International Civil Aviation Organization

The Thirteenth Meeting of the South China Sea Traffic Flow Review Group (SCSTFRG/13)

Beijing China, 16 – 18 July 2025

Agenda Item 3: Review of the Existing Traffic Flow Route Structures in SCS Airspace and Identifying Priorities

TRAFFIC SAMPLE DATA VISUALIZATION OVER THE SOUTH CHINA SEA AIRSPACE

(Presented by Secretariat and original data supported by MAAR)

SUMMARY

This paper presents the updated visualization of traffic flow over South China Sea airspace and the number of flights on routes A202, A1, L642, M771, N892, L625, M646, A583, A461, N884, A582, M767 and M758, based on Traffic Sample Data (TSD) from 2018 to 2024. The visualization and the number of flights aims to assist the SCSTFRG in reviewing the route structure and traffic flow in this airspace. All graphic and statistical data were supported by MAAR (Monitoring Agency for Asia Region).

1. INTRODUCTION

1.1 MAAR has compiled the visualization of traffic flow based on the TSD collected in December every year. To assist SCSTFRG, visualizations were first presented in the Second Meeting of South China Sea Major Traffic Flow Review Group (SCS-MTFRG/2) meeting held in 2015 to illustrate the route structure and the traffic changes over the years. MAAR also presented the similar visualization to the Bay of Bengal Traffic Flow Review Group (BOBTFRG). During BOBTFRG/5 meeting, MAAR was asked to extent the TSD analysis to specific routes. In coordination with the ICAO Asia and Pacific Regional Sub-Office prior to SCSTFRG/13 meeting, it was agreed to demonstrate traffic on the routes A202, A1, L642, M771, N892, L625, M646, A583, A461, N884, A582, M767 and M758. Thus, this paper presents the updated visualization of traffic flow over the South China Sea airspace and the number of flights on the specified routes based on TSD from 2018 to 2024.

1.2 With the support of this data and information, we will be able to easily identify traffic volume trends and changes along the key air traffic routes in the South China Sea region. This will also help us set priorities for activities that must be carried out with limited time and resources. Furthermore, it will support a better understanding of the importance of communication among Member States concerning each ATS route (MTR), as well as inform the development of practical implementation strategies. We kindly encourage continued contributions from Member States, as the sharing of more detailed traffic data will allow us to produce more accurate and widely useful trend analyses.

2. DISCUSSION

2.1 Data limitations of TSD, used to generate the visualization of traffic flow and the comparison of flight numbers presented in this paper, are:

- TSD from each State is generated differently. Data may be extracted from each ANSP's ATM system, prepared manually, processed from flight plans (FPLs), or submitted in raw FPL format. Consequently, the nature of each TSD varies; for instance, some datasets are based on actual flight trajectories, while others reflect only planned trajectories

- Some datasets may lack significant points inside the FIR, while others may be missing a significant portion of flights.

2.2 **Attachment 1** to this paper shows the visualization figure and line graphs of traffic flow in South China Sea Airspace, where **blue lines** represent **westbound movements** and **orange lines** represent **eastbound movements** in the visualization figure. The **thickness** of each line reflects the **volume of traffic** in December each year. Additionally, **Attachment 2** to this paper shows the comparison of flight numbers and line graphs on the crucial ATS routes. The statistical table and trend lines together help clearly illustrate how traffic volumes have changed each year on each route, including A1, A202, L642, M771, N892, L625, M646, A583, A461, N884, A582, M767 and M758, based on TSD from 2018 to 2024.

2.3 In addition, we created a broken line graph to show the traffic volume change drifts for each route in the west/east direction in **Attachment 1 & 2,** based on the raw data provided. As shown in the attached figures and graphs, you would be able to find somehow trends in traffic volume changes. Before interpreting this data, we should assume that the statistics for one flight section of each route were chosen as a sample data for the single traffic volume of each route.

2.4 **DISCLAIMER**: This air traffic volume statistic data was provided by MAAR and is only for a reference document processed using partial sample data from certain flight sections of each ATS route. It is intended solely for the purpose of confirming trends in traffic volume changes at this meeting. Therefore, it should be noted that this does not represent the official views of ICAO or MAAR regarding air traffic data in the South China Sea region.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper; and

b) discuss any relevant matters as appropriate.

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Attachment A

The visualization of traffic flow in South China Sea Airspace based on Traffic Sample Data (TSD) from 2018 to 2024.

