New York Community Aviation Roundtable

Meeting: Wednesday, October 25, 2023

7:00 – 9:00 PM
Online Zoom Meeting

Co-Chairs:
Barbara E. Brown
Maria R. Becce

Facilitator: Bill Huisman

Agenda

1) Welcome/Announcements 7:00

2) Roll Call 7:10

3) Meeting Notes: Lei Zhao, Recording Secretary/LGA Committee 7:15

4) FAA PROGRESS REPORT: 7:20

   a. CLEEN Initiatives
      i. Fuel Efficiency
      ii. Emissions & EPA/ICAO Emission Standards
      iii. Noise
   b. Incentivizing Technologies: environmental performance

5) Port Authority: Ralph Tamburro 8:00
   a. Interaction/Flight Procedure Decisions: NY area airports (JFK, LGA, EWR, Teterboro, Westchester County)

6) Public Comment Period 8:50

7) Adjournment 9:00

FAA Environmental Aircraft Technology Research & Development

Continuous Lower Energy Emissions and Noise Program (CLEEN)

Presented to: New York Community Aviation Roundtable

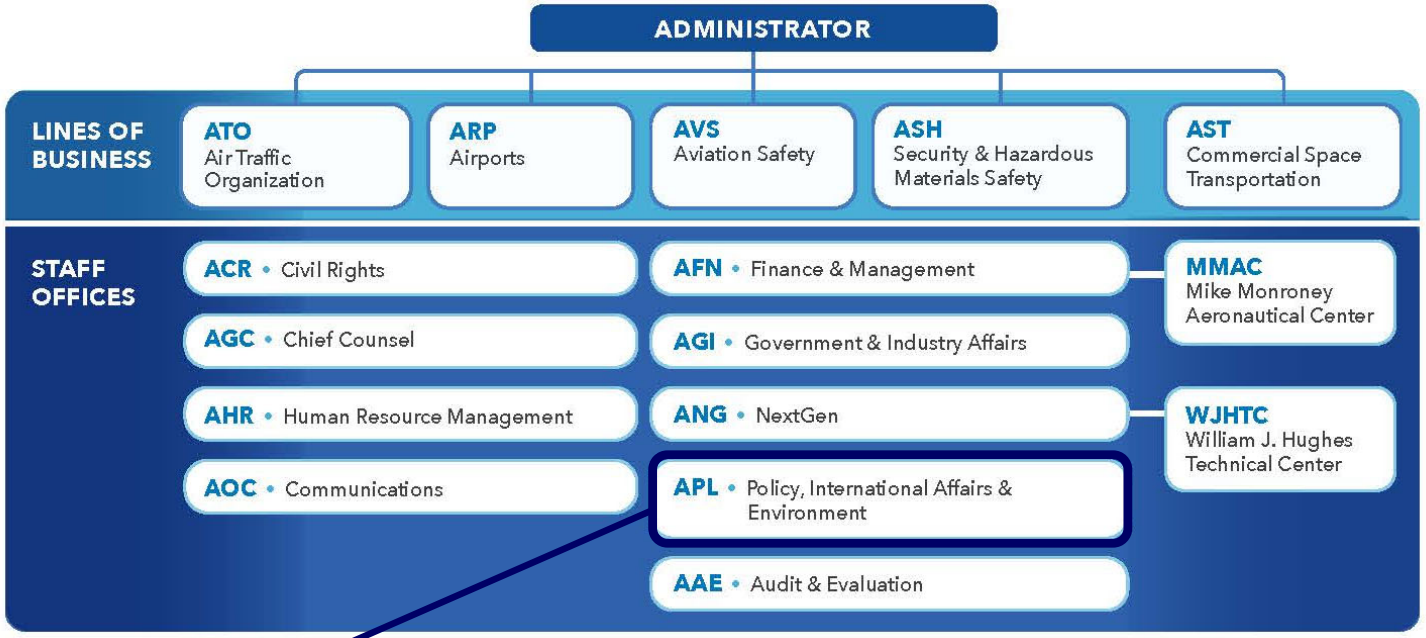
By: Arthur Orton
Manager, Technology & Operations Division
Office of Environment and Energy
Federal Aviation Administration

Date: October 25, 2023

Presentation Outline

- **FAA Environment & Energy Context and Background**
- **CLEEN Program Overview and Highlights**

FAA Organizational Structure



Office of Environment and Energy (AEE)

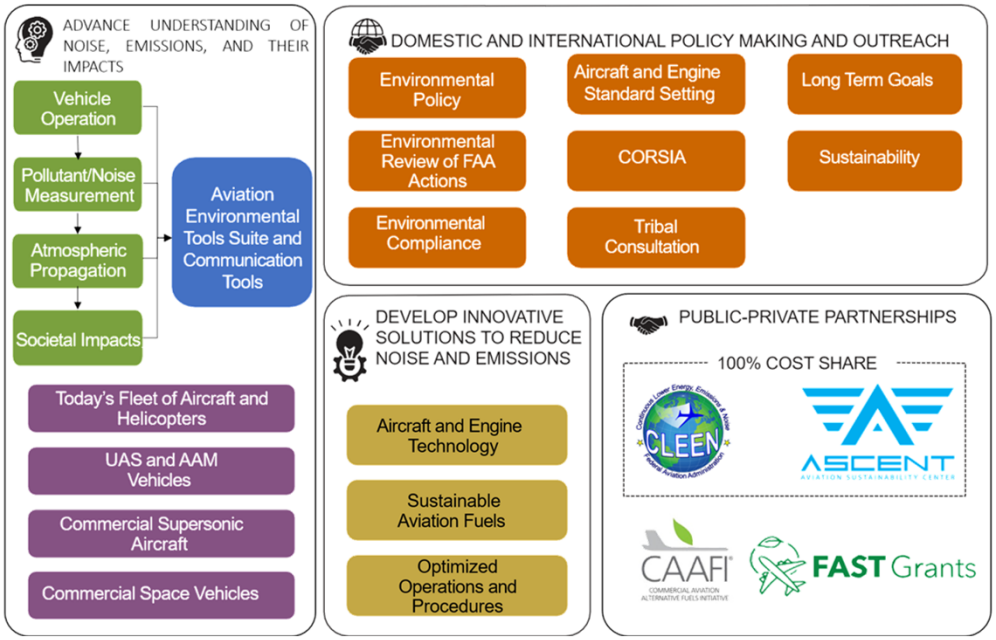
- Office within APL, responsible for broad range of environmental policies
- Roughly 45 staff members
- Responsible for roughly 1/3 of FAA Research, Engineering & Development Budget
- Responsible for the FAA Inflation Reduction Act Grant Program

FAA Environmental & Energy (E&E) Strategy

E&E Mission: *To understand, manage, and reduce the environmental impacts of global aviation through research, technological innovation, policy, and outreach to benefit the public*

E&E Vision: *Remove environmental constraints on aviation growth by achieving quiet, clean, and efficient air transportation*

E&E Program:



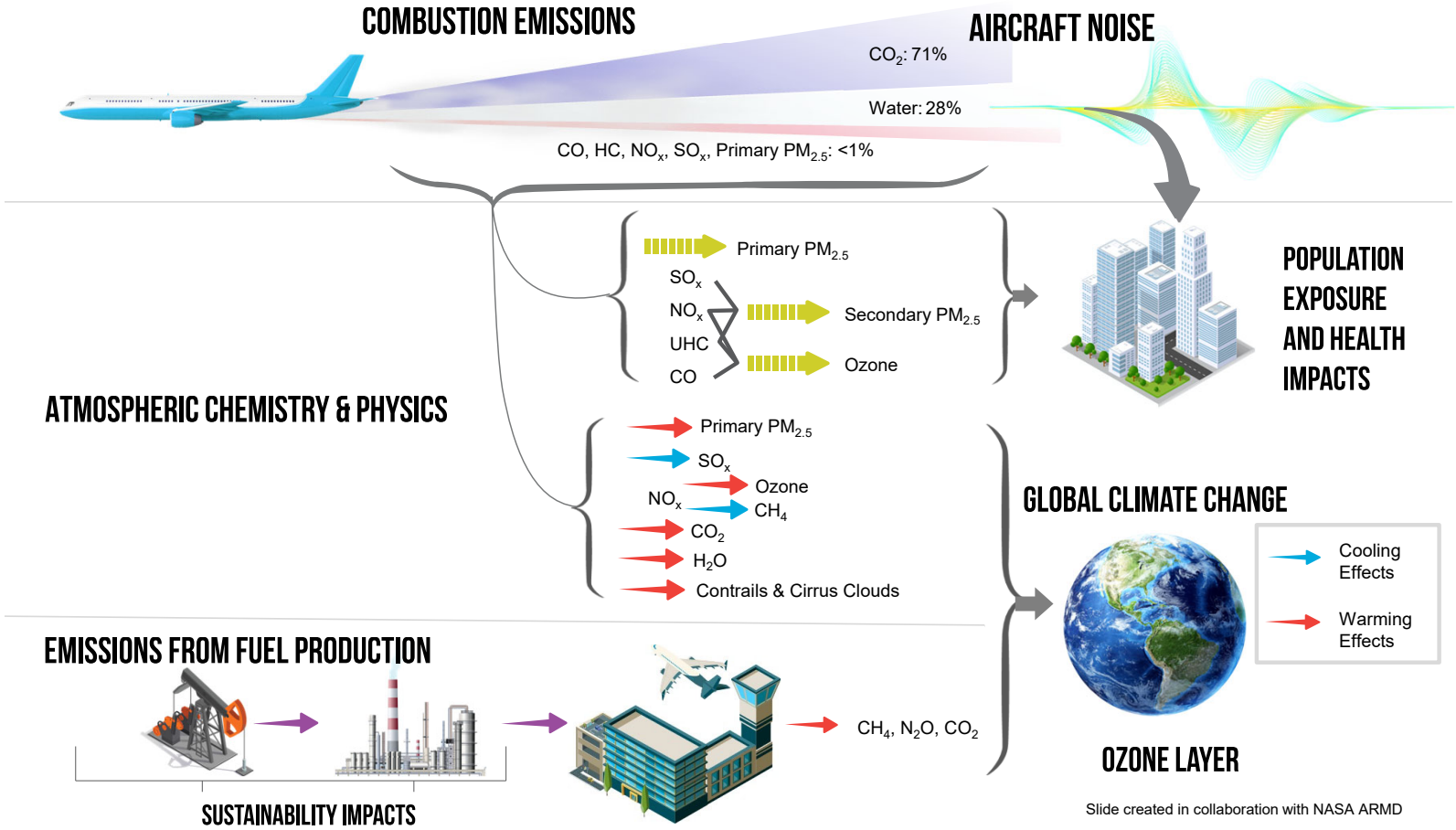
ASCENT AVIATION SUSTAINABILITY CENTER
www.ascent.aero/

