Public Safety Drone-Cop UAV System

December, 2024

KARI 한국항공우주연구원 Korea Aerospace Research Institute

I C-UAS Trends

Concept of C-UAS For Airport

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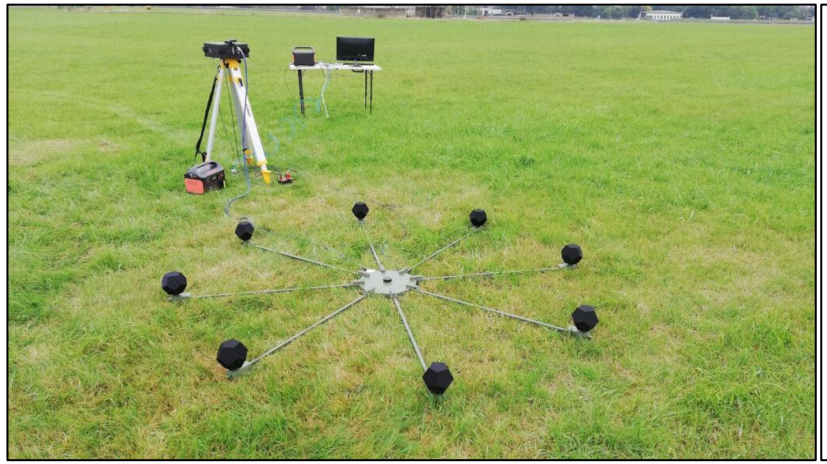
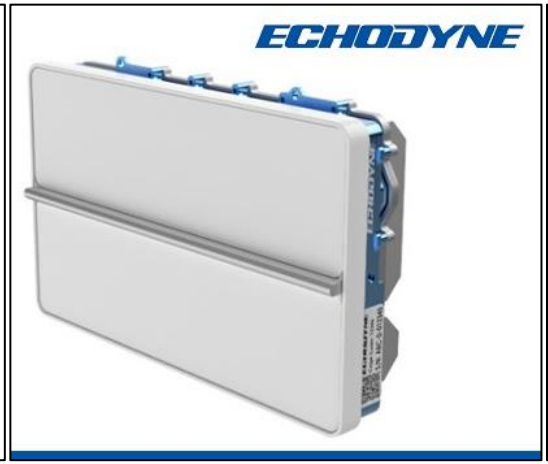
Drone Detection Equipment

Type	Equipment	Pros	Cons
Detection	Acoustic	Low Cost Multiple Drones Detection Mobile & Quick deploy	Noisy Environment Short range
	EO	Low Cost Spatial Resolution	Environmental Condition Short range
	Radar	Long Range Accurate Target Location Environmental Condition	Detection Range Depend on RCS Low Resolution Identification
	RF	Low Cost Multiple Drones Detection	Autonomous Drones Specific Frequency





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Drone Neutralization Equipment

Type	Equipment	Pros	Cons
Neutralization	RF Jammer	Mid Cost Mobile	Unpredictable Drone Behavior Short Range Frequency Dependent
	GNSS Jammer	Mid Cost	Self Jamming Short Range
	Laser	Low Cost Long Range	Large System High collateral damage
	Spoofer	Low Collateral Damage Autonomous Drone Detection	Low Effective Against Developed Drone Drone protocol library update
	High Power Microwave	Effective Performance within Range	High Cost Damage to Electronic Devices within Range
	Net Gun	Forensic & Prosecution High Accuracy (Ground) Low Collateral Damage (Drone)	Short Range (Ground) Performance Depend on Controller (Drone)
	Projectile	High Accuracy	High Cost High Collateral Damage
	Collision Drone	Low Cost High Accuracy	High Collateral Damage Need Faster than Target

