

UAS Ground School

CU Boulder Flight Operations Department

Introductions & Course Overview

- ▶ Introduction
 - ▶ Course Introduction
 - ▶ Student/Teacher Introductions
- ▶ UCB Flight Operations Department
 - ▶ Departmental goals
 - ▶ Website
 - ▶ <https://www.colorado.edu/isc/flight-operations>
 - ▶ Pilot training timeline/courses
 - ▶ Ground school overview and expectations
 - ▶ Questions

Modules

This course can be complex, confusing, and bit hard to follow as we need to present a vast amount of new information. We have split up learning topics into different modules. For each module we will follow a specific presentation outline in order to enhance learning in a structured manner.

- ▶ Modules Day 1

- ▶ FOM Ch 1
- ▶ FOM Ch 2
- ▶ Introduction to Sectional Charts
- ▶ How to read a METAR

- ▶ Modules Day 2

- ▶ FOM Ch 3
- ▶ FOM Ch 4
- ▶ FOM Ch 5
- ▶ FOM Ch 6
- ▶ FOM Ch 7
- ▶ FOM Ch 8
- ▶ FOM Ch 9
- ▶ FOM Ch 10
- ▶ COA
- ▶ Complex Airspace Examples

Module Breakdown

Each module will be presented in the following way. Although modules may differ in complexity and type the same consistent format will attempt to be followed. If you find after ground school you are confused or unclear on a section, feel free to references these slides and the applicable module.

- ▶ Module #
 - ▶ Overview of importance
 - ▶ Why is this important to the department, FAA, or for UAS operations
 - ▶ Applicability to user
 - ▶ How does this apply to you
 - ▶ Supporting documentation
 - ▶ What resources do you have to access this information and what supplemental material do you have at your disposal to enhance your knowledge of this information
 - ▶ Specific information
 - ▶ What exactly does this module cover
 - ▶ Recap summary and quiz

A quick overview of important topics

▶ Commercial UAS flying

- ▶ You are likely all here because you need to fly UAS commercially in some sense. Per the FAA there are three ways to access the NAS:
 - ▶ Hobbyist flight rules (this can only be done if UAS is being operated recreationally)
 - ▶ Part 107 flight rules (Individual certificate which closely follows specific UAS written regs)
 - ▶ COA flight rules (Issued by a public entity, flexibly for operating under regulations similar to that of manned aircraft, requires an administrator but allows for more pilot flexibility and protection)
- ▶ As a public entity we operate under COA flight rules
 - ▶ This is what we will be training towards allowing you to do
- ▶ You will hear COA referenced a lot. There are different types of COAs for different operations, but the general COA is called the blanket COA
- ▶ The COA contains **specific flight operating procedures** that we must follow when we fly

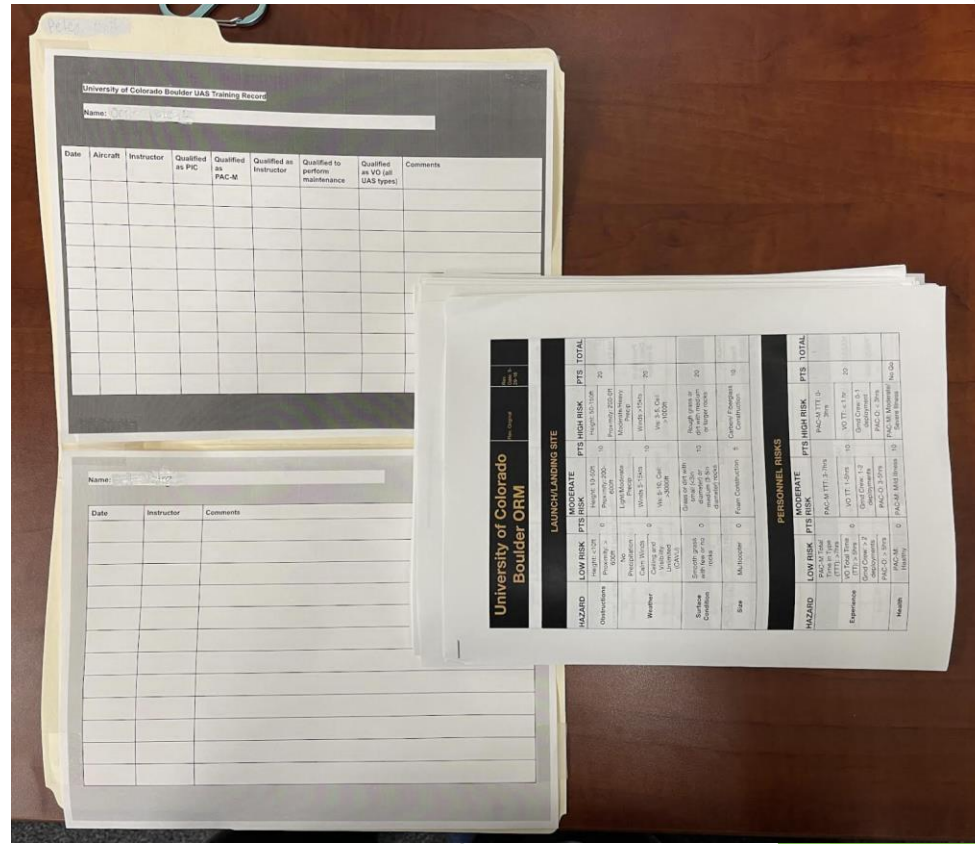
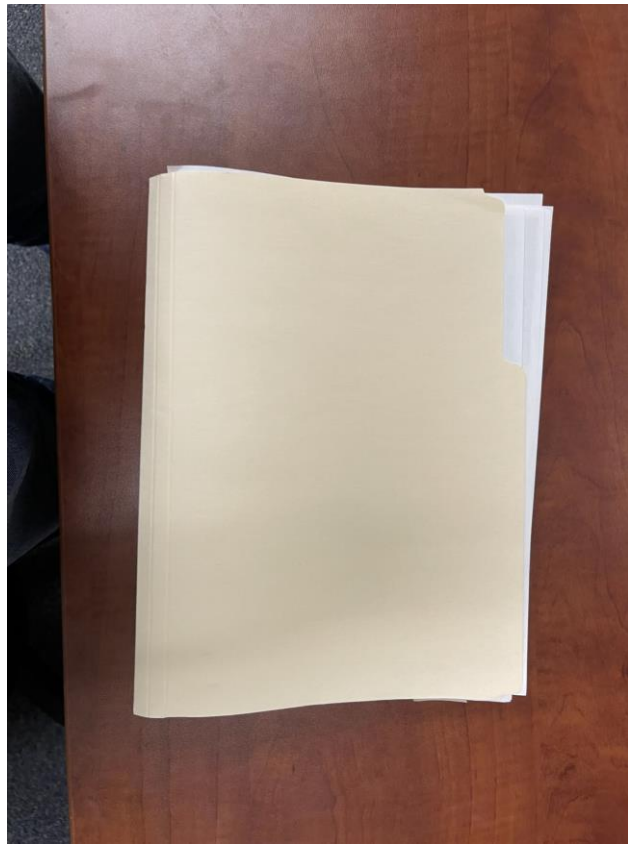
▶ Departmental Documentation

- ▶ The department has a lot of important manuals but one of the most important manual which **governs all basic UAS / university rules and regulations** is called the FOM

The majority of ground school is teaching you the knowledge required to understand and follow these documents.

Ground School folder

- In the past each person would get a ground school folder this would consist of a manila folder which had your training log taped to the inside and then the contents of the folders consisted of all the supplemental ground school documents. We will review these right now.



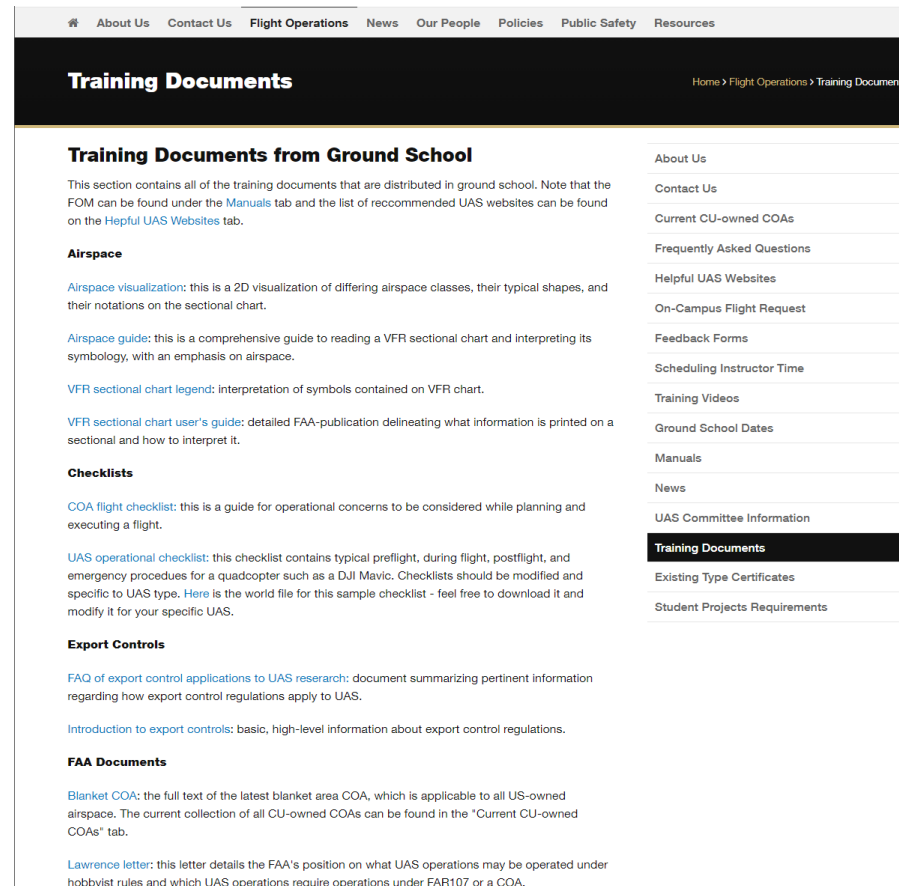
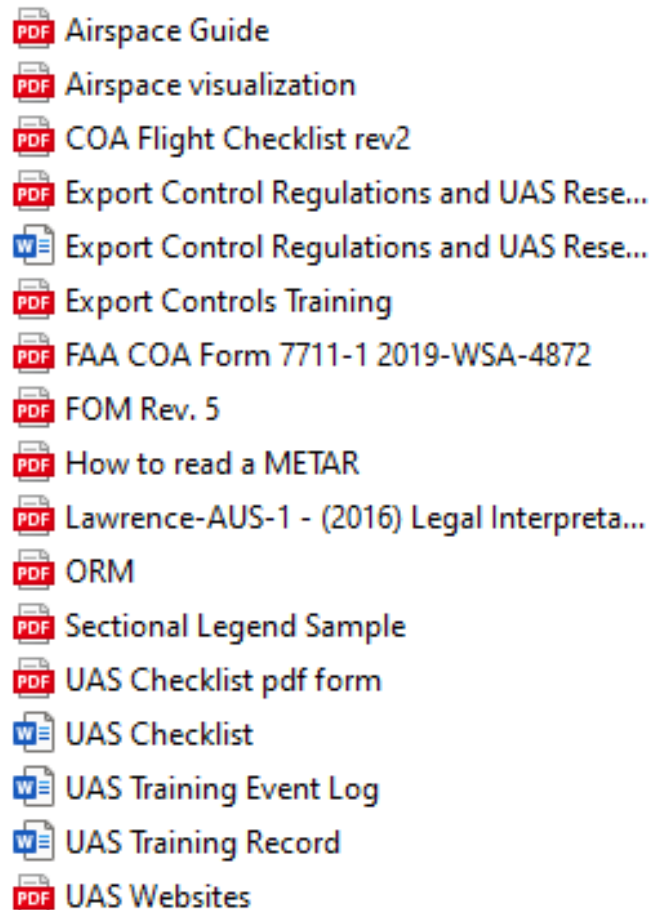
Training Logs

- ▶ Your training logs have two sections. They will be filled out by your instructors to track your progress throughout training. If you wish to have access to them that can be granted upon request. All training and certifications will be track on this paper document and an electronic copy.
- ▶ Attached below are pictures of actual training logs.

The image displays two examples of training log forms. The top form is titled "University of Colorado Boulder Unit Training Record" and includes a "Name" field. It features a table with the following columns: "Date", "Aircraft", "Instructor", "Qualified as PIC", "Qualified as PAC-M", "Qualified as instructor", "Qualified to Perform Microprocedures", "Qualified as VRI (all LRS types)", and "Comments". The bottom form also includes a "Name" field and a table with columns for "Date", "Instructor", and "Comments". Both forms are designed for tracking training progress and qualifications.

Ground School Documents

- All the documents required for ground school were emailed to you in the initial ground school invitation email but they can also be found on our website. You should have the following:



Ground School Documents

- ▶ When going to the website navigate to the training documents page. A description of what the supplemental document is covering will be included as well.

Airspace

[Airspace visualization](#): this is a 2D visualization of differing airspace classes, their typical shapes, and their notations on the sectional chart.

[Airspace guide](#): this is a comprehensive guide to reading a VFR sectional chart and interpreting its symbology, with an emphasis on airspace.

[VFR sectional chart legend](#): interpretation of symbols contained on VFR chart.

[VFR sectional chart user's guide](#): detailed FAA-publication delineating what information is printed on sectional and how to interpret it.

Checklists

[COA flight checklist](#): this is a guide for operational concerns to be considered while planning and executing a flight.

[UAS operational checklist](#): this checklist contains typical preflight, during flight, postflight, and emergency procedures for a quadcopter such as a DJI Mavic. Checklists should be modified and specific to UAS type. [Here](#) is the world file for this sample checklist - feel free to download it and modify it for your specific UAS.

Export Controls

[FAQ of export control applications to UAS research](#): document summarizing pertinent information regarding how export control regulations apply to UAS.

[Introduction to export controls](#): basic, high-level information about export control regulations.

FAA Documents

[Blanket COA](#): the full text of the latest blanket area COA, which is applicable to all US-owned airspace. The current collection of all CU-owned COAs can be found in the "Current CU-owned COAs" tab.

[Lawrence letter](#): this letter details the FAA's position on what UAS operations may be operated under hobbyist rules and which UAS operations require operations under FAR107 or a COA.

Miscellaneous

[How to read a METAR](#): a document to explain how to read Meteorological Aerodrome Reports (METARs) and assess whether the weather meets legal minimum requirements.

[ORM](#): this a risk assessment tool to quantify the risk associated with a given mission. Using this is not required.

[Briefings Documents](#): additional clarifications into what should be included in the three required briefings.

Modules

We will now begin with the day one modules

Any questions before we begin?

- ▶ FOM Ch 1
- ▶ FOM Ch 2
- ▶ Introduction to Sectional Charts
- ▶ How to read a METAR

Extra time:

- ▶ FOM Ch 3
- ▶ FOM Ch 4

FOM Ch 1- *(Outline)*

► Overview of importance

- The FOM is a major regulatory document, it sites FAA, UAS, and university rules that you must follow if you wish to become certified and operate legally. You will need to read and understand this document thoroughly. Chapter 1's is important as it is existing to help clarify and explain basic definitions and acronyms.

► Applicability to user

- Because you will be reading the FOM to interoperate regulations you will need to understand what it says. The FOM uses a lot of verbiage and acronyms that are FAA or aviation specific which may be a bit hard to understand. So, this chapter is here to help provide clarification to users when a terms definition or acronym is unknown.

► Supporting documentation

- The FOM is the main source of this module and there is no supplemental material as definitions and acronyms are pretty straight forward.
- If something is very confusion you can contact the department for a clarification.

► Specific information

- FOM Chapter 1 - Introduction

► Recap summary and quiz

FOM Ch 1- (*Specific Information*)

- ▶ Present FOM Chapter 1: Introduction

FOM Ch 1- *(Recap Summary)*

- ▶ FOM importance to the department and PICs
- ▶ FOM definitions
 - ▶ Some of the more important definitions -
 - ▶ UAS category / class / type / difficulty ratings
 - ▶ Altitudes (AGL/MSL)
 - ▶ Crew positions (PIC/VO)
 - ▶ VLOS
 - ▶ Weather (VFR/Cloud ceilings)
 - ▶ Know this is the section to go to if you don't understand/remember a specific definition

Note: Know we do not expect you to memorize all definitions, some are more important or more applicable than others.

FOM Ch 1- (*Quiz*)

Once again, it is important to have immediate knowledge of commonly used definitions but if there is a term you are unfamiliar with just know where to go to find clarification.

Quiz Questions:

- ▶ What is initial and continuing airworthiness?
- ▶ Define VLOS?
- ▶ Where do I go to find a definition or acronym, I am unfamiliar with?

FOM Ch 2- (*Outline*)

▶ Overview of importance

- ▶ As the FOM is a regulatory document this chapter covers the **operational policies** which pilots must follow in order to remain legal in the eyes of the FAA and university.

▶ Applicability to user

- ▶ Its extremely important to be similar with all the different operational policies associated with the FOM. If there is one section to memorize or be very familiar with its this one. If you have questions about how you are operating in the field or how you will be able to accomplish a questionable mission this is the place to go to make sure what you are doing is legal.

▶ Supporting documentation

- ▶ Logbook / UAS checklist / SARs / Supplemental Briefings documents

▶ Specific information

- ▶ FOM Chapter 2 - Operational policies

▶ Recap summary and quiz

FOM Ch 2- (*Specific Information*)

- ▶ Present FOM Chapter 2: Operational policies

FOM Ch 2- (*Specific Information*)

► Personal Logbook Example

[illegible]

FOM Ch 2- (Specific Information)

► Master Logbook Example

Flight Logs ☆ ☁								
File Edit View Insert Format Data Tools Add-ons Help Last edit was 2 days ago								
100% \$ % .0 .00 123 Arial 10 B I S A								
A1	Date							
	A	B	C	D	E	F	G	H
1	Date	UAS	COA	PIC	Flight Time	Comments	COA Rules	Part 107 Rules
2	Previous Data Archived							
3	10/1/2021	Mavic 2 / Twin Otter	2019-WSA-4872-COA		0.2	Currency	X	
4	10/1/2021	Mavic / Twin Otter	2019-WSA-4872-COA		0.2	Currency	X	
5	10/1/2021	Mavic 2 / Twin Otter	2019-WSA-4872-COA		0.2	Currency	X	
6	10/2/2021	Mavic 2 Enterprise	2019-WSA-4872-COA		1.0	CUPD ops	X	
7	10/2/2021	Mavic 2 Enterprise	2019-WSA-4872-COA		1.2	CUPD ops	X	
8	10/3/2021	Mavic	2019-WSA-4872-COA		0.5	Athletics Photography	X	
9	10/7/2021	Mavic	2019-WSA-4872-COA		0.3	Recertification	X	
10	10/7/2021	Matrice 200	2019-WSA-4872-COA		0.5	BIO Tech gutter video	X	
11	10/7/2021	Matrice 200	2019-WSA-4872-COA		0.5	BIO Tech gutter video	X	
12	10/8/2021	Mavic / Twin Otter	2019-WSA-4872-COA		0.2	Currency	X	
13	10/8/2021	Mavic / Twin Otter	2019-WSA-4872-COA		0.2	Currency	X	
14	10/9/2021	Mavic	2019-WSA-4872-COA		0.5	campus photography		
15	10/11/2021	Bixler	2019-WSA-4872-COA		0.2	Currency	X	
16	10/11/2021	Bixler	2019-WSA-4872-COA		0.2	Currency	X	
17	10/16/2021	Mavic 2 Pro	2019-WSA-4872-COA		0.7	CUPD ops	X	
18	10/16/2021	Mavic 2 Air	2019-WSA-4872-COA		0.3	Currency	X	
19	10/16/2021	Mavic 2 Enterprise	2019-WSA-4872-COA		0.7	CUPD ops	X	
20	10/16/2021	Mavic 2 Enterprise	2019-WSA-4872-COA		1.5	CUPD ops	X	
21	10/16/2021	Phantom 4 Pro	2019-WSA-4872-COA		0.1	CUPD, criminal investigation, assault suspect search		X
22	10/22/2021	Matrice 200	2019-WSA-4872-COA		0.2	Wolf gutter video		
23	10/22/2021	Mavic	2019-WSA-4872-COA		0.4	Currency; training	X	
24	10/22/2021	Mavic	2019-WSA-4872-COA		0.1	Currency	X	
25	10/22/2021	Mavic	2019-WSA-4872-COA		0.1	Currency	X	
26	10/22/2021	Matrice 200	2019-WSA-4872-COA		0.2	Wolf gutter video		
27	10/28/2021	Bixler	2019-WSA-4872-COA		0.5	Currency	X	

FOM Ch 2- (*Specific Information*)

► Example UAS checklist

MotorGlider UAS Normal Operating Checklist

Normal Procedures

Preflight Actions

COA FLT CHECKLIST.....COMPLETED
NOTAM.....FILED w/ ADEQUATE TIME REMAINING
MAINTENANCE ISSUES..... LOG CHECKED AND ISSUES RESOLVED

Preflight Inspection

FLIGHT BATTERY.....VERIFY CHARGED
TRANSMITTER BATTERY..... VERIFY CHARGED
AIRCRAFT WINGS..... ATTACHED AND BOLTED
HORIZONTAL STABILIZER.....ATTACHED, LEVEL, AND BOLTED
CONTROL LINKAGE/HORNS.....INSPECT AND SECURE
SERVO CABLES.....PROPERLY ROUTED AND CONNECTED
AIRCRAFT CONDITION.....INSPECT AND VERIFY AIRWORTHY
FLIGHT BATTERY.....INSTALLED
CANOPY.....SECURED
CENTER OF GRAVITY.....VERIFY WITHIN ALLOWABLE RANGE (40-45MM FROM LE)

Startup and Runup

TRANSMITTER..... ON AND CORRECT MODEL SELECTED
MOTORS.....DISARMED
FLIGHT BATTERY.....CONNECT
FLIGHT CONTROLS.....FREE AND CORRECT

If using trainer radio:

TRAINER FLIGHT CONTROLS..... FREE AND CORRECT

RATES/EXPO..... ACTUATE AS EXPECTED
SPOILERS.....ACTUATE AS EXPECTED
GEAR.....ACTUATE AS EXPECTED
MOTORS.....ARMED
RMS SYSTEM.....EXTEND RETRACT - VERIFY OPERATION
MOTORS.....DISARMED
PROPELLER SECURITY.....VERIFY
MOTORS.....ARMED
THRUST TEST.....GOOD PULL, ELEVATOR MIX ACTUATES AS EXPECTED
PREFLIGHT BRIEFING.....COMPLETE

FOM Ch 2- (*Specific Information*)

► SAR first page (FOM appendix)

A.2 UCB Safety action report

All Pilots or Visual Observers must submit this report to the DO within 24 hours of any accident/incident, as defined below. Only one report for each event is required. However, the Pilot and VO may both submit a separate SAR for the same event.

This report is used to document any unsafe events that occur while flying or preparing to fly an unmanned aircraft. The following definitions are based on COA requirements, 14 C.F.R. 107.9, and In addition, this SAR will be used by the DO and the Associate Vice Chancellor for Integrity, Safety, and Compliance. for consideration and possible investigation. The intent of this report is to learn and become safety as well as to assist in compliance with FAA, NTSB, and UCB reporting requirements.

- "Accident" or "incident" is defined as any:
 - o Fatal injury, where the operation of a UAS results in a death occurring within 30 days of the accident/mishap
 - o Serious injury
 - Serious injury means:
 - Hospitalization for more than 48 hours, commencing within 7 days from the date of the injury
 - Any bone fracture (except simple fractures of fingers, toes, or nose)
 - Severe hemorrhages, nerve, muscle, or tendon damage
 - Involving any internal organ
 - Involving second- or third-degree burns, or any burns affecting more than 5 percent of the body surface
 - o Loss of consciousness
 - o Total unmanned aircraft loss
 - o Substantial damage to the unmanned aircraft system where there is damage to the airframe, power plant, or onboard systems that must be repaired prior to further flight
 - o Damage to property, other than the unmanned aircraft.
 - o Any incident/mishap that results in an unsafe/abnormal operation including but not limited to:
 - A malfunction or failure of the unmanned aircraft's on-board flight control system (including navigation)
 - A malfunction or failure of ground control station flight control hardware or software (other than loss of control link)
 - A power plant failure or malfunction
 - An in-flight fire
 - An aircraft collision
 - Any in-flight failure of the unmanned aircraft's electrical system requiring use of alternate or emergency power to complete the flight
 - o A deviation from any provision contained in the COA
 - o Any incident that requires NTSB notification under 49 C.F.R. § 830.5

FOM Ch 2- (Specific Information)

► Pilot Briefings, supporting document

COA flight checklist: this is a guide for operational concerns to be considered while planning and executing a flight.

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ORM: this is a risk assessment tool to quantify the risk associated with a given mission. Using this is not required.

Briefings Documents: additional clarifications into what should be included in the three required briefings.

Review Quiz

UAS Committee Information

Training Documents

Existing Type Certificates

Student Projects Requirements

Emergency phone numbers

CU Boulder OISC Flight Ops Department

Clarification on and additional information regarding required Flight Briefings

Per the FOM 2.5.14 the PIC must give three crew briefings, which include an initial crew briefing, a before landing briefing, and a post flight debriefing. These briefings are the responsibility of the PIC and should contain all relevant information. Most briefings are complete with the entire crew present and should be tailored in a way which is clear and inclusive to all who participate in the mission. As there are a variety of different missions with different types of UAS, environments, weather, COAs, etc it may be confusing on what should be included in each of these briefings. This document has been made to clarify, suggest, and act as a baseline for what your briefings should include.

Initial Crew Briefing

This crew briefing is typically given to all member of the flight crew to clearly state the intentions, flight rules, duties, and foreseeable complications of the flight. The briefing should include the overall mission goal so everyone knows the objective. In this statement the PIC can discuss with the crew where the UAS intends to operate and how (ie, altitude, maneuvers, planned flight paths). It should include how the airspace is being accessed, if it's being accessed through a COA the crew members should be familiar with some of the main flight requirements stipulated under those flight rules so they effectively help the mission be completed safely. When talking about the flight rules it could be important to mention altitude limits, weather limits, airspace limits, and or distance to nearby obstruction limits if applicable that way the crew can notify the pilot if he/she is in danger of breaking them. Next the PIC should specify the different types of crew duties and their responsibilities for the mission. Lastly in the initial crew briefing any unforeseen or possible complications which could adversely effect the flight should be stated. This allows for full transparency about the possible risks associated with the mission and allows the crewmembers to be vigilant towards those possible risks. The last stamen made in the initial crew briefing is "are there any questions". This gives the open opportunity for other crewmembers to speak up and question or get clarification if needed.

A sample initial crew briefing between a two person PIC and VO crew for a common training flight is as follows: "Today I plan on flying my recurrency training flight where I will go up and preform basic UAS training maneuver with my MAVIC. This flight will be conducted under the blanket COA and will comply with the required rules. There are no TFRs, no airspace considerations and we will complete this flight in class G, the closet airport is boulder municipal which is 3 miles to the south south east, the weather is well above the minimums of 3sm visibility and 1000ft ceilings, and my notam has been filed and verified. I have confirmed you are legal to act as my VO and as my VO, I would like you to identify me any manned aircraft sound, its location, and if it's a relevant factor; any wildlife possible interferences; any by standard interferences; and other UAS in my vicinity. I would like these announcement to address interferences made in reference to the cardinal directions (NSEW). I would like you to pay special attention to the other UAS in my flight aera as there is an increased amount of activity at the model field today. Other than that, do you have any questions?"

FOM Ch 2- *(Recap Summary)*

- ▶ FOM Ch 2 important sections
 - ▶ Most important definitions -
 - ▶ PIC responsibility and authority
 - ▶ Minimum crew complement
 - ▶ Currency
 - ▶ NOTAM submission
 - ▶ Crew briefings
 - ▶ Weather requirements
 - ▶ Logbook documentation
 - ▶ Right of way
 - ▶ Safety
 - ▶ MTR
 - ▶ Medical requirements
 - ▶ SARs

FOM Ch 2- (Quiz)

The operational policies section applies to real world flying situations and are where a lot of the regulations new pilots must learn. If you have a question about flying or conducting a UAS operation in a certain manner this is one of the best places to look. This section does use a lot of terminology so feel free to use chapter one as a reference if needed.

Quiz Questions:

- ▶ What are the regulations for flying within the vicinity of an MTR?
- ▶ How many briefings must be done for each flight?
- ▶ What is the minimum crew complement?
- ▶ What is the duty of the PIC?
- ▶ Can we fly over people for a drone mission?
- ▶ What are the alcohol and drug limits?
- ▶ What basic weather minimums must we need to legally fly?

How to read a METAR- (*Outline*)

▶ Overview of importance

- ▶ Weather is a major consideration when flying UAS, it is important to know what weather exists and how it may affect flying. There are multiple regulations PICs must adhere too and knowing how to get an official aviation weather report is important

▶ Applicability to user

- ▶ Especially when new to the aviation industry it may be hard to know what certain weather types look like, a METAR can help you build judgement skills. Furthermore, in order to stay legal in terms of regulations and safe in terms of operating practices using a METAR gives you an official and recorded weather report.

▶ Supporting documentation

- ▶ How to read a METAR document
- ▶ Sky vector
- ▶ FOM - weather sections

▶ Specific information

- ▶ Regulations
- ▶ Decoded METAR language

▶ Recap summary and quiz

How to read a METAR- (*Specific Information*)

▶ Regulation Review

▶ Basic VFR weather minimums

- ▶ 3SM visibly / 1000ft ceilings
- ▶ Ceiling definition

▶ Finding a METAR

- ▶ Skyvector.com

▶ How to read a METAR document

▶ Practical application

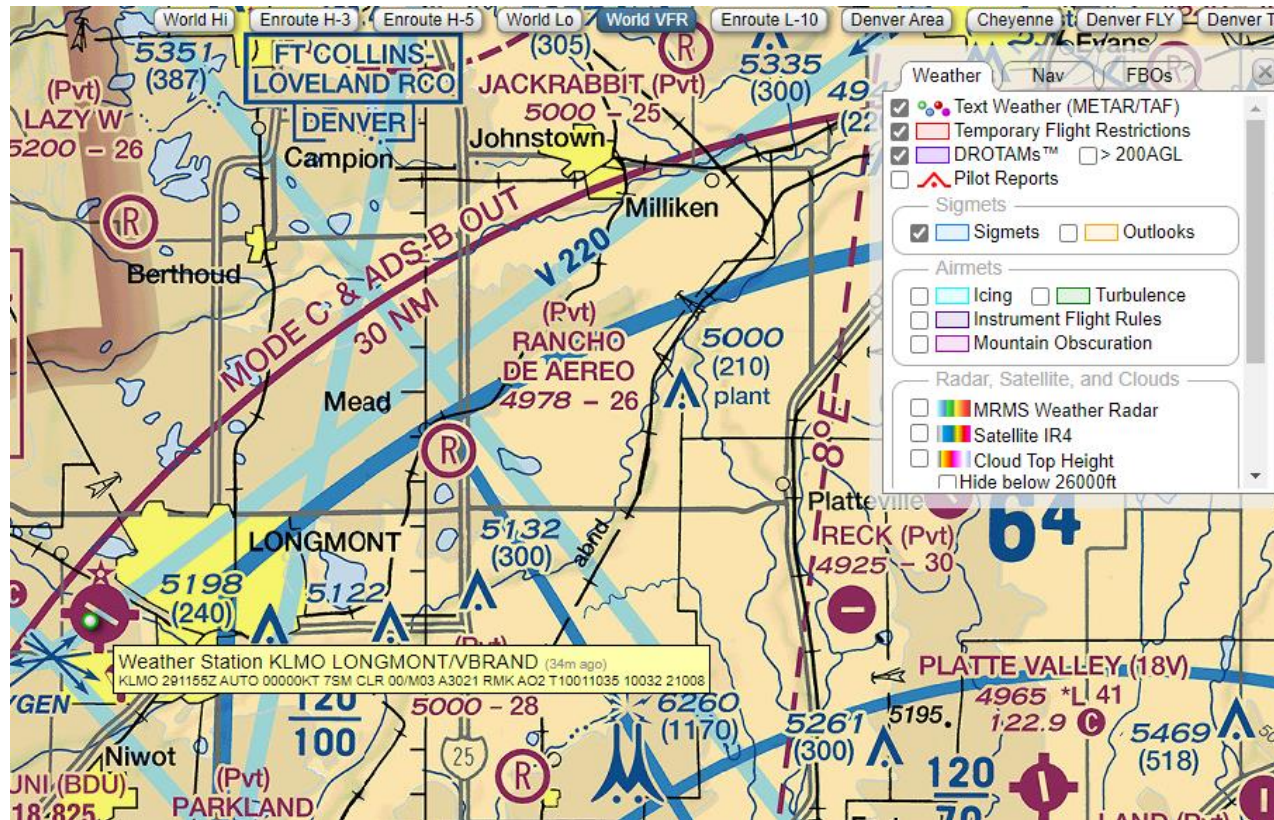
▶ General procedure for when to use a METAR

- ▶ Use general internet forecast ~24-72 hours in advance
- ▶ If weather is questionable on the day use METAR to verify legality

▶ Additional knowledge of METARs may be beneficial

- ▶ Wind limits, times/old information, specific type of weather to be expected, etc
- ▶ Forecasts

How to read a METAR- (*Specific Information*)



How to read a METAR- *(Specific Information)*

How to read a METAR

A METAR will look something like this:

PHNY 202124Z AUTO 27009KT 1 1/4SM BR BKN016 BKN038 22/21 A3018 RMK AO2

Let's decipher what each bit of the METAR means.

