

Flight Procedures Cover Page	Task Action: FLIGHT CHECK	Task Type: STAR	Estimated Chart Date: 09/05/2024	APWS Task ID: E74AECDE639C4CA8A421AA500BC7FE6E	APWS Project ID: 13FF286B992B4A9791BEAF097B2F54D4
Procedure: RAVNN (RNAV) SEVEN ARRIVAL		Enroute: YES	Specialist: Bradshaw, Henry		Agreement Number:
Airport ID: KBWI			Airport City: BALTIMORE		State: MD
Facility ID:	Facility Type:	Flight Inspection Remark Type: New FC Slot			
<div>Procedure Comments: PROCEDURE REDESIGNED PER PBN AFS APPROVAL REQUESTED FOR: Descent Gradient - CAPKO to RAVNN Segment Descent Gradient - DFORT to WALKN Segment Descent Gradient - FIMBO to UDUDE Segment CONTACT: ALLAN WILL (AJV-A423) (405) 954-6103 05/16/24: THIS IS A CORRECTED COPY OF THE FORM APPROVED ON 05/06/24. 8260-2: KOOLZ 1. TYPE: REMOVED "DME" 2. FIX MAKE-UP: REMOVED FAC 1 BALTIMORE I-RUX LOC 3. FIX USE: REMOVED FAC 1 FROM "IAP ILS OR LOC RWY 33L", "IAP ILS OR LOC RWY 33L (SA CAT I)", AND "IAP ILS OR LOC RWY 33L (SA CAT II)" AT KBWI. 06/12/24: THIS IS A CORRECTED COPY OF THE FORM APPROVED ON 05/17/24. 8260-2: DUDDS 1. FIX USE: REMOVED "IAP VOR/DME RWY 15L" AT KBWI.</div>					

QUALITY
35
CHECKED

QUALITY
41
CHECKED

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FIPC DME/DME FORM						
PROCEDURE: STAR RAVNN SEVEN (RNAV)			AIRPORT NAME: BALTIMORE/WASHINGTON INTL		AIRPORT ID: KBWI	SPECIAL CONTROL NO: YG-03-248-24
FAC ID: RAVNN7		CITY: BALTIMORE			ST: MD	ORIG CHART DATE: 09/05/2024
DFL TYPE: PROC/D	THIRD PARTY: <input type="checkbox"/> YES	EST. TIME ON SITE: 1.0	REIMB. NUMBER: AC0721	PTS TASK ID: E74AECDE639C4CA8A421AA500BC7FE6E		
PREFLIGHT NOTES						
REVIEWER: michael g campbell					DATE: 04/25/2024	
COMMENTS:					CHECK ONE:	
					<input checked="" type="checkbox"/> FLT CK REQ <input type="checkbox"/> NFCR <input type="checkbox"/> REJECT	
						YES
					CPV COMPLETE?	
					X	
PROCEDURE RESULTS						
INSPECTION DATE: 04/25/2024	CREW #: VN504	N #: N80	INSTRUMENT PROCEDURE STATUS: <input checked="" type="checkbox"/> SAT <input type="checkbox"/> SAT W/CHANGES <input type="checkbox"/> UNSAT		ARINC CODING: <input checked="" type="checkbox"/> SAT <input type="checkbox"/> SAT/GOLD <input type="checkbox"/> UNSAT	
FLIGHT INSPECTOR SIGNATURE: michael g campbell @ 04/25/2024 15:35			PRINTED NAME: CAMPBELL, MICHAEL GRANT			NOTAM INITIATED? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
FLIGHT INSPECTOR REMARKS:						
DME/DME STATUS: <input checked="" type="checkbox"/> SAT <input type="checkbox"/> UNSAT		SPECIALIST SIGNATURE: david c-ctr cook @ 05/01/2024 14:48			PRINTED NAME: Dave Cook	
SPECIALIST REMARKS: All ESV's recorder by Flight Inspection aircraft. Satisfactory for DME/DME/IRU flight.						
IN-FLIGHT OBSTACLE REPORT						
OBSTRUCTION ID #:	COORDINATES OR LOCATION:	GNSS ALTITUDE (MSL):	BAROMETRIC ALTITUDE (MSL):	HEIGHT ABOVE GROUND LEVEL:		



Federal Aviation Administration

Memorandum

Date: November 8, 2023

To: Christopher Hope, Manager, Flight Technologies and Procedures Division
THRU: Romana Wolf, Manager, Flight Procedures and Airspace Group

From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A45

Prepared by: Jeff Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Approval Request: Baltimore, MD (KBWI) , RAVNN (RNAV) STAR
Descent Gradient

CAPKO to RAVNN Segment

The requirements stated in Order 8260.3F, (United States Standard for Terminal Instrument Procedures (TERPS), paragraph 2-2-8.a. are:

“(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).

“(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).

Paragraph 2-2-8.b states:

“When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval.”

Paragraph 1-4-2. ...states in part:

“Nonstandard IFP. ...obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented, and an equivalent level of safety exists...”

RSO144: [Approval Required] The Descent Gradient (333.21) from CAPKO to RAVNN is greater than the Maximum Permissible Descent Gradient (318.0).

A computed descent gradient value from CAPKO to RAVNN of 333.21 ft./NM resulted from the descent gradient being calculated from descending from the restriction of AT 9000 at CAPKO to cross RAVNN AOB 7000 and AOA 6000 over 9 NM. The restriction after RAVNN is at MALXX at 6000. The distance required to descend from CAPKO at 9000 to MALXX at 6000 is 14 NM. Calculating a descent gradient from CAPKO to MALXX 14 NM resulted in a descent gradient of 214.29 ft./NM.