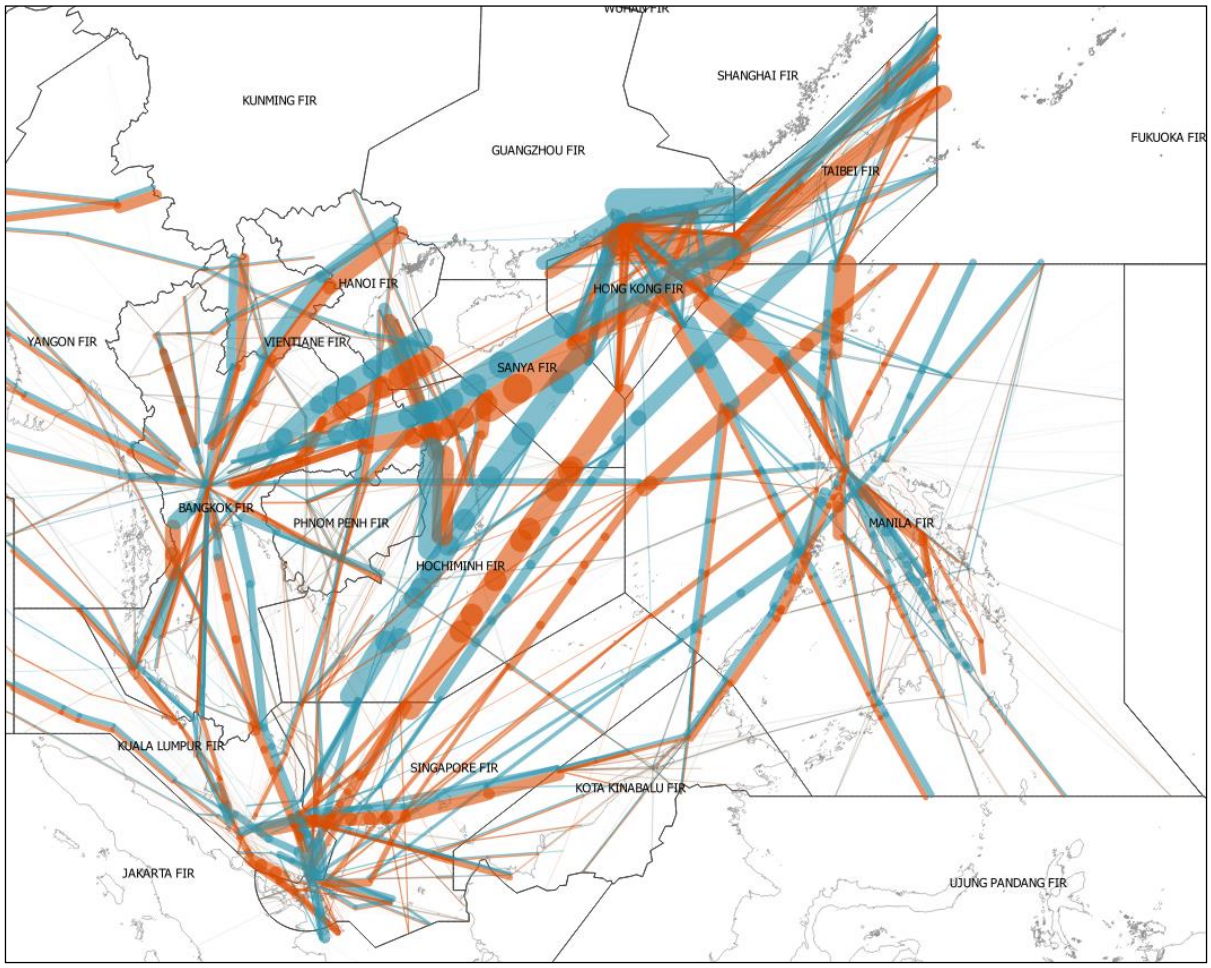


Figure 1: 2018 Traffic Flow from TSD in South China Sea Airspace

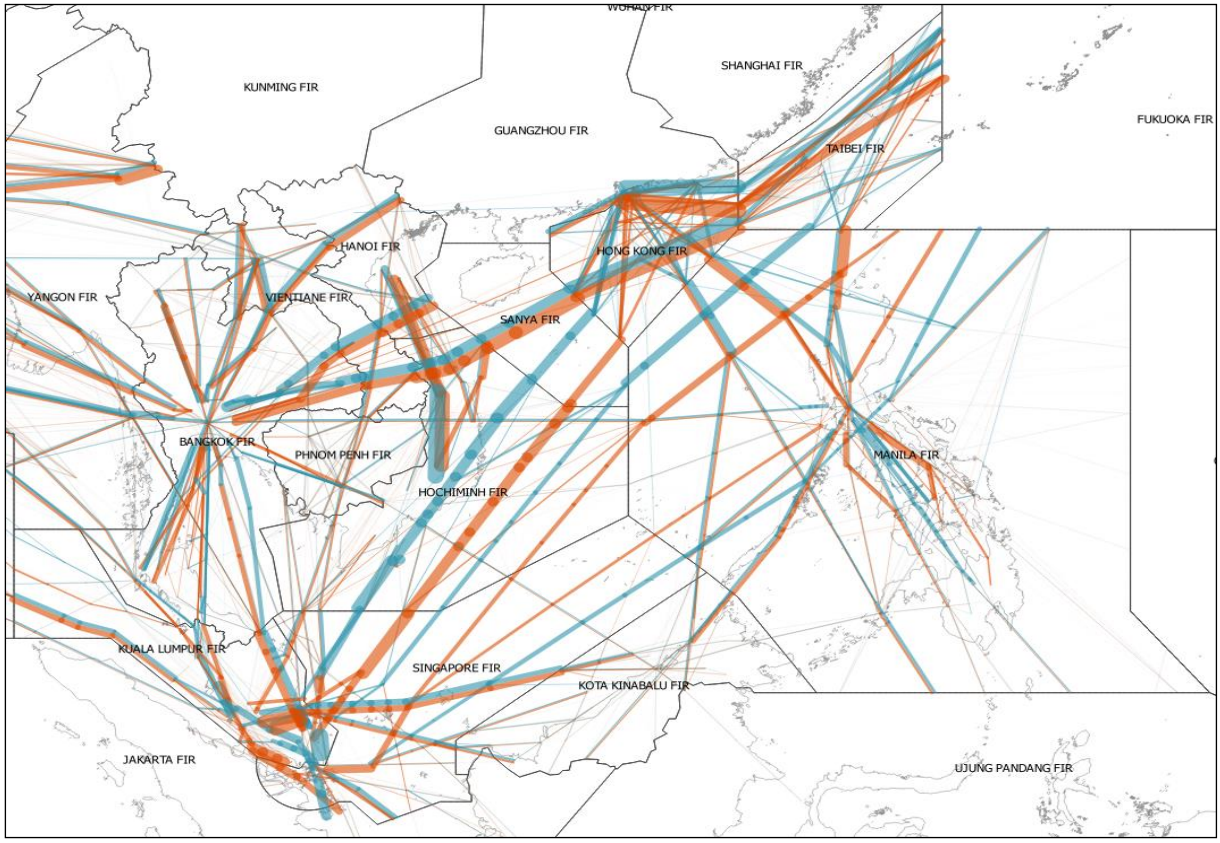


Figure 2: 2019 Traffic Flow from TSD in South China Sea Airspace

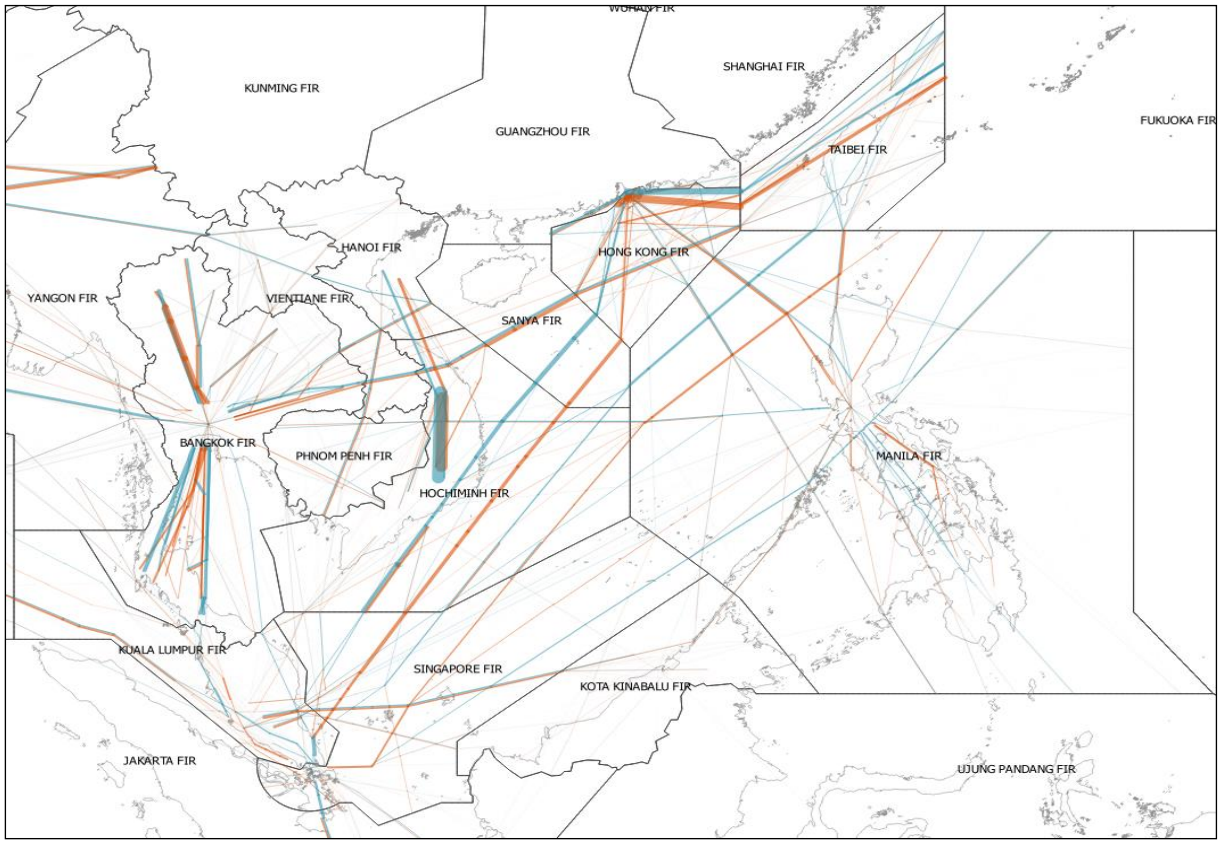


Figure 3: 2020 Traffic Flow from TSD in South China Sea Airspace

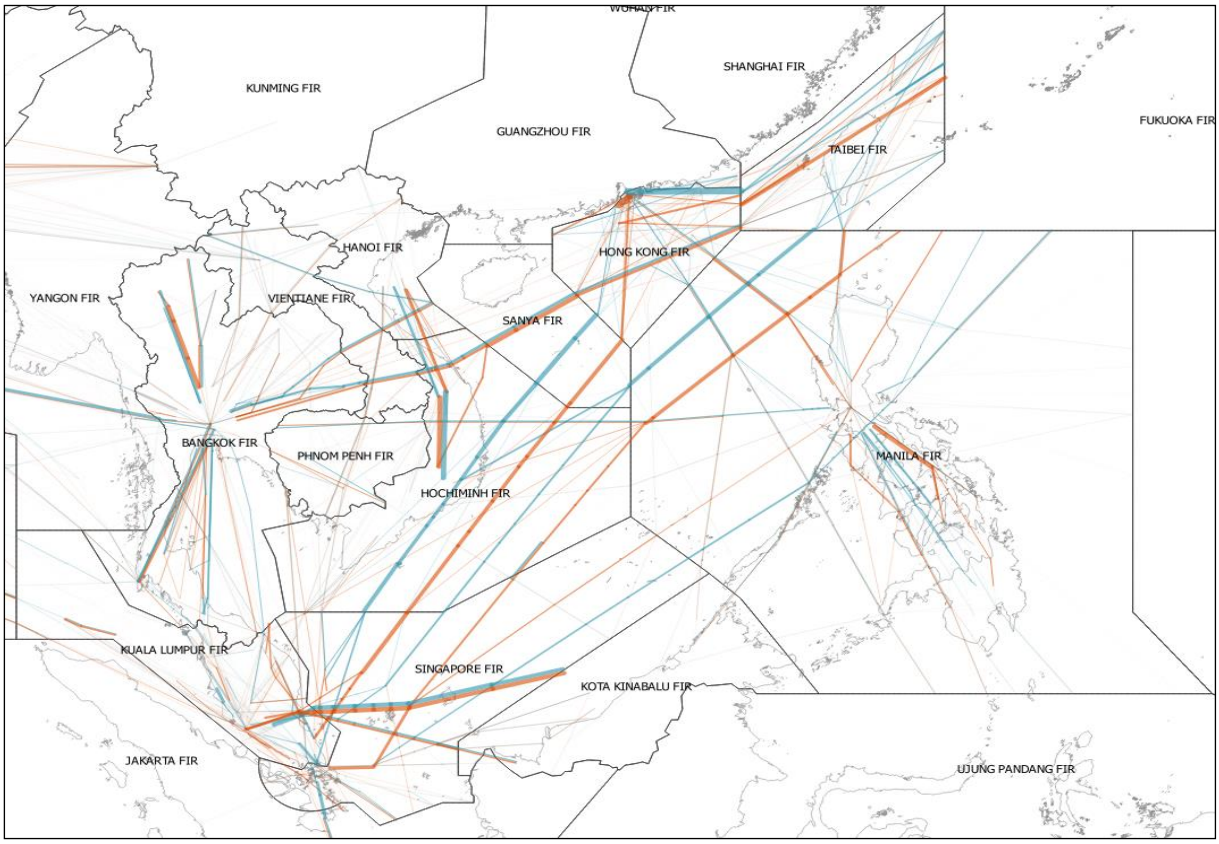


Figure 4: 2021 Traffic Flow from TSD in South China Sea Airspace

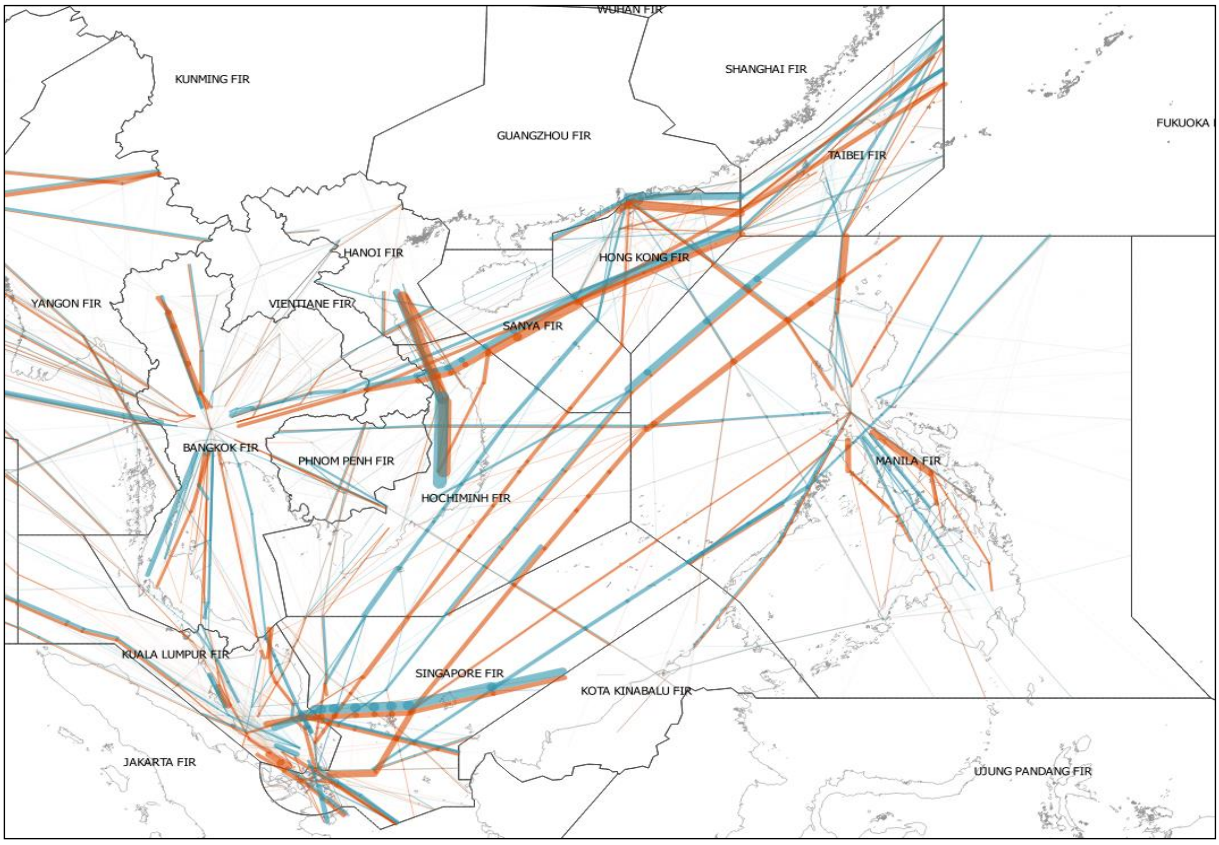


