



# Smart Safe Cities

## - Systems, Solutions and Application

**Peng DU**

**Beijing Global Safety Technology Co., Ltd.**

**Institute of Public Safety Research Tsinghua University**



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**IPSR & GSAFETY**

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# 01 IP SR & GSAFETY





**#1**

BEST UNIVERSITY IN  
ASIA 2021

GLOBAL UNIVERSITY  
FOR ENGINEERING  
2016-2021

**US NEWS EDUCATION**

**#17**

WORLD UNIVERSITY -  
QS WORLD UNIVERSITY  
RANKINGS 2022

**#13**

TIMES HIGHER EDUCATION  
WORLD REPUTATION  
RANKINGS 2020

**#20**

THE WORLD  
UNIVERSITY RANKINGS  
2020  
(HIGHEST IN ASIA)



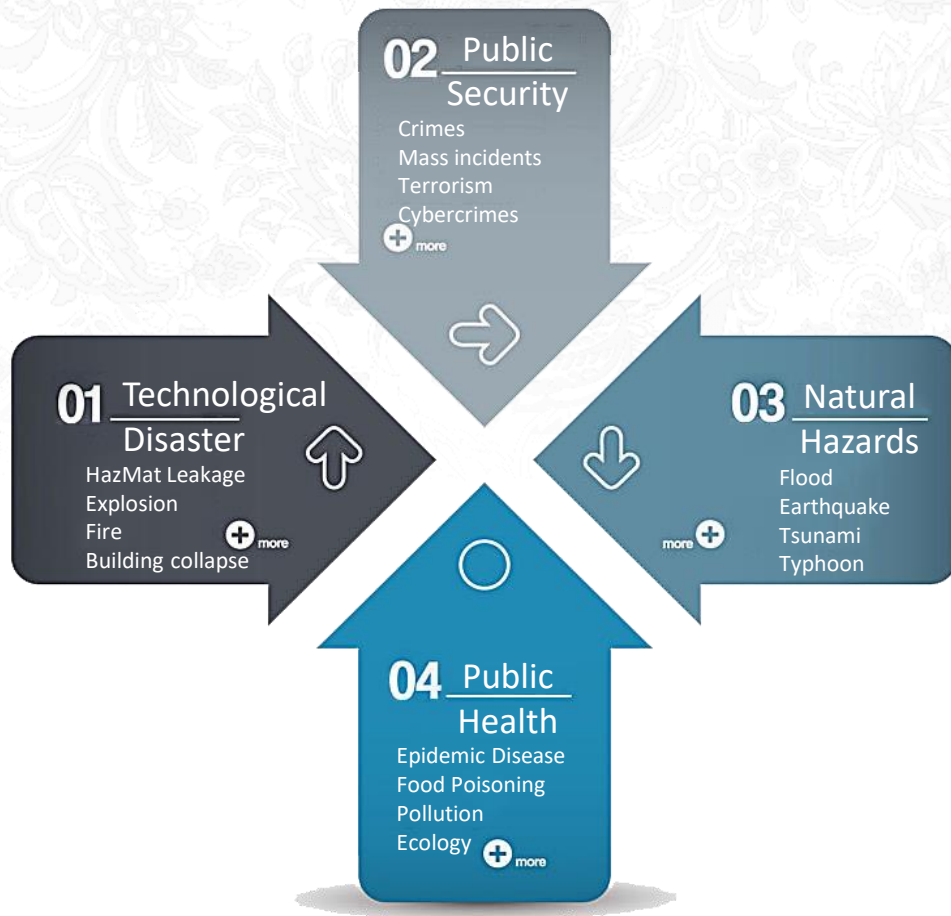
- Chulalongkorn University
- King Saud University
- Peking University
- United Arab Emirates University
- University of Colombo
- The Hong Kong University of Science and Technology
- National University of Singapore
- Seoul National University
- Universitas Indonesia
- The University of Tokyo
- Indian Institute of Technology Bombay
- Nazarbayev University
- Tsinghua University
- Universiti Malaya
- University of Yangon

## Research Excellence



- Home to 149 key research institutes and 13 key state laboratories, 20 colleges, 58 departments, 3,416 faculties (46 CAS members, 34 CAE members), and 47,762 students.
- Annual government funding totals over 3 billion USD, subsidizing 1,400+ projects every year
- On average, 30+ projects commissioned for the new National Key Research and Development Projects, 600+ research projects sponsored by the National Natural Science Foundation, 1400 additional research projects funded by central or regional governments amounting 4+ billion USD
- 71 National Natural Science Awards, 150 National Technology Invention Awards, 325 National S&T Progress Awards (By 2017)

# Institute of Public Safety Research (IPSR)

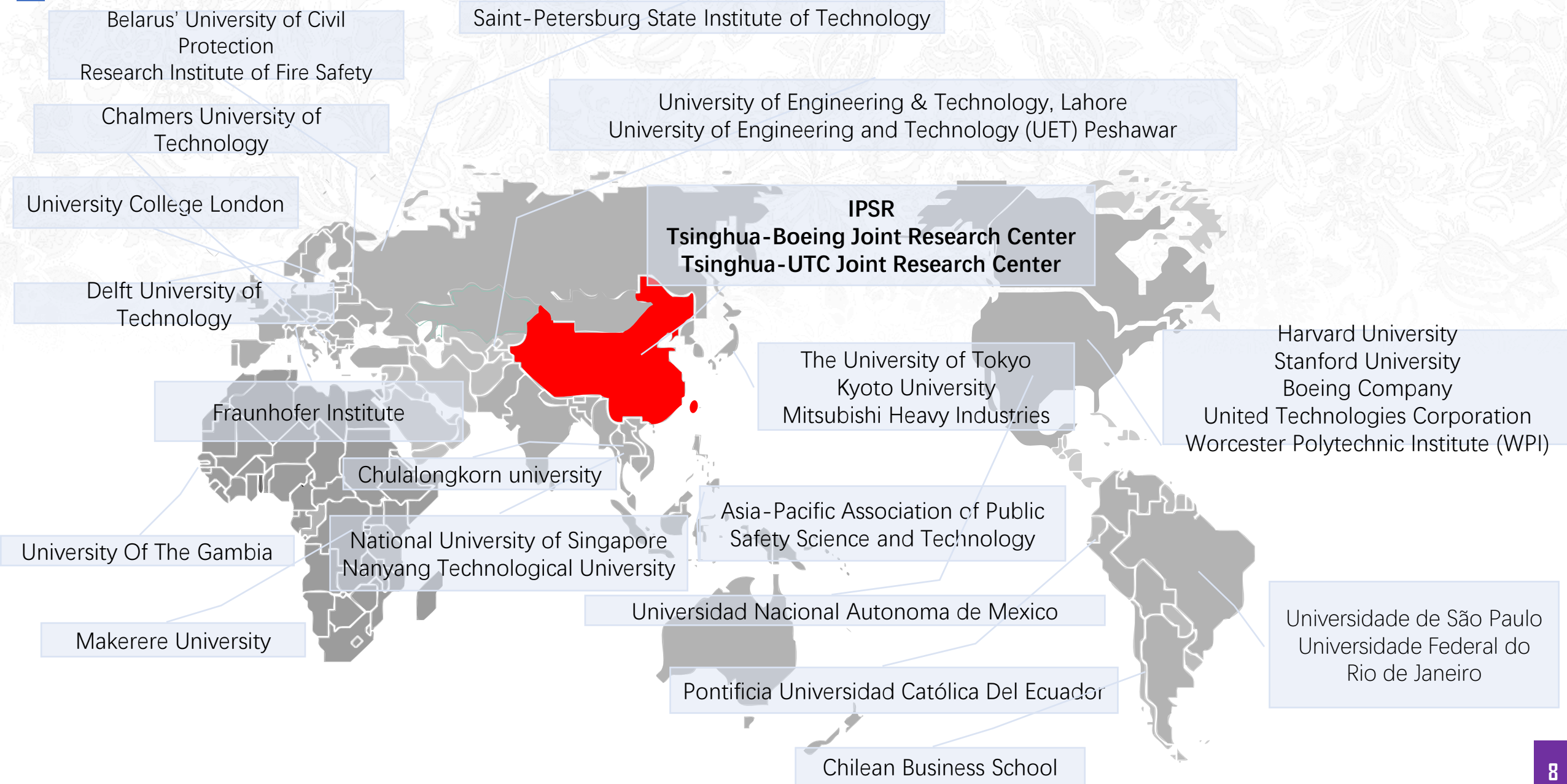


- Founded as part of **Tsinghua University**, Beijing, 2003.
- Leading research center on **public safety** in China
- Multidisciplinary institute: **15+** key research bodies

## National Ranking of IPSR Member Departments

• Architecture	1
• Chemical Engineering and Technology	3
• Civil Engineering	2
• Computer Science and Engineering	1
• Control Science and Engineering	1
• Electric Engineering	1
• Electrical Science and Technology	1
• Engineering Mechanics	1
• Environmental Science and Engineering	3
• Hydraulic Engineering	1
• Information and Communication Engineering	1
• Instrument Science and Technology	2
• Management Science and Technology	2
• Material Science and Technology	1
• Mechanics	1
• Nuclear Science and Technology	1
• Power Engineering & Thermophysics	2

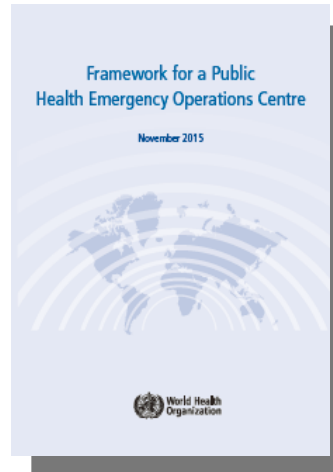
# International Collaboration





# Standardization

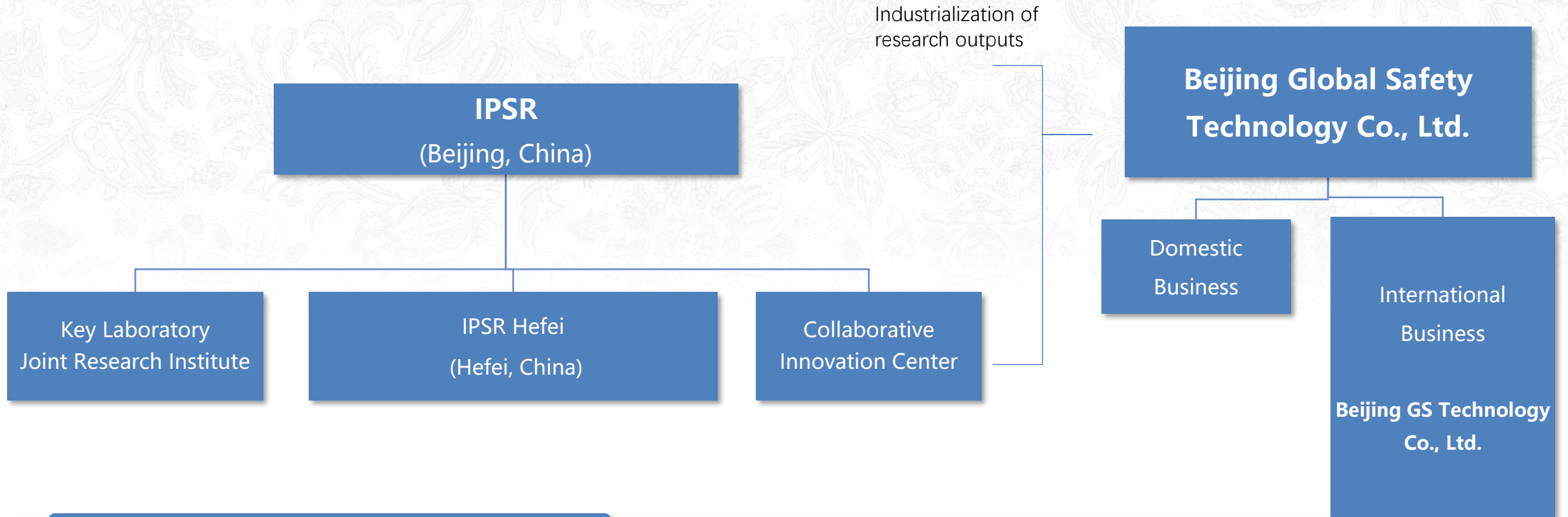
- ISO **Public Safety Experts Committee** (ISO/TC292) unit.
- Host of the **ISO/TC223** 12<sup>th</sup> International Plenary.
- **Leader and main contributor** to Guide for Emergency Capability Assessment



- Ongoing Collaboration with World Health Organization (WHO)
- PHEOC Framework: **main workgroup, advisor**
- Implementation guideline: **main consultant & core workgroup member**

- China "National Emergency Platform System Technical Requirements (Trial)" (Emergency Office Letter [2007] No. 104)
- China "National Emergency Platform System Ministry Emergency Platform Database Table Structure Specification (Trial)" (Emergency Office Letter [2008] No. 14)
- China "National Emergency Platform System Provincial Emergency Platform Database Table Structure Specification (Trial)" (Emergency Office Letter [2008] No. 28)
- "Emergency Platform System Information Resource Classification and Encoding Specification (Trial)" (Emergency Office [2008] No. 55)
- "Emergency Event Precaution Information Exchange Agreement (Trial)" (Emergency Office Letter [2009] No. 46)
- "Emergencies Report Information Exchange Agreement (Trial)" (Emergency Office Letter [2009] No. 46)
- "Prediction and Early Warning Application Integration (Trial)" (Emergency Office Letter [2009] No. 47)

# IPSR R&D Platform



## Interdisciplinary Joint Research Institutions (16+)

- Institute of Safety Science and Technology
- Institute of Disaster Prevention and Mitigation
- Construction Safety Research Center
- Institute of Hydropower Engineering
- Beijing Public Policy and Crisis Management Research Center
- Nuclear Accident Emergency Response Center
- Chemical Processing Disaster Prevention Center
- Power System Control and Simulation Laboratory
- Particle and Radiation Imaging Laboratory
- Work Safety Monitoring and Management Laboratory
- Safety Engineering Technology Research Center
- Institute of Thermal Engineering
- Institute of Building Environment and Facilities Engineering
- Institute of Software Theory and Systems
- ...

# GSAFETY at a Glance

- China's leading Public Safety & Emergency Management solution and services provider
- **Founded in 2005** and IPO in 2016
- A high-tech enterprise originating from Tsinghua University and the sole spin-off of IPSR, dedicated to **industrialize and commercialize** Tsinghua's intellectual properties in service to society
- **80% share of** in domestic market. **30+ overseas** projects.
- 6 oversea platforms, 14 subsidiaries, 17 branches, more than 2,300 employees
- **100+ government customers** from China and abroad



Headquarter, Beijing



International Branch HQ, Beijing



IPSR Hefei, Anhui



Wuhan R&D Base, Hubei

# 02 Overall Design

2 Centers – 2 Clouds – 1 Base

- Emergency Command Center
- City Operation Safety Monitoring Centre
- Fire Safety Cloud
- Industrial Safety Cloud
- Education & Training Base for Safety



# Towards Smart Safe Cities

## Conventional City

- Limited monitoring capacity
- Manual management
- Single communication means

## Safe City

- Increase the coverage of video surveillance
- Improve city security monitoring capabilities
- Enhance communication capabilities

## Smart Safe City

- Urban safety integration platform
- Perceive risks and situations comprehensively and thoroughly
- Massive data collection and information analysis ability
- Real-time mobile internet
- Multi-sector collaboration and information sharing
- Intelligent decision support



# Conceptual Design

Two Centers  
Two Clouds  
One Base  
+  
N Solutions



N solutions

# 02 Overall Design

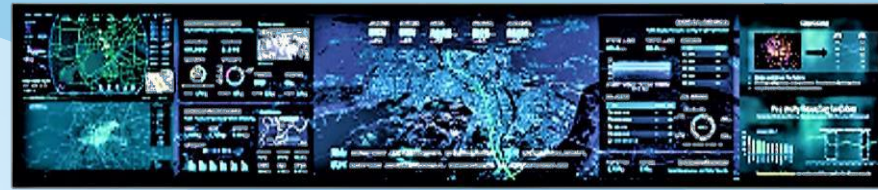
2 Centers – 2 Clouds – 1 Base

- **Emergency Command Center**
- City Operation Safety Monitoring Centre
- Fire Safety Cloud
- Industrial Safety Cloud
- Education & Training Base for Safety



# Emergency Command Center

## Sub-Level Centre



## Comprehensive Dashboard

## Relevant Departments



Command & Dispatch

Situational Analysis

Information  
Dissemination

Decision Support

Collaborative  
Consultation

Duty Support

Resource Management

## Full Lifecycle Support

## BIM + AI+ Big Data Platform E-GIS

Microwave

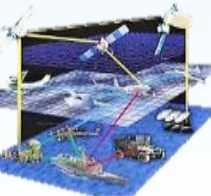


Integrated Communication Infrastructure

Satellite



IOT Gateway Trunk 2G/3G/4G



Satellite  
Positioning



Specialized  
Equipment



Public Emergency Info  
Dissemination Terminals



Data Center



# Integrated Emergency Response - Challenges



Earthquake



Typhoon



First-aid



Accident



Fire



Public Security



Manual Call-Taking & Dispatch



Separate Communication System



Lack of Event Panorama



Fill in police information many times

Ask questions repeatedly due to communication gap



Unable to locate the incident accurately



Judgement & dispatch rely on personal experience

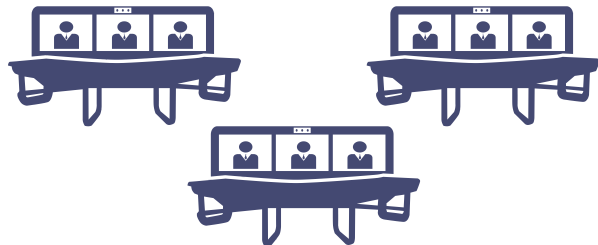
Uneven dispatch of police tasks



# Integrated Emergency Response - CAD



## Computer Aided Dispatch System



### Multi-channel Emergency Report



### One Number for All Emergency



### Integrated Communication



### Visualized Command & Dispatch



Quicker Response



Maximize  
Collaboration



Maintain Situation  
Awareness



# CAD - Modules



## Core Function

- Call-Taking
- Dispatch
- GIS
- Authentication & Authorization
- Resource Management



## Expansion

- Convergent Communication
- Mobile APP
- Supporting Services
- Telephone & Wireless Trunking
- Statistics & Quality Control

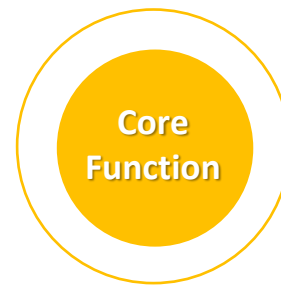


## System Integration

- Emergency & Crisis Management
- Video Management & Analysis
- Automatic Vehicle Management
- Public Opinion Management

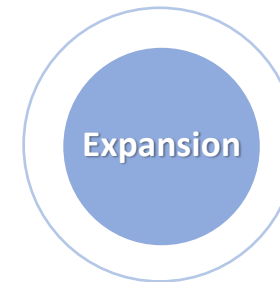
## Basic Core Function + Optional Expansion Pack

Configure System to Fit Your Needs



Core Function

Basic



Expansion

Optional

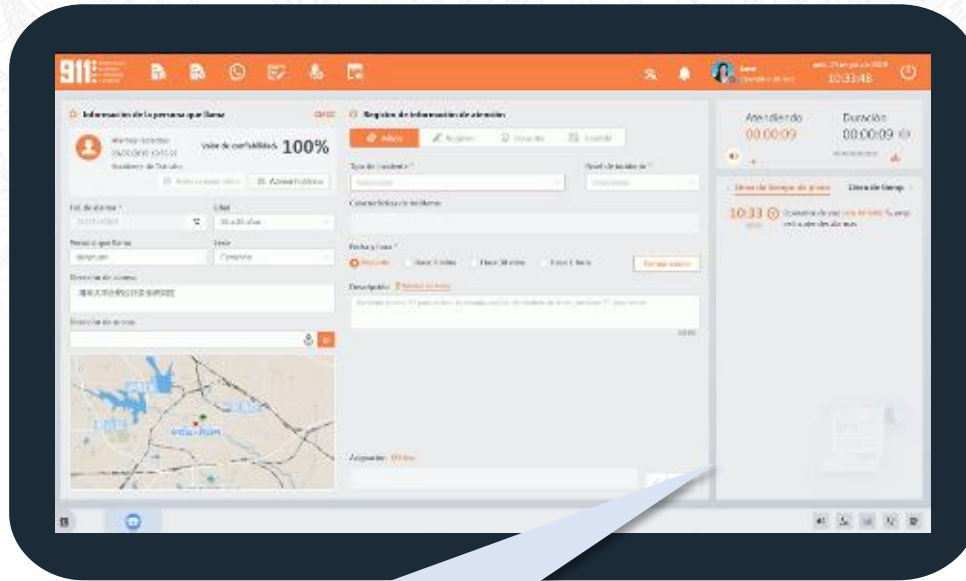
Core Function

Expansion Pack Upgrade

System Integration

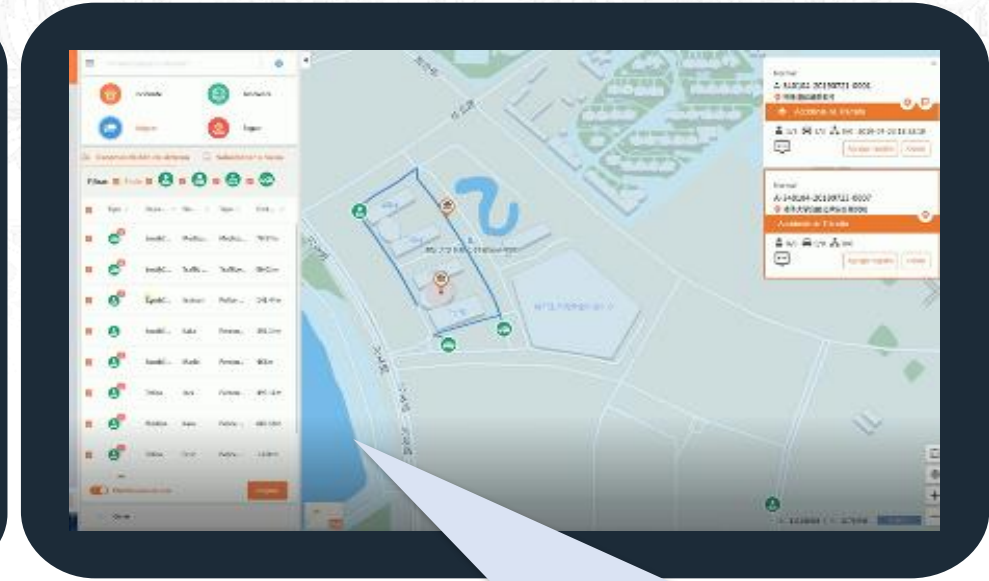
# Core Function

## Dual Screen Operation



**Main Screen**

The main work screen of call-taking and case information recording , such as alarm type, location and severity level



**GIS Screen**

Provide support function for the call-taker, such as received case inquiry, site video check, address book, notice, etc.

**Police Coverage**

**Fast & Convenient**

**Efficiency**

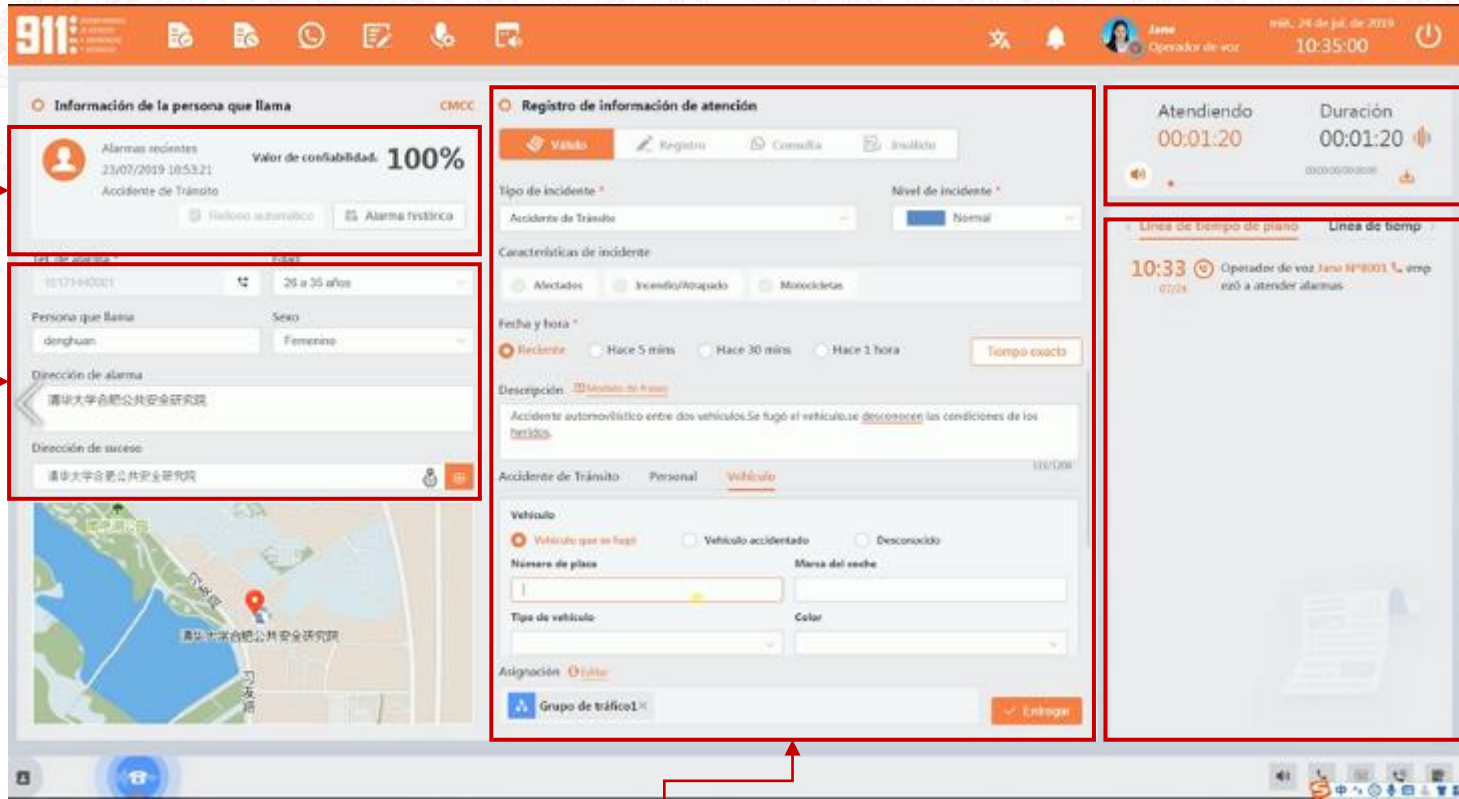
**Dynamic Information**

# Core Function

## Main Screen

**Credibility score** according to report history. Low credibility score indicates there may be a prank or false alarm

**Display phone number, owner name and location**



Call recording

Call-taker action recording

**Case information fill-in:**

Type, severity, time & location, etc.

