

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	
CERTIFICATE OF WAIVER OR AUTHORIZATION	
ISSUED TO Public Agency – University of Colorado, Boulder	Part 91
ADDRESS University of Colorado Boulder 3775 Discovery Drive Boulder, CO 80309	
This certificate is issued for the operations specifically described hereinafter. No person shall conduct any operation pursuant to the authority of this certificate except in accordance with the standard and special provisions contained in this certificate, and such other requirements of the Federal Aviation Regulations not	
OPERATIONS AUTHORIZED Operation of the S2 and Drak, Unmanned Aircraft System (UAS) in Class E and G airspace at or below 2500 AGL within the state of Kansas, Oklahoma and Colorado under the jurisdiction of Kansas City (ZKC) Air Route Traffic Control Center (ARTCC), Denver (ZDV) ARTCC, Albuquerque (ZAB) ARTCC, Minneapolis (ZMP) ARTCC, Wichita (ICT) Air Traffic Control Tower Air Traffic Control Tower(ATCT) and Marshall GCA. See attachment.	
LIST OF WAIVED REGULATIONS BY SECTION AND TITLE N/A	
STANDARD PROVISIONS	
<ol style="list-style-type: none">1. A copy of the application made for this certificate shall be attached and become a part hereof.2. This certificate shall be presented for inspection upon the request of any authorized representative of the Federal Aviation Administration, or of any State or municipal official charged with the duty of enforcing local laws or regulations.3. The holder of this certificate shall be responsible for the strict observance of the terms and provisions contained herein.4. This certificate is nontransferable.	
Note-This certificate constitutes a waiver of those Federal rules or regulations specifically referred to above. It does not constitute a waiver of any State law or local ordinance.	
SPECIAL PROVISIONS	
Special Provisions Nos. A thru I, inclusive, are set forth on the reverse side hereof.	
The certificate is effective from December 28 2020 to December 27, 2022 and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.	
BY DIRECTION OF THE ADMINISTRATOR	
<u>FAA Central Area Service Center</u> (Region)	<u>Vonnie L. Giles</u> (Signature)
<u>Tactical Operations Team Manager AJV-C23</u> (Title)	

Purpose: To prescribe UAS operating requirements in the National Airspace System (NAS) for the purpose of Public Aircraft Operations. The holder of this COA will be referred herein as the “Proponent”.

Public Aircraft

1. A public aircraft operation is determined by statutes, 49 USC §40102(a) (41) and §40125.
2. All public aircraft flights conducted under a COA must comply with the terms of the statute.
3. All flights must be conducted per the declarations submitted in the application, and as specified in the following Special Provisions.
4. This COA provides an alternate means of complying with 14 CFR §91.113(b) for unmanned aircraft operations.
5. All operations will be conducted in compliance with Title 14 CFR §91 and the conditions of the authorization issued herein. If the operator cannot adhere to any of these requirements, a separate FAA Form 7711-2 waiver application may be required.

SPECIAL PROVISIONS

A. General.

1. All personnel connected with the UAS operation must read and comply with the contents of this authorization and its provisions.
2. A copy of the COA including the special limitations must be immediately available to all operational personnel at each operating location whenever UAS operations are conducted.
3. This authorization may be canceled at any time by the Administrator, the person authorized to grant the authorization, or the representative designated to monitor a specific operation. As a general rule, this authorization may be canceled when it is no longer required, there is an abuse of its provisions, or when unforeseen safety factors develop. Failure to comply with the authorization is cause for cancellation. The proponent will receive a written notice of cancellation.
4. During the time this COA is approved and active, a site safety evaluation/visit may be accomplished to ensure COA compliance, assess any adverse impact on ATC or airspace, and ensure this COA is not burdensome or ineffective. Deviations, accidents/incidents/mishaps, complaints, etc., will prompt a COA review or site visit to address the issue. Refusal to allow a site safety evaluation/visit may result in cancellation of the COA. Note: This section does not pertain to agencies that have other existing agreements in place with the FAA.
5. Radiofrequency spectrum authorization is independent of the COA process and requires the proponent to obtain Federal Communications Commission (FCC) equipment certification (47 CFR Part 2, Subpart J and 47 CFR Part 87, Subpart D) and frequency licenses (47 CFR Part 87) in the Aeronautical Radio navigation, Aeronautical Mobile (Route), or Aeronautical Mobile Services, as appropriate, for the control link, ATC radios, transponders, detect and avoid systems, and navigation systems used to support this COA. For systems operating exclusively below 400 feet, and within visual line of sight, the control link equipment may be licensed under 47 CFR Part 15 (Radio Frequency Devices). Equipment licensed under 47 CFR Part 5 (Experimental) does not provide the protection