CAAFI®
www.caafi.org/

Continuous Lower Energy, Emissions & Noise
CLEEN
Federal Aviation Administration
www.faa.gov/go/cleen/

the VOLPE center

Environmental Impacts of Aviation



Slide created in collaboration with NASA ARMD

Aviation Climate Action Plan

- International Civil Aviation Organization (ICAO) – “State Action Plans”
- Plan builds on ongoing FAA Environment & Energy Program – long-term focus on reducing climate impacts of aviation
- Administration focus on climate – Achieving net zero emissions economy-wide by 2050

- Climate Action Plan Press Release:

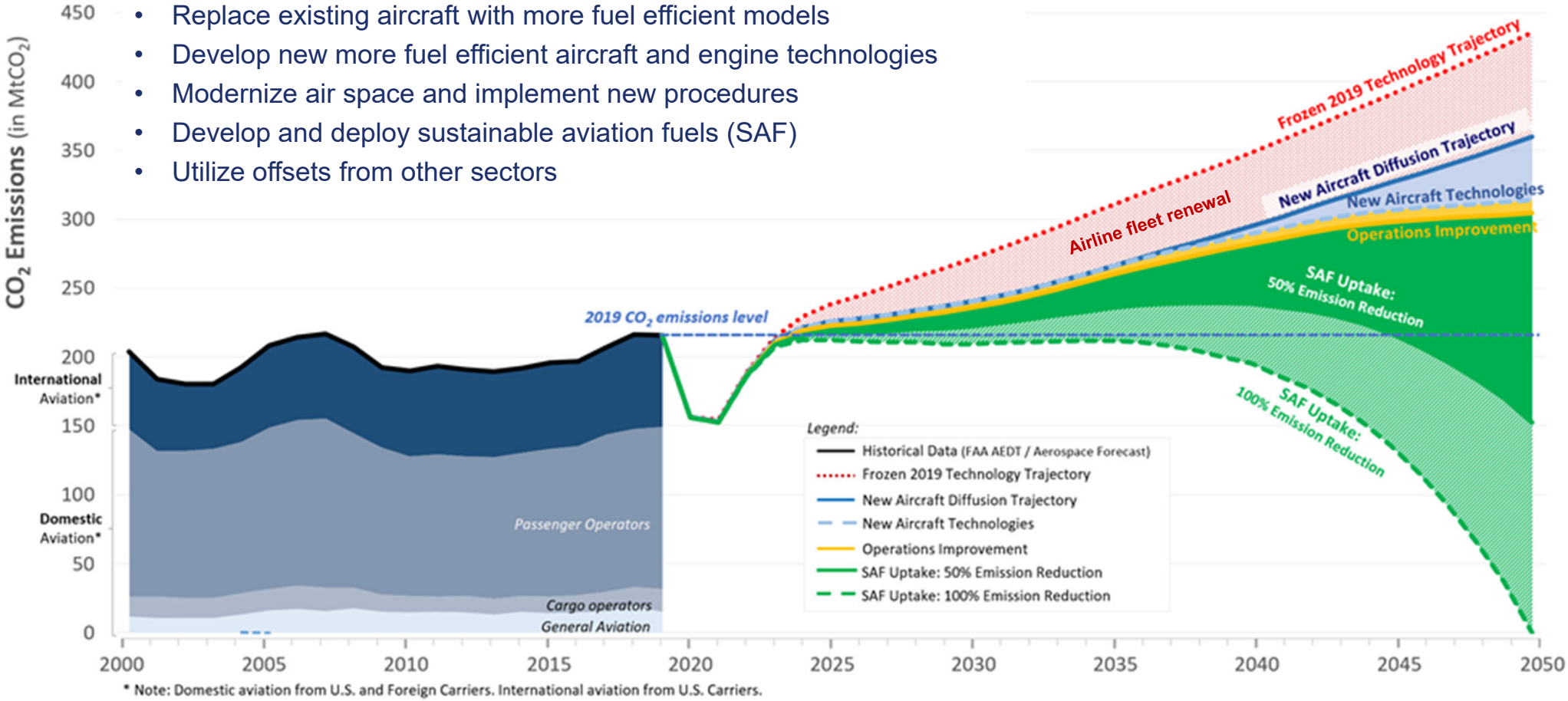
https://www.faa.gov/newsroom/us-releases-first-ever-comprehensive-aviation-climate-action-plan-achieve-net-zero

- Climate Action Plan Document:

https://www.faa.gov/sites/faa.gov/files/2021-11/Aviation_Climate_Action_Plan.pdf

Analysis of Future Domestic and International Aviation CO_2 Emissions

- Replace existing aircraft with more fuel efficient models
- Develop new more fuel efficient aircraft and engine technologies
- Modernize air space and implement new procedures
- Develop and deploy sustainable aviation fuels (SAF)
- Utilize offsets from other sectors



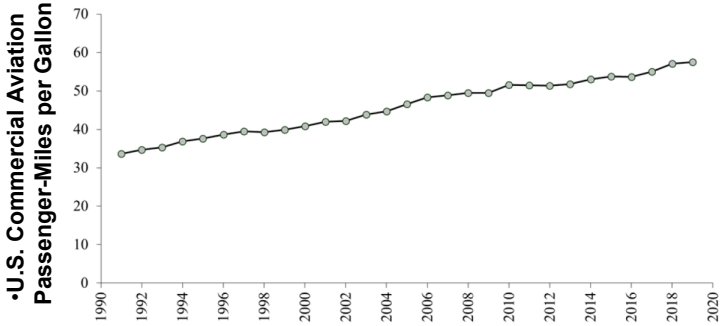
* Note: Domestic aviation from U.S. and Foreign Carriers. International aviation from U.S. Carriers.

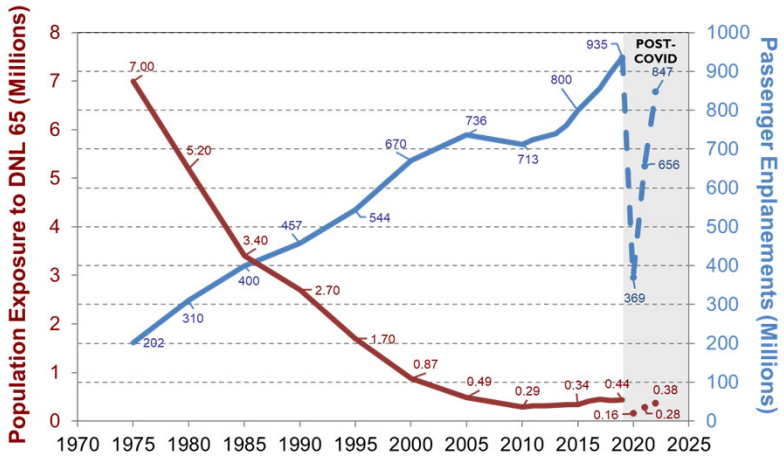
NOTE: Analysis conducted by BlueSky leveraging FAA Aerospace Forecast and R&D efforts from the FAA Office of Environment & Energy (AEE) regarding CO_2 emissions contributions from aircraft technology, operational improvements, and SAF

Federal Aviation Administration

Rationale for Investing in Aircraft Technology

- Historically, advances in aircraft technology have been the main factor in reducing aviation's environmental impact
- Continued improvements come with large technological risk
- COVID-19 pandemic has hit the aerospace sector particularly hard and the industry has considerably reduced ability to undertake research to advance new technologies
- Manufacturers have limited financial resources to develop technologies to reduce noise and emissions
- Government resources help mitigate technological risk and incentivize aviation manufacturers to invest in and develop cleaner, quieter technology





