

# Collaborative Decision Making

## Flow Evaluation Team

Co-Leads: Walter Williams / FAA  
Chris Vital / JetBlue

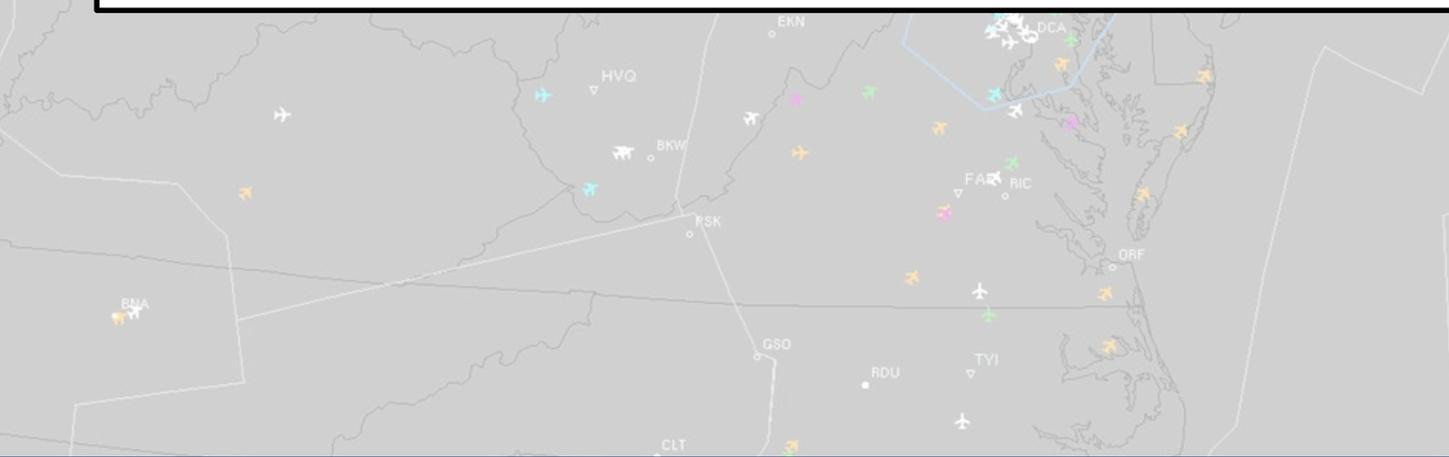


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# Flow Evaluation Team

**The Flow Evaluation Team strives to increase system efficiency by reducing route coordination time and enhancing system planning through the creation of common situational awareness of potential route alternatives, procedures, and coordination processes.**



# FET Members



FET attending a TOS evaluation at Houston Center

## FAA

- Walter Williams ATCCSCC
- Dan Kerr NATCA/DCC
- Ron Foley NATCA/ZOB

## Industry SME

- Chris Vital JetBlue
- Darin Tietjen Southwest Airlines
- Dean Snell NBAA
- Drew Toman United Airlines
- Ed Olsen Delta Air Lines
- RB Haggerty A4A
- Richard Voigt FedEx
- Tom O'Neill American Airlines

## Technical Matter Experts

- Michael Karrels Delta Air Lines
- Dr. Phil Smith Ohio State University
- Tim Niznik American Airlines



# Closed Taskings



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## Tasking 108 - Design, Conduct, and Evaluate TOS Table Top Exercise

- Since our last briefing, A safety review was conducted with several mitigations were put in place before another evaluation can be conducted.
- Once receiving the approval to continue, a revised script was developed based on new guidance from the review and lessons learned from previous exercises.
- Flight operators was able to assess if internal software changes have corrected previous errors in the last evaluation.
- Evaluation was conducted in Cleveland Center (ZOB ARTCC) in July 2023.

Amendments will be sent for 0 flights

Cancel



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# Tasking 108

## Areas of Evaluation

- Evaluate any errors on a TOS after the original P-Time was filed
- Submit a new TOS with different routes after the original TOS was submitted.
- Submit a 5-line TOS with RTC values out of order, including a CDR route that is a “Coordination Required”
- A flight plan was cancelled and refiled. Would the TOS stay in TFMS or would a Flight Operator have to resubmit another TOS once the flight plan was refiled?
- Evaluate different types of routes submitted thru TOS. List included CDR/Playbook/Pref/Optimize route. Original filed route was a longer than the 2 CDR and playbook TOS routes.
- ICAO vs IATA was used in the flight plan strip and TOS submissions

Amendments will be sent for 0 flights

Cancel



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# Tasking 108

## Results

- **Most of the information submitted from the flight operator into TFMS and SWIM was correctly viewed on the RAD/Departure Viewer.**
- **Once the TMC was able to access the RAD and evaluate the TOS, it was simple to send an amended route to the aircraft when necessary.**
- **There is no set ordering when routes with the RTC values are the same. Additional requirements would need to be added to further differentiate each route.**

