HU ENTROPY TECH
IoT Monitoring, Smarter Future.
深圳胡熵科技有限公司

Product Advantages

深　圳　胡　熵　科　技　有　限　公　司

Shenzhen Hu Entropy Tech Co., Ltd



2026年10月

www.huentropytech.com

Online Visual Tracking System

- **Multi-System Coordination**

Supports synchronized triggering and resetting of multiple measurement heads, as well as collaborative analysis and expansion across multiple measurement points.





Online Visual Tracking System

- **Automatic Recognition of Multiple Targets**

  Automatically recognizes and numbers multiple targets, significantly improving operational efficiency.

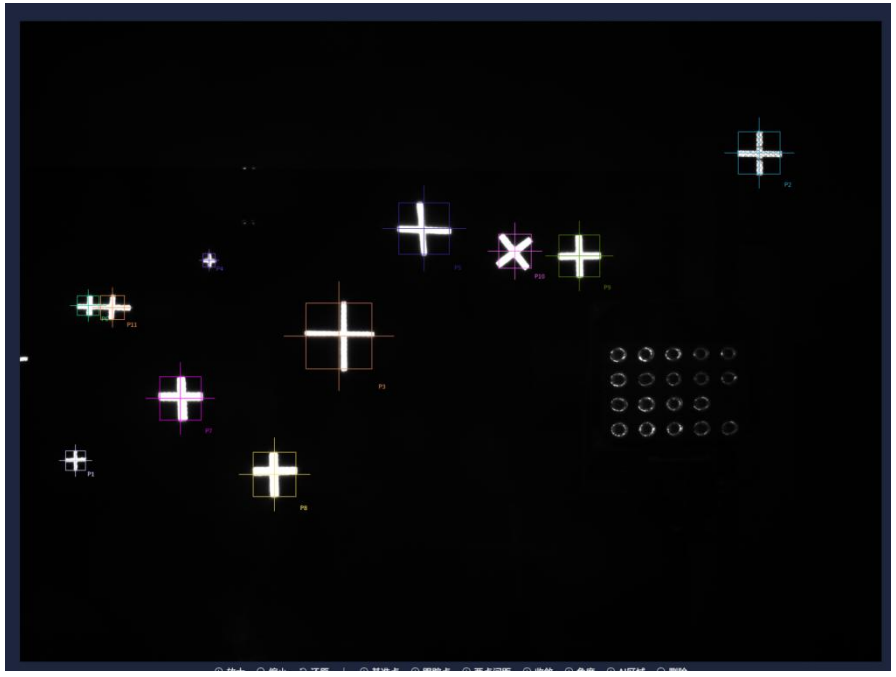
  Step 1: Enable automatic target recognition.

  Step 2: Click to capture the reference image and initialize data acquisition.

  Step 3: Click "Set Measurement Point" to configure the front camera.

  Step 4: Click "Set Measurement Point" to configure the rear camera.





Online Visual Tracking System

Automatic Resetting

Uses high-precision positioning and orientation algorithms to achieve automatic initial calibration and automatic resetting.





Interface Operation



Target Resetting

Online Visual Tracking System

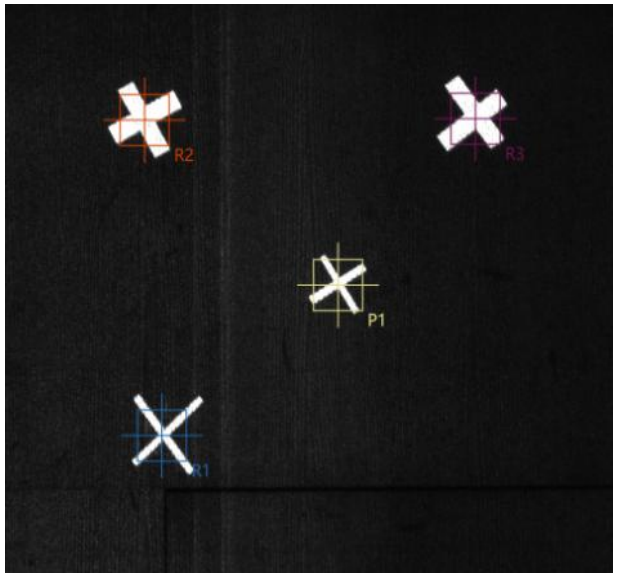
- **Vibration Interference Resistance**

  Uses deep learning and high-precision positioning and orientation algorithms to provide attitude compensation and eliminate vibration interference.

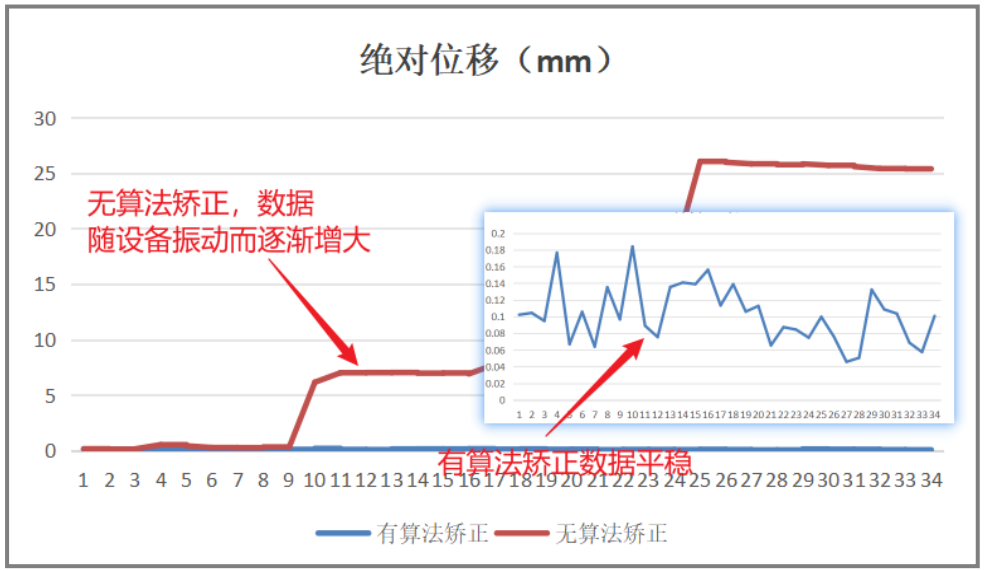




Test Scenario



Target Imaging



Online Visual Tracking System

- **Temperature and Humidity Measurement**

  Integrates a temperature and humidity sensor, with support for extended temperature and humidity measurement.





temperature

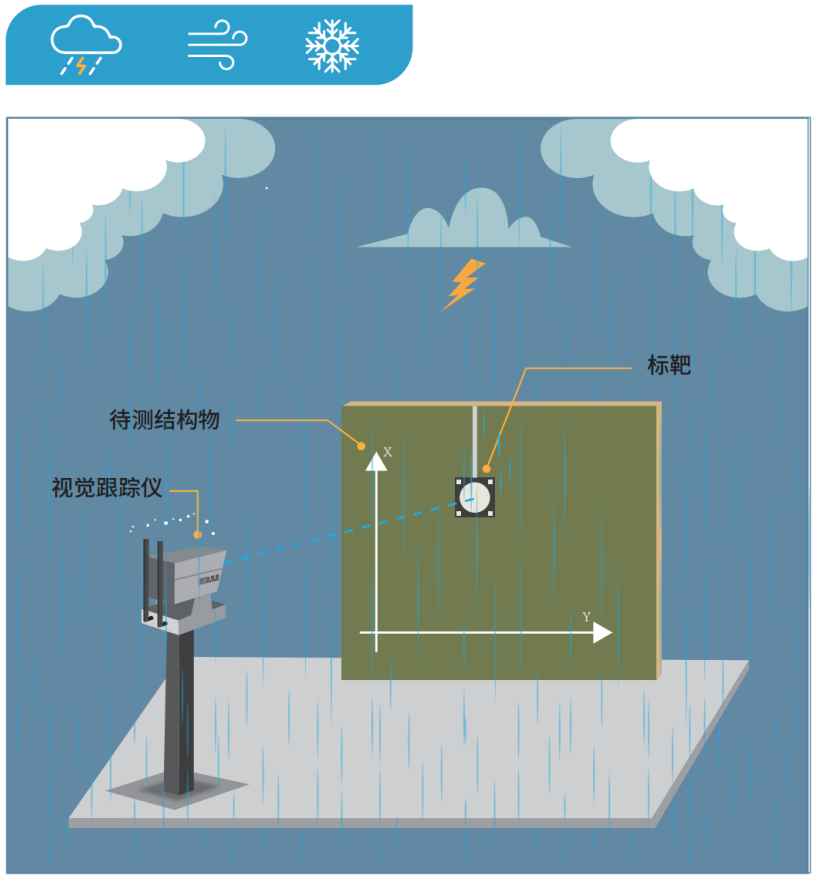


humidity

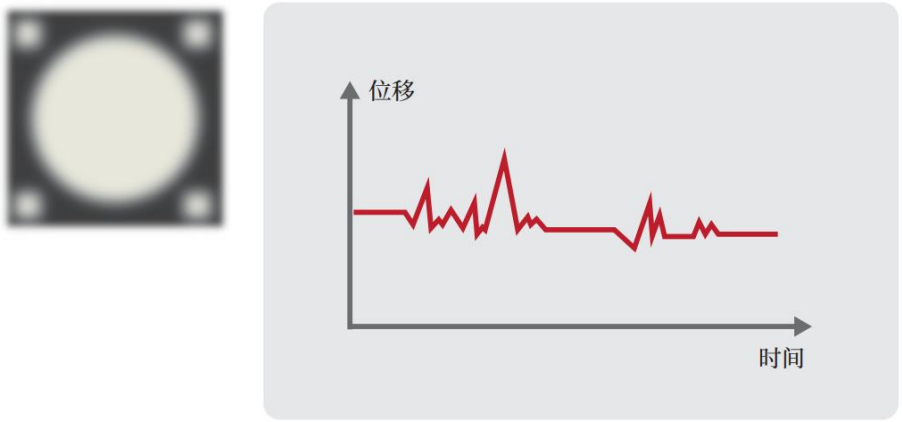
Online Visual Tracking System

- **Weather Interference Resistance**

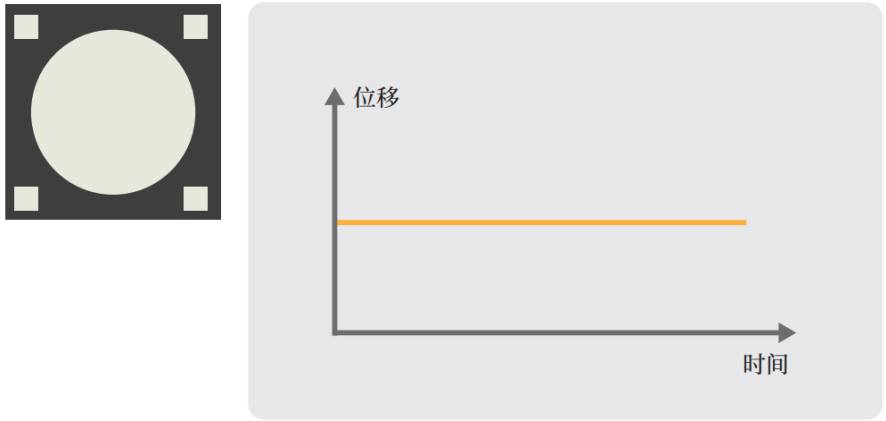
  Uses deep learning algorithms optimized to reduce interference caused by rain, snow, and fog.



