



U.S. Department
of Transportation
**Federal Aviation
Administration**

InFO

Information for Operators

InFO 12009
DATE: 06/26/12

Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/info

An InFO contains valuable information for operators that should help them meet certain administrative, regulatory, or operational requirements with relatively low urgency or impact on safety.

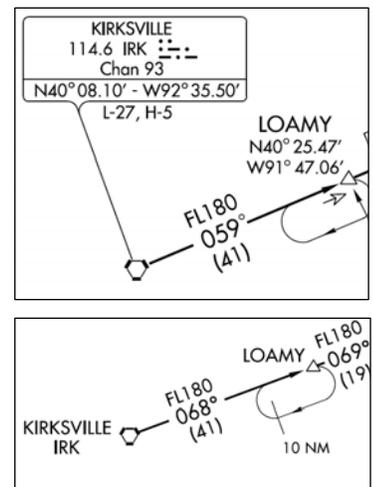
Subject: Magnetic Variation Differences Between Ground-Based Navigational Aid (NAVAID) Instrument Flight Procedures (IFP), Area Navigation (RNAV) IFPs, and RNAV Systems

Purpose: This InFO explains some of the differences between the magnetic courses charted on Standard Instrument Departure/Standard Terminal Arrival (SID/STAR) charts and magnetic courses displayed by some RNAV systems.

Discussion: Some pilots have reported noticeable differences between their RNAV system's displayed magnetic course and the magnetic course as depicted on the corresponding SID/STAR chart. Questions have also come up regarding apparent disparities in magnetic course between NAVAID-based and RNAV IFPs on legs that share the same navigational points. In most cases, these differences can be attributed to charting convention and RNAV system design differences as they apply to magnetic variation.

Each leg of an instrument procedure, regardless of type, is first charted along a desired ground track with reference to true north. The resulting true course is then corrected for magnetic variation in order to determine the magnetic course to be depicted on the IFP plate. The magnetic variation used for this correction, however, may vary somewhat depending on whether the procedure is a "conventional" NAVAID-based IFP or a RNAV IFP. As a result, there will often be slight variances in magnetic course between NAVAID-based and RNAV IFP legs. While, in most cases, these differences will be small, somewhat larger course differences are possible (see example at right).

Unlike IFPs, RNAV systems are not constrained by charting conventions. Rather, many of these systems will rely on their navigational database for magnetic variation or will calculate it dynamically based on aircraft position. For this reason, it is possible that the magnetic variation applied by the RNAV system will be marginally different than the magnetic variation used by the procedure designer when the IFP chart was created, or last updated. Thus, the magnetic course *displayed* by the RNAV system for a particular IFP leg may also slightly vary from the magnetic course *charted* on the IFP plate.



It is important to understand, however, that RNAV systems, (with the exception of VOR/DME RNAV equipment) navigate by reference to true north and display magnetic course only for pilot reference. As such, a *properly functioning* RNAV system, containing a *current and accurate navigational database*, should still fly the correct ground track for any loaded instrument procedure, despite any differences in magnetic course that may be attributed to magnetic variation application.

Recommended Action Directors of Operations, Directors of Safety, and pilots should familiarize themselves with the information found in this InFO as well as the following references:

- **Aeronautical Information Manual (AIM):** http://www.faa.gov/air_traffic/publications/
 - Chapter 1, Paragraph 1-1-19, subparagraph 1 *Conventional Versus GPS Navigation Data*
 - Chapter 5, Paragraph 5-1-16, *RNAV and RNP Operations*
- **Instrument Procedures Handbook (IPH):** http://www.faa.gov/library/manuals/aviation/instrument_procedures_handbook/
 - Appendix A, Page A-12 *Issues Related to Magnetic Variation*

Contact: Questions or comments regarding this InFO should be directed to the New Program Implementation and International Support Branch, AFS-240 at (202) 267-8166.