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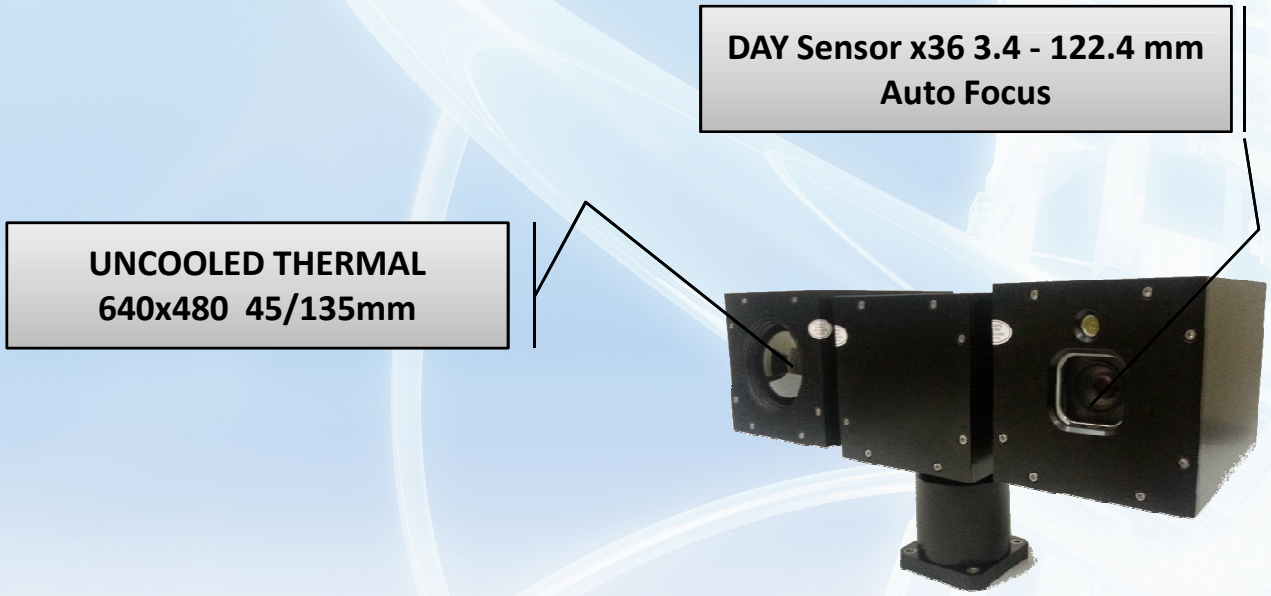
TOREF 45/135

Dual Sensor Uncooled Observation Unit

TOREF 45/135

System Description

TOREF is a mid-range dual sensor video reconnaissance system. It integrates a 360-degree PAN TILT Platform with a Dual FOV Thermal Sensor and a Continuous Zoom Day Sensor. The system demonstrates unparalleled video analytic accuracy and image clarity and is able to withstand extreme environmental conditions due to its rugged design. Optionally, the unit can be installed on a mast for mobile observation, e.g. from a vehicle's roof).



