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DEVELOPMENT OF ROADSIDE UNITS FOR COOPERATIVE I2V

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- Provide the traffic information which drivers can not get in advance

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- Help drive calmly, efficiently and safely

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Applicable for conditionally, highly or fully automated vehicles too

SIGNIFICANCE OF I2V

IMPORTANCE OF ASSISTANCE AT SIGNALIZED INTERSECTIONS

- Intersections with traffic lights will stop vehicles regardless of the drivers' will.
- Intersections may make vehicles and pedestrians cross each other.

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- Intersections are dangerous spots on roads.

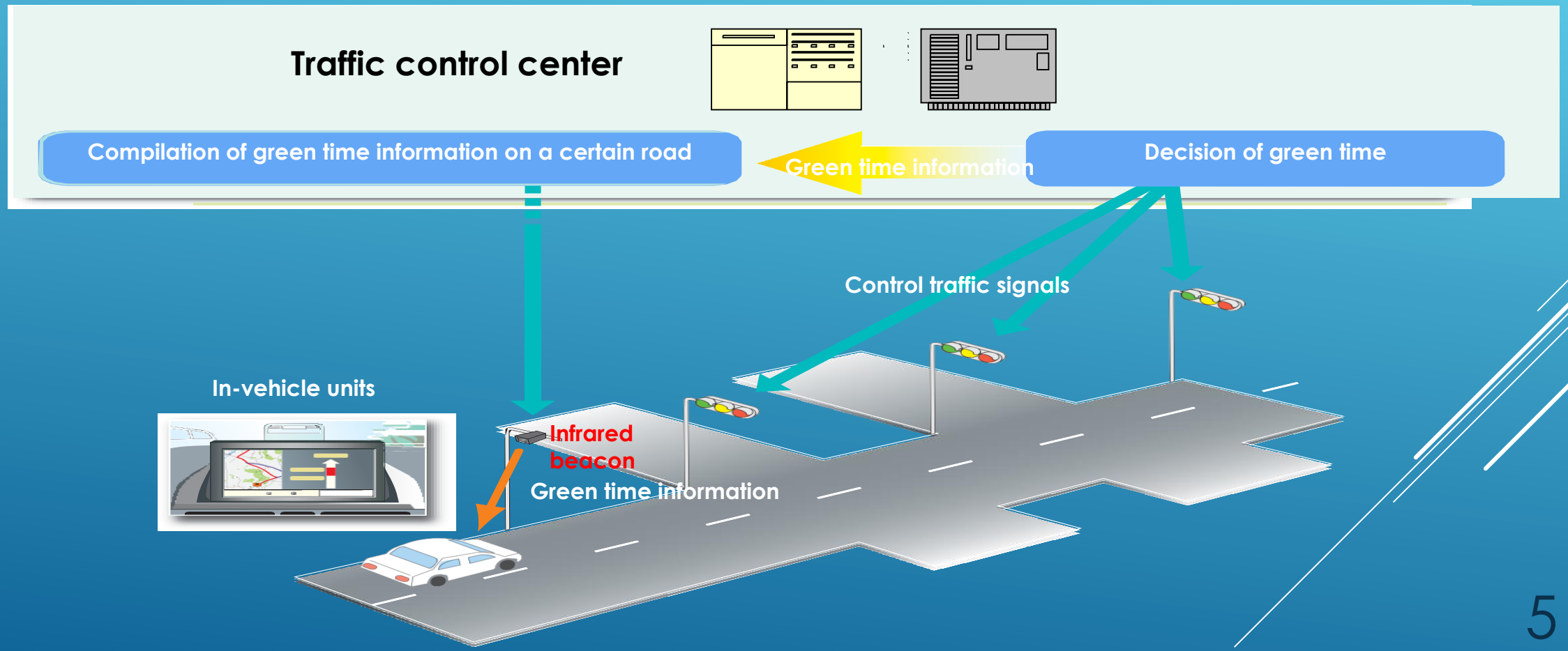
Cf. The number of intersections with traffic lights throughout Japan:
around 175,000