TF	CAPKO [IFPA r4 03-29-18 TO UNK]	FLY_BY	0.0		12000.0	300.0	0.0	69.45	370.41	439.86	1.8	8.03	9000.0	250.0	12.63	57.11	294.24	351.35
TF	RAVNN	FLY_BY	1.8	8.03	9000.0	250.0	12.63	57.11	294.24	351.35	0.0		7000.0	250.0	0.0	52.99	285.16	338.15
TF	MALXX	FLY_BY	0.0		7000.0	250.0	0.0	52.99	285.16	338.15	0.0		6000.0	250.0	0.0	51.37	280.77	332.15

Consideration was given to removing and or changing the restrictions at CAPKO, RAVNN, and MALXX. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent confliction from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).



Federal Aviation Administration

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From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A45

Prepared by: Jeff Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Approval Request: Baltimore, MD (KBWI) , RAVNN (RNAV) STAR
Descent Gradient

DFORT to WALKN Segment

The requirements stated in Order 8260.3F, (United States Standard for Terminal Instrument Procedures (TERPS), paragraph 2-2-8.a. are:

“(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).

“(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).

“(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL.”

Paragraph 2-2-8.b states:

“When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval.”

Paragraph 1-4-2. ...states in part:

“Nonstandard IFP. ...obstacles, navigation information, or traffic congestion

may require special consideration where justified by operational requirements. In such cases, nonstandardIFPs that deviate from these criteria may be approved, provided they are documented, and an equivalent level of safety exists...”

RSO144: [Approval Required] The Descent Gradient (355.99) from DFORT to WALKN is greater than the Maximum Permissible Descent Gradient (330.0).

A computed descent gradient value from DFORT to WALKN of 355.99 ft./NM resulted from the descent gradient being calculated from descending from the restriction of At FL180 at DFORT to cross WALKN AOB 17000 and AOA 15000 over 8.42 NM. The restriction after WALKN is JAYOH AOB 12000 and AOA 11000. The restriction after JAYOH is CAPKO At 9000. The distance required to descend from DFORT at FL180 to CAPKO at 9000 is 34.7 NM. Calculating a descent gradient from DFORT to CAPKO resulted in a descent gradient of 320.66 ft./NM.

TF	DFORT [IFPA r1 12-10-15 TO UNK]	FLY_BY	0.0		21000.0	280.0	0.0	89.34	401.87	495.76	0.0		18000.0	280.0	0.0	72.23	381.75	453.98
TF	WALKN [IFPA r0 03-05-15 TO UNK]	FLY_BY	0.0		18000.0	280.0	0.0	72.23	381.75	453.98	2.82	13.7	15372.85	280.0	11.62	74.27	365.33	439.6
TF	JAYOH [IFPA r1 12-10-15 TO UNK]	FLY_BY	2.82	13.7	15372.85	280.0	11.62	74.27	365.33	439.6	0.0	28.1	12000.0	280.0	5.0	65.05	345.72	410.77
TF	CAPKO [IFPA r4 03-29-18 TO UNK]	FLY_BY	0.0	28.1	12000.0	280.0	5.0	65.05	345.72	410.77	1.8	11.62	9000.0	250.0	8.8	57.11	294.24	351.35

Consideration was given to removing and or changing the restrictions at DFORT, WALKN, JAYOH and CAPKO. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent conflicts from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).



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From: Bev Bordy, Manager, Instrument Flight Procedures Coordination Team, AJV-A45

Prepared by: Jeff Rutledge, Sr. ATC Specialist, NAVTAC CTR Support

Subject: Approval Request: Baltimore, MD (KBWI) , RAVNN (RNAV) STAR

Descent Gradient

FIMBO to UDUDE Segment

The requirements stated in Order 8260.3F, (United States Standard for Terminal Instrument Procedures (TERPS), paragraph 2-2-8.a. are:

“(1) the maximum permissible gradient 10000 MSL and above is 330 ft/NM (approximately 3.11 degrees).

“(2) The maximum permissible DG below 10000 feet MSL is 318 ft. /NM (approximately 3.0 degrees).

“(3) When a STAR contains a descent between fixes that passes through 10000 feet MSL, the maximum permissible DG is between 318 ft. /NM and 330 ft. /NM and is in proportion to the amount of the altitude change that is below/above 10000 feet MSL. Use formula 2-2-1 to determine the maximum DG (DGmax) between fixes that contain a descent that passes through 10000 feet MSL.”

Paragraph 2-2-8.b states:

“When a gradient exceeds the maximum DG allowed in paragraph 2-2-8a, the STAR requires approval.”

Paragraph 1-4-2. ...states in part:

“Nonstandard IFP. ...obstacles, navigation information, or traffic congestion may require special consideration where justified by operational requirements. In such cases, nonstandard IFPs that deviate from these criteria may be approved, provided they are documented, and an equivalent level of safety exists...”

RSO144: [Approval Required] The Descent Gradient (459.79) from FIMBO to UDUDE is greater than the Maximum Permissible Descent Gradient (330.0).

A computed descent gradient value from FIMBO to UDUDE of 459.79 ft./NM resulted from the descent gradient being calculated from descending from the restriction of AT 16000 at FIMBO to cross UDUDE AOA 13000 over a distance of 6.52 NM. The restriction after UDUDE is at REXEE at 12000. The restriction after REXEE is at CAPKO at 9000. The distance required to descend from FIMBO at 16000 to CAPKO at 9000 is 27.02 NM. Calculating a descent gradient from FIMBO to CAPKO 27.02 NM resulted in a descent gradient of 328.29 ft./NM.

TF	FIMBO [IFPA 13 12-10-15 TO UNK]	FLY_BY	3.64	38.59	19000.0	300.0	5.39	99.25	416.03	500.0	0.0	38.66	16000.0	300.0	5.0	86.26	395.52	481.78
TF	UDUDE [IFPA 13 12-10-15 TO UNK]	FLY_BY	0.0	38.66	16000.0	300.0	5.0	86.26	395.52	481.78	0.0		13863.24	300.0	0.0	77.53	381.81	459.34
TF	REXEE [IFPA 13 12-10-15 TO UNK]	FLY_BY	0.0		13863.24	300.0	0.0	77.53	381.81	459.34	0.0		12000.0	300.0	0.0	69.45	370.41	439.86
TF	CAPKO [IFPA 14 03-29-18 TO UNK]	FLY_BY	0.0		12000.0	300.0	0.0	69.45	370.41	439.86	1.8	8.03	9000.0	250.0	12.63	57.11	294.24	351.11

Consideration was given to removing and or changing the restrictions at FIMBO, UDUDE, REXEE and CAPKO. However, due to airspace constraints and traffic flows it was decided that the restrictions are necessary to prevent aircraft from entering adjacent airspace, prevent conflict from other traffic and procedures, and reduce ATC workload due to required coordination, (point outs).