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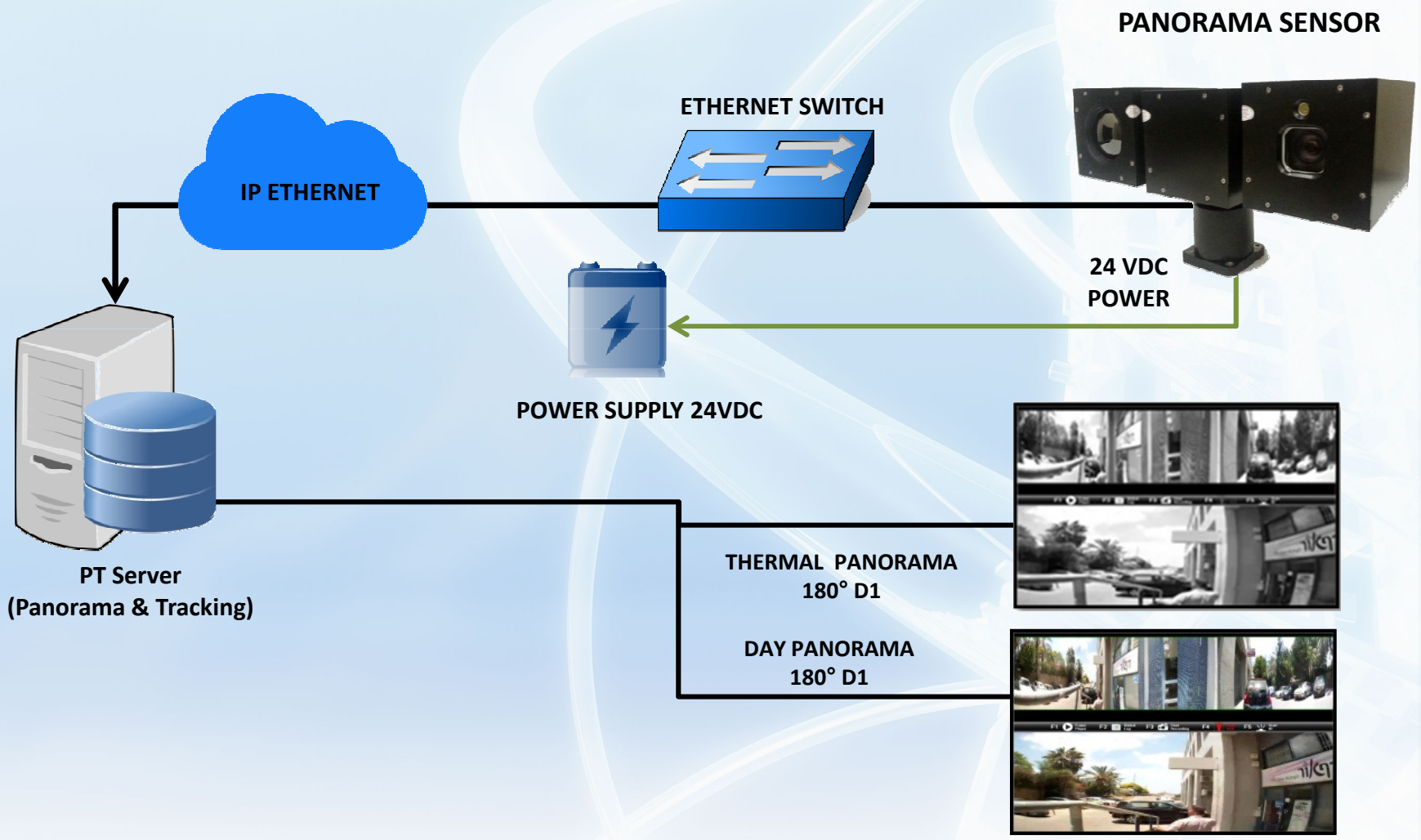
PANORAMA SYSTEM CONNECTIVITY