PHNY

The first part of the METAR is the airport identifier for the facility which produced the METAR. In this case, this is Lanai Airport in Hawaii.

202124Z

Next comes the time and date of issue. The first two digits correspond to the date of the month, and the last 4 digits correspond to the time of issue (in Zulu time). In the example, the METAR was issued on the 20th of the month at 21:24 Zulu time.

AUTO

This part indicates that the METAR was generated automatically.

27009KT

Next comes the wind information. The first 3 digits represent the heading from which the wind is blowing, and the next digits indicate speed in knots. In this case, the wind is coming from a heading of 270 relative to magnetic north, and the speed is 9 knots. Some other wind-related notation you might see:

- 27009G15KT – the G indicates gusting. In this case, the wind comes from 270 at 9 knots, and gusts to 15 knots.
- VRB09KT – the VRB indicates the wind direction is variable; the wind speed is 9 knots.

1 1/4SM

This section of the METAR indicates visibility in statute miles. In this case, visibility is 1 ¼ statute miles. Note that the range is typically limited to 10 statute miles, so a report with 10 statute mile visibility could well indicate a situation with more than 10 statute miles of visibility. An M indicates that the visibility is less than the value shown.

BR

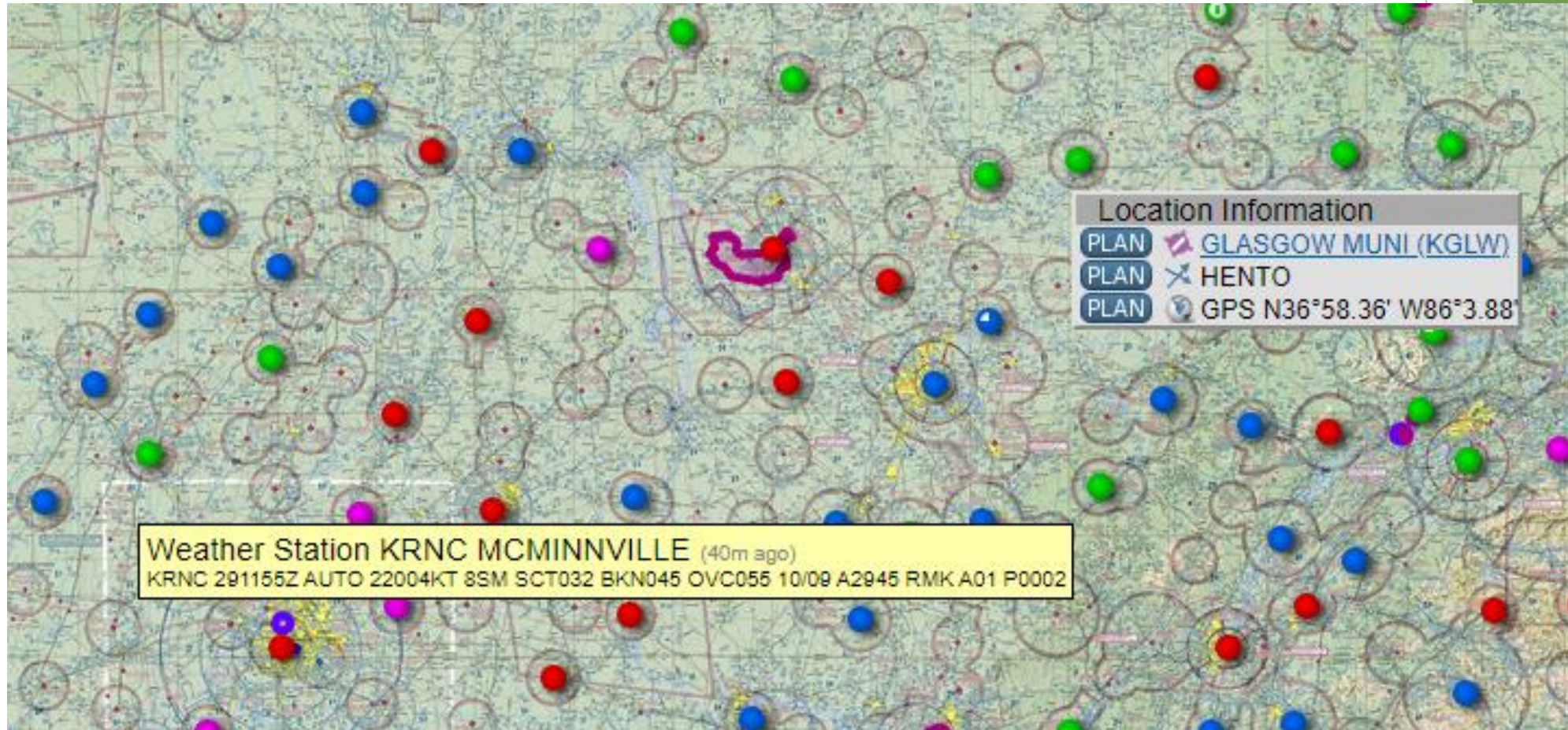
This section describes elements (i.e. precipitation, smoke, etc.) that exist at the report facility. In the example, mist exists in the vicinity. Here is a list of the possible elements that could be reported:

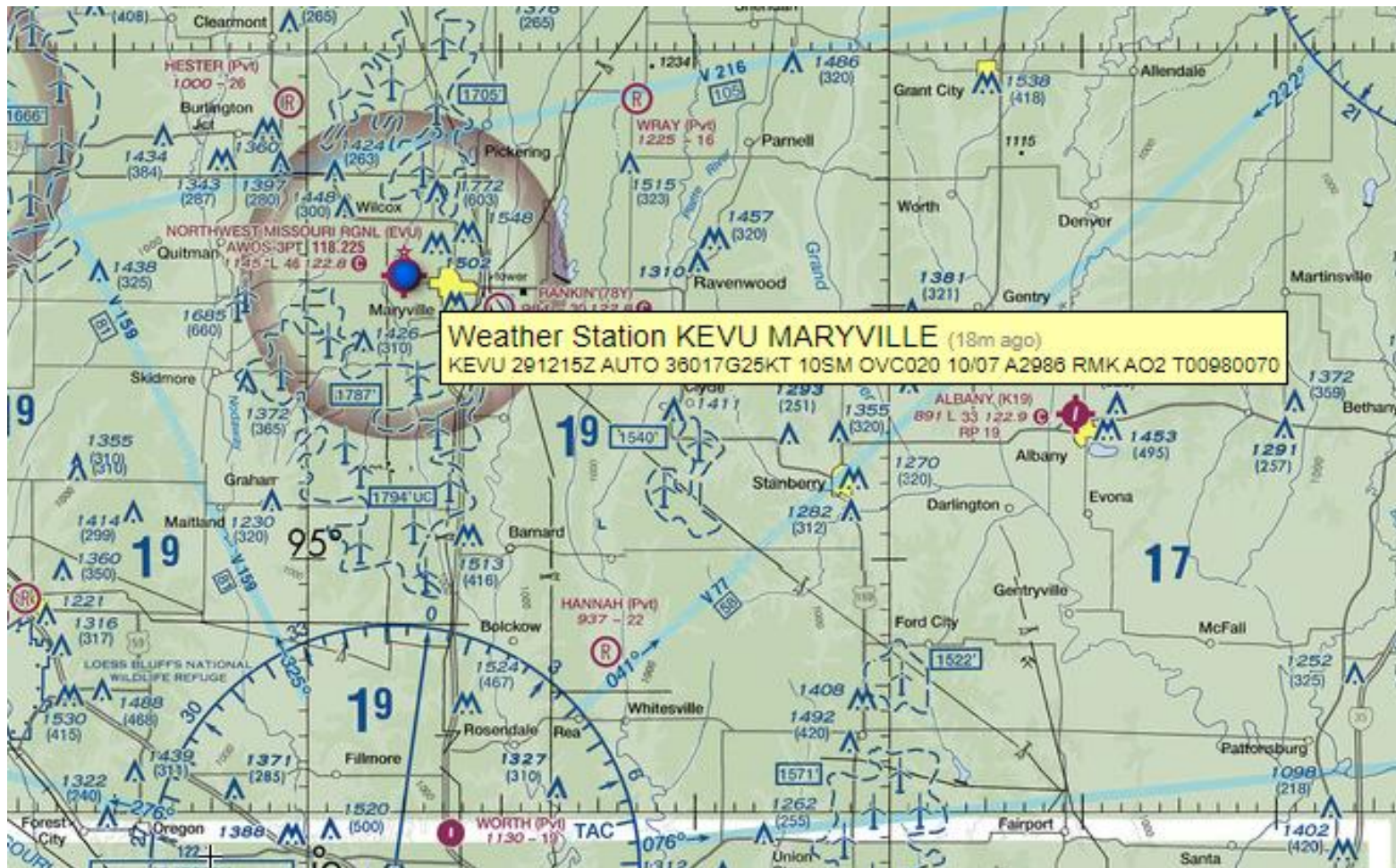
- | | |
|---------------------|----------------------|
| • FG – fog | • SN – snow |
| • BR – mist | • SG – snow grains |
| • FU – smoke | • GR – hail |
| • HZ – haze | • GS – small hail |
| • PY – spray | • PE – ice pellets |
| • SA – sand | • IC – ice crystals |
| • DU – dust | • BC – patches |
| • VA – volcanic ash | • FZ – freezing |
| • RA – rain | • SH – showers |
| • DZ – drizzle | • TS – thunderstorms |

How to read a METAR- *(Recap Summary)*

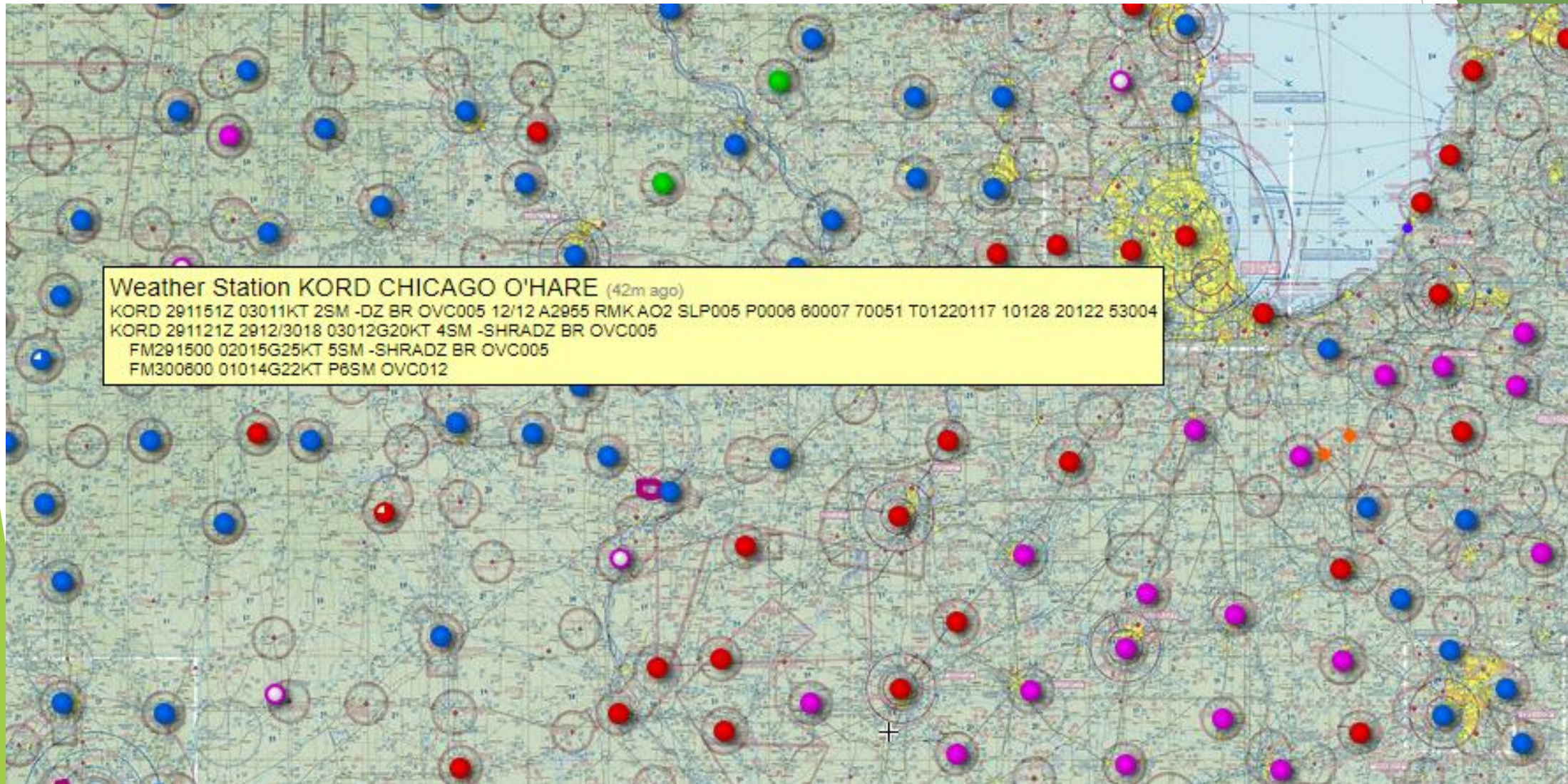
- ▶ Where to find METARs
 - ▶ Skyvector drop down menu
- ▶ Basic weather requirements
 - ▶ 1000ft/3sm
 - ▶ Cloud clearance: 500ft below, 2000ft side, 1000ft above
- ▶ Practicality in using METARs
 - ▶ Using common forecasts to predict the weather 24hrs in advance
 - ▶ Using METAR the day of if weather is questionable
 - ▶ Legal minimums vs safe minimums (personal minimums)
- ▶ Requirements to be able to find visibility and ceiling but benefit of knowing more
 - ▶ UAS limitations, winds, forecasts, locational/times, other present weather phenomena
- ▶ Flying with other weather phenomena present (rain/snow/ash/etc)

How to read a METAR- (Quiz)





How to read a METAR- (Quiz)



Introduction to Sectional Charts- (*Outline*)

▶ Overview of importance

- ▶ Airspace is one of the most important UAS related knowledge areas. The majority of the regulations about UAS pertain to airspace knowledge in some way or another. It is also one of the most important things for a pilot to know in order to be safe in the sky.

▶ Applicability to user

- ▶ UAS need to be flown in the proper area. Failure to do so could cause serious injury, financial/legal penalty, or death. Knowing all airspaces is important for CU COA pilots because different COAs allow us to fly in different airspaces

▶ Supporting documentation

- ▶ Skyvector.com
- ▶ Airspace Visualization Guide
- ▶ Airspace Information Guide
- ▶ Sectional legend sample
- ▶ 3D airspace tool

▶ Specific information

- ▶ Different types of airspace
- ▶ Sectionals chart symbols

▶ Recap summary and quiz

Intro to sectional charts- (*Specific Information*)

- ▶ Why have different types of airspace?
 - ▶ Main reason: Separate and control different types of people using the airspace
 - ▶ Congested airplane traffic areas
 - ▶ Large commercial traffic from small general aviation traffic
 - ▶ Large airports vs small airports
 - ▶ Military areas
 - ▶ No fly / restricted / special area
 - ▶ Allow for people wanting to operate under different flight rules in different areas
- ▶ Types of basic airspace
 - ▶ Airspace is 4 dimensional
 - ▶ A, B, C, D, E, and G airspace
 - ▶ Ascending from most controlling to least controlling

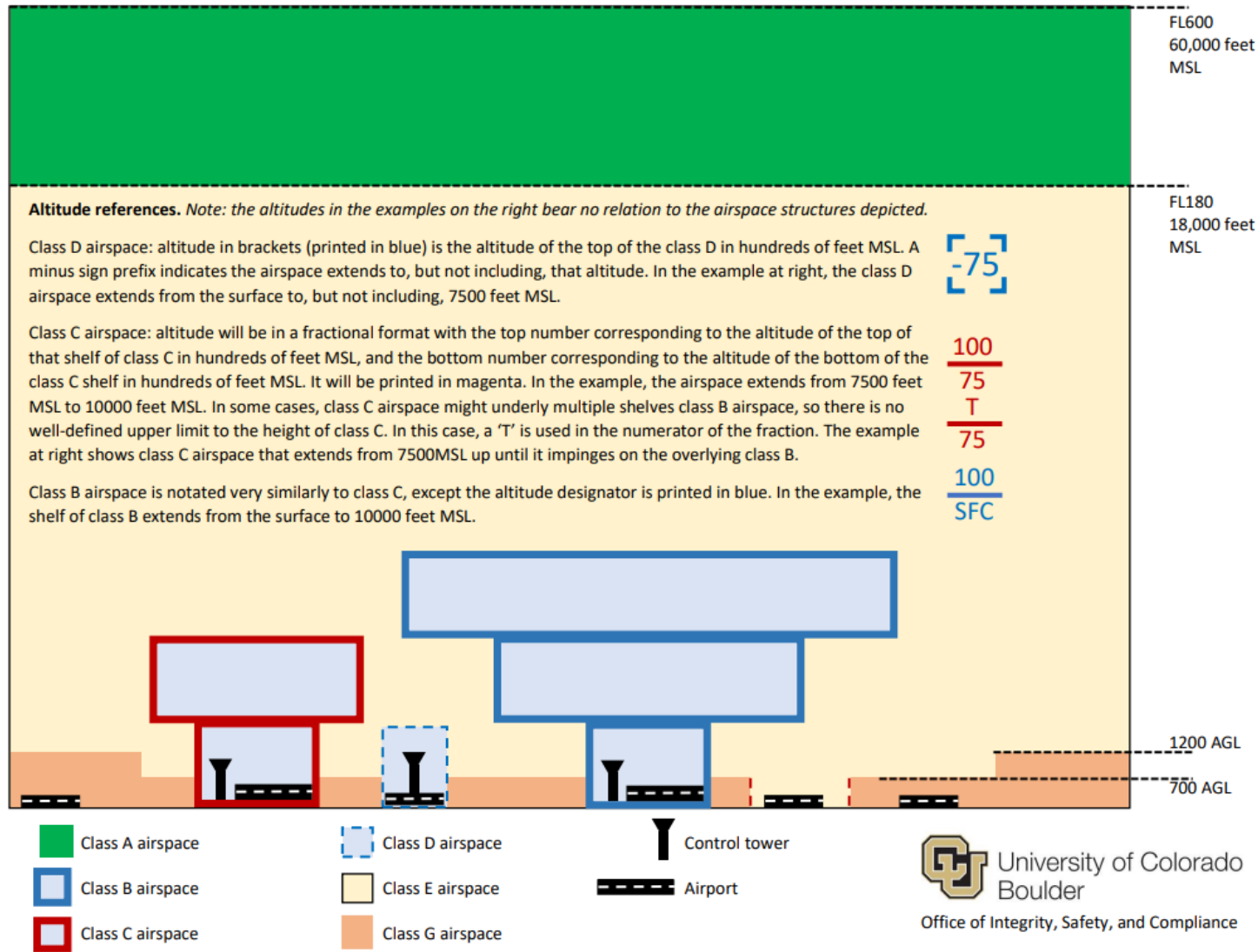
Intro to sectional charts- (*Specific Information*)

- ▶ Thinking of airspace
 - ▶ Airspace is depicted on sectional charts (topographic, informational, roadmaps)
 - ▶ Skyvector.com takes local sectional charts and stitches them together for the whole USA.
 - ▶ Airspace is depicted in 2D
 - ▶ It will be important to learn how to interoperate its 2D depiction into its 3D model
 - ▶ This is done with altitude labels or fractions somewhere in or around the airspace markings
 - ▶ The last step in understanding airspace is that it can vary with time
 - ▶ Airspace is depicted in its highest / most dominant form

Intro to sectional charts- (*Specific Information*)

- ▶ Teach a high level airspace introduction, use the following slides for back up if needed

Intro to sectional charts- (*Specific Information*)



Intro to sectional charts- (*Specific Information*)

Class B: Big Metropolitan Areas

Class B airspace is the first of the airspace class that sets aside airspace for a specific airport. Finding class B airspace on the sectional charts is very easy as it is designated by a thick solid blue line.



Figure 14 Denver International Airport inner class B airspace.



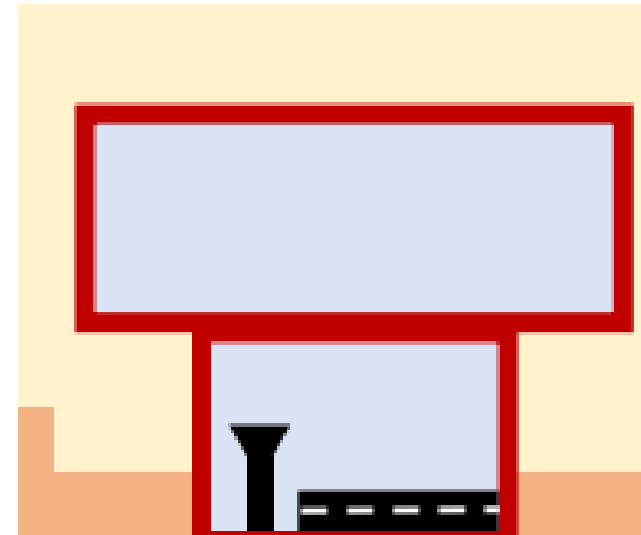
Intro to sectional charts- (*Specific Information*)

Class C: Cities of Notable Size

Class C airspace can be thought of as a smaller version of class B airspace. Like class B, class C is structured similarly to an inverted wedding cake but typically with only 2 shelves. Class C can be found on a sectional chart by looking for a solid magenta line. Class C airspace structures tend to be very similar in shape to each other, but are still custom-tailored to the region they exist in.



Figure 15 Colorado Springs Airport class C airspace.



Intro to sectional charts- (*Specific Information*)

Class D: Daylight Hours Airports

Class D airspace is found around airports that are towered, but with non-continuous tower operation. While the phrase 'Daylight Hours' doesn't entirely describe their typical operating hours, it represents the idea these airports are likely to have a tower which closes at some point. This class of airspace is represented by a thick blue dashed line.

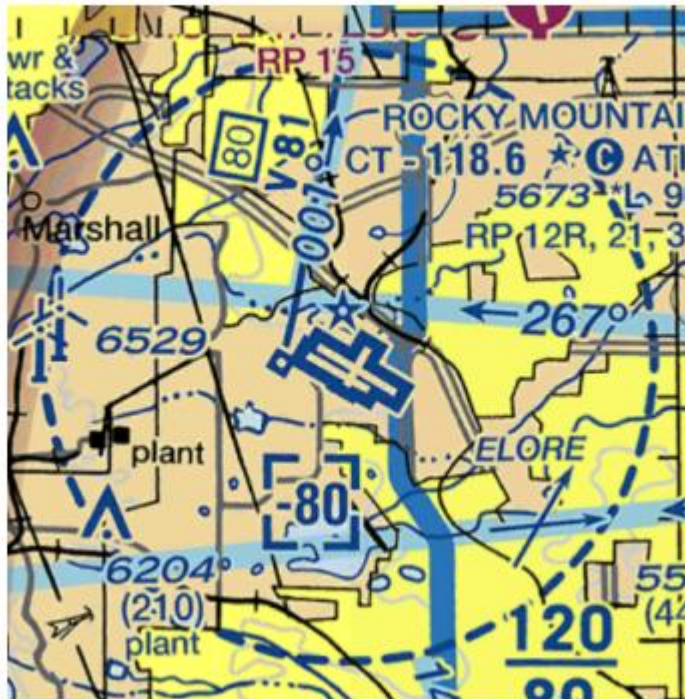
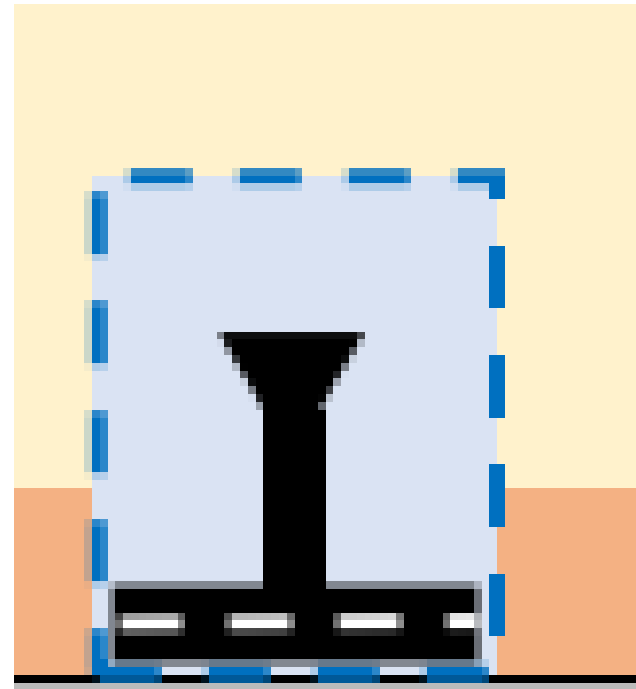


Figure 16 Rocky Mountain Metropolitan Airport class D airspace.



Intro to sectional charts- (*Specific Information*)

Class E: Everywhere Else

Class E airspace is the last airspace type to discuss. Note that there is no class F airspace. Class E is the airspace that best represents the blank area behind a drawing: it fills in around all of the airspace previously discussed. However, there are cases where class E drops all the way to the surface. This is designated by a dashed magenta line. Class E to the surface can exist in 2 ways: (1) as the highest airspace class set aside for an airport, or (2) as an extension/augmentation for an airport which is associated with higher classes of airspace. This guide considers an example of each.

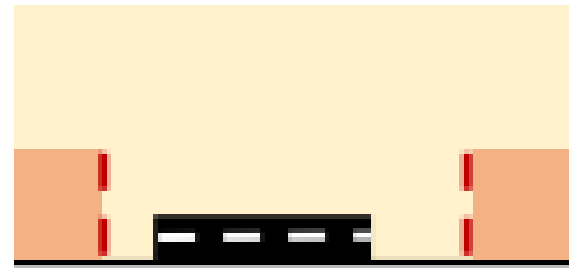


Figure 20 Northern Colorado Regional Airport class E airspace.

Intro to sectional charts- (*Specific Information*)

Class G: Ground Level

Covering G airspace first will make understanding E easier. Class G airspace is defined primarily by AGL altitudes. This airspace class exists typically from the surface to, but not including, 1200 feet AGL. However, there are plenty of circumstances where this is not the case:

- If another airspace class exists at the location/altitude in question instead.
- If the ceiling of class G airspace changes. This will be noted by a shaded magenta, shaded blue, or blue zipper line.

The shaded magenta line is the most common, so it will be covered first. The shaded magenta line will create a closed shape around an airport, set of airports, or metropolitan area containing many airports. On the faded side (inside) of the shaded magenta line, class G airspace extends from the surface to, but not including, 700 feet AGL. Note that the border exists at the hard edge. So in figure 17, at Larkspur, class G exists from the surface to, but not including, 1200 feet AGL. Near the "V81" designator, class G extends to, but not including, 700 feet AGL.

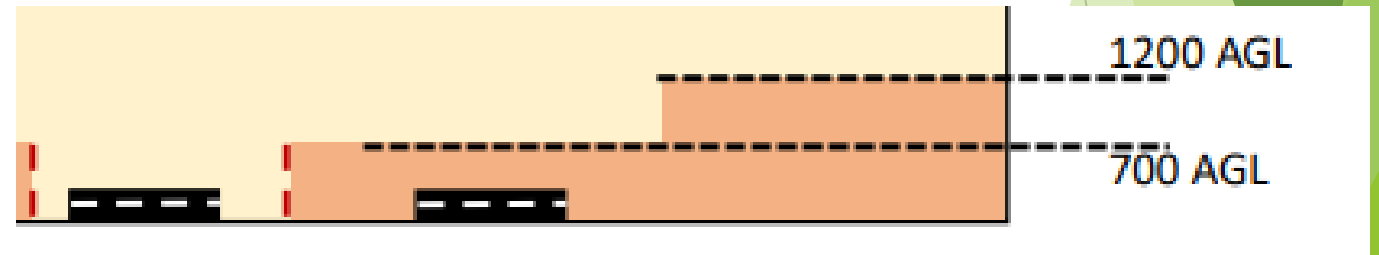
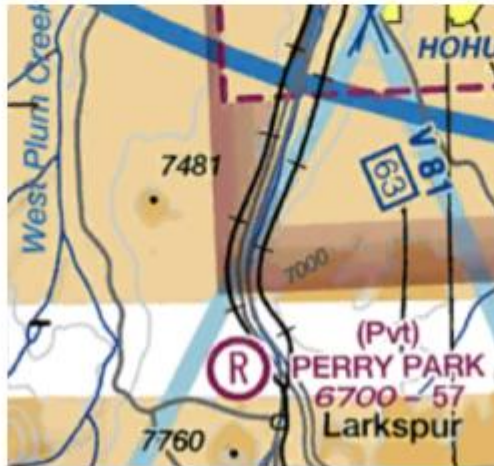
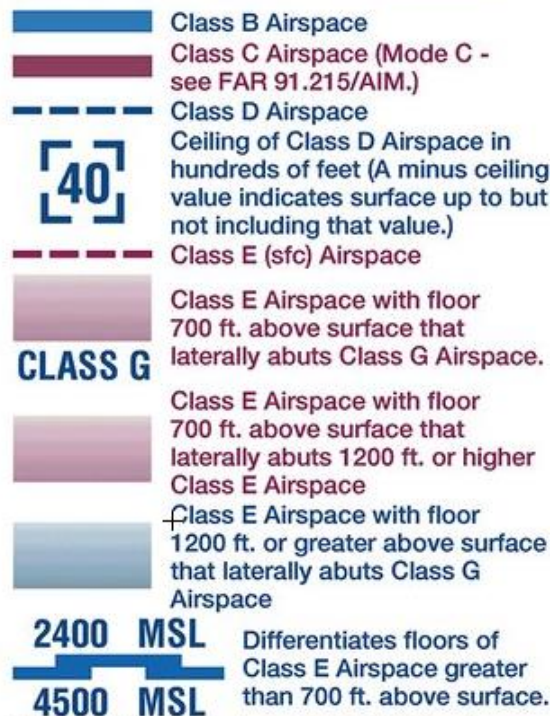


Figure 17 Shelf drop off of class E airspace near Castle Rock.