①PROVISION OF SIGNAL INFORMATION FROM ROADSIDE UNITS AT INTERSECTIONS

About TSPS

(Traffic Signal Prediction Systems)

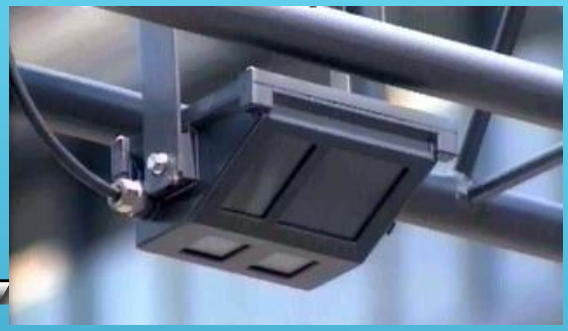
STRUCTURE OF PROVIDING SIGNAL INFORMATION



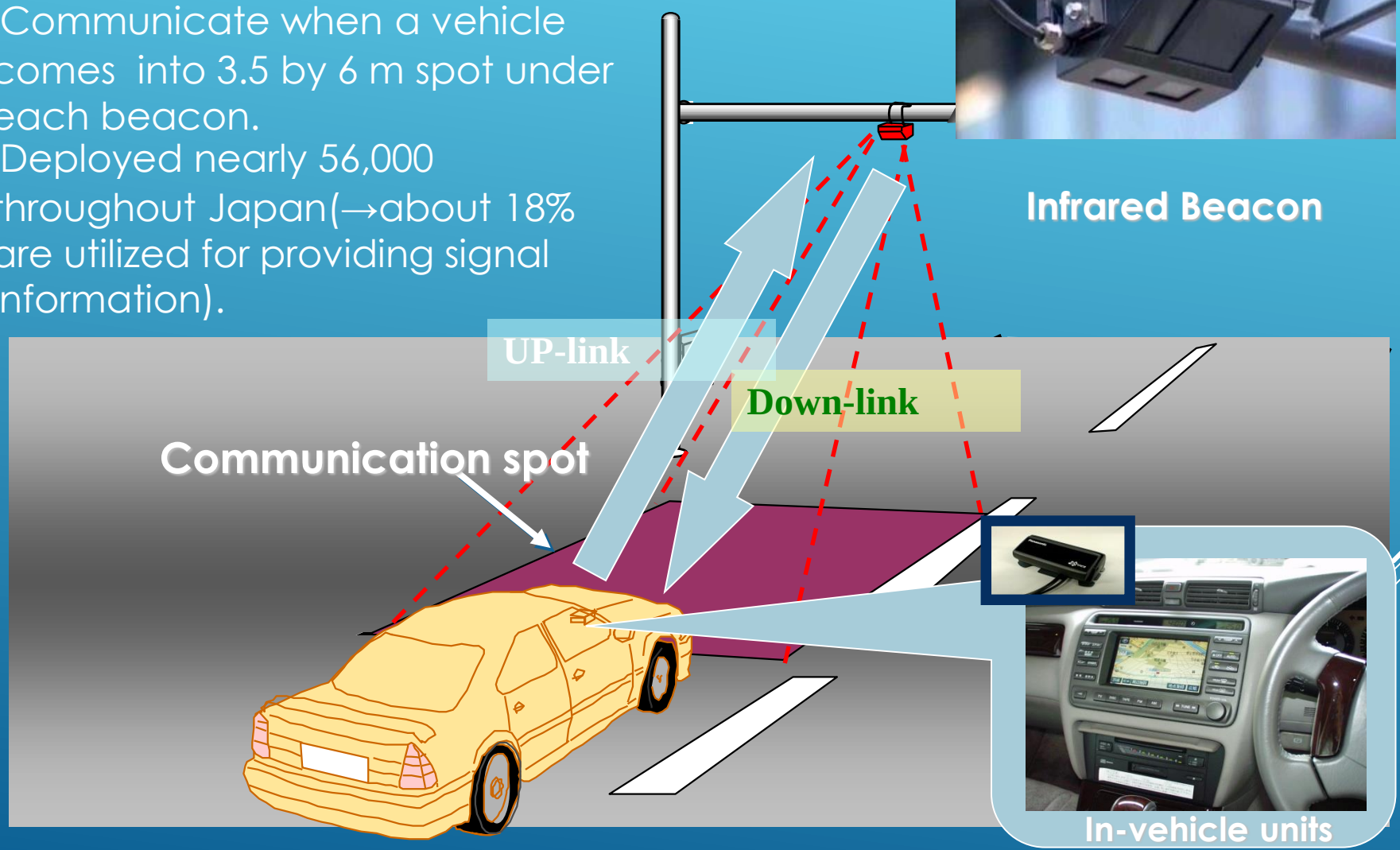
INFRARED BEACON

Features

- Communicate by infrared light.