Amendments will be sent for 0 flights

Cancel



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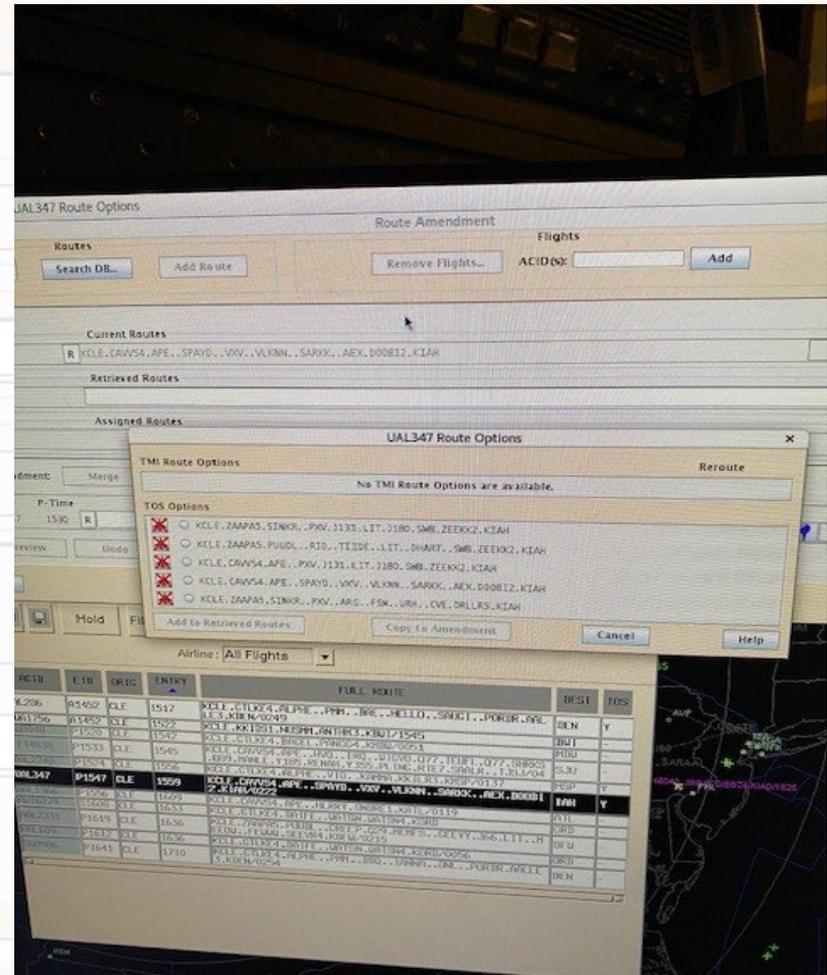


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# Tasking 108

## Case Study: UAL347 CLE-IAH

- 5 line TOS that the Flight Operator (FO) manually submitted TOS routes out of RTC DB.
- TFMS was able to display the routes in the order the dispatcher filed them.
- This is a key informational tool for a Traffic Manager to know what the FO route preferences are if the primary option is not available.



## Tasking 126 – TOS Scenarios

- **Tasking was to provide use case scenarios to give a Traffic Manager a holistic view on how Flight Operators are planning to use TOS.**
- **TFMS R15 update in Q4 2023 also provided FET the ability to see the additional functionality in person.**
- **Another evaluation was conducted at Washington Center (ZDC ARTCC) in January 2024**
- **Due to time constraints, a total of 7 scenarios was evaluated.**
- **Flight operators were able to evaluate TOS submissions in both Legacy and SWIM feeds**

Amendments will be sent for 0 flights

Cancel



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# Tasking 126

TMC procedures using TOS in PDRR for pre-departure reroutes

An efficient method to use PDRR and TOSs when the call sign for a flight is known.

Using TOS to indicate a flight is fueled to accept a longer reroute when more preferred routes are stopped during a SWAP event.

Using TOS to specify a flight is fueled to accept a longer reroute to significantly reduce departure delays.

TOS submission to show aircraft capability using overwater routes (such as AR/Y, WATRS or ADSB routes over the Gulf of Mexico).

Business Aviation use of TOS to specify a flight that is able to accept a longer reroute to reduce significant departure delays.

TOS submission to signal a flight is fueled to accept low altitude escape routes.



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# Tasking 126

## An efficient method to use PDRR and TOSs when the call sign for a flight is known.

- Traffic Manager receives a list of 10 flights that the Tower would like to have rerouted.
- Opens PDRR to have a copy of the RAD available to reroute each of these flights without having to go to an FEA list, Departure Viewer or Reroute Monitor to re-open the RAD for each flight..
- The RAD can then be left open to make reroutes for all 10 flights

Departure Viewer (Relative Time Range)

File Functions View

Enter Filter:  Add  Fix  ARPT  ARPT  Fix  ARPT  Fix

Options... Filter by: ALL Show: List Time Bins

Include:  Jet  Turbo  Prop  Super  Heavy  Large  Small  Active Flights  Unknown DFx (0)