Intro to sectional charts- (*Specific Information*)

AIRPORT TRAFFIC SERVICE AND AIRSPACE INFORMATION

Only the controlled and reserved airspace effective below 18,000 ft. MSL are shown.



Class E Airspace exists at 1200' AGL unless otherwise designated as shown above.
Class E Airspace low altitude Federal Airways and RNAV 2 Routes are indicated by center line Intersection - Arrows are directed towards facilities which establish intersection.

Intro to sectional charts- (*Specific Information*)

Present 3D airspace tool if desired

Intro to sectional charts- *(Specific Information)*

- ▶ Airspace is 4 dimensional
 - ▶ The sectionals charts depicted 2D
 - ▶ The altitude fractions on the chart allow you to create 3D images
 - ▶ But airspace can change over time
- ▶ Sectional charts publish the most “controlling”/restrictive airspace but that does not mean that airspace always exists.
 - ▶ If the airspace around airports is class E, D, or C it has the possibility to revert (meaning change to another airspace)

Intro to sectional charts- (*Specific Information*)

- ▶ To find if an airspace around an airport reverts use the following FAA website:
 - ▶ https://www.faa.gov/air_traffic/flight_info/aeronav/Digital_Products/dafd/search/



Search By _____

Airport Identifier:
Example: KOKC or OKC

NAVAID Name:
Example: Texaco, Tex, etc.

Ident (ICAO)	City	Stat	Airpor	NavAid	Chart	Vol Back Pages	Airport/NavAid Listing
ARR (KARR)	CHICAGO/AURORA	IL	AURORA MUNI		CHICAGO	EC (PDF)	ec_46_07OCT2021 (PDF)

Intro to sectional charts- (*Specific Information*)

46

ILLINOIS

CHICAGO/AURORA

AURORA MUNI (ARR)(KARR) 38 W UTC-6(-5DT) N41°46.32' W88°28.54'

712 B NOTAM FILE ARR

RWY 09-27: H6501X100 (CONC-GRVD) S-30, D-130, 2S-165 HIRL

RWY 09: MALSR. PAPI(P4L)—GA 3.0° TCH 45'.

RWY 27: REIL. PAPI(P4L)—GA 3.0° TCH 45'.

RWY 15-33: H5503X100 (CONC-GRVD) D-130, 2S-165 HIRL

RWY 15: REIL. PAPI(P4L)—GA 3.0° TCH 34'. Tree.

RWY 33: MALSR. PAPI(P4L)—GA 3.0° TCH 48'. Tree.

RWY 18-36: H3198X75 (ASPH) S-30 MIRL

RWY 18: REIL. PAPI(P4L)—GA 3.0° TCH 30'. Pole.

RWY 36: REIL. VASI(V4L)—GA 3.0° TCH 34'. Tree.

SERVICE: S4 **FUEL** 100, JET A1 **OX** 1, 2, 3, 4 **LGT** ACTIVATE MALSR

Rwy 09, Rwy 33, REIL Rwy 18, 36, 15 and Rwy 27; twy lgt—CTAF.

When twr clsd HIRL Rwy 15-33 and Rwy 09-27 and MIRL Rwy 18-36 preset low ints: to increase ints and actvt—CTAF.

AIRPORT REMARKS: Attended 1200-0600Z†. Rwy 18-36 sfc several large cracks and vegetative growth. Seasonal crops in Part 77 surfaces Rwy 09-27 and 15-33.

AIRPORT MANAGER: (630) 256-3120

WEATHER DATA SOURCES: ASOS (630) 466-5622 LAWRS.

COMMUNICATIONS: CTAF 120.6 ATIS 125.85 UNICOM 122.95 123.5

JOLIET RCO 122.1R 112.3T (KANKAKEE RADIO)

JOLIET RCO 122.5 (KANKAKEE RADIO)

® **CHICAGO APP/DEP CON** 133.5

TOWER 120.6 (1300-0300Z†) **GND CON** 121.7 **CLNC DEL** 121.7 (When twr clsd)

AIRSPACE: CLASS D svc 1300-0300Z†; other times CLASS G.

RADIO AIDS TO NAVIGATION: NOTAM FILE DPA.

DUPAGE (L) VOR/DME 108.4 DPA Chan 21 N41°53.42' W88°21.01' 216° 9.1 NM to fld. 802/2E.

VOR unusable:

290°-310° byd 35 NM

DME unusable:

290°-340° byd 35 NM

JOLIET (H) VOR/DME 112.3 JOT Chan 70 N41°32.79' W88°19.10' 330° 15.3 NM to fld. 591/2E. NOTAM

FILE JOT.

VOR unusable:

030°-040° byd 25 NM

ILS 108.9 I-ARR Rwy 09.

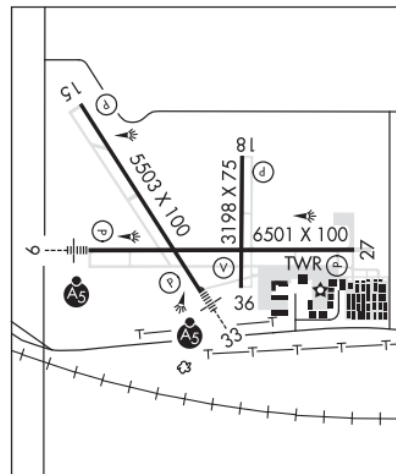
LOC/DME 111.15 I-ROF Chan 48(Y) Rwy 33.

COMM/NAV/WEATHER REMARKS: Emerg frequency 121.5 not avbl at twr.

CHICAGO

H-5E, L-28H, A

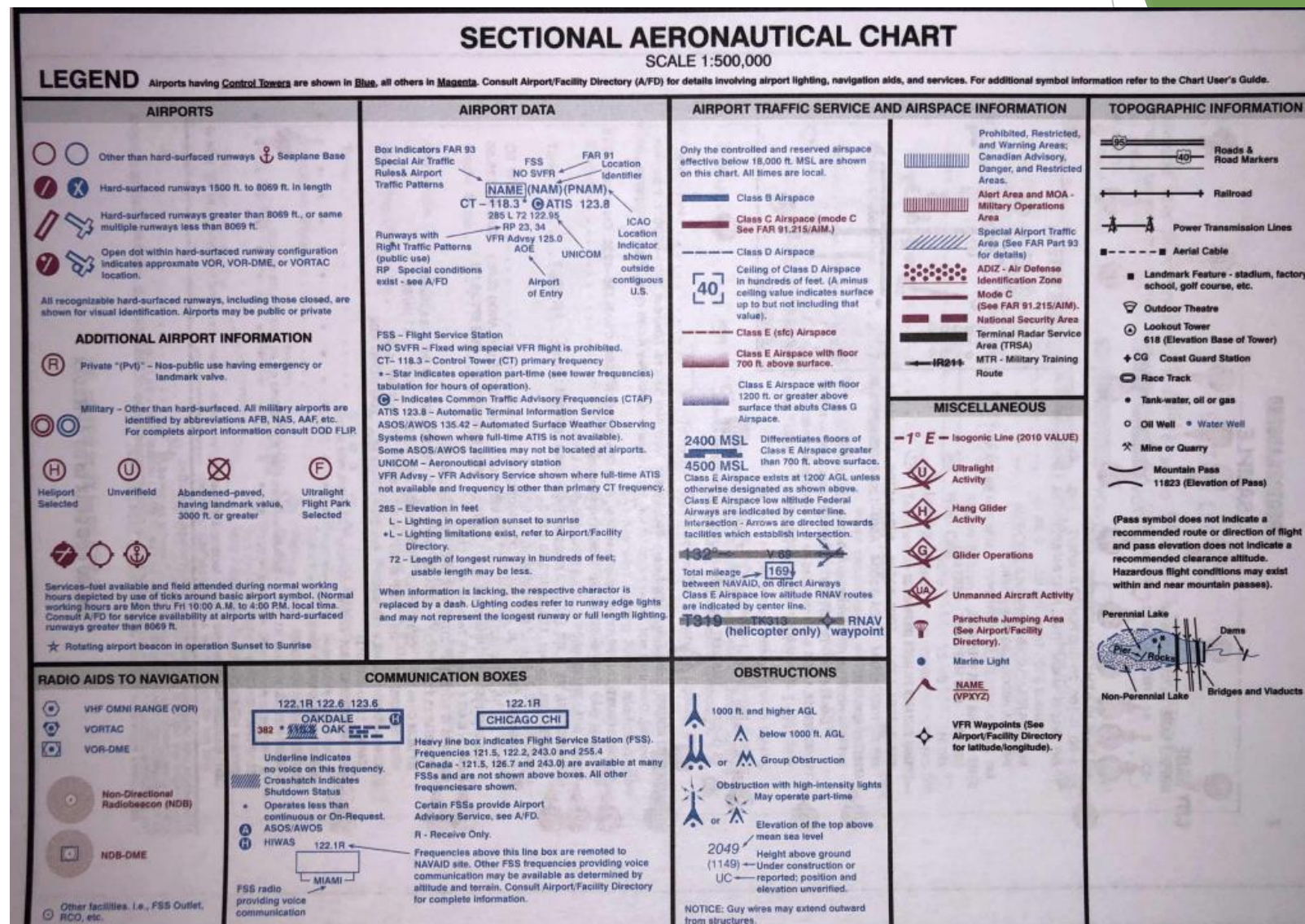
IAP, AD



Intro to sectional charts- (Specific Information)

► Symbols

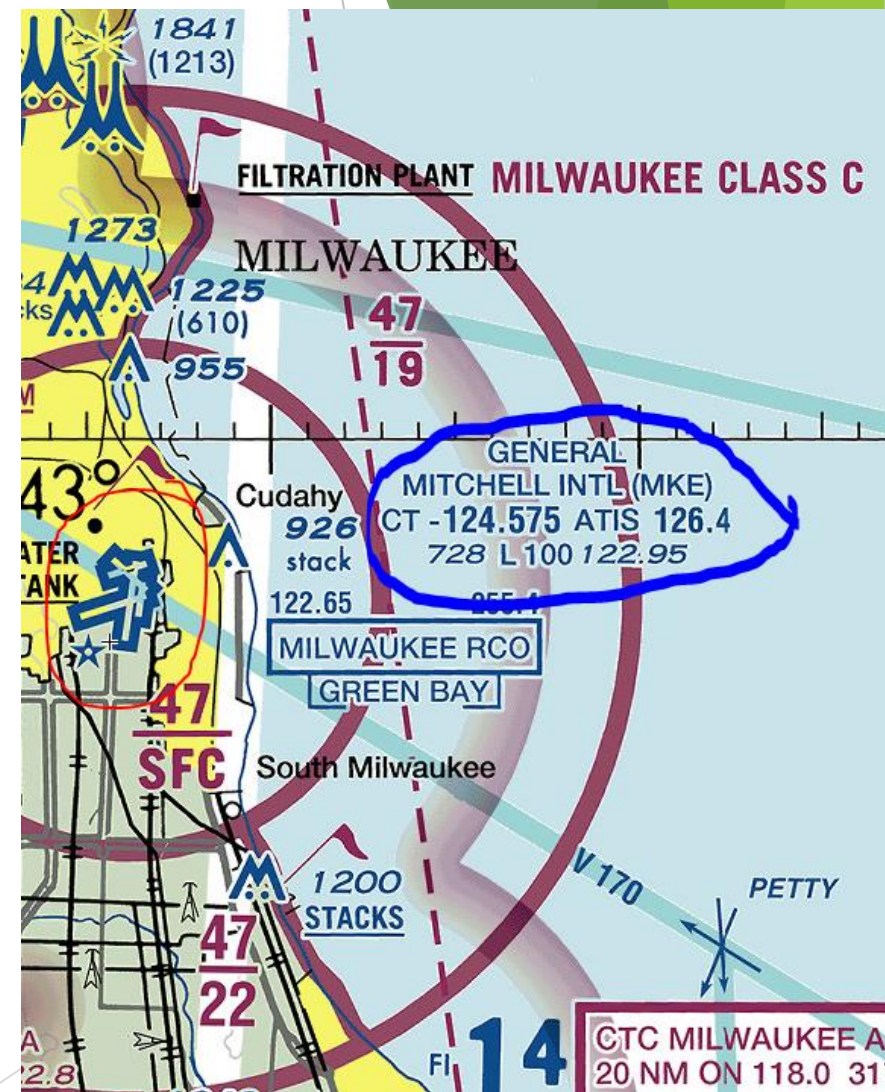
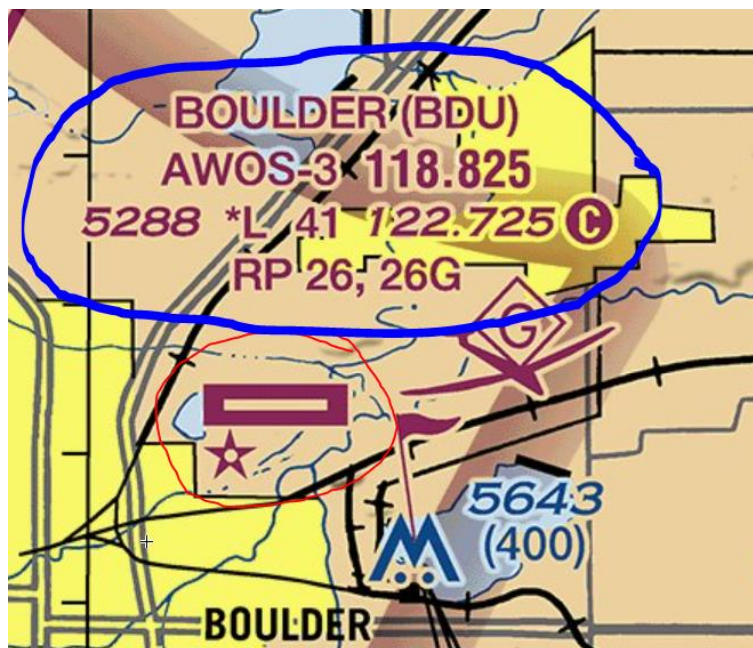
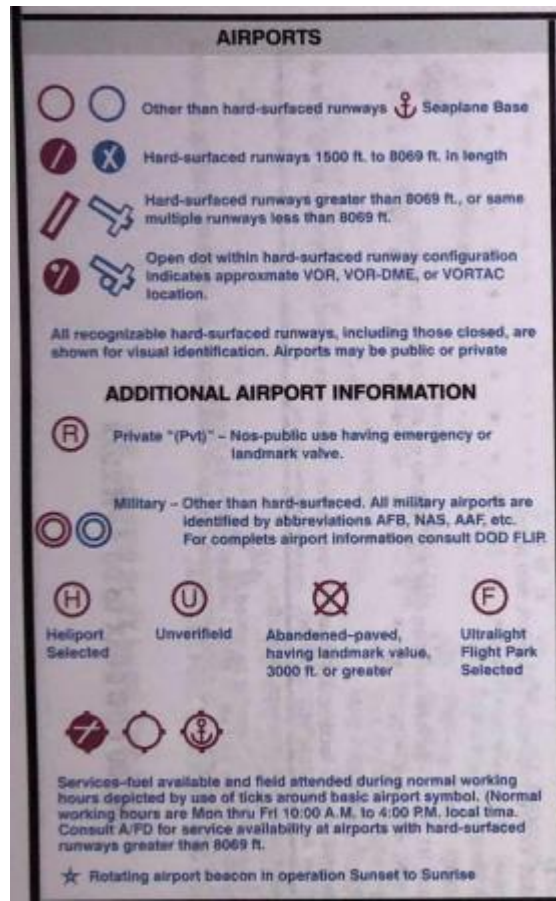
► Legend Guide



Intro to sectional charts- (*Specific Information*)

► Airport symbology

Airports having Control Towers are shown in Blue, all others in Magenta.



Intro to sectional charts- (*Specific Information*)

AIRPORT DATA

Box Indicators FAR 93
Special Air Traffic Rules & Airport Traffic Patterns

FSS NO SVFR FAR 91 Location Identifier

NAME (NAM) (PNAM)
CT-118.3 * ATIS 123.8
285 L 72 122.95
RP 23, 34
VFR Advy 125.0 AOE UNICOM

Runways with Right Traffic Patterns (public use)
RP Special conditions exist - see A/FD

ICAO Location Indicator shown outside contiguous U.S.

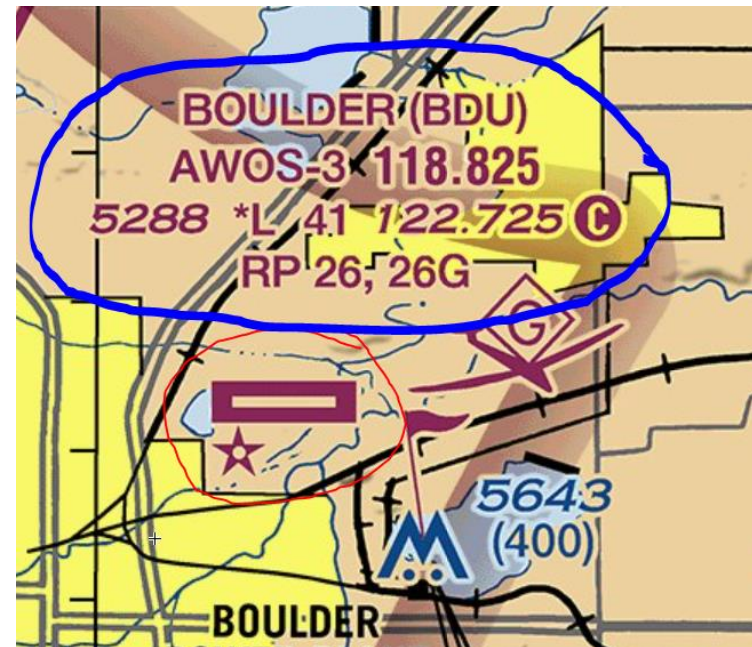
Airport of Entry

FSS - Flight Service Station
NO SVFR - Fixed wing special VFR flight is prohibited.
CT- 118.3 - Control Tower (CT) primary frequency
* - Star indicates operation part-time (see tower frequencies tabulation for hours of operation).
Ⓢ - Indicates Common Traffic Advisory Frequencies (CTAF)
ATIS 123.8 - Automatic Terminal Information Service
ASOS/AWOS 135.42 - Automated Surface Weather Observing Systems (shown where full-time ATIS is not available).
Some ASOS/AWOS facilities may not be located at airports.
UNICOM - Aeronautical advisory station
VFR Advy - VFR Advisory Service shown where full-time ATIS not available and frequency is other than primary CT frequency.

285 - Elevation in feet
L - Lighting in operation sunset to sunrise
*L - Lighting limitations exist, refer to Airport/Facility Directory.
72 - Length of longest runway in hundreds of feet; usable length may be less.

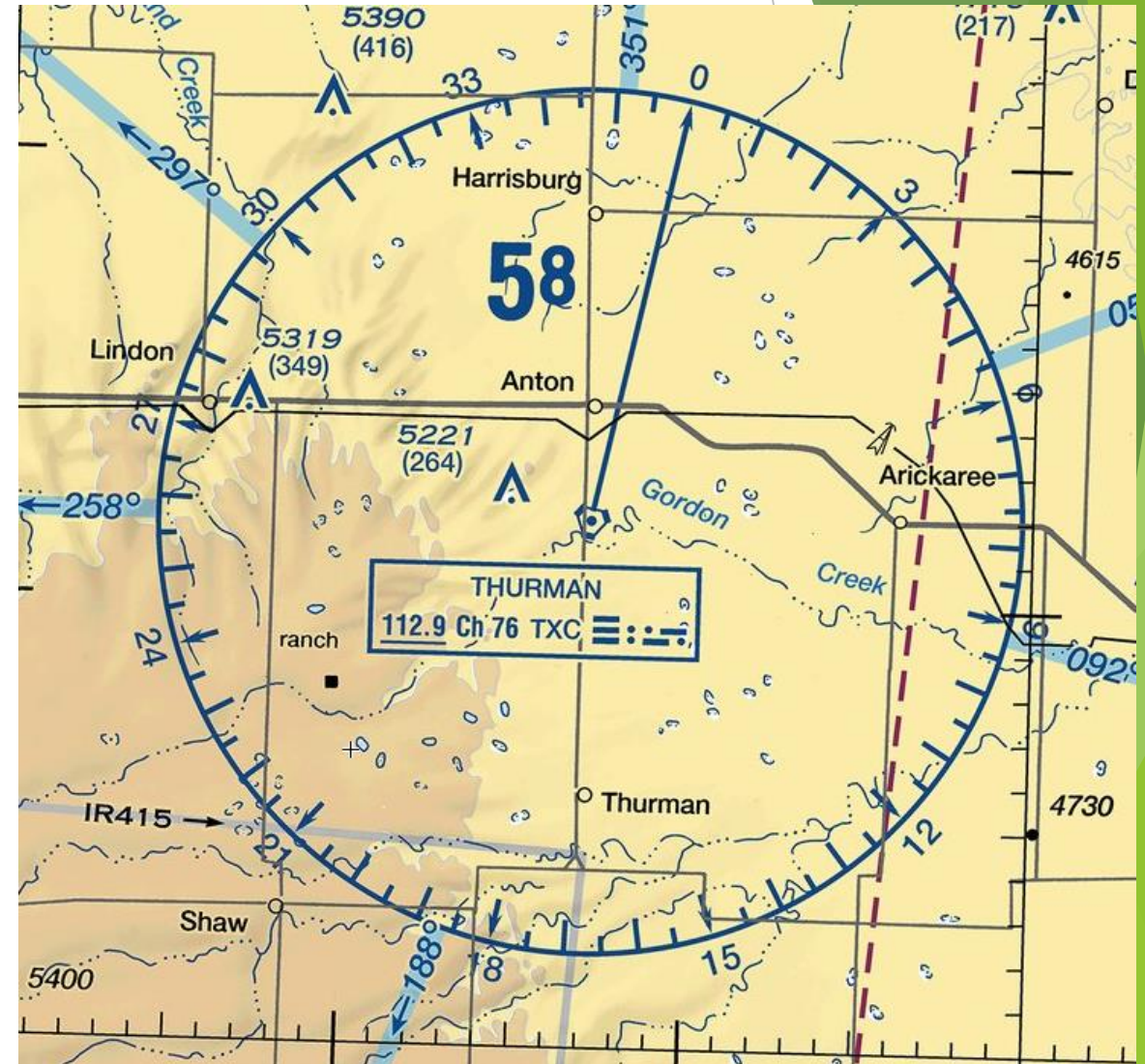
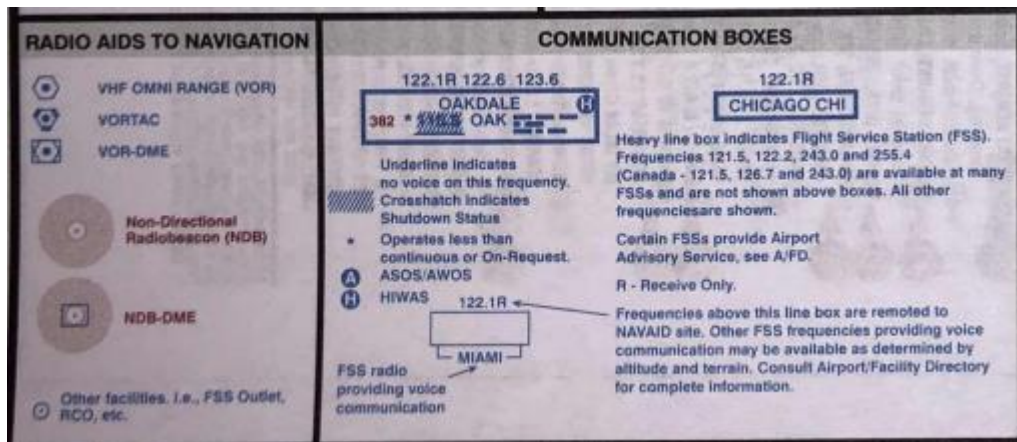
When information is lacking, the respective character is replaced by a dash. Lighting codes refer to runway edge lights and may not represent the longest runway or full length lighting.

► Airport Data

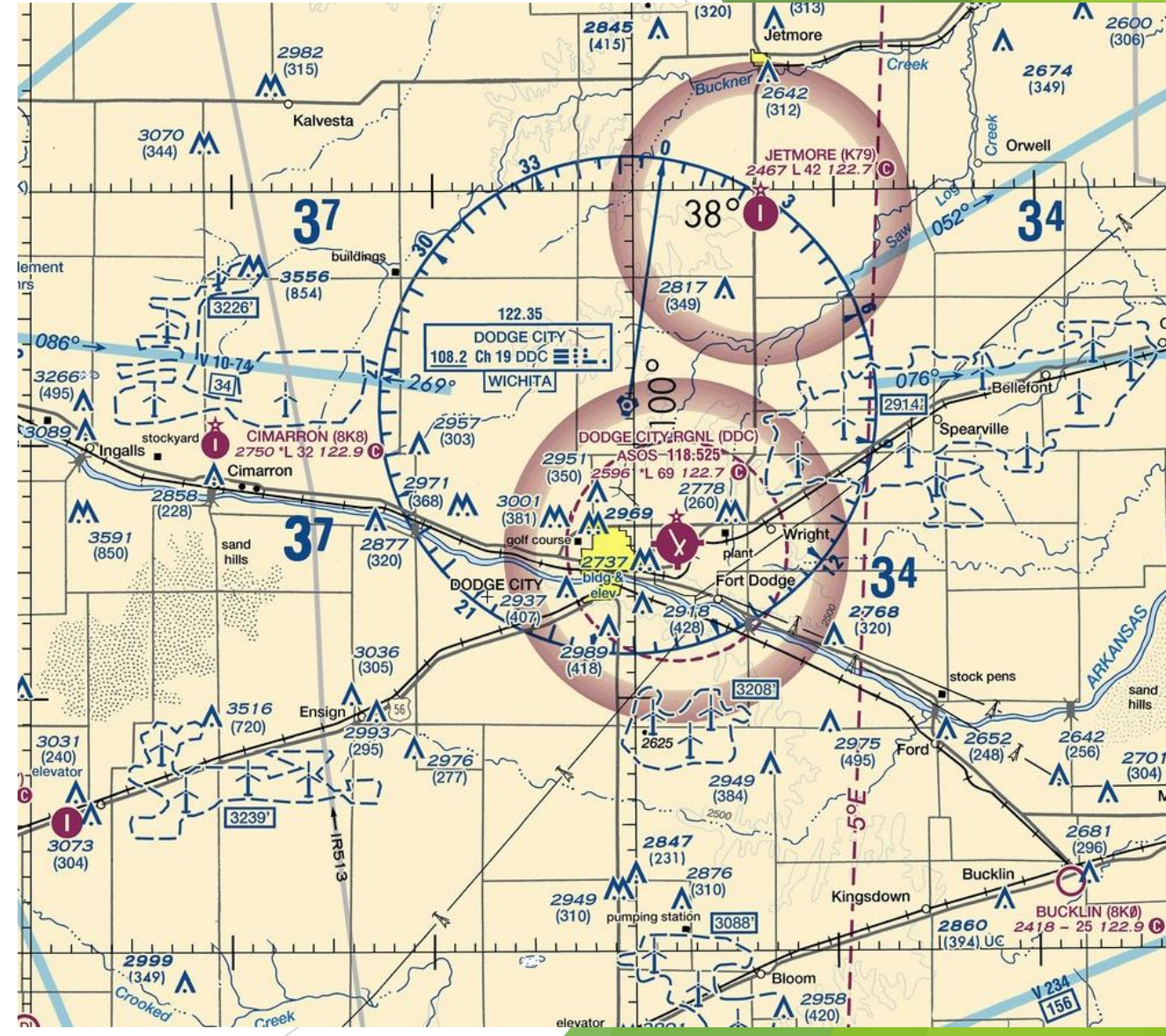
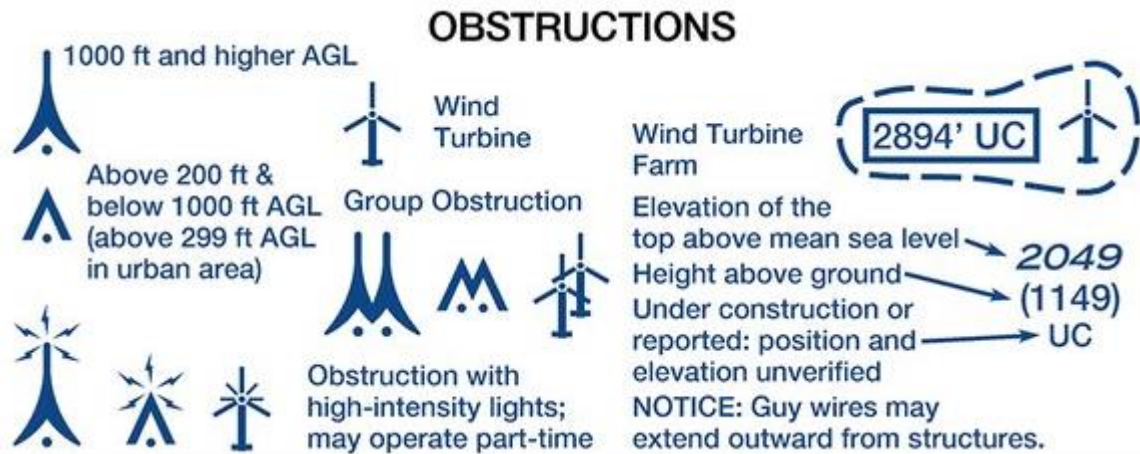


Intro to sectional charts- (*Specific Information*)