RAVNN SIX ARRIVAL (RNAV) Arrival Routes

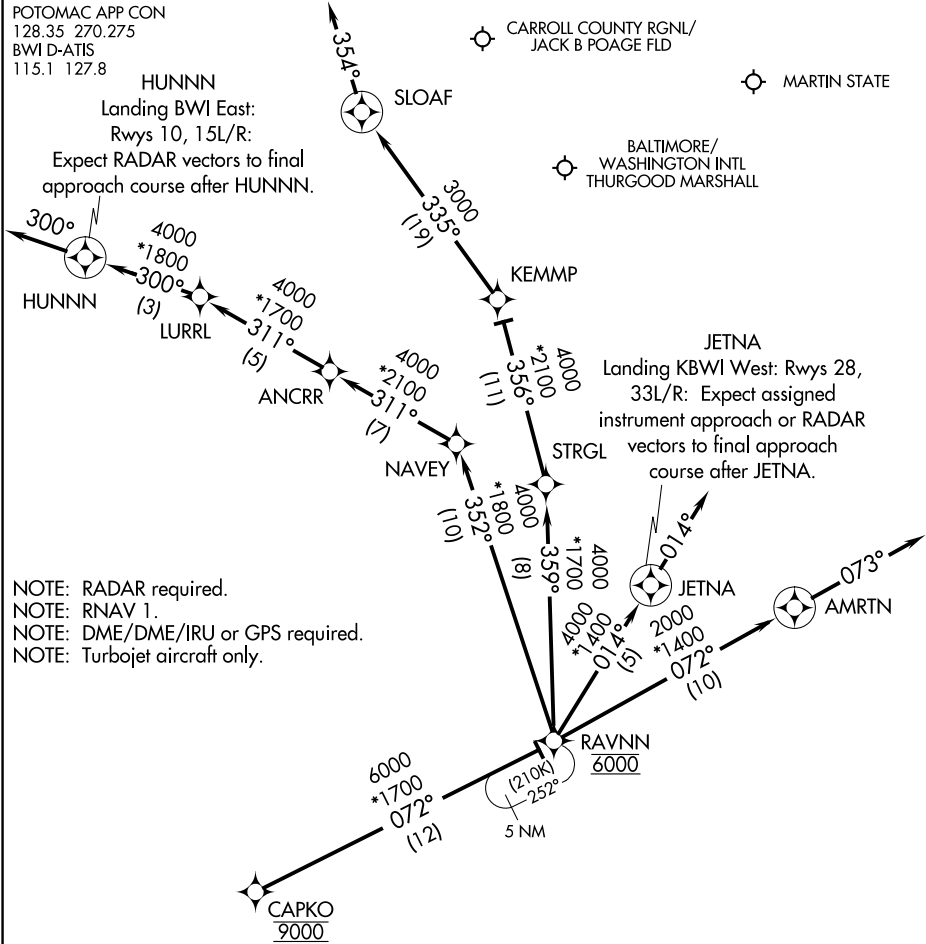
BALTIMORE, MARYLAND

POTOMAC APP CON
128.35 270.275
BWI D-ATIS
115.1 127.8

HUNNN

Landing BWI East:
Rwys 10, 15L/R:

Expect RADAR vectors to final
approach course after HUNNN.



NOTE: RADAR required.
NOTE: RNAV 1.
NOTE: DME/DME/IRU or GPS required.
NOTE: Turbopjet aircraft only.

NOTE: Chart not to scale.

ARRIVAL ROUTE DESCRIPTION

From CAPKO on track 072° to cross RAVNN at 6000.

LANDING BWI RUNWAYS 10, 15L/R: From RAVNN on track 352° to NAVCY, then on track 311° to ANCRR, then on track 311° to LURRL, then on track 300° to HUNNN, then on track 300°. Expect RADAR vectors to final approach course.