1		3		7		7		10		8		9		14		5		3		2		11		12		14		10		12							
1930		1945		2000		2015		2030		2045		2100		2115		2130		2145		2200		2215		2230		2245		2300		2315							
N (21)																																					
JERES (21)																																					
ORIG	DEST	TOS	ACID	PTIME	ETD	ORIG	DEST	TOS	ACID	PTIME	ETD	ORIG	DEST	TOS	ACID	PTIME	ETD	ORIG	DEST	TOS	ACID	PTIME	ETD	ORIG	DEST	TOS	ACID	PTIME	ETD	ORIG	DEST	TOS	ACID	PTIME			
BMT	SJU	-	UCM929	-	12236	IAD	ALB	-	UAL2621	1950	P2007	DCA	JAH	Y	J1A5368	-	12214	DCA	HSV	-	11A5368	-	12214	DCA	HSV	-	11A5368	-	12214	DCA	HSV	-	11A5368	-	12214	DCA	HSV
DCA	MCO	-	ASH812	-	12235	IAD	SYR	-	EW9303	-	12124	IAD	AUS	-	11A5630	-	12221	DCA	TVS	-	11A5630	-	12221	DCA	TVS	-	11A5630	-	12221	DCA	TVS	-	11A5630	-	12221	DCA	TVS
DCA	FLL	-	RP3635	-	12239	IAD	ROC	-	EDV221	-	12110	DCA	CVG	-	11A5219	-	12238	DCA	CHA	-	11A5219	-	12238	DCA	CHA	-	11A5219	-	12238	DCA	CHA	-	11A5219	-	12238	DCA	CHA
IAD	CRS	-	UCM316	-	12246	IAD	BUF	-	J1A5398	-	12148	DCA	STL	-	0MA1230	-	12229	BMT	JAN	-	0MA1230	-	12229	BMT	JAN	-	0MA1230	-	12229	BMT	JAN	-	0MA1230	-	12229	BMT	JAN
IAD	MEA	-	0MA1450	-	12245	BMT	BUF	-	0MA1710	-	12120	BMT	DFW	-	0CA4905	-	12239	IAD	WSY	-	0CA4905	-	12239	IAD	WSY	-	0CA4905	-	12239	IAD	WSY	-	0CA4905	-	12239	IAD	WSY
DCA	ILW	-	ASH063	-	12235	IAD	CLE	-	AAL1863	-	12307	IAD	DFW	-	UAL1566	-	12302	IAD	MWK	-	UAL1566	-	12302	IAD	MWK	-	UAL1566	-	12302	IAD	MWK	-	UAL1566	-	12302	IAD	MWK
DCA	MDA	-	E154418	-	12311	IAD	YOW	-	AAL2761	-	12220	DCA	PHX	-	UAL2245	-	12302	DCA	IAH	-	UAL2245	-	12302	DCA	IAH	-	UAL2245	-	12302	DCA	IAH	-	UAL2245	-	12302	DCA	IAH
IAD	LAV	-	RP2656	-	12250	IAD	BTU	-	0SH0215	-	12228	IAD	CVG	-	0MA3755	1112	12131	BMT	BHM	-	0MA3755	1112	12131	BMT	BHM	-	0MA3755	1112	12131	BMT	BHM	-	0MA3755	1112	12131	BMT	BHM
BMT	ORF	-	KLW052	2240	P2257	IAD	EHAM	-	UAL2116	-	12256	IAD	DFW	-	11A5325	1958	P2039	DCA	WSY	-	11A5325	1958	P2039	DCA	WSY	-	11A5325	1958	P2039	DCA	WSY	-	11A5325	1958	P2039	DCA	WSY
BMT	MDA	-	J2A726	2040	P2059	IAD	VOL	-	J1A5462	-	12235	DCA	BNA	-	EW9889	1954	P2033	DCA	TVS	-	EW9889	1954	P2033	DCA	TVS	-	EW9889	1954	P2033	DCA	TVS	-	EW9889	1954	P2033	DCA	TVS
BMT	MDA	-	0MA030	2032	P2125	BMT	SYR	-	UAL2796	-	12252	IAD	LAX	-	0MA1833	1919	P1943	DCA	WSY	-	0MA1833	1919	P1943	DCA	WSY	-	0MA1833	1919	P1943	DCA	WSY	-	0MA1833	1919	P1943	DCA	WSY
DCA	MDA	-	RP44485	2025	P2204	DCA	BUF	-	UAL1869	-	12257	IAD	SAT	-	0CA4263	1755	P1950	IAD	HSV	-	0CA4263	1755	P1950	IAD	HSV	-	0CA4263	1755	P1950	IAD	HSV	-	0CA4263	1755	P1950	IAD	HSV
DCA	PBI	-	0MA540	2023	P2055	BMT	BUF	-	UAL506	-	12250	IAD	BNA	-	12250	IAD	BNA	-	12250	IAD	BNA	-	12250	IAD	BNA	-	12250	IAD	BNA	-	12250	IAD	BNA	-	12250	IAD	BNA
BMT	FLL	-	12A619	2015	P2050	IAD	YYZ	-	RP3870	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW
DCA	FLL	-	RP44490	2015	P2040	DCA	SYR	-	CA818	2135	P2146	IAD	LAX	-	12255	IAD	LAX	-	12255	IAD	LAX	-	12255	IAD	LAX	-	12255	IAD	LAX	-	12255	IAD	LAX	-	12255	IAD	LAX
DCA	ROW	-	J1A5553	2012	P2118	DCA	CLE	-	0MA1129	2112	P2121	DCA	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA
BMT	PBI	-	RP44392	2005	P2038	DCA	ROC	-	0MA307	2051	P2105	BMT	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA
DCA	MTN	-	J1A5667	1955	P2031	DCA	YYZ	-	KAF7Y	2030	P2030	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS
BMT	MCO	-	0MA348	1955	P2009	BMT	ROC	-	0RF444	2026	P2042	IAD	MPTO	-	12255	IAD	MPTO	-	12255	IAD	MPTO	-	12255	IAD	MPTO	-	12255	IAD	MPTO	-	12255	IAD	MPTO	-	12255	IAD	MPTO
DCA	MDA	-	E1208	1935	P1945	IAD	YCK	-	0MS1129	2017	P2036	BMT	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS	-	12255	IAD	LAS
DCA	MCO	-	E1A807	1927	P2003	IAD	BTU	-	RP5672	2000	P2010	DCA	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA	-	12255	IAD	BNA
									AAL1921	1957	P2025	DCA	JAX	-	12255	IAD	JAX	-	12255	IAD	JAX	-	12255	IAD	JAX	-	12255	IAD	JAX	-	12255	IAD	JAX	-	12255	IAD	JAX
									RP4268	1844	P2012	DCA	TUL	-	12255	IAD	TUL	-	12255	IAD	TUL	-	12255	IAD	TUL	-	12255	IAD	TUL	-	12255	IAD	TUL	-	12255	IAD	TUL
									E1A763	1930	P1931	IAD	APA	-	12255	IAD	APA	-	12255	IAD	APA	-	12255	IAD	APA	-	12255	IAD	APA	-	12255	IAD	APA	-	12255	IAD	APA
									J1A5512	1915	P2028	DCA	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW	-	12255	IAD	DFW