- NavAids depictions and information boxes















Intro to sectional charts- *(Specific Information)*


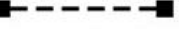




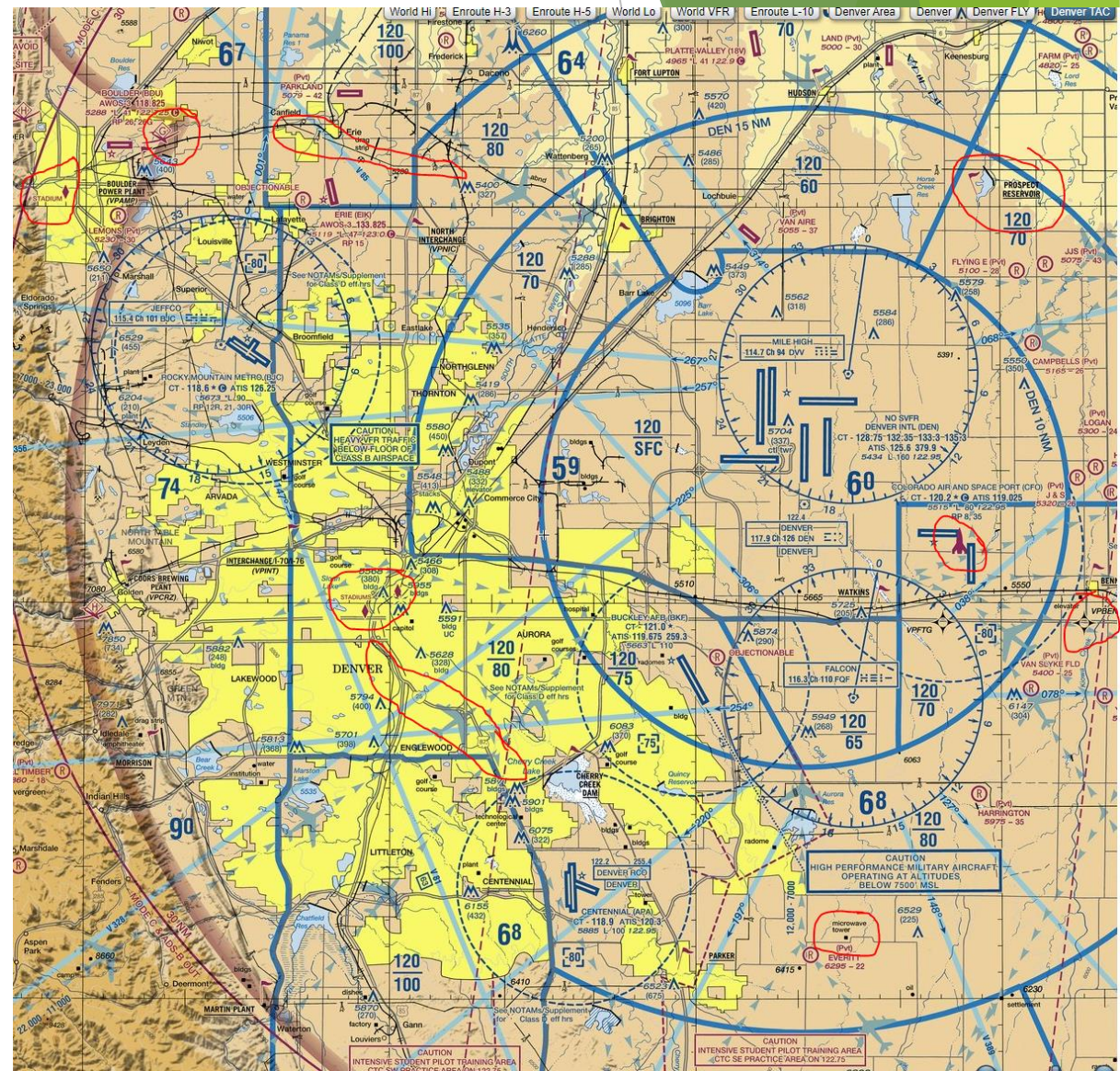
Intro to sectional charts- (*Specific Information*)

MISCELLANEOUS

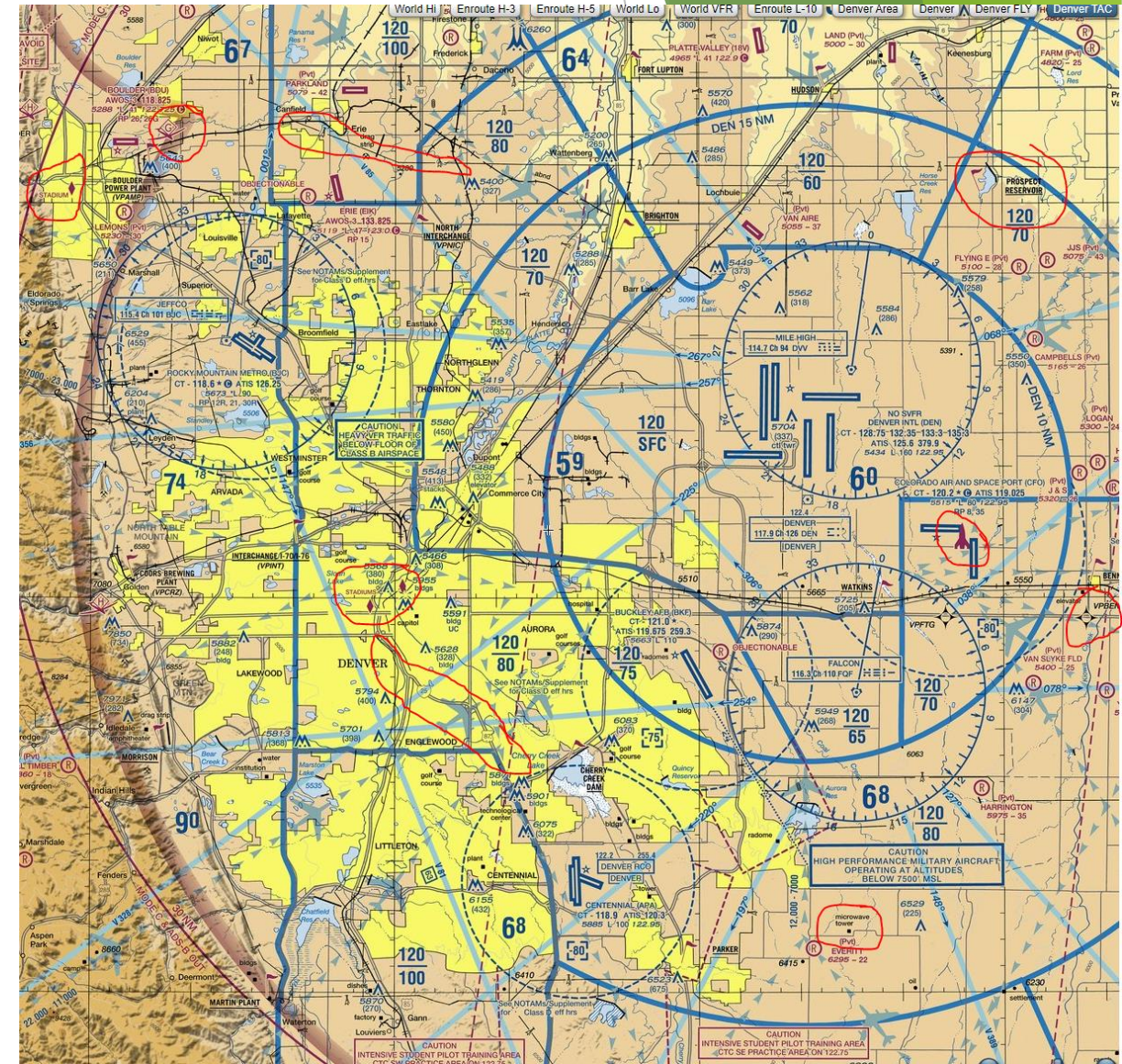
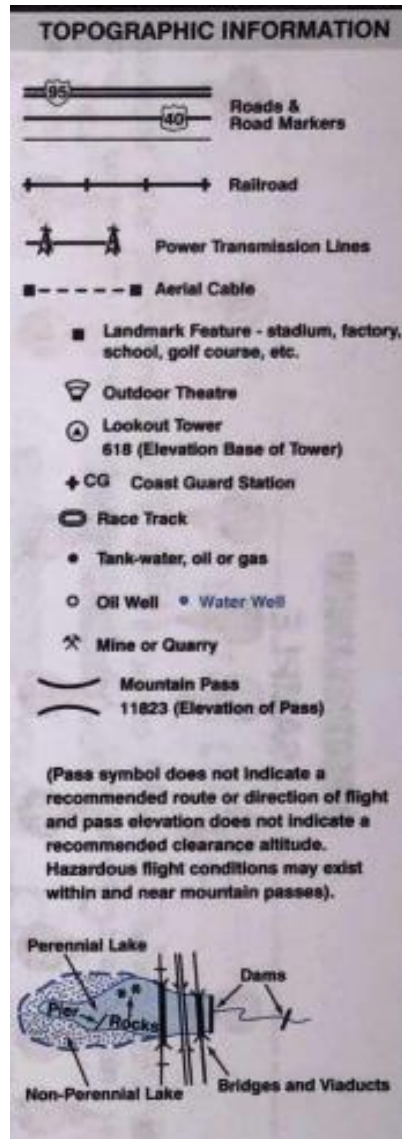
-  **A** - Aerobic Practice Area (See Supplement.)
-  **G** - Glider Operations
-  **H** - Hang Glider Activity
-  **U** - Ultralight Activity
-  **UA** - Unmanned Aircraft Activity
-  Parachute Jumping Area (See Supplement.)
-  **STADIUM**
Intermittent TFR site (within 3 NM, up to & incl 3000' AGL)
-  Space Launch Activity Area
-  **Marine Light**
-  **VPXYZ**
VFR Waypoints
-  **-1°E-** Isogonic Line (2020 VALUE)
-  **NAME**
(VPXYZ)

TOPOGRAPHIC INFORMATION

-  Power Transmission Line
-  Aerial Cable
-  Lookout Tower
618 (Elevation Base of Tower)
-  Mountain Pass
11823 (Elevation of Pass)
Pass symbol does not indicate a recommended route or direction of flight and pass elevation does not indicate a recommended clearance altitude. Hazardous flight conditions may exist within and near mountain passes.



Intro to sectional charts- (*Specific Information*)



Intro to sectional charts- (*Specific Information*)

Military Training Routes

In addition to SUA, MTRs (Military Training Routes) are a significant concern to UAS operations. MTRs can be particularly dangerous because aircraft can be traveling very close to Mach 1 at very low altitudes. The centerlines are always depicted in gray on the VFR sectional charts and in brown by number on the IFR Low Enroute charts.



Figure 37 Example of MTRs on VFR Sectional.

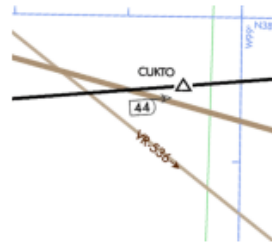


Figure 38 Example of MTRs on IFR Low Chart.

Note that MTRs are much easier to spot on an IFR chart than on a VFR chart. When looking for MTRs, it is always worth looking at IFR charts to double-check that no MTRs exist. Keep in mind that the line on the sectional does not directly correlate to where the aircraft will be. Instead you should understand that any aircraft traveling on the MTR could be as far as 8 nautical miles away from centerline (FAA Sectional Chart User's Guide). Military routes flown at or below 1500 AGL are identified with a 4-digit suffix; 3 or fewer digits indicate that the route exists at 1500 AGL and above.

2.5.9 Operation near military training routes

No person may operate a UAS within 8 nautical miles of the centerline, or closer than 100' above or below the vertical limits of a published VR or IR military training route without coordinating with the DO for approval. The DO may designate, in writing, a representative to handle MTR coordination and approval in situations where it is deemed appropriate.

Unsuccessful attempts to contact an MTR operator must be taken to mean the route is active.



Intro to sectional charts- *(Specific Information)*

- ▶ Special Use Airspace
 - ▶ This airspace is created for unusual type of flying activity
 - ▶ Regulatory vs Non-Regulatory
 - ▶ Regulatory: Prohibited and Restricted
 - ▶ Cannot fly there unless permission is given from the controlling agency
 - ▶ Non-Regulatory: MOA, Alert Area, Warning Area, CFAs
 - ▶ Legal to fly there but exercise extreme caution when active
 - ▶ Special use airspace is time dependent. All SUA will be depicted but may not be active
 - ▶ Active times can be found on the sides of sectional charts
 - ▶ To find the “side of sectional chart” you need to go to a local view in skyvector

Intro to sectional charts- (*Specific Information*)

► Regulatory SUA

Regulatory Special Use Airspace

This includes restricted, prohibited, and warning areas, of which many exist throughout the US. They exist due to national security concerns or due to the presence of an activity which poses an invisible hazard to flight. They are found over locations such as Washington, DC and Camp David. Restricted and prohibited areas will always be in blue with a comb like pattern around the area that the restriction is in effect over. Likewise, you will see a denotation of the prohibited area with a label, such as P-56 in the Washington DC area.



Figure 32 Area over Washington DC where the prohibited area exists.

P in this case stands for prohibited. Restricted areas are labeled with an R, and warning areas with a W. In any case, there will be a numerical identifier associated with the letter.



Figure 33 Bloodsworth Island restricted area.

Intro to sectional charts- (*Specific Information*)

► Non-Regulatory SUA

Non-Regulatory Special Use Airspace

Non-regulatory SUA includes MOAs (Military Operation Areas) and Alert Areas. These are represented by a combed magenta line around the area in question.

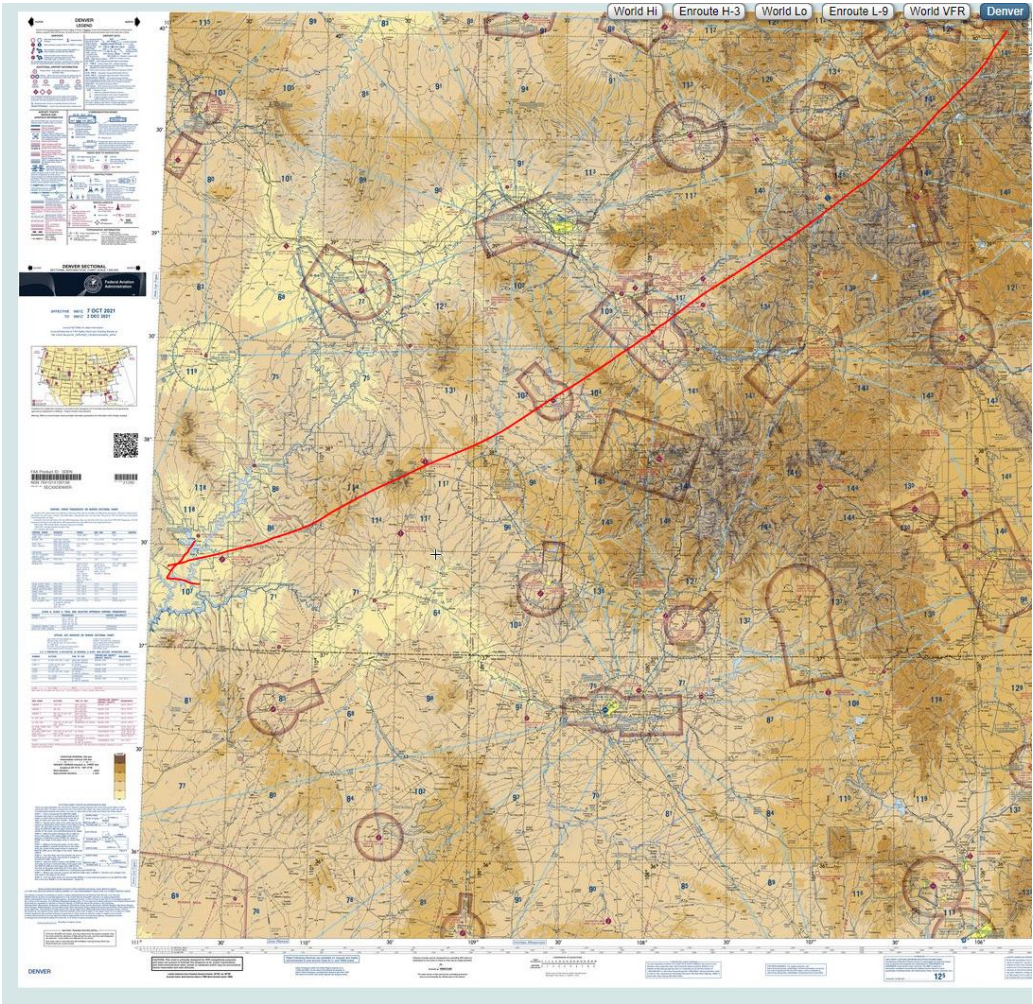


Figure 34 Vance 1D MOA.

MOAs and alert areas are not places where flight is prohibited in any sense, but within these areas, the military will be conducting more risky operations. This could include aerial intercepts, aerobatic maneuvers with high performance

Intro to sectional charts- (Specific Information)

► Checking active times



CONTROL TOWER FREQUENCIES ON DENVER SECTIONAL CHART

Airports with control towers are indicated on the face of the chart by the letters CT followed by the primary VHF tower frequency(ies). Information for each tower is listed in the table below. Operational hours are local time. The primary VHF and UHF tower and ground control frequencies are listed.

Automatic Terminal Information Service (ATIS) frequencies shown on the face of the chart are arrival VHF/UHF frequencies. All ATIS frequencies are listed in the table below. ATIS operational hours may differ from tower operational hours.

ASR and/or PAR indicate Radar Instrument Approach available.

*MON-FRI indicates Monday through Friday.

O/T indicates other times.

CONTROL TOWER	OPERATES	TOWER	GND CON	ATIS	ASR/PAR
ASPEN-PITKIN COUNTY/ SASEY FID	0700-2000	118.85 288.3	121.9	120.4	
BUCKLEY AFB	0630-2330 TUE-SAT 0800-1600 SUN-MON 0600-2300 TUE-FRI 0500-2300 THU-MON CLOS THUNDERSTORM, CHRISTMAS & NEW YEAR	121.0 291.675 125.5 229.4 239.3	121.6 275.8	119.675 239.3	
BUTTS AAF (FORT CARSON)			118.55 253.6	108.8	
CENTENNIAL	CONTINUOUS	118.9	121.8	120.3	
CITY OF COLORADO SPRINGS MUNI	CONTINUOUS	118.9 360.6	121.7 348.6	125.0 254.3	
COLORADO AIR AND SPACE PORT	0700-2100	120.2	124.7	119.025	
DENVER INTL	CONTINUOUS	128.75 273.55 (RWY 07/25) 122.35 239.375 (RWYS 06/26 & 12/23R) 133.3 222.45 (RWY 17R/35L) 135.3 351.95 (RWYS 16L/34R & 16R/34L)	121.85 377.1 (RWYS 08/26, 17L/35R & 17R/35L) 127.5 375.175 (RWYS 07/25, 16L/34R & 16R/34L)	125.6 379.9 (ARR) 134.025 (DEP)	
EAGLE COUNTY RGNL	0700-1900	119.8	121.8	135.575	
FOUR CORNERS RGNL	0600-2200	118.9 257.8	121.7	127.15	
GRAND JUNCTION RGNL	0600-2200	118.1 257.8	121.7 257.8	118.55	
PUEBLO MEAL	0600-2200	119.1 257.8	121.9	125.25	
ROCKY MOUNTAIN METRO	0600-2200	118.6 233.7	121.7	126.25	
SANTA FE MUNI	0700-2100	119.5 239.3	121.7	128.55	
USAF ACADEMY AFD	0545-1800 (WHICHEVER IS LATER) MON-FRI 0700-1400 SAT CLOS HCL	124.15 319.25	118.125	128.525 269.375	

CLASS B, CLASS C, TRSA, AND SELECTED APPROACH CONTROL FREQUENCIES

FACILITY	FREQUENCIES	SERVICE AVAILABILITY
DENVER CLASS B	124.1 360.75 (W) 128.25 371.95 (E) 128.45 251.075 (S) 134.85 251.125 (N)	CONTINUOUS
COLORADO SPRINGS CLASS C	124.0 257.875	CONTINUOUS
BUTTS AAF (FORT CARSON)	124.0 257.875	CONTINUOUS

SPECIAL USE AIRSPACE ON DENVER SECTIONAL CHART

Unless otherwise noted altitudes are MSL and in feet. Time is local.

† Other times by NOTAM.

NOTAM - Use of this term in Restricted Areas indicates FAA and DoD NOTAM systems. Use of this term in all other Special Use areas indicates the DoD NOTAM system.

NO A/G - No air to ground communications.

Control Flight Service for information.

U.S. P-PROHIBITED, R-RESTRICTED, W-WARNING, A-ALERT, MOA-MILITARY OPERATIONS AREA

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
R-2601 A	TO BUT NOT INCL 12,500	0500-2400 MON-FRI 1 hr IN ADVANCE	DENVER CNTR	128.375 379.95
R-2601 B	12,500 TO BUT NOT INCL 12,550	BY NOTAM 1 hr IN ADVANCE	DENVER CNTR	128.375 379.95
R-2602	TO 1000 AGL	CONTINUOUS	DENVER CNTR	
R-2603	TO BUT NOT INCL 10,000	BY NOTAM 24 HRS IN ADVANCE	DENVER CNTR	
R-5101	TO 12,000	CONTINUOUS	NO A/G	
R-6413	UNLIMITED	BY NOTAM	DENVER CNTR	134.5 327.8

A-360 TO 17,500 58-55 NO A/G

Alert Areas do not extend into Class A, B, C and D airspace, or Class E airport surface areas.

MOA NAME ALTITUDE* TIME OF USE† CONTROLLING AGENCY/ CONTACT FACILITY FREQUENCIES

ABRUJEST X	1500 AGL	58-55 TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
ABRUJEST Y	500 AGL	58-55 TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
ABRUJEST Z	500 AGL TO BUT NOT INCL 5500	58-55 TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
LA VETA HIGH	13,000	0700-1600 MON-FRI EXC HCL	DENVER CNTR	128.375 379.95
LA VETA LOW	1500 AGL TO BUT NOT INCL 13,000	INTERMITTENT BY NOTAM	DENVER CNTR	128.375 379.95
MT DORA NORTH HIGH, WEST HIGH	11,000	BY NOTAM	ALBUQUERQUE CNTR	127.85 285.47 (E) 132.8 346.35 (W)
MT DORA NORTH LOW, WEST LOW	1500 AGL TO BUT NOT INCL 11,000	BY NOTAM	ALBUQUERQUE CNTR	127.85 285.47 (E) 132.8 346.35 (W)
PIKOR CANYON	100 AGL TO 10,000	0700-2200 INTERMITTENT BY NOTAM	DENVER CNTR	128.375 379.95
SUNNY	12,000	BY NOTAM 24 HRS IN ADVANCE	ALBUQUERQUE CNTR	124.5 306.2

*Altitudes indicate floor of MOA. All MOAs extend to but do not include FL 180 unless otherwise indicated in tabulation or on chart.

†Other times by DoD NOTAM.

Intro to sectional charts- (Specific Information)

► Time of use: Active by NOTAM

U.S. P-PROHIBITED, R-RESTRICTED, W-WARNING, A-ALERT, MOA-MILITARY OPERATIONS AREA

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
R-2601 A	TO BUT NOT INCL 12,500	0500-2400 MON-FRI †1 HR IN ADVANCE	DENVER CNTR	128.375 379.95
R-2601 B	12,500 TO BUT NOT INCL 22,500	BY NOTAM 1 HR IN ADVANCE	DENVER CNTR	128.375 379.95
R-2602	TO 1000 AGL	CONTINUOUS	DENVER CNTR	
R-2603	TO BUT NOT INCL 10,000	BY NOTAM 24 HRS IN ADVANCE	DENVER CNTR	
R-5101	TO 12,000	CONTINUOUS	NO A/G	
R-6413	UNLIMITED	BY NOTAM 48 HRS IN ADVANCE	DENVER CNTR	134.5 327.8

A-260 TO 17,500 SR-SS NO A/G

Alert Areas do not extend into Class A, B, C and D airspace, nor Class E airport surface areas.

MOA NAME	ALTITUDE*	TIME OF USE†	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
AIRBURST X	1500 AGL	SR-SS TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
AIRBURST Y	500 AGL	SR-SS TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
AIRBURST Z	500 AGL TO BUT NOT INCL 8500	SR-SS TUE-SAT EXC 2200-0700	DENVER CNTR	128.37 379.95
LA VETA HIGH	13,000	0700-1600 MON-FRI EXC HOL	DENVER CNTR	128.375 379.95
LA VETA LOW	1500 AGL TO BUT NOT INCL 13,000	INTERMITTENT BY NOTAM	DENVER CNTR	128.375 379.95
MT DORA NORTH HIGH, WEST HIGH	11,000	BY NOTAM	ALBUQUERQUE CNTR	127.85 285.47 (E) 132.8 346.35 (W)
MT DORA NORTH LOW, WEST LOW	1500 AGL TO BUT NOT INCL 11,000	BY NOTAM	ALBUQUERQUE CNTR	127.85 285.47 (E) 132.8 346.35 (W)
PINON CANYON	100 AGL TO 10,000	0700-2200 INTERMITTENT BY NOTAM	DENVER CNTR	128.375 379.95
SUNNY	12,000	BY NOTAM 24 HRS IN ADVANCE	ALBUQUERQUE CNTR	124.5 306.2

*Altitudes indicate floor of MOA. All MOAs extend to but do not include FL 180 unless otherwise indicated in tabulation or on chart.

†Other times by DoD NOTAM.

Welcome to the SUA Website.

Text List Graphic Map

Map as of: Oct 29, 2021 15:10 (Z)

Map Layers

- ☒ All SAA
- ☒ Air Traffic Control Assigned Airspaces
- ☒ Alert Areas
- ☒ Military Operations Areas
- ☒ National Security Areas
- ☒ Other
- ☒ Prohibited Areas
- ☒ Restricted Areas
- ☒ Warning Areas

Airspace Types (use checkboxes to show or hide Airspace Types)

- ☒ All MTR / AR
- ☒ Aerial Refueling Routes/Anchors
- ☒ IFR Military Training Routes
- ☒ Slow Speed Low Altitude Training Routes
- ☒ VFR Military Training Routes

Map Layer Types (use checkboxes to show or hide Map Layer Types. * Layer visible at or above listed zoom level)

- ☒ Waypoints (3) *
- ☒ Cities (5) *
- ☒ Airports (4) *

Altitude Types (use checkboxes to show or hide Altitude Types)

- ☒ Surface - 10,000 msl
- ☒ 10,000 msl - 17,999 msl
- ☒ FL 180 - < FL 290

Activation Types (use checkboxes to show or hide Activation Types)

- ☒ 2h - 4h
- ☒ 4h - 8h
- ☒ > 8h
- ☐ Not Scheduled

Update Map

Interacting Schedules - Personal - Microsoft Edge

https://sua.faa.gov/sua/lkSched.jsp?asname=AIRBURST%20X%20MOA

SCHEDULES THAT INTERACT WITH AIRSPACE AIRBURST X MOA

Number of Records: 6

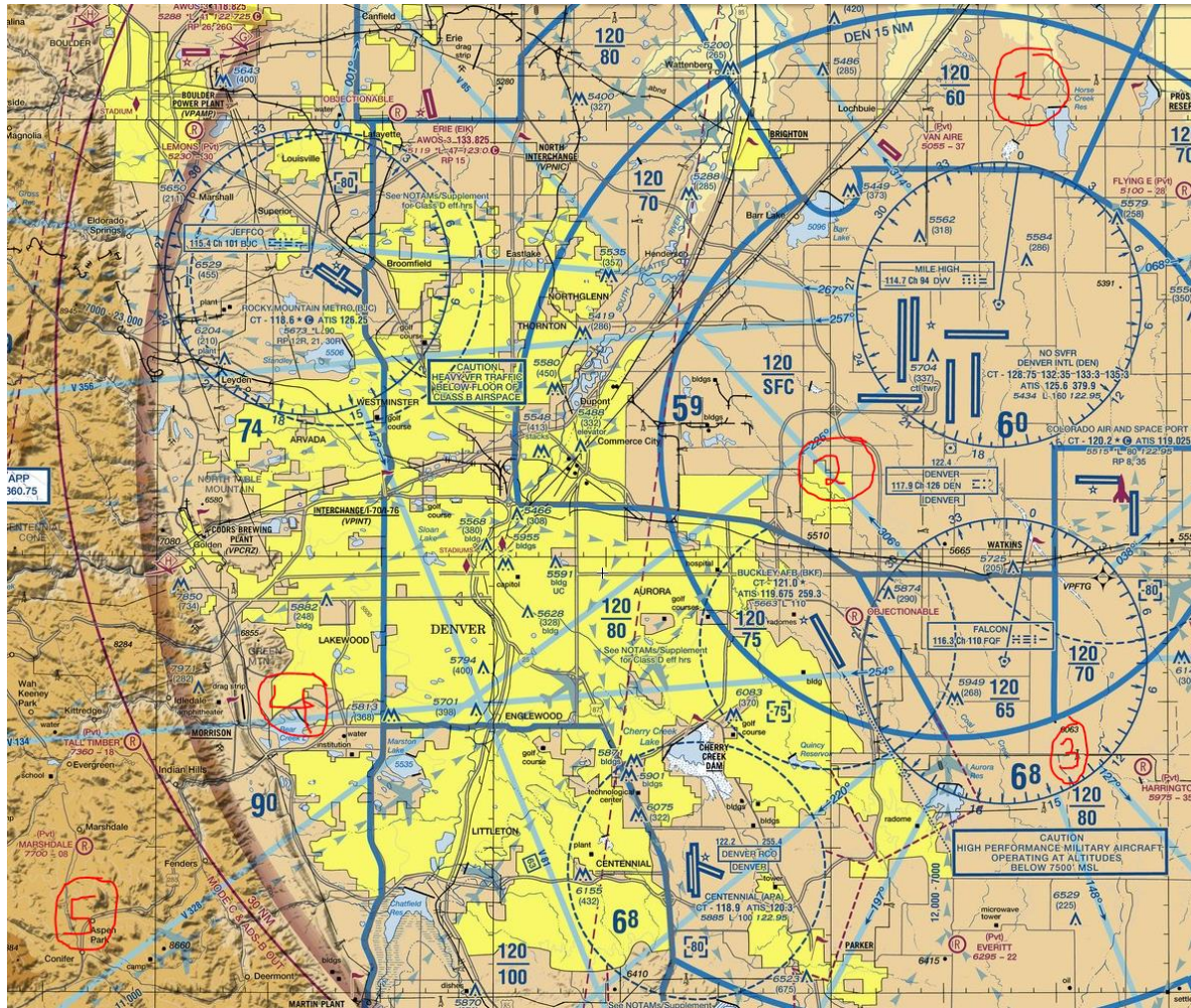
Type	SAA / NOTAM ID	Start Time	End Time	Center ID	State	Min Alt (100s ft)	Max Alt (100s ft)	Group
M	AIRBURST X MOA	10/29/2021 17:00	10/30/2021 04:00	ZDV	CO	015*	<180	SAA
M	AIRBURST Y MOA	10/29/2021 17:00	10/30/2021 04:00	ZDV	CO	005*	<180	SAA
A	AIRBURST X ATCAA	10/29/2021 17:00	10/30/2021 04:00	ZDV	CO	180	290	SAA
A	AIRBURST Y ATCAA	10/29/2021 17:00	10/30/2021 04:00	ZDV	CO	180	290	SAA
R	2601A	10/29/2021 06:00	11/06/2021 06:00	ZDV	CO	000*	<125	SAA
R	2601B	10/29/2021 06:00	11/06/2021 06:00	ZDV	CO	125	<225	SAA

Intro to sectional charts- *(Recap Summary)*

- ▶ Types of airspace
 - ▶ Classic airspace: A, B, C, D, E, and G
 - ▶ Special Use: Regulatory vs Non-Regulatory
 - ▶ Reversions
- ▶ Chart symbology
 - ▶ Airports
 - ▶ Colors
 - ▶ Different visual depictions
 - ▶ Airport data boxes
 - ▶ Airspace
 - ▶ Depictions
 - ▶ Altitudes
 - ▶ NavAids
 - ▶ Topographic / Miscellaneous information
- ▶ Resources available
 - ▶ Legend
 - ▶ Airspace informational guide
 - ▶ Airspace visualization guide
 - ▶ 3D airspace model
- ▶ Access
 - ▶ Skyvector
 - ▶ Skyvector layers and tabs allowing you to see different things

