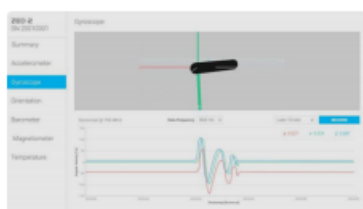
Motion/Environmental sensors Temperature

sensors

Temperature Range	-40 to 125°C (-40 to 257°F)
Abs. Temperature Accuracy	+/-0.5C
output Data Rate	25 HZ

sensors AP

You can access these sensors and acquire sensor data by using the Sensors API.



The ZED family of depth cameras is a multi-sensor platform. The cameras have built-in sensors to add position and motion-assisted capabilities to your app, from accelerometer and gyroscope sensors to temperature, barometer, magnetometer and more. The sensors can be used to detect camera movements, compute the camera orientation according to the north magnetic pole, detect relative altitude variations, analyze external weather conditions, and much more.

Inertial Measurementunit

Accelerometer Range	+/- 8G
Accelerometer Resolution	0.244 mg
Accelerometer Noise Density	3.2 mg
Gyroscope Range	+/-1000dps
Gyroscope Resolution	0.03 dps
Gyroscope Noise Density	0.16 dps
sensitivity Error	+/- 0.4%
output Data Rate	400 HZ

Magneto meter

Magnetic Field Range	+/- 2500 μT (z) +/- 1300 μT (x,y)
Magnetic Field Resolution	0.3 μT
output Data Rate	10 HZ

Barometer

pressure Range	300 to 1100 hpa
Pressure Resolution	0.18 pa
Relative Pressure Accuracy	0.12 hpa
RMS Noise	0.2 pa
output Data Rate	25 HZ

* ZED 2i Sensors Specifications

Focal Lengths Available



2.1 mm

2.1mm fixed focal lens offers an exceptionally wide field of view while also providing optically corrected distortion for enhanced image quality.

4 mm

The 4mm focal length lens is perfect for an enhanced resolution and depth accuracy at longer ranges.

NO More Reflections with polarizing Filters

Experience the highest image quality possible outdoors with the built-in polarizing filter. This filter effectively minimizes glare and reflections while enhancing color depth and overall quality.



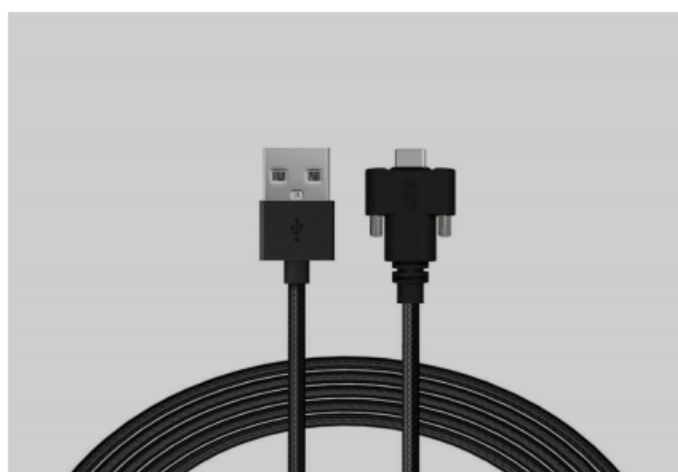
ZED 2i Available Models

specifications	ZED 2i 2.1mm w/o Polarizer	ZED 2i 2.1mm with Polarizer	ZED 2i 4mm w/o Polarizer	ZED 2i 4mm with Polarizer
Reference	ZED2i21MM	ZED2i21MM P	ZED2i40MM	ZED2i40M MP
polarize r	Not available	Built-in polarize r	Not available	Built-in polarize r
Focal Length	2.12mm (0.008")		4mm (0.16")	
Field of view	Max.110(H)x70(V)x 120(D)		Max.729(H)X44(V)X 81P(D)	
Aperture	f/2.0		f/1.8	
TV Distortion	5.07%		4.8%	
Depth Range Max	0.3m to 20m (0.98ft to65.6ft)		1.5m to35m (4.9ft to 114.8ft)	
Ideal Range	0.3m to12m (0.98ft to39.4ft)		1.5m to 20m (4.9ft to 65.6ft)	
Depth Accuracy	<0.8% at 2m (6.6ft) < 4% at 12m (39.4ft)		<0.4% at 2m (6.6ft) < 7% at 20m (65.6ft)	
object Detection	(3D) Up to 20m (65.61ft) (2D) Up to 40m (131.23ft)		Up to Max Depth (3D) Up to 55m (2D)	
Body Tracking	ZED2i- up to8m (26.24ft)		Up to 15m (49.21ft)	

* ZED 2i Accessories

USB3.0Dual screw Locking cables

For many applications of the ZED 2i, longer distance between the camera and host computer are often needed. This USB 3.0 cable allows you to extend the ZED camera range by up to 10m (32.8ft) without any external power supply.