# Core Function

## GIS Screen

请输入地址

摄像头 相似警情

符合并警情数量 (1)

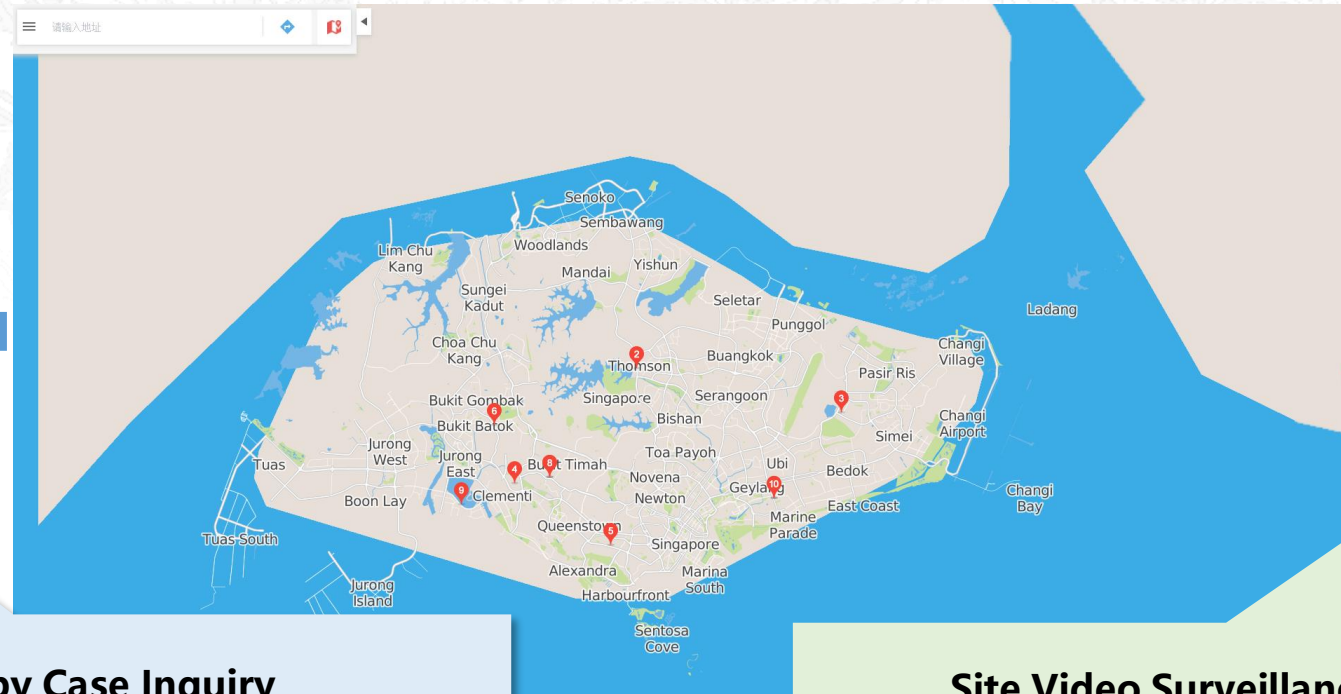
- 000000-20190321-ACCI-75381  
未处理 2019-03-21 08:16:21  
Blk 102  
DESCRIPTION  
3333333333
- 000000-20190321-ACCI-86182  
未处理 2019-03-21 08:59:21  
Before Jalan Khairuddin  
DESCRIPTION  
3333

收起

### Case Information Analysis

### Resource Analysis

### Surroundings Analysis



### Nearby Case Inquiry

- User defined query radius
- Police information distribution check
- Police resource check
- Similar case can be merged

### Site Video Surveillance

- User defined query radius
- Distribution of video cameras
- Real time video check
- Historical video playback

请输入地址

摄像头 相似警情

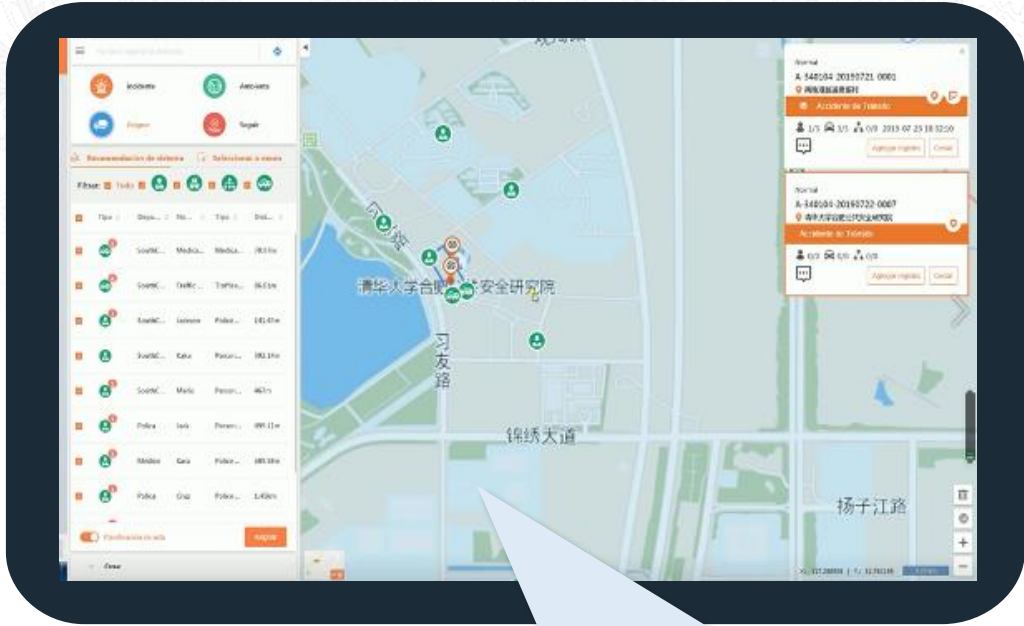
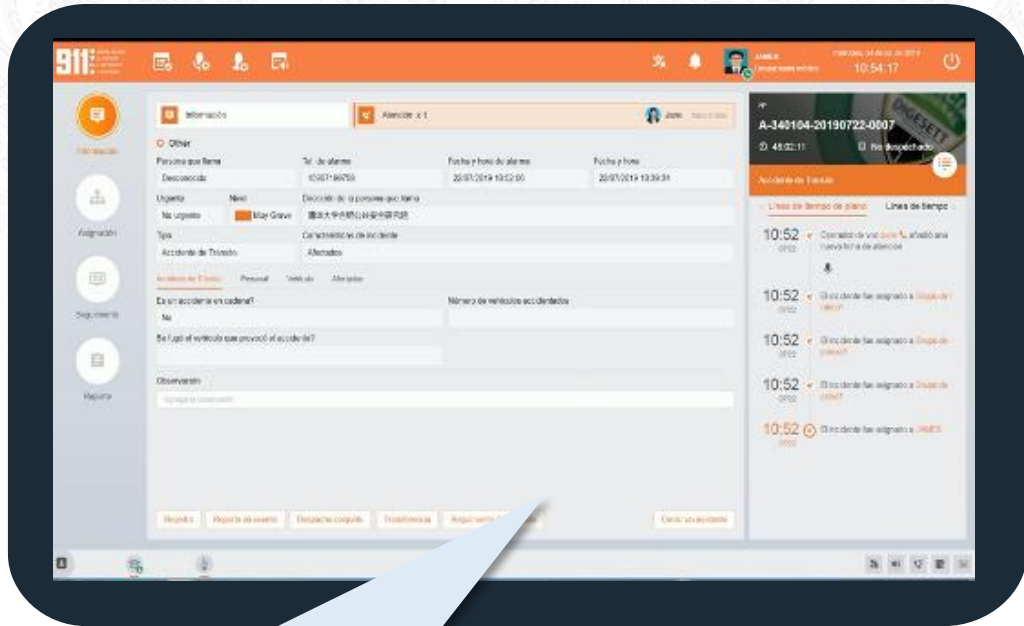
DaXueYuan Road camera1: Supervision squadron Uyb an Management Committee - southeast gate.

DaXueYuan Road camera2: Supervision squadron Uyb an Management Committee - southeast gate.

DaXueYuan Road camera3: Supervision squadron Uyb an Management Committee - southeast gate.

# Core Function

## Dual Screen Operation



**Case Information Form**  
Auto-update of the list according to follow-up supplementary information

**GIS Screen**  
Distribution of police resources around the scene

**Police Coverage**  
**Fast & Convenient**

**Efficiency**  
**Dynamic Information**

# Core Function

## Resource Selection



### System Recommended Resources

系统推荐 手动圈选

筛选:  全部

<input checked="" type="checkbox"/>	类型	部门	名称	类型	距离
<input checked="" type="checkbox"/>		Médico	Kara	Police ...	201.37m
<input checked="" type="checkbox"/>		South...	Riquel...	Medic...	1.58km
<input checked="" type="checkbox"/>		South...	Honda	Munic...	1.92km
<input checked="" type="checkbox"/>		South...	Fire en...	Traffic...	2.36km
<input checked="" type="checkbox"/>		South...	Police ...	Police ...	2.42km

路径规划 调派

收起



### Manually Circle Resources

系统推荐 手动圈选

圆形 矩形 多边形

筛选:  全部

类型  部门  名称  类型  距离

路径规划 调派



Turn on the **[path planning]** switch, and the system will display the planned path of all resources to the place where the police incident happened on the map.

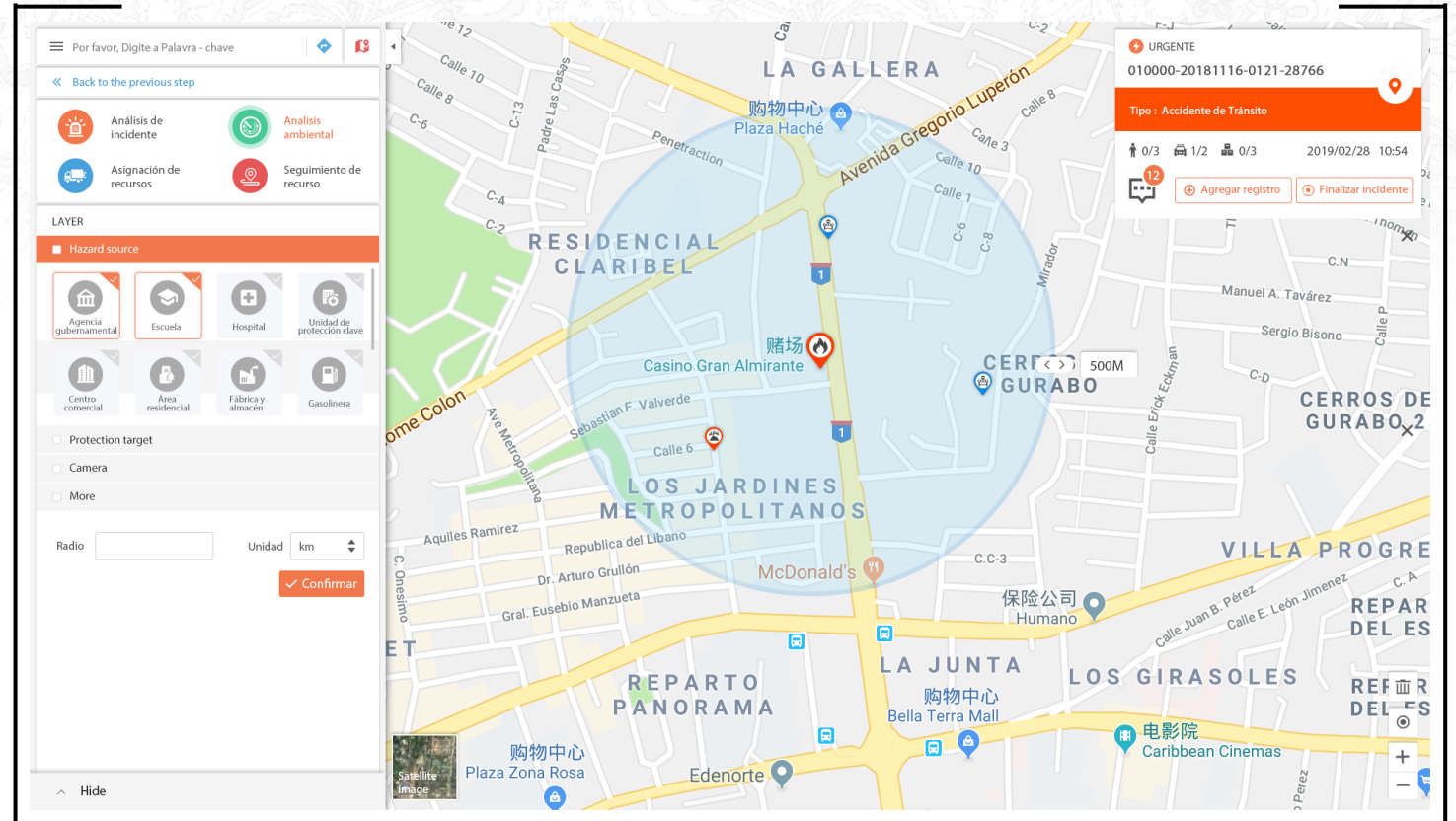


# Core Function

## Surroundings Analysis

Display key facilities information such as school, hospital, gas station, emergency shelter, etc., and provide decision support.

- User defined query radius
- Optional query items
- Exportable graph



# Core Function

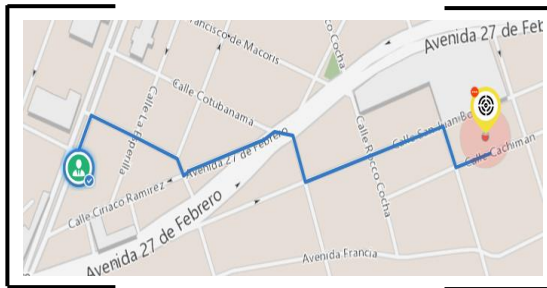
## Resource Tracking



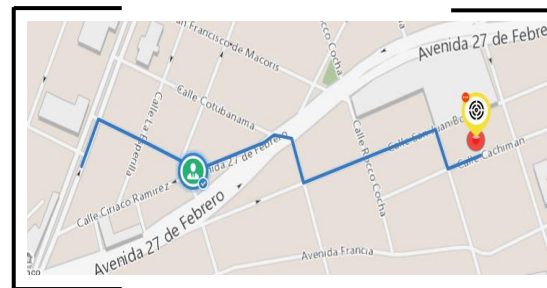
所有

 Rame 2019-07-15 14:30:07	 215:52:19 ! 2019-07-15 14:30:07 Recibo	 Acción iniciada	 llegado	 Despachar	 Finalizar	 Volver al equipo
 Honda 2019-07-24 11:41:41	 2019-07-24 11:41:41 Recibo	 00:00:26 ! 2019-07-24 14:22:00 Acción iniciada	 llegado	 Despachar	 Finalizar	 Volver al equipo

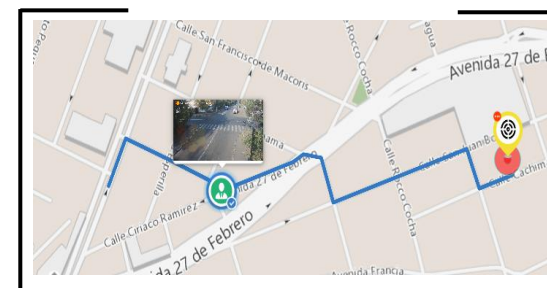
- Unexecuted
- Processing
- Completed
- Abnormal



Path Planning



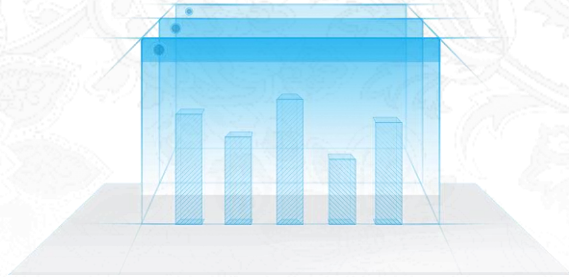
Real Time Tracking



Video Relay

# Core Function

## Statistics & Quality Control



### Statistics Type

- Case information (Quantity/Type)
- Real time resources
- Peak hour statistics
- Resource dispatch quantity

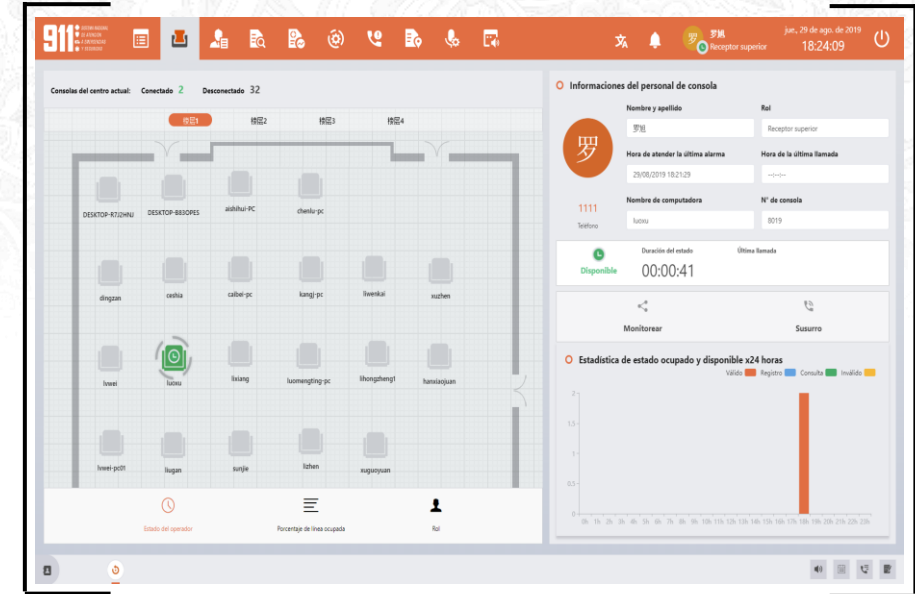


Call-taker Profile

Monthly Call-taking

Daily Call-taking

Call Type



Console Distribution

Console Status

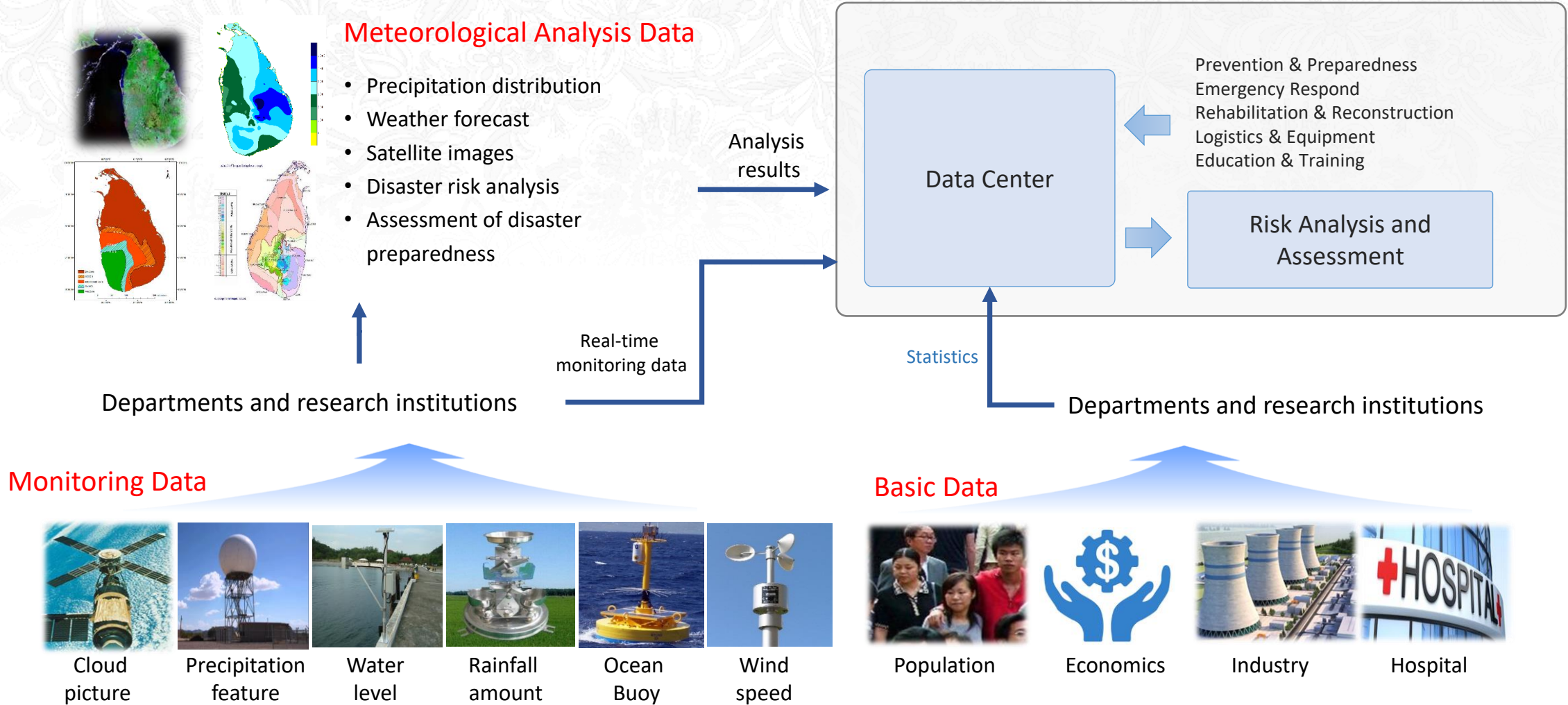
Console Role

Console Monitoring

Management Efficiency

Responsiveness

# Multi-Hazard Early Warning (MHEW) - Multi-source Data Integration



# Multi-Hazard Early Warning (MHEW) – Dissemination Process

**基本信息**

标题: 河北省气象台2017年06月21日发布暴雨红色预警

预警信号: 暴雨

预警等级: 红色

发布时间: 2015-08-12 10:23:13

发布区域: 河北省

制作单位: 河北省气象局

预警描述: 自18日夜间到19日早晨, 全省的降水量已达200毫米以上, 请注意防范。

防御指南: 1. 地方各级人民政府、有关部门和单位按照职责及时做好城区、郊区县及山区暴雨及其次生灾害的应急防御和抢险工作; 向社会滚动发布灾情、灾害风险和旅游风险信息; 2. 公安交警部门应实施高规格交通管制, 确保深积水路段、地面塌陷、洪水冲毁、高压线塔倒塌、电杆折断、高压线落地等危险区域有明确标识和专人值守, 严禁车辆及行人进入;

**发布渠道及发布内容**

121短信 | 12379短信 | 电视 | 官方微博

微信 | 邮件 | 传真 | 大喇叭

显示屏 | 广播电台

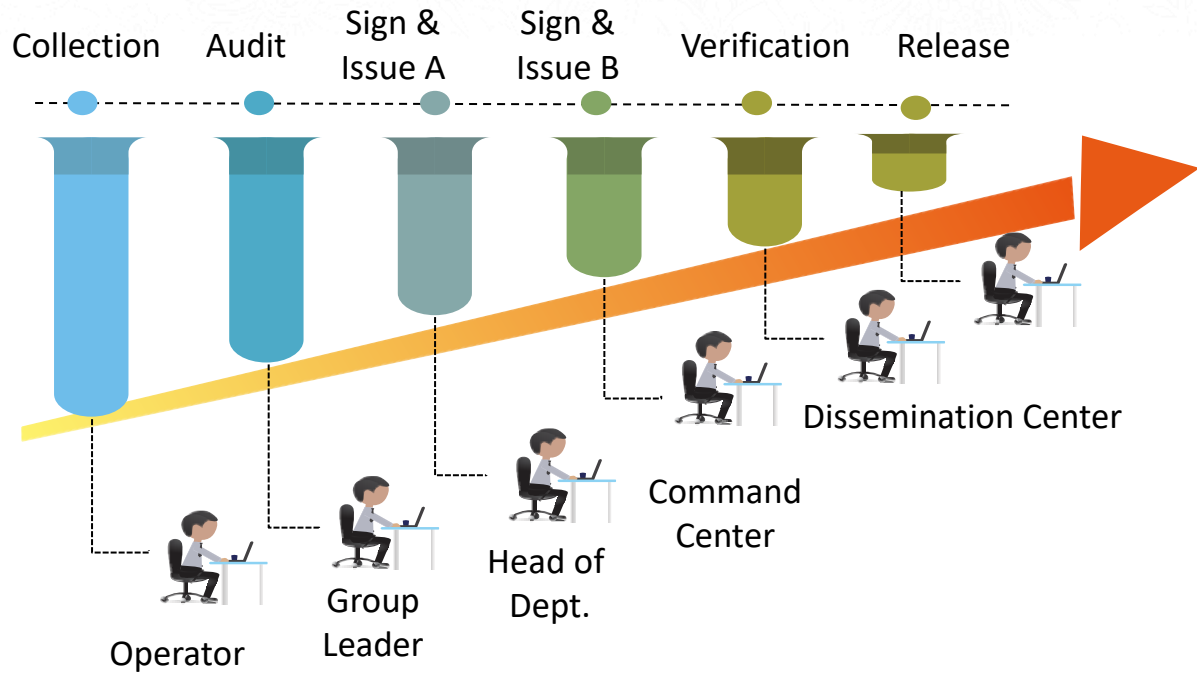
发布内容1 (0/500): 河北省气象局18日20时发布暴雨红色预警, 自18日夜间到19日早晨已达200毫米上, 预计发生山洪、地质灾害、中小河流洪水的危险。同时, 河北省气象台发布

**发布对象**

序号	渠道名称	渠道状态	操作
1	121短信	正常	
2	12379短信	正常	
3	邮件	正常	



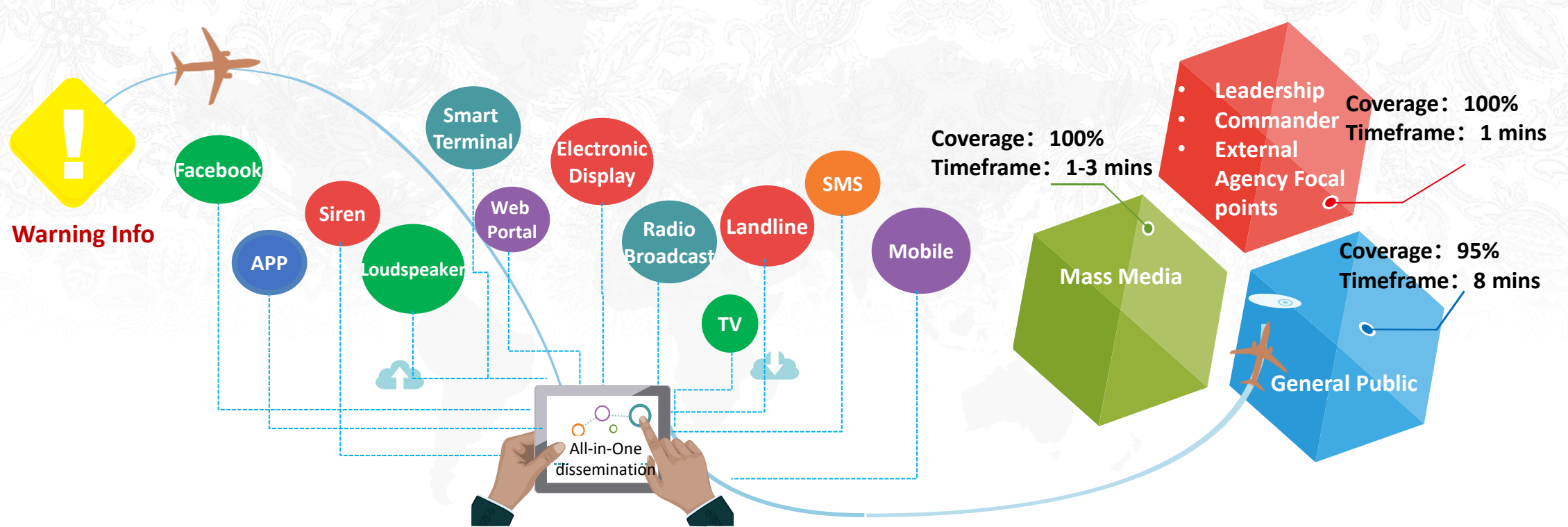
External Warning Info













- TV
- Radio
- Website
- Message
- Wechat
- Weibo
- QQ
- Beidou Satellite
- Hotline
- Fax
- E-Mail
- APP
- Typhon
- Electronic Signs
- Coast Radio station
- Cell Broadcast
- Intelligent Terminal
- Barrage



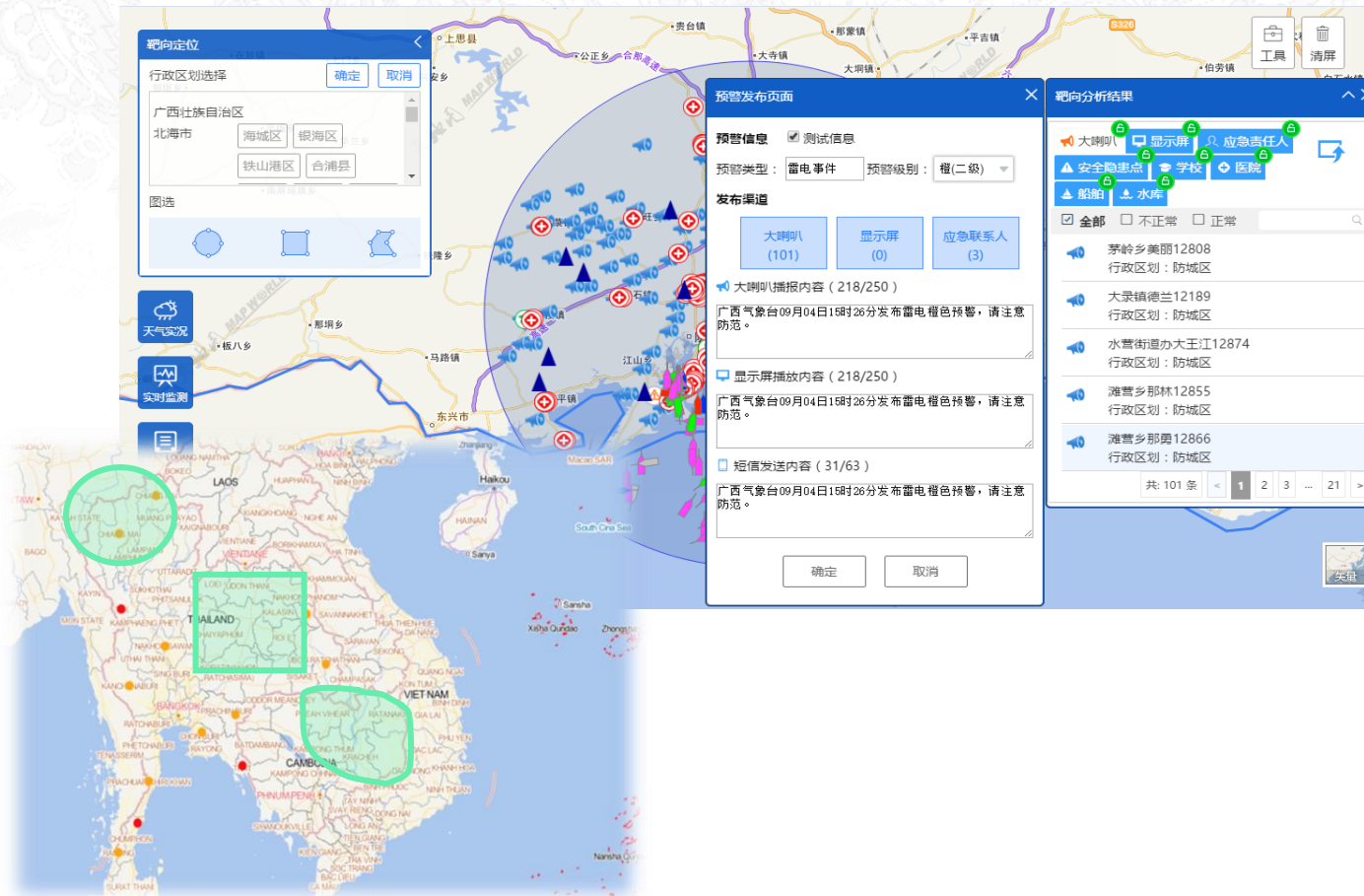
# Multi-Hazard Early Warning (MHEW) – Channels



