Policy alignment for public/industrial use of drones

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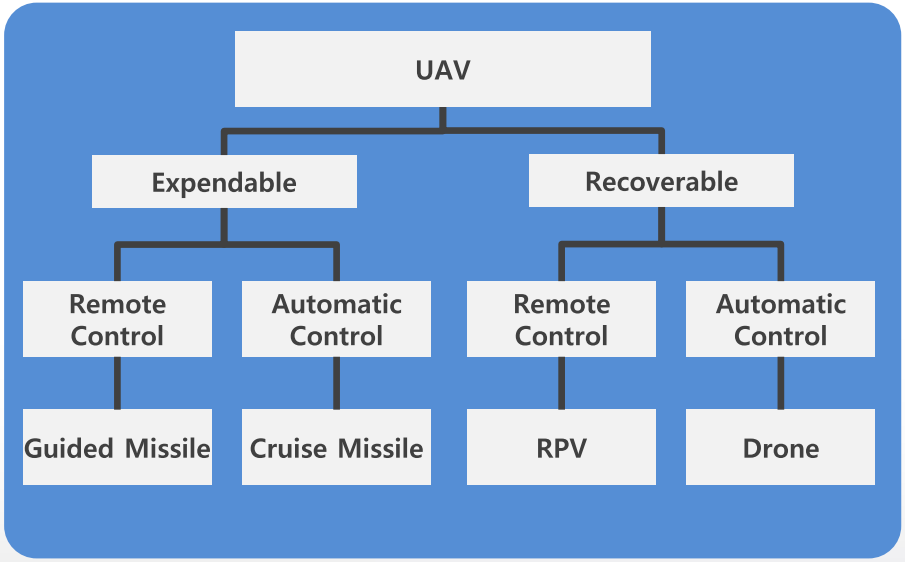
Drones (UAV)

Unmanned Aircraft Systems

- Remotely piloted aircraft
- No human aboard
- Differences by model:
  - Cost
  - Performance Capability



UAV (Drones)

Drones(UAV) in Korea

Drone History

Military

RQ101

KUS-9

Remoeye

2000 2010 2015

Civil

Durumi 1

50m Unmanned Airship

Smart UAV

TR – 6X

EAV 3

SME Companies

DusiTech
Dual System Integration Technology

SWE
WWW.SWERC.COM

UCONSYSTEM CO., LTD.

Kascom

HUINS

NES&TEC

Drone Policies in Korea

Blue House & MSIP Announced Drone Policies (2015.5.29)

