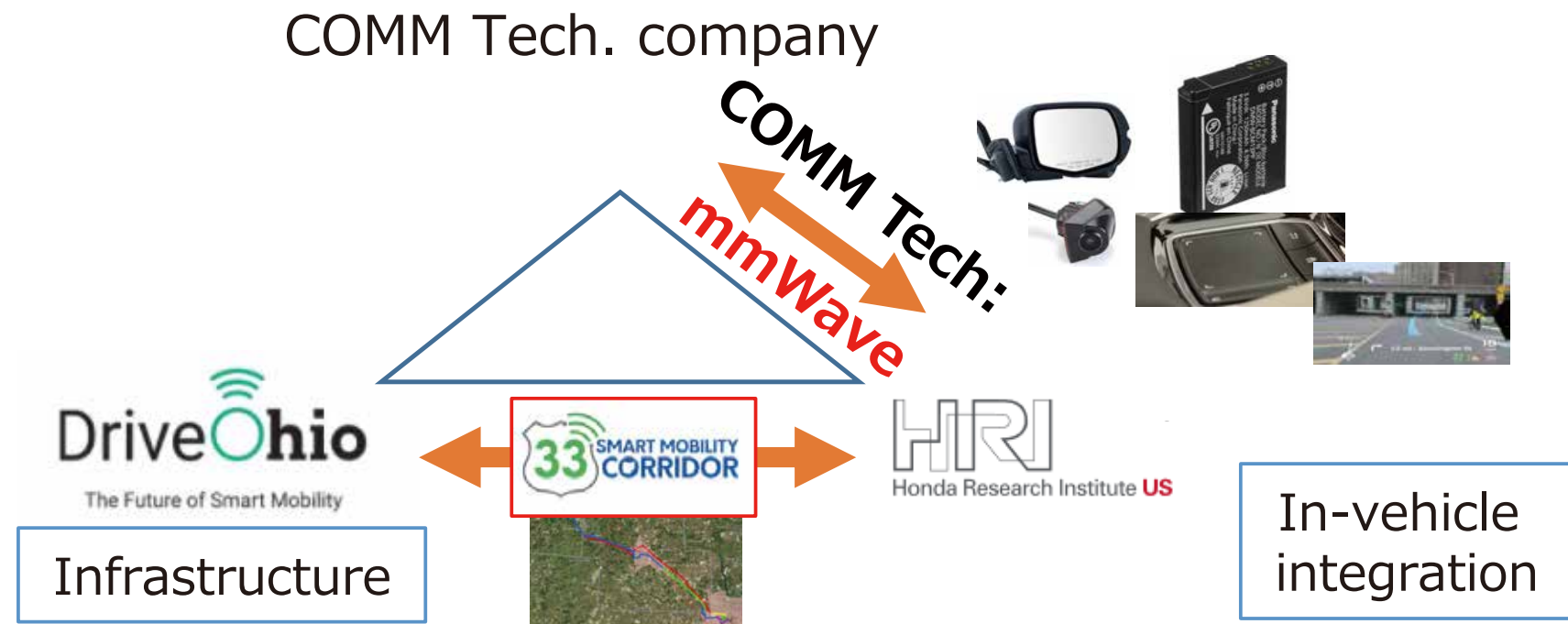# SAFE SWARM

mmWaveSystem — Demonstration experiment of safety technology between infrastructure on the road and vehicles using mmWave technology

COMM Tech. company

COMM Tech: mmWave

Infrastructure

In-vehicle integration

DriveOhio — The Future of Smart Mobility

33 SMART MOBILITY CORRIDOR

HRI — Honda Research Institute US

- Introducing the efforts of three parties in constructing an intersection system using mmWave this time
- HRI develops mainly in-vehicle integration

