

DEDICATED TO HELPING BUSINESS ACHIEVE ITS HIGHEST GOALS.



# RF/TF Concurrent Ops Charting WG ACM CG 21-01-354

Richard Boll

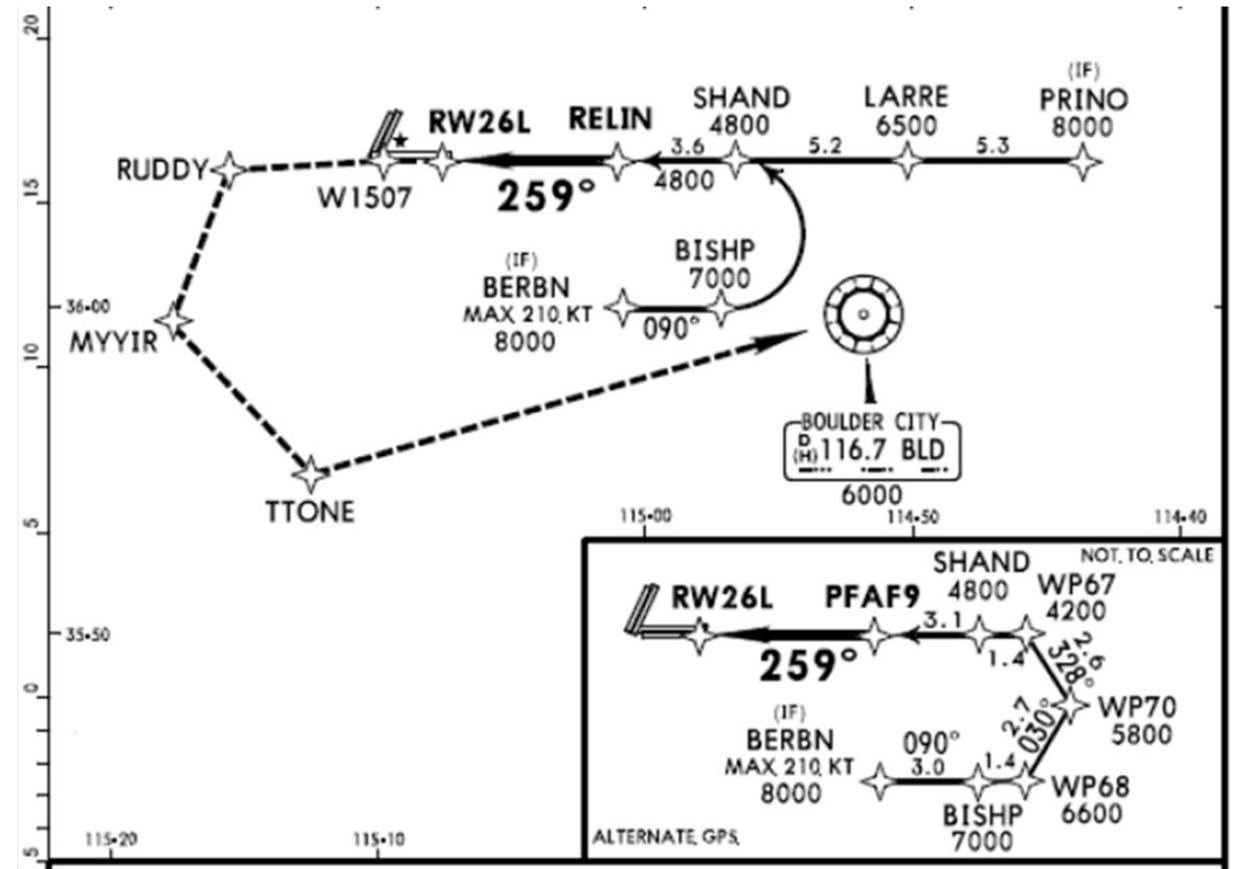
NBAA, Access Committee

# Activities

- Several meetings since 21-01 ACM
- WG reviewed various options for depicting a single approach procedure using both Radius-to-Fix (RF) and Track-to-Fix (TF) legs.
  - Inset Method.
  - “Ghosting” Method – one leg type, either RF or TF would be shown on the IAP in gray relief, while the other method would be depicted normally.
  - Two chart Method.

