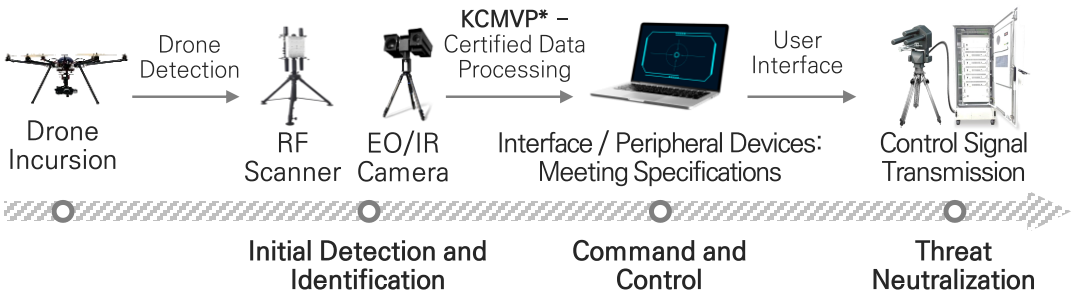
GBICS(Ground Based Integrated C-UAS System)

Request for proposal

1. Summary

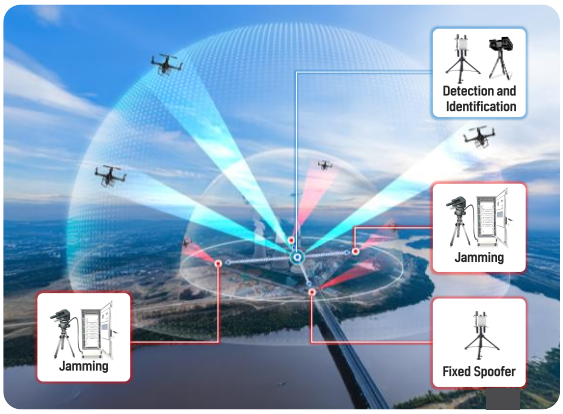
1.1. Operational concept

Automatic integration of detection, identification, and disabling equipment for quick response to illegal drones



1.2. An integrated system to detect UAS and drones approaching to national critical facilities from a distance, identify and neutralizes them by jamming the piloting and satellite signalsv

- The system consists of detection and identification equipment (RF Scanner, EO/IR Camera), neutralization equipment (Jammer) around the command & control center.



Features and Advantages

360-Degree All-Directional Surveillance and Detection
→ Broad-spectrum frequency detection, tracking, and identification capabilities at ranges of 5 km

AI Deep Learning-Based Identification Capability
→ Capable of distinguishing between birds and drones, enabling precise detection even in cluttered and complex environments

Radio Frequency Blocking and Jamming up to 7km
→ Jamming Capability Across Seven Frequency Bands up to a Range of 7km

2. System Configuration (based on 1 SET)

Components	Quantity	Note
• RF Sanner	1 EA	
• EOIR Camera	1 EA	
• Jamming System - with Antenna	1 EA	
• Integrated Control Solution - Includes operation console and integrated SW	1 Set	

3. Detailed Specifications

3.1. drone-detecting RF Scanner

·RF Scanner with Detection Range of up to 5 km
·RF Scanner with Neutralization Range of 1.2 km to 4 km
·All-in-One System for Detection, Identification, Tracking, and Neutralization

Sortation	Standard	Note
scanning method	· RF Drones that Satisfy Detection-Capable or Database-Held Protocols	
frequency	· 433㎒~6.0㎓	
detection range	· 5km, 360° omni coverage · Vertical Coverage of –30, +30 degrees	
Transmission Power	· Up to 36 dBm	
Operating Voltage	· AC 100-240V, 50/60㎐ · DC 24V	
Power Consumption	· 150W/170W(Detection/Mitigation)	
Weight & Dimensions	· 390 x 520 x 120 mm (L x H x W) · 12.8kg	
Envrionmental & Radio Compliance	· MIL STD 801H, MIL STD 461 · IP 66	
Operating Temp	· -30℃ ~ +50℃	

