An Intelligent Device for Positioning at Any Traffic Accident Scene

AR technology enables this device to crush its rivals in terms of collecting evidence at type A3 traffic accident scenes.
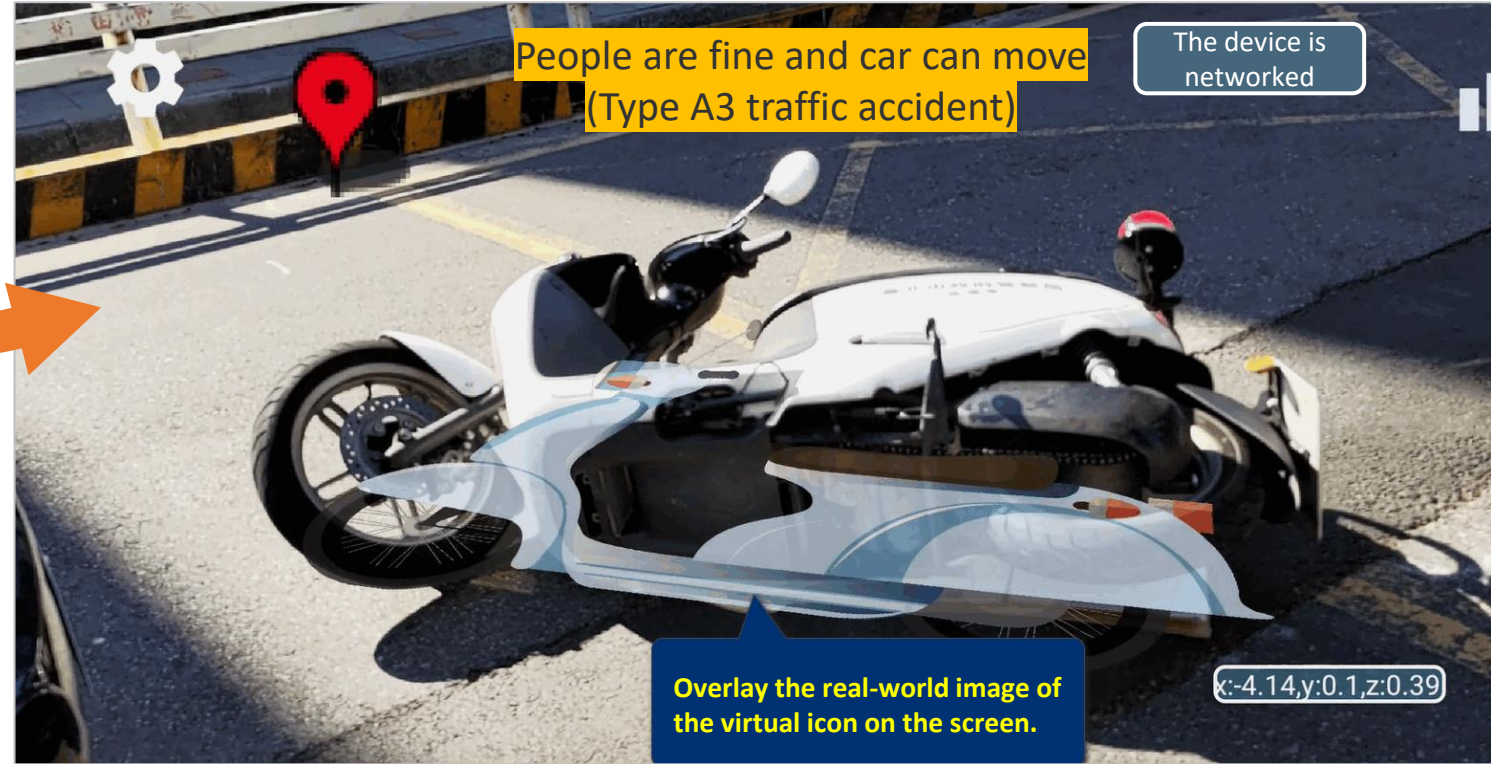
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👍 **AR technology enables fact-based measurement when a car involved has been moved away from the scene.**

Place a warning sign

Shoot panoramas (with markings)

Shoot collision points and damage to a car

Move the car to a safe place off the roadway as soon as possible

Safely film the scene before moving the car

People are fine, car can be moved, shoot the scene and move the car quickly.

