



THE VFR SECTIONAL CHART'S HIDDEN VALUE Looking beyond the ABCs

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There's more to teaching the chart than the obvious

Students and licensed pilots alike have found many uses for the VFR Sectional chart. They are great for filling those little empty spaces in the flight bag, they make wonderful gift wrap for anyone who is even remotely aware of aviation, and they substitute as a “view-restricting” device when you forget your hood or foggles. Of course, none of these great ideas are the chart’s primary purpose. As any student pilot will tell you, the VFR chart is loaded with lots of, ummm confusing but useful information. Much, much more information than a pilot candidate is taught or can absorb in the relatively short time it takes to prepare for a certificate or rating. Most students learn just enough to “get-by” and to pass the oral portion of their practical test. After a brief refresher for their instrument rating or flight review a lot of the information the chart provides is quickly forgotten.

“Why do we need to know this stuff?” is a familiar question heard by CFIs from their students. As instructors we patiently explain that the primary reason is safety. The chart is an important tool to use in flight planning for several reasons. First, to plan courses and distances from point A to point B using prominent “check-points” to keep from getting lost. Second, to keep him or her out of places they don’t belong. And third, to give them the frequencies they may need to call for help if necessary. There is a whole lot more about the chart for the student to learn, so here is some of that good information.



The chart can also be used to cover instruments so your student will look outside during maneuvers and not focus on the gauges when flying by visual flight rules. After all, we are teaching “VFR” and not “IFR” flight in the primary stage of training. And when we do teach “flight-by-reference to instruments” the chart can be that substitute hood.

It’s time for us – as instructors – to do the research and put some study time in so that we can do a better job of teaching the VFR chart. There is so much information provided if we just look closely and understand what that big - sometimes hard-to-handle - multi-colored piece of paper is telling us. (Did you know that there is an easy way to always open the chart to the correct side?) Of all the resources we introduce to our students, the VFR chart is right on top of the list as an important document to be understood and taken along on every flight. We CFIs need to learn as much as possible about the charts and airspace and can accomplish this by spending some time in the Aeronautical Information Manual – Chapter 3; FAR Part 71 and 91; on the internet; and attend an Airspace seminar in our area. Additionally, I would like to share here, some information that I have learned over the years. I hope you learn something new that you can add to your knowledge of Airspace.

Are you telling your student how to use the chart to find Flight Service Station (FSS) frequencies? How about how to use the chart tab to determine when and where to fly to safely navigate Military Operating Areas, or how to find the correct frequency to get a Class B clearance? How about how to determine where IFR traffic will be? IFR? Isn’t there a separate chart for that? We’ll cover more about this in a minute.

What the chart tells us –



In addition to the obvious information on airspace, terrain, roads, rivers, and airways, the chart has invaluable – but more subtle - information that can be “lifted” if you take the time to understand it and then pass it on to your students. When we know the “why” of something we have a better chance of not only retaining it, but an increased ability to explain it to our budding pilots.

Most pilots look at the VFR chart as a tool to be used for flight in visual meteorological conditions (VMC) and that is in fact, its primary purpose. But, what if we tell our students that the VFR chart has a lot of IFR information that can be very useful to them when planning their VFR flights? “What”, you say, “why should I confuse my private pilot student by teaching him or her IFR stuff when they may not be ready”?

Because, what the pilot can learn from the chart is where there is likely to be traffic operating under Instrument Flight Rules and by knowing that, he or she will be a safer pilot. For example: The faded magenta tint bands that define Class E airspace beginning at 700’ AGL - *See Figure 1*; or the dashed magenta line that defines Class E airspace at the surface - *See Figure 2*; means there is an instrument approach associated with the primary airport within these airspace boundaries. (Figures are at end of article) A pilot can use this information to be more diligent about looking for traffic and also be reminded that VFR weather minimums apply. You can not fly VFR in controlled airspace without VFR weather minimums or a SVFR clearance. You do know the minimums for VFR don’t you?