- Communicate when a vehicle comes into 3.5 by 6 m spot under each beacon.
- Deployed nearly 56,000 throughout Japan(→about 18% are utilized for providing signal information).



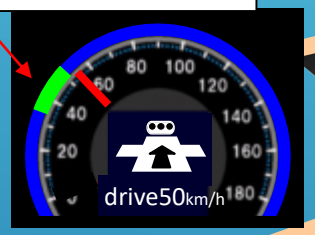
Infrared Beacon



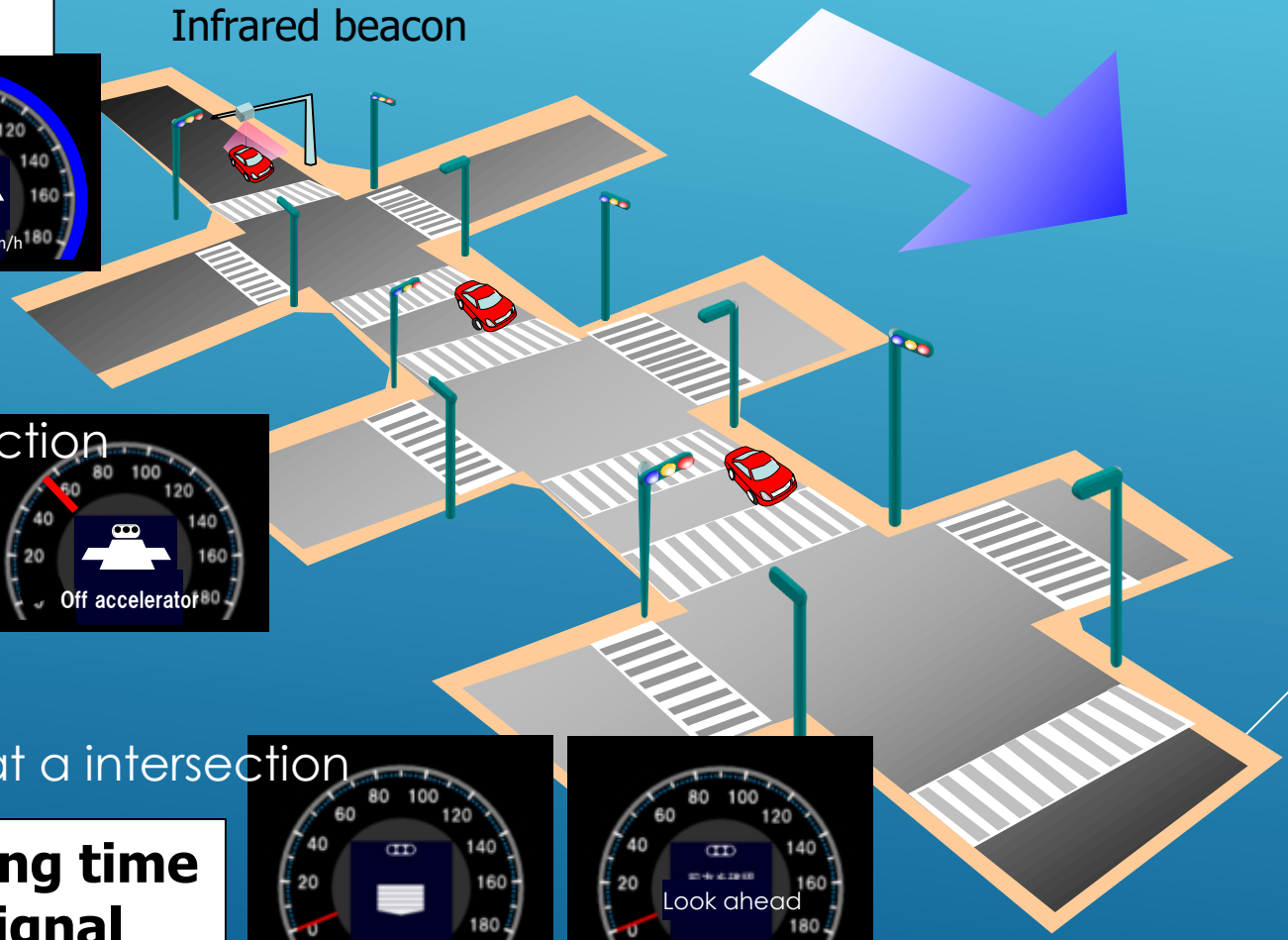
TSPS(Traffic Signal Prediction Systems)

