

smart city

Smart City Solution

extend your view **4+**
T E R R A





TERRA 4D – The innovative software platform which immediately takes you to the next dimension in smart city management. It solves any unanswered questions related to safety and security in modern cities. *Why settle for less?*

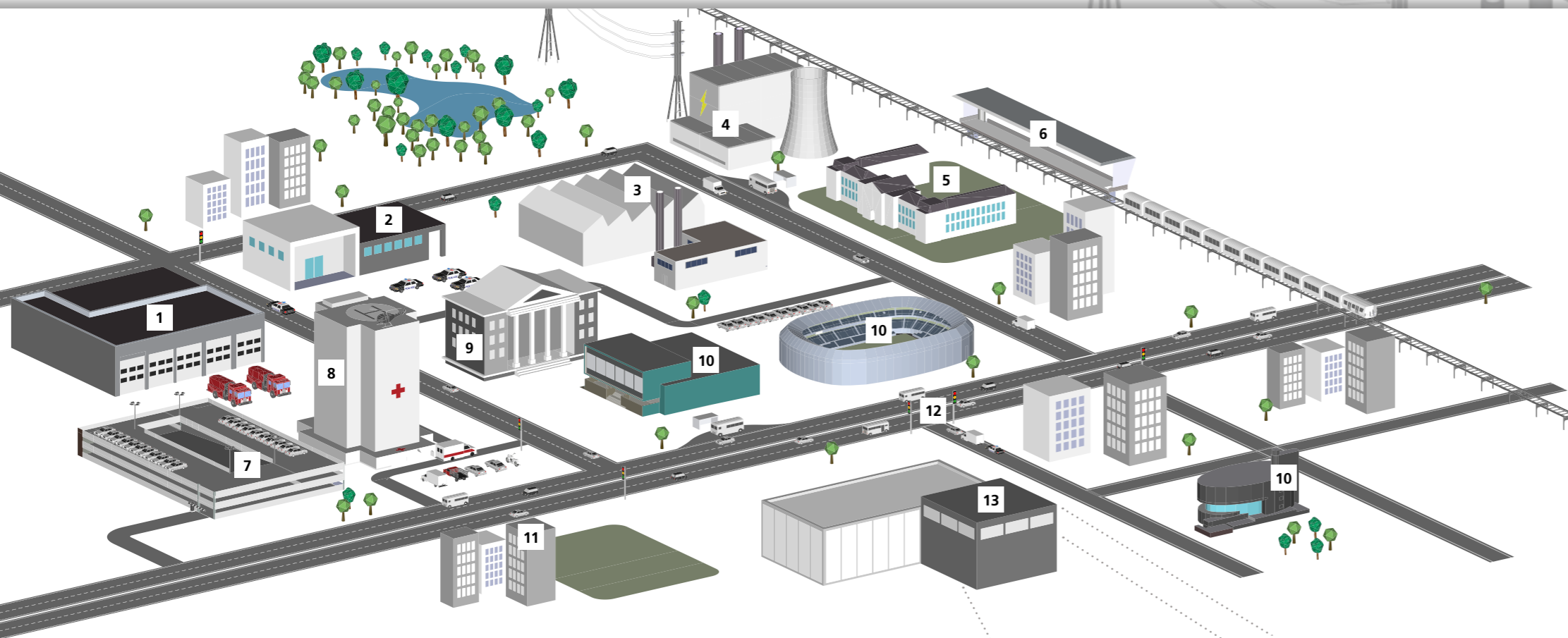
TERRA 4D smart city solutions offers advanced features that support operators in all departments, to assess and resolve incidents efficiently. Features like multiple camera object tracking, time machine, workflow and incident reporting, localization and dispatching are a few of the features which enable operators to take immediate and precise action during a security incident. Thanks to the 3D GIS model the intuitive and field-approved user interface provides superior situational awareness in every circumstance.

The TERRA 4D platform links city systems and subsystems inseparably to each other. This integration and unification of all subsystems enables acquisition and analysis of all information on one central entity allowing comprehensive, effective and overall protection.

TERRA 4D Physical Security Information Management (PSIM) solution facilitates incident detection, security and safety related incidents, presenting complex information in a simplified, user-friendly geographical context in 3D form, thus offering operators superior situational awareness and ease of use.

