AERONAUTICAL CHARTING FORUM
Instrument Procedures Group
October 29, 2013

HISTORY RECORD

FAA Control # 13-02-312

Subject: Equipment Requirement Notes on Instrument Approach Procedures

Background/Discussion: Two recommendations were received independently relating to this issue. At the request of the ACF-IPG Chair, the recommendations were combined and a single recommendation is submitted jointly by Richard Boll on behalf of NBAA and Bruce Williams, a Certified Flight Instructor and FAASTeam Representative from Seattle, WA.

FAA Aeronautical Information Manual 5-4-5, paragraph 3 (b) states the following:

> (b) In some cases, other types of navigation systems including radar may be required to execute other portions of the approach or to navigate to the IAF (e.g., an NDB procedure turn to an ILS, an NDB in the missed approach, or radar required to join the procedure or identify a fix). *When radar or other equipment is required for **procedure entry** from the en route environment, a **note** will be charted in the **planview** of the approach procedure chart **(e.g., RADAR REQUIRED or ADF REQUIRED)**. When radar or other equipment is required on **portions of the procedure outside the final approach segment**, including the missed approach, a **note** will be charted in the **notes box** of the pilot briefing portion of the approach chart (e.g., RADAR REQUIRED or DME REQUIRED).* Notes are not charted when VOR is required outside the final approach segment. Pilots should ensure that the aircraft is equipped with the required NAVAID(s) in order to execute the approach, including the missed approach.

These charting requirements are contained within FAA Order 8260.19E, Flight *Procedures & Airspace*, Paragraph 8-55 h, Equipment Requirement Notes, sub-paragraphs (1) and (2):

> **h. Equipment Requirement Notes.** Determine the need for equipment notes after evaluating all SIAP segments, including missed approach.
>
> (1) Where certain equipment is ***required for procedure entry*** from the en route environment, enter the following in Additional Flight Data: "**Chart planview note**: **ADF REQUIRED**"; or, "**ADF OR DME REQUIRED**."
>
> (2) Where other navigation equipment is ***required to complete the approach***; e.g., VOR, ILS, or other non-ADF approaches requiring ADF or DME for missed approach, use: **"Chart note: ADF required",** or **"Chart note: DME required."** When radar vectoring is also available, use: **"Chart note: ADF or Radar required."**
>
> (3) Where radar is the only method of determining or defining a terminal fix, use: "**Chart note: Radar Required."** See paragraph 8-55g(2) note.

(4) ILS/LOC procedures that require RNAV for all segments leading to the intermediate fix, use: **"Chart Planview Note: GPS REQUIRED."**

(5) ILS/LOC procedures that contain both conventional and RNAV segments must have a note in the Planview, adjacent to the applicable fix where the segment begins, use: **"Chart planview note adjacent to (fix name): GPS Required."**

(6) GLS procedures require the use of GPS to navigate to the GLS final approach segment and execute the missed approach. Use: **"Chart Note: GPS REQUIRED."**

In certain cases, the application of these charting requirements can result in two separate equipment restriction notes on the same instrument approach charts (see Figures 1 and 1A, Marion IL - KMWA, ILS Runway 20). As can be seen on this example, there is a note in the briefing strip notes that states: "ADF Required". However, in the planview of this same chart there is a note stating: "ADF or DME Required". These two notes are confusing to the pilot since it is unclear whether ADF is *really required*, or can DME substitute for the ADF on this approach?" The pilot has no way of determining immediately whether these notes are inclusive of either other (i.e. either ADF or DME is required) or whether they are mutually exclusive of each other (i.e. an ADF is *always* required).

Medford, OR (KMFR) ILS or LOC/DME Runway 14 approach (Fig 2) provides another example of an approach with confusing notes. For this approach, a "DME required" is published in the Briefing Strip because DME is required to fly the missed approach procedure. The planview note, "DME or Radar Required" is published because DME or radar is required for procedure entry.

On a commercially produced version of this same procedure (see Fig 3), a "DME or Radar Required" note is published in the Briefing Strip. Note that this provider publishes the "DME Required" as a minima note associated with the LOC (GS-Out) line of minima. However, DME is required to execute the missed approach segment, regardless of whether the ILS minima or the LOC-only minima are use, and therefore applies to both the ILS and the LOC (GS-Out) lines of minima.

A careful read of the AIM guidance indicates that the briefing strip note and planview note are mutually exclusive and both equally apply to the approach. Therefore, the most restrictive note establishes the equipment requirement on the approach. However, this is not clear to the pilot on the approach chart, which is what he/she is referencing when flying the approach.

NBAA believes that the reason behind the additional equipment requirement is irrelevant as both equally restrict the ability of the pilot to fly the procedure based on aircraft equipage. The current charting specification requires the pilot to check two difference places on the instrument approach chart to determine if any additional equipment is required for the approach. The fact that information contained in these two locations may contradict each other results in unnecessary work (decision tree) and unnecessarily complicates the approach.

Recommendations: Depict equipment requirements to enter or complete any segment the approach prominently on the chart in single location. Specifically, we recommend:

1. Revise FAA Order 8260.19E paragraph 8-55 h. Chart all equipment requirement notes in a single location. While NBAA favors placing this note on the Planview, we request that FAA assess the proper location for this note on US government charts based on their human factors research conducted as part of the VOLPE approach chart format study with the added consideration of the transition from pre-composed paper charts to electronic, data-driven charts.

2. Evaluate all requirements to execute the approach. Determine if any single aircraft equipment or navigation source (e.g. DME, Radar) is required for the approach and publish that requirement on the chart. For example, on the MWA ILS Rwy 20 approach, publish only "ADF Required". The availability of DME is irrelevant to being able to fly this procedure since ADF is ***always*** required to fly the procedure.

3. When multiple equipment options are available, restrict the use of the "or" conjunction to those situations where that option is permissive on all segments of the approach (except the final segment).

We further recommend that FAA revise the AIM section 5-4-5 guidance, FAA-H-8083-15B Instrument Flying Handbook, and FAA-H-8261-1A - Instrument Procedures Handbook concurrent with the change to the 8260.19, reflecting the revised equipment note requirements.