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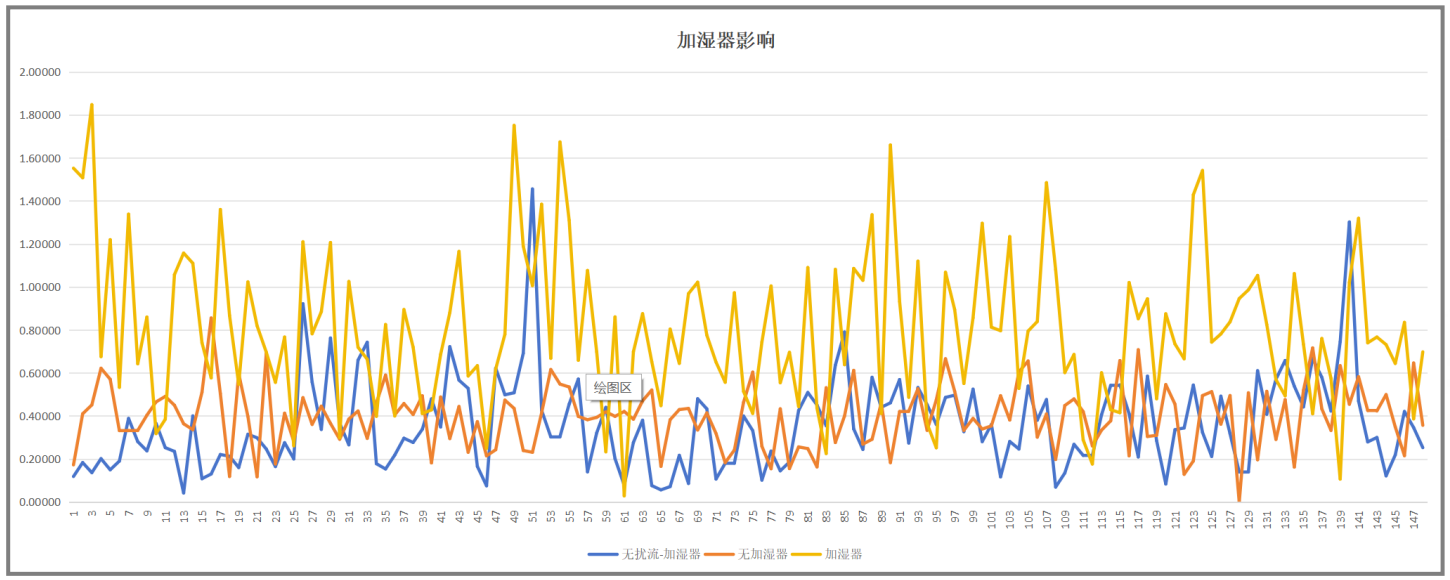
Online Visual Tracking System



Online Visual Tracking System

- **Weather Interference Resistance**





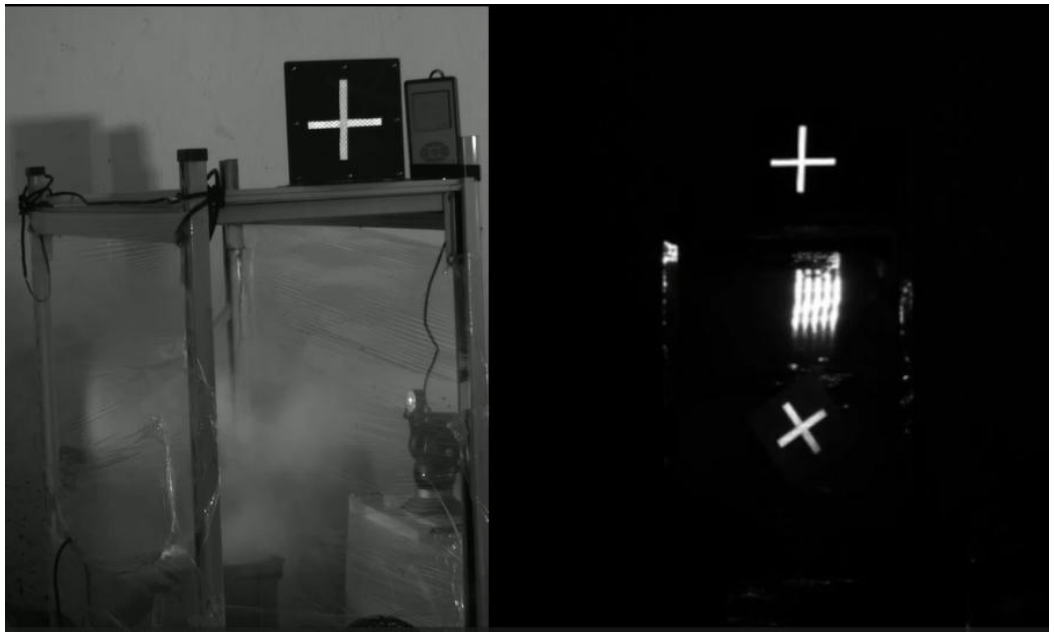


Online Visual Tracking System

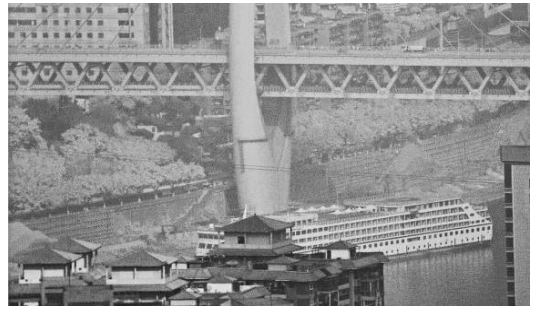
- **Fog Interference Resistance**

Combines algorithm-based fog removal and electronic defogging functions to eliminate the impact of fog on measurement data.

(The image on the left was captured by a device without fog removal, while the image on the right was captured by a device with fog removal.)







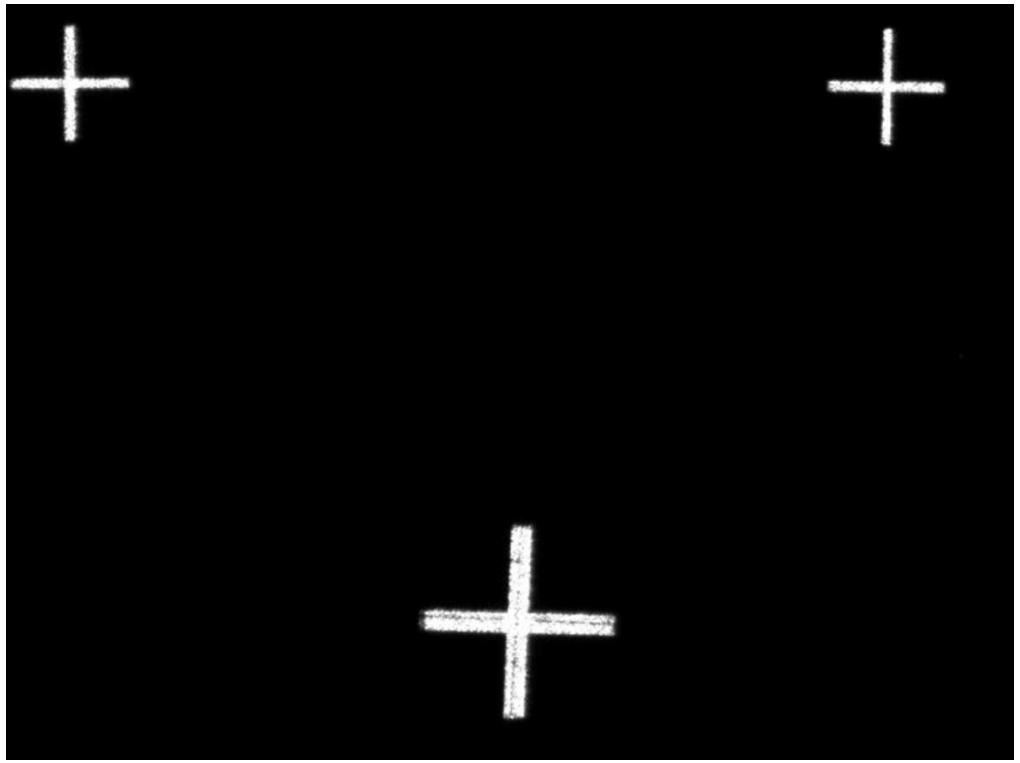


Online Visual Tracking System

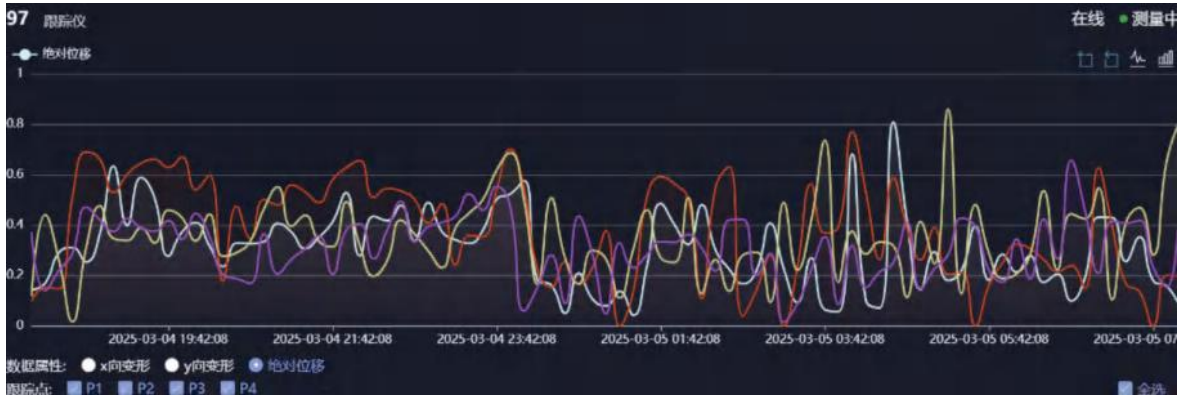
- ## Rain Interference Resistance

Adopts a combined technical approach of hardware anti-interference design and intelligent algorithm optimization to significantly improve monitoring stability during rainfall.

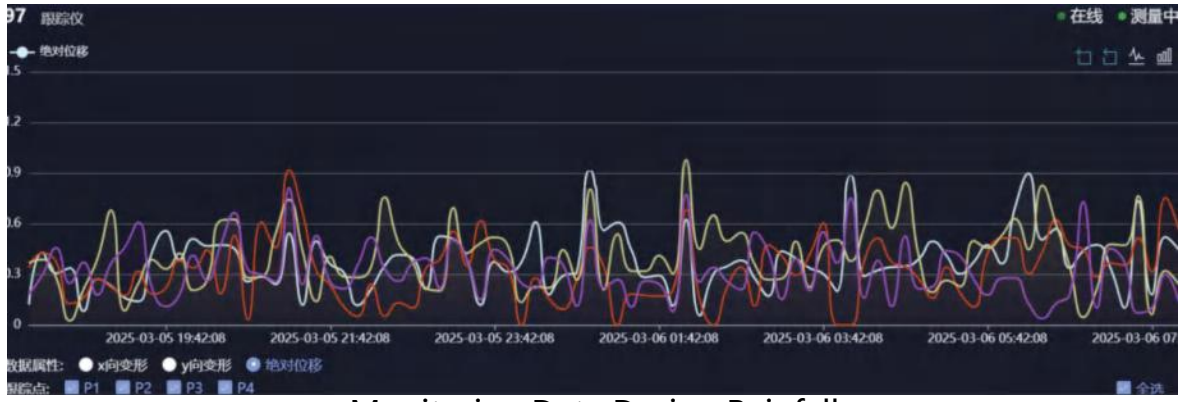
As shown in the figures, data fluctuations during rainy conditions remain within 1 mm, which is basically consistent with the 1 mm fluctuation range under clear weather conditions. This achieves a breakthrough in all-weather environmental monitoring.