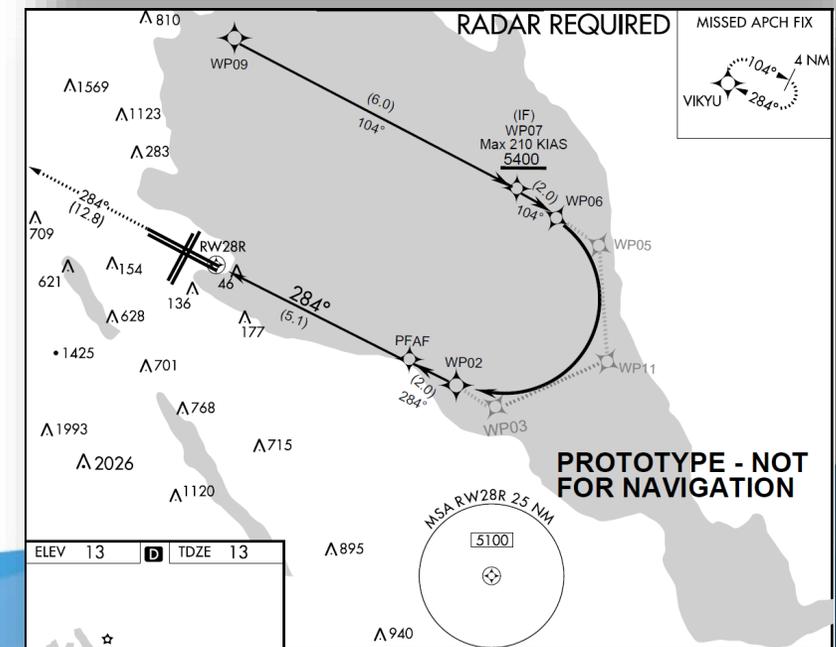
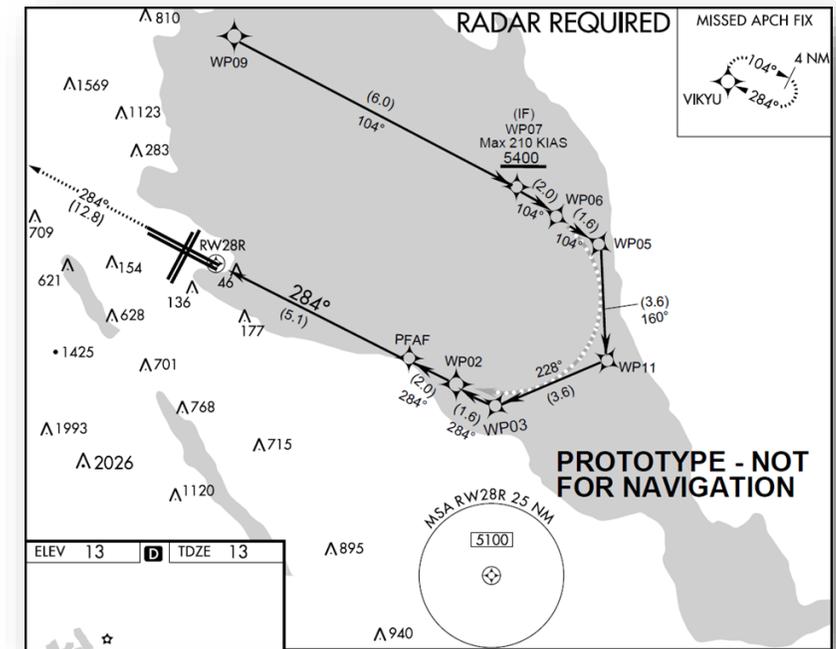
# Inset Method

- Either the RF or TF legs would be depicted by a chart inset
- Rejected by the WG:
  - Chart clutter
  - Space restriction due to alternate missed approach procedure, off scale missed approach holding, etc.
  - Human factors
- No further consideration



# “Ghosting” Method

- Consensus:
  - Pilots would have trouble briefing the procedure.
  - Some waypoints are only for on version.
  - TF bearing and distance information missing on TF “ghost”
  - Chart clutter
- Moved to a “Parking Lot” pending consideration of other alternatives



