



## JEPPESEN ELECTRONIC CHART CLINIC FOURTH IN A SERIES

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### DIGITAL BRIEFING

There are millions and millions of bits and bytes all packed together trying to make something meaningful. All those zeros and ones racing around in that silicon trying to create an image that you and I know as a chart. To keep all of them in order is something beyond me, but the software programmers have a talent that seems to defy logic.

What comes out in the end, however, is something we make judgments about. Something that is the same as what we are used to on paper. This is one of the reasons that electronic charts appear similar to paper charts. Industry standardization committees have stated that the new generation of electronic charts should be created in a way so that a whole new learning process does not need to be accomplished to read electronic charts. It is called human factors.

We have all learned to read VFR and IFR charts during the process of becoming pilots. Human factors experts say that old habits die hard so changes should be evolutionary, not revolutionary. So then, why have electronic charts at all?

### Why Electronic Charts?

Probably the best advantage of electronic charts is the new situational awareness that comes with having your airplane's position move on top of the chart display. Another obvious reason is not having to carry pounds and pounds of paper. A nice benefit with electronic charts is the savings of time necessary to file revisions.

But let's go beyond the obvious.

What if only the information you needed for each phase of flight was in front of you? What if you flew an approach and all the information behind you went away? What if only those communication frequencies for your specific flight appeared on the chart? What if none of the radials from a VOR that formed an intersection appeared on the chart because you were flying with a GPS using an overlay approach and the VOR was not necessary?

To look at the possibilities for this magic, we should review again the three main types of electronic charts. Raster charts are those that have been electronically scanned, geo-referenced (synchronizing latitude/longitude positions on paper), and then placed in a chart software program. The visual aeronautical charts such as Sectionals, WACs, TPCs, etc. fall

into that category. In the FlightMap software program, virtually all the visual aeronautical charts are available. This means you can fly with an electronic chart that is identical to the familiar paper charts because the image is the same due to scanning technology.

Raster charts make it easy to fly with the familiar symbols such as roads, railroads, city patterns, water bodies, cities, man-made

obstacles, color contours, etc. And the magic allows you to see all those images in your airplane with your airplane's position moving on

top of the chart. It also makes it virtually impossible to not know where you are. But with raster, placing your heading at the top of the screen makes all the words and symbols upside down if you are flying south. And zooming in will cause the images to start breaking up so if you keep the zoom levels reasonable, they still look good.

### One Grade Up

Raster charts have the limit of zooming, but vector charts do not. This means you can zoom into a level that allows you to see lots of details without having the image break apart. Vector also is much more precise than raster so your airplane's position should be within meters on the chart if your GPS sensor has that precision. You can precisely tell how close you are to your intended path.

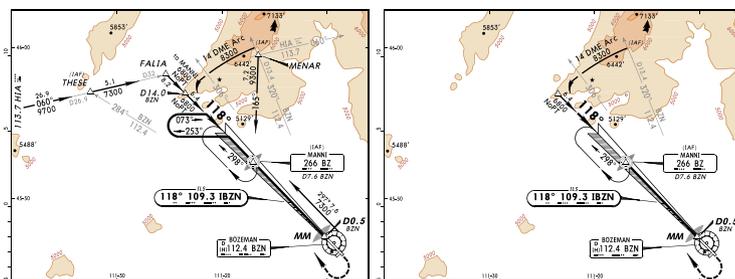
Vector charts also carry intelligence. So if you want to search for something on the chart, a good search engine will find what you are looking for. All of the charts in JeppView are vector charts. When you look at the detail of any information on an approach chart, SID, STAR, or airport diagram, you will see what you are after in very readable detail at even the closest zoom level.

Vector charts also consume significantly less computer storage space which doesn't seem important in this day of gigabyte and terabyte storage. But, it is important when you consider the ability to move all the bits and bytes around at tremendous speeds for smooth movement in a fast airplane.

### More Intelligence

Let's now explore the intelligence that is available in charts that are generated out of a database. Since the final graphic that you see on the screen for an approach chart is created from the

information in the database, the intelligence exists to draw a chart that exactly meets the needs of you and your aircraft and your intended route of flight. To best illustrate this, look at the two different charts for the ILS Rwy 12 approach at Bozeman, Montana. The chart on the left is the plan view as it exists today. The chart on the right is the way it would be drawn if you flew the approach using the DME arc.



The FAA has designed the approach procedure in a way that facilitates arrivals from numerous directions. There is no radar at Bozeman so there are more feeder routes and initial approach segments than at locations where radar is available. If you are arriving from the northwest, there is a feeder route that starts at the Whitehall (HIA) VOR and proceeds via the 060° radial past THESE intersection to the FALIA intersection where you intercept the localizer and follow it to the airport.

MENAR intersection is on V-365 so it is also available for transitioning from enroute to the approach; however, it requires flying the procedure turn. If arriving from the east on Victor airways, the Bozeman VOR forms the airway and is also the beginning of the feeder route to the outer marker from which a procedure turn would be flown.

For illustration purposes, assume you have a DME and are arriving from the north on V-365. The beginning of the DME arc is the BZN 320° radial which is the radial that also forms V-365. Since the radials match, this allows you to fly the DME arc from the airway. Assuming you have a GPS or FMS, and also assuming that your new chart subscription is electronic and is connected to the avionics system, the approach transitions that you have elected not to use would not be displayed.

Numerous questions arise about how the decisions are going to be made for your selection of the appropriate transition to fly, but you can see the future with charts that include only what you need, when you need it. ☑

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