

Collaborative Decision Making

Flow Evaluation Team

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



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FET Members

Walter Williams
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Southwest Airlines
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Delta Air Lines
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FAA/AJV
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FAA/ZOB SME
American Airlines
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FET Members



Ernie Stellings

**FET Co-lead
1903 – 2022**

**Witness to first
flight at Kitty
Hawk**



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Tasking 108

TOS End to End Exercise



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Tasking 108

Use of Trajectory Options Sets in PDRR

Background:

- The continuation of the idea of TOSs as a stand-alone traffic management tool outside of CTOP
- The FET saw the need for further evaluation of use cases for TOS to be used in both the terminal and enroute environment during SWAP or space launch events.
- The most promising use case with the greatest operational impact appeared to be identifying aircraft to traffic managers that were fueled and capable of an alternative departure route to avoid a departure constraint in the terminal environment without having to pre-coordinate



Tasking 108

Goals:

- Conduct operational evaluations of the process for the submission of multi-line TOSs by flight operators
- Develop recommendations for the use of TOSs within PDRR to aid pre-departure reroutes made by Traffic Managers to avoid departure constraints
- Identify potential facilities to conduct an operational evaluation
- Develop recommendations for training and requirements for flight operators for TOS generators under development by third party contractors



Tasking 108

Use of Trajectory Options Sets in PDRR

Process

- The FAA sends out a SWAP statement advisory or similar indicator they anticipate dynamic departure constraints for an airport and request flight operators submit TOSs indicating routes they are fueled and qualified to fly using alternative departure fixes. These could include low altitude escape or deep-water routes.



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Tasking 108 - Use of Trajectory Options Sets in PDRR

ATCSCC Advisory

ATCSCC ADVZY 028 DCC/ZDC 06/03/2021 DC METRO SWAP IMPLEMENTATION PLAN_FYI

RAW TEXT: CONSTRAINED FACILITIES: ZDC

THIS ADVISORY IS FOR PLANNING PURPOSES ONLY. CUSTOMERS ARE ENCOURAGED TO FILE NORMAL ROUTINGS AND ANTICIPATE THE SPECIFIED ALTERNATE ROUTES.

SWAP STATEMENT:

SEVERE WEATHER AVOIDANCE PLANS ARE EXPECTED FOR THE ZDC AIRSPACE.

TWO AREAS OF CONCERN.....

BETWEEN 16Z-18Z...SCATTERED THUNDERSTORMS WILL RE-DEVELOP ACROSS NC AND SOUTHEAST VA...TOPS NEAR FL400 TRACK NE 25 KT. A FEW

Indication that Tstorms are expected to impact departure fixes but the location and timing is uncertain

ALSO....

BETWEEN 18Z-20Z... A SCATTERED LINE OF THUNDERSTORMS WILL DEVELOP ACROSS NW ZDC AND TRACK NE IMPACTING DC METRO'S BETWEEN 20Z-00Z....TOPS FL350. THE SCATTERED LINE OF THUNDERSTORMS WILL MOVE INTO NJ AND E MD BETWEEN 00Z-03Z. THUNDERSTORMS WILL DECREASE IN INTENSITY AND COVERAGE AFTER 02Z BUT IMPACTS WILL CONTINUE ACROSS SOUTHERN NJ THROUGH 06Z.

PLANNED ALTERNATE DEPARTURE ROUTES:

CDRS FOR BUFFR, JERES, OTTTO, RAMAY, JDUBB, CLTCH AND COLIN MAY BE UTILIZED AS ROUTES ARE IMPACTED. SWANN AND AGARD ROUTES MAY ALSO BE AFFECTED LATE IN THE DAY AS THE WEATHER MOVES EAST ACROSS ZDC AND THE DC METRO AREA. NY&PHL METRO DEPARTURES FILED VIA J6,Q75, J48, WHITE, WAVEY AND ODD MAY BE SWAPPED AFTER 1900Z.

