

## Design Scheme of MESH High-speed Mobile Wireless Transmission System in 12Km Tunnel

### 『High-speed mobile monitoring and detection and warning control』 + 『tunnel abnormal light display and prevention mechanism』 applied to emergency situations

#### 1、Wireless transmission system planning design and application design and special mechanism planning requirements for emergencies in 12Km tunnels

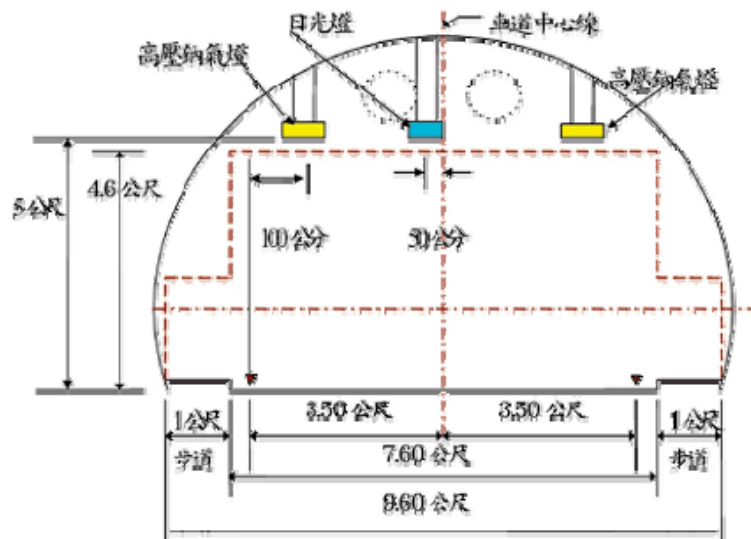
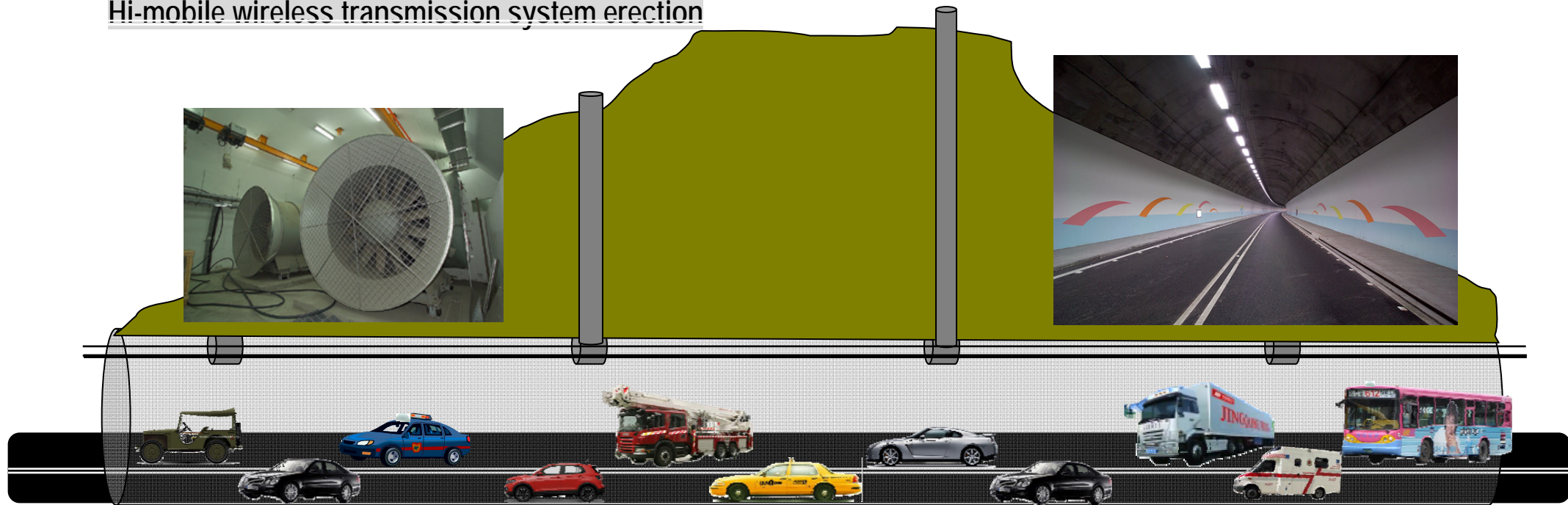
- The driving tunnel is a special traffic environment system. For the traffic safety management of the tunnel and the control and handling of the emergency situation in the tunnel, it is necessary to specially plan a complete real-time monitoring and communication system and a special emergency response mechanism. Multiple systems, multiple backups, and multiple Mechanisms are used to achieve tunnel safety management, on-site control of emergencies, and information collection for decision-making and processing.