Target Image During Rainfall



Monitoring Data in Clear Weather

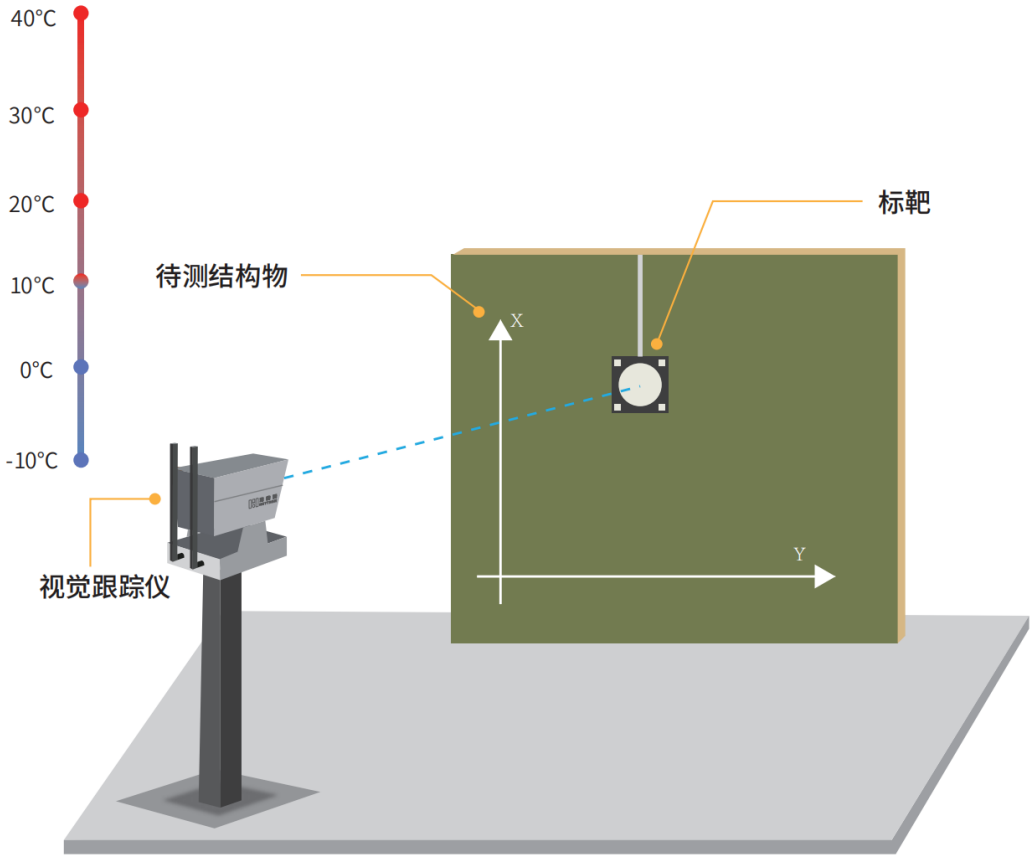


Monitoring Data During Rainfall

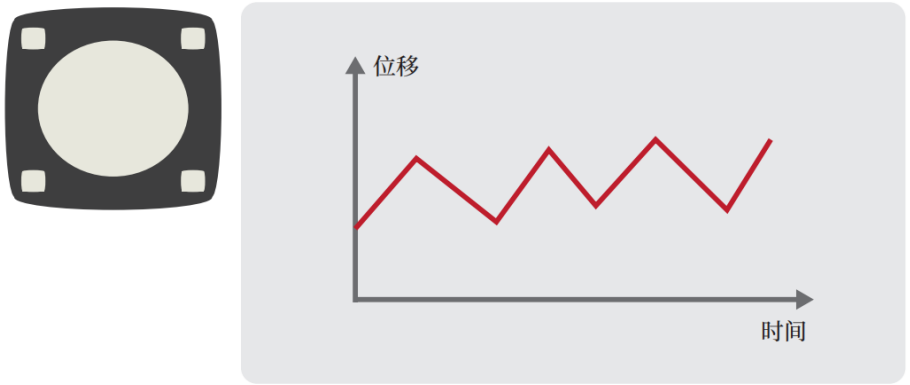
Online Visual Tracking System

- **Temperature Interference Resistance**

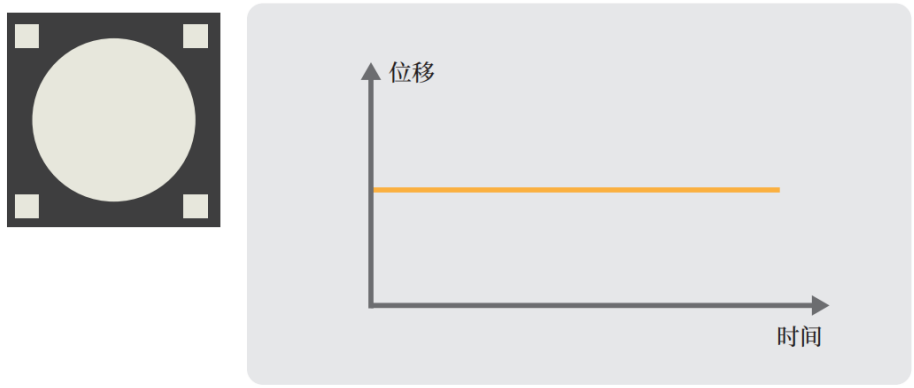
  Uses deep learning algorithms optimized to reduce interference caused by temperature changes.



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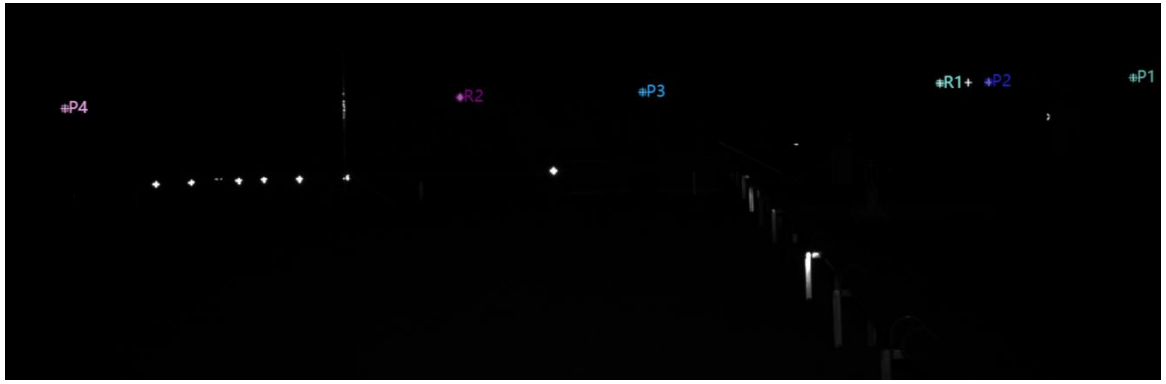


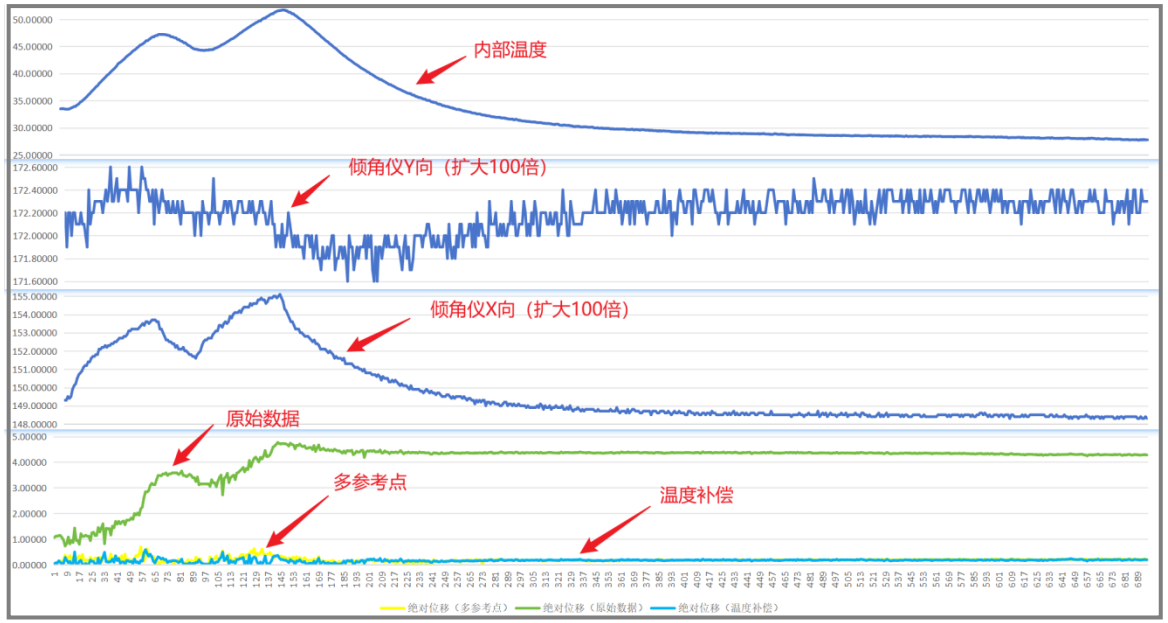
Online Visual Tracking System



Online Visual Tracking System

- **Temperature Interference Resistance**







Online Visual Tracking System

- **Temperature Interference Resistance**

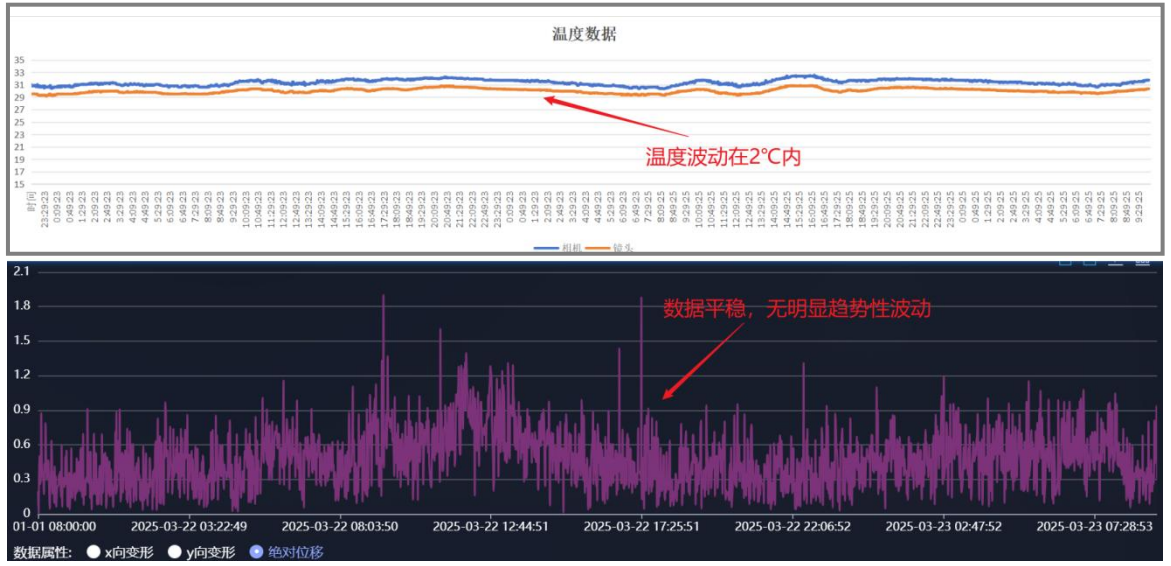
Through the coordinated optimization of an adaptive temperature compensation algorithm and an intelligent temperature control system, the tracking instrument significantly improves monitoring data stability in complex environments.

