



Smart safety Harness Monitoring Equipment base on array sensors



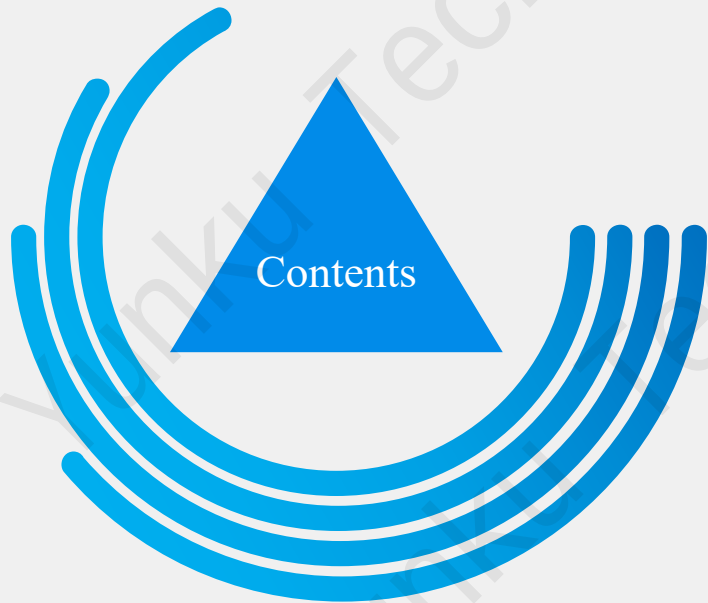
Hebei Yunku Technology Co., LTD



Hebei Yunku Technology Co., LTD was founded in 2015 by a number of industry experts. It is headquartered in Qinhuangdao city, Hebei province. The company is committed to the research, development, consulting, implementation and service of power industry informatization. After years of unremitting efforts, the company has more than 100 employees, with two branches in Beijing and Hangzhou, and has obtained more than 30 patent certificates and software copyrights. It also has good project cooperation with several major power generation groups in China.

Main products: Confined space monitoring equipment, Smart safety harness monitor, risk warning instrument and other safety control equipment; personnel positioning control platform and equipment, boiler anti-friction and explosion-proof system, safety whole process control APP.





1

Background analysis

2

Product solutions

3

success case

01

Background analysis

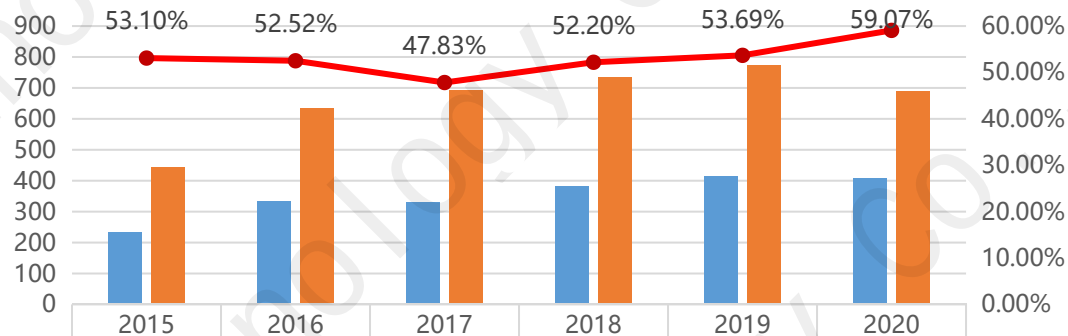
Background analysis of fall protection



Background analysis



Work-at-height accidents are numerous and frequent



Number of accidents during high-altitude operations

Total number of accidents

Proportion of high-altitude work accidents

■ 高处作业事故数

■ 总事故数

— 事故占比

2015

2016

2017

2018

2019

2020

235

333

331

383

415

407

443

634

692

734

773

689

53.10%

52.52%

47.83%

52.20%

53.69%

59.07%

- **Global Safety Report by the International Powered Access Federation (IPAF): Falls from heights top the list of types of manufacturing accidents resulting in serious injuries and fatalities over the past decade (2012-2022)**
- **According to the statistics of the Ministry of Housing and Construction, since 2003, there have been about 450 accidents involving falls from height in the construction field each year, accounting for 52% and 48% of the total number of construction accidents and fatalities, respectively.**



1

Difficulty in managing outsourced staff

Difficult to control the outsourcing team: large scope of operation, large number of personnel, low safety awareness, low risk identification ability, unfamiliarity with the site, low level of education, and safety training as a formality.

2

High-rise work is hazardous

There are many safety risks associated with elevated operations (complex operating environment, reliability of work equipment, etc.) that require focused supervision, and the consequences of a high fall are severe.

3

Inadequate implementation of safety precautions

The site is large and complex, and it is an ongoing challenge to ensure that personal protective equipment (e.g., harnesses, fall arrest systems) is correctly worn and utilized by each operator, and that it is used effectively throughout the operation.

4

Safety supervision is weak and not easy to close the loop

- Protection measures rely on security measures, lack of intelligent alerts and real-time monitoring
- Complex safety regulations and fewer supervisory staff
- Safety control mainly relies on "human defense", and the "timeliness" of supervision is insufficient.
- Lack of traces of on-site violations, easy to "harbor", difficult to "assessment".