Therefore, the following planning requirements are proposed for the traffic tunnel:

1. Tunnel and Highway Administration Bureau, high-speed mobile real-time report transmission of images from 2 cameras for each highway police car (belongs to a privatized dedicated high-speed mobile wireless transmission system).
2. Real-time transmission requirements such as the on-board computer patrol of the tunnel highway traffic police to check the license plate, check the information of the violating vehicle, and issue the electronic fine.
3. Add the real-time monitoring and transmission of the traffic flow status of some fixed-point lanes and the status of the interchange.
4. High-speed mobile WiFi phone, video phone, and wireless Internet service on tunnel roads (belonging to the privatized dedicated wireless communication system).
5. The data update and transmission of the LED road condition real-time notice board above the driveway, and the wireless transmission system can act as a backup mechanism (not afraid of fire, not afraid of smoke and not afraid of path line interruption).
6. Passenger buses, logistics trucks, cash transport vehicles GPS positioning signal import and vehicle monitoring image transmission (dedicated wireless communication backbone, with extended GPS signal reception).
7. Transmission of unexpected traffic accidents on tunnels and roads, emergency medical reports, etc. (belonging to the privatized dedicated wireless Internet link system).
8. The emergency digital phone beside the tunnel road extension lane, increase the backup call mechanism of wireless communication transmission.
9. Real-time monitoring and reporting of the construction progress of the tunnel road construction team.
10. Digital broadcasting on tunnels and highways and special broadcasting in emergency situations have a backup operation mechanism through wireless transmission.
11. Data transmission of digital detection instruments and equipment of other tunnel highways (traffic flow, vehicle speed, toxic gas detection, temperature detection, air oxygen content, electronic toll collection, etc.).
12. Introduce new AI technology, extract and feedback the data obtained by the above-mentioned various systems, and apply AI technology to improve the safety management of tunnels and highways.

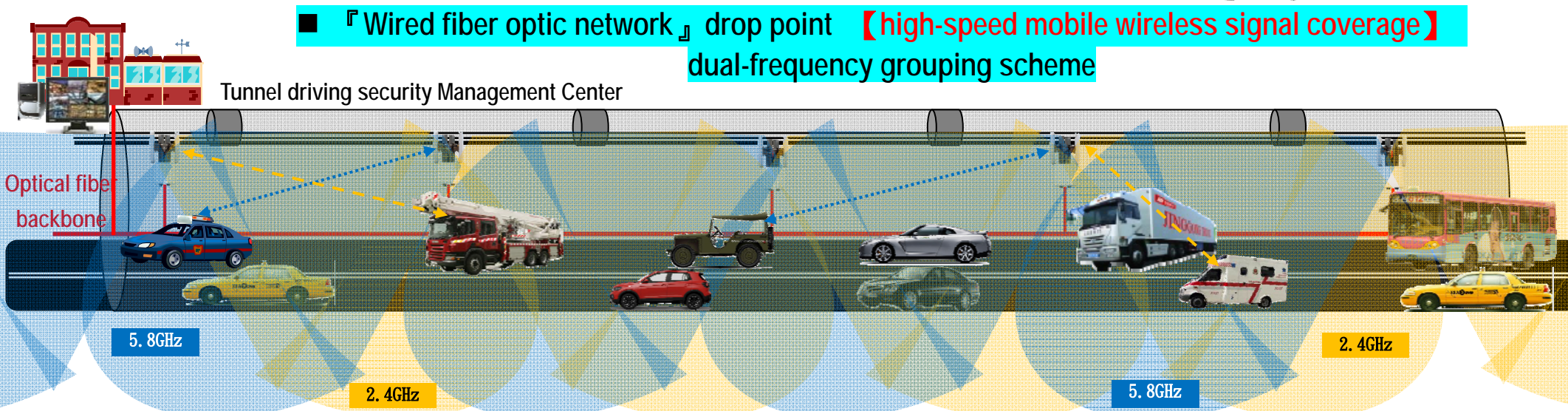
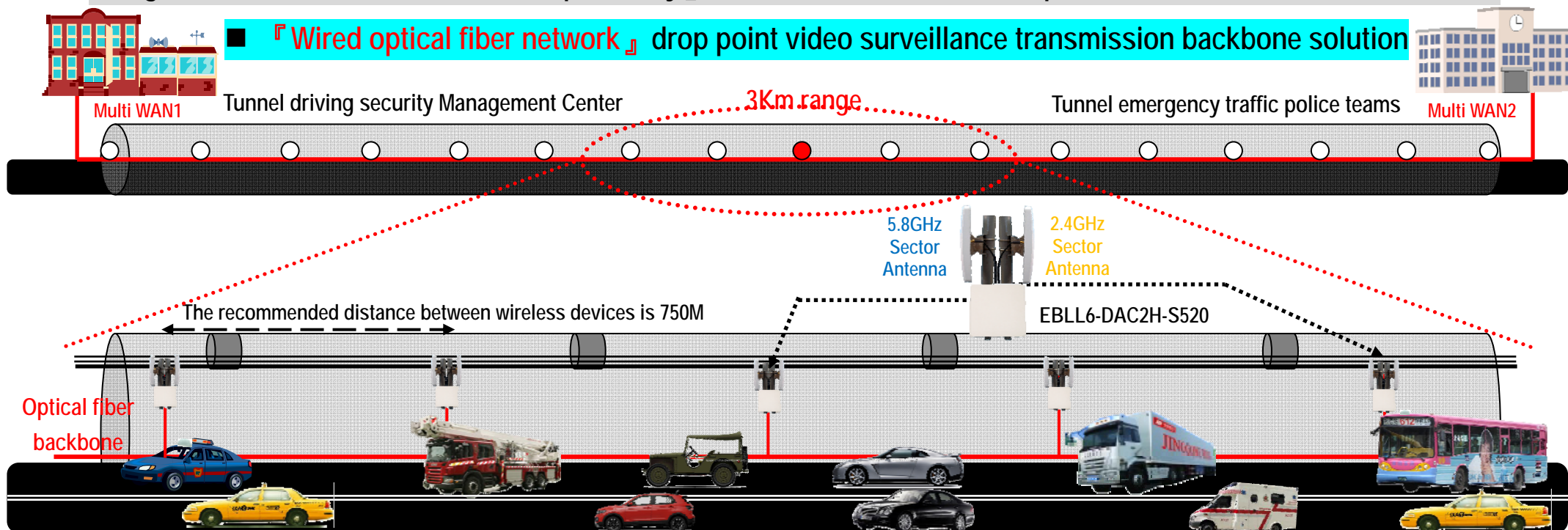
The establishment of a high-speed mobile wireless system on the extension of the tunnel road is undoubtedly the establishment of a "wireless information highway" on the extension line of the tunnel road. It can be used as a platform for the transmission of various computer information equipment in emergency situations, so that the tunnel road is not just for vehicles. During transportation, a large amount of real-time emergency information is also transmitted wirelessly on the tunnel road.