Comments: This recommendation affects:
1. FAA Order 8260.19
2. Aeronautical Information Manual 5-4-5.
3. FAA-H-8083-15B Instrument Flying Handbook
4. FAA-H-8261-1A - Instrument Procedures Handbook

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Fig 1:

U.S. Department of Transportation
Federal Aviation Administration

ILS - STANDARD
INSTRUMENT APPROACH PROCEDURE
TITLE 14 CFR PART 97.29

Bearings, headings, courses, and radials are magnetic. Elevations and altitudes are in feet, MSL, except HAT, HAA, TCH, and RA. Altitudes are minimum altitudes unless otherwise indicated. Ceilings are in feet above airport elevation. Distances are in nautical miles unless otherwise indicated, except visibilities which are in statute miles or in feet RVR.

TERMINAL ROUTES

FROM	TO	COURSE AND DISTANCE	ALTITUDE
MWA VOR/DME	JONNY LOM/MWA VOR/DME 5.45 DME	016.97/5.45	2000
ENL VORTAC	JONNY	161.58/35.94	2100

MISSED APPROACH

ILS: AT THE DH. LOC: 4.57 MILES AFTER JONNY LOM/MWA 5.45 DME

CLIMB TO 1500 THEN CLIMBING LEFT TURN TO 2000 DIRECT JONNY LOM AND HOLD, OR WHEN DIRECTED BY ATC, CLIMB TO 1000 THEN CLIMBING RIGHT TURN TO 3000 VIA MWA R-216 TO MAKAN INT AND HOLD SW, RT, 036.48 INBOUND.

ADDITIONAL FLIGHT DATA:
FAS OBST: 589 TREE 374643N/0890021W
CHART: ALTERNATE MA HOLDING, HOLD SW MAKAN, RT, 036.48.
CHART: TDZE 468
CHART IN PLANVIEW: MAKAN INT / MWA 10.17 DME
CHART PLANVIEW NOTE: ADF OR DME REQUIRED

1. PT ____ SIDE OF COURSE ____ OUTBOUND ____ FT WITHIN ____ MILES OF ____ (IAF)
2. HOLD N JONNY, LT, 201.66 INBOUND, 2000 FT. IN LIEU OF PT (IAF).
3. FAC: 201.66 FAF: JONNY DIST FAF TO MAP: 4.57 THLD: 4.57
4. MIN. ALT: JONNY 2000
5. DIST TO THLD FROM OM: 4.57 MM: - IM: - 150 HAT: - 100 HAT: - GS ANT: 910
6. MIN GS INCPT: 2000 GS ALT AT: ____ OM: 1990 MM: - IM: -
7. GS ANGLE: 3.00 TCH: 49.9
8. MSA FROM: MW LOM 2700

MAG VAR: 1E EPOCH YEAR: 85

MINIMUMS

TAKEOFF: [ ] STANDARD [X] SEE FAA FORM 8260-15A FOR THIS AIRPORT ALTERNATE: N A [ ] ILS: STANDARD#@ LOC: STANDARD#@

CATEGORY =====>	A			B			C			D			E		
	DH/ MDA	VIS	HAT/HAA	DH/ MDA	VIS	HAT/HAA	DH/ MDA	VIS	HAT/HAA	DH/ MDA	VIS	HAT/HAA	DH/ MDA	VIS	HAT/HAA
S-ILS 20	668	1/2	200	668	1/2	200	668	1/2	200	668	1/2	200			
S-LOC 20	840	1/2	372	840	1/2	372	840	1/2	372	840	3/4	372			
CIRCLING	920	1	448	940	1	468	940	1 1/2	468	1040	2	568			

NOTES:
CHART NOTES: ADF REQUIRED.
IF LOCAL ALTIMETER SETTING NOT RECEIVED, USE CARBONDALE-MURPHYSBORO ALTIMETER SETTING AND INCREASE ALL DA/MDAs 40 FEET.

NA WHEN LOCAL WEATHER NOT AVAILABLE.
@ NA WHEN CONTROL TOWER CLOSED.

CITY AND STATE	ELEVATION: 472 TDZE: 468 AIRPORT NAME:	FACILITY IDENTIFIER:	PROCEDURE NO. / AMDT NO. / EFFECTIVE DATE:	SUP:
MARION, IL	WILLIAMSON COUNTY REGIONAL	I-MWA	MAY 12 2005 ILS OR LOC RWY 20, AMDT 12	AMDT: 11A
				DATE 12/09/1998

FAA FORM 8260 - 3 / December 2002 (computer generated)