5

Difficulty in identifying security risks in a timely manner

When a violation occurs on site, the violator himself, the managers at all levels of safety should receive different levels of safety warnings. ①The boarding personnel are not wearing or not correctly wearing the safety belt, timely notification of the violation himself. ② The safety officer in the area under his jurisdiction to support the phone, SMS, WeChat multi-state timely reminder. ③ habitual violations or key monitoring events on the leadership to support the phone, SMS, WeChat polymorphism timely alerts

6

Difficulty of timely emergency rescue

- The person involved in a security incident should support emergency calls for help
- In the event of a safety accident, the location of the accident should be obtained at the first time, so as to provide rapid and efficient emergency rescue and reduce the impact of the accident.

02

Product Solutions

Smart safety harness solutions



Applicable Scene



Grid



Construction



Transportation



Generators



Oil



Chemical



Vessels



Steel

Applicable Scene



Metallurgical



Railroad



Mechanics



Municipal



**Construction
material**



Port



**Non-ferrous
metals**



**Light
industry**

Applicable Scene



Communication



Transfer



Surface coal



Spinning&Weaving



Warehouse



Airport



Advertising



Service

Smart Safety Harness Monitor

Combined with the Internet of things, big data technology, the design of "Smart safety harness monitor (array)", through the "intelligent wearable equipment + cloud monitoring center" to achieve the "safety harness not worn", "safety harness hanging empty", "safety harness hanging low and high" and other types of violations of real-time monitoring and remote supervision, closed-loop management.



Smart safety harness monitor



Mobile Viewing Pages



big screen pages

No replacement of existing safety harness

01

Multiple Stance Determination

Support harness/rope high hanging, flat hanging, low hanging, ground, hanging on, hanging, falling, silent posture; can support posture self-learning.

02

Violation Alarm

Comparison with similar products and image AI recognition, the array of intelligent safety harness can realize the alarm of not wearing safety harness, safety harness hanging empty, hanging low and high with the wrong wearing mode

03

Edge Computing

Can be used offline or online, not affected by the network environment. Can autonomously calculate the abnormal state, play a role in reminding the scene, can be used stand-alone

04

Dual-mode Positioning

4G transmission GPS/Beidou dual-mode positioning. Support real-time and safe data transmission to cloud or intranet, support real-time monitoring and reminding by mobile and PC monitoring center.

05

Multi-Modal Alerts

The climbers support abnormal wearing alarm reminder; for all levels of safety management personnel support climbers abnormal wearing SMS, WeChat or telephone reminder.

Business Architecture

Preoperation

Operational safety
handover

Distribution of intelligent
security devices

During Operation

Violation Monitoring

Failure to wear a safety harness

hang low, use high

no hang

Exception Alerts

Suspension

low power

fall

silent

weariness

Synchronized alarm

operator

Guardians

Leader

After operation

History Assignment Search

Smart assignment analysis

Traceability of the accident

Function Architecture

Mobile Monitor pages

- **Launching, closing operations**
- **GPS/BeiDou dual-mode positioning**
- **Real Name Binding, Smart safety harness Authorization**
- **safety harness posture display**
- **WeChat/SMS/Phone Alerts**
- **Various types of operations, alarm displays**

Smart safety harness monitor

- High-hanging, flat-hanging, low-hanging, ground, offending attitude judgment
- Low hanging high use, empty hanging alarm
- Failure to wear safety harness alarm
- Mutil Type Alarm: Fatigue, Suspension, Fall, Silent
- Device Low Power Alert
- Audible Alerts for Violations

