



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

1601 Lind Avenue Southwest  
Renton, Washington 98057

FEB 02 2016

Edge of Space Sciences, Inc.  
ATTN: Russell Chadwick  
4371 North 63<sup>rd</sup> Street  
Boulder, Colorado 80301

Dear Mr. Chadwick:

Enclosed is your Federal Aviation Administration (FAA) Form 7711-1, *Certificate of Waiver or Authorization* (WSA-1602-BAL), issued in response to your application/request to operate unmanned balloon launches/flights up to 115,000 feet Mean Sea Level near Denver, Colorado. The certificate is effective from February 5, 2016, through December 31, 2016; your compliance with the enclosed special provisions is required when conducting operations specified by the certificate.

If you intend to request renewal of this waiver and/or file a new and separate application, please forward application documents electronically to 9-ATO-WSA-OSG-Part101@faa.gov, or submit hard-copy documents to FAA, Western Service Center, Operations Support Group, 1601 Lind Ave. SW, Renton, WA 98057, no fewer than 45 days prior to the event date. Along with your FAA Form 7711-2, *Application for Certificate of Waiver or Authorization*, please include a map clearly depicting the site, i.e., Sectional Aeronautical Chart.

If you have questions, please contact Rob Riedl, Aviation Technical Systems Specialist, Western Service Center, Operations Support Group at (425) 203-4534 / email: robert.riedl@faa.gov.

Sincerely,

Tracey Johnson  
Manager, Operations Support Group  
Western Service Center, AJV-W2

Enclosure

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

## CERTIFICATE OF WAIVER OR AUTHORIZATION

ISSUED TO

Edge of Space Sciences, Inc. (EOSS) / Russell B. Chadwick, Vice President

ADDRESS

4371 North 63<sup>rd</sup> Street, Boulder, CO 80301 / 303-530-0228 / russell.b.chadwick@gmail.com and ...@noaa.gov

This certificate is issued for the operations specifically described hereinafter. No person shall conduct an 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

Activity: Up to 14 unmanned free balloon launches, in compliance with 14 CFR Part 101, to test atmospheric measuring equipment. Balloon, attachments, and payload must be equipped IAW 14 CFR Part 101.35 (b).

Max. Altitude: 115,000 feet Mean Sea Level (MSL)

Location: Five (5) potential launch sites – see special provisions and attached map/table of launch sites

Time: Official sunrise to sunset applicable to launch site (daylight hours only)

Date/s: 2/5/2016 - 12/31/2016

COA: WSA-1602-BAL

(cc: Prescott AFSS, ZDV, D01)

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

14 CFR 101.35 Equipment and marking requirements (a)(3) ...radar reflective devices...

### STANDARD PROVISIONS

1. A copy of the application made for this certificate shall be attached to and become a part hereof.
2. This certificate shall be presented for inspection upon the request of any authorized representative of the Administrator 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. 1 to 7, inclusive, are set forth on the reverse side hereof.

This certificate is effective from February 5, 2016 to December 31, 2016, inclusive, and is subject to cancellation at any time upon notice by the Administrator or his authorized representative.

BY DIRECTION OF THE ADMINISTRATOR

Western Service Area

(Region)



(Signature)

2 February 2016

(Date)

Tracey Johnson, Manager,  
Operations Support Group (AJV-W2), WSC

(Title)