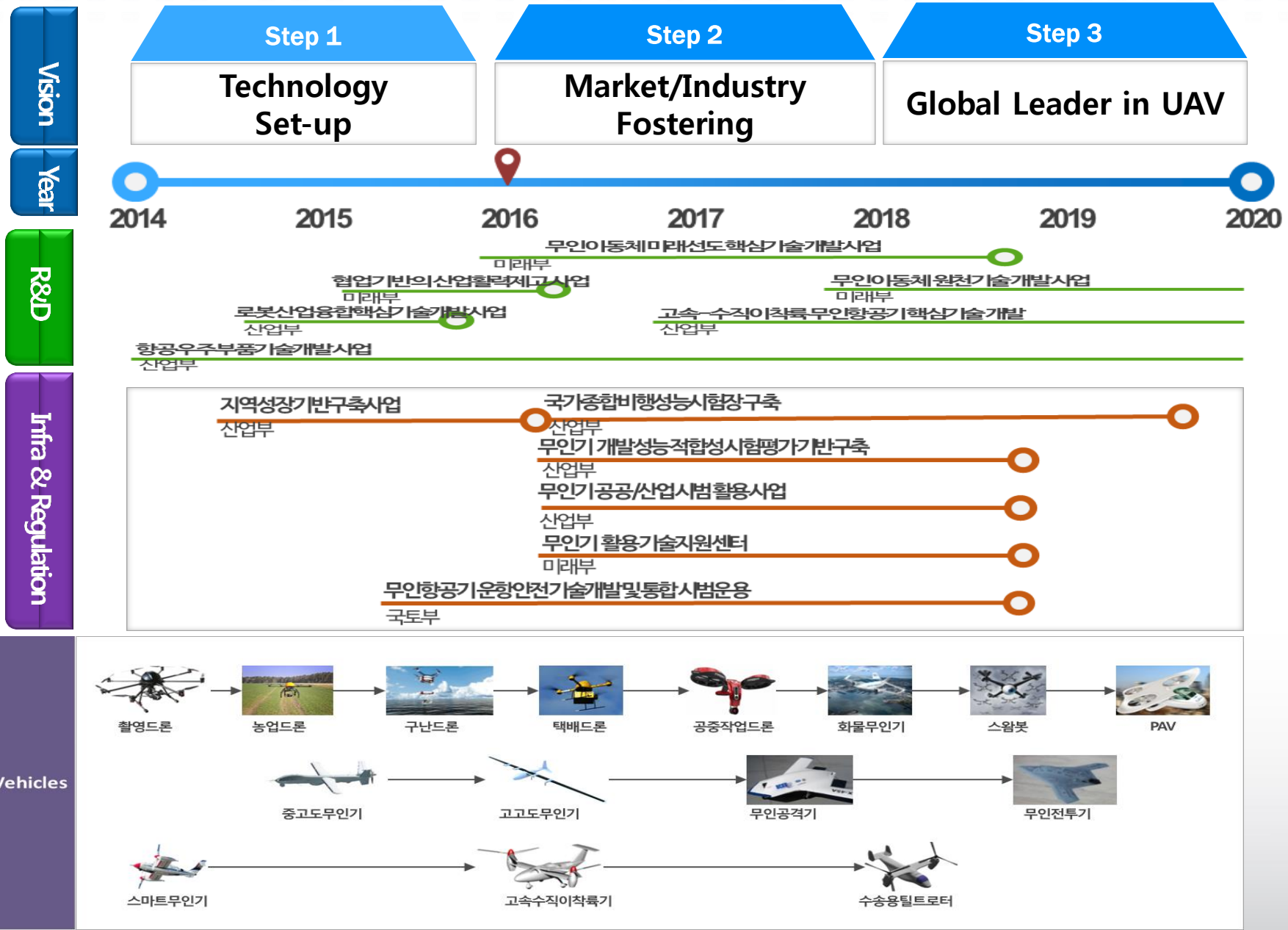
▶ **President Park**

> “Considering our advanced ICT prowess, Korea is equipped with some of the best infrastructure for the growth of unmanned aircraft and vehicles”

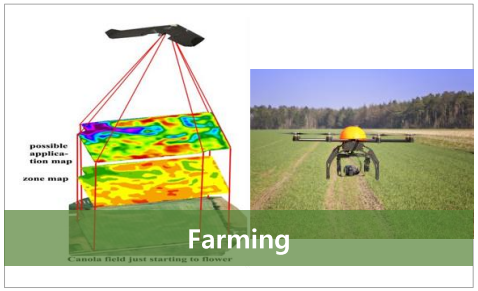
Key Agenda

- **Market** — Application Market Creation by government & public sectors
- **R&D Support** — Government R&D support on Technology Innovation
- **Drone Usage** — Infra structure, Regulation & De-Regulation for Drone Usages

Drone(UAV) Technical Roadmaps by Korean Gov't



Drones(UAV) in Application

Present	Near Future	Future
 Video & Drone press	 Farming	 Delivery
 Entertainment	 Infrastructure	 Cargo
 Science	 Public Service	 PAV

(FAA) Drone Operation will create $82 billion for the U.S. economy and more than 100,000 new jobs over the next 10 years

Hurdles for Drone Commercial Applications

Market

- Current Market is limited to the "Hobby & Filming"
- Enhanced Mission Payloads are required, such as IR, Lidar, Radar, Hyperspectral Camera, etc
- Business model which consists of customer, provider in operation & data processing, and business infras (insurance program, pilot/maintenance training)

Drone reliability for safe operation

- Limited Endurance : 20~30 minutes
- Sense & Avoid capabilities are not fully developed
- Not enough on-board computing capability for data processing and fully Autonomous flight