Continuous Lower Energy, Emissions & Noise (CLEEN) Program

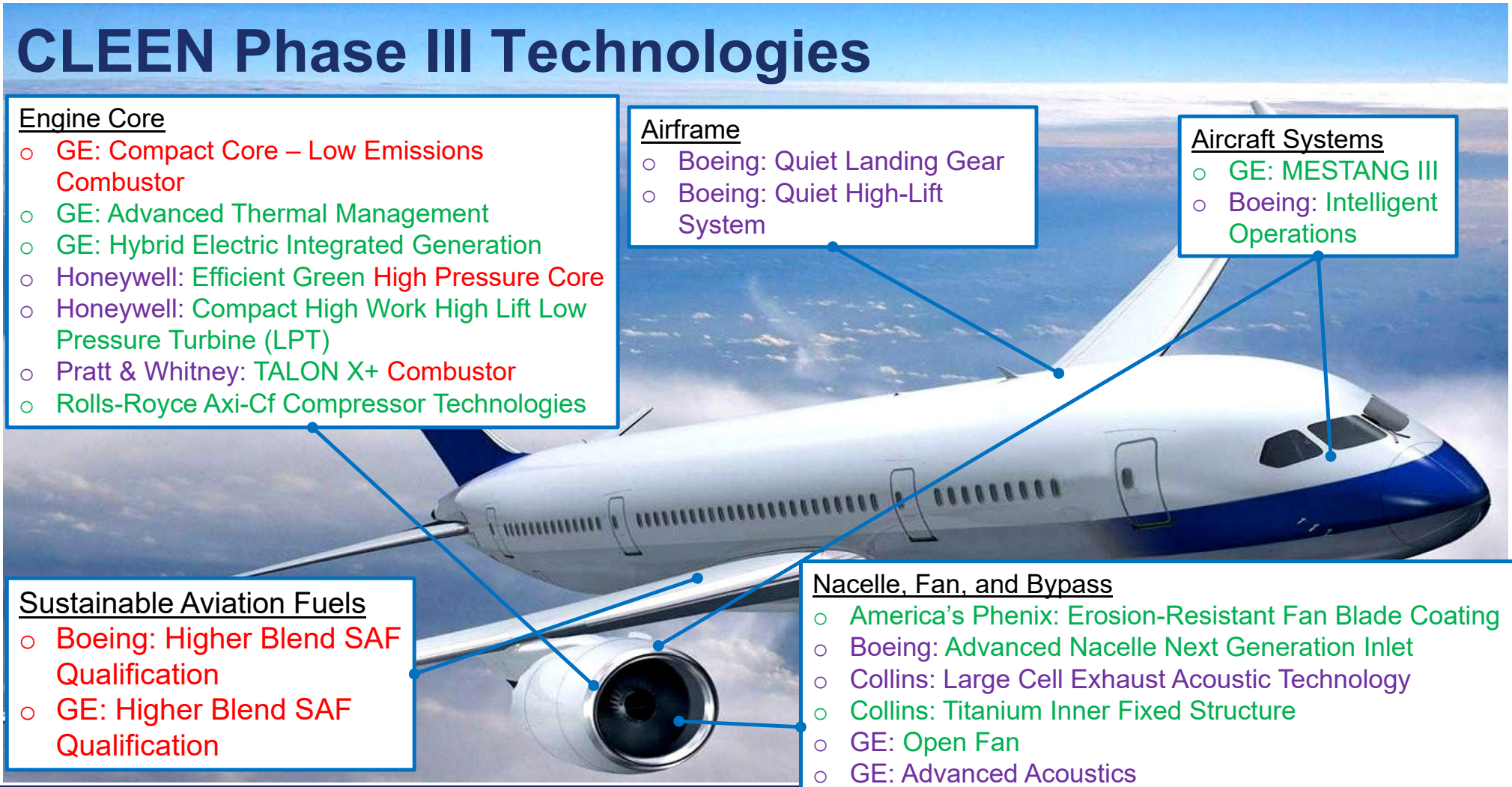
- FAA led public-private partnership with 100% cost share from industry
- Reducing fuel burn, emissions and noise via aircraft and engine technologies and alternative jet fuels
- Conducting ground and/or flight test demonstrations to accelerate maturation of certifiable aircraft and engine technologies

	Phase I	Phase II	Phase III
Time Frame	2010-2015	2016-2020	2021-2026
FAA Budget	~$125M	~$100M	~$100M+
Noise Reduction Goal	25 dB cumulative noise reduction cumulative to Stage 5 and/or reduces community noise exposure (new goal for Phase III)		
Fuel Burn Goal	33% reduction	40% reduction	-20% re: CAEP/10 Std.
NO_X Emissions Reduction Goal	60% landing/take-off NO_X emissions (re: CAEP/6)	75% landing/take-off NO_X emissions (-70% re: CAEP/8)	
Particulate Matter Reduction Goal	-	-	Reduction relative to CAEP/11 Std.
Entry into Service	2018	2026	~2031

For more information on CLEEN program: http://www.faa.gov/go/cleen

Federal Aviation Administration

CLEEN Phase III Technologies



Engine Core
- GE: Compact Core – Low Emissions Combustor
- GE: Advanced Thermal Management
- GE: Hybrid Electric Integrated Generation
- Honeywell: Efficient Green High Pressure Core
- Honeywell: Compact High Work High Lift Low Pressure Turbine (LPT)
- Pratt & Whitney: TALON X+ Combustor
- Rolls-Royce Axi-Cf Compressor Technologies

Airframe
- Boeing: Quiet Landing Gear
- Boeing: Quiet High-Lift System

Aircraft Systems
- GE: MESTANG III
- Boeing: Intelligent Operations

Sustainable Aviation Fuels
- Boeing: Higher Blend SAF Qualification
- GE: Higher Blend SAF Qualification

Nacelle, Fan, and Bypass
- America's Phenix: Erosion-Resistant Fan Blade Coating
- Boeing: Advanced Nacelle Next Generation Inlet
- Collins: Large Cell Exhaust Acoustic Technology
- Collins: Titanium Inner Fixed Structure
- GE: Open Fan
- GE: Advanced Acoustics
- Honeywell: Highly Efficient Fan Module
- Pratt & Whitney: Ultra-Quiet Reduced-Loss Fan Stage
- Safran: Acoustic Air Inlet Lip Skin

Fuel
Emissions
Noise

Assessment of CLEEN Technologies

Analytical Evaluation:

- Conducted by Georgia Tech through ASCENT COE Project 37
- Evaluating impact of technology applications through 2050
- Have completed modeling and assessment of CLEEN Phase I and II technologies and their fuel burn and NOx impacts

Fuel Burn Benefit:

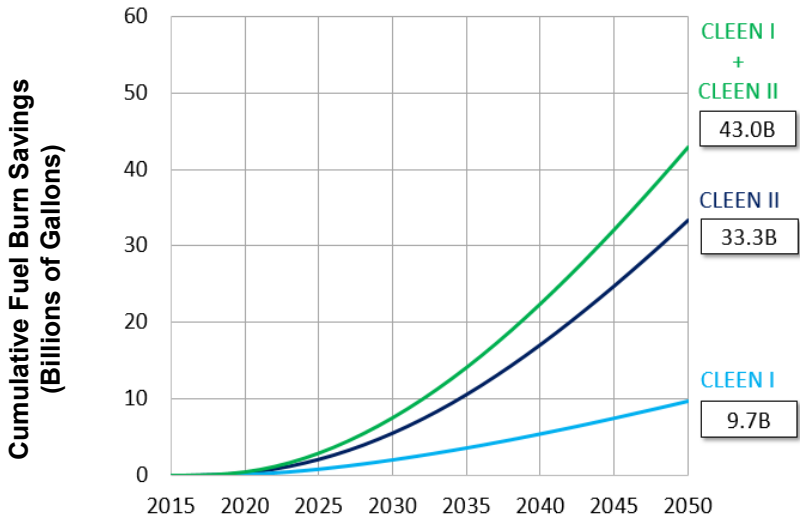
- 43.0 billion gallons of fuel saved cumulative by 2050 from CLEEN Phase I and II
- CO_2 emissions reduced by 500 million metric tons over this time period – the equivalent to removing ~3.6 million cars from the road from 2020 to 2050

NOx Benefit:

- CLEEN Phase I and II technology cumulatively reduce LTO NOx emissions by 2.79 Megatons through 2050

Noise Benefit:

- Updated noise benefits assessment including all CLEEN I and II technologies expected to be complete this Fall



Updated 9/6/2023

Arthur Orton
Manager, Technology & Operations Division
Office of Environment and Energy
Federal Aviation Administration