3. Detailed Specifications

3.2. drone-identification EO/IR

<table>
<tr><th>Sortation</th><th>Standard</th><th>Note</th></tr>
<tr><td>detection distance</td><td>· Minimum detection distance
<table><tr><th>Sortation</th><th>EO</th><th>IR</th></tr><tr><td>detection</td><td>3km</td><td>2km</td></tr><tr><td>trace</td><td>2km</td><td>1km</td></tr><tr><td>recognition</td><td>1km</td><td>0.7km</td></tr></table></td><td></td></tr>
<tr><td>Detection Range</td><td>·azimuth: 360。(±180。), Elevation: 180。(±90。)
·Resolution : 0.01。 Less than</td><td></td></tr>
<tr><td>AI Tracking Target</td><td>· 1 each Over</td><td></td></tr>
<tr><td>EO resolution</td><td>· 1920 x 1080 Over</td><td></td></tr>
<tr><td>IR resolution</td><td>· 640 x 512 Over</td><td></td></tr>
<tr><td>magnification</td><td>· EO : 60 double zoom, IR 20 double zoom</td><td></td></tr>
<tr><td>Size</td><td>· EO/IR : 634 x 380 x 458 mm</td><td></td></tr>
<tr><td>focusing/tracking</td><td>· AF/MF, Auto Tracking</td><td></td></tr>
<tr><td>Detection/Recognition Image Processing Speed</td><td>·10 fps Over</td><td></td></tr>
<tr><td>Tracking image processing speed</td><td>·20 fps Over</td><td></td></tr>
</table>

Sortation	Standard	Note
Target detection/ recognition CSU	·EO/IR Application of based deep learning detection algorithms	
Power consumption	· 250W Less than	
operating temperature	· -10°~ +60°	
Dustproof and waterproof grades /MTBF	·IP66 Rating Over ·15,000 Time Over	
Network / Interface	· Ethernet ,TCP-IP (Reflecting the requirement specification of the client)	

3. Detailed Specifications

3.3. Jammer

Sortation	Standard	Note
Cutoff frequency	·GNSS 2Bands - GPS L1 : 1.559 ~ 1.610 GHz - GPS L2 1.164 ~ 1.300GHz ·RC Band(ISM 5Bands) - ISM 400 MHz : 433.05 ~434.79 MHz - ISM 900 MHz : 902 ~ 928 MHz - ISM 2.4 GHz : 2.400 ~ 2.483.5 GHz - 5G Low : 5.030 ~ 5.350 GHz - ISM 5.8 GHz : 5.470 ~ 5.850 GHz	
Equipment Output	· GNSS : 100W (50dBm± 1dB) · ISM : 100W (50dBm± 1dB), 80W(49dBm± 1dB)	
a cut-off distance	· GNSS up to 5,000m · ISM up to 2,000m	
CPL	· 50dB ± 2.0dB each Band	
radiation beam angle	· V/H 40。 Over	
Power	· regular power source AC110V · UPS,Battery(Optional)	
Power consumption	·2KW Less than@7Band	
radiation response time	·immediate radiation 1Second Less than	
Continuous	·24hours Continuous operation	

radiation time		
P/T movement	· Pan 0~355。, 0.1~60。/sec · Tilt +30~-90。, 0.1~30。/sec	
PT control	· PT Dedicated controls provided · RS-485/RS-422	
Weight/Size	· 19 Inch 20U, 3U@Band · Maximum 130kg Less than, 20kg@Band	
MTBF	·15,000hr Over	
upper interlocking Networking	·Ethernet , TCP-IP , (Reflecting the requirement specification of the client)	
coaxial cable	·LMR-400 6EA (Eac 3M)	
Cooling Method	·Forced Air Cooling (FAN) Type	
Environmental Temperature	· -20~ +50。	

