Tactical Pocket Reference
A Guide for US Forces
January 2016

NON-KINETIC UNMANNED AIRCRAFT SYSTEM (UAS) COUNTERMEASURE

Asymmetric Warfare Group
2282 Morrison St. Ft. Meade, MD 20755-5355
Email: usarmy.meade.tradoc.mbx.usarmy-ft-meade-tradoc-list-awg-opcen@mail.mil

(U) DroneDefender Overview

(U) The DroneDefender is a non-kinetic solution to defend airspace against UAS, such as quadcopters, hexacopters and fixed-wing UAS, without compromising safety or risking collateral damage.

(U) KEY BENEFITS:

- ✓ Immediate response
- ✓ Low-cost technology
- ✓ Man-in-the-loop
- ✓ Point directional
- ✓ Lightweight
- ✓ Minimal training required
- ✓ Rugged

Disclaimer: This TPR is only applicable to the Evaluation Unit (B-DD-021) distribution of DroneDefender and should not be used with any Production Units.

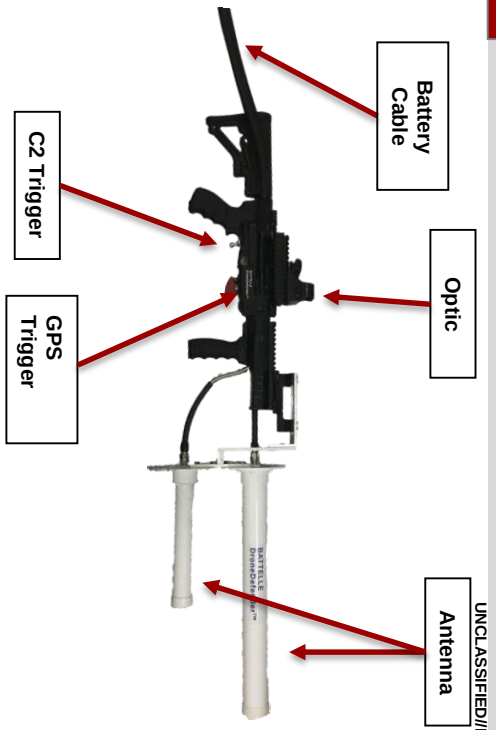
(U) System Statistics

- (U) Cold start time: <0.1 seconds
- (U) Operating time: Up to 5 hours continuous (~300+ Engagements)
- (U) Weight: 15 lbs.- configuration dependent
- (U) Effective Area: 25˚ cone
- (U//FOUO) Effective against commercially available UAS operating on the most common command link and global navigation satellite system frequencies
- (U) Picatinny Rail-based system for mounting optics and lasers
- (U) Battery powered

(U) Enemy UAS Mission

- (U) UAS can be used to conduct Kinetic Attacks, Call for Fire Support, ISR, Cyber Warfare, to elicit reactions or any other combination limited only by creativity.
- (U) Enemy forces have access to a wide variety of drones, from single-wing aircraft that can quickly create a three-dimensional map of a military base to four-propeller copters that carry high-definition cameras for ISR missions.
- (U) UAS can be guided by a radio controller or autonomously by GPS waypoints.

UNCLASSIFIED//FOUO



UNCLASSIFIED//FOUO

(U) DroneDefender Employment

- (U) Proper planning by leaders will ensure that units employ adequate force protection measures when employing the DroneDefender system.
- (U) Notify higher and adjacent units (Clear airspace and pass early warning).
- (U) Get distance and bearing to the threat.
- (U) Center the UAS in the optic.
- (U) Activate the DroneDefender while keeping the UAS in the center of the reticle as it either returns to the initial launch point or lands on the ground.
- (U) Determine if a recovery team or EOD is required for retrieval or exploitation.

(U) UAS Basics

(U) The majority of commercial UAS operate their command link on similar radio frequencies.