NYCAR

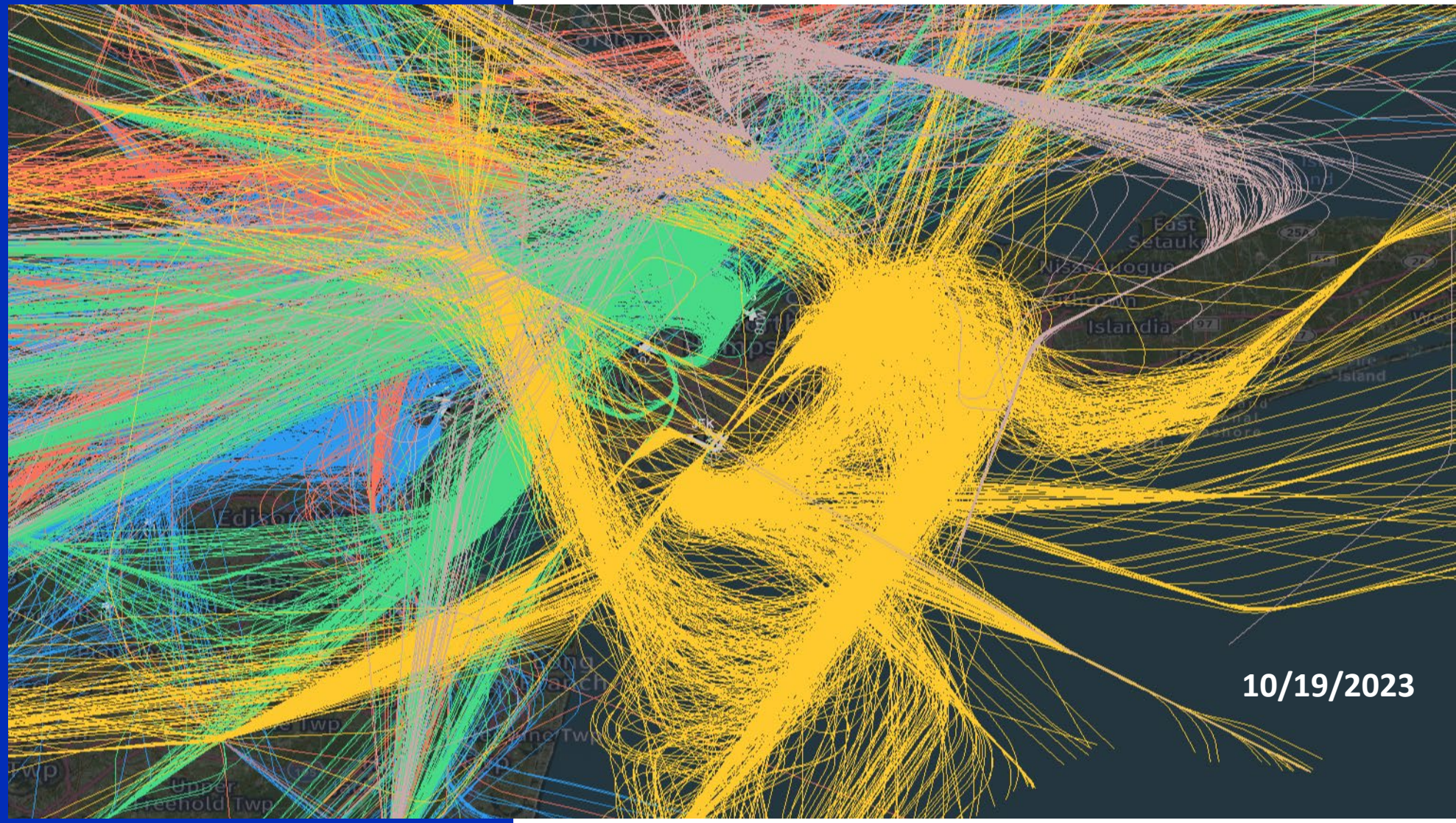
Airport Interaction

Ralph Tamburro
Port Authority of NY/NJ

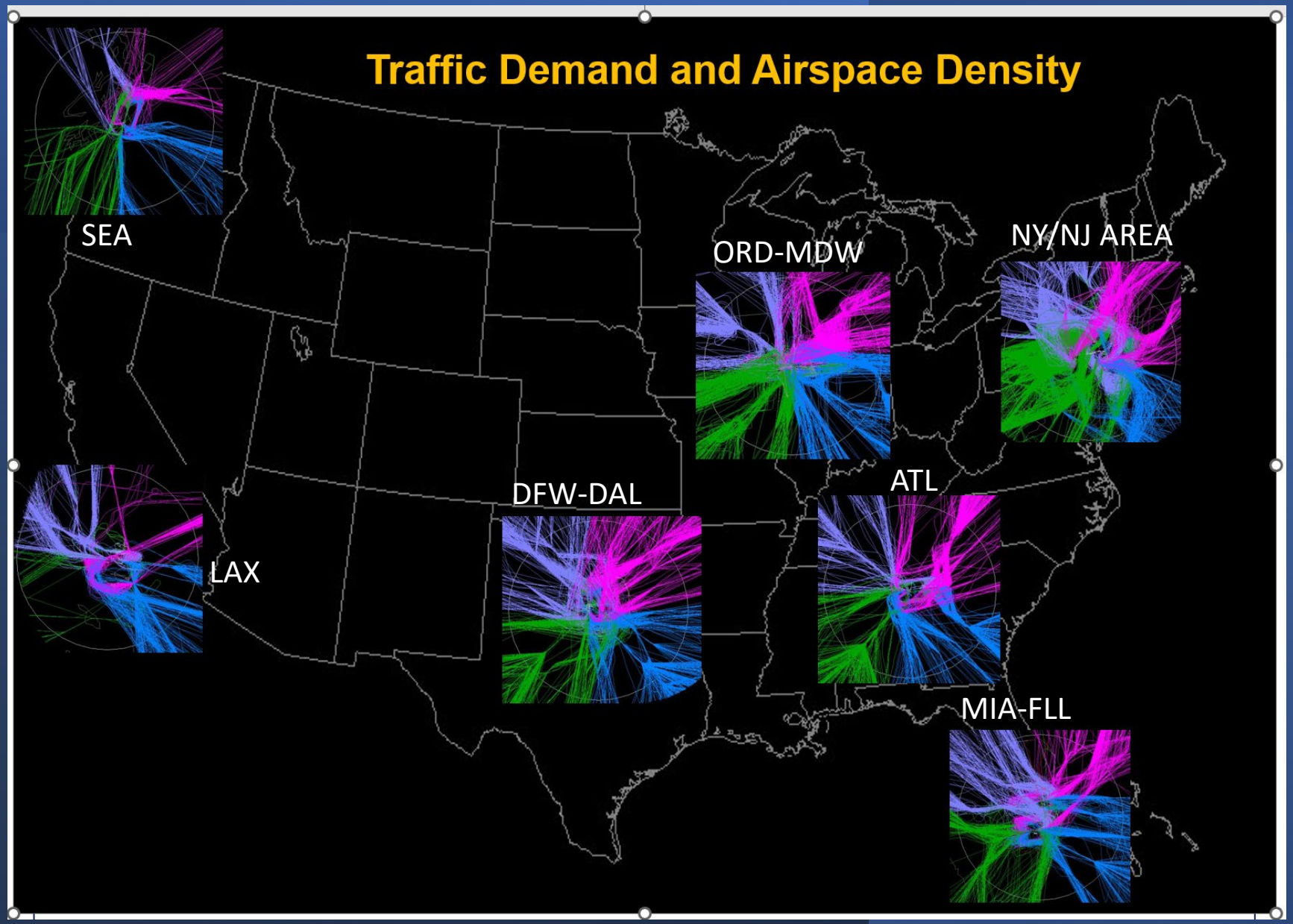
10/26/2023

PORT AUTHORITY NY NJ

AIR LAND RAIL SEA



Traffic density in the NY/NJ area vs other major areas across the country




These are all the airports and heliports in the region
NY08
2NY6
NK86
NY85
96NY
DXR
73NJ
4NY1
NY44
1NJ9
N72
2NK4
0NY2
H43
NK78
CT12
CT37
BDR
FWN
5NJ3
6NJ7
29NY
CT91
6NJ2
27JY
4N1
NK40
CT56
JY12
JY43
NY47
HPN
7NJ3
1NJ6
21NJ
5CT8
7NY7
NJ41
1N7
0NJ4
N07
NK67
8PN2
JY24
JY02
47NJ
35NY
1NK9
26NY
9NJ8
CDW
4PA0
NJ65
NJ66
12NJ
NJ12
TEB
NJ54
6N6
7N3
N05
MMU
5NK5
NJ09
07NJ
14NY
2NJ6
NJ36
LGA
7NY3
ISP
0NJ2
08NJ
JRA
8NY9
NJ77
65NJ
FRG
7NJ6
JY25
9NJ3
6NY5
4NY9
NK92
5NJ7
EWR
77NJ
70NJ
JY06
02NJ
1NK4
2NJ5
58NY
2NJ1
52NJ
JFK
2JY7
LDJ
93NY
NK30
15NY
5NJ2
N85
N51
9NJ1
NJ61
JY01
47N
NJ76
NJ53
23PA
NJ50
40NJ
0NJ9
17NJ
NJ63
2JY6
15NJ
38PA
30NJ
