


High Altitude Class 3 Filing

Mines Rocket Club

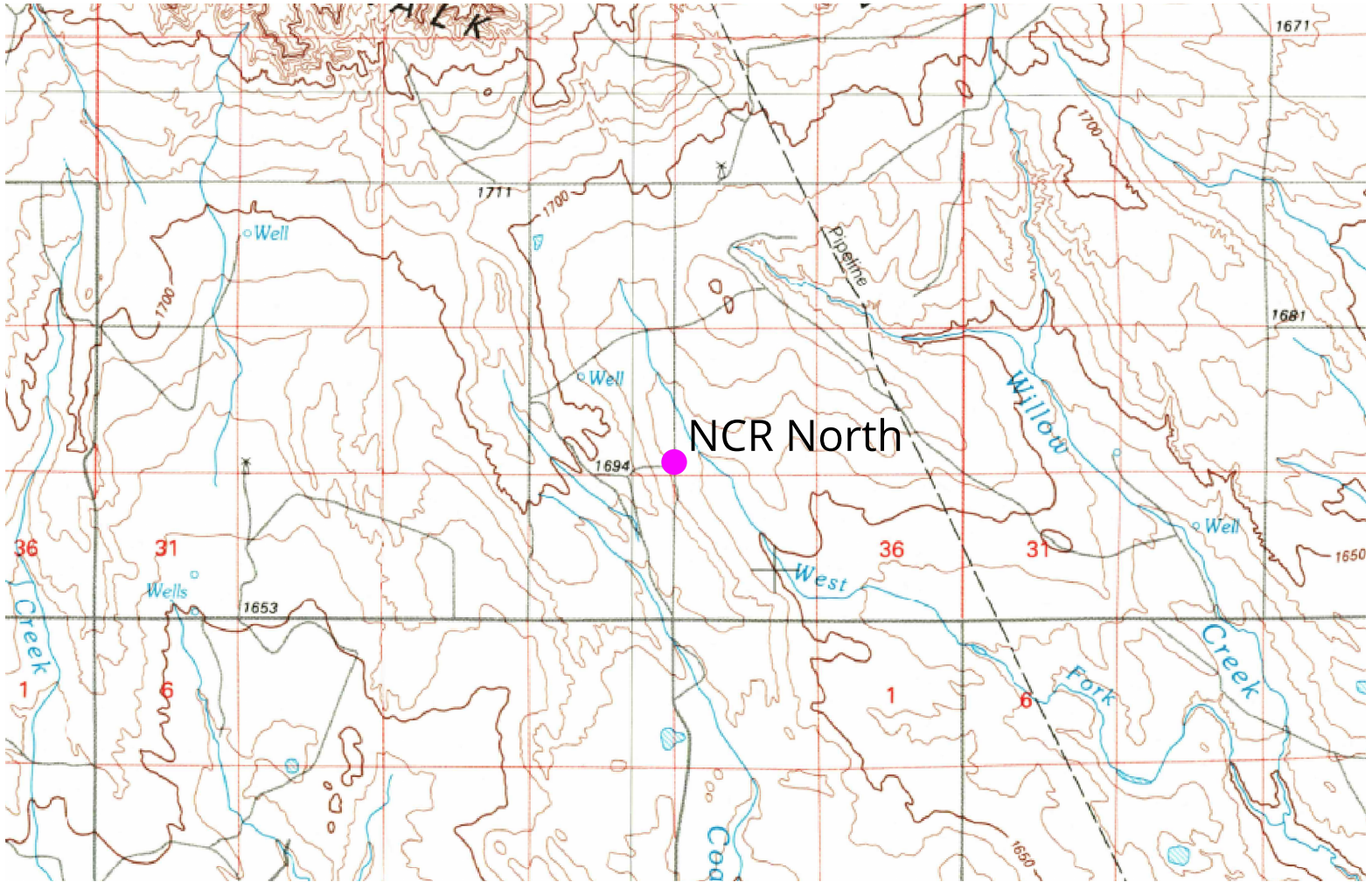
Document prepared by Tom Powell, with information furnished by:

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- Ashle Jantzen,
- Caleb Mark,
- Andrew Wu

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

 <p>US Department of Transportation Federal Aviation Administration</p> <p>APPLICATION FOR CERTIFICATE OF WAIVER OR AUTHORIZATION</p>		From Approved: O.M.B. No.2120-0027 08/31/2019	
		APPLICANTS - DO NOT USE THESE SPACES	
		Region	Date
		Action <input type="checkbox"/> Approved <input type="checkbox"/> Disapproved – "Explain under "Remarks"	
		Signature of authorized FAA representative	
INSTRUCTIONS			
<p>Submit this application in triplicate (3) to any FAA Flight Standards district office.</p> <p>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.</p> <p>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.</p>			
1. Name of organization		2. Name of responsible person	
Tripoli Rocketry Association			
3. Permanent mailing address	House number and street or route number	City	State and ZIP code
	16500 South Golden Road	Golden	CO 80401
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.			
No members of the applying organization or group have pending wavier applications at any other FAA office.			
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.			
No members of the applying organization have had wavers denied or withdrawn.			
6. FAR section and number to be waived			
14CFR101.26(b)6			
7. Detailed description of proposed operation (Attach supplement if needed)			
Launching of Class 3 unmanned rocket into controlled airspace. Operations to be performed during concurrent Northern Colorado Rocketry launch at their North Site in the Pawnee National Grassland. NCR Event organizers requested for launch duty administration. Refer to attached supplemental information for operational parameters.			
8. Area of operation (Location, altitudes, etc.)			
NCR Pawnee North Site, Co Rd 45, Nunn, CO 80648. 40° 53.134'N, 104° 38.322'W EL1665m/5462.6ft MSL			
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)