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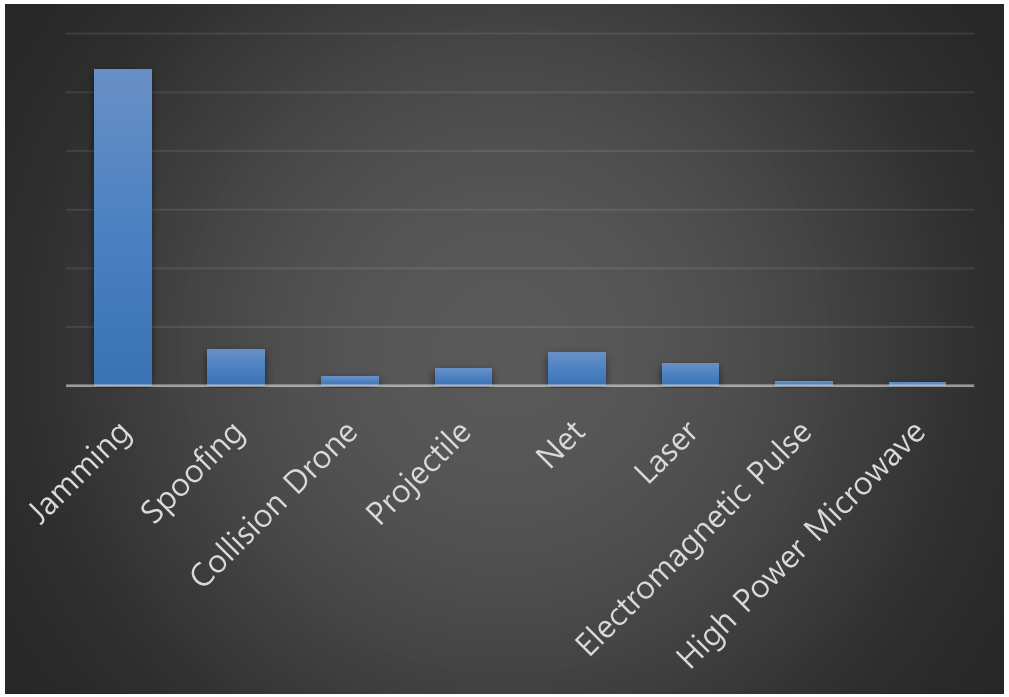
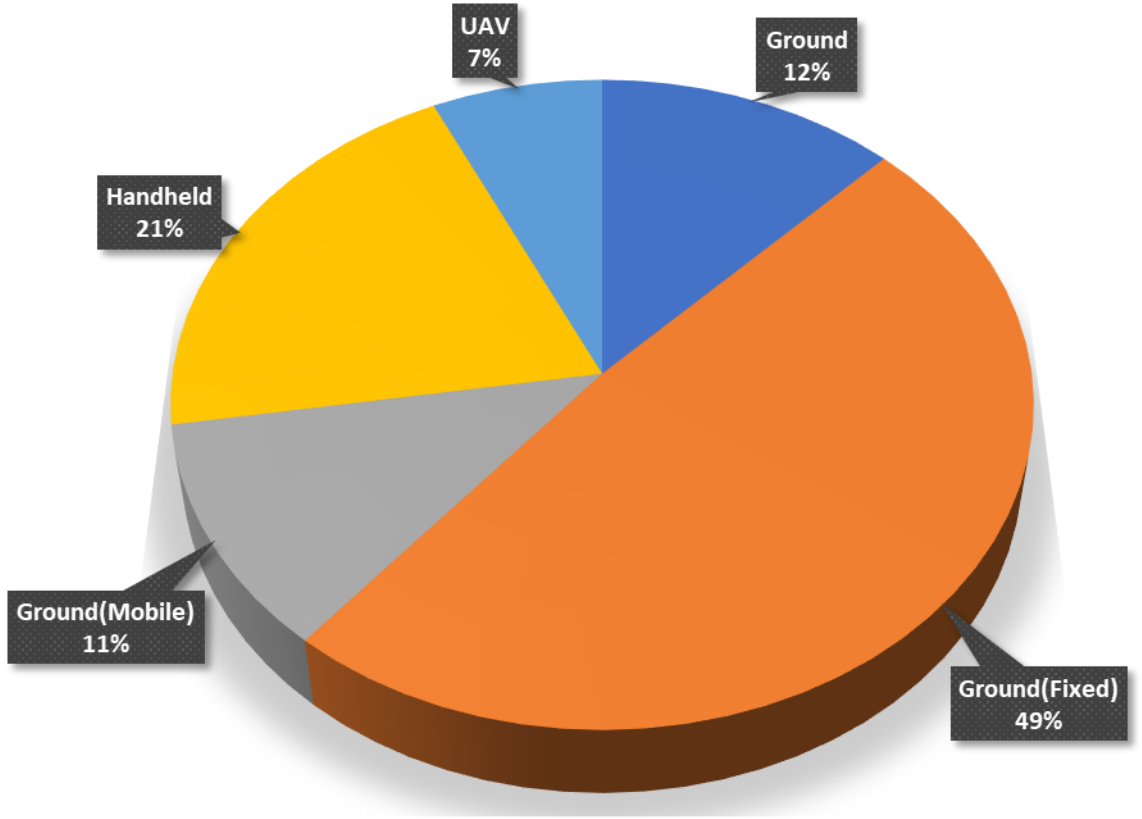
Global Status of C-UAS



Neutralization Equipment



Platform

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II Drone-Cop System

Purpose of Drone-Cop System Development

- As the threat of drones to national critical infrastructure becomes a growing social issue, KARI(Korea Aerospace Research Institute) is developing an aerial-based drone countermeasure system counter-UAS, Drone-Cop platform, to address various illegal drone activities.