39N
NJ73
3NJ3
PS46
NJ79
3NJ2
NJ72
3N6
9PS3
18PA
59NJ
6NJ6
4NJ4
NJ29
TTN
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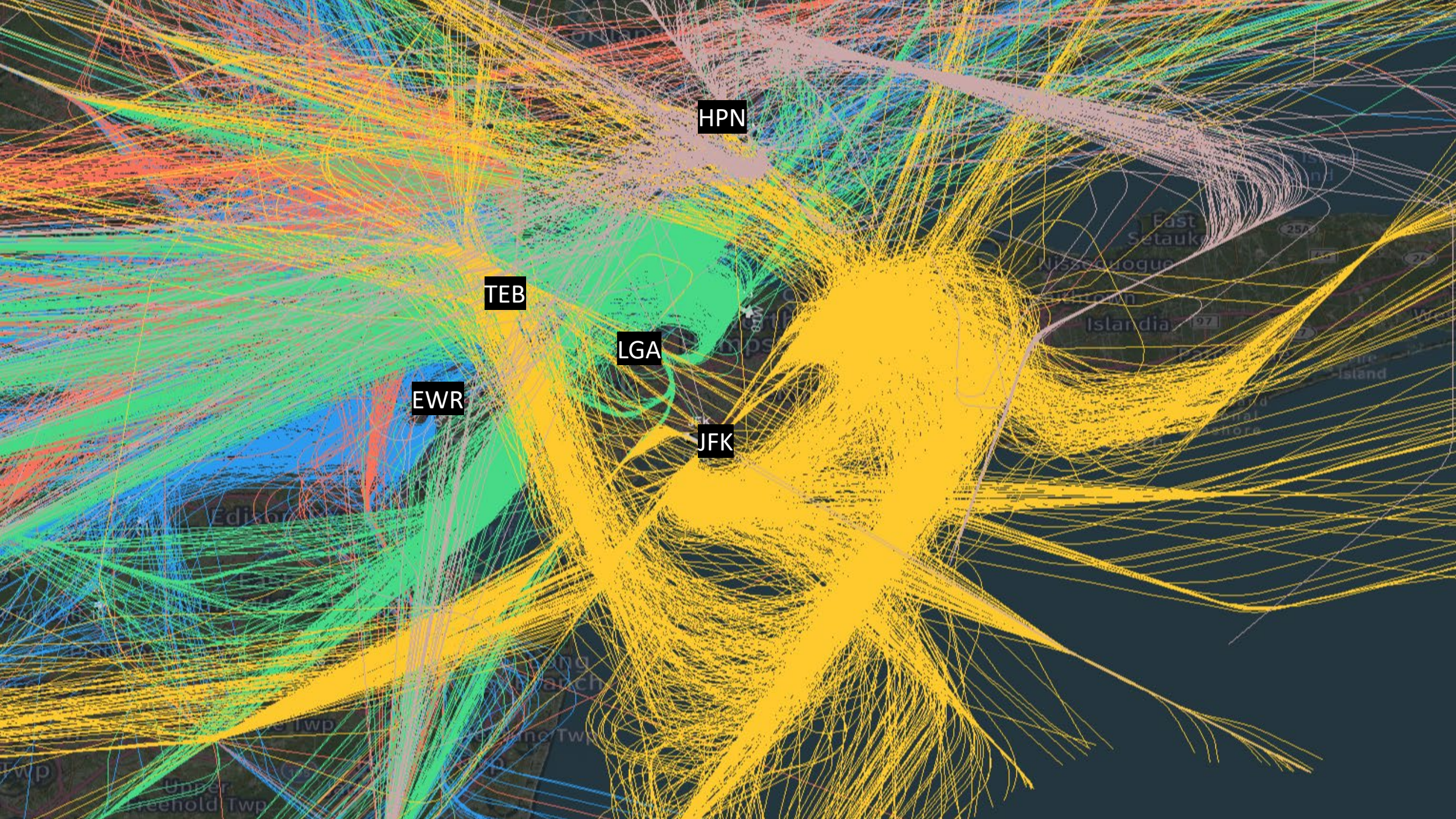

HPN
TEB
LGA
EWR
JFK

There are three primary impacts to traffic flows with one being a major impact to the operation

EWR and TEB must be on the same directional flow

When JFK Lands runway 13L, LGA must also land 13.

These configurations are very impactful to the entire airspace and is only required 1% of the time

When LGA Lands runway 31 via the Localizer approach JFK must also land on 31R

This configuration is used when NW winds are present and are above 25 kts

All are interactions limits the flexibility of each airport to amend flight paths

Radar video map

EWR Blue
3 runways, 6 runway ends
22L-22R-4L-4R-11-29

Landing 22L/11 depart 22R

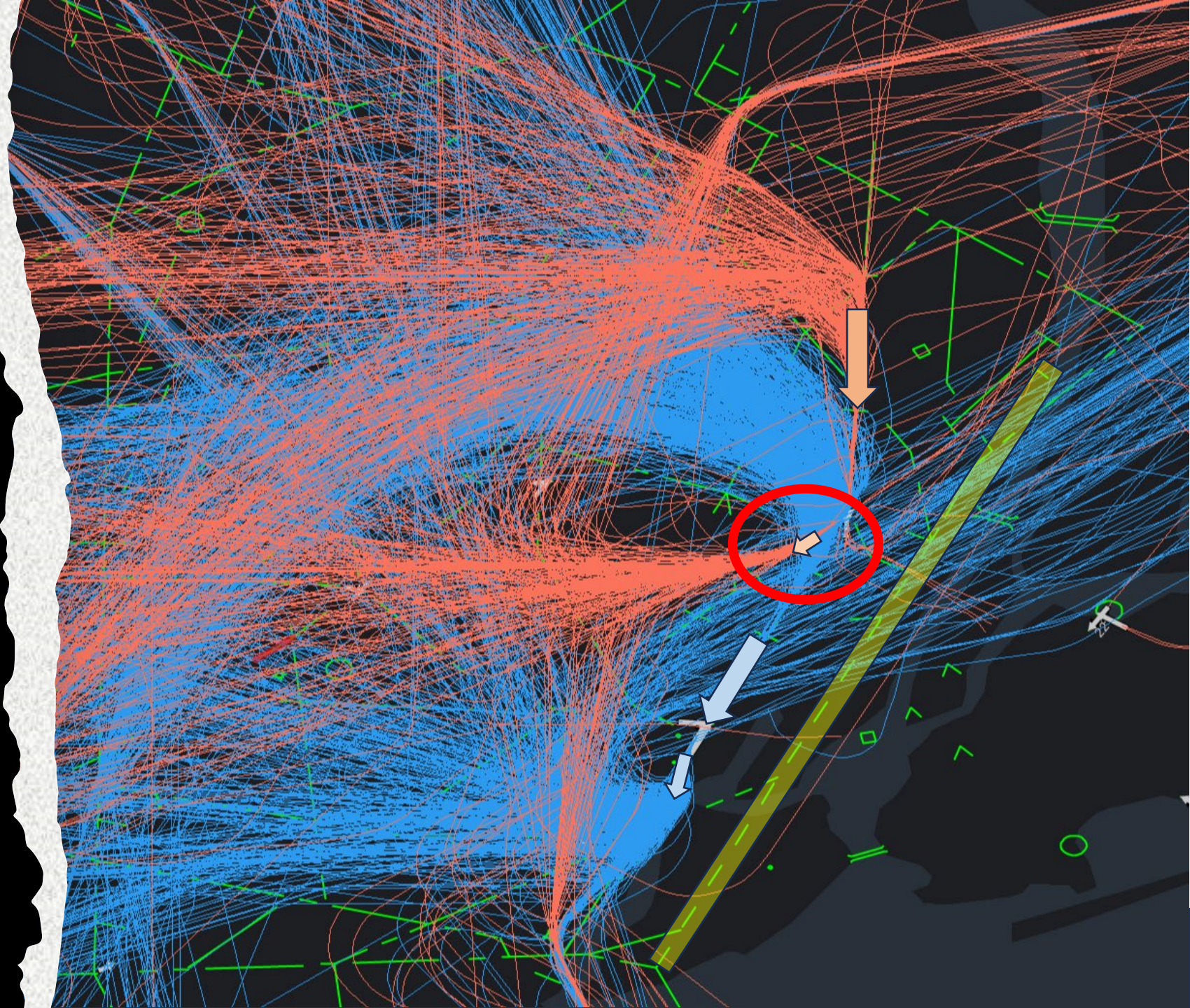
TEB Orange
2 runways, 4 runway ends
19-24-1-6

