Counter Drone Defence System
Countering the threat caused by rogue drones is now a global issue and an increasing concern for the military, government and homeland security forces across every continent. It is expected that unmanned aircraft systems (UAS) will be used increasingly for malicious purposes as they can carry cameras, weapons, toxic chemicals and explosives and are being used increasingly for terrorism, espionage and smuggling purposes.

The Mopoke Counter UAS (CUAS) system was developed by EOS to address the growing threat from malicious and misbehaving unmanned aircraft systems.

Utilising robust battle proven technology from the world’s best sensor and soft kill system providers, the Mopoke CUAS capability can deal with single drones within 8 seconds of detection out to a range of up to 10 km (6 miles).

The Mopoke system is designed to not only defeat single drone threats but also SWARM drone tactics recently observed in operational theatres across the Middle East.

The Mopoke system detects the drone using state-of-the-art software defined, multi-mission, 4D AESA pulse Doppler radar, tracks it using high precision infrared and daylight cameras and advanced video tracking software, before using a non-kinetic radio frequency (RF) inhibitor to defeat the drone before switching to hard kill to destroy the drone threat should the RF inhibitor not be effective.

Mopoke has been built upon field proven sub-systems to detect all types of drones including fixed wing and quadcopters up to 600kg (Group 3). EOS is committed to constantly evolving the Mopoke capability to respond to new threats and stay ahead in the dynamic UAS countermeasures market. Mopoke is a tactical system designed for use by the military, police, other government and non-government agencies for protecting high value critical national infrastructure and personnel.

The rise of the consumer / prosumer drone markets combined with the proliferation of military drones has demonstrated the wide range of existing and new potential threats within the Counter UAS threat landscape.

These threats can be classified into two broad categories – malicious and misbehaving:

- Malicious intent
  - Militant groups are exploiting consumer drones for:
    - Battlefield reconnaissance
    - Dropping small bombs/IEDs
    - Propaganda footage for recruitment videos
  - Acts of terrorism:
    - Flying drone into the flight path of commercial airliner
    - Creating fear by causing temporary closure of airports, stadiums or disruption of national public events
  - Drug smuggling:
    - Prosumer and custom-built drones are being used for international cross border smuggling of narcotics
  - Industrial espionage:
    - Hostile surveillance by rival manufacturers for reasons of IP theft (vehicle proving grounds and test tracks)
    - Breaching secure perimeters for cyber hacking and covert information gathering misbehaving operation
    - Unwanted surveillance by Paparazzi
    - VIP privacy intrusion
    - Untrained users around sensitive areas

Mopoke has been designed to help mitigate all of the above threats

DETECTION TO THREAT DEFEATED IN LESS THAN 8 SECONDS EVEN IF THE DRONE IS NOT RF DEPENDENT
CUAS capability is based upon the proven EOS R-Series Remote Weapon Systems, with direct energy and soft kill capabilities, to provide a layered protection to UAS threats.

The solution enables identification and close combat against UAS targets; with both soft and hard kill capabilities, while providing the ability to operate under protection.

CUAS capability is based upon the in-service R400. Through the use of this approach, the cost of introducing the CUAS capability is reduced, as the training, support and operation are all based upon the in-service RWS.
EOS MOPOKE DRONE DEFEAT

- Integrated command and control
- Integrated soft/hard kill and directed energy effectors
- SWARM defeat capable
- Layered sensor fusion and integration
- Very low false alarm rate
- Fixed, mobile and portable installation
- Protection for facilities, key personnel and mobile forces
- Technology transfer and local production possible
- Locally supportable

**KEY**
- Command
- Sensors
- Effectors
- Threats

**7.62mm Mini Gun**
**30x113mm Proximity Fused Airburst**

**Direct Energy**

**30x173mm Airburst**
The EOS Mopoke Drone Defeat system is a scalable layered drone defeat system. The base system sensors include radar, camera and radio frequency detection to complement existing security systems.

Soft/hard and directed energy effectors steered by the command and control system offer the full spectrum of defeat solutions to prevent threat drone use.

<table>
<thead>
<tr>
<th>Radar</th>
<th>RF Detection</th>
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<tbody>
<tr>
<td>Pulse Doppler, Software-Defined Radars</td>
<td>Fully compatible with dense urban environments</td>
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<tr>
<td>Armoured, AESA (Active Electronically Scanned Array) Antenna, GaN Technology</td>
<td>High accuracy and long range detection</td>
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<tr>
<td>Extremely high elevation Coverage</td>
<td>Passive detection</td>
</tr>
<tr>
<td>Non-Rotating, Solid State Radars</td>
<td>High probability on intercept and zero false alarm rates</td>
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<tr>
<td>Digital: Beam Forming, Receivers, Pulse Compression</td>
<td>Small footprint and form factor</td>
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<td>Compact and mobile, for tactical applications</td>
<td>Fixed and portable deployments</td>
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<td>High reliability</td>
<td>Large area coverage</td>
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<td></td>
<td>SWARM target tracking</td>
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<td>Identify UAS operator location</td>
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<tr>
<th>Hard Kill Effector</th>
<th>Directed Energy Effector</th>
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<tr>
<td>Concentrated point defence R400 mounting 7.62mm Dillon Aero mini-gun</td>
<td>26Kw high power laser effector</td>
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<tr>
<td>Proximity air-bursts R400 M230LF</td>
<td>Minimal collateral damage</td>
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<tr>
<td>Programmable air-bursts R800 Mk44</td>
<td>Effective range out to 4000m against Group 1,2,3 drone threats</td>
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<tr>
<td>Effective range out to 3000m</td>
<td>SWARM defeat capable with high rates of target engagement from maximum range</td>
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<tr>
<td>Low collateral damage ammunition options</td>
<td>Transferable technology</td>
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<tr>
<td>Defeat set and forget drone threats</td>
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<tr>
<td>Defeat drone SWARM tactics with high rates of target engagements and long range</td>
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<tr>
<th>Soft Kill Effector</th>
<th>Camera</th>
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<tr>
<td>Defeats – control, video and / or navigation system</td>
<td>Powerful optic and thermal drone detection and tracking</td>
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<tr>
<td>Effect - land immediately or return to launch point</td>
<td>SWARM target detection and tracking</td>
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<td></td>
<td>Passive system</td>
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- SWARM target tracking
- Passive system
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