# Collaborative Decision Making

## Flow Evaluation Team

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

# 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.**

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# FET Members

FET attending a TOS evaluation at Houston Center

| | |
|---|---|
| **FAA** | |
| Walter Williams | ATCSCC |
| 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

# 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.

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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

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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.**

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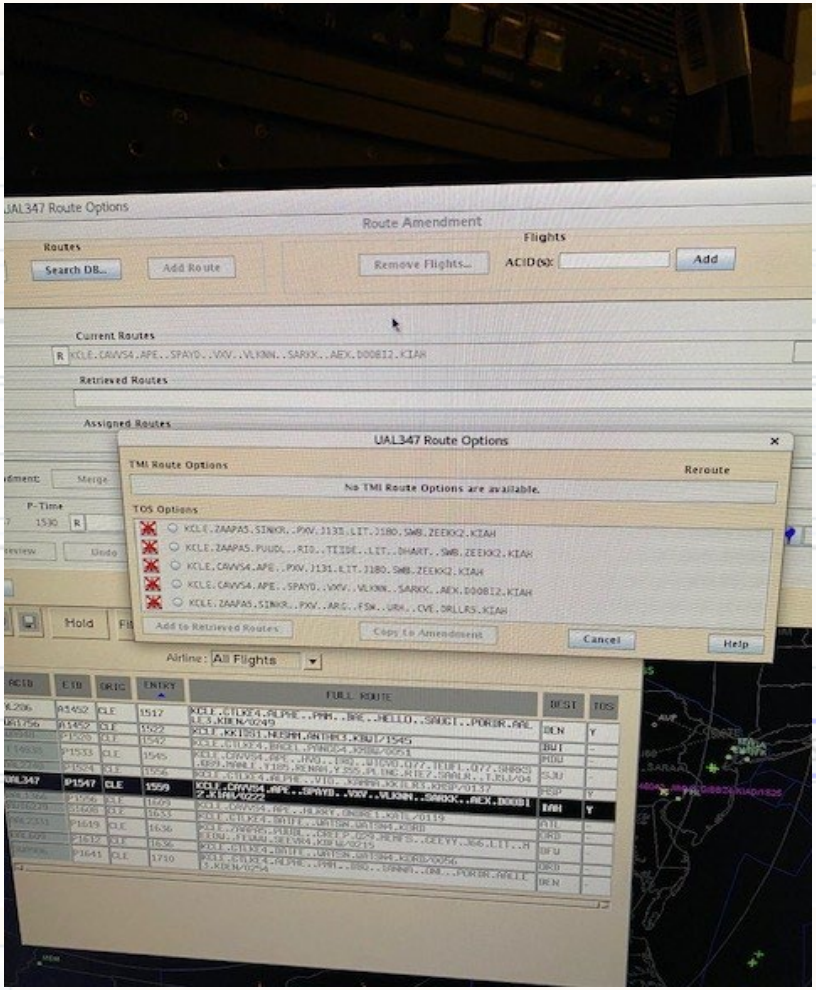
# Tasking 108

**Case Study: UAL347 CLE-IAH**

- **5 line TOS that the Flight Operator (FO) manually submitted TOS routes out of RTC order.**
- **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 conduced 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

