

International Airlines Safety Concerns in the Caribbean region.

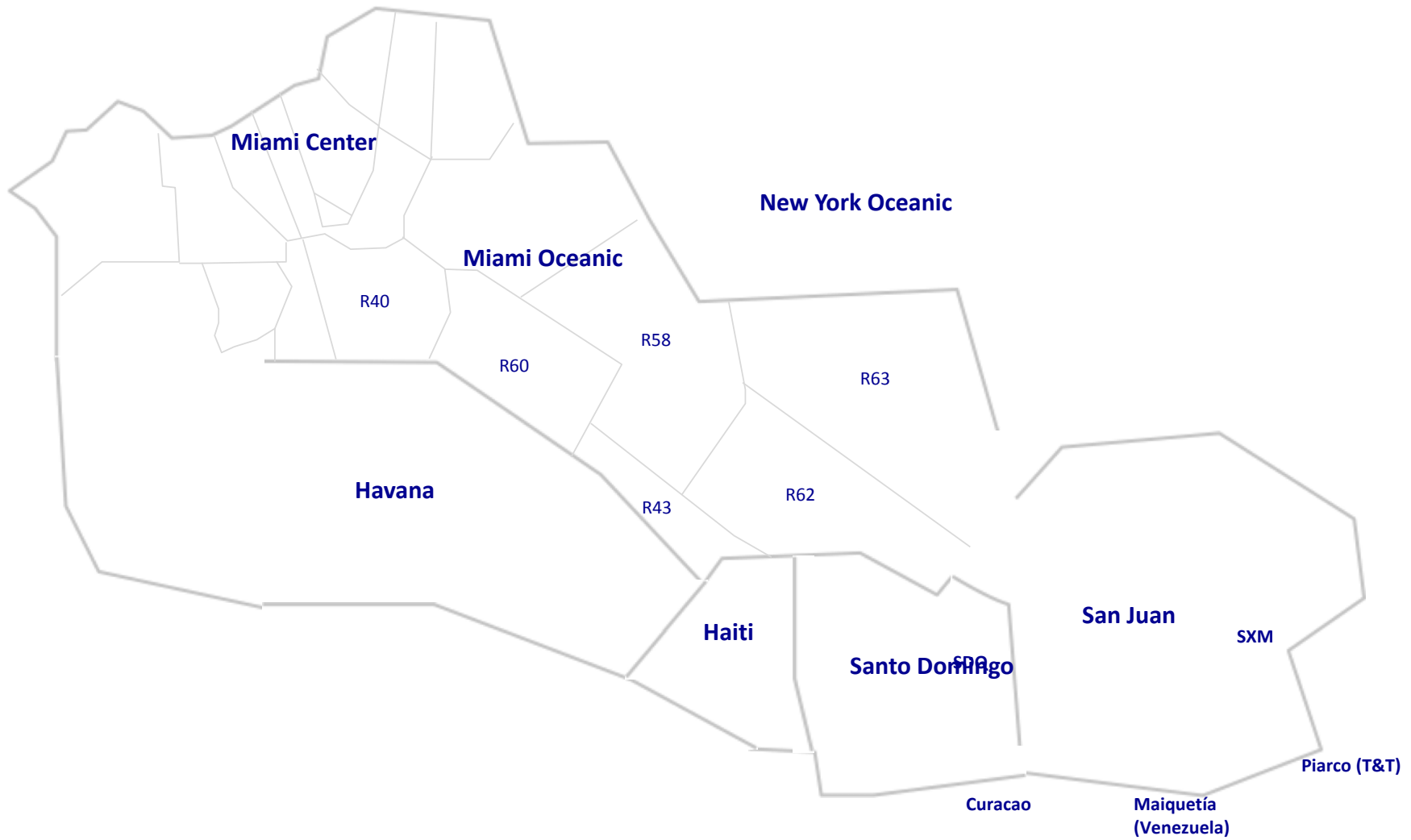
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Executive Summary

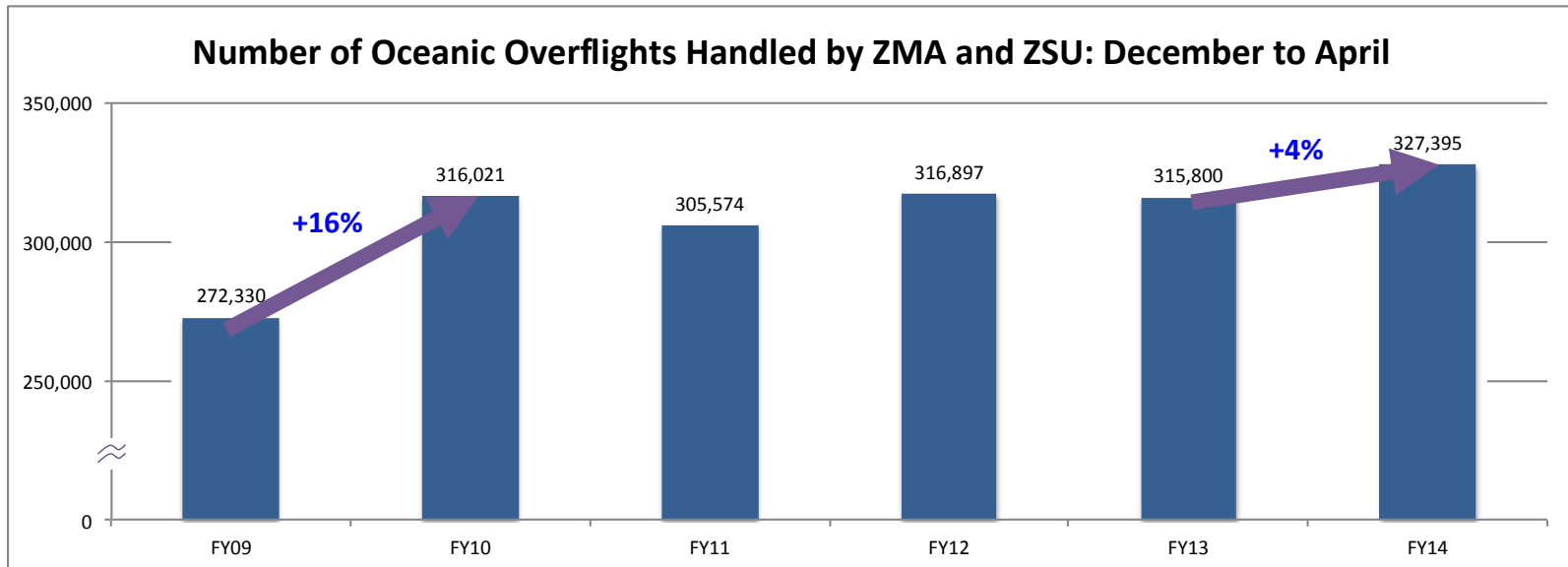
- Air traffic in ZMA Oceanic and ZSU have grown while the airspace has had little change last 15-20 years
- Demand/capacity imbalances in the airspace have resulted in:
 - Numerous Traffic Flow Management initiatives to manage volume until more permanent airspace solutions can be implemented
 - NTSB recommendations to review airspace to provide increased safety and improved traffic flows
- FAA and industry have previously identified a matrix of infrastructure and airspace solutions to address these issues; some are in work
 - Prioritization of key infrastructure efforts in this region, and
 - An approach to review Miami Oceanic and Caribbean airspace resectorization

South Florida and Caribbean

Static Airspace Last 20 Years



Growth in Operations



- Significant growth in FY2010 of 16%
- Stable demand FY2010 to 2013
- Growth returned FY13 to FY14
- Growth outpacing rest of NAS

South Florida and Caribbean

Demand / Capacity Imbalance

MAP Numbers for Some ZMA Sectors

March 15, 2014 – typical peak Saturday in March, busiest month for ZMA Oceanic/Caribbean

ZMA Sectors	MAP	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00
40	18	3	4	3	5	3	8	6	8	13	16	22	17	20	18	19	18	21	19	15	7	8	7	5	2
58	21	4	1	2	3	1	4	3	6	12	19	19	24	27	25	21	25	20	19	12	8	9	5	4	3
59	18	1	1	3	3	3	1	1	5	10	11	16	17	15	17	14	10	7	12	9	6	6	3	3	3
60	20	3	3	5	6	6	9	9	10	14	20	20	21	20	27	26	19	21	23	19	6	7	9	4	3
61	15	0	0	0	0	1	4	4	6	12	14	13	16	13	16	13	11	12	6	6	4	2	1	1	1
62	21	10	2	6	5	3	5	9	10	14	20	24	24	29	32	29	26	26	19	9	11	8	5	6	6
63	21	8	6	3	6	2	3	2	8	10	15	17	19	18	25	24	21	21	20	12	6	4	2	3	6

South Florida and Caribbean

Demand / Capacity Imbalance

AFP Usage: ZMA Oceanic Sectors

- FY 2013
 - One time for sector volume
 - Total Delay: 5,571 min, 34 min avg
- FY 2014
 - 17 times for sector volume
 - 2 Times for equipment failure
 - 2 times for thunderstorm activity
 - Total Delay: 99,855 min, 33 min avg

Other TMIs

- Departure restrictions off S Florida airports through Oceanic sectors
- Departure restrictions off ATL & CLT
- Departure restrictions westbound off San Juan and St Thomas
- Reroutes on aircraft transiting Oceanic sectors

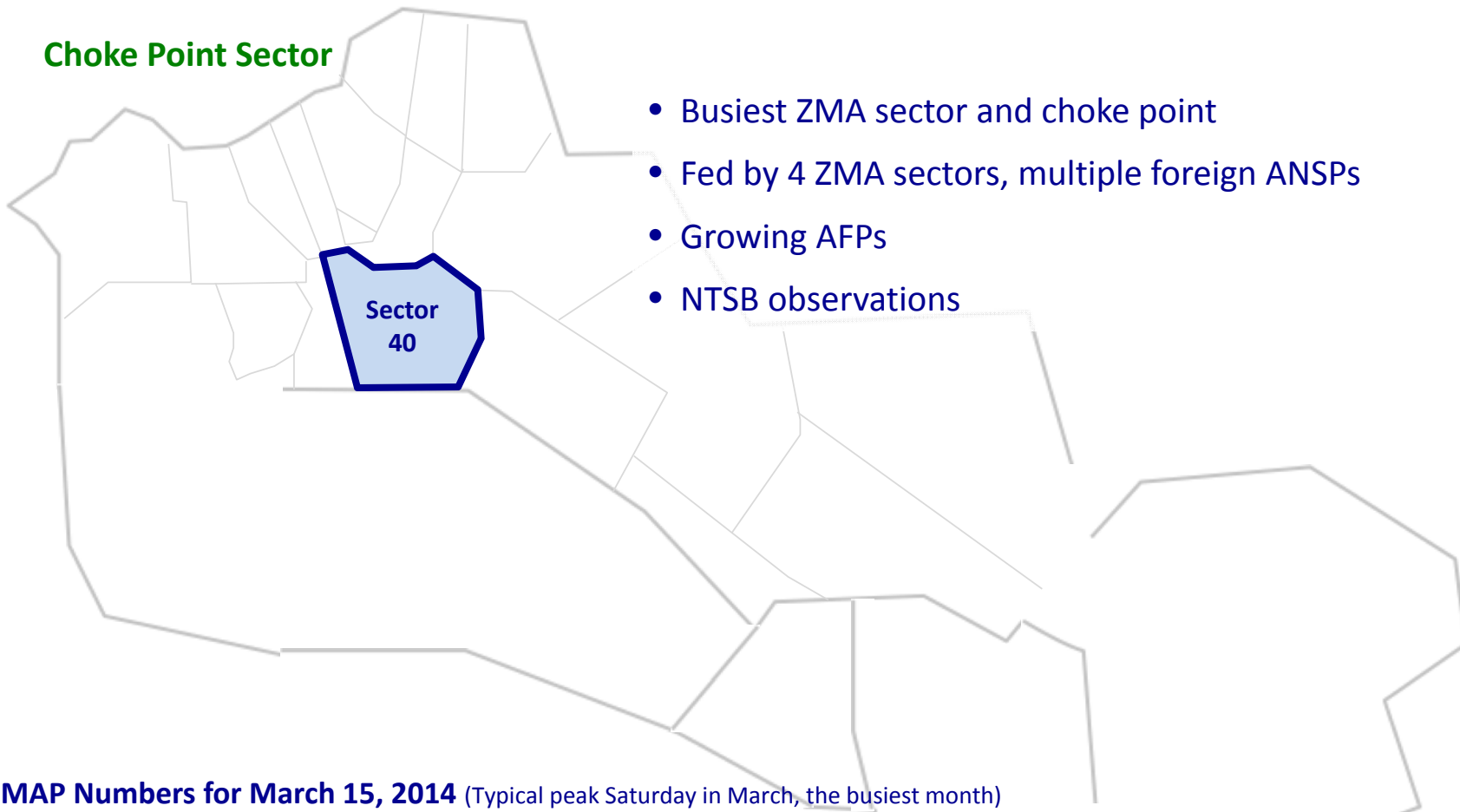
Sources of the Problem

- **Airspace Issues**
 - Choke point sector (R40) off Southeast tip of Florida handling traffic into/out of Florida to the Caribbean/South America
 - Caribbean traffic funneled into narrow corridor between South Florida and San Juan
 - San Juan (ZSU) has little airspace structure (no SIDs, no STARs) to manage converging and crossing traffic
 - Some oceanic sectors up to 500 nm and take 40+ minutes to traverse resulting in frequency congestion
- **Infrastructure Issues**
 - Controllers occupied with extensive manual coordination with neighboring facilities to share flight plan and estimated times (Santo Domingo, St. Maarten, etc.)
 - Communications limitations limit usable airspace in which aircraft may be vectored, descended
 - ADS-B gap between ZMA and ZSU