Land 19 depart 24

EWR and TEB must be on the same directional flow

EWR landing 22L departing 22R TEB must land on 19 or 24

Special Use Line (SUL) due to limited space between EWR nd LGA airspace



EWR Blue
3 runways, 6 runway ends
22L-22R-4L-4R-11-29

Landing 4R dep 4L

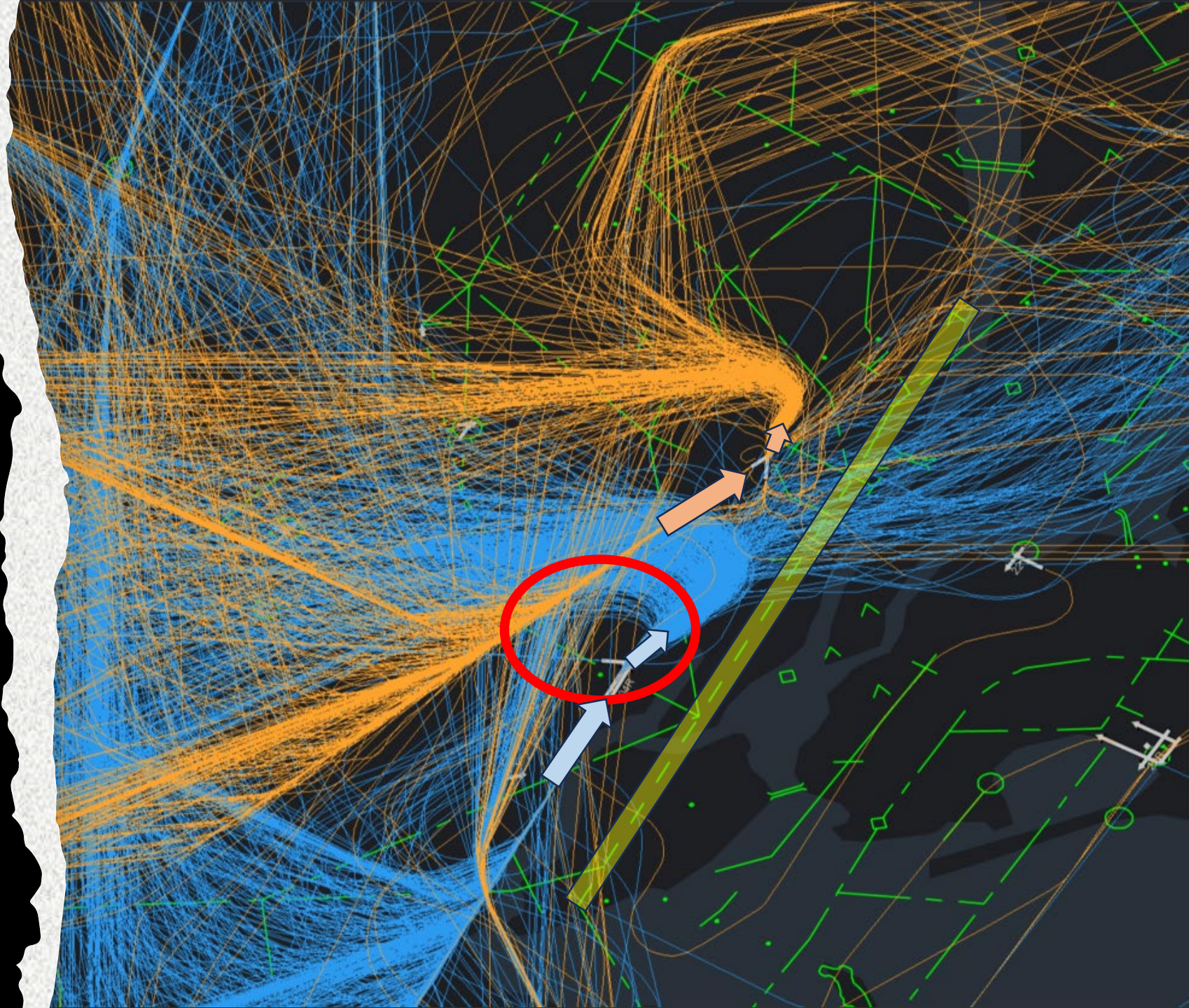
TEB Orange
2 runways, 4 runway ends
19-24-1-6

Land 6 depart 1

EWR and TEB must be on the same directional flow

EWR landing 4R departing 4L TEB must land on 6 or 1

Special Use Line (SUL) due to limited space between EWR nd LGA airspace



Radar video map

LGA Green
2 runways, 4 runway ends
4-22-13-31

Land 22 depart 13
3 different climbs used this day.
TNNIS, GLDMN, NTHNS

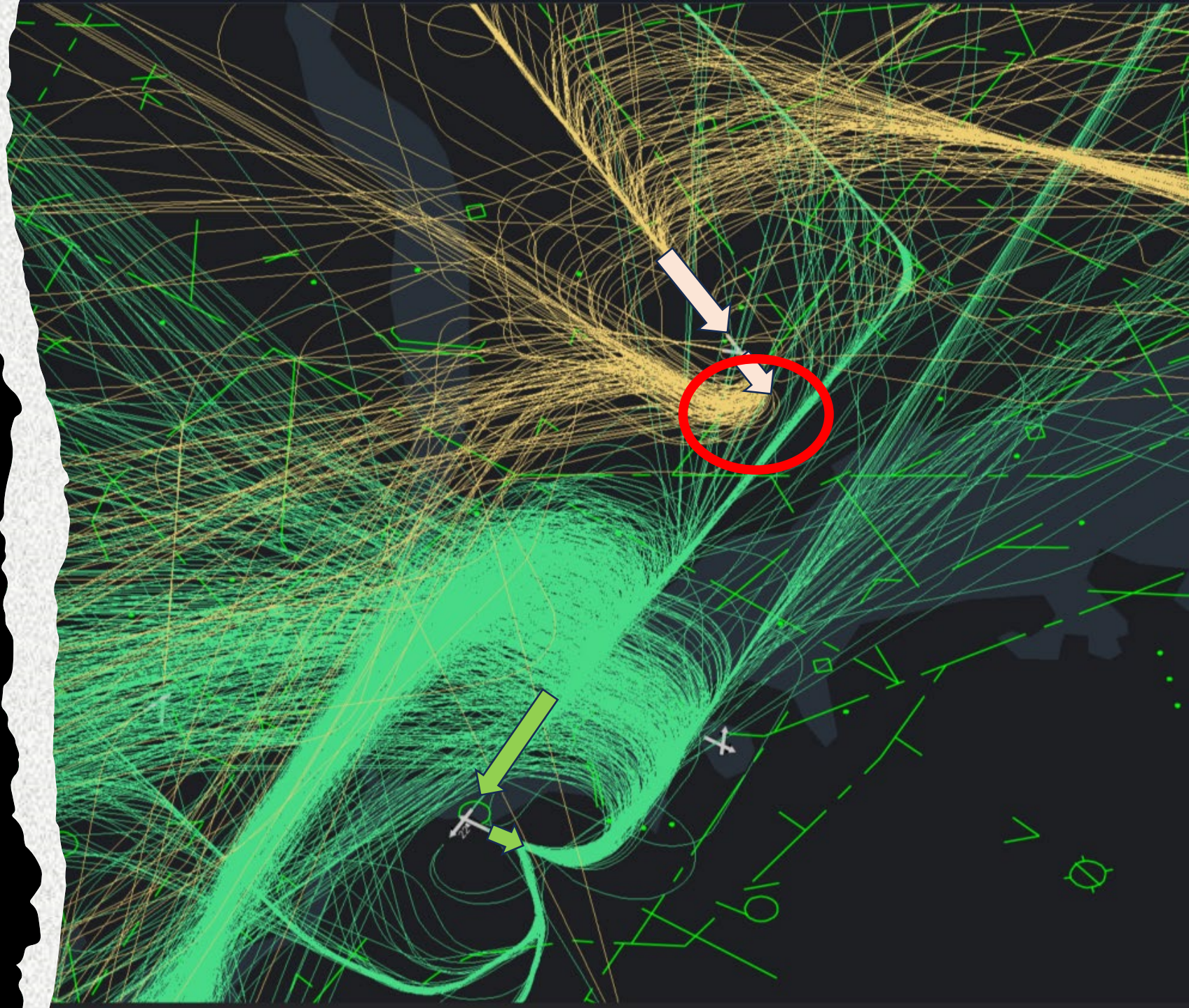
Climbs are dictated by JFK's configuration and demand