內 政 部 警 政 署　關 心 您

People are fine and car can move (Type A3 traffic accident)

The device is networked

Overlay the real-world image of the virtual icon on the screen.

x:-4.14,y:0.1,z:0.39

The AR positioning device passed concept verification by the Taipei City Government in 2022.

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Purpose：

- **Accelerates the digitizing of accident scenes**
- Shortens the time required for graphics generation.
- Mitigates the workload on the police.

Measures：

A **handheld** high-precision **positioning** and **measurement** device for **real-time digitization** to **replace hand-drawn** maps of accident scenes.

Outcome：

Shorten the **time** required for accident scene map generation ⟫⟫

by up to

71%

Click wheel, hand-drawing sketch

The Qianmo drawing system generates a map of the scene

1 A positioning measuring device

2 Upload to PilotGaea Server

3 Interfaces to the Qianmo drawing system

The Features and Benefits of an AR Based Positioning System

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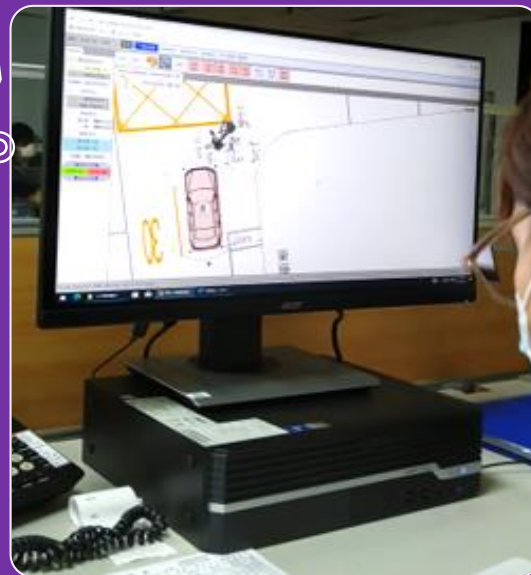
This product can improve the efficiency of traffic accident handling and the quality of service for the people.

👍 **Relieves traffic jams caused by accidents and alleviates public complaints and grievances.**

Traffic accidents are likely to cause chaotic traffic conditions and much public grievance because the scenes have to be kept intact until all the evidence has been collected.

The "5G Smart Police Action Service Plan" introduced by the National Police Agency is a key development in a project that uses highly specialized technology to precisely and automatically map the scene of any accident in a very short time.

