



U.S. Department
of Transportation
**Federal Aviation
Administration**

Eastern Service Center

1701 Columbia Avenue
College Park, Georgia 30337

May 31, 2019

Michael Rogers
Carolina Unmanned Vehicles
4105 Graham-Newton Road
Raleigh, NC 27606

Dear Mr. Rogers:

Thank you for informing us of your intent to operate a moored balloon in the vicinity of Sanford, NC.

The enclosed Certificate of Waiver or Authorization honors your request for a waiver to Title 14 of the Code of Federal Regulations, Part 101, Subpart B, 101.13(a)(2). Please review the Special Provisions in Attachment 1 of the Certificate of Waiver or Authorization. To provide for an adequate level of flight safety for air traffic, real-time notification prior to and upon termination of operations is required to Fayetteville Terminal Radar Approach Control and Raleigh Terminal Radar Approach Control as specified.

This Certificate of Waiver or Authorization is only for those regulations specifically identified and disposes the Federal Aviation Administration interest in the matter but should not be construed as superseding or invalidating any existing rules or regulations promulgated by any other federal, state, county, or municipal government, which may be required for this operation.

If you have any questions regarding this waiver, please contact Jerry L. Rutherford at Jerry.ctr.Rutherford@faa.gov, or (404) 305-5574.

Sincerely,

A handwritten signature in blue ink, appearing to read "R. Almasy".

Ryan W. Almasy
Manager, Operations Support Group

Enclosures

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

CERTIFICATE OF WAIVER OR AUTHORIZATION
ESA-19021-MB

ISSUED TO

Michael Rogers-Carolina Unmanned Vehicles

ADDRESS

4105 Graham-Newton Road
Raleigh, NC 27606

tel: (919) 851-9898

email:merogers@carolinaunmanned.com

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 specifically waived by this certificate.

OPERATIONS AUTHORIZED

Operation of a moored balloon within a 0.2 nautical mile (NM) radius of Latitude 35° 28' 48" North, Longitude 79° 15' 36" West, not to exceed 3,500 feet Above Ground Level (AGL) or ~3,900 feet Mean Sea Level (MSL). Approximately Sandhills VORTAC (SDZ) 048° radial, 22.6 NM.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

14 CFR Part 101.1, Subpart B, 101.13(a)(2) More than 500 feet above the surface of the earth.

STANDARD PROVISIONS

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 of Authorization permits the holder to comply with restrictions as defined in Title 14 Code of Federal Regulation, Part 101, Subpart B- Moored Balloons and Kites. It does not constitute a waiver of any State law or local ordinance.

SPECIAL PROVISIONS

See "Special Provisions" attachment letter numbers 1 through 9 inclusive.

This certificate is effective **June 1, 2019** through **May 31, 2020** and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

Air Traffic Organization/Eastern Service Area



Ryan W. Almasy

May 28, 2019

Manager, Operations Support Group

CERTIFICATE OF WAIVER OR AUTHORIZATION
ESA-19021-MB
ATTACHMENT 1

SPECIAL PROVISIONS

1. Operator shall contact Leidos Flight Service Station at (877) 487-6867, at least 24 hours, but not more than 3 days, prior to conducting balloon operations to request the issuance of a Notice to Airmen (NOTAM). Provide the following information:
 - a. Date and time of balloon activity.
 - b. Location of the operation: Latitude 35° 28' 48" North, Longitude 79° 15' 36" West or the Sandhills VORTAC, (SDZ) 048° Radial at 22.6 NM.
 - c. Affected altitudes: Not to exceed 3,500 feet AGL or ~3,900 feet MSL.
2. Balloon operations are only authorized during Visual Meteorological Conditions (VMC).
3. As stipulated in Part 101.17, the balloon and tether must be in compliance with and give a visual warning equal to that required for obstructions to air navigation in the FAA Advisory Circular AC 70/7460-1L Obstruction Marking and Lighting, Chapter 11.
4. Certificate holder/operator shall contact Fayetteville Terminal Radar Approach Control (FAY) at (910) 484-8012 and Raleigh Terminal Radar Approach Control (RDU) at (919) 380-3125, 1 hour prior to, again 15 minutes prior to balloon launch, and upon completion of balloon operations.
5. Certificate holder/operator shall provide the point of contact (POC) name and phone number for each day of operations. The POC shall remain on site and available for the duration of each operation. The operator is responsible for ensuring reliable communication exists between the site, FAY and RDU. For this operation the POC will be:

Michael Rogers (919) 851-9898 or designee.
6. The site will be identified as "**Sanford**".
7. Certificate holder/operator shall immediately suspend/delay all operations if so directed by air traffic or security personnel. FAY is authorized to restrict/delay/terminate any operation(s) at their discretion. The decision will not be subject to negotiation, compliance will be immediate, and continue until the certificate holder/operator is notified otherwise.
8. All personnel directly involved with balloon operations shall be familiar with 14 CFR Part 101, Subpart B, provisions of the "Certificate of Waiver or Authorization", and this Special Provisions attachment. The certificate holder/operator will strictly adhere to all regulations, except those specifically waived. All equipment shall be maintained and operated in accordance with industry safety guidelines and established criteria.
9. No changes to the Certificate of Waiver or Authorization or Special Provisions may be made unless specifically coordinated with, and approved by, the Federal Aviation Administration, Eastern Service Center, Operations Support Group, Jerry L. Rutherford at Jerry.ctr.Rutherford@faa.gov, or (404) 305-5574 prior to the activity.

No certificate may be issued unless a completed application form has been received (14 C.F.R. 91. 101. and 105).

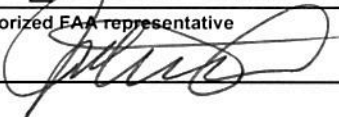


US Department of Transportation
Federal Aviation Administration

**APPLICATION FOR
CERTIFICATE OF WAIVER
OR AUTHORIZATION**

From Approved: O.M.B. No.2120-0027 08/31/2019

APPLICANTS - DO NOT USE THESE SPACES

Region ESC	Date 4-29-19
Action <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved – "Explain under "Remarks"	
Signature of authorized FAA representative 	

INSTRUCTIONS

Submit this application in triplicate (3) to any FAA Flight Standards district office.

Applicants requesting a Certificate of Waiver or Authorization for an aviation event must complete all the applicable items on this form and attach a properly marked 7.5 series Topographic Quadrangle Map(s), published by the U.S. Geological Survey (scale 1:24,000), of the proposed operating area. The map(s) must include scale depictions of the flightlines, showlines, race courses, and the location of the air event control point, Police dispatch, ambulance, and fire

fighting equipment. The applicant may also wish to submit photographs and scale diagrams as supplemental material to assist in the FAA's evaluation of a particular site. Application for a Certificate of Waiver or Authorization must be submitted 45 days prior to the requested date of the event.

Applicants requesting a Certificate of Waiver or Authorization for activities other than an aviation event will complete items 1 through 10 only and the certification, item 17, on the reverse.

1. Name of organization Carolina Unmanned vehicles Inc.		2. Name of responsible person Michael Rogers		
3. Permanent mailing address	House number and street or route number 4105 Graham-Newton Road	City Raleigh	State and ZIP code NC 27606	Telephone No. 919-851-9898

4. State whether the applicant or any of its principal officers/owners has an application for waiver pending at any other office of the FAA.
None

5. State whether the applicant or any of its principal officers owners has ever had its application for waiver denied, or whether the FAA has ever withdrawn a waiver from the applicant or any of its principal officers/owners.
None

6. FAR section and number to be waived
Part 101 9 Moored Balloons, Kites, Unmanned Rockets and Unmanned Free Balloons

7. Detailed description of proposed operation (Attach supplement if needed)
Operation of a tethered balloon approximately 25 feet long with a maximum net lift of 44 pounds. Operate to an altitude of 3,500 feet AGL. operate 24 hours a day for multiple days per session. Multiple sessions over operating period.

8. Area of operation (Location, altitudes, etc.)
Latitude N 35.48; Longitude -079.26, up to 3,500 feet AGL

9a. Beginning (Date and hour)		b. Ending (Date and hour)	
1 June 2019 12:00 am		May 31 2020 11:59 Pm	
10. Aircraft make and model (a)	Pilot's Name (b)	Certificate number and rating (c)	Home address (Street, City, State) (d)
Balloon 21M3	Michael Rogers	No certificate required	4105 Graham-Newton Road, Raleigh, NC
Balloon 45M3	Michael Rogers	for unmanned balloon	4105 Graham-Newton Road, Raleigh, NC
Balloon 21M3	Glenda Rogers		4105 Graham-Newton Road, Raleigh, NC
Balloon 45M3	Glenda Rogers		4105 Graham-Newton Road, Raleigh, NC
Balloon 21M3	Robert Hutchison		5616 Huntford Lane Raleigh, NC
Balloon 45M3	Robert Hutchison		5616 Huntford Lane Raleigh, NC

ITEMS 11 THROUGH 16 TO BE FILLED OUT FOR AIR SHOW/AIR RACE WAIVER REQUESTS ONLY.