South Florida and Caribbean

Sources of Problem – Airspace

Choke Point Sector



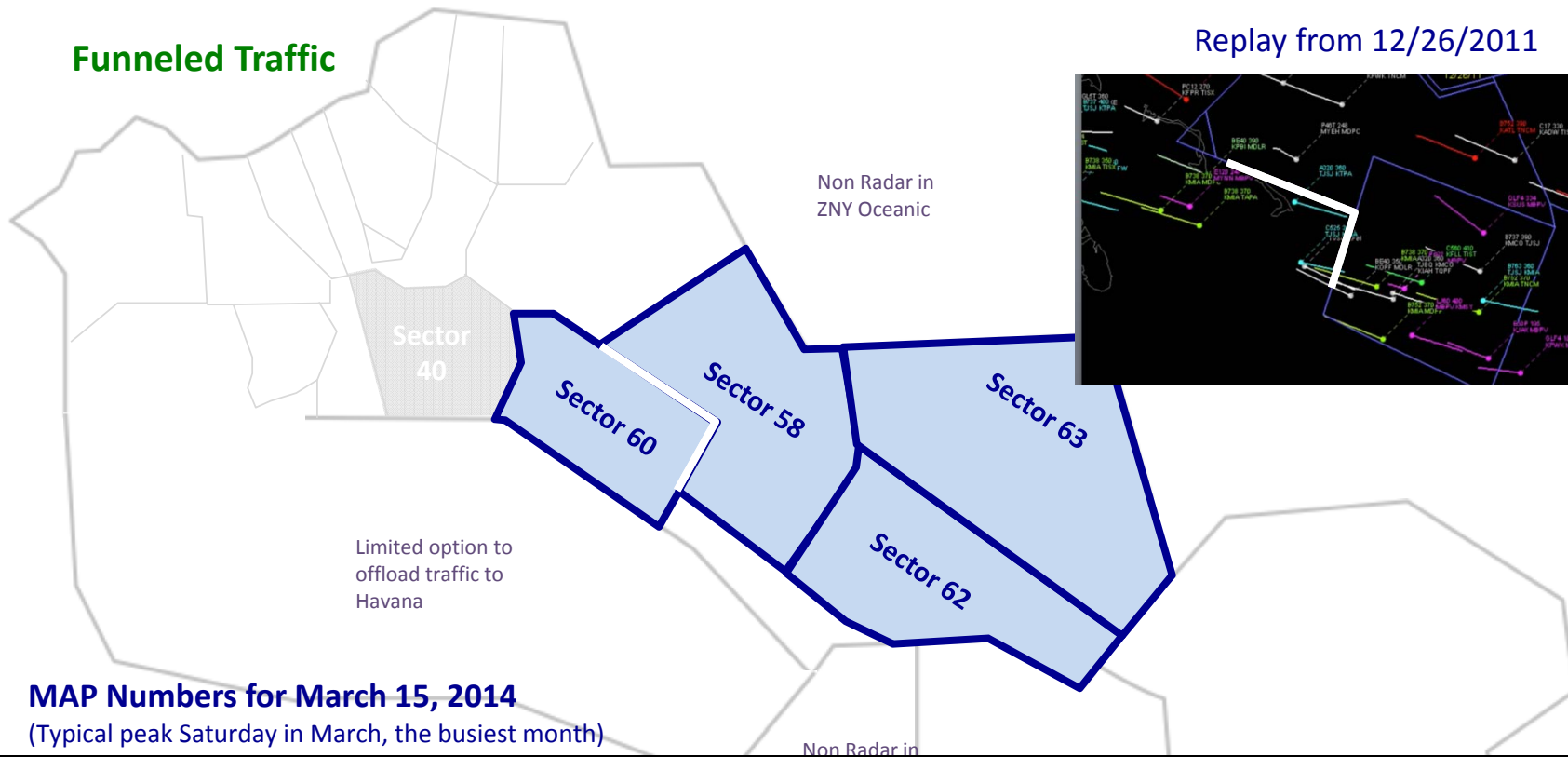
MAP Numbers for March 15, 2014 (Typical peak Saturday in March, the busiest month)

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40	18	3	4	3	5	3	8	6	8	13	16	22	17	20	18	19	18	21	19	15	7	8	7	5	2

South Florida and Caribbean

Sources of Problem – Airspace

Funneled Traffic



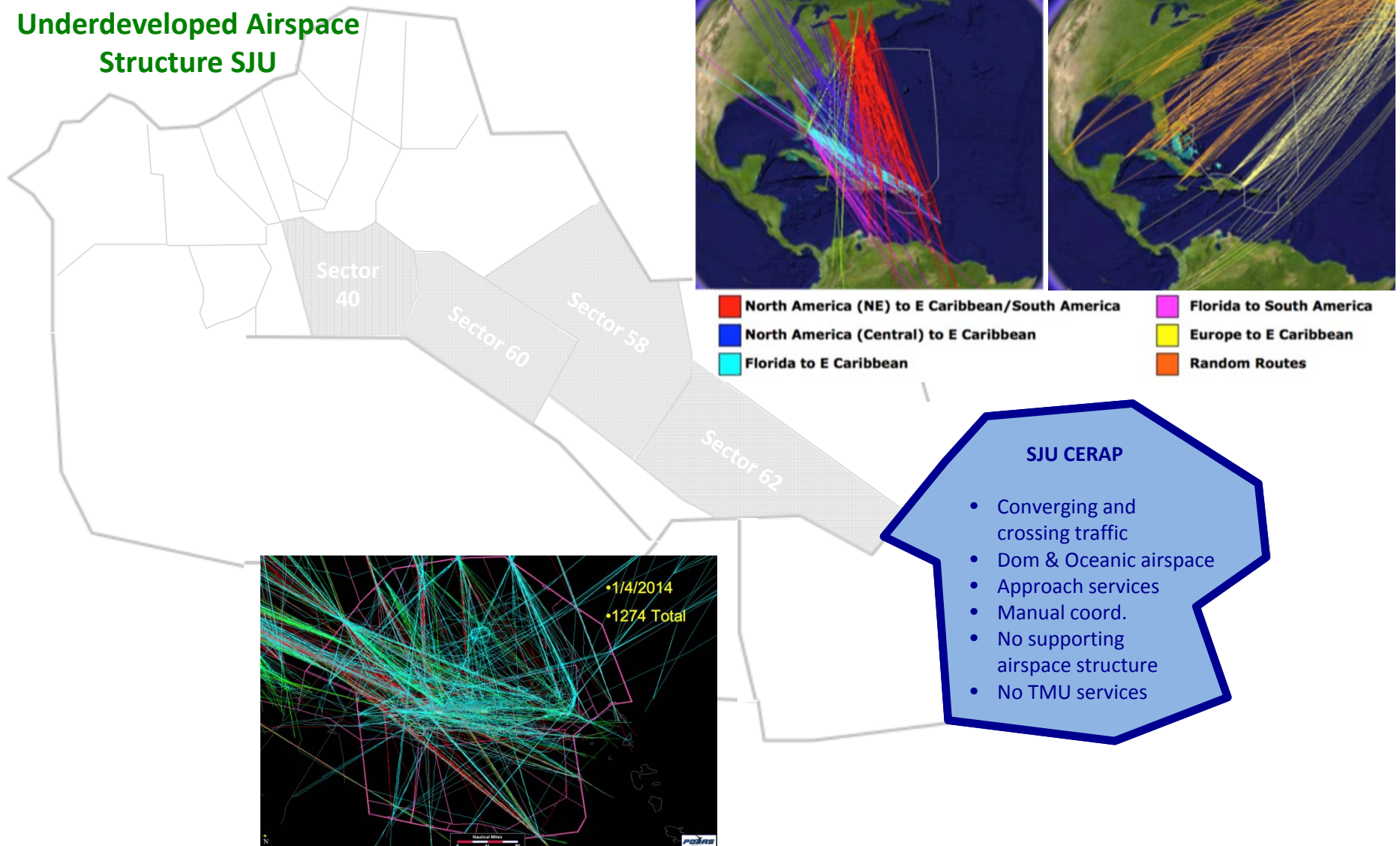
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South Florida and Caribbean

