**AERONAUTICAL CHARTING MEETING**
**Instrument Procedures Group**
**Meeting – October 25 - 26, 2021**

**RECOMMENDATION DOCUMENT**

**FAA Control #21-02-363**

**Subject: Depict ARINC 424-Coded Missed Approach Point on Conventional Charts**

**Background/Discussion:**
RNAV non-precision procedures always depict the missed approach point (MAP) as shown in Figure 1.

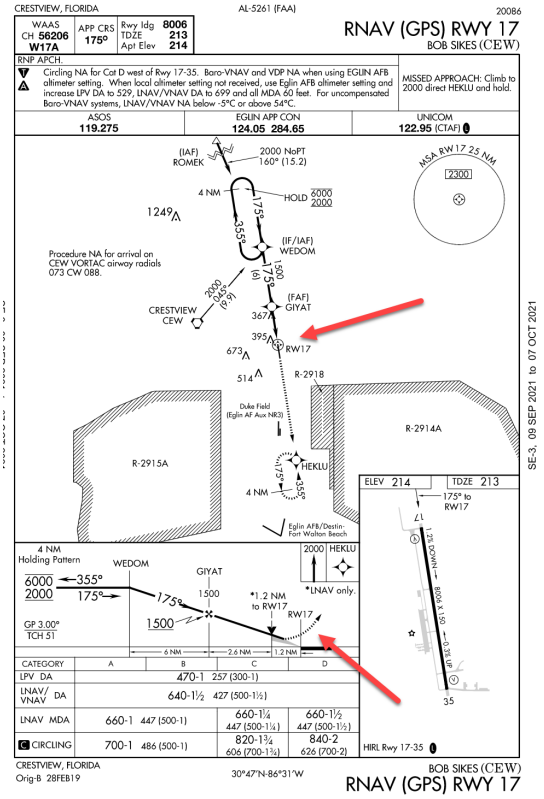


*Figure 1. RNAV MAP.*

Conventional non-precision procedures depict a MAP and others do not, depending on procedure design as shown in Figures 2, 3, and 4.

