Security robot

S5.2 IR series, 2020 models

SMP ROBOTICS

- **Dual-spectrum PTZ camera**
- **Detection and tracking of thermal anomalies**
- **Human recognition and tracking by PTZ camera**
- **360-degree video surveillance by 6 cameras**
- **Human and face detection by panoramic cameras**

All robot models in the series feature:
- **Autonomous travel by a learned route**
- **Site patrolling by a group of robots**
- **Transmission of ONVIF videos and alarm events over 4G or WIFI**
- **Sound warning and IP intercom with an operator**
- **Automatic battery charging**

Intelligent thermal surveillance

The video surveillance system of robots includes a PTZ camera with two sensors (thermal and visible radiation). The IR image enables to observe the people and machines at distances from several hundreds of meters to one kilometer, with totally absent illumination. These robot models feature a built-in supercomputer to process video images from both sensors of the PTZ camera and control it.

In surveillance mode, the PTZ camera performs circular scanning around its axis; if humans, machines or other thermal anomalies are detected, it starts tracking them. Video analytics of the thermal vision channel detect thermal anomalies in a broad range of distances. The visible spectrum sensor image processing program concurrently searches and detects humans, recognizes human faces, provided sufficient illumination. In case of low-light conditions, tracking is performed using the thermal camera image.

The robot's video surveillance system is easily integrated into the ONVIF CMS. As a result, the operator may view videos from both PTZ channels and six panoramic cameras. The operator may suspend automatic control of the PTZ camera and control it manually. The images from PTZ cameras have the resolution suitable for TV, and their sufficient detail is ensured by optical zoom, whereby a minor flow of data from the cameras enables the reliable transmission by wireless channels.

Simultaneously with video flows from the robot's cameras the CMS operator is communicated the robot's current position, in two scales. The maps are transmitted in video format and require no software tweaking by the CMS.

Robots of the series stand out for the low center of gravity and can travel non-perfect roads with minimum tipping risk.

Robotic night patrolling

Both robot models of the series are fitted with six all-round panoramic video surveillance cameras. They enable to continuously inspect the territory at a short distance from the robot. The solution precludes a human's unnoticeable approach to the robot from the side not covered by the PTZ. In confined areas, where the robot encounters a small risk of external exposure, panoramic cameras may come without a human detector and transmit videos only if requested by the operator. A model that features human detection in the field of vision of panoramic cameras has been designed for areas where an intruder may approach a robot. In that case the operator is shown an alarm and a video of human detection by the robot. With no people around the robot, the videos from all panoramic cameras are sequentially displayed in the common alarm channel.

The analytical features of panoramic cameras may recognize the face of a human beside the robot. The function enables to control the work of security officers during site patrolling and reduce the number of alarm events transmitted to the operator. Automatic human recognition is done in the cloud servers.

The scanning PTZ camera inspects sufficiently vast areas, which enables to station the robots at considerable distances from one another. A high-potential wireless video transmission channel is needed to offer reliable functioning in lengthy facilities. To this end, the robots are fitted with an antenna in the highest point of the robot. The antenna ensures a MESH WIFI data exchange between the robots or a steady broadband 4G connection.

The robot may optionally be fitted with a powerful horn to expose a potential intruder to acoustic effects. If preordered, the robots may come complete with the blocking differential of the rear drive. That configuration enables to enhance cross-country ability in case of snow or dirt.

The comparative characteristics of S5.2 IR series thermal security surveillance robots

	Herschel	
Name		
Models	**S5.2 IR IS SH**	**S5.2 IR IS**
Daylight Imaging Cameras		
Quantity of panoramic cameras	6	
Resolution panoramic cameras	1280 × 720	
Type of panoramic cameras	AHD	
Sensitivity of panoramic cameras	0.005 lx	
PTZ camera, zoom	1/4" SONY EX-View HAD CCD; optical: x36, digital: x12	
Resolution of PTZ camera	PAL: 752(H) x 582(V)	
Sensitivity of PTZ camera	color: 1.4lux; B/W: 0.01lux	
Thermal Imaging Camera		
Resolutions	384 x 288	640 x 480
Focal	19mm	
FOV	19.5°x 14.7°	
A sector of the PTZ camera's field of vision	340 °	
Typical sector scanning time	100 sec	
Human detecting range at night, up to	210m (700 ft)	320m (1000 ft)
Face recognition range at day, up to	60m (200 ft) by PTZ camera	
Human detection cameras	PTZ and panoramic	
Embedded computer for video analysis	2pcs T9	
Bitrate and storage size for panoramic cameras	6 x 2048Kb/s or 4096 Kb/s	
	6 x 0.9GB or 1.8 GB per hour	
Bitrate and storage size per channel for PTZ cameras	2 x 1024Kb/s, 2 x 0.45GB per hour	
Embedded SSD T9	120GB	
Estimated operating time	10 hour	
Wi-Fi MESH and Ad Hock antennas	8dBi	