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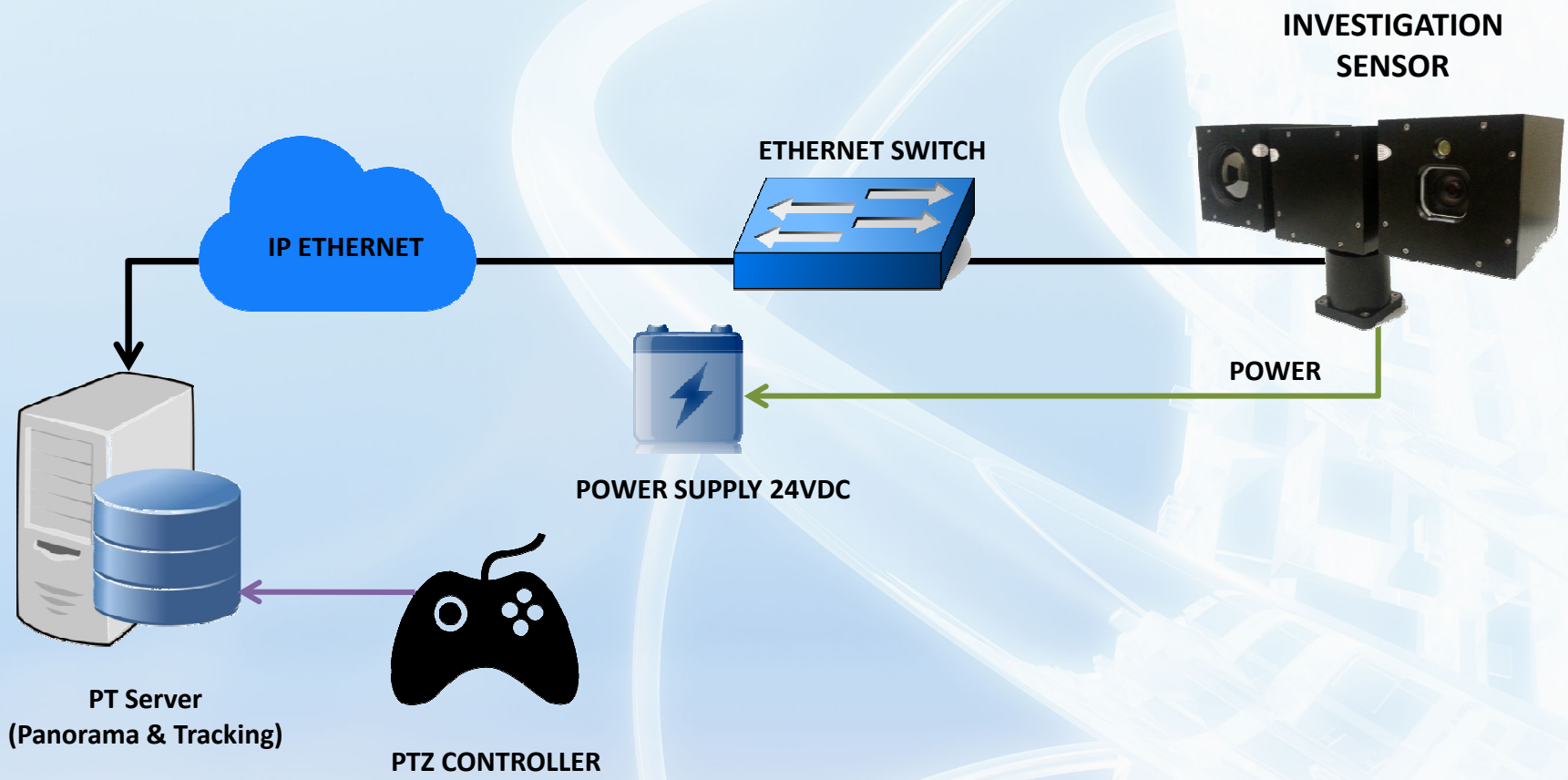
INVESTIGATION SYSTEM CONNECTIVITY



TOREF 45/135

General Specifications

ELECTRICAL

POWER INPUT	24VDC
POWER CONSUMPTION	Uncooled: 30w TYPICAL (STATIC, NO HEATERS) 350w max (MOVING, WITH HEATERS)

MECHANICAL

WEIGHT	~32Kg
ROTATIONAL ANGLE	PAN: 360° CONTINUOUS TILT: -30° to +90°
ROTATIONAL SPEED	PAN/TILT: 0-50° PER SECOND

COMMUNICATIONAL

COM. MODE	RS-485 / Ethernet
COM. PROTOCOL	PELCO-D

ENVIRONMENTAL

PROTECTION RATE	IP 67
STORAGE TEMPERATURE	-40°C to +71°C
OPERATING TEMPERATURE	-40°C to +60°C
HUMIDITY	+40°C , 93% RH

DAY IMAGING SENSOR

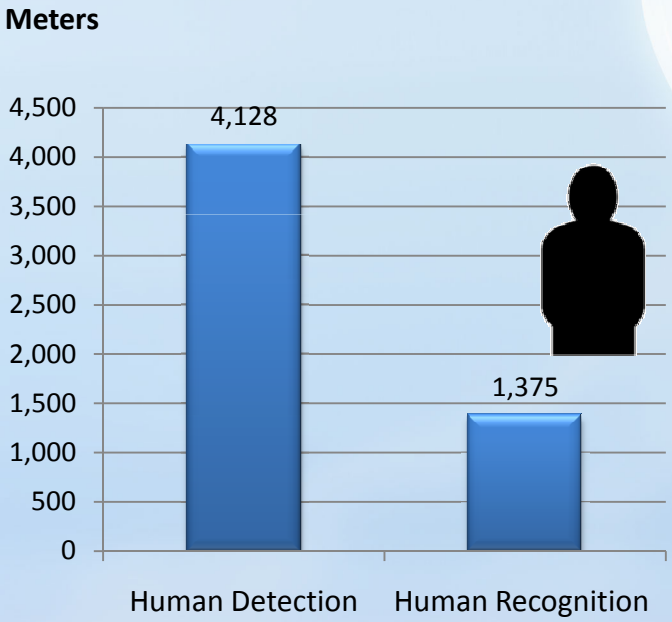
IMAGER TYPE	1 /2.8" CCD
LENS	4.3 mm ~ 129.0 mm
RESOLUTION	~ 3.27 MILLION
S/N RATIO	>50dB