Key Release Channels			Social Media
Emergency Responders	Urban Areas	Suburban Areas	
	  	  	  

# Multi-Hazard Early Warning (MHEW) – Targeted Dissemination

- Configurable strategy based on affected area, channel characteristics, targeted population
- Maximized coverage and efficiency



Priority Release



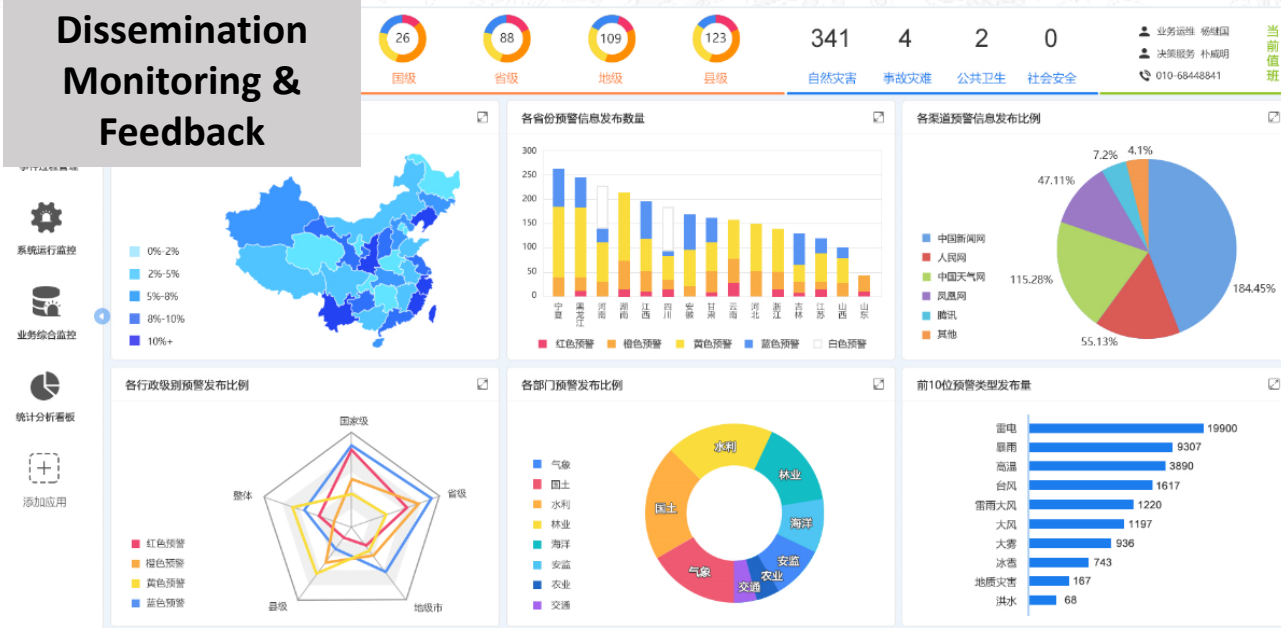
Confined Release



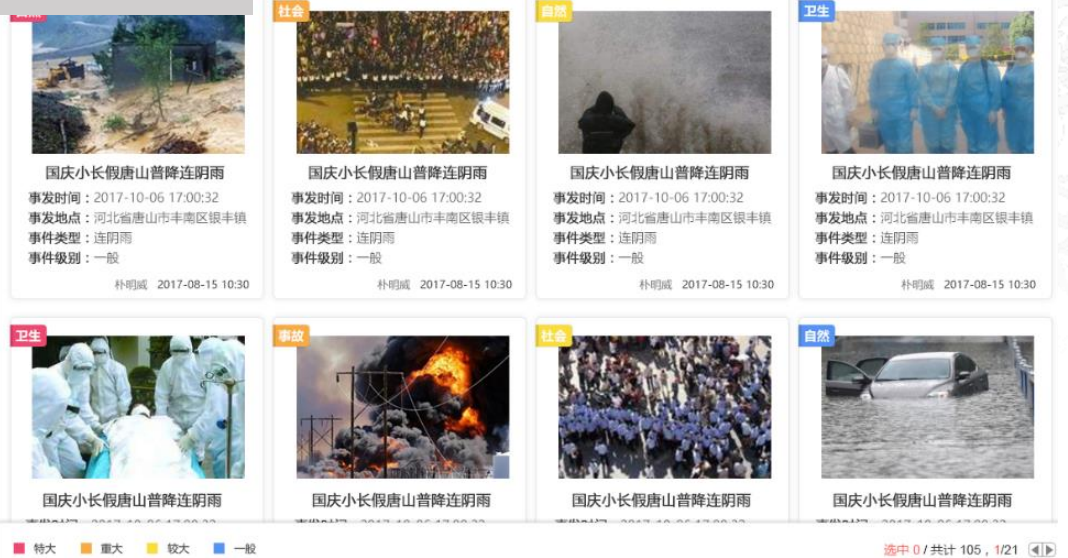
Flexible Scope Selection

# Multi-Hazard Early Warning (MHEW) – Visualized Management

## Dissemination Monitoring & Feedback



## Major Event Themes



## Operation Status Monitoring

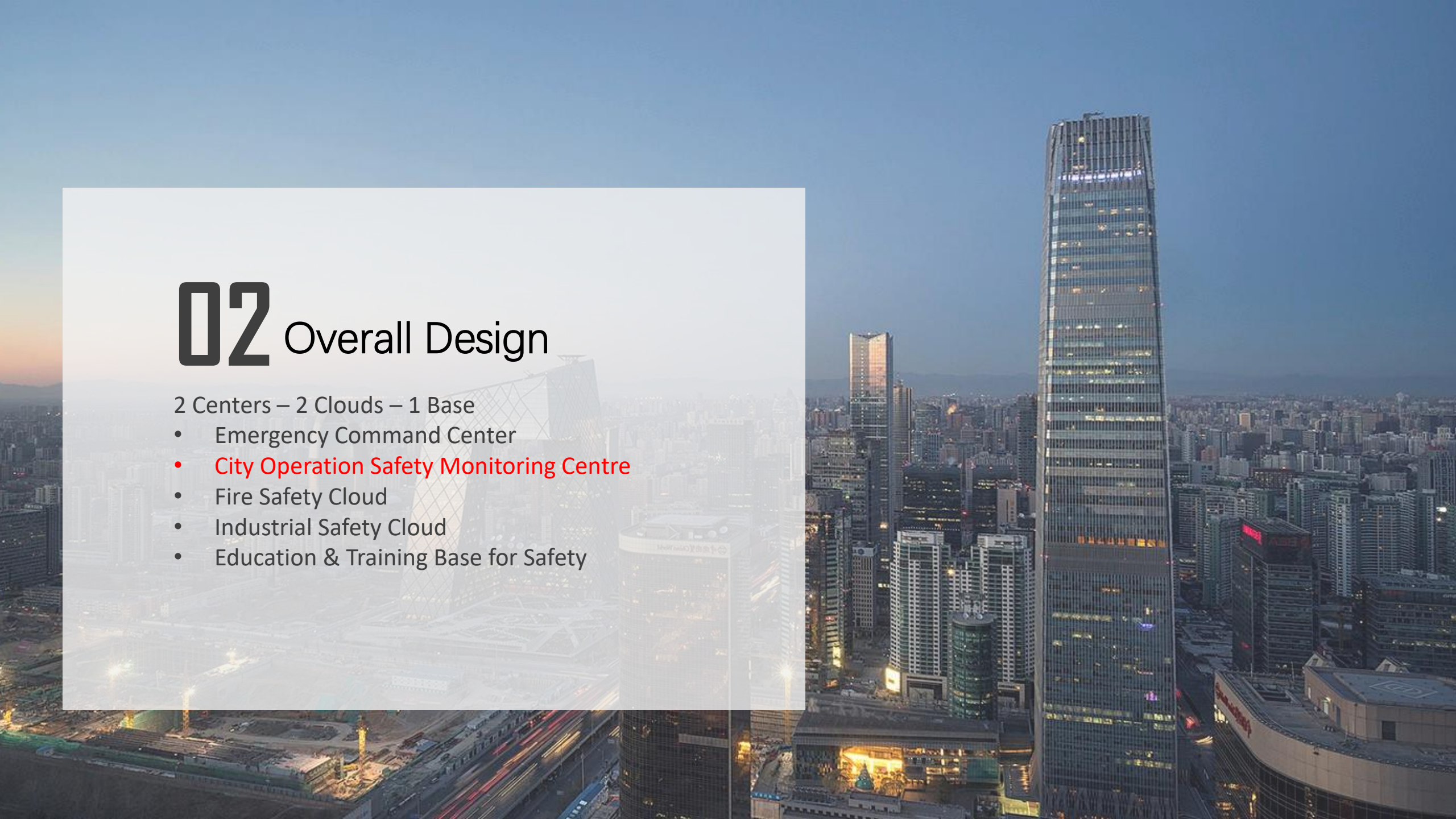




# 02 Overall Design

2 Centers – 2 Clouds – 1 Base

- Emergency Command Center
- **City Operation Safety Monitoring Centre**
- Fire Safety Cloud
- Industrial Safety Cloud
- Education & Training Base for Safety



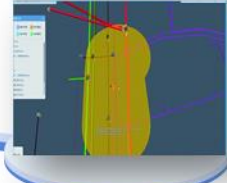
# City Operation Safety Monitoring Centre



Elevator Safety Cloud Service



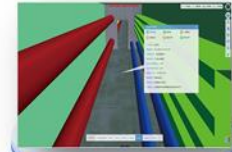
Bridge Safety & Illegal Transport Monitoring



Gas Pipe Safety



Water Distribution Network & Drainage System Safety



Utility Tunnel Operation & Maintenance Management

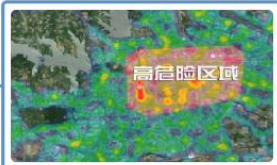


Underground Transit

Full Lifecycle Capacity Building



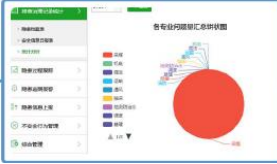
Construction Planning



Risk detection



Operation Supervision



Hazard management



Emergency Response



Construction Support

IoT-empowered Sensing

# Urban Lifelines

*Lifelines are critical infrastructure and fundamental utilities of modern cities. Deviation from safe states or incidents involving lifelines could result in major disruptions of social operation and potentially mass casualty and economic loss.*



- Elevators
- Escalators

Vertical  
Transit



- Gas Pipes and Adjacent Space
- Water Distribution Networks
- Drainage System
- Utility Tunnel

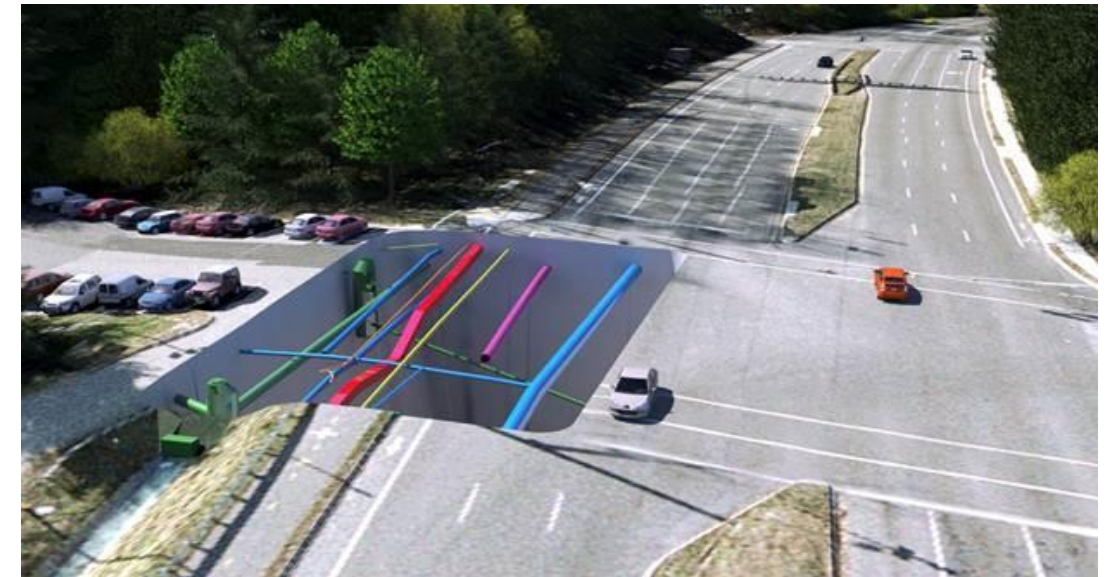
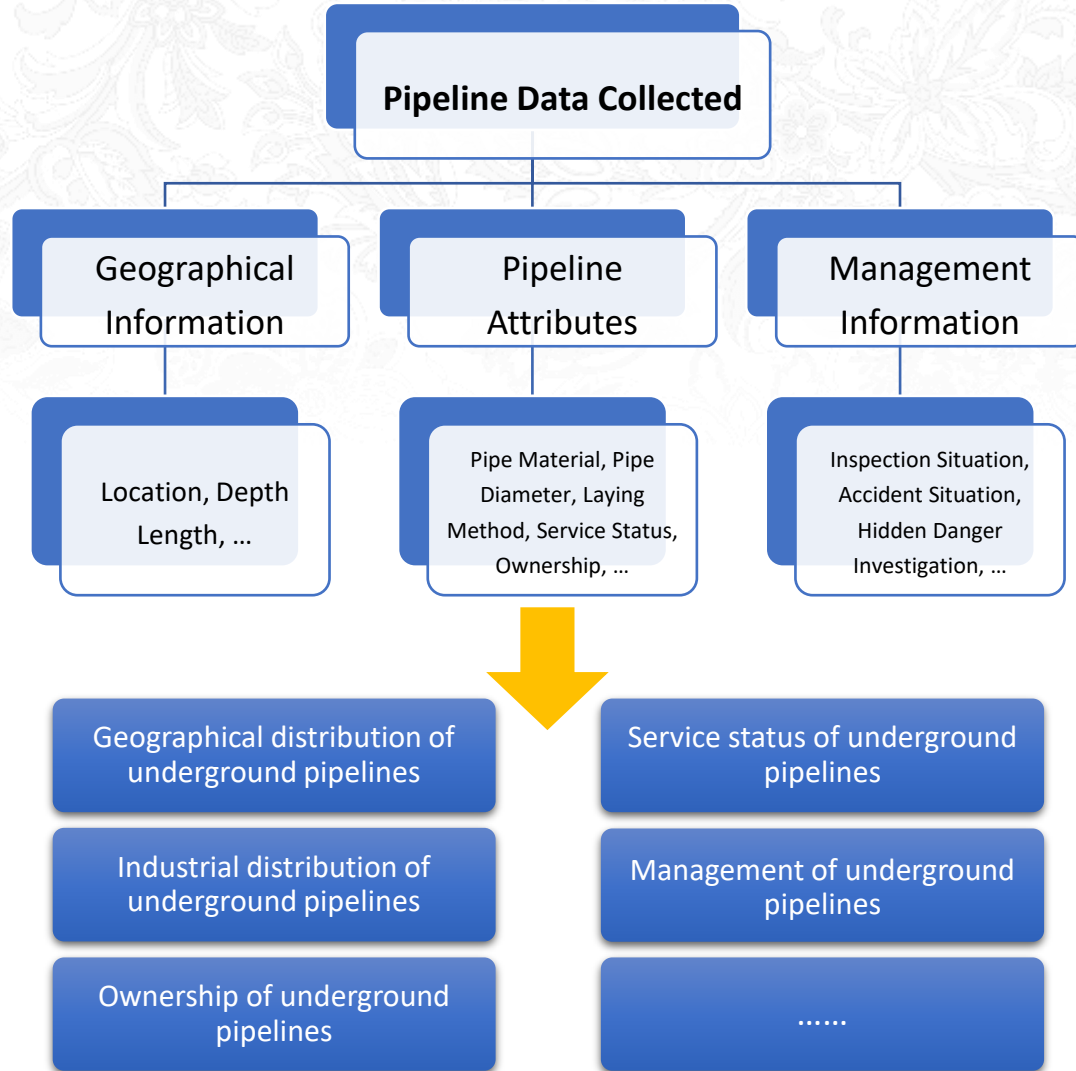
Underground Critical Infrastructure



- Bridges
- Underground Rail Transit

Transport Structures

# Underground Pipeline & Structure Data Integration & BIM



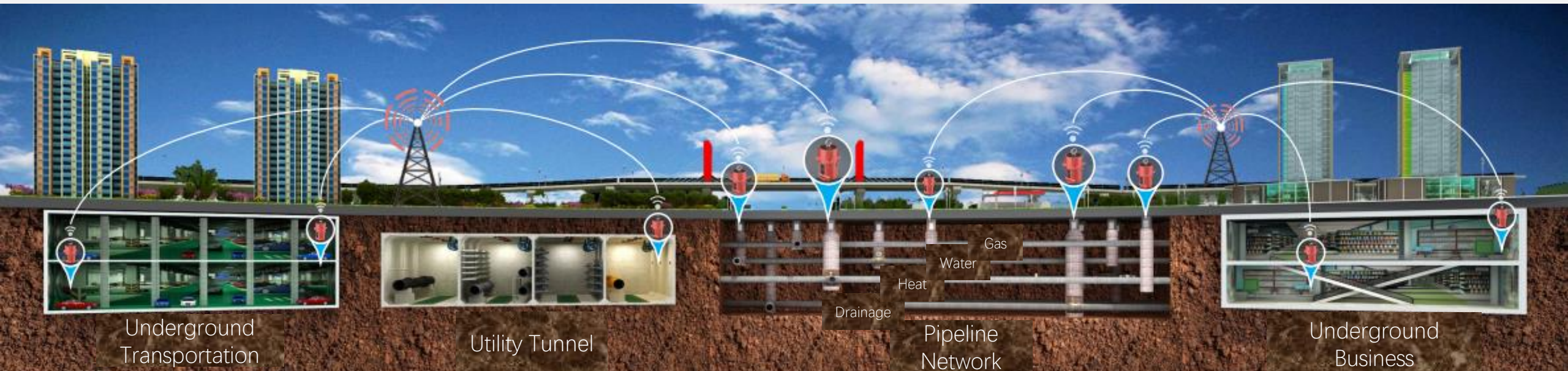
# Gas Pipeline - Leakage & Explosion Monitoring Technology and Equipment

Based on study of underground gas pipeline **leakage, diffusion and explosion**, an **Intelligent Gas Monitor** is developed using the most advanced TDLAS laser technology, suitable for gas pipeline network and surrounding drainage, pollution, electricity and other underground pipeline / cable networks.

- ✓ Major equipment manufacturing certification
- ✓ First prize of scientific progress
- ✓ First prize of science and technology of the national industry association

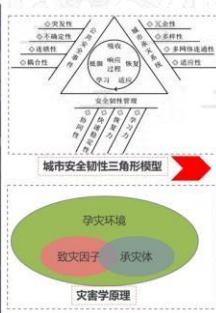
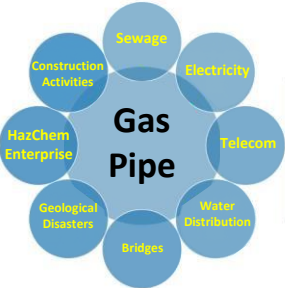


- TDLAS laser technology
- Smart IoT communication
- 20%vol range, covering the gas explosion limit
- The industry's top explosion-proof, anti-corrosion, protection capability



# Gas Pipeline – Network Operation Monitoring

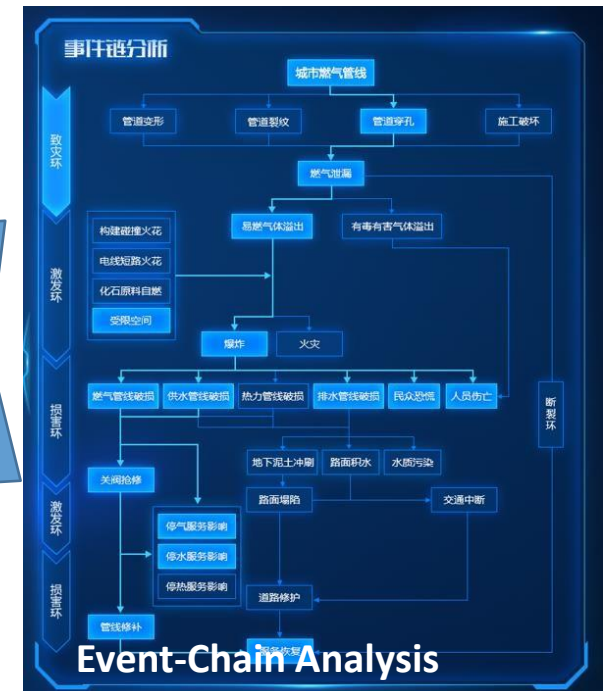
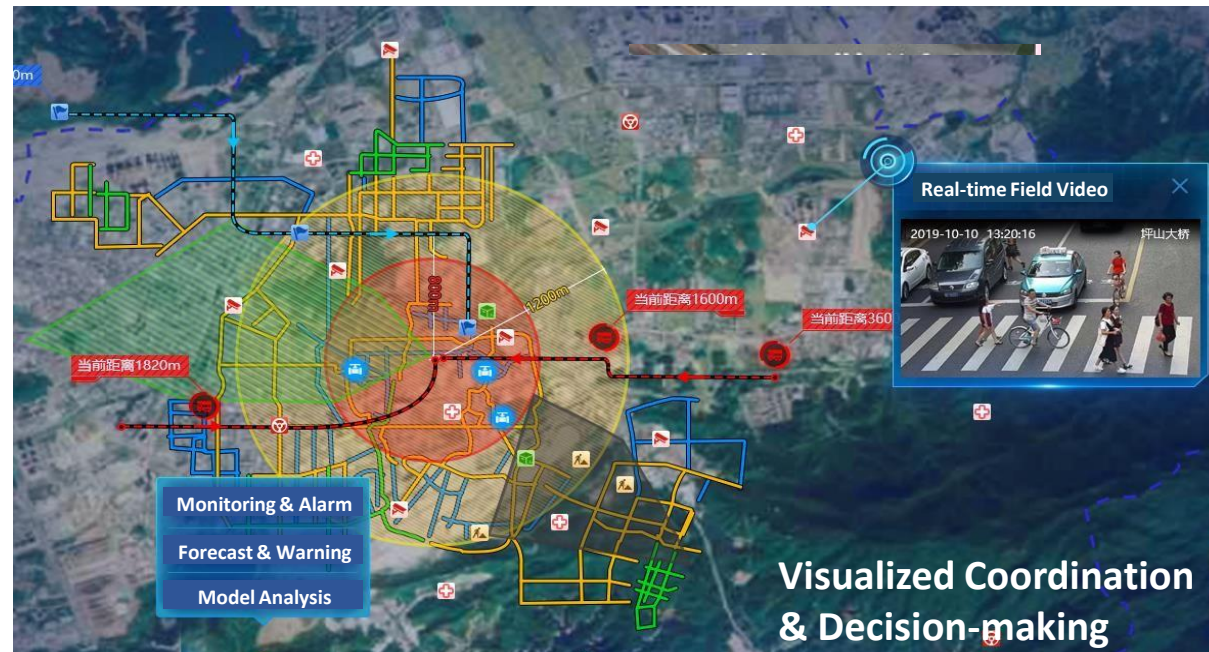
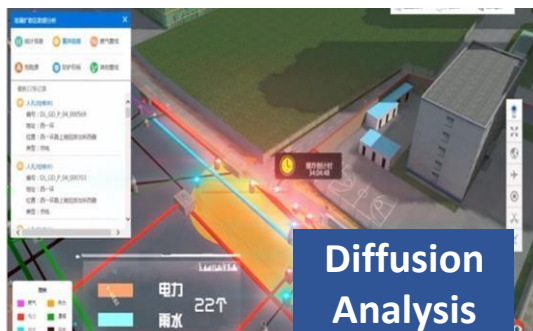
- Integrated analysis based on IoT monitoring and external data
- Daily hazard identification and risk management
- Early warning and dissemination
- Event chain and incident modelling analysis for decision support



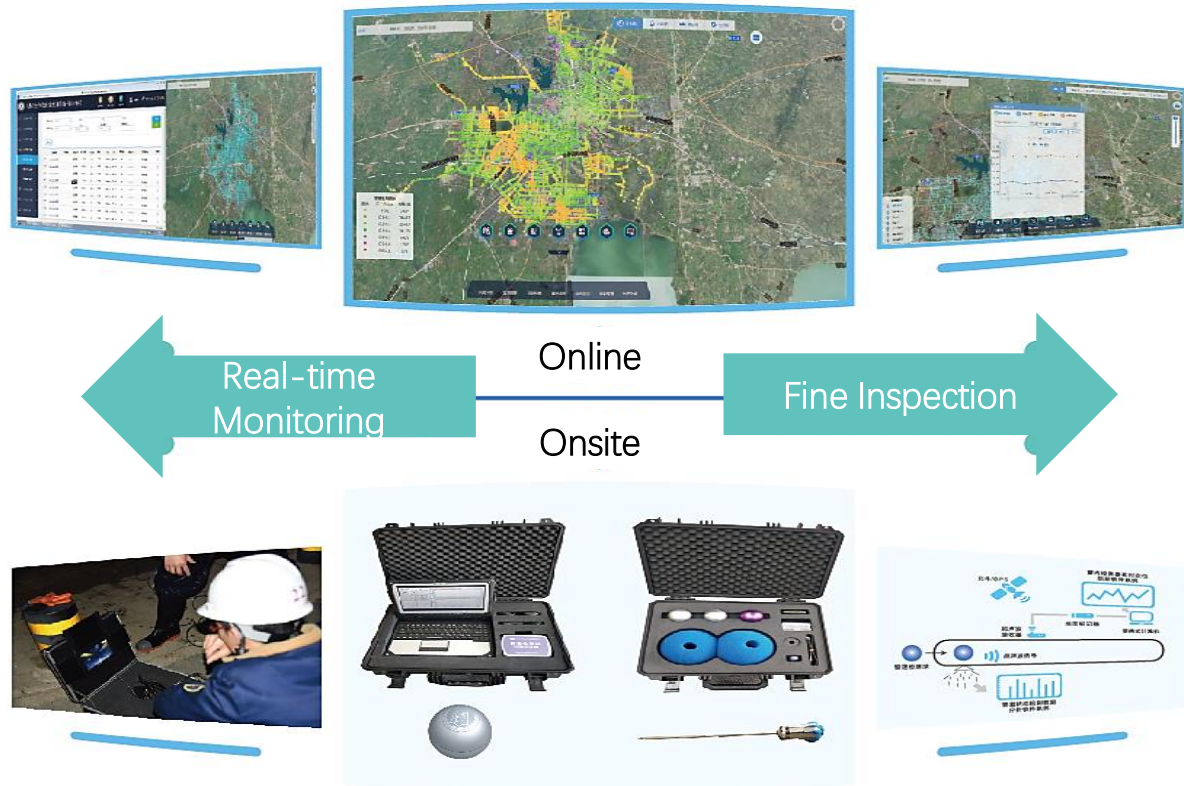
Model Analytics



- 宏观把控
- 日常巡检
- 维修更换
- 隐患排查
- 整改计划
- 监测监控



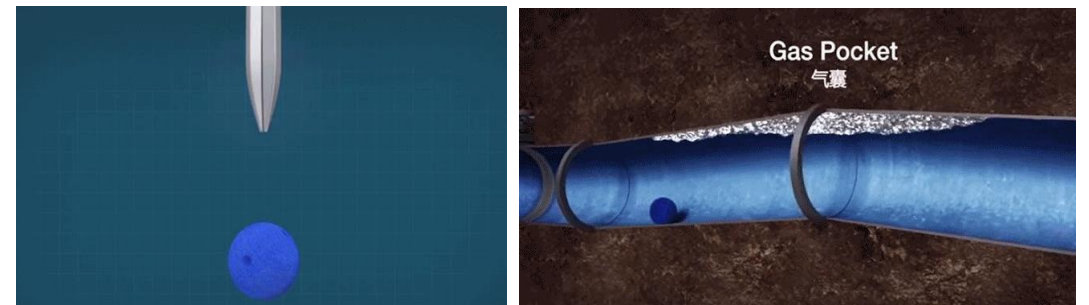
# Water Distribution Network – Smart Ball Leakage Detection and Tracing



## Technical Advantage:

- ✓ No interruption to water supply
  - ✓ Optimized anti-interference ability
  - ✓ High positioning accuracy
  - ✓ Wide range of applicable pipe diameter and pipe materials
- Collection of abnormal acoustic waves in pressured pipes by rolling freely in the pipeline to locate the leakage and retention air bubble using advance analysis software.
  - Minimal prerequisite compared to conventional leakage locating operations.
  - Based on experiments and past applications, the system is able to detect leakage points as fine as 0.1L/min.