Inform the timing of traffic signal change to drivers to make them drive calmly in preparation for the change.

Speed for passing the intersection



Infrared beacon

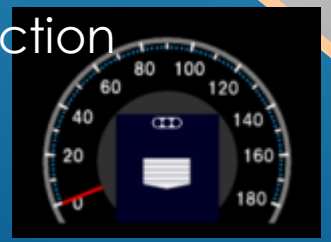


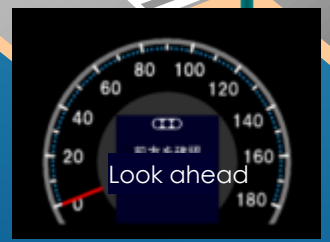
When you can't pass the intersection

Off accelerator ready for red signal

While stopping at a intersection

Remaining time of red signal





CURRENT SITUATION OF TSPS

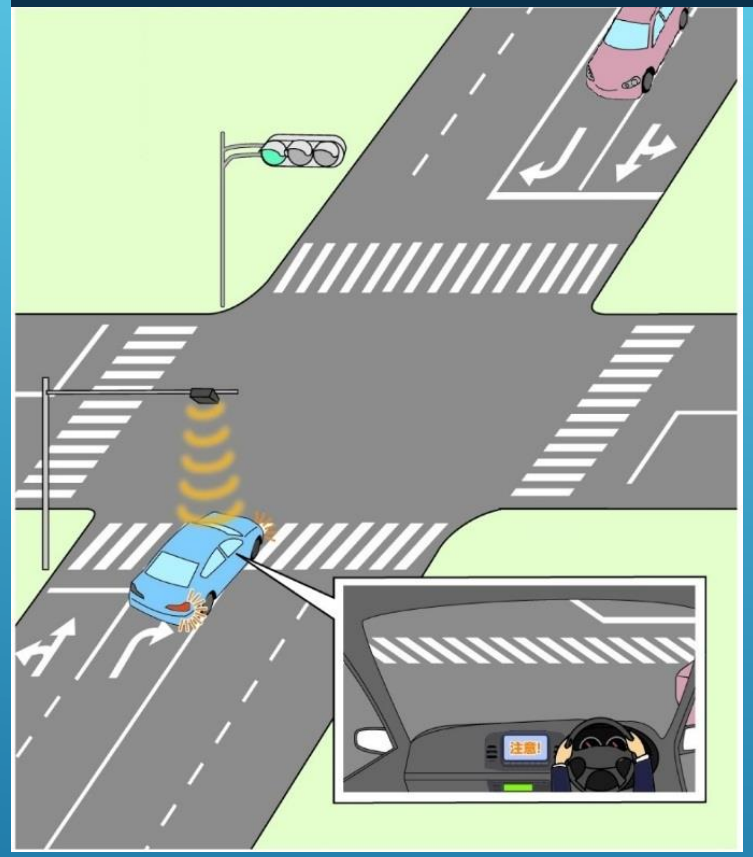
- The number of routes which provide TSPS: 819
- The total distance which provide TSPS: 1,849.5 k m
- The number of intersections which provide TSPS: 6,063
- Vehicles corresponding to TSPS went on the market in May this year