Figure 5: 2022 Traffic Flow from TSD in South China Sea Airspace

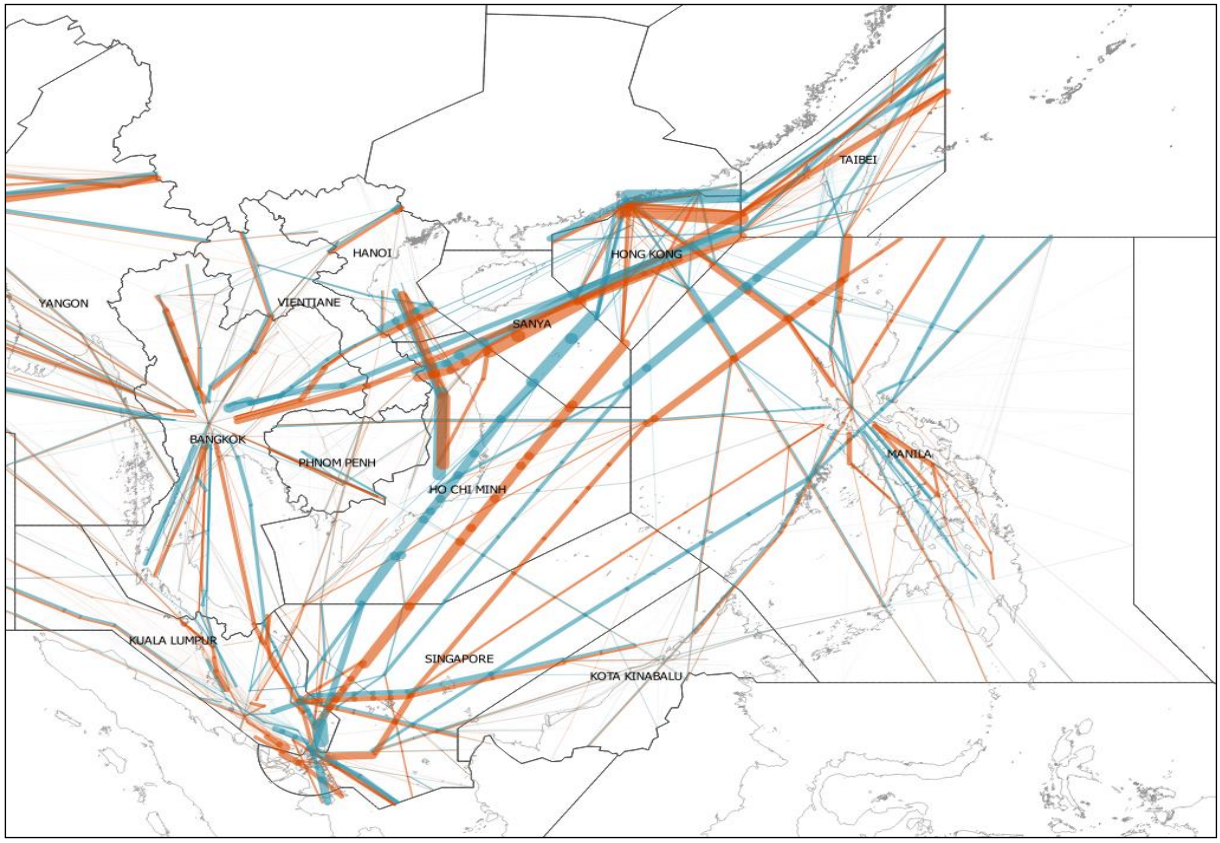


Figure 6: 2023 Traffic Flow from TSD in South China Sea Airspace

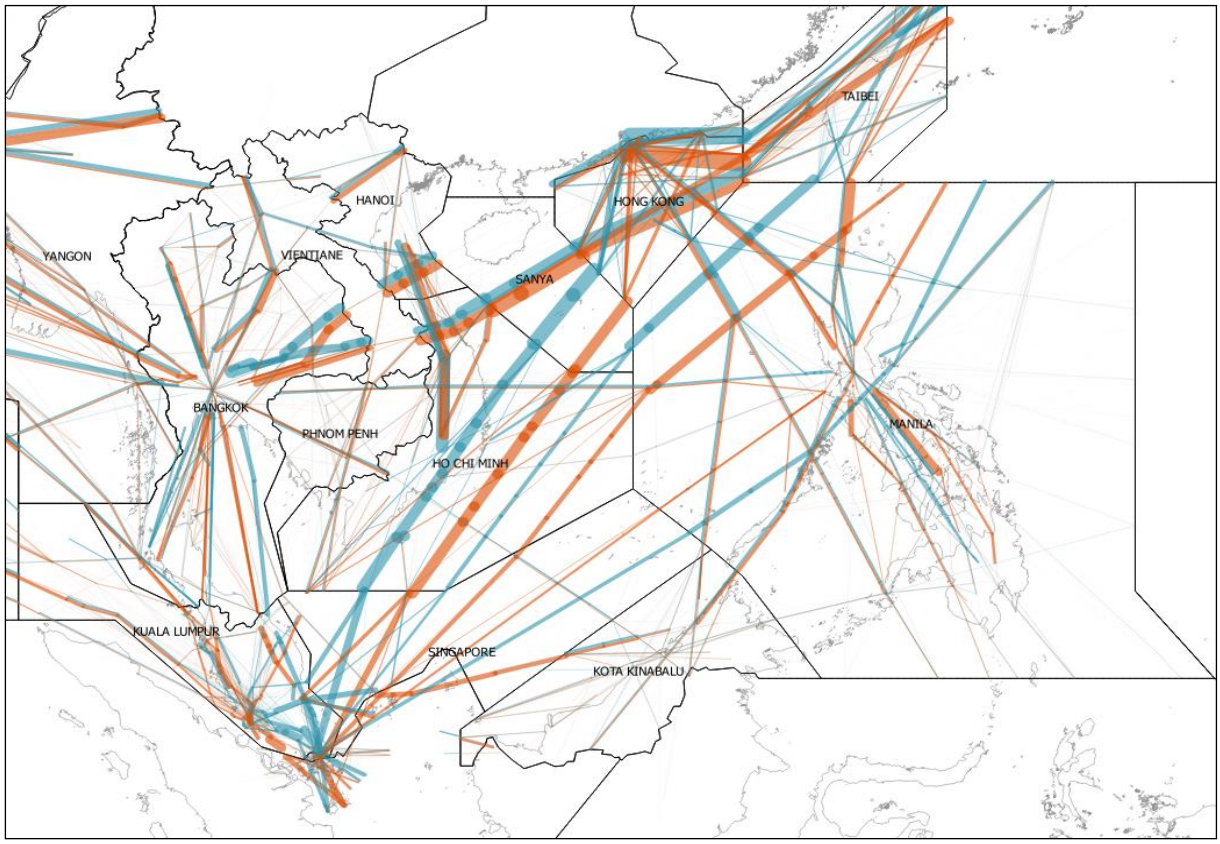
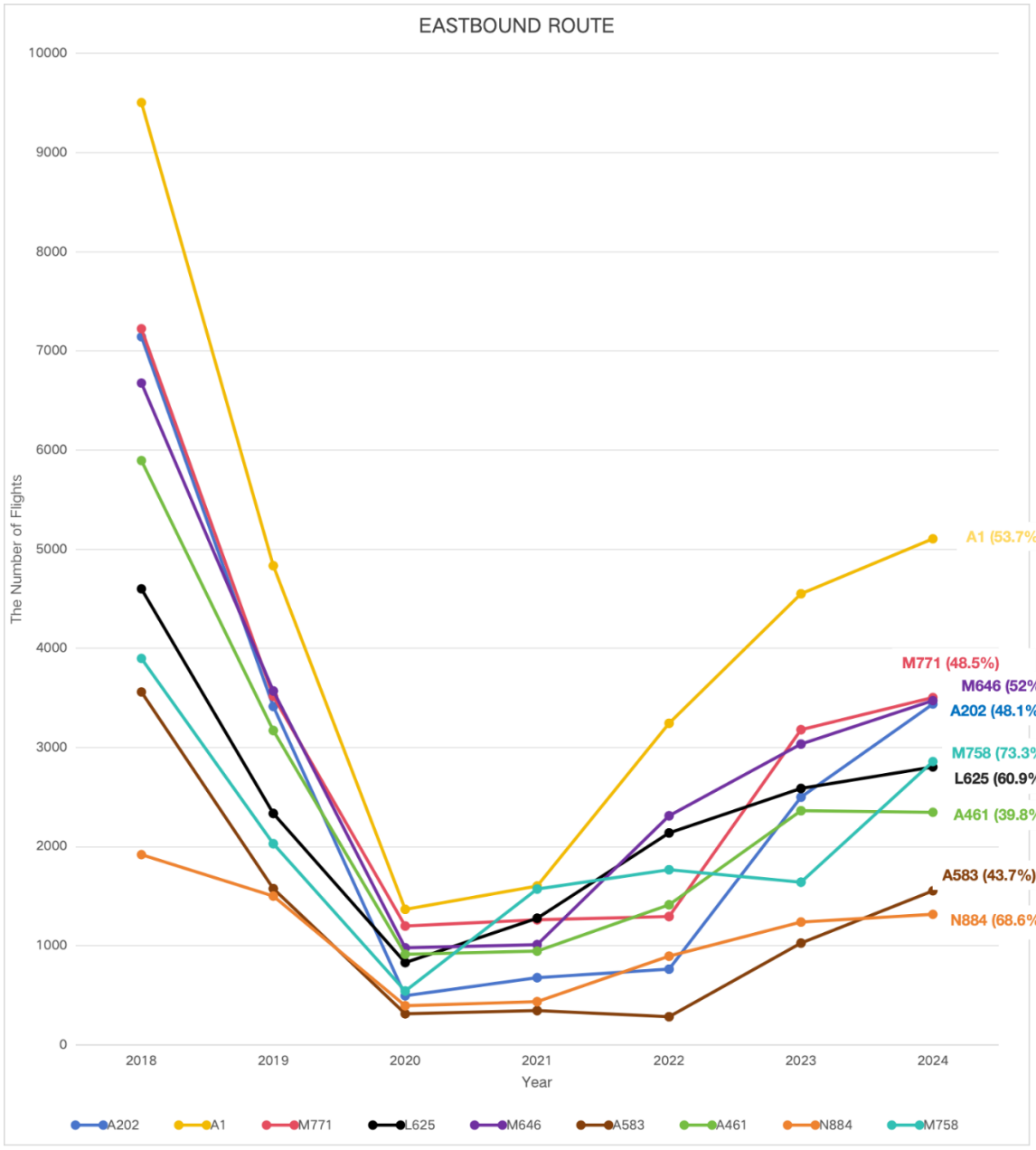


Figure 7: 2024 Traffic Flow from TSD in South China Sea Airspace



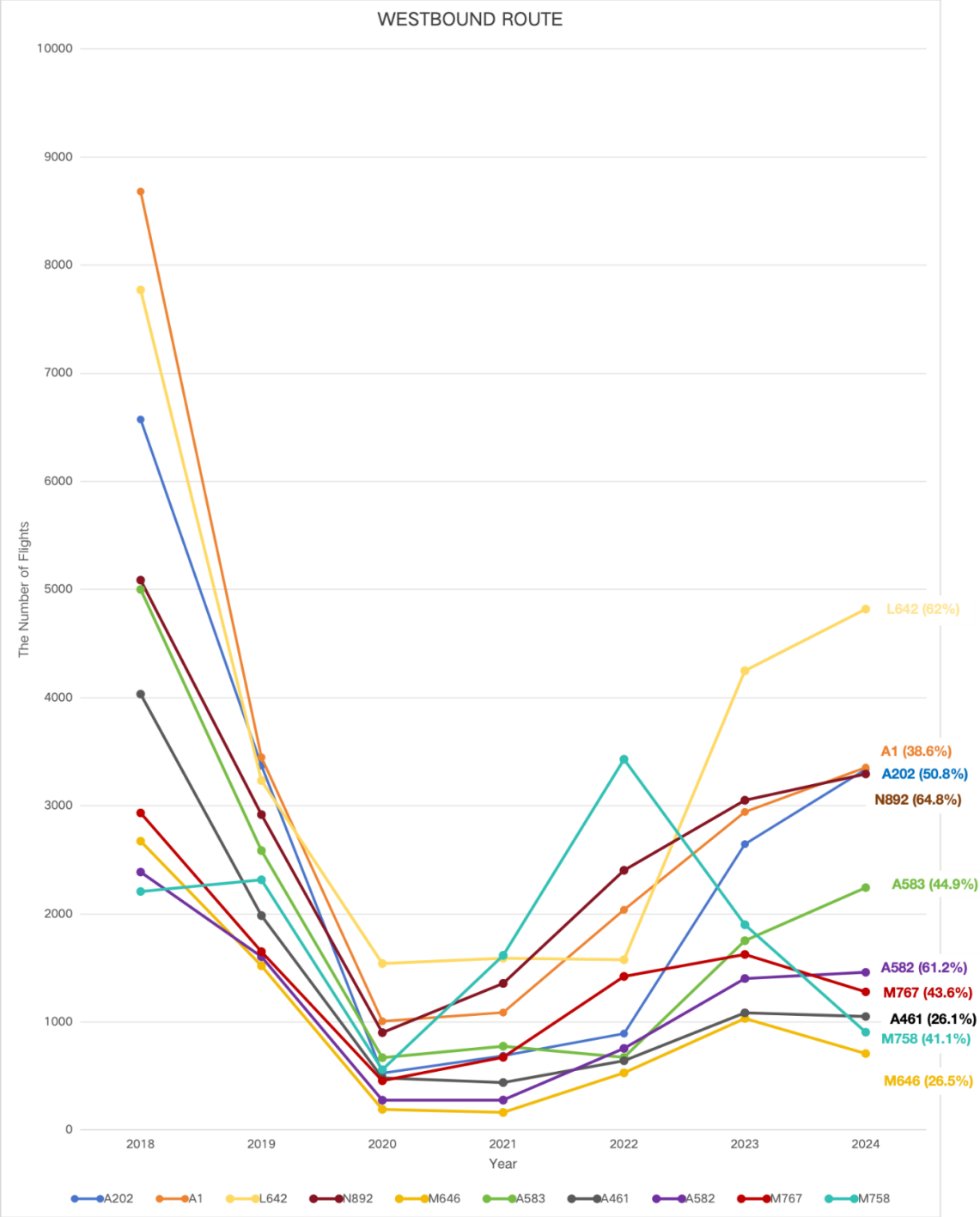
Statistical analysis method and results

1.1 All analyses were based on 2018 statistics as 100%. The rate of recovery in 2024 compared to 2018 statistics was confirmed and presented in the statistics graph for each year. We only described **the top three routes** from **the results of the analysis of changes**, focusing on the routes with the highest traffic volume. For the remaining routes, **please refer to the trends for each year based on the 2018 statistics** through the same way forementioned**.**

1.2 Compared to 2018, among **the eastbound traffic**, the **A1** ATS route has **recovered to 53.7%**, the **A202 route to 48.1%**, and the **M771 route to 48.5%**.