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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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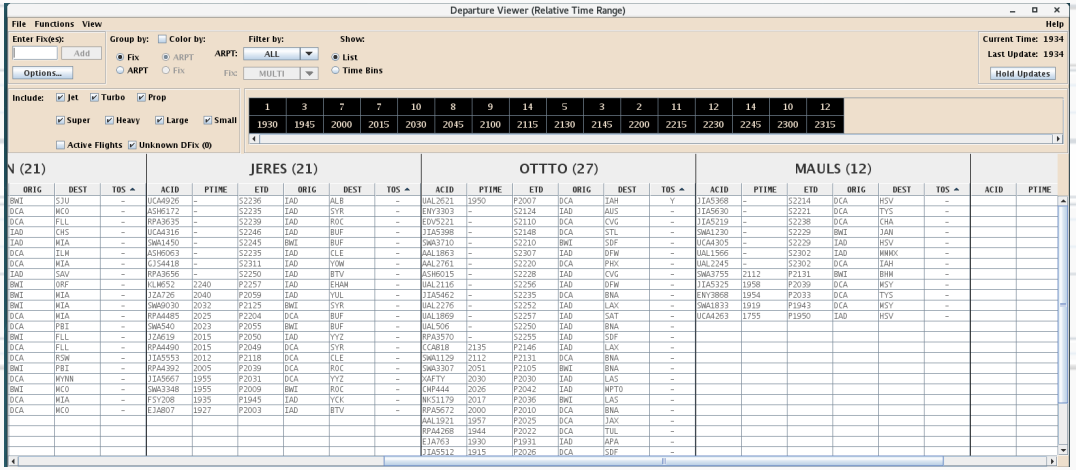
# Tasking 126

**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**




Amendments will be sent for 0 flights

Cancel

CDR Rte/TOS

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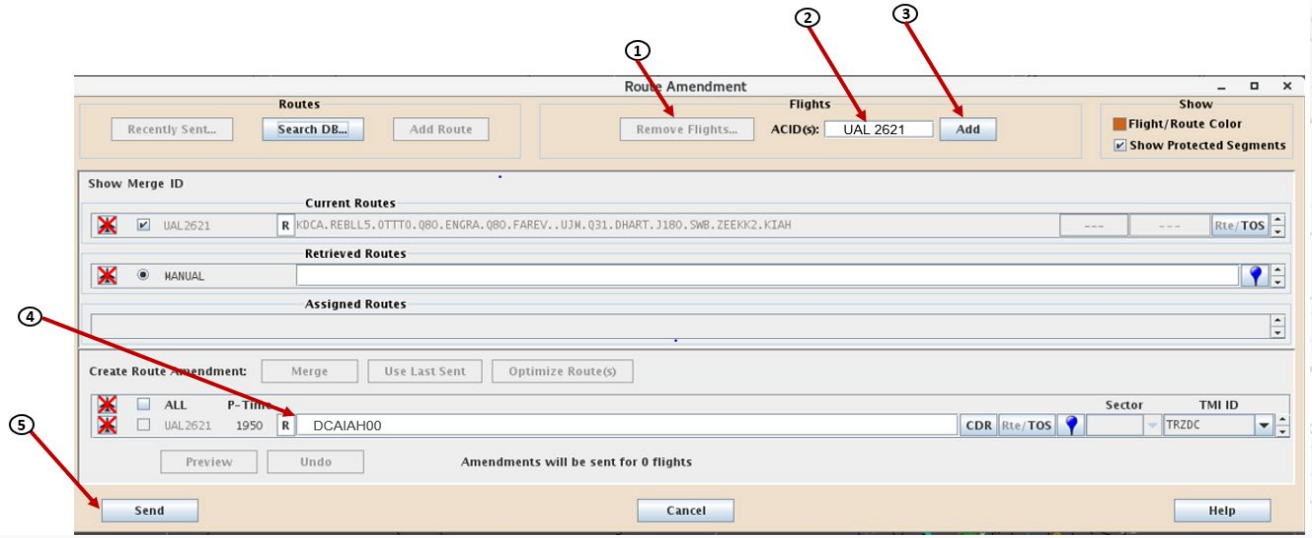
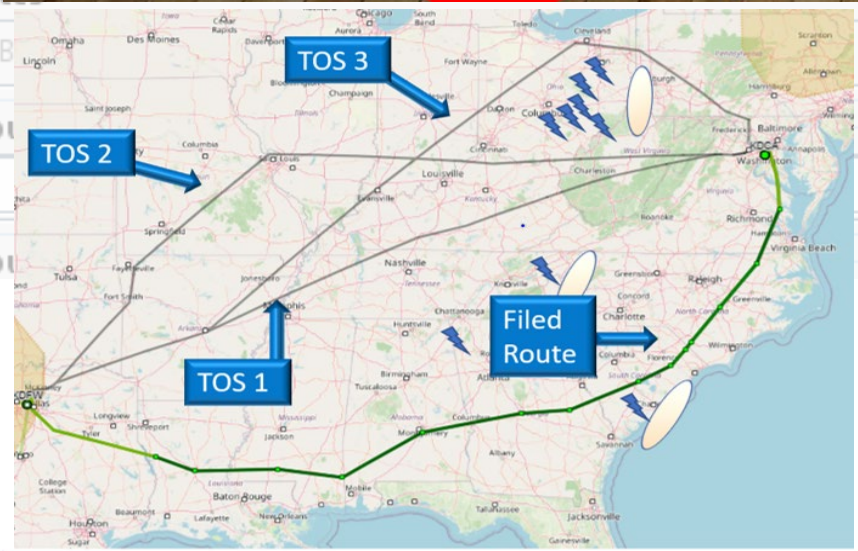
# Tasking 126