②PROVISION OF INFORMATION ON VEHICLES AND PEDESTRIANS FROM ROADSIDE UNITS AT INTERSECTIONS

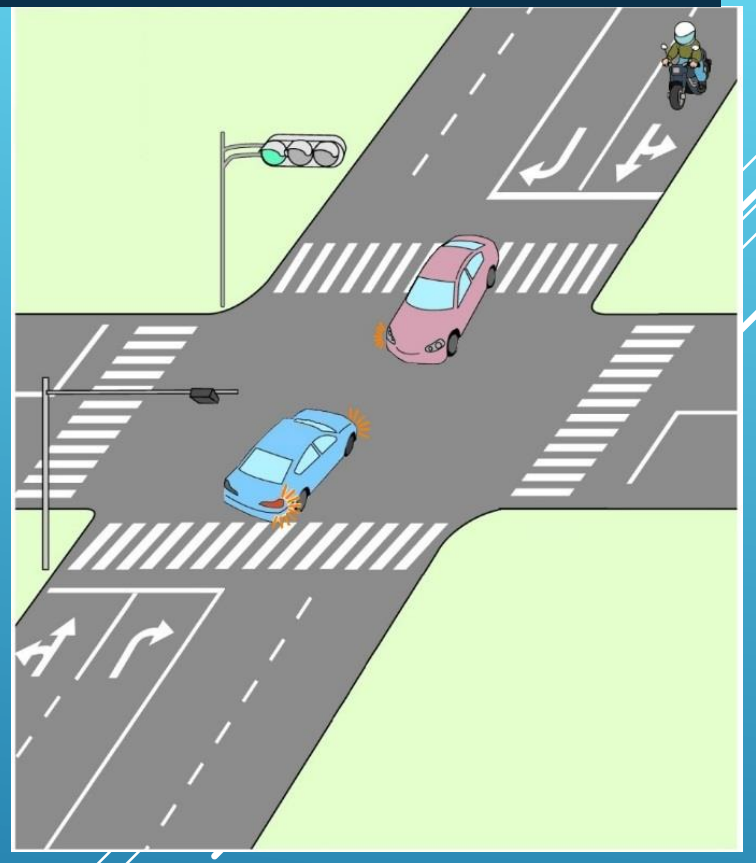
Radio Wave ‘DSSS’

(Driving Safety Support Systems)

Problems within an intersection



Get information from an infrared beacon before an intersection



Stop to let opposite vehicles pass.
A right-turn opposite vehicle obstructs your view.
Difficult to know when to cross.
Might collide with an opposite vehicle or pedestrians.