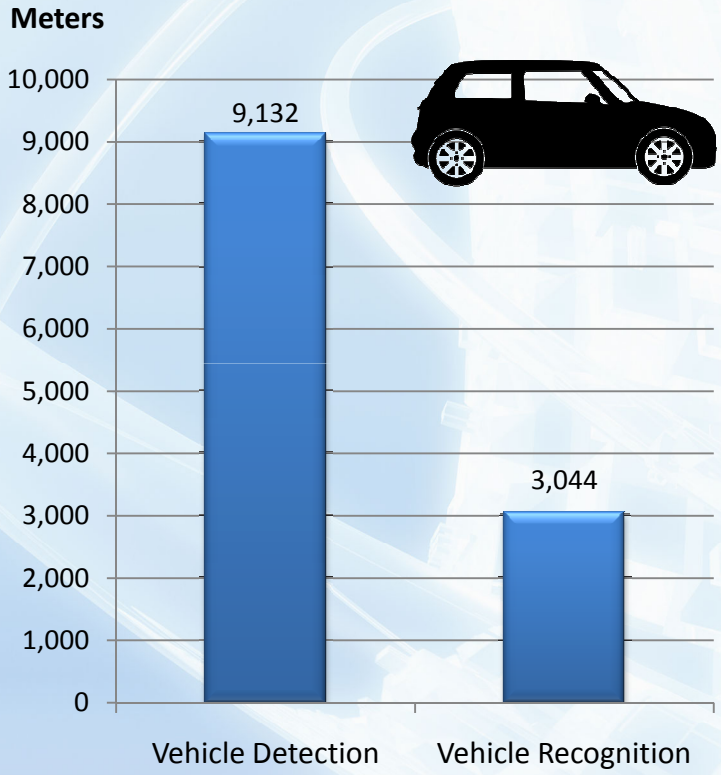
THERMAL IMAGING SENSOR

IMAGER TYPE	UNCOOLED
SPECTRAL BAND	7.5-14µ
PIXEL SIZE / RESOLUTION	17µ / 640 x 480
NETD	<50° mK
LENS	45/135mm Dual FOV

TOREF 45/135

Thermal 45/135mm Sensor Performance





Detection = 2 p/m
Recognition = 6 p/m

TOREF 45/135

SONY 6500 FULLHD 1080p x30 Zoom

This model features 1920 x 1080 HD resolution and incorporates a 1/2.8-type Exmor™ CMOS image sensor for exceptional picture quality.

CAMERA	
IMAGE DEVICE	1 /2.8 TYPE EXMOR CMOS SENSOR
EFFECTIVE PIXELS	~3.27 MILLION
DIGITAL ZOOM	12x (360x WITH OPTICAL ZOOM)
HORIZONTAL VIEWING ANGLE	54.1° (WIDE END) TO 2.9° (TELE END)
MINIMUM OBJECT DISTANCE	10mm (WIDE) ~ 1,000 mm (TELE)
SYNC SYSTEM	INTERNAL
ELECTRONIC SHUTTER	1/2 TO 1/10,000 S, 21 STEPS
WHITE BALANCE	AUTO, ATW, INDOOR, OUTDOOR AUTO, SODIUM VAPOR LAMP (FIX/AUTO), ONE-PUSH, MANUAL
GAIN	AUTO/MANUAL/MAX. GAIN LIMIT (-3 TO 28 DB, 2 DB STEPS)
WIDE DYNAMIC RANGE	AUTO/MANUAL
PRIVACY ZONE MASKING	SPHERICAL
CHARACTER GENERATOR	20 CHARACTERS/LINE, MAX. 11 LINES
FOCUS SYSTEM	AUTO (SENSITIVITY: NORMAL, LOW), ONE-PUSH AF, MANUAL, INFINITY, INTERVAL AF, ZOOM TRIGGER AF
CAMERA OPERATION / ZOOM SWITCH	ZOOM TELE, ZOOM WIDE
PICTURE EFFECTS	E-FLIP, NEGA ART, BLACK & WHITE, MIRROR IMAGE, COLOR
ENHANCEMENT	
EXPOSURE CONTROL	AE CONTROL: AUTO, MANUAL, PRIORITY (SHUTTER PRIORITY
AND IRIS	PRIORITY), BRIGHT, EV COMPENSATION, SLOW AE