PC Cloud Platform

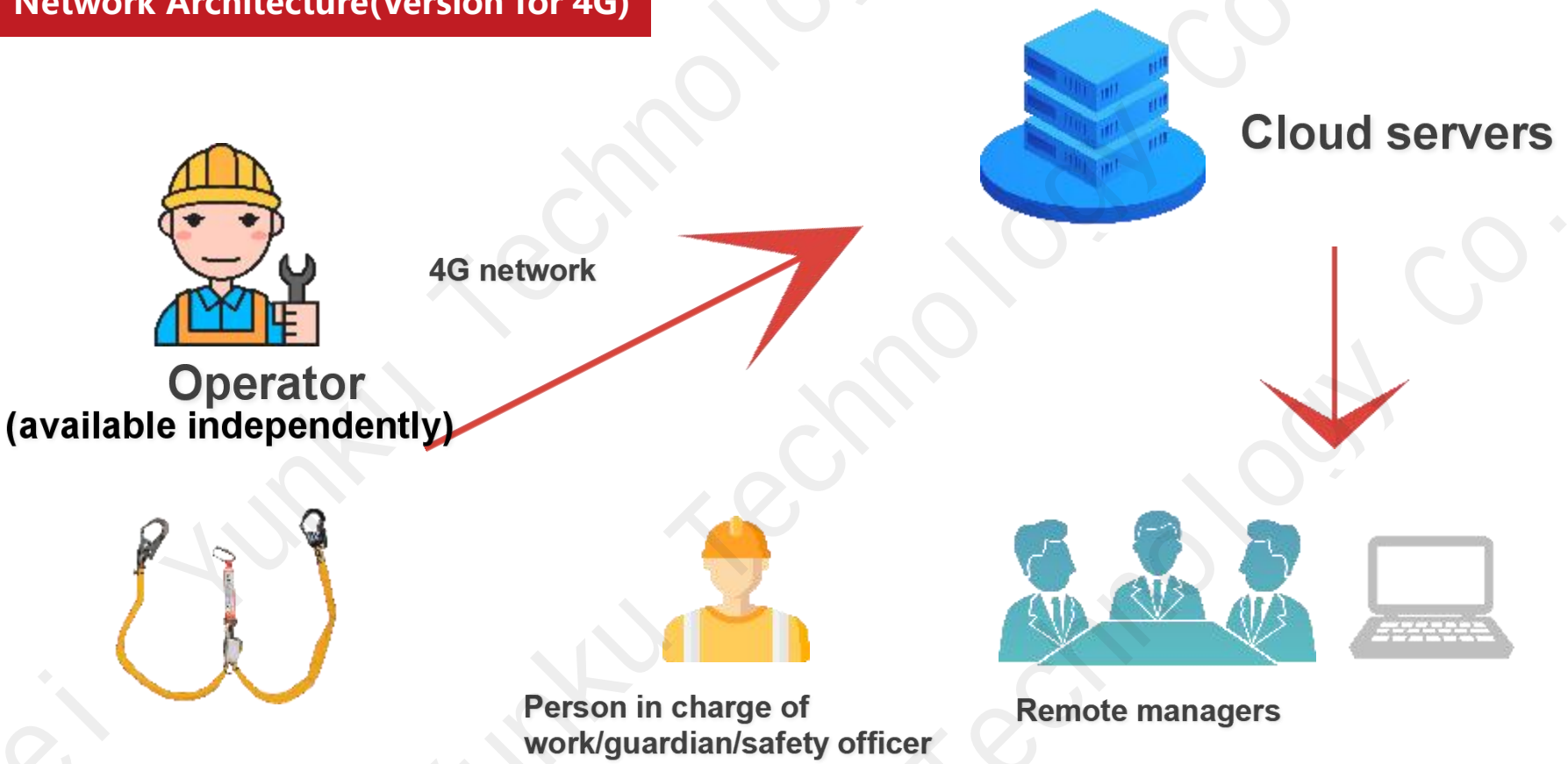
- **Real-Time Assignment Display**
- **Real-time alarm information**
- **Equipment management**
- **Historical Assignment Search**
- **Historical Alarm Query**

Monitor Large Screen

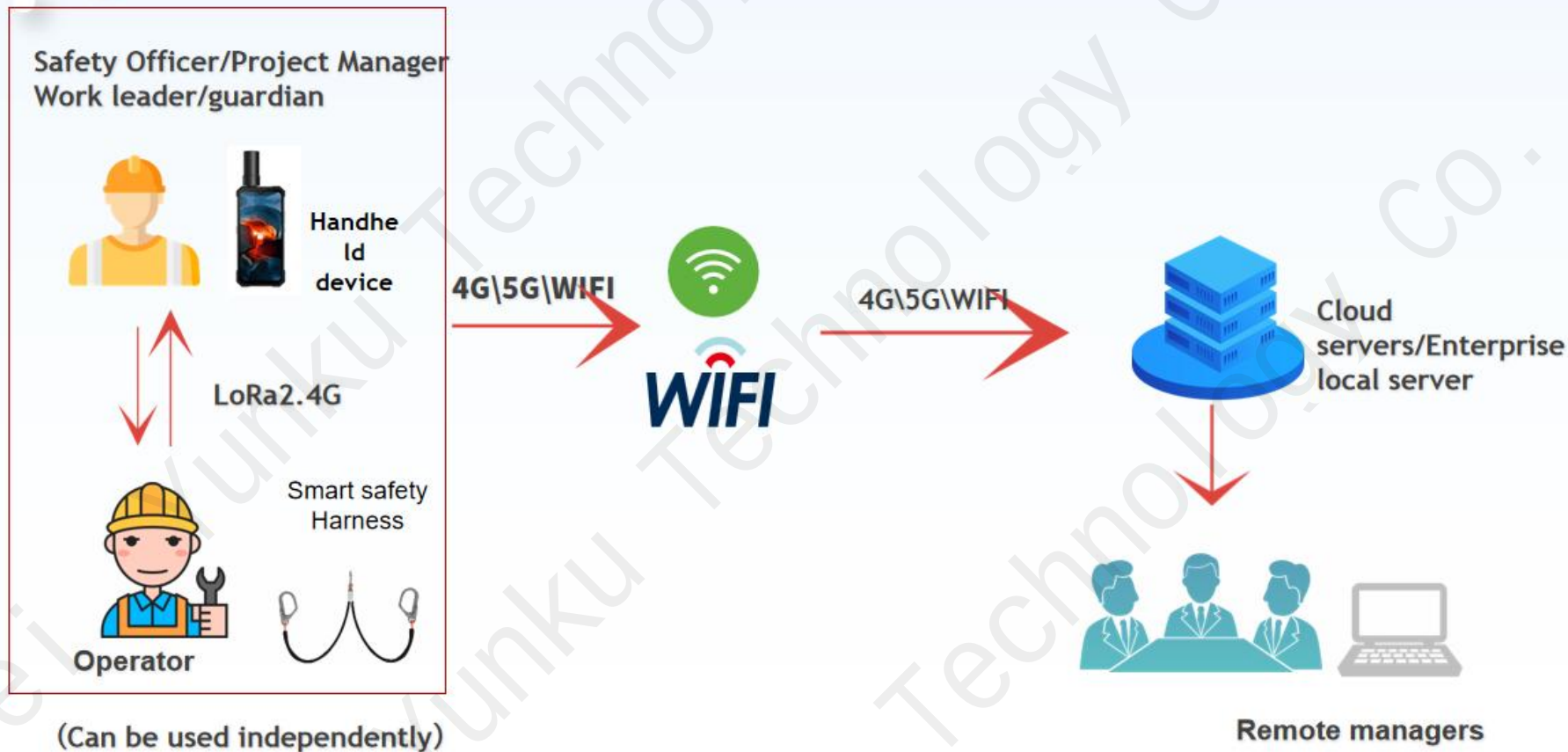
- **Number of site operations**
- **Number of persons**
- **Number of altitude alarms**
- **Real-time operational information**
- **Real-time ascent status**
- **Violation Alarm Reminder**
- **Focused inspectors**