As shown in the figures, under actual operating conditions in a slope monitoring project, the temperature compensation algorithm effectively suppresses baseline drift caused by temperature gradient changes. Measured results show that the original data fluctuation was reduced from 3 mm to 2 mm, improving measurement accuracy by approximately 33%.

When the monitoring system is connected to mains power, the physical temperature control device can keep the operating temperature fluctuation of the tracking instrument's core components within 2°C. Combined with the temperature compensation algorithm, measurement accuracy can be improved by approximately 50%.



Temperature Compensation Data Chart

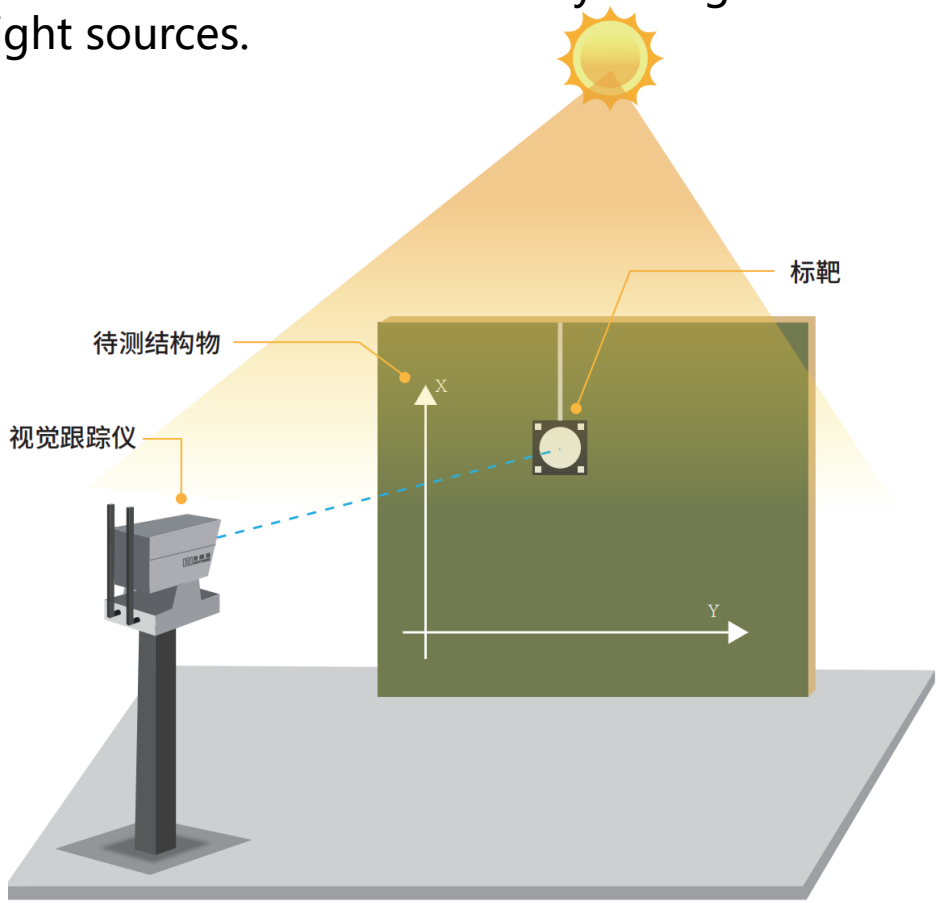


Temperature Compensation + Physical Temperature Control Data Chart

Online Visual Tracking System

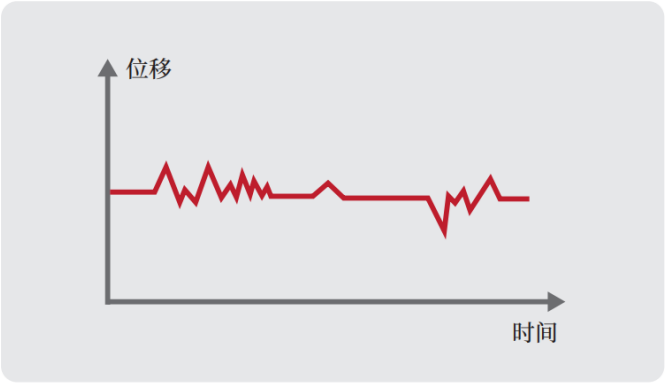
- **Exposure Interference Resistance**

Uses deep learning algorithms optimized to reduce interference caused by sunlight and other light sources.

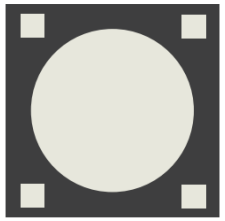


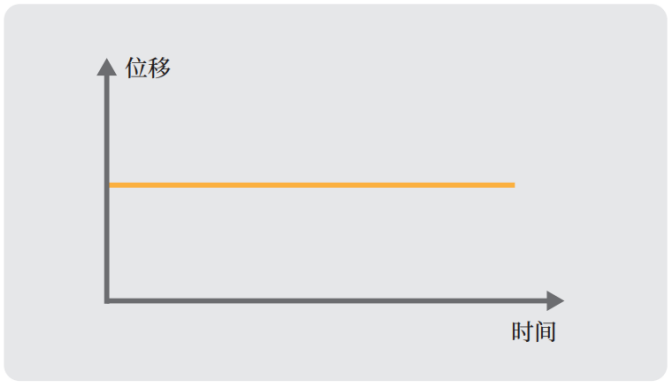
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Online Visual Tracking System

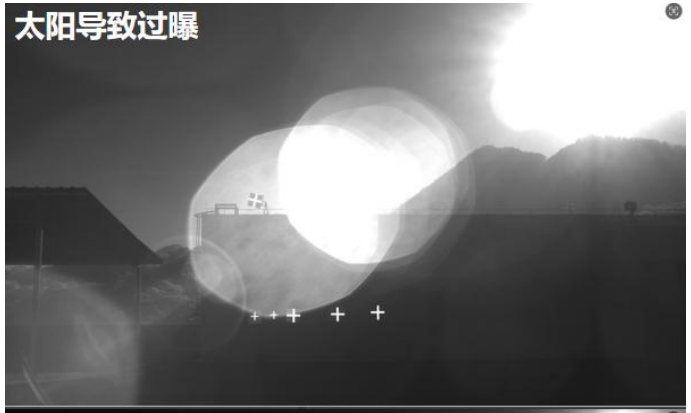


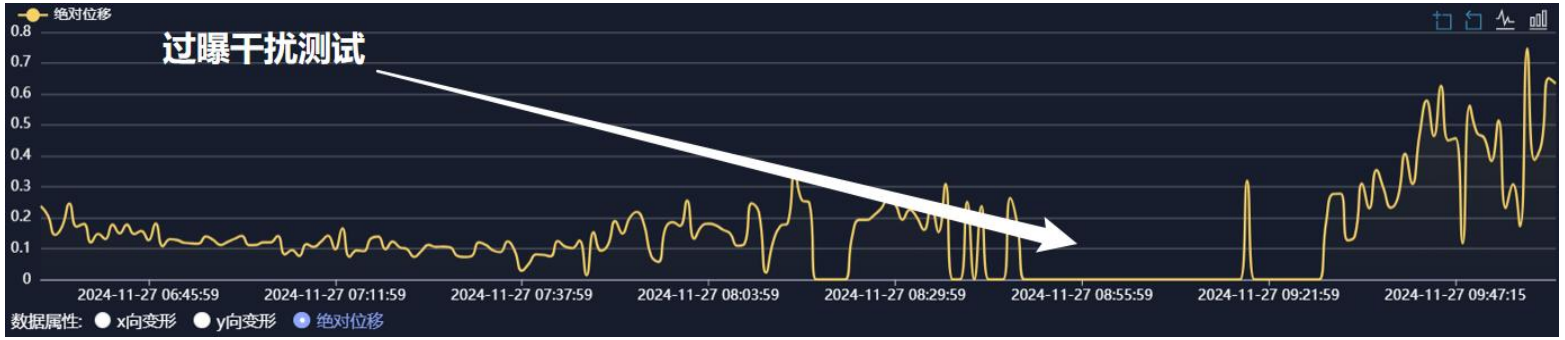


Online Visual Tracking System

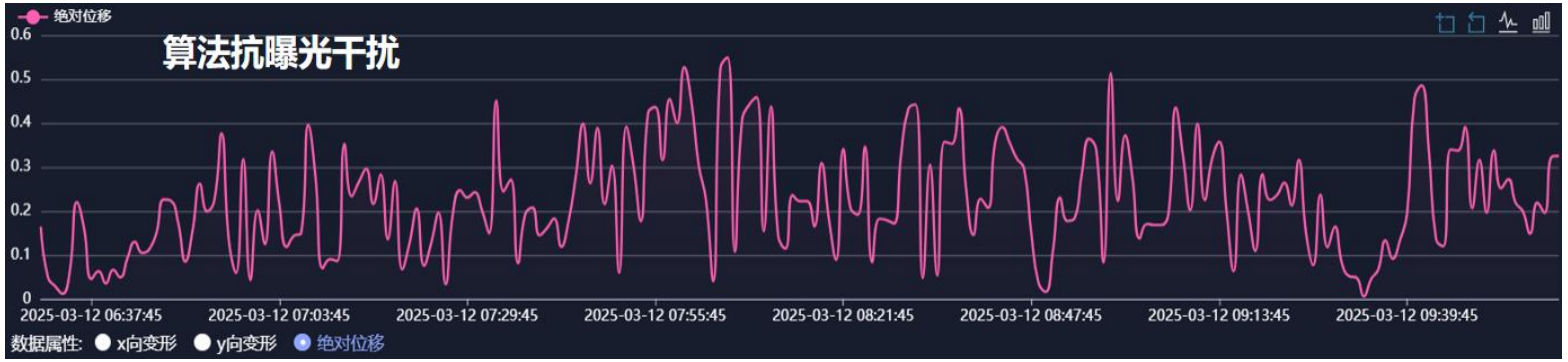
- **Exposure Interference Resistance**

Intelligent Exposure Interference Resistance: Based on deep learning, the system identifies changes in ambient lighting in real time and automatically compensates for overexposure and backlight interference, ensuring clear images and accurate colors under different lighting conditions.