## 2、The map of 『Simulated Space Environment in the Tunnel』 and the environmental considerations diagram of MESH Hi-mobile wireless transmission system erection



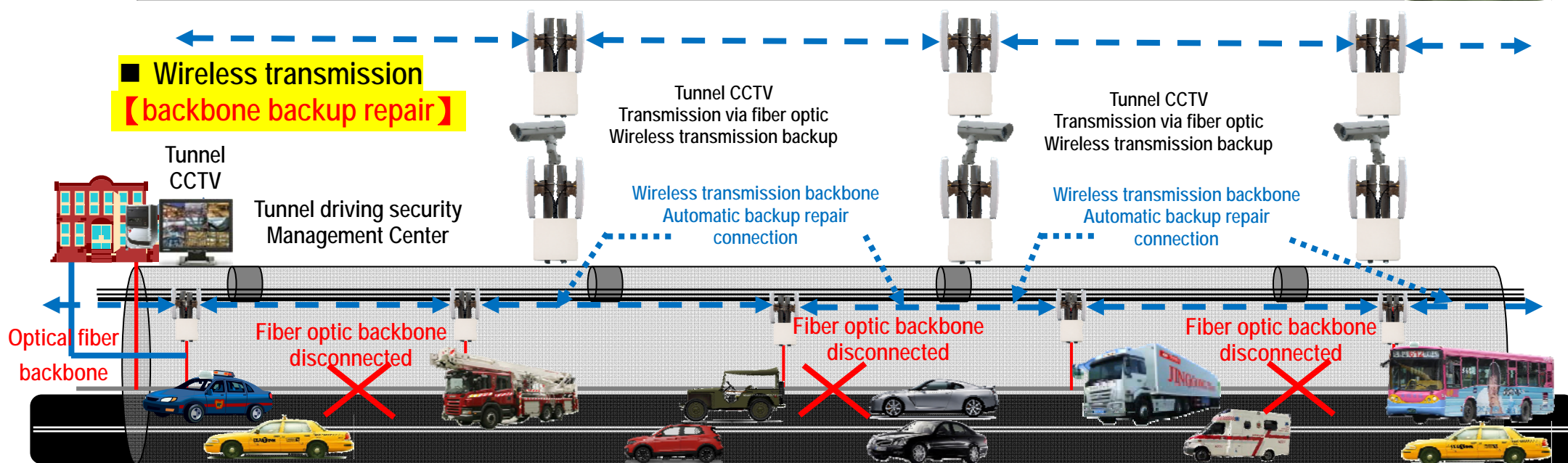
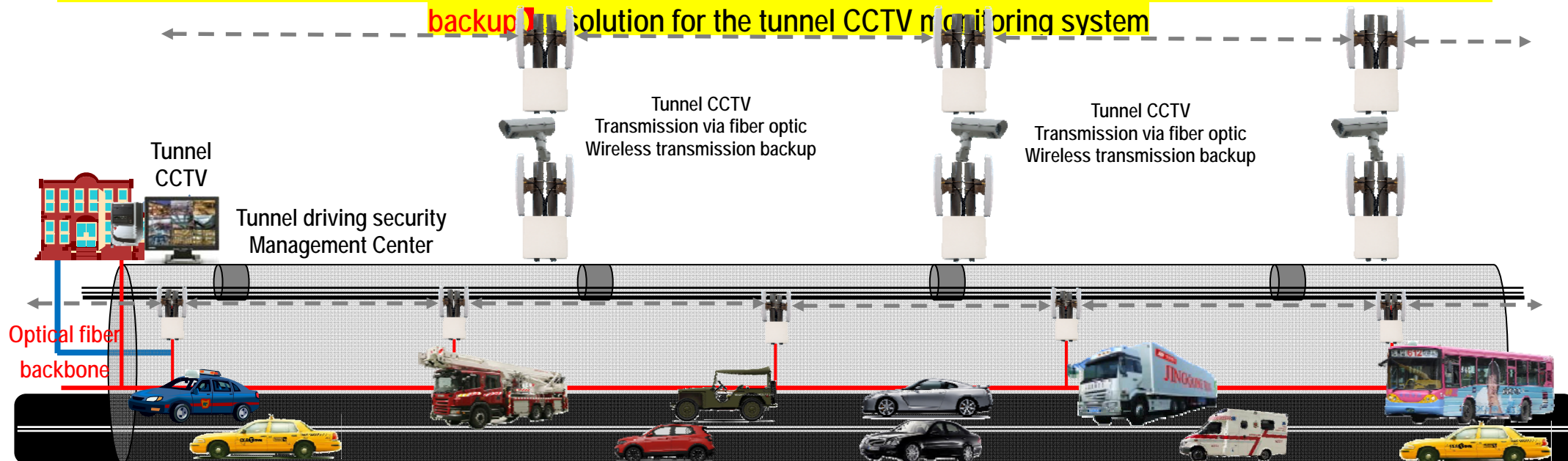