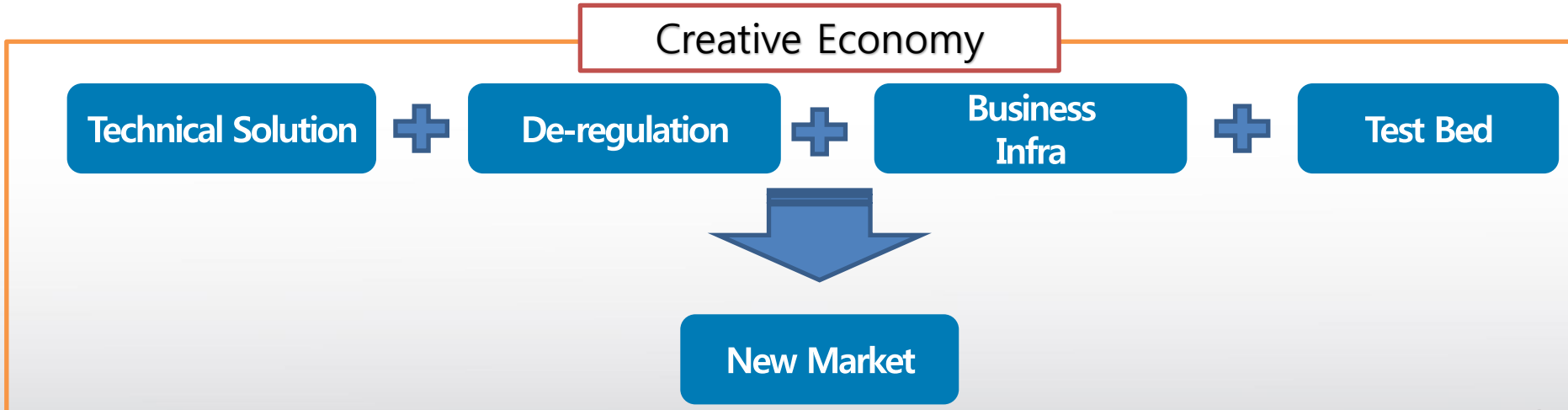
Operational Regulation : "Manned Aircraft"

- FAA part 107 is only temporary
- VLOS(visual line of sight) operation ONLY (1~3km operational range)
- Allowed Airspace is limited to AGL 400ft(120m) ONLY
- Fully Autonomous Flight is NOT allowed
  ▶1 pilot for 1 vehicle is mandatory

Creative Economy for Drone Industry

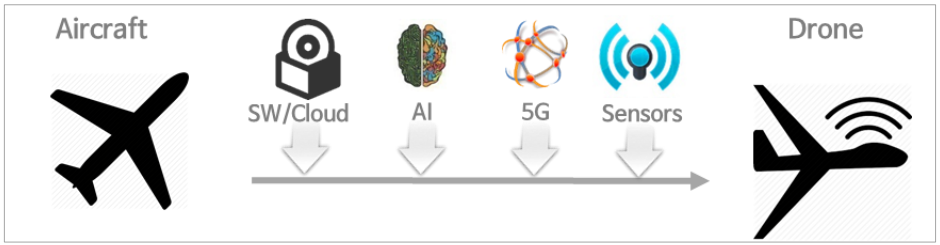
Creative Economy : Key promotion policy for Drone Industry

- Creative ideas on new technologies such as Drone, VR/AR, IOT, etc, especially in application
- Total Package tool for New Business Model
  - ▶ Technology Innovation, Regulation & de-regulation, Infras
  - ▶ New Application aimed to create a new market
- Test-bed should be provided for the verification and validation on new business model



Technical Innovation : Convergence Research

MSIP's plan on Drone innovation by Convergence Research



UAV

- Airframe
- Engine
- Avionics
- Telemetry

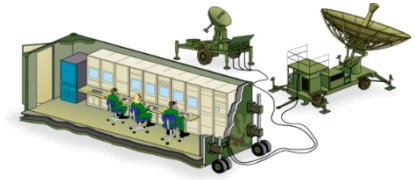
Payload


EO


RADAR

- Sensors

Ground Station



- Ground Controller
- Data Links

Related Technologies

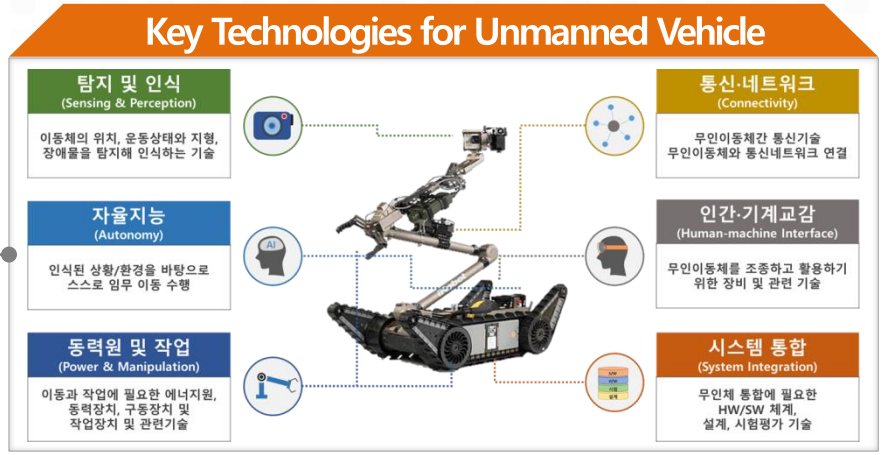
- Autonomous Vehicle
- New Materials
- SMART CHIPs
- Wearable Devices
- IOT
- Big Data
- 5G Communication
- VR/AR
- Intelligent Robotics
- Artificial Intelligence