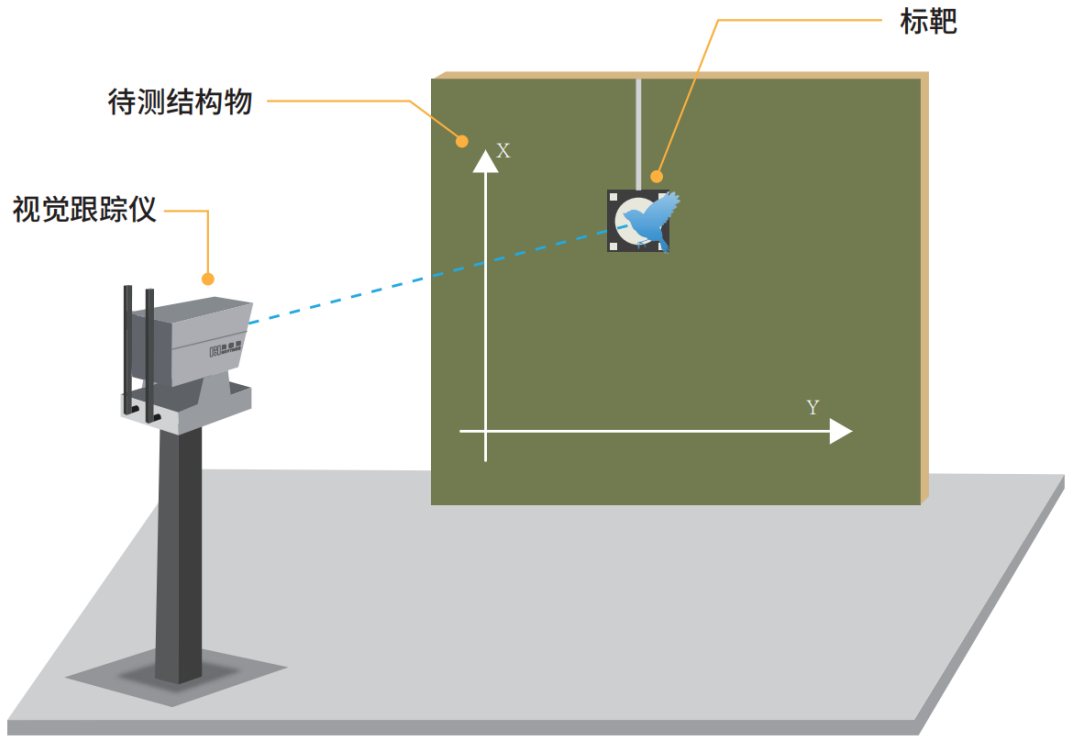




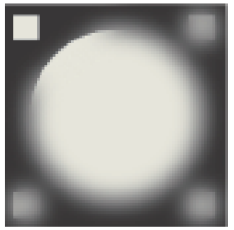
Online Visual Tracking System

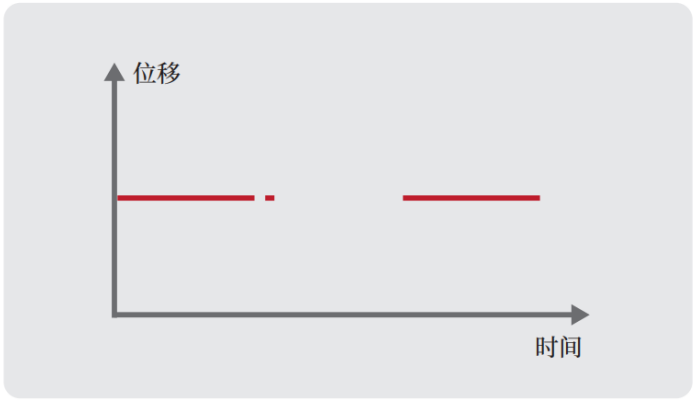
- **Occlusion Interference Resistance**

  Uses intelligent recognition algorithms to identify target occlusion and avoid false alarms.

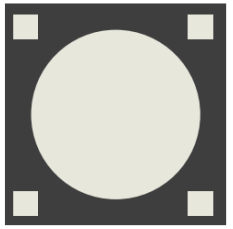


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Online Visual Tracking System





Online Visual Tracking System

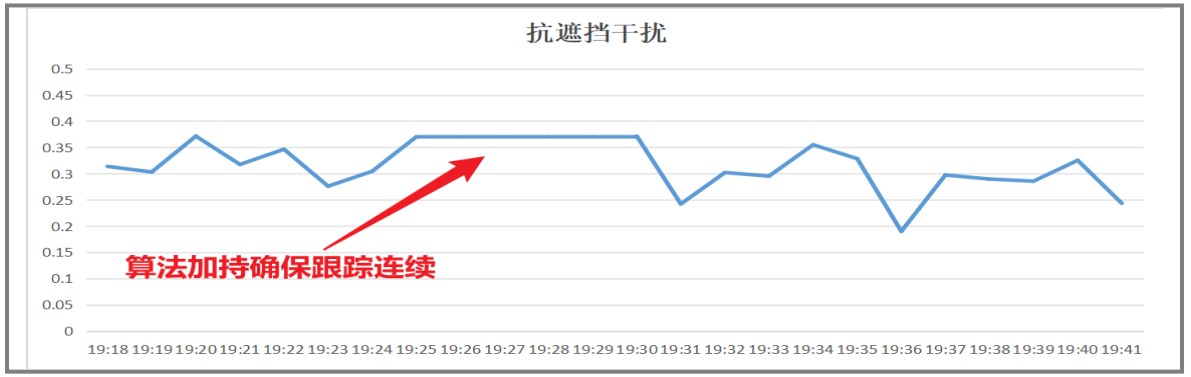
Occlusion Interference Resistance

- When a target is temporarily occluded, the system uses historical trajectories and feature matching to avoid false alarms triggered by the occlusion.
- After the obstruction disappears, the algorithm quickly reacquires the target to ensure continuous tracking and improve monitoring reliability in complex environments.









Metro Tunnel Monitoring Application – Partial Target Occlusion by Personnel During Construction

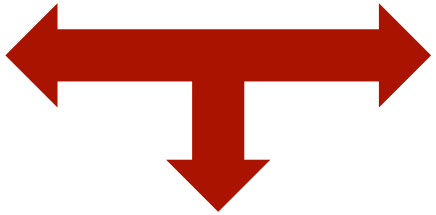




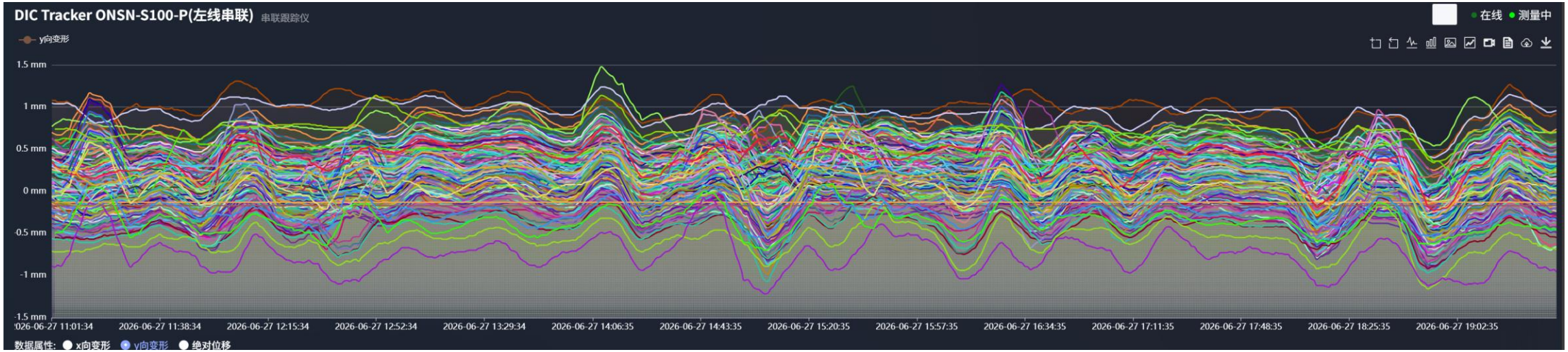
Infers occlusion based on the integrity assessment of prism targets.

Metro Tunnel Monitoring Application – Extensive Target Occlusion by Passing Trains During Operation









Dynamically evaluates the reliability of the interconnected tracking chain.

Online Visual Tracking System

- **Resistance to Light Spot Flicker Interference**
  - Increases the acquisition frame rate and uses multi-frame averaging to reduce noise and improve stability.

Effect 1
Intensity Scintillation
High-frequency random intensity fluctuations
Caused by small-scale turbulent eddies
Brightness Flickering

Effect 2
Beam Wander
Medium-frequency random positional fluctuations
Deflection caused by large-scale turbulent eddies
Overall Jitter

Effect 3
Refraction Drift
Low-frequency systematic positional drift
Bending caused by persistent temperature gradients
Unidirectional Slow Drift

效应 1
强度闪烁 (Scintillation)
高频随机强度起伏
小尺度湍涡引起



效应 2
光斑漂移 (Beam Wander)
中频随机位置抖动
大尺度湍涡偏折



效应 3
趋势偏差 (Refraction Drift)
低频系统位置漂移
持续温度梯度弯曲





1 Hz (up to 10 Hz)

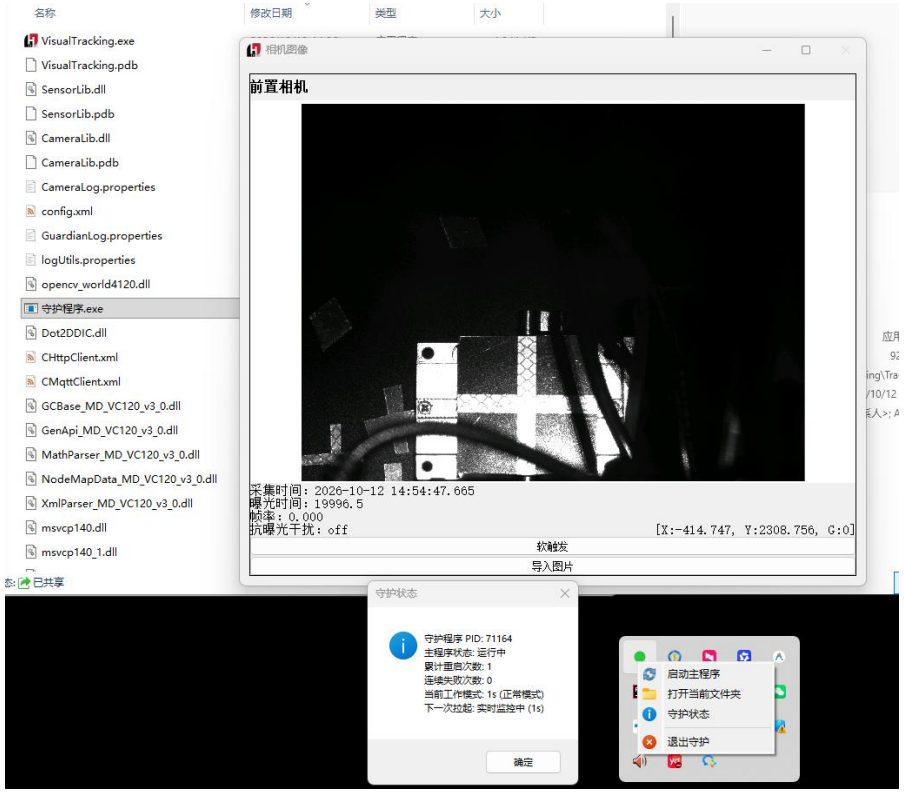
Once per minute

Online Visual Tracking System

- **Power Failure Protection and Automatic Restart**
- Prevents equipment damage caused by unexpected power outages.
- After power is restored, the hardware automatically restarts, and data transmission resumes through a watchdog program.









