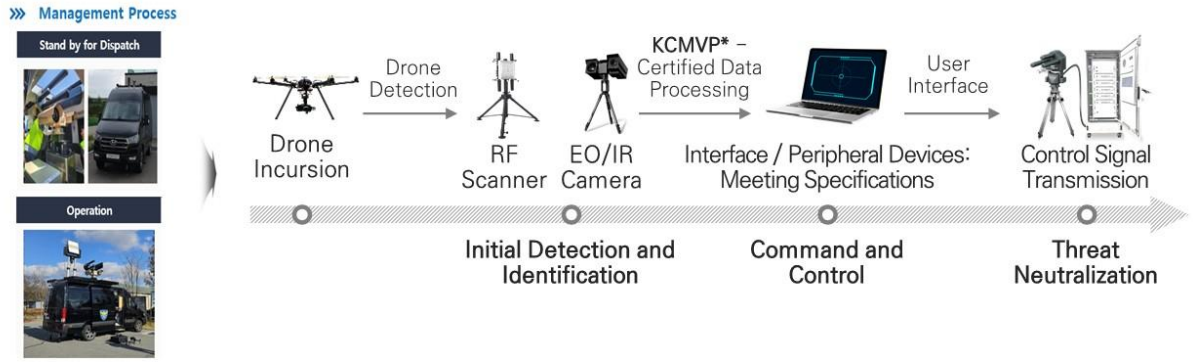
Integrated, low-tech unmanned solution

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. We're going to use a mobile vehicle, Scanner, camera-identified illegal drones An integrated anti-drone system that disables the jamming system against

2. System Configuration (based on 1 SET)

Components	Quantity	Note
• RF Scanner	1EA	
• EOIR Camera	1EA	
• Jamming System - with Antenna	1EA	
• Integrated Control Solution - Includes operation console and integrated SW	1Set	
• a maneuverable vehicle - Solati two-seater	1EA	
• Power supply - Phase power/generator/UPS/battery (2 hours)	1EA	

3. Detailed Specifications

3.1. drone-detecting RF Scanner

· RF Scanner with Detection Range of up to 5km

· RF Scanner with Neutralization Range of 1.2km to 4km

· 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, 50/60Hz · 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℃	

3.2. 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>
<tr><td>Target detection/ recognition</td><td>·EO/IR Application of based deep learning detection algorithms</td><td></td></tr>
</table>

CSU		
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)	

3.3. 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	·2KW Less than@7Band	

consumption		
radiation response time	· immediate radiation 1Second Less than	
Continuous radiation time	· 24hours Continuous operation	
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。	

3.4. maneuverable vehicle

1 Manufacturing and Installation Specifications

All matters concerning design and manufacturing installation shall be carefully reviewed to prevent interference with other processes, and prior approval from the supervisor shall be obtained before manufacturing and installation.

l The configuration of the SYSTEM should be thoroughly reviewed to prevent disruptions caused by obstacles and ensure structural stability.

l KS or JIS specifications shall be used for all materials used for manufacturing and

installation, and in the absence of specifications, the best products on the market shall be used.

l Various devices should be equipped with sufficient facilities against heat, vibration, and corrosion, and the system should be installed to enable arbitrary operation to respond quickly in case of an emergency.

l It should be designed and manufactured so that operating does not require a lot of personnel and does not require a lot of cost and manpower for maintenance.

l Except for the items in this manufacturing specification, matters requested to be supplemented at the time of on-site construction shall be complied with unless there is a compelling reason not to do so.

4. Detailed Specifications

4-1. Vehicle specifications

1 Hyundai Solati. Must self-certify after renovation.

4-2. FOOR & Interior interior

For insulation and sound insulation of the vehicle body, the floor shall be constructed with vehicle lux-strong after installation of vehicle plywood.

l A separate reinforcement is installed in the area required for the lower part of the vehicle's floor, and it should be robust in installing desks, racks, and masts.

l The ceiling and wall of the vehicle body shall be finished after inserting a

reinforcement into each necessary part, and the final finish shall be finished using carpet.

l The finished part shall be molded separately.

l Cable wiring shall be beautifully installed with internal construction and separate ducts in consideration of the internal environment and aesthetics

4-3. Mast

l The design load of Scanner and camera lifting devices shall be manufactured and designed with a strength and structure of at least 120% of all structural loads.

l The mast is designed with a double arm to minimize the effect of vibration wind speed

l The mast should be 4~4.5M in size and should be applied at least 5~6 steps when the height is deployed.

l The mast shall be mounted inside the vehicle with all folded up

l The mast height shall be made to rise at least 2 m above the roof of the vehicle on the basis of maximum elevation.

l Support wire fixing hooks shall be manufactured to minimize the impact on wind speed

l The mast should be made of aluminum.

l Fine height adjustment should be possible when the mast rises or falls.

l Controllers for upper and lower masts shall be provided and stored and installed

separately

l The mast shall be made of electric type.

l For the mast, the controller shall operate the azimuth angle elevation through the mast elevation and pantomime

l In addition, the opening and closing of the outer/inner sunroof of the double sunroof shall be operated and the automatic setting function shall be retained

4-4. Rotating device (pantilt)

l The rotating device shall be capable of carrying a weight of not less than 60 kg of the primary payload.

l The up, down, left, right motion function shall be followed.

l Control controllers shall operate the elevation angle of the azimuth through the mast elevation and the pan tilt

4-5. Roof Automatic opening/closing door

l Automatic opening and closing doors should be manufactured and installed at two locations on the roof so that mounted items such as masts and Scanner cameras can be inserted into the vehicle.

l A separate opening and closing device for preventing the inflow of rainwater shall be separately installed in order to prevent the inflow of rainwater due to rain in operation after automatic opening and closing.

l When closed, there shall be no damage caused by the chipping of the connection cable

l The opening and closing of the outer and inner sunroof of the double sunroof shall be operated through the control controller and shall have an automatic setting function

4-6. Roof Production

l The roof of the vehicle shall be constructed in such a way that the stage can be made using aluminum check plates so that the operator can climb and work safely after installing the guide.