Technical Innovation : R&D support

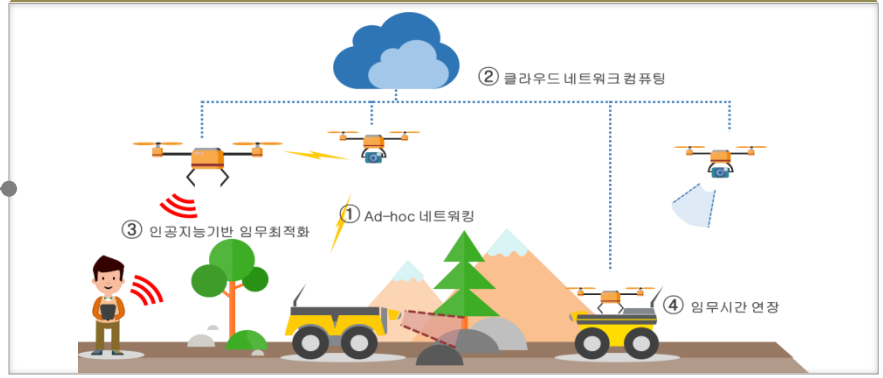
Unmanned Vehicle Advanced R&D Program

- Funding by and Operation By KARI
- Research Institutes, College Labs, SMEs are eligible
- International cooperation will be welcome

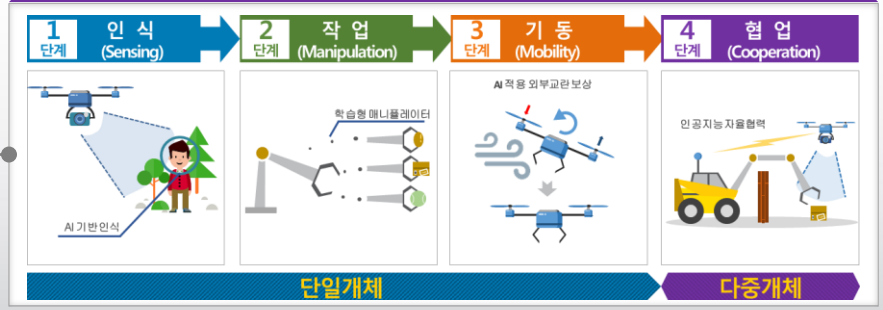
Key Technologies for Unmanned Vehicle



Core Teches for Next-Generation Unmanned Vehicles

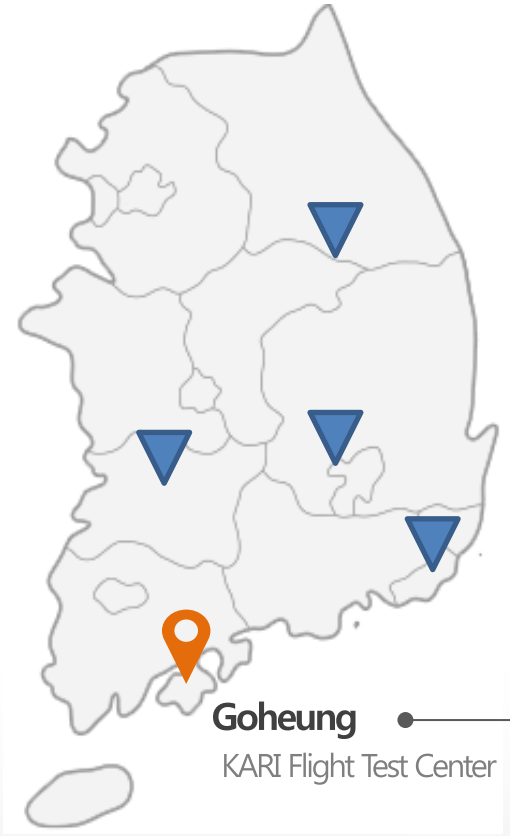


Artificial Intelligence for Drones



Drone Test Center

- 5 Test Center
- Commercial drone application can be tested in the designated center



Goheung Flight Test Center


LTA Laboratory


Small Aircraft Laboratory


Whirl Tower Test Bld.