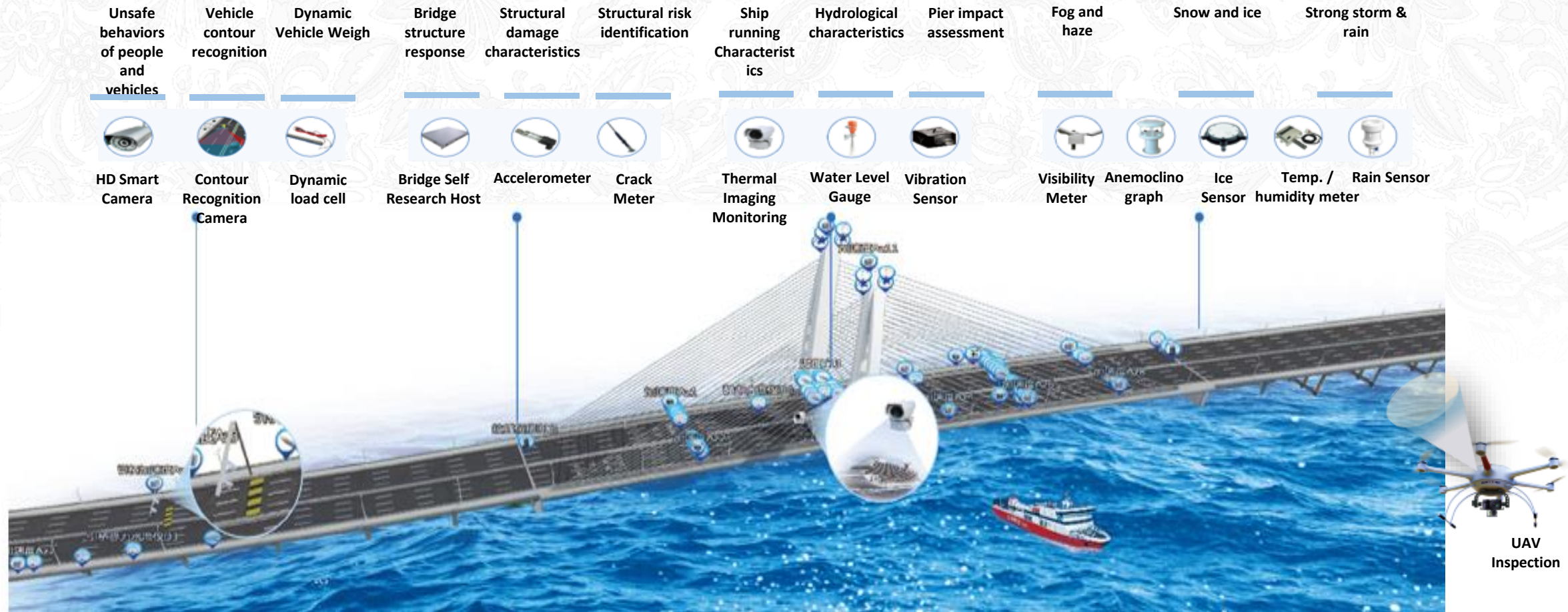
Consists of detection ball, foam ball sleeve and floor marker



Water Supply Pipeline Leakage Monitoring

25km Detection Length  
1m Positioning Accuracy

# Bridge Safety Operation Monitoring Technology



## Bridge Structure Health Assessment

Real-time monitoring of key parameters and awareness of structural health of bridges via assessment of external damages and dynamic vibration mode.

## Road Traffic Law Enforcement for Bridge Safety

Real-time vehicle recognition (weight, size, type, etc.) in motion to prevent traffic-induced bridge safety incidents. Support for multi-department response coordination.

## Traffic-Meteorological Condition Monitoring

Quantitative monitoring and early warning of visibility, ponding, snow and ice on the bridge deck under adverse weather conditions, and traffic guidance in advance

## Bridge Anti-collision Monitoring

Warning before crossing bridge, control during crossing bridge, bridge assessment after collision, chain management and record of ship collision



# 02 Overall Design

2 Centers – 2 Clouds – 1 Base

- Emergency Command Center
- City Operation Safety Monitoring Centre
- **Fire Safety Cloud**
- **Industrial Safety Cloud**
- Education & Training Base for Safety



# Fire Safety Cloud

*Could not*

## Government

- Limited human resource and uncovered areas
- Disparity in “lab quality” and real equipment installed
- Not liable to financial loss caused by fire

*May not*

## Property Owners

- Insufficient emphasis given to fire safety
- Lack of professional fire safety capabilities
- Poorly maintained fire facilities

*Would not*

## Service Providers

- Disconnection among design, construction, and maintenance
- Disorderly pricing strategies
- Lack of service quality standards

16 dead



14 Jan 2014 Zhejiang Province Shoe factory fire

58 dead



15 Nov 2010 Shanghai Residential block fire

2 dead

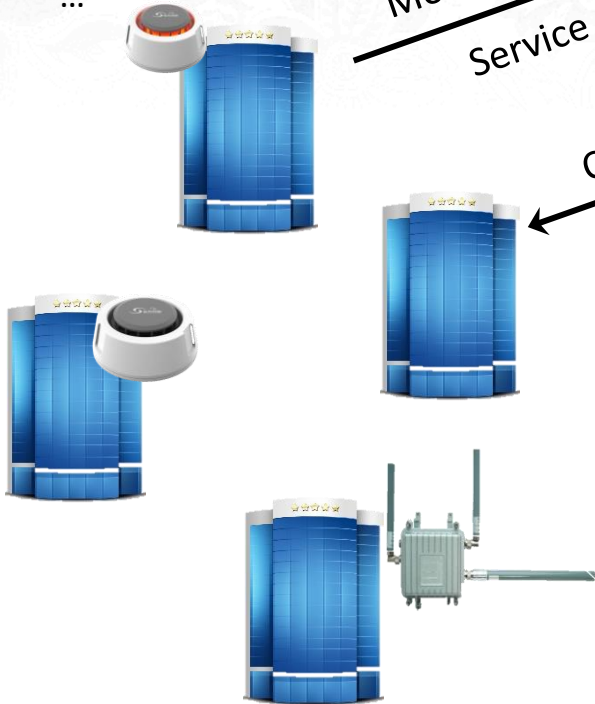


11 Oct 2013 Beijing Shopping mall fire

# Fire Safety Cloud Service Model

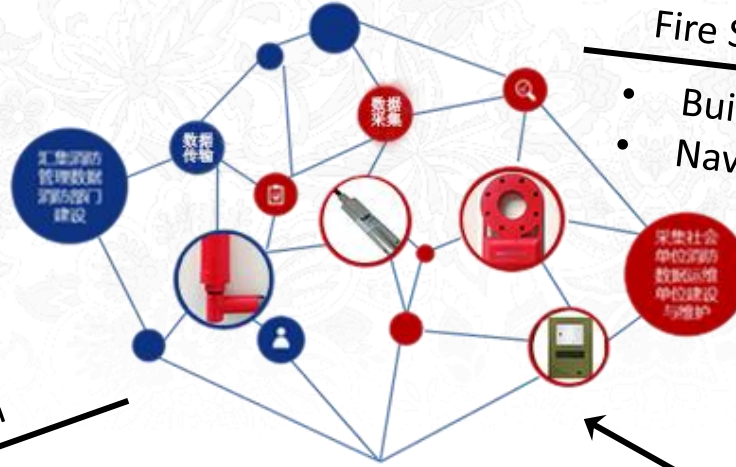
## Property Owners

- Hotel
- Shopping center
- Industrial parks
- ...



Monitoring / Alarm  
Service Fee

Compensation



## Cloud Fire Safety Platform

- Monitoring of fire facility operation status
- Fire alarm monitoring
- Maintenance task management
- Fire safety thematic visualisation (map, real-time traffic, facility location / status)
- 3D building models (fire / personnel positioning)
- Compensation base on insurance

Fire Situations

- Building models
- Navigation

## Fire Department

- Rescue
- Command / Coordination



Service Supervision  
Maintenance Tasking

Service Fee  
Real-time Sharing of Maintenance Process

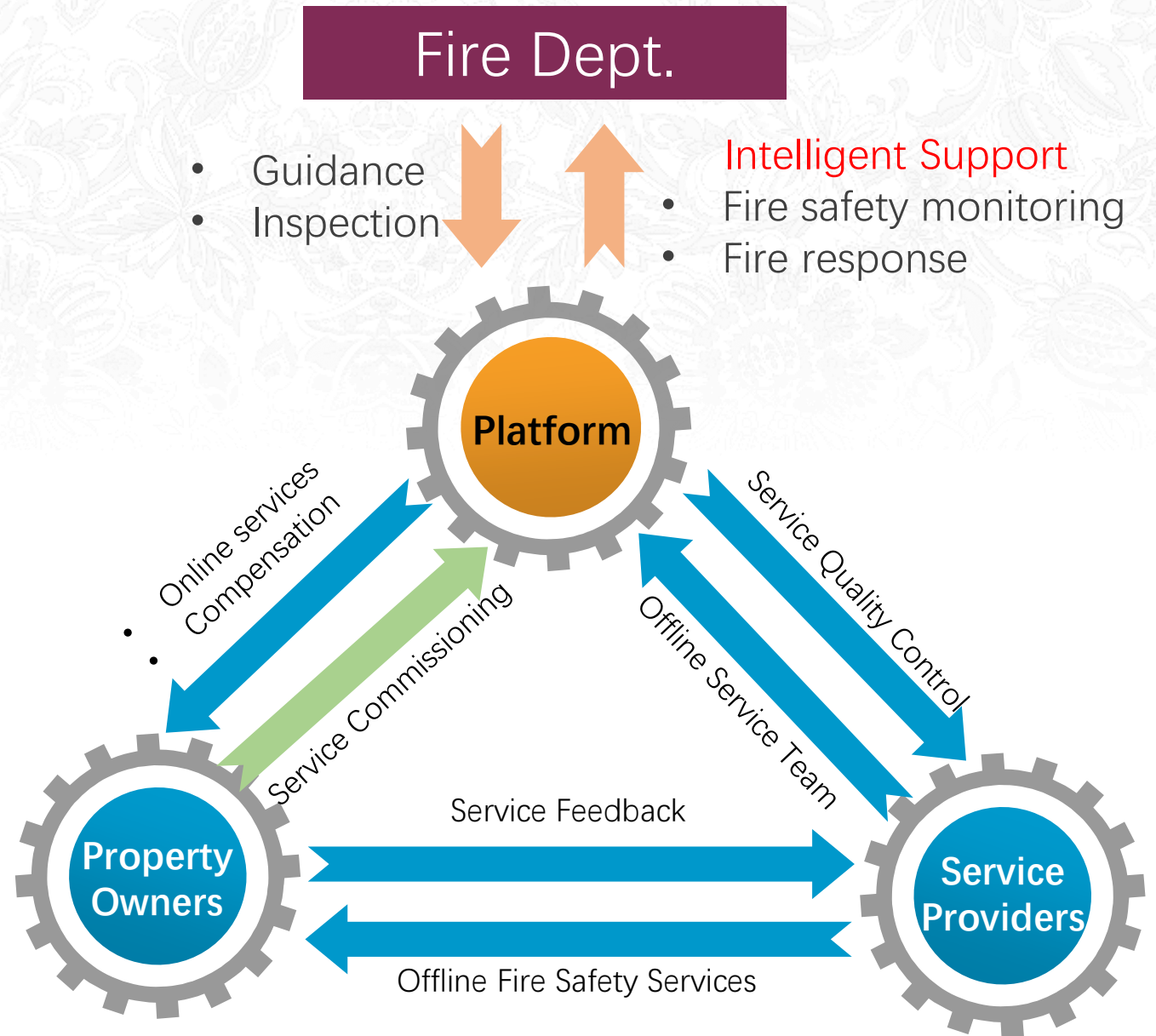


## Fire Safety Service Providers

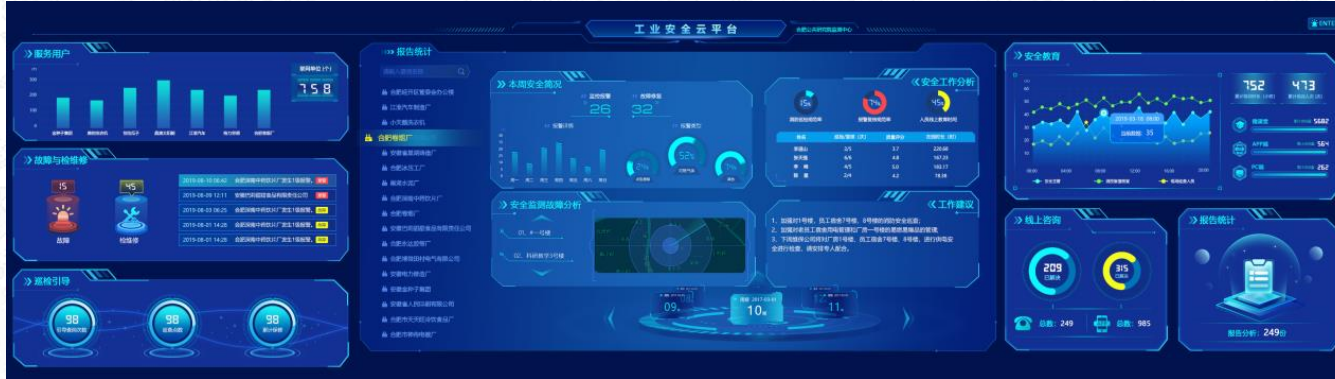


# Fire Safety Cloud Service Model

- Full lifecycle commissioned services
  - ✓ Safety / facility maintenance
  - ✓ Fire inspection
  - ✓ Training & exercises
  - ✓ 7\*24\*365 facility operation monitoring
  - ✓ Alarm taking, incident response
  - ✓ .....
- ✓ Financial compensation for loss caused by fire incidents (dependent on local insurance policy)
- Ultimately responsible for property owners

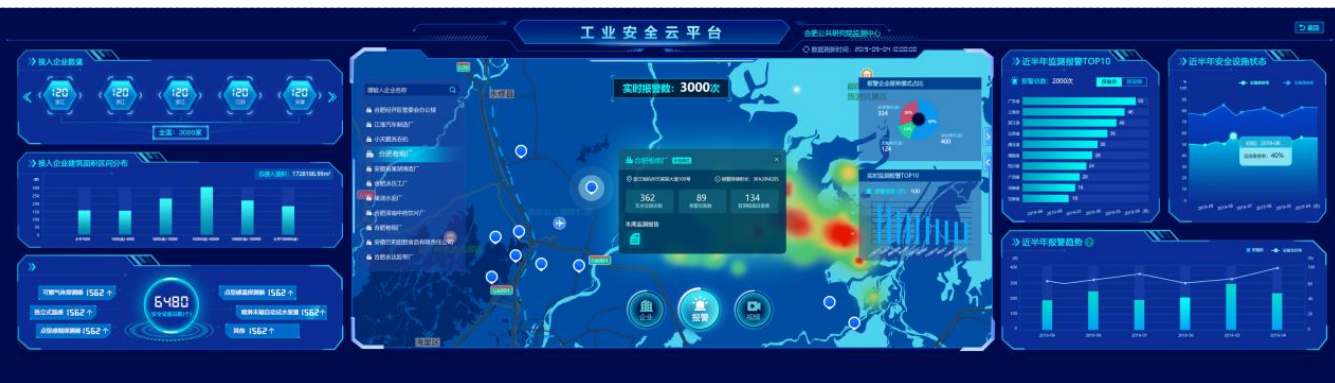


# Industrial Safety Cloud



- Online inspection execution monitoring for fault inspection and maintenance of industrial safety facilities
- Enterprise safety profile and safety work supervision
- Enterprise safety education, online consultation and report analysis

## Industrial Safety Cloud Platform



- The dynamic monitoring of safety facilities realizes the dynamic supervision and analysis of the monitoring and early warning data of the safety facilities of enterprises.
- Real-time monitoring of all connected enterprises and fault profiles based on GIS geographic data information.
- Mobilize video data through GIS maps to learn the on-site situation of key supervision areas.

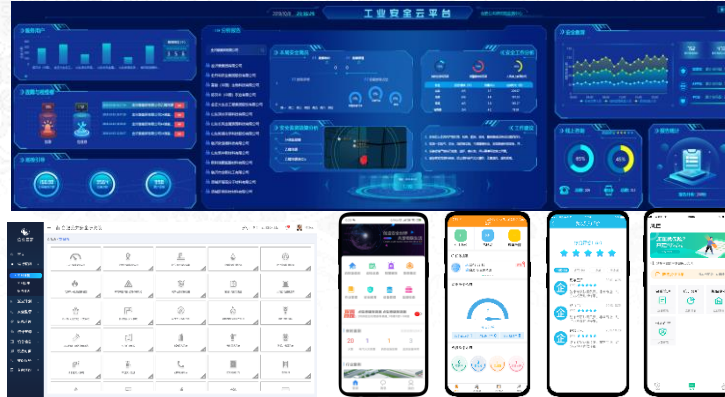
# The Structure of Industrial Safety Products

## Industrial Safety Supervision



Hazardous Chemicals Risk Supervision System  
 Production Risk Monitoring System  
 Production Supervision and Mgt. System

## Industrial Safety Socialization Service



7×24h On-site & One-stop Services:

- Dynamic Risk Mgt. and Control
- Hidden Danger Investigation
- Safety Education & Training
- Facility Inspection & Maintenance
- Emergency Drill Training
- .....

## Successful Cases

- Risk Warning System of Hazardous Chemicals, Jiangsu Province
- Safety Production Supervision and Management System, Zhejiang Province
- Hazardous Chemicals Emergency Rescue Base, Jiangyin City
- Intelligent Chemical Park, Huaibei City
- .....



Intelligent  
 Chemical Park



Energy & Civil Aviation Emergency

# 02 Overall Design

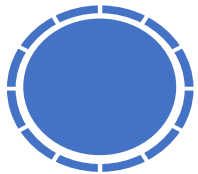
- 2 Centers – 2 Clouds – 1 Base
- Emergency Command Center
- City Operation Safety Monitoring Centre
- Fire Safety Cloud
- Industrial Safety Cloud
- **Education & Training Base for Safety**



# Education & Training Base

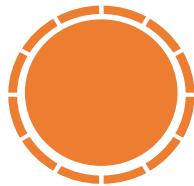
- Elevation of safety capacity of the public
- Target users: government departments, general public, practitioners, and professional rescue teams
- Provide safety education, professional training, and practical drills

## Comprehensive Service System of Urban Safety Culture Education



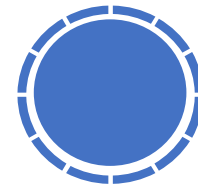
- Offline Experience
- Online Safety Education Platform

## Safety Education Cloud



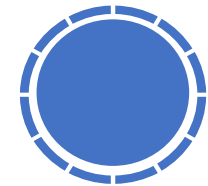
- Knowledge service
- Operation Service
- Business service

## Safety Education and Experience Center



- State-of-the-arts technologies and hands-on experience
- Sustainable safety education services

## Campus Safety Education Hosting Service



- Lecture
- Practice
- Test
- Assessment



# Education & Training Base - Examples



Safety Thematic Cartoon



High School Textbooks



Social Network Platforms



Animated Films



Theme Activities



Safety Experience Centers



# 03 Solutions and Services

- **Public Security Management**
- Intelligent Public Transport
- Smart Firefighting
- Environmental Protection
- Emergency Management Infrastructure



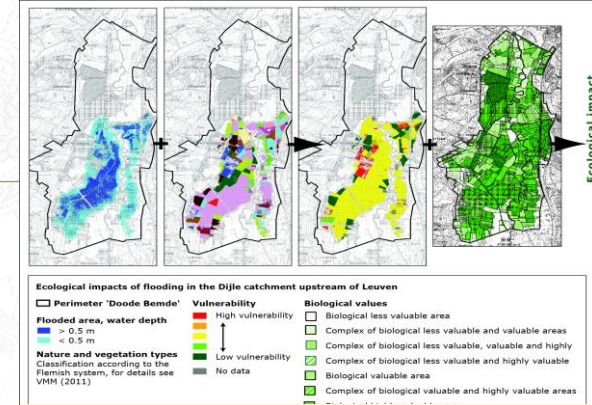
# Public Security Management – Daily Operation Management



Duty scheduling



Patrol Management



Data statistics and presentation

## Information reporting

- Information reporting way
- Report object
- Report summary
- Emergency report
- .....

## Fleet management

- Vehicle information management
- Driver information management
- Vehicle monitoring
- .....

## Daily human resource management

- Organization management
- Basic data management
- Recruitment management
- Contract management
- Attendance management
- .....

## File management

- Document storage
- Document security management
- Document search
- Release control
- .....

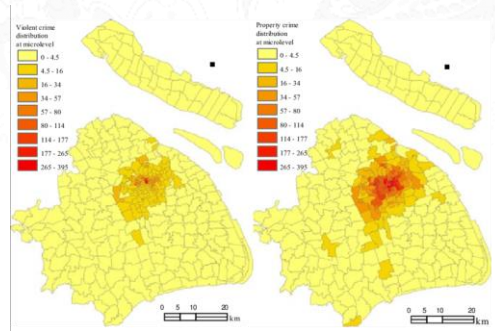
## Statistical analysis

- Incident loss
- Types of incident
- Hazard ratio
- Casualty
- .....

Management of daily affairs, including equipment, personnel, resources, etc., and to make statistics on the corresponding situation

# Public Security Management – Case Management and Research System

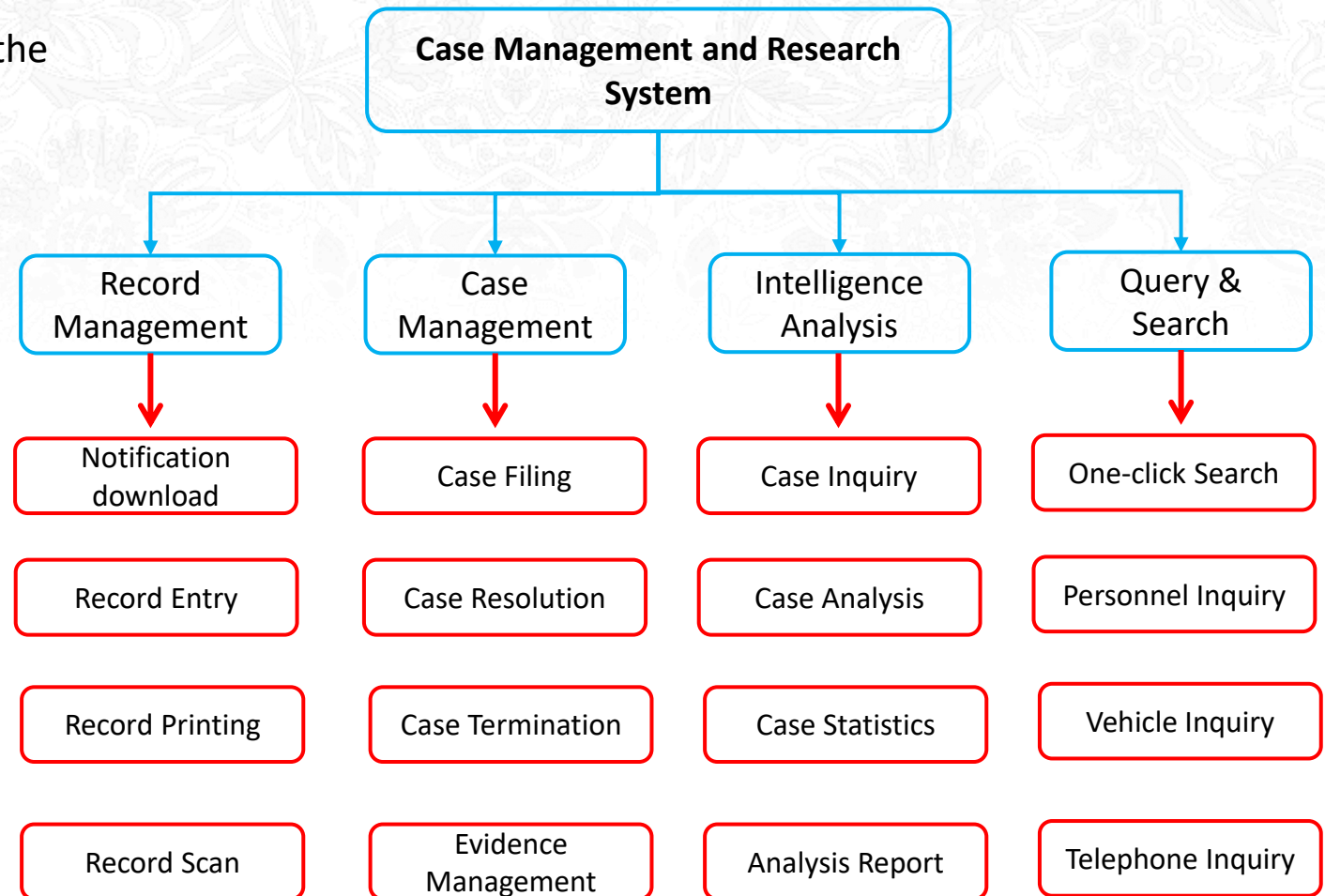
- Provide data support for finding clues and case detection
- Accurately analyze the feature and laws of the case to achieve crime prevention



Crime Distribution



Crime Statistics



# 03 Solutions and Services

- Public Security Management
- **Intelligent Public Transport**
- Smart Firefighting
- Environmental Protection
- Emergency Management Infrastructure

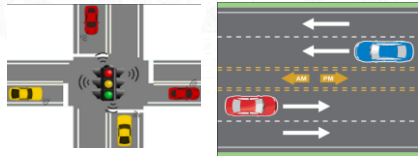


# Intelligent Transport

## Intelligent Transport Mgt



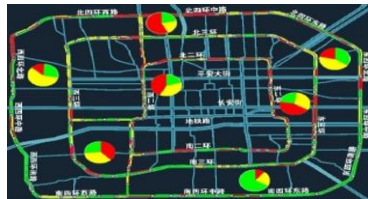
Comprehensive monitoring



Traffic light

Reversible lane

## Intelligent traffic control



Transport early warning



Traffic enforcement

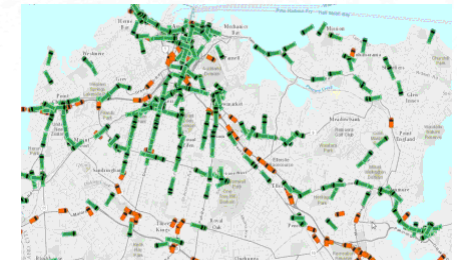


Command and control center

## Intelligent Transport Command



Computer aided dispatch



Police units position



Common operation picture

3G/4G/5G, Trunk, Fiber...