Key benefits provided by TERRA 4D smart city solutions help municipalities:

- Speeds up situation response times and minimizes risk
- Assists in maintaining public order and reducing crime
- Improves multi-agency coordination and data exchange
- Reduces cost of services by increasing efficiency and avoidance of human errors
- Provides perfect situational awareness by embedding all relevant information in 3D GIS model
- Produces real-time information of all systems and subsystems under one unified operators platform
- Time machine function for historical data
- Seamless integration of all existing and future subsystems



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|----------------------|------------------------------------|
| 1 Fire Department | 8 Healthcare |
| 2 Police | 9 City Administration |
| 3 Industry | 10 Leisure – Museum, Stadium, Mall |
| 4 Smart Energy | 11 Smart Buildings |
| 5 Education | 12 Smart Traffic |
| 6 Transportation | 13 Emergency Center |
| 7 Parking Management | |

Centralized Platform

TERRA 4D is the platform which connects to all existing and future systems, subsystems and sensors and allows management, coordination, correlation and sharing of all data from one unique management platform. This enables the centralized command and control of all local governance issues in a modern city – security (police, ambulance, fire brigade) – traffic (smart traffic lights, parking guidance) – utilities (energy, water, waste disposal) – sanitary (hospitals, emergency). The result is better quality of life for citizens in a safer, cleaner and healthier environment.

Emergency Center

The Smart City emergency response center based on the TERRA 4D integrated management platform, is a multi agency command and control hub, coordinating the efforts of police, ambulance, fire brigade and disaster control. It efficiently coordinates all emergency forces under one management platform, with real-time video and geo-referenced information in a 3D GIS model. TERRA 4D can simultaneously and automatically alert the local emergency services (i.e police, ambulance and fire services) directing the relevant service by the most immediate and quickest route to the incident

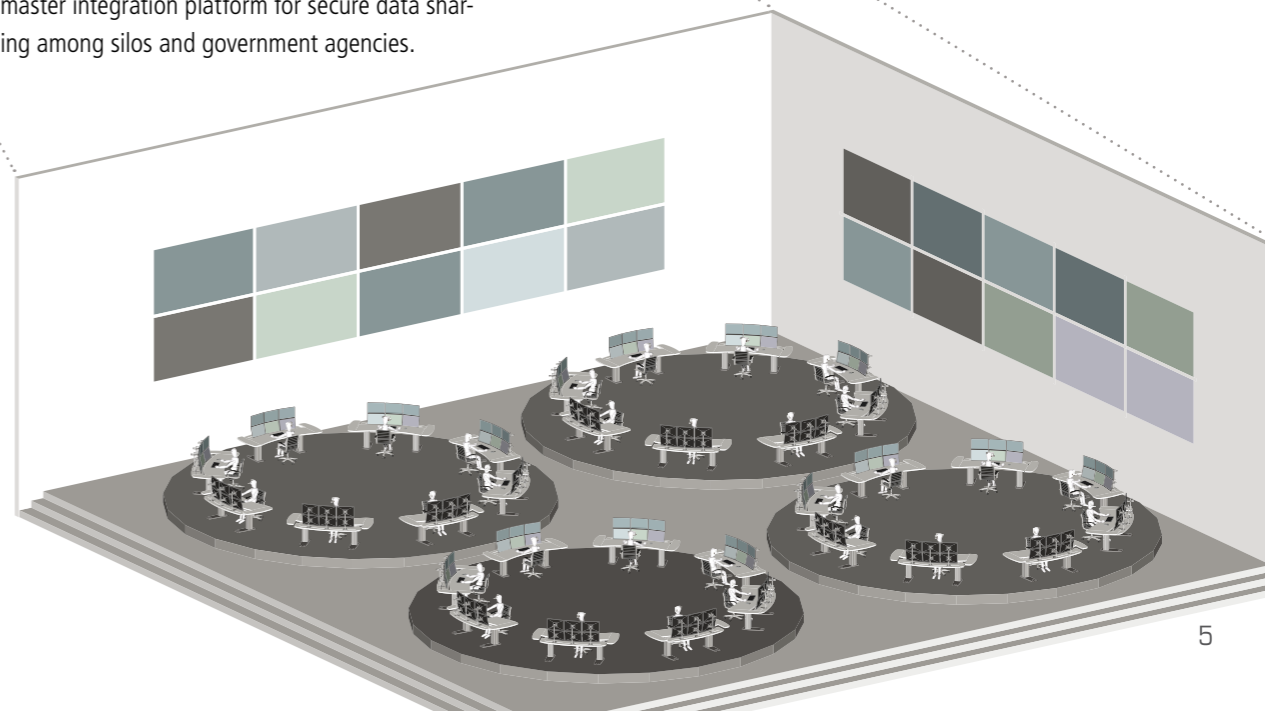
location. TERRA 4D supports all kinds of sensors for detection of fire alarm (smoke, temperature), natural disaster (earthquake, volcanic eruption, tsunami, torrential rain, flooding and hurricanes), crime (CCTV, intruder detection, tracking, alarm buttons) and facilitates the prompt dispatch and tracking of applicable emergency service to the incident location. As a consequence, crime and incident detection will speed up, and response times of dealing with disasters and emergencies will greatly decrease. Therefore resulting in a securer and safer environment, promoting the safety and well being of citizens. A smarter city is a safer city!