## WSA-1602-BAL SPECIAL PROVISIONS

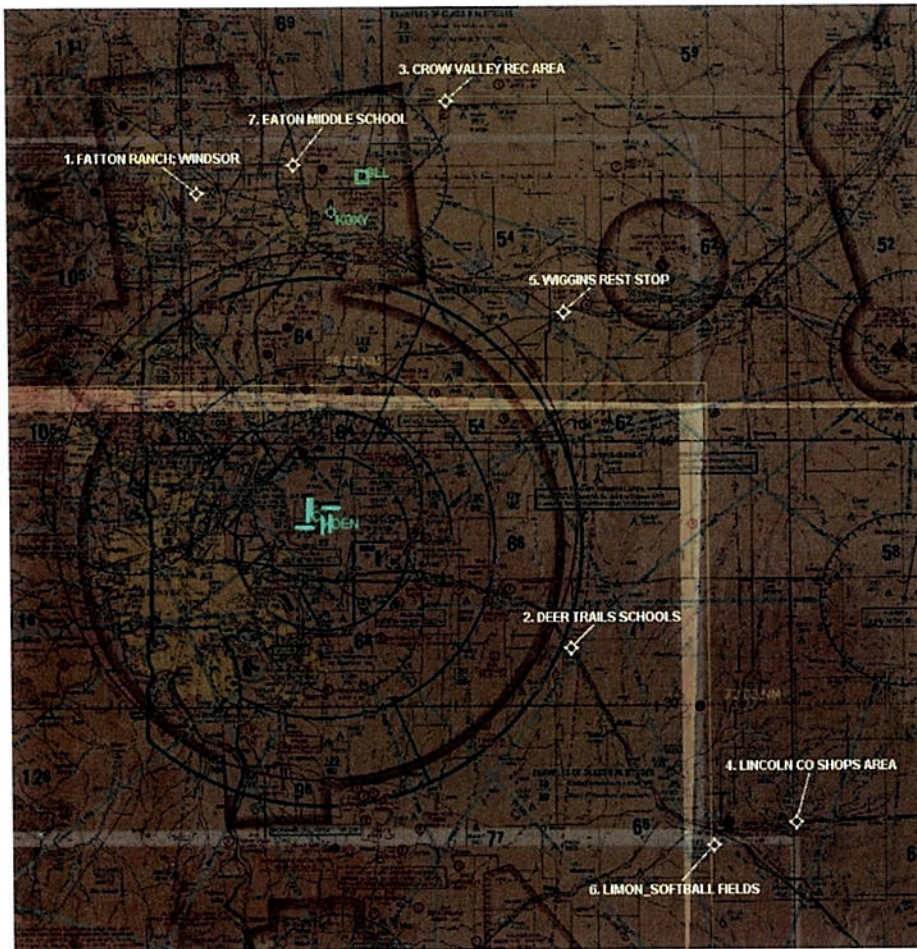
Prepared for and applicable to:

**Edge of Space Sciences, Inc. (EOSS)**  
(POC: Russell Chadwick, Vice President)

1. Authority to deviate from the Federal Aviation Regulations (FAR) is limited to specific regulations shown on the Certificate of Waiver. All other applicable FARs must be fully complied with.
2. **You must make the following notifications to concerned facilities as listed below:** Note: The notification information listed below is necessary for Air Traffic Control (ATC) to advise known aircraft of balloon and payload location. It does not alleviate EOSS's responsibility to ensure safety to unknown aircraft, persons, or their property.
  - a. **Seven (7) days in advance of the launch:** Provide pre-launch notice to the following:
    - (1) Denver Air Route Traffic Control Center (ARTCC) Traffic Management Unit (TMU) at 303-651-4252.
    - (2) Denver ARTCC Airspace and Procedures Office at 303-651-4532 and/or email [michelle.flores@faa.gov](mailto:michelle.flores@faa.gov).
    - (3) Denver Terminal Radar Approach Control (TRACON), Airspace and Procedures Office at 303-342-1546 and/or email [william.m.dunn@faa.gov](mailto:william.m.dunn@faa.gov).
  - b. **Twenty-four (24) hours in advance of the launch:** Contact Denver TRACON Airspace and Procedures Office at 303-342-1546. If unable to reach William Dunn, contact Denver TRACON at 303-342-1590. Provide your pre-launch notice.
  - c. **Between 12 and 72 hours prior to conducting operations:** Contact Prescott Automated Flight Service Station (AFSS) at 877-487-6867 and ask to issue a Notice to Airmen (NOTAM) referencing this waiver.
  - d. **Between 12 and 72 hours prior to launch:** Provide current forecast trajectory to:
    - (1) Denver ARTCC Airspace and Procedures Office at 303-651-4532 and/or email [michelle.flores@faa.gov](mailto:michelle.flores@faa.gov).
    - (2) Denver Terminal Radar Approach Control (TRACON), Airspace and Procedures Office at 303-342-1546 and/or email [william.m.dunn@faa.gov](mailto:william.m.dunn@faa.gov).
  - e. **Between 30 minutes and two (2) hours prior to conducting operations:** Call Denver ARTCC at 303-651-4252 and Denver TRACON at 303-342-1590 to advise them of the forecast trajectory.