► 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.
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			
Remarks				

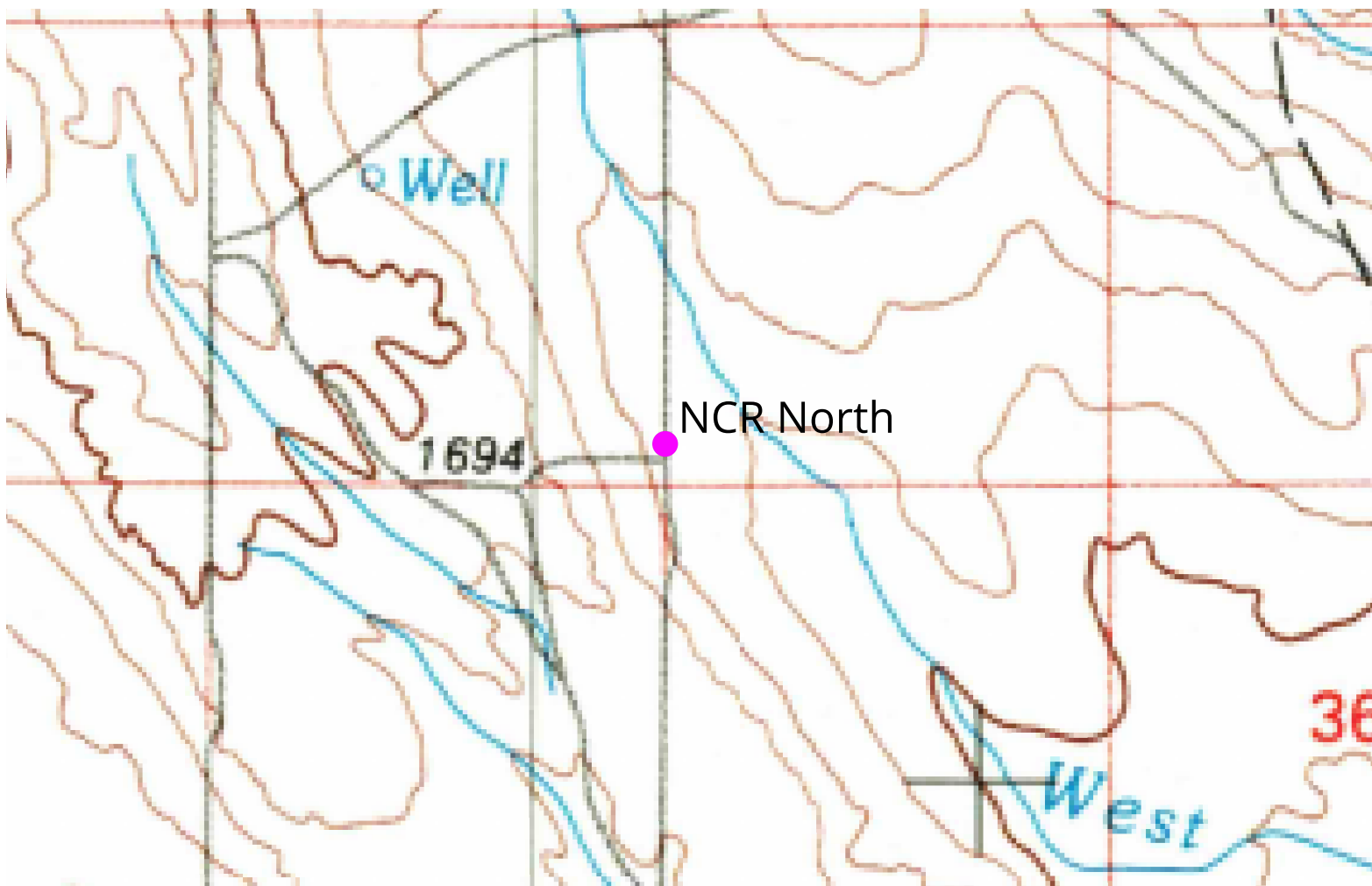


Overview Map

Subregion of USGS Eaton, CO 1:100,000 Topographical Map. Map prepared by T. POWELL on 2024-06-25

1:75,000





Detail Map

Subregion of USGS Eaton, CO 1:100,000 Topographical Map. Map prepared by T. POWELL on 2024-06-25

1:24,000

Supplemental Information for Item 5, FAA Form 7711-2

1 Description of Systems

1.1 Lower Stage (Booster)

1.1.1 Propulsion

(a) Ammonium Perchlorate Composite Propellant (APCP); 80% solids, 10% Aluminum.

