Subject: Charting Waypoints with Both Fly-Over and Fly-By Functions

Background/Discussion:

On some GPS/RNAV Instrument Approach Procedures (IAPs) a single waypoint may function as both a Fly-By (FB) and Fly-Over (FO) waypoint. This can happen in the missed approach segment when the missed approach holding waypoint supports another segment of the approach (i.e. the Initial Approach Waypoint (IAF)). This also happens when an Intermediate Waypoint (IF)/IAF is designed with a hold-in-lieu of a procedure turn. Because of the dual usage of waypoints, there are disparities amongst the IAC charting specification, FAAO 8260.19H, and the Aeronautical Information Manual (AIM) on how a waypoint is charted as compared to how it is intended for use.

The 8260.19H currently states, “For RNAV (GPS and RNP) IAPs, and ILS/LOC procedures containing RNAV segments, document: The missed approach holding waypoint (clearance limit) as a FO waypoint. However, the missed approach holding waypoint will not be charted as a fly-over waypoint in order to avoid confusion when the fix is used for other purposes and treated as a fly-by waypoint.” This statement indicates the missed approach holding waypoint is charted as a FO if the waypoint is not used in conjunction with any other segment or is not dual use (see following examples). The 8260.19H does not direct how other holding waypoints will be designed/charted like a hold-in-lieu.
Currently the IAC states, “Waypoints designated as a holding fix will be shown as fly-by, without the circle around the symbol. However, in the event the holding fix/waypoint is also designated in some other part of the procedure (i.e., IAF) with a fly-over function, then the holding fix/waypoint will be charted as a fly-over point.” This indicates that stand alone missed approach holding (which is designed as a FO) will be charted as a FB and would contradict the 8260.19H per the example below. The IAC doesn’t direct how other holding waypoints will be charted like a hold-in-lieu.

The AIM currently states, “The MAWP and the missed approach holding waypoint (MAHWP) are normally the only two waypoints on the approach that are not fly−by waypoints. Fly−over waypoints are used when the aircraft must overfly the waypoint prior to starting a turn to the new course. The symbol for a fly−over waypoint is a circled waypoint. Some waypoints may have dual use; for example, as a fly−by waypoint when used as an IF for a NoPT route and as a fly-over waypoint when the same waypoint is also used as an IAF/IF hold-in-lieu of PT. When this occurs, the less restrictive (fly-by) symbology will be charted.” The AIM identifies the MAHWP and MAWP as the only two waypoints not flown as a FB but doesn’t provide exceptions (i.e. when the missed approach holding may tie back to the IAF). This can cause confusion because review of the IAC specification and the 8260.19H would be needed for clarification. The AIM does a good job of stating the holding at a hold-in-lieu will be a fly over but the AIM is not regulatory guidance and that requirement is not written in any other regulatory guidance.

The dual designation of a waypoint is not a factor when designing an instrument procedure because they are specific to the segment. Thus the coding is not an issue for the flight management system. The problem lies in the physical charting of a waypoint when the coded procedure identifies the waypoint as both a "fly-over" and a "fly-by" designation within the instrument procedure. Since the waypoint can only be charted one way, there is an inherent disparity between a portion of navigational database and the charted procedure. This creates a challenge for the United States Air Force (USAF) because we are required to validate the navigational database by comparing it to the charted instrument procedure graphic. Per Air Force regulations, if the navigational database doesn’t match the graphic, USAF crews cannot legally fly the procedure. This guidance includes the Air Force Reserve and Air National Guard stationed at FAA core airports around the United States.
**Recommendations:**

Adjustments need to be made to regulations for synchronicity between charted IAPs and the navigational databases. I recommend changing the following manuals and regulations to read:

**8260.19H**

**From-**

8-6-4. Terminal routes. This information is used to develop the planview of the instrument approach chart. For RNAV (GPS and RNP) procedures, document all segments of the procedure, including the final and missed approach segments. See paragraph 8-2-5 for guidance regarding the establishment of terminal routes.

(6)For RNAV (GPS and RNP) IAPs, and ILS/LOC procedures containing RNAV segments, document:

(e)The missed approach holding waypoint (clearance limit) as a FO waypoint. However, the missed approach holding waypoint will not be charted as a fly-over waypoint in order to avoid confusion when the fix is used for other purposes and treated as a fly-by waypoint.

**To-**

(e)Waypoints as FB unless required otherwise for obstacle avoidance. Exception: Holding waypoints and the Missed Approach Waypoint shall be designed as FO waypoints. In the event a holding fix/waypoint is also designed in the procedure as both a FO and FB waypoint, chart the waypoint as a FB. Missed approach holding waypoints shall be charted in the Missed Approach Icon Box as a FO.

**IAC**

**From-**

Waypoints designated as a holding fix will be shown as fly-by, without the circle around the symbol. However, in the event the holding fix/waypoint is also designated in some other part of the procedure (i.e., IAF) with a fly-over function, then the holding fix/waypoint will be charted as a fly-over point.

**To-**

Waypoints designated as a holding fix will be charted as fly-over waypoint, with the circle around the symbol. However, in the event the holding waypoint is also designated in some other part of the procedure (i.e., IAF) with a fly-by function, then the holding waypoint will be charted as a fly-by waypoint. Missed approach holding waypoints shall be charted in the Missed Approach Icon Box as a FO.