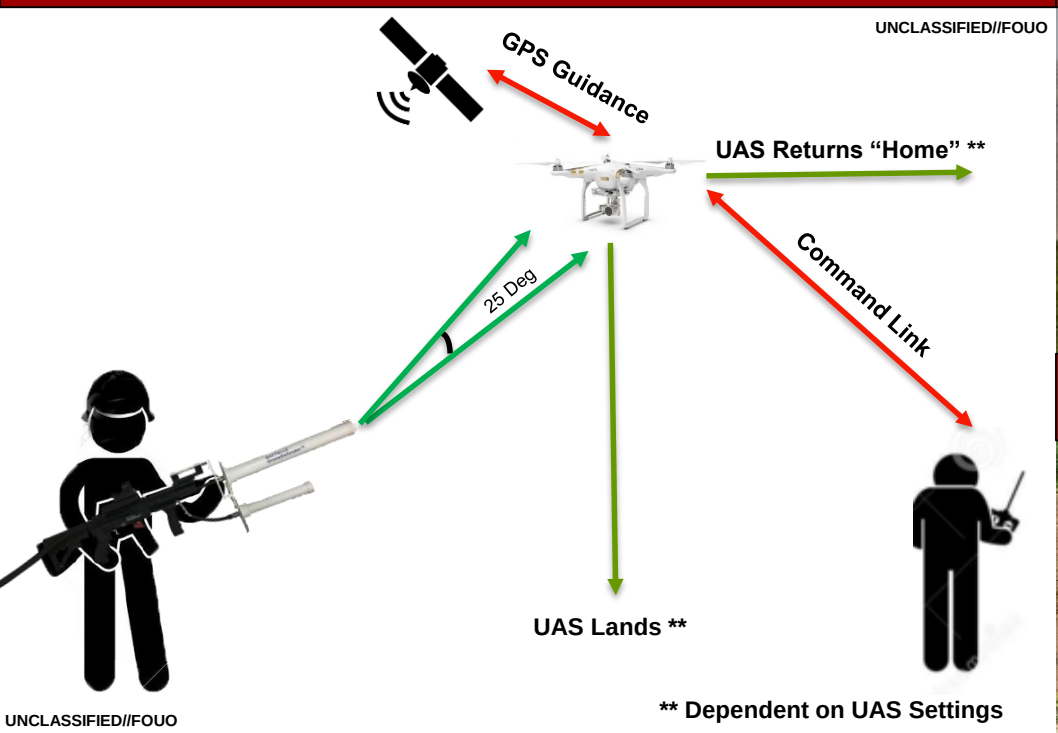
(U) Drones receive guidance and position information in real time by GPS sensors.

(U) Operators can set up waypoints to have the UAS follow a flight path using GPS coordinates.

(U) Drones have automatic failsafe commands, which will tell the system what to do if it loses a signal. Pilots have the option of setting the drone's failsafe to hover, land at its current location, or return to home if the command and control link is disrupted.

(U) If the GPS and the command link are disrupted, the system will either hover until the battery is depleted or land in place.

(U//FOUO) General Employment of DroneDefender



(U//FOUO) Dismounted Operations

(U//FOUO) Base Defense

(U) Operational Considerations

- (U//FOUO) DroneDefender is designed to be a man-portable, dismounted system. It is best emplaced in perimeter guard towers for base defense.
- (U) Once spotted, UAS are vulnerable to Radio Frequency (RF) and/or GPS disruption by the DroneDefender.
- (U//FOUO) Operators should conduct system checks, including battery and system functionality, during pre-mission checks or shift changes. The battery can be left on during an operation or a shift without degradation of operational capability.
- (U//FOUO) The audible signature of the UAS will most likely be noticed before any visual indicators are present.
- (U//FOUO) Scan air sectors vertically 10 degrees at a time in order to maximize peripheral vision. Tilting the operators head while wearing polarized sunglasses 90 degrees will help visually draw out a suspected UAS in the sky.
- (U//FOUO) DroneDefender works within line of sight and even when the UAS is right above the patrol or guard tower.
- (U//FOUO) Obtain compass bearings of UAS's route of ingress and egress (if it returns to the initial launch point).

Disclaimer: This TPR is only applicable to the Evaluation Unit (B-DD-021) distribution of DroneDefender and should not be used with any Production Units.

(U) Recovery of Enemy UAS

- (U//FOUO) Depending on the type of UAS engaged, the drone will either return to the initial launch location or land when disrupted.
- (U//FOUO) If the enemy UAS lands, keep the DroneDefender centered in the reticle while recovery forces or EOD responds to the downed UAS. If there is a suspected payload on it, use standoff optics and sensors to determine the UAS payload.
- (U//FOUO) Do not attempt to pick up the defeated UAS if the propellers on the UAS are still spinning or if there is reason to believe the system is carrying a dangerous payload. Throw a towel or a blanket on the system to prevent injury from remote propeller activation.
- (U//FOUO) Take photos of the downed UAS. If there is a camera on it and no reason to suspect a dangerous payload, retrieve the memory card from the UAS's camera.
- (U//FOUO) When recovering the downed UAS, ensure the drone is off and tape up the camera lens to prevent enemy exploitation.
- (U//FOUO) If the battery on the drone appears structurally compromised, use surgical gloves to recover the UAS to ensure no hazardous material gets in contact with human skin.
- (U//FOUO) If UAS is recovered, take photos of the aircraft and any components (to include the controller) for later analysis.