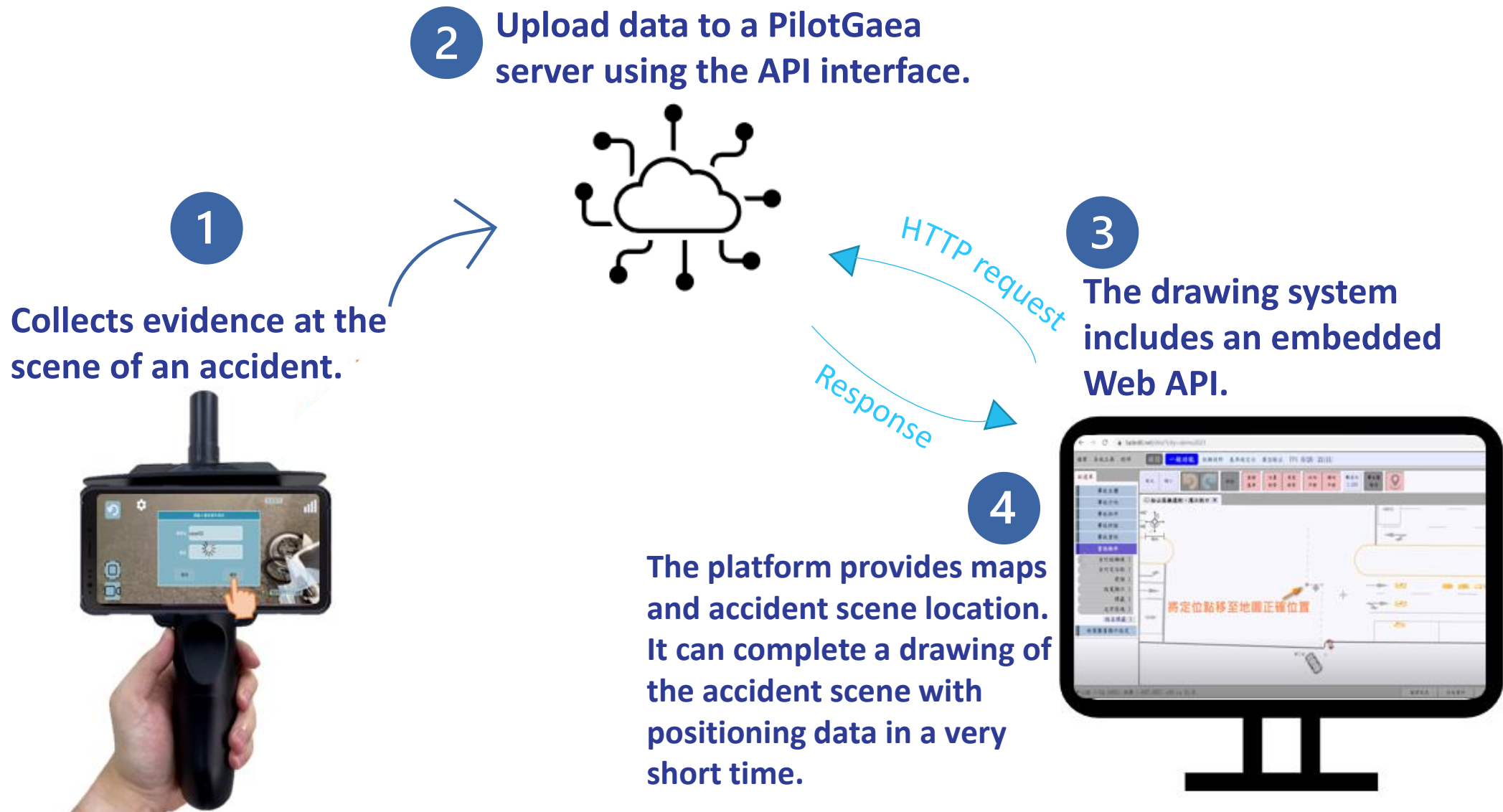👍 **Digital copy is available for repeated verification and validation.**

👍 **AR technology enables fact-based measurement when a car involved has been moved away from the scene.**

👍 **Operation is Intuitive and user-friendly.**

The AR based positioning device can provide information services via a Web API.

2 Upload data to a PilotGaea server using the API interface.

1

Collects evidence at the scene of an accident.

HTTP request

Response

3 The drawing system includes an embedded Web API.

4 The platform provides maps and accident scene location. It can complete a drawing of the accident scene with positioning data in a very short time.

An Intelligent device for positioning at any traffic accident scene

Qianmo Drawing System

Begin by entering the case number

Initial positioning error
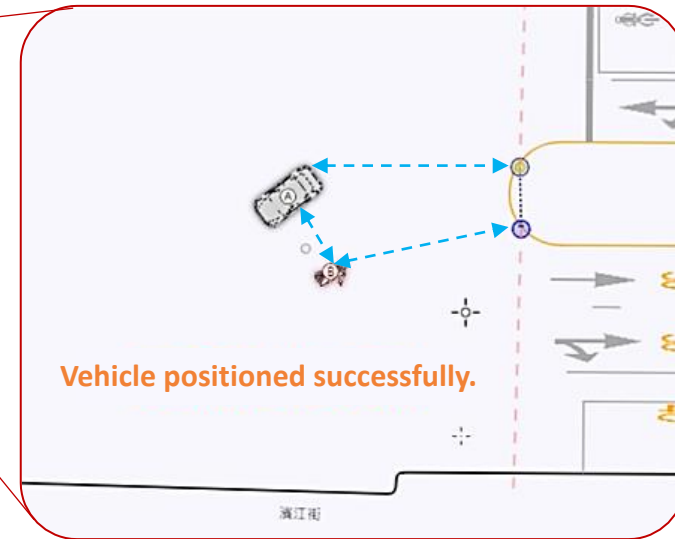
① Mark the datum points

