

AERONAUTICAL CHARTING MEETING
Instrument Procedures Group
Meeting 23-01 – April 24-25, 2023

RECOMMENDATION DOCUMENT

FAA Control #23-01-374

Subject: Definition of Vectors to Final Approach Course

Background/Discussion:

Vectors to the Final Approach Course for an ILS is straightforward and unambiguous: Join the extension of the localizer navigation aid.

Other approaches may have ambiguities manifested into today's FMS selections and, in the future, in data-driven charting displays. Some members of the FAA have raised questions about how vectors to final approach course work with RNP approaches, some suggesting the term "vectors to final" is obsolete.

In this document a number of examples of increasing ambiguity are provided. In most of the examples provided, a prudent instrument pilot might query ATC to resolve the ambiguity.

First, the GED VOR RWY 22 shown in Figure 1. If the pilot is given vectors outside of ATR to intercept the final, do they: intercept 234 (annotation #1) or intercept 213 (annotation #2)?

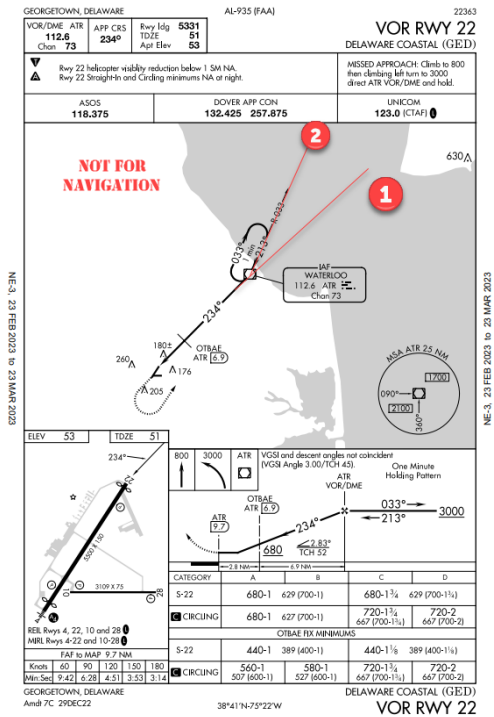


Figure 1. VOR vectors to final.

Next, the LGA RNAV (GPS) Y RWY 31 shown in Figure 2. In this RNP approach if the pilot is given a vector to intercept the final approach course, do they: intercept the 313 extension out of MANLL (annotation #1); intercept the 302 extension formed by NYJET to MANLL (annotation #2); or intercept the 248 extension formed by GEMKE (IF) to NYJET (annotation #3)?

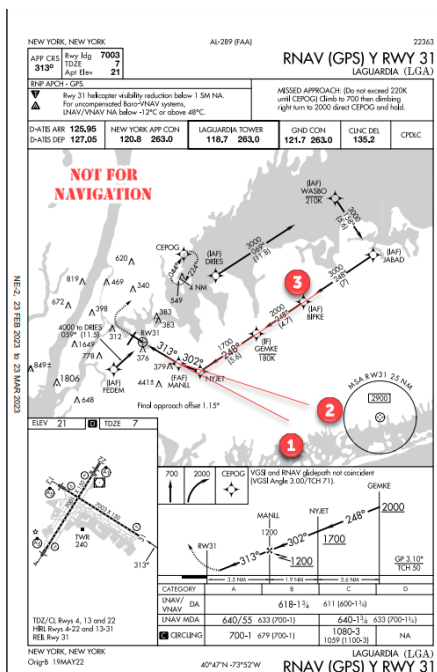


Figure 2. RNP Vectors to Final.

Next, the LGA RNAV (GPS) X RWY 31 shown in Figure 3. In this RNP approach if the pilot is given a vector to intercept the final approach course, do they: intercept the 089 extension out of GACAR (annotation #1); intercept the 059 extension formed by SHAYY to GACAR (annotation #2); or intercept the 045 extension formed by PACHU (IF) to SHAYY (annotation #3)?