DRONE COP

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Development Concept

- The aerial based Drone countermeasure system is being developed to serve two purposes : Patrol & Response.
- The Patrol Drone-Cop is intended to patrol areas beyond the range of ground-based equipment detection.
- When an illegal drone is detected, the Response Drone-Cop deploys to neutralize the threat
- Thereby conceptually ensuring a swift response to illegal drone activities through patrols and responses.

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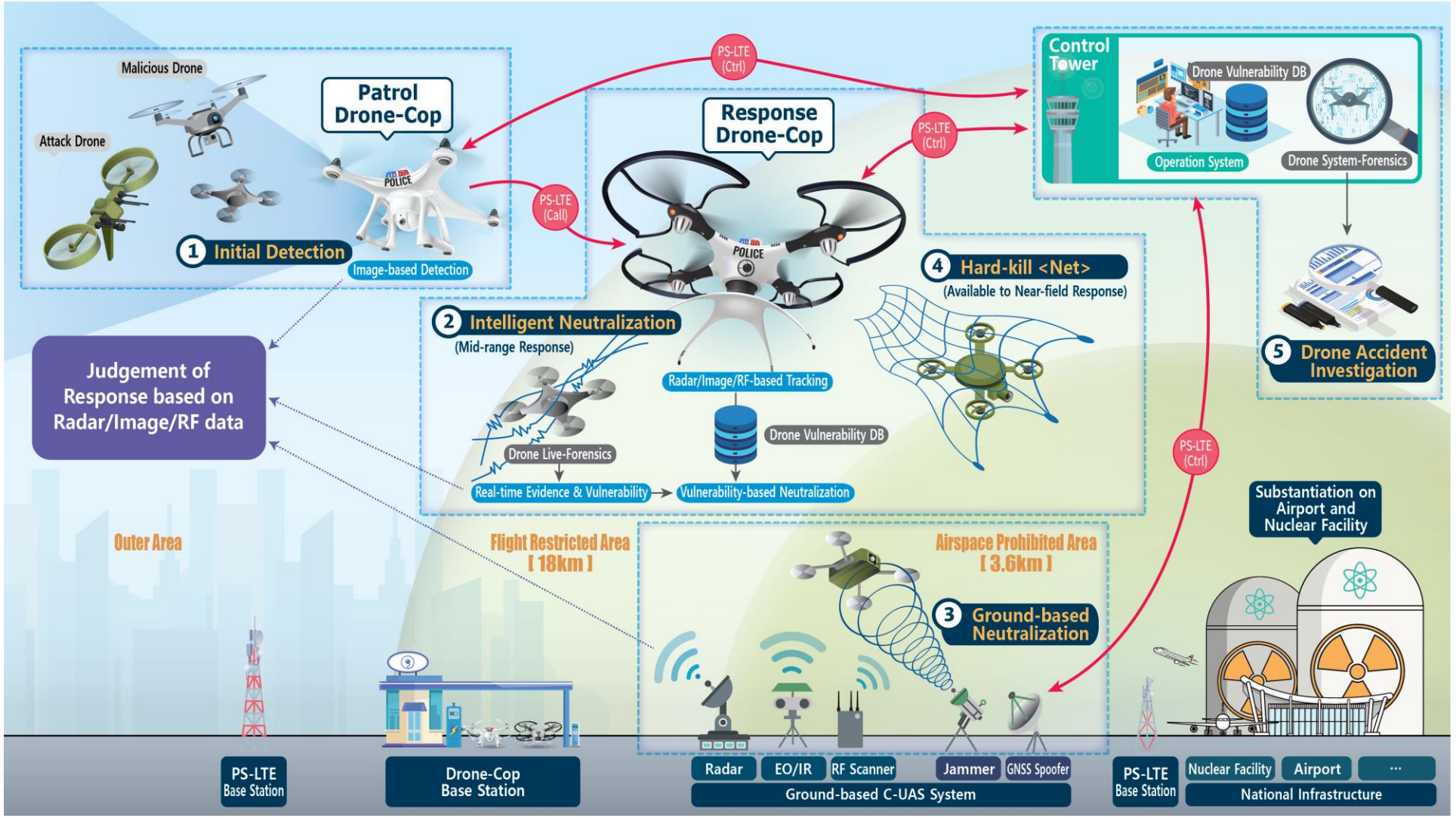
Illegal Drone Response Scenario Example