Don’t become a statistic. Even when operating IFR you must be looking outside if you are not “in the clouds”. Both VFR and IFR pilots have the responsibility to “see and avoid” when operating in VMC.



You can teach your students that Special VFR rules apply in certain controlled airspaces. However, a request for a SVFR clearance will be low priority if an IFR flight is in the area. It's not a good idea to be in a busy traffic area with low visibility, right? So why would any VFR pilot want to be anywhere near instrument traffic in reduced visibility however legal they may be? I always remind my students - and pilots during flight reviews – “many things they ‘can do’ are legal, but are not necessarily safe for them”.

Your student doesn't need to be instrument rated to understand where an IFR flight might be. All he or she needs to know is how to decipher this information on the VFR chart. Let me give you another example: Figure 2 is a photo of an excerpt from the San Diego Terminal Area Chart. The airport pictured has an ILS approach to runway 24. Notice the dashed magenta symbol leading to the dashed blue Class D symbol? The magenta area is Class E airspace from the surface to 17,999 ft. MSL and requires VFR minimums if you want to fly through it under visual rules. In this case the magenta area protects IFR flights to the surface since all IFR flights are provided separation from other IFR traffic in controlled airspace. If the Class E Surface area did not exist then the portion of airspace outside of the Class D ring would be Class G and therefore no separation would be provided to the IFR pilot and a VFR pilot could legally fly through this area under 700 ft. AGL with 1 mile visibility while remaining clear of any clouds. A perfect setup for a mid-air collision.

You will find Class E surface areas protecting approaches anytime the approach-minimums are less than 700 ft. AGL. For example precision approaches – mainly ILS - normally will have a decision altitude (DA) of 200 ft. AGL. Additionally some VOR and GPS approaches have minimums lower than 700 ft. AGL. In these instances there will be



a surface area Class E symbol protecting the approach. In the case of higher minimums for VOR, GPS, Localizer and other non-precision approach types the magenta tint band is used to protect the approach corridor. In congested areas where there are a lot of airports with instrument approaches the magenta tint band may not be immediately adjacent to the airport, but look closely at the chart and you will see it not too far out.

By reading these symbols you can determine – with some accuracy – what type of approach, either precision or non-precision, exists for a given airport whether it is a towered or non-towered one. In some cases you can determine where the instrument approach path will be and therefore have the information necessary to avoid much of the traffic that could be encountered during your flight.

An additional consideration regarding busy instrument traffic areas is to remain clear of them while practicing maneuvers. Not only is this a situation that increases the risk of a collision, but maneuvering back and forth, up and down near the approach area could cause an instrument approach to be “called off” to avoid hitting you and your student. ATC must provide proper and adequate separation from other traffic in controlled airspace and if your maneuvering interferes with that separation than the IFR flight will be vectored away causing a delay, at the very least, for that pilot. It only takes a little thought and planning to increase the safety of a flight and be considerate of others.

The “WHY” of Airspace Classes –

Understanding why the five classes of controlled airspace exist makes learning and understanding the information easier. So, let’s look into the purpose of airspace in a little more detail.



What do you teach as the reason for having airspace classes, i.e. A, B, C, D, and E? Everything above 18,000 feet MSL must be on an instrument flight plan, with an instrument pilot, in an instrument equipped airplane. Operations in Class B airspace must have an operating Mode C transponder with prior permission to enter and have 3 miles visibility and remain clear of clouds. These rules and all of the other regulations that apply to the various classes of controlled airspace are there for one reason and one reason only; to separate instrument flights from other instrument flights and from participating VFR flights as controller work load allows. If everyone flew in visual meteorological conditions (VMC) and followed “see and avoid, and see and be seen” there would be no need to regulate airspace. There would be a whole lot less color and complexity to the chart.

In the early days of flying in the clouds, there was little traffic and the chance of a collision was remote. Today however, with more and more air traffic, there is an increasing need for noise abatement. (Have you ever heard the sound that two airplanes make when they collide?) This can only be accomplished by having established regulations that describe what is required for pilots to operate in a given class of airspace.