Amendments will be sent for 0 flights

Cancel

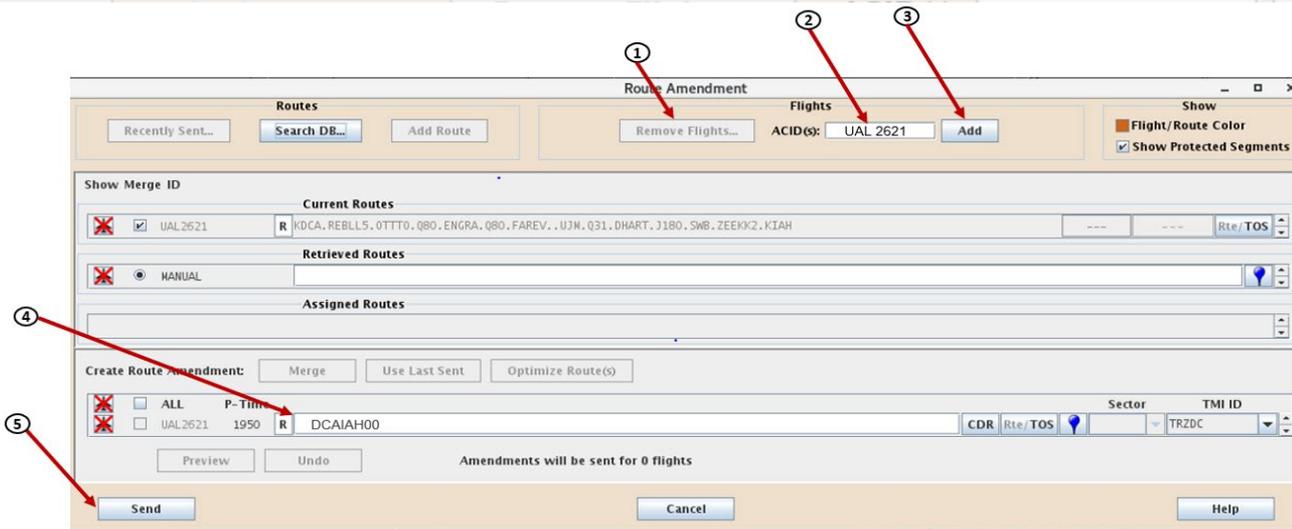


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# Tasking 126

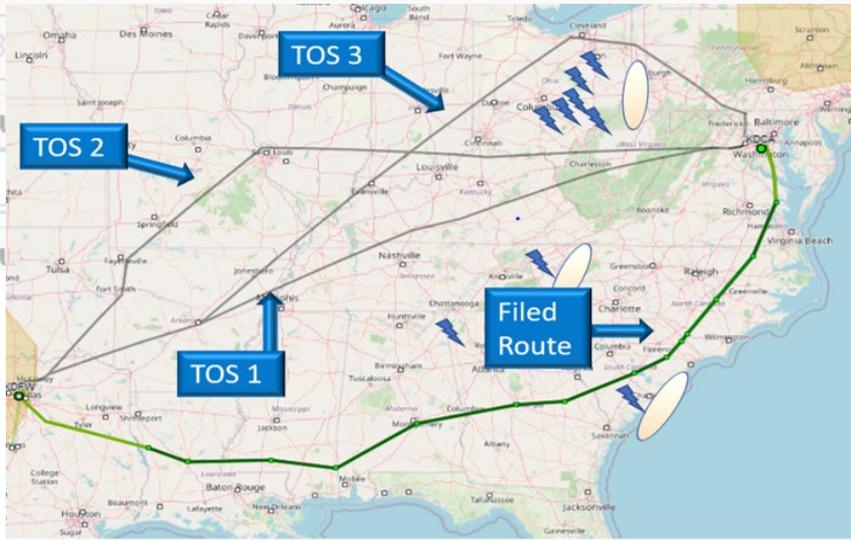


- With the RAD now open, the traffic manager:
  - 1. Clicks on Remove Flights... to remove the flight used to open the RAD from the Current Routes field.
  - 2. Enters the ACID for the first flight of interest (UAL 2621).
  - 3. Clicks on Add to put that flight and its filed route in the Current Routes field of the RAD.
- This displays the current route for UAL 2621 in the Current Routes field.
- Instead of using ERAM to enter the reroute, the traffic manager can simply:
  - 4. Type in the CDR code for the reroute in the Create Route Amendment field or type in a full route string.
  - 5. Click on Send to send the reroute to ERAM.



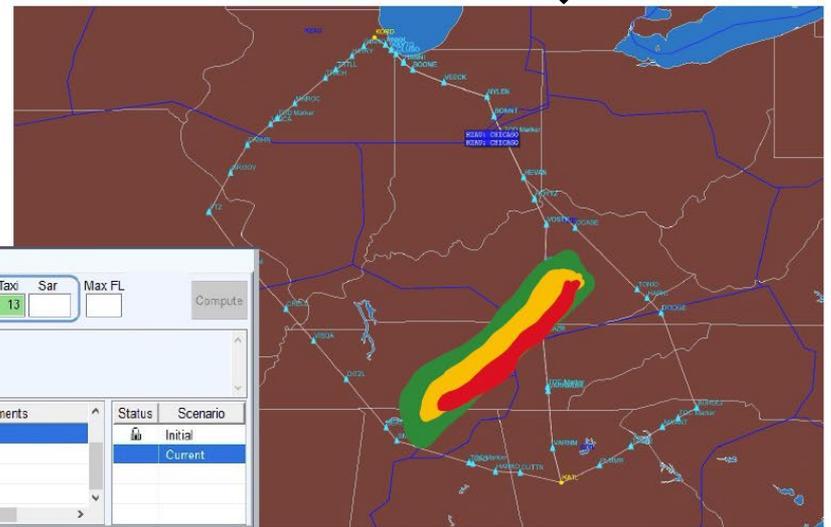
# Tasking 126

FP#	TRIP TIME	FUEL	MIN T/O FUEL	ΔFUEL TO BEST	PAYLOAD	COST INDEX	TOTAL COSTS	ΔCOST TO BE...	DELAY
RLS 1.1	03:40	23176	29558	3843	19092	40	15814	2580	00:37
TOS1 1 (FAA)	03:03	19333	25997	0	19092	40	13234	0	00:00
TOS2 2 (FAA)	03:14	19964	26352	631	19092	40	13812	578	00:11
TOS3 4 (FAA)	03:16	20089	26475	756	19092	40	13901	667	00:13
001 0 (FAA)	03:40	23176	29558	3843	19092	40	15814	2580	00:37



← AAL DCA-DFW TOS Example

↓ DAL ATL-ORD TOS Example



Fit/Dt	Ship	Orig	Dptr	ETD	Dest	Am	ETA	Am Var	DP	Elock	Goal	25	Hold Tm	TGAF	TNKR	Taxi	Sar	Max FL
1038/19	6804	KATL	1835	1835	KORD	2036	2047	0:11	33	19600	Median	38	15	5842	0	13		