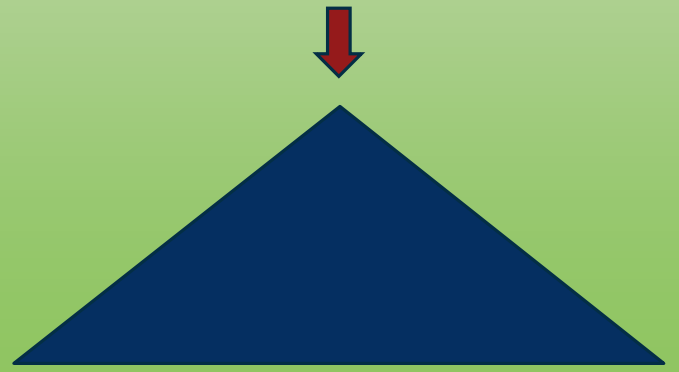
THE USE OF 700MHZ RADIO WAVE

Infrared

- **Straightness→one-time communication at a certain spot（about　3.5×6m）**

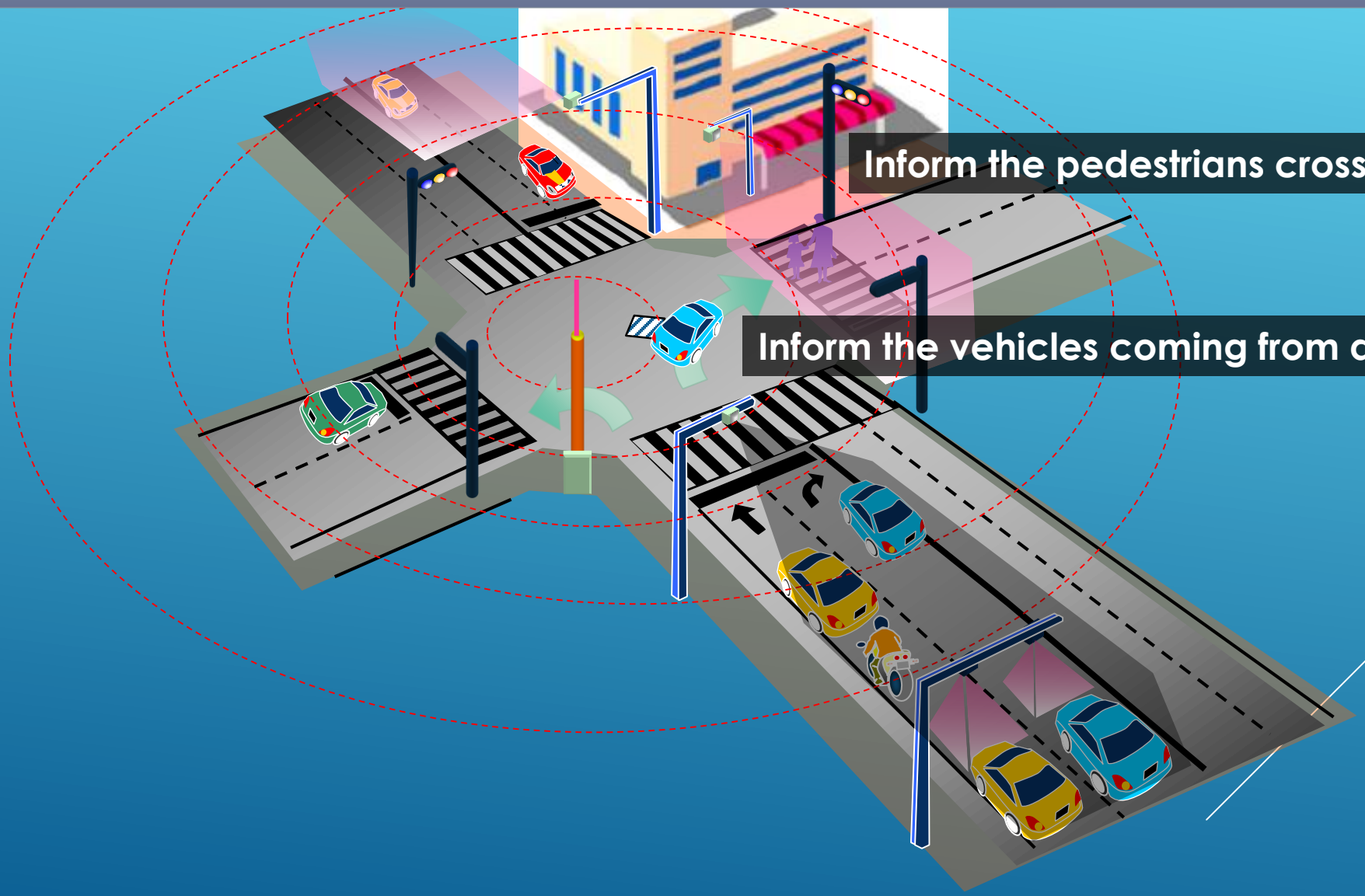
700MHz band radio wave

- **Widespread→consecutive communication within a wider area（about 300m square）**
- **Diffractiveness→transmissible even behind obstacles**



DSSS with 700MHz band radio wave('radio wave DSSS')

Inform the dangers within an intersection through consecutive communication in 100ms cycles



CURRENT SITUATION OF ‘RADIO WAVE DSSS’

- **The number of intersections which provide ‘radio wave DSSS’: 52**
- **Vehicles corresponding to ‘radio wave DSSS’ went on the market in October last year.**