Filing an Instrument Flight Plan effectively “erases” the airspace because these flights are under positive control with radar and constant communication. VFR flights must fly with the minimum visibility and cloud separations as determined by the particular class of airspace that is transitioned.

Early in the student’s training we teach the five classes of controlled and one class of uncontrolled airspace and how to recognize the different classes by their chart symbol and color, what communication is required to enter and transition, what weather minimums are necessary, what equipment an aircraft must have and what pilot



qualifications are needed. It is rarely, if ever, taught how to use the information to “visualize” where IFR traffic may be concentrated. Useful IFR traffic information is in the chart symbols and fully understanding these symbols will reveal their secrets and can add to the safety of flight by allowing the pilot to use the hidden information to his or her advantage.

As mentioned earlier and to summarize, the faded magenta band and magenta dashed line define where Class E begins; 700 ft. AGL and on the surface respectively - and is used to define where an instrument approach is available whether the airport has a tower or is non-towered.

The magenta dashed line is sometimes used at towered airports as an extension of Class D and protects an IFR approach down to the surface. (See Figure 2).

Here is a brief explanation of how these symbols work. An IFR flight receives “separation” services only in controlled airspace; A, B, C, D, & E. What does “separation” mean in this context? When a pilot files and receives a clearance for an instrument flight, that flight is handled under positive control and separation is provided either by radar contact and communication or by communication alone with constant updates of position as reported by the pilot. When an instrument flight is conducted in visual meteorological conditions (VMC) the pilot is responsible to “see and avoid” other traffic. Flights conducted in (VMC) and not on an IFR flight plan must follow visual flight rules (VFR) even if the flight receives radar services. Since Class E airspace is one of the “controlled” airspaces utilized by both VFR and IFR flights, the VFR pilot must have the proper visibility and cloud separation criteria to be legal in that airspace. Therefore, a VFR flight can not fly in Class E airspace in conditions less than 3 miles visibility and/or less than the standard cloud separation of 500 ft. below, 1,000 ft. above,



and 2,000 ft. of horizontal distance from clouds, (Special VFR is the exception). The VFR chart then is the tool to determine where those areas of Class E exist. Remember to teach the importance of understanding the faded magenta band and magenta dashed line – to protect an IFR flight as it descends on an approach to an airport.

Study the VFR chart and see how you can determine and teach where IFR traffic is likely to be, based on all of those crazy colors and lines. You will even get skilled at knowing what type of approach is likely to be available at an airport based on the now familiar symbols. Challenge your fellow CFI's with this new knowledge and encourage them to share it with their students. Maybe you can win lunch.

Here are a couple of clues to what type of approach is probably at the airport based on the VFR chart symbology. When there is a magenta dashed area connected to Class Delta airspace, (see Figure 2), that airport has either an ILS, PAR, or one of the new GPS approaches such as an LPV. If there is a magenta tint band in the vicinity of either a non-towered or towered airport there is – most likely – a VOR, LOC, or GPS such as an L/NAV or other non-precision approach. Check the terrain and availability of VORs near the airport for additional clues as to the type of approach. No Class E surface area or VOR? Then the approach is probably GPS. Test yourself by trying to guess the approach type and then look up the airport in the IFR approach publications and see if you are correct.

Supplementing Ground School

A typical ground school could be six weeks up to one college semester. This relatively short period limits the amount of knowledge that a student will absorb. The main focus of the ground school is to prepare for the FAA knowledge exam which leaves many chart details undiscovered. As an instructor your responsibility is to fill in the gaps of



knowledge in all areas and get your students beyond the rote level of learning. It may be necessary to spend quality one-on-one time with them to ensure their knowledge is complete. With regard to charts and airspace there are some pretty common weak areas. One approach I like is to get two or three students together in a “mini” class and have them work together in planning a cross-country flight. I like to use a chart from some unfamiliar region to challenge the student’s knowledge and ability to correctly identify the various classes of airspace. Be sure to review - and teach as necessary – information such as VOR frequency boxes, what the small “H”, “A”, and “T” provide, ask the student to describe how to use the 122.1R frequency and to describe the difference between the “IR” and “VR” military airways. Find an airport with surface based Class E and ask the students if they can land there as a VFR pilot with a ceiling of 3,000 ft. and 2 ½ miles visibility. Be ready to explain why they can not when they seem puzzled.