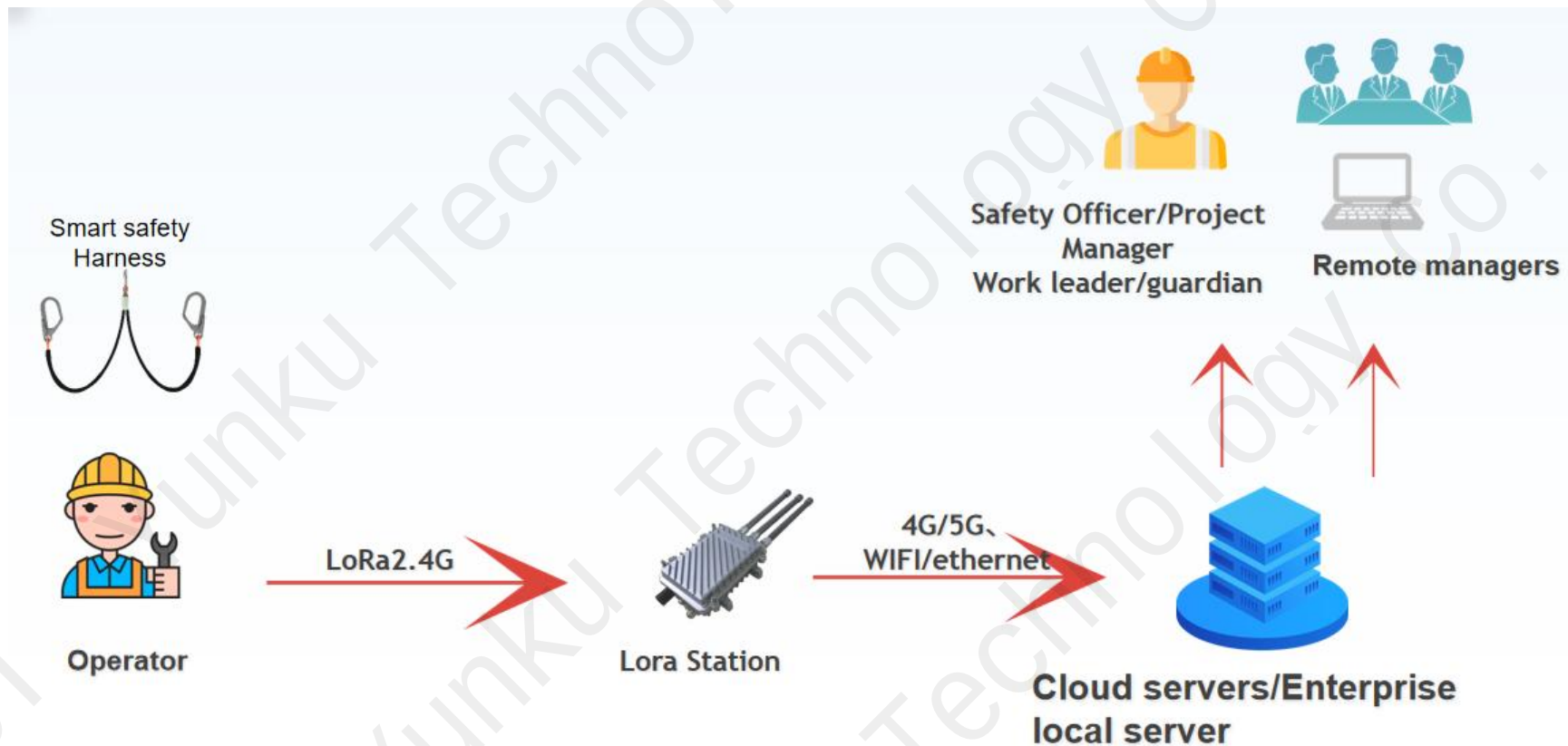
Network Architecture (Version for 4G)