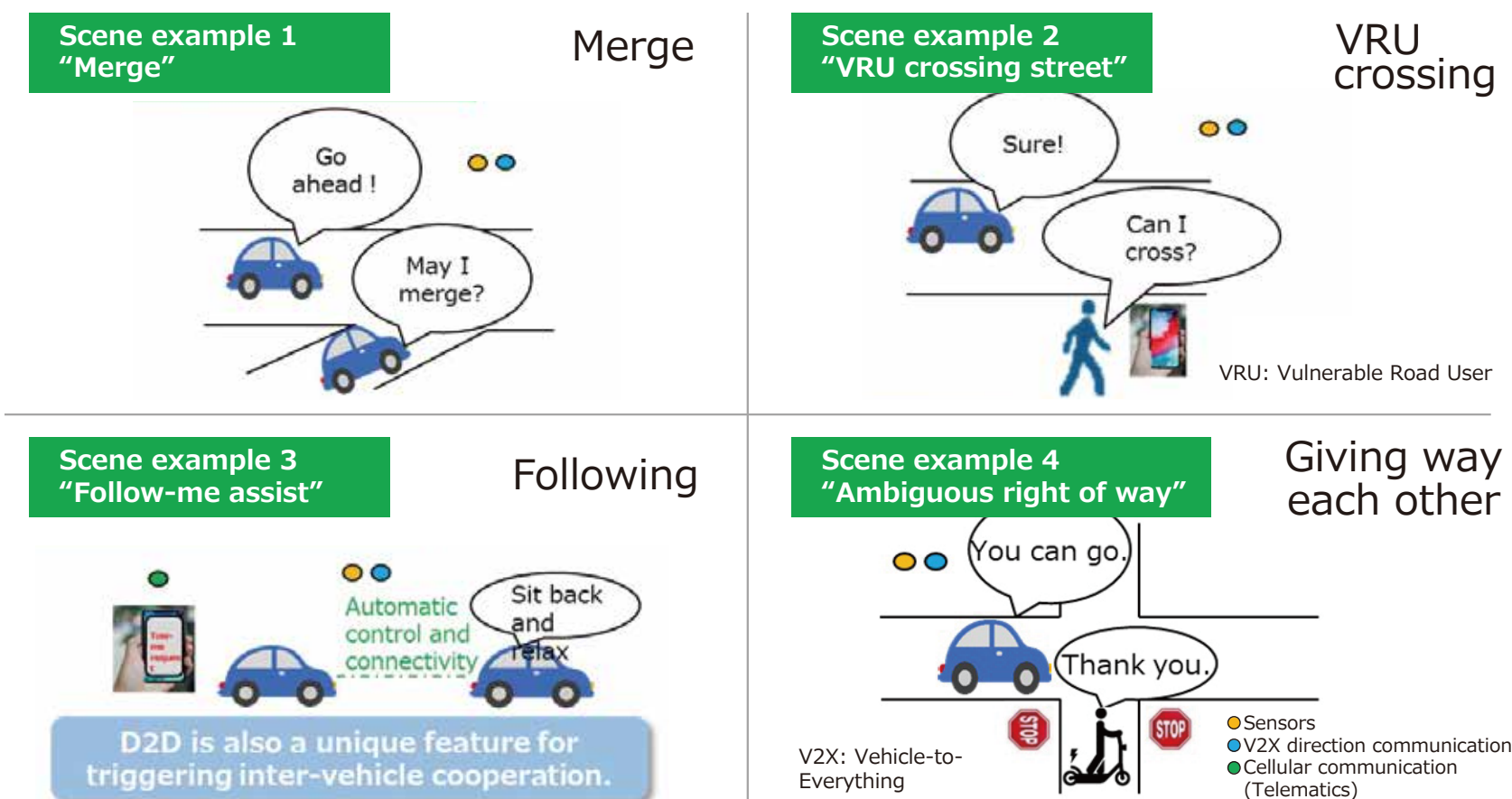### ●Intersection use case
Location: US OH, US-33 off ramp intersection

