



JEPPESEN ELECTRONIC CHART CLINIC

THIRD IN A SERIES

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DIGITAL BRIEFING

At first glance, a chart is a chart is a chart. It's a little like when you got your first car. You probably were most concerned that it had four tires and a radio. As you gained more experience and the original thrill was behind you, other things became important - such as cruise control, stereo with lots of watts, ABS brakes, air conditioning, power windows, power seats - and you know the rest.

As you become more familiar with electronic charts, your wants and desires become more like your experience after your first car. Other things on charts become important. Things like clarity of the image, color, ease of changing from one chart to the other, and additional things such as the ability to turn off some of the information that is no longer important to you.

In the first two articles in this series on electronic charts, we discussed charts created using raster and vector technology. In this article, we will discuss charts that are "created on the fly" from an airborne database.

Database Charts

The term "database charts" is not exactly a standard term, so let me explain what is meant by those words. In a database chart, there is no graphic image that has been created by someone before you see it. The image, or chart, that you see is dynamically created by software each time you make a request to view the image and it gets regenerated each time you zoom, pan, or look somewhere else in the area of chart coverage.

With a database chart, there is a file stored in your computer. That file contains a database of textual descriptions of aeronautical information, although it will most likely be in a binary format when carried on board the airplane.

As an example, the information about the Bozeman VOR in the database would include its identifier, frequency, latitude, longitude, elevation, class, service volume, station declination (magnetic variation), DME capability, etc. The actual VORDME symbol for the Bozeman VOR is not stored with the Bozeman VOR record in the database.

If you want to look at a chart of the Bozeman area, you would make the software program open a window near

the Bozeman area. When you open the window, you can decide to have the window appear as a low altitude enroute chart, assuming you have the appropriate software. After you make that decision, the software knows you need the Bozeman VOR to appear in the window with all the other information that is included on the enroute chart. The software knows the size of the window and the latitude and longitude of the four corners and therefore searches the database and finds all information included in that latitude/longitude area. When it finds that the Bozeman VOR is inside that window, it accesses that database to find everything it is supposed to know about the VOR.

When it finds the Bozeman VOR record of information, it reads the record and sees the attribute that states the VOR is actually a VORDME and has a station declination of 11° east. From that information, the software then accesses a symbol file and places it at the correct geographical location on the chart. The software uses the station declination to know how many degrees to rotate the symbol so that the north arrow actually points to magnetic north.

To complete the visual image of the chart, the software must access the database to find the other attributes that describe the VOR and display that information in the navaid facility box. Now the software is presented with a challenge. Where to place the facility box?

Placing Aeronautical Information

The software starts by trying to place the navaid facility box to the upper right of the navaid symbol. But - what if there is an airport in that location? What if the box is on top of an airway? What if the box conflicts with a restricted area?



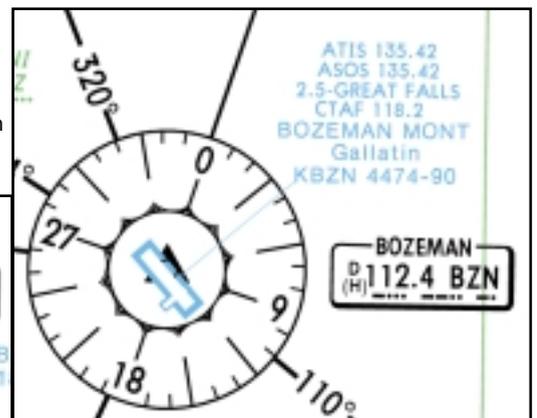
Since the exact location of attributes such as a navaid facility box can change, the rules within the software state that all information that has a geographical location will be drawn first. This means that VORs, NDBs, airports, intersections, waypoints, restrictive area boundaries, and other aeronautical information that has a specific latitude and longitude on the earth's surface will be placed first and will not be moved - at all. This means that if a VOR is located on an airport, the two

symbols that depict this information will appear on top of each other. That's OK. That's reality.

Aeronautical charts that use the raster or vector technology typically have been created on the ground by experts in chart design and compilation. These chart compilers have performed all the drafting and compilation while at a desk so all the composition of information is laid out so that the information is easily read. One of the things the compilers do is to make sure that all information is placed in a location that has the minimum amount of conflict with other information.

So what do you do with the attributes that are generated by software from a database? After the fixed locations are generated, the software then attempts to place the facility box in the default location to the upper right of the navaid symbol. Smart software has what is known as "visual conflict detection" and "visual conflict resolution." It is one thing for the software to know that the facility box has a conflict with other information on the chart - but it is quite a leap beyond that to know what to do when the conflict has been detected.

The two illustrations depict the same location on an electronic enroute chart, but at different zoom levels. In the left illustration, the navaid facility box is as large as the VOR symbol and in the right, the navaid facility box is much smaller. Also, in the left illustration, the airport symbol is depicted, whereas in the right illustration, the runway layout can be seen.



In the next article, we will look at the advantages and disadvantages of the three types of formats: raster, vector, and database. ☘

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