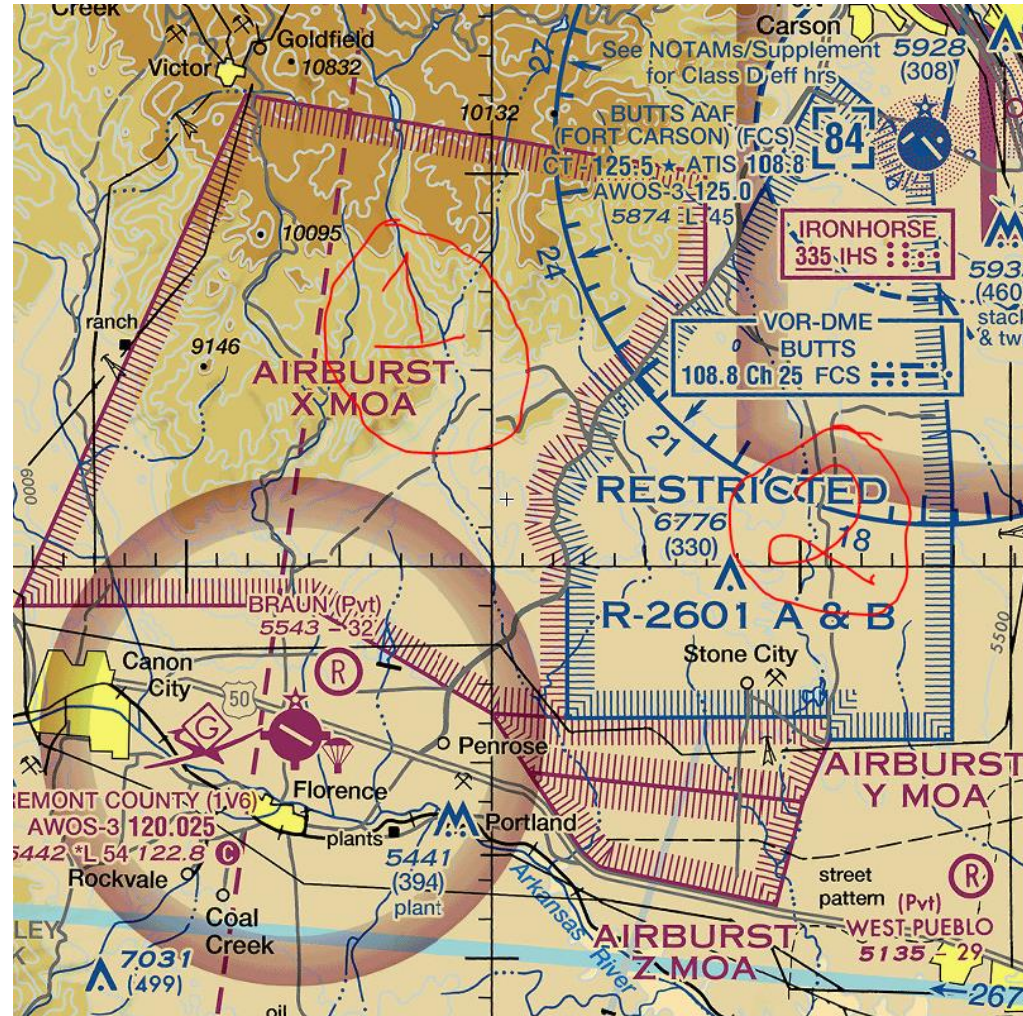
Intro to sectional charts- (Quiz)

- What is the airspace at the following points (through a full altitude range)



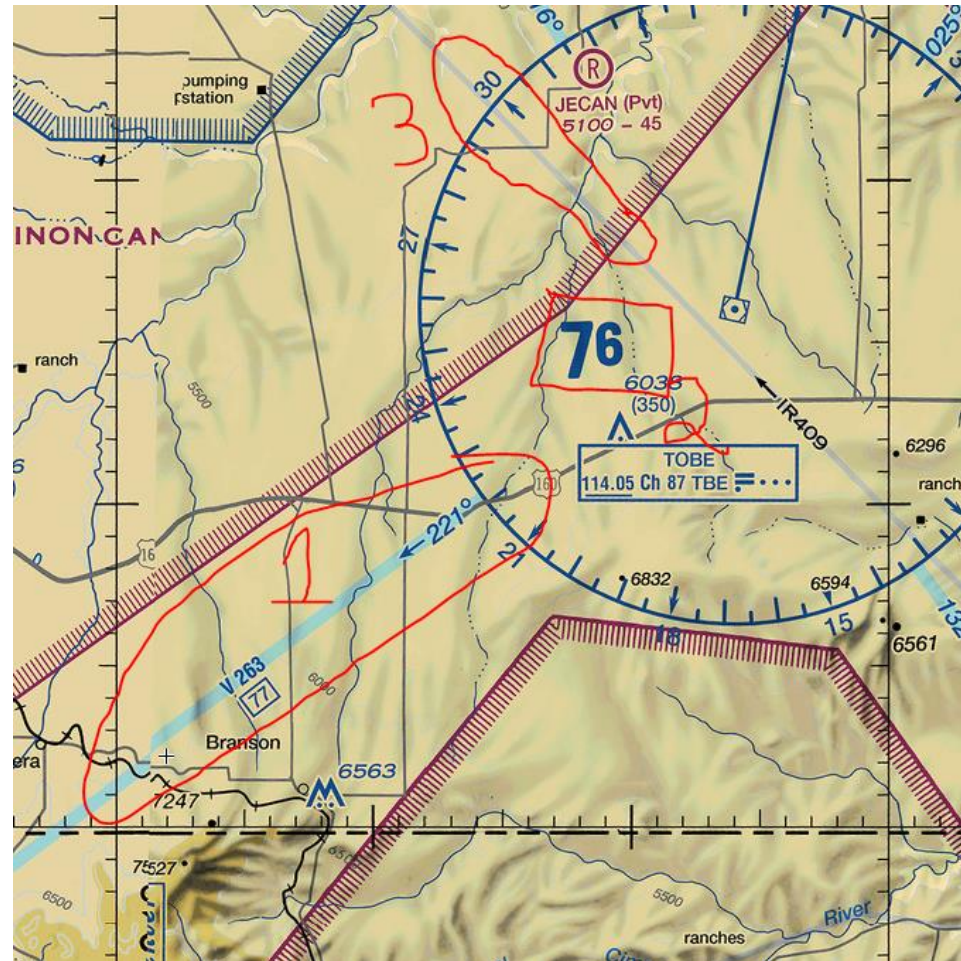
Intro to sectional charts- (Quiz)

- Can we fly in area one and or area two? When are they active what are the times and altitudes?



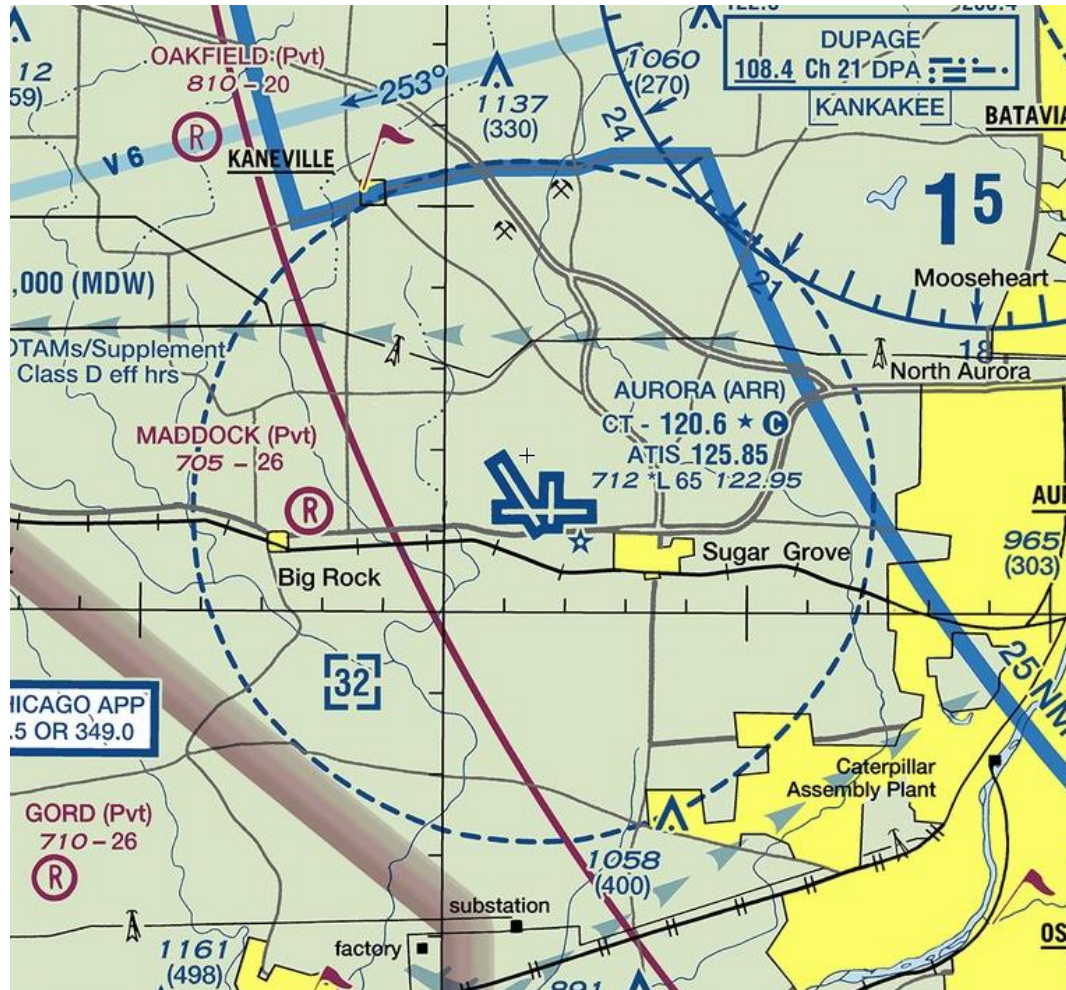
Intro to sectional charts- (Quiz)

- What do each of the following symbols mean?



Intro to sectional charts- (Quiz)

- Does KARRs airspace revert?



FOM Ch 3- (*Outline*)

▶ Overview of importance

- ▶ The department wants to clarify different crew roles, responsibilities, and certification processes for each crew member.

▶ Applicability to user

- ▶ This will show you what steps must be completed to get your initial certification. It will also show you what additional requirements are needed to get and additional certification.

▶ Supporting documentation

- ▶ FOTM - Flight Operations Training Manual provides explicit learning areas and training sections for each certification process.

▶ Specific information

- ▶ FOM Chapter 3 - Crew training and standardization

▶ Recap summary and quiz

FOM Ch 3- (*Specific Information*)

- ▶ Present FOM Chapter 3: Crew training and standardization

FOM Ch 3- (*Specific Information*)

- ▶ Training folder

[illegible]

FOM Ch 3- (*Specific Information*)

► Electronic Log

	A	B	C	D	E	F	G	H	I	J	K
1	Last Name	First Name	Last Check Ride	Last Flight Review	CFI	E-Mail Contact	On Campus	Night Training	Multirotor	Skywalker	Datahawk
2			5/18/2020				3/1/2021	3/1/2021	2/3/2017		
3			7/22/2021						7/22/2021		
4			7/26/2018						7/26/2018		
5			8/1/2017						8/1/2017		
6			1/27/2020				1/27/2020		1/27/2020		
7			8/6/2020						8/6/2020		
8			3/27/2019						2/8/2017		
9			6/7/2021				3/1/2021	3/1/2021	3/6/2020	6/7/2021	
10			8/31/2021						12/1/2019	8/31/2021	
11			11/18/2019						11/18/2019		
12			9/5/2019				8/22/17	X	6/22/2017		
13			5/22/2017						5/22/2017		
14			5/12/2021				10/2018	10/2018	1/20/2018		
15			10/17/2018						10/17/2018		
16			8/24/2017 N						6/18/17	7/21/2017	
17			8/1/2017						8/1/2017		
18			8/1/2017						8/1/2017		
19			12/20/2018						1/5/2018	10/24/2018	12/20/2018
20			5/25/2018						5/25/2018		
21			5/22/2017						5/22/2017		
22			8/17/2021				X	10/2018	2/7/2017	4/11/2017	
23			2/2/2018				7/3/2018		2/2/2018		
24			9/6/2016 N						9/6/2016		
25			3/21/2018						3/21/2018		
26			2/22/2018						2/22/2018		
27			8/17/2018				X		8/17/2018		
28			12/20/2018						8/2/2018	11/15/2018	12/20/2018
29			11/18/2019						11/18/2019		
30			11/29/2017 N						11/29/2017		
31			10/17/2018 N				X		10/17/2018		
32			3/10/2017 N					X	3/10/2017	3/10/17	
33			9/24/2019						9/24/2019		
34			10/7/2021				X	X	6/29/2018		
35			5/13/2021						5/13/2021		
36			9/6/2016 N						9/6/16	9/6/16	
37			9/30/2021				9/5/19		9/12/19		
38			4/18/2017						4/18/17		
39			9/27/2017						9/27/2017		
40			12/31/2019				1/2/20		12/31/2019		
41			7/23/2021						6/30/2021		
42			4/11/2017 N						3/9/2017	4/11/2017	
43			3/7/2018						3/7/2018		
44			8/23/2021						10/26/2018	11/15/2018	12/20/2018
45			2/21/2020						2/21/2020		
46			5/14/2018						5/14/2018		
47			8/14/2018						8/14/2018		
48			8/23/2018						8/23/2018		
49			8/5/2021				X	X	9/6/2016	9/6/2016	5/12/2016
50			2/13/2019				X		11/3/2016		
51			1/28/2020						1/5/2018		
52			7/27/2021						7/27/2021		
53			4/9/2019						4/9/2019		
54			4/27/2017						4/27/2017		
55			5/6/2021						5/6/2021		
56			8/17/2018				X		8/17/2018		
57			4/10/2018						4/10/2018		
58			1/20/2020						3/6/2019		1/20/2020
59			8/21/2020						8/21/2020		
60			7/23/2019						7/23/2019		
61			1/9/2018						1/9/2018		
62			6/29/2018 N				X		6/29/2018		
63			11/14/2018 N				X	X	6/16/2017	6/27/2017	
64			4/1/2019						4/1/2019		
65			5/22/2018						5/22/2018		

FOM Ch 3- *(Specific Information)*

► Difficulty level rating

University of Colorado at Boulder
Office of Integrity, Safety, and Compliance
Flight Operations Department



University of Colorado **Boulder**

TYPE CERTIFICATE

This type certificate is issued by the Office of Integrity, Safety, and Compliance to the following proponent:

HORIZON HOBBY, LLC

CHAMPAIGN, ILLINOIS, UNITED STATES OF AMERICA

This type certificate affirms that the product type design listed below complies with the applicable type certification airworthiness standards.

TYPE MODEL NAME	DATE OF ISSUANCE	OISC-RECOMMENDED PILOT SKILL LEVEL
Twin Otter 1.2m BNF BASIC Twin Otter 1.2m PNP	1 May 2021	Airplane skill level 1

TYPE CERTIFICATE DATA SHEET

Propulsion system

1. Motors: 2x EFLM300514 2210-1350 Motor
2. ESCs: 2x EFLA300515 ESC 20A: Twin Otter
3. Battery type: 3S LiPo 2200-3200 mAh
4. Propellers: EFLP20056 and EFLP30060 3-blade propeller, CW/CCW, 7x5.6
5. Spinners: EFLM300516 Prop Adapter Set (L/R): Twin Otter

Airspeed limitations

1. V speeds, to include V_A , V_{NO} , V_{NE} , V_{FE} .

Weight and balance limits

FOM Ch 3- (*Specific Information*)

► FOTM

Chapter 3. Specific Training Curriculum: Multirotor

3.1 Multirotor Definition

3.1.1 Definition

3.2 Multirotor Uses

3.2.1 Typical uses/missions

3.2.2 Risk associated with multirotor and related missions

3.2.3 Training type flying

3.3 Multirotor Characteristics

3.3.1 General characteristics

3.3.2 Common multirotor components - general

- Power - Battery
- Propulsion – Motor and propellers
- Electronics – ESCs, flight controller, lights, payload
- Frame – Construction

3.3.3 UAS axes

- Lateral, Longitudinal, Vertical
- Orientations for flying

3.3.4 Maneuverability

- Ability to change multirotor pitch, yaw, and roll with controllable components

3.4 Remote Control Basics

3.4.1 General concept

3.4.2 Radio wave propagation

3.4.3 Transmitter

3.4.4 Receiver

3.4.5 Multirotor Controllability

- Demonstrate how controller changes an input which affects each axis

3.4.6 Possible RC errors

- Frequency interference
- Antenna placement and propagation

3.5 Introduce the Training Multirotor

3.5.1 Introduce the multirotor used for training

3.5.2 Show storage techniques

- LiPo location and safety

FOM Ch 3- *(Recap Summary)*

- ▶ You now have knowledge of what needs to get done to get certified to as CU recognized COA UAS pilot
 - ▶ VO requirements
 - ▶ PIC requirements
- ▶ You know what training standards / checkride policies exist
 - ▶ General standards
 - ▶ FOTM as a secondary resource
- ▶ You know what and when other training is required
 - ▶ Night, On campus, New COA
- ▶ Currency and BFRs

FOM Ch 3- (Quiz)

Quiz Questions:

- ▶ How many training events do you need before you can attempt a checkride?
- ▶ Can anyone train a VO or does it need to be done by the department?
- ▶ Once you are certified as a PIC are you allowed to act as a VO?
- ▶ If you are certified on multirotors can you fly fixed wing UAS?
- ▶ If you pass a checkride on a difficulty level 2 multirotor can you fly a difficulty level 3? How about level 1?

FOM Ch 4- (*Outline*)

▶ Overview of importance

- ▶ Just like cars and manned aircraft each UAS needs to be categorized and held to certain standards in order to insure safe operating practices. Rules and regulations written about different types of UAS airworthiness are included in this chapter.

▶ Applicability to user

- ▶ Depending on your mission and goals in becoming a certified UAS pilot you will be flying a UAS and it is up to you to know the airworthiness requirements for that hardware.

▶ Supporting documentation

- ▶ Maintenance logs
- ▶ Airworthiness certification manual

▶ Specific information

- ▶ FOM Chapter 3 - Airworthiness

▶ Recap summary and quiz

FOM Ch 4- (*Specific Information*)

- ▶ Present FOM Chapter 4: Airworthiness

FOM Ch 4- *(Specific Information)*

► Maintenance Log Example

Mavic 2 Pro Flight Ops Aircraft Maintenance Log ☆ 📁 📄				
File Edit View Insert Format Data Tools Add-ons Help Last edit was made on October 5 by Aidan Sesnic				
100% \$ % .0 .00 123 Default (Ari... 10 B I S A 🔍 📊 📈 📉 📊 📈 📉 📊 📈 📉				
A20	fx			
	A	B	C	D
1	Date	Maintenance performed by	Maintenance issue	Resolution
2	9/9/2019	Sesnic	Firmware check	Firmware is up to date
3	9/9/2019	Sesnic	Outdated firmware for new battery	Firmware updated
4	10/22/2019	Sesnic	At field, drone warned firmware was out of date	Checked when connected to WiFi, has latest firmware.
5	7/4/2021	Beinhauer	Right front propeller tip bent	replaced front right prop
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				

FOM Ch 4- (Specific Information)

► Airworthiness Manual

University of Colorado at Boulder
Office of Integrity, Safety, and Compliance
Flight Operations Department



STANDARD AIRWORTHINESS CERTIFICATE

(1) Registration marks	(2) Type-certificated make and model	(3) Serial number, if applicable	(4) Category of operation, operational/experimental
FA3EMPKP9X	DJI Mavic Series	163DG6J00105PU	Operational

(5) Authority and basis for issuance

This airworthiness certificate is issued by the Office of Integrity Safety, and Compliance, and certifies that, as of the date of issuance, the aircraft to which issued has been inspected and found to conform to the type certificate therefor, to be in condition for safe operation, and has been shown to meet the requirements of the applicable comprehensive and detailed airworthiness code.

(6) Terms and conditions

Unless sooner surrendered, suspended, revoked, or a termination date is otherwise established by the Director of Flight Operations, this airworthiness certificate is effective if the maintenance, preventative maintenance, and alterations are performed in accordance with OISC-recommended procedures.

(7) Restrictions

Aircraft certified for experimental flight only must adhere to the following limitations on operation:

1. The aircraft may only be flown in a remote location, far from any infrastructure or people who could be adversely affected by an aircraft malfunction,
2. Regardless of the applicable flight rules, the aircraft may only be flown in daytime VFR conditions, and
3. The aircraft must be flown by an experienced pilot, and
4. The aircraft may only be flown for engineering and testing purposes.

Aircraft certified for operational flight have no restrictions other than those imposed by FAA flight rules and the UCB UAS FOM.

Date of issuance	OISC representative name	OISC representative signature
1 May 2021	Aidan Sesnic	[signature]

Any alteration, reproduction, or misuse of this certificate may be punishable by suspension of UCB UAS credentials.

This aircraft is certified for the following special applications:

Application or system - multirotor	Mark if certified
Flight during nighttime hours	Dependent on supplemental lighting features
Flight in precipitation	NO
Flight in cold weather	YES
Flight in conditions with a risk of incidental icing	NO
Variable-pitch rotors	NO
Fueled propulsion system	NO
Clutch systems	NO
Flight BVLOS/in IMC	NO
Aerial chase operations	NO
Stability augmentation system	YES
Lightning	NO

The aircraft is certified for the following use:

Normal: YES	High load factor: N/A
-------------	-----------------------

An aircraft certified for normal operation must avoid turbulent flight and may not intentionally execute any maneuver which results in a high load factor.

(8) United States Government contract eligibility

FEDERAL	STATE	LOCAL
No	Yes	Yes

FOM Ch 4- *(Specific Information)*

► Bailment Agreement

BAILMENT AGREEMENT

This **Bailment Agreement** entered into as of _____ the ("Effective Date") by and between _____ (Bailor), having an address at _____ and The Regents of the University of Colorado on behalf of the University of Colorado Boulder, a public institution of higher education created under the Constitution and law of the State of Colorado ("University"), 3100 Marine Street, Boulder, CO 80309.

University has agreed to assist Bailor in performing certain data collection activities by using and exercising operational control over Property (as defined below) owned by Bailor. The parties wish to enter into this Bailment Agreement to provide for the transfer of physical possession of the Property from Bailor to the University.

Agreement

In consideration of the mutual promises made below and for other good and valuable consideration, receipt of which is hereby acknowledged, the parties agree, as follows:

1. Description of Bailed Property ("Property"): Bailor shall bail to University the following tangible item(s): _____. The Property has an estimated current value of _____ US Dollars (\$ _____).
2. Place of Delivery: Bailor shall personally deliver the Property to the University's Point of Contact, on or before _____ at a time agreed to between the parties. Bailor will pay (or promptly reimburse University for) all costs and expenses in connection with transportation of Property to and from the University Point of Contact (including any Property insurance).
3. Purpose: The Property is to be used by University for _____, related to _____ (the "Purpose"). During the term of this Bailment Agreement, University shall only use the Property in accordance with the stated Purpose above.
4. Points of Contact: Contractual notices furnished hereunder shall be forwarded to the signatories named below. The technical points of contact responsible for shipment, control and use of the Property are:

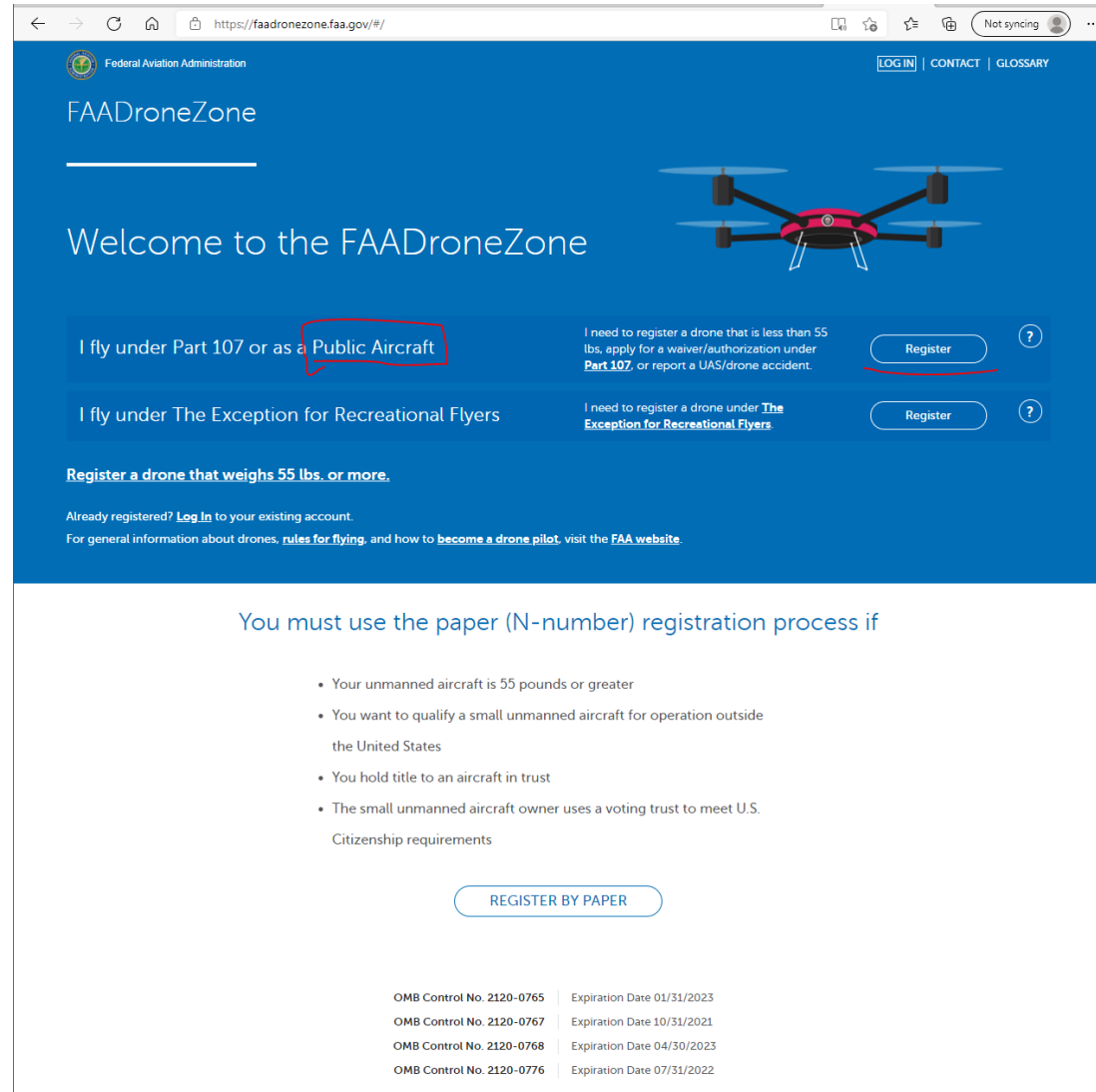
FOR BAILOR:

FOR UNIVERSITY: Daniel Hesselius, Director of Flight Operations, 3775 Discovery Drive, Ste 261, Boulder, CO 80303. directorofflightoperations@colorado.edu, (303) 735-8112.

5. Term of Bailment: The term of this Bailment Agreement shall commence upon receipt and acceptance of the Property by the University Point of Contact and shall terminate on _____, unless earlier terminated or extended by a written modification to this Bailment Agreement signed by both parties. Either party may terminate this Agreement for any reason, upon ten (10) days' notice to the other party. Upon termination of this Agreement, Bailor shall promptly retrieve the Property from the University Point of Contact. Alternatively, University may arrange for transport of the Property, "AS IS," to Bailor's Point of Contact. Bailor shall be solely responsible for the cost of transport, if any, and the risk of loss related to such transport.
6. Property Damage; Risk of Loss: At all times during the term of this Agreement, Bailor remains exclusively responsible for insurance on the Property and all loss and damage to the Property. At Bailor's request, University may (without liability to the University) attempt, but is not required, to repair damaged Property.
7. Title: Title to the Property shall remain with Bailor. University shall not sell, transfer, lease, mortgage, borrow against, pledge or otherwise create a legal or equitable interest by any third party to the Property without the prior consent of Bailor.
8. Applicable Law: The laws of the State of Colorado shall govern this Agreement. Unless otherwise provided in writing in this Bailment Agreement, Bailor hereby represents and warrants that the Property does not appear on the US Munitions or Commerce Control Lists and is not subject to United States Export Administration Regulations (15 CFR Parts 730-774) or International Traffic in Arms Regulations (22 CFR Parts 120-130).

FOM Ch 4- (*Specific Information*)

UAS registration



The screenshot shows the FAA DroneZone website. The header includes the Federal Aviation Administration logo, the site name 'FAADroneZone', and links for 'LOG IN', 'CONTACT', and 'GLOSSARY'. A central graphic of a drone is displayed. Below it, two main registration paths are presented: 'I fly under Part 107 or as a Public Aircraft' and 'I fly under The Exception for Recreational Flyers'. Each path includes a brief description of the requirements and a 'Register' button. A red box highlights the 'Public Aircraft' link. Below these options, a section titled 'Register a drone that weighs 55 lbs. or more.' provides instructions for users who are already registered or need more information. At the bottom, a section titled 'You must use the paper (N-number) registration process if' lists four conditions: 1) The aircraft is 55 pounds or greater. 2) The user wants to qualify a small unmanned aircraft for operation outside the United States. 3) The user holds title to an aircraft in trust. 4) The small unmanned aircraft owner uses a voting trust to meet U.S. Citizenship requirements. A 'REGISTER BY PAPER' button is located below this list. At the very bottom, a table lists OMB Control Numbers and their expiration dates.

FAADroneZone

Welcome to the FAADroneZone

I fly under Part 107 or as a Public Aircraft [Register](#) ?

I fly under The Exception for Recreational Flyers [Register](#) ?

Register a drone that weighs 55 lbs. or more.

Already registered? [Log In](#) to your existing account.
For general information about drones, [rules for flying](#), and how to [become a drone pilot](#), visit the [FAA website](#).

You must use the paper (N-number) registration process if

- Your unmanned aircraft is 55 pounds or greater
- You want to qualify a small unmanned aircraft for operation outside the United States
- You hold title to an aircraft in trust
- The small unmanned aircraft owner uses a voting trust to meet U.S. Citizenship requirements

[REGISTER BY PAPER](#)

OMB Control No. 2120-0765	Expiration Date 01/31/2023
OMB Control No. 2120-0767	Expiration Date 10/31/2021
OMB Control No. 2120-0768	Expiration Date 04/30/2023
OMB Control No. 2120-0776	Expiration Date 07/31/2022

FOM Ch 4- (*Specific Information*)

- ▶ Typical flight training is done on a departmental owned multirotor UAS of a difficult level 1 rating.
- ▶ This UAS is shown in the picture below.
 - ▶ It has stability augmentation and is relatively easy to fly. People with no prior experience rarely have a lot of trouble flying



FOM Ch 4- *(Recap Summary)*

- ▶ Chapter 4 of FOM important sections
 - ▶ Airworthiness certification program
 - ▶ Applicability of UAS category (multirotor, fixed wing aircraft, helicopter, airship)
 - ▶ Applicability of origin (COTS, user assembled COTS, entirely novel)
 - ▶ Initial airworthiness
 - ▶ Airworthiness Directives
 - ▶ Examples of when one can be issued
 - ▶ Payloads
 - ▶ Modified and repaired aircraft
 - ▶ Real world scenario examples
 - ▶ Flying difficult evaluation
 - ▶ Continuing airworthiness
 - ▶ Student projects

FOM Ch 4- (*Quiz*)

Quiz Questions:

- ▶ What are the different UAS categories?
- ▶ Why are difficulty levels important to PIC users to understand?
- ▶ What is initial airworthiness?
- ▶ What is continuing airworthiness?

