JEPPESEN®
BRIEFING BULLETIN

FRA 01-A

Are Aeronautical Charts Required When Using Navigational Databases?

As GPS navigation, flight management systems, computer flight maps, and computer flight planning systems have gained acceptance, avionics companies and software developers have added more and more features. Many of the systems available today make it all too easy to forget that paper enroute, departure, arrival and approach charts are still required and necessary for flight. **Avionics systems, flight planning, computer mapping systems, and associated databases *do not* provide all of the navigation information needed to conduct a legal and safe flight. They are not a substitute for current aeronautical charts.** When flying with GPS, flight management systems (FMS), or planning a flight with a computer, it is important to understand the limitations of the system you are using. Outlined below are a few of the most common situations where navigation databases do not contain all of the information needed:

- **Not all instrument flight procedures can be coded into a navigation database.** While the vast majority of the world's SID (DP), STAR and approach procedures can be coded, other procedures cannot be adequately translated to computer code within the industry recommended standards. These "uncodeable" procedures are not included in the Jeppesen Master Database and are unavailable to systems using a navigation database. Procedures containing radar vectors and complicated contingent instructions are the most common ones that fall into this category. Furthermore, when using some systems, not all IFR navigation systems are certified to fly IFR approaches. If your avionics system is certified for IFR enroute and terminal navigation only, it will not include approaches . If it is certified to fly IFR approaches, it will only include those approaches that are authorized when using your particular avionics system.

  The storage size of many avionics systems prevent many procedures from being loaded into airborne databases. Additionally, an airline might decide to delete holding patterns or other types of information from their databases in favor of including other procedures such as approaches. Be sure you are knowledgeable about what types of information may or may not be in the airborne database you are using.

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! **Stepdown fixes between the Final Approach Fix (FAF) and Missed Approach Point (MAP) are not included in navigation databases**. Stepdown fixes between the FAF and the MAP are not coded in the database because not all systems are capable of handling stepdown fixes. In some avionics systems, inclusion of a fix in the database between the FAF and the MAP will cause, for example, a GPS Course Deviation Indicator (CDI) sensitivity to change prematurely from approach mode (0.3 nm) to terminal area mode (1 nm) at the stepdown fix instead of the MAP.

In the more complex flight management systems (FMS) with automated vertical navigation capabilities, the vertical path in the database is defined by an angle that provides a constant descent path clearing all stepdown fixes. Many systems, do not have an automated vertical guidance capability that follows the database vertical angle . When vertical guidance is not provided, pilots must use methods depicted on the chart to identify the location of stepdown fixes on final approach, such as charted Along Track Distances (ATD) counted down on the GPS navigation system, or other conventional navaids such as VOR, DME, or NDB.

! The amount of information included in any particular avionics system varies from model to model depending on its capabilities and available database memory. For example, many avionics systems have point-to-point navigation only. Civil aviation authorities define flight procedure legs in terms that cause ground track changes with changing wind, temperature, weight and other factors. Jeppesen codes these legs into its master database as defined by these civil aviation authorities, and provided for in ARINC 424, the industry standard for navigation databases. However, **point-to-point navigation systems are generally not able to use route legs that are not defined by geographic points on the ground.** In general, those legs are dropped in the process that converts ARINC 424 data to the unique configuration required for each specific navigation unit. Examples of commonly deleted leg types are: climb on runway heading to an altitude, then turn; fly a heading to intercept an airway or radial; fly a DME arc, fly a heading and expect radar vectors, etc. In such cases, direct flight from waypoint to waypoint will violate the charted procedure and potentially put your flight in danger. **It is critical that all legs of the procedure on the paper chart be flown as charted**, with assistance from your avionics system for those legs that go direct to a waypoint, and using "pilot nav" for other segments . Always remember that the charted procedure represents the flight procedure as defined by the government regulatory authority, and the pilot is responsible for flying the procedure as charted.

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- **You may not be authorized to fly all procedures in your database**. Databases include a small number of private airports, private approaches, and helicopter approaches. Although the Jeppesen master database contains codes identifying them as private or helicopter data, GPS and FMS navigation systems do not make that distinction. The procedures will appear in many avionics systems with the approach selection menus just like any standard, public use procedure. **If you don't have a paper chart for it, you are not authorized to fly it.**

- **Some categories of controlled airspace are not in your database.** If your system provides airspace mapping or warnings, only the most restrictive airspace is included in the database. Generally, that is Class B and Class C airspace. Class D, E and F airspace is not included. Class A airspace, although very restrictive, is also not included because it generally occupies such huge parcels of airspace that mapping it or providing warnings is of little practical value. Additionally, there may be other types of controlled and restrictive airspace that are not included in various databases. The appropriate paper aeronautical charts should be used for these types of airspace.

- **Not all altitudes are in your database:** Approach minimum descent altitudes, approach decision altitudes, minimum obstruction clearance altitudes, minimum reception altitudes, minimum safe altitudes, minimum sector altitudes, minimum crossing altitudes, and maximum authorized altitudes are not in your database. Even though the minimum enroute altitudes for airways are in master databases, most avionics systems do not include the airway minimum altitudes in the airborne databases.

GPS, FMSs, computer mapping, and computer flight planning systems are key elements in the future of navigation. It is important to understand that they are still "works in progress." GPS navigation systems generally do not have all of the capabilities of the more sophisticated FMSs on larger aircraft, and even those systems have limitations. It is reasonable to assume that many of the limitations of both systems will be overcome in the years ahead. Until then, we must understand and operate within the capabilities and limitations of today's systems. In summary, please remember:

- Always fly IFR flight procedures as charted. **DO NOT** follow the database point-to-point without reference to the chart.

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Are Aeronautical Charts Required When Using Navigational Databases? (continued)

! Be aware that your database may not contain every SID (DP), STAR and approach procedure.

! Be aware that holding patterns might not be included in your database.

! Be aware that your database may not contain every leg or segment of the procedure you are flying.

! Not everything you need is in your database.

! Always confirm that the waypoint or navaid you retrieve from the database is at the location you intended.

! GPS, FMS, and electronic map displays with associated databases are not a substitute for current aeronautical charts.

Every navigation system operates differently. Please refer to the Pilot's Operating Handbook and your avionics manufacturer for specific information on the features, capabilities and limitations of your avionics system.

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