HPN Tan
2 Runways, 4 runway ends
16-34-11-29

Land and depart 16

Departures are restricted to 3000' due to LGA traffic

JFK does not affect HPN when operating on 16

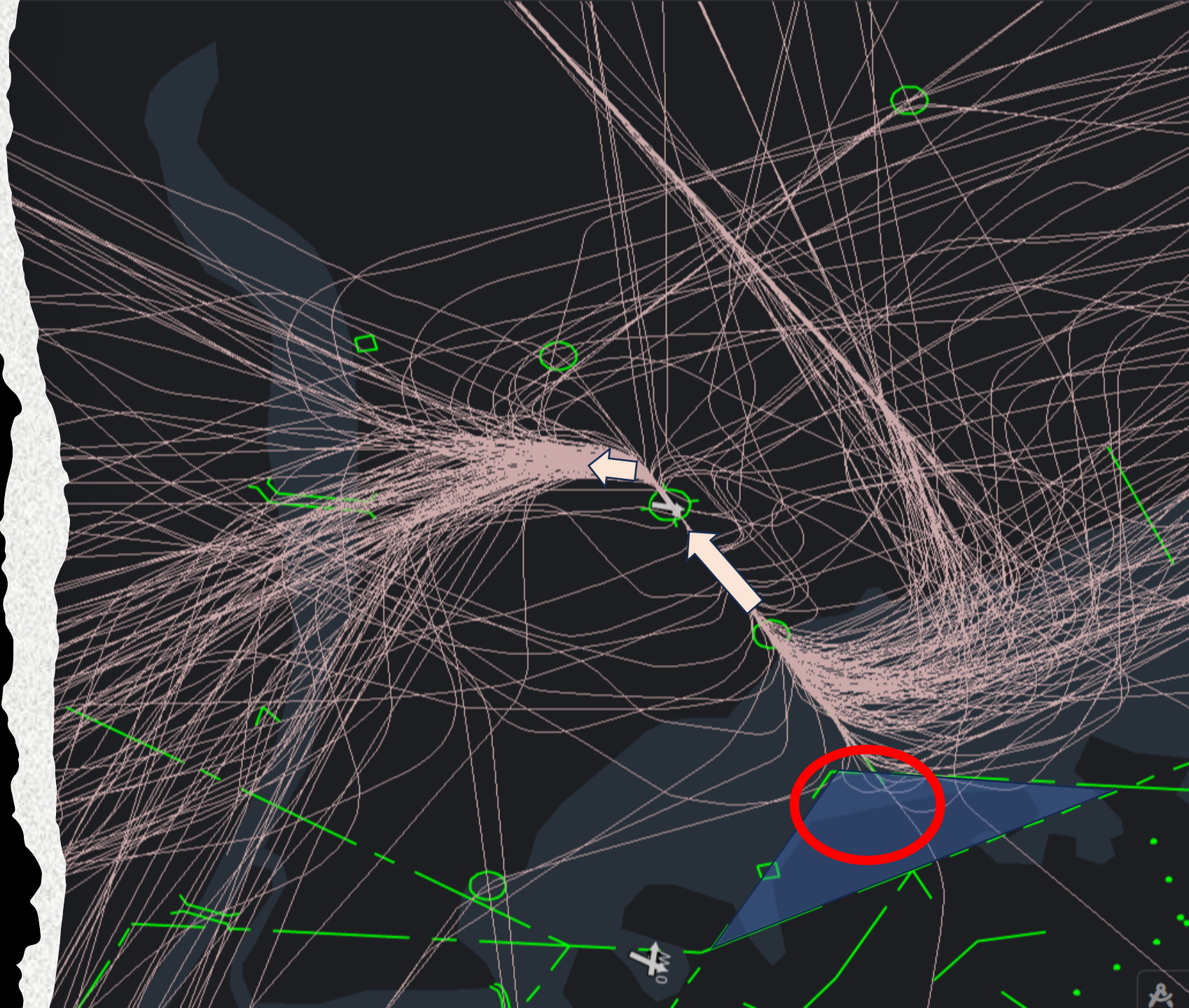


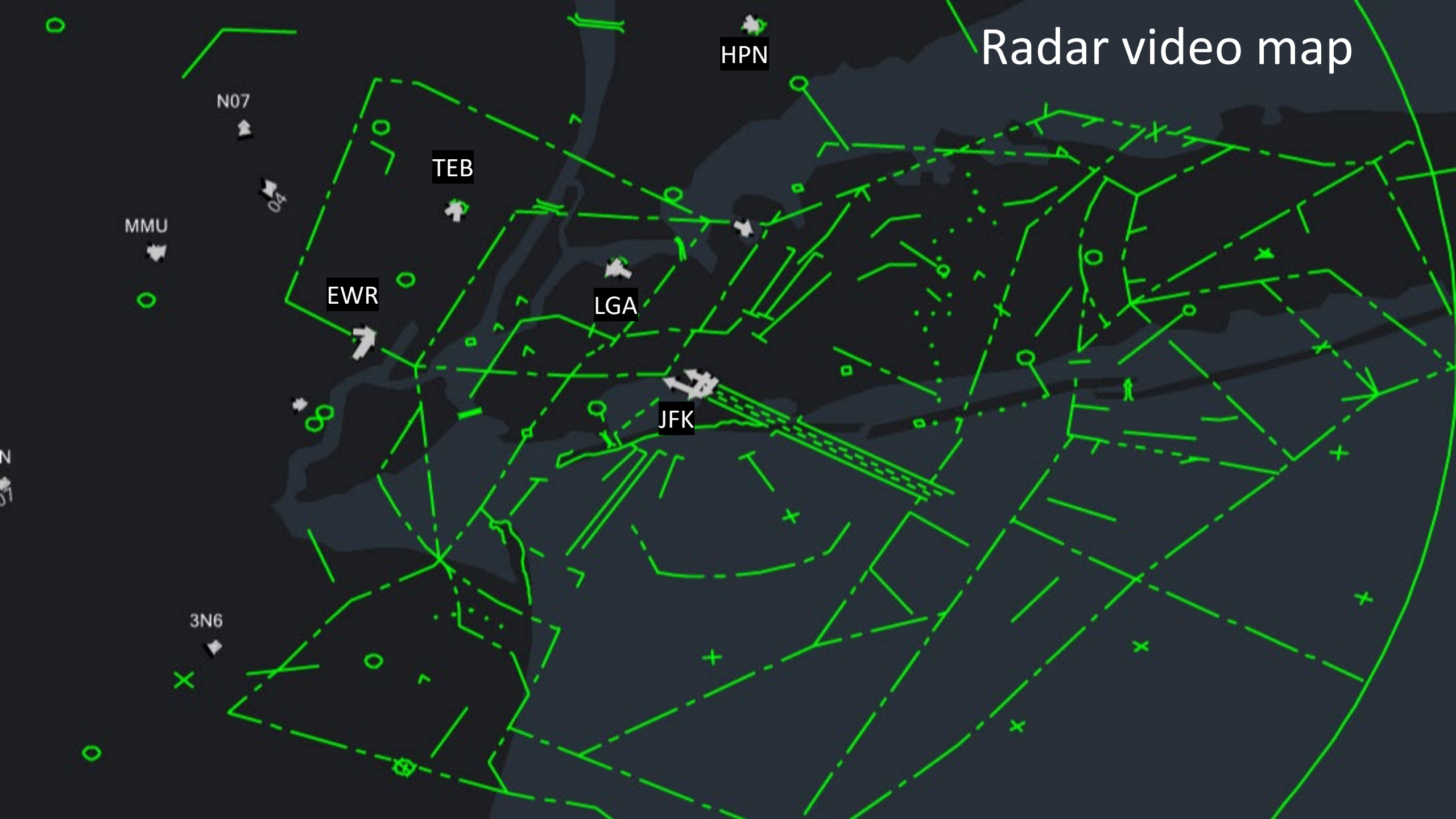
HPN Tan
2 Runways, 4 runway ends
16-34-11-29

Land and depart 16

Departures are restricted to 3000’ due to LGA traffic

HPN does not affect JFK when operating on 16 but JFK is limited by HPN when they are landing 34




Radar video map
HPN
N07
TEB
MMU
EWR
LGA
JFK
3N6

JFK Yellow
4 runways, 8 runway ends
13L, 13R, 22L, 22R, 31R, 31L, 4R, 4L

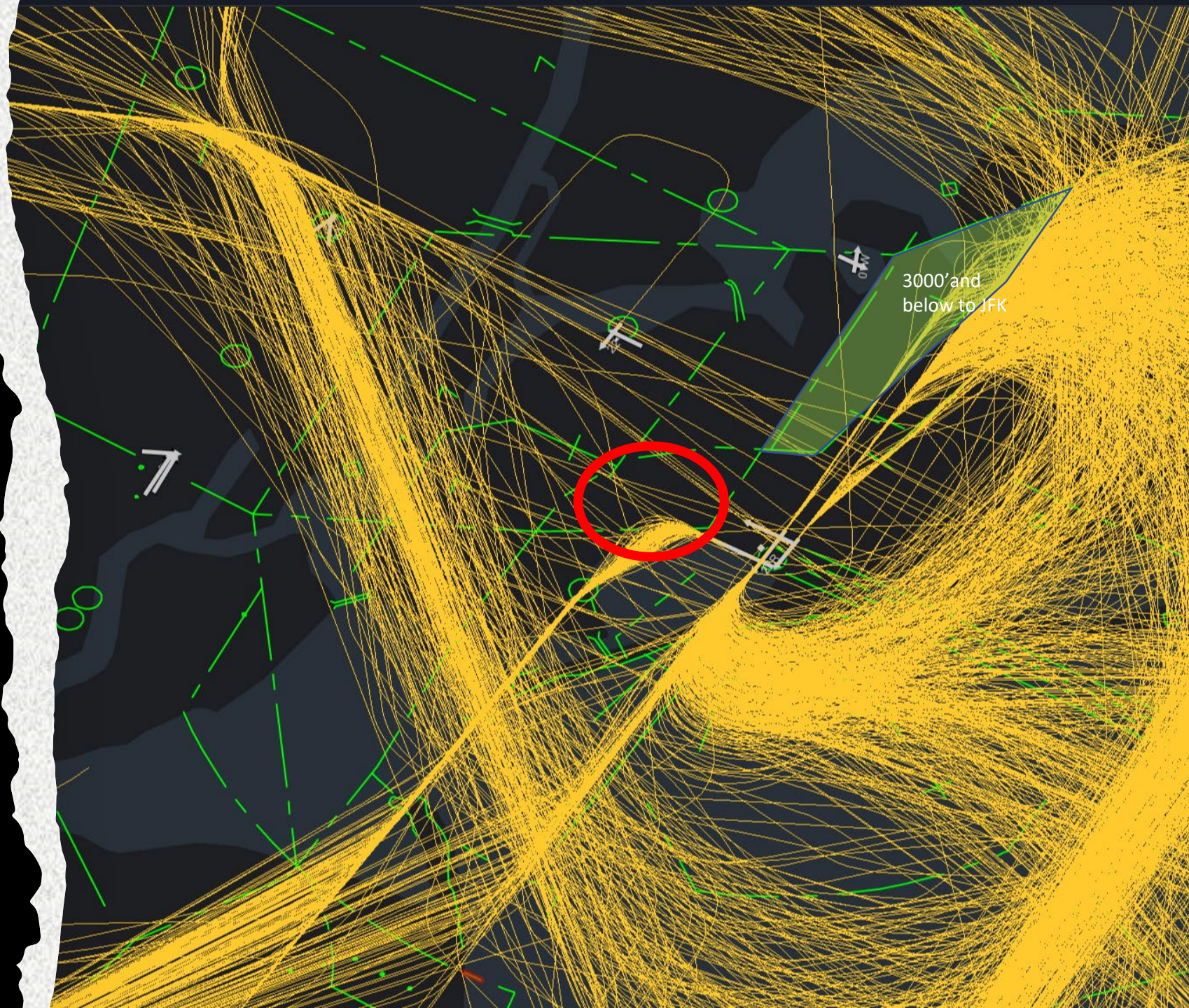
Configuration shown

Land ILS 22L and ILS 22R (RNAV GPS X 22L was used for a period 10/19/2023)
Depart 22R and 31L