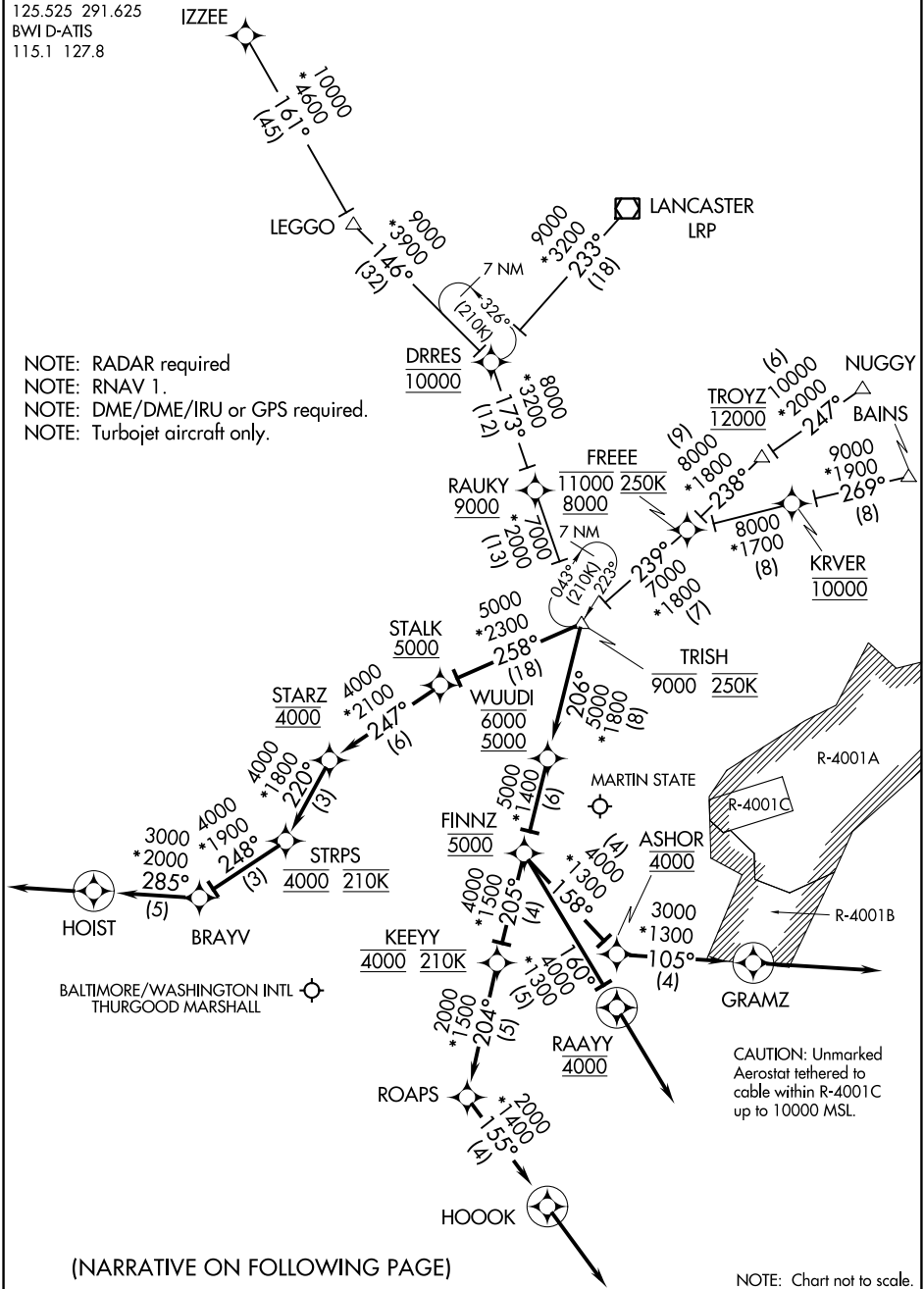
LANDING BWI RUNWAYS 28, 33L/R: From RAVNN on track 014° to JETNA, then on track 014°. Expect assigned instrument approach or RADAR vectors to final approach course.

LANDING DMW: From CAPKO on track 072° to cross RAVNN at 6000, then on track 359° to STRGL, then on track 356° to KEMMP, then on track 335° to SLOAF, then on heading 354°. Expect RADAR vectors to final approach course.

LANDING MTN: From CAPKO on track 072° to cross RAVNN at 6000, then on track 072° to AMRTN, then on track 073°. Expect RADAR vectors to final approach course.

POTOMAC APP CON
125.525 291.625
BWI D-ATIS
115.1 127.8

- NOTE: RADAR required
- NOTE: RNAV 1.
- NOTE: DME/DME/IRU or GPS required.
- NOTE: Turbojet aircraft only.



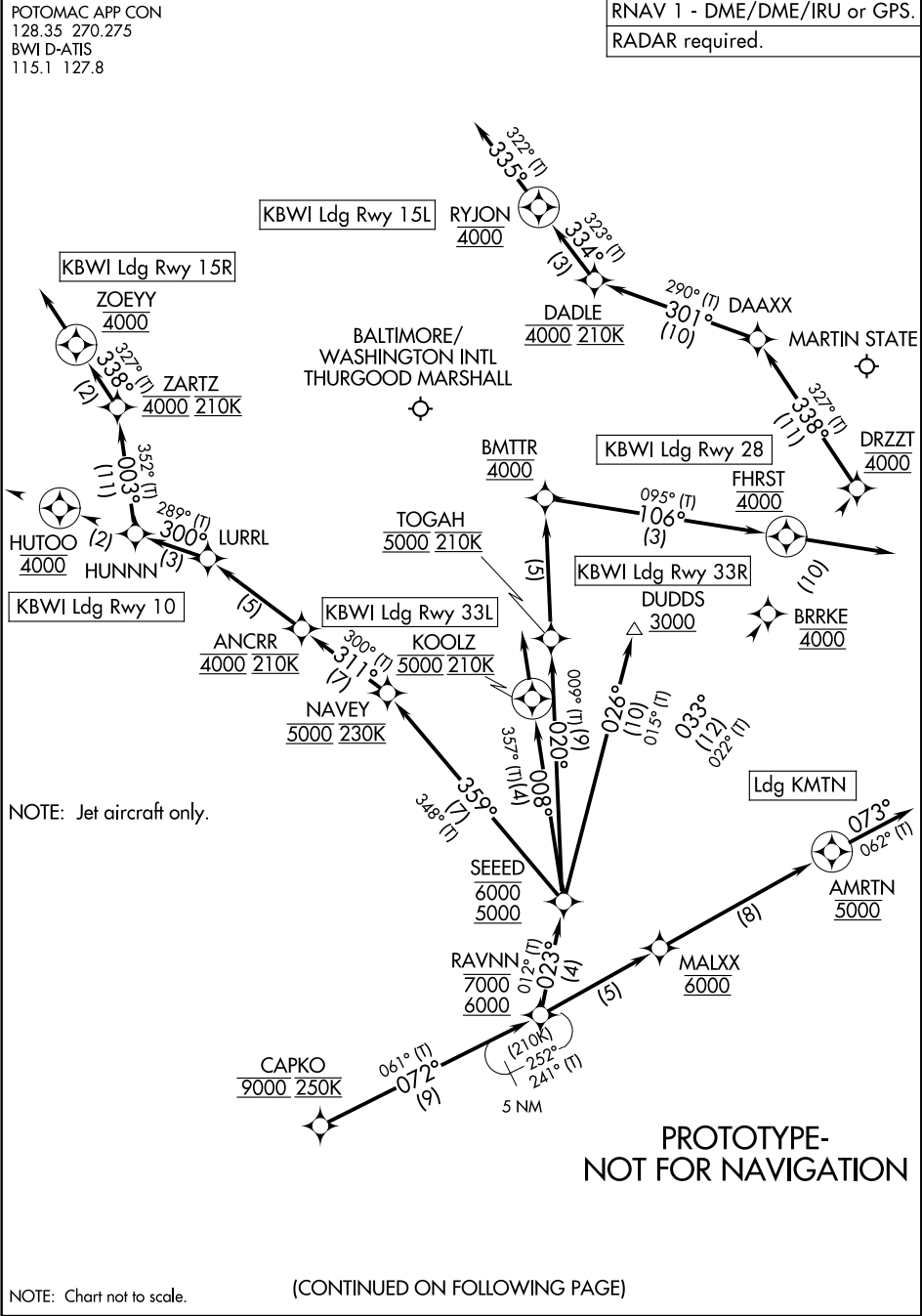
(NARRATIVE ON FOLLOWING PAGE)