② Mark the accident cars and adjust the positions in the Qianmo drawing system

③

④ Enter license plate number

⑤ Upload location and image
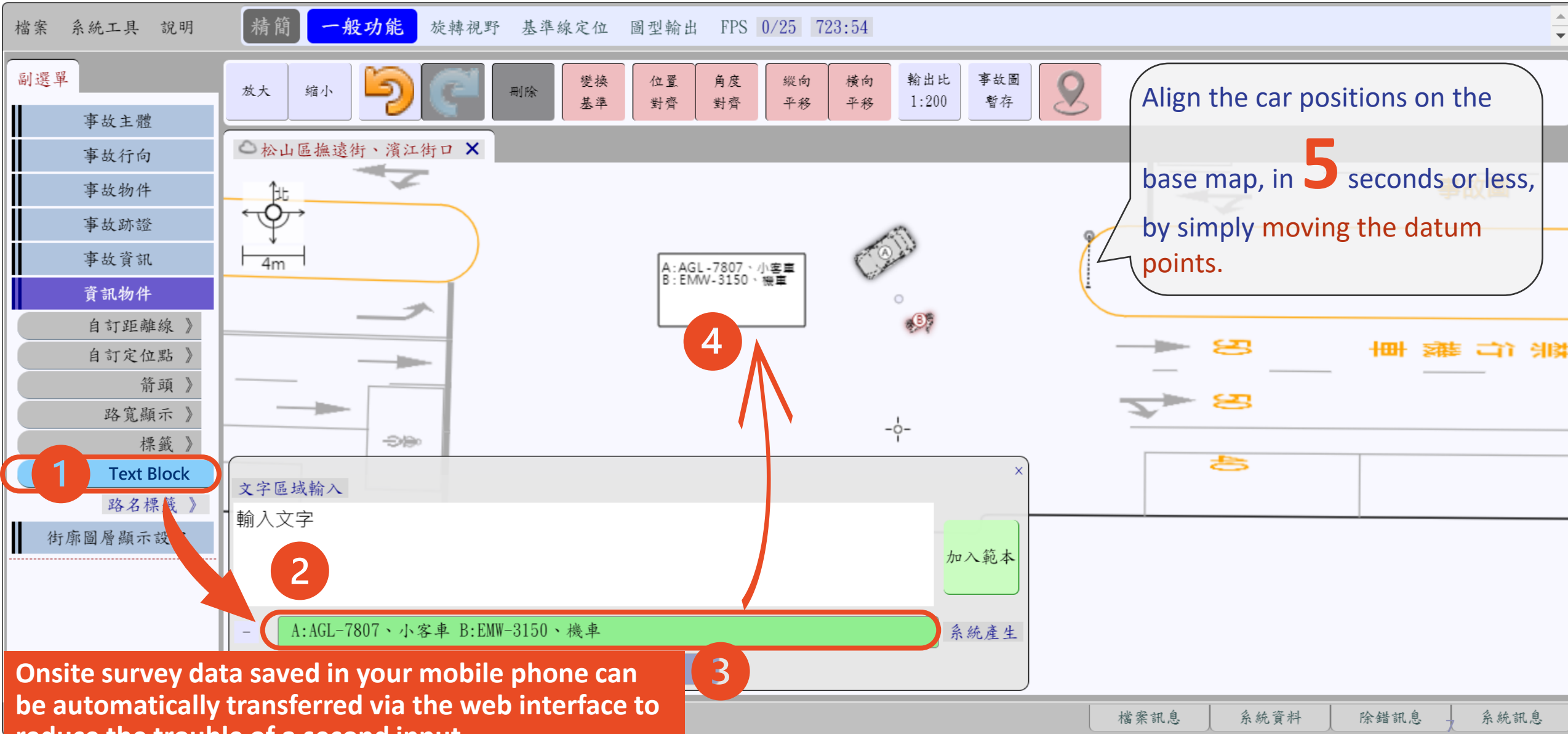
Location data, and photos and videos

