UNMANNED AIRCRAFT SYSTEM (UAS): RECOGNIZING MALICIOUS MODIFICATION

First responders, UAS enthusiasts and vendors, and the public may encounter suspicious activities, equipment, or behaviors associated with modification of UAS[1] for nefarious purposes. Early identification of potential UAS misuse and illegal or malicious modification is a critical aspect of public safety. UAS appeal to terrorists, as they are a relatively inexpensive and highly portable system that can offer tactical advantages—such as circumventing physical security measures—during the planning and execution of an attack. The purchase, possession, or use of UAS and related accessories does not indicate terrorist activity. Observers should consider the totality of the circumstances, additional indicators, or behaviors reasonably indicative of terrorism.

SCOPE: First responders may encounter the use of UAS for nefarious purposes, during the course of their normal duties. Awareness of the technology and methods of modification for malicious purposes are key to stopping unauthorized UAS operations, mounting an effective response, and conducting investigations.

CONSIDERATIONS:

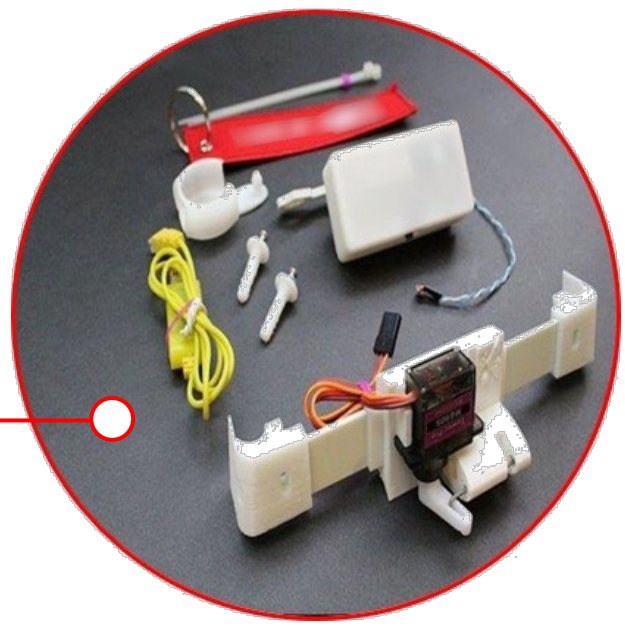
In 2012, a US person was sentenced to 17 years in prison for attempting to use a UAS to damage and destroy a federal building.

- UAS and associated components are legal, readily available, and normally require no identification or certification to purchase. Since UAS are ubiquitous and cannot easily be heard or seen above 400 feet, detection of malicious UAS is difficult. Additionally, federal regulations limit the ability of most first responders to use radio frequencies lawfully to detect and defeat UAS. However, first responders that observe a UAS should assess the appearance and behavior of the vehicle, consider its operating area, and assess any other risk factors present to determine whether a threat exists to nearby persons and property.
- Identifying UAS operators who are acting in a malicious or illegal capacity presents a significant challenge to first responders. The FAA does not verify UAS registration data, and unlike manned aircraft, most registration numbers are not visible while in flight. Most UAS operators are not required to file a flight plan. As such, reliable reporting on the suspicious acquisition of UAS or components is critical to law enforcement's ability to investigate and disrupt threats. Indicators of planned threat activity may include expressed interest in extended flight time, obfuscation or deactivation of identification systems (such as those associated with the FAA Remote ID requirement), and the introduction of payload-bearing, dispersal, or drop-mechanism capabilities. Further indicators of suspicious intent include unusual inquiries or questions and apparent anxiety or nervousness exhibited by customers.
- Outreach and coordination with critical infrastructure owners, operators, and security personnel may reveal suspicious activities, such as UAS flights over sensitive or otherwise secure facilities.