FOM Ch 5- (*Outline*)

▶ Overview of importance

- ▶ Part 107 regulations are published by the FAA and grant individuals' the ability to get access to operate UAS commercially in the NAS.

▶ Applicability to user

- ▶ Depending on the type of UAS operations you would like to conduct, this maybe an avenue for you to pursue. While the department doesn't explicitly teach rules and fly under part 107, the university/department has regulations for people operating under part 107.

▶ Supporting documentation

- ▶ FAR Part 107

▶ Specific information

- ▶ FOM Chapter 5 - Part 107 Operations

▶ Recap summary and quiz

FOM Ch 5- (*Specific Information*)

- ▶ Present FOM Chapter 5. Part 107 operations

FOM Ch 5- *(Recap Summary)*

- ▶ Operations not over UCB property
 - ▶ Benefits
 - ▶ Varying liability
 - ▶ If flying in part 107 in conjunction with CU, pilot must be on approved part 107 operators list
 - ▶ Credentials
 - ▶ Accident and communication procedures
- ▶ Operations over UCB property
 - ▶ Authorization required from the DO or AVC

FOM Ch 5- *(Quiz)*

Quiz Questions:

- ▶ If you are flying under part 107 where should you go to get more information?
- ▶ Are there differences between flying under part 107 vs a COA?

FOM Ch 6- (*Outline*)

- ▶ **Overview of importance**

- ▶ UAS weighing less than .55lbs have a different set of regulations

- ▶ **Applicability to user**

- ▶ If a user plans on operating a UAS of this weight this is where the applicable rules and regulations reside. The different rules and regulations pertaining to UAS of this size may be advantageous to some mission profiles/planning.

- ▶ **Supporting documentation**

- ▶ N/A

- ▶ **Specific information**

- ▶ FOM Chapter 6 - UAS weighing less than .55 pounds

- ▶ **Recap summary and quiz**

FOM Ch 6- (*Specific Information*)

- ▶ Present FOM Chapter 6. UAS weighing less than .55 pounds

FOM Ch 6- (*Recap Summary*)

- ▶ .55lbs or less total weight, toy drone reference
- ▶ Registration
- ▶ 12 basic rules

FOM Ch 6- *(Quiz)*

Quiz Questions:

- ▶ What is a toy drone and or what is the importance of operating a drone if it weighs less than .55lbs?
- ▶ If you plan to operate a drone of this size what regulations apply?
- ▶ Do regulations in chapter two apply?

FOM Ch 7- (*Outline*)

- ▶ **Overview of importance**

- ▶ The third main way to operate UAS in the NAS.

- ▶ **Applicability to user**

- ▶ Depending on the UAS mission or goals operating under the hobbyist rules maybe advantageous to the user. This chapter is also published to provide knowledge for how people can operate in a less restrictive manner for noncommercial operations

- ▶ **Supporting documentation**

- ▶ AMA (academy of model aeronautics) website
 - ▶ Lawrence letter

- ▶ **Specific information**

- ▶ FOM Chapter 7 - Hobbyist pilots

- ▶ **Recap summary and quiz**

FOM Ch 7- (*Specific Information*)

- ▶ Present FOM Chapter 7: Hobbyist pilots

FOM Ch 7- (Specific Information)

The screenshot shows the homepage of modelaircraft.org. At the top, a red banner reads: "We are monitoring the news surrounding COVID-19. AMA will continue to post updates to our IAC and Sanctioned Event calendars to reflect the latest information from clubs and Special Interest Groups. Updates are posted to modelaircraft.org/covid-19". Below this is a navigation bar with links: AMA FLIGHT SCHOOL, AMA FOUNDATION, AMA SAFETY GUIDE, 1-800-IFLYAMA, JOIN/RENEW, Shop, Donate, and Login. The main content area features a "Club of the Month" section for November 2021, highlighting the MARCS / Mid Arkansas Radio Control Society (MARCS) as an AMA Gold Leader Club. Below this is a "Discover Flight" section with a "Beginner Pilots" banner that says "WHAT TO KNOW BEFORE YOU FLY!". The "Discover Flight" section includes a photo of a model airplane and text: "Model aviation is more than just a hobby. It's a passion; it's a sport; it's a unique view of the world. And it's never been a more exciting time to fly. Take an inside look into the world's largest model aviation association and learn more about how you can start flying today." There are "DISCOVER FLIGHT" and "GET STARTED" buttons at the bottom of these sections.

Academy of Model Aeronautics National Model Aircraft Safety Code

Effective January 1, 2018

A model aircraft is a non-human-carrying device capable of sustained flight within visual line of sight of the pilot or spotter(s). It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and related AMA guidelines, any additional rules specific to the flying site, as well as all applicable laws and regulations.

As an AMA member I agree:

- I will not fly a model aircraft in a careless or reckless manner.
- I will not interfere with and will yield the right of way to all human-carrying aircraft using AMA's *See and Avoid Guidance* and a spotter when appropriate.
- I will not operate any model aircraft while I am under the influence of alcohol or any drug that could adversely affect my ability to safely control the model.
- I will avoid flying directly over unprotected people, moving vehicles, and occupied structures.
- I will fly Free Flight (FF) and Control Line (CL) models in compliance with AMA's safety programming.
- I will maintain visual contact of an RC model aircraft without enhancement other than corrective lenses prescribed to me. When using an advanced flight system, such as an autopilot, or flying First-Person View (FPV), I will comply with AMA's Advanced Flight System programming.
- I will only fly models weighing more than 55 pounds, including fuel, if certified through AMA's Large Model Airplane Program.
- I will only fly a turbine-powered model aircraft in compliance with AMA's Gas Turbine Program.
- I will not fly a powered model outdoors closer than 25 feet to any individual, except for myself or my helper(s) located at the flightline, unless I am taking off and landing, or as otherwise provided in AMA's *Competition Regulation*.
- I will use an established safety line to separate all model aircraft operations from spectators and bystanders.

For a complete copy of AMA's Safety Handbook please visit:
www.modelaircraft.org/files/100.pdf

FOM Ch 7- (Specific Information)

← → ↻ colorado.edu/sc/flight-operations/training-documents ☆

University of Colorado Boulder

Integrity, Safety and Compliance # About Us Contact Us Flight Operations News Our People Policies Public Safety Resources

COA flight checklist: this is a guide for operational concerns to be considered while planning and executing a flight.

UAS operational checklist: this checklist contains typical preflight, during flight, postflight, and emergency procedures for a quadcopter such as a DJI Mavic. Checklists should be modified and specific to UAS type. [Here](#) is the world file for this sample checklist - feel free to download it and modify it for your specific UAS.

Export Controls

FAQ of export control applications to UAS research: document summarizing pertinent information regarding how export control regulations apply to UAS.

Introduction to export controls: basic, high-level information about export control regulations.

FAA Documents

Blanket COA: the full text of the latest blanket area COA, which is applicable to all US-owned airspace. The current collection of all CU-owned COAs can be found in the "Current CU-owned COAs" tab.

Lawrence letter: this letter details the FAA's position on what UAS operations may be operated under hobbyist rules and which UAS operations require operations under FAR107 or a COA.

Miscellaneous

How to read a METAR: a document to explain how to read Meteorological Aerodrome Reports (METARs) and assess whether the weather meets legal minimum requirements.

ORM: this is a risk assessment tool to quantify the risk associated with a given mission. Using this is not required.

Briefings Documents: additional clarifications into what should be included in the three required briefings.

Review Quiz

If you'd like to self-assess your knowledge of key parts of the trailing curriculum, such as airspace, please use this quiz: [Google Form](#).

Additional Training Documents

This section contains supplemental documentation to further clarify content taught during ground school.

Standards for Flight Maneuvers

[Multirotor](#)

[Fixed wing](#)


UAS Committee Information

Training Documents

Existing Type Certificates

Student Projects Requirements

Emergency phone numbers


 **Federal Aviation Administration**

Memorandum

Date: May 4, 2016

To: Earl Lawrence, Director, Unmanned Aircraft Systems Integration Office, AUS-1

John Duncan, Director, Flight Standards Service, AFS-1

From: Reginald C. Govan, Chief Counsel, AGC-1 

Prepared by: Dean E. Griffith, Attorney, AGC-220

Subject: Educational Use of Unmanned Aircraft Systems (UAS)

This interpretation addresses: (1) use of unmanned aircraft for hobby or recreational purposes at educational institutions and community-sponsored events; and (2) student use of unmanned aircraft in furtherance of receiving instruction at accredited educational institutions.

There is uncertainty in the model aircraft community about when an unmanned aircraft is a model aircraft operated for hobby or recreation or is an operation requiring FAA authorization. The FAA has received many inquiries from students and educational institutions offering coursework in the design, construction and operation of small unmanned aircraft with respect to the types of activities in which students and faculty lawfully may engage pursuant to the existing legal framework.

In light of these questions, we are issuing this interpretation to clarify that:

- A person may operate an unmanned aircraft for hobby or recreation in accordance with section 336 of the FAA Modernization and Reform Act of 2012 (FMRA)¹ at educational institutions and community-sponsored events² provided that person is (1) not compensated, or (2) any compensation received is neither directly nor incidentally related to that person's operation of the aircraft at such events;
- A student may conduct model aircraft operations in accordance with section 336 of the FMRA in furtherance of his or her aviation-related education at an accredited educational institution.

¹ Pub. L. 112-95, § 336(a)(1)-(5)

² Community-sponsored events would include demonstrations at schools, Boy or Girl Scout meetings, science clubs, etc.

FOM Ch 7- (*Recap Summary*)

- ▶ Hobbyist definition and applicability
 - ▶ Operating outside CU
- ▶ AMA safety code
- ▶ Registration
 - ▶ Proof of registration

FOM Ch 7- (Quiz)

Quiz Questions:

- ▶ What constitutes a commercial operation?
- ▶ What are the rules and regulations pertaining to flying under hobbyist rules?
 - ▶ Where do you find the rules and regulations?
- ▶ Are hobbyist drones registered differently than commercial drones?

FOM Ch 8- Export control (*Outline*)

▶ Overview of importance

- ▶ Export controls are U.S. laws and regulations that regulate and restrict the release of critical technologies, information, and services to foreign nationals, outside of the United States and foreign countries for reasons of foreign policy and national security.

▶ Applicability to user

- ▶ Certain UAS missions or research projects may occur outside or under the realm of export controls.

▶ Supporting documentation

- ▶ FAQ of export control applications to UAS research
- ▶ Introduction to export controls

▶ Specific information

- ▶ FOM Chapter 8: Export control

▶ Recap summary and quiz

FOM Ch 8- (*Specific Information*)

- ▶ Present FOM Chapter 8: Export Controls

FOM Ch 8- (*Specific Information*)

colorado.edu/isc/flight-operations/training-documents

University of Colorado Boulder

Integrity, Safety and Compliance

About Us Contact Us Flight Operations News Our People Policies Public Safety Resources

[Airspace visualization](#): this is a 2D visualization of differing airspace classes, their typical shapes, and their notations on the sectional chart.

[Airspace guide](#): this is a comprehensive guide to reading a VFR sectional chart and interpreting its symbology, with an emphasis on airspace.

[VFR sectional chart legend](#): interpretation of symbols contained on VFR chart.

[VFR sectional chart user's guide](#): detailed FAA-publication delineating what information is printed on a sectional and how to interpret it.

Checklists

[COA flight checklist](#): this is a guide for operational concerns to be considered while planning and executing a flight.

[UAS operational checklist](#): this checklist contains typical preflight, during flight, postflight, and emergency procedures for a quadcopter such as a DJI Mavic. Checklists should be modified and specific to UAS type. [Here](#) is the world file for this sample checklist - feel free to download it and modify it for your specific UAS.

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Review Quiz

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Helpful UAS websites

On-Campus Flight Request

Feedback Forms

Scheduling Instructor Time

Training Videos

Ground School Dates

Manuals

News

UAS Committee Information

Training Documents

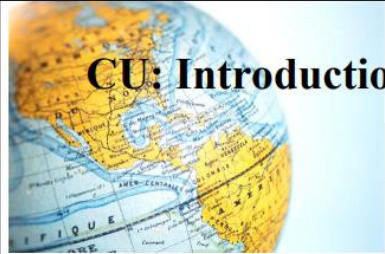
Existing Type Certificates

Student Projects Requirements

Emergency phone numbers

FOM Ch 8- (Specific Information)

CU: Introduction to Export Controls



Myth Busters....

Myth: Export control laws don't apply to research universities.

Myth: Export control laws apply only to military hardware or software.

Myth: The government really doesn't enforce all of these regulations.

Working under these misconceptions, may violate export controls laws – jeopardizing your career and the University of Colorado.

Learn more about export compliance.

CU: Introduction to Export Controls is now available on SkillSoft Online Training. This one-hour online course is recommended for CU-Boulder research personnel whose work involves export-controlled technologies, or who are responsible for transactions with non-US entities. The course provides an overview of export control regulations and how they affect university research.

To access SkillSoft:

- ▶ Logon to your CU campus portal at <https://mycuinfo.colorado.edu>
- ▶ Click on the CU Resources tab (skip this step if you are using the System portal.)
- ▶ Select **TRAINING**
- ▶ Select **Start SkillSoft** (SkillSoft will open in a separate window.)
- ▶ Select **Catalog**
- ▶ Click **University of Colorado - Courses**
- ▶ Folders are organized by topic.
- ▶ Select **Export Controls** folder
- ▶ Select **CU: Introduction to Export Controls** and click **[Launch]**

Contact **Katherine.E.Mills@colorado.edu** for more information. Visit the

Employee Learning and Development website for additional resources: <http://www.cu.edu/eld>



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Export Control Regulations and UAS Research Frequently Asked Questions

What are export controls? Why are certain technologies controlled?

The United States Government (USG) regulates the export or transfer of certain hardware, software and technology considered strategically important. These controls are in place to protect US national security; to prevent the proliferation of weapons of mass destruction; to further U.S. foreign policy including the support of international agreements, human rights and regional stability; and to maintain U.S. economic competitiveness. Export control regulations govern how information, software, and commodities may be transmitted overseas to anyone, including U.S. citizens, or to foreign nationals located physically in the United States.

UAS have the potential to use some of the most high-profile and highly controlled technologies currently in use. They are considered a "dual-use" item: a commodity that can be used for both military/strategic and commercial/civilian purposes. Almost all UAS are subject to some form of export control, even if the UAS is for research or non-commercial use. Different UAS abilities will cause the hardware, software, and technical information associated with the UAS to be controlled by government regulatory regimes.

Who governs the federal export control regulations?

Several federal agencies have jurisdiction over the control of exports, including but not limited to: The Department of Commerce, the Department of Energy, the Department of State, the Department of Treasury, the Nuclear Regulatory Commission, and the Department of Agriculture. The three principal agencies among these are:

- **The Department of State**, which administers controls of defense exports through its Directorate of Defense Trade Controls (**DDTC**)
- **The Department of Commerce**, which administers export of commercial, 'dual-use' and less sensitive defense items and technologies through the Bureau of Industry and Security (**BIS**)
- **The Department of Treasury**, which administers exports to embargoed countries and specially designated nationals through its Office of Foreign Asset Controls (**OFAC**). As of July 2017, OFAC embargoed countries include Cuba, Iran, North Korea, Sudan and Syria.



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FOM Ch 8- *(Recap Summary)*

- ▶ Export controls is most applicable when a UAS is being exported outside the united states or when a foreign national may have access to controlled technical data related to certain UAS.
- ▶ As a university we must comply with all federal rules
- ▶ Specific controls for unarmed and armed UAS (ITAR)
- ▶ Commercial and dual use items (EAR) export administration regulations
- ▶ OFAC countries
- ▶ Contacts

FOM Ch 8- (*Quiz*)

Quiz Questions:

- ▶ When may export controls be applicable?

FOM Ch 9- (*Outline*)

- ▶ **Overview of importance**

- ▶ Certain devices commonly found with UAS need to be handled with care

- ▶ **Applicability to user**

- ▶ Some users may not be familiar with the different systems found on UAS and may be new to different components which may cause harm

- ▶ **Supporting documentation**

- ▶ N/A

- ▶ **Specific information**

- ▶ FOM Chapter 9 - Ground safety

- ▶ **Recap summary and quiz**

FOM Ch 9- (*Specific Information*)

- ▶ Present FOM Chapter 9: Ground safety

FOM Ch 9- *(Recap Summary)*

- ▶ Battery types
- ▶ LIPO storage
- ▶ Propeller safety

FOM Ch 9- *(Quiz)*

Quiz Questions:

- ▶ What are the end of life considerations for battery's?
- ▶ What are key considerations with propellers?

FOM Ch 10- (*Outline*)

▶ Overview of importance

- ▶ When operating outside of the US rules and regulations differ and its important to know the differences and procedures for operating outside of the country

▶ Applicability to user

- ▶ Users may plan to operate outside of the US in which case they should be familiar with these rules, or know that these rules exist and where to find them

▶ Supporting documentation

- ▶ Export controls doc 1

▶ Specific information

- ▶ FOM Chapter 10 - International operations

▶ Recap summary and quiz

FOM Ch 10- (*Specific Information*)

- ▶ Present FOM Chapter 10: International operations

FOM Ch 10- *(Recap Summary)*

- ▶ Applicability of this section
- ▶ Crewmember qualifications
 - ▶ US UAS currency and certifications
- ▶ Flight operations requirements
 - ▶ Contacting the DO and planning
 - ▶ Approval

FOM Ch 10- *(Quiz)*

Quiz Questions:

- ▶ When flying outside of the country what regulations apply?
- ▶ Who must you contact for approval to fly outside of the country?

COA- *(Outline)*

▶ Overview of importance

- ▶ As stated earlier a COA is a certificate of authorization allowing a user to fly commercially in the NAS. This contains the rules and regulations for doing so. Understanding and following these rules are very important to remain safe and legal.

▶ Applicability to user

- ▶ We initially teach people how to fly under the blanket COA, which is an overarching COA that has basic regulations which allow people to accomplish most missions. In order to accomplish your specific UAS mission you will need to know and understand airspace, UAS type, speeds, flight procedures specific to that COA in order to remain safe and legal. If your mission falls outside the bounds of the blanket COA we have plenty other COAs to choose from.

▶ Supporting documentation

- ▶ UAS registration website
- ▶ NOTAM submission

▶ Specific information

- ▶ Walk through all sections of the COA

▶ Recap summary and quiz

COA- (Specific Information)

► COA Structure

FAA FORM 7711-1 UAS COA Attachment
Blanket Area- Public Agency sUAS COA
2019-WSA-4872-COA

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 small Unmanned Aircraft System (sUAS) weighing less than 55 pounds and operating at speeds of less than 87 kts (100 mph) in Class G airspace at or below 400 feet Above Ground Level (AGL) for the purpose of public aircraft operations.

LIST OF WAIVED REGULATIONS BY SECTION AND TITLE

N/A

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 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 A thru I, inclusive, are set forth on the reverse side hereof.

This certificate is effective from December 27, 2019 to December 26, 2021 and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.

FAA FORM 7711-1 UAS COA Attachment
Blanket Area- Public Agency sUAS COA
2019-WSA-4872-COA

Page 1 of 6

DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION	
CERTIFICATE OF WAIVER OR AUTHORIZATION	
ISSUED TO University of Colorado-Boulder	Part 91
ADDRESS 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 specifically waived by this certificate.	
OPERATIONS AUTHORIZED Operation of small Unmanned Aircraft System (sUAS) weighing less than 55 pounds and operating at speeds of less than 87 kts (100 mph) in Class G airspace at or below 400 feet Above Ground Level (AGL) for the purpose of public aircraft operations.	
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 herein4. 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 A thru I, inclusive, are set forth on the reverse side hereof.	
This certificate is effective from <u>December 27, 2019</u> to <u>December 26, 2021</u> and is subject to cancellation at any time upon notice by the Administrator or his/her authorized representative.	
BY DIRECTION OF THE ADMINISTRATOR	
FAA Western Service Area (Region)	BYRON G Y CHEW Digitally signed by BYRON G Y CHEW Date: 2019.12.26 08:42:05 -08'00'
December 26, 2019 (Date)	B. G. Chew (Signature)
	Tactical Operations Manager (Title)

COA- *(Specific Information)*

► Section A

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. Frequency spectrum approval is independent of the COA process and requires the proponent to obtain certification and frequency assignments (licenses) from the National Telecommunications and Information Administration (NTIA) (47 CFR Part 300) or Federal Communications Commission (47 CFR Part 2, Subpart J and 47 CFR Part 87, Subpart D) and frequency licenses (47 CFR Part 87) when applicable for the control link, ATC radios, transponders, detect and avoid systems, and navigation systems used to support this COA. Equipment licensed under 47 CFR Part 5 (Experimental) or 47 CFR Part 15 (Radio Frequency Devices) does not provide the protection necessary for NAS operations.

COA- *(Specific Information)*

► Section B

B. Operations.

1. The UA must be operated within visual line of sight (VLOS) of the Pilot in Command (PIC) and the person manipulating the flight controls at all times. This requires the PIC to be able to use human vision unaided by any device other than corrective lenses. Although the remote PIC and person manipulating the controls must maintain the capability to see the UA, using one or more visual observers (VO)'s allows the remote PIC and person manipulating the controls to conduct other mission-critical duties (such as checking displays) while still ensuring situational awareness of the UA.
2. Must yield right of way to other aircraft, manned or unmanned.
3. First-person view camera cannot satisfy "see-and-avoid" requirement but can be used as long as the visual requirement is satisfied in other ways.
4. Maximum altitude of 400 feet above ground level (AGL) or, if higher than 400 feet AGL, remain within 400 foot radius of a structures upper most limit. In all cases, the UAS must remain within Class G airspace.
5. Minimum visibility of 3 statute miles from control station.
6. No person may act as a remote pilot in command or VO for more than one unmanned aircraft at one time.
7. No operations from a moving vehicle or watercraft unless the operation is over a sparsely populated area and the PIC and VO are co-located.
8. Lost link must remain within visual line of sight of the PIC and VO.
9. The remote pilot in command may deviate from the requirements of this rule in response to an in-flight emergency.
10. Requests to operate in an area outside the approved operating area of this authorization should be limited to emergency/life threatening operations. Coordinate these flights through the Special Government Interest (SGI) process by calling the System Operations Support Center (SOSC) at (202) 267-8276, or email: 9-ATOR-HQ-SOSC@faa.gov.

COA- *(Specific Information)*

► Section C

- NOTAM submission done at www.1800wxbrief.com
- Create an account
- Navigate to UAS page
- UAS NOTAM Submission format
- Watch COA ID video to get COA ID submission access
- COA ID validation issues

C. 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. 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 (D) NOTAM request
 - (2) Location, altitude and 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.

COA- *(Specific Information)*

- ▶ Review how to set up a 1800wxbrief account and how to file a NOTAM use the following slides for reference

COA- (Specific Information)


► Create and account


FlightService [Home](#) [Dashboard](#) [Map](#) [Wx Charts](#) [Plan & Brief](#) [Airports](#) [Account](#) [Features](#) [Links](#) [Help](#)


Thu Nov 11 07:54:07 MST | 14:54:07 Z


We are aware of an issue preventing submission of pilot feedback. Please contact 1-877-377-3721 to submit feedback while we continue to investigate.

Featured Capabilities

New Briefing


Interactive Map


Automated Voice Service


SMS Text Message Service


Latest Features & Enhancements


Resources

 Service Provider Integration

 How-To Videos

 Student Pilot Journey Poster

 Pilot Tip Cards

 Phone Numbers & Quick Steps

News & Announcements

October 5, 2021

Unused Account Deletion Notification

On November 1, 2021 Leidos Flight Service will begin a routine cleanup of unused user accounts on the www.1800wxbrief.com website, per our policy of deleting profiles that have not been updated in the previous two years.

[READ MORE >](#)

August 3, 2021

Automation Option for Opening and Closing Flight Plans via Phone Now Available

Leidos Flight Service has released a new feature that gives pilots the ability to directly activate and close their VFR Flight Plans via the Voice Response System without talking to a specialist. This upgrade is designed to make opening and closing VFR Flight Plans easier than ever and saves pilots valuable time by eliminating hold times.

[READ MORE >](#)

July 22, 2021

FAA "From the Flight Deck" Videos added to External Links Page

The Links now contain a link to the FAA's "From the Flight Deck" video series that provides runway approach and airport taxiway footage combined with diagrams and graphics to identify

Login

Login

[Create Account](#)
[Forgot/Reset Password](#)

Upcoming Events

There are no upcoming events.

COA- *(Specific Information)*

- Navigate to UAS NOTAM Form tab

The screenshot displays the FlightService website interface. At the top, the 'FlightService' logo is on the left, and a navigation bar contains links: Home, Dashboard, Map, Wx Charts, Plan & Brief, Airports, Account, Features, Links, Help, and Logout. Below the navigation bar, a welcome message 'Welcome BEINHAUER' is on the left, and the current date and time 'Thu Nov 11 07:52:39 MST | 14:52:39 Z' are on the right. A red-bordered notification bar spans the width of the page, containing the text: 'We are aware of an issue preventing submission of pilot feedback. Please contact [redacted] feedback while we continue to investigate.' Below the notification bar, a horizontal menu of icons is shown. The icons are labeled: 'Optimize your experience' (with a 'Learn & Register' link and a right-pointing triangle), 'ACAS', 'EasyActivate™ EasyClose™' (with a green square icon), 'Close Remind', 'UAS NOTAM Form' (with a red circle icon), 'SAR', 'Preflight Summaries', and 'Provide information for improved service' (with a 'My Aircraft' link). A dropdown menu is open over the 'Plan & Brief' link in the navigation bar, showing four options: 'Plan & Brief', 'Locations Briefing', 'Pilot History', and 'UAS NOTAM Form'. The 'UAS NOTAM Form' option in the dropdown is circled in red.

COA- *(Specific Information)*

- Become familiar with each section

FlightService [Home](#) [Dashboard](#) [Map](#) [Wx Charts](#) [Plan & Brief](#) [Airports](#) [Account](#) [Features](#) [Links](#) [Help](#) [Logout](#)

Welcome BEINHAUER Thu Nov 11 07:55:08 MST | 14:55:08 Z

We are aware of an issue preventing submission of pilot feedback. Please contact 1-877-377-3721 to submit feedback while we continue to investigate.

UAS Operating Area (UOA) with NOTAM

Active UOAs ▼ Pending UOAs ▼ Past UOAs ▼

* Click field names for help [UAS & UOA Help](#)

Draft	<u>Aircraft ID or Reg. No.</u> <input type="text"/>	<u>Altitude</u> <input type="radio"/> MSL <input type="radio"/> AGL <u>Lower</u> <input type="text"/> ft <u>Upper</u> <input type="text"/> ft	<u>Frequency</u> <input checked="" type="radio"/> One Flight <input type="radio"/> Recurring Flight
<u>Operating Area</u> <input checked="" type="radio"/> <u>Circular Area (a center point and radius)</u> <u>Center Point</u> <input type="text"/> <u>Radius</u> <input type="text"/> nm <input type="button" value="Address"/> <input type="button" value="Clear"/> <input type="radio"/> <u>Non-circular Area (a boundary defined by a series of points)</u> <input type="radio"/> <u>Line (a line defined by multiple points and a width)</u> <input type="button" value="Map"/>			<u>Schedule</u> <u>Start Date & Time</u> <input type="text" value="11/11/2021"/> <input type="text" value="HHMM"/> <input type="text" value="MST"/> <u>End Date & Time</u> <input type="text" value="11/11/2021"/> <input type="text" value="HHMM"/> <input type="text" value="MST"/>
<u>Contact Information</u> <input type="text" value="BEINHAUER, +1(630)699-2852"/>		<u>Additional Information (optional)</u> <input type="text"/>	NOTAM Creation and Service Registration (required) <u>COA Identifier:</u> <input type="text"/> A UAS NOTAM will be submitted on your behalf when clicking the Submit button. <input type="button" value="Preview NOTAM"/> Refer to FAA Guidance regarding submission of NOTAMs for Unmanned Aircraft. NOTAM service information and registration.
<u>Pre-programmed Contingency Route (optional)</u> <input type="text"/>			

Notice: UAS operators are responsible for ensuring their operations are authorized and in compliance with FAA guidance.

COA- *(Specific Information)*

► Section D

- This is why filling out your logbooks are so important and why you only have 24hrs to do so

D. 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).

COA- *(Specific Information)*

► Section E

- This is why the additional night training / certification is required

E. sUAS Night Operations.

sUAS operations may be conducted at night, as defined in 14 CFR § 1.1, provided:

1. All operations under the approved COA must use one or more VOs;
2. Prior to conducting operations that are the subject of the COA, the remote PIC and VO must be trained to recognize and overcome visual illusions caused by darkness, and understand physiological conditions which may degrade night vision. This training must be documented and must be presented for inspection upon request from the Administrator or an authorized representative;
3. The sUAS must be equipped with lighted anti-collision lighting visible from a distance of no less than 3 statute miles. The intensity of the anti-collision lighting may be reduced if, because of operating conditions, it would be in the interest of safety to do so. Additionally, in order to comply with § 91.209, the aircraft must have position lighting that enables determination of location altitude, attitude, and direction of flight.

COA- *(Specific Information)*

► Section F

F. Minimum Safe Altitude Operations.

A waiver from the requirements of 14 CFR 91.119(b) and (c) is approved as follows:

1. The ground speed of the small UAS must not exceed 100 mph/87 knots.
2. Except for those operations where it is necessary to safeguard human life, no person may operate a small unmanned aircraft over a human being unless that human being is:
 - a. Directly participating in the operation of the small unmanned aircraft; or
 - b. Located under a covered structure or inside a stationary vehicle that can provide reasonable protection from a falling small unmanned aircraft

Note: People “directly participating in the operation of the small unmanned aircraft” may include qualified non-crewmembers, as defined in 49 USC 40125.

3. For those operations where it is necessary to operate over a human being in order to safeguard human life, the remote pilot in command must not operate any lower or in proximity to human beings necessary to accomplish the operation.

COA- *(Specific Information)*

► Section G

G. 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.

2.5.9 Operation near military training routes

No person may operate a UAS within 8 nautical miles of the centerline, or closer than 100' above or below the vertical limits of a published VR or IR military training route without coordinating with the DO for approval. The DO may designate, in writing, a representative to handle MTR coordination and approval in situations where it is deemed appropriate.

Unsuccessful attempts to contact an MTR operator must be taken to mean the route is active.

COA- *(Specific Information)*

► Section H

H. Flight Planning Requirements.

Operations must only be conducted beyond the following distances from the airport reference point (ARP) of a public use airport, heliport, gliderport, or water landing port listed in the Airport/Facility Directory, Alaska Supplement, or Pacific Chart Supplement of the U.S. Government Flight Information Publications:

1. 5 nautical miles (NM) from an airport having an operational control tower, or
2. 3 NM from an airport having a published instrument flight procedure, but not having an operational control tower, or
3. 2 NM from an airport not having a published instrument flight procedure or an operational control tower, or
4. 2 NM from a heliport.