- f. **Fifteen (15) minutes prior to launch:** Call Denver ARTCC TMU at 303-651-4252 to ensure the cell phone used at the site is working and able to send and receive phone calls.
  - g. **As requested by Denver ARTCC and Denver TRACON:** Provide launch information, en route position reports, and “on deck” reports. Advise Denver ARTCC when the balloon has burst or when the balloon is being cut down.
  - h. **Prior to issuing the cut down command:** In the event an unplanned early termination of flight occurs, call Denver ARTCC at 303-651-4252 to coordinate the optimum time for cut down, to avoid possible conflict with high traffic volume and known aircraft.
  - i. **When operations have terminated:** Advise Denver ARTCC at 303-651-4252 and Denver TRACON at 303-342-1590 when the balloon has landed. Call Prescott AFSS at 877-487-6867 and ask to cancel the NOTAM.
3. Provide the following information to each facility upon **initial** notification:
    - a. Provide/verify/confirm launch location.
    - b. Time of launch and duration of activity.
    - c. Ascent rate, direction, speed, altitude of operation, package separation information, and estimated impact location.
    - d. Telemetry monitoring capabilities. Position updates via established internet site are required for each descent package (give separate position reports). Verify the website: [www.wxqa.com/cgi-bin/balon1.cgi](http://www.wxqa.com/cgi-bin/balon1.cgi) and [www.eoss.org/scgi-bin/balon1.cgi](http://www.eoss.org/scgi-bin/balon1.cgi).
    - e. Means of establishing contact with launch site (cellular or satellite phone number).
    - f. Capability to advise the FAA when all launched objects have returned to earth.
  4. Safety spotters must scan the airspace within five (5) miles of the launch site to ascertain the area is clear of aircraft and will remain clear of aircraft during balloon package launch operation.
  5. All operations will be conducted in accordance with the holder’s safety rules and codes.
  6. The holder must be responsible for safeguarding persons and property on the ground and must ensure all persons connected with the operation are familiar with the waiver and the above special provisions.
  7. The following map and table (w/coordinates) depict five (5) of seven (7) launch sites applicable to this COA (WSA-1602-BAL), i.e., 1, 2, 3, 5, and 7:



#	Launch Site Name	VOR referenced location	Latitude	Longitude
1	Fatton Ranch; Windsor	GLL256019	40° 28' 25.2" North	104° 57' 45.0" West
2	Deer Trail Schools	FQF092027	39° 36' 37.8" North	104° 02' 29.4" West
3	Crow Valley Rec Area; Briggsdale	GLL040013	40° 38' 45.0" North	104° 20' 25.2" West
4*	Lincoln Co Shops Area; Genoa*	TXC200028*	39° 16' 43.8" North*	103° 29' 27.0" West*
5	Wiggins Rest Stop	GLL116028	40° 14' 43.8" North	104° 03' 13.2" West
6*	Limon Softball Fields*	HGO344025*	39° 14' 12.0" North*	103° 41' 46.2" West*
7	Eaton Middle School	GLL272008	40° 31' 36.0" North	104° 43' 24.6" West

TEAR OFF  
BEFORE USING

DEPARTMENT OF TRANSPORTATION  
FEDERAL AVIATION ADMINISTRATION

SUPPLEMENTAL  
INFORMATION

**CERTIFICATION OF WAIVER OR AUTHORIZATION APPLICATION - PRIVACY ACT**

The information on the accompanying form is solicited under authority of Federal Aviation Regulations Parts 91, 101, and 105.

Submission of the information is mandatory.

The purpose of this information is to establish eligibility for certificate of waiver or authorization

The data will be used for recordkeeping and statistical purposes.

Incomplete submission may result in delay or denial of your request.

**FAA Form 7711-2** (8/08) Supersedes Previous Edition

*DETACH THIS PART BEFORE USING*



**US Department of Transportation  
Federal Aviation Administration**

**APPLICATION FOR  
CERTIFICATE OF WAIVER  
OR AUTHORIZATION**

From Approved: O.M.B. No.2120-0027 10/31/2015

**APPLICANTS - DO NOT USE THESE SPACES**

Region

Date

Action

☐ Approved ☐ 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

2. Name of responsible person

3. Permanent mailing address

House number and street or route number

City

State and ZIP code

Telephone No.

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.

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.

6. FAR section and number to be waived

7. Detailed description of proposed operation (*Attach supplement if needed*)

8. Area of operation (*Location, altitudes, etc.*)

9a. Beginning (*Date and hour*)

b. Ending (*Date and hour*)

10. Aircraft make and model (a)

Pilot's Name (b)

Certificate number and rating (c)

Home address (Street, City, State) (d)

▶ <b>ITEMS 11 THROUGH 16 TO BE FILLED OUT FOR AIR SHOW/AIR RACE WAIVER REQUESTS ONLY.</b>				
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.
13. Policing <i>(Describe provisions to be made for policing the event.)</i>				
14. Emergency facilities <i>(Mark all that will be available at time and place of air event.)</i>  <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Physician   <input type="checkbox"/> Ambulance             </div> <div> <input type="checkbox"/> Fire truck   <input type="checkbox"/> Crash wagon             </div> <div> <input type="checkbox"/> Other - Specify _____              _____           </div> </div>				
15. Air Traffic control <i>(Describe method of controlling traffic, including provision for arrival and departure of scheduled aircraft.)</i>				
16. Schedule of Events <i>(include arrival and departure of scheduled aircraft and other periods the airport maybe open.)</i>				
Hour (a)	Date (b)	Event (c)		
<i>If sufficient space is not available, the entire schedule of events may be submitted on separate sheets, in the order and manner indicated above.</i>				
<div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 10px;">➤</div> <div> <p>Please Read</p> <p>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.</p> </div> </div>				
17. Certification - I CERTIFY that the foregoing statements are true.				
Date	Signature of Applicant  <div style="text-align: center; font-family: cursive; font-size: 1.2em;">Russell B. Chadwick</div>			
Remarks				