NOTE: Chart not to scale.

(CAPKO.RAVNN7) FIG
RAVNN SEVEN ARRIVAL (RNAV) Arrival Routes

AL-804 (FAA)

BALTIMORE, MARYLAND



RAVNN SEVEN ARRIVAL (RNAV) Arrival Routes
(CAPKO.RAVNN7) FIG

BALTIMORE, MARYLAND

ARRIVAL ROUTE DESCRIPTION

From CAPKO on track 072° to cross RAVNN between 6000 and 7000.

LANDING BWI RUNWAY 10: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 359° to cross NAVY at 5000 and at 230K, then on track 311° to cross ANCR at 4000 and at 210K, then on track 311° to LURRL, then on track 300° to HUNNN, then on track 300° to cross HUTOO at 4000, then on track 300°. Expect RADAR vectors to final approach course.

LANDING BWI RUNWAY 15L: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 033° to cross BRKE at 4000, then on track 033° to cross DRZZT at 4000, then on track 338° to DAAX, then on track 301° to cross DADLE at 4000 and at 210K, then on track 334° to cross RYJON at 4000, then on track 335°. Expect RADAR vectors to final approach course.

LANDING BWI RUNWAY 15R: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 359° to cross NAVY at 5000 and at 230K, then on track 311° to cross ANCR at 4000 and at 210K, then on track 311° to LURRL, then on track 300° to HUNNN, then on track 003° to cross ZARTZ at 4000 and at 210K, then on track 338° to cross ZOYY at 4000, then on track 338°. Expect RADAR vectors to final approach course.

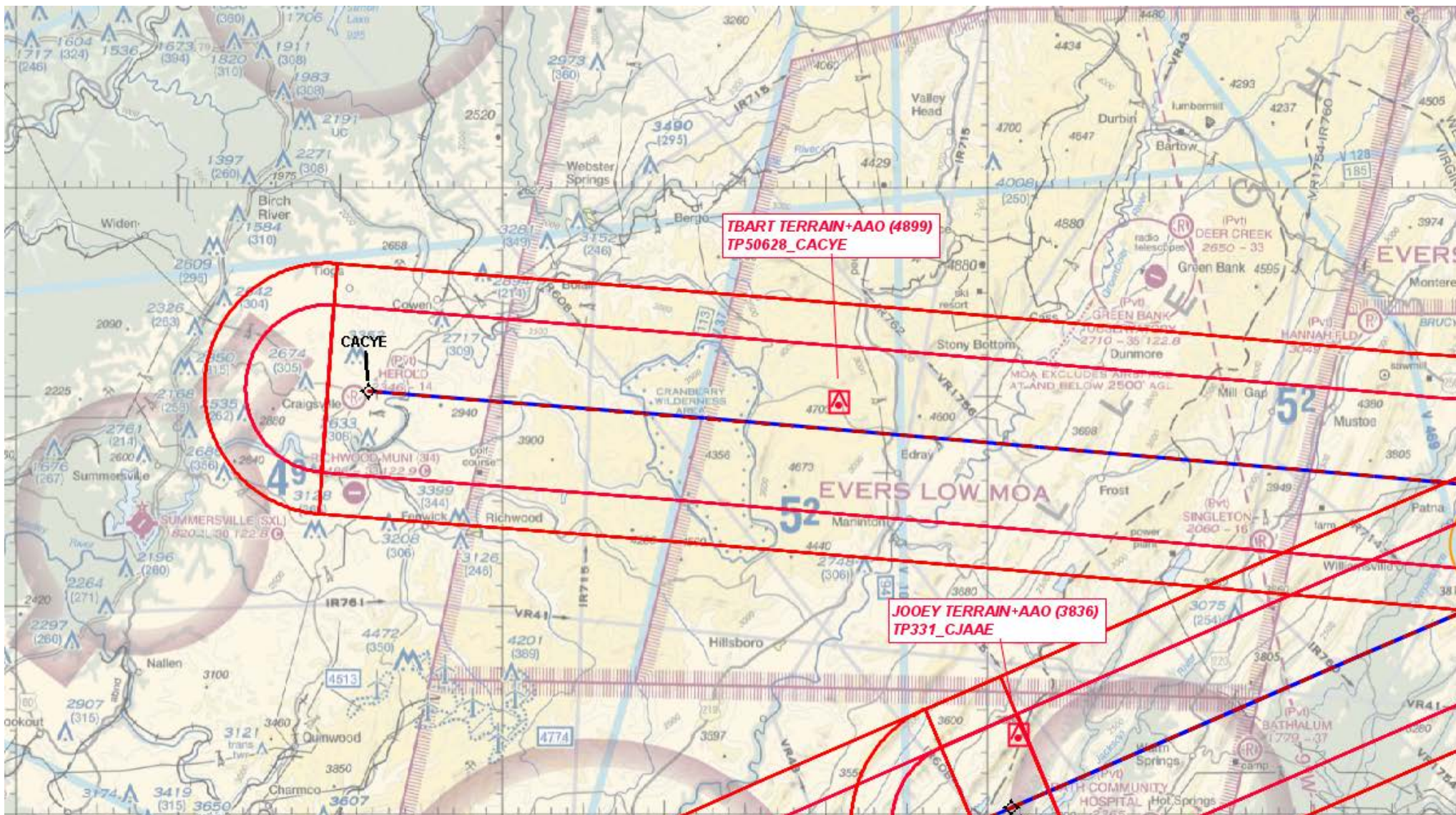
LANDING BWI RUNWAY 28: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 020° to cross TOGAH at 5000 and at 210K, then on track 020° to cross BMTR at 4000, then on track 106° to cross FHRST at 4000, then on track 106°. Expect RADAR vectors to final approach course.