Length	Reference
0.3m (0.98ft)	CBLZ ED2i30
3m (10ft)	CBLZ ED2i300
5m (16.4ft)	CBLZ ED2i500
10m (32.8ft)	CBLZ ED2i1000

ZED BOX NVIDIA Jetson on Orin-NX

The ZED Box Orin™ NX takes advantage of NVIDIA® Jetson™ modules to propel your AI capabilities to new heights. It revolutionizes 3D sensor data processing by delivering real-time performance, transforming this compact embedded PC into a fully autonomous AI system. With its small form factor and PoE+ power connection, it offers a complete solution in a convenient package.



General specifications	Reference
NVIDIA® Orin™ NX 16GB	GT WON X16
Power: PoE+ (25W) or DC-IN (35W, 12-19V)	
available with a locking ring	
Aluminum case passively cooled	
Dimensions: 109.6 x 92 x 52.5mm (LxWxH)	
(4.32 x 3.63 x 2.07")	

* ZED 2i ZED SDK

SDK Modules

stereo capture

The ZED 2i is a camera with dual lenses. It captures high-definition 3D video with a wide field of view and outputs two synchronized left and right video streams in side-by-side format on USB 3.0.

Depth sensing

Depth Map

Depth maps captured by the ZED X store a distance value (Z) for each pixel (X, Y) in the image. The distance is expressed in metric units (meters for example) and calculated from the back of the left eye of the camera to the scene object.

3D point cloud

Another common way of representing depth information is by a 3-D point cloud. A point cloud can be seen as a depth map in three dimensions. While a depth map only contains the distance or Z information for each pixel, a point cloud is a collection of 3D points (X,Y,Z) that represent the external surface of the scene and can contain color information.

positional Tracking

The ZED 2i uses visual tracking of its surroundings to understand the movement of the user or system holding it. As the camera moves in the real-world, it reports its new position and orientation. This information is called the camera 6DoF pose. Pose information is output at the frame rate of the camera, up to 100 times per second in WVGA mode.

spatial Mapping

The ZED continuously scans its surroundings and creates a 3D map of what it sees. It updates this map as the device moves around and captures new elements in the scene. Since the camera perceives distances beyond the range of traditional RGB-D sensors, it can quickly reconstruct 3D maps of large indoor and outdoor areas.

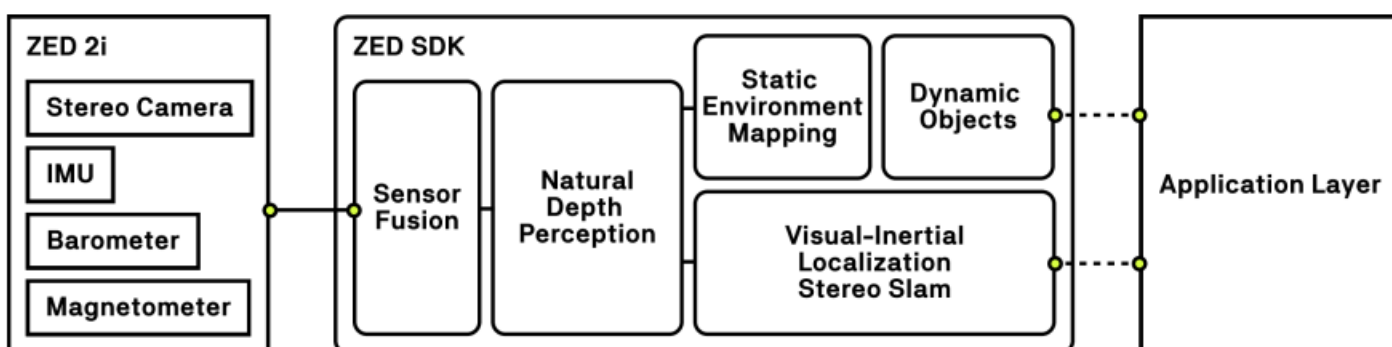
object Detection

Object detection is the ability to identify objects present in an image. Thanks to depth sensing and 3D information, the ZED camera is able to provide the 2D and 3D position of the objects in the scene. Since ZED SDK 3.6, a custom detector can be used with the API. The 2D detection are ingested and 3D informations such as position, 3D bounding box and more are computed. More informations in the Custom Detector page

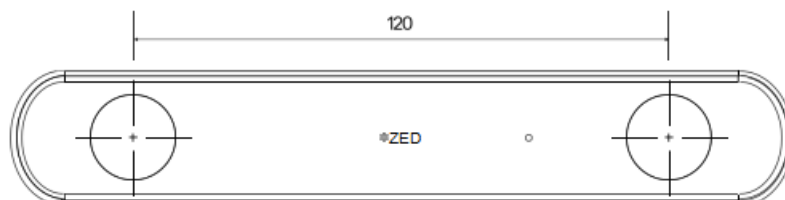
Body Tracking

Body tracking module focuses on skeleton bone detection and tracking. A detected bone is represented by its two end points also called keypoints. The ZED camera provides 2D and 3D information for each keypoint as well as local rotation. The ZED SDK supports four body formats: 18 or 34, 38 keypoints.

Functional sDK Diagram



* ZED 2i Technical Drawings



1x
Mounting hole
1/4-20 UNC|
Max Length:7mm

2x
Mounting holes
M3x0.5|
Max Length:10mm