## Two Chart Method

- One (1) instrument approach procedure – One (1) 8260 Form
- Two (2) Charts:
  - :RNAV (GPS) Rwy 28R (RF)
  - RNAV (GPS) Rwy 28R (TF)
- Same concept used on ILS CAT I SA and CAT II SA approaches
- The “(RF)” and “(TF)” discriminators in the chart title are required
  - ARINC 424 coding
  - Charting
  - NOTAM identification

# Consensus Recommendation

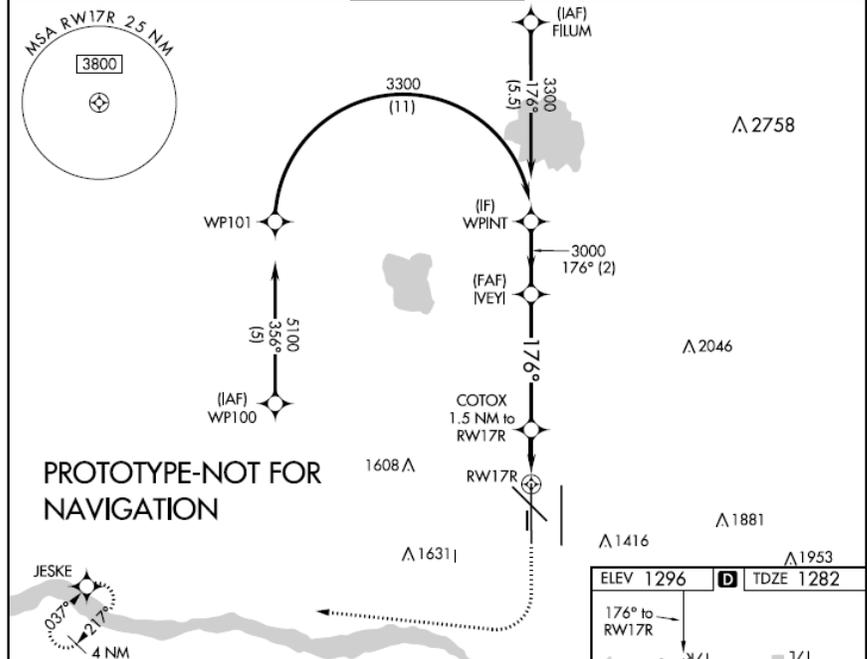
1. **One 8260 Form – Single procedure – PARC Recommendation**
2. **Two Procedure Charts – one depicting the RF leg and one depicting the TF leg**
3. **Title: Add (RF) and (TF) – Follow current standard for ILS SA CAT I and SA CAT II charting**
4. **If at all possible – Have a single Profile View**
5. **If there are two different Profile views, one version for the (RF) chart and one version for the (TF) chart – need to be called out separately on the 8260-3 Form - will be an 8260.19 change & a 8260-3 Form change**
6. **Separate terminal routes (transitions) and Notes would need to be stated on the 8260-3 Form**
7. **Must be very clear to the developer that terminal routes must be limited**
  - Left base
  - Right base
  - Straight in
8. **Everything else on the procedure should be the same – minimums, missed approach procedure, etc.**

# Putting Together....

APP CRS	Rwy Idg	9800
176°	TDZE	1282
	Apt Elev	1296

**RNAV (GPS) RWY 17R (RF)**  
WILL ROGERS WORLD (OKC)

RNP APCH-GPS, RF		MALS	MISSED APPROACH: Climb to 2000 then climbing right turn to 3000 direct JESKE and hold.		
D-ATIS	OKE CITY APP CON	ROGERS TOWER	GND CON	CLNC DEL	
125.85	124.6 266.8	119.35 269.45	121.9 348.6	124.35	