3. Detailed Specifications

3.4. Integrated Control System

Operate the entire system of neutralization through illegal drone detection, tracking/identification, and blocking of radio waves, Integrated systems for display and control

1 Specification

Sortation	standard
Current content	·Data received from Scanner/Camera/Jammer devices must be linked to the system in real time and displayed · Link other systems by providing SDK or API or ICD ·Location, direction, and speed of the target aircraft by Scanner detection · Tracking camera objects and identifying new drones · Whether output and radiation are present by the radio wave blocking device band · Display of alarm functions by device, etc
Map	·Use a map with a Scanner radius of at least 5km even when not connected to the external Internet (National Geographic Information Service Map) ·Zoom-in / Zoom-out function · Display Scanner radiation jammer

Sortation	standard
Playback / Report	·Real-time storage and playback with detection tracking information storage and playback capabilities · Among the stored data, recordings for the desired time period should be used as a general OA program Can be extracted as a playable video file through · Various report output functions should be supported, and the form of the report should be supported by the user Changeable ·Detecting/tracking/destroying time, location, and flight history record storage of the object
Equipment inspection	·The switch on/off status of the equipment shall be indicated. ·The status must be indicated when the equipment is stopped.

Sortation	standard	
Identification	Processor	2.1GHz (3.7GHz Turbo)
	Memory	DDR4 RAM, 192 GB
	Storage	SSD (1 TB) + HDD (4TB)
	Front Input & Output Ports	2x USB 3.1 Gen 1 Type A, 2x USB 3.1 Type C, 1x Universal Audio Jack
	Rear Input & Output Ports	6x USB 3.1 Gen 1 Type A 1x Serial 2x RJ45 Network 2x PS2 1x Audio Line Out 1x Audio Line In/Microphone
	Power Supply	1,450W PSU
	Display	1 installed display screen, 27 inches, resolution 2560 x 1080 (full HD) Aspect ratio 21:9, IPS panel type Connectivity: 2 HDMI, 1 DisplayPort each

Sortation	standard
Update	·Manually and automatically update from a direct or wired network
Monitor	·Integrated monitors (2, 27-inch monitors)
Network & Server PC	·PC remote keyboard and mouse for wired and LTE wireless networks and servers
equipment control	· Remote equipment control on/off control
Alarm function	·Operation SW GUI screen pop-up and red alarm display
operation table	·Construction of an in-vehicle integrated system operation table
Integrated Systems	·It consists of a drone detection Scanner/tracking identification EOIR camera, radio wave blocking device ·Configured to link with drone tracking cameras and radio wave blocking devices based on drone location information through drone detection Scanner ·Data received from drone detection Scanner, drone tracking camera, and radio wave blocking device are displayed in real time on the integrated control system ·Controlling and monitoring various additional devices including power supplies mounted in the vehicle

2 Management SW

1 All operating and application software required to operate anti-drone system detection/identification/armed equipment shall be supplied in package form, and all software and operating systems shall be manufactured and provided in CD-ROM or USB form.

l The application software and operating system provided in the form of a package must be able to be reinstalled in case of failure of the operating terminal of the anti-drone system equipment. A manual including installation methods and procedures in Korean shall be provided so that the “order“ may be installed in the event of a failure.

l The operating screen configuration is based on Hangul, but Korean/English must be freely compatible.

l The supplied PC for the operation server should be integrated with drone detection/identification/armed operation and control, and standard protocols (ONVIF, etc.) should be used to enable interworking with Scanner, EO/IR cameras, and radio wave blocking devices.

l Various parameters for each equipment should be easily set and changed through remote equipment monitoring equipment (equipment room).

l All supplied equipment (including software) should have sufficient expansion (preliminary) ports for each supplied equipment to prevent interactive operation in preparation for future sensor expansion, and there should be no problem in establishing a low-altitude unmanned air traffic system using national standard protocols such as ONVIF so that there is no problem in linking with other equipment (UTM, etc.) in the future.

l If there is no national standard protocol, the protocol must be defined in consultation with the “Order“, and a communication protocol definition must be prepared and provided.

