

◇ Trends in Leading-Edge Industrial Technology Development in Taiwan and Taiwan-Japan Cooperation: Self-Driving Vehicles and Drones

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In this lecture I would like to talk about the "self-driving vehicles" and "drones" that will occupy an important position in the society of the future described by Society 5.0, which is being promoted by Japan.

※I would like you to watch the English-language description of the "Automatic Police UAV Patrol System" that begins 33 minutes and 10 seconds into this video.

○Introduction of ITRI

<https://www.itri.org.tw/english/>

Founded in 1973, ITRI is Taiwan's largest applied technology development corporation.
ISTI serves as a think-tank for ITRI and the government of Taiwan.

■About the development of self-driving vehicles

- The global market for self-driving vehicles

The global market for self-driving vehicles is predicted to be worth US\$800 billion in 2030 and to grow to twice that by 2035.

It is expected that key among these will be commercial self-driving vehicles - buses, taxis, delivery trucks & vans and the like.

【The situation regarding the development of self-driving vehicles in various countries - evaluation of 30 countries by KPMG】

Singapore : leading in government regulation

The Netherlands : best equipped with infrastructure

USA : leading in technological innovation

Japan and Taiwan are ranked 11th and 13th, respectively, and are expected to grow in the future.

- Development trends in Taiwan

The government supports development through subsidies, and verification testing of self-driving vehicles is underway throughout Taiwan.

- ITRI achievement with respect to self-driving vehicles

In cooperation with the local governments, ITRI is carrying out the following kinds of verification

testing of self-driving vehicles.

- a) Home delivery service using self-driving vehicles (Hsinchu Smart City)
- b) Pick-up and drop-off of airport staff (Taoyuan International Airport)
- c) Shuttle-bus operation (Taichung Smart City)

The self-driving vehicles use the ITRI Advanced Driving Assistance System. ADAS is technology that perceives the environment (situation) around the vehicle from images and leads to safe driving.

- About Taiwan-Japan cooperation in the fields of EV and self-driving cars

【Examples of collaboration in EV-related design and development】

Electric motor /Controller

Power conversion and power management

Electric vehicle systems

Vehicle transmission systems

【Examples of collaboration in self-driving vehicle design and development】

System integration of self-driving vehicles

Integration of drive-by-wire systems for self-driving vehicles / special applications

High-precision mapping and positioning technology

Cloud V2X technology

ADAS software

■About the development of drones

- Market trends in drones

The growth and development of the commercial market is expected. In 2020 the global market composite annual growth rate exceeded 20%, and there is data that shows the price of commercial drones to be more than thirty times that of those for consumer use.

- International development trends in commercial drones

A variety of functions and technologies have been developed, focusing on three applications: aerial work, logistics and transportation, and aerial communications platforms.

Important functions: Payload, flight time, vertical take-off and landing (VTOL), beyond visual line of sight flight, information analysis, etc.

Related technologies: High-density energy supply, AI applications, autonomous manned aircraft

- ITRI drone development and achievements in verification testing

Since 2017 ITRI has developed a variety of drones, ranging in size from small to large. These drones are equipped with technology enabling obstacle avoidance, large payloads and other

special applications, and has acquired many patents.

【Examples of drone development】

- a) Drone for pesticide-spraying
- b) Drone for fruit transportation
- c) Drone for monitoring disaster-stricken areas
- d) Patrol drone

- ・ Taiwan-Japan cooperation to be anticipated in the field of drones

【Relating to the power module (main component)】

High-tension blades and motors, ESC modules

Hybrid power modules exclusive for high payload drone

Power modules for large drone

【Overall airframe design / Prototype development】

Heavy-lift multi-rotor drone

Vertical take-off and landing fixed-wing drone

SITL (software in the loop) flight simulator

Cf.

Society5.0 : https://www8.cao.go.jp/cstp/english/society5_0/index.html