- 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.

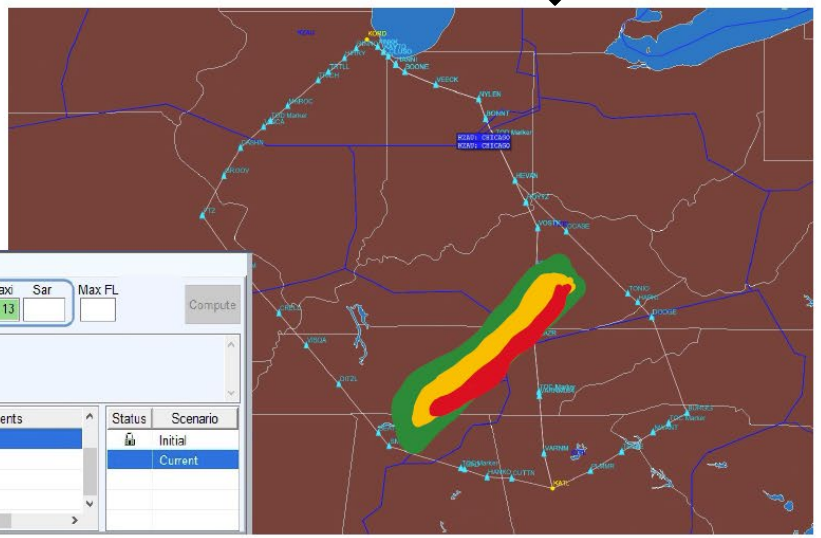
# Tasking 126

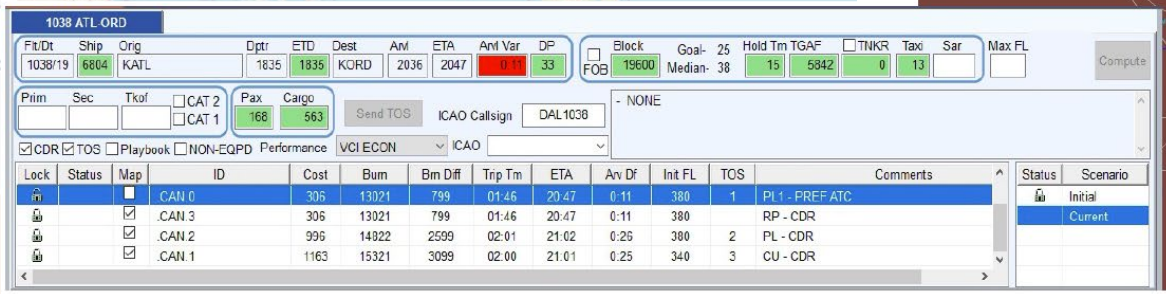
| | FP# | TRIP TIME | FUEL | MIN T/O FUEL | ΔFUEL TO BEST | PAYLOAD | COST INDEX | TOTAL COSTS | ΔCOST TO BE... | DELAY |
|---|---|---|---|---|---|---|---|---|---|---|
| RLS | 1.1 | 03:40 | 23176 | 29558 | 3843 | 39092 | 40 | 15814 | 2580 | 00:37 |
| TOS1 | 1 (FAA) | 03:03 | 19333 | 25997 | 0 | 39092 | 40 | 13234 | 0 | 00:00 |
| TOS2 | 2 (FAA) | 03:14 | 19964 | 26352 | 631 | 39092 | 40 | 13812 | 578 | 00:11 |
| TOS3 | 4 (FAA) | 03:16 | 20089 | 26475 | 756 | 39092 | 40 | 13901 | 667 | 00:13 |
| 001 | 0 (FAA) | 03:40 | 23176 | 29558 | 3843 | 39092 | 40 | 15814 | 2580 | 00:37 |