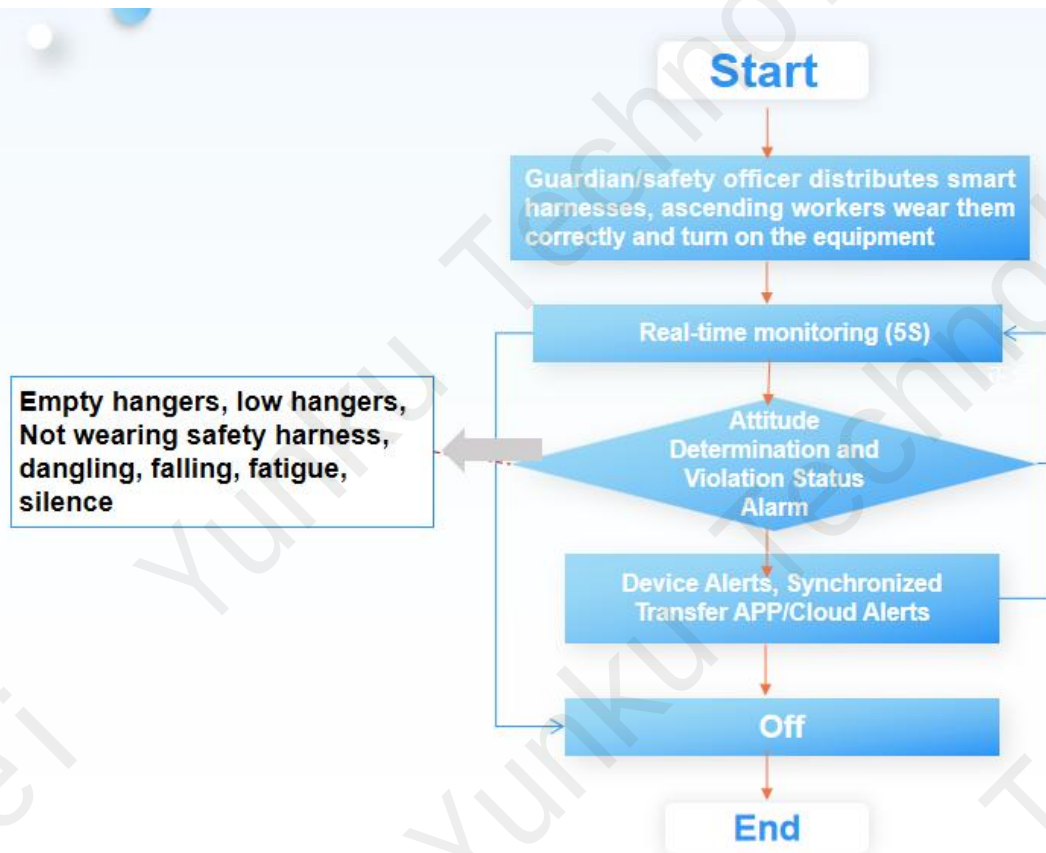
Network Architecture (Version for Lora and Handheld device)



Network Architecture (Version for Lora Station)



Process flow



4G Version Smart safety Harness Monitoring Equipment

- Size: host: 92 * 59 * 23mm; sensor node: 35 * 15 * 17mm
- Weight: host: 120g; double hook array node: 434g; single hook array node: 217g
- Attitude Determination: high hanging, flat hanging, low hanging, ground, violation, hanging, falling
- Alarm judgment: empty hanging, low hanging high use, not wearing a safety harness, hanging, falling, silent, fatigue, low power, equipment failure
- Supports stand-alone and remote dual-end use
- Assembly mode: support DIY assembly, whole machine (with safety rope)
- Communication: 4G; 4G Data latency: <1s
- Positioning technology:GPS/BeiDou dual mode Accuracy 10M
- Power supply: Battery, 3.7V 3000mAh
- Operating hours: Double hook 48H, Single hook 64H
- Charging: TYPE-C 5V 1A; Charging hours: 5 hours
- Operating temperature: -20~60°C ; Operating humidity: <90%RH
- Device certification: CE certification



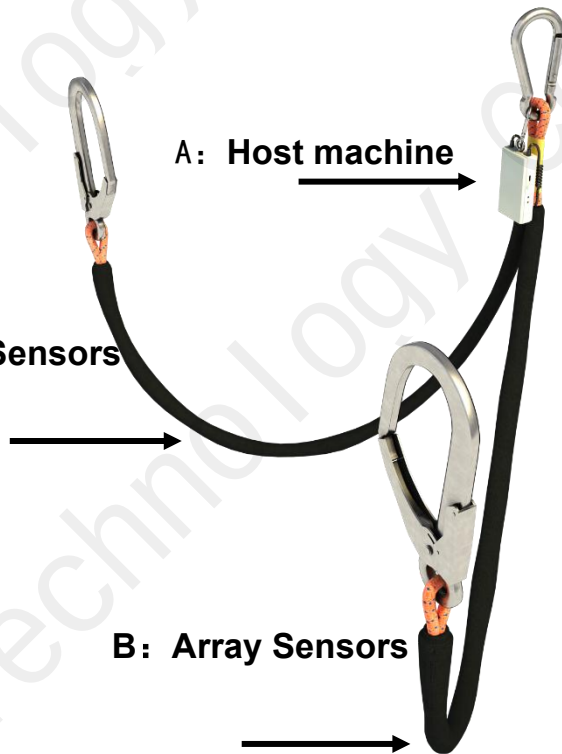
Equipment wearing method



A: Host machine



B: Array Sensors



A: Host machine

B: Array Sensors

B: Array Sensors

Complete plan for high-altitude monitoring



High-altitude operation monitor



AI camera



Smart safety harness



smart watch



Mobile application

The page supports both English and Chinese
More languages available for paid customization

Creation operations

The screenshot shows the 'Create New Task' form with the following fields and options:

- 作业名称** (Task Name): Input field with placeholder '请输入作业名称' and a '快速创建' (Quick Create) button.
- 开始时间** (Start Time): Input field showing '2024-06-13 17:36:34'.
- 疲劳时长** (Fatigue Duration): Input field with placeholder '请选择疲劳作业告警时长'.
- 工作票** (Work Ticket): Input field with placeholder '点击上传工作票照片'.
- 监控状态** (Monitoring Status): Radio buttons for '未挂锁' (Not Locked) and '未高挂' (Not High Hanging).
- 监控设备** (Monitoring Device): Input field with a QR code icon.
- 创建设备** (Create Device) and **删除设备** (Delete Device) buttons.
- 创建** (Create) button at the bottom.