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Project Progress and Planning

- April 1, 2021 : Selection of Project Operators
- October 14~15, 2021 : SDR(Drone-Cop System Design Review)
- March 29~30, 2022 : PDR(Drone-Cop Preliminary Design Review)
- October 24~25, 2022 : CDR(Drone-Cop Critical Design Review)
- December 31, 2023 : Prototype Completed and Unit, Components Test & Evaluation Completed
- April 18, 2024 : TRR(Drone-Cop System Test Readiness Review)
- as of 2024: Flight Test, Environmental Test, Mission Equipment Installation Test in Progress
- 2025 : Testing of Operational Performance at Airport and Nuclear Power Plant Facilities

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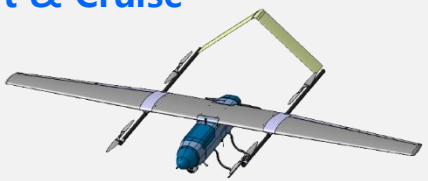
Drone-Cop System Configuration

Patrol DC

Lift & Cruise



Communication System
- [main] PS-LTE, [sub] commercial LTE
- Back-Up Link [only for test]

Basic Mission Equipment
- Gimbal For Mission Equipment
- EO / IR Camera
- Image Processing Board

Specialized Mission Equipment
- Radar
- RF Sniffer

Response DC #1

Multicopter

Communication System
- [main] PS-LTE, [sub] commercial LTE
- Back-Up Link [only for test]

Basic Mission Equipment
- EO / IR Camera
- Image Processing Board

Specialized Mission Equipment
- Gimbal For Mission Equipment
- RF Spoofer
- GNSS Spoofer
- Anti-Spoofing Encoding Module

Response DC #2

Multicopter

Communication System
- [main] PS-LTE, [sub] commercial LTE
- Back-Up Link [only for test]

Basic Mission Equipment
- EO / IR Camera
- Image Processing Board

Specialized Mission Equipment
- Gimbal For Mission Equipment
- Jammer
- Net Gun
- Anti-Spoofing Encoding Module

Collision DC

Racing Drone

Communication System
- Self-Communication Link

Basic Mission Equipment
- EO Camera

Specialized Mission Equipment
- FPV Goggle

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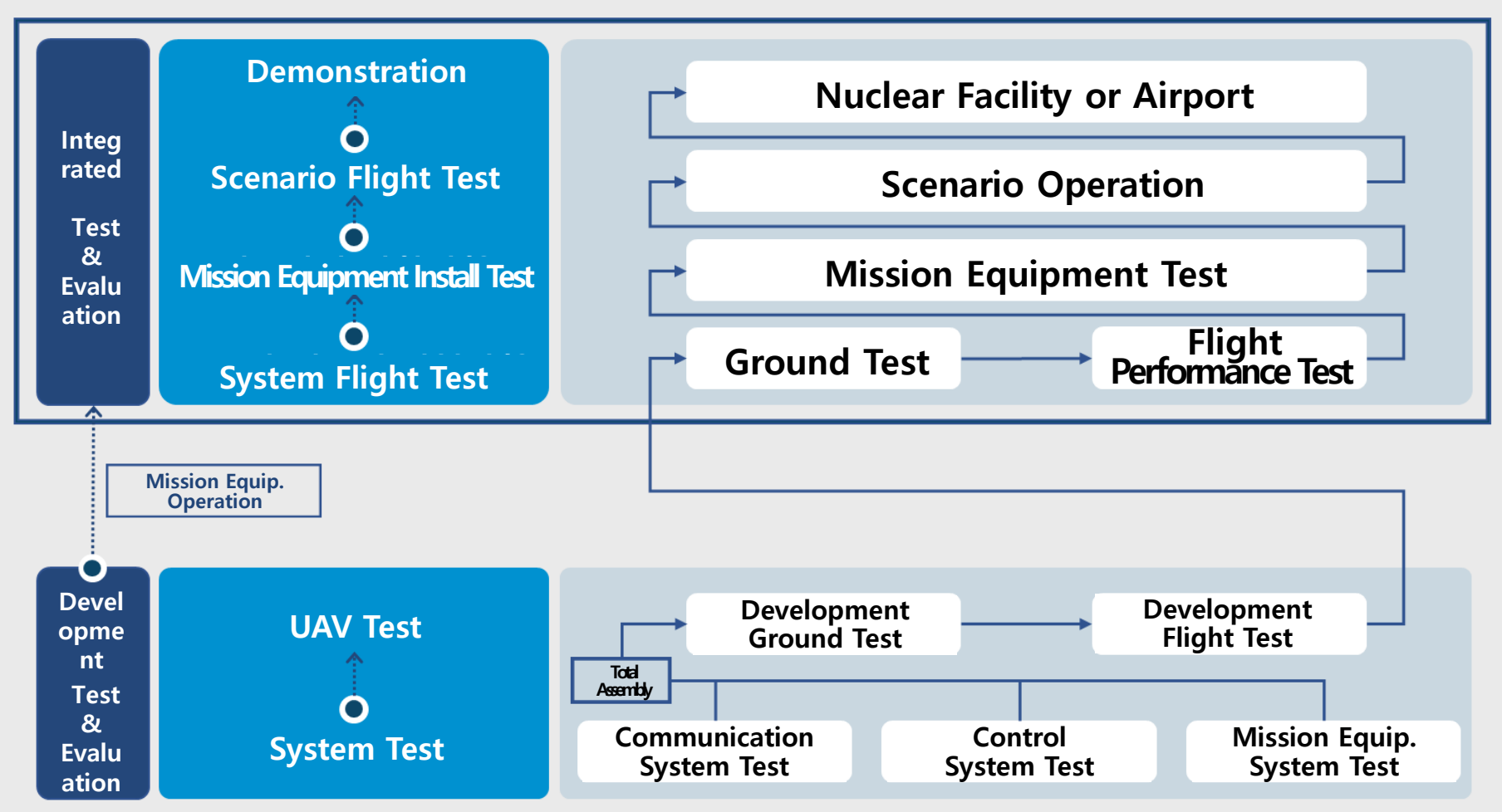

