AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
October 23, 2012

HISTORY RECORD

FAA Control # 12-02-305

Subject: Conflict Between STAR VNAV Path and MEA

Background/Discussion: It was brought to the attention of the AA Safety Action Program (ASAP) team at Allied Pilots Association (APA) that a potential disconnect between the procedure's VNAV path and the MEA segment at that point exist on the EAGUL5 STAR at Phoenix Sky Harbor Int'l (KPHX). If the FMS or crew uses the bottom limit of the VNNOM waypoint (10000 ft) to make speed requests by ATC or handle a tailwind, the FMS calculated VNAV path, in some cases, will descend below the published MEA (12000 ft) on the segment between EAGUL and HOMRR (only 4.1 nm from VNNOM). The primary problem appears to be at the fix HOMRR, which only publishes an "At or below 16000" altitude restriction. It is one of the only fixes in a string of fixes that does not set the bottom altitude in the Descend Via route.

Recommendations: As a short term fix to this specific problem, recommendation is to NOTAM a bottom altitude for the fix at HOMRR of 12000 ft causing crews to be aware of the issue and forcing FMS calculated VNAV paths to stay above the MEA. Since STARs may not be permanently be revised via NOTAM, the NOTAM should be followed up expeditiously with an amended STAR so the restriction may be permanently charted and coded. Initial investigation shows that this situation may exist on similar Phoenix area STARS as well as at other airports. There appears to be a procedural design flaw that would allow this to happen, and thus I would encourage the Instrument Procedures Group to task the appropriate office to establish policy to ensure that bottom altitudes are always specified above any established MEAs to prevent this issue on all STARS.

Comments: This recommendation affects FAA Order 7100.9.

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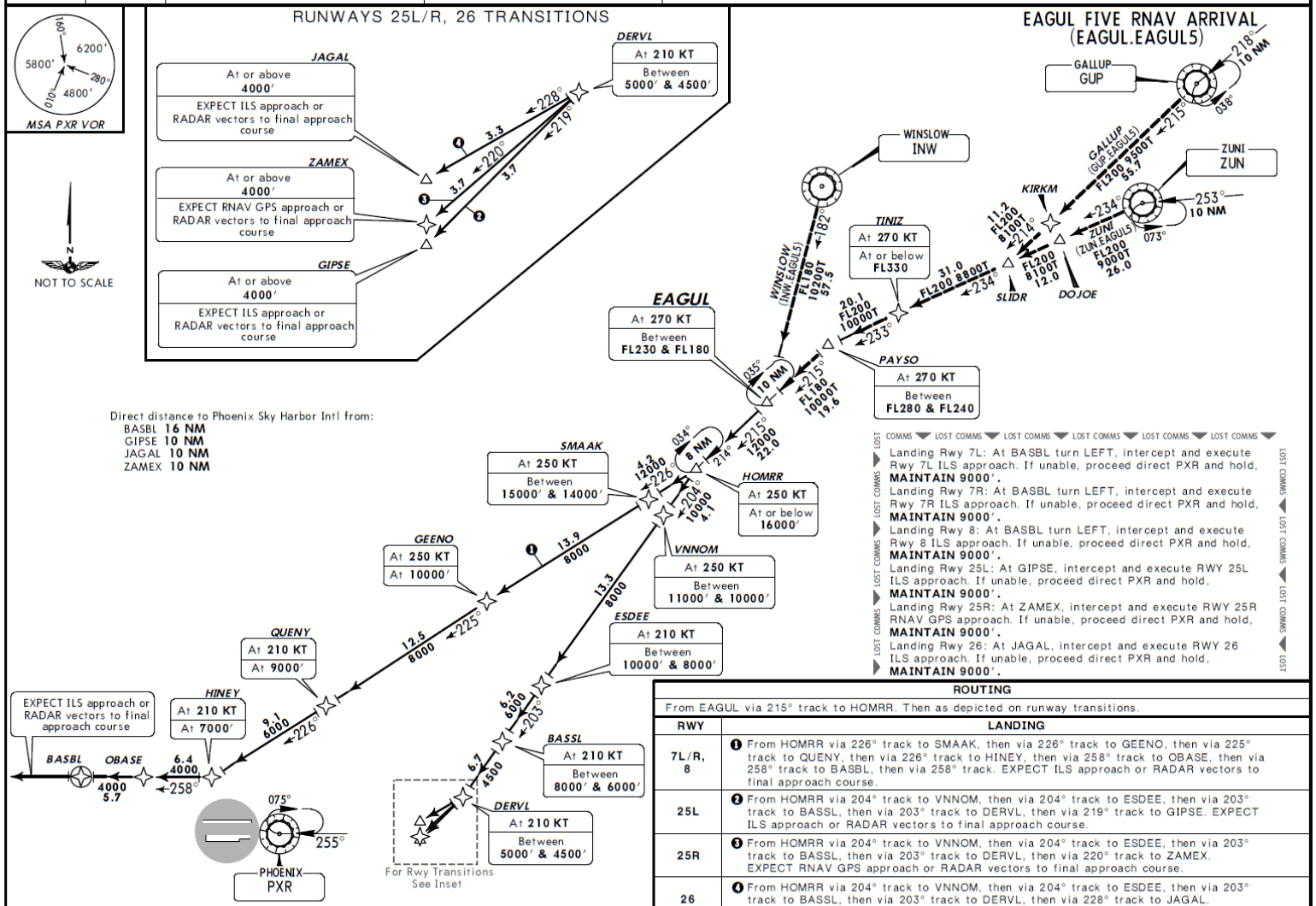
Date: 4 Oct 2012