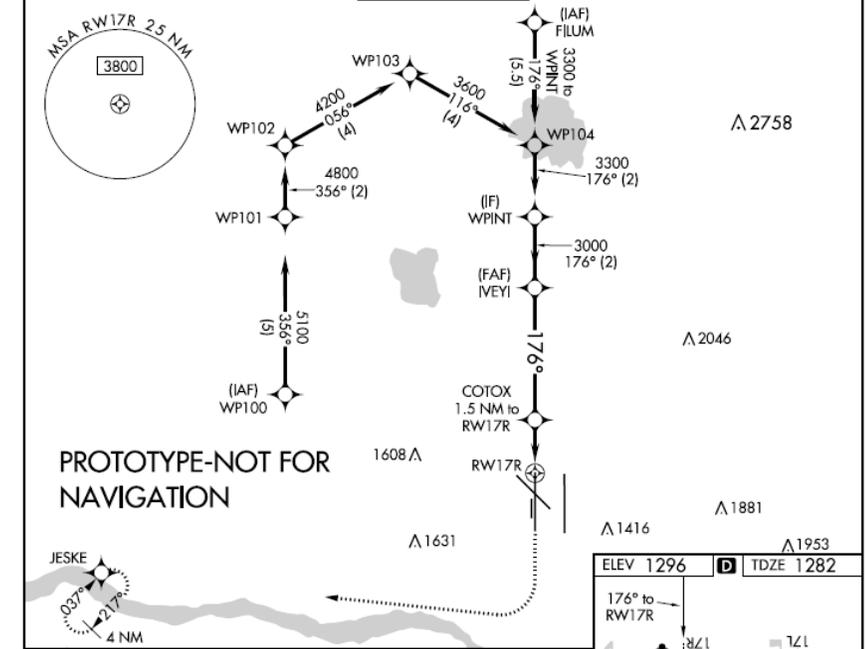


WPINT		IVEYI		COTOX 1.5 NM to RW17R		JESKE	
3300		3000		*1800		*LNNAV only.	
GP 3.00° TCH 55		2 NM		3.7 NM		0.6 NM	
0.9 NM to RW17R		0.9 NM					
CATEGORY	A	B	C	D			
LPV DA	1482/24		200 (200-½)				
LNNAV/VNAV DA	1550/24		268 (300-½)				
LNNAV MDA	1640/24	358 (400-½)	1640/30	358 (400-½)			
CIRCLING	1740-1 444 (500-1)	1760-1 464 (500-1)	1960-1¾ 664 (700-1¾)	2000-2¼ 704 (800-2¼)			

APP CRS	Rwy Idg	9800
176°	TDZE	1282
	Apt Elev	1296

**RNAV (GPS) RWY 17R (TF)**  
WILL ROGERS WORLD (OKC)

RNP APCH-GPS		MALS	MISSED APPROACH: Climb to 2000 then climbing right turn to 3000 direct JESKE and hold.		
D-ATIS	OKE CITY APP CON	ROGERS TOWER	GND CON	CLNC DEL	
125.85	124.6 266.8	119.35 269.45	121.9 348.6	124.35	



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Both IAP Charts Will Be in the TPP Publication

Option for Commercial Charting Providers to Exclude a Non-Compatible Chart

# FAA 8260 Form

Requirements are still TBD, but will include the following:

- The terminal routes portion will reflect both the RF and TF paths
- Information to indicate which unique terminal routes should be charted for each
- Separate PBN equipment requirements for each
- Delineation of any other information charted specifically to one or the other

# ARINC 424 Navigation DB Changes

## 2019 Working Paper 3

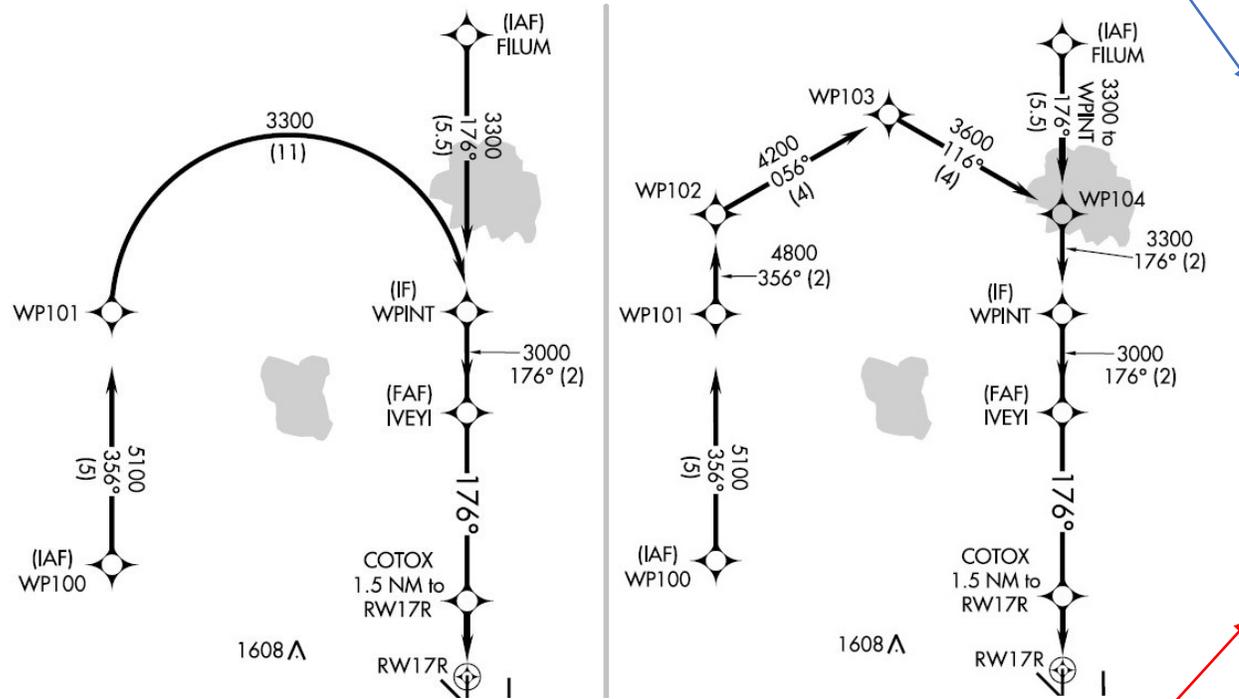
Table 5-8 – Airport Approach (PF) and Heliport Approach (HF) Records