## Traffic Information Service



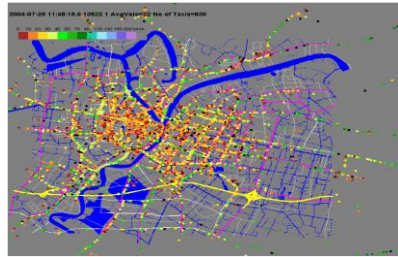
Traffic induction



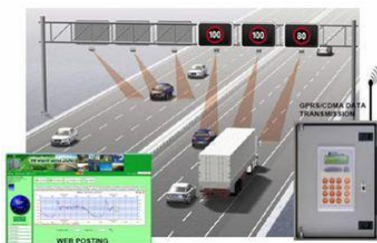
Multimedia traffic info. publishing

# Intelligent Transport - Intelligent Traffic light Control

- Improve road traffic efficiency
- Reduce traffic congestion
- High security based on VPN,  
High stability

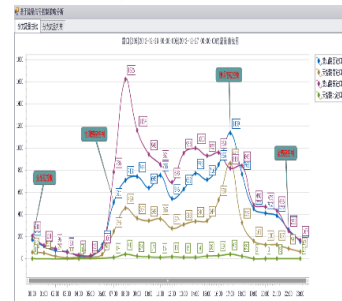


Mobile Sensor Network

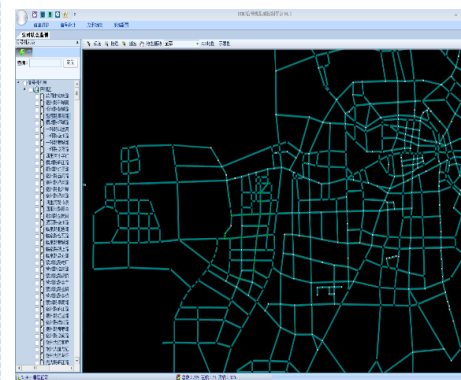


Fixed Sensor Network

Traffic flow monitoring



Traffic flow statistics  
and analysis results



Traffic signal control platform



Automatically generate the  
optimum proposal of  
intersection signal timing

# Intelligent Public Transport – Online Enforcement

The screenshot shows the 'Violation Management' section of the system. On the left is a navigation menu with options like 'Violation management', 'Information check', 'Batch approval & upload', etc. The main area displays a gallery of three vehicle images with 'Select' and 'Delete' buttons. Below the gallery is a 'Catalogue of violated vehicles' list and a detailed 'Information of violated Vehicle' form. The form includes fields for license plate, issuer, location, road name, and vehicle details.

## Information Inputting

The screenshot shows the 'Off-site sorting' interface. It features search filters for violation type, plate type, direction, province, start time, and end time. Below the filters is a grid of vehicle images with their license plate numbers: SuA 2J4A0, JingG S1627, JinR 5659C, SuA ODP78, WanA T1740, SuA M127Z, SuA W9D70, SuA 90E63, MinK 00124, and WanA RZ699. Buttons for 'Query', 'Sorting', 'Export', 'Return', and 'Next' are visible.

## Off-site Classification

The screenshot shows the 'User Registration' form. It includes a progress indicator with three steps: 'Essential Information', 'SMS Verification', and 'Registered Successfully'. The form has fields for User Name, Login Password, Passport Confirm, Real Name, Driving License Number, Cell Phone Number, and E-mail. It also contains a 'TIPS' section with instructions for users.

## Violations Dealing

The screenshot shows the 'Vehicle Owner Management' interface. It displays 'Information of the vehicle' with fields for Owner name, age, gender, license plate number, brand, and color. Below this is a 'Traffic ticket: total 4 records' table with columns for Document category, Document number, Violation time, Violation location, and Operation.

Document category	Document number	Violation time	Violation location	Operation
G201	44070300909345C	21/01/2018	Cross of Fangchan Street	Check / Pay
G301	44070300902343C	20/01/2018	Gate of Jishmitan Hospital	Check / Pay
G701	44070300907233C	20/01/2018	Cross of Nanan Street	Check / Pay
G531	44070300902354C	19/01/2018	Gate of Xinhua School	Check / Pay
G722	44070300907233C	17/01/2018	Cross of Linan Street	Check / Pay
G333	44070300902343C	15/01/2018	Gate of Tianfian Hospital	Check / Pay

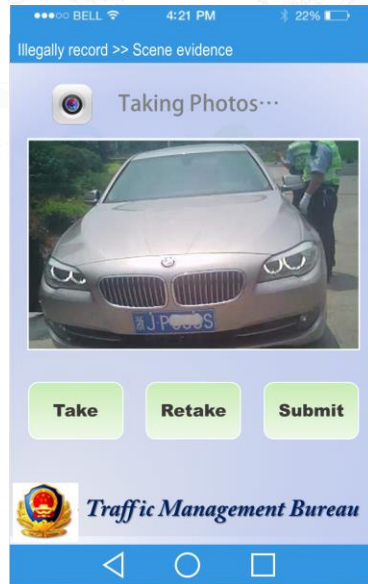
Below the table are buttons for 'Vehicle Insurance', 'Vehicle Checking', and 'Vehicle Parking Fee'.

## Penalty and Processing

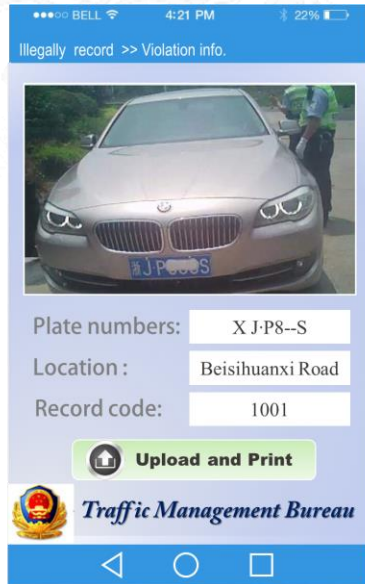


# Intelligent Public Transport – Mobile Enforcement

Mobil enforcement instrument can achieve the whole process of law enforcement at the scene, the whole process includes scene evidence obtaining, information unload and print, online payment.



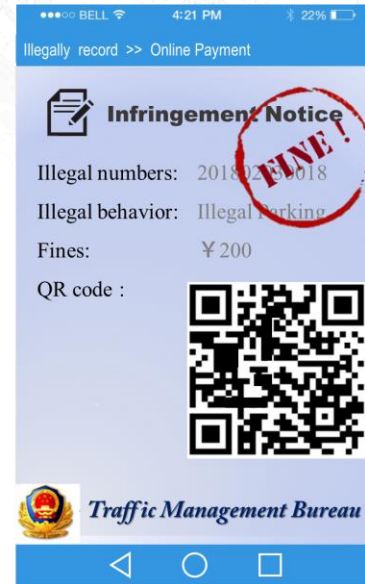
Photo



Info. Enter



Unload and Print



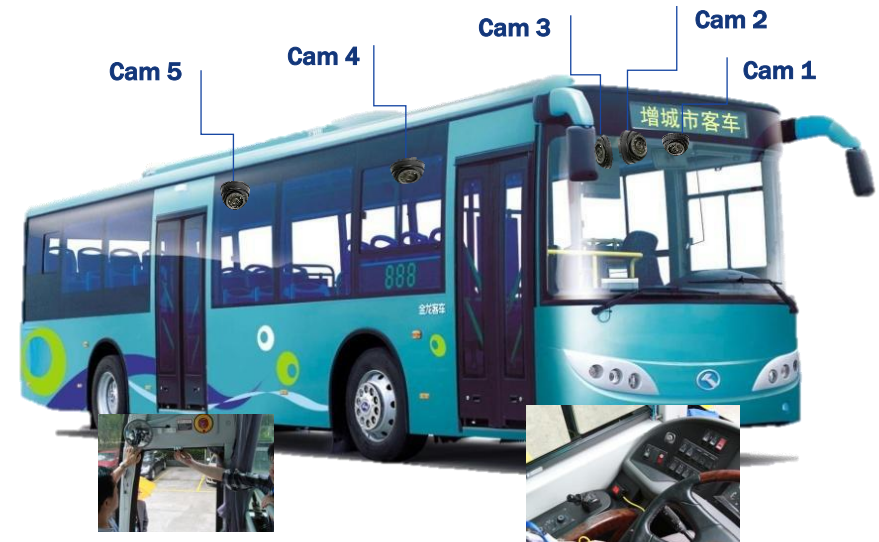
Payment Onsite



# Intelligent Public Transport – In-Vehicle Security

Public transport user Safety and security

- Security kits installation
  - Positioning
  - Video
  - Vehicle status
- Real-time communication with command centre
  - Instant vehicle information access
  - Remote control of security kits



# Intelligent Public Transport – Fleet Management System



## Vehicle management

- Vehicle information
- Maintenance management
- Vehicle device installation status
- Link to drivers



## Driver management

- Basic information (name, drivers' license, contact, etc.)
- Link to vehicles
- Driving history
- Performance management

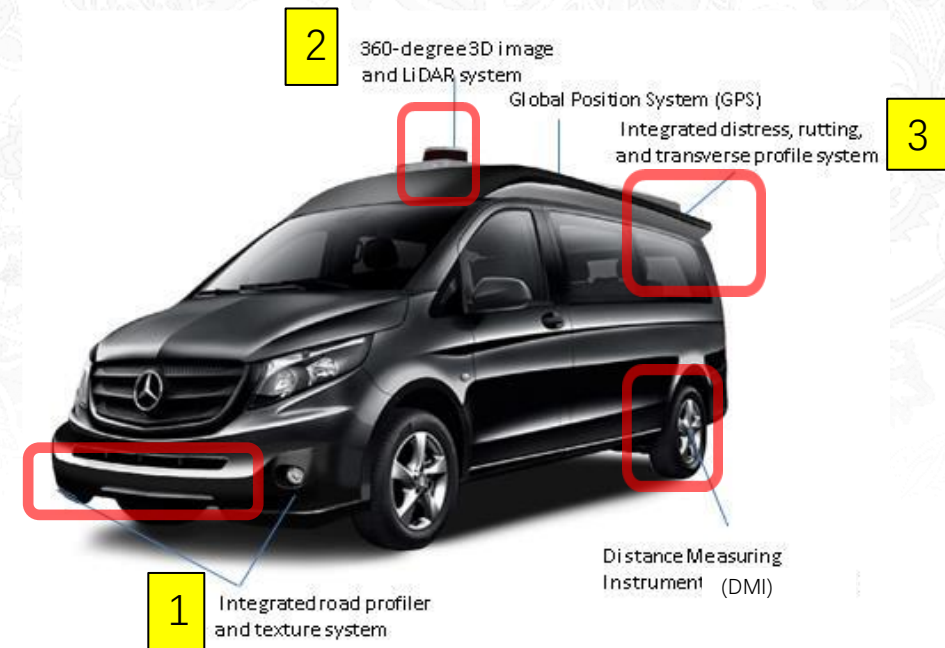


## Equipment management

- Camera information
- Sensor information
- Alarm key information
- Working status
- Duration of use
- Maintenance

# Airport Runway Safety Management – Defect Inspection Vehicle

- Inspection Vehicle is bundled with **in-house software** capable of instantaneous detection of various types of pavement distresses but not limited to cracking, rutting, and potholes with location referencing capabilities
- Module 1: Integrated road profiler and texture sensors
  - Measures pavement properties such as IRI (International roughness index) and BBI (Boeing Bump Index), Flatness, Texture of surface
- Module 2: 360 degree 3D LiDAR imaging System
  - Collects high resolution 360 degree images and high density range data to cater information required for asset inventory and management
  - The 3D cloud based matrix includes the spatial information for the following items: geometry, roadside slope, bridge, etc.
- Module 3 : Integrated 3D distress and transverse profile system
  - Based on high speed 3D technology to capture full lane pavement images without image stitching
  - Works on different pavement condition from bright concrete to dark asphalt surface
  - Allow real time detection of pavement defects such as Cracks, Rutting, rut depth and area

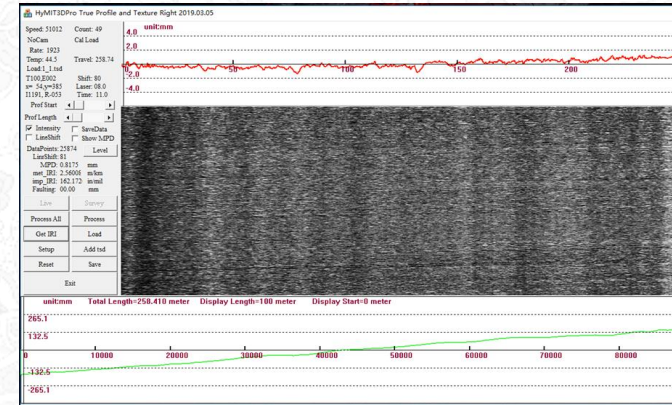


Drone Inspection

# Airport Runway Safety Management – Complete Suite of Pavement Evaluation and Analysis

1. International Roughness Index(IRI)
2. Flatness, Texture of Surface
3. Pavement Condition Index (PCI)
4. Automated Distress Classification
5. Rut Depth
6. 3D Display, Intensity and Elevation Imaging

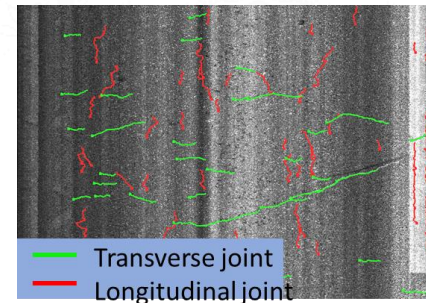
1&2.



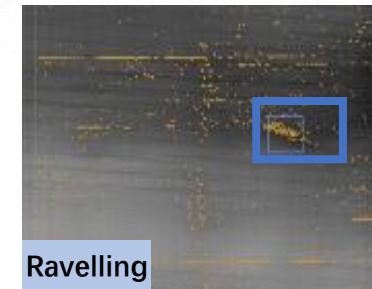
3.



4.



— Transverse joint  
— Longitudinal joint

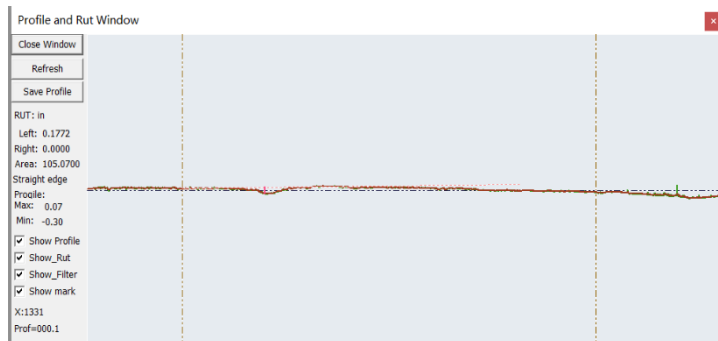


Ravelling

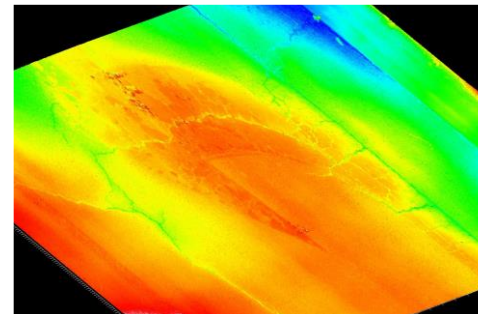


Shallow grooves

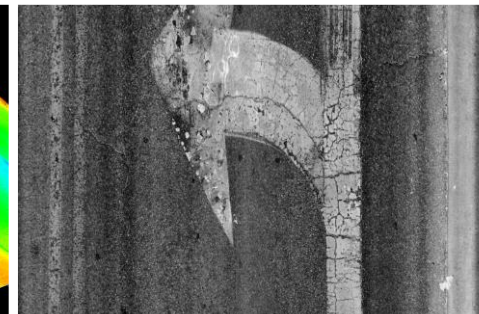
5.



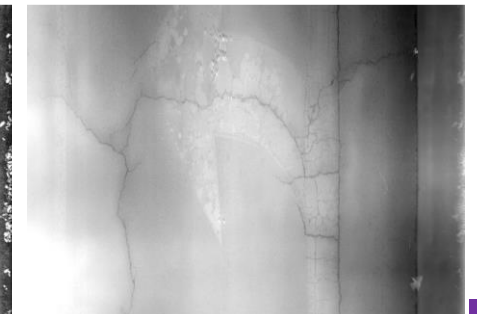
6.



3D Display



Intensity Image



Elevation Image

# Airport Runway Safety Management – Complete Suite of Pavement Evaluation and Analysis

7. Detection of FOD on pavement
8. Automated Runway Friction Assessment Framework
9. Automated Runway Distress Assessment Criteria
10. Road Geometry
11. Pavement water accumulating volume estimation
12. Accurate Real-time data acquisition with integrated analysis at up to 100km/h
13. Suitable for both day and night-time operations

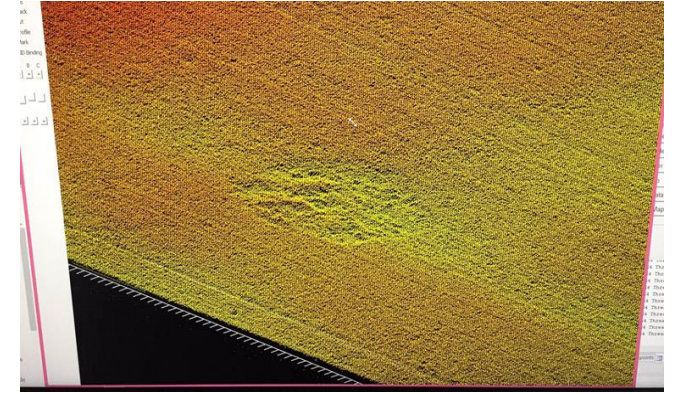
7.



8.



9.



# Airport Runway Safety Management – Water Depth Detection

## Real time Sensor Data



Pressure sensor

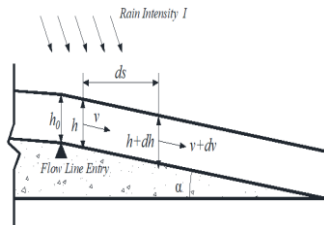
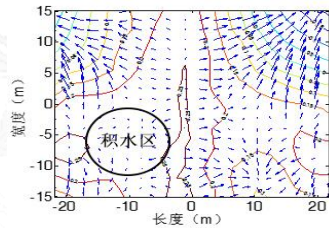


Rainfall Intensity gauge

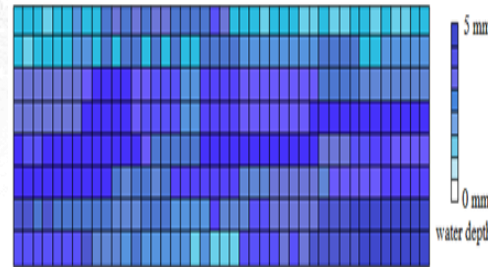


Remote sensing sensor

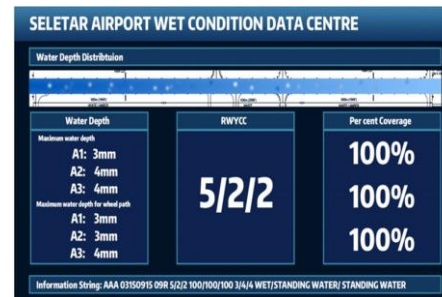
## Model Calculation



## Full Runway Water Depth Distribution



## Dashboard



Due ICAO GRF starting in Nov 2020, there is requirement to automate **Runway Condition Assessment Matrix (RCAM)**

Automated RCAM in accordance to ICAO GRF

Improve efficiency and labor required for ICAO GRF

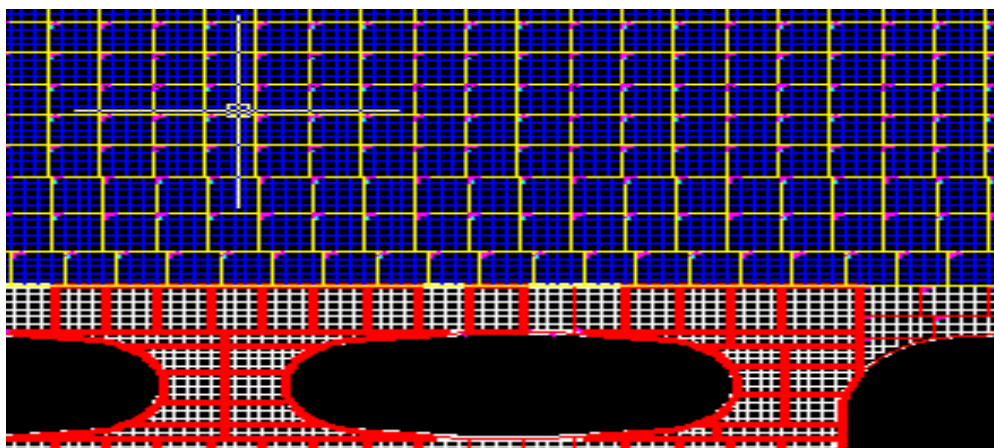
Automate compliance

Improve Safety

High accuracy, customisable solution

With in house developed pressure sensor, model and display, our solution is more cost effective and flexible

# Airport Runway Safety Management – Grid-Based Management



## Monthly Maintenance Report

2013 年第 6 期 (2013 年 6 月)

总第 50 期

内部资料 请勿外传

虹桥国际机场公司

飞行区管理部 施工管理科

(2013 年 5 月 25 日~2013 年 6 月 21 日)

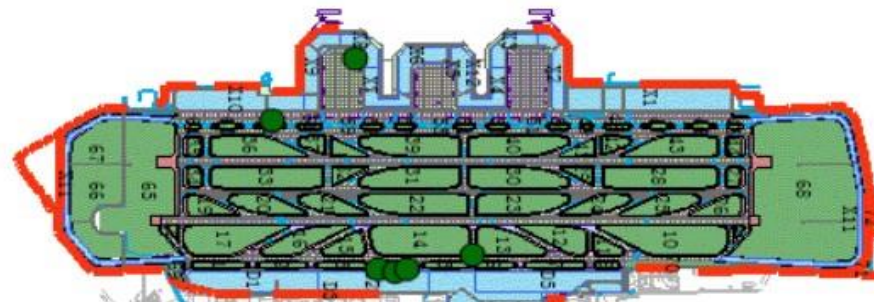
### 一、本月工作总体状况

本月科室无不安全事件, 无重大隐患。飞行区设施维修维护、车辆管理、施工监管方面工作正常开展。

### 二、本月维修维护状况

#### 1、道面接报修情况

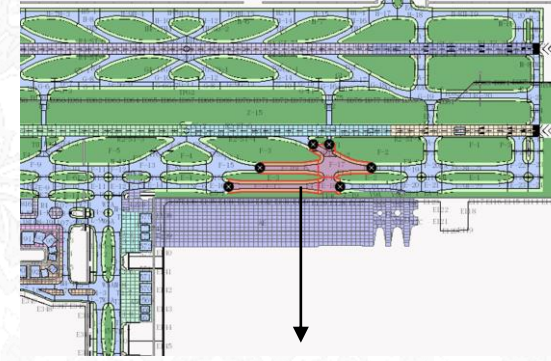
接报 6 起, 实施完 6 起, 接报维修率 100 %, 接报反馈率 100 %。



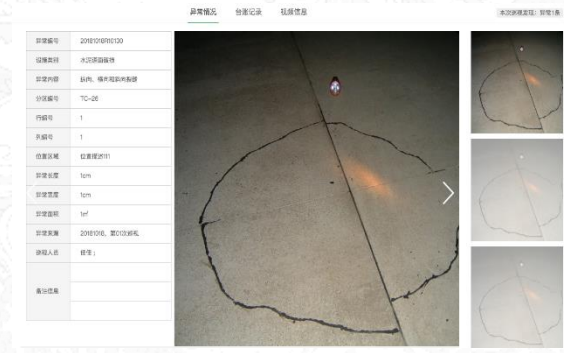


# Airport Runway Safety Management – Tracking of Maintenance and Repair

Full business cycle monitoring of work units



Closed Repair Section



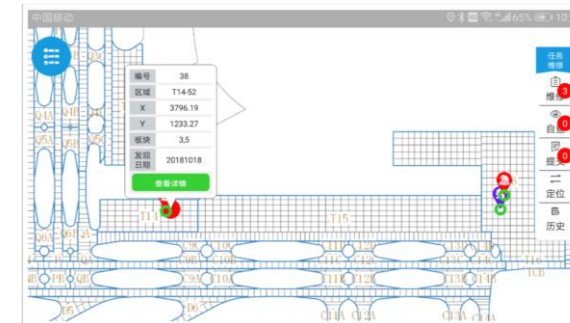
Distress

Distress Code	Distress Name	Severity	Maintenance Work Type	Work Unit
41	Alligator Cracking	L, M, H	Full Depth Pavement Patch	Square Feet
42	Bleeding	N/A	Partial Depth Pavement Patch	Square Feet
43	Block Cracking	L	Seal Coat Treatment	Square Feet
43	Block Cracking	M, H	Full Depth Pavement Patch	Square Feet
44	Corrugation	L, M, H	Full Depth Pavement Patch	Square Feet
45	Depression	L, M, H	Full Depth Pavement Patch	Square Feet

Treatments

Distress ID	Date Source	Inspection ID	MAR Rank	MAR ID	Status
1	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
2	47	2018101810100	2018101810100	2018101810100	待维修人员验证
3	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
4	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
5	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
6	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
7	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
8	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
9	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证
10	2018101810100	20181018	2018101810100	2018101810100	待维修人员验证

Repair Records

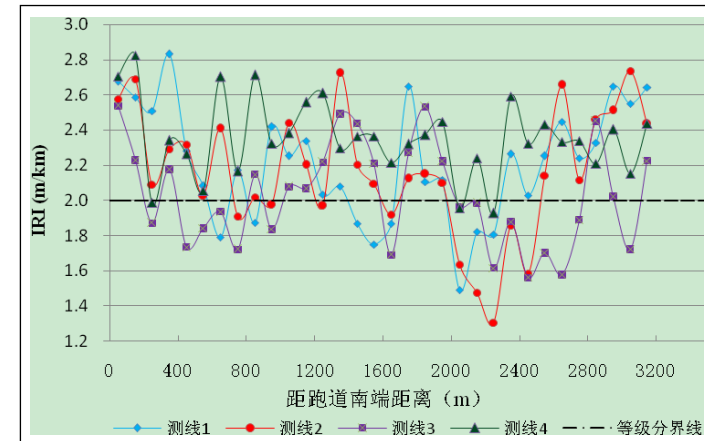
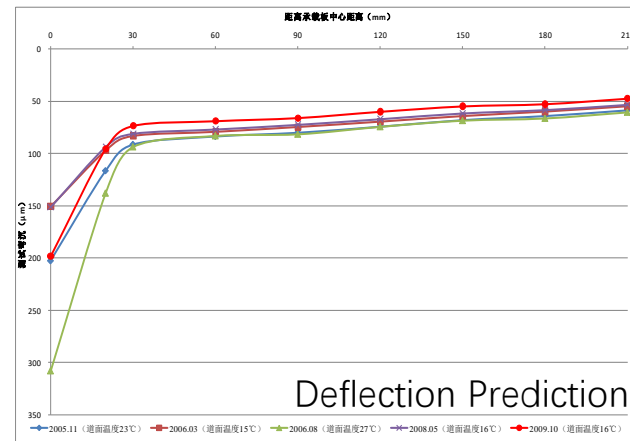
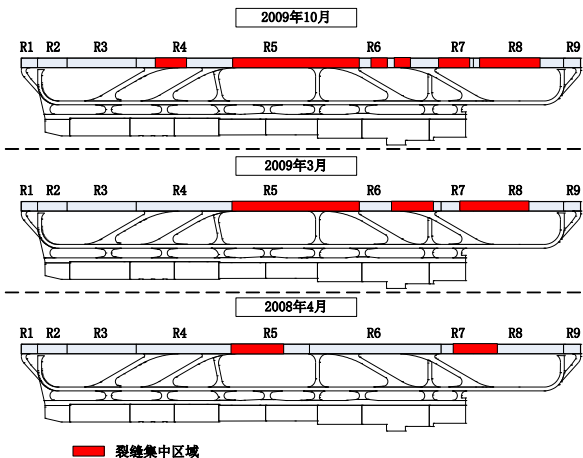
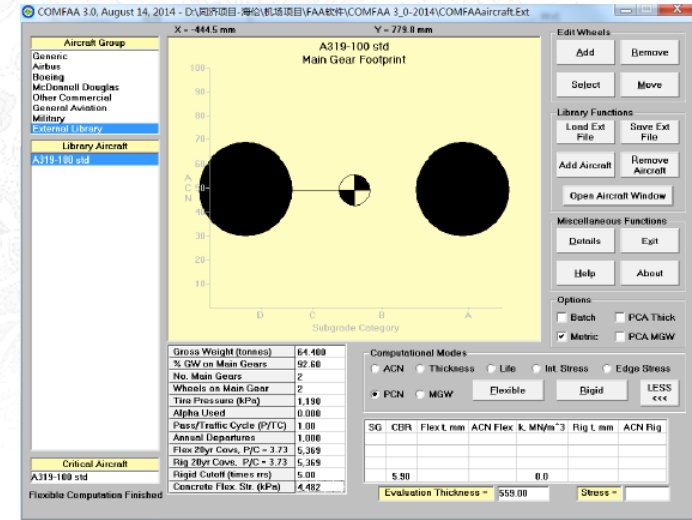
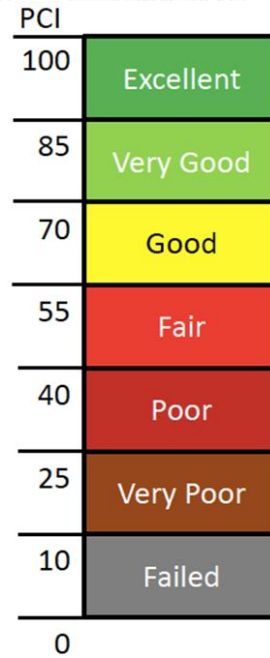


Repair App

# Airport Runway Safety Management – Condition Tracking & Performance Prediction

- Use ASTM D5340-12 to calculate PCI
- Quantify Airport Pavement Condition
- Numerical rating of the pavement condition
- Predicted Lifespan for Runway in 2009: 3.3 years thus repair was done only in 2011

Unit PCI	Section PCI	Branch PCI	A1				
Sample Units	Unit PCI	Unit SCI	Dominant distress	Rating	COV	De...	
1	A1-3	98.20	91.58	起皮、龟裂和块状剥落	中	0.00	详细
2	A1-2	97.70	100.00	小补丁	优	0.00	详细
3	A1-1	100.00	100.00		优	0.00	详细
4	A1-5	100.00	100.00		优	0.00	详细
5	A1-7	100.00	100.00		优	0.00	详细
6	A1-9	97.90	100.00	板角剥落	优	0.00	详细
7	A1-10	99.00	100.00		优	0.00	详细
8	A1-11	99.00	100.00	小补丁	优	0.00	详细



# 03 Solutions and Services

- Public Security Management
- **Intelligent Public Transport**
- Smart Firefighting
- Environmental Protection
- Emergency Management Infrastructure



# Smart Fire Safety Solution

## Users

Fire department

Emergency-related department

Property owner

Residents

Public

Service provider

## Business Application

Remote fire monitoring

Fire safety supervision and management

Real-time fire fighting command

## Data Support Platform

Data share and exchange

IoT access

Big Data

Cloud

GIS

Video management

Converged Comm.