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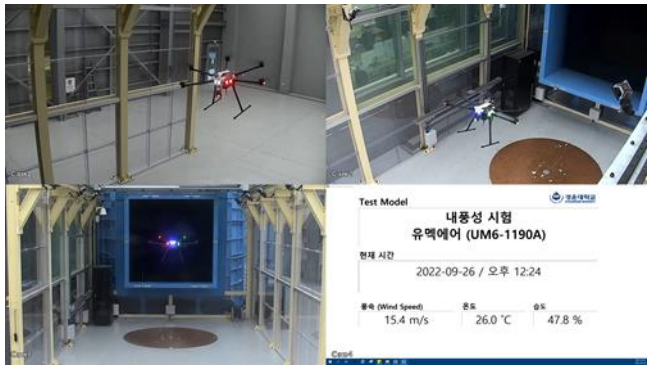
Unit and Component Test Completed

- Completed Production of Component Unit Specimen
- Verification of Function, Performance and Environmental Requirements









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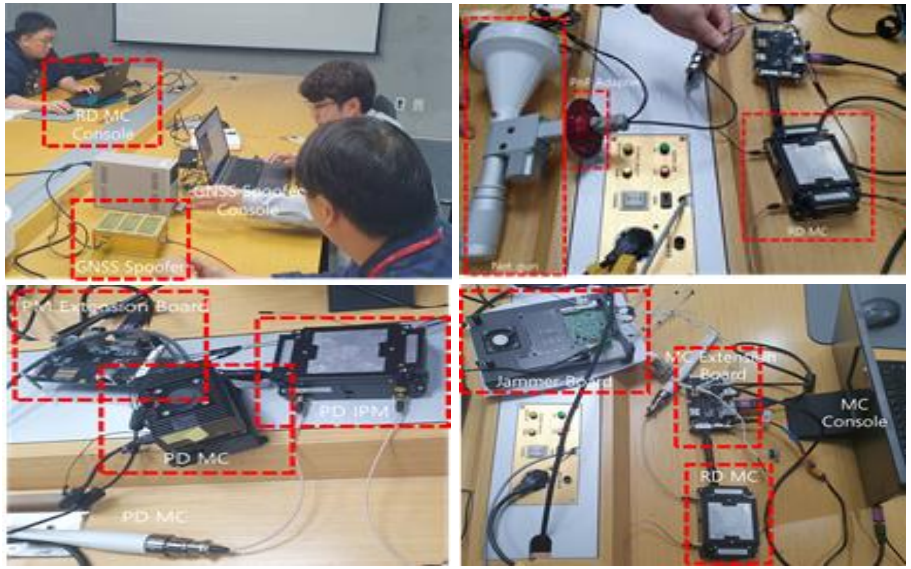
Project Progress and Planning