Online Visual Tracking System

- **Voltage Stabilization Function**
  - Voltage stabilization range:
    - AC 90–265 V, 50 Hz, AC 3.3 A–1.1 A (current must be above 3.3 A at AC 90 V)
    - DC 11.8–15 V, current above 6 A
  - Prevents equipment disconnection and data interruption caused by unstable voltage.



Online Visual Tracking System

- **Power Monitoring and Automatic Restart After Power Failure**

  - Real-time monitoring of remaining battery capacity.
  - Remote automatic restart after an unexpected power failure.

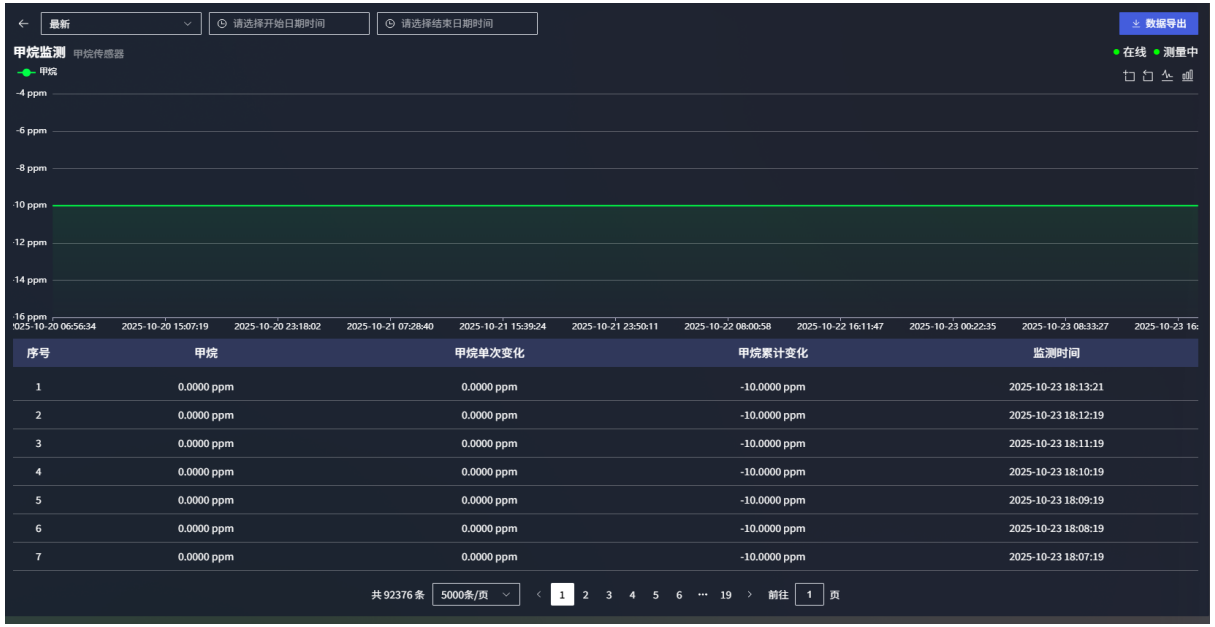


Online Visual Tracking System

- **Gas Leakage Monitoring Function**

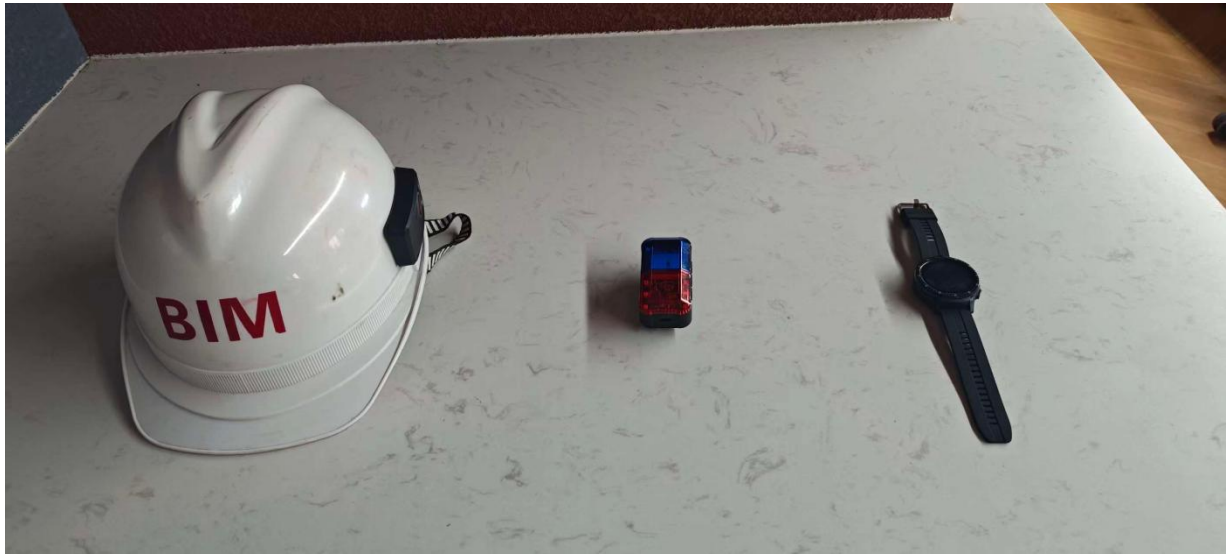
  - Can be equipped with a catalytic module using catalytic combustion-type sensors, together with a dedicated instrumentation amplifier and high-precision processor.
  - Combined with intelligent algorithms, the detected gas concentration is converted into recognizable digital signals and transmitted through a serial port.
  - The module uses sensors featuring good linearity, high accuracy, fast response, and resistance to hydrogen sulfide and organic silicone interference. Combined with temperature and humidity compensation algorithms, the module‘s reliability is significantly improved.
  - The module can meet the methane gas detection requirements of various customers in commercial catering establishments, underground utility tunnels, petrochemical facilities, underground mines, and other applications.

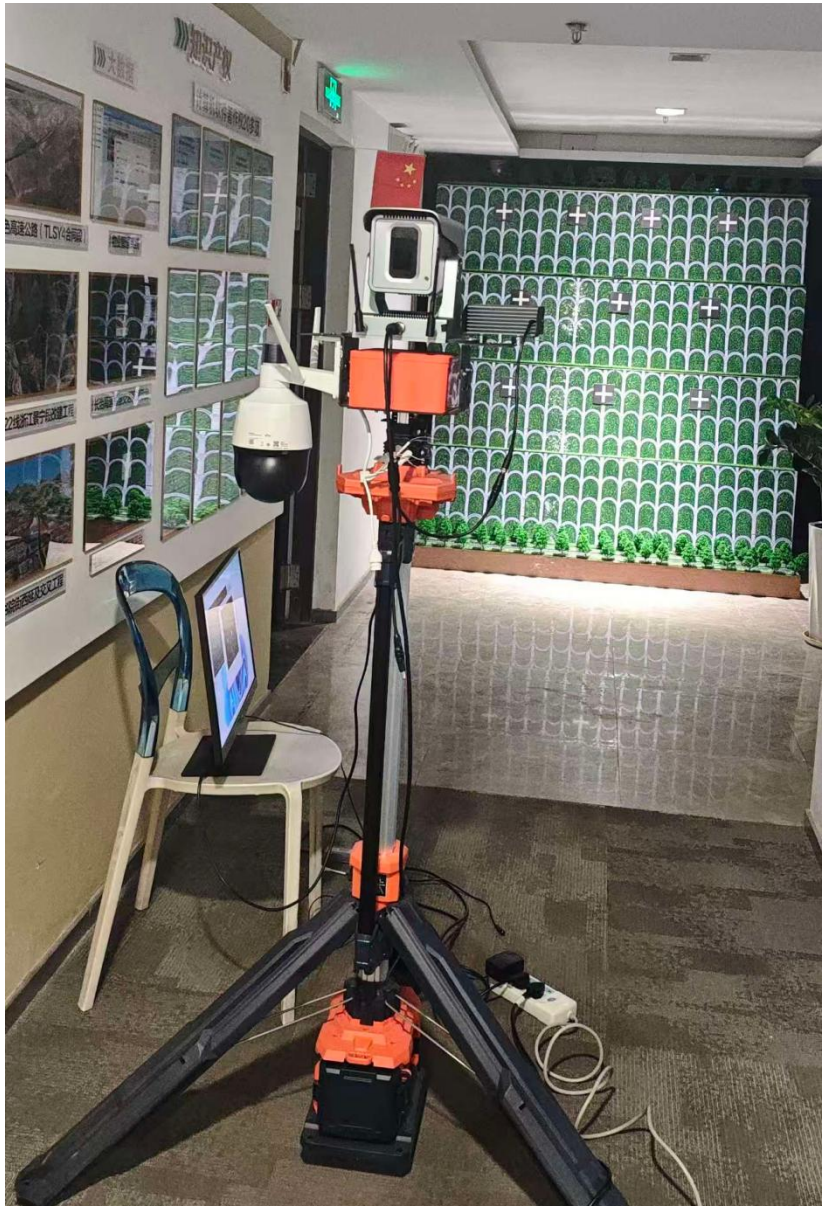




Online Visual Tracking System

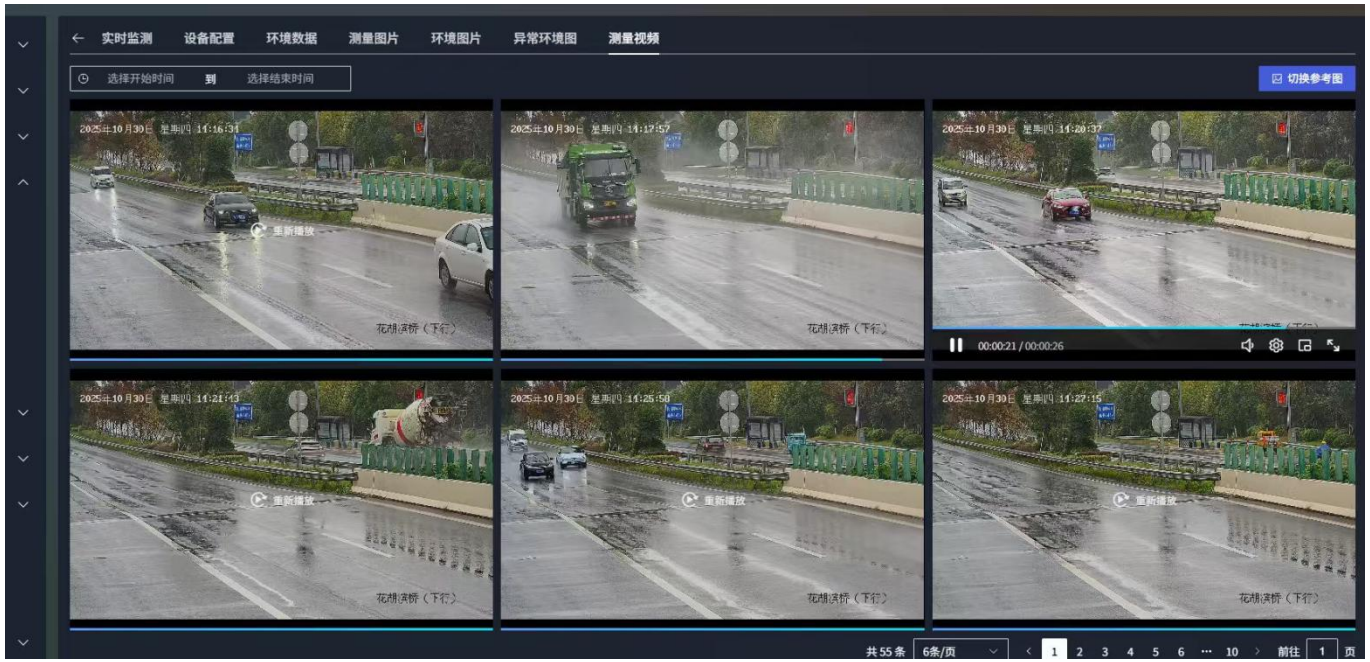
- **Monitoring Alarm Devices**
  - Real-time alarms are triggered when deformation exceeds the preset threshold.
  - Optional alarm devices include:
  - •Safety helmets with alarm functions
  - •Audible and visual alarms
  - •Alarm watches
  - Monitoring cameras can also be provided and linked to capture images when deformation exceeds the preset threshold.