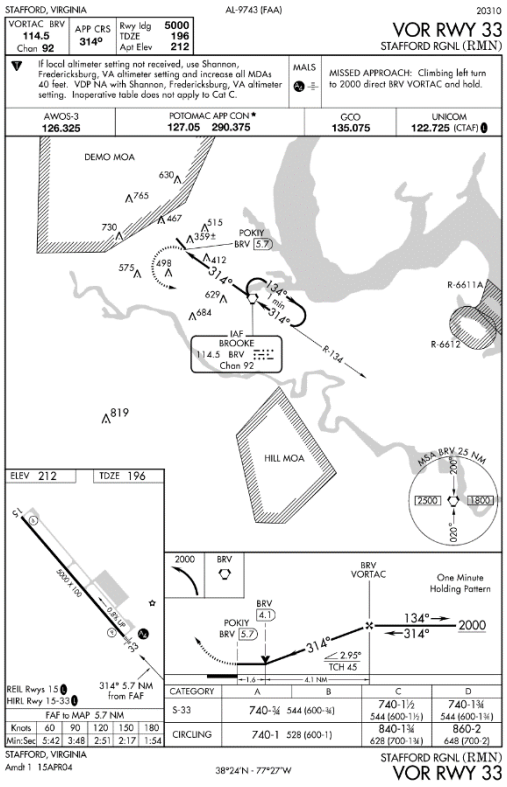


*Figure 2. Conventional with depicted MAP.*

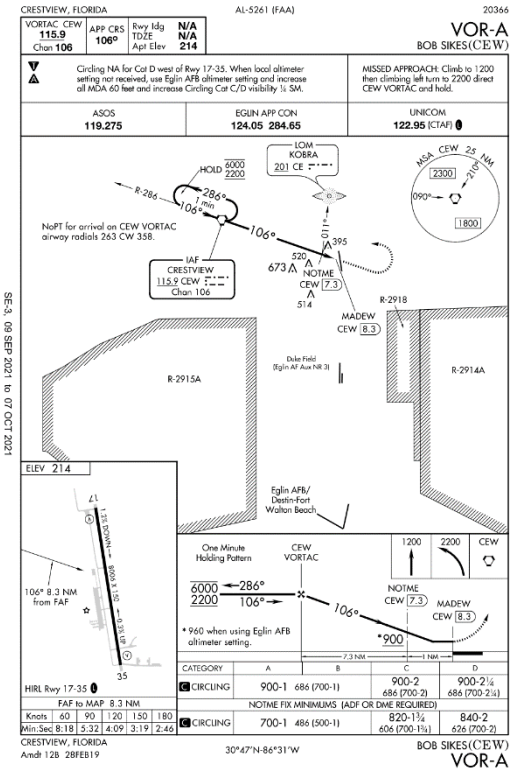


*Figure 3. Conventional with depicted MAP.*

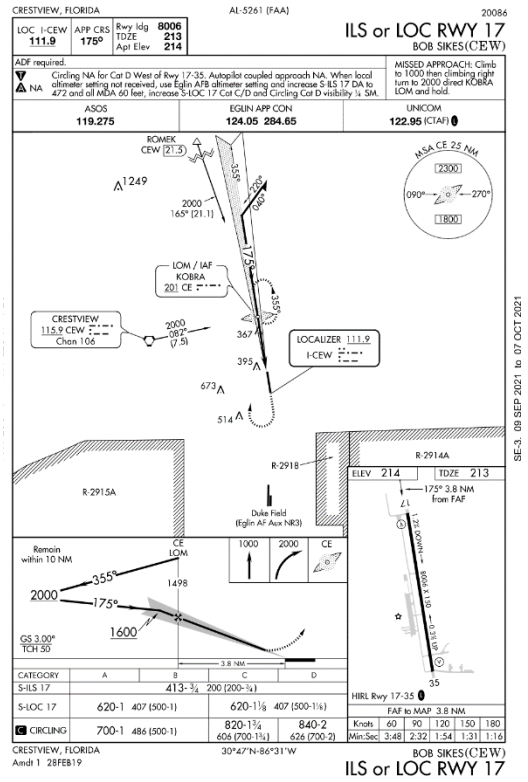


*Figure 4. Conventional without depicted MAP.*

Figure 5 shows the FMS representation of a conventional procedure with a depicted MAP, which closely aligns with the chart from Figure 2.


*Figure 5. Conventional with depicted MAP as shown on FMS.*

Figure 6 shows the FMS representation of a conventional procedure without a depicted MAP, which diverges from the chart shown in Figure 4 because the FMS adds the ARINC 424-coded MAP of “RW17.”


*Figure 6. Conventional without depicted MAP as shown on FMS.*

**Discussion:**

When the MAP is not charted/depicted the chart contains timing. Operational experience supports timing is an inaccurate way to identity the missed while contributing to a higher pilot workload. With the widespread adoption of RNAV systems (aka, GPS), pilots tend to identify the missed using their FMS.

Harmonizing the chart with the FMS improves safety by lowering pilot workload and encouraging the use of the most accurate means possible to identify the MAP.

**Recommendations:**

Garmin suggests:

1. Procedure design include the RNAV fix for the MAP; and
2. Charts depict this MAP.

A mockup is shown in Figure 7.

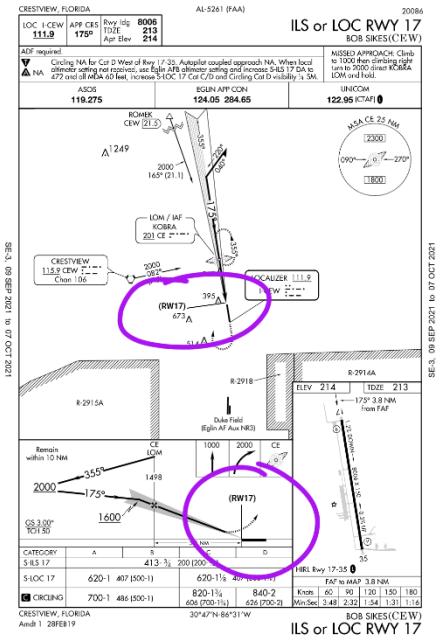


*Figure 7. Mockup: Conventional procedure with ARINC 424-coded MAP depicted.*

**Comments**:

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**Initial meeting 21-02:** Bill Tuccio, Garmin, presented the issue from the RD slides. RNAV charts depict a missed approach point (MAP), even when it is the runway threshold. Some example conventional charts were then shown, where the MAP may or may not be shown. If the point is not shown, it is defined by timing from the final approach fix. Garmin says timing is an inaccurate way to identify the MAP, and contributes to a higher flight deck workload. They would like to harmonize the chart with the flight management system (FMS), stressing this is not an effort to redefine the MAP, but to make it consistent with how most pilots fly the approach. Joshua Fenwick, Garmin, said when the MAP is defined on a conventional approach, it is usually via DME location or along track distance (ATD), with ATD usually the runway endpoint. They request the 8260-series forms indicate the MAP is the runway endpoint when that is the case, as it is done on RNAV approaches. Jeff Rawdon, FAA Flight Procedures and Airspace Group (FPAG), has a concern where the runway is not the final end point of the final approach segment as it may be just off to one side. Joshua said they do not want the MAP changed when it is not at the runway threshold; they want the procedure designer to indicate when the MAP is either the runway end (RWxx) or is a point prior. Gary Fiske, FAA ATC Procedures (Terminal) Team (AJV-P310), commented if RW17 is a documented fix, there are too many runway 17s in the