Device Authorization

The screenshot shows the 'Device Information Maintenance' form with the following fields and options:

- 头像** (Avatar): Input field with placeholder '点击上传头像' and a user icon.
- 编码** (Code): Input field showing '0108'.
- 名称** (Name): Input field showing '0108'.
- 外委公司** (Outsourcing Company): Input field showing '本单位'.
- 手机号** (Mobile Number): Input field with placeholder '请输入手机号'.
- 身份证号** (ID Number): Input field with placeholder '请输入身份证号'.
- 添加设备** (Add Device) button at the bottom.

Real-time violation monitoring

The screenshot shows the 'Task Management' page with the following elements:

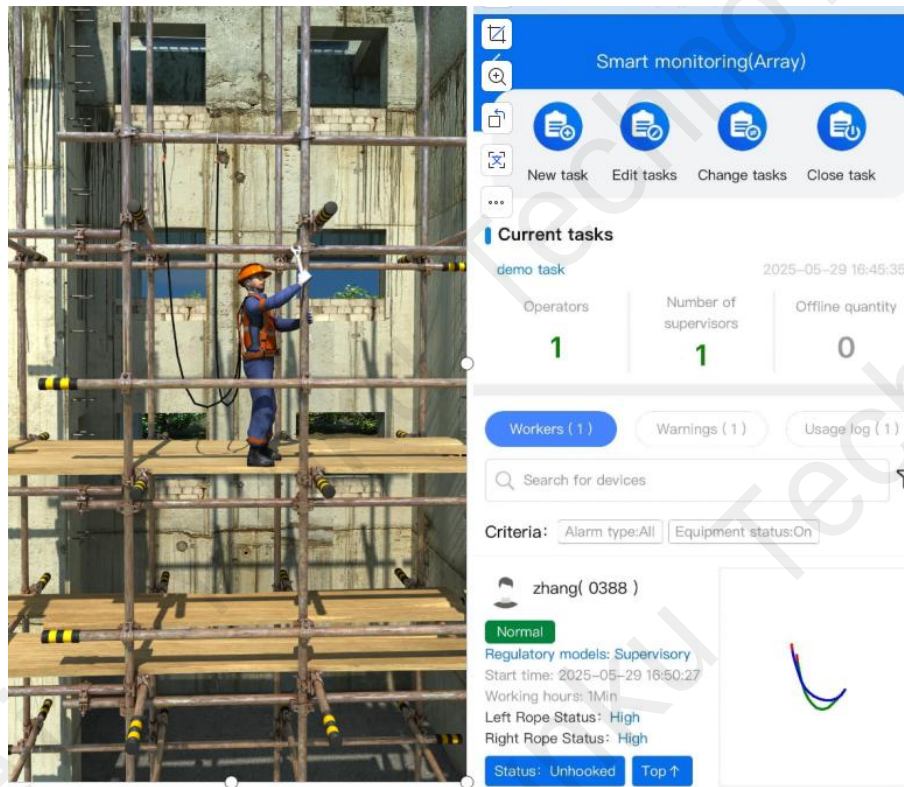
- 任务管理** (Task Management) header.
- 当前作业情况** (Current Task Status) section with a link to '查看设备状态' (View Device Status) and '查看作业设备统计' (View Task Device Statistics).
- 当前作业人数** (Current Task Personnel): 1.
- 当前作业设备数** (Current Task Device Count): 2.
- 作业人数 (1)** (Task Personnel (1)) button.
- 告警数量 (44)** (Alert Count (44)) button.
- 使用记录 (44)** (Usage Record (44)) button.
- 搜索设备** (Search Device) input field.
- 当前筛选条件** (Current Filter Conditions): '筛选条件: 全部' (Filter Condition: All) and '筛选75条记录' (Filter 75 records).
- 设备信息** (Device Information) table with columns: 设备名称 (Device Name), 设备编号 (Device ID), 设备状态 (Device Status), 设备位置 (Device Location), 设备类型 (Device Type), 设备颜色 (Device Color), 设备尺寸 (Device Size), 设备重量 (Device Weight), 设备材质 (Device Material), 设备品牌 (Device Brand), 设备型号 (Device Model), 设备规格 (Device Specification), 设备参数 (Device Parameters), 设备性能 (Device Performance), 设备寿命 (Device Life), 设备维护 (Device Maintenance), 设备使用 (Device Usage), 设备记录 (Device Record), 设备备注 (Device Remark).