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Fig 1A

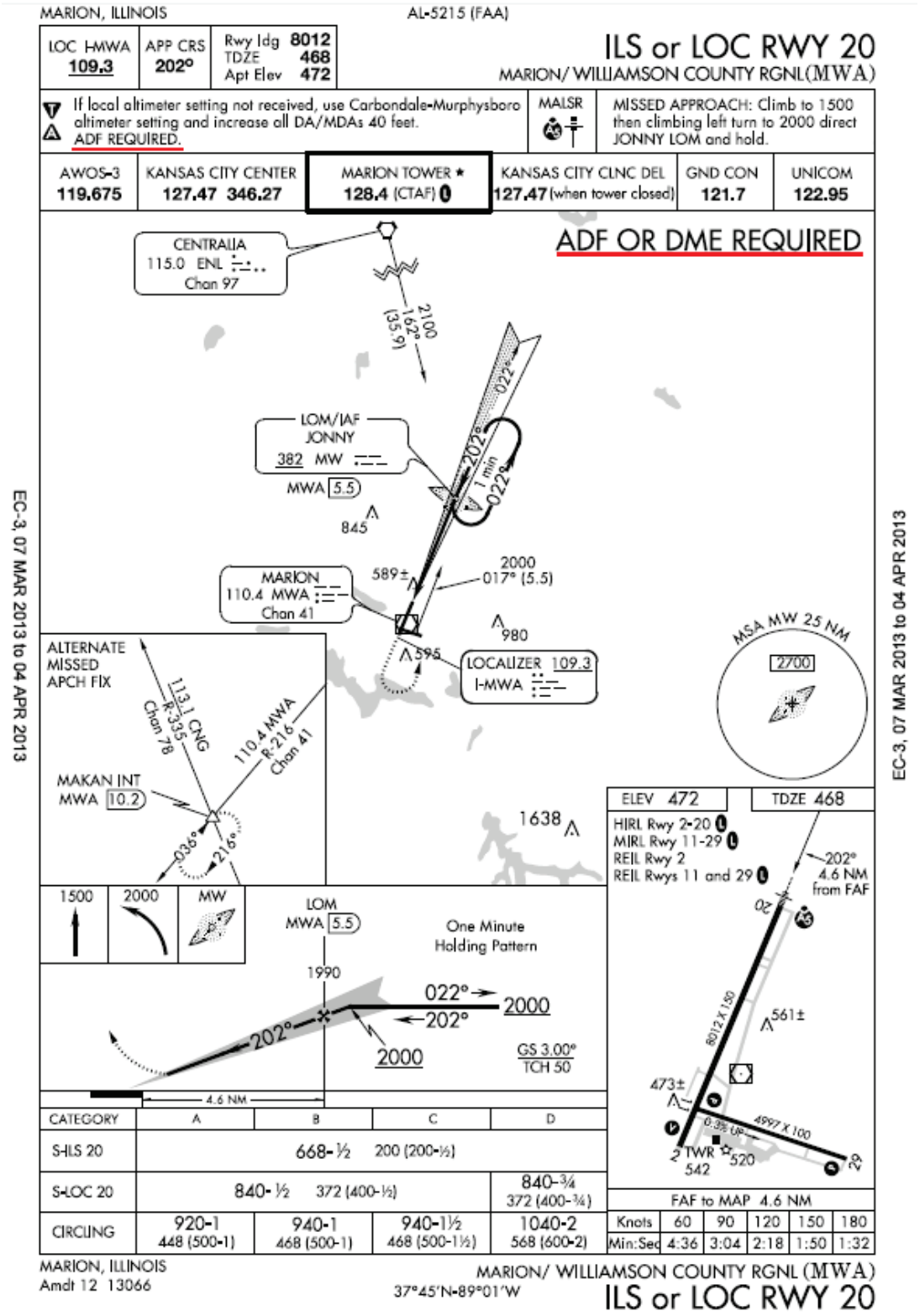

MARION, ILLINOIS
AL-5215 (FAA)
LOC I-MWA 109.3
APP CRS 202°
Rwy ldg 8012
TDZE 468
Apt Elev 472
ILS or LOC RWY 20
MARION/ WILLIAMSON COUNTY RGNL(MWA)
If local altimeter setting not received, use Carbondale-Murphysboro altimeter setting and increase all DA/MDAs 40 feet.
ADF REQUIRED.
MALSR
MISSED APPROACH: Climb to 1500 then climbing left turn to 2000 direct JONNY LOM and hold.
AWOS-3 119.675
KANSAS CITY CENTER 127.47 346.27
MARION TOWER * 128.4 (CTAF)
KANSAS CITY CLNC DEL 127.47 (when tower closed)
GND CON 121.7
UNICOM 122.95
ADF OR DME REQUIRED
CENTRALIA 115.0 ENL Chan 97
2100 162° (35.9)
022°
202°
1 min
LOM/IAF JONNY 382 MW
MWA 5.5
845
589±
2000 017° (5.5)
MARION 110.4 MWA Chan 41
980
595
LOCALIZER 109.3 I-MWA
MSA MW 25 NM
2700
ALTERNATE MISSED APCH FIX
113.1 CNG R-335 Chan 78
110.4 MWA R-216 Chan 41
MAKAN INT MWA 10.2
036°
216°
1638
1500
2000
MW
LOM MWA 5.5
One Minute Holding Pattern
1990
022°
2000
202°
2000
GS 3.00°
TCH 50
4.6 NM
ELEV 472
TDZE 468
HIRL Rwy 2-20
MIRL Rwy 11-29
REIL Rwy 2
REIL Rwys 11 and 29
202° 4.6 NM from FAF
20
8012 X 150
561±
473±
0.3% UP
4997 X 100
2 TWR 542
520
2
CATEGORY A B C D
S-ILS 20 668-½ 200 (200-½)
S-LOC 20 840-½ 372 (400-½) 840-¾ 372 (400-¾)
CIRCLING 920-1 448 (500-1) 940-1 468 (500-1) 940-1½ 468 (500-1½) 1040-2 568 (600-2)
FAF to MAP 4.6 NM
Knots 60 90 120 150 180
Min:Sec 4:36 3:04 2:18 1:50 1:32
MARION, ILLINOIS
Amdt 12 13066
37°45'N-89°01'W
MARION/ WILLIAMSON COUNTY RGNL (MWA)
ILS or LOC RWY 20
EC-3, 07 MAR 2013 to 04 APR 2013
EC-3, 07 MAR 2013 to 04 APR 2013

FIG 2:

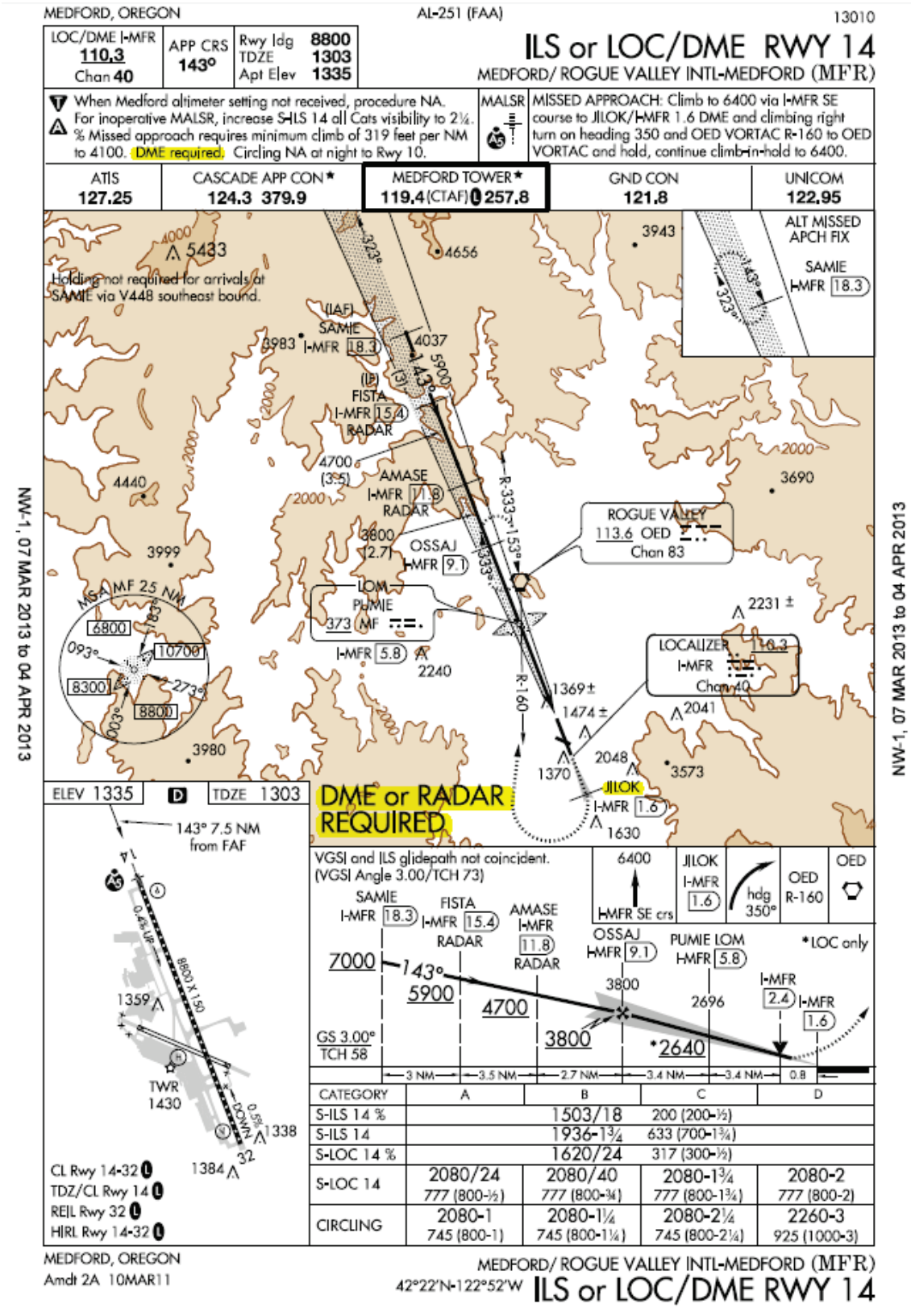
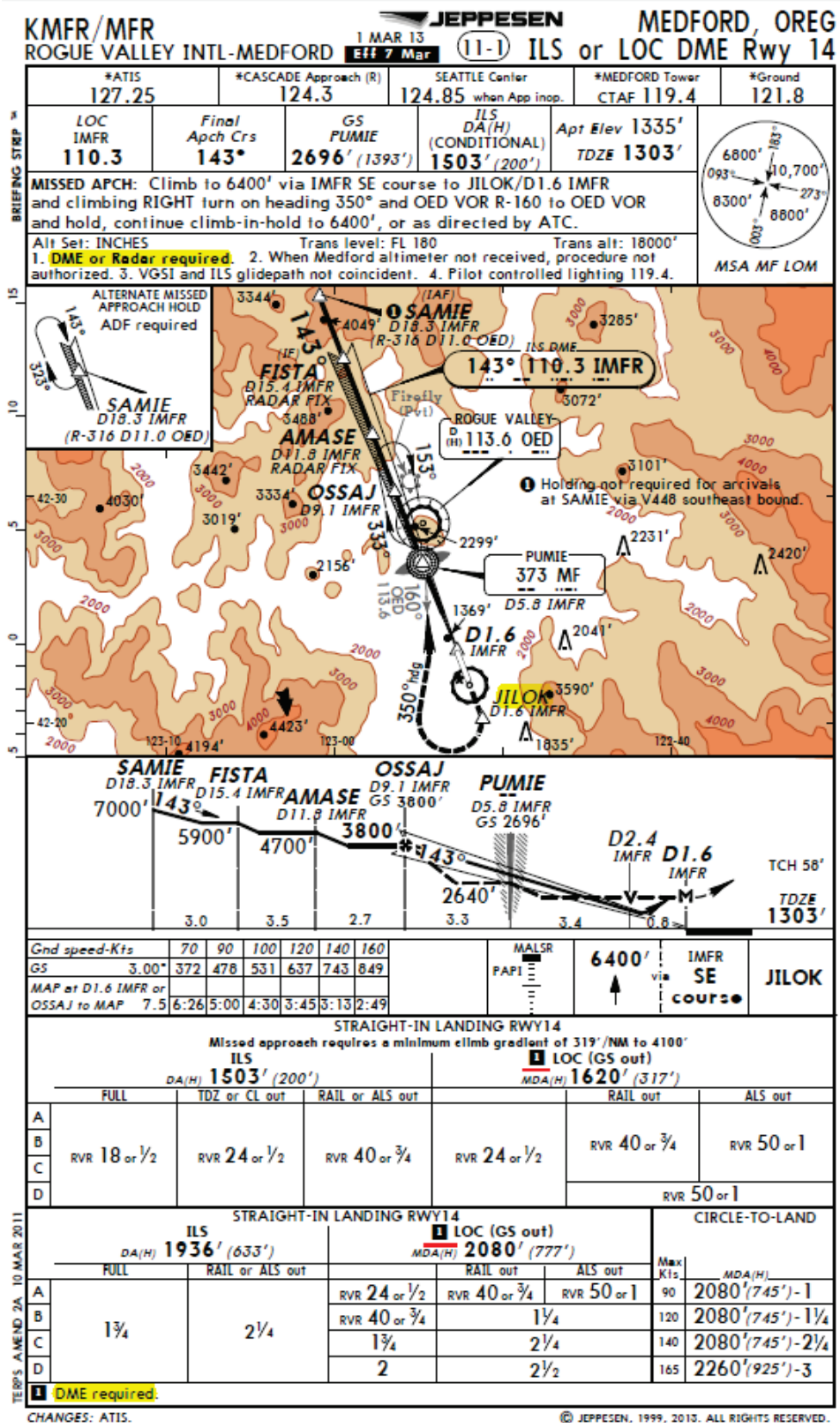