Approach Route Type Description	Route Type Field Content
Approach Transition	A
Approach Transition with TF Based Construction of RF Turns (Note 2)	Y

**Note 2:** Route Type Y is only used to identify transitions with the same path as an Approach Transition with RF legs, but with TF legs used to reconstruct the RF leg paths. These Route Type Y transitions must have the same transition identifier as the corresponding transition with RF legs. The transition with the RF legs will be coded with a Route Type of A.

# RF to TF Concurrent Operations

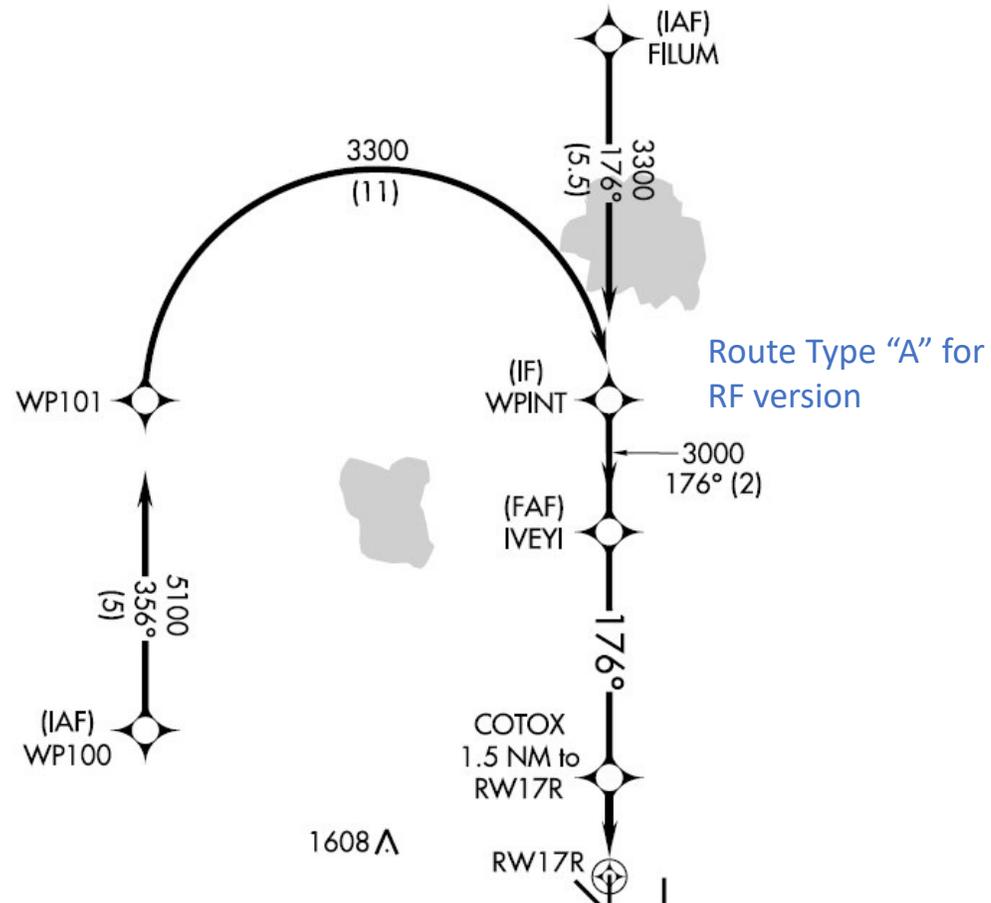
## Example KOKC R17R: ARINC 424 Coding



Proc Ident	Rte Type	Trans	Seq	Path/Term	Fix	Altitude
R17R	A	FILUM	10	IF	FILUM	