Sources of Problem – Airspace

Underdeveloped Airspace
Structure SJU

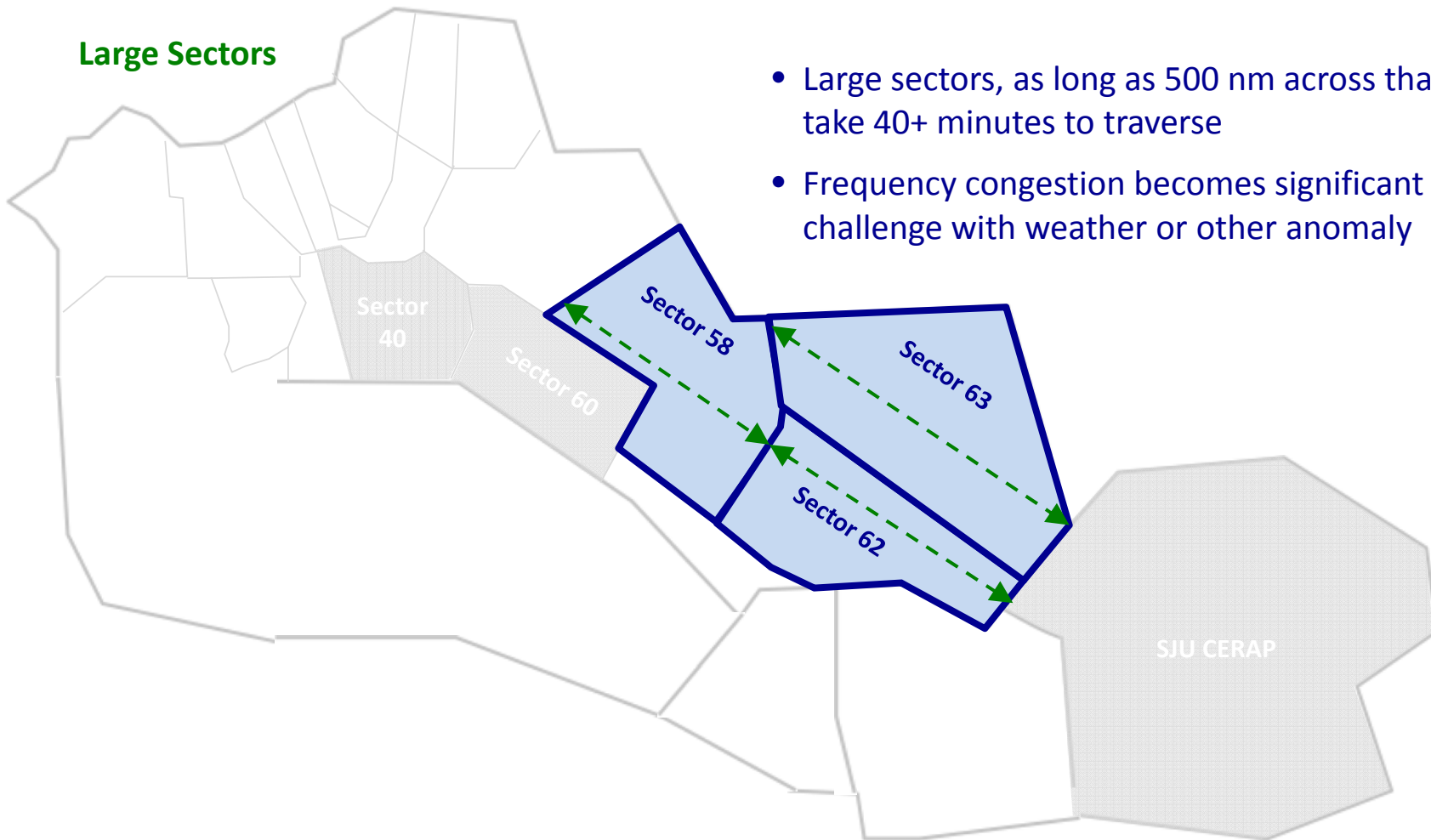


South Florida and Caribbean

Sources of Problem – Airspace

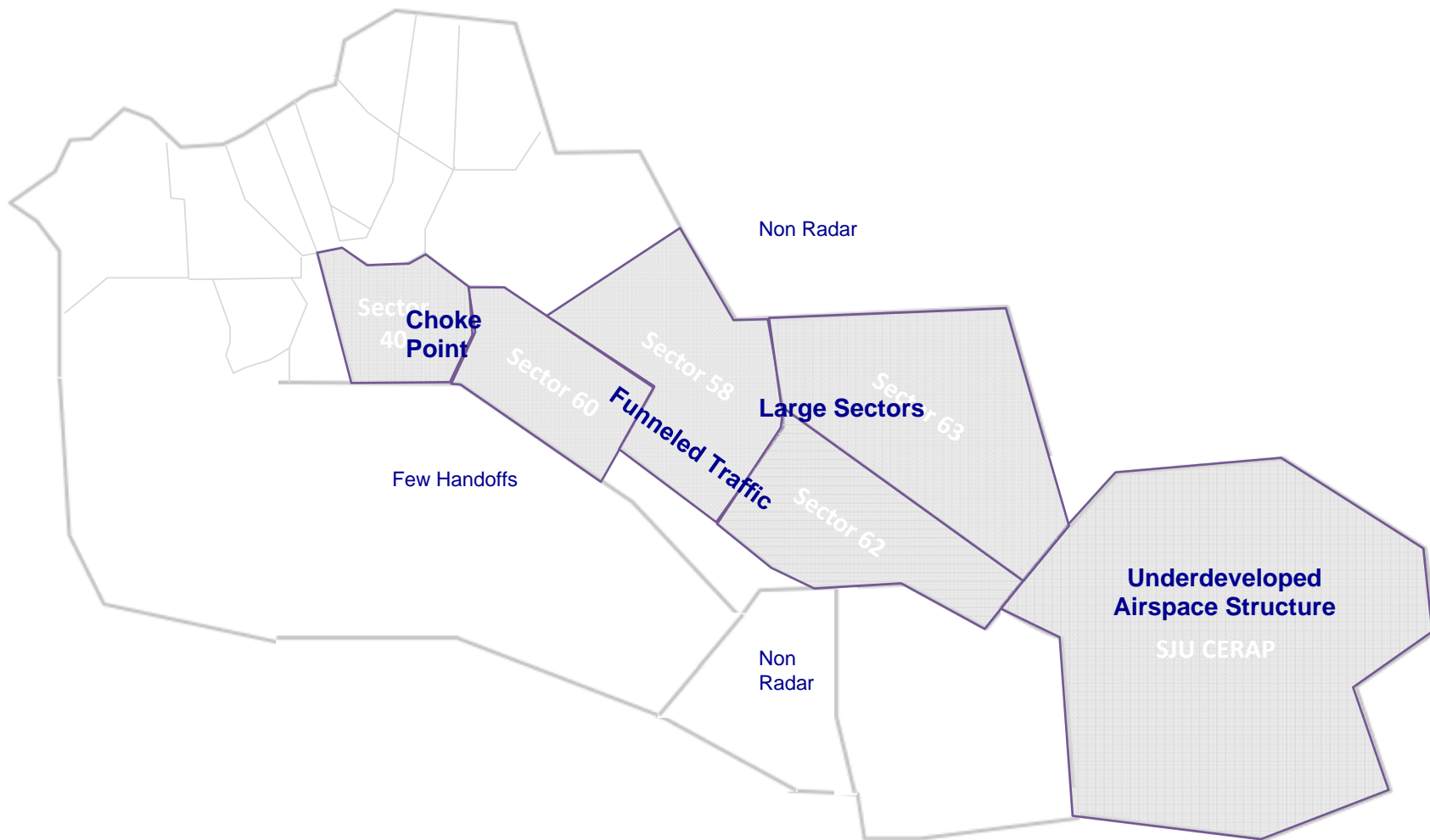
Large Sectors

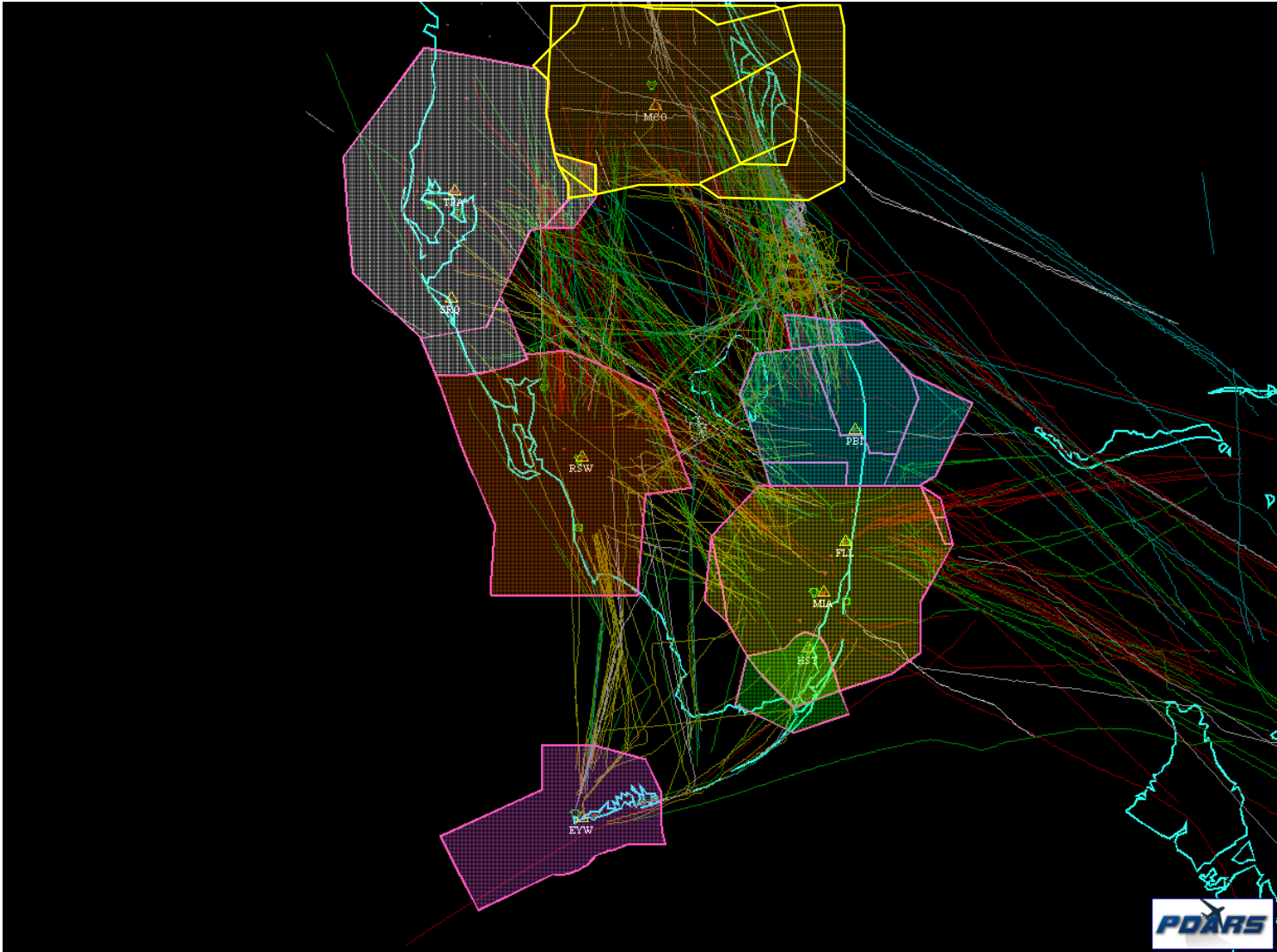
- Large sectors, as long as 500 nm across that can take 40+ minutes to traverse
- Frequency congestion becomes significant challenge with weather or other anomaly