MEDFORD, OREGON
AL-251 (FAA)
13010
LOC/DME I-MFR 110.3 Chan 40
APP CRS 143°
Rwy ldg 8800
TDZE 1303
Apt Elev 1335
ILS or LOC/DME RWY 14
MEDFORD/ ROGUE VALLEY INTL-MEDFORD (MFR)
When Medford altimeter setting not received, procedure NA.
For inoperative MALSR, increase S-ILS 14 all Cats visibility to 2¼.
% Missed approach requires minimum climb of 319 feet per NM to 4100. DME required. Circling NA at night to Rwy 10.
MALSR
MISSED APPROACH: Climb to 6400 via I-MFR SE course to JILOK/I-MFR 1.6 DME and climbing right turn on heading 350 and OED VORTAC R-160 to OED VORTAC and hold, continue climb-in-hold to 6400.
ATIS 127.25
CASCADE APP CON* 124.3 379.9
MEDFORD TOWER* 119.4 (CTAF) 257.8
GND CON 121.8
UNICOM 122.95
Holding not required for arrivals at SAMIE via V448 southeast bound.
(IAF) SAMIE I-MFR 18.3
(IF) FISTA I-MFR 15.4 RADAR
AMASE I-MFR 11.8 RADAR
OSSAJ I-MFR 9.1
LOM PUMIE 373 MF I-MFR 5.8
ROGUE VALLEY 113.6 OED Chan 83
LOCALIZER 110.3 I-MFR Chan 40
JILOK I-MFR 1.6
ALT MISSED APCH FIX SAMIE I-MFR 18.3
MSA MF 25 NM
ELEV 1335
D
TDZE 1303
143° 7.5 NM from FAF
DME or RADAR REQUIRED
VGSI and ILS glidepath not coincident. (VGSI Angle 3.00/TCH 73)
6400 I-MFR SE crs
JILOK I-MFR 1.6
hdg 350°
OED R-160
OED
*LOC only
GS 3.00° TCH 58
TWR 1430
CL Rwy 14-32
TDZ/CL Rwy 14
REIL Rwy 32
HIRL Rwy 14-32
CATEGORY A B C D
S-ILS 14 % 1503/18 200 (200-½)
S-ILS 14 1936-1¾ 633 (700-1¾)
S-LOC 14 % 1620/24 317 (300-½)
S-LOC 14 2080/24 777 (800-½) 2080/40 777 (800-¾) 2080-1¾ 777 (800-1¾) 2080-2 777 (800-2)
CIRCLING 2080-1 745 (800-1) 2080-1¼ 745 (800-1¼) 2080-2¼ 745 (800-2¼) 2260-3 925 (1000-3)
MEDFORD, OREGON
Amdt 2A 10MAR11
42°22'N-122°52'W
MEDFORD/ ROGUE VALLEY INTL-MEDFORD (MFR)
ILS or LOC/DME RWY 14
NW-1, 07 MAR 2013 to 04 APR 2013

Fig 3.


KMFR/MFR
ROGUE VALLEY INTL-MEDFORD
JEPPESEN
1 MAR 13
Eff 7 Mar
(11-1)
MEDFORD, OREG
ILS or LOC DME Rwy 14
*ATIS 127.25
*CASCADE Approach (R) 124.3
SEATTLE Center 124.85 when App inop.
*MEDFORD Tower CTAF 119.4
*Ground 121.8
LOC IMFR 110.3
Final Apch Crs 143°
GS PUMIE 2696′ (1393′)
ILS DA(H) (CONDITIONAL) 1503′ (200′)
Apt Elev 1335′
TDZE 1303′
MISSED APCH: Climb to 6400′ via IMFR SE course to JILOK/D1.6 IMFR and climbing RIGHT turn on heading 350° and OED VOR R-160 to OED VOR and hold, continue climb-in-hold to 6400′, or as directed by ATC.
Alt Set: INCHES
Trans level: FL 180
Trans alt: 18000′
1. DME or Radar required. 2. When Medford altimeter not received, procedure not authorized. 3. VGSI and ILS glidepath not coincident. 4. Pilot controlled lighting 119.4.
MSA MF LOM
ALTERNATE MISSED APPROACH HOLD
ADF required
SAMIE D18.3 IMFR (R-316 D11.0 OED)
FISTA D15.4 IMFR RADAR FIX
AMASE D11.8 IMFR RADAR FIX
OSSAJ D9.1 IMFR
143° 110.3 IMFR
ROGUE VALLEY D 113.6 OED
Holding not required for arrivals at SAMIE via V448 southeast bound.
PUMIE 373 MF D5.8 IMFR
D1.6 IMFR
JILOK D1.6 IMFR
350° hdg
160° OED 113.6
SAMIE D18.3 IMFR
FISTA D15.4 IMFR
AMASE D11.8 IMFR
OSSAJ D9.1 IMFR GS 3800′
PUMIE D5.8 IMFR GS 2696′
D2.4 IMFR
D1.6 IMFR
TCH 58′
TDZE 1303′
Gnd speed-Kts 70 90 100 120 140 160
GS 3.00° 372 478 531 637 743 849
MAP at D1.6 IMFR or OSSAJ to MAP 7.5 6:26 5:00 4:30 3:45 3:13 2:49
MALSR
PAPI
6400′
IMFR via SE course
JILOK
STRAIGHT-IN LANDING RWY14
Missed approach requires a minimum climb gradient of 319′/NM to 4100′
ILS DA(H) 1503′ (200′)
LOC (GS out) MDA(H) 1620′ (317′)
FULL
TDZ or CL out
RAIL or ALS out
RAIL out
ALS out
A
B
C
D
RVR 18 or 1/2
RVR 24 or 1/2
RVR 40 or 3/4
RVR 24 or 1/2
RVR 40 or 3/4
RVR 50 or 1
RVR 50 or 1
STRAIGHT-IN LANDING RWY14
ILS DA(H) 1936′ (633′)
LOC (GS out) MDA(H) 2080′ (777′)
FULL
RAIL or ALS out
RAIL out
ALS out
1 3/4
2 1/4
RVR 24 or 1/2
RVR 40 or 3/4
RVR 50 or 1
RVR 40 or 3/4
1 1/4
1 3/4
2 1/4
2
2 1/2
CIRCLE-TO-LAND
Max Kts
MDA(H)
90 2080′(745′)-1
120 2080′(745′)-1 1/4
140 2080′(745′)-2 1/4
165 2260′(925′)-3
DME required.
TERPS AMEND 2A 10 MAR 2011
CHANGES: ATIS.
© JEPPESEN, 1999, 2013. ALL RIGHTS RESERVED.

Initial Discussion – MEETING 13-02: New issue presented by Rich Boll, NBAA, as a joint submission on behalf of NBAA and Bruce Williams, CFI and FAASTeam Member, Seattle, WA. Rich presented background info (View), highlighting the duplication (both plan view and briefing strip) of chart notes on some procedures. Rich and Bruce both recommend that FAA determine the most critical equipment requirement and publish a single note regardless of whether that equipment is required to enter the procedure or to fly it. Tom Schneider, AFS-420, briefed that split notes are published as a direct result of ACF Charting Group consensus on CG issue 01-01-137. A long discussion followed after which Tom asked if the group had any objection to charting just one note in the briefing strip. Brad Rush AJV-3B questioned if IPG was initiating policy. Tom responded no; however, it is helpful to get users consensus **prior to** writing policy/criteria. Kevin Bridges, AIR 130, asked the benefits of the equipment notes. Rich responded that pilots must know what equipment is required to fly the approach. If something more than what the title suggests is necessary, then that equipment must be noted for the pilot. The general consensus is that FAA should determine the most critical equipment necessary for the approach and publish one note in the briefing strip. Tom recommended an AFS-410/420/470 working group be formed to address the issue and report back to the ACF. ACTION: AFS-410/420/470.