TOREF 45/135

SONY 6500 FULLHD 1080p x30 Zoom

VIDEO OUTPUT	
LENS VALUE	30X OPTICAL ZOOM, F=4.3 mm (WIDE) ~ 129.0 mm (TELE), F1.6 TO F4.7
S/N RATIO	>50 DB
MINIMUM ILLUMINATION	LESS THAN 1.7 LX (F1.6, 50 IRE), 0.5 LX IN HIGH SENSITIVITY MODE
SIGNAL SYSTEM	HD:1080P/29.97, 1080P/25, 1080I/59.94, 1080I/50, 720P/50, 720P/29.97, 720P/25 SD: NTSC/PAL
INTERFACES	
CAMERA CONTROL INTERFACE	VISCA (TTL SIGNAL LEVEL) BAUD RATE: 96 KB/S, 19.2 KB/S, 38.4 KB/S STOP BIT: 1/2 BIT SELECTABLE
ENVIRONMENTAL	
OPERATING TEMPERATURE	-5° C - 60° C
STORAGE TEMPERATURE	-20° C - 60° C
ELECTRICAL	
POWER CONSUMPTION	<4.8W (MOTORS INACTIVE)

TOREF 45/135

45/135 mm Uncooled Thermal Sensor

TOREF 45/135 allows long range observation and detection using state of the art uncooled thermal imaging technology and contrast enhancing image processing algorithms.

TOREF 45/135 features one uncooled camera configuration .The uncooled model features a 17µ 640 x 480 thermal core with 45/135 mm dual FOV lens. AutoFocus on Demand for crisp, clear imaging.

THERMAL ENGINE	17M 640 X 480
LENS TYPE	FOCAL LENGTH 45/135mm
LENS	F # F/1.35
VIDEO TYPE	(NTSC/PAL) 30HZ OR 9HZ
SPECTRAL BAND	7.5 – 14
NETD	<50°
HORIZONTAL FIELD OF VIEW (WIDE)	24.5°
HORIZONTAL FIELD OF VIEW (NARROW)	2.77°
DIGITAL ZOOM	**X**1, X2, X4
FOCUS CONTROL	MOTORIZED, AUTOFOCUS ON DEMAND
CONTROL OPERATION	POLARITY, NUC, IMAGE FLIP, MANUAL GAIN/LEVEL, OPTICAL & DIGITAL ZOOM, AUTOFOCUS ON DEMAND

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Uncooled Thermal Lens

Property	Value	
Optical	WFOV	NFOV
Focal Length	114mm	342mm
F/#	1.35	1.58
Average Transmission (8-12µm)	81% (HC)	
Horizontal Field of View (FOV)	9.2° (17.9mm)	3.0° (17.9mm)
Back Focal Length	114.9mm in air	
Mechanical		
Focus Mechanism	Motorized adjustable	
Focus Range	10m to infinity	75m to infinity
Focus Switch Time	12 sec	
Weight	14Kg	
Dimensions	Length 396mm, Width 250mm, Height 262mm	
FOV Mechanism	Motorized	
FOV Switch Time	≤2 sec	
Electrical		
Focus Motor	12VDC, Encoder 5VDC , 0.5A	
FOV Motor	12VDC, Encoder 5VDC , 0.5A	
Environmental		
Operating Temperature	-40°C to +80°C	
Storage Temperature	-50°C to +85°C	
Sealing	IP 67	
External Coating	Hard Carbon	
Solar Radiation (Operating)	1120W/m^2 at 35°C for 4 hours	
Mechanical Shock	MIL-E-5400, Para.3.2.24.6.3	
Vibration	MIL-STD-810F	
Configurations		
65168		
65168-04	Casting	