⑥

⑦
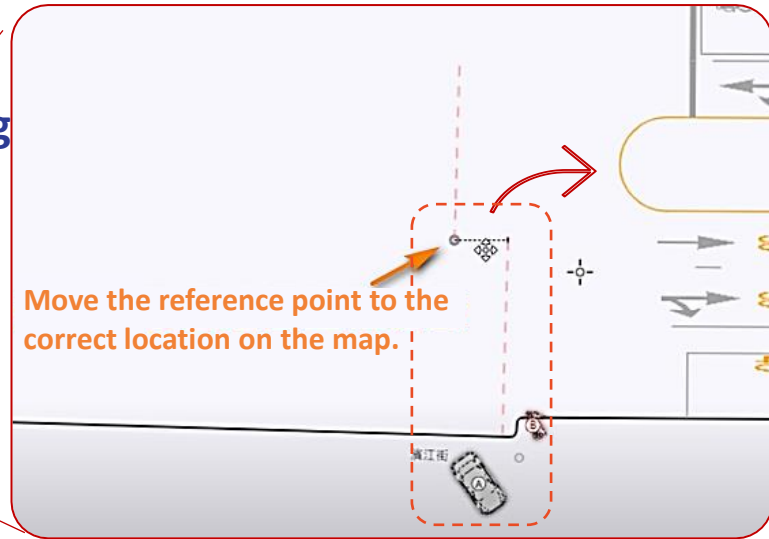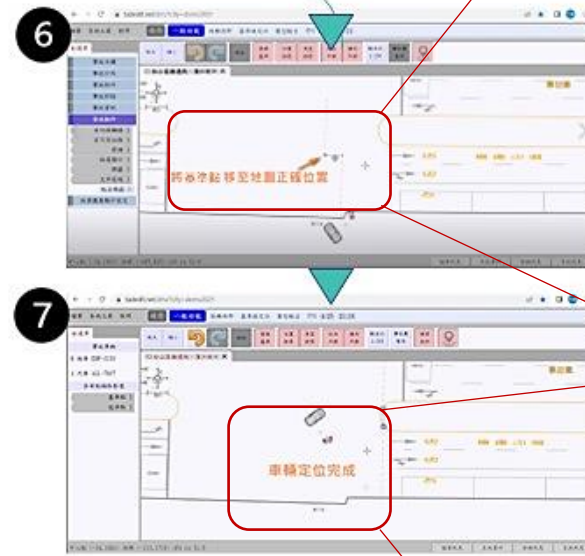
Move the reference point to the correct location on the map.

Vehicle positioned successfully.

The relative positions of the objects are subject to an error of

about **1**%

The AR based smart positioning device comes with optional interfaces to simplify operation and make it smooth and fast.

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Align the car positions on the base map, in **5** seconds or less, by simply moving the datum points.

Onsite survey data saved in your mobile phone can be automatically transferred via the web interface to reduce the trouble of a second input.

Accuracy of the AR Based Positioning Device

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Distribution map of e-GNSS satellite reference stations

▲ Main stations
▲ Standby stations
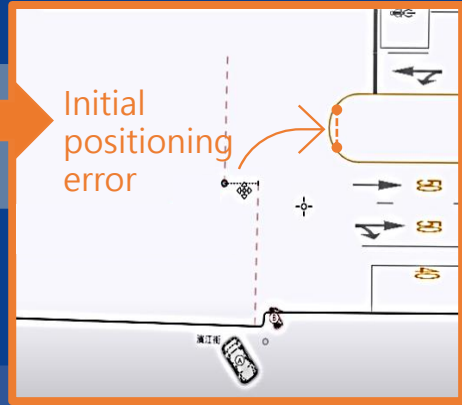
RTK automatic positioning

Ultra-short baseline RTK positioning computing
- GPS correction technology
- Enhances positioning accuracy

RTK Fix / Floating

Calibration

Initial positioning：

Error 2-5cm

Error 100-200cm

When the RTK automatic positioning continues to fix, remind the user to calibrate the device.