Smart City Tool Box

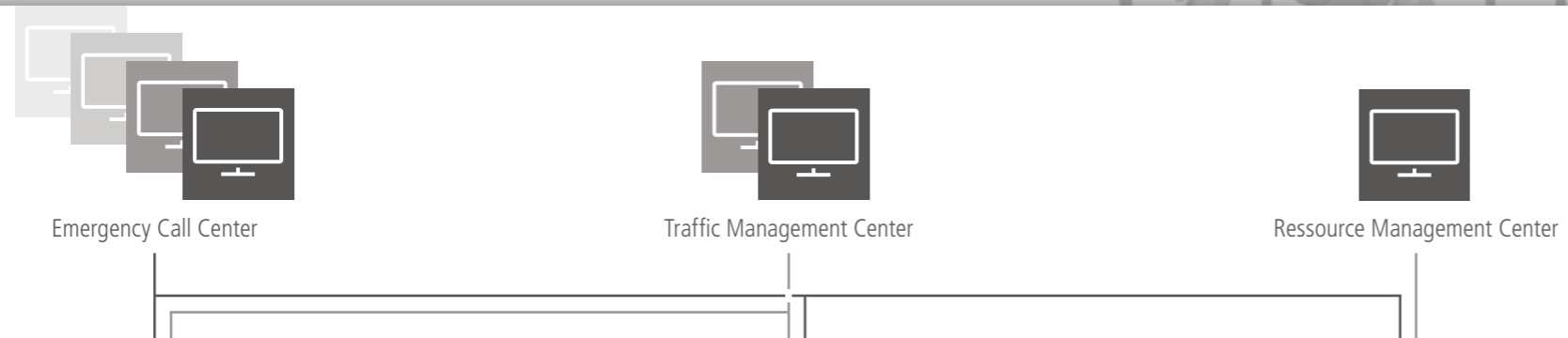
TERRA 4D Smart City – The Geographical Information System (GIS) for 3D visualization, common system control interface, geospatial data fusion, correlation and secure data sharing among different silos and agencies. Every incident that occurs in the city generates data. TERRA 4D Smart City, geo-references that data, and performs geospatial sensor data correlation, leading to patterns. Gather enough data and patterns emerge. Recognizing patterns creates greater awareness and insight into public safety and related issues, enabling public health and safety officials to make smarter

decisions regarding deployment of resources and necessary protocol. Operators at 911 emergency control, crime investigation and crisis management centers or building management can fly through time and space having “bird’s eye view”, supported by 3D visualization, leading to superior situational awareness. Data interface to MOI in accordance with local MOI law can be integrated.