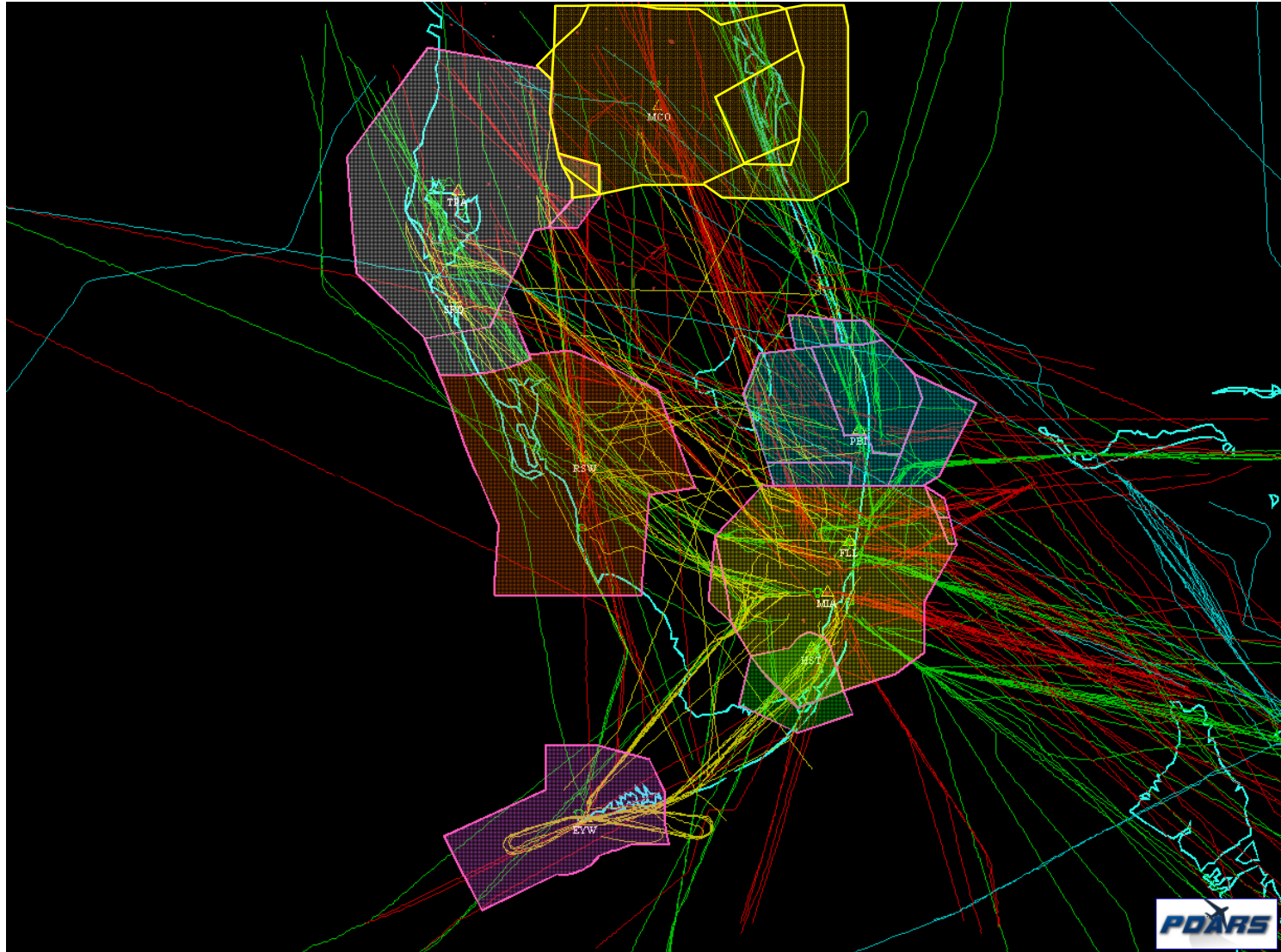


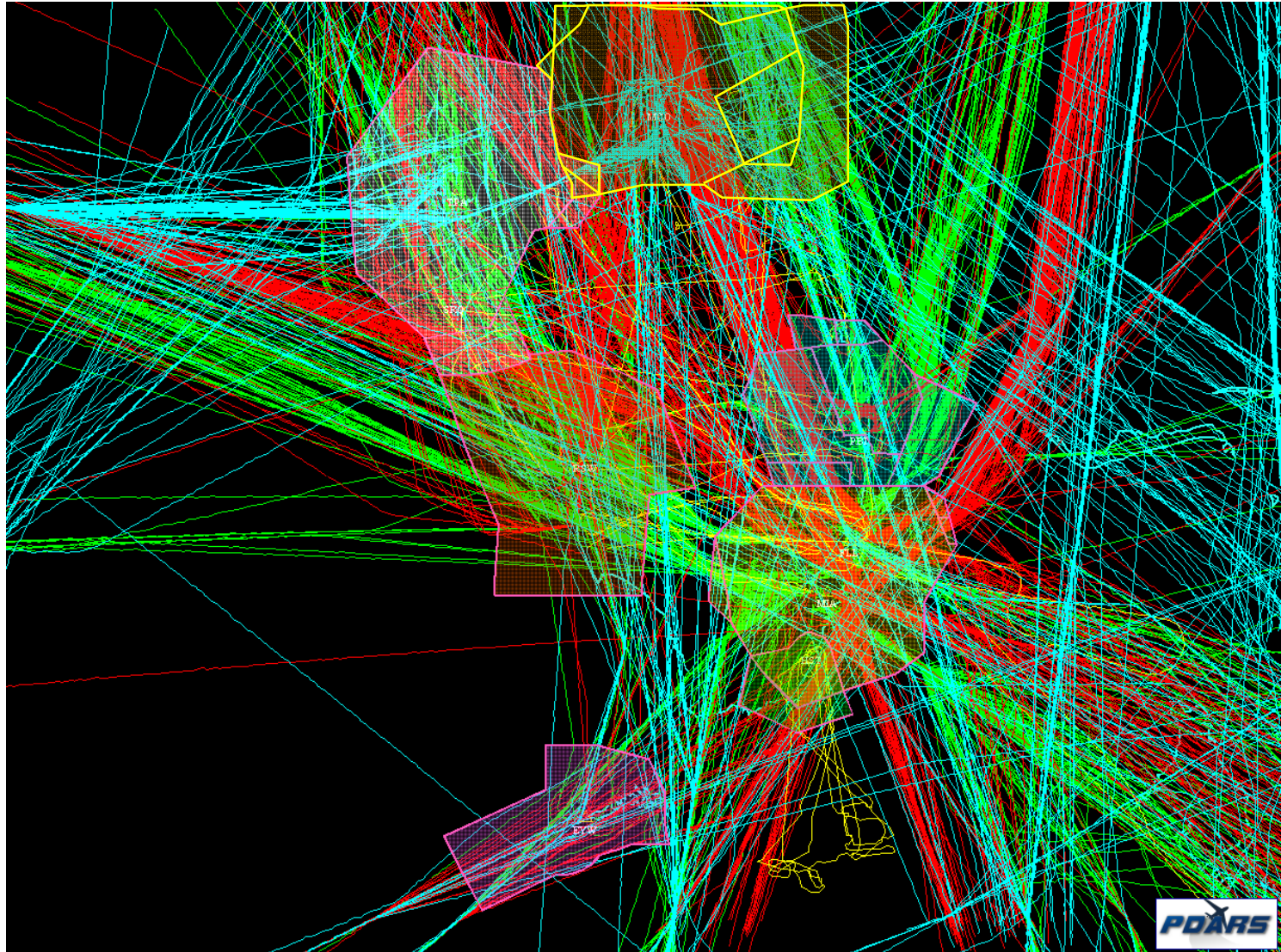
South Florida and Caribbean

Sources of Problem – Airspace



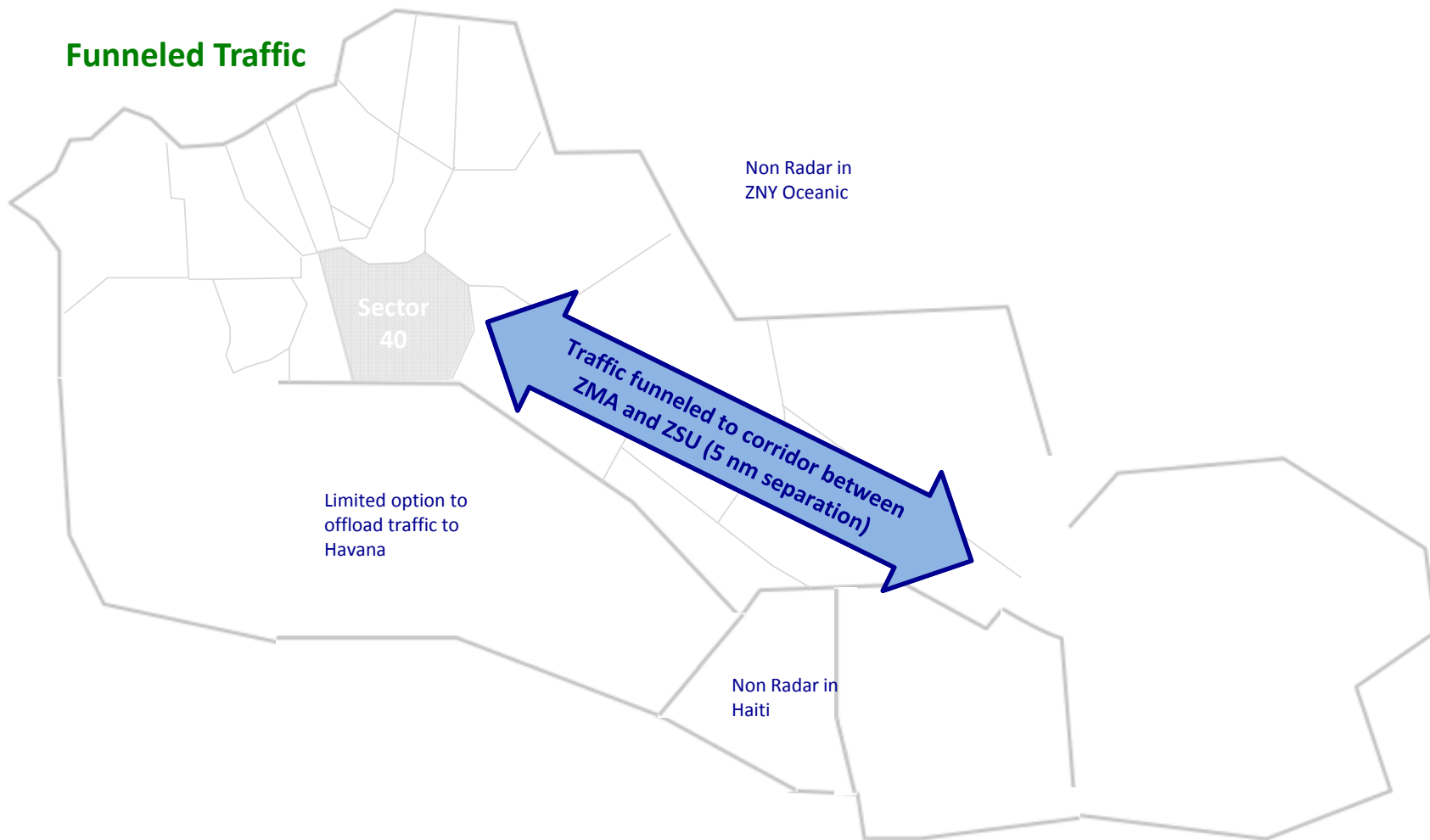






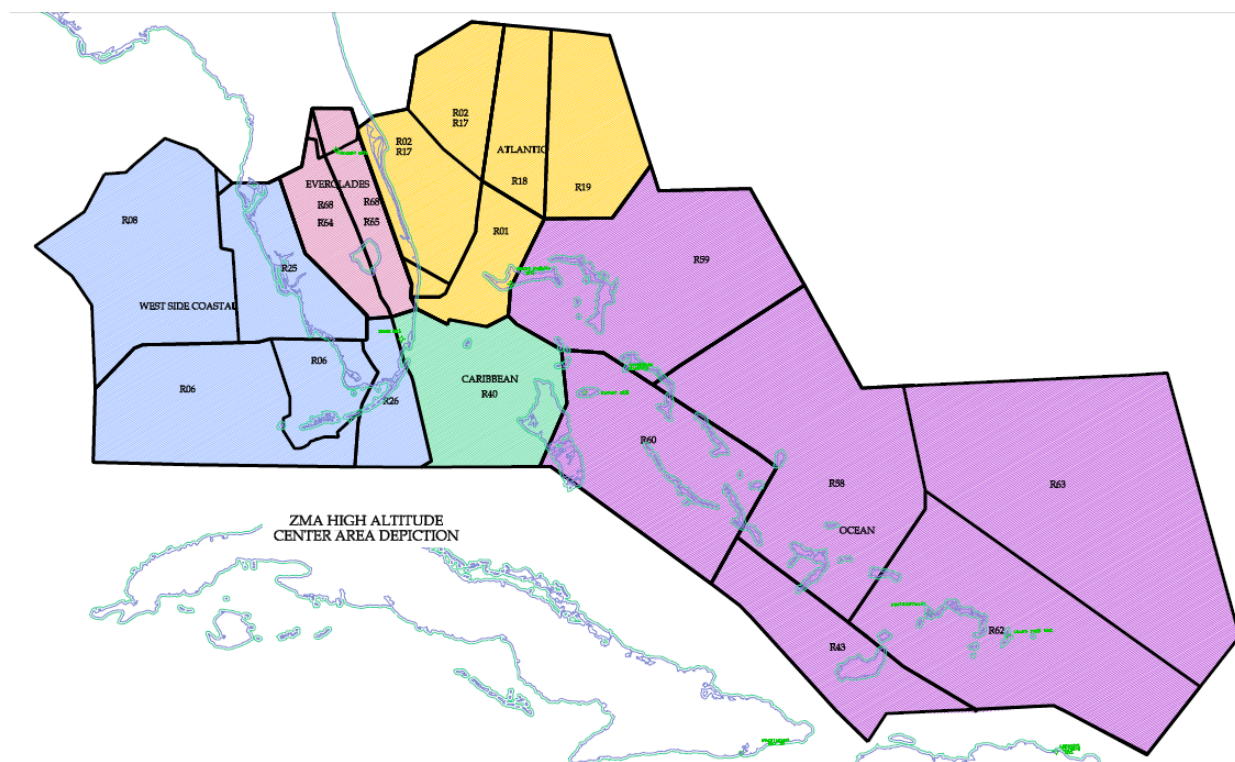
South Florida and Caribbean

Sources of Problem – Airspace



Boundaries: Controlled Airspace

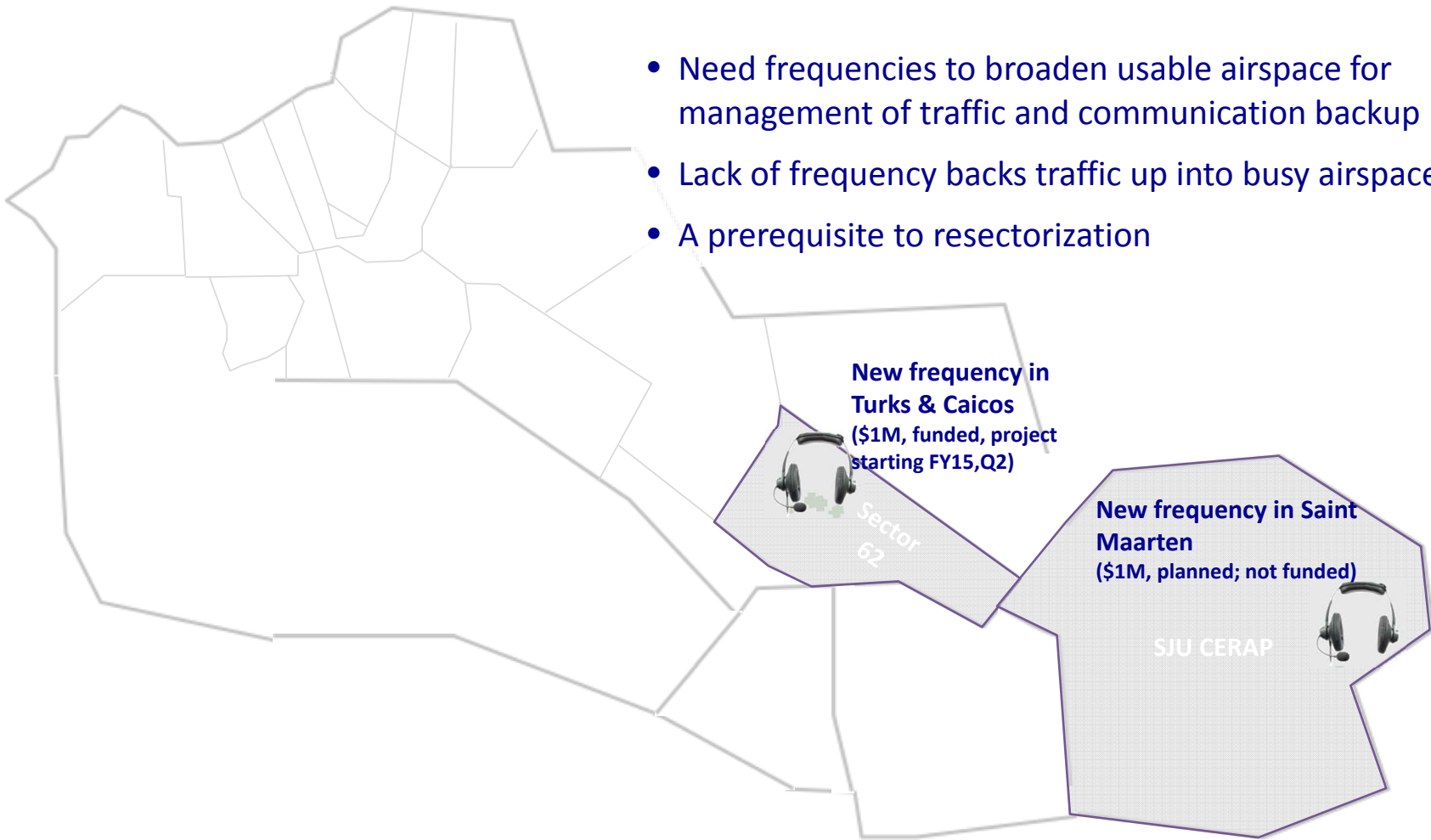
- International Boundaries: 2607 NM
- 80 Airways Cross the Miami Center Airspace Boundary
- Interface with 5 International Entities and 4 Other ARTCCs
 - Cuba (R)
 - Bahamas (R/N)
 - Haiti (N)
 - Santo Domingo (R)
 - Turks & Caicos (N)
 - ZJX
 - ZHU
 - ZNY
 - ZSU