Mobile APP

## Hardware

### IoT Monitor

Fire-resistant door  
Control cabinet  
Fire control host  
Electrical safety detector  
Fire water system  
Smoke/temp. detector

### Video Surveillance

Real-time traffic  
Individual camera  
Fire station CCTV  
Fire control room CCTV  
Aerial viewpoint camera  
Key place CCTV

### Specialized Equipment

UAV  
Respirator  
Interphone  
Fire engine / truck  
Vital signs monitor  
Fire robot

### Intelligent Device

Water mist  
Fire water cannon  
Fire detector with image identification  
Converged communication command system

# 1. Remote Fire Safety Monitoring

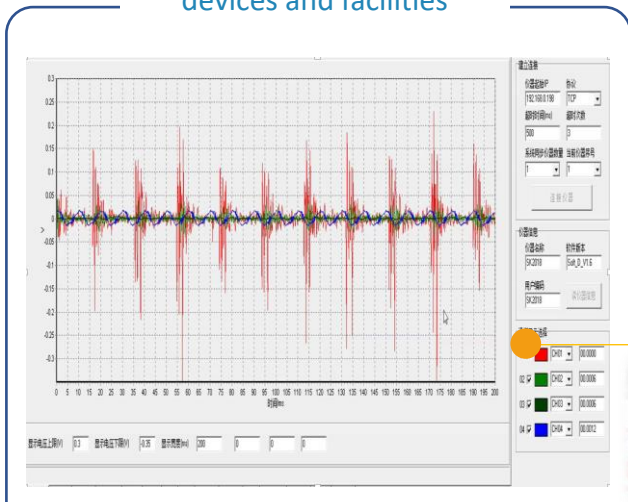
### Hydrant water pressure



### Smoke detector monitor & alarm



### Predictive maintenance of devices and facilities



Control room camera

Electrical fire monitoring

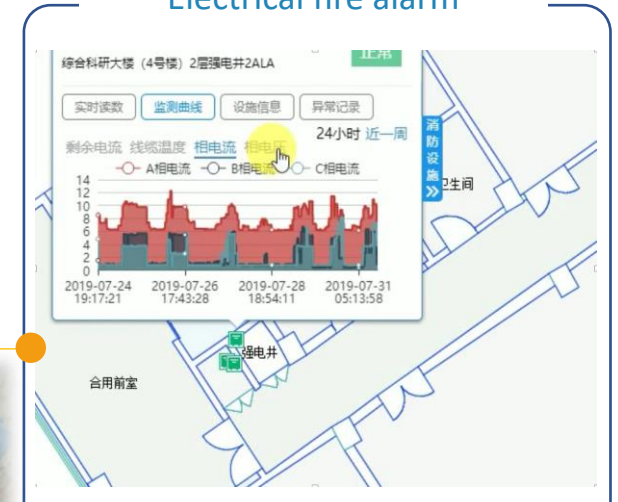
Bluetooth tags

Fire hydrant

Fire alarm host monitoring



### Electrical fire alarm



Camera

Water tank

Fire-proof door

Evacuation routes

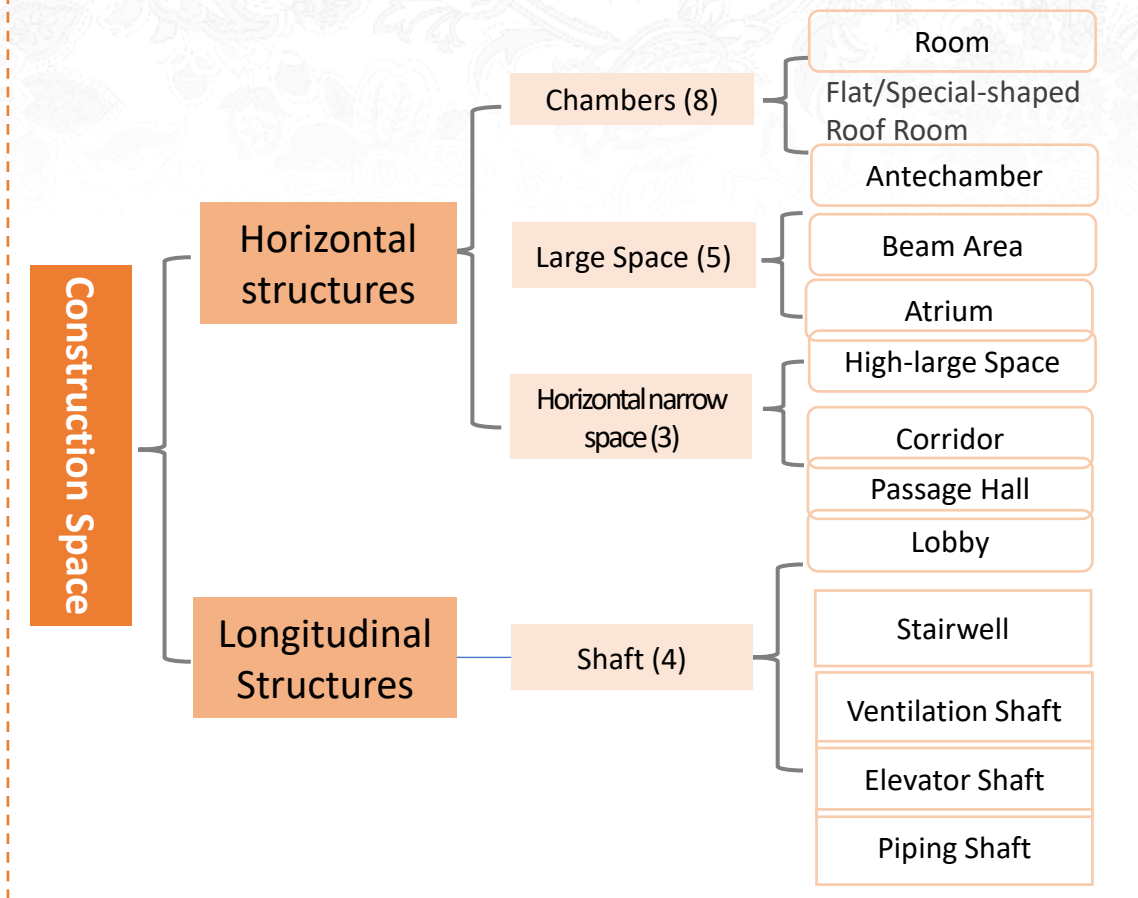
Fire sprinkler

NB-IoT smoke sensor

# 1. Remote Fire Safety Monitoring - False Alarm Reduction

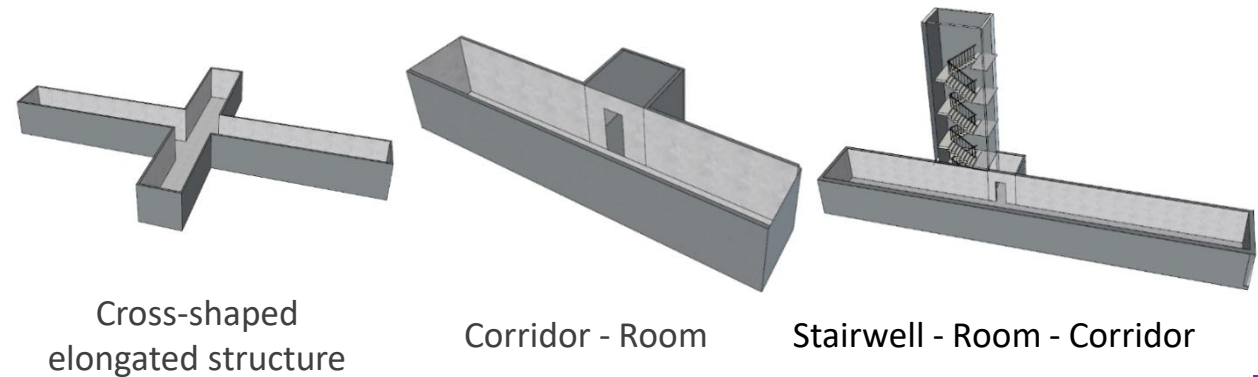
- The smallest spatial unit that characterizes the law of smoke spread in the architectural space -- Architectural Structure Micro-elements
- Increase alarm accuracy by the factor of 100 based on research of different micro-element.

## Types of Architectural Structure Micro-elements

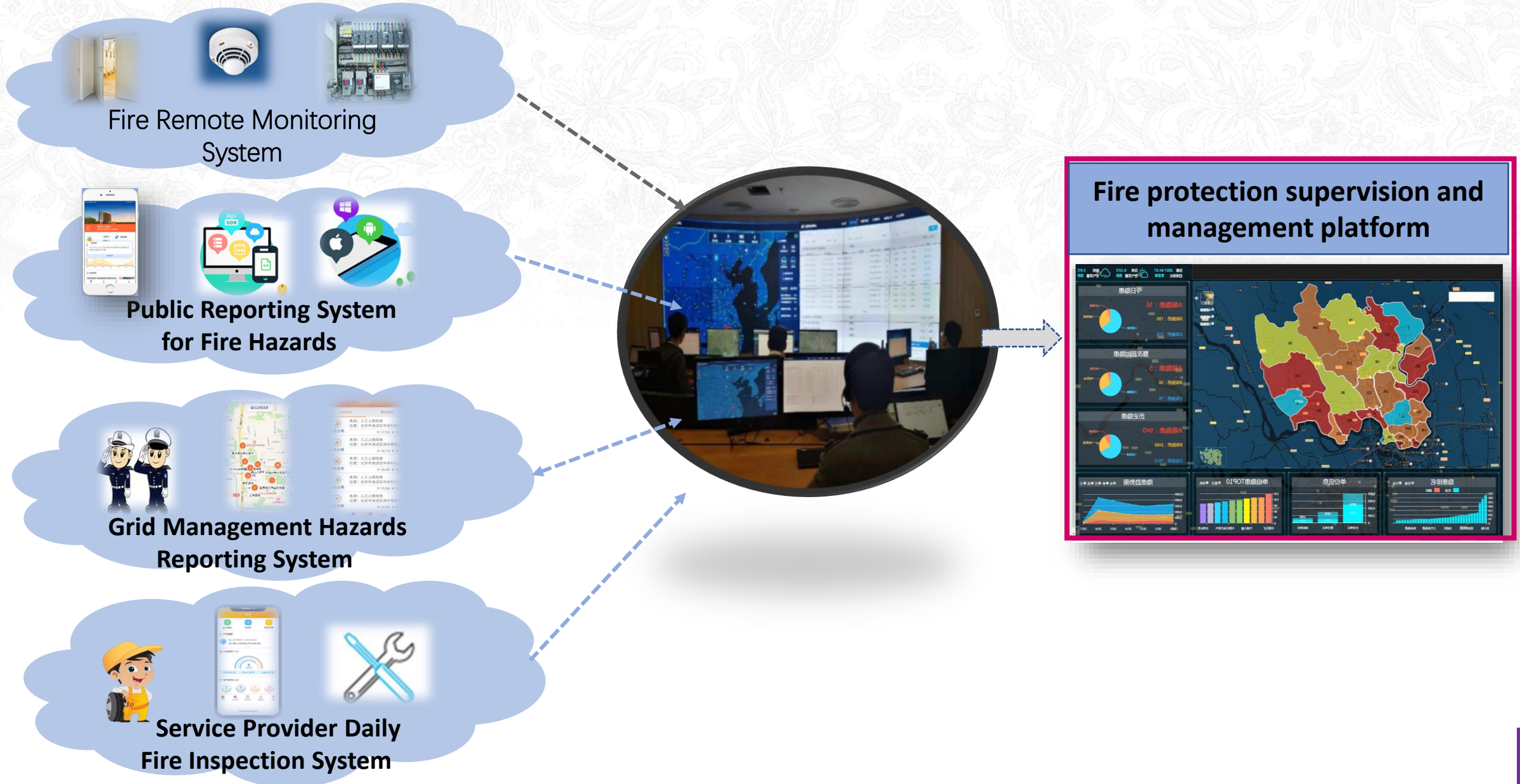


## Architectural Structure Micro-element Adjacency Relationship

<b>Horizontal - Horizontal</b>	Room - Room	Room - Corridor	Corridor - Corridor	...
<b>Horizontal - Vertical</b>	Room - Stairwell	Room - Elevator Shaft	Corridor - Elevator Shaft	
	Corridor - Stairwell	Corridor - Ventilation Shaft		...
<b>Multi-adjacency</b>	Stairwell - Room - Corridor	Room - Corridor - Room		...



## 2. Fire Supervision and Management



## 2. Fire Supervision and Management - Hazard Inspection & Analysis





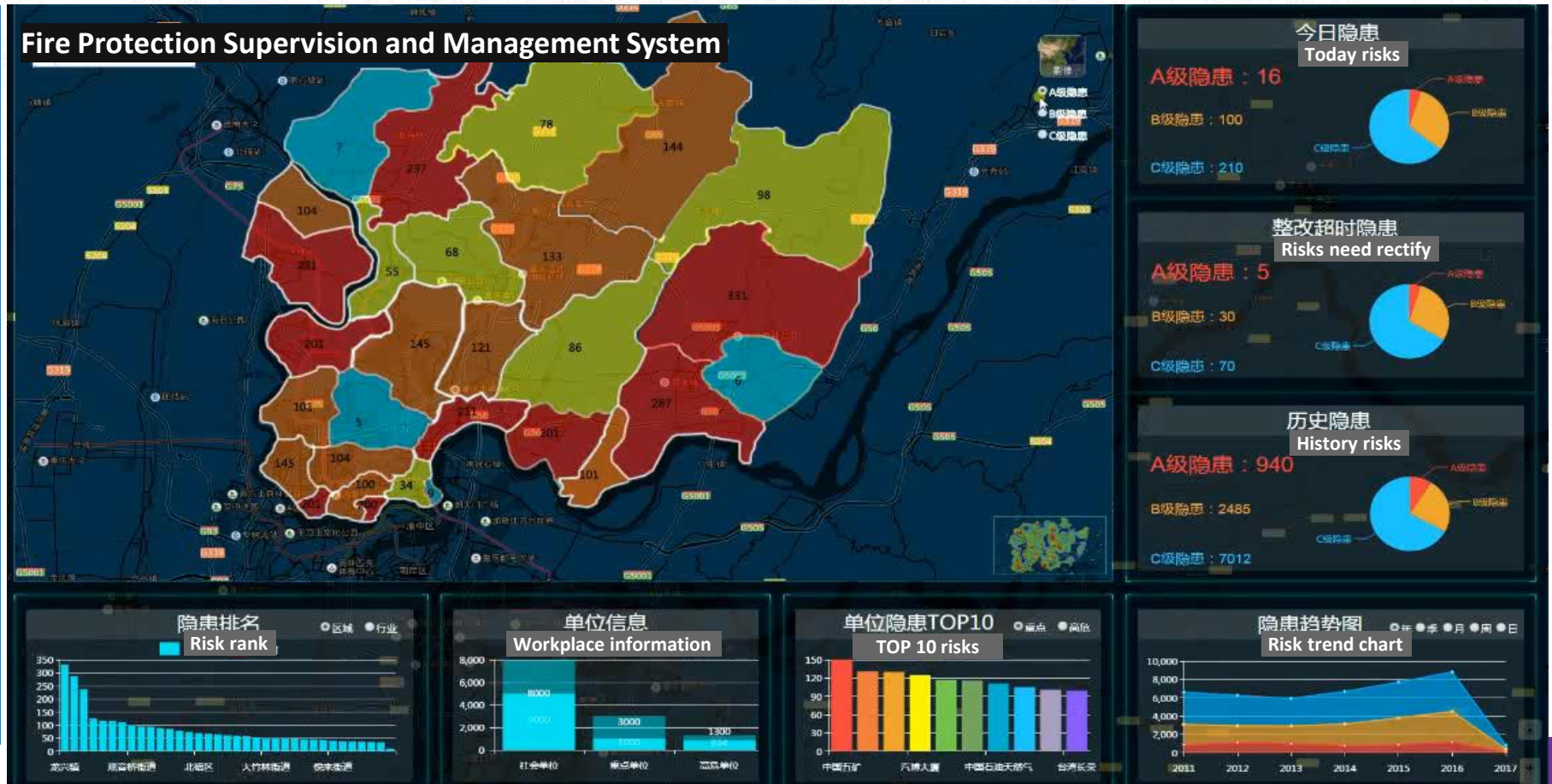
## 2. Fire Supervision and Management - Fire Risk Assessment

- Building structure
- Protection management
- Dangerous source distribution
- Economy development



- Fire IoT remote monitoring data
- Reported hazard data

1. Big data of fire protection
  - Multi-source hazard data
  - Industry hazard distribution
  - Grid inspection data
  - Related companies' data
2. Common operational picture for fire protection & supervision
  - Based on GIS+BIM
  - Fire safety situation awareness in jurisdiction



# 3. Real-time Fire Fighting - En Route Intelligence Support

## Fire information



## Rescue force

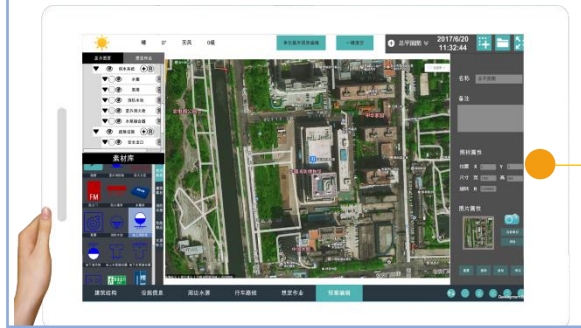
人员信息 4

消防中队 100 100 100 100 100 100 100 100 100 100

姓名	性别	年龄	职务	警衔	警种	所属中队
张三	男	35	队长	一级警长	消防	100中队
李四	男	30	副队长	二级警长	消防	100中队
王五	男	28	班长	三级警长	消防	100中队
赵六	男	25	消防员	四级警长	消防	100中队
孙七	男	22	消防员	四级警员	消防	100中队

消防中队 100 100 100 100 100 100 100 100 100 100

## Firefighting rescue plan



## Affected building floor plan



## Surrounding water source



### 3. Real-time Fire Fighting - Smart Helmet

Carbon fiber composite shell

Radiation-resistant coated mask

Built-in breathing apparatus

Fire retardant lining

External device rail

Double flash warning lights

Smashing-resistant shawls

All-round Situational Awareness

Built-in Camera

- 16 megapixels
- Laser positioning
- Lighting

Vital Sign Sensor

- Blood oxygen
- Heart rate

Hazardous Gas Concentration Sensor

Temperature Sensor

### 3. Real-time Fire Fighting - Field Operation APP



Onsite Video



Positioning & Navigation



Statistics



Live Communication



Danger Alert



PoI Marking



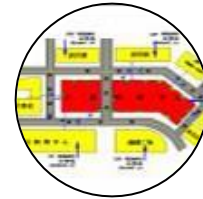
Vital Sign Monitoring



Info Dissemination

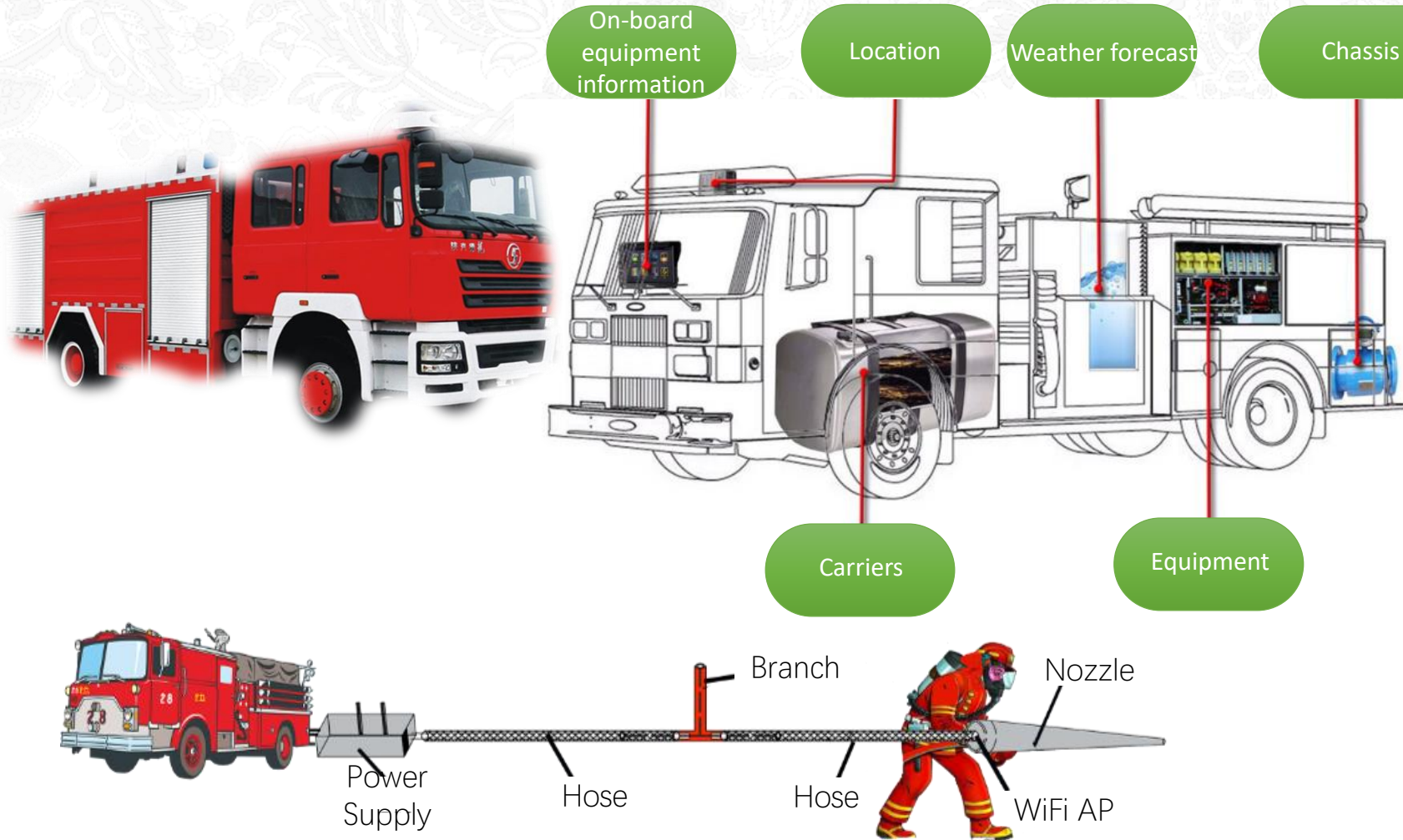


Emergency Plan



### 3. Real-time Fire Fighting - Digitalization of Field Equipment

- Monitor the status of firefighting vehicles, mounted equipment and environment in real-time.
- Assistance & protection for firefighters



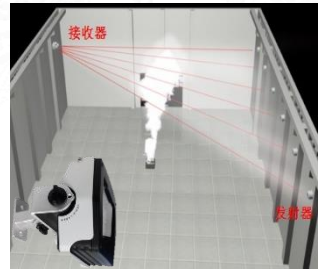
# Smart Fire Safety – Professional Fire Safety Equipment



Image type fire detector



Fire hydrant/sprinkler water pressure monitors



Smoke detectors with optical cross-section



Automatic fire extinguisher



Fire Alarm Controller



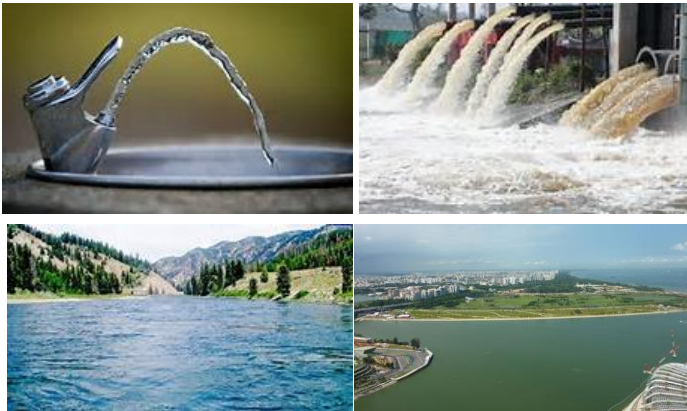
User information transmission device

# 03 Solutions and Services

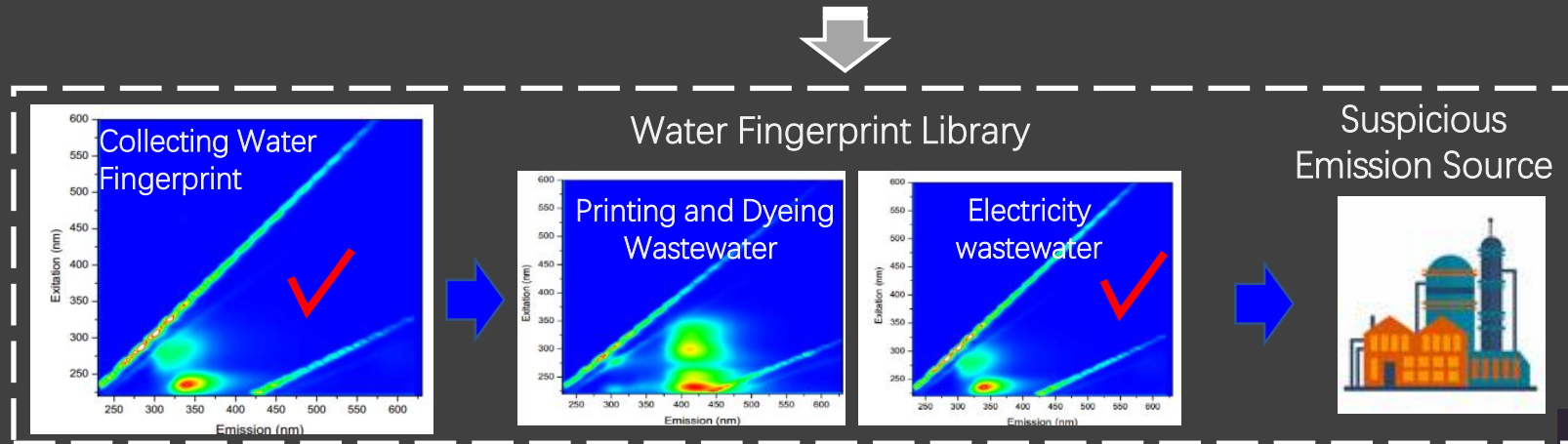
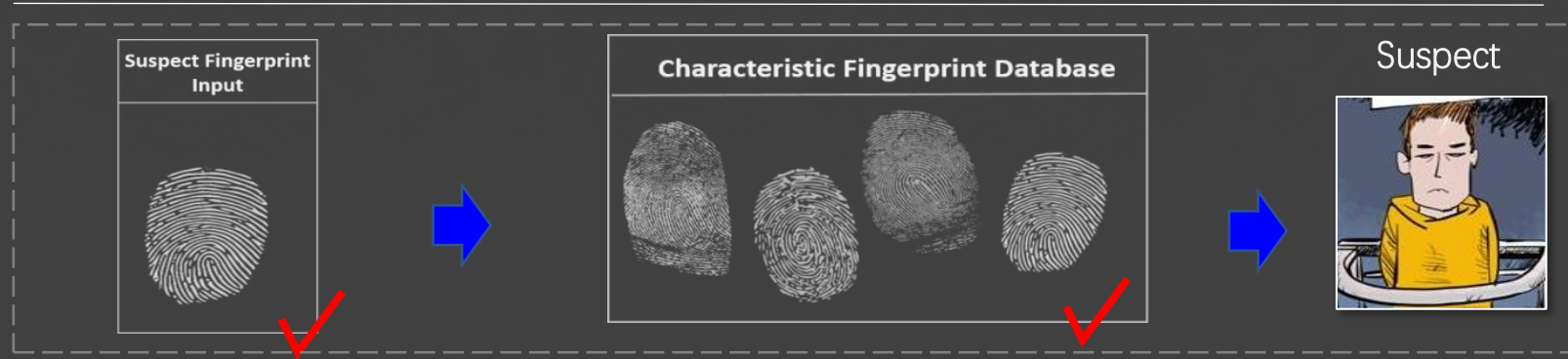
- Public Security Management
- Intelligent Public Transport
- Smart Firefighting
- **Environmental Protection**
- Emergency Management Infrastructure



# Water Pollution Tracer



- Correspondence between fluorescence spectrum diagram and pollution sources one by one, called "Water Fingerprint".
- Fingerprint comparison help learn the type of pollution source.