Since the airspace system is complex and charts are overwhelming to the new student be sure to start their schooling with the area around the training airport and work outward as they progress. The local area is sufficient during pre-solo training and you can expand their knowledge of the chart when they begin cross-country training.

The Chart and the Flight Review –

The FAA mandated Flight Review is the perfect opportunity to review, enlighten, and/or enhance, a pilot’s knowledge of airspace and charts. You can use some of the same methods during a flight review as you would with a student during a stage check. A scenario based ground session is a perfect way to explore pilot knowledge. Get the pilot to talk about his or her normal flying habits. Perhaps they go on regular cross-country trips in various types of airspace. As they tell their story, look for opportunities to quiz them about the chart and applicable Part 91 regulations. One of the best ways for CFIs to



learn is to work with as many pilots as possible. If your student base is small try to provide stage-check services to other CFIs. You can always benefit from this approach and will be a better instructor for it.

Figures

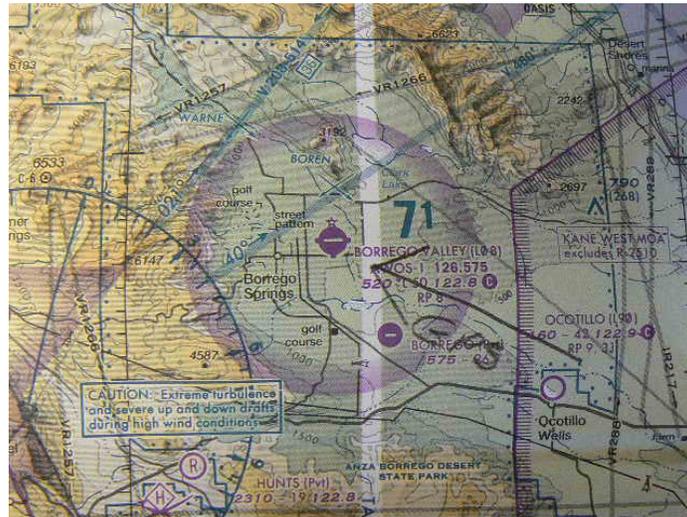


Figure 1

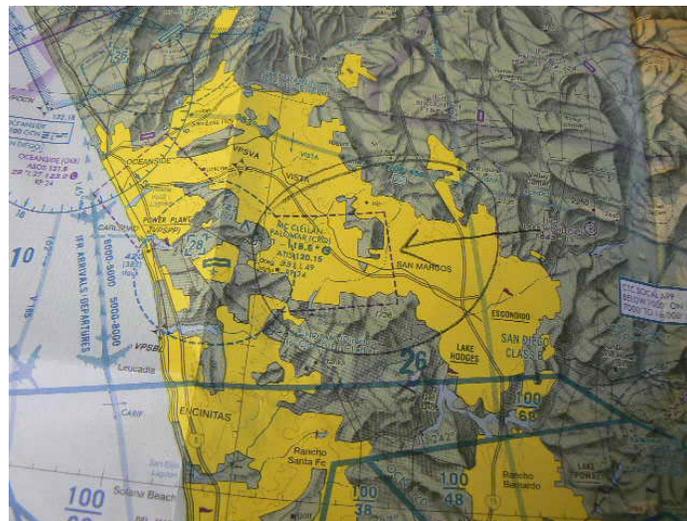


Figure 2

I hope that you have enjoyed this article. Look for other articles in the library in the near future.

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