4-7. REAR ladder

l A ladder shall be constructed at the rear of the vehicle that can be raised and lowered on the roof.

4-8. LEVERING JACK Syatem

l Horizontal jacks shall be installed in four locations, before, after, left and right of the lower part of the vehicle.

l The jack should be made of an electric type.

l The jack shall be applied with an automatic horizontal system.

l It is operated through a dedicated control controller

4-9. Power control system(Power control board)

l It shall be beautifully manufactured and installed in the form of panels, such as adjustment switches, digital meters, etc., necessary for the adjustment of all power sources and equipment adjustment operation in the vehicle at an appropriate location next to the monitor in the operating room.

4-10. UPS

l The capacity is 5kva, and the UPS for 15 minutes of back time is installed in a rack type.

l A voltage stabilization function (AVR) and a battery charging inverter must be built in.

4-11. generator

l The generator shall be equipped with an 8-kva class portable generator at the rear end and shall be fixed separately to prevent detachment and detachment when moving.

l In addition, generators should be equipped with handles and wheels to facilitate movement.

4-12. water board

l A terminal stand for inputting power from the outside may be installed on a wall

surface of the vehicle body or in a separate place.

l The water board shall be installed with a capacity of AC220V 5KW or higher, and a device capable of protecting equipment in case of external overvoltage supply shall be installed.

4-13. Charger

l An automatic charger capable of charging a vehicle storage battery from an AC power source must be installed.

l The AC automatic charger capacity should be at least 27A and have the ability to prevent overcharging.

l The charger shall be able to charge the storage battery with an external power source and an electrical facility source.

4-14. A storage battery

l The battery capacity must be at least 8KW for 2 hours of continuous operation

l Lightweight configuration consists of a lithium battery and a separate rack

l The storage battery must be safely installed and protected from physical damage, vibration, water spray, engine/exhaust heat, etc.

l Vehicle storage batteries shall be based on the manufacturer's (commercial vehicles) shipping standards.

l To start an electrical facility, a separate capacitor for electrical facilities is used, and

it is automatically charged when the engine is driven, and it is automatically charged when external power is introduced.

4-15. Electric wire reel and Drum

l An automatic rewind reel must be fixedly installed in the loading box of the vehicle body.

l The automatic rewind reel shall be fixed at least 20 m in length.

4-16. variety of lighting devices(Illumination System)

l Indoor lights shall be installed in an appropriate location inside the vehicle.

l Two searchlights shall be installed on both sides of the roof of the vehicle

l

4-17. safety

l At the rear of the vehicle, a significant ramp can be manufactured and installed when the generator is moved, and storage is stored on the vehicle door in a mounted manner.

l Loop shall be installed on the roof so that the operator's safety cord can be installed.

4-18. Operations Desk

l Install the desk top on the front or side of the vehicle

l A 19-inch 5U rack should be installed under the desk

l A reinforcement stand for monitor installation shall be installed at the appropriate position at the top of the table.

l Have a two-person chair and store it separately when moving

4-19. Air Conditioner System

l A separate fixed air conditioner for temperature control shall be installed in the operating room.

l The outdoor unit shall be discharged from the outside of the vehicle and shall be equipped with a noise prevention function

4-20. Fire extinguisher

l Equipped with one 3KG clean fire extinguisher.

4-21. a safety valve

l Attach the boarding footboard to the rear and side doors and automatically through the switch It should be opened and closed

4-22. a storage box

l Equipped with a gun/VEST/helmet cabinet

l Storage boxes for stable storage of vehicle operating parts and accessories shall be installed.

l Install it in a fixed type in the free space inside the vehicle.

4-23. Self-certification of the vehicle must be obtained after manufacture.

4-24. an air conditioner for jammers

l It shall cover the heat from the jammer equipment so that it does not interfere with the use of the system. If necessary, use a bellows to allow wind to enter the rear of the rack directly.

4-25. Auxiliary power system

l The auxiliary power system can be used in an emergency without the use of generators and external power

l Rock 5kw capacity should be available for 2 hours.

l The battery rack and low-frequency inverter shall be available for charging and cutting within 30 seconds.

4-26. wind instruments, CCTV

A fixing bracket and a roof box for power shall be installed on the roof of the vehicle so that wind instruments, cctv, etc. can be installed

4-27. AV System

An around view system shall be in place for the convenience of the driver

4-28. Others

l A separate opening and closing window shall be installed for communication between the driver's seat and the operating room.

l Fuel aids shall be installed in the interior of the vehicle, if necessary, and branch lines for fixing the mast shall be provided.

l The manufacturer shall provide a manual after the production is completed, and the operation training shall be conducted before shipment.

l The manufacturer shall provide all documents necessary for vehicle registration after completion of self-authentication.

5. 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

5.1 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 radio radiation Scanner/jammer
Vehicle Location	·Vehicle placement position indicated ·Detective/de-force range shall be indicated.

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
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

Sortation	standard
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

5.2 Management SW

l 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 camera, and Jammer.

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.

5.3 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.

5.4 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.

5.5 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.

5.6 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.