Total East

Route		The number of flights							
		2018	2019	2020	2021	2022	2023	2024	
A202	VILAO to ASSAD	7143	3414	496	678	764	2499	3438	48.1%
A1	LENKO to IKELA	9505	4833	1367	1602	3244	4550	5105	53.7%
M771	DUDIS to DAGAC	7224	3517	1199	1262	1295	3179	3504	48.5%
L625	ARESI to AKOTA	4600	2334	830	1277	2138	2587	2803	60.9%
M646	Eastbound	6676	3570	979	1011	2311	3034	3473	52.0%
A583	Eastbound	3560	1576	314	346	284	1027	1554	43.7%
A461	Eastbound	5894	3171	914	946	1413	2362	2346	39.8%
N884	DADNU to LEBIX	1919	1501	395	436	895	1239	1317	68.6%
M758	Eastbound	3898	2029	543	1572	1767	1641	2858	73.3%



1.3 Looking at the opposite direction, westbound, the following trends can be observed. For the year 2018, the **A1 westbound route in 2024** has recovered to **38.6%**, likewise the **A202** route to **50.8%**, and the **L642** route to **62.0%**.

1.4 When examining the 2024 traffic volume data, it would be deemed as traffic volume has not yet fully recovered to 2018 levels. However, based on the upward trend in the graph, it is anticipated that traffic volume will gradually recover to pre-COVID-19 levels depending on the economic recovery of the Asia-Pacific region.

Total West

Route		The number of flights							
		2018	2019	2020	2021	2022	2023	2024	
A202	ASSAD to VILAO	6573	3371	527	688	893	2645	3337	50.8%
A1	IKELA to LENKO	8681	3448	1007	1088	2038	2943	3354	38.6%
L642	EPKAL to EXOTO	7771	3233	1541	1590	1576	4249	4819	62.0%
N892	KABAM to MIKIN	5087	2918	902	1357	2403	3051	3294	64.8%
M646	Westbound	2673	1520	192	164	530	1033	708	26.5%
A583	Westbound	5001	2585	670	776	673	1752	2243	44.9%
A461	Westbound	4033	1984	483	440	642	1085	1051	26.1%
A582	Westbound	2387	1604	277	279	756	1402	1460	61.2%
M767	Westbound	2934	1650	457	674	1422	1625	1279	43.6%
M758	Westbound	2207	2315	559	1616	3430	1900	906	41.1%

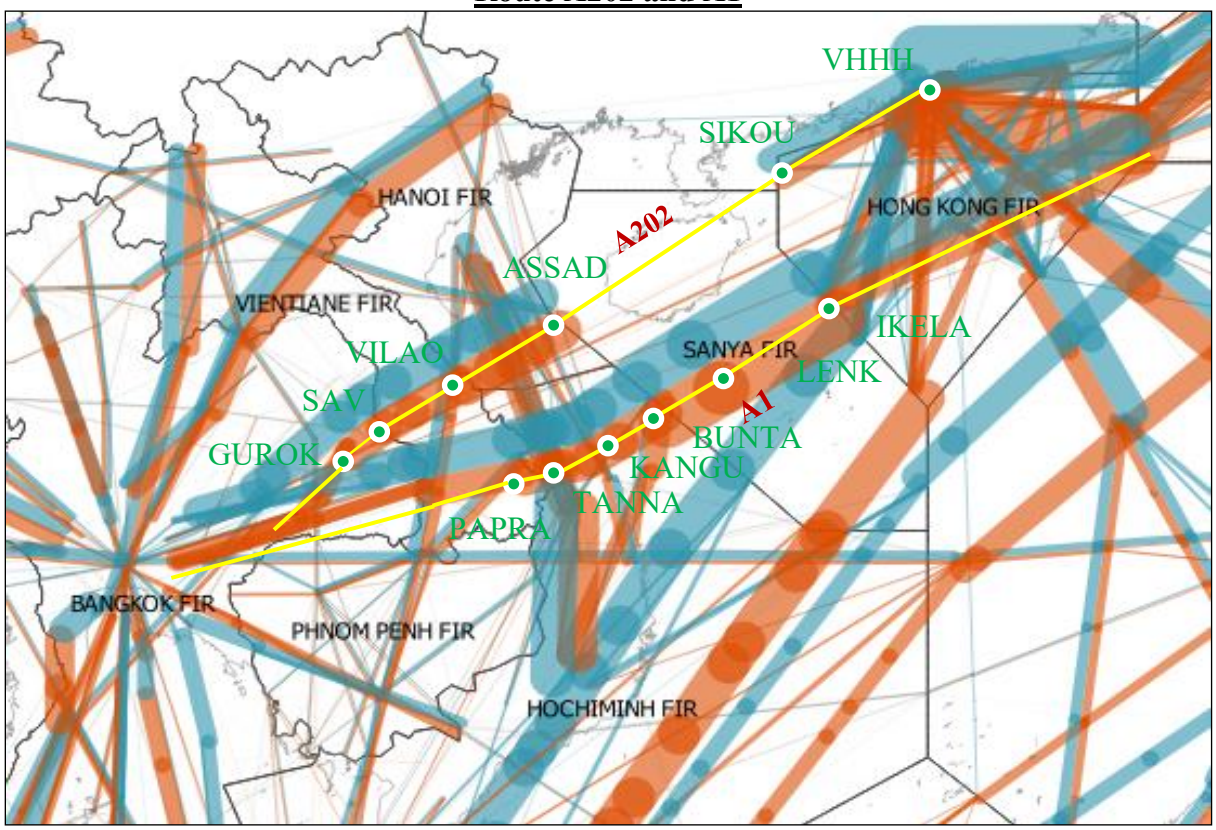
Attachment B

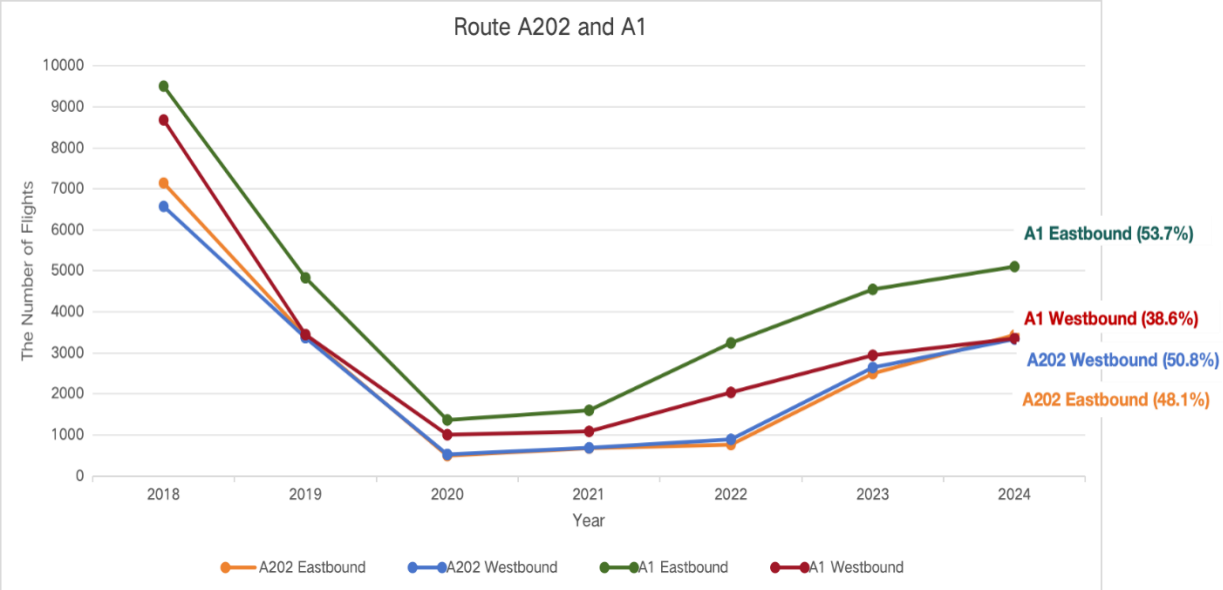
The number of flights in the South China Sea airspace based on Traffic Sample Data (TSD) from 2018 to 2024

1.5 **Caveats in the Attachment 2**: Please be advised of the following points when using the sample traffic volume data provided by MAAR for each section of the ATS routes.

To illustrate annual trends, MAAR and ICAO selected the section with the highest traffic volume in 2018 to represent each ATS route. This approach was taken to ensure consistency when comparing data across years. It is important to note that the data reflects traffic volume for selected sections only, not the total volume for the entire route.