JFK arrival traffic on the ILS 22L/R is restricted to 3000’ and below

RNAV GPS X does not have that restriction

JFK needs airspace to be released from LGA to JFK



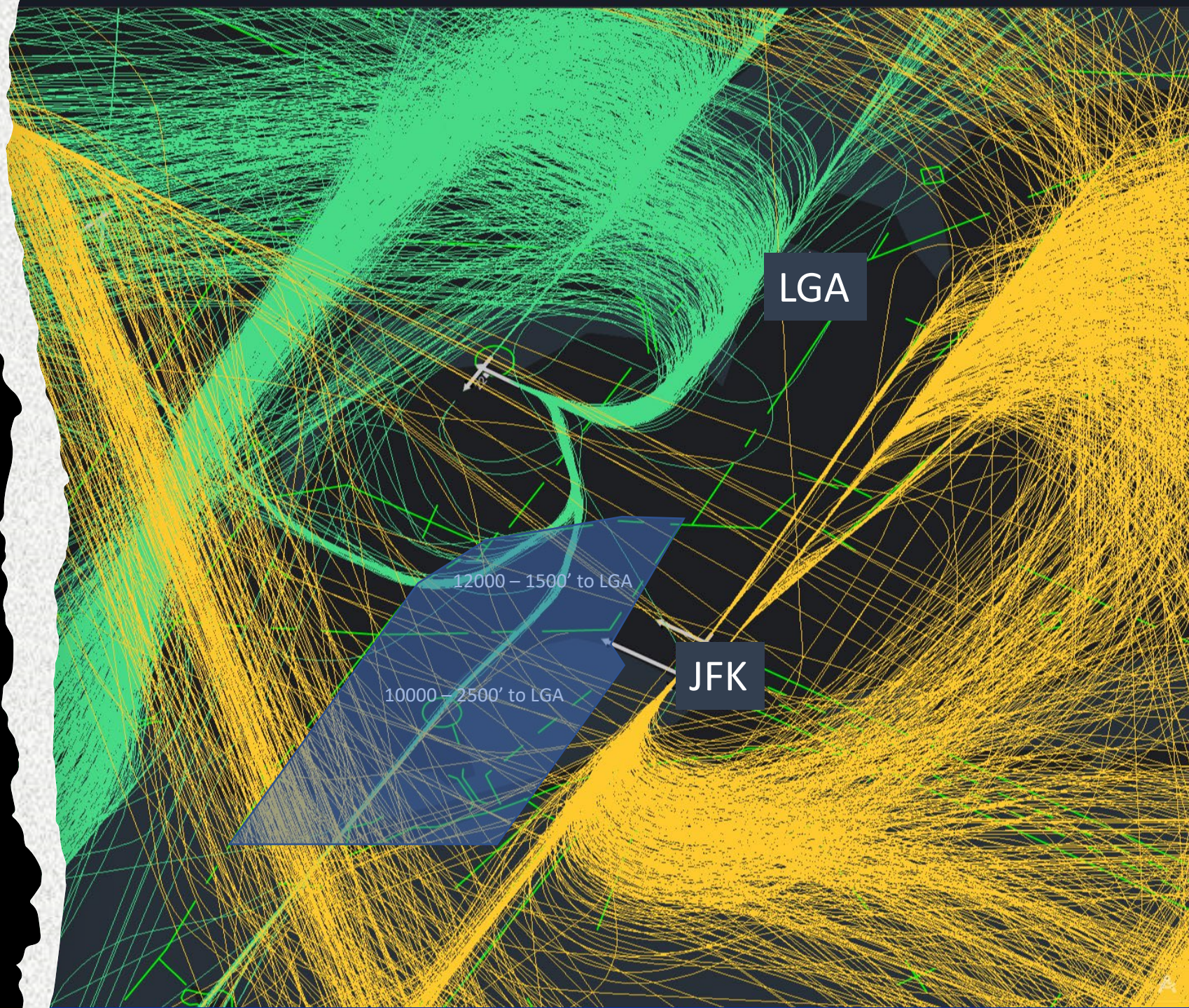
LGA Green
2 runways, 4 runway ends
4-22-13-31

JFK Yellow
4 runways, 8 runway ends
13L, 13R, 22L, 22R, 31R, 31L, 4R, 4L

Land 22 depart 13
3 different climbs used this day.
TNNIS, GLDMN, NTHNS

Climbs are dictated by JFK's configuration and demand

Needs airspace to be released from JFK to LGA

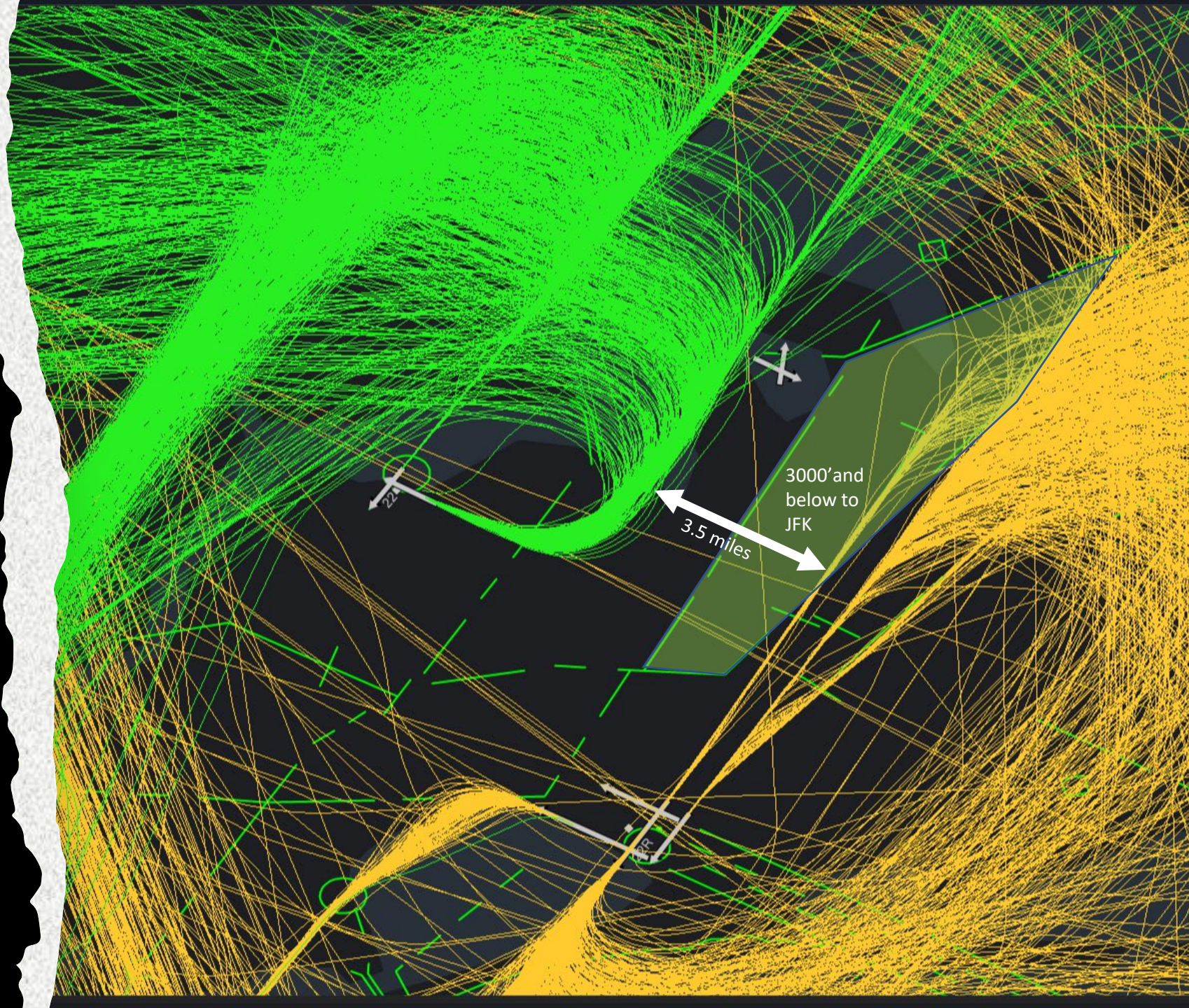


LGA Green
2 runways, 4 runway ends
4-22-13-31

JFK Yellow
4 runways, 8 runway ends
13L, 13R, 22L, 22R, 31R, 31L, 4R, 4L

LGA TNNIS Only

JFK ILS 22L 22R Depart 22R/31L



Questions