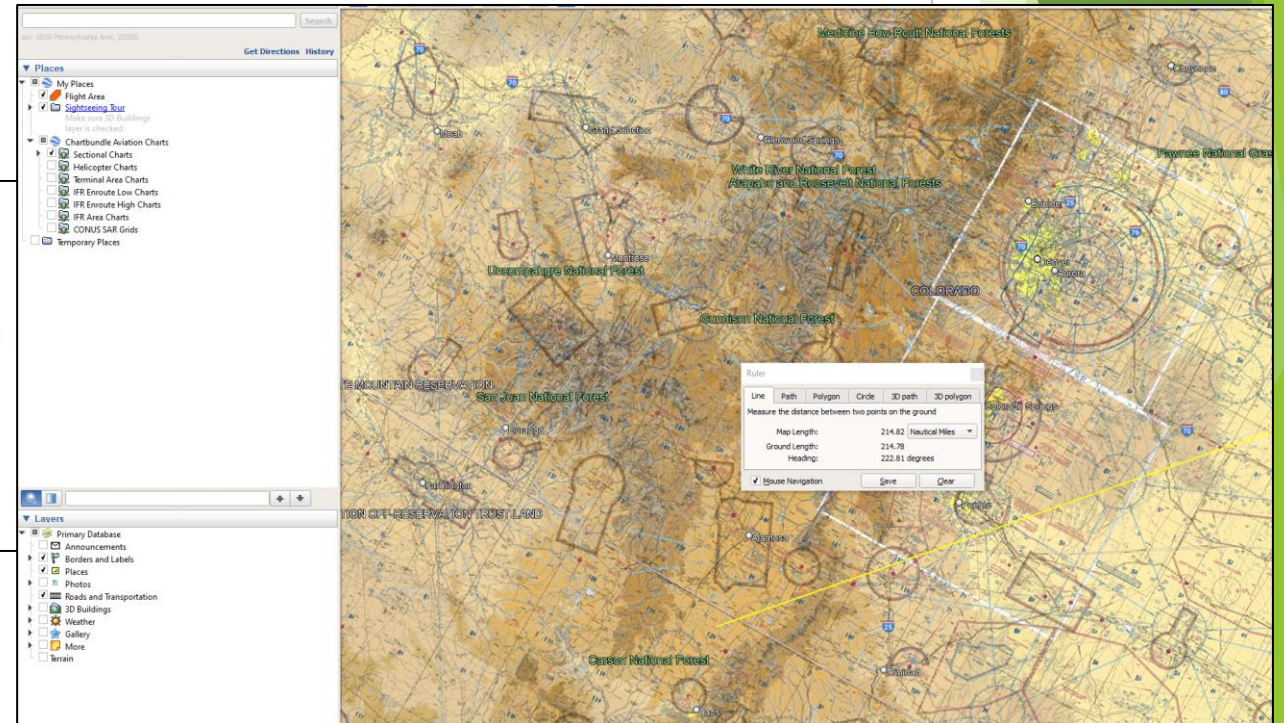
COA- *(Specific Information)*

► Google Earth

- In order to determine distances away from airports you will need access to google earth
- To get google earth to populate with sectional charts you will need to download chart bundle from [Your source for Aviation Digital Raster Charts. \(chartbundle.com\)](http://chartbundle.com)
- Google earth gives you measuring functionality

Chartbundle Charts

- Overlay aviation charts onto Google Earth
- On the bottom of this page is a section called "KML/KMZ - Google Earth." Download "chartbundle_aero.kml"
- When the download is complete, click on it to open the file in Google Earth.
- Within Google Earth, right-click on the folder and click "Save to my places"



COA- (Specific Information)

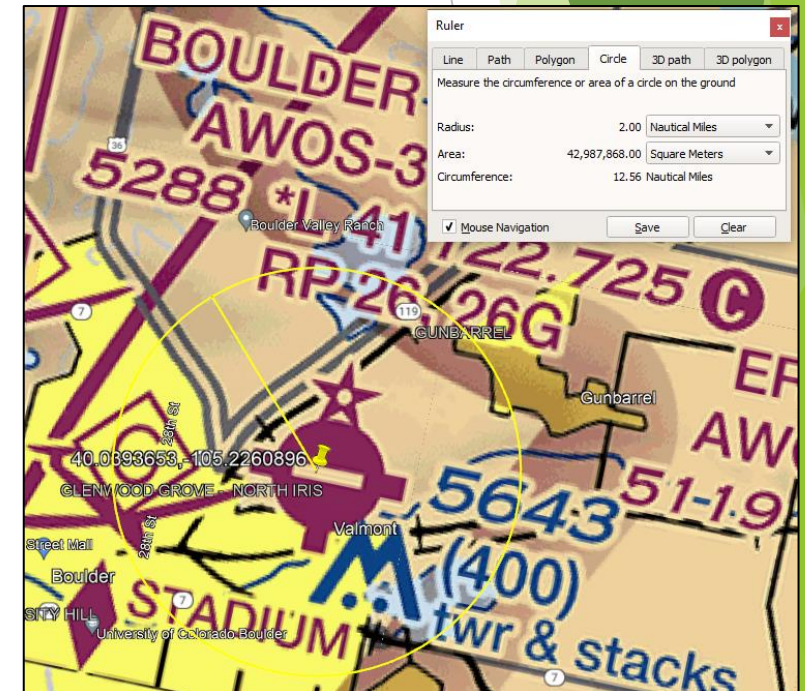
► Specific ARP distances

- To properly measure your distance from the airport you need to find the airport reference point. This can be done on airnav.com by searching the airports ICAO identifier into the airport search bar. From there copy the last lat/long point found on the website.
- You can then search it in google earth.
- From there use the measuring tool in google earth to find distances relative to that point

The screenshot shows the AirNav website's search bar. The search input field contains 'kdbu'. Below the input field, there are examples: 'KBOS', 'BOS', and 'VAN NUYS'. To the right of the input field is a button labeled 'GET AIRPORT INFORMATION'. Below this button are three links: 'Browse by U.S. State', 'Browse by country/territory', and 'Advanced Search'. At the bottom of the search section is a link labeled 'Identifier Changes'.

The screenshot shows the AirNav website's details page for KBDU Boulder Municipal Airport. The page includes the following information:

- Airports** | NavAids | Airspace Fixes | Aviation Fuel | Hotels
- KBDU Boulder Municipal Airport**
Boulder, Colorado, USA
- GOING TO BOULDER?**
[Reserve a Hotel Room](#)
- FAA INFORMATION EFFECTIVE 07 OCTOBER 2021**
- Location**
FAA Identifier: BDU
Lat/Long: 40-02-21.7150N 105-13-33.9225W
40-02.361917N 105-13.563375W
40.0393653, -105.2260896
(estimated)
Elevation: 5288 ft. / 1612 m
Variation: 12E (1985)
From city: 3 miles NE of BC
Time zone: UTC -6 (UTC -7)
Zip code: 80301
- Airport Operations**



COA- *(Specific Information)*

- ▶ Specific Airport proximity
 - ▶ Operational Control tower
 - ▶ Skyvector, if airport is blue with no reversions
 - ▶ Instrument Approach
 - ▶ Airnav, in instrument approach section
 - ▶ “there are no published instrument procedures at xxxx”

Option 2: IAPs exist

Option 1: No IAPs

Instrument Procedures

There are no published instrument procedures at KBDU.

Instrument Procedures

NOTE: All procedures below are presented as PDF files. If you need a reader for these files, you should [download](#) the free Adobe Reader.

NOT FOR NAVIGATION. Please procure official charts for flight.

FAA instrument procedures published for use from 07 October 2021 at 0901Z to 04 November 2021 at 0900z.

STARs - Standard Terminal Arrivals

BRNKO TWO (RNAV) ****CHANGED****

2 pages: [\[1\]](#) [\[2\]](#) (248KB)

BRNKO TWO (RNAV), CONT.2

[download](#) (251KB)

PINN3 THREE (RNAV)

2 pages: [\[1\]](#) [\[2\]](#) (366KB)

IAPs - Instrument Approach Procedures

RNAV (GPS) RWY 29 ****CHANGED****

[download](#) (272KB)

RNAV (GPS)-B

[download](#) (275KB)

VOR/DME-A

[download](#) (280KB)

NOTE: Special Alternate Minimums apply ****CHANGED****

[download](#) (140KB)

Departure Procedures

ECHOO ONE (RNAV)

2 pages: [\[1\]](#) [\[2\]](#) (290KB)

MRSHH TWO (RNAV) ****CHANGED****

2 pages: [\[1\]](#) [\[2\]](#) (281KB)

SKYEE ONE (RNAV)

2 pages: [\[1\]](#) [\[2\]](#) (286KB)

WNGSS ONE (RNAV)

2 pages: [\[1\]](#) [\[2\]](#) (337KB)

NOTE: Special Take-Off Minimums/Departure Procedures apply [download](#) (105KB)

COA- *(Specific Information)*

► Section I

I. **Emergency/Contingency Procedures.**

1. Lost Link Procedures:

In the event of a lost link, the UAS pilot will comply with the following provisions:

- a. The UA lost link will be programmed to ensure that lost link flight does not fly over persons and the landing location is within the view of the PIC.
- b. Rally and home locations will be programmed to remain within the area defined in the NOTAM where flight operations are being conducted.
- c. Lost link procedures will not transit or orbit over populated areas, Victor airways, or busy roadways/interstate highways.
- d. Lost link procedures will be programmed to remain within the operations area and altitude, avoid unexpected turn-around and/or altitude changes, and will provide sufficient time to communicate with ATC if necessary.

2. Emergency/Fly-Away Procedures:

- a. In the event of an emergency, the PIC will immediately contact the ATC facility having jurisdiction for the airspace, state the nature of emergency and pilot intentions.
- b. In the event of a UA fly-away, advise ATC of the following:
 - (1) Direction of flight
 - (2) Last known altitude
 - (3) Maximum remaining flight time

COA- *(Specific Information)*

► Lost Link Procedures

- Programming lost link procedures follow the set considerations

1. Lost Link Procedures:

In the event of a lost link, the UAS pilot will comply with the following provisions:

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- d. Lost link procedures will be programmed to remain within the operations area and altitude, avoid unexpected turn-around and/or altitude changes, and will provide sufficient time to communicate with ATC if necessary.

COA- (*Specific Information*)

- ▶ Fly away procedures
 - ▶ First thing to do is to fly the UAS and try to regain control. Your UAS specific checklist should have an energy procures section. Run through that to try to regain control. Then move on with the rest of what is required in the COA statement I.2.a & b.
 - ▶ Preflight planning should included looking at all nearby airports and gathering the contact information for relevant personal. This information can be found on the Arnav website. If no airports are of concern the nearest controlling agency will need to be contacted, this information can be found at ...

Emergency Procedures

BATTERY BELOW 15 PERCENT

LAND IMMEDIATELY

AIRCRAFT CONTROL LINK LOST

RETURN-TO-HOME.....ATTEMPT

If unsuccessful:

MOTOR CUTOFF.....ATTEMPT

If unsuccessful:

NEAREST AIRPORT.....CONTACT

Provide altitude, time remaining, and direction of flight

Airport Ownership and Management from official FAA records

Ownership: Publicly-owned

Owner: CITY OF BOULDER

PO BOX 791

BOULDER, CO 80306

Phone 303-441-3108

Manager: JOHN KINNEY

3327 AIRPORT ROAD

BOULDER, CO 80301

Phone 303-441-3108

COA- *(Recap Summary)*

- ▶ COA front pages
 - ▶ COA IDs
 - ▶ Basic descriptions
- ▶ Format for more detailed information
 - ▶ General
 - ▶ Operations
 - ▶ NOTAMs
 - ▶ Reporting requirements
 - ▶ Night Ops
 - ▶ Minimum safe altitudes
 - ▶ Special Use Airspace
 - ▶ Flight Planning Requirements
 - ▶ Emergency procedures
- ▶ Important takeaways
 - ▶ UAS types types allowed to fly in COA (weight / speed) [55lbs <100mph]
 - ▶ Max altitudes [400ft + exception]
 - ▶ Airspace [class G]
 - ▶ VLOS
 - ▶ Crew requirement
 - ▶ Weather
 - ▶ NOTAM submission
 - ▶ MTRs / SUA
 - ▶ Airport proximity
 - ▶ Emergency procedures

COA- *(Quiz)*

- ▶ What is the maximum altitude we can fly per the blanket COA?
- ▶ What airspace are we allowed to fly into?
- ▶ Can the pilot look at a FPV display while flying?
- ▶ How far away do you need to remain from airports per the blanket COA?
- ▶ What point do you measure from when finding distances away from airports?
- ▶ How do you know if an airport is towered?
- ▶ How do you know if an airport has an instrument approach?
- ▶ How close can you fly to a private airport?
- ▶ How long before flying do you need to submit a NOTAM?

Complex Airspace Examples (*Outline*)

▶ Overview of importance

- ▶ There is a lot that goes into UAS COA flight mission planning and its important to know what needs to be done and not to miss any steps

▶ Applicability to user

- ▶ This is the same process you will go through when planning a flight for yourself, this section encompasses the most important parts of your training thus far.

▶ Supporting documentation

- ▶ All ground school help / supporting documents

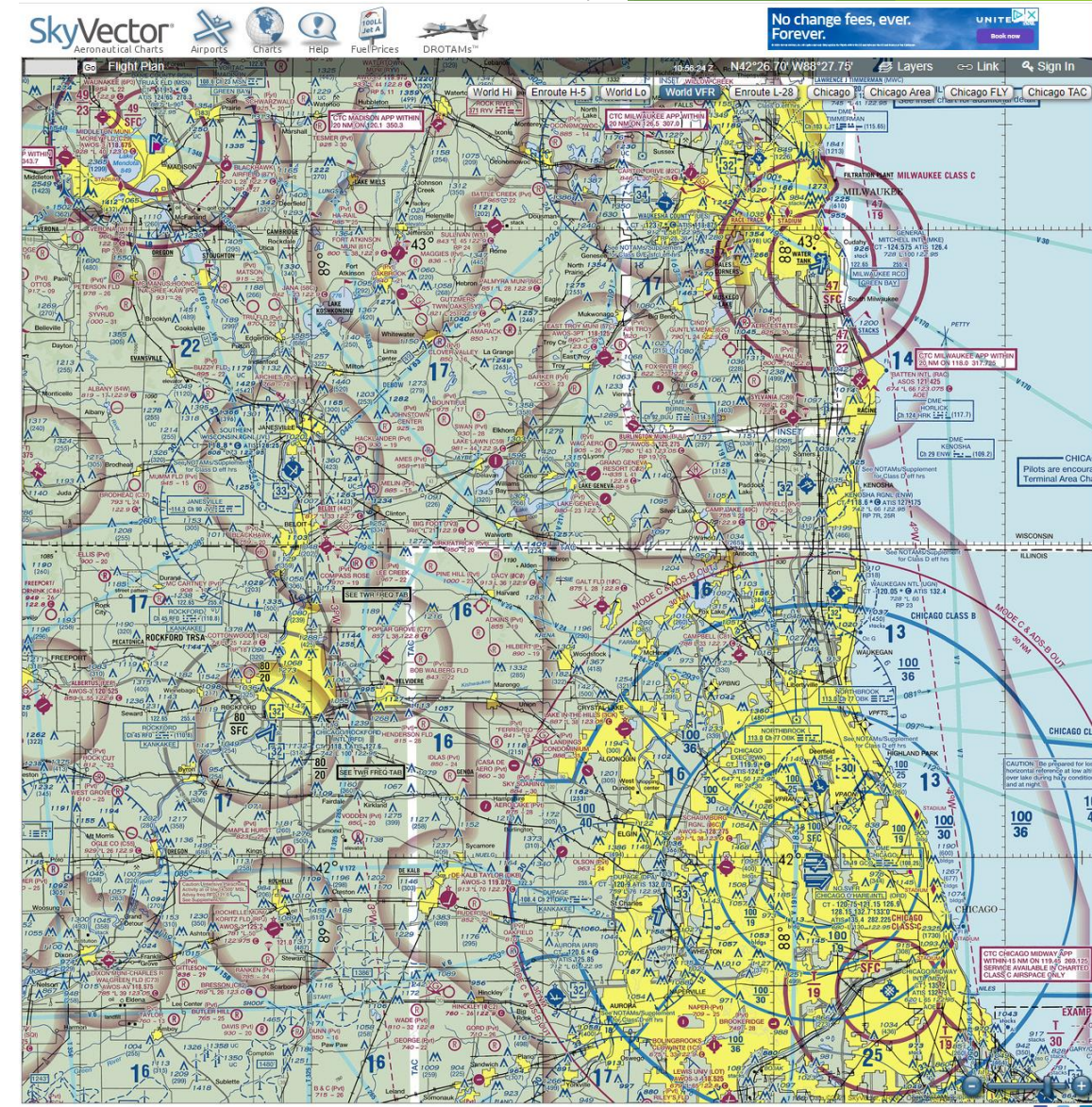
▶ Specific information

- ▶ Airspace review
- ▶ COA flight checklist
- ▶ NOTAM Submission
- ▶ Complete examples

▶ Recap summary and quiz

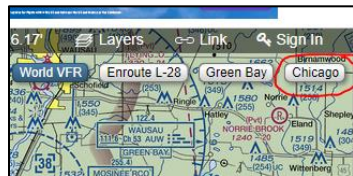
Complex Airspace Examples

- ▶ Review all the different types of airspace A-E.
- ▶ Identify altitudes fractions
- ▶ Complete “Rocketship” examples



Complex Airspace Examples

- ▶ Review all the different types of special use airspace.
- ▶ Reiterate difference between regulatory vs non reg.
 - ▶ How does that relate to where we can fly?
- ▶ Active times and altitudes
 - ▶ If intermittent by NOTAM, where do you go to get that information?



SPECIAL USE AIRSPACE ON CHICAGO SECTIONAL CHART

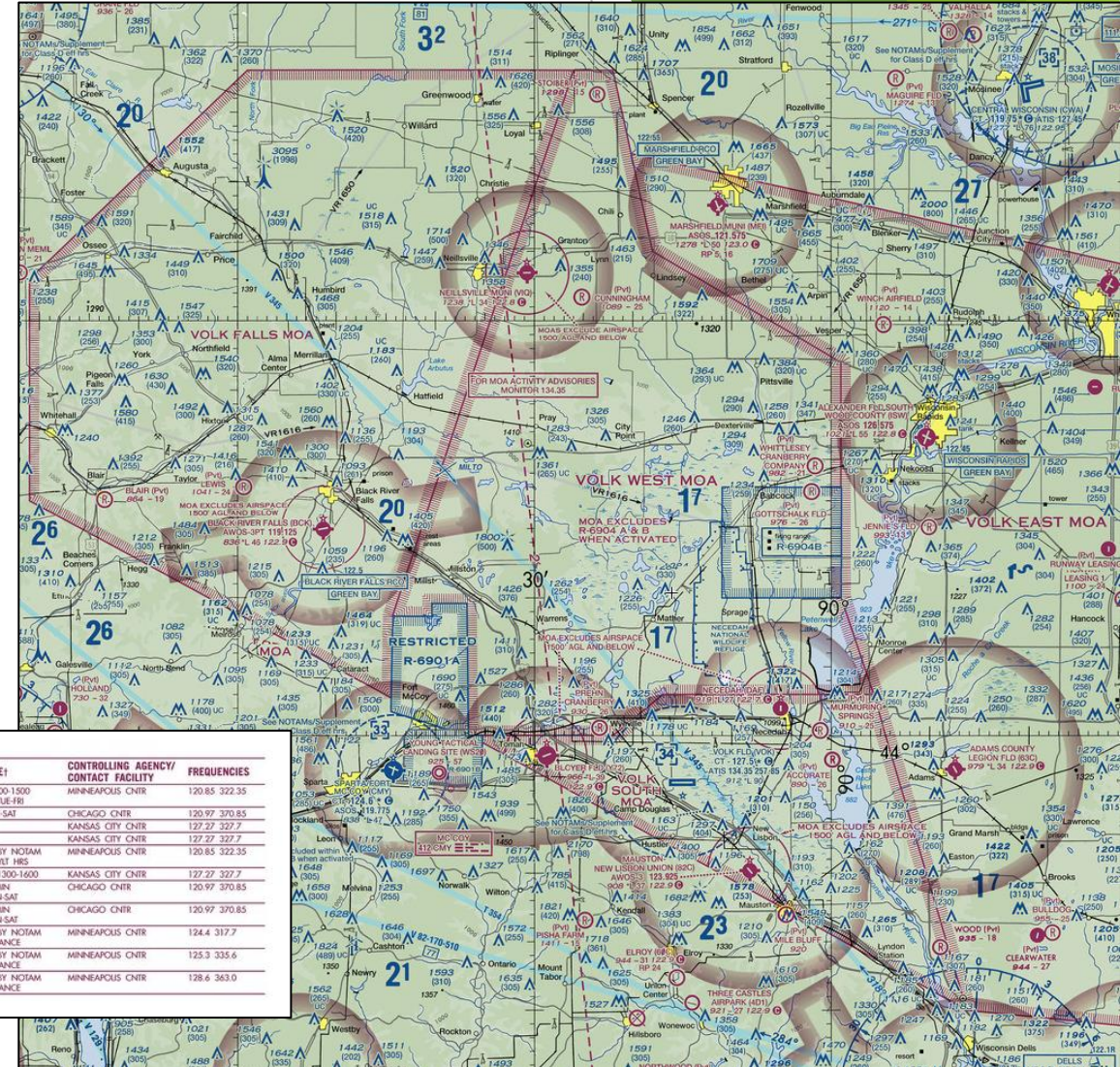
Unless otherwise noted altitudes are MSL and in feet. Time is local.
 "TO" on altitude means "To and including."
 FL - Flight level
 NO A/G - No air to ground communications.
 Contact Flight Service for information.

† Other times by NOTAM.
 NOTAM - Use of this term in Restricted Areas indicates FAA and DoD NOTAM systems. Use of this term in all other Special Use areas indicates the DoD NOTAM system.

U.S. P-PROHIBITED, R-RESTRICTED, W-WARNING, A-ALERT, MOA-MILITARY OPERATIONS AREA

NUMBER	ALTITUDE	TIME OF USE	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
R-6901 A	TO 20,000	CONTINUOUS 1 MAY-30 SEP 0800-2200 MON-THU & 0800 FR-2200 SUN 1 OCT-30 APR 124 HRS IN ADVANCE	MINNEAPOLIS CNTR	128.6 363.0
R-6901 B	TO 20,000	BY NOTAM 24 HRS IN ADVANCE	MINNEAPOLIS CNTR	128.6 363.0
R-6903	TO FL 450	INTERMITTENT BY NOTAM	MINNEAPOLIS CNTR	128.6 363.0
R-6904 A	150 AGL TO FL 230	0800-1600 TUE-SAT	MINNEAPOLIS CNTR	124.4 317.7
R-6904 B	TO FL 230	0800-1600 TUE-SAT	MINNEAPOLIS CNTR	124.4 317.7

MOA NAME	ALTITUDE*	TIME OF USE†	CONTROLLING AGENCY/ CONTACT FACILITY	FREQUENCIES
HERSEY	5000	0900-1100, 1300-1500 8 1800-2200 TUE-FRI	MINNEAPOLIS CNTR	120.85 322.35
HILL TOP	10,000	0800-1900 TUE-SAT	CHICAGO CNTR	120.97 370.85
HOWARD EAST	9000	0700-2200	KANSAS CITY CNTR	127.27 327.7
HOWARD WEST	10,000	0700-2200	KANSAS CITY CNTR	127.27 327.7
MINNOW	10,000	INTERMITTENT BY NOTAM NORMALLY DAVIS HES	MINNEAPOLIS CNTR	120.85 322.35
PRUITT A	500 AGL TO 6000	0900-1200 & 1300-1600	KANSAS CITY CNTR	127.27 327.7
TWELVE MILE EAST	500 AGL TO BUT NOT INCL 10,000	0900 TO 30 MIN AFTER SS MON-SAT	CHICAGO CNTR	120.97 370.85
TWELVE MILE WEST	500 AGL TO BUT NOT INCL 6000	0900 TO 30 MIN AFTER SS MON-SAT	CHICAGO CNTR	120.97 370.85
VOUK EAST	8000	INTERMITTENT BY NOTAM	MINNEAPOLIS CNTR	124.4 317.7
VOUK FALLS	500 AGL	INTERMITTENT BY NOTAM 4 HRS IN ADVANCE	MINNEAPOLIS CNTR	125.3 335.6
VOUK SOUTH	500 AGL	INTERMITTENT BY NOTAM 4 HRS IN ADVANCE	MINNEAPOLIS CNTR	128.6 363.0



Complex Airspace Examples

- ▶ Full “can we fly here” examples
 - ▶ Strictly follow the COA flight checklist

COA Flight Checklist

TFRs or NOTAMs?

- TFRS → FAA website: tfr.faa.gov
- NOTAMS → FAA website: notams.aim.faa.gov
- TFR/NOTAMS → Third Party website: Skyvector.com (Confirm layers for TFRs and “DROTAMs” are enabled)

Airspace Class?

- Basic Airspace
 - B: solid blue (large rings around a big city airport)
 - C: solid magenta (rings around a moderately big city airport)
 - D: dashed blue (ring around large general aviation airports, small passenger airports)
 - E: Normally from 1200’ AGL, but drops to 700’ AGL on soft side of shaded magenta line, and drops to surface if there is a purple dashed line surrounding an airport
 - G: surface to beginning of Class E (if not B, C, or D)
- Special Use Airspace
 - Regulatory (Prohibited & Restricted) vs nonregulatory (Other)
 - TFRs are special use airspace but are not depicted on charts
- Military Training Routes (MTRs)
 - Light grey line with VR or IR designation
 - Operations within 8NM on either side of centerline required coordination to deconflict
- Check time and airspace level reversions (if applicable)
 - Class C, D, and E (sfc) may revert, refer to current chart supplement (https://www.faa.gov/air_traffic/flight_info/aeronav/Digital_Products/dafd/search/)
 - Active times for Special Use Airspace vary (sua.faa.gov or Skyvector “regional” view)

Nearby airports with restrictions?

- Airport with active tower: UAS flight must be 5NM radius from Airport Reference Point (ARP)
 - Refer to current chart supplement (Skyvector.com)
- Airport with no tower or no active tower: UAS flight must be 3NM from ARP if the airport has an instrument approach associated with it, otherwise UAS flight must be 2NM from ARP
 - Instrument approaches associated with airport (Airnav.com)

Note: ARP can be found on Airnav.com - the lat/long can be pasted into Google Maps for analysis

Note: Uncharted heliports, seaplane bases, airports, and private airports do not apply

Weather Restrictions?

- Check Skyvector.com (weather layers must be turned on)
 - Need a ceiling (broken, overcast, or VV) of 1,000ft or better
 - Need visibility greater than 3 statute miles
 - Wind, elements, and other weather/environmental considerations for the UAS flight

Flight time?

- Night operations: day is defined as 30 min prior to official sunrise until 30 min after official sunset. Operations outside these hours requires nighttime training.

NOTAM Filed? (at least 24 hours in advance)

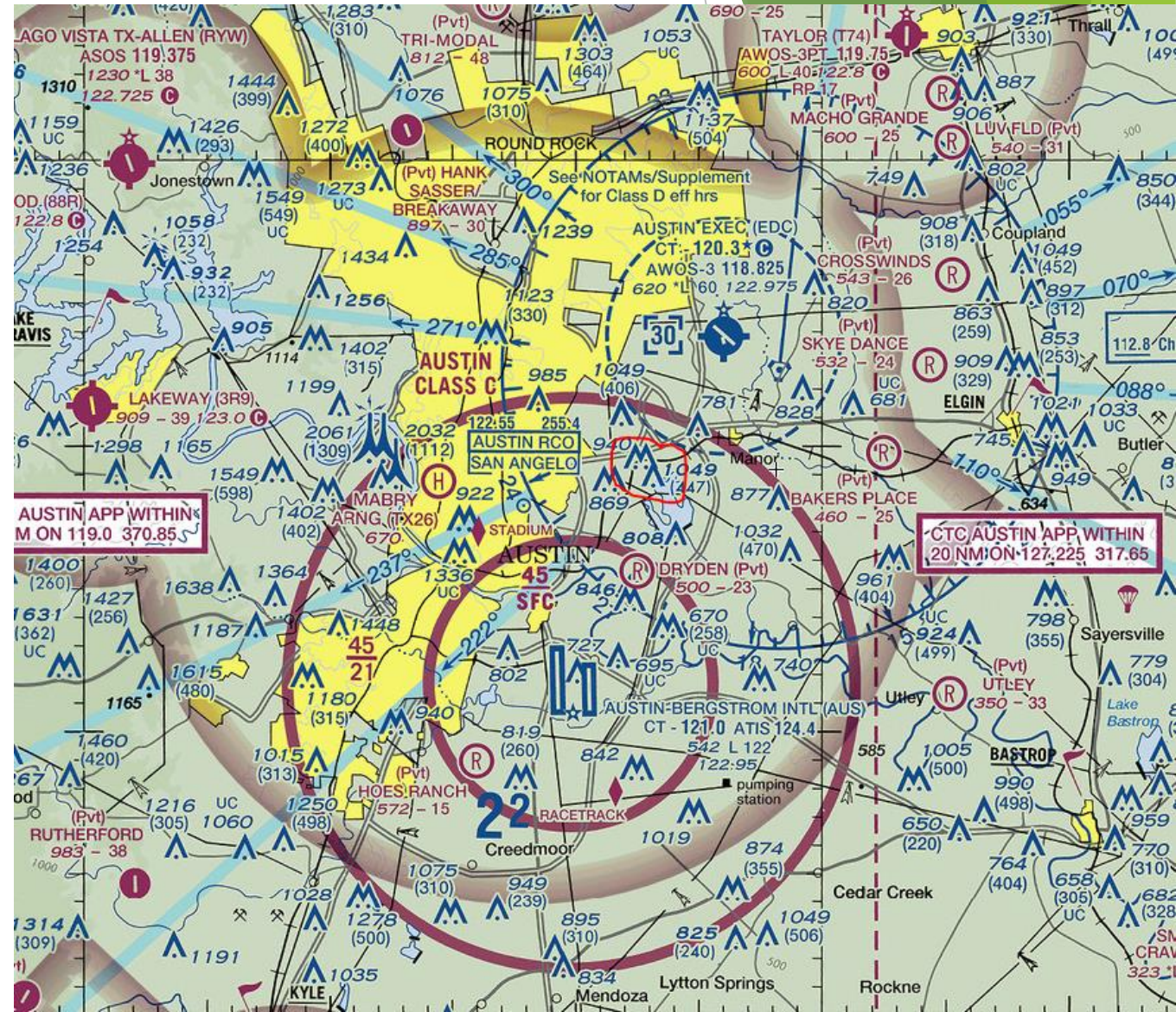
- 1800WXbrief.com
 - Correct submission formation
 - Location identified with NAV aid (VOR) ID, radial, and distance***
 - Can be verified under Skyvector “DROTAMs” tab or with other sources

Logbooks? (plan to fill out after flight)

- Personal and Master logbooks

Complex Airspace Examples

- Can we fly at this point 26 hours from now?



Complex Airspace Examples

COA Flight Checklist

TFRs or NOTAMS?