LANDING BWI RUNWAY 33L: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 008° to cross KOOLZ at 5000 and at 210K, then on track 008°. Expect RADAR vectors to final approach course.

LANDING BWI RUNWAY 33R: From RAVNN on track 023° to cross SEED between 5000 and 6000, then on track 026° to cross DUDDS at or above 3000. Expect ILS or LOC Rwy 33R approach.

LANDING MTN: From CAPKO on track 072° to cross RAVNN between 5000 and 6000, then on track 072° to cross MALXX at 6000, then on track 072° to cross AMRTN at 5000, then on heading 073° or as assigned by ATC. Expect RADAR vectors to final approach course.

PROTOTYPE-NOT FOR NAVIGATION

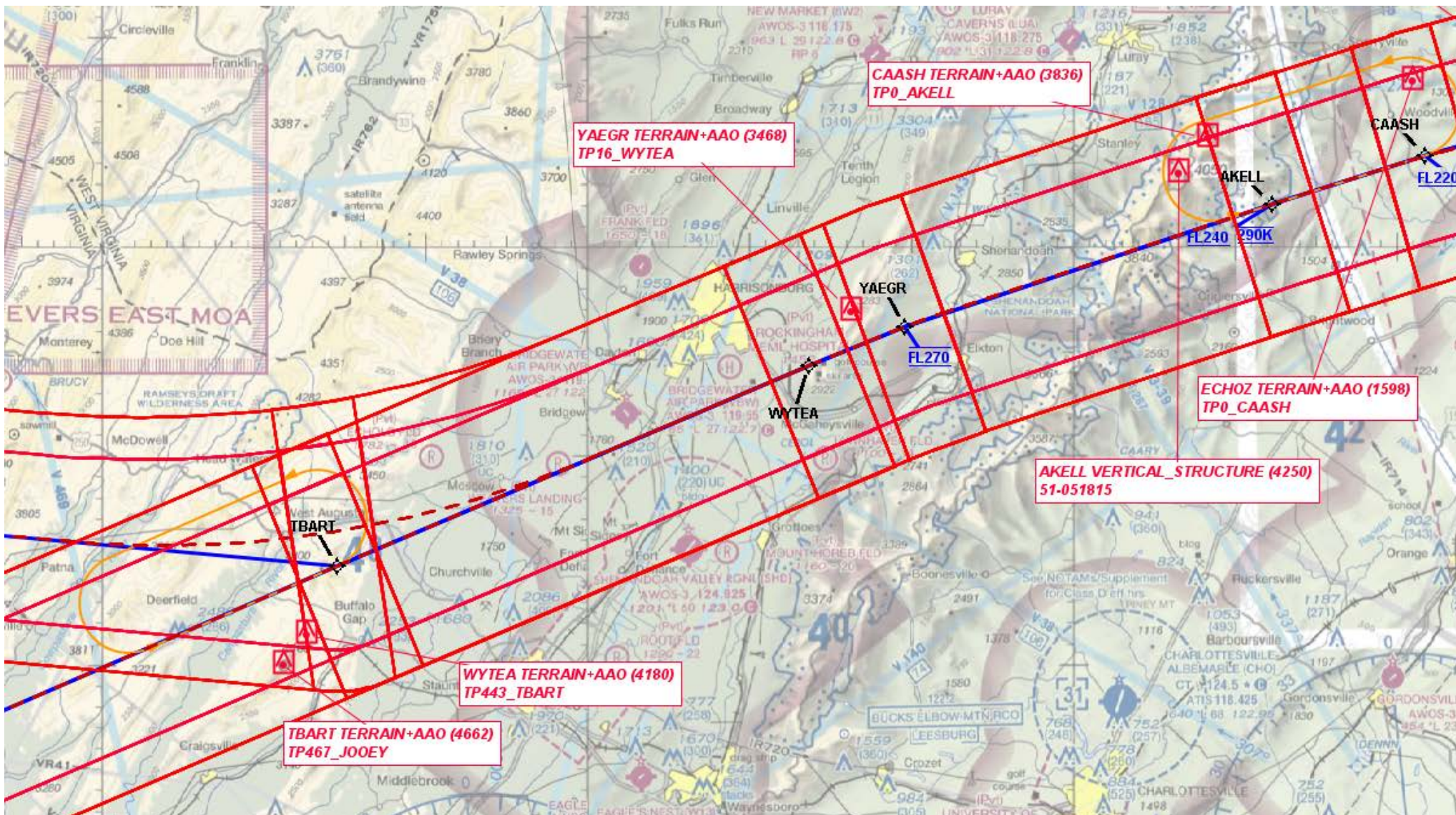


KBWI - BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT
 BALTIMORE, MD
 RAVNN SEVEN ARRIVAL (RNAV)
 SCALE 1:500,000
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RAVNN (RNAV)