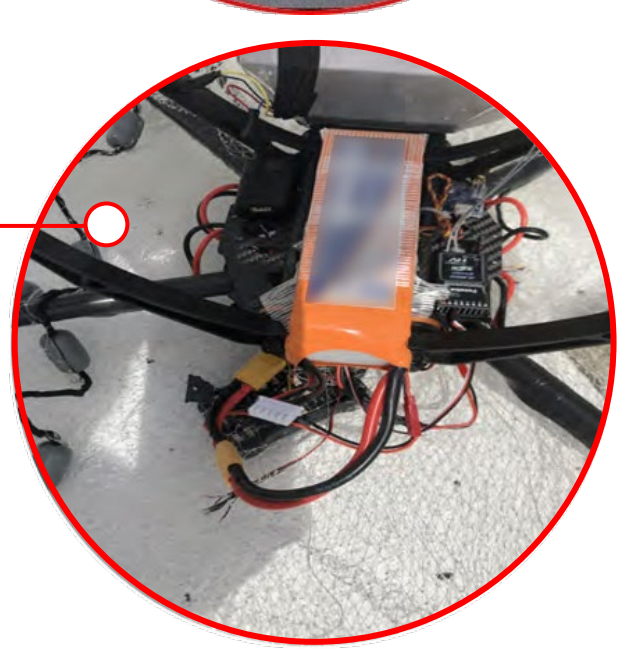
INDICATORS OF MODIFICATION: UAS enthusiasts often design and build their own platforms. Therefore, modifications such as visible wiring or items attached with tape, cables, or wire ties are common. Notable behaviors or indicators should be supported by additional facts that justify reasonable suspicion. Although one activity may seem insignificant on its own, the indicators should be observed under the totality of the circumstances. Any of the following, in combination with efforts to manufacture homemade explosives (HME) or construct IEDs, including the acquisition, transport, or storage of precursor chemicals or materials, may be of concern when associated with a UAS.

DROP AND RELEASE MECHANISM:

- Unusual, homemade or commercially purchased parts out of place on UAS body or propeller arms without a reasonable alternative explanation
- Homemade or commercially purchased drop or release mechanism



VISIBLE MODIFICATION: Payloads attached with excessive tape, cables, or wire ties or external wiring appearing to control a mechanism to drop an object



ADDITIVE MANUFACTURING (3D PRINTING): Any of the above in combination with other electronic or mechanical devices modified or disassembled (image of 3D printed ordnance recovered from a UAS in Mosul, Iraq)

WARNING: CALL 911 FOR OBSERVED UAS ACTIVITY PLACING INDIVIDUALS OR FACILITIES IN IMMEDIATE DANGER. Precursors, materials and components, and even the most rudimentary of devices are inherently dangerous and should be treated accordingly, until rendered safe by authorized subject matter experts.

[1] UAS includes the unmanned aerial vehicle, the control module used to manipulate, direct, steer, or maneuver the vehicle, and the human operator or operators, if any are present. (FBI)

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UNMANNED AIRCRAFT SYSTEM (UAS): RECOGNIZING MALICIOUS MODIFICATION *(continued)*

INDICATORS (continued):

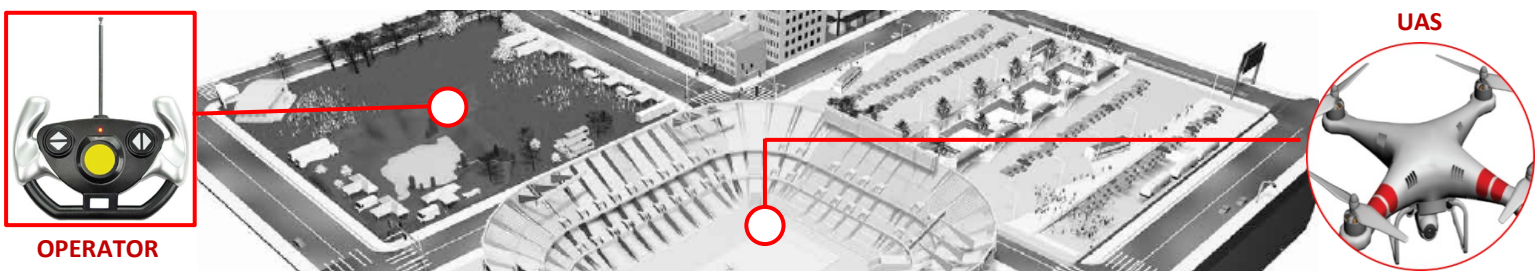
- Covering or disabling UAS lights and geo-fence[1] capabilities
- Testing UAS capabilities near sensitive locations
- Conducting repeated UAS flights at unusual times without a reasonable explanation
- Expressing interest in using UAS to observe or collect information on US Government, military, or critical infrastructure facilities
- Multiple UAS flying in tandem/concert
- Obfuscation or deactivation of identification systems

SECURITY MEASURES:

- Report repeated sightings of UAS, including operating or landing on or near sensitive facilities, or interfering with or disrupting operations
- Observe UAS from a distance before approach to determine danger
- Approach UAS from out of line of sight of the UAS camera
- Monitor for indicators of operational planning, such as surveillance, research, acquisition of materials, and dry runs
- Perform public awareness outreach through social media messaging
- Establish rapport with UAS retailers, flying clubs, and local UAS organizations
- Install notices around critical infrastructure that clearly indicate UAS flight restrictions
- Know your state's and federal laws regarding the use of UAS
- Grounded UAS may be a potential explosive or other hazardous threat

NOTE: Makeshift and portable workbenches may include UAS, UAS components, and an assortment of tools. Workbenches may raise suspicion when there are signs of explosive precursors and other potentially harmful materials present that are not commonly used with UAS for legitimate purposes, and/or when UAS components are modified in a manner inconsistent with their intended use. (Images obtained from separate law enforcement searches)

NOTE: A UAS equipped with advanced features may permit flight beyond the line of sight to a target that is unobservable from a standoff distance.