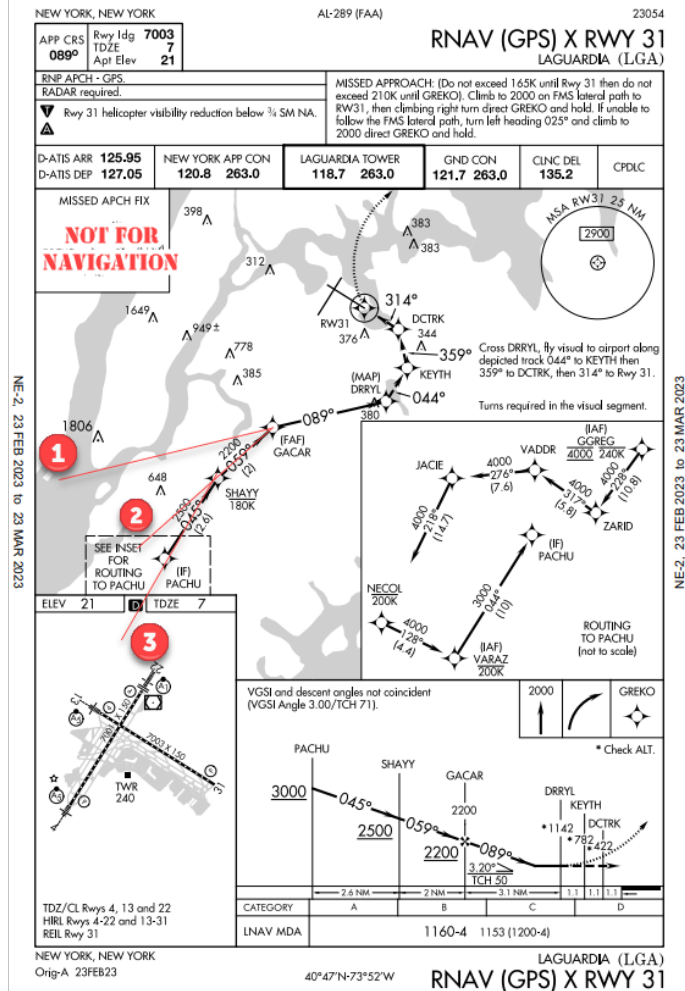


Figure 3. RNP Vectors to Final.

Next, the BWI RNAV (GPS) Z RWY 33L shown in Figure 4. In this RNP approach if the pilot is given a vector to intercept the final approach course, do they: intercept the RF leg from LABPI to MILRE (annotation #1); intercept the JANNIS to MILRE leg (annotation #2); or intercept the LIYCO to MILRE leg (annotation #3)? There may even be additional ambiguity by the small RF leg between MILRE and GRAFE (FAF).

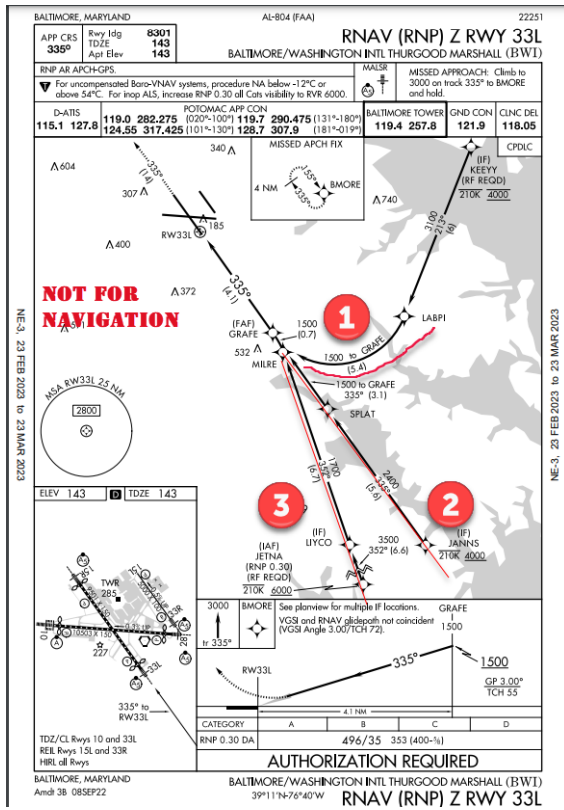


Figure 4. RNP Vectors to Final with three potential options.