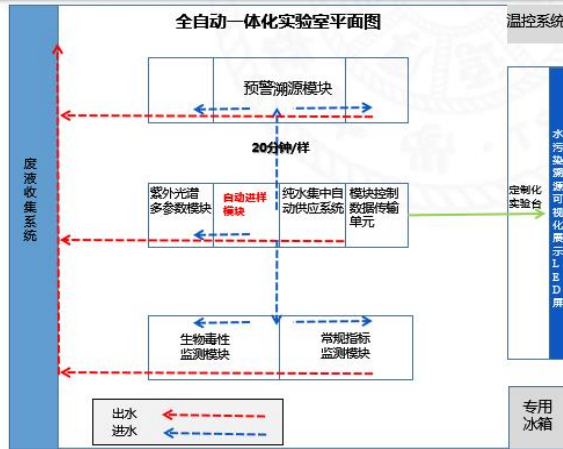


# Water Pollution Traceability Service Center

Automatic and modularized water quality full-feature detection system, saves time and labor costs; reagent-free detection methods eliminate potential environmental hazards.

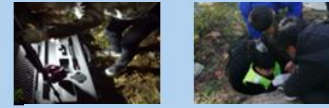


Batch and unattended test taking 20 mins



Flexible configuration and quick response traceability investigation team Point and surface integrated, flexibility and efficiency, monitoring water quality in large river basins in a short time

## Investigation and Evidence Collection



On-Site Survey



Evidence Collection

## Operation and Maintenance



Sampling



Automatic Monitoring Operation & Maintenance

Big data analysis model of water environment

Water quality full feature database



**Batch fast** cloud automatic analysis and comparison, to achieve accurate positioning of pollution source and in-depth analysis of the behavior law. Offline investigation team and program guidance, professional evaluation report

Water environment expert team online service

Core Water Pollution Traceability Algorithm

Offline Investigation	Online Analysis	Technical Support
Batch sampling and water quality testing	Comparative analysis of full feature of water quality	Water quality full feature collection
Violation investigation	Suspected pollution sources and companies screening	Automatic water quality monitoring operation and maintenance
Illegal pollutant discharge evidence fixation	Law of illegal discharge analysis	Database system operation and maintenance

# 03 Solutions and Services

- Public Security Management
- Intelligent Public Transport
- Smart Firefighting
- Environmental Protection
- **Emergency Management Infrastructure**



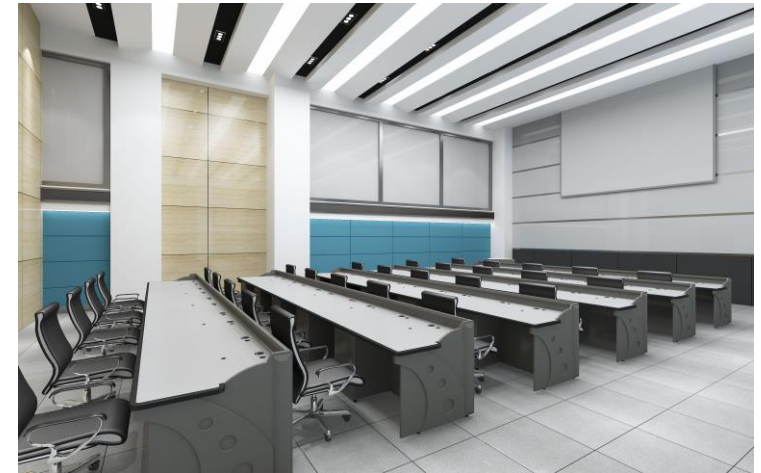
# Emergency Management Infrastructure – Command & Control Center



Command Hall

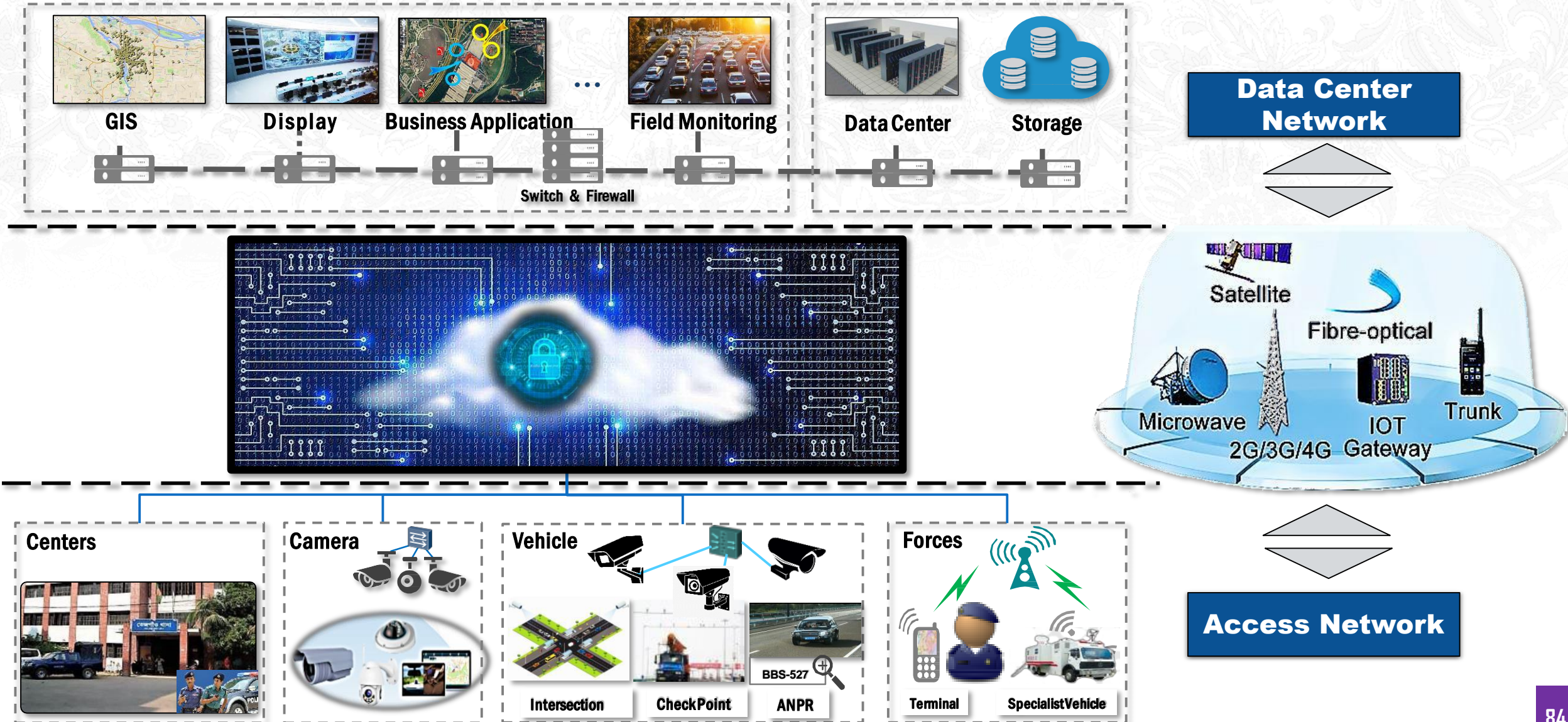


Conference Room

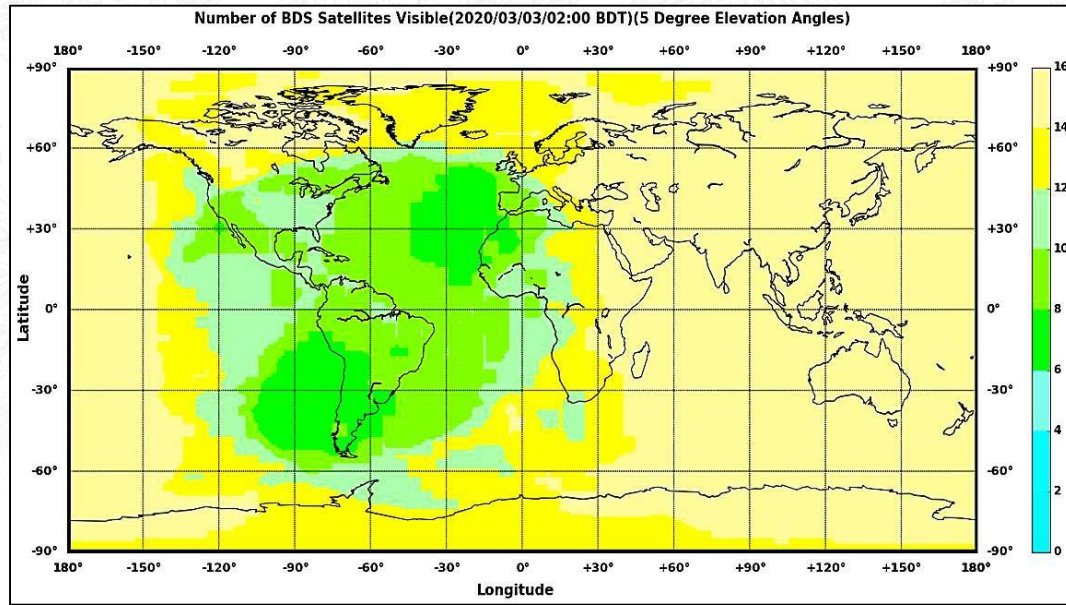


Training Room

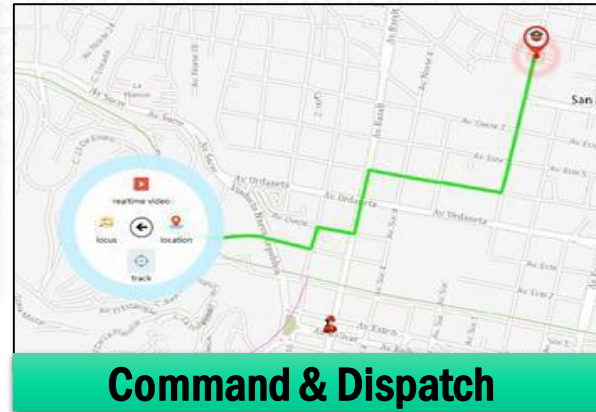
# Emergency Management Infrastructure – Integrated Communication and ICT Components



# Emergency Management Infrastructure – BeiDou Satellite High-Resolution Positioning System



Ideal for Key Applications of Urban Safety and Security



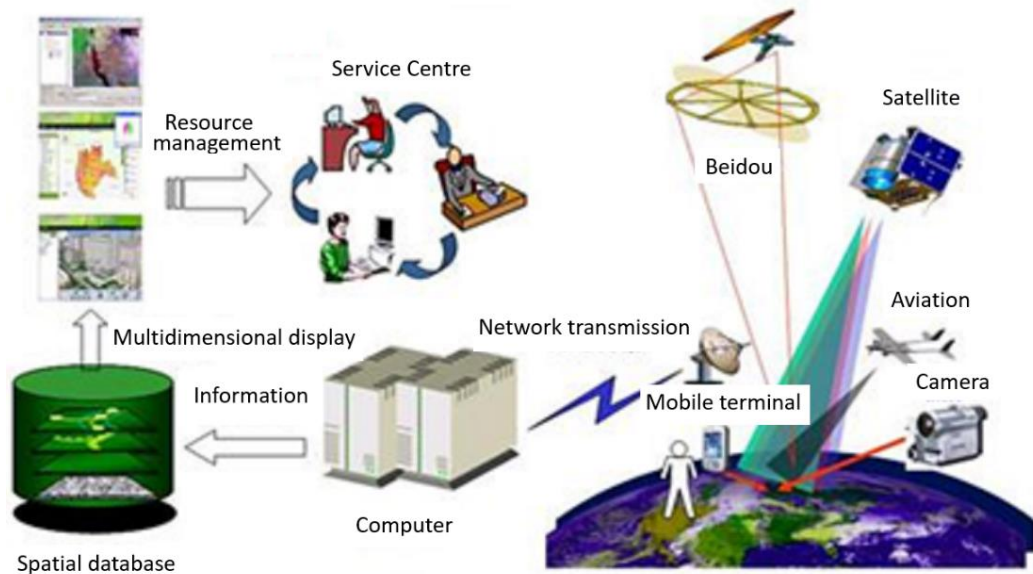
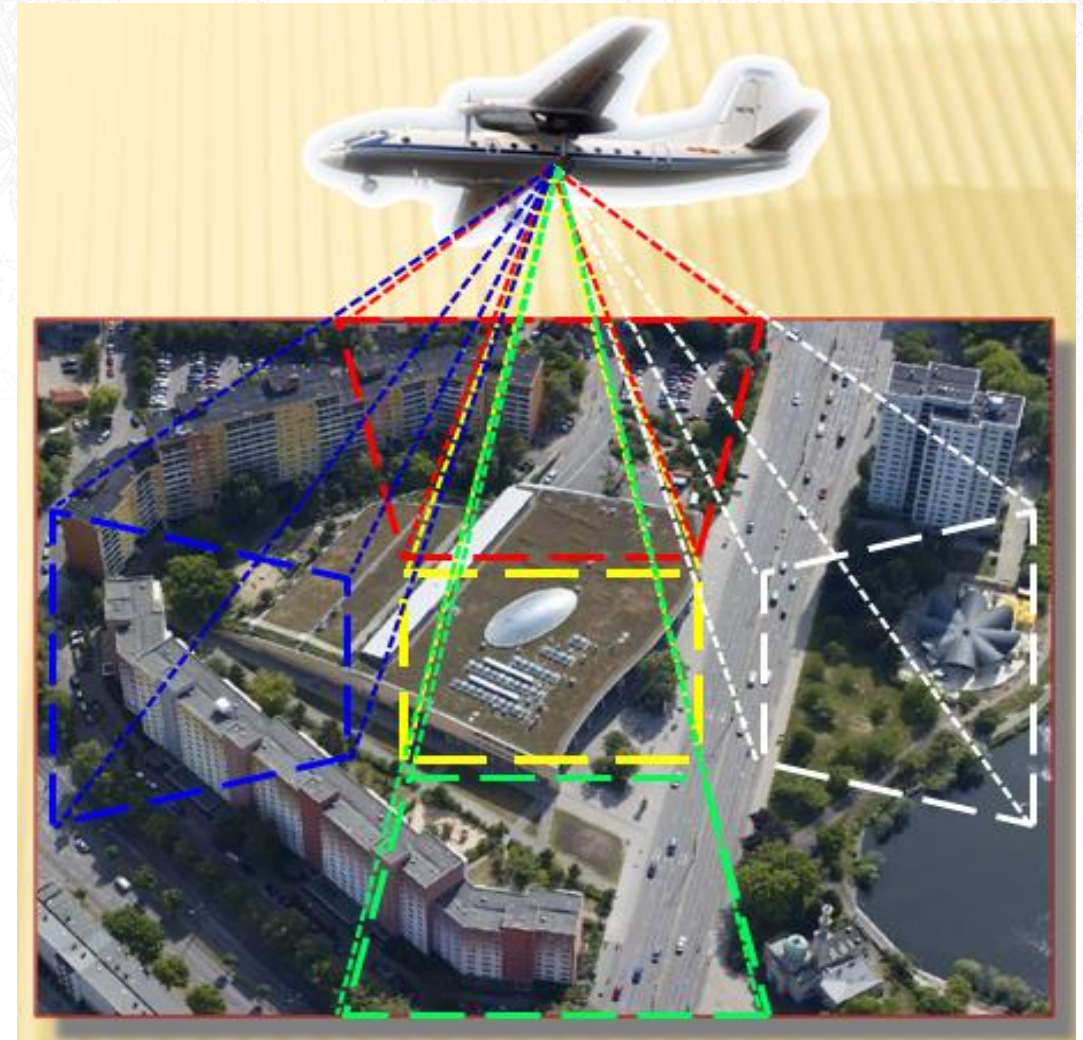
## Superior Performance in Selected Regions

Performance	GPS	BeiDou Satellite	BeiDou High-precision Positioning
Horizontal	<10m	<5m	2cm
Vertical	<20m	<10m	4cm
Timing	10ns	10ns	10ns



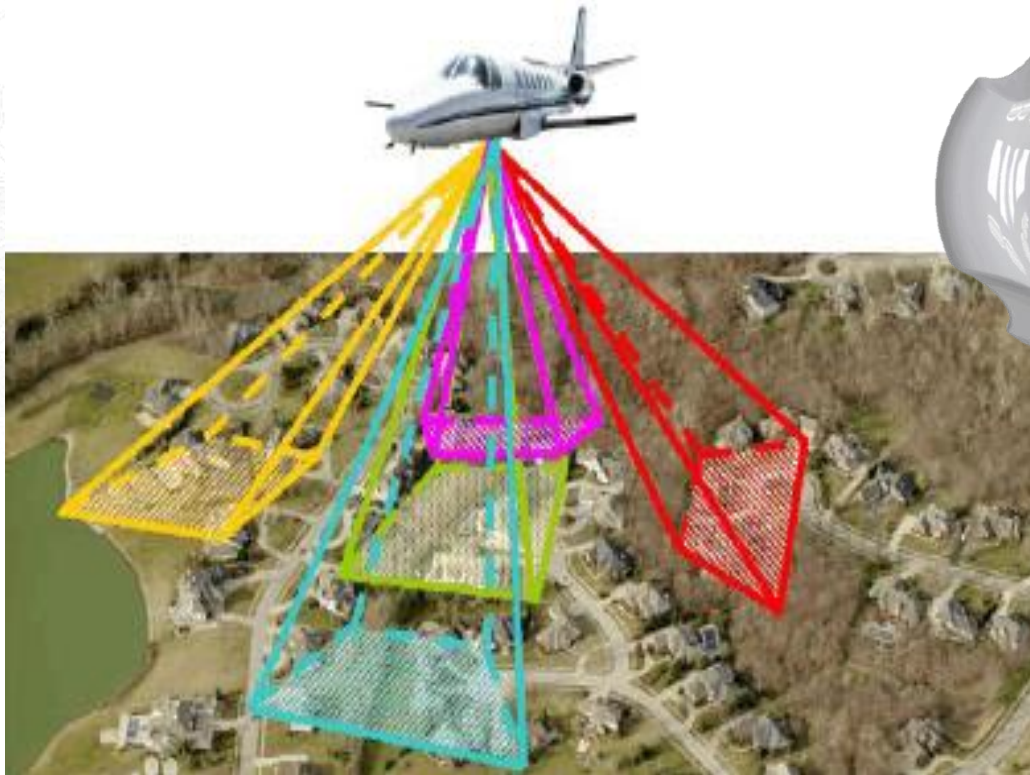
# Emergency Management Infrastructure – Survey & Mapping System

- Small and medium scale surveying and mapping
- Static and dynamic measurement data collecting
- High-precision engineering sample releasing
- Hydrogeological surveying and mapping
- Post-disaster all-weather surveying and mapping



# Emergency Management Infrastructure – Oblique Photography

## New Generation Five-eye Tilt Camera



Compatible Platform	Fixed/Multiple Rotors
CCD Size	23.5*15.6mm
Size	φ170*80.5
Minimum Width	160mm
Net Weight	600g
Single-Lens Reflex	2400w
Equivalent Focal Length	40mm/60mm
Photographing Interval	0.8S
Copying Speed	≥45M/s
Shutter Synchronization	20ms
Lens Layout	Inner opposite
Minimum optical path diameter	62mm

- Collect synchronously images from five different perspectives (one vertical, four oblique), permitting a rich high-resolution texture of the building's top and side views;
- Reflect truly the situation of objects and obtain the precise texture information;
- **Generate a real 3D city model through advanced technologies (positioning, fusion, modeling, etc.),** which can be widely used to support emergency command, homeland security, urban management, real estate taxation and other industries.

# Application examples





# Emergency Management Infrastructure – Mobile Command and Control

Transferring methods



Base station

User terminals



Mobile phone



Cable phone



Notebook



Command and control center



Audio  
Video

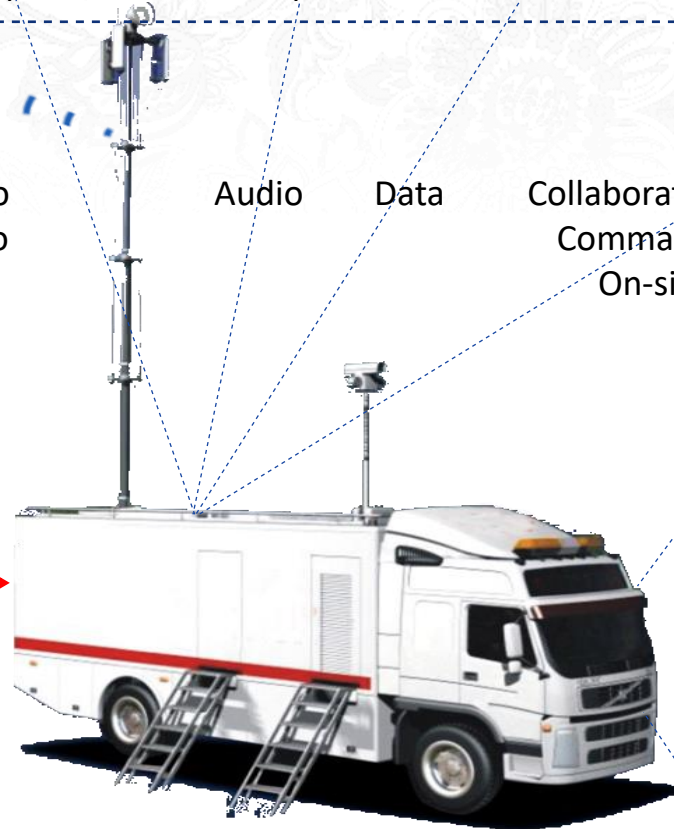
Audio

Data

Collaborative consultation  
Command and control  
On-site feedback

Fiber interface

Cable network



Emergency communication vehicle

Ground station



Mobile Station



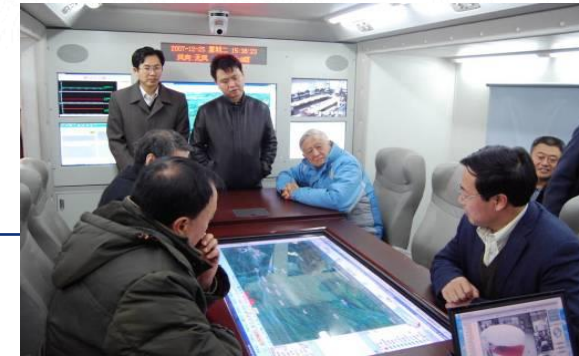
UAV Controller



Portable Station



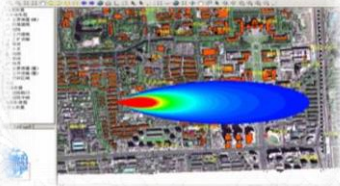
Recharger



# 04 Successful Cases



# Emergency Management in China



- 1 National center
- 26 provincial/municipal centers
- 4/5 mainland China

- China National System of Emergency Platforms
- China National Early Warning System
- Comprehensive Monitoring and Early Warning of Natural Disasters for the Ministry of Emergency Management of China
- 2008 Wenchuan Earthquake
- 2008 Beijing Summer Olympic
- 2010 Jiangxi Flood
- 2010 Yushu Earthquake
- 2014 Typhoon Rammasun
- 2016 Hangzhou G20 Summit
- BRICS Summit 2017
- 2022 Beijing Winter Olympic



# Hefei Urban Lifelines Safety Operation Monitoring Center

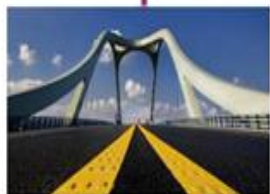


## Monitoring of urban lifelines in Hefei:

- 51 bridges
- 822km gas pipeline network
- 739km water supply pipeline network
- 254km drainage pipeline network
- 201km heat supply pipeline network
- 14km medium water pipeline network
- 57900 elevators
- 150km river water environment
- 58.5km comprehensive pipe gallery



Water distribution network



Bridges



Gas pipeline network



Comprehensive pipe gallery



Elevator



Urban infrastructure

Pipeline monitoring mileage **exceeds 2200 km**

Monitoring data is **50 billion entries everyday**

# Smart and Safety Foshan

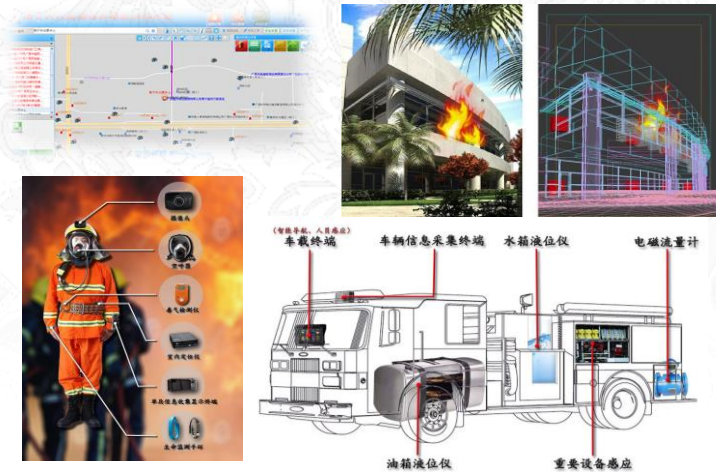


- 7 Large-scale bridges
- 204km Gas pipeline and adjacent space
- 600 Gas end users
- 78km<sup>2</sup> drainage system
- 100+ Elevators
- ...



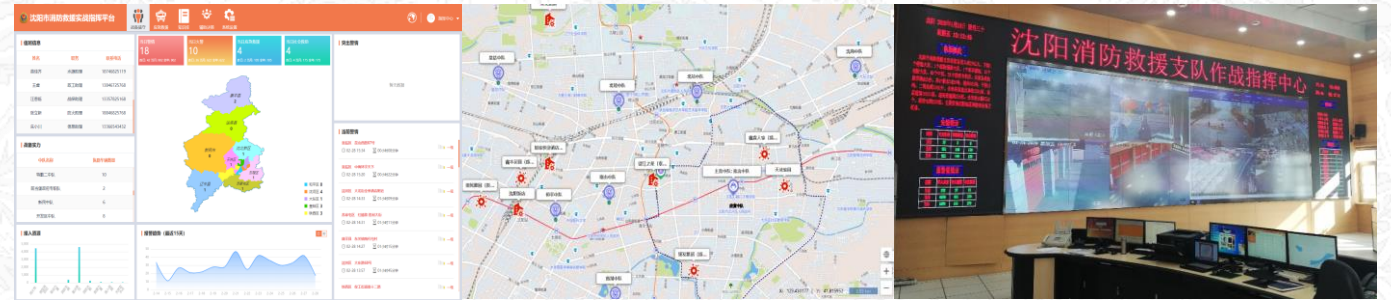
- 8 business modules (bridge, gas, drainage, fire, rail transit, elevator, road transport)
- 2 core systems (city operation monitoring, emergency command)

# Smart Fire Safety



## Nanning City Smart Firefighting Platform

- Real time monitoring, alarm call-taking and dispatch
- Visualization based on IoT and BIM
- Fusion of fire scene dynamic information
- On site online consultation 3D digital simulation drilling system



## Shenyang City Smart Firefighting Platform

- Realized rapid and accurate reception of alarms, graded dispatch, on-site real-time tracking and command, multi-dimensional information statistical management, etc.
- The average annual disposal of more than 20,000 fire



## Tianjin City, Jinnan District Smart Firefighting Platform

- Including firefighting integrated business management system, fire emergency response system and social service platform.
- Through the Internet of Things data platform, the fusion display of smart fire safety business data and fire social service data is realized.

# One-stop Fire Safety Cloud Service

## Government Customer



- **Hefei Economic-tech Development Zone (ETDZ), Anhui**
  - one stop managed fire safety service for 18 key agencies and 984 householders. Cover 1.33 million m<sup>2</sup>
- **Tangshan harbor economic development Zone, Hebei**
  - Provide fire socialization services for 42 key fire units and 1400 small business premises
- **Foshan City, Guangdong**
  - One-stop trust service for fire safety for 10 key fire units
- .....