Components / Data Flow
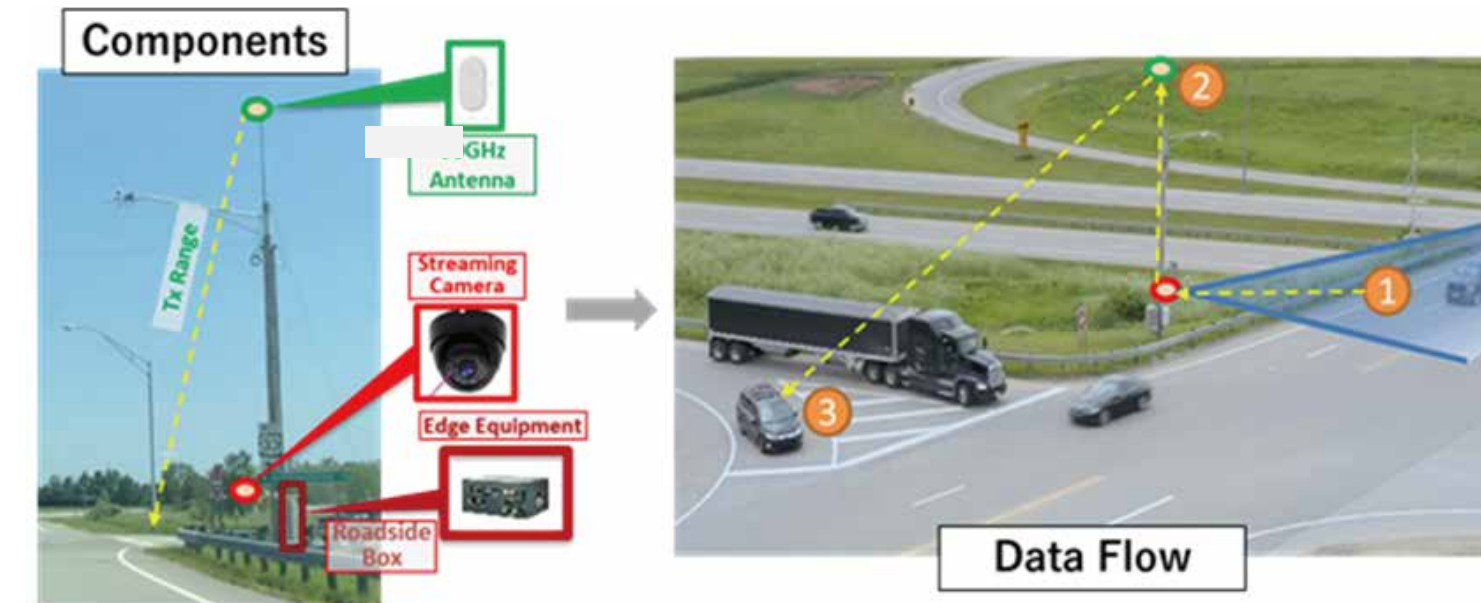
- 1．mmWave Antenna / 2．Streaming Camera / 3．Edge Equipment
- These 1.) and 2.) equipment above installed on US-33
- 3.) above installed on the vehicle

Driver-to-Driver — Research on contributions to safety through communication between drivers