3 Self-diagnosis and remote health monitoring

l All equipment and incidental equipment supplied shall not affect or interfere with other communication equipment. (EMI, EMC)

l The network is configured to accommodate both wired and wireless networks, and the wireless network utilizes the LTE network.

l Secure the network by implementing a certified security module (KCMVP)

l To facilitate fault diagnosis, self-diagnosis (BIT inspection) is possible, and the fault area should be displayed with a red LED on the fault area in case of equipment failure.

l Monitor the operational status of each equipment

l Monitor the fault condition of each equipment

l It shall be possible to monitor the condition of power facilities (UPS/storage batteries) and additional facilities mounted in the vehicle, and to monitor the condition of related facilities

l The situation room should also be able to remotely monitor all equipment.

4 Current screen and function of operating equipment

l At least two LED monitors of at least 27 inches shall be installed so that the operator does not experience any inconvenience in operating and observing the equipment

l On the current screen, the location of the vehicle (up/hardness coordinates)

such as detection equipment should be displayed on the map screen.

l Operational software must be able to operate and edit each equipment information on an electronic map (such as a national geographic information map).

l The digital compass shall be displayed and interlocked on the electronic map

l The person placing an order shall be able to update the map information directly.

l Unlawful drone direction, location, altitude, and flight speed

l The detection and identified results of illegal drones should be classified and expressed by time, area, and type.

l The current screen should be reduced and enlarged, and the window size should be automatically converted

l Information on detection/identification/radiation results should be stored 24 hours a day.

l Information (log information and data/images related to detection/recognition/tracking/identification/dispowerment, etc.) should be stored on an operating PC and can be inquired by period and place, and printed out.

l The operating equipment shall be able to display the status of the connected surveillance equipment in real time.

5 Control and control functions

l The data of each equipment must be integrated and controlled at the same time.

l It should be possible to track/identify illegal drone objects and display them on the screen.

l A separate operation team shall be formed in addition to the operation software

l A digital locking device shall be mounted on the control panel to control the SW login and radio radiation of the control panel

l The locking device for controlling radio radiation and the radio radiation switch are applied to toggle switches to prevent malfunction

l The history record and playback function according to illegal drone identification should provide a history-specific recording function according to drone identification, and there should be a data playback function for each record

l It should be possible to give priority to equipment operation and control and to prioritize the priority.

l All usage records (e.g., equipment failure and error details, radio radiation, etc.) shall be stored on a daily basis in the form of log files.

l Detection information, etc. of drones should be able to be stored for 24 hours in a row, and stored data should be able to be reproduced, output, and

searched.

l When the storage period elapses, it shall be possible to automatically delete it on a daily basis sequentially by date, and if necessary, the selected image shall be separately saved. It shall be able to be stored for at least 30 days.

l The operator should be able to search, play, and output by condition/channel, and the detected drone detection time, location, flight history, and drone type can be extracted as statistical data such as monthly, quarterly, half-year, and yearly.

6 Operating environment and interface of the equipment

l The components of the equipment (hardware and software) should be integrated and designed and manufactured to reflect the latest ergonomic elements so that there is no inconvenience to the operator in operating the equipment.

l User interfaces such as screen menus should be configured in a graphical user interface (GUI) environment.

l The operating software of the equipment should basically be supported by Hangeul, and it should be compatible with Hangeul and English even in a user environment that interworks with other equipment. It should also be possible to share and utilize mutual information.

l All data input/output devices, including keyboards and printers, must be able to

directly process Korean input and output.

l The screen menu should be able to change the display in Korean or English if necessary at the operator's choice by rebooting or resetting the equipment.

l In the future, the software of the operating equipment should configure the interface so that it can be interlocked with other sensors.

7. Technical Warranty : We guarantee that all requirements of the Technical Warranty will be complied with.

8. Technical Annex : We guarantee that all requirements of the Technical Annex will be complied with.