### 3、Design of 『12Km Tunnel Wireless Expressway』 for MESH Hi-mobile multi-path wireless backbone transmission



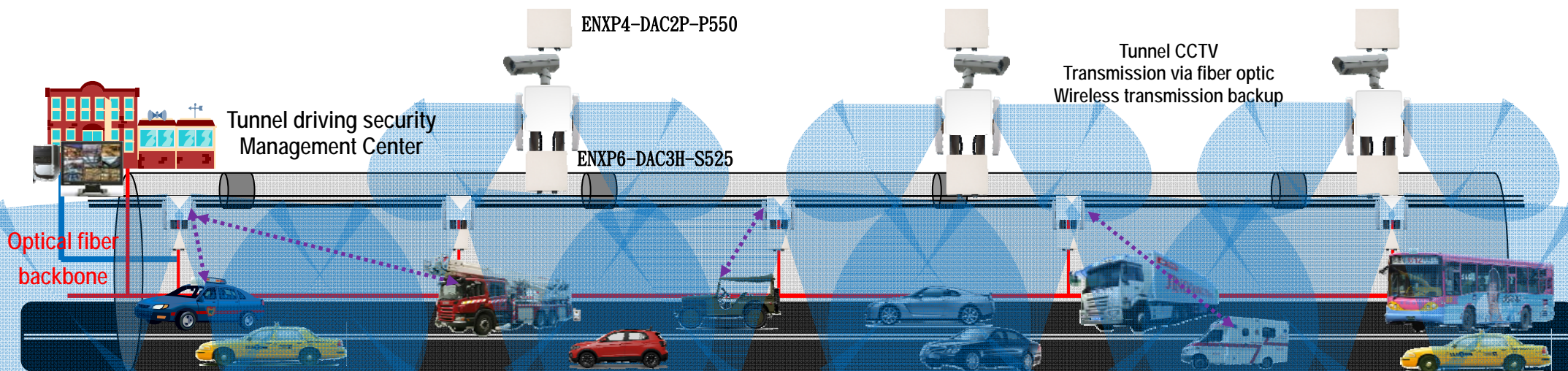


■ 『Wireless Transmission Backbone Network』 provides the 【Fiber-optic cable + wireless transmission backbone backup】 solution for the tunnel CCTV monitoring system