- System Integration Ground Test
- Verification Test of Requirements
- Ground Test
- Flight Test in Progress
- Operational Performance Test at Airport & Nuclear Facility in 2025



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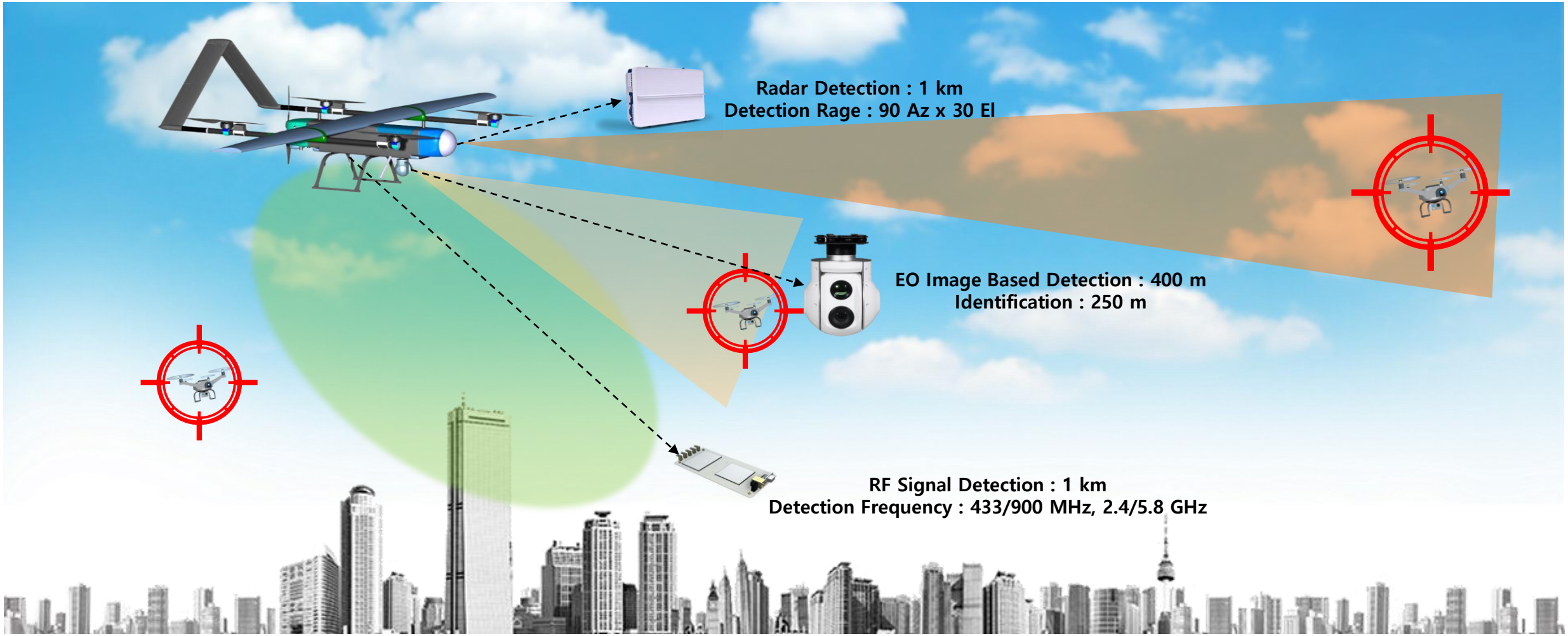
Operation of PD Mission Equipment