**AIM**

**From-**

The MAWP and the missed approach holding waypoint (MAHWP) are normally the only two waypoints on the approach that are not fly−by waypoints. Fly-over waypoints are used when the aircraft must overfly the waypoint prior to starting a turn to the new course. The symbol for a fly-over waypoint is a circled waypoint. Some waypoints may have dual use; for example, as a fly−by waypoint when used as an IF for a NoPT route and as a fly-over waypoint when the same waypoint is also used as an IAF/IF hold-in-lieu of PT. When this occurs, the less restrictive (fly-by) symbology will be charted.

**To-**

Fly-over waypoints are used when the aircraft must overfly the waypoint prior to starting a turn to the new course. The symbol for a fly-over waypoint is a circled waypoint. The Missed Approach Waypoint MAWP will always be a Fly-over waypoint. The missed approach holding waypoint (MAHWP) will always be a Fly-over way point in the navigational database but will not always be charted as such in the event the waypoint is a dual use waypoint. Some waypoints may have dual use; for example, as a fly−by waypoint when used as an IF for a NoPT route and as a fly-over waypoint when the same waypoint is also used as an IAF/IF hold-in-lieu of PT. When this occurs, fly-by symbology will be charted even though the navigational database will identify a fly-over event in the specific portion of the procedure.
MEETING 19-01

Kevin Keszer, AFFSA, presented the new Recommendation Document. Kevin reviewed the current FAA Instrument Approach Procedure charting practice pertaining to the depiction of Fly-over (FO) versus Fly-by (FB) status at holding waypoints. He pointed out that the Interagency Air Committee (IAC) charting specifications state “Waypoints designated as a holding fix will be shown as fly-by, without the circle around the symbol. However, in the event the holding fix/waypoint is also designated in some other part of the procedure (i.e., IAF) with a fly-over function, then the holding fix/waypoint will be charted as a fly-over point”. This contradicts what is documented in FAA Order 8260.19, which indicates that the missed approach holding waypoint will be charted as a FO unless it is used as a FB on another segment of the procedure.

George Bland, USAF, said that the military charts depict the holding waypoint as FO unless it is used as FB in another part of the procedure, which is completely opposite to the FAA standard. He also pointed out that it causes confusion when the symbols do not match between the planview and the missed approach icon box.

Kevin showed the audience the current language used for waypoints from the 8260.19H, IAC Charting Specifications and the Aeronautical Information Manual (AIM), along with suggested changes to the language in all three that would support the current military standard. He pointed out that the coding of dual-use waypoints is not an issue for the flight management systems so no change there is required.

Valerie Watson, FAA/AJV-A250, commented that the current FAA charting practice has been in place for nearly 15 years and there have been no reports of pilot confusion. She explained that the current FAA process was agreed upon based on the thinking that it is unnecessary to chart these points as FO because pilots know that in establishing a hold, they are required to fly over the waypoint/fix on which the holding pattern is predicated. Valerie said that the FAA does not feel it is necessary to revise over 7,000 charts to “fix” something that has not been shown to cause confusion in the pilot community. She also pointed out that in the interim period, as the 7,000 charts were in the process of being revised, there would be a mixture of contradictory depictions and that would cause confusion. She suggested that a more practical solution would be to
clarify the guidance to ensure it supports what is currently being charted. The audience agreed.

Kevin and George both stated that they concur with the decision to not change the FAA charting standard as long as the guidance is updated to support it. This includes updates to FAA Order 8260.19 and the AIM. Kevin agreed to draft proposed language revisions to the AIM guidance and submit to Valerie, who will then coordinate with Flight Standards and the AIM office.

John Bordy, FAA/AFS-420, will work to revise the 8260.19 text to agree with the current charting standard.

**STATUS: OPEN**

**ACTION:** John Bordy, FAA/AFS-420, will report on the status of revised guidance in FAA Order 8260.19

**ACTION:** Kevin Keszler, AFFSA, will draft revised text for the AIM and submit to Valerie Watson, FAA/AJV-A250 for coordination.

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**MEETING 19-02**

Valerie Watson, FAA/AJV-A250, reviewed this issue. She first showed the audience the language changes that are being worked for FAA Order 8260.19 (See Slide 2). John Bordy, FAA/AFS-420, stated that the 8260.19 has been updated for missed approach holding patterns, but he still needs to scrub the text to ensure that the charting of all holding pattern waypoints are clearly described the same way.

Valerie then showed the audience the proposed updates to the Aeronautical Information Manual (AIM) (See Slide 4). There was audience support for the updates. Joel Dickinson, FAA/AFS-410, said that he would take the action to process the AIM revision.

Valerie then showed the proposed change to the Interagency Air Committee (IAC) Specifications. Kevin stated that Department of Defense (DoD) will take an exception to the specifications. He said military charts will continue to depict the holding waypoint as Fly-over unless it is used as Fly-by in another part of the procedure, which is opposite to the FAA standard. Valerie expressed her concern with not charting them the same way. She voiced a need for further discussions regarding adherence of both FAA and DoD to the charting specifications. She said she would take this discussion to the IAC and or IAC Point of Contact meetings.

**STATUS: OPEN**
**ACTION:** John Bordy, FAA/AFS-420, to update FAA Order 8260.19 to ensure all the guidance agrees with the current charting standard.

**ACTION:** Joel Dickinson, FAA/AFS-410, will submit the proposed updates to the Aeronautical Information Manual (AIM).

**ACTION:** Valerie Watson, FAA/AJV-A250, will bring the discussion of a standard waypoint depiction to the IAC to ensure the FAA and DoD concur on the charting standard for the depiction of Fly-over and Fly-by waypoints.