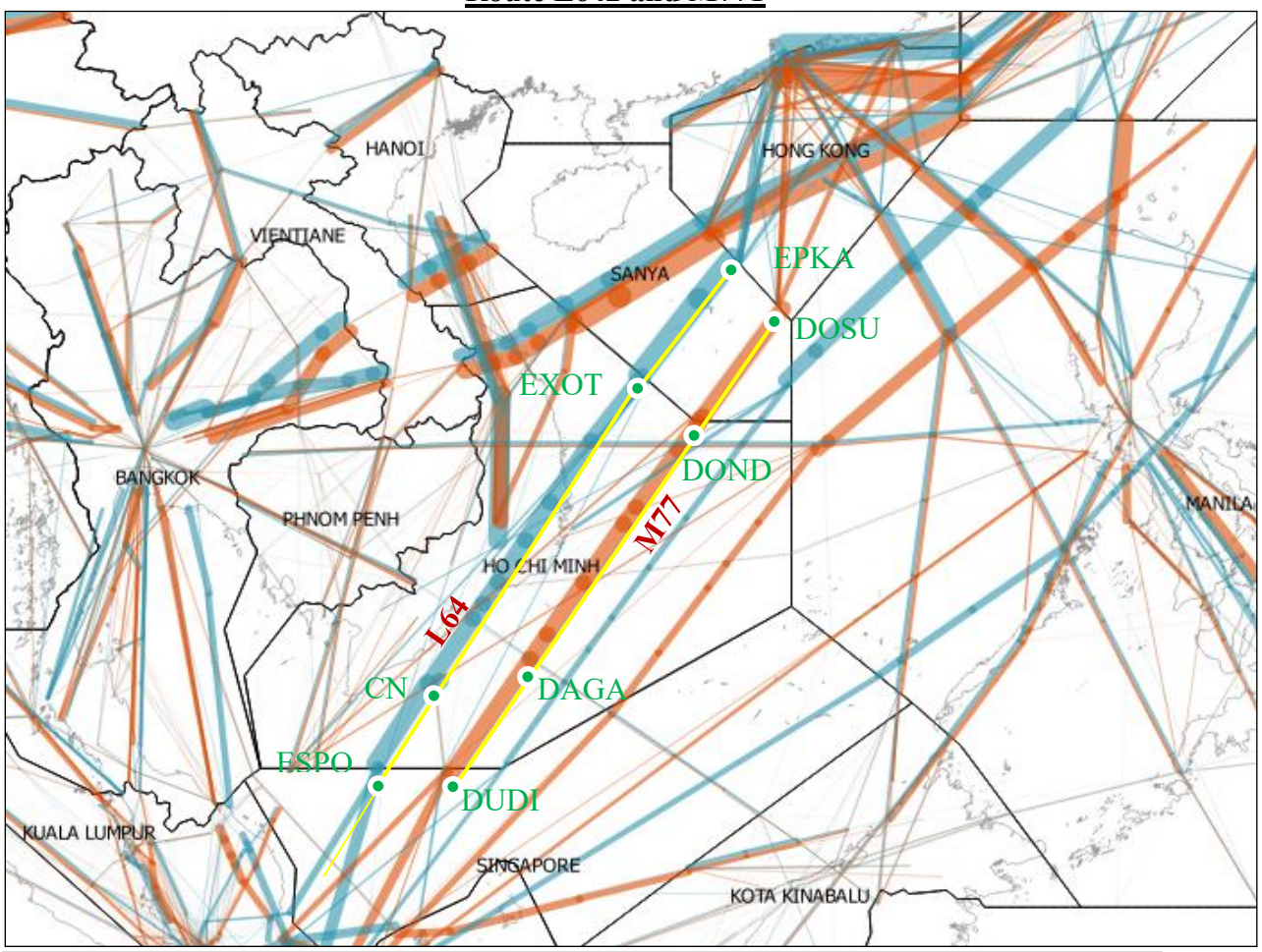
Route A202 and A1

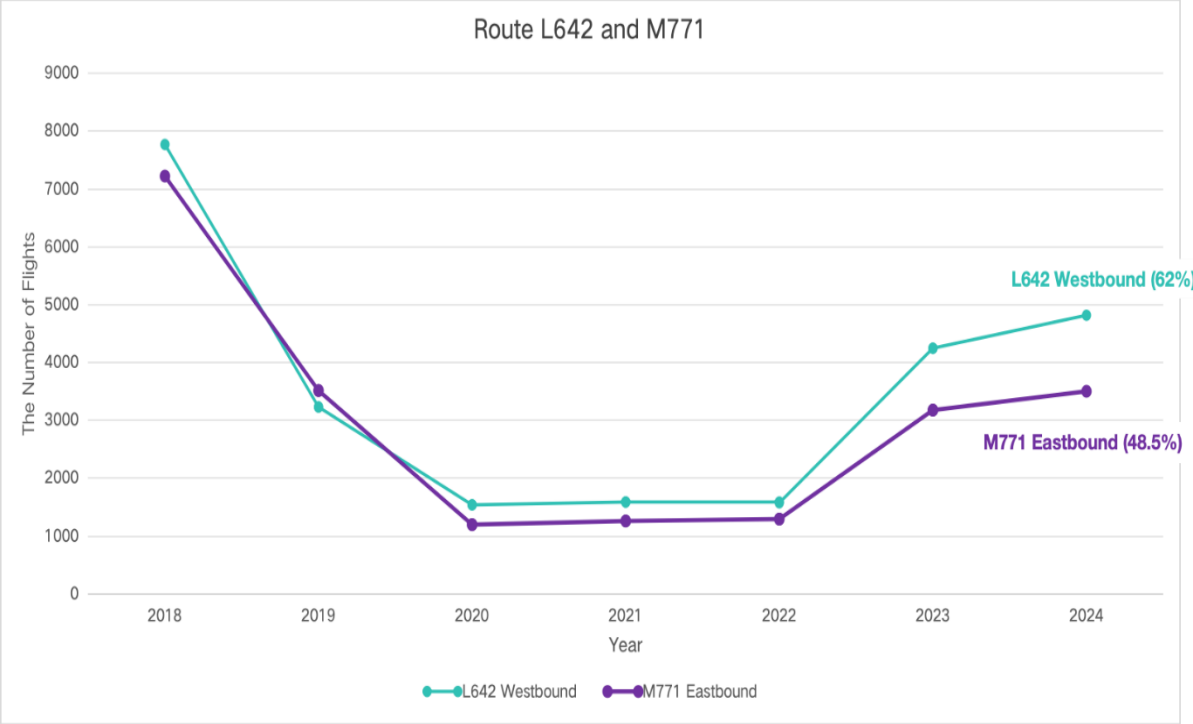




Route	Portion	Direction	The number of flights						
			2018	2019	2020	2021	2022	2023	2024
A202	GUROK to SAV	Eastbound	5689	2453	282	531	226	1414	3090
A202	VILAO to ASSAD	Eastbound	7143	3414	496	678	764	2499	3438
A202	SIKOU to VHHH	Eastbound	3466	1435	431	492	649	1190	1352
A202	VHHH to SIKOU	Westbound	4639	1942	1040	3	1443	2339	2504
A202	ASSAD to VILAO	Westbound	6573	3371	527	688	893	2645	3337
A202	SAV to GUROK	Westbound	6132	2887	410	681	148	1411	3400
A1	PAPRA to TANNA	Eastbound	6675	4176	734	945	2078	2993	3646
A1	KANGU to BUNTA	Eastbound	6705	4190	734	945	2075	2940	3635
A1	LENKO to IKELA	Eastbound	9505	4833	1367	1602	3244	4550	5105
A1	IKELA to LENKO	Westbound	8681	3448	1007	1088	2038	2943	3354
A1	BANTA to KANGU	Westbound	7204	3758	849	964	2179	3796	4241
A1	TANNA to PAPRA	Westbound	7198	3744	849	963	2157	2844	3150