Data analysis

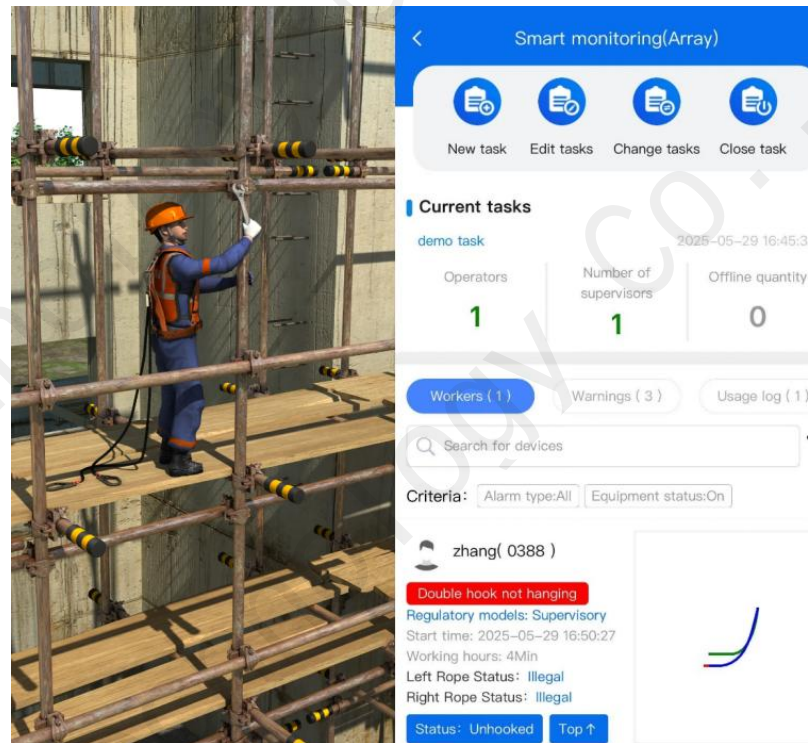
The screenshot shows the 'Data Analysis' page with the following elements:

- 数据分析** (Data Analysis) header.
- 日期** (Date) section with '日期: 2024-06-13' and '前一个月' (Previous Month) button.
- 作业数量** (Task Count): 30.
- 警告人数** (Warning Personnel): 3.
- 警告数量** (Warning Count): 16.
- 重点监控人员** (Key Monitoring Personnel) section with a link to '查看设备状态' (View Device Status) and '查看作业设备统计' (View Task Device Statistics).
- 重点监控人员** (Key Monitoring Personnel) table with columns: 人员姓名 (Person Name), 人员编号 (Person ID), 人员状态 (Person Status), 人员位置 (Person Location), 人员类型 (Person Type), 人员颜色 (Person Color), 人员尺寸 (Person Size), 人员重量 (Person Weight), 人员材质 (Person Material), 人员品牌 (Person Brand), 人员型号 (Person Model), 人员规格 (Person Specification), 人员参数 (Person Parameters), 人员性能 (Person Performance), 人员寿命 (Person Life), 人员维护 (Person Maintenance), 人员使用 (Person Usage), 人员记录 (Person Record), 人员备注 (Person Remark).

array smart safety harness alarm status description

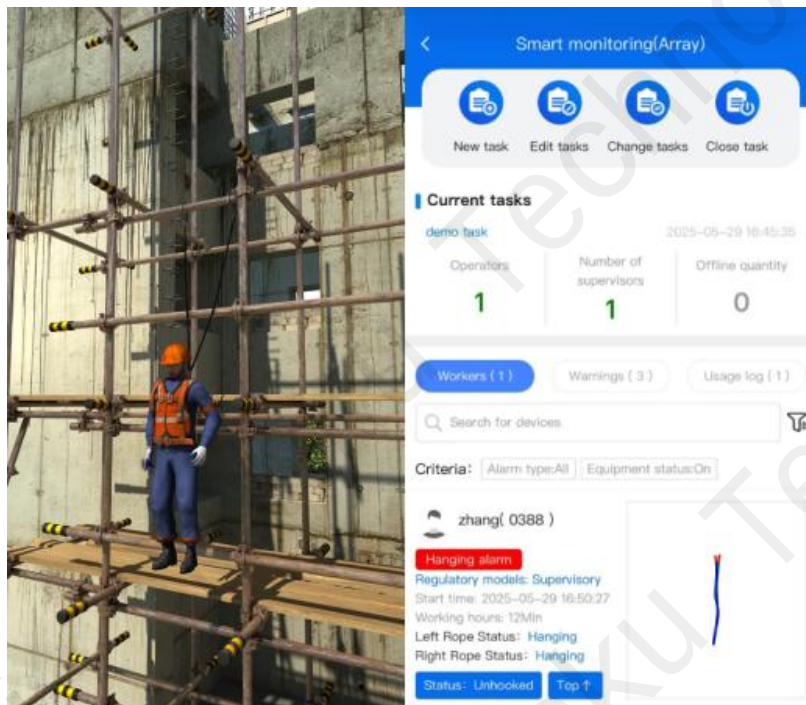


Normal (two hooks hanging high, flat, low)