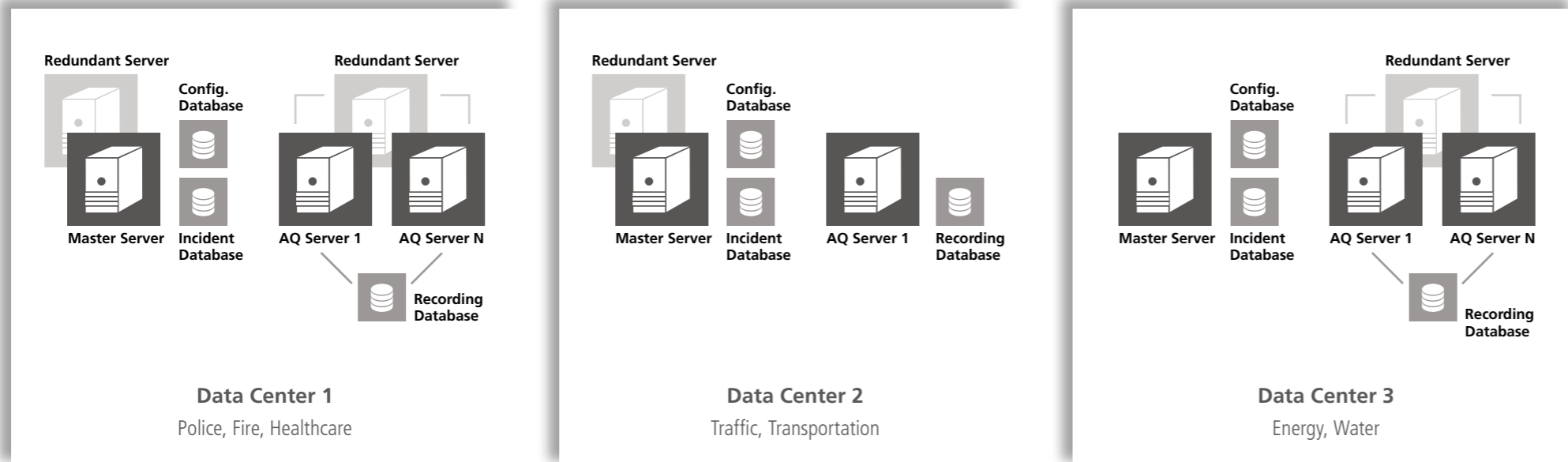
TERRA 4D SmartCity is a toolbox containing a 3D visualization engine, mass data geo correlation engine, a geographical information system and master integration platform for secure data sharing among silos and government agencies.



Clients



Servers



Subsystems



Traffic Management

As populations in urban areas grow, the traffic situation continuously worsens. Daily people waste considerable time in traffic jams, and looking for parking spaces. TERRA 4D unique management platform provides traffic and parking management solutions. All sensors are connected to TERRA 4D providing the platform with informations about actual traffic situation (quantity, density, direction and speed) 24 hours 7 days a week. The gathered information is stored and analyzed in order to predict future traffic conditions and optimize traffic flow and speed, managing all smart traffic lights and other sensors. In case of accidents or any incidents, the platform adapts automatically alternative courses and steers all smart traffic

lights. It optimizes the use of certain routes relating to the direction and volume of current traffic information. City traffic is made up of mountains of unorganized data. In a smart city all this data will be combined into a single platform, where it will be organized and regularly analyzed.

Parking Management

Illuminated signs on main streets and a mobile application will guide citizens to the nearest available parking places. Advanced parking reservations along with payment are possible with the use of a designated mobile application. This will reduce the average time spent in the car and the number and size of traffic jams, and will therefore help people to feel more relaxed.

Energy Efficiency and Water Conservation

Cities are expanding as businesses grow and new people move in. How do we deal with the extra strain that this will put on energy and water supplies?

Smart Grid

21st century's electrical grid systems are going to be very different from today's solutions. TERRA 4D PSIM is not only able to monitor the status of transformers, voltage and currents across the grid but it will know where the energy is going and will detect where energy is lost – all in real-time. Smart grids will allow utility managers

to make smarter decisions on managing resources and saving energy. Customers will be informed about energy efficiency and when off peak rates are available to maximize savings.

Water Conservation

About 70% of the earth's surface is covered by water but less than 1% of the world's water is accessible by humans and the demand is rising! TERRA 4D integrates smart technologies to monitor and control the global aquatic ecosystems, from springs, rivers and reservoirs that supply our cities, to water that is piped to our households. Smart sensors are used to show users water quality and levels of consumption, which allows users to understand how natural resources are being utilized. Utilities use advanced software to track and manage assets like pipes, pumps or filters to facilitate the regular servicing of equipment and timely repairs and maintenance, to avoid any loss of water through preventable leakage.