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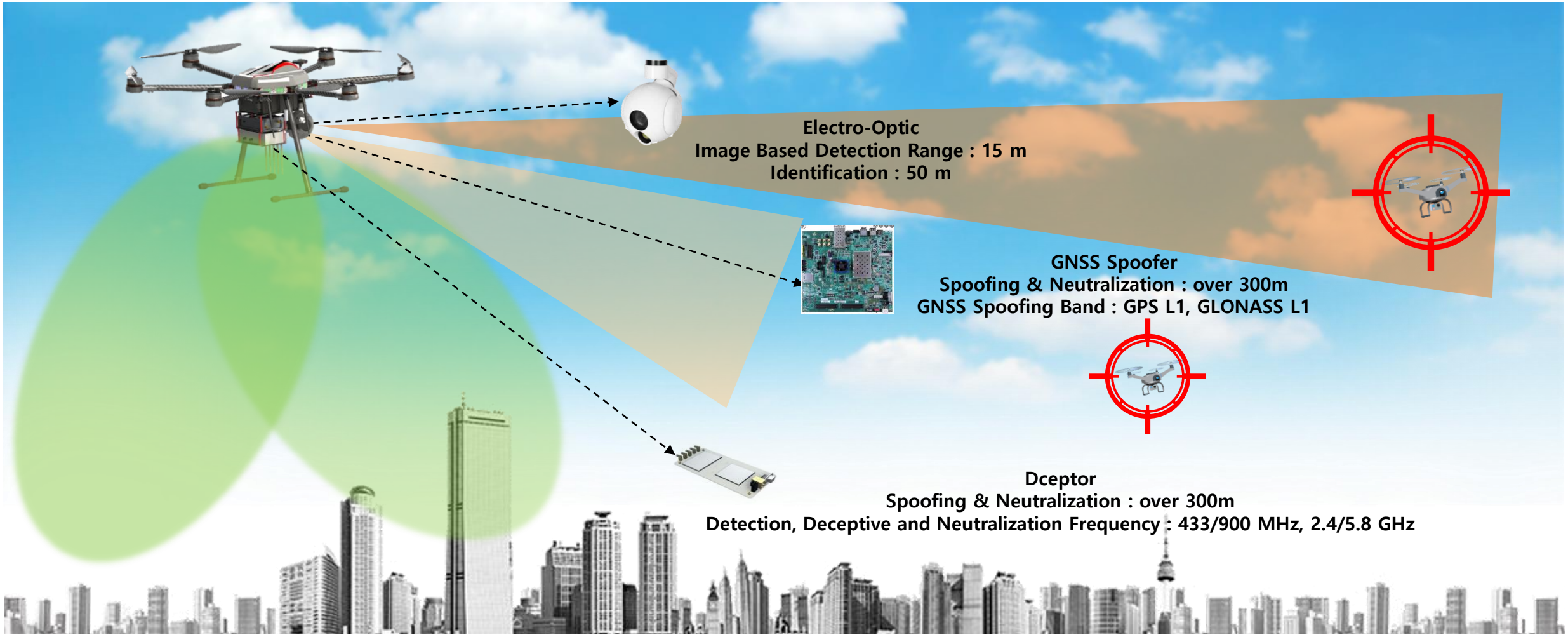
Response Drone-Cop Mission Equipment

Operation of RD(no. 1) Mission Equipment



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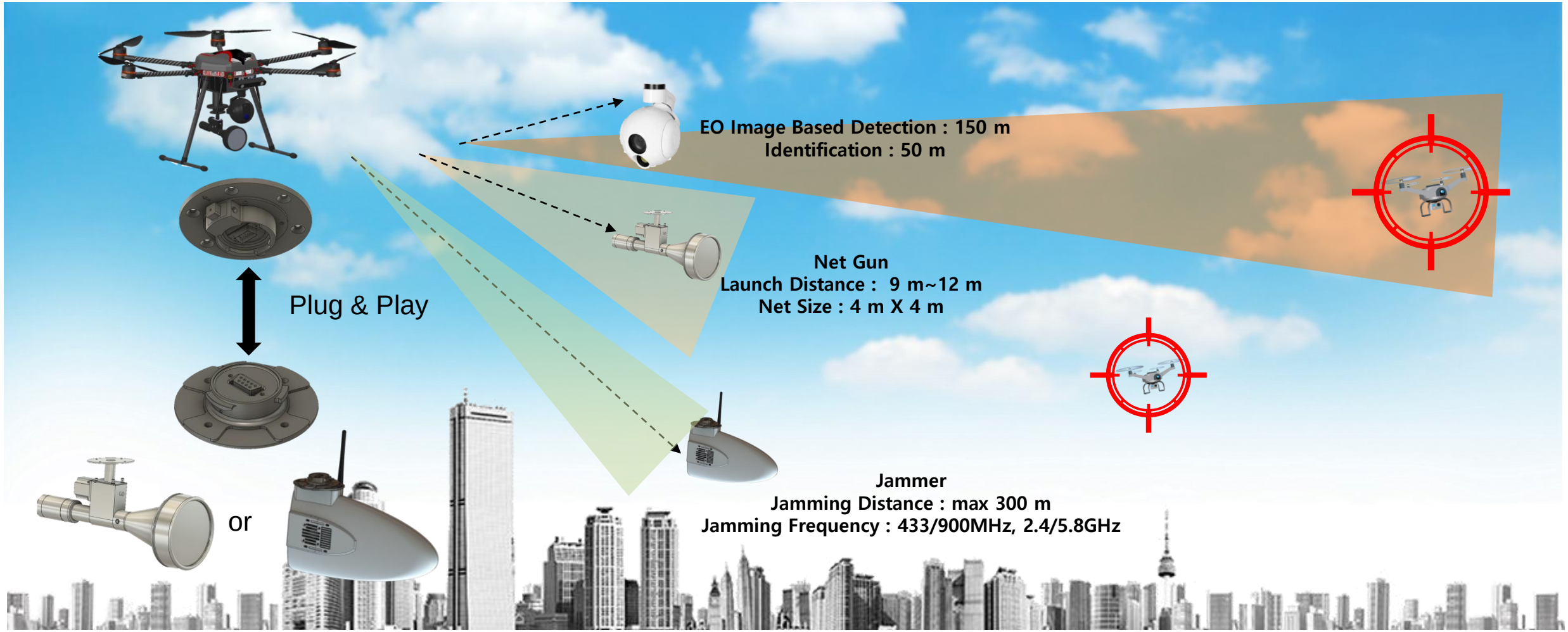
Response Drone-Cop Mission Equipment