AAL DCA-DFW TOS Example

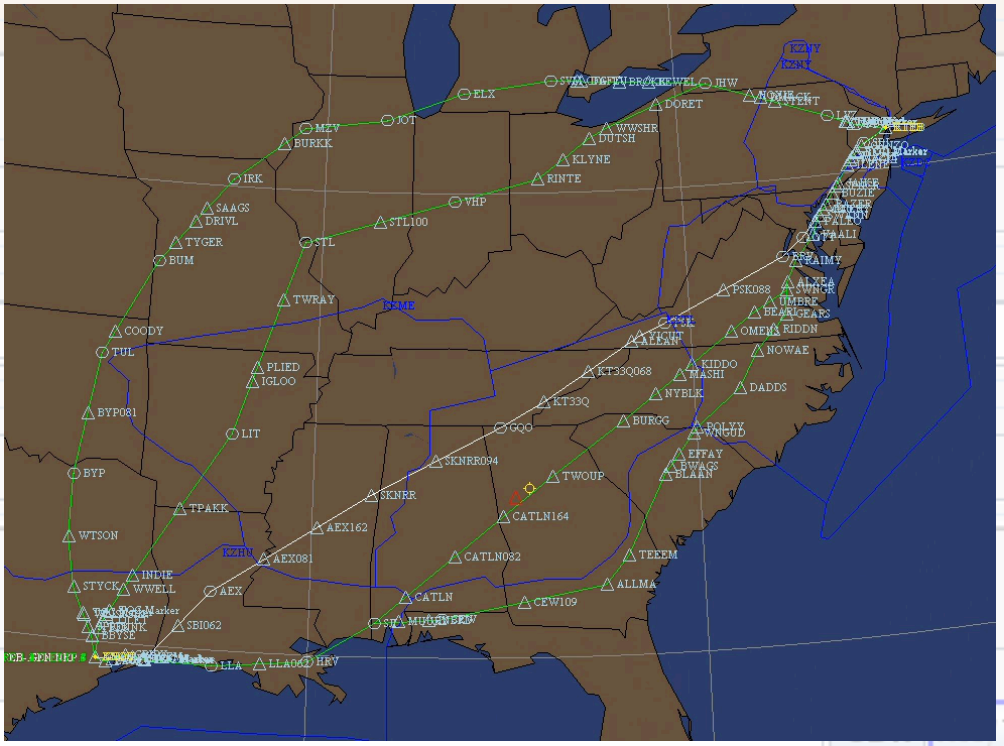
DAL ATL-ORD TOS Example





# Tasking 126

**General Aviation HOU-TEB TOS Example**




| 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 SJI J2 CEW ALLMA TEEEM Q99 POLYY 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 |

# 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.

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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.