- TFRs → FAA website: [tfr.faa.gov](https://www.tfr.faa.gov)
- NOTAMS → FAA website: [notams.aim.faa.gov](https://www.notams.aim.faa.gov)
- TFR/NOTAMS → Third Party website: [skyvector.com](https://www.skyvector.com) (Confirm layers for TFRs and "DROTAMs" are enabled)

► Step 1. Check for TFRs



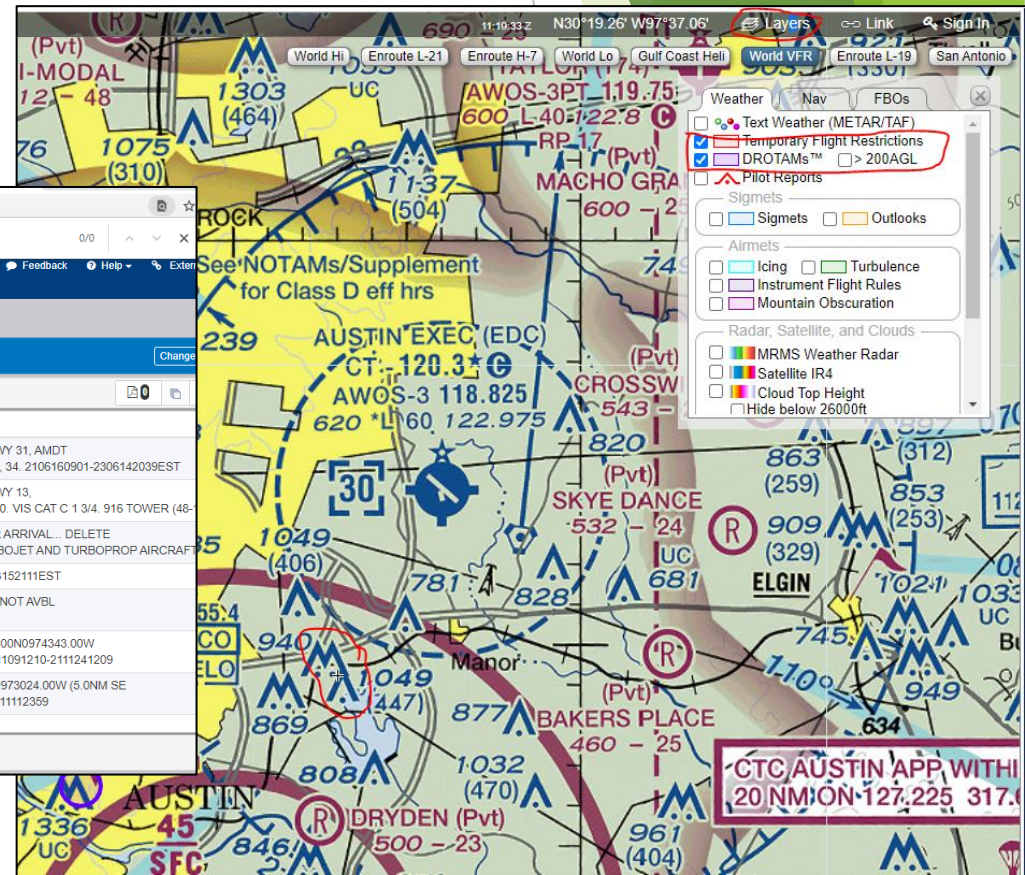
FAA FNS NOTAM Search

Searched at: 2021-11-11 11:23:28 UTC

→ Location search on location(s) EDC. 7 NOTAM(s) found.

Location	Number	Class	Start Date UTC	End Date UTC	Condition
EDC	1/3534	Procedure	06/16/2021 0901	06/14/2023 2039EST	IAP AUSTIN EXEC, AUSTIN, TX. RNAV (GPS) RWY 31, AMDT 1A... CHANGE NOTE: CIRCLING NA TO RWY 16, 34. 2106160901-2306142039EST
EDC	1/4937	Procedure	06/01/2021 1255	05/30/2023 1255EST	IAP AUSTIN EXEC, AUSTIN, TX. RNAV (GPS) RWY 13. ORIG-A... CIRCLING CAT C/D MDA 1280/HAA 660. VIS CAT C 1 3/4. 916 TOWER (48-
EDC	1/1003	Procedure	07/16/2021 1345	07/31/2022 2359	STAR AUSTIN EXEC, AUSTIN, TX BLEVE FOUR ARRIVAL... DELETE NOTE: DME/DME/IRU OR GPS EQUIPPED TURBOJET AND TURBOPROP AIRCRAFT
EDC	09/006	Aerodrome	09/15/2021 1158	03/15/2022 2111EST	RWY 31 RWY END ID LGT U/S 2109151158-2203152111EST
EDC	10/013	Aerodrome	10/28/2021 1739	01/28/2022 2300	SVC AUTOMATED WX BCST SYSTEM CEILING NOT AVBL 2110281739-2201282300
EDC	11/007	Obstruction	11/09/2021 1210	11/24/2021 1209	EDC OBST TOWER LGT (ASR 1205965) 303230.00N0974343.00W (8.5NM W EDC) 1071.9FT (292.0FT AGL) U/S 2111091210-2111241209
EDC	10/006	Obstruction	10/11/2021 1929	11/11/2021 2359	OBST TOWER LGT (ASR 1279136) 301956.00N0973024.00W (5.0NM SE EDC) 796.3FT (299.5FT AGL) U/S 2110111929-2111112359

End of Report



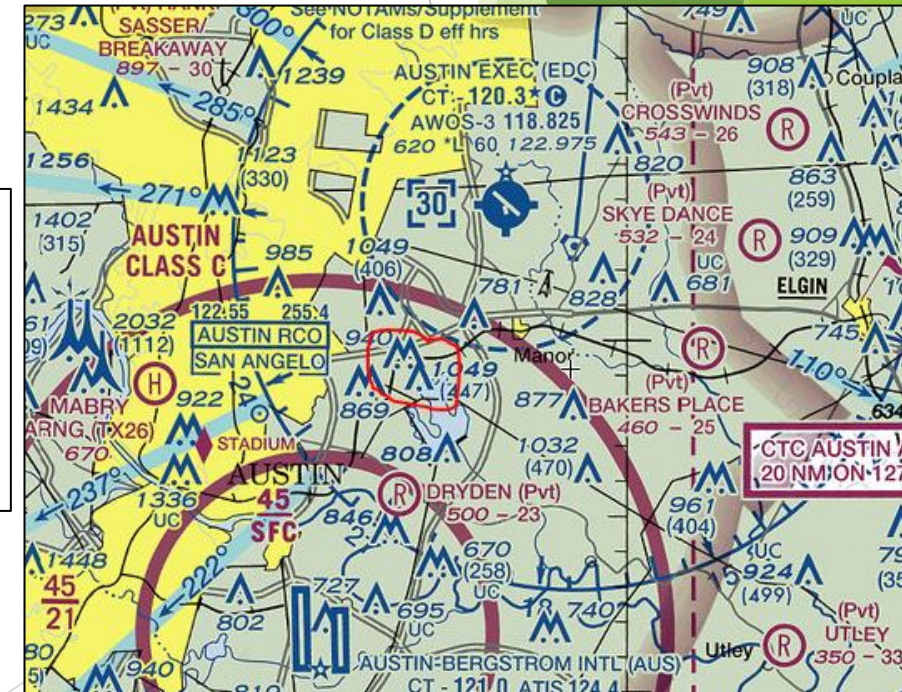
Date	NOTAM Facility	State	Type	Description
09/02/2021	1/0488	FDC	USA	SECURITY USA, Thursday, September 02, 2021 through Friday, Sep 01, 2023 UTC
05/13/2021	1/5318	FDC	USA	SECURITY USA, Thursday, May 13, 2021 through Saturday, May 20, 2021 UTC
10/08/2020	0/0230	FDC	USA	SECURITY Special Notice, USA
10/08/2020	0/0229	FDC	USA	SECURITY USA, Thursday, October 29, 2020 through Friday, October 29, 2021 UTC
08/29/2020	0/9801	FDC	USA	SECURITY USA, Tuesday, September 08, 2020 UTC
01/14/2020	0/3929	ZDC	USA	SECURITY USA, Wednesday, January 15, 2020 UTC

Complex Airspace Examples

- ▶ Basic airspace, what airspace are we in from the surface going all the way up?
 - ▶ Identify all the different types of airspace
 - ▶ Look at the big picture if needed to find clues for what happens to G airspace

Airspace Class?

- Basic Airspace
 - B: solid blue (large rings around a big city airport)
 - C: solid magenta (rings around a moderately big city airport)
 - D: dashed blue (ring around large general aviation airports, small passenger airports)
 - E: Normally from 1200' AGL, but drops to 700' AGL on soft side of shaded magenta line, and drops to surface if there is a purple dashed line surrounding an airport
 - G: surface to beginning of Class E (if not B, C, or D)



Complex Airspace Examples

- ▶ What does SUA look like?
 - ▶ Is there any that would apply?
- ▶ What do MTRs look like?
 - ▶ Are there any here?
- ▶ What airspaces revert, do we need to worry about reversions here?

- Special Use Airspace
 - Regulatory (Prohibited & Restricted) vs nonregulatory (Other)
 - TFRs are special use airspace but are not depicted on charts
- Military Training Routes (MTRs)
 - Light grey line with VR or IR designation
 - Operations within 8NM on either side of centerline required coordination to deconflict
- Check time and airspace level reversions (if applicable)
 - Class C, D, and E (sfc) may revert, refer to current chart supplement (https://www.faa.gov/air_traffic/flight_info/aeronav/Digital_Products/dafd/search/)
 - Active times for Special Use Airspace vary (sua.faa.gov or Skyvector "regional" view)



Complex Airspace Examples

- ▶ What are the closest airports?
 - ▶ How far away do we need to remain from different types of airports
 - ▶ Private airports?
 - ▶ Rule of thumb for checking specific ARP



Nearby airports with restrictions?

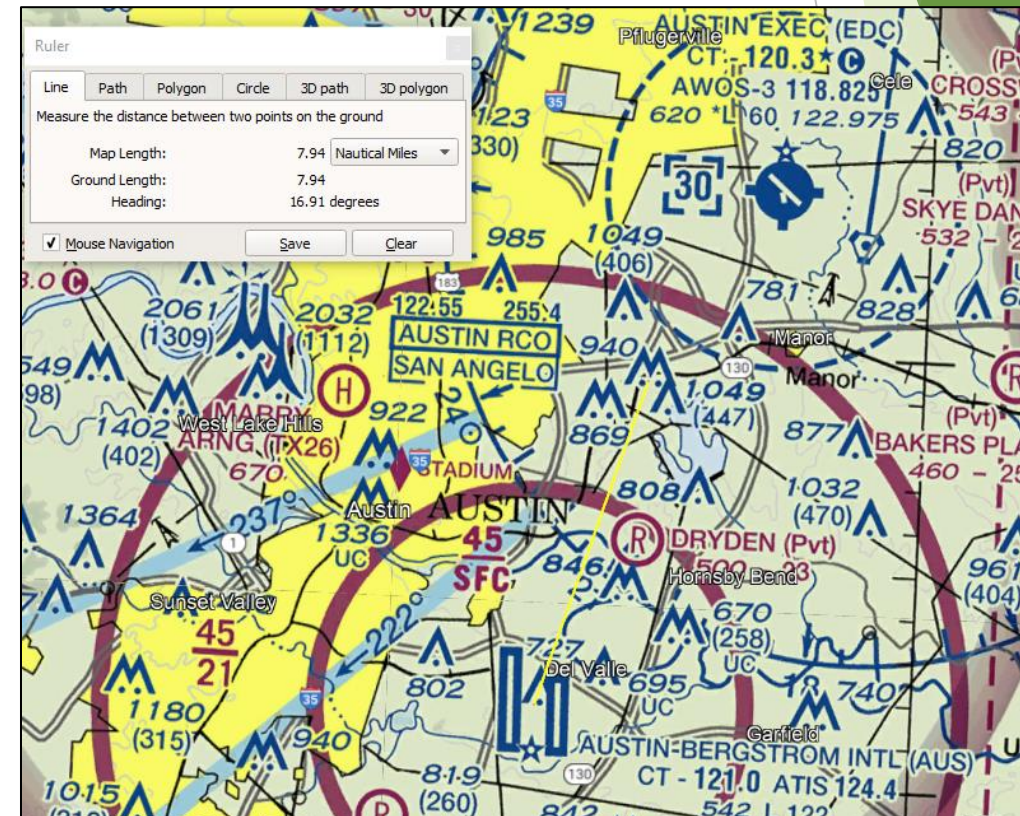
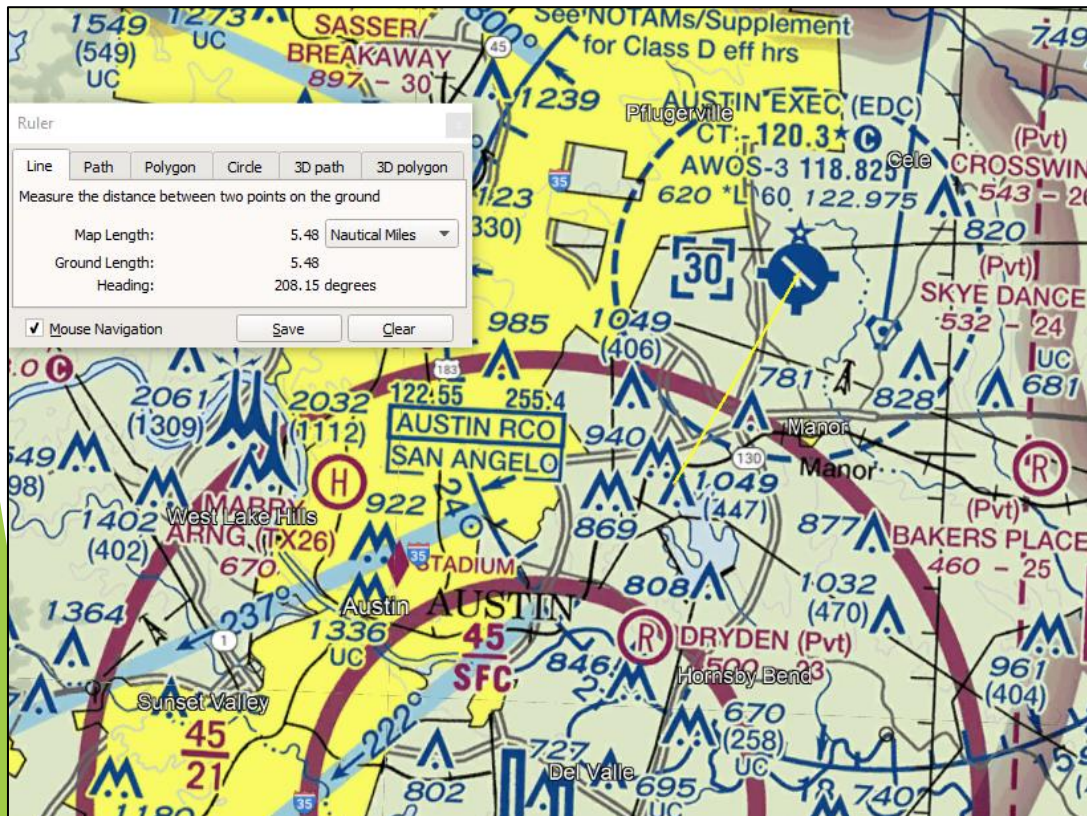
- Airport with active tower: UAS flight must be 5NM radius from Airport Reference Point (ARP)
 - Refer to current chart supplement (Skyvector.com)
- Airport with no tower or no active tower: UAS flight must be 3NM from ARP if the airport has an instrument approach associated with it, otherwise UAS flight must be 2NM from ARP
 - Instrument approaches associated with airport (Ainrav.com)

Note: ARP can be found on Airnav.com - the lat/long can be pasted into Google Maps for analysis

Note: Uncharted heliports, seaplane bases, airports, and private airports do not apply

Complex Airspace Examples

- ▶ To figure out if 5NM or 3NM distance is required from KEDC check the chart supplement
- ▶ If the tower is active 5.4 NM is pretty close to what is legally required for the airport of EDC so a more in depth check of the distance can be made



Complex Airspace Examples

- Check to see if tower will be active?

240

TEXAS

AUSTIN

AUSTIN EXEC (EDC)(KEDC) 12 NE UTC-6(-5DT) N30°23.85' W97°33.98'

620 B NOTAM FILE EDC

RWY 13-31: H6025X100 (ASPH) D-101 MIRL 0.4% up NW

RWY 13: REIL. PAPI(P4L)—GA 3.0° TCH 40'. Thld displcd 600'. Tree.

RWY 31: REIL. PAPI(P4L)—GA 3.0° TCH 40'.

RWY 16-34: H1550X25 (ASPH) S-8 1.0% up N

SERVICE: S4 **FUEL** 100LL, JET A **LGT** ACTIVATE MIRL Rwy 13-31, REIL Rwy 13 and Rwy 31—CTAF. PAPI Rwy 13 and Rwy 31 opr continuously.

AIRPORT REMARKS: Attended continuously. Fuel avbl 24 hrs with credit card. Acft tiedowns and buildings within Rwy 16-34 primary sfc. Rwy 16-34 twy unmarked. Rwy 13-31 twy edges are marked by reflector posts. Northwest end of Rwy 13-31 and parallel twy have a 16' descending embankment off end of pavement. Touch and go landings prohibited. VFR departures requesting ATC svc remain clear of the final apch course of Rwy 17L and Rwy 17R. If the acft is initially eastbound, ctc Austin Apch Ctl on 127.22. If the acft is initially westbound ctc Austin Apch Ctl on 125.32. Austin clearance delivery 126.025. Rwy 16-34 numbers 20' tall and centerline markings only.

AIRPORT MANAGER: 512-247-7678

WEATHER DATA SOURCES: AWOS-3 118.825 (512) 616-2967.

COMMUNICATIONS: CTAF 120.3 UNICOM 122.975

Ⓡ **AUSTIN APP/DEP CON** 127.225

EXECUTIVE TOWER 120.3 (1200-0400Z†)

GND CON 119.45 **CLNC DEL** 126.025 (Aus App/Dep when EDC twr clsd)

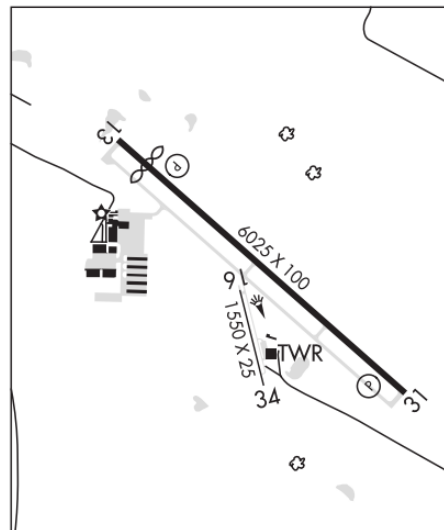
CLEARANCE DELIVERY PHONE: For CD ctc Austin Apch at 512-369-7865.

AIRSPACE: CLASS D svc 1200-0400Z†; other times CLASS E.

RADIO AIDS TO NAVIGATION: NOTAM FILE AUS.

CENTEX (H) VORTACW 112.8 CWK Chan 75 N30°22.71' W97°31.79' 295° 2.2 NM to fld. 593/6E.


SAN ANTONIO
H-7C, L-19C, 21A
IAP, AD



Complex Airspace Examples

KEDC **Austin Executive Airport**
Austin, Texas, USA

GOING TO AUSTIN?


[Reserve a Hotel Room](#)

FAA INFORMATION EFFECTIVE 04 NOVEMBER 2010

Location

FAA Identifier: EDC

Lat/Long: 30-23-50.9753N 097-33-59.0166W

30-23.849588N 097-33.983610W

30.3974931, -97.5663935

(estimated)

Elevation: 620 ft. / 189.0 m (surveyed)

Variation: 05E (2010)

From city: 12 miles NE of AUSTIN, TX

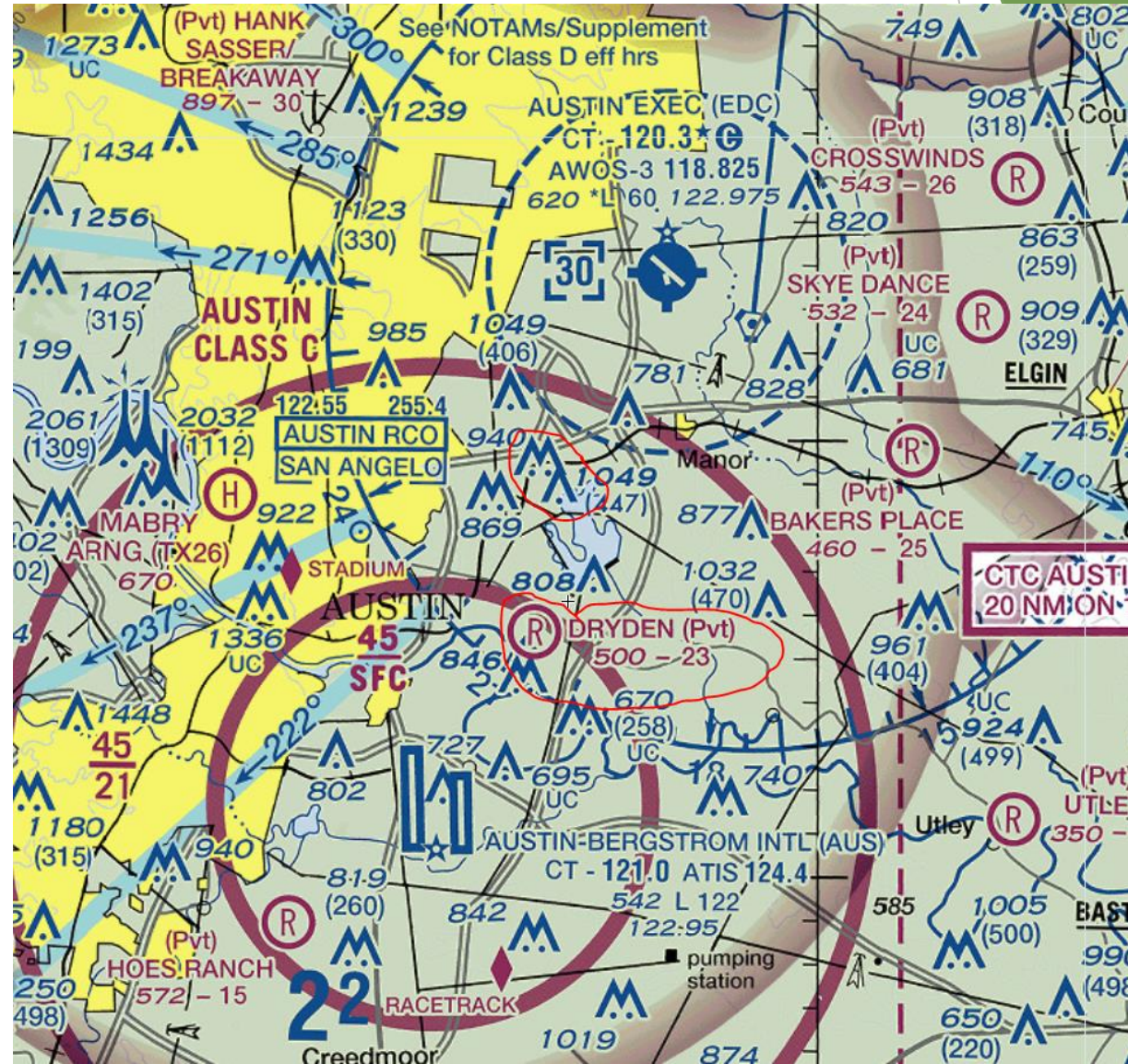
Time zone: UTC -5 (UTC -6 during Standard Time)

Zip code: 78660



Complex Airspace Examples

- What about Dryden airport?



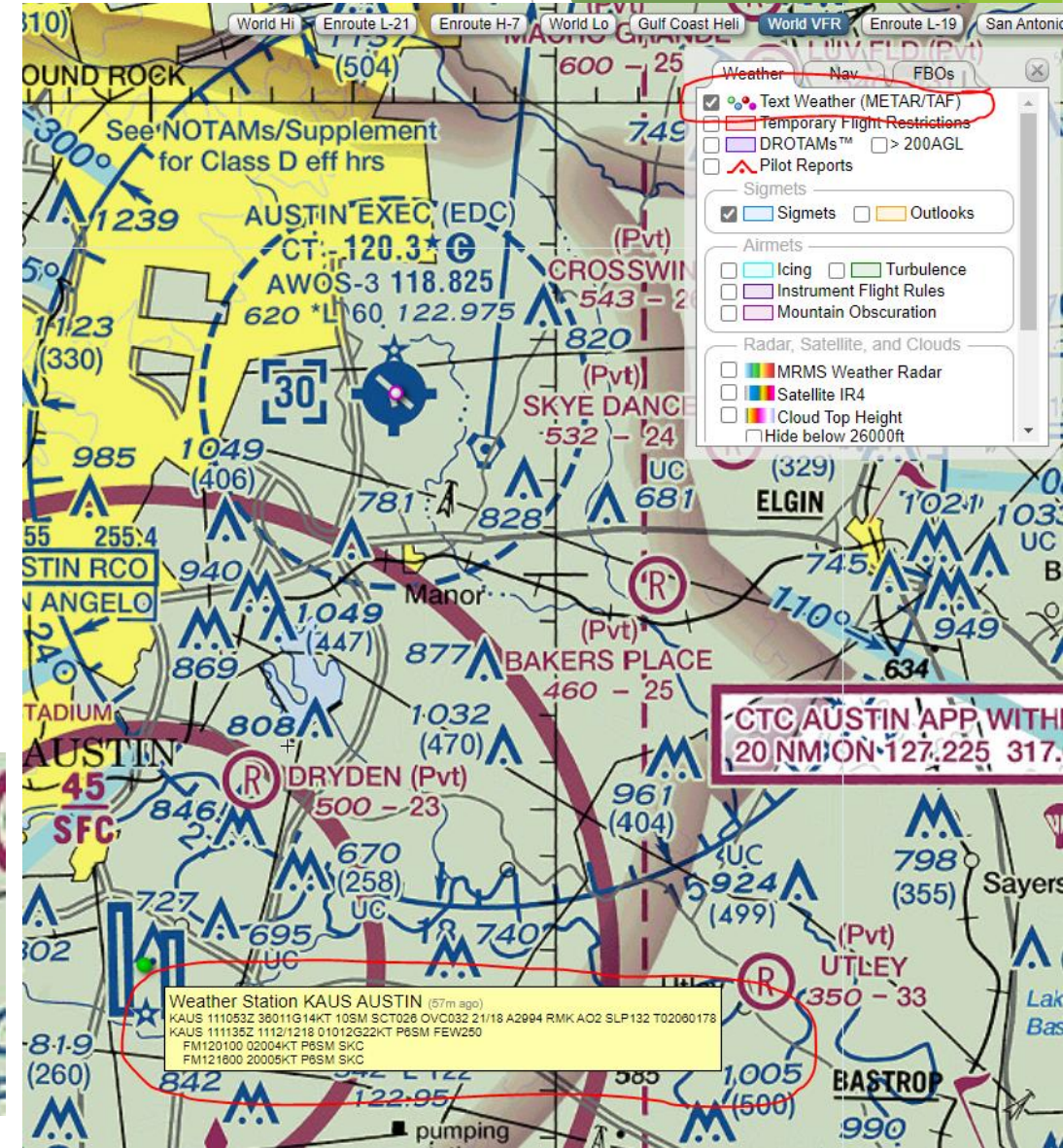
Complex Airspace Examples

- ▶ When checking to see if you can fly at a location 26 hours in advance use a general forecast. If however, when you show up the weather is questionable then use a METAR. Just for practice we will assume this is the METAR when we show up

Weather Restrictions?

- Check Skyvector.com (weather layers must be turned on)
 - Need a ceiling (broken, overcast, or VV) of 1,000ft or better
 - Need visibility greater than 3 statute miles
 - Wind, elements, and other weather/environmental considerations for the UAS flight

Weather Station KAUS AUSTIN (59m ago)
KAUS 111053Z 36011G14KT 10SM SCT026 OVC032 21/18 A2994 RMK AO2 SLP132 T02080178
KAUS 111135Z 1112/1218 01012G22KT P6SM FEW250
FM120100 02004KT P6SM SKC
FM121600 20005KT P6SM SKC



Complex Airspace Examples

- ▶ Will we be operating at a time when we require night training?

Flight time?

- Night operations: day is defined as 30 min prior to official sunrise until 30 min after official sunset. Operations outside these hours requires nighttime training.

Complex Airspace Examples

- ▶ Closest VOR (NAVAID)
 - ▶ ID, Radial, Distance

NOTAM Filed? (at least 24 hours in advance)

- 1800WXbrief.com
 - Correct submission formation
 - Location identified with NAV aid (VOR) ID, radial, and distance***
 - Can be verified under Skyvector "DROTAMS" tab or with other sources

UAS Operating Area (UOA) with NOTAM

Active UOAs ▼ Pending UOAs ▼ Past UOAs ▼

* Click field names for help [UAS & UOA Help](#)

Draft	Aircraft ID or Reg. No.	Altitude <input type="radio"/> MSL <input checked="" type="radio"/> AGL	Frequency
	ABCD12345	Lower SFC ft Upper 400 ft	<input checked="" type="radio"/> One Flight <input type="radio"/> Recurring Flight

Operating Area

☒ Circular Area (a center point and radius)
Center Point: CWK225006 Radius: .2 nm
Address: Clear

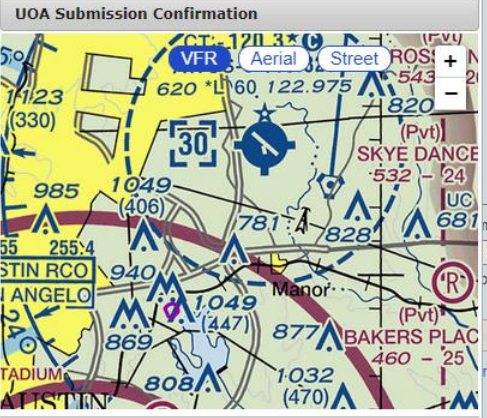
☐ Non-circular Area (a boundary defined by a series of points)
☐ Line (a line defined by multiple points)
Map

Schedule
Start Date & Time: 11/12/2021 1200 MST
End Date & Time: 11/12/2021 1300 MST

Contact Information
INFO, PHONE NUMBER:

Pre-programmed Contingency Route

UOA Submission Confirmation



Submit Cancel

End Service Registration (required)
2018-WSA-1043-COA
be submitted on your behalf when clicking the Submit

Refer to FAA Guidance regarding submission of NOTAMS for Unmanned Aircraft.

insible for ensuring their operations are authorized and in compliance with FAA guidance.

Complex Airspace Examples

- After you have completed your flight make sure to set a reminder to fill out both of your logbooks. (Master and Personal)

[illegible]

FOM Ch 10- (*Recap Summary*)

- ▶ Complete multiple COA flight checklist examples

FOM Ch 10- *(Quiz)*

Quiz Questions:

- ▶ When flying outside of the country what regulations apply?
- ▶ Who must you contact for approval to fly outside of the country?

Moving forward

- ▶ Congratulations on completing your initial ground school
 - ▶ Your training folders will be filled out to reflect this accomplishment
- ▶ Next steps
 - ▶ Reach out to the department to schedule a training event
 - ▶ During this training event you will review all important topics from ground school as well as get asked more practical questions
 - ▶ During this initial training event you will also get the opportunity to fly a departmental UAS. (typically multirotor D1)
 - ▶ After the initial training event, if you feel comfortable, you can schedule a checkride.
 - ▶ On average it takes one to two training events before a checkride
 - ▶ The quicker you schedule a training event the higher the success rate
- ▶ Final questions and feedback
 - ▶ Reviews and feedback quizzes

Moving forward