Operation of RD(no. 2) Mission Equipment



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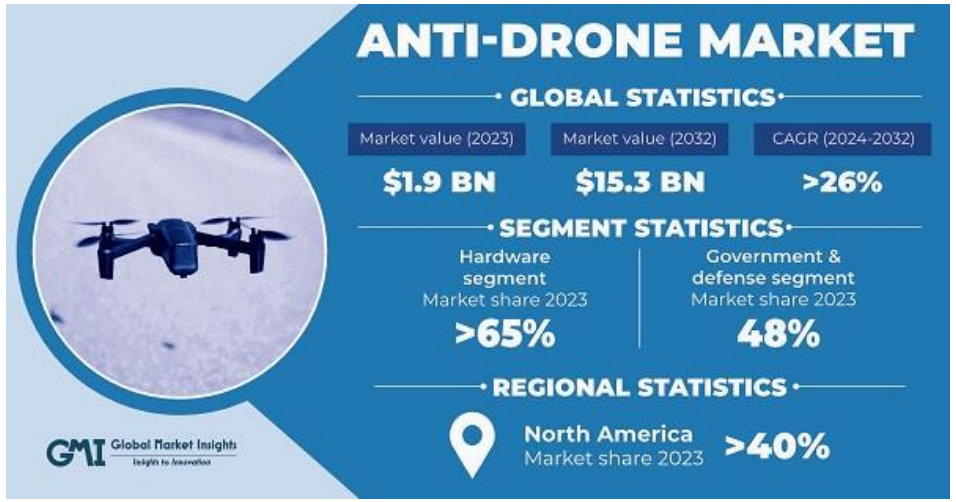
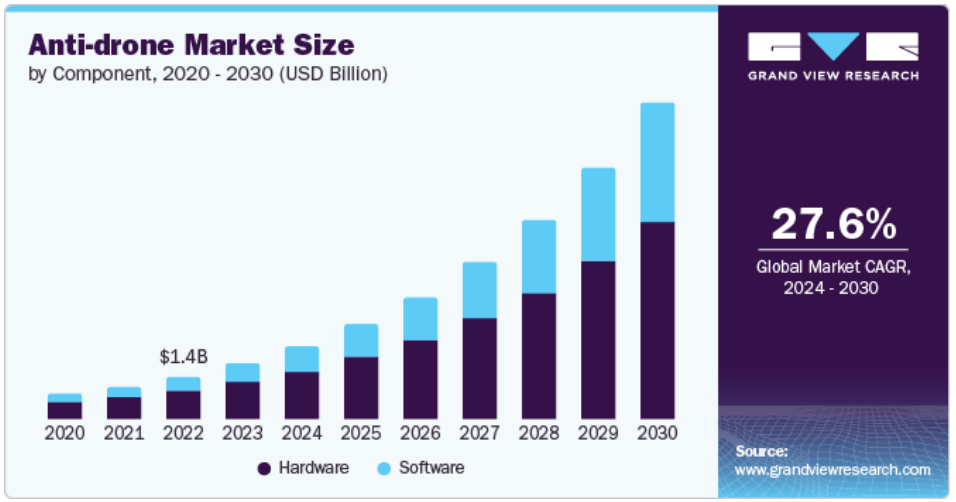
Global Counter UAS Market Forecast





illegal drone

Difficult to prevent with regulations and laws alone

Physical

countermeasures, technologies, and equipment

are required

Leads to the

expansion of the counter UAS market

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thank you !!