11. The air event will be sponsored by:

12. Permanent mailing address	House number and street or route number	City	State and ZIP code	Telephone No.
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13. Policing (Describe provisions to be made for policing the event.)

14. Emergency facilities (Mark all that will be available at time and place of air event.)


Physician Fire truck Other - Specify _____
 Ambulance Crash wagon _____

15. Air Traffic control (Describe method of controlling traffic, including provision for arrival and departure of scheduled aircraft.)


16. Schedule of Events (include arrival and departure of scheduled aircraft and other periods the airport maybe open.)

Hour (a)	Date (b)	Event (c)

If sufficient space is not available, the entire schedule of events may be submitted on separate sheets, in the order and manner indicated above.

Please Read  The undersigned applicant accepts full responsibility for the strict observance of the terms of the Certificate of Waiver or Authorization, and understands that the authorization contained in such certificate will be strictly limited to the above described operation.

17. Certification - I CERTIFY that the foregoing statements are true.

Date 29 April 2019	Signature of Applicant 
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Remarks

Proposal to Federal Aviation Administration

1.0 Launch Location & Height

Request to fly unmanned tethered balloons at location N 35.48° Longitude, W 079.26°, 330 feet elevation above sea level (+ / - 16 feet) to a height of up to 3,500 feet above the location elevation.

1.1 Who will fly what, how?

Carolina Unmanned Vehicles, Inc is a development contractor that supplies tethered balloons systems and payloads to the United States Government, its contractors, and other customers. The balloons are circular viewed from the top and elliptical if viewed from the side. Attached to the bottom is a kite which adds significant stability especially in wind. The kite is maintained rigid about the center of the balloon with a carbon fiber spar that is installed in a reinforced horizontal pocket of the kite material. Under wind conditions other balloons become unstable and are forced to the earth. The balloon with kite (Helikite) positions itself into the wind, is pulled to an angle of 30 ° to 45° with the vertical, depending upon balloon size, and maintains this position. The Helikite are launched from a fixed point on the ground and connected by a tether to a powered winch.

1.2 Description of Balloons

There are two applications that will be flown at the site. One Helikite, Model 21M3, has a volume of 21 M³ (745 Ft³), is 18 feet long and weighs 9.5 kilograms. The designation denotes the volume of the balloon in cubic meters. The 21M3 Helikite will have a payload of up to 9.5 kg (21 pounds). The second, Model 45M3, has a volume of 45 M³ (1600 Ft³) is 24 feet long and weighs 20 kg (44 pounds). The 45M3 Helikite will have a payload of up to 20 kg (44 pounds). Previous testing has been conducted by CUV at a site near McGees Crossroad, NC with 21M3, 34M3 and 64M3 Helikites in the period from 2005 through 2014.

1.3 Why Fly?

The Helikites will be tested in final configurations as they would be deployed in military or other service, and in research configurations. The primary effort is further research and development of payloads to be used on an Air Force contract. The payloads of each Helikite will be slightly different during different test sequences. Payloads may include cameras, communications relay, and similar payloads.

In addition to research, the site will be used to fly Helikites in training flights for customer crews.

1.4 Duration Time and Conditions of test

Flights will be conducted from 1 June 2019 to 31 May 2020. Flights can occur on any day, during daylight and nighttime hours. Some flights will be 24 hours a day for several days. Most flights will be dawn to dusk, with primary flying planned from 8:00 AM to 6:00 PM. Flights will be in Visual Meteorological Conditions (VMC) only.

1.5 Payloads

Each component of the payload will be individually attached to the spar or reinforced cloth portions of the Helikite with two methods. Velcro straps will be the primary attachment method through loops in a specially strengthened multilayered load carrying area of the kite below the spar. Additionally a safety strap will be used as a secondary securing method to attach each of the items in the payload to the kite. A carbon rod attachment will be used to position camera payloads below the lower cloth keel.

1.6 Safe Design

The Helikites are secured by the main tether that is attached to a powered winch and a safety tether which is attached to a manual winch. The Helikites will be filled with helium and launched with powered winch. There is a controlled maximum release rate of the tether to maintain control of the operation. The Spectra tether has a breaking strength of up to 2400 pounds. The winch controlling the Helikite has a rated line pull of 490 pounds and a hold force of 944 pounds. At the rated wind speed the expected maximum pull of the 21M³ Helikite is 400 pounds and that of a 45M³ Helikite is 600 pounds. The manual safety tether is released from its reel as the main winch releases the main tether. The safety tether is equipped with banners and lights to enhance visibility.