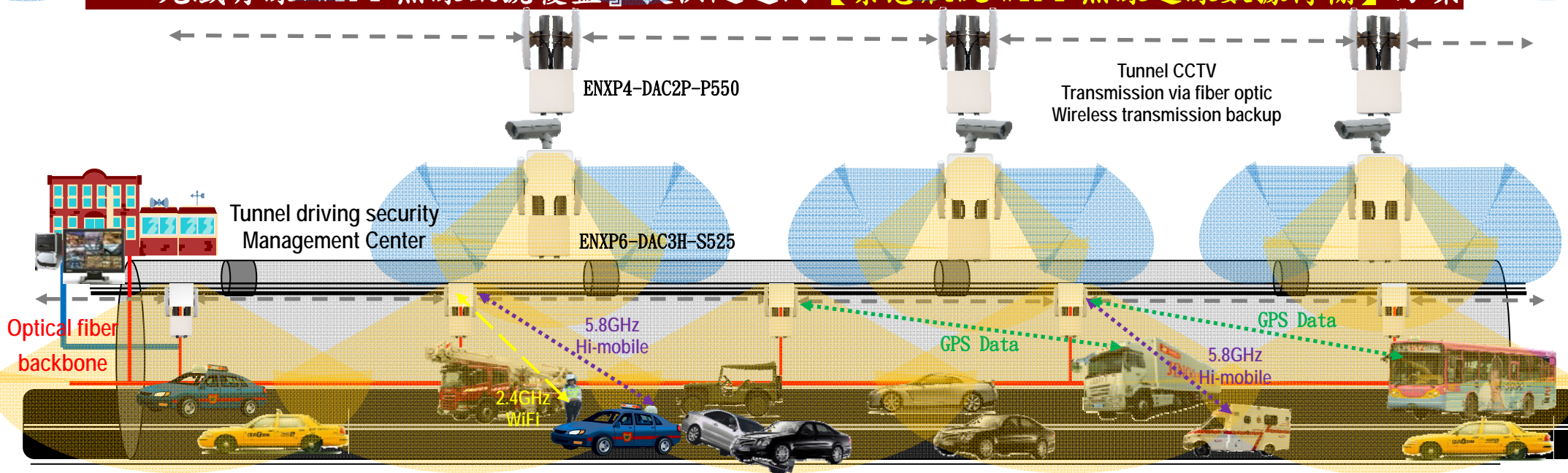




『Fiber optic cable + high-speed mobile wireless signal coverage』 provides **【wireless high-speed mobile monitoring and data transmission】** solutions

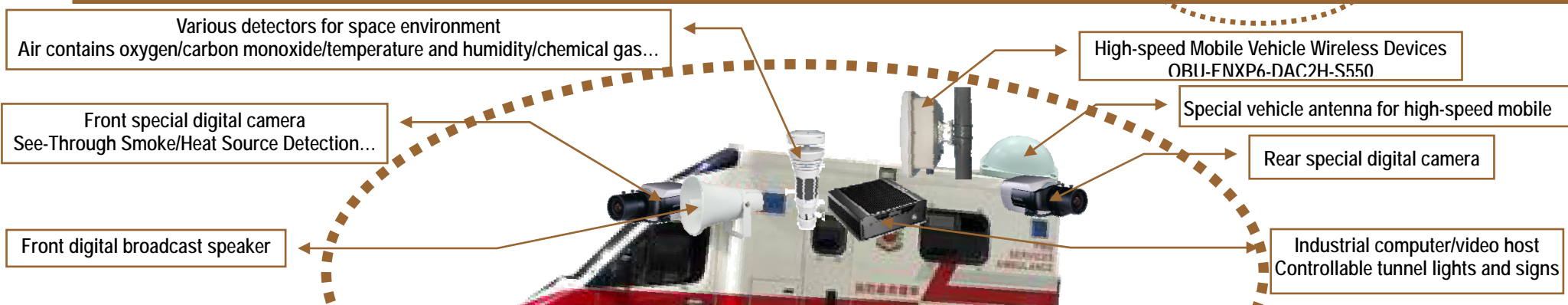
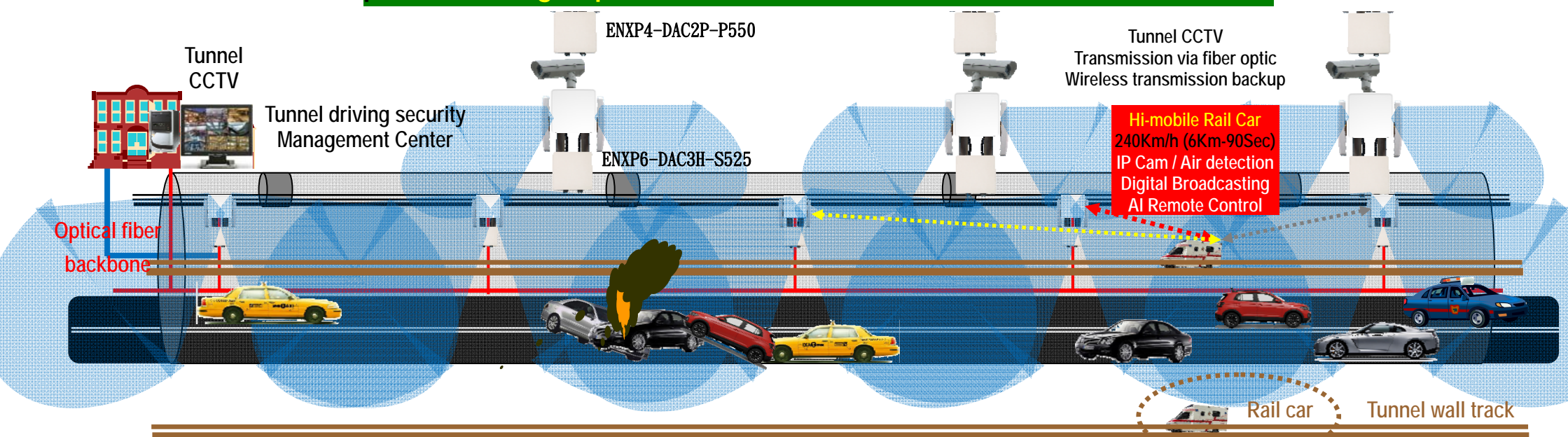


『光纖有線+WiFi 無線訊號覆蓋』提供隧道內 **【緊急狀況 WiFi 無線連線數據傳輸】** 方案





『Fiber optic wired backbone + wireless backbone backup + high-speed mobile signal coverage』 specially provides **【high-speed mobile rail vehicle connection transmission】**