MEETING 14-01: Kel Christianson, AFS-470, discussed the possibility of an equipment requirements box on PBN approach charts. Once this happens, consideration will be given to apply this to conventional procedures for consistency, to show the most restrictive requirements needed to fly a given approach. Val Watson, AJV-3, remarked that the PBN Requirements box standard is years in the future, and that today we alert users to equipment requirements via the position (planview or briefing strip) of an equipment note; one position for equipment required for joining the approach and one for that required to fly the approach itself. Tom Schneider, AFS-420, stated “yes” and that is the confusing convention utilized for years. The charting convention is explained in the AIM, but most pilots do not carry an AIM to readily access when faced with this confusion. Ted Thompson, Jeppesen, said the location on the chart was intended to infer the meaning, but because the notes were sometimes repetitive, it became confusing. Kel said this is a work in progress on the PBN side, as a separate block will be used below title line and above notes section, telling exactly what is needed to fly the approach. The question is can it then be brought over to the conventional side. Ted said this is mixing apples and oranges, taking PBN efforts over to conventional. Tom’s concern is making PBN changes now, and then later making similar changes to conventional (same concept). Ted is all in favor of that idea if we do not make it more confusing. Mark Steinbicker, AFS-470, said we are trying (ongoing effort) to make charts more specific and consistent. A question for ACF is since there is an active group (i.e. PARC) in PBN charting how is this issue to be worked. Is it FAA internal (US-IFPP) or for a working group/action team to collaborate? Tom would not envision the US-IFPP working this issue. The ACF is currently working the agenda item, so once the charting aspect is established, AFS-420 would put requirements in Order 8260.19 to advise developer what to put on 8260-series Forms. Mark does not want the PBN work group distracted by this endeavor. Tom said the IOU on this item is AFS-410/470 from an OPS perspective and with reference to what pilots want to see. Tom asked how the group should approach this? Mark suggested that as there are folks interested in this issue in attendance at the ACF, a workgroup be formed. Tom provided a sign-up sheet for an Equipment Requirements Notes sub-group. (View)

Status: Equipment Requirements sub-group chaired by AFS-410/470 will report results of meeting at the next ACF. Item Open (AFS-410/470).

MEETING 14-02: John Blair, AFS-410, briefed the status and stated his belief that it would be beneficial to have consistent chart placement of a box with required equipage (items not in procedure title) for conventional and PBN approaches. This would enhance preparation and briefing of the approach. Tom Schneider, AFS-420, referred to PBN information box work in progress and Kel Christianson, AFS-470, said that for approaches, the group briefed last time that equipment requirements would be published above the existing notes box of the briefing strip. He briefed that this should be done initially with conventional procedure information, then as PBN information is developed and finalized, it can be placed in the same location. Rich Boll, NBAA, said the original issue was about both contradictory information and various locations of information on the approach plate/chart, and inquired about the 2020 timeframe on PBN information. Ted Thompson, Jeppesen, brought up that chart note placement has historical inferences: placement in the planview means one thing and briefing strip placement means another. If equipment notes were consolidated to perhaps publication of the most onerous one and placed in a standardized location, much pilot confusion may be alleviated. The nuances of note placement are fairly subtle and are probably often misinterpreted. There may also be a need to enhance wording for applicability to a certain phase of the procedure. Rick Dunham, AFS-420, acknowledged the concerns of the group, but stated that staffing dictates that at this time this is not a high priority issue. A work group formed at ACF14-01 did not meet, although there is still interest. A copy of the previous work group list was read and is included (View).

Status: AFS-410 will work toward scheduling a meeting with those signed up to participate and report back at the next meeting. **Item Open:** AFS-410

MEETING 15-01: Mike Webb, AFS-420, briefed (View) regarding a sub-group that met to formulate ways to de-conflict required equipment information on charts; i.e., briefing strip notes vs planview notes may list different requirements than the procedure title indicates. This sub-group broke out what was specifically required to enter the procedure and fly the entire procedure in addition to Final Approach Segment requirements. The goal is to locate information in one spot on U.S. Government charts to help the pilot determine requirements (this process should also work on non-government vendor chart vendor products). Just as the PARC recommendation (with VOLPE input) for a PBN information box, the result is having an “equipment requirements box,” as shown on the slide, in the same location on each chart. Ted Thompson, Jeppesen, stated that if a note applies in general, you want that in one location, but if a note has applicability to a specific point in space, it should be attributed to the point where it applies. Mike asked for ACF direction/input from here. The move is for standardization. The ACF attendees liked the proposal and the sub-group will formalize it as a recommendation. Tom Schneider, AFS-420, advised that any changes will be submitted in Order 8260.19H (at the earliest). Tom took an IOU to work on draft language for the Order 8260.19H, in consultation with Valerie Watson, AJV-553, to facilitate charting issues. Ted recommended drafting language in a way that also supports long term PBN goals for

notes. Recommendations should include what to name the box so that it encompasses both conventional and RNAV type instrument procedures.

Status: Sub group will formalize recommendations. Tom took an IOU to work on draft language for the Order 8260.19H. **Item Open:** AFS-420/ AFS Sub Group

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MEETING 15-02: Mike Webb, AFS-420, briefed (View) proposed changes to get consensus on the equipment requirements box usage from the forum so that work can commence on the IACC specifications. A decision must also be made regarding PBN procedures (PBN requirements box) utilizing the same space as conventional procedures equipment requirements box. The effort is to consolidate the notes for equipment requirements that are scattered on the plan view and in the briefing strip into one place in the briefing strip for the pilot. The goal from the ACF discussion today was to gather opinion on whether to also specify what portion of the approach requires the specified equipment. Group discussions followed on several related topics including: What would notes look like; examples of PBN/conventional/missed approach shown; PBN to conventional (i.e., RNAV transition to an ILS); procedure naming differences (i.e., title of the procedure) between the U.S. and overseas (i.e., changing from RNAV to RNP outside U.S. and not here). Rick Dunham, AFS-420, said FAA current position is no change to procedure naming. Questions were raised about ICAO standards and pilots understanding the differences. There was discussion on NavSpecs (i.e., AC-90-100A/101A/105A/107) with concerns raised on the process of having to learn all the capabilities defined under current and future NavSpecs. There were questions on apparent redundancy for GPS in notes. It was brought up whether there would be too much text information in one box (Ted Thompson, Jeppesen, says yes) resulting in volumes of text like on SIDs & STARs. Radar Required – what does that mean and why necessary came up again and Tom Schneider, AFS-420, advised that is spelled out in current policy and it is explained in the AIM.