South Florida and Caribbean

Sources of Problem – Comm

- Need frequencies to broaden usable airspace for management of traffic and communication backup
- Lack of frequency backs traffic up into busy airspace
- A prerequisite to resectorization



The map shows the outline of South Florida and the Caribbean region, divided into several irregularly shaped sectors. Two sectors are highlighted with a purple border and a grid pattern. The first highlighted sector is labeled 'Sector 62' and contains a headset icon. The second highlighted sector is labeled 'SJU CERAP' and also contains a headset icon. Text callouts provide details for each sector.

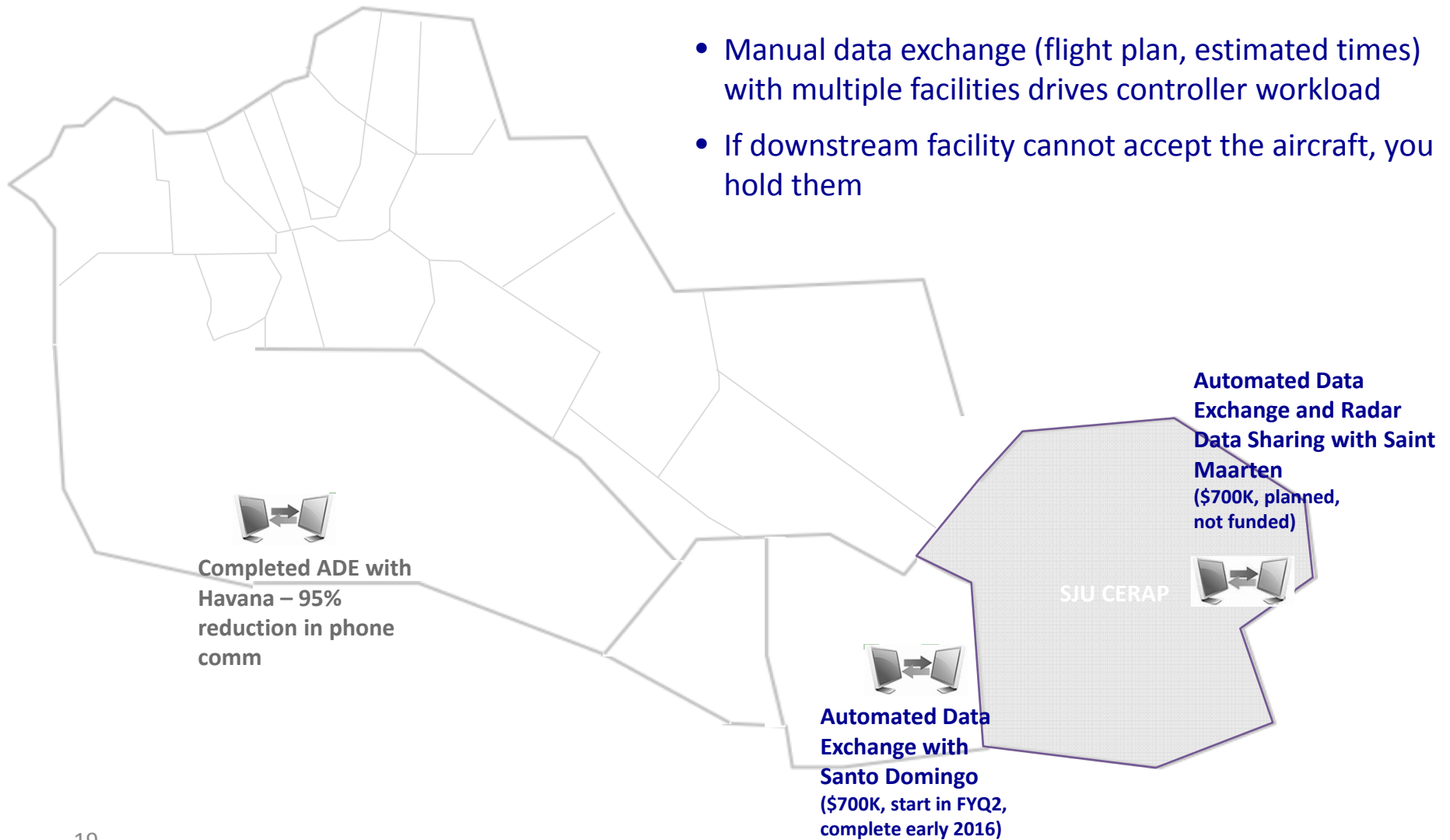
**New frequency in
Turks & Caicos**
(\$1M, funded, project
starting FY15,Q2)

**New frequency in Saint
Maarten**
(\$1M, planned; not funded)

SJU CERAP

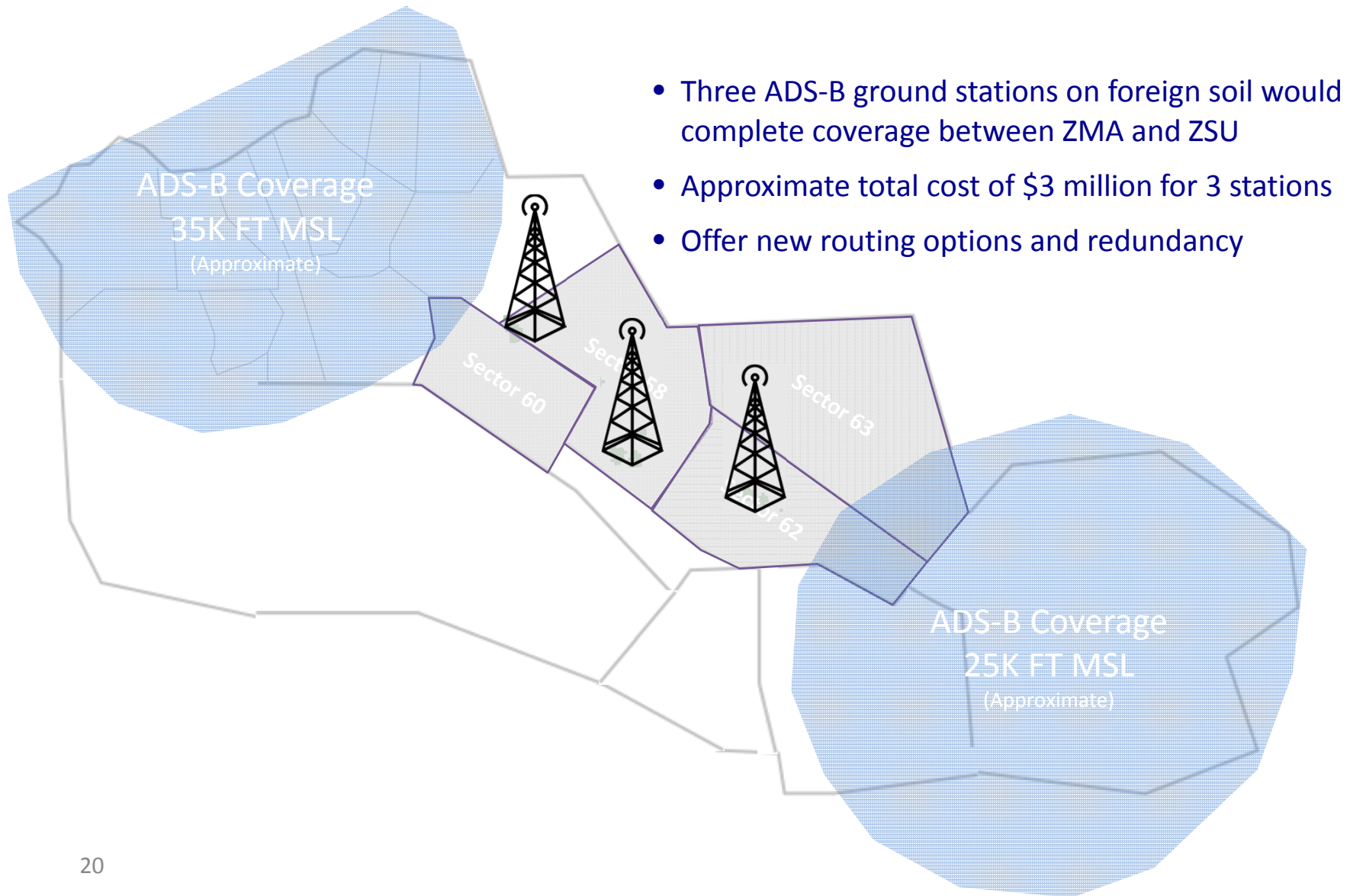
Sources of Problem – Manual Effort

- Manual data exchange (flight plan, estimated times) with multiple facilities drives controller workload
- If downstream facility cannot accept the aircraft, you hold them