KPHX/PHX
PHOENIX SKY HARBOR INTL

JEPPESEN 30 MAR 12 Eff 5 Apr (10-2D)

PHOENIX, ARIZ
RNAV STAR

D-ATIS	Apt Elev			
127.57	1135′	Alt Set: INCHES Trans level: FL180 Trans alt: 18000′	**1. RNAV 1.** **2. DME/DME/IRU or GPS required.** **3. RADAR required.** 4. Turbojet aircraft only.	5. File GALLUP or ZUNI transitions only. WINSLOW transition assigned by ATC for hazardous weather avoidance only. 6. GALLUP and ZUNI transitions: For non-GPS equipped aircraft INW, IWA, PXR and ZUN must be operational. 7. WINSLOW transition: For non-GPS equipped aircraft DRK, IWA, and PXR must be operational.



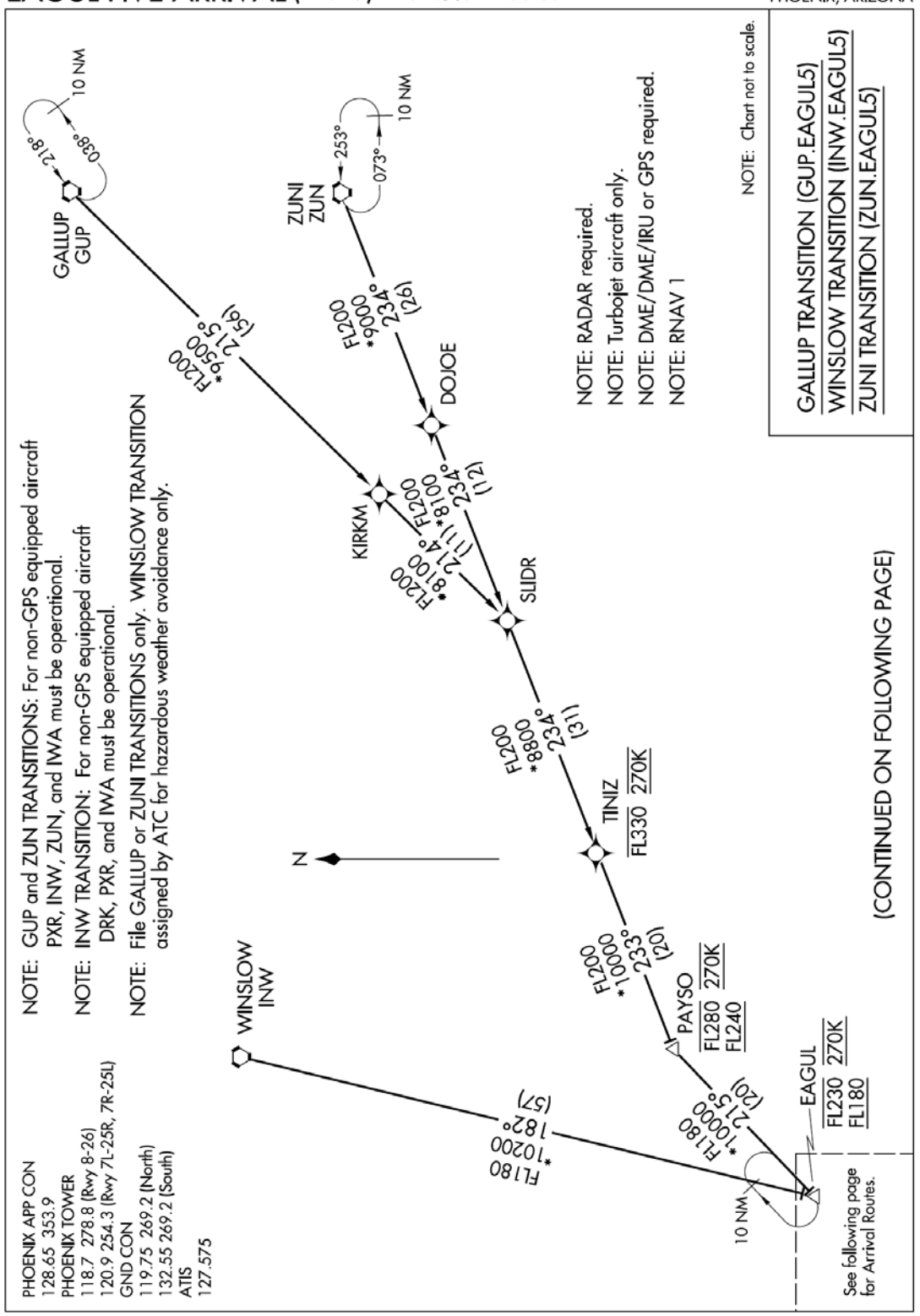
ROUTING	
From EAGUL via 215° track to HOMRR. Then as depicted on runway transitions.	
RWY	**LANDING**
7L/R, 8	❶ From HOMRR via 226° track to SMAAK, then via 226° track to GEENO, then via 225° track to QUENY, then via 226° track to HINEY, then via 258° track to OBASE, then via 258° track to BASBL, then via 258° track. EXPECT ILS approach or RADAR vectors to final approach course.
25L	❷ From HOMRR via 204° track to VNNOM, then via 204° track to ESDEE, then via 203° track to BASSL, then via 203° track to DERVL, then via 219° track to GIPSE. EXPECT ILS approach or RADAR vectors to final approach course.
25R	❸ From HOMRR via 204° track to VNNOM, then via 204° track to ESDEE, then via 203° track to BASSL, then via 203° track to DERVL, then via 220° track to ZAMEX. EXPECT RNAV GPS approach or RADAR vectors to final approach course.
26	❹ From HOMRR via 204° track to VNNOM, then via 204° track to ESDEE, then via 203° track to BASSL, then via 203° track to DERVL, then via 228° track to JAGAL. EXPECT ILS approach or RADAR vectors to final approach course.