necessary for NAS operations.

B. Operations.

1. Unless otherwise authorized as a special provision, a maximum of one unmanned aircraft will be controlled:
 - a. From a single control station, and
 - b. By one pilot at a time.
2. When necessary, transit of airways and routes must be conducted as expeditiously as possible. The unmanned aircraft should not plan to loiter on Victor airways, jet routes, Q and T routes, IR routes, or VR routes.
3. For flights operating on an IFR clearance, the PIC must ensure positional information in reference to established National Airspace System (NAS) fixes, NAVAIDs, and/or waypoints are provided to ATC. The use of latitude/longitude positions is not authorized, except oceanic flight operations.
4. Unless installed as part of a Detect and Avoid (DAA) system, the use of a Traffic Collision Avoidance System (TCAS) in Traffic Advisory (TA) or Traffic Advisory/Resolution Advisory (TA/RA) modes while operating an unmanned aircraft is prohibited.

C. Safety of Flight.

1. The operator or delegated representative is responsible for halting or canceling activity in the COA area if, at any time, the safety of persons or property on the ground or in the air is in jeopardy, or if there is a failure to comply with the terms or conditions of this authorization.
 - a. Any crew member responsible for performing see-and-avoid requirements for the UA must have and maintain instantaneous communication with the PIC.
 - b. Visual observers must be used at all times except in Class A airspace, active restricted areas, and warning areas designated for aviation activities or as authorized in the Special Provisions. Observers may either be ground-based or airborne in a chase plane.
 - (1) Visual Observers:
 - (a) Must be able to communicate clearly to the pilot any instructions required to remain clear of conflicting traffic, using standard phraseology as listed in the Aeronautical Information Manual when practical.
 - (b) The PIC is responsible to ensure visual observers are able to see the aircraft and the surrounding airspace throughout the entire flight, and
 - (c) The PIC is responsible to ensure visual observers are able to provide the PIC with the UA's flight path, and proximity to all aviation activities and other hazards (e.g., terrain, weather, structures) sufficiently to exercise effective control of the UA to:
 - Comply with 14 CFR § 91.111, §91.113 and § 91.115, and
 - Prevent the UA from creating a collision hazard, and
 - Comply with all conditions of this COA.

D. Notice to Airmen (NOTAM).

1. A Distant (D) NOTAM must be issued prior to conducting UAS operations not more than 72 hours in advance, but not less than 24 hours for UAS operations prior to the operation for routine operations unless operations are contained within Class A airspace, active restricted or warning areas that are designated on the appropriate aeronautical chart or airport directory. This requirement may be accomplished:
 - a. Through the operator's local base operations or (D) NOTAM issuing authority, or
 - b. By contacting the NOTAM Flight Service Station at 1-877-4-US-NTMS (1-877-487-6867). The issuing agency will require:
 - (1) Name and contact information of the pilot filing the NOTAM request
 - (2) Location, altitude, or operating area
 - (3) Time and nature of the activity.
2. The area of operation defined in the (D) NOTAM must only be for the actual area to be flown for each day defined by a point and the minimum radius required to conduct the operation.
3. Operator must cancel (D) NOTAMs when UAS operations are completed or will not be conducted.
4. For first responders only. Due to the immediacy of some emergency management operations, the (D) NOTAM notification requirement may be issued as soon as practical before flight and if the issuance of a (D) NOTAM may endanger the safety of persons on the ground, it may be excluded. If the (D) NOTAM is not issued, the proponent must be prepared to provide justification to the FAA upon request.