Online Visual Tracking System

- **Video-Linked Image Capture Function**
  - Supports image capture triggered by:
  - •The Online Visual Tracking System
  - •Security surveillance cameras





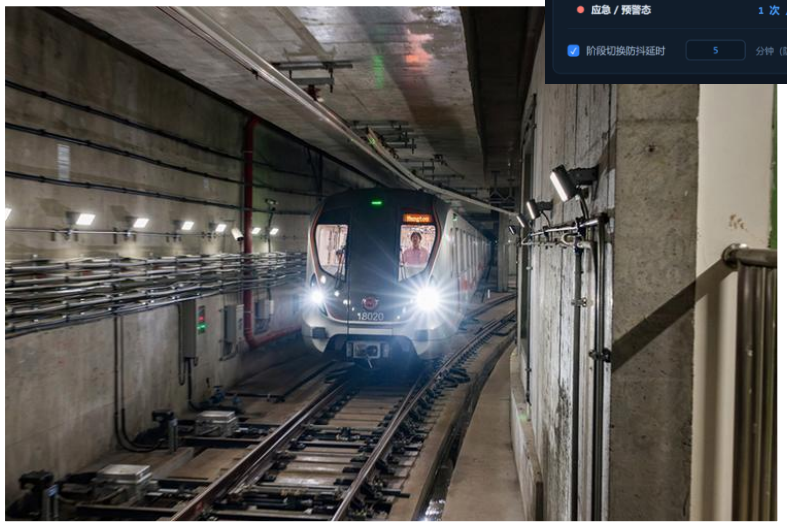


Online Visual Tracking System

- **Dynamic Adjustment of Data Upload Frequency**









00 Upload once every 5 minutes. 06 Focus on monitoring trends and reduce the upload frequency to once every 15 minutes. 23

Maintenance

Operation

Construction Stage (Outdoor)

Real-time data monitoring, with uploads once per minute.

Online Visual Tracking System

- **Local Deployment Function**
  - Supports local deployment and operation without an internet connection.
  - The display features a magnetic cover design and can be attached directly to the visual tracking instrument.

	Related Specifications	Parameter Specification
Display Size	7 inches	
Display Resolution	1026*600	
Touchscreen	Capacitive Touchscreen	
USB Ports	2	for keyboard, mouse, or USB drive
Protection Rating	IP66	
Operation Method	Buttons or Touchscreen	

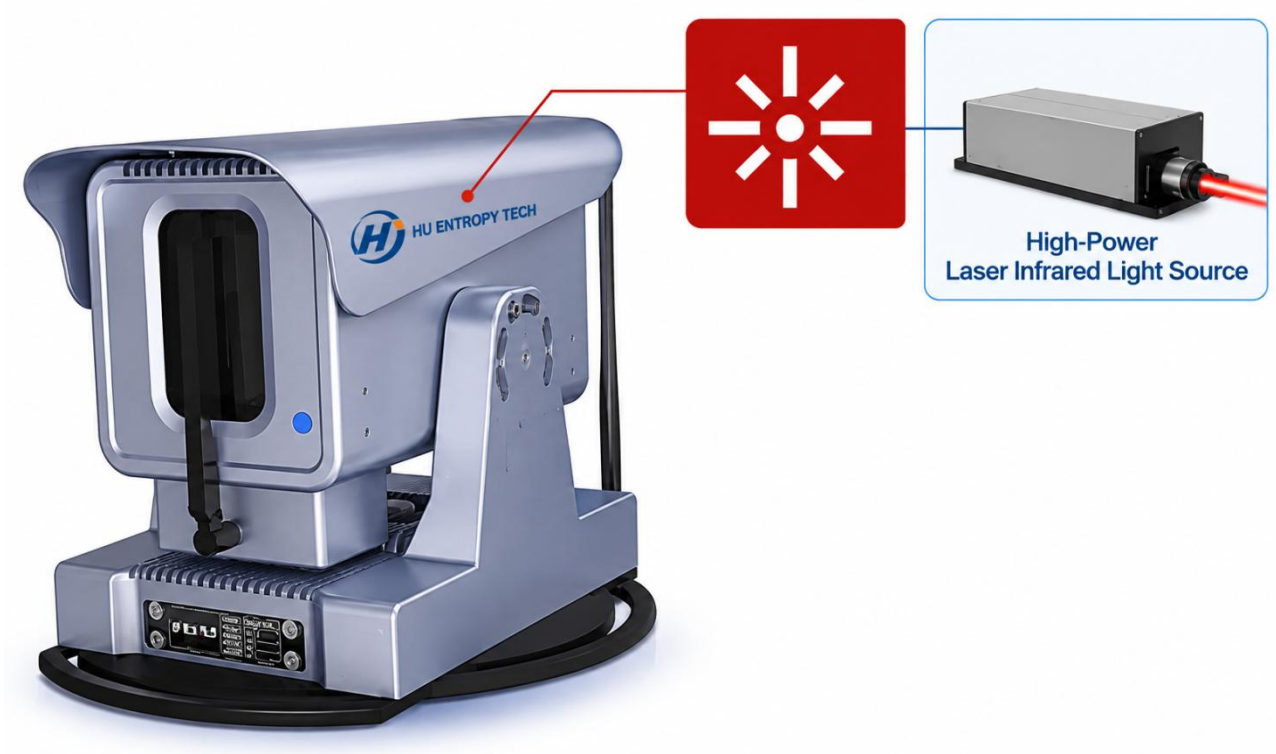




Online Visual Tracking System

- **High-Power Laser Infrared Light Source**

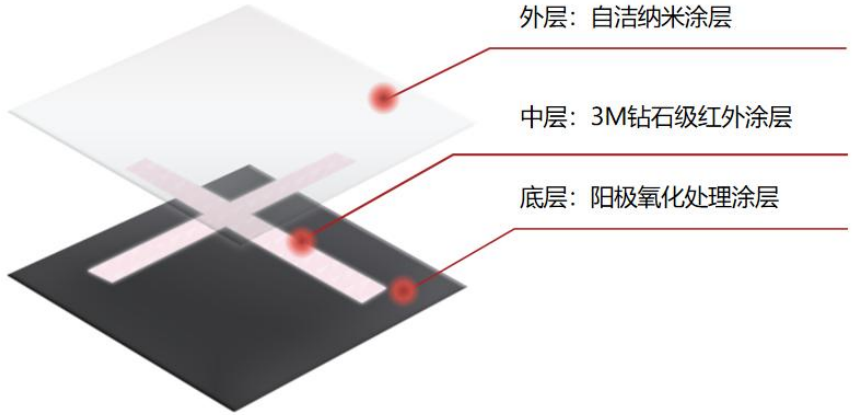
  - •Continuous service life of up to 5 years.
  - •Works with infrared cameras and infrared passive targets to achieve high-precision passive measurement.
  - •Laser beam homogenization technology enables uniform measurement across different fields of view.



Online Visual Tracking System

Infrared Passive Target: Triple-Layer Coating Design

- **Outer Layer: Self-cleaning nano-coating. It reflects infrared light and creates a lotus-leaf effect, allowing water droplets to slide off easily. It also protects the middle infrared coating.**
- **Middle Layer: 3M diamond-grade infrared coating, providing diffuse reflection of infrared light, with a service life of 10 years.**
- **Bottom Layer: Anodized coating, providing an outdoor service life of 5 years while maintaining stability and preventing deformation.**





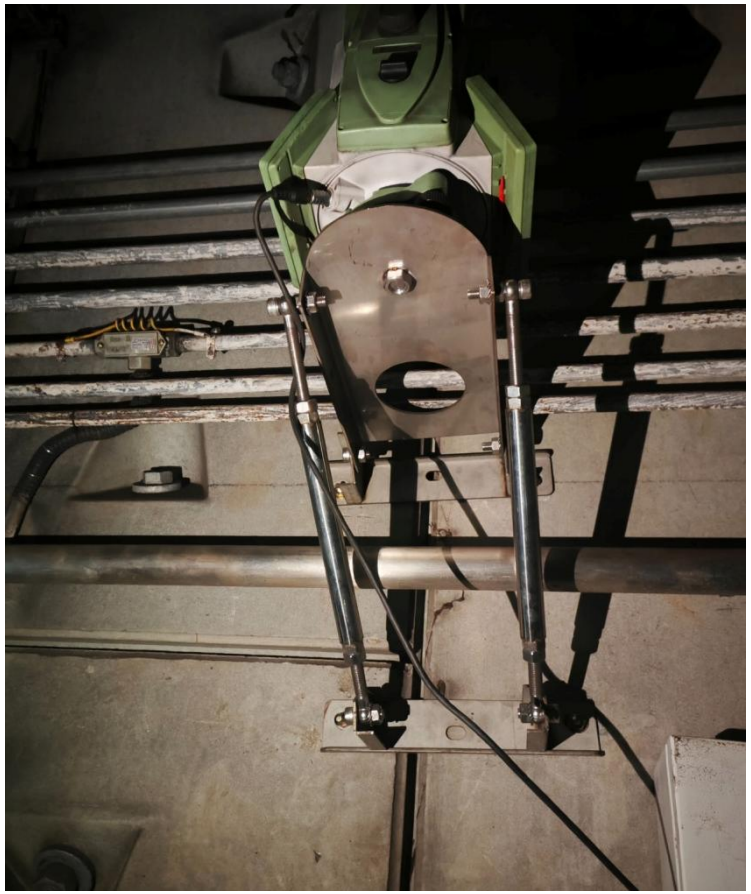






Online Visual Tracking System

- **Simple and Quick Installation**
  - Uses multi-axis fusion algorithms and dynamic compensation technology to output high-precision attitude data in real time.
  - The equipment can be installed at any angle, eliminating the traditional requirement for horizontal calibration of conventional sensors.