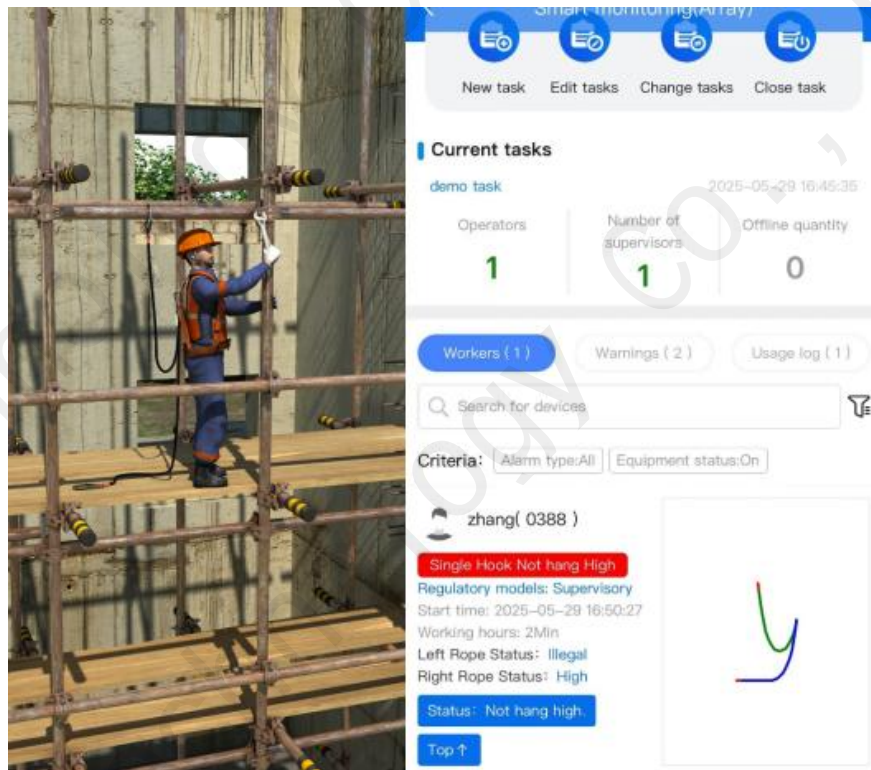


Double hooks not hanging (neither hook hanging)

array smart safety harness alarm status description

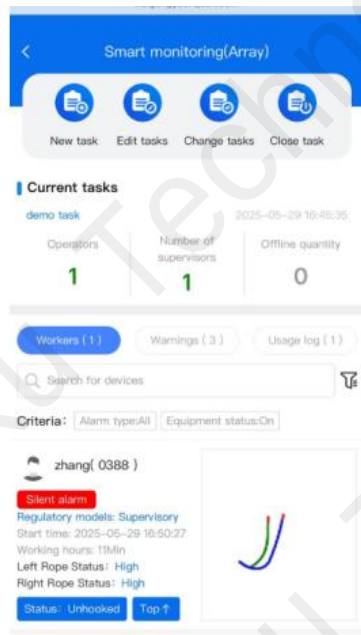


Hanging/midair alarm (person being pulled by safety harness)

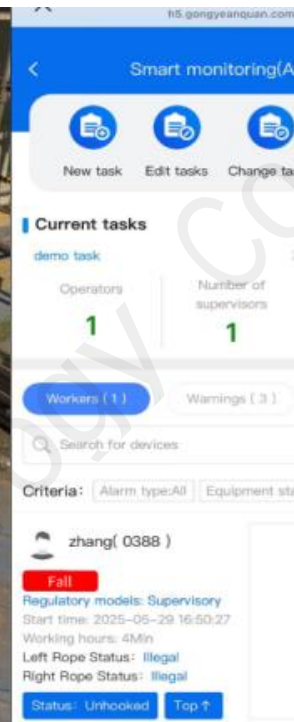


Single hook not hung high (one hook of the safety harness is hung high, the other is not hung)

array smart safety harness alarm status description



Silent alarm (the device remains stationary for 5 minutes when the safety harness is normal and there is no alarm)



Falling alarm (if a person is wearing a safety harness, causing an accident or free fall)

array smart safety harness alarm status description



Navigation: New task, Edit tasks, Change tasks, Close task

Current tasks

demo task 2025-05-29 16:45:35

Operators	Number of supervisors	Offline quantity
1	1	0

Workers (1) Warnings (2) Usage log (1)

Search for devices

Criteria: Alarm type: All Equipment status: On

zhang(0388)

Failure to wear safety harness

Regulatory models: Supervisory

Start time: 2025-05-29 16:50:27

Working hours: 4Min

Left Rope Status: Ground

Right Rope Status: Ground

Status: Not hang high.

Top ↑

Not wearing a smart safety harness (not wearing a smart safety harness when thrown on the ground)

Current tasks

demo task 2025-05-29 16:45:35

Operators	Number of supervisors	Offline quantity
1	1	0

Workers (1) Warnings (1) Usage log (1)

Search for devices

Criteria: Alarm type: All Equipment status: On

zhang(0388)

weariness

Regulatory models: Supervisory

Start time: 2025-05-29 16:50:27

Working hours: 1Min

Left Rope Status: High

Right Rope Status: High

Status: Unhooked

Top ↑

Weariness alarm (set fatigue time in the operation task and alarm when the time is up)

03

Successful Cases

Successful Cases of Smart safety harness



China has covered the vast majority of provinces

it covers 26 provinces in China: For example, Beijing, Hong Kong, Guangdong, and Xinjiang

Industry distribution: power plants, transportation, power grids, non-ferrous metals, communications, construction, machinery, building materials, chemicals, petroleum



Successful Cases



Successful Cases



Successful Cases



Thanks!

As a renowned smart safety devices solution provider, Yunku technology can ensure that your project is leading the industry safety.

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