country for that to work. Joshua said there is no intent for any new fixes, Garmin just want the MAP clearly marked on the procedure documentation as is currently done on RNAV forms. Rich Boll, NBAA, discussed the FMS examples from the slides, asking where the data for the MAP waypoints on those come from, and Joshua said ARINC 424 coding. Rich said we need to be sure the FMS is not implying points not intended for the pilots to use on conventional approaches, and Joshua said they want clarification on the forms for the non-precision MAP. Jeff said putting RWxx on source documentation is problematic since if you do, it could drive a PBN requirements box, rather than using timing during a conventional procedure. Lev Pritchard, Allied Pilots Association, says this could have huge operational consequences, asking why Garmin is requesting this change. Joshua said the intent is to make the procedure more as it is being flown presently, and to assist the data suppliers. Jeff restated the source data needs to match what the procedure is actually based on. Bill stated this is not a 100% harmonization effort. Lev said it appears Garmin wants the FAA to make it easier to define where the MAP is, and this seems like a fair request since most folks are using FMS to fly these procedures. Lev added we do not want to negatively affect any existing procedures as not all aircraft are equipped or operated the same. Bill stressed Garmin does not want an RNAV requirement to fly the approach, and this needs to be conveyed to the pilot. Rich is concerned how it would be handled if the MAP is not located at the runway threshold, and wondered if ARINC 424 coding may become part of the procedure again. Pat Mulqueen, FAA Instrument Flight Procedures Group (AJV-400), said the ARINC coding is not on the source documents, but is provided for flight check and CIFP use, and they do identify if the runway is the MAP, but do not do so on the source documentation. Joshua said that they cannot use CIFP as source, and must use the 8260-series forms as source, and they would like it documented there. John Barry, FAA Aircraft Certification, said the Garmin request seems reasonable, but added if a fix is charted you must define how to fly to it on a conventional procedure. John added it is important to not chart anything that may exclude anyone from flying the conventional procedure, and to avoid the PBN requirements box, adding these procedures were not designed under PBN criteria. Bill said they only want these identified on the approach plates when appropriate. The information is available today with current ARINC 424 coding. Bruce Williams, general aviation pilot, added most pilots in light single-engine aircraft are also flying procedures like this. Lev pointed out the entire issue appears to be one of charting, since Jeppesen and possibly other chart providers possibly already do this. Lev said a good example is College Station, TX (KCLL) VOR RWY 29, where Jeppesen charts RW29 and the FAA chart does not, adding he is unaware of any issues. Jeff will look at these, adding FAA Charting only will chart what is on source documentation. Lev said this appears to be requesting a standard that is already out there. Dan Wacker, FPAG, liked Lev's point, agreeing Jeppesen does things to their charts the FAA does not, but said you must ensure the pilot can fly the conventional procedures as designed with conventional navigation, adding RNAV waypoints can be problematic.

**Actions:** Issue accepted for continuation on the agenda. The Agency will consider at the proposal to determine if any action will be taken and report back at the next ACM.

**Status:** Item open

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**Meeting 22-01:** Jeff Rawdon, FAA Flight Procedures and Airspace Group (FPAG), briefed the issue (slide). The ACM Recommendation Review Group (ARRG) reviewed and decided to reject the issue. Although there would be a limited benefit, it would take a long time to accomplish, and would primarily affect localizer-only procedures where the missed approach point (MAP) is located at the landing threshold point. Joshua Fenwick, Garmin, says this looks like a disconnect between charting and the database. Jeff said the FAA does not provide location data identifying the points, adding the CIFP is not to be considered source. John Barry, FAA Aircraft Certification, said the MAP is what the source documentation form says it is, adding it may happen to be close to the end of the runway. If GPS fails, you must be able to fly the procedure using time and distance information. Bill Tuccio, Garmin, agreed these must be flown conventionally, but since a majority of these are flown with RNAV, they should not confuse the pilot. Jeff said if the issue had been accepted for work, implementing these changes would take a significant period of time, and the RNAV substitution elements would need to be addressed first. Rich Boll, NBAA sees no issues, and agrees the issue is not necessary and could be closed.

**Status:** Item closed.