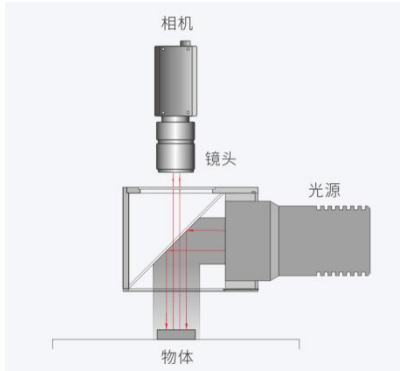


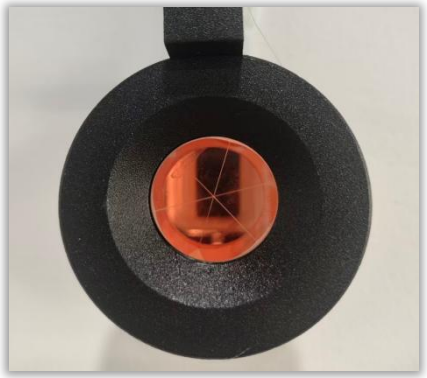
Traditional Equipment – The Total Station Base Requires Leveling



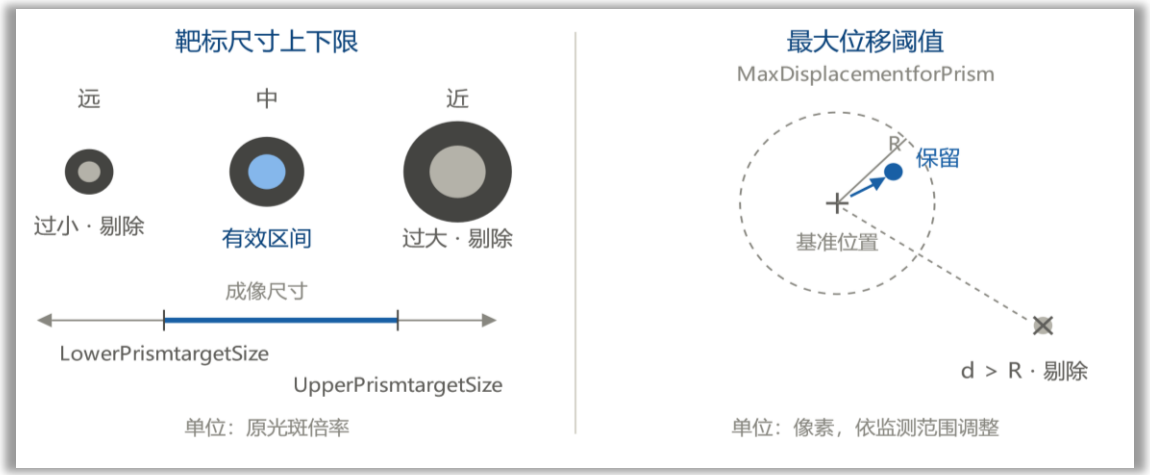
Online Visual Tracking System – Supports Installation at Any Angle

- **Coaxial Light + Topological Constraint Algorithm: Compatible with Total Station Prism Targets**
  - Compatible with existing prism targets already deployed at project sites.
  - Suitable for precision measurement applications such as metro tunnels, where installation space is limited and small-size prism targets are required.
  - Improves target centroid recognition stability, interference resistance, and recognition accuracy, achieving performance comparable to crosshair targets.





Total Station Prism Target



Prism Target Parameter Configuration



Topological Constraint Parameter Configuration

Online Visual Tracking System

- **IP66 Waterproofing, Surge Protection, and Salt Spray Certification**

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5 IP6X

5.1 测试要求

检测依据：GB/T 4208-2017

样品编号：DT02507000090

样品状态：裸机，不工作

1）第一位特征数字所代表的对接近危险部件的防护等级

第一位特征数字 6

直径 1.0 mm 的试验金属线不得进入外壳，并与带电部分保持足够的间隙。

2）第一位特征数字所代表的防止固体异物进入的防护等级

第一位特征数字 6

被试外壳放在试箱内，壳内压力用真空泵保持低于大气压。

利用压差把箱内空气抽入被试样品内，抽气量为 80 倍被试外壳容积，抽气速度每小时不超过 60 倍外壳容积。任何情况下压差不得超过 2 kPa。

抽气速度低于每小时 40 倍外壳容积，连续抽满 80 倍容积或抽满 8 h。

5.2 判定依据

1）如果试具与危险部件之间有足够的间隙，则防护合格。

2）试验后壳内无明显的灰尘沉积，即认为试验合格。

5.3 测试结果

1）不适用（样品无危险部件）。

2）试验后，样品内部未进尘。

5.4 测试结论

符合

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5.5 图片

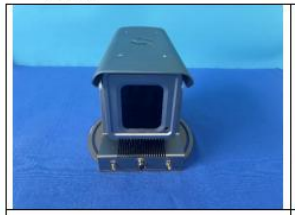


图 5-1 试验前样品检查



图 5-2 IP6X 试验（防止固体异物进入的防护）

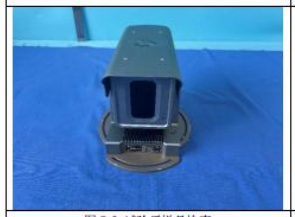


图 5-3 试验后样品检查（防止固体异物进入的防护）



图 5-4 试验后样品检查（防止固体异物进入的防护）



图 5-5 试验后样品检查（防止固体异物进入的防护）



图 5-6 试验后样品检查（防止固体异物进入的防护）

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4 浪涌抗扰度

4.1 标准要求

4.1.1 依据标准

检测依据：GB/T 17626.5-2019

判定依据：GB/T 17626.5-2019

4.1.2 试验要求

表 2 浪涌抗扰度试验等级

电磁现象	试验规定	性能判据	施加端口
浪涌	±4kV（线-线） 试验波形：1.2/50 (8/20)μs	A	交流电源端口

4.2 测试方法及步骤

4.2.1 待测物按标准要求进行布置。

4.2.2 将待测物与仪器设备连接好，测试电源输入端口接至测试设备的电源输出端口，接通电源，让待测物在待测模式下正常工作。

4.2.3 按标准要求在线与线之间施加浪涌信号。

4.2.4 按性能判据判断是否符合。

4.3 待测物的工作状况

通电工作

4.4 测试照片



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4.5 检测结果

所测得的数据如下表 3 所示。

测试日期	2025.08.25	温度	24℃
待测物	海塞姆在线视觉跟踪仪	相对湿度	43%
型号规格	DIC Tracker ONS	样品编号	DT02507000090

表 3 浪涌抗扰度检测结果

耦合方式	施加电压 (kV)	相位	脉冲个数	间隔时间（s）	实测等级	结论
L-N	±4	0°	10	60	A	符合
		90°	10	60	A	符合
		180°	10	60	A	符合
		270°	10	60	A	符合

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4 乙酸盐雾

4.1 测试要求

检测依据：GB/T 10125-2021

样品编号：DT02507000090

样品状态：底板材料

试验箱温度：（35±2）℃

氯化钠溶液质量百分比浓度：（5±0.5）%

盐雾沉降量 mL/(h · 80cm²)：1.0 ~ 2.0

pH 值：3.1 ~ 3.3

喷雾方式：连续喷雾

持续时间：168h

试验后恢复：样品放在室内自然干燥 1h,然后用温度不高于 40℃的清洁流动水轻轻清洗以除去样品表面残留的盐雾溶液，接着用气压不超过 200kPa 的空气立即吹干。

4.2 判定依据

试验后，样品表面应无明显腐蚀、鼓泡或开裂。

4.3 测试结果

试验后，样品表面无明显腐蚀、鼓泡或开裂。

4.4 测试结论

符合

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报告编号：25080036C01-R1

4.5 图片

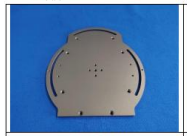


图 4-1 试验前样品检查

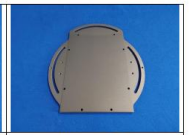


图 4-2 试验前样品检查



图 4-3 乙酸盐雾试验样品放置

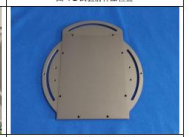


图 4-4 试验后样品检查

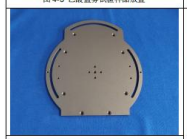


图 4-5 试验后样品检查

Online Visual Tracking System

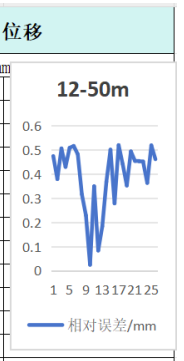
Measurement Accuracy Verification by Professional Institutions

- Self-test accuracy verification with industrial-grade measurement accuracy and an error of 0.5 mm.
- Certified by the Shenzhen Institute of Measurement and Quality Inspection (SIMTQ).



一、室内绝对位移精度测试：Y向位移

十标定仪y向位移	测量值/mm	相对误差/mm
0	-0.4742	0.4742
1	-1.3789	0.3789
2	-2.5057	0.5057
3	-3.42931	0.42931
4	-4.5081	0.5081
5	-5.5160	0.51599
6	-6.48161	0.48161
7	-7.3159	0.3159
8	-8.22839	0.22839
9	-9.02449	0.02449
10	-10.3492	0.3492
11	-11.0834	0.0834
12	-12.1835	0.1835
13	-13.3679	0.3679
14	-14.5006	0.5006
15	-15.2785	0.2785
16	-16.5193	0.5193
17	-17.4402	0.4402
18	-18.3523	0.3523
19	-19.4934	0.4934
20	-20.4538	0.4538
21	-21.4522	0.4522
22	-22.4497	0.4497
23	-23.3631	0.3631
24	-24.5184	0.5184
25	-25.4611	0.4611





SMQ 深圳市计量质量检测研究院
Shenzhen Academy of Metrology & Quality Inspection

校 准 证 书
CALIBRATION CERTIFICATE

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证书编号：JL2418760611

客户名称 Name of Customer	深圳市海塞姆科技有限公司
客户地址 Address of Customer	深圳市南山区桃源街道平山社区留仙大道 4093 号南山云谷创新产业园山水楼 A 座 206
计量器具名称 Name of Instrument	在线跟踪仪
型号/规格 Type/Specification	DIC Tracker ONS-S-50
出厂编号 Serial No	DTO241100001
资产编号 Asset No	未标明
制造单位 Manufacture	深圳市海塞姆科技有限公司
校准依据 Calibrated in Accordance to	JJG (交通)143-2020 桥梁挠度检测仪

校准专用章

批准人 Approved by		伍沛刚
签名 Signature		
校准日期 Operation Date	2024 年 12 月 12 日 Year Month Day	核验员 Checked by
建议复校日期 Suggested Recal.Date	2025 年 12 月 11 日 Year Month Day	
签发日期 Issue Date	2025 年 01 月 06 日 Year Month Day	校准员 Calibrated by

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Shenzhen Academy of Metrology & Quality Inspection

校准结果
RESULTS OF CALIBRATION

证书编号：JL2418760611
Certificate No

第 3 页，共 3 页
Page 3 of 3 Pages

序号	校准项目	技术要求	校准结果
1	外观及一般功能检查	/	符合要求
2	主机与标靶之间的距离	/	50.2m
3	静挠度测量变差系数	≤1%	0.7%
4	单点最大动挠度示值误差	±5%	+4.2%
5	静挠度最大示值误差	±5mm	-0.49mm

静挠度各校准点示值误差

校准方向	校准点	示值误差
静挠度横向（mm）	1	-0.03
	5	+0.22
	10	-0.06
	15	-0.13
	20	-0.48
	25	-0.49
静挠度纵向（mm）	1	+0.01
	5	+0.05
	10	-0.20
	15	0.00
	20	-0.09
	25	-0.16

测量结果的扩展不确定度：U=0.05mm，k=2。

附注：
本证书中给出的测量不确定度依据 JJF 1059.1-2012《测量不确定度评定与表示》评定。

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