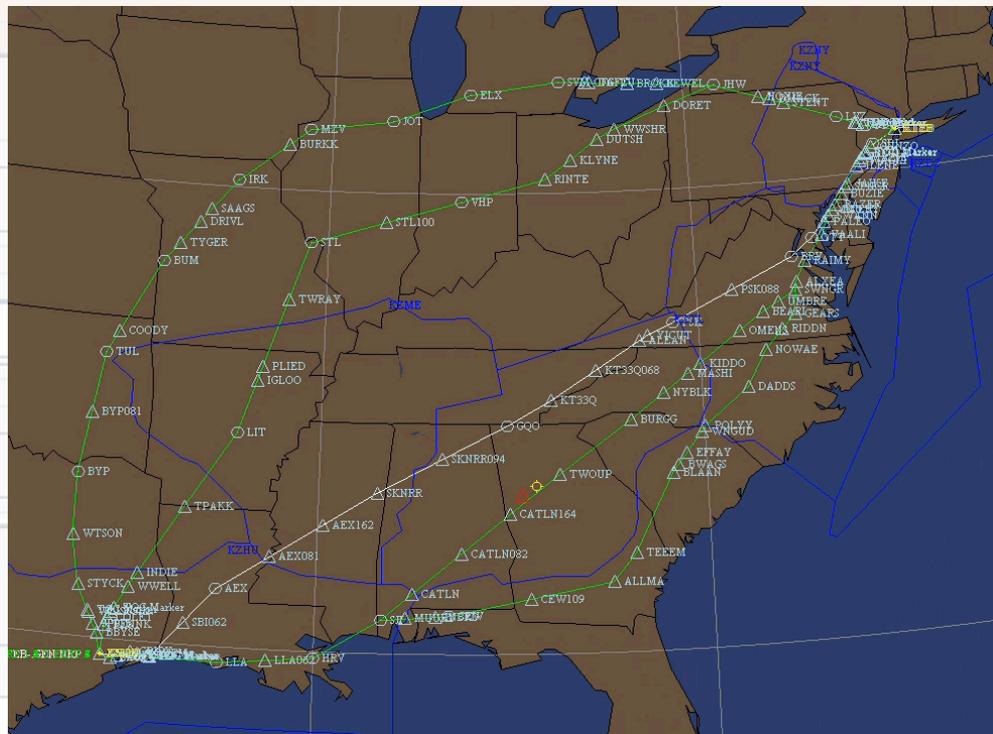
Lock	Status	Map	ID	Cost	Burn	Bm Dif	Trip Tm	ETA	Av Df	Init FL	TOS	Comments
			CAN 0	305	13021	799	01:46	20:47	0:11	380	1	PL1 - PREF ATC
			CAN 3	306	13021	799	01:46	20:47	0:11	380	2	RP - CDR
			CAN 2	996	14822	2599	02:01	21:02	0:25	380	2	PL - CDR
			CAN 1	1163	15321	3099	02:00	21:01	0:25	340	3	CU - CDR



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# Tasking 126

## General Aviation HOU-TEB TOS Example



Use Last Sent

Optimize Route(s)

TOS

TOS	Time	Burn	Δ in burn	Δ in time	Route	CDR
1	2:43	5208	-	-	LURIC8 HAWES SUTTN J29 CARIN MEMFS Q34 GVE JAIKE4	
2	2:43	5173	-35		0:00 KHOU ELOCO6 LLA HRV Q56 CATLN Q22 UMBRE SWNGR JAIKE4 KTEB	0M
3	2:49	5383	175		0:06 KHOU ELOCO6 LLA HRV SJJ J2 CEW ALLMA TEEM Q99 POLY DADDS Q87 GEARS SWNGR JAIKE4 KTEB	0C
4	3:03	5670	462		0:20 KHOU INDIE8 TPAKK LIT J101 STL VHP RINTE KLYNE Q29 JHW LVZ4 KTEB	1T
5	3:28	6380	1172		0:45 KHOU STYCK8 WTSON BYP TUL J87 JOT ELX SVM J70 JHW LVZ4 KTEB	0E



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# Tasking 126

## Results

- New updates in the TFMS R15 update provided incremental improvements in the use of TOS.
- The “find flight” tool on the Route Amendment page saves a few steps for the Traffic Manager.
- Flight operators was able to confirm that their submissions are being sent thru SWIM or Legacy correctly.
