

# D-90AI Intelligent Multi-sensor Spherical Gimbal



## Characteristics

- Features AI multi-object detection and tracking, which can constantly track one of the persons and vehicles intelligently identified in the image.
- Carries a 30x hybrid zoom camera, a thermal camera and a laser range finder.
- Low-profile spherical shape and 3-axis nonorthogonal mechanical stabilized structure, minimize the gyration radius and the wind resistance of the gimbal. The D-90AI is able to spin continually around its yaw axis.
- With the GCU, the D-90AI supports network, UART and S.BUS control. The GCU supports both private protocol and MAVLink protocol.
- Thanks to the Dual-IMU complementary algorithms with IMU temperature control and carrier AHRS fusion, the D-90AI provides a stabilization accuracy at  $\pm 0.01^\circ$ .
- Can be mounted onto multiple carriers, whether downward or upward.
- With the GCU and the Dragonfly software, user can watch the image and control the gimbal without protocol ducking.
- Screen supports overlaying OSD information such as latitude, longitude and altitude. Image supports shooting point coordinate EXIF save. Video stream supports SEI stacking.
- 14~53 VDC wide voltage input.

# Specifications

General			
Product Name	D-90Ar		
Dimensions	Gimbal: 96.4 x 96 x 147mm		
	GCU: 45.4 x 40 x 13.5mm		
Weight	Gimbal: 608g		
	GCU: 18.6g		
Operating Voltage	14 ~ 53 VDC		
Power	Gimbal: 10.5W (AVG, ranging off) / 55W (Stall, ranging on)		
	GCU: 1.8W		
Mounting	Downward / Upward		
Target Positioning Accuracy <sup>[1]</sup>	Horizontal Error: 1.8m	@	Horizontal Distance: 105m
	Vertical Error: 0.7m		Relative Height: 75m
	Horizontal Error: 17.4m	@	Horizontal Distance: 513m
	Vertical Error: 6.7m		Relative Height: 119m
	Horizontal Error: 33.8m	@	Horizontal Distance: 1003m
	Vertical Error: 13.7m		Relative Height: 246m
Gimbal			
Gimbal Type	3-axis Nonorthogonal Mechanical Stabilization		
Angular Accuracy	±0.01°		
Controllable Range	Pitch: -150° ~ +50° , Yaw: ±360° constantly		
Max Controllable Speed	Pitch: ±200°/s, Yaw: ±200°/s		
Zoom Camera			
Image Sensor	1/2.8" CMOS; Effective Pixels: 2.07M		
Lens	Focal Length: 4.7~47mm		
	HFOV: 61.3° ~6.8°		
	VFOV: 36.9° ~3.9°		
	DFOV: 68.4° ~7.8°		
Resolution	1920 x 1080		
Pixel Pitch	2.9µm		
Optical Zoom Rate	10x		
Equivalent Digital Zoom Rate	3x		
Min Illumination	Night Vision off: 0.01Lux / F1.6		
	Night Vision on: 0.0015Lux / F1.6		
Object Detection Distance	EN62676-4:2015	Person <sup>[2]</sup> : 709m; Light vehicle <sup>[3]</sup> : 932m; Large vehicle <sup>[4]</sup> : 1986m	
	Johnson Criteria	Person: 8103m; Light vehicle: 24851m; Large vehicle: 52943m	
Object Identification Distance	EN62676-4:2015	Person: 142m; Light vehicle: 187m; Large vehicle: 397m	
	Johnson Criteria	Person: 2026m; Light vehicle: 6213m; Large vehicle: 13236m	
Object Verification Distance	EN62676-4:2015	Person: 71m; Light vehicle: 93m; Large vehicle: 199m	
	Johnson Criteria	Person: 1013m; Light vehicle: 3106m; Large vehicle: 6618m	

[1] Measured by gimbal mounted on a dual antenna RTK positioned multicopter drone to a known coordinate point. The target positioning accuracy is influenced by carrier's positioning and orientation accuracy, angle between the direction of gimbal mounted and the heading of carrier, slant range, gradient of measurement line and air quality. The data is for reference only.

[2] Reference dimension of person: 1.8x0.5m. Critical dimension under Johnson criteria is 0.75m

[3] Reference dimension of light vehicle: 4.2x1.8m. Critical dimension under Johnson criteria is 2.3m

[4] Reference dimension of large vehicle: 6.0x4.0m. Critical dimension under Johnson criteria is 4.9m

<b>Thermal Camera</b>	
Thermal Sensor	Uncooled VOx Microbolometer
Lens	Focal Length: 18mm
	HFOV: 24°
	VFOV: 18°
	DFOV: 30.4°
Resolution	640 x 512
Pixel Pitch	12µm
Spectral Band	8~12µm
Sensitivity (NETD)	<50mk@25°C
Object Detection Distance	Person: 750m; Light vehicle: 2300m; Large vehicle: 4900m
Object Identification Distance	Johnson Criteria Person: 188m; Light vehicle: 575m; Large vehicle: 1225m
Object Verification Distance	Person: 94m; Light vehicle: 288m; Large vehicle: 613m
<b>Laser Range Finder</b>	
Wavelength	905nm
Max Laser Power	1mW
Beam Angle	3.5mrad
Beam Diameter	0.35m @ 100m
Laser Safety	Class 1M (IEC 60825-1:2014)
Measurement Accuracy	±1.0m
Measurement Range	5-1200m (φ12m vertical surface with 20% reflectivity)
<b>AI Multi-object Detection &amp; Tracking</b>	
Object Size	16x16 ~ 128x128 px
Object Identification Delay	<40ms
Tracking Speed	±32 px / field
Tracking Deviation Refresh Rate	30Hz
Tracking Deviation Output Delay	≤5ms
<b>Image &amp; Video</b>	
Image Format	JPEG
Maximum Image Resolution	1920 x 1080
EXIF	Shooting point coordinate
Video Format	MP4
Maximum Video Resolution	1080P@25fps
Stream Encode Format	H.264, H.265
Stream Network Protocol	RTSP
<b>Storage</b>	
Supported SD Cards	Supports a Speed Class 10 MicroSD card with a capacity of up to 256GB
Support File System	HDD-FAT32
<b>Environment</b>	
Operating Temperature	-20°C ~ 50°C
Storage Temperature	-40°C ~ 60°C
Operating Humidity	≤85%RH (Non-condensing)