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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

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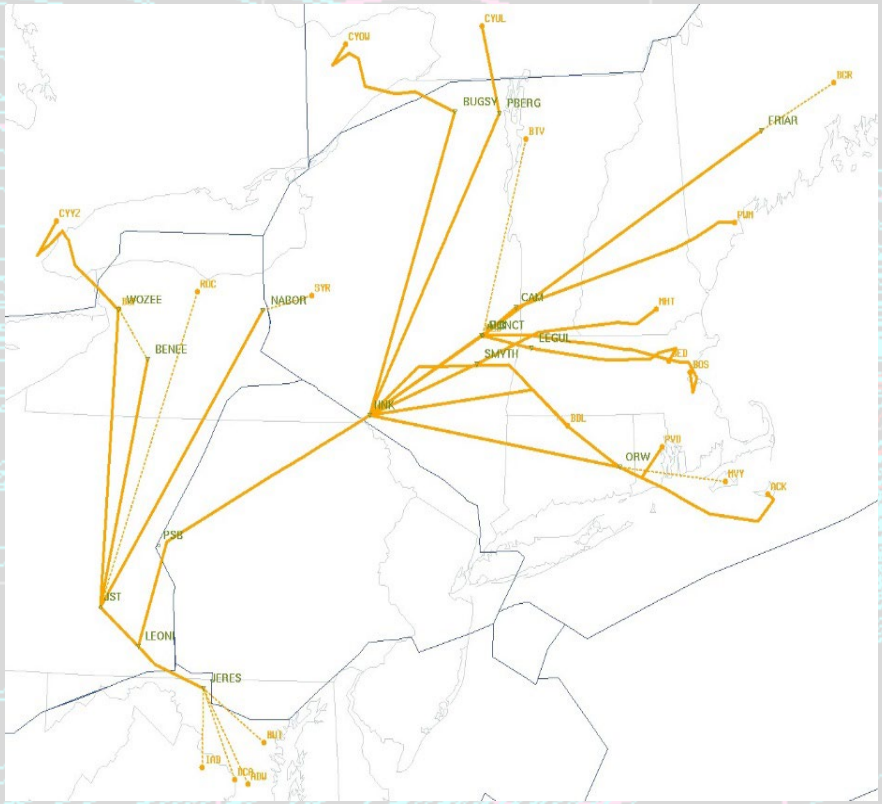
# Tasking 113/124




**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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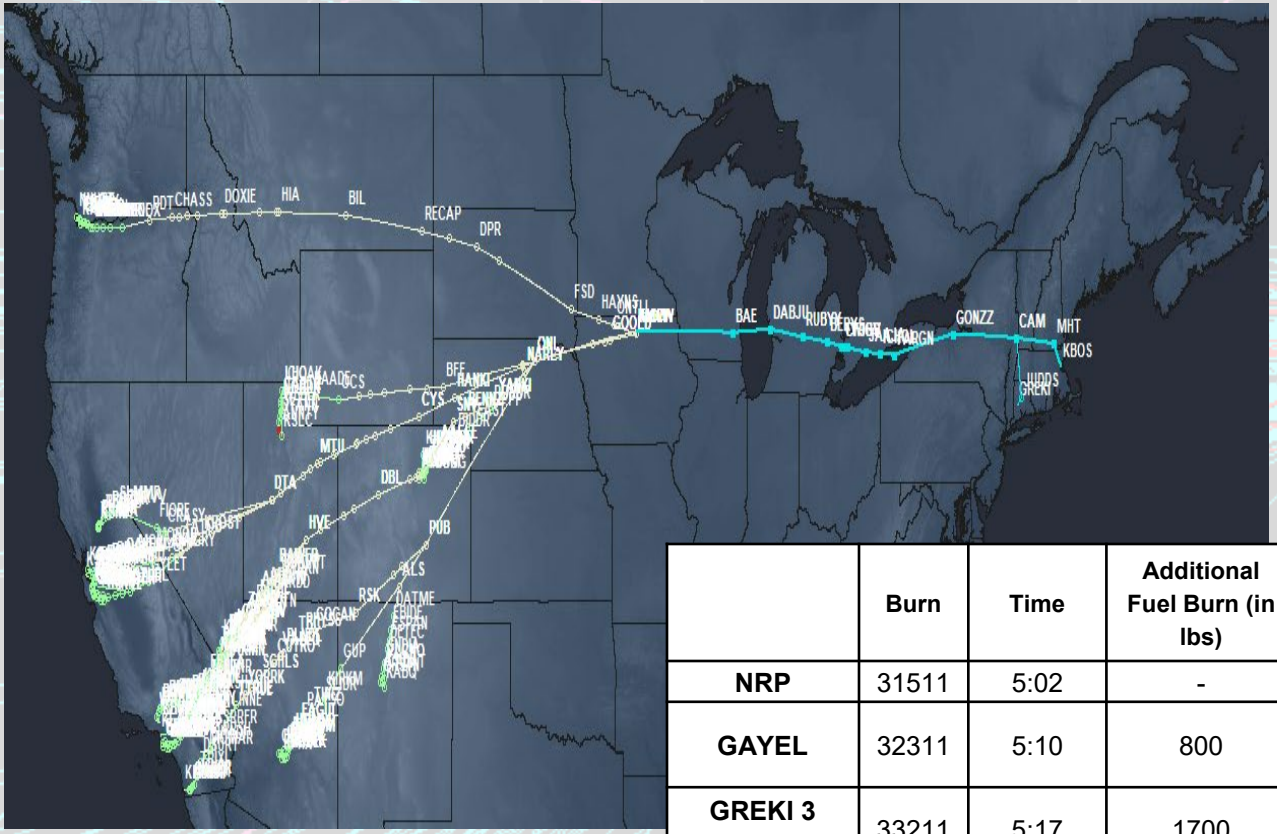
# Tasking 113/124