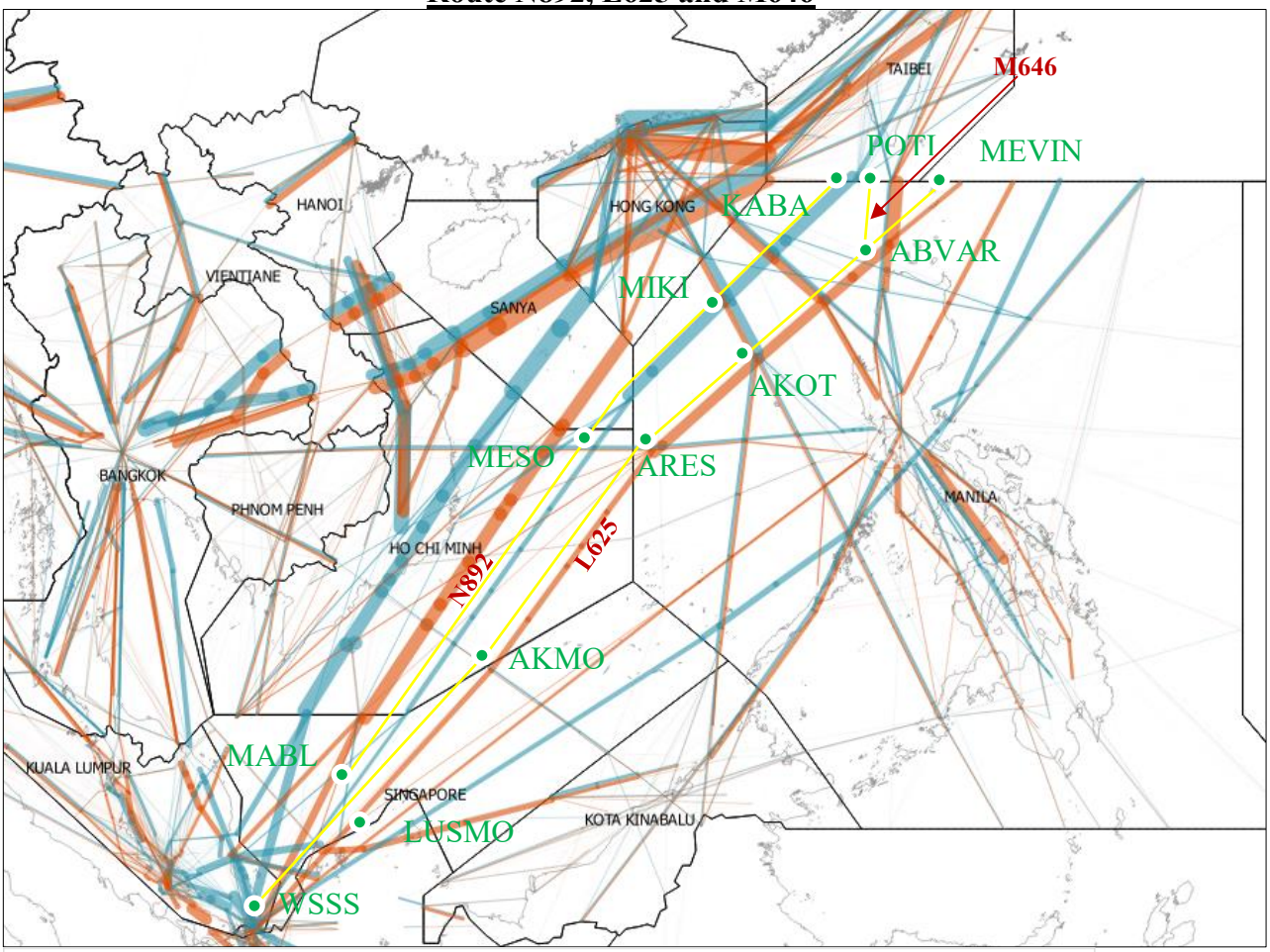
Route L642 and M771

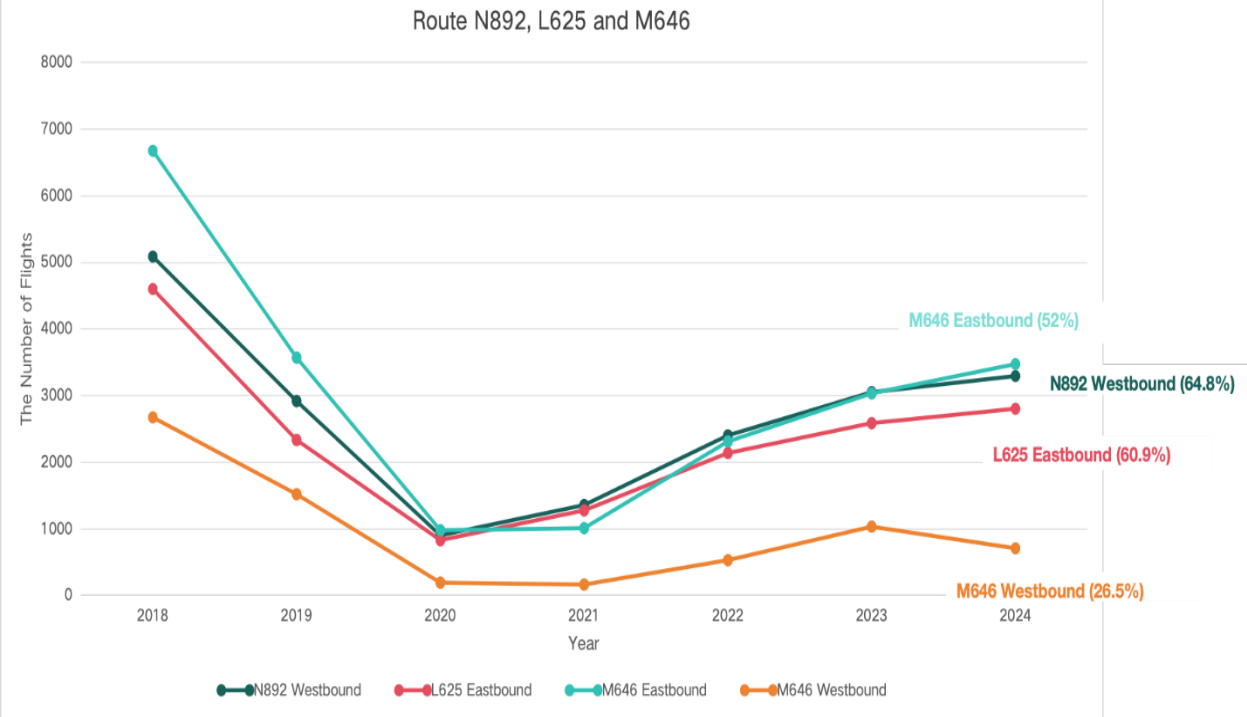




Route	Portion	Direction	The number of flights						
			2018	2019	2020	2021	2022	2023	2024
L642	EPKAL to EXOTO	Westbound	7771	3233	1541	1590	1576	4249	4819
L642	CN to ESPOB	Westbound	7438	4146	1267	1384	1786	3510	3952
M771	DUDIS to DAGAC	Eastbound	7224	3517	1199	1262	1295	3179	3504
M771	DONDA to DOSUT	Eastbound	6711	2608	1265	1332	1281	3367	3498