- New TOS software developed by Delta now allows for multi-line TOS versus previous single line TOS submissions.

Amendments will be sent for 0 flights

Cancel



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## Next Steps

- **FET collaborating with the TFMS team and CTT to create a consolidated eLMS TOS module**
- **Developing flight operator and flight planning software providers requirements and guidelines on how TOS options should be submitted into TFMS.**
- **For a successful TOS implementation, participating flight operators must ensure approved routes are submitted into TFMS. Adding safeguards in the flight planning software is critical.**
- **Flight operators such as UA/DL are capable of using TOS on a limited basis.**
- **Completing additional facility visits to encourage the benefits of TOS and providing additional functionality on both the industry and FAA side.**
- **Provide additional recommendations for future FMDS requirements.**

Amendments will be sent for 0 flights

Cancel



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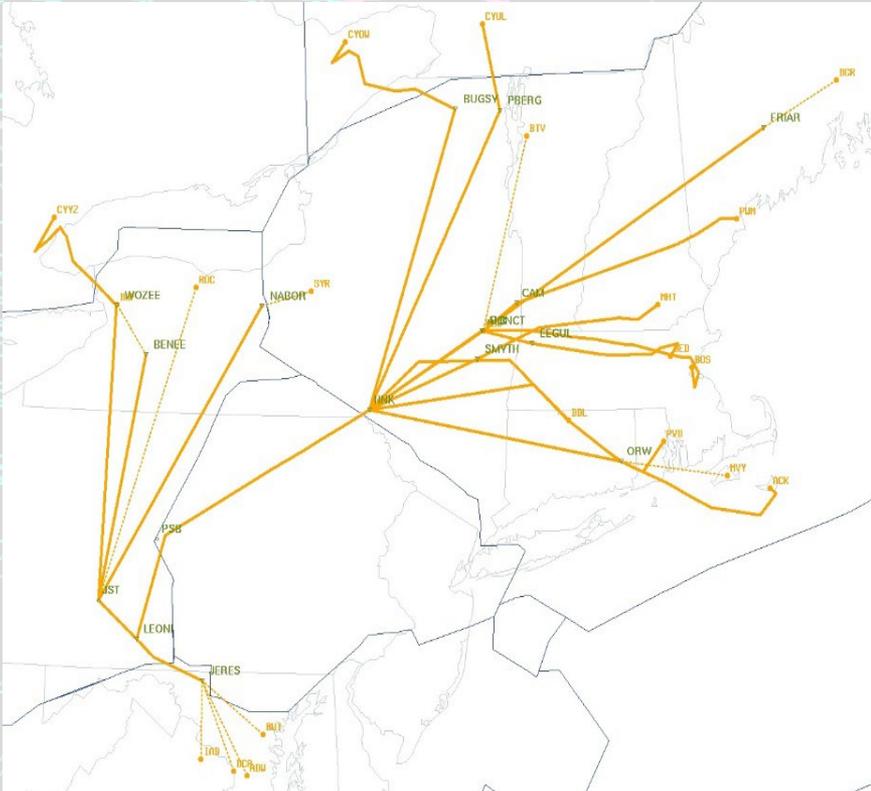
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# Tasking 113/124 – Tower Enroute Control (TEC) Route Utilization to Tunneling Routes