## GREKI 3 route expansion

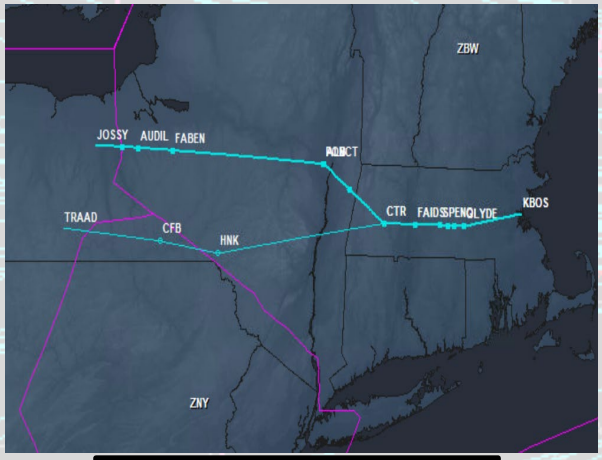
**Concept was developed by combining two existing playbooks: GREKI 3 and MCW West**

**Potential SWAP route when NAVCANADA is unable to accept traffic**

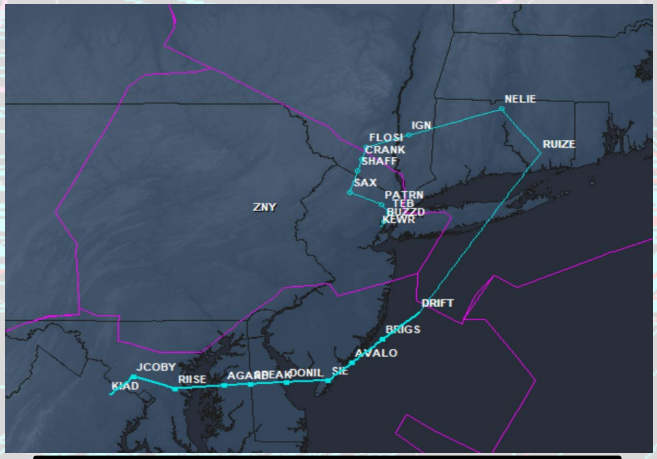
**Based on a B738 JFKLAX**

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

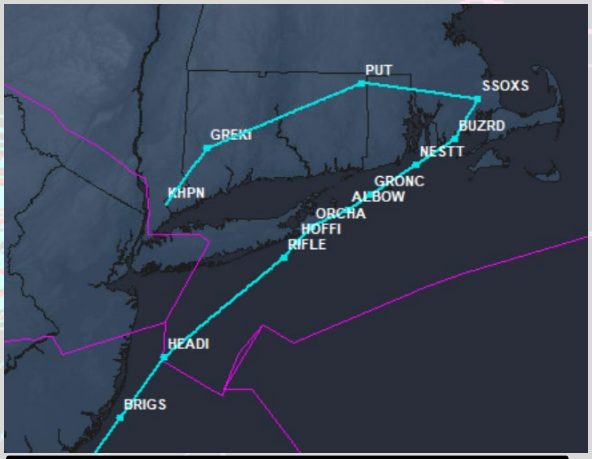