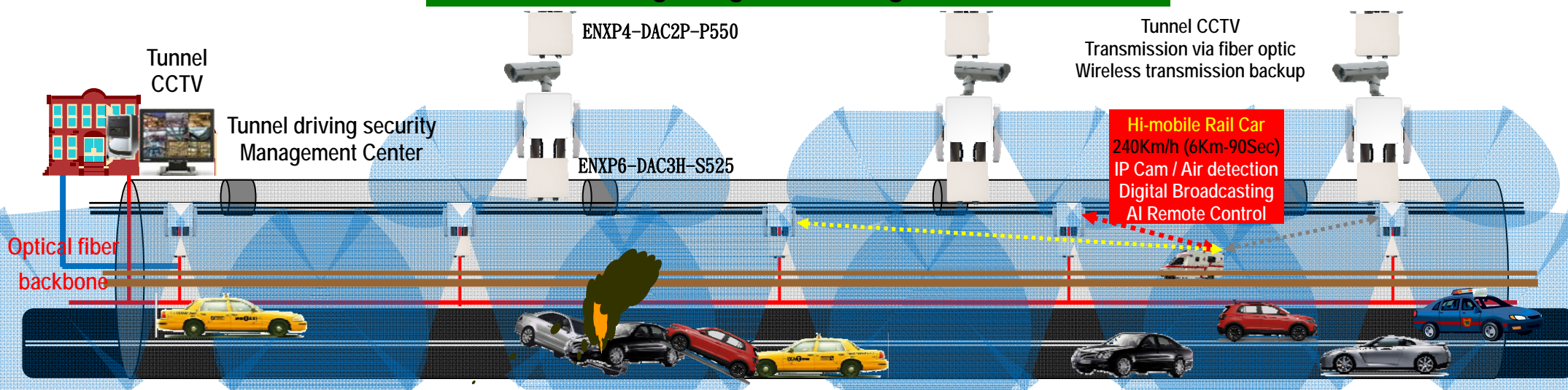


The high-speed rail car runs on the track of the tunnel wall. It is usually responsible for patrolling the tunnel, detecting various air, temperature, and environmental data in the tunnel. In an emergency, it acts as an SNG broadcast vehicle or a control platform.

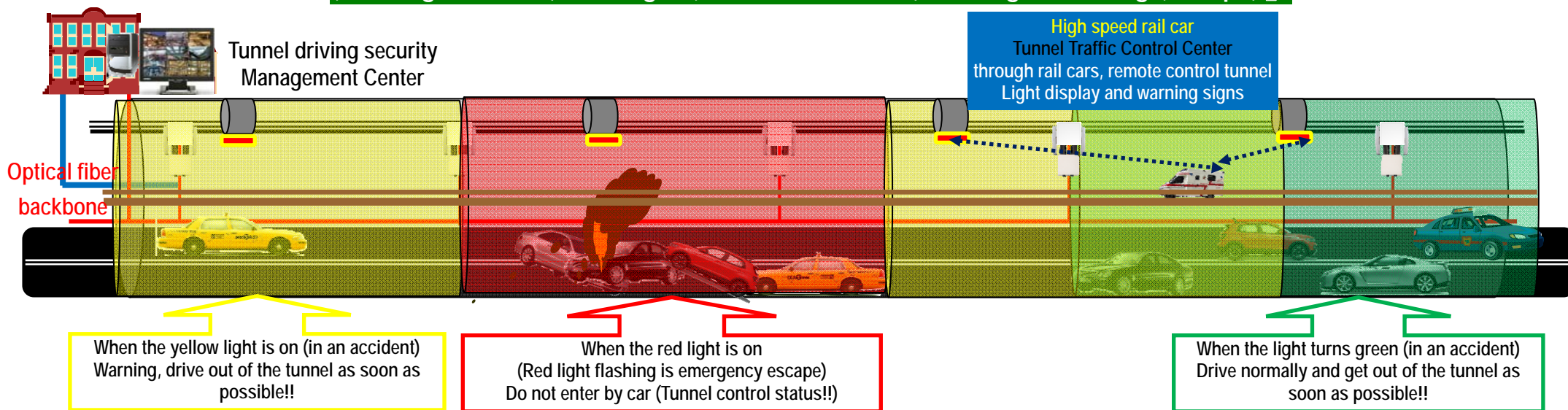
High-speed rail car: speed 120-240Km/h / usually 10-30Km/h slow patrol/tunnel unilateral or bilateral wall installation/high-speed arrival at the accident scene, 6Km accident scene takes 90 seconds.