- **Evaluated underutilized CDR escape routes and looked for potential areas where additional escape routes could be used.**
- **Identified Boston Center escape routes as a potential area for first tier traffic and DUCT type routes for longer city pairs.**
- **Conceptualized new escape routes combining existing playbook routes or underutilized CDR routes.**
- **Revisited escape routes that were initially discussed prior to the pandemic to see if they are still an option.**
- **Reviewed escape routes used during SWAP 2023**



# Tasking 113/124



## ZDC to ZBW via J49

**ZOB designed escape route for ZDC traffic into ZBW/CZY airports using J49 to free up J220 for international departures.**

**Alternate route when WEVEL/GOATR playbooks are unavailable due to constraints.**

**Not to be used for any ZNY arrivals.**

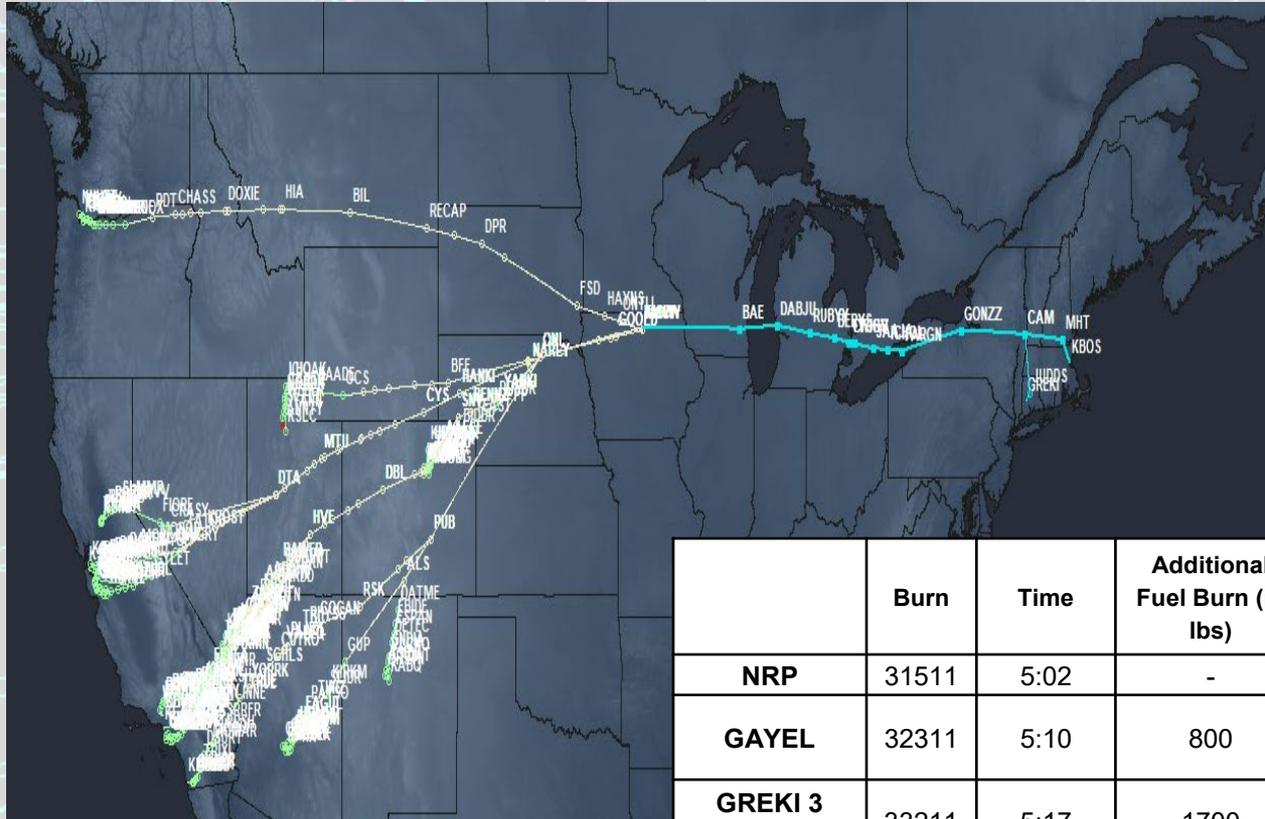


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# Tasking 113/124



## GREKI 3 route expansion

Concept was developed by combining two existing playbooks: GREKI 3 and MCW West

Potential SWAP route when NAVCANADA is unable to accept traffic

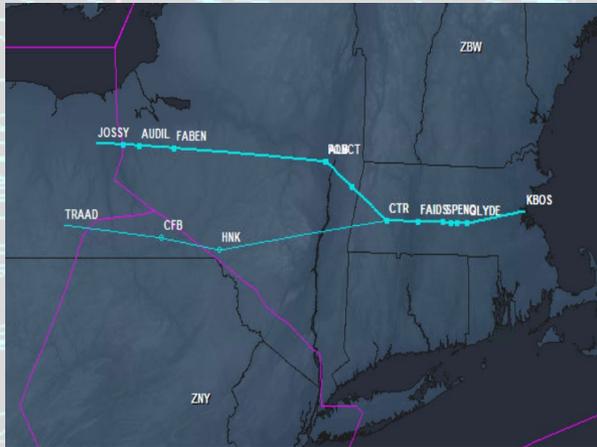
Based on a B738 JFKLAX

	Burn	Time	Additional Fuel Burn (in lbs)	Additional ETE	Estimated Cost per Flight (In USD)	Cost Adjustment (In USD)
<b>NRP</b>	31511	5:02	-	-	30544.28	
<b>GAYEL</b>	32311	5:10	800	0:08	31353.72	+809.44
<b>GREKI 3 Expansion</b>	33211	5:17	1700	0:15	32061.32	+1517.70
<b>CAN KENPA West 4</b>	34911	5:30	3400	0:28	33377.32	+2833.04

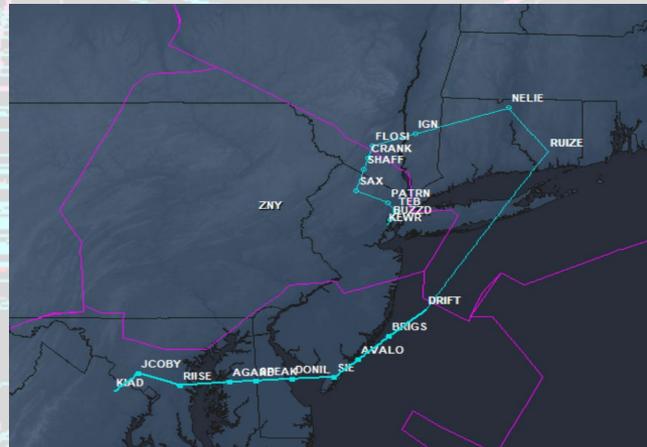