REPORTING: In the event of suspected malicious acquisition, modification, or use of UAS, please contact the local or regional fusion center or FBI Field Office and follow your jurisdiction's suspicious activity reporting protocol. The acronym **DRONE** can assist in providing detailed reporting to law enforcement:

- **D**irect attention outward and upward to attempt to locate individuals who are holding a controller or device that appears to be operating a UAS (look at windows, balconies, and rooftops)
- **R**eport incidents to local police non-emergency line, absent an imminent threat
- **O**bserve the UAS and maintain visibility of the device, look for damage or affected individuals
- **N**otice features: Identify the type of device (fixed wing, multi-rotor) and make note of the size, shape, color, payload, video-camera equipment and activity of the device
- **E**xercise caution while maintaining visibility and direct law enforcement to any vulnerable locations

The **U.S. FEDERAL AVIATION ADMINISTRATION** (FAA) is responsible for the safety of U.S. airspace and has established strict regulations that outline guidelines for operating UAS near critical infrastructure facilities. These regulations, along with rules for recreational flyers and modeler community-based organizations, are at https://www.faa.gov/uas/recreational_fliers/

RESOURCES:

- **ADVISORY ON THE APPLICATION OF FEDERAL LAWS TO THE ACQUISITION AND USE OF TECHNOLOGY TO DETECT AND MITIGATE UNMANNED AIRCRAFT SYSTEMS:** https://www.justice.gov/file/1304841/download
- **eGUARDIAN** (Suspicious activity reporting): https://www.fbi.gov/resources/law-enforcement/eguardian
- **FBI FIELD OFFICE:** https://www.fbi.gov/contact-us/field-offices
- **PREVENTING EMERGING THREATS ACT:** https://www.congress.gov/115/bills/s2836/BILLS-115s2836rs.pdf
- **STATE AND MAJOR URBAN AREA FUSION CENTER:** https://www.dhs.gov/fusion-center-locations-and-contact-information

[1] Hardware or software function of a device, such as UAS, which uses data provided by an on-board GPS unit to determine if the vehicle is authorized to be functioning at its current location. Some UAS have built-in geo-fences that will either prohibit the craft from, or notify the operator that the UAS is about to enter restricted airspace, such as an FAA no-fly zone. A geo-fence can be bypassed in a variety of ways, including by disabling the GPS unit, covering the unit with a material to interfere with receipt of GPS signals, spoofing the GPS signal to make the device think it is not in a geo-fenced area, or by acknowledging a notice that the UAS is entering a geo-fenced area and affirming the operator has permission to enter the area.

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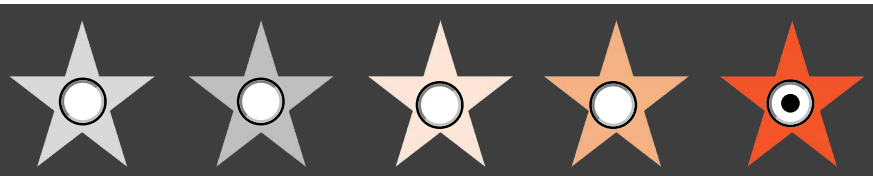
PRODUCT FEEDBACK FORM

(U) JCAT MISSION: To improve information sharing and enhance public safety. In coordination with the FBI and DHS, collaborate with other members of the IC to research, produce, and disseminate counterterrorism (CT) intelligence products for federal, state, local, tribal and territorial government agencies and the private sector. Advocate for the CT intelligence requirements and needs of these partners throughout the IC.

NAME and ORG:

DISCIPLINE: ☐ LE ☐ FIRE ☐ EMS ☐ HEALTH ☐ ANALYSIS ☐ PRIVATE SECTOR DATE:

PRODUCT TITLE: NCTC-FBI-DHS (U) First Responders Toolbox - Unmanned Aircraft System (UAS)-

POOR  GREAT

ADDITIONAL COMMENTS, SUGGESTIONS, OR QUESTIONS.

WHAT TOPICS DO YOU RECOMMEND?

SUBMIT