(b) inches of characterized propellant in diameter type grains; phenolic liner, epoxy bonded grains, assembled per OEM instructions.

(c) Characteristics

Table 1: Motor Characteristics, generated with BurnSim version .

Kn: <input type="text"/>	Max Pc <input type="text"/>	Volumetric Loading: <input type="text"/>
Web: <input type="text"/>	Burn Time <input type="text"/>	Propellant Length: <input type="text"/>
Mass: <input type="text"/>	Motor Class <input type="text"/>	Delivered Isp: <input type="text"/>

(d) Motor is long, diameter, wall drawn over mandrel (DOM) tubing, OEM supplied composite nozzle with steel retention cap. The motor is retained into the airframe using head end motor retention, no loading from recovery systems is placed on the retainer-motor interface.

1.1.2 Airframe

(a) Nominal outer body tube diameter of in, length of in.

(b) Internal motor retention bulkhead FDM printed from polycarbonate.

(c) Fins constructed from milled & routed plate.

(d) Fillets made with Smooth-On MT-13 pre-thickened epoxy.

(e) Fin can received layers of layup, with alternating weave directions.

1.1.3 Avionics

(a) Motor is ignited by ground launch control box.

(b) Altus Metrum TeleMetrum (GPS, Barometric, Accelerometer)

- (1) Drives stage separation charge.
- (2) Drives lower stage recovery deployment charge.

(c) Jolly Logic Chute Release

- (1) Ejected by recovery deployment charge with both drogue and main parachutes.
- (2) Releases main parachute at feet AGL.

1.1.4 Recovery

- (a) inch drogue parachute. feet per second descent rate.
- (b) inch main parachute. feet per second descent rate.

1.2 Upper Stage (Sustainer)

1.2.1 Propulsion

- (a) Ammonium Perchlorate Composite Propellant (APCP); 80% solids, 10% Aluminum.
- (b) inches of characterized propellant in diameter type grains; phenolic liner, epoxy bonded grains, assembled per OEM instructions.
- (c) Characteristics

Table 2: Motor Characteristics, generated with BurnSim version .

Kn: <input type="text"/>	Max Pc <input type="text"/>	Volumetric Loading: <input type="text"/>
Web: <input type="text"/>	Burn Time <input type="text"/>	Propellant Length: <input type="text"/>
Mass: <input type="text"/>	Motor Class <input type="text"/>	Delivered Isp: <input type="text"/>

- (d) Motor is long, diameter, wall drawn over mandrel (DOM) tubing, OEM supplied composite nozzle with steel retention cap. The motor is retained into the airframe using head end motor retention, no loading from recovery systems is placed on the retainer-motor interface.

1.2.2 Airframe

- (a) Nominal outer body tube diameter of in, length of in.
- (b) Internal motor retention bulkhead FDM printed from polycarbonate.
- (c) Fins constructed from milled & routed plate.

- (d) Fillets made with Smooth-On MT-13 pre-thickened epoxy.
- (e) Fin can received layers of layup, with alternating weave directions.

1.2.3 Avionics

- (a) Motor is ignited by ground launch control box.
- (b) Altus Metrum TeleMetrum (GPS, Barometric, Accelerometer)
- (1) Drives stage separation charge.
 - (2) Drives lower stage recovery deployment charge.
- (c) Jolly Logic Chute Release
- (1) Ejected by recovery deployment charge with both drogue and main parachutes.
 - (2) Releases main parachute at feet AGL.

1.2.4 Recovery

- (a) inch drogue parachute. feet per second descent rate.
- (b) inch main parachute. feet per second descent rate.

2 Operational Properties

2.1 Site Properties

Table 3: Launch Site Parameters

Tower Height	<input type="text"/> in
Launch Site Altitude	5462.6 ft MSL
Estimated Landing Site Altitude	5400 ft MSL
Site Longitude	104° 38.322' W
Site Latitude	40° 53.134' N
Typical Site Temperature	<input type="text"/>
Typical Site Pressure	<input type="text"/>

2.2 Maximum Altitude and Maximum Range

2.2.1 Methods

Highest altitude and maximum range simulations were attained using RASAero version aerodynamic performance data. Wind data was collated from observations recorded at the Eaton, CO¹ weather

¹EATON 4.3 ENE, CO US

station. Resultant collated data was provided to RS-Pro version .

Table 4: Maximum altitude and range.

Wind State	Launch Orientation	Booster Altitude	Sustainer Altitude	Booster Range	Sustainer Range
No Wind	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Typ. 08:00 Winds	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Typ. 12:00 Winds	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Typ. 16:00 Winds	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

2.3 Static Stability Characteristics

Mach Number	C.P. (in)	Stability/Static Margin (calibers)
0.10	<input type="text"/>	<input type="text"/>
1.0	<input type="text"/>	<input type="text"/>
2.0	<input type="text"/>	<input type="text"/>
<input type="text"/> (Max + 5%)	<input type="text"/>	<input type="text"/>