CHANGES: None.

(EAGUL.EAGUL5) 11349 ST-322 (FAA)

EAGUL FIVE ARRIVAL (RNAV) Transition Routes

PHOENIX SKY HARBOR INTL
PHOENIX, ARIZONA



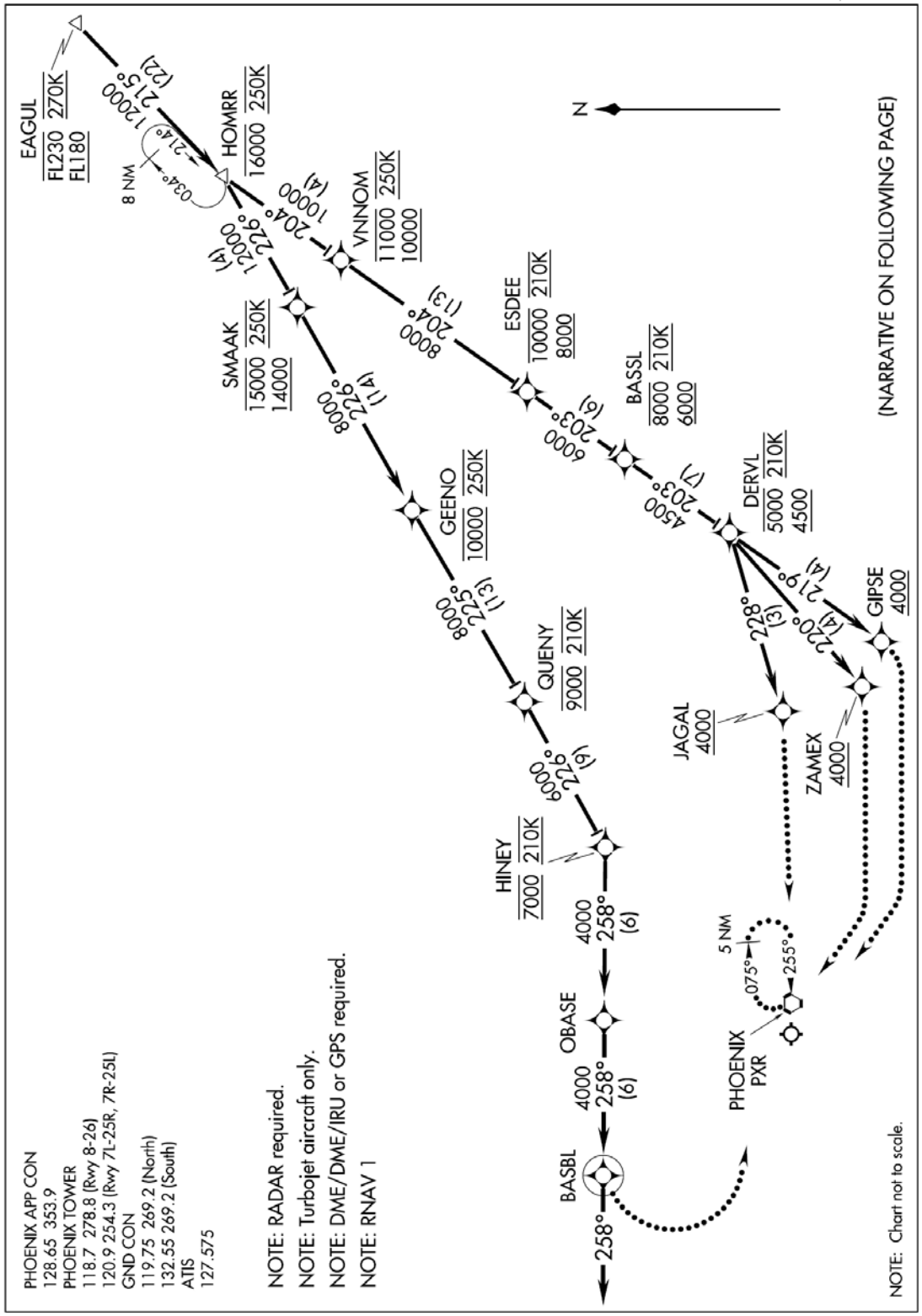
EAGUL FIVE ARRIVAL (RNAV) Transition Routes