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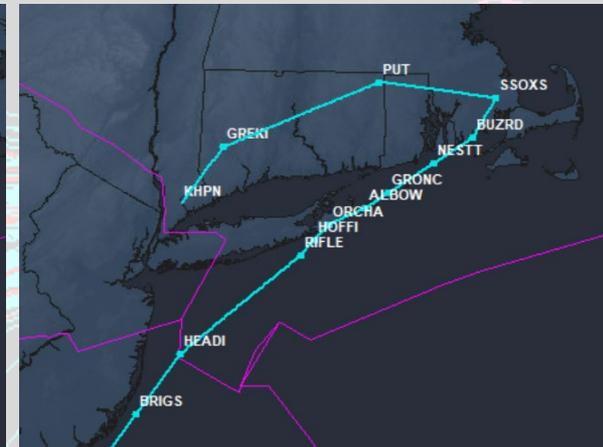
# Tasking 113/124



**ZBW DUCT Concept**



**SWL offload to ZNY via ZBW**



**NY Sats high-altitude escape to southern destinations**



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# Tasking 113/124

## Advisory Date

Monday, May 1, 2023

Wednesday, November 1, 2023

Playbook Name	Playbook Count
SERMN SOUTH	54
PHLYER WEST	52
WATRS*	43
SERMN NORTH	42
PHLYER NORTH	39
PHLYER SOUTH 2	38
SERMN EAST	25
SERBOS 1	19
GREKI 3	15
GREKI 1	8
GREKI 2	3
NEW YORK DUCT NORTH	2
NEW YORK DUCT WEST	2

## 12 ZNY low level escape routes were used during SWAP 2023

- While SERMN/PHLYR/GREKI routes were primarily used, other viable escape routes were issued as an advisory sparingly
- Impacts from staffing triggers also prevented other escape routes from being utilized.
- LIMBO routes for ZDC departures were also evaluated. No advisories were issued in 2023.



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# Tasking 113/124

## Results

- **J49 escape route is in coordination with ZNY with expectation to be used for SWAP 2024**
- **GREKI 3 expansion is moving forward with SFO/OAK as the first destinations.**
- **ZBW DUCT concept will need additional discussions with NATCA and TRACON's across ZBW.**
- **SWL and NY Sats high-altitude escape routes not a viable option.**
- **LIMBO routes have been sparingly used since the NEC ACR changes and will need a full redesign.**



# Questions?



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