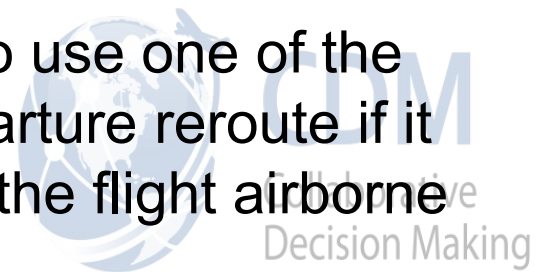


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Tasking 108

Use of Trajectory Options Sets in PDRR

- In response to the advisory, the flight operator submits a Trajectory Option Set (TOS) with a prioritized list of alternative routes that a flight has been fueled to accept
- When there is a system constraint inhibiting a timely departure the traffic manager can use the submitted TOS as a decision support tool and know the route is vetted and the flight is capable
- The traffic manager can decide whether to use one of the submitted TOS options to make a predeparture reroute if it provides an operational advantage to get the flight airborne



Tasking 108 – Use of TOSs in PDRR

The screenshot displays the 'Route Amendment' window in the Traffic Situation Display (Dynamic Projection) software. The window is titled 'Route Amendment' and contains several sections:

- Routes:** Includes buttons for 'Recently Sent...', 'Search DB...', and 'Add Route'.
- Flights:** Includes a 'Remove Flights...' button and an 'ACID(s):' field with an 'Add' button.
- Show:** Includes checkboxes for 'Flight/Route Color' and 'Show Protected Segments'.
- Current Routes:** A table with columns 'Sh...', 'Me...', and 'ID'. The first row shows route AAL4015 with a red 'X' icon and a dropdown menu set to 'Rte/TOS' (circled in red).
- Retrieved Routes:** A table with a 'MANUAL' entry.
- Assigned Routes:** A table with three entries, each with a red 'X' icon and a dropdown menu set to 'RRZOB002'.
- Create AAL4015 Route Options:** A modal dialog box with a 'Reroute' button and a message: 'No TMI Route Options are available.' It contains a 'TOS Options' section with two radio buttons: 'LAXJFKW1 - KLAX..LAS.Q70.BAWER..SNY.J114.GEP..DLL..HASTE..DAFLU.J70.LVZ.LENDY6.KJFK' and 'KLAX..LNK..DSM..EVOTE..KEEHO..SLT..KJFK'. A mouse cursor is pointing at the second option.
- CDR:** A dropdown menu set to 'Rte/TOS' (circled in red).
- Sector:** A dropdown menu set to 'TRDCC'.
- TMI ID:** A dropdown menu set to 'TRDCC'.
- Map:** A background map showing flight paths and sectors labeled 'ZDV', 'ZKC', and 'ZID'.



Tasking 108

Activity 1: Conduct an operational evaluation of the process for the submission of TOSs by flight operators

- Evaluated the submission of TOSs for use in PDRR at ZDC
 - Flight operators sent single and multi-options TOS routes into TFMS for a Traffic Manager to see
 - Most TOSs were successfully transmitted and displayed in PDRR
 - Some necessary adjustments to workflow were identified to ensure end-to-end connectivity



Tasking 108

Activity 2: Conduct cognitive walkthroughs

- **Walkthrough 1. Dispatchers, ATC Coordinators and Traffic Managers**
 - Supported by Tanya Yuditsky (FAA)
- **Walkthrough 2. TMCs (10 participants from 9 Centers)**
 - Conducted by Tanya Yuditsky (FAA)



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Tasking 108

Conclusions:

- TOSs can be used as a tool to provide useful decision support information to Traffic Managers.
- The existing PDRR software can effectively support the use of TOSs
- Additional supplemental training for all stakeholders should be accomplished to streamline the workflow while enhancing safety and efficiency



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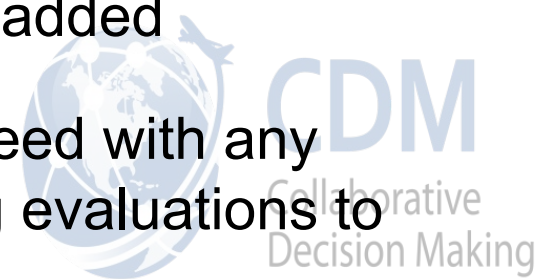


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Tasking 108

What's Next?:

- Though the FET has completed the defined requirements of this tasking, we feel there is more we can accomplish
- Based on the results of the SRMP the FET will recommend that a new task be issued to support a more robust end-to-end evaluation in collaboration with AJR, AJT and NATCA
- Future enhancements of PDRR in FMDS could further improve this process with additional tools added
- Flight operators and the FAA should proceed with any recommended steps jointly defined during evaluations to make this process operational



Tasking 111

Florida CDR Use Case



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Tasking 111 – FL CDR Use case

FET was tasked to evaluate CDR usage out of ZJX/ZMA

- Currently there are no CDR's listed departing Florida Airports
- ZJX/ZMA constraints include military activity on both sides of the Florida Coast
- Effective strategies to increase departure and arrival throughput require the integration of capping and tunneling with routing solutions



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Tasking 111 – FL CDR Use case

- Capping of flights from ATL and CLT to FL
- Capping of northbound flights departing from FL
- Development of routes to support the effective use of lower altitude escape routes
- CDRs in support of plays using altitude caps could support integration of these traffic management strategies



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Tasking 111 – FL CDR Use case

Additional Insights

- Increased use of SWAP advisories for FL departures would help flight operators
- Ultrahigh sectors could support strategies to increase throughput
- Route structures for flights over GoM / FL Panhandle could support more effective traffic management efforts
- A re-design of the airspace over the Florida peninsula to allow for structured climb and descent corridors.