Initial positioning error
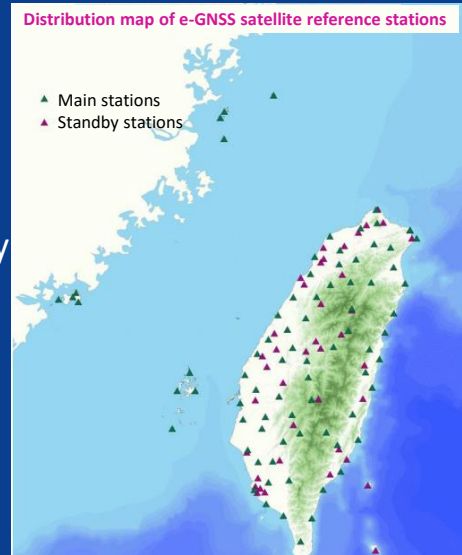
Align with the base map by moving the datum point.

Measurement accuracy：

about **1**% error

measurement error

The accuracy of the relative position and alignment with the base map are more important than the absolute position.

Development Status and Future Application Potential

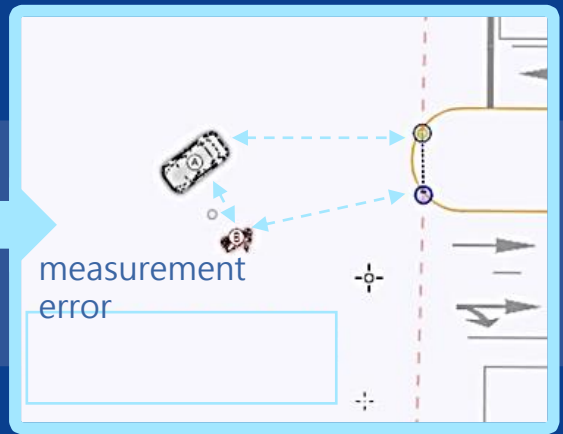The solution used by the National Police Agency for the improvement of accident scene investigation by **"replacing scene maps with photos for no-casualty traffic accidents"** outperforms others in several ways, especially in ease of use and the saving of photos, videos, and positioning data from the scenes of relatively simple accidents directly into the Cloud in one shot.

As of September 30, 2022, there were 307,885 type A3 traffic accidents (i.e. with property loss only) nationwide. **This device is more valuable and better at gathering evidence than the existing profiling tools.**

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✓ **Display BIM/3D pipeline/ 2D3D layers in AR**

✓ **Conventional measurement, high-level measurement, and 3D modeling**

✓ **Road planning and Trench design**

✓ **Data upload and traceability**

✓ **Route survey and navigation data delivery**

Traditional 2D design drawings can often be misinterpreted.

Design content can be difficult to visualize. Communication costs more and there is increased risk of interpretative error.

It is difficult to update information from both parties in real time.

Field notes can often be very messy. Data is difficult to update quickly. Backward tracing can also be very difficult and this can result in higher risk.

The AR Positioning Device

Simplifies positioning and measurement in complex geospace using state of the art AR technology and mobile phones.

Eliminates the problems that might be faced in communicating the details of complex and difficult engineering design drawings.

- **Replaces the click-wheels used for positioning at accident scenes**

Integrate an image of the car(s) involved in the accident, the system reference points and location measurements, as both videos and photos, and upload the file to the server.

- **On-site inspections of pipeline systems**

Image a complex pipeline system on your mobile phone display, rather than a traditional 2D drawing. This allows visualization of the pipeline structure at the excavation site, as well as marking and measurement, in real time.

- **Disaster investigation**

Disaster investigation can be simplified because the elevation models of the post-disaster landform can be obtained quickly and accurately at much reduced cost.

- **Pre-engineering discussion and quality control investigations**

Quality inspections can be much easier because bulky hard copies are not needed and notes and measurement can be made and recorded in real time. This speeds up the process and includes data sharing as well.

On-site Inspections of Pipeline Systems

Replaces traditional 2D blueprints

Display the AR-based pipeline system on your mobile phone at an excavation site to learn about pipeline structure and attributes and to carry out map marking and simple measurement.

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Convert complex and hard-to-read design drawings into AR screen displays.