## Enterpriser Customer

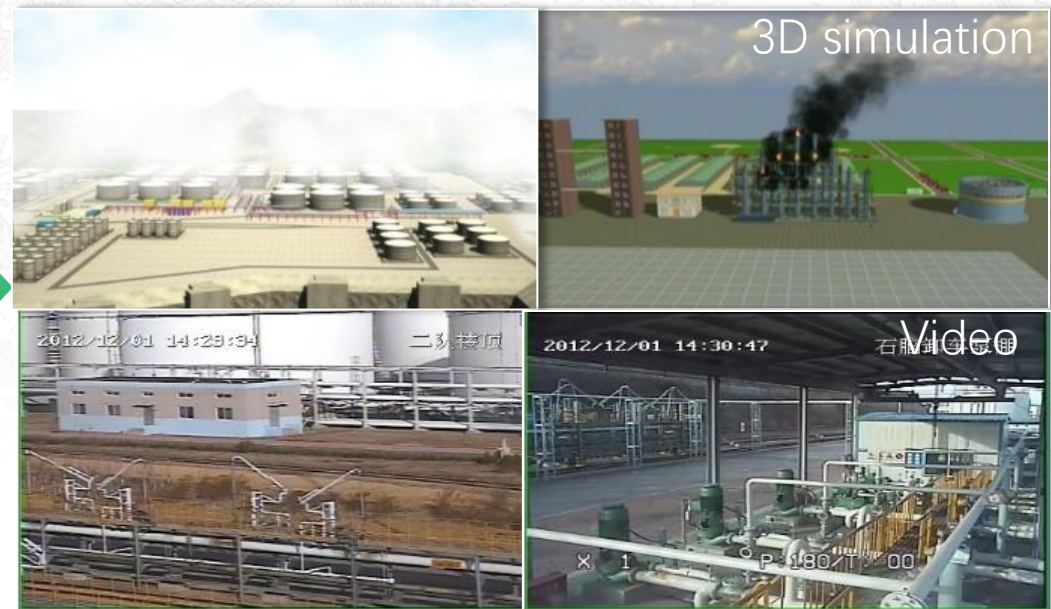


- **Lanshan shopping mall in Linyi city, Shandong**
  - More than 40,000 merchants, and more than 40,000 electrical fire monitoring equipment
- **Nanjing South Railway Station, Jiangsu**
  - Integrate the security video surveillance system
  - Monitor the alarm status of fire equipment in real time,
  - the distribution of fire equipment in 3D map overview and the emergency response of fire situation
- **Hefei District Construction Investment Co., Ltd. Anhui**

# Intelligent Safety Management of Chemical Industry Park in Dalian City



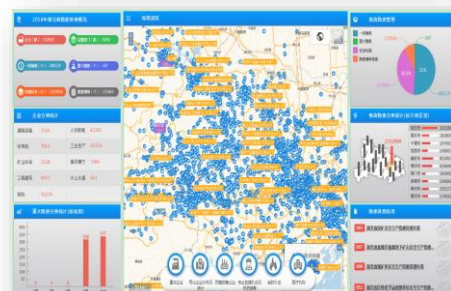
Emergency visualization application in one map



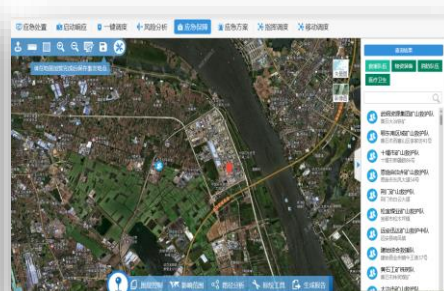
Integrated business and command dispatching system



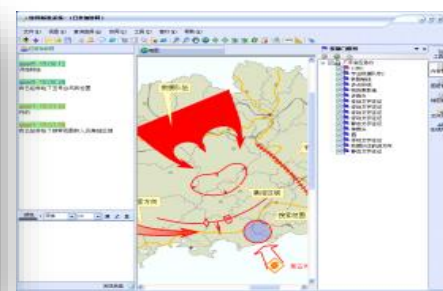
Emergency plan



Information Integration



Command and Dispatching



Online Consultation



Situation Analysis



# Macau Emergency Command Application Platform

- Commissioned by MSAR
- Key component of Macau Disaster Prevention and Reduction Plan (2019-2028)
- Successful application in Typhoon Mangkhut 2018, Tropical Storm Wipha 2019, Typhoon Higos 2020
- New civil operation coordination centre



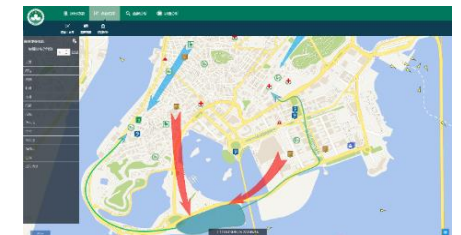
Expert Group Received by Chief Executive



Chief Executive's Visit to IPSR



"Jade Fish 2018 - 2021" Simulated Response Exercise



# Ecuador -Public Safety Management System

## Command & Control Center



Police



Risk Control



Medical Care



Military



Fire-fighting



Municipal Administration



Transportation



- 2 National Command Center
- 5 Regional Command Center
- 9 Local Command Center



## Application Support Platform



**ECU-911 – PROJECT EFFECT**  
By the end of 2016

**4.5 million+**  
emergencies have been disposed

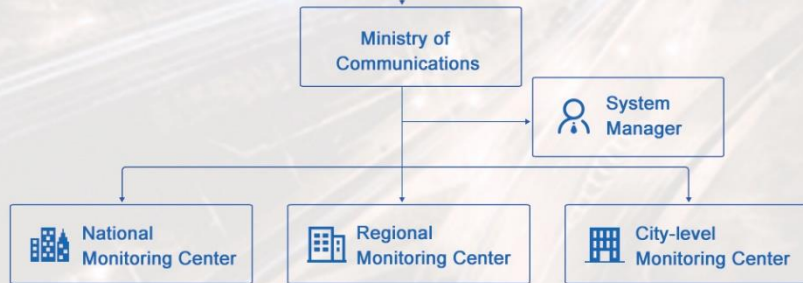
**10,000+**  
lives have been saved

the Ecuador's safety ranking has been Boosted from  
**16th to 4th** in Latin America

# Ecuador - Intelligent Traffic Management Platform (ANT)



**155,000**



- SECURITY MONITORING
- ALARM & ALERT MANAGEMENT
- INVESTIGATION SUPPORT & SERVICES
- TRAFFIC MANAGEMENT
- INSTALLATION & MAINTENANCE MANAGEMENT
- MOBILE APP SERVICES

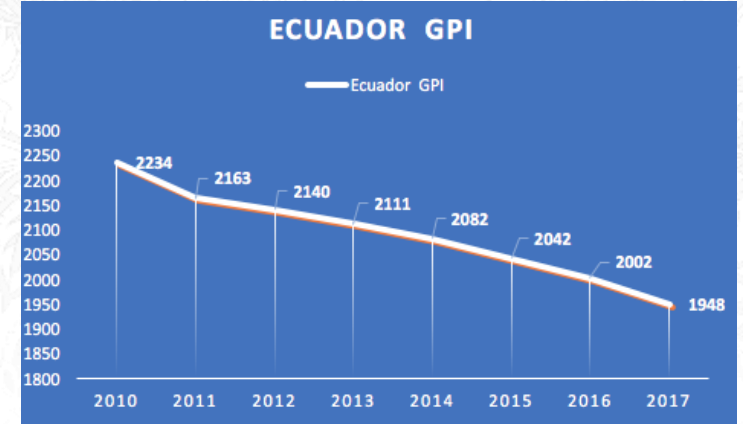
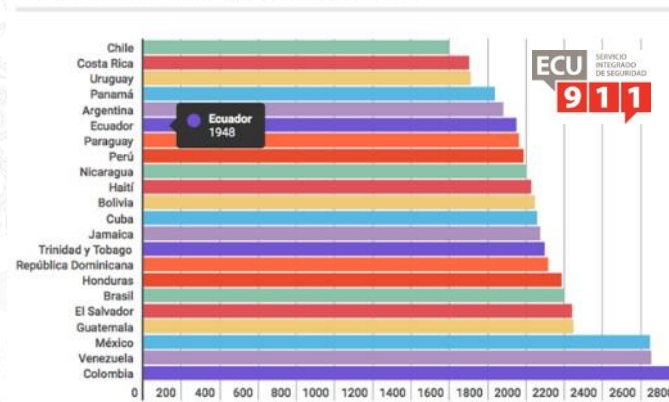
- Emergency Alarm
- Video Monitoring
- Positioning & Tracking
- Image Capture
- Alarm Dispose
- Vehicle Monitoring Management
- History Search



# Public Safety Management System for Ecuador (ECU911)



Los países de América Latina



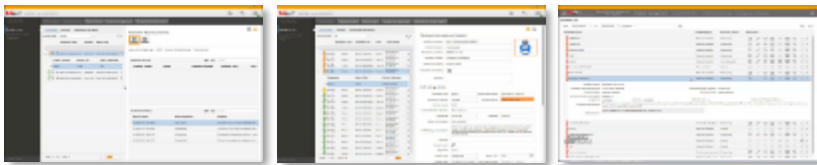
## Performance:

- **34,000,000** emergency cases handled per year
- Public safety incidents reduced by **29%**, crime rate down by **24%**, robbery cases down by **36.54%**
- 92% emergency call responded within **4 seconds** (vs. 3 minutes in 2012)
- Emergency responding time reduced by **15 seconds**, 8,000 lives saved per year
- GPI world-wide ranking **#66** (vs. #112 in 2010)
- GPI Latin-America ranking **#6** (vs. #18 in 2010)
- EENA **A level** ranking (First in Latin America)

# Trinidad and Tobago National Operations Center



**Emergency Management & Response Platform**



**Multi-video Display**



**Real-time Video**



**Camera Status**



**Feature Analysis**



**Intelligent Video Analysis**



**Video Search**



**Clues**



**Electronic Sand Table**



**Police Terminal**



**Mobile Command Center**



# Angola – Public Safety & Emergency Management System



## URBAN SAFETY:

- EFFECTIVE MONITORING OF URBAN CONTROL TARGETS
- UNIFIED CALL-TAKING
- RAPID COMMAND & DISPOSAL OF EMERGENCIES



## ANTI-TERRORISM:

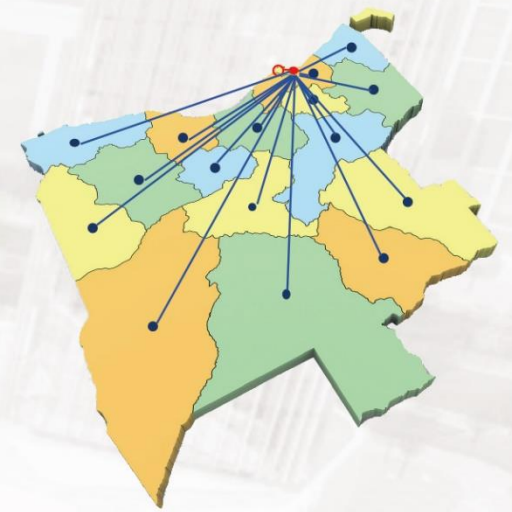
- COLLECTION & ANALYSIS OF MULTI-SOURCE INTELLIGENCE
- COMPLETE SET OF ANTI-TERRORISM EQUIPMENT



## DISASTER RESPONSE:

- RAPID ACQUISITION OF REAL-TIME SITUATION
- SCIENTIFIC ANALYSIS OF DISASTER TREND
- RAPID FORMATION OF DISPOSAL PROGRAM
- CROSS-DEPARTMENT COLLABORATIVE RESPONSE

- Border Police Department
- Prison Management Department
- Immigration Department
- Crime Investigation Department
- Police Department
- Fire Control Department
- Medical Department
- Customs Department



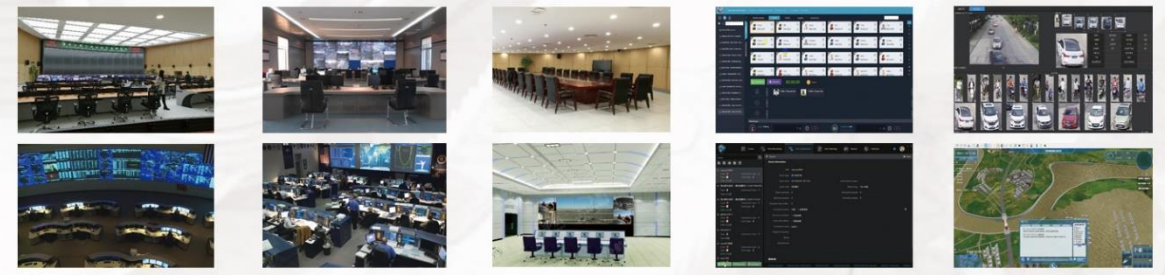
## NATIONAL SYSTEM

- ▶ National Public Safety Center
- ▶ Vessel-mounted Integrated Command Center
- ▶ Exclusive Emergency Command & Control Airplane
- ▶ Rapid Response Troop
- ▶ Geographic Information Mapping System

## PROVINCIAL SYSTEM

## STATION SYSTEM

## FRONT-END INFORMATION COLLECTION SYSTEM



- Public Safety Sharing & Exchange Platform
- Public Safety Big-Data Integrated Analysis System
- Internet Monitoring System
- Public Safety & Emergency Response System
- Video Surveillance System



# Laos Smart Prison Management Project



- Implemented for prisons in 4 major cities in Laos
- Comprehensive monitoring of prisons based on IoT technologies
- Smart prison administration system to facilitate departmental business



# Singapore Intelligent Video Analysis - VTM System

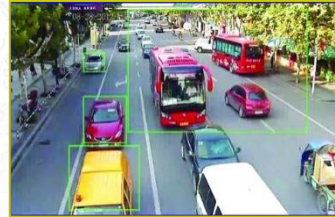
## Panoramic Mosaic

- Real-time screen
- Panoramic view



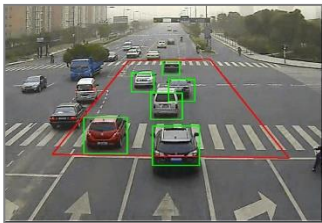
## Vehicle Recognition

- Color
- License plate
- Trajectory
- Type



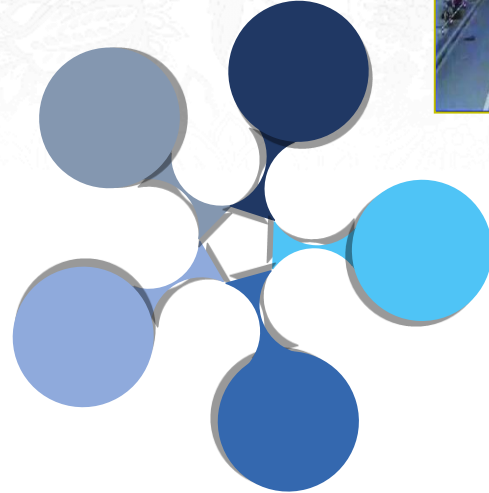
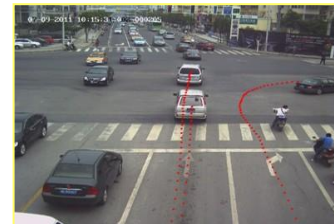
## Vehicle Behavior Analysis

- Run at red light
- Over speed
- Converse driving



## Vehicle Tracking

- Real-time trajectories
- Trend



## Video Retrieval

- Selecting and matching the interested vehicles





# Public Safety Management System for Makati City of Philippines

- Start & End Time  
Dec., 2017- Mar., 2018
- Clients  
Makati City Hall Disaster Risk Reduction and Management Office(DRRMO)
- Objectives  
An efficient platform to improve public safety and reduce disasters risk for Makati



Makati City Hall DRRM Command Center



Makati City Hall



On-site Training

- 20 Seats
- Covering over 1 million population
- Connection 6 departments

# Other International Projects



Gov't Emergency Management



Smart Urban Management



Environmental Safety



National Command Control Centre



Cyber Security



Smart Fire Safety



Smart Civil Protection



Work Safety



Changi Airport-Singapore



Fire Safety for Great Stone Industrial Park



Plataforma de Gestão Integrada do Bilhete de Identidade

National ID & Population-Angola



The Government of the Republic Of Trinidad and Tobago Office of the Prime Minister



National Operation Centre - Trinidad & Tobago

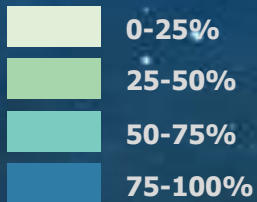
# 05 Outlook



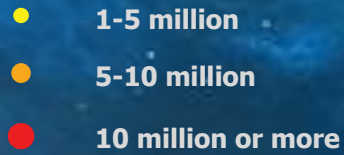
# Urban Safety & Emergency Management



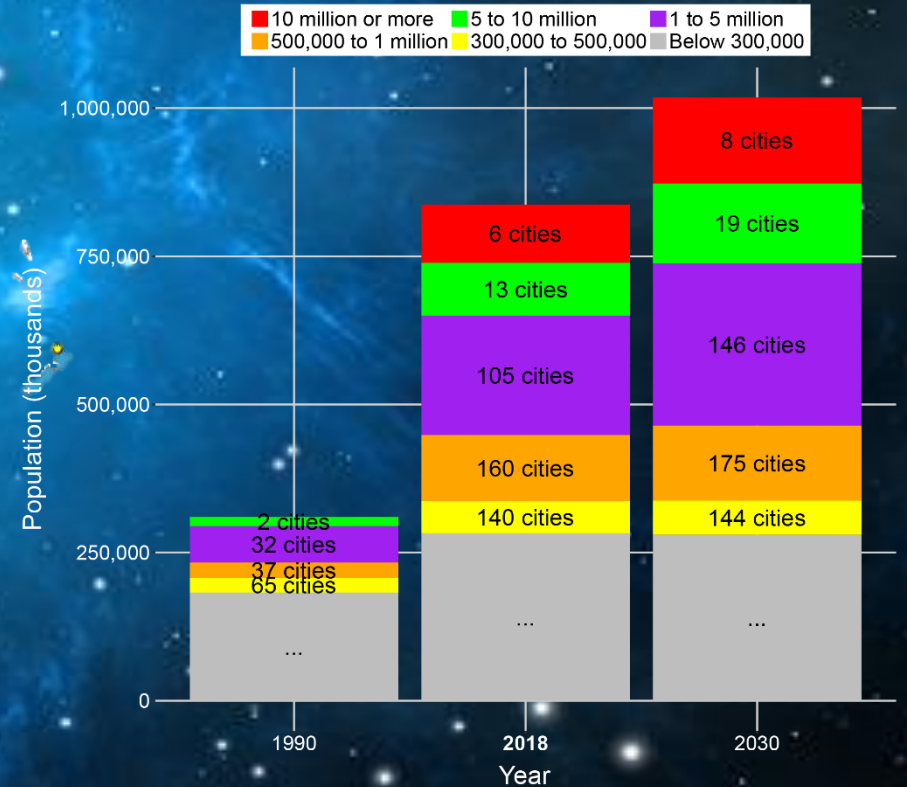
## Percentage Urban



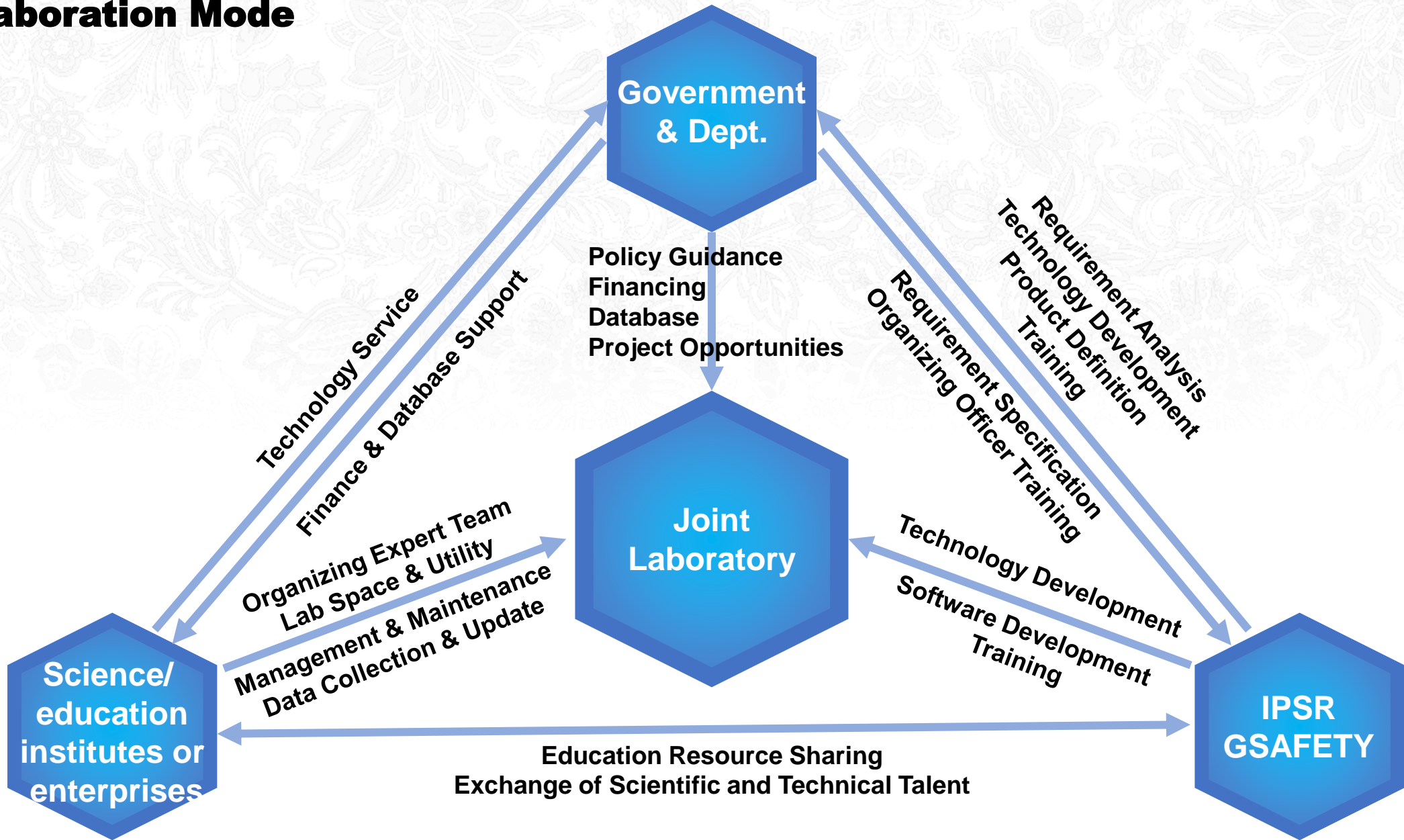
## City Population



Urban population by size class of urban settlement  
China

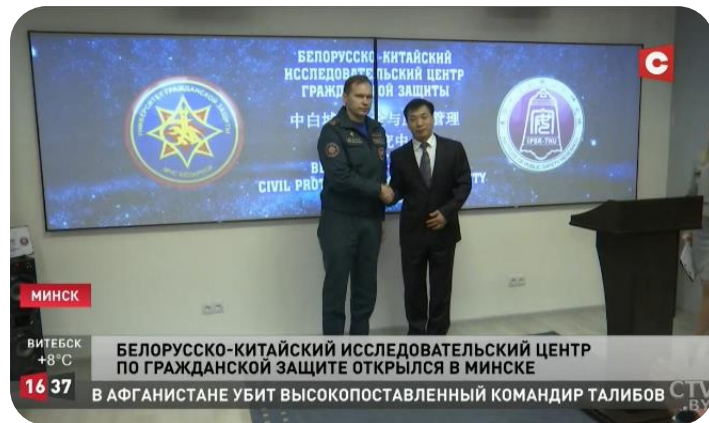
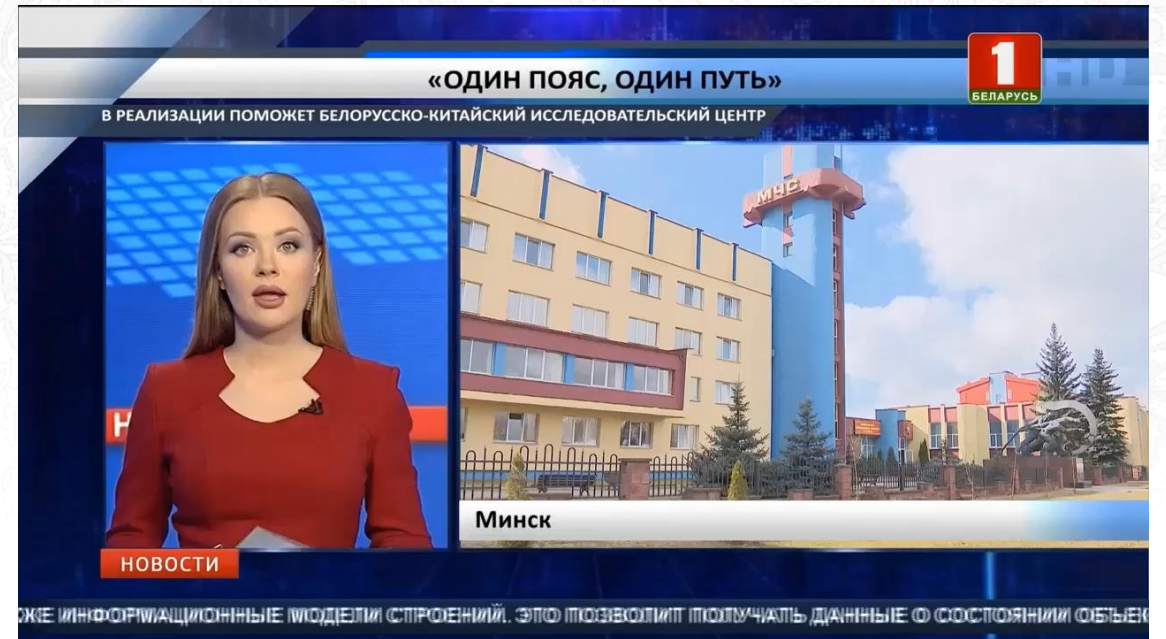


# Collaboration Mode



# Case: Belarusian-Chinese Civil Protection and Urban Safety Research Centre

- Belarusian-Chinese Civil Protection and Urban Safety Research Centre launched in March 2019
- Main research direction: smart fire protection
- The first project in Belarus Education Year



Launching Ceremony



Alexander Khudoleyev, First Deputy Minister of the Ministry of Emergency Situations of Belarus

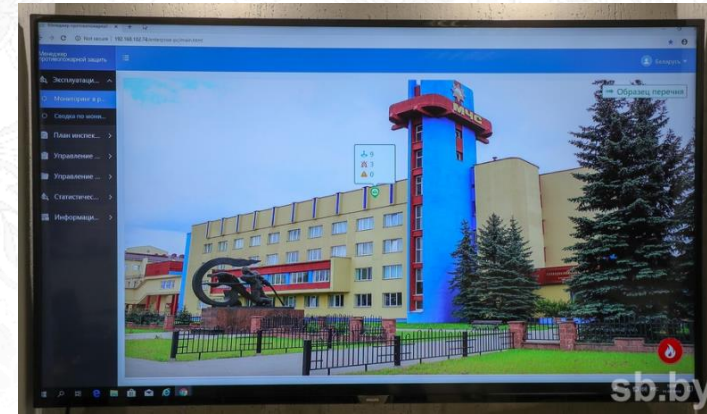


Qiming Cui, Chinese Ambassador to Belarus

# Case: Belarusian-Chinese Civil Protection and Urban Safety Research Centre



Demonstration of fire safety system



Fire safety guarding system



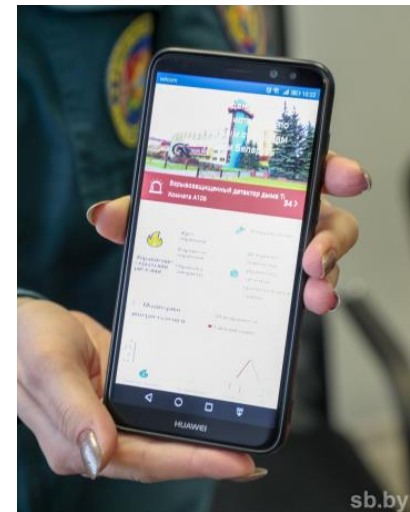
Emergency rescue assistance system



Demonstration of fire safety system



Fire safety devices



Fire safety mobile App

# Training & Exchange Programmes

## Training Content

### (1) Public safety and emergency theory

- Development and prospect
- Framework
- Functions
- Key technology

### (2) Application software

- Integrated Emergency Response
- Public Security Management
- Intelligence & Anti-terrorism
- Intelligent Public Transport
- Smart Fire Safety
- Disaster/crisis Management
- Urban Safety Operation Management

### (3) Application exploitation technology

- Safe city system exploitation skills
- Data management technology
- Big-data technology
- Communication technology
- Network technology

### (4) In stall deploy and system display

- system install deploy, operation and maintenance
- Safe city system display

### Training instructor

- Public safety expert of Tsinghua university
- Emergency management expert
- Senior system engineer



Training completion  
certificate issued



Senior manager  
training



General manager training



System operator training



شكرًا لك

感谢!

**THANK YOU!**

IPSR/GSafety looks forward to collaboration

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