L/G Drop Test Bld.

KARI flight test center supports flight test

Specific Drone Application Test & Verification


Drone Pilot Training


Data Processing

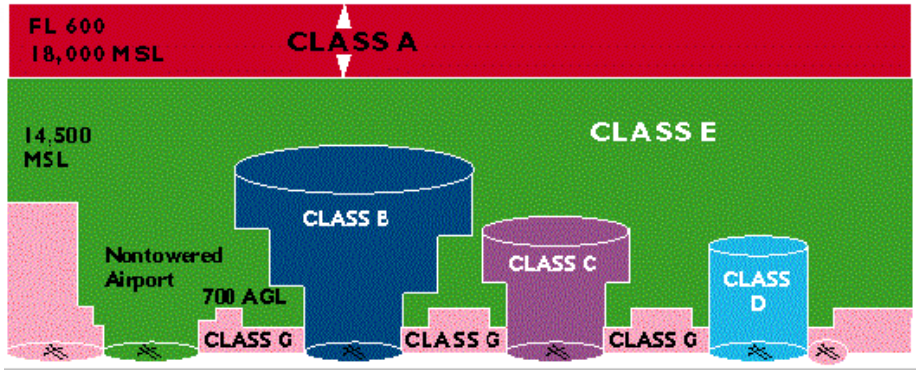

Application Test


Technical Support

Infras for Drone operation

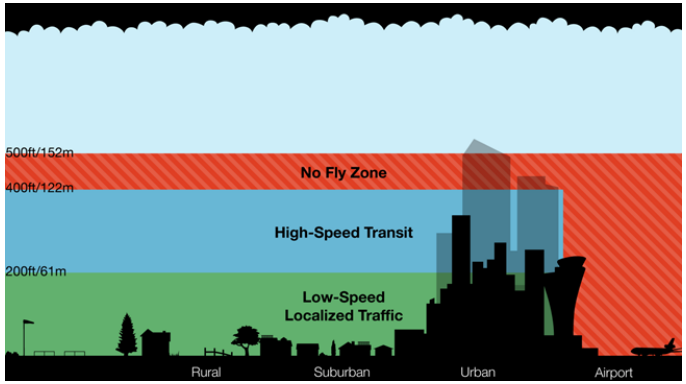
Airspace

- CLASS G airspace
- 400 AGL
- No Drone Zone : Power Plant
- Enter into Class E required



UAV traffic management

- Not established yet
- FAA, NASA, Amazon on Study
- Fully autonomous flight, BLOS
- Real-time monitoring using LTE



Radio Frequency

- CNPC : 2.4GHz
- 5GHz for Payload communication
- Wi-Fi, LTE, 5G, Zigbee

Regulation

- FAA part 107 : VLOS, daylight operation, pilot license required, no moving vehicle, no multiple drone
- No dropping and hazardous material delivery by drone

International Alignment Required

Market Creation by Gov't and Public Sectors

Korean Government acts as a market creator for Drone Applications

Application Area

Cooperative Program between Administrations

- Cooperative Program between MSIP, PPS and Operating Admin.s are on the Planning Stage
- Operating Administrations : Military, Police, MAFRA, MOLIT & etc
  - ▶ Define Application Area, required mission & vehicle level
- Public Procurement Service (PPS)
  - ▶ New program similar to PPI (Public Procurement of Innovation, EU)
- Technology Back-up by MSIP
  - ▶ Unmanned Vehicle Advanced Research Center at KARI

De-Regulation Activities by Korean Gov't

Business Environments

- Negative regulation for drone business items
- No equity for drone start-up

Drone Pilot license

- Pilot license specialized for drone(sUAV) is possible

Test Center

- 22 drone flight sites are provided including 6 sites for Seoul and KyungGi area
- Night & BVLOS(beyond visual line of sight) can be permitted in some designated flight sites

R&D Programs for drone application

- UAV traffic management
- Research for new market application
- Drone privacy, security & safety