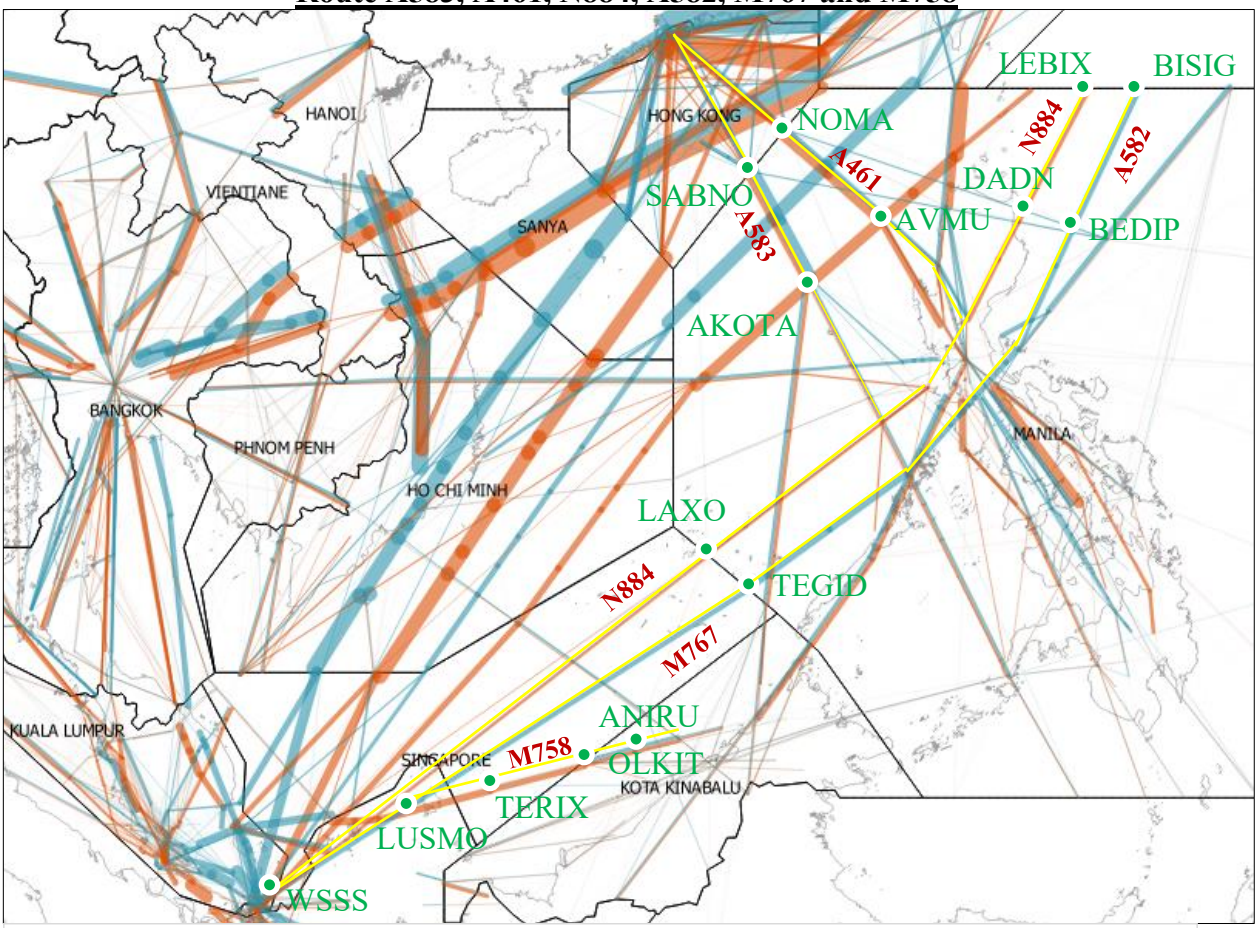
Route N892, L625 and M646

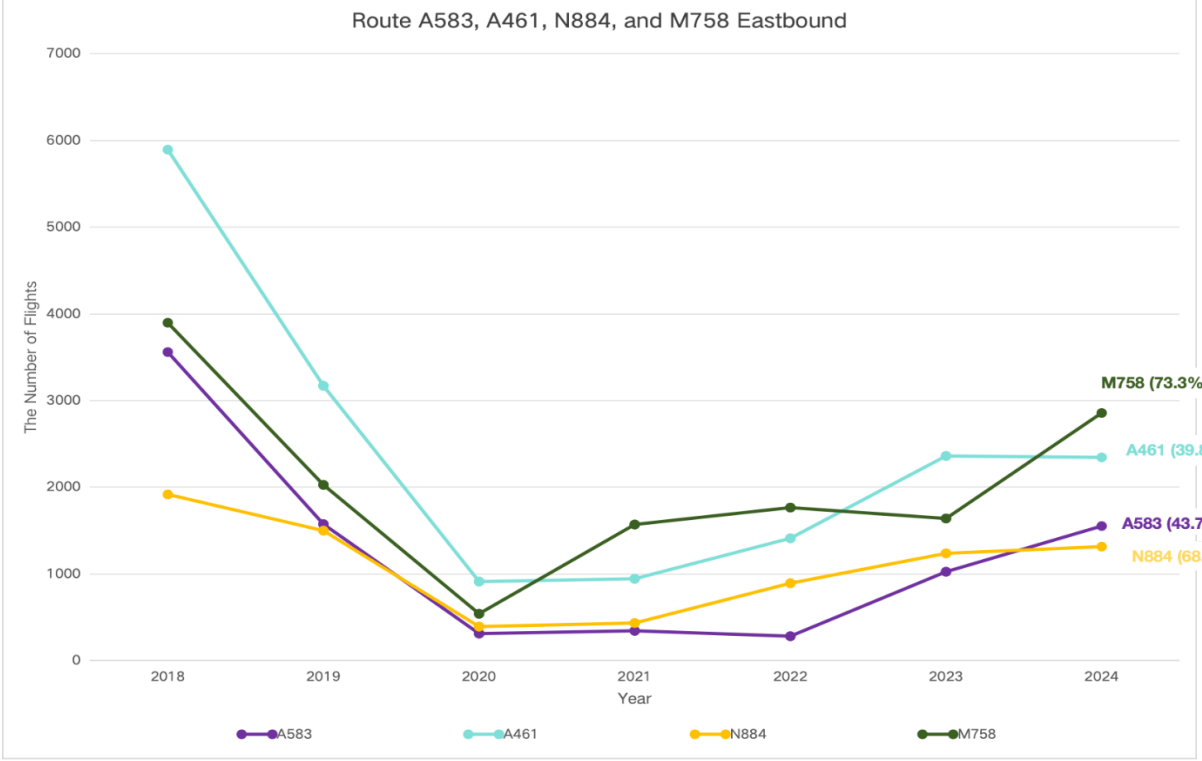


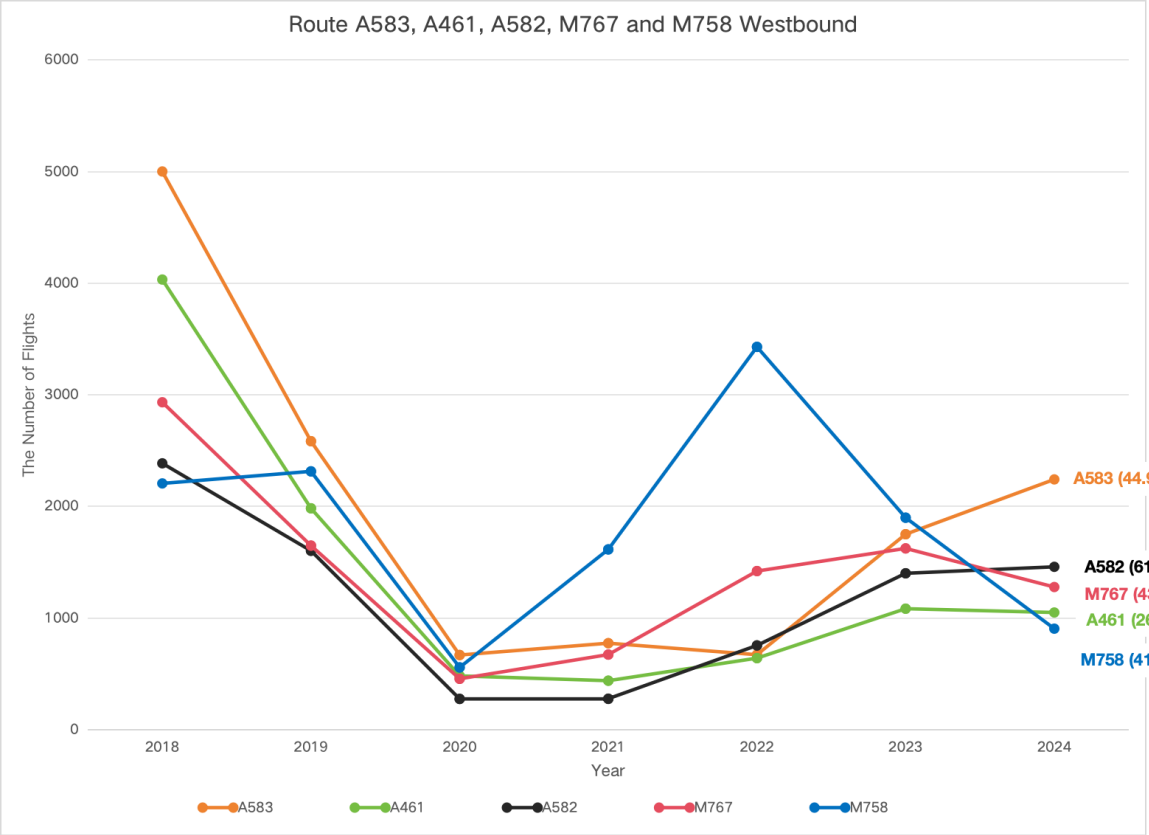


Route	Portion	Direction	The number of flights						
			2018	2019	2020	2021	2022	2023	2024
N892	KABAM to MIKIN	Westbound	5087	2918	902	1357	2403	3051	3294
N892	MESOX to MABLI	Westbound	3111	1560	467	673	1073	1359	1378
L625	LUSMO to AKMON	Eastbound	2780	1423	456	710	1522	1581	-
L625	WSSS to AKMON	Eastbound	-	-	-	-	-	-	1443
L625	ARESI to AKOTA	Eastbound	4600	2334	830	1277	2138	2587	2803
L625	ABVAR to MEVIN	Eastbound	2209	1215	291	606	1112	1337	1258
M646	ABVAR to POTIB	Eastbound	6676	3570	979	1011	2311	3034	3473
M646	POTIB to ABVAR	Westbound	2673	1520	192	164	530	1033	708

Route A583, A461, N884, A582, M767 and M758







Route	Portion	Direction	The number of flights						
			2018	2019	2020	2021	2022	2023	2024
A583	SABNO to AKOTA	Eastbound	3560	1576	314	346	284	1027	1554
A583	AKOTA to SABNO	Westbound	5001	2585	670	776	673	1752	2243
A461	NOMAN to AVMUP	Eastbound	5894	3171	914	946	1413	2362	2346
A461	AVMUP to NOMAN	Westbound	4033	1984	483	440	642	1085	1051
N884	LUSMO to LAXOR	Eastbound	876	1036	282	424	864	927	-
N884	WSSS to LAXOR	Eastbound	-	-	-	-	-	-	811
N884	DADNU to LEBIX	Eastbound	1919	1501	395	436	895	1239	1317
A582	BISIG to BEDIP	Westbound	2387	1604	277	279	756	1402	1460
M767	TEGID to TERIX	Westbound	2934	1650	457	674	1422	1625	-
M767	TEGID to WSSS	Westbound	-	-	-	-	-	-	1279

		Sum	2934	1650	457	674	1422	1625	1279
M758	LUSMO to TERIX	Eastbound	3898	2029	543	1572	1767	1641	1777
M758	OLKIT to ANIRU	Eastbound	-	-	-	-	-	-	1081
M758	TERIX to LUSMO	Westbound	2207	2315	559	1616	3430	1900	-
M758	ANIRU to OLKIT	Westbound	-	-	-	-	-	-	906
		Sum	2207	2315	559	1616	3430	1900	906