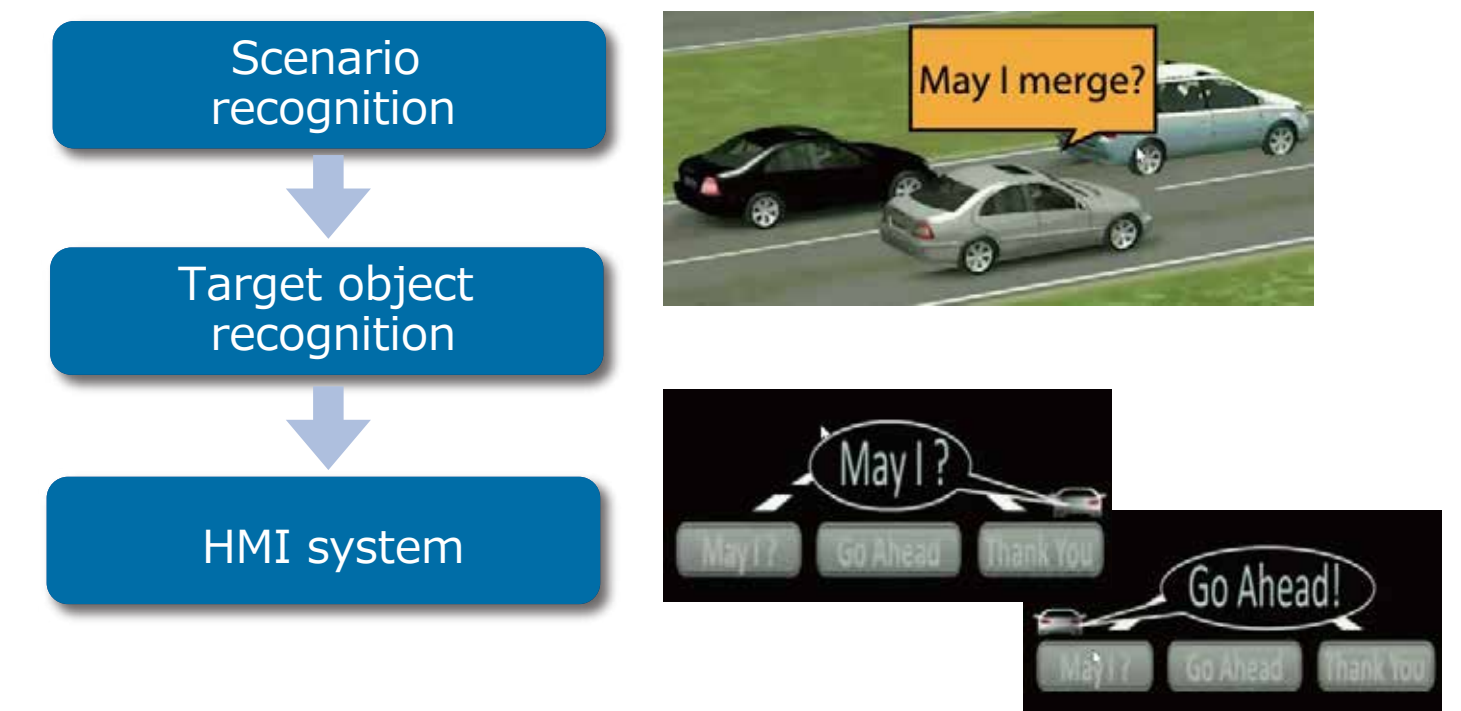Needs effective intention-sharing

(before) / (after)

- Effectively convey your intentions to others and reduce driver frustration
- Providing compassionate services that reduce anxiety and strengthen empathy

●Use case scenarios — When(In what type of scene)D2D Is needed?

Scene example 1 "Merge" — Merge
Go ahead ! / May I merge?

Scene example 2 "VRU crossing street" — VRU crossing
Sure! / Can I cross?
VRU: Vulnerable Road User

Scene example 3 "Follow-me assist" — Following
Automatic control and connectivity / Sit back and relax
D2D is also a unique feature for triggering inter-vehicle cooperation.

Scene example 4 "Ambiguous right of way" — Giving way each other
You can go. / Thank you.
V2X: Vehicle-to-Everything
○ Sensors
● V2X direction communication
● Cellular communication (Telematics)

●How it works

Scenario recognition
↓
Target object recognition
↓
HMI system

May I merge?

May I ? / Go Ahead / Thank You / Go Ahead!

- V2X / HMI system needed
  Scene and target recognition needed
- Firstly, Communicate each other, then behave

SAFE SWARM

5G System Demonstration experiment of safety technology between vehicles or between vehicles and pedestrians via infrastructure using 5G

•Efforts for safety and relief utilizing communication technology

- Share speed and location information using Safe Swam technology using V2X
- Considering how to utilize new communication technology to reduce collisions and fatal accidents

•Use case scenarios

Invisible Pedestrian | Invisible / inaudible emergency vehicle | invisible ignoring signals Vehicles

•How it works

- 5G ULTRA WIDEBAND
- MOBLIE EDGE COMPUTING
- V2X SOFTWARE PLATFORM

- 5G ULTRA WIDEBAND
- Camera on the pole

•Future plan

- V2X and 5G network availability extension
- Contribute to a safer society by seamlessly communicating with self-driving cars

HONDA