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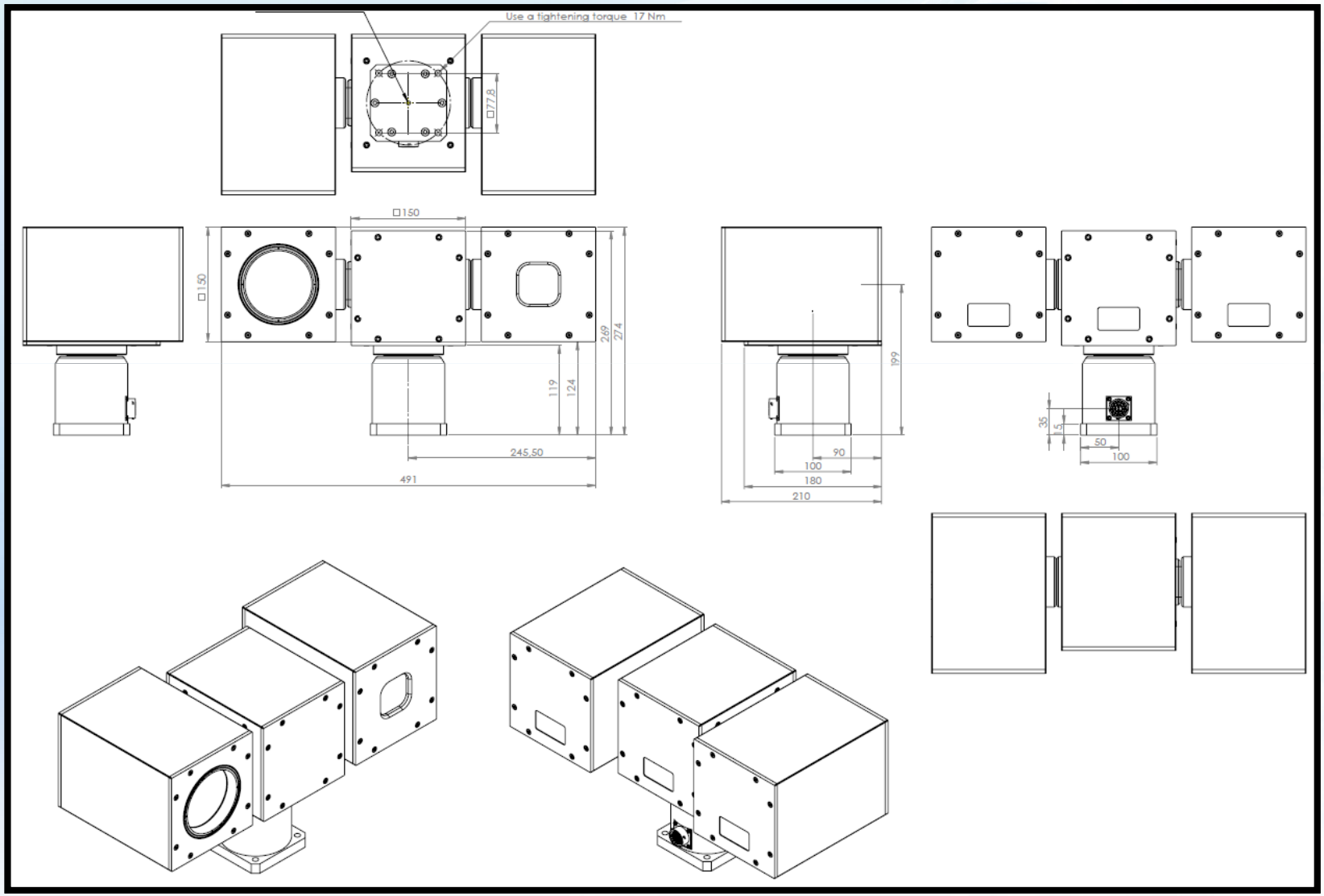
Dual FOV 45/135mm Uncooled Thermal Sensor