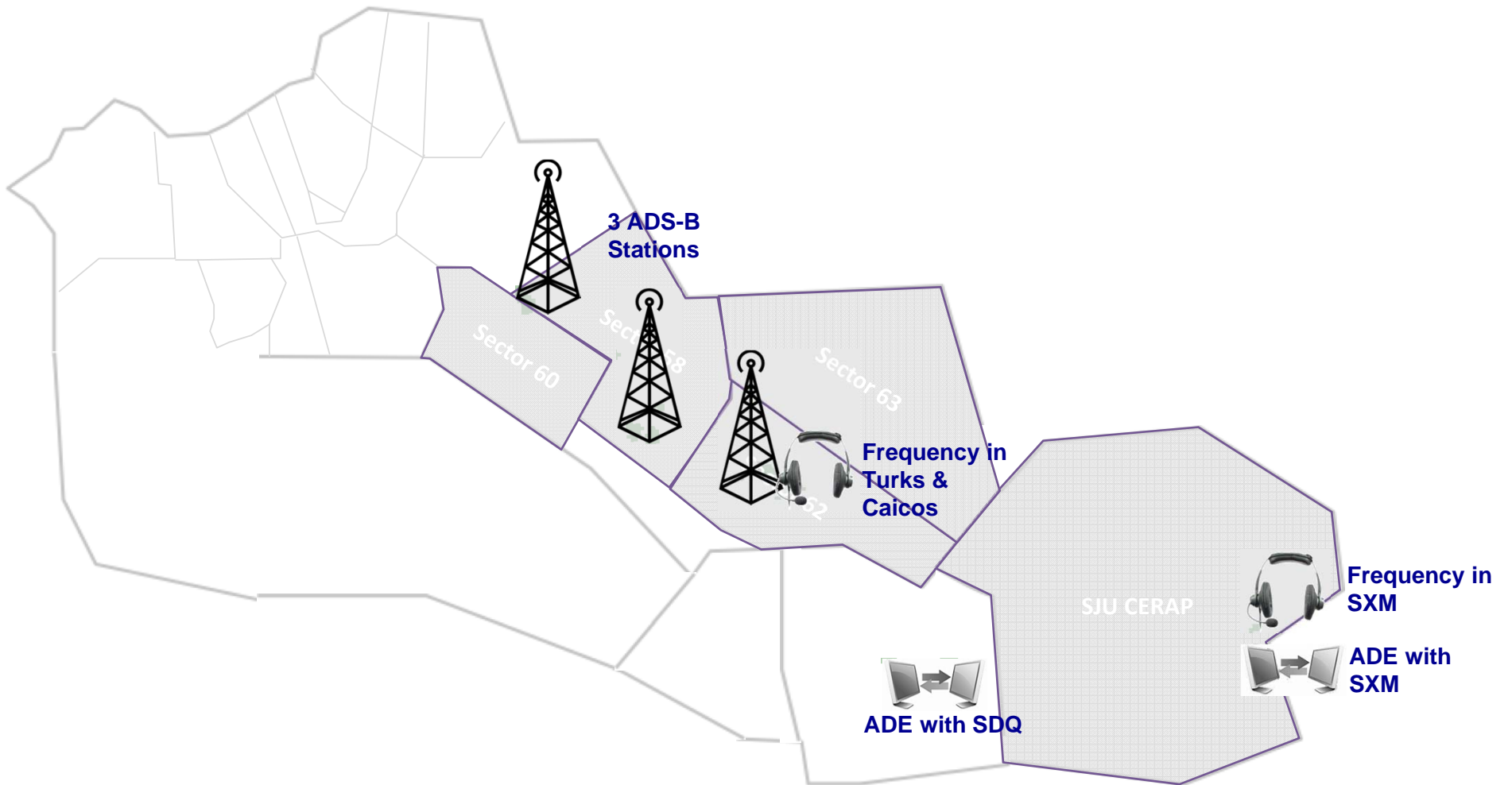


South Florida and Caribbean

Sources of Problem – Surveillance



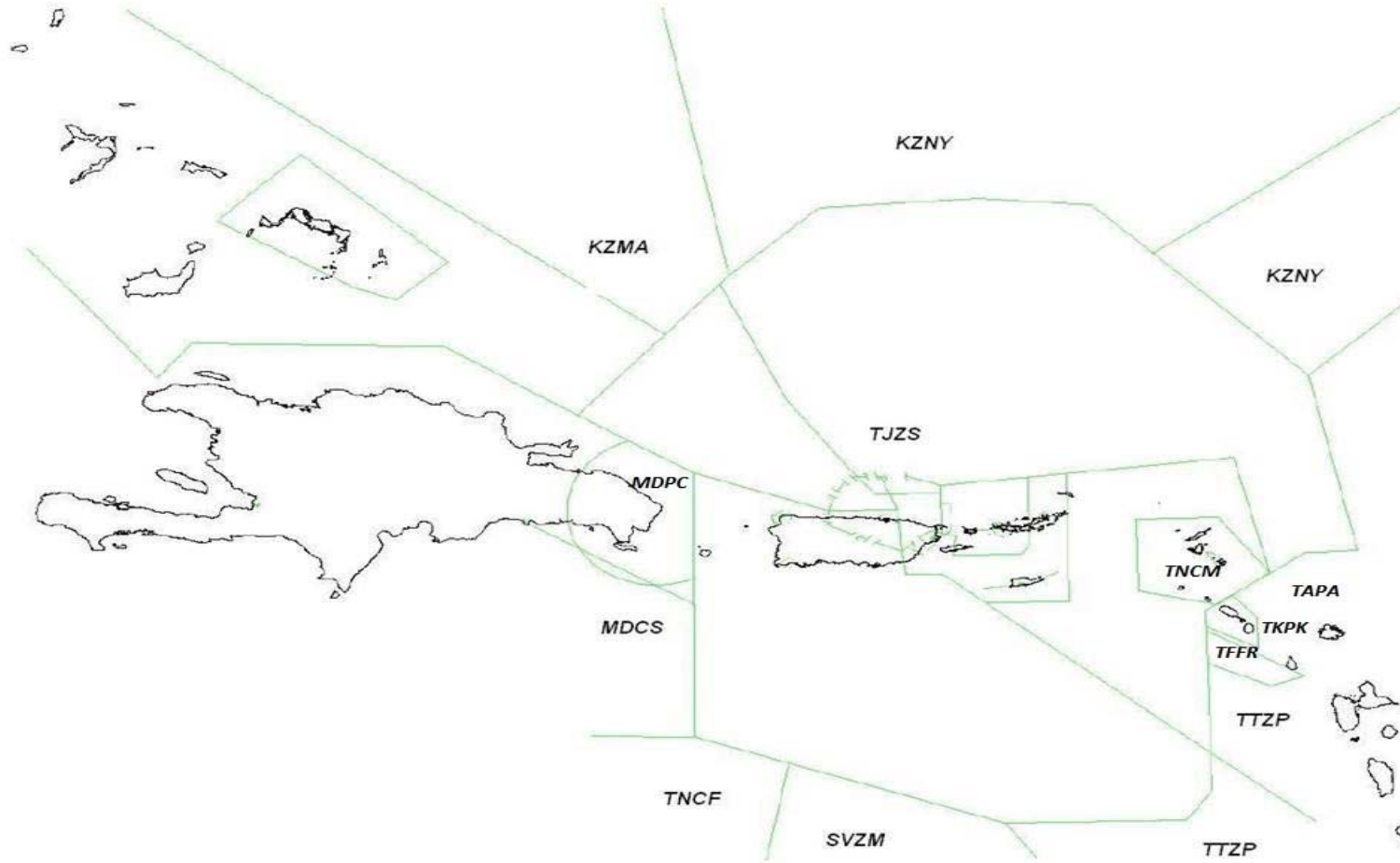
Sources of Problem – Infrastructure



San Juan CERAP Airspace

- * ZSU is surrounded total of 10 foreign facilities. Nine Enroute and one in approach.
- * San Juan Airspace contains domestic and oceanic airspace. Different separation standards apply based on airspace classification and aircraft equipment.
- Domestic airspace is defined as 100 nautical miles around TJIG (Isla Grande airport) with the addition of the airspace (R6) that extends toward the ZSU/ZMA boundary. The remainder of the airspace is classified as oceanic.

ZSU AIRSPACE



San Juan CERAP Airspace

- * San Juan CERAP provides both terminal and enroute services.
- * San Juan CERAP provides arrival and departure services to the following airports:

Airports under Enroute Services

1. BQN – Aguadilla, Puerto Rico (Cargo Hub)
2. MAZ – Mayaguez, Puerto Rico
3. PSE – Ponce, Puerto Rico
4. TNCM – St. Marteen

San Juan CERAP Airspace

Airports under Approach Services

1. SJU – San Juan International
2. SIG – Isla Grande Airport
3. STT – St. Thomas, USVI
4. STX – St. Croix, USVI
5. RVR – Ceiba Airport, Puerto Rico
6. TUPJ – Beef Island, Tortola. British VI
7. VQS – Vieques Island, Puerto Rico
8. CPX – Culebra Island, Puerto Rico

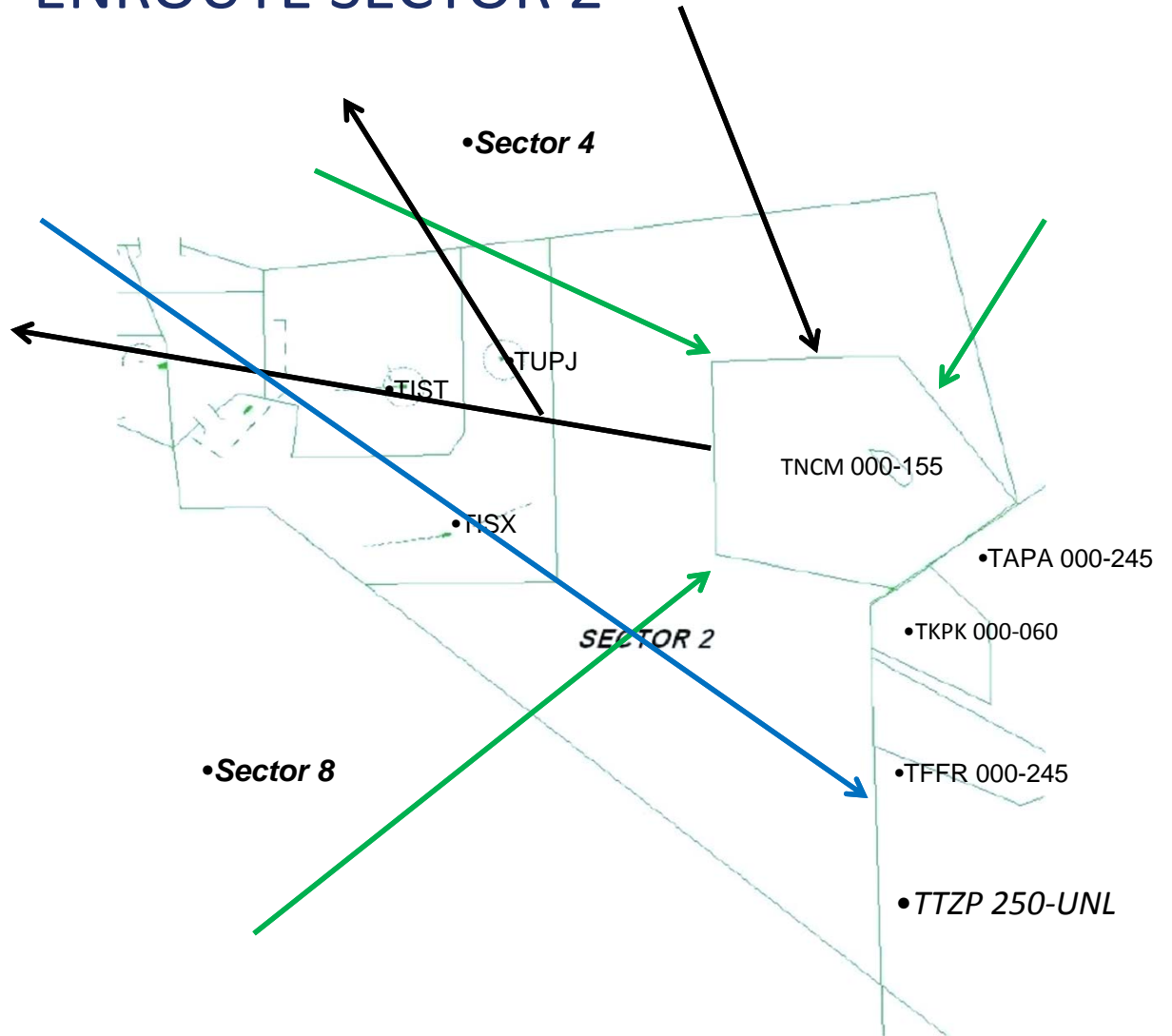
ENROUTE SECTOR 2

ADJACENT FACILITIES:

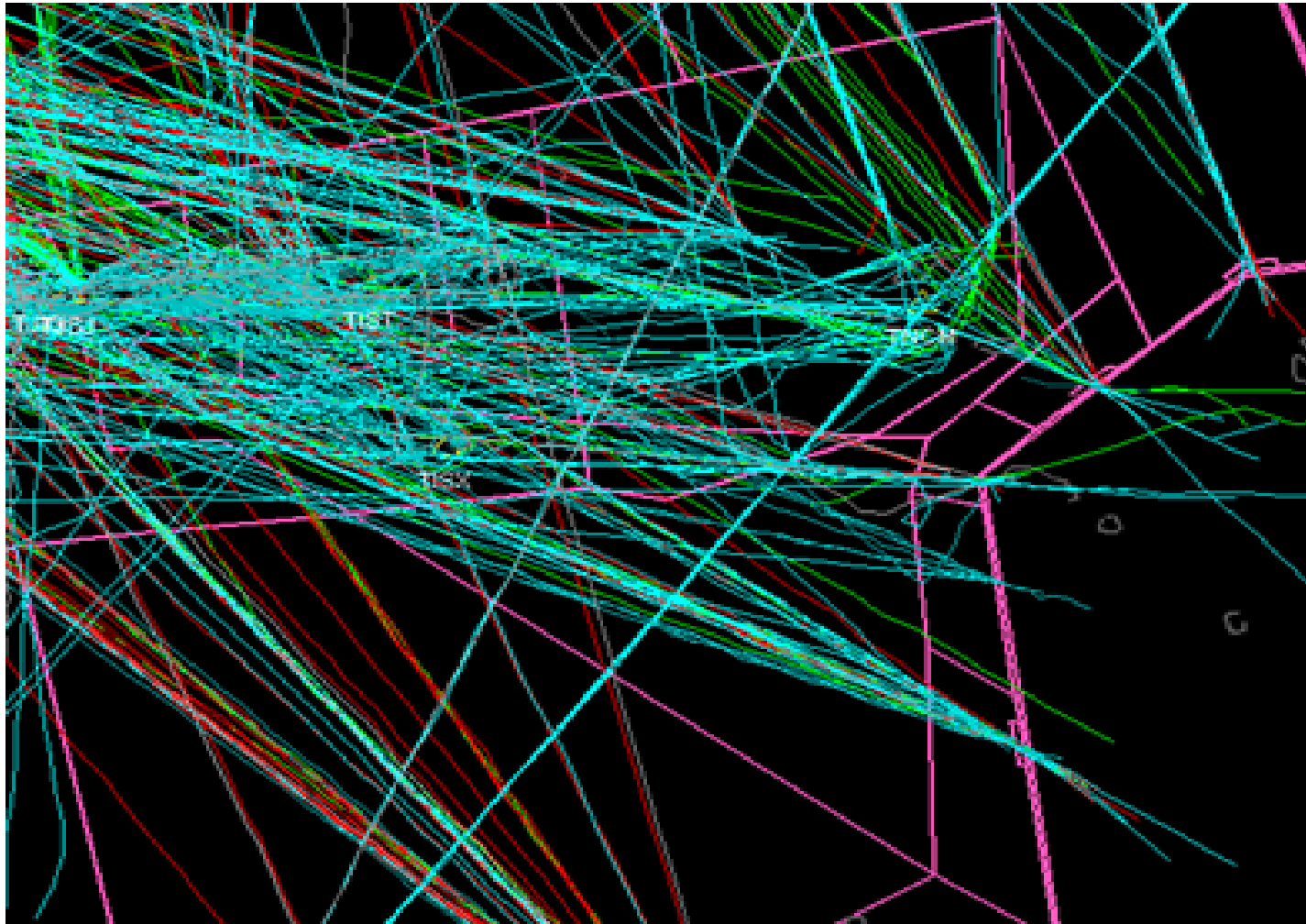
- 1. TAPA
- 2. TKPK
- 3. TTZP
- 4. TNCM
- 5. TFFR