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Tasking 113

TEC for Tunneling Routes



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Tasking 113 – TEC routes NE

Tasking was to evaluate escape routes, including Tower Enroute (TEC) solutions, to increase departure throughput

- FET evaluated Northeast escape routes from July – September 2022.
- Most used routes were SERMN / GREKI / PHLR / DQO
- Office of System Efficiency has provided the FET with data to look at the use of existing TEC routes
- Escape Dashboard displays escape route playbooks on frequency of use and compliance of route/altitude structure



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Tasking 113 – TEC routes NE


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Start Date:

End Date:

REROUTE ADVISORIES



Escape Route Name: (All)

Advisory Action:

 FYI

 RMD

 RQD

- Candidate Flights
- Usage Metrics
- Escape Routes
- Map-Flights

Disclaimer: The Sector ID associated with Altitude Non Compliance is based on the assumption that all sector are open/Baseline Sector values
 Right click on any 'Advisory Name' for Candidates Flights & Playbook Name' for Sector Maps or Escape routes

Advisory Date	Advisory Name	Advisory Num	Orig Advisory Num	Playbook Name	Advisory Type	Advisory Action	Start Time (UTC)	End Time (UTC)	Origins	Destinations	Full Advisory Log
8/17/2022	SERMN_SOUTH_PARTIAL	63	60	SERMN SOUTH	Reroute	RQD	8/17/2022 18:53	8/18/2022 00:50	KEWR/KHPN/KJFK/KLGA/KMMU/K TEB	KBWI/KDCA/KGSO/KIAD/KORF/KRDU/KRIC/KR OA	ATCSCC ADVZY 063 DCC 08/17/22 ROUTE RQC NAME: SERMN_SOUTH_PARTIAL CONSTRAINED AREA: ZNY REASON: WEATHER... LR4
	SERMN_SOUTH_PARTIAL	63	60	SERMN SOUTH	Reroute	RQD	8/17/2022 18:53	8/18/2022 00:50	-	-	TMI ID: RRDCC063.
8/20/2022	SERMN_SOUTH_PARTIAL	87	87	SERMN SOUTH	Reroute	RQD	8/20/2022 19:00	8/20/2022 23:12	KEWR/KHPN/KJFK/KLGA/KMMU/K TEB	KBWI/KDCA/KGSO/KIAD/KORF/KRDU/KRIC/KR OA	ATCSCC ADVZY 087 DCC 08/20/22 ROUTE RQC NAME: SERMN_SOUTH_PARTIAL CONSTRAINED AREA: ZNY REASON: OTHER... PPA
	SERMN_SOUTH_PARTIAL	87	87	SERMN SOUTH	Reroute	RQD	8/20/2022 19:00	8/20/2022 23:12	-	-	HCM< KLGA KHPN KBWI >JFK V16 DIXIE LEEAH ...
8/21/2022	SERMN_SOUTH_PARTIAL	96	58	SERMN SOUTH	Reroute	RQD	8/21/2022 19:37	8/22/2022 02:00	KEWR/KHPN/KJFK/KLGA/KMMU/K TEB	KCAE/KCHS/KGSO/KORF/KRDU/KRIC/KROA/KS AV	ATCSCC ADVZY 096 DCC 08/21/22 ROUTE RQC NAME: SERMN_SOUTH_PARTIAL CONSTRAINED AREA: ZNY REASON: OTHER... V229 GARED V16 RIC< KLGA KHPN KRDU >JFK V16 DIXIE LEEAH
	SERMN_SOUTH_PARTIAL	96	58	SERMN SOUTH	Reroute	RQD	8/21/2022 19:37	8/22/2022 02:00	-	-	V229 GARED V16 PXT TAP
	SERMN_SOUTH_PARTIAL	96	58	SERMN SOUTH	Reroute	RQD	8/21/2022 19:37	8/22/2022 02:00	KEWR/KHPN/KJFK/KLGA/KMMU/K TEB	KCAE/KCHS/KGSO/KORF/KRDU/KRIC/KROA/KS AV	ATCSCC ADVZY 096 DCC 08/21/22 ROUTE RQC NAME: SERMN_SOUTH_PARTIAL CONSTRAINED AREA: ZNY REASON: OTHER... V229 GARED V16 RIC< KLGA KHPN KRDU >JFK V16 DIXIE LEEAH
	SERMN_SOUTH_PARTIAL	96	58	SERMN SOUTH	Reroute	RQD	8/21/2022 19:37	8/22/2022 02:00	-	-	V229 GARED V16 PXT TAP
	GREKI_1	263	263	GREKI 1	Reroute	RQD	8/22/2022 22:57	8/23/2022 02:00	KEWR/KHPN/KJFK/KLGA/KTEB	CYYZ/KBUF/KROC/KSYR	ATCSCC ADVZY 263 DCC 08/22/22 ROUTE RQC NAME: GREKI_1 CONSTRAINED AREA: 7NY REASON: WEAT