E. Reporting Requirements.

1. Documentation of all operations associated with UAS activities is required regardless of the airspace in which the UAS operates.
2. The Proponent must submit the number of flights on a monthly basis through the COA Application Processing System (CAPS).

F. Special Use Airspace.

1. Coordination and de-confliction between Military Training Routes (MTR) and Special Use Airspace (SUA) is the operator's responsibility. When identifying an operational area the operator must evaluate whether an MTR or SUA will be affected. In the event the UAS operational area overlaps an MTR or SUA, the operator will contact the scheduling agency as soon as practicable in advance to coordinate and de-conflict. Approval from the scheduling agency is required for regulatory SUA, but not for MTR's and non-regulatory SUA. If no response to coordination efforts, the operator must exercise extreme caution and remain vigilant of all MTRs and/ or non-regulatory SUAs.
2. Scheduling agencies for MTRs are listed in the Area Planning AP/1B Military Planning Routes North and South America. If unable to gain access to AP/1B contact the FAA at email address mail to: 9-AJV-115-UASOrganization@faa.gov with the IR/VR routes affected and the FAA will provide the scheduling agency information. Scheduling agencies for SUAs are listed in the FAA JO 7400.10.

G. Air Traffic Control Requirements.

1. Coordination Requirements.

a. Wichita Tracon:

1. Operations within 40nm of the ICT VOR shall be coordinated with the Wichita Air Traffic Control Tower at 316-350-1520, 15 minutes prior to launch and upon the completion of the operation.

b. Marshal GCA:

1. Proponent will advise Marshal GCA at least 15 minutes prior to flying at phone number (785) 239-2118 of their plans for the day.
2. Proponent will provide a valid contact number that will be answered during operations.
3. If advised by ATC, proponent will monitor frequency 121.25.

c. Kansas City ARTCC:

1. Proponent will advise ZKC (913-254-8500) at least 15 minutes prior to launch.
2. Proponent will provide a valid contact number that will be answered during operations.
3. If advised by ATC, proponent will monitor the appropriate frequency.

d. Denver ARTCC:

1. No notification prior to each flight, nor a lost link phone call. The 1-hour prior to flight NOTAM is sufficient for notification. We expect any lost link flight to execute the lost link procedure.

e. Minneapolis ARTCC:

1. No notification prior to each flight, nor a lost link phone call. The 1-hour prior to flight NOTAM is sufficient for notification.

f. Albuquerque ARTCC:

1. Proponent will advise ZAB (505) 856-4591, at least 15 minutes prior to launch (only if flight will go into ZAB).
2. Proponent will provide a valid contact number that will be answered during operations.
3. If advised by ATC, proponent will monitor the appropriate frequency.

2. Communication Requirements.

When operating in the vicinity of an airport without an operating control tower, PIC shall announce operations in accordance with the FAA Aeronautical Information Manual (AIM) 4-1-9 Traffic Advisory Practices at Airports without Operating Control Towers.

3. Flight Planning Requirements.

- a. No flights will occur in any active MOA, SUA, restricted airspace, prohibited airspace, or TFR area. The aircrew is responsible for obtaining the most current list of SUA in the operations area and understands that this list may change over the life of this authorization. Prior to operations (see Special Use Airspace section above), the PIC will contact the using agency to coordinate and de-conflict UAS operations for any SUA where operations are to occur.
- b. No flights will occur in any Class D or Class E Surface areas.
- c. No flights will be conducted within 3 nautical miles of any active airfield.
- d. Proponent must file a Distant (D) NOTAM one (1) hour prior to start of UAS operations,

within the defined operating area. Direct real-time telephone contact information, to include primary and backup methods, as well as the name of the POC must be provided in the (D) NOTAM when filed.

- e. If a review of NOTAMs during preflight actions reveals another proponent operating in all, or part of, the intended operating area, the proponent must de-conflict the intended operating area from the active operating area by contacting that proponent.