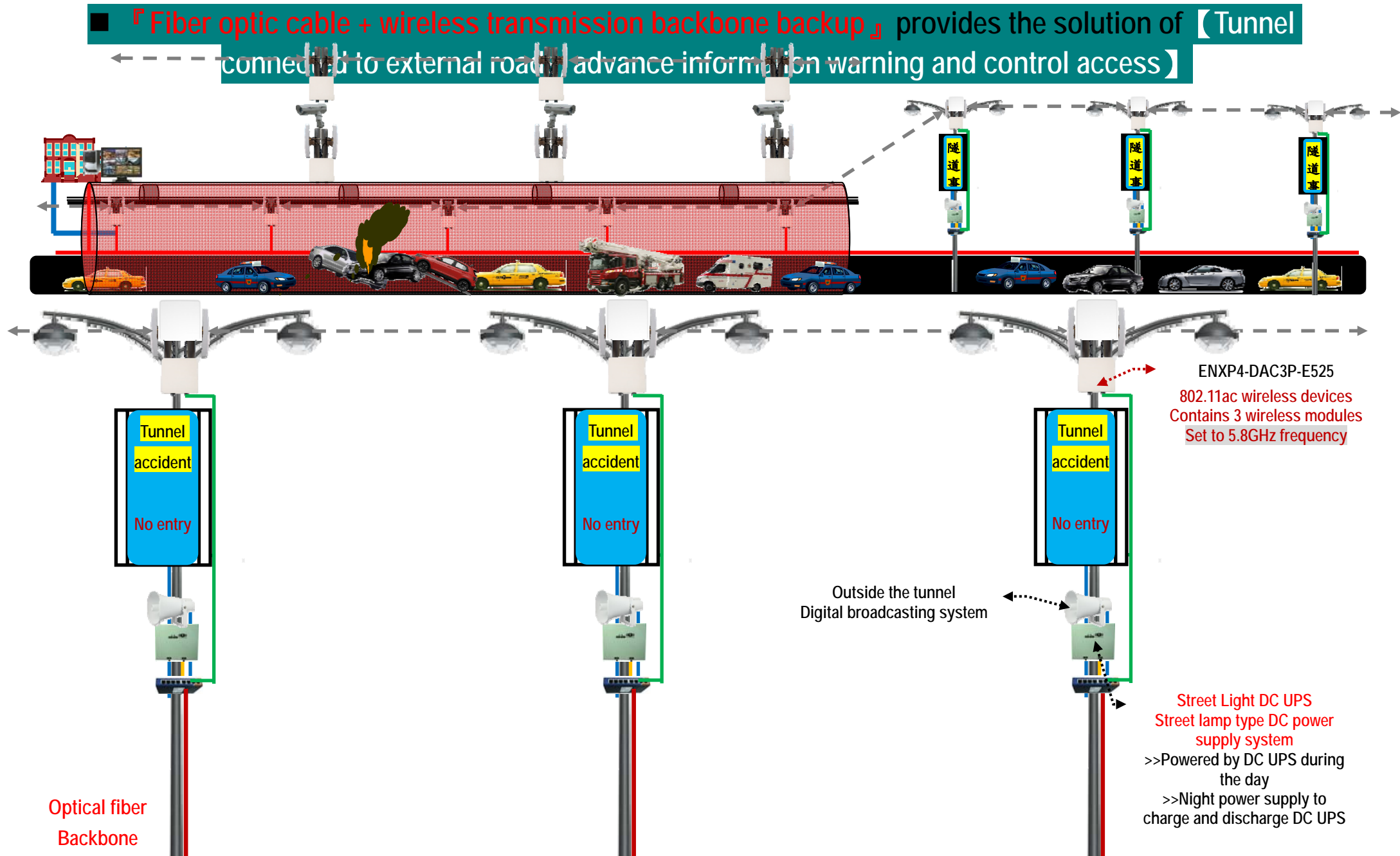


## 『 High-speed mobile wireless signal coverage 』 specially provides 【 high-speed mobile rail vehicle -- remote control light signal warning control 】 scheme



## 『 Light warning control in the tunnel: white light (normal) / green light (driving in case of accident) / yellow light (warning attention) / red light (forbidden to drive) / red light flashing (escape) 』

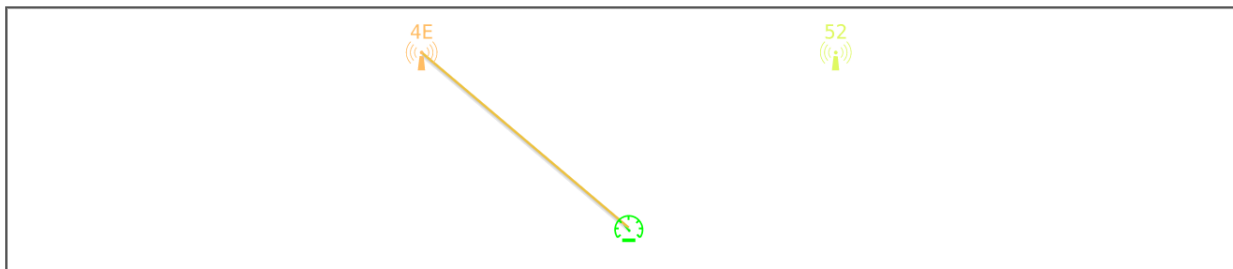




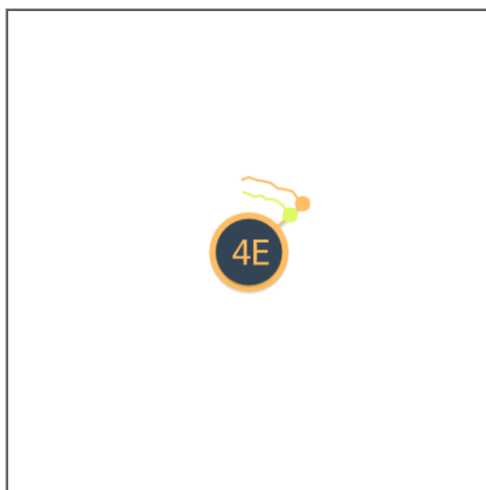


#### 4、High-speed mobile connection status and Handover switching information (new products will also have a software screen for web page status detection)