Lastly, the PSP RNP (RNP) Z RWY 13R shown in Figure 5. In this RNP AR with RF legs approach if the pilot is given a vector to intercept the final approach course, do they intercept at annotation #1 or annotation #2?

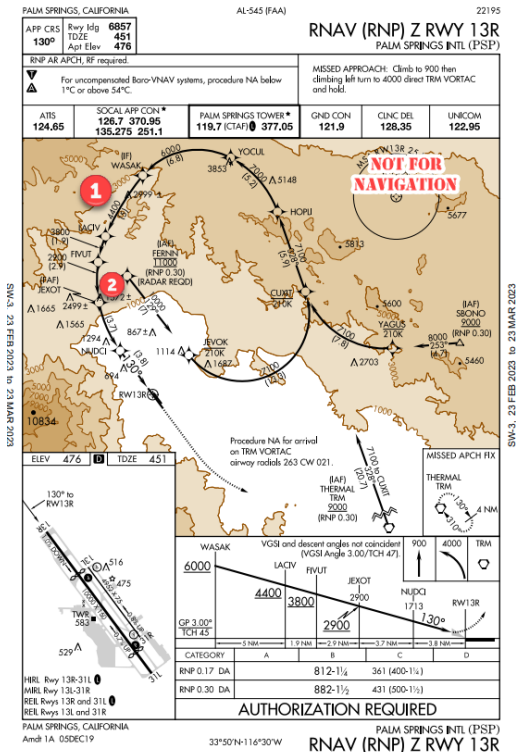


Figure 5. RNP AR RF Vectors to Final.

There is a large body of knowledge on vectors to final by reputable authors available to pilots:

- AIM 5-4-6e
- AOPA (2016): <https://www.aopa.org/news-and-media/all-news/2016/august/pilot/on-instruments>
- 7110.65() (current): Section 5-9-1 “Vectors to Final Approach Course”
- AvWeb (2019): <https://www.avweb.com/flight-safety/vectors-to-final/>
- FAASafety.gov (n.d.) discussing Destin/Eglin AFB Part 93: https://www.faasafety.gov/gslac/ALC/course_content.aspx?cID=47&sID=282&review=true
- Aviation Safety Magazine (2019) <https://www.aviationsafetymagazine.com/features/approach-vectors-checklist/>

Without a clear coming together of procedure design, ATC practices, ARINC practices, and FAA AFS-4XX it is difficult for avionics interfaces to best assist the pilot.

Recommendations:

These possible recommendations:

1. At the procedure design level, clarify what the ARINC coding should be to define the vectors to final transition; and/or
2. Update AIM guidance to align controllers and pilots on the meaning of vectors to final approach course;
3. Develop a unified message within the FAA regarding the role vectors to final approach course plays in the NAS; and/or

4. Provide guidance to avionics manufacturers on what options to present to pilots consistent with operational practices of ATC.

Benefits:

By clarifying this issue, the following benefits will be achieved:

1. More efficient radio communications between controllers and pilots.
2. Prevent the likelihood of clearance deviations.
3. Better align navigation database ARINC coding with FAA NAS intentions (contributing to 1 & 2 above).
4. Optimized avionics design, lowering crew workload, and improving safety.

Comments:

It will be useful in the IPG to hear from pilots and controllers.

Submitted by: Dr. Bill Tuccio
Organization: GARMIN
Phone: 913-440-5945
E-mail: bill.tuccio@garmin.com
Date: March 6, 2023

Please send completed form and any attachments to:
9-AMC-AVS-ACM-Info@faa.gov