1.7 Rapid Deflation

The safety tether is the first backup if the main tether breaks. In addition all versions Helikites have FAA approved "pop valves" that will open automatically when the aerostat rises to altitude and external pressure decreases. Additionally, the 45M³ Helikites have a rapid deflation device that opens a large orifice in the Helikite, in the event of a failure of both tether systems. This action is initiated by a GPS based sensor in the onboard controller. The helium is rapidly released and the Helikite returns to earth.

1.8 Aerostat Lights

Each 21M³ Helikite will have four (4) red lights flashing at 40 FPM. The lights will be located on the nose, tail, top and below the Helikite on the tether. These lights are visible for a minimum of one mile. Each 45M³ Helikite will have two (2) red lights flashing at 40 FPM. The lights are based upon modified Special Operations airfield marking lights and are visible up to 10 miles. The lights will be located on the nose and tail of the Helikite.

1.9 Tether Markings

The safety tether is equipped with markers to enhance visibility. Markers will be not less than 2 feet (0.6 m) on a side. The color will be Aviation orange. Markers will be displayed at no more than 50-foot (15-m) intervals and should be visible for at least 1 statute mile.

The safety tether is equipped with lights equally spaced along the tether's overall length for each 350 feet (107 m), or fraction thereof.

Alternately lights and / or flags may be spaced periodically on the main tether, at the same spacing and locations as on the safety tether, eliminating the use of the safety tether.

1.10 NOTAM Procedures

Not less than 6 hours, nor more than 48 hours prior to any balloon operation CUV will notify the appropriate Flight Service Station (FSS), for the purpose of issuing a Notice To Airmen (NOTAM). The current phone number we have for the relevant FSS is 1-877-487-6867. Our suggested wording for the NOTAM is:

Moored balloon operations will be conducted 15 miles South / Southwest of the Raleigh Executive / Lee County Airport, near an area in Lee County NC known as Cricket Hearth Road, N 35.48° Longitude, W 079.26°, elevation 330 Feet + - 16 feet. Operation will be up to a height of up to 3,500 feet above the location elevation, or 3830 feet above Mean Sea level (AMSL).

Moored Balloon not to exceed 3,500 ft. AGL or ~3,900 ft. MSL
 (site elevation ~325 ft. MSL)



Enter the Latitude:

35:28:48N

Submit

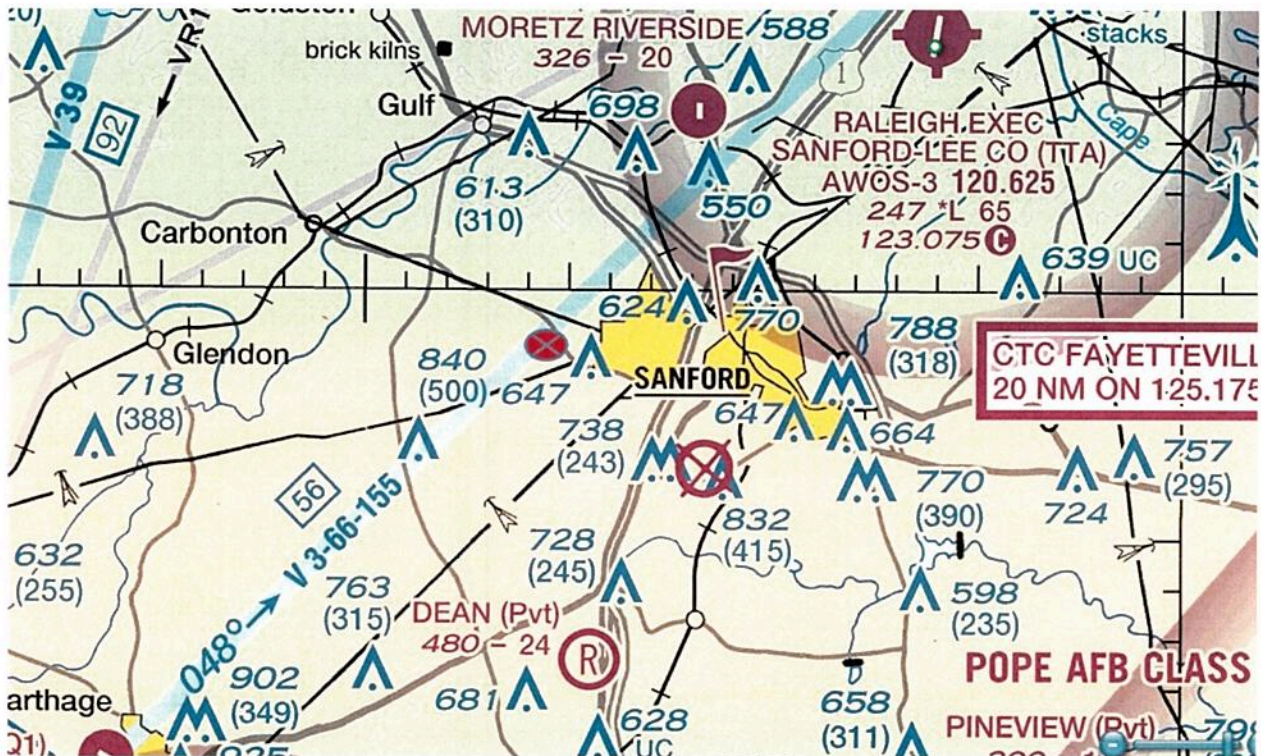
Clear

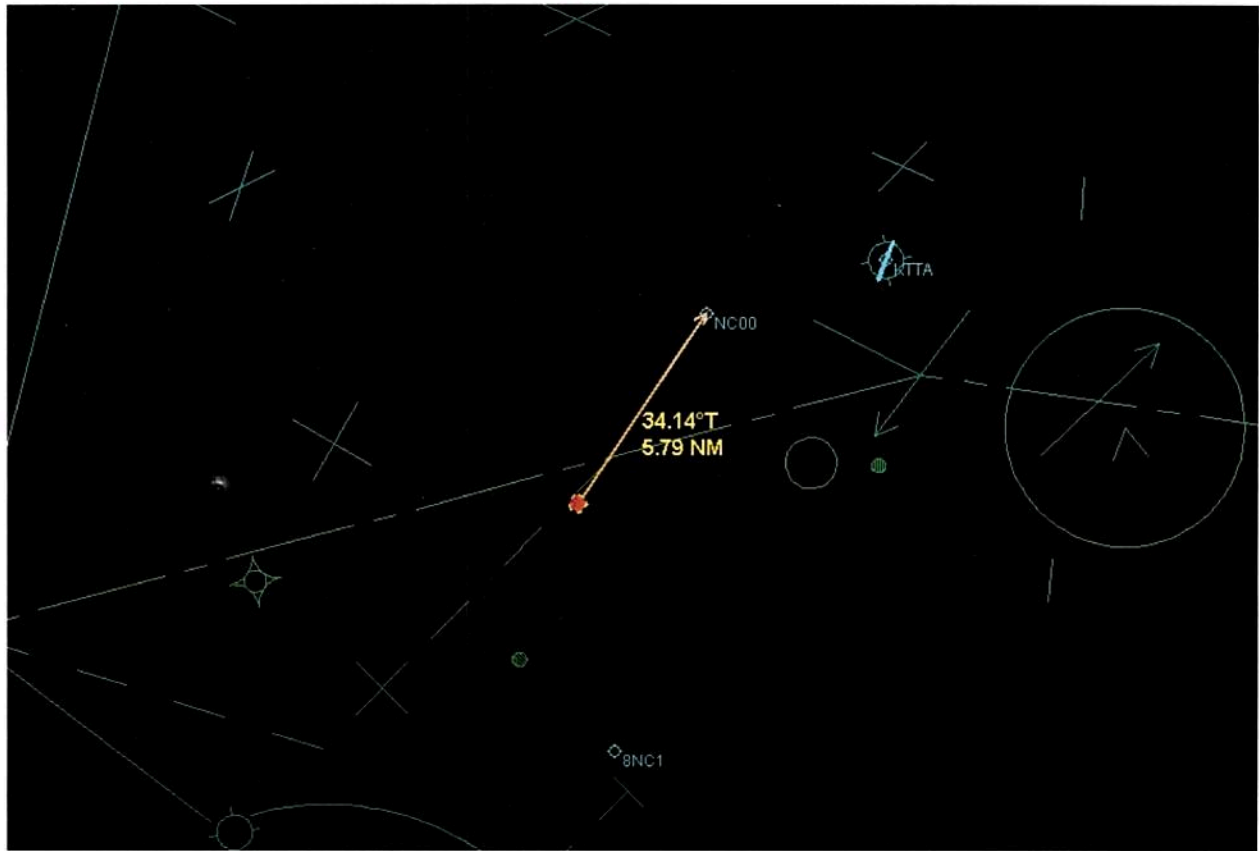
Enter the Longitude:

079:15:36W

Nearby FRD's

SDZ048022.6	SANDHILLS
LIB142026.3	LIBERTY
RDU234033.1	RALEIGH/DURHAM
FAY332035.1	FAYETTEVILLE





ILS Y or LOC Y and ILS Z or LOZ Z RWY 03 (LIB Transition)