R17R	A	FILUM	20	TF	WPINT	AT/ABOVE 3300
R17R	A	WP100	10	IF	WP100	
R17R	A	WP100	20	TF	WP101	AT/ABOVE 5100
R17R	A	WP100	30	RF	WPINT	AT/ABOVE 3300
R17R	R		10	IF	WPINT	AT/ABOVE 3300
R17R	R		20	TF	IVEYI	AT/ABOVE 3000
R17R	R		21	TF	COTOX	AT/ABOVE 1800
R17R	R		30	TF	RW35R	AT 1337
R17R	R		40	CA		AT/ABOVE 2000
R17R	R		50	DF	JESKE	AT 3000
R17R	R		60	HM	JESKE	AT 3000
R17R	Y	WP100	10	IF	WP100	
R17R	Y	WP100	20	TF	WP101	AT/ABOVE 5100
R17R	Y	WP100	30	TF	WP102	AT/ABOVE 4800
R17R	Y	WP100	40	TF	WP103	AT/ABOVE 4200
R17R	Y	WP100	50	TF	WP104	AT/ABOVE 3600
R17R	Y	WP100	60	TF	WPTINT	AT/ABOVE 3300

# RF to TF Concurrent Operations

## Example KOKC R17R: FMS with RF Legs



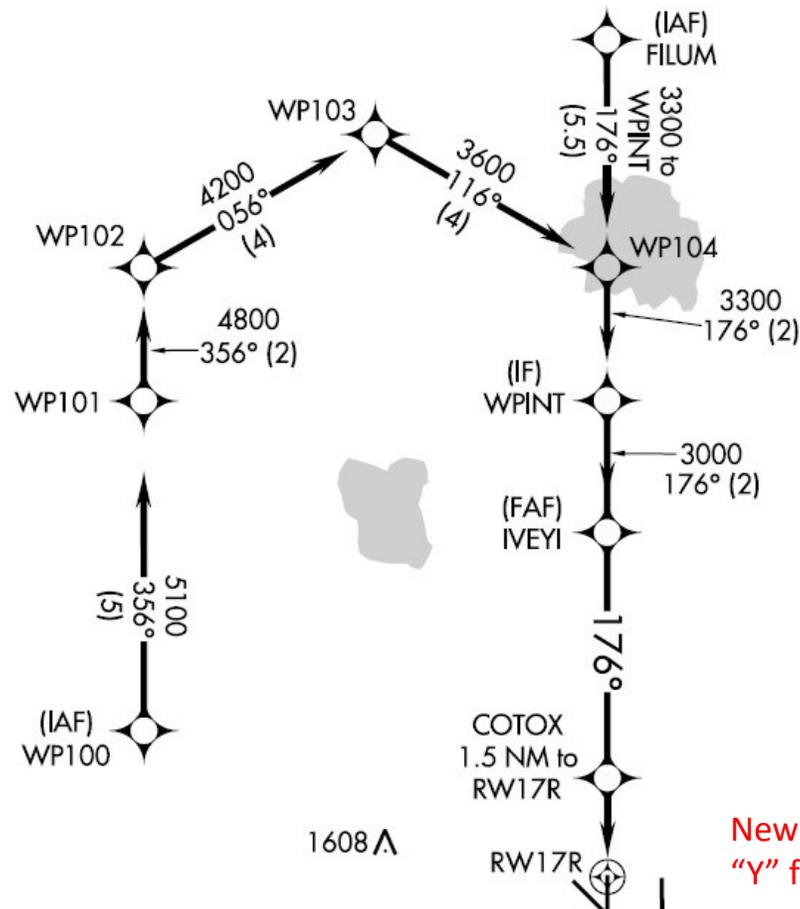
FMS with RF Leg Capability:

- "Y" route type WP100 is not packed

Proc Ident	Rte Type	Trans	Seq	Path/Term	Fix	Altitude
R17R	A	FILUM	10	IF	FILUM	
R17R	A	FILUM	20	TF	WPINT	AT/ABOVE 3300
R17R	A	WP100	10	IF	WP100	
R17R	A	WP100	20	TF	WP101	AT/ABOVE 5100
R17R	A	WP100	30	RF	WPINT	AT/ABOVE 3300
R17R	R		10	IF	WPINT	AT/ABOVE 3300
R17R	R		20	TF	IVEYI	AT/ABOVE 3000
R17R	R		21	TF	COTOX	AT/ABOVE 1800
R17R	R		30	TF	RW35R	AT 1337
R17R	R		40	CA		AT/ABOVE 2000
R17R	R		50	DF	JESKE	AT 3000
R17R	R		60	HM	JESKE	AT 3000

# RF to TF Concurrent Operations

## Example KOKC R17R: FMS without RF Legs



FMS without RF Leg Capability:

- "A" route type WP100 is not packed

Proc Ident	Rte Type	Trans	Seq	Path/Term	Fix	Altitude
R17R	A	FILUM	10	IF	FILUM	
R17R	A	FILUM	20	TF	WPINT	AT/ABOVE 3300
R17R	R		10	IF	WPINT	AT/ABOVE 3300
R17R	R		20	TF	IVEYI	AT/ABOVE 3000
R17R	R		21	TF	COTOX	AT/ABOVE 1800
R17R	R		30	TF	RW35R	AT 1337
R17R	R		40	CA		AT/ABOVE 2000
R17R	R		50	DF	JESKE	AT 3000
R17R	R		60	HM	JESKE	AT 3000
R17R	Y	WP100	10	IF	WP100	
R17R	Y	WP100	20	TF	WP101	AT/ABOVE 5100
R17R	Y	WP100	30	TF	WP102	AT/ABOVE 4800
R17R	Y	WP100	40	TF	WP103	AT/ABOVE 4200
R17R	Y	WP100	50	TF	WP104	AT/ABOVE 3600
R17R	Y	WP100	60	TF	WPTINT	AT/ABOVE 3300

## Which Approach in the Nav-Database?

- If the aircraft's avionics is approved for RF legs, the OEM will pack the (RF) procedure.
- Otherwise, the OEM will pack the (TF) procedure.
- Under no circumstances is both the (RF) and (TF) procedure to be packed in the same database.

# NOTAMS

## FORM: The 8260 Series Form

- If both charts are generated from a single **FORM**, then the NOTAM must address the published regulatory procedure, which is represented by the **FORM**.
- If the revision is in a place on the **FORM** that is designated only for the TF leg, then that would be part of the NOTAM, but NOTAMS address the **FORM**.
- Chart Correction NOTAMS **address individual charts**, but not procedural NOTAMS.
- Whether the NOTAM affects both charts or not, the Amendment number will be up-lettered by a P-NOTAM and the eff date will be revised on both (even though there may be NO change to the CHARTED procedure on one of the sister charts).

# Temporary (T) NOTAMS

- Obstacle affecting the OEA of the TF procedure or the RF procedure, but not both.
- Scenario: 4039 MSL CRANE  
353545.47N/097465.75W – **Yellow Circle.**
- In the OEA of the TF-TF leg, but outside the OEA of the RF leg.
  - TF OEAs are in cyan and the RF in red.
- Increase the WP102-WP103 segment minimum altitude from 4200 to 4300.



# T-NOTAM

## 4039 MSL CRANE 353545.47N/097465.75W

!FDC 1/5137 OKC IAP WILL ROGERS WORLD, OKLAHOMA CITY, OK. RNAV (GPS) RWY 17R (TF), ORIG... TERMINAL ROUTE FROM WP102 TO WP103: MINIMUM ALTITUDE 4300. ALL CATS. 4039 MSL CRANE 353545.47N/097465.75W (2020-ASW-xxxxx-NRA). 2107261432-2203071432EST

# Questions & Comments?





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