In summary, there was support for the equipment requirements box idea. Rick said we need input/feedback, since the goal is to simplify the planview and create a briefing strip for the pilot to focus in on when determining requirements for executing the approach. Brad Rush, AJV-54, questioned the required level of detail needed in the requirements box to fly the approach. Valerie Watson, AJV-553, said the question is do we put only those notes pertaining to the entire procedure (FAC, Missed or all transitions) in the briefing strip and those uniquely pertaining to transitions in the planview, *or* do we place ALL equipment requirement notes in briefing strip. Mike Webb said that all participants need to mark up the slides presented today and send back to us as specific feedback. Tom requested that all participants also review FAA Order 8260.19 draft data (View) and comment on that as well.

Status: All participants to please review the presentations and forward input to Mike Webb and Tom Schneider. **Item Open:** AFS-420.

MEETING 16-01: Tom Schneider (AFS-420) had an IOU to update FAA Order 8260.19, and displayed (View) draft language. Input was requested from participants at ACF 15-02, and comments were received and considered. The order is now in coordination within the FAA. Mike Webb (AFS-420) will brief another aspect of the issue during the charting portion of meeting. John Collins (GA pilot) inquired on timeline, and Tom said issue invoves: publication of Order 8269.19H; Valerie Watson (AJV-5) will address the charting RD process and IACC specifications; Ted Thompson (Jeppesen) and other charting service providers will be kept informed of progress. Kevin Allen (American Airlines) inquired if the PBN requirements box has been coordinated with ICAO. Mike said ICAO Annex 4 does not specify how the box is to be presented, just that it has to be on the chart. The guidance is State specific by data house providers and users, with the Order 8260.19H being specific to our State. Ted added Jeppesen and Lido plan to follow US method, providing the PBN requirements are determined at the design level, specifically documented on procedure source and not left to cartographers. Mike said the NavSpec for the procedure will be first item in the requirements box, with the US following AC 90-105A in naming of the NavSpec, adding this is tied to ICAO Doc 9613 naming also. Discussion followed on charting notes for RNP/RNAV/RNP-AR and conventional procedures with RNAV legs on the charts, along with various combinations of equipment. Ted said there were two aspects to the issue: What should the note read; and how should the note be charted. Gary McMullin (Southwest Airlines) said pilot training will be required on this change. Tom added guidance will be out November 1 (Order 8260.19H), and Valerie will have the RD (charting portion) around the same time frame. AIM/IPG guidance will be required for transition from notes now to notes in future.

Status: Tom will provide status update on Order 8260.19H. Valerie will provide update on status of charting portion. **Item open:** AFS-420/AJV-5

MEETING 16-02: Tom Schneider (AFS-420) briefed there are two IOUs on the topic from the last ACF. (VIEW) Tom discussed latest version of change to draft Order 8260.19H, which most have already seen, showing examples of the equipment requirements notes and the PBN information box type notes. There still may be some changes to the NavSpec specifics for the notes, but the concept is not changing. Kevin Bridges (AIR-130) said if a box can do an approach it can do RNAV-1, adding that some old boxes may not be listed in the AC 90-100A spreadsheet. He explained that this is a manufacturer problem (not an FAA one) and suggested the user should ask the manufacturer to have their equipment listed. Rich Boll (NBAA) added that the spreadsheet has no bearing on whether or not a user can fly the approach and explained differences between AC 90-100A and AC 90-105. Valerie Watson (AJV-553) briefed the second IOU, reporting that the charting standard has been approved and is in place, and the PBN/Equipment Requirement briefing strip notes will be placed as depicted in the prototype chart examples when sourced on the 8260 procedure source document. Tom said this change will result from implementation of Order 8260.19H in January 2017, and charts with this feature should start appearing about a year later.

Status: Track and report status of Order 8260.19H. **Item open:** AFS-420/AJV-5

MEETING 17-02: John Bordy (FAA Flight Procedure Standards Branch), briefed changes were added to Order 8260.19H (published in July 2017), which expanded guidance related to equipment requirement notes. See paragraph 8-6-8 of Order 8260.19H for the new content. In addition, Aeronautical Information Services completed a charting specification to support the new equipment/PBN requirements box on an approach procedure. After publication, it was determined the new guidance didn't fully address "hybrid" procedures, which are a mix of both conventional and PBN (e.g., an ILS approach with a PBN initial approach segment). Implementation of Order 8260.19H is currently on hold for hybrid type procedures until requirements can be determined and guidance developed to ensure equipment and PBN requirements can be clearly conveyed to pilots. Joel Dickinson (Performance Based Flight Operations Branch) then provided a conceptual briefing (VIEWs) related to PBN requirement notes. The concept he has been working on is intended to standardize information on procedure charts. Some examples of the front of the TPP were discussed, showing the format as: NAVSPEC first, then a required sensor, then a required function, then the minimum RNP. Valerie Watson (Aeronautical Information Services) discussed how to differentiate these items, such as punctuation, and a lengthy discussion ensued on the pros and cons of various delineations (lines, semi-colon, colons, parentheses, slashes, words, etc.). Rich Boll (NBAA) inquired about training on the new format (once established). Joel said there will be explanatory guidance issued, adding he will look at what ICAO is doing and this work was generated by the PARC three years ago. John Bordy asked Joel how to move forward, and it was decided that specific comments on the presentation should be sent directly to Joel.dickinson@faa.gov. John Moore (Jeppesen) said the ICAO did work on this for years and that their movement is towards a single NAVSPEC on a procedure. He asked Joel when the FAA decided to include multiple NAVSPECs on a procedure and how that got coordinated. John Moore expressed a concern that foreign operators who are used to a single NAVSPEC will fly here and see multiple NAVSPECs. In addition, John Moore expressed a concern that charting formats should be under the purview of Aeronautical Information Services and not a Flight Standards entity.