## Form 7711-2 Supplemental Information

### Box 4 & 5:

On suitable launch dates in 2016, one to three 1200, 1600, 2000 or 3000 gram latex balloons will each carry a flight string of up to 28 lb. of EOSS, Colorado Space Grant/CU educational/scientific, and/or NOAA payload devices to a burst altitude of 75k to 115k feet MSL. The flight string and attached payloads will then descend via parachute back to the surface where the equipment will be recovered. The payloads and parachute may be separated from the balloon by radio command prior to burst if required for flight safety.

The flight string will be equipped with GPS location telemetry beacons to support FAA position and altitude reports throughout the flight. These reports will be echoed every minute or less to an Internet web site where they will appear as VOR radial and range and MSL altitude. EOSS provided VHF RDF triangulation and barometric or dead-reckoned altitude will back up the GPS location reporting. If necessary, internet reports will be backed up by telephoned reports from the flight coordinator at the launch site. Since the latex balloon envelope will accompany the flight string in ascent and will disintegrate on burst above FL600, radar reflective devices are not deemed necessary to flight safety.

Meteorological conditions over eastern CO are difficult to forecast and may change rapidly over the course of a balloon flight. Therefore, it is not possible to ensure VFR conditions over the entire flight prior to committing to a launch. EOSS's GPS position reports have proven satisfactory for FAA flight advisories.

### Box 6:

Ascent rate is expected to be approximately 1100 fpm which results in about 86 minute time from launch to burst at 100,000 feet. The flight trajectory from launch to recovery is dependent upon winds aloft, but will generally be east of the launch site. Descent rate varies directly with pressure altitude; descent time is expected to be approximately 45 minutes. Under normal conditions, flight times will be less than 2.3 hours.

The choice of launch site is based on forecast trajectory to a safe landing site, local facilities, avoidance of DEN Class B Airspace, and reliable radio communications with the tracking and recovery team. The selected launch site will be specified in the HIBAL Pre-launch Notice for each launch date.

The proposed launch site locations are shown in the map below and the site number, site name, location relative to VOR and latitude and longitude are given in this table.

### Table of Proposed EOSS Balloon Launch Sites in Colorado

#	Launch Site Name	VOR referenced location	Latitude	Longitude
1	Fatton Ranch; Windsor	GLL250019	40° 28.42' North	104° 57.75' West
2	Deer Trail Schools	FQF088027	39° 36.63' North	104° 02.49' West
3	Crow Valley Rec Area; Briggsdale	GLL036013	40° 38.75' North	104° 20.42' West
4*	Lincoln Co Shops Area; Genoa*	TXC193028*	39° 16.73' North*	103° 29.45' West*
5	Wiggins Rest Stop	GLL110028	40° 14.73' North	104° 03.22' West
6*	Limon Softball Fields*	HGO339026*	39° 14.20' North*	103° 41.77' West*
7	Eaton Middle School	GLL267008	40° 31.60' North	104° 43.41' West

\*Launch site numbers 4 and 6 are outside the Denver TRACON area of interest and are part of a separate waiver application request, filed simultaneously with this one, from EOSS for 2016.



**Map of proposed EOSS Launch Sites in Colorado. Launch site numbers correspond to those in table above. Several FAA VOR locations and airport locations are also shown.**

**Box 7:**

This Waiver Request is for up to fourteen flights in 2016. In the interest of paperwork mitigation, it was deemed appropriate to include all of these very similar flights in a single waiver request. It is very unlikely that any other test and verification flight will be needed. However, if any follow-up flights are needed, separate HIBAL Prelaunch Notices will be filed for each launch date.

Commitment to launch is contingent upon many largely uncontrollable variables, including suitable weather conditions at the launch site, forecast landings in unpopulated areas and flight-ready payloads. Thus, launch dates may be delayed on short notice until all criteria are met. In the unlikely event that conditions are unsuitable for both days of a weekend, then affected flights may be postponed to a later date; revised HIBAL Prelaunch Notices will be filed in such events.