See this in full screen



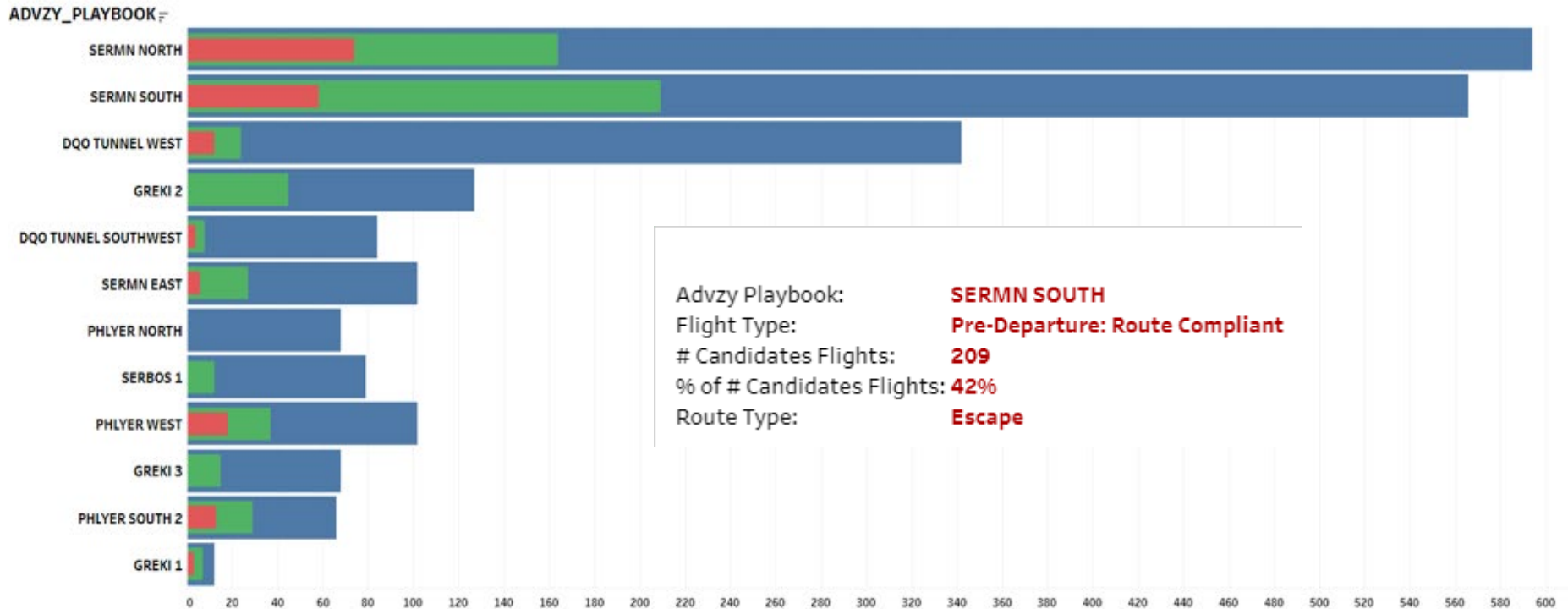
Tasking 113 – TEC routes NE

Escape routes from August 15 – September 15, 2022

Select a view: Pre-Departure: Route Compliant
Pre-Departure: Route Compliant %

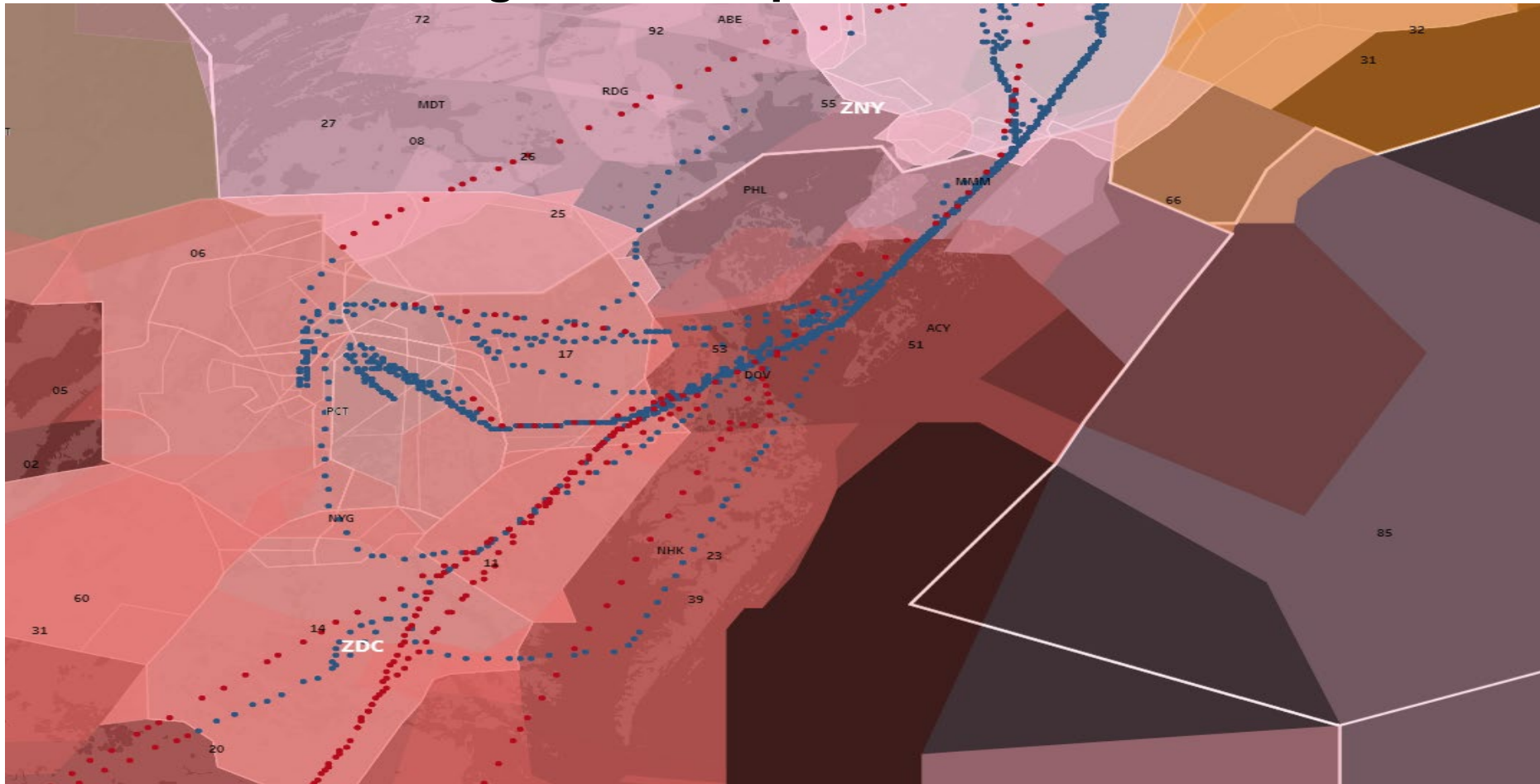
Advisory Playbook: (Multiple values)

- Altitude Not Compliant
- Pre-Departure: Route Compliant
- Candidate



Tasking 113 – TEC routes NE

SERMN South August 15 – September 15, 2022



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Tasking 113 – TEC routes NE

E190 LGA-BOS

- Pref route @ FL160:
3364lbs burn – 34 min
- SERMN E / TEC route
@ FL090:
3217lbs burn – 36 min



Tasking 113 – TEC route NE

A319 LGA-DTW

SERMN North @ FL100 – 12205lbs / 1:28 min

DUCT North @ FL160 – 11705lbs / 1:26 min



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Tasking 113 – TEC routes NE

Conclusions:

- Flight operators prefer to take a TEC route if it means to get airborne to prevent an extended departure delay
- Approaches to improve usage need to be further explored (with this ongoing FET effort)
- Additional escape routes for BOS/ZBW westbound departures could be evaluated
- SERBOS is the only playbook escape route available for BOS to ZNY/ZDC airports during SWAP.



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Questions?



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