Action Items:
John Bordy will post the slide presentation on the IPG website and solicit comments to be forwarded to Joel Dickinson.
Joel Dickinson will continue to develop PBN requirements notes.
Joel Dickinson will solicit and review comments as requested above.

Status: Item will remain open and new developments briefed at next IPG.

Meeting 18-01: Joel Dickinson (Performance Based Operations Branch) provided an update on progress related to developing the long-term concept for performance based navigation (PBN) notes on instrument flight procedures. The PBN notes will indicate the required navigation specification and sensor required to fly the procedure (or certain segments of the procedure) and indicate any additional capabilities that may be required (for example, RF turns). This effort is rooted in a recommendation from the Performance-based Operations Aviation Rulemaking Committee (PARC) to standardize notes and add them to all PBN instrument flight procedures. Joel indicated that when the notes and format are finalized, there would be corresponding guidance in the legend of the Terminal Procedures Publication and expanded AIM and

Instrument Procedures Handbook information. Joel stated the original PARC recommendation was for annotating PBN notes on all PBN instrument procedures, but somehow SIDs and standard terminal arrival (STAR) procedures were not included in the FAA's initial efforts, so Joel is working to correct that. Rune Duke, Aircraft Owners and Pilots Association (AOPA), said there are some existing procedures with notes that are not clear. Valerie Watson (Aeronautical Information Services) added they are receiving P-NOTAMs and amendments for PBN requirements notes on these type procedures also. Joel confirmed these are on hold awaiting corresponding guidance publication. John Collins (GA pilot) discussed PBN codes as used when filing flight plans, and Joel concurred some line up and others do not, adding that is part of the effort. John Collins added that when designating some codes, ARTCC ERAM computers gives the authority to some aircraft to fly procedures their equipment is not capable. Ken Holden, U.S. Army, added the note "RNAV-1" linking to a sensor (leads to question should TAA be RNAV-1). Joel reiterated the effort is to standardize terminology (meaning), format (presentation), and how it will look to the pilot. John Bordy (Flight Procedures and Airspace Group) mentioned change 2 to FAA Order 8260.19 clarifies existing PBN note requirements to, particularly ILS procedures that incorporate PBN segments (i.e., hybrid procedures). Michael Stromberg (UPS) asked if examples would be available, and Joel said yes. Gary McMullen, Southwest Airlines (SWA) said they would like to take examples back for review by management. Many members of the group indicated they want to see proposed changes before making any decisions, as there are concerns related to ICAO harmonization, format, PBN box content, and the language intended for the AIM and IPH. Joel solicited volunteers to hold a group meeting for further PBN Requirements Notes discussions (List).

Action Items:

- Joel Dickinson will hold a meeting to discuss the issue with identified participants.
- Joel Dickinson will mature the concept and provide a further update at the next meeting.

Status: Item open.

Meeting 18-02: Joel Dickinson (Flight Operations Group) provided a status update for annotating PBN procedures with standard nomenclatures for PBN requirement notes (Slides). Joel displayed many examples for approach procedures, departure procedures, and arrival procedures. Joel stated any procedure with a PBN segment would include a PBN box, which cannot be disregarded. The PBN box will contain the required navigation specification, required sensor, and any additional capabilities necessary to fly the PBN segment(s) (such as RF). The examples generated significant group discussion and questions related to specific scenarios and segments. In particular, there seemed to be some confusion related to the naming of "RNAV (GPS)" procedures annotated with a required navigation specification of "RNP APCH". Joel explained the difference between procedure naming and required navigation specifications and John Moore (Jeppesen) explained some of the history behind the procedure naming of PBN procedures. Joel closed the discussion by stating that the nomenclature format for populating the PBN boxes are finalized and that work is ongoing to add the nomenclatures to FAA Order 8260.19 so procedure designers can populate boxes with the correct notes for each procedure. John Bordy stated the slide presentation will be posted on the ACM-IPG website and that any comments should be directed to Joel Dickinson directly.

Action Items:

- Participants requested to review the example slides and provide feedback direct to Joel Dickinson.
- John Bordy to provide status update for adding PBN notes requirements to FAA Order 8260.19.

Status: Item open.

Meeting 19-01 John Bordy, Flight Procedures and Airspace Group, briefed the issue directly from the slide: Summary of the issue given. Discussion over past few years has turned more toward PBN requirements notes. Enhanced guidance for annotating PBN requirement notes on approach procedures and STARs have been added to draft Order 8260.19I. Explanation for the PBN requirements box has been added to the Terminal Procedures Publication legend and the Aeronautical Information Manual (AIM). Joel Dickinson, Flight Operations Group, indicated he has not received any recent feedback related to PBN requirement notes, therefore we are now just waiting for the Order 8260.19I to be published. Rich Boll, NBAA, inquired about confusing entries on non-PBN approach procedures related to equipment annotation related to procedure entry and when such equipment may also be needed to fly the missed approach segment. John Bordy believes this was also corrected in the draft Order 8260.19I, but took an action to ensure it was corrected and to provide a copy of that section to Rich prior to the draft entering external coordination.

Action Item: John Bordy to provide Rich Boll, NBAA, sections from draft Order 8260.19I related to both equipment requirement notes and PBN requirement notes.

Status: Item open.

Meeting 19-02 John Bordy, FAA Flight Procedures and Airspace Group, briefed the issue summary and current status from the slide. NBAA originally introduced this issue as charting of equipment requirements, but over time the effort has shifted to charting of PBN requirement notes. The requirement notes have been addressed in 8260.19I, and the guidance has been added to the AIM, but the original item has not yet been closed. John had a previous action to submit the proposed changes to Rich Boll (NBAA), and accomplished that prior to the current meeting. The item will be held open until status of the changes in 8260.19I is finalized. Rich advised he liked the changes sent. The intent will be to close this issue when Order 8260.19I publishes. ICAO is addressing a similar issue, but intend to exclude sensor requirements from the charts, while FAA intends to press forward with sensor requirements.

Action Items:

- FAA Flight Procedures and Airspace Group will report progress of Order 8260.19I

Status: Item open

Meeting 20-02: Jeff Rawdon, FAA Flight Procedures and Airspace Group, briefed the issue summary and current status from the slide. Equipment notes requirements have been added to Order 8260.19I, which was published June 2020. Rich Boll, NBAA (proponent) and the group concurred with closing this issue, and agreed any new issues could be addressed with new recommendation documents (RDs).

Status: Closed