3D GIS Model

TERRA 4D is based on a 3D geographical information system. The Digital Terrain Model (DTM) represents a 3 dimensional elevation layer of the ground. Satellite imagery, current and historic aerial photos are overlaid e.g. for evaluation of damage assessments. On the adapted street map, blocked roads are marked to be excluded by the tactical navigation systems in the field. The tactical map illustrates important assets like fresh water supplies, storage facilities, field hospitals and other real-time information from various sources in the field. On the tracked object layer, the location of all tagged objects such as ambulances, police cars, supply trucks, rescue teams etc. are displayed. In addition, the 3D building layer shows constructions in 3D offering exterior and interior viewpoints. Temporary and permanent CCTV video streams can also be visualized in the 3D model, as well as on separate monitors. All modules are compatible with TERRA 4D MIP (Master Integration Platform) for secure data sharing between different agencies and silos.

Command and Control

Video wall	Support of video walls and multiple screens per desk.
Time machine	Navigate through space and time and see all recorded data (video, tracked objects, PTZ positions,...) time-synchronized.
Flexible GUI layouts	GUI layouts changing automatically or driven by operator. User and situation specific layouts are possible.
Chat messenger	Operators exchange information quick and simple.

Geospatial Data Management

Geospatial rules engine	Define rules and methods to auto-respond to incidents.
Geospatial data correlation	Any sensor can be used to control other sensors. Alarm verification utilizing multiple sensors.
Geo fencing	Define geographical alarm or warning zones to receive alarms when tracked objects enter or leave such zones.

Event and Alarm Management

Workflow automation	Intuitive workflows remove operator randomness and reduce stress.
Incident reporting	Support of interactive incident forms. Videos, map views and resources can be linked. Customized design supported via HTML forms.
Escalation and delegation	Escalate alarms to supervisor user groups or delegate alarms to other operators for work balancing.
Procedure enforcement	Workflows enforce company's or legal compliance guidelines.
Audit trail	Logging of all user actions for every workflow step for later analysis
Alarm notifications	Sends alarm notifications to remote systems via SMS or Email
Operator alarm	Operator can select alarm templates and fire alarms at specific locations on the map or directly in the video

3D Visualization

Multi Layer GIS with real-time rendering engine	Digital Terrain Model (DTM), Ortho imagery (aerial or satellite images), Street map, 3D buildings.
Geocoder	Address search, Forward: type address and GIS shows location, Backward: show address for any clicked location in GIS model.
Indoor visualization	3D indoor building structures with floors and rooms. 2D CAD floor plans can be imported to visualize indoor environments in 3D.
Geospatial document library	Organization of the document library (document is placed at geographical location) and access according to user privileges.
Object track visualization	Trace object's movement including historical track in 3D GIS model.
Video wall	Live or playback video is "projected" on virtual video walls in 3D GIS model. Camera orientation and view area is shown.
Avatar	Represents a detected object and its class in the 3D space.
AIS, ADS-B, GPS meta data	Shows meta data attached to an Avatar.

Video

Video unification platform	Seamless integrated video streams from one or many different video sub-systems (live and playback).
Supported cameras	Analog (with encoder), IP, fixed, PTZ, 360, mobile or airborne.
Position dependent salvo	Shows closest cameras to a static or dynamic object location.
Direct PTZ control	Video latency compensating method to control any PTZ camera.
PTZ auto presets	Automatic configuration of all interesting locations in PTZ camera's field of view as PTZ preset positions.
Geo-referenced video	Determine object location (latitude, longitude, height), speed, direction and size directly from video image.
Meta data recording	PTZ head data are recorded.
Multi camera tracking	Follow a moving object even in crowded environments using one or more fix or PTZ cameras simultaneously.
Augmented reality	Augmented reality layer on top of video image display including context sensitive interactions.

Mobile Unit Dispatching

Android and iOS app	GPS tracker and target intervention application. Target waypoint navigation, instant messaging and alarm handling.
Dispatching	Get current positions of all units in the field, send units to target coordinates, keep track of ongoing interventions.

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