##### 連線狀態



##### 連線資訊



Time	MAC		RSSI1	RSSI2
2017/3/30 下午2:14:57	34:4f:3f:5f:00:4e	✓	-40	-54
2017/3/30 下午2:14:58	34:4f:3f:5f:00:4e	✓	-41	-54
2017/3/30 下午2:14:59	34:4f:3f:5f:00:4e	✓	-40	-54
2017/3/30 下午2:15:00	34:4f:3f:5f:00:4e	✓	-40	-54
2017/3/30 下午2:15:01	34:4f:3f:5f:00:4e	✓	-40	-54
2017/3/30 下午2:15:02	34:4f:3f:5f:00:4e	✓	-39	-54
2017/3/30 下午2:15:03	34:4f:3f:5f:00:4e	✓	-40	-54
2017/3/30 下午2:15:04	34:4f:3f:5f:00:4e	✓	-41	-54
2017/3/30 下午2:15:05	34:4f:3f:5f:00:4e	✓	-40	-54

複製資料到剪貼簿

## 5、Simple network scanning management system operation icon (new products will also have MAC-Level 2 software tools)

EL\_ML\_Utility(x64) v1.1

Interface : Network adapter 'Realtek PCIe GBE Family Controller' on local host-c8:d3:ff:d3:fc:ce

Init NIC START STOP

Sta	Update	MAC	IP	Model	Firmware	CPU%	MEM%	PPS	UP Time	Seq.
●	10:57:48	34:4f:3f:5f:01:ae	192.168.51	EL-N-2	1.3.1_z	30	34	7531	16:48:30.986	278
●	10:57:48	34:4f:3f:5f:01:c2	192.168.52	EL-N-2	1.3.1_z	30	35	10556	59:40:04.717	278
●	10:57:48	34:4f:3f:5f:01:da	192.168.32	EL-N-2	1.3.1_z	34	38	5854	85:46:25.249	278
●	10:57:48	34:4f:3f:5f:01:b6	192.168.34	EL-N-2	1.3.1_z	9	35	1760	23:34:09.842	278
●	10:57:48	34:4f:3f:5f:01:ce	192.168.37	EL-N-2	1.3.1_z	34	37	6635	111:50:08.792	278
●	10:57:48	34:4f:3f:5f:01:3e	192.168.33	EL-N-1	1.3.1_z	1	30	13	85:46:09.663	278
●	10:57:48	34:4f:3f:5f:01:9a	192.168.31	EL-N-2	1.3.1_z	9	36	1743	21:01:58.065	278
●	10:57:48	34:4f:3f:5f:01:c6	192.168.35	EL-N-2	1.3.1_z	18	36	3563	24:18:30.136	278
●	10:57:48	34:4f:3f:5f:01:a2	192.168.39	EL-N-2	1.3.1_z	30	35	5440	72:33:13.789	278
●	10:57:48	34:4f:3f:5f:01:8a	192.168.38	EL-N-1	1.3.1_z	0	32	9	144:43:15.030	278
●	10:57:48	34:4f:3f:5f:01:b2	192.168.36	EL-N-2	1.3.1_z	6	36	1371	20:26:24.209	278
●	10:57:48	34:4f:3f:5f:01:ba	192.168.40	EL-N-2	1.3.1_z	22	37	3534	140:16:06.995	278
●	10:57:48	34:4f:3f:5f:01:d2	192.168.41	EL-N-2	1.3.1_z	14	35	1869	139:19:35.008	278
●	10:57:48	34:4f:3f:5f:01:ca	192.168.42	EL-N-2	1.3.1_z	4	35	1042	62:17:01.443	278

Node Status : Query Seq. : 278

Status Counts

●	14
●	0
●	0
●	0
Total	14

Time : 00:00

F/W Upgrade : 5 Minutes to Reboot

FTP Server IP : . . .

EL f/w name :

ML RSU f/w :

ML ORU f/w :

Notes :

Steps :

1. Select Correct Interface.
2. Press Init NIC Button to initialize NIC.
3. Set Check Level Number @ GreenYellow fields.
4. Set Query Interval @ Time GreenYellow field.
5. Press START Button to discover network.
6. Press STOP Button to stop discovering.

Msg : Init NIC...

Msg : Init NIC Success!!

Msg : Start discovering...



# IOP-EBLLX-DACXX-XXXX Wireless Device Model Analysis



## IOP-EBLLX-DACXX-XXXX