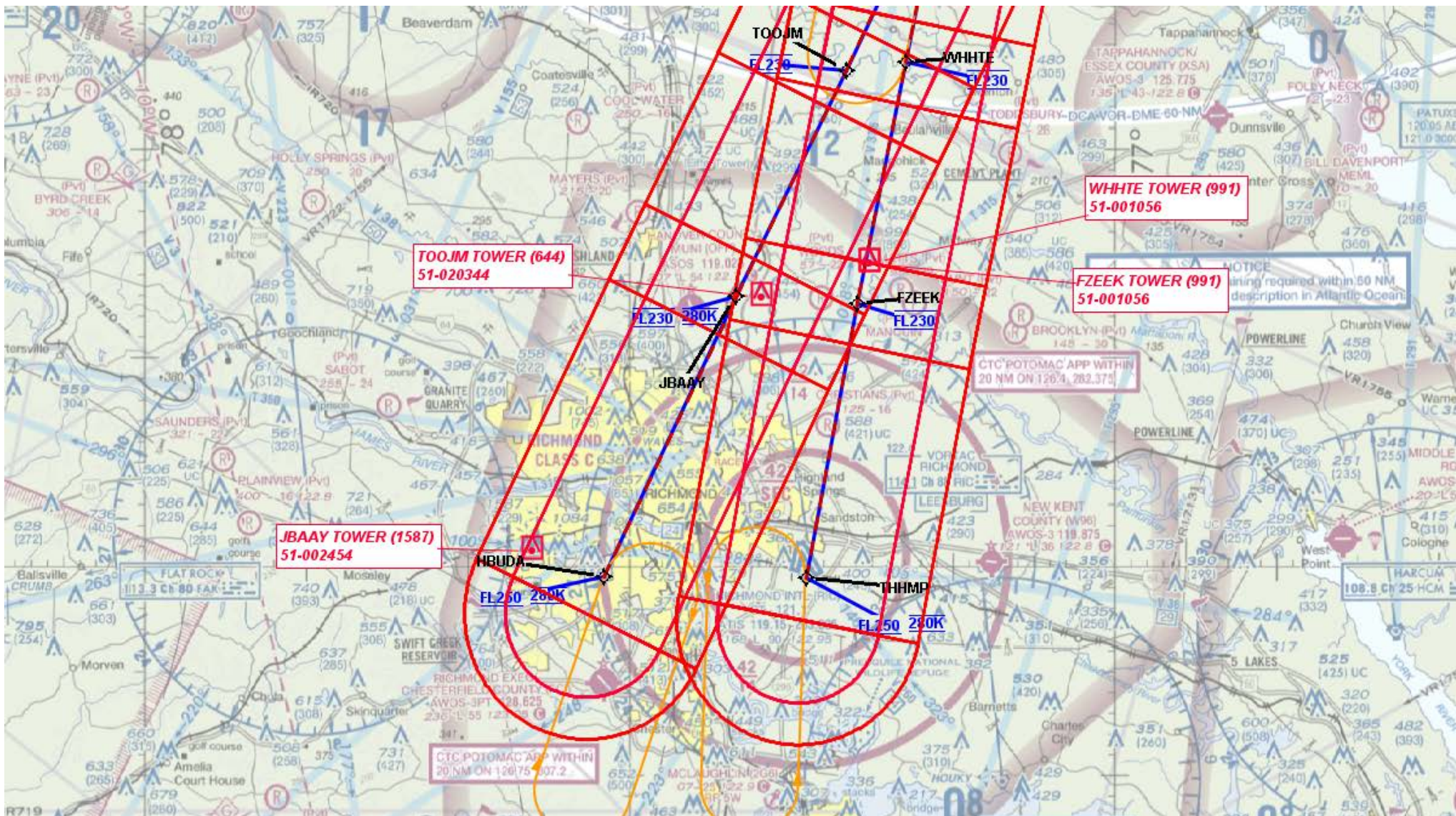
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KBWI - BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT
BALTIMORE, MD
RAVNN SEVEN ARRIVAL (RNAV)
SCALE 1:500,000
PAGE 3 OF 8

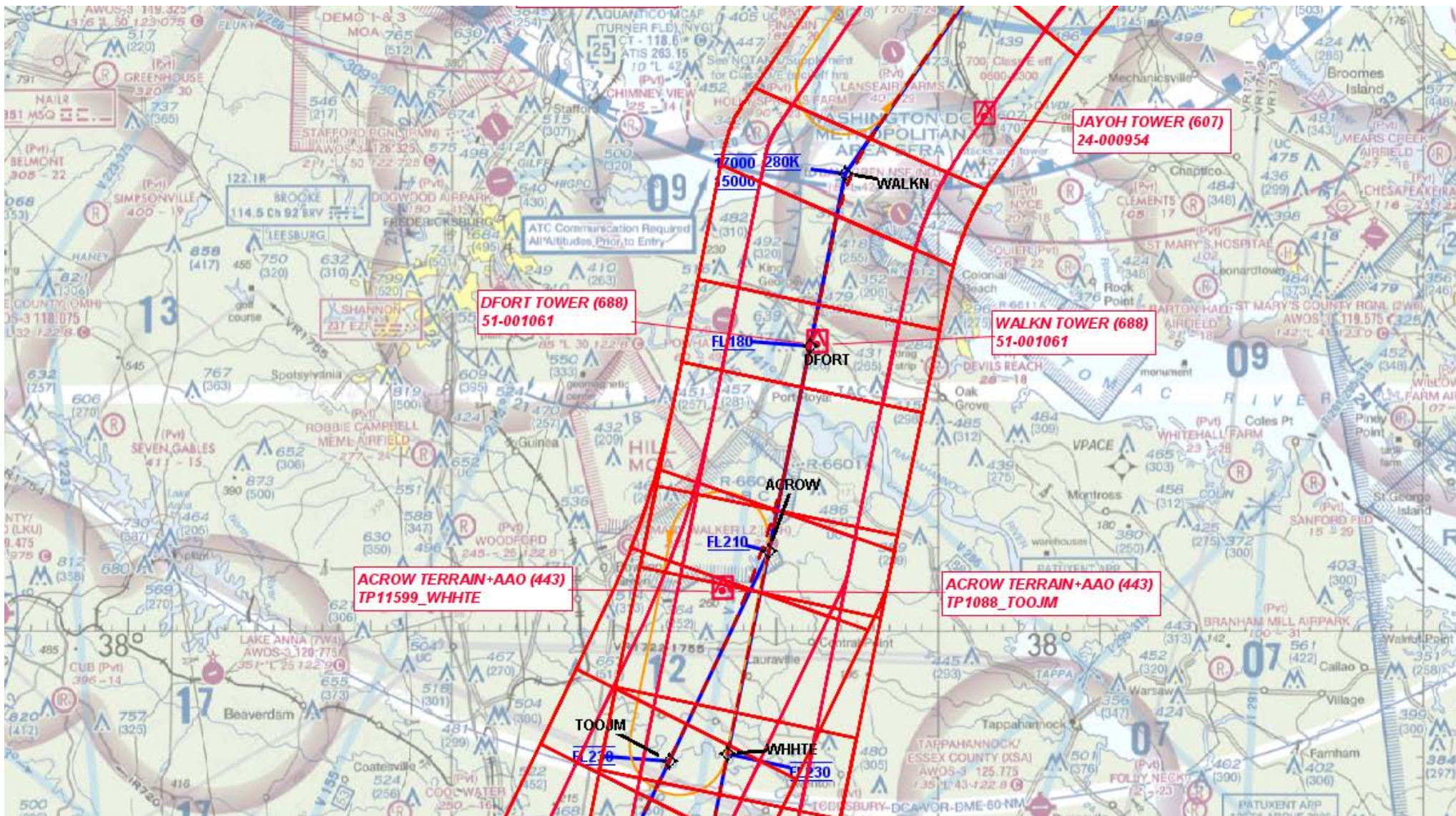
RAVNN (RNAV)