# Tasking 113/124




ZBW DUCT Concept




SWL offload to ZNY via ZBW




NY Sats high-altitude escape to southern destinations

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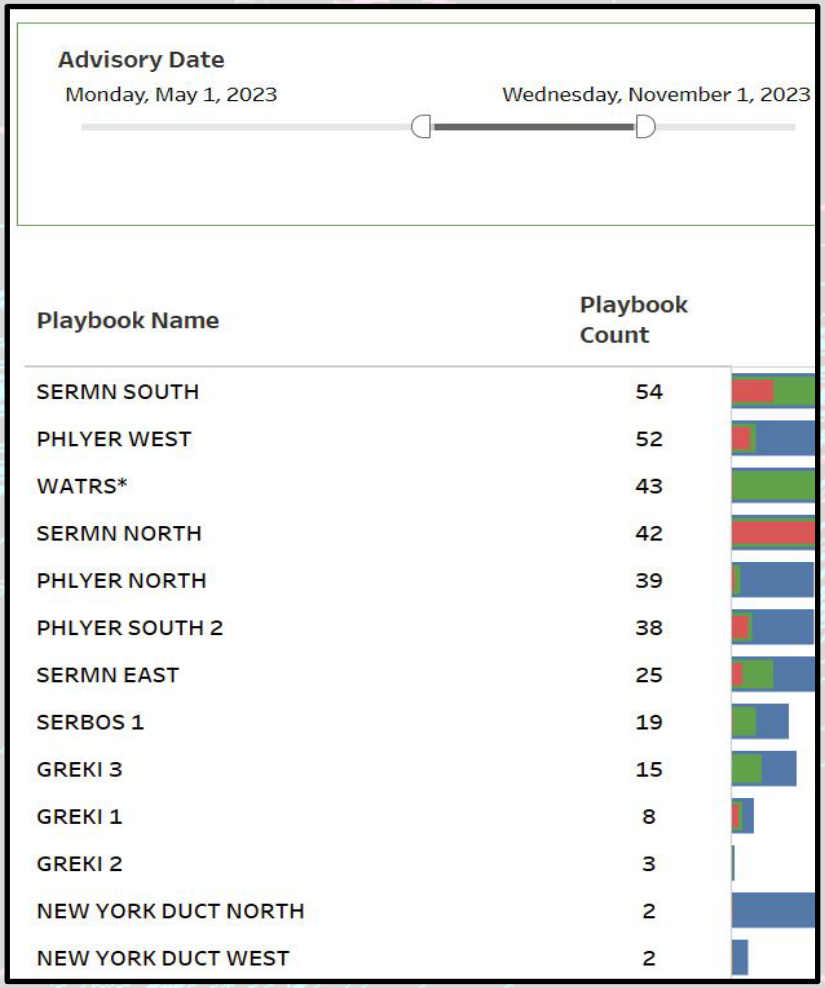
# Tasking 113/124




| 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.

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# Questions?