4. Procedural Requirements.

- a. Night operations are not approved under the authority of this COA.
- b. The proponent must be familiar with and comply with 18 U.S. Code §795: "Photographing and sketching defense installations."
- c. It is the responsibility of the proponent to comply with all Federal, State and Local requirements when operating over publicly owned or controlled land and waterways (i.e. National Parks, National Seashore, etc.)

H. Lost Link Emergency/Contingency Procedures.

1. Lost Link Procedures:

- a. In the event of a lost link, the UAS pilot will immediately notify (the appropriate ATC facility Wichita 316 350-1520, Kansas City ARTCC (913) 254-8500, Albuquerque ARTCC 505-856-4591. Minneapolis ARTCC no contact. Denver ARTCC no contact, state pilot intentions, and comply with the following provisions:
- b. Any loss of communication between the pilot and the aircraft longer than a predefined time interval (typically 1-10 seconds) will result in the aircraft executing a pre-determined lost link procedure. This procedure is typically the aircraft returning by the shortest and safest route possible that is contained in the NOTAM area.
- c. Prior to each operation, a safe landing zone and minimum obstruction clearance altitude will be determined. A lost link recovery location and flight path will be pre-programmed prior to launch. The recovery location coordinates will be within the Notice to Airman (NOTAM) area filed for the operation, e.g. "Prior to each flight, regardless of location within the COA Operating Area, Lost Link coordinates will be programmed into the aircraft which will define a flight termination point within one quarter mile of the center point of the coordinates provided in the NOTAM issued for the most current flight operation.
- d. Upon reaching the recovery location, the aircraft will land. In certain situations, it may be more desirable, due to surrounding obstructions, to have the pre-determined lost link profile for the aircraft to land in place. The PIC will determine the safest lost link flight profile and program it before flight. If at any time after initiating lost link procedures the link with the UAS is regained, the PIC will land the UAS as soon as practical via the method he deems appropriate in order to ensure maximum safety.
- e. Lost Link procedures will be programmed to ensure the UA remains within the NOTAM area published for the operation should a lost link maneuver be executed from any location within the planned flight area.
- f. The unmanned aircraft lost link mission will not transit or orbit over populated areas.
- g. Lost link programmed procedures will avoid unexpected turn-around and/or altitude changes and will provide sufficient time to communicate and coordinate with ATC.

- h. Lost link orbit points shall not coincide with the centerline of Victor airways.

2. Lost Communications:

Operations at the flying site will occur with the PAC-M and PAC-O in close proximity using voice communication and in VHF-radio contact with observer. If communication between certain parties is lost, collision avoidance capability may be compromised. The general approach to communications failures is to:

- a. Immediately initiate a timely aircraft recovery,
- b. Employ backup communications methods.
- c. Attempt to resolve the communications issues without compromising primary flight duties. Detailed emergency responses are covered below.

AUTHORIZATION

This Certificate of Waiver or Authorization does not, in itself, waive any Title 14 Code of Federal Regulations not specifically stated, nor any state law or local ordinance. Should the proposed operation conflict with any state law or local ordinance, or require permission of local authorities or property owners, it is the responsibility of the proponent to resolve the matter. This COA does not authorize flight within Temporary Flight Restrictions, Special Flight Rule Areas, regulatory Special Use Airspace or the Washington DC Federal Restricted Zone (FRZ) without pre-approval. The proponent is hereby authorized to operate the Unmanned Aircraft System in the NAS within the areas defined in the Operations Authorized section of the cover page.

Attachment 1

Operations Area
Class G and E Airspace
At or below 2,500 feet AGL

Point	Latitude	Longitude
1	38° 10' 30"N	102° 49' 59"W
2	36° 45' 00"N	102° 49' 59"W
3	36° 45' 00"N	97° 53' 02"W
4	38° 11' 49"N	95° 35' 17"W
5	39° 58' 59"N	95° 35' 17"W
6	39° 22' 01"N	103° 43' 30"W