AIRPORTS:

- 1. TNCM (PJM)



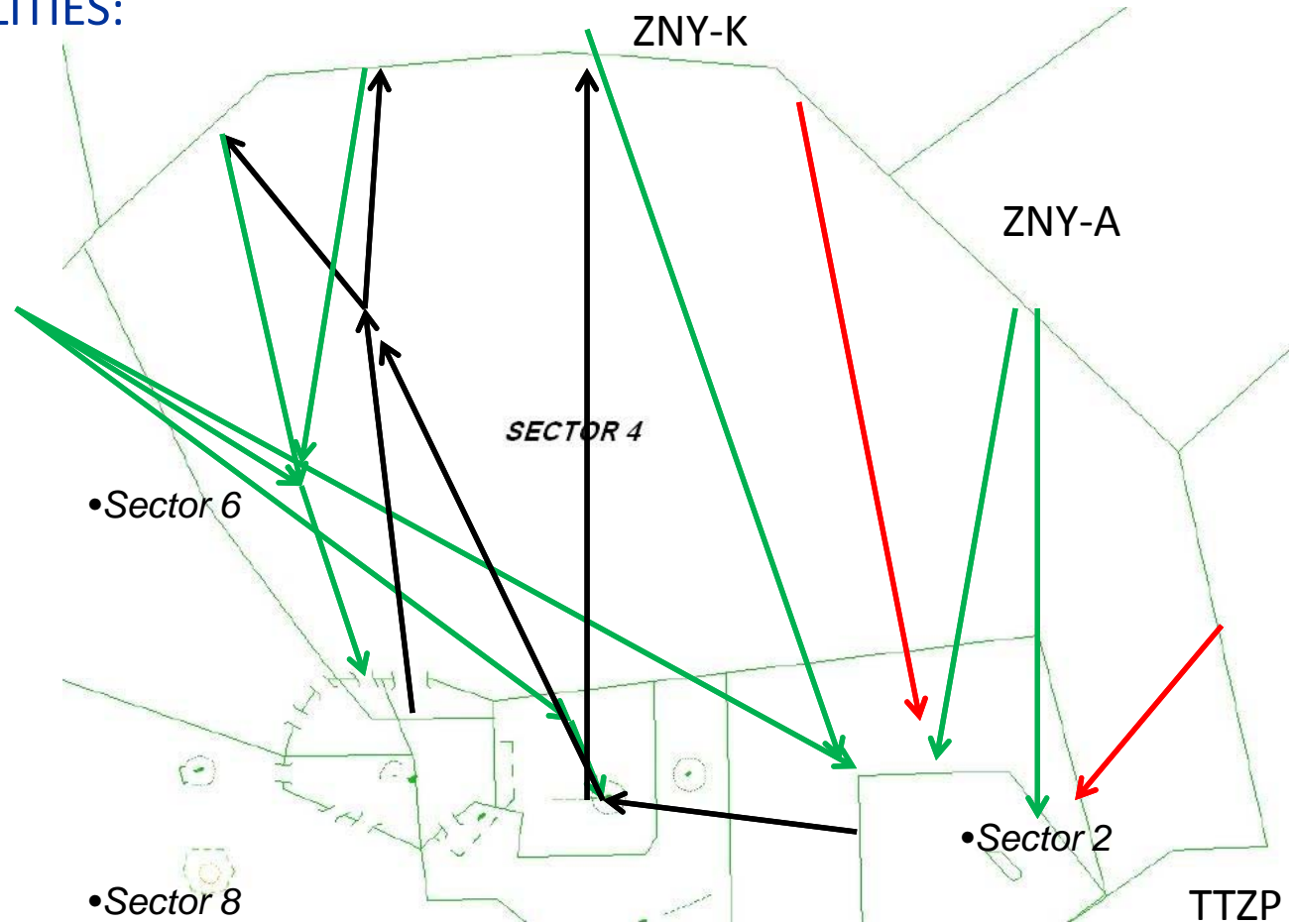
Traffic R2



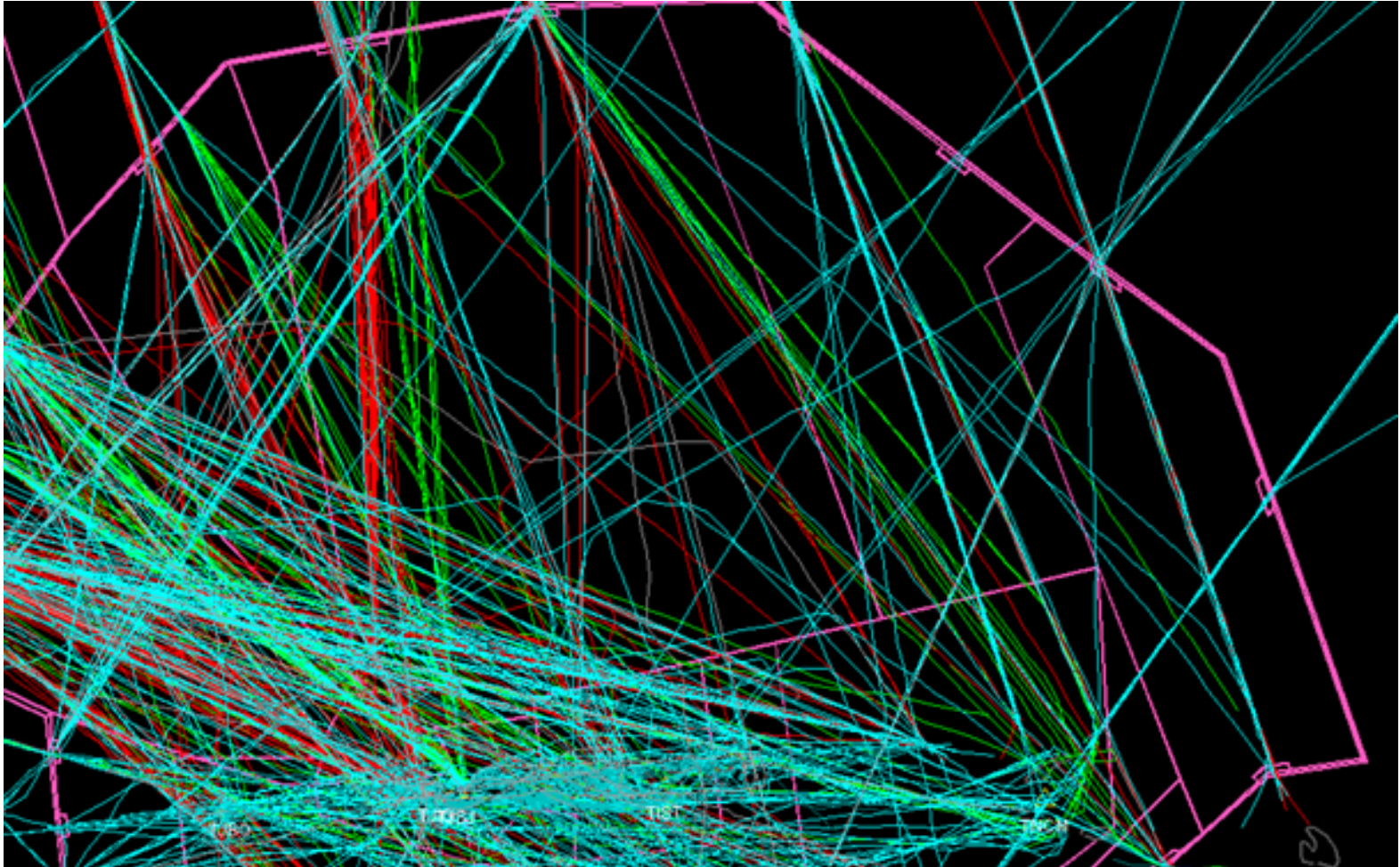
ENROUTE SECTOR 4

ADJACENT FACILITIES:

1. ZNY
2. TTZP
3. TAPA



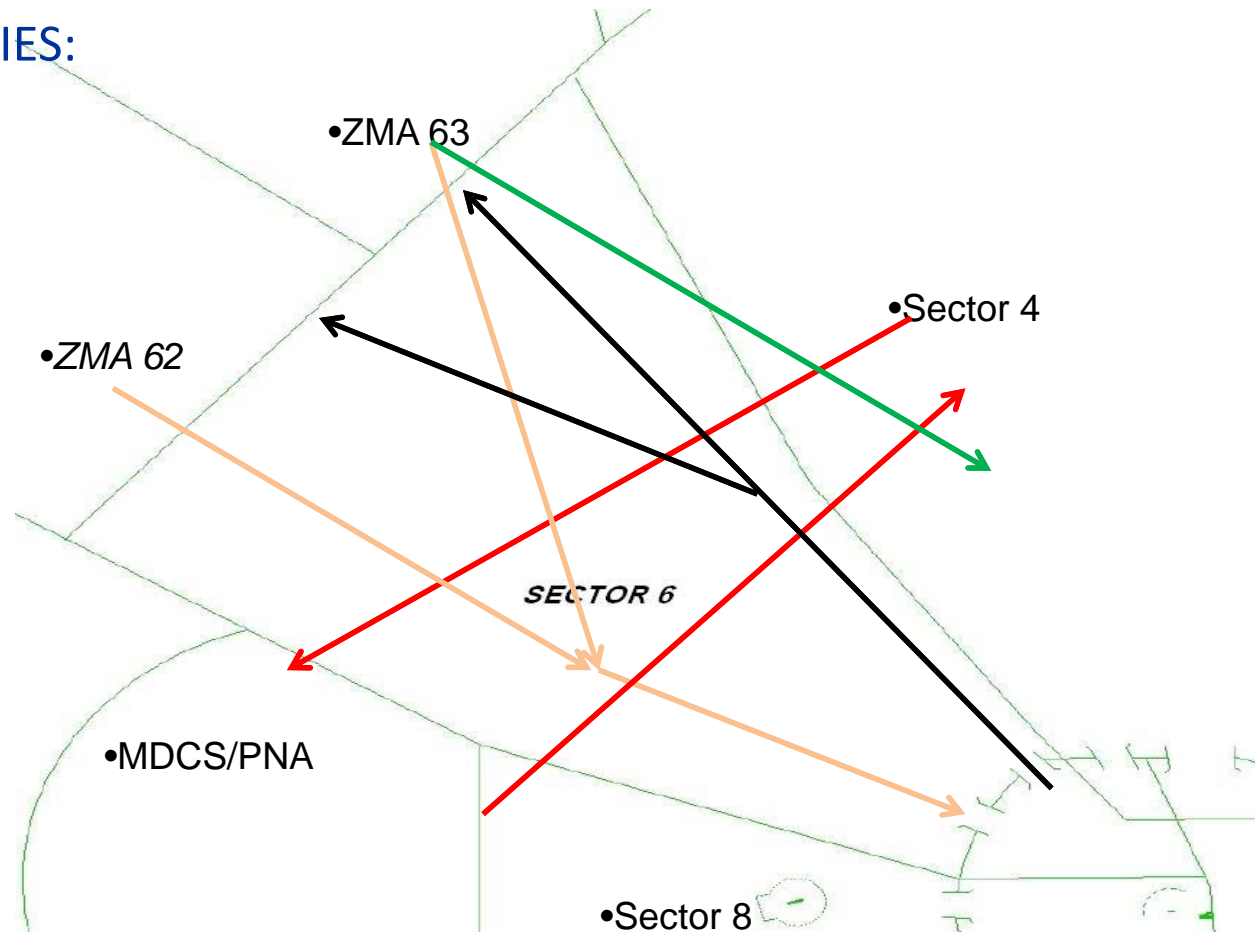
Traffic R4



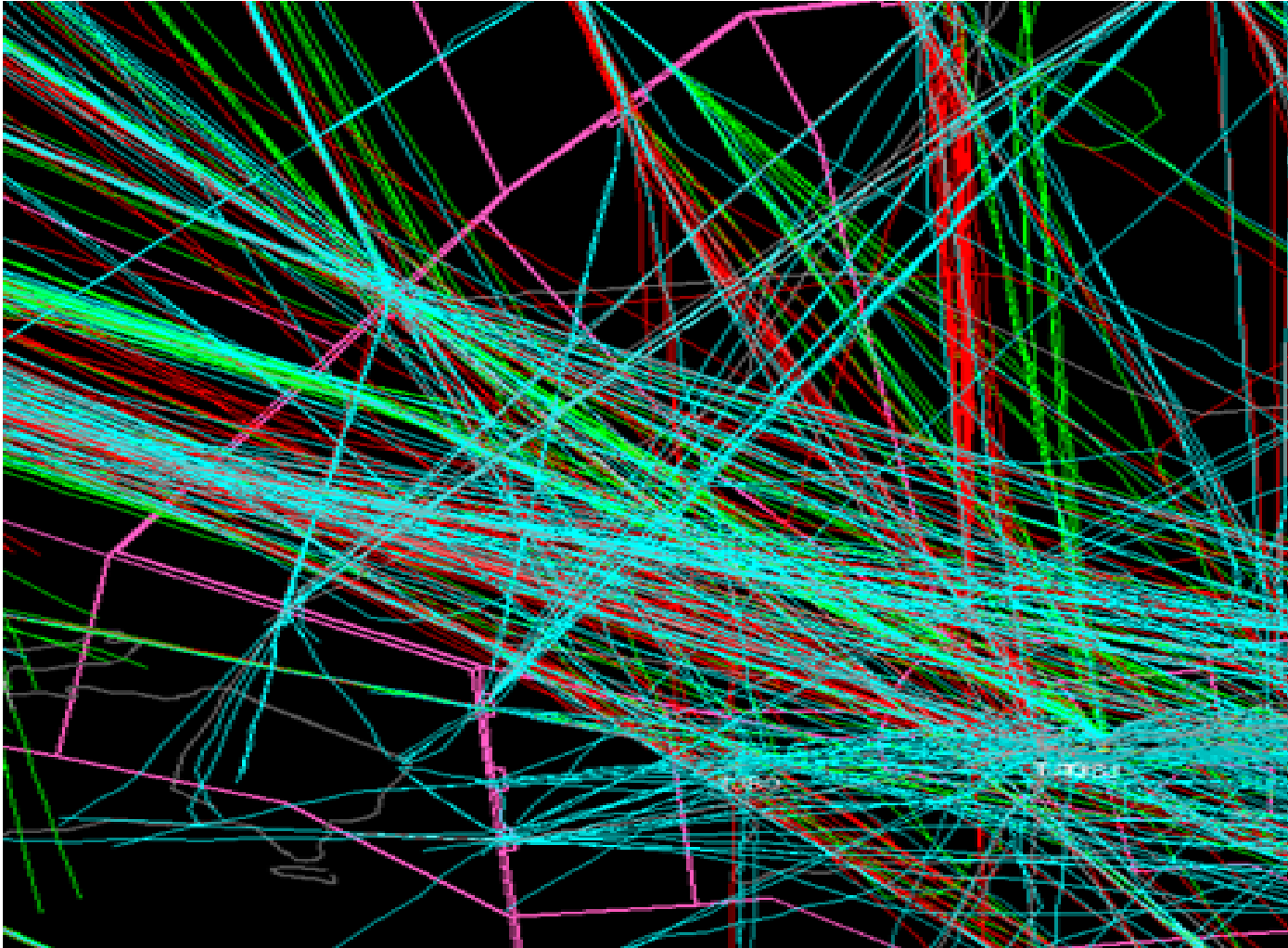
ENROUTE SECTOR 6

ADJACENT FACILITIES:

1. KZMA
2. MDCS
3. MDPC



SECTOR R6



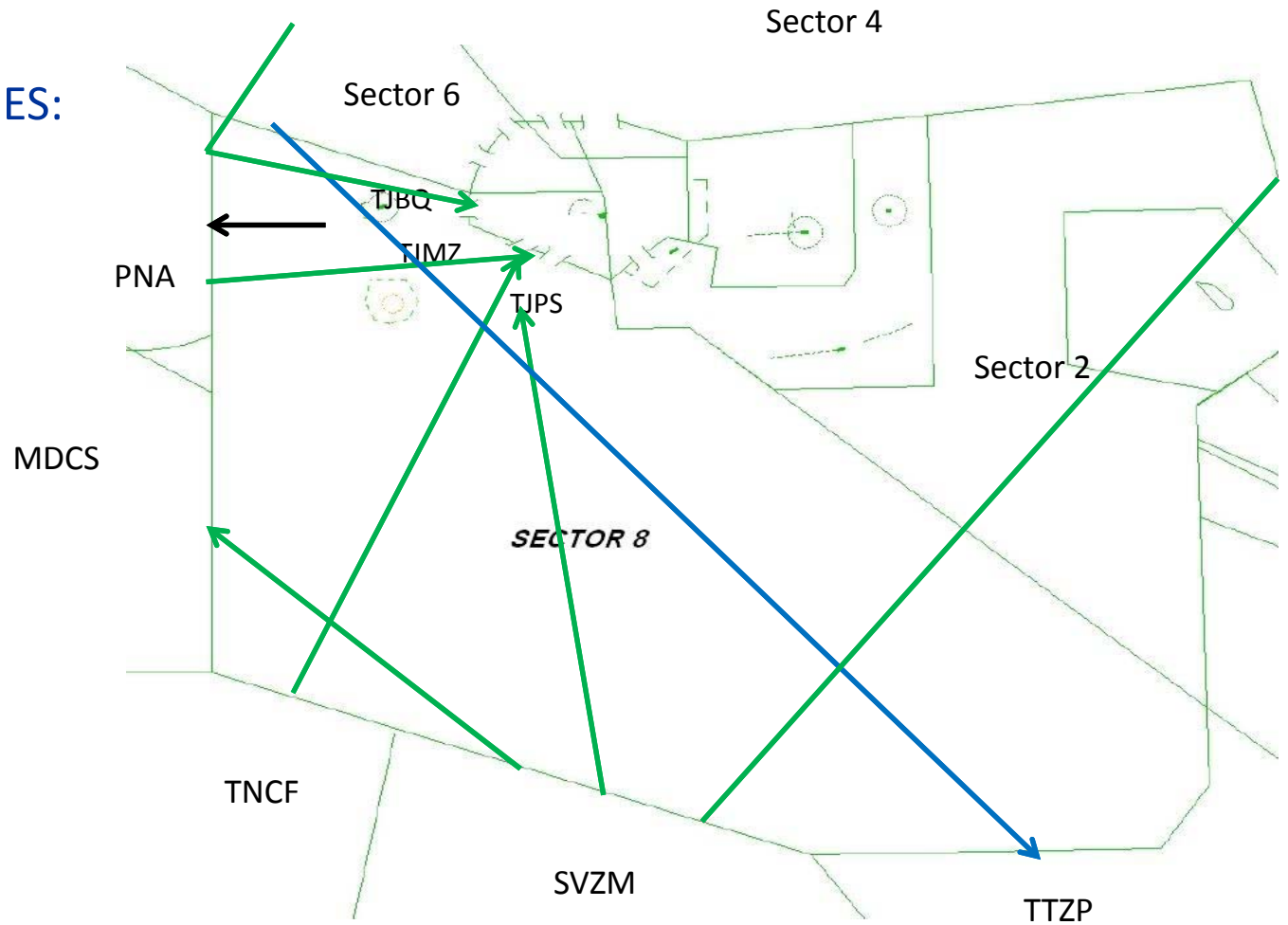
ENROUTE SECTOR 8

ADJACENT FACILITIES:

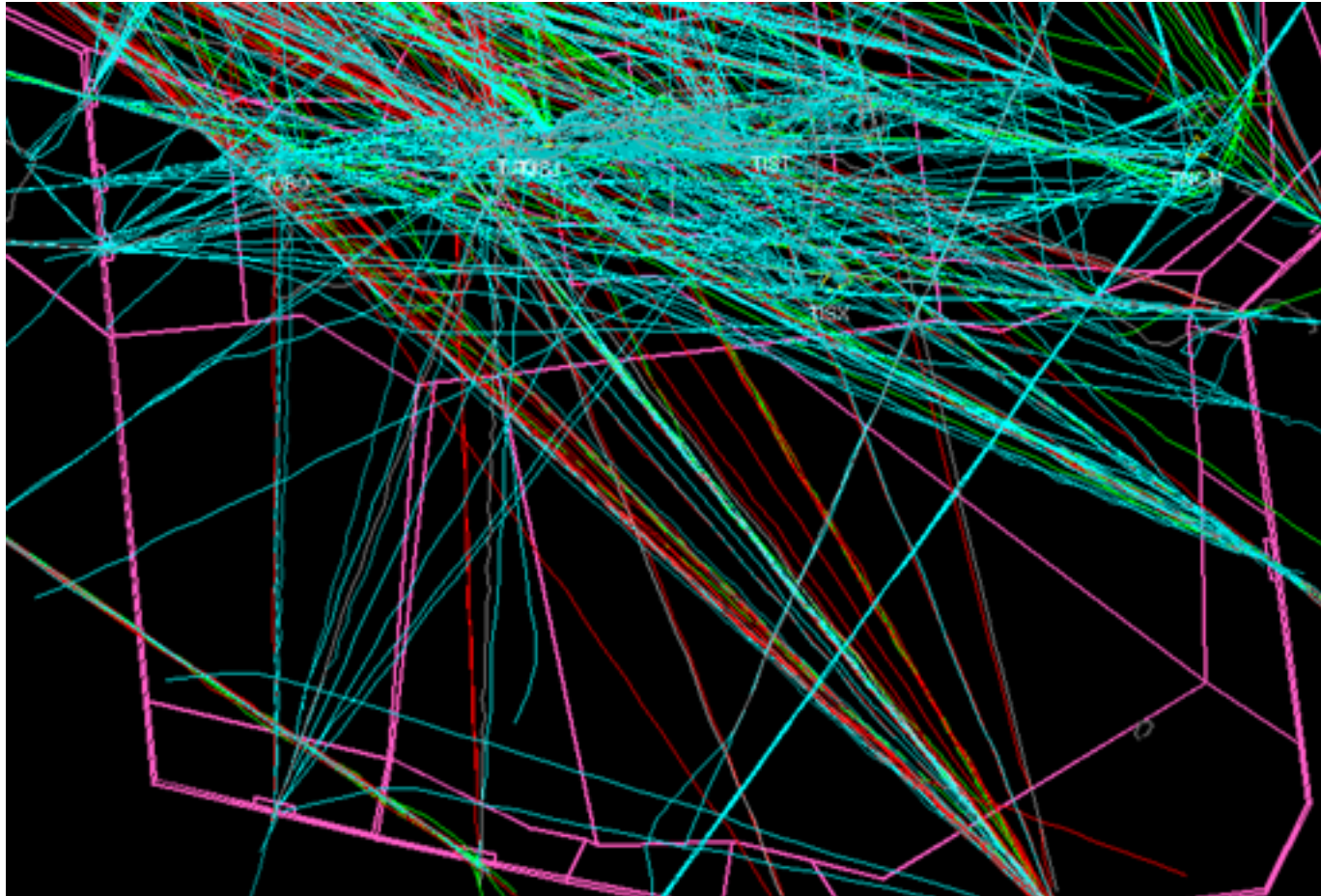
1. MDCS
2. TNCF
3. SVZM
4. MDPC
5. TTZP

AIRPORTS:

1. BQN
2. MAZ
3. PSE



SECTOR R8



South Florida and Caribbean

In Summary

- The South Florida / Caribbean problem is complex and compelling...
 - Infrastructure and airspace needs
 - Solutions are identified and not overly expensive
 - Opportunity to utilize NextGen technology
 - Meaningful safety impacts
 - Benefits opportunity for operators
 - Critical timing with Florida OAPM effort
 - Enthusiasm of industry to participate
- A **comprehensive** approach to this situation is NOT being worked anywhere else
 - Some singular projects underway – a matrix approach would be more effective

Data collection to update the understanding of safety, efficiency and delay impacts in the Miami Oceanic / Caribbean Region

A recommendation on prioritization of the infrastructure components most critical to improving performance in the Region. This also includes recommendation(s) on what else is required to reap the benefits of the new infrastructure (i.e., building new capacity in a facility to be able to utilize an additional frequency).

A recommendation to establish an airspace modernization team for Miami Oceanic and SJU CERAP to maximize use of the proposed connectivity and infrastructure while remaining in harmony with the Florida OAPM effort.