PHOENIX, ARIZONA
PHOENIX SKY HARBOR INTL

(EAGUL.EAGUL5) 11349

EAGUL FIVE ARRIVAL (RNAV) Arrival Routes

PHOENIX SKY HARBOR INTL
PHOENIX, ARIZONA



EAGUL FIVE ARRIVAL (RNAV) Arrival Routes

PHOENIX, ARIZONA
PHOENIX SKY HARBOR INTL

Initial Discussion - MEETING 12-02: New recommendation presented by Lev Prichard, APA. Lev expressed concern that FMS coding of the EAGUL STAR at Phoenix causes pilots to violate the MEA on the segment from EAGUL to VNNOM by allowing descent to 10,000 prior to HOMRR, which is below the specified MEA of 12,000. Although the EAGUL STAR is used as an example, Lev, believes that policy should be established to preclude this from occurring . Kevin Allen, US Airways, stated that Flight Standards in the Southwest Region is aware of this problem and is working a fix. Lev recommends, as a short term solution to this specific problem, a NOTAM to specify a bottom altitude of 12,000 at HOMRR. This would make crews aware of the issue and force FMS calculated VNAV paths to stay above the MEA. The NOTAM should be followed up with a revised STAR ASAP. Bill Hammett, AFS-420 (ISI) noted that while there is nothing in the current Order to prevent this, a new Order JO 7100.9E is currently in coordination that should resolve the problem by addition of the following (red text) in paragraph 7a(10)

> (10) Establish a minimum en route altitude (MEA) for each segment of the STAR. The MEA will be established based upon obstacle clearance over the terrain or manmade obstacles, adequacy of navigation coverage, and communication coverage. Follow the guidance in FAA Order 8260.19, to determine the communication requirements. Conventional, RNAV and RNP STARs follow guidance in FAA 8260 series orders to establish the MEA. At, at or above, and block altitudes may be charted to accommodate ATC requirements and profile descents. If possible avoid use of at or below altitudes. All altitudes must be at or above the established MEA. The termination altitude for STARs attached to an SIAP IAF, IF or Final Approach Course Fix (FACF) must coincide with the fix altitude published on the SIAP. For RNAV and RNP STARs, evaluate the Obstacle Evaluation Area (OEA) for feeder routes.

Brad Rush AJV-3B, stated that the procedure was correct, but the coding was wrong in that it should have accounted for the MEA of 12,000 to HOMRR. Josh Fenwick, AeroNavData, Inc., responded that the coding was according to the NFDD's source, but there was an error on the supporting form. All agree that the proposed text for Order JO 7100.9 will resolve the issue. Kyle McKee, AJV-14, took the IOU to track publication of the revised Order. ACTION: AJV-14.

MEETING 13-01: Jim Arrighi, AJV-14, briefed that the recommended verbiage (See previous meeting minutes) to address the issue has been included in the draft FAA Order JO 7100.9, which is targeted for publication December 13, 2013. The issue remains open pending publication. ACTION: AJV-14.

MEETING 13-02: Jim Arrighi, AJV-14, briefed that Order JO 7100.9E was signed on September 27, 2013. Issue CLOSED.