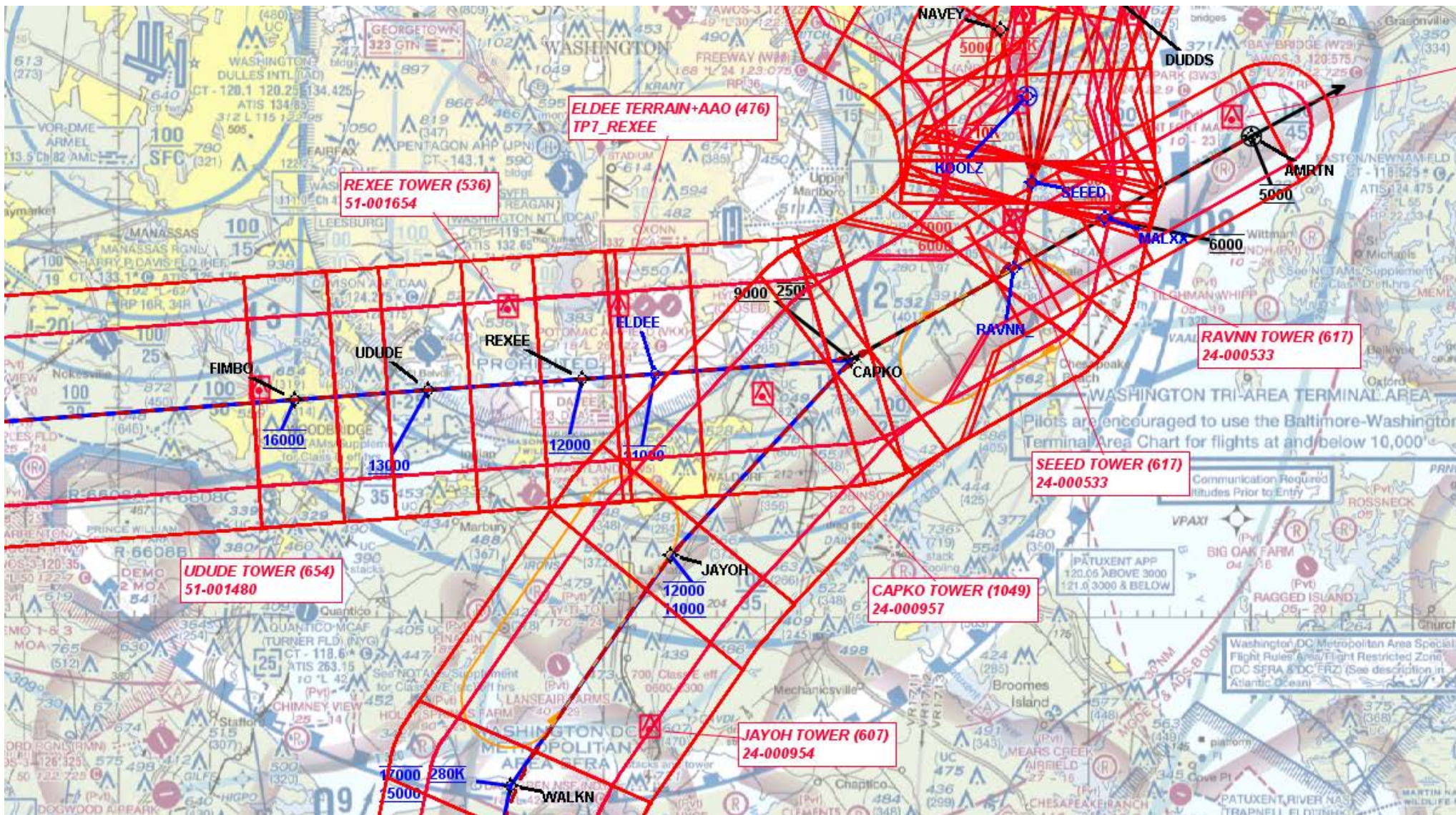
KBWI - BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT
BALTIMORE, MD
RAVNN SEVEN ARRIVAL (RNAV)
SCALE 1:500,000
PAGE 5 OF 8

RAVNN (RNAV)



KBWI - BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT
BALTIMORE, MD
RAVNN SEVEN ARRIVAL (RNAV)
SCALE 1:500,000
PAGE 6 OF 8

RAVNN (RNAV)



KBWI - BALTIMORE/WASHINGTON INTERNATIONAL THURGOOD MARSHALL AIRPORT
BALTIMORE, MD
RAVNN SEVEN ARRIVAL (RNAV)
SCALE 1:500,000
PAGE 7 OF 8

RAVNN (RNAV)



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