SAN DIEGO INTERNATIONAL AIRPORT
LET'S GO.

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Fly Quiet Report

Calendar Year 2022

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1.0 Summary of the 2022 Report

Planning & Environmental Affairs (Aircraft Noise Office) publishes an annual report that outlines trends on how quietly each operator flies in and out of San Diego International Airport (SDIA). This is a summary of the Fly Quiet Report for 2022.

To better align with ANAC reporting periods, we have adjusted the program evaluation period to a Calendar Year. This will allow for facilitation of the awards approval by ANAC in February, and award coordination and Board presentation to the carriers in April of each year.

Observations for 2022:

- Stage 4 aircraft use has expanded significantly, improving fleet quality scores.
- Lufthansa and British Airways began to use Stage 5 aircraft for their San Diego International Airport operations.
- Noise Curfew Violation impacts have been significant in 2022, causing four airlines to have negative Curfew Compliance component scores.

This year's winners:

- Large Domestic Carrier – Southwest Airlines
- Small Domestic Carrier – Spirit Airlines
- Cargo Carrier – DHL
- International Carrier – Lufthansa

2.0 Fly Quiet Program Description

The purpose of the SDIA Fly Quiet Program is to encourage individual Air Carriers to fly as quietly as possible in the San Diego area by acknowledging those Carriers that operate the quietest fleets and adhere to Authority Use Regulations (Curfew)[1]. By grading an Air Carrier's performance and making the scores available to the public, the program creates a participatory atmosphere for Carriers to actively reduce noise impacts.

The Fly Quiet Program offers a dynamic venue for reviewing noise abatement initiatives by praising and publicizing active participation rather than a system that admonishes violations from essentially voluntary procedures.

2.1 Reports

Fly Quiet reports communicate individual category results on an annual basis on a scale of 0-10 per element. These quantitative scores allow Air Carrier management and flight personnel to measure exactly how they stand compared to other carriers and how their proactive involvement can positively reduce noise in the San Diego area. Each year has a maximum value of 30 points.

2.2 Awards

At the end of the year, awards will be presented to the carriers in the following categories:

- Large Domestic Carrier (10% of SAN passengers or more)
- Small Domestic Carrier (Less than 10% of SAN passengers)
- Air Cargo Carrier (All Cargo Carriers operating at SAN)
- International Carrier (All International Carriers operating at SAN)

2.3 Elements

The Fly Quiet Program scores Air Carriers on the following three elements that will be described in detail in the next section. The elements are:

- Fleet Quality
- Noise Exceedances
- Curfew Compliance

[1] San Diego County Regional Airport Authority Code 9.40, Airport Use Regulations: https://www.san.org/DesktopModules/Bring2mind/DMX/API/Entries/Download?EntryId=12229&Command=Core_Download&language=en-US&PortalId=0&TabId=499

2.3.1 Fleet Quality

The Fleet Quality score evaluates the noise contribution of each operator's fleet mix as it actually operates at SDIA. Carriers generally own a variety of aircraft types and schedule them according to operational needs, passenger/cargo demand and other marketing considerations. The Fly Quiet Program assigns a higher score to carriers flying quieter, newer aircraft, and to those that adhere to the curfew.

Historically airports have rated Fleet Quality by the relative percentage of Stage 2 vs. Stage 3 operations[2]. Since the completion of the phase out of Stage 2 aircraft mandated by the Airport Noise and Capacity Act (ANCA) of 1990, all aircraft in the U.S. over 75,000 pounds meet the more stringent Stage 3 noise standards. However, within the allowable Stage 3 criteria, there is a wide range of noise levels, and the Federal Aviation Administration (FAA) does not distinguish between these aircraft types.

There are now Stage 4 and Stage 5 aircraft types entering service. All *new design aircraft* over 12,500 pounds issued a type certificate after January 1, 2006, were required to meet Stage 4 standards. The new Stage 5 noise standard applies to any application for a new airplane type design that has a Maximum Certificated Takeoff Weight (MTOW) of 121,254 pounds or more on or after December 31, 2017; or that has a MTOW of less than 121,254 pounds on or after December 31, 2021.

The method used here bases an operator's Fleet Quality Score on aircraft manufacturer noise certification data. For each aircraft type, 14 CFR Part 36 specifies allowable noise levels at three measurement locations: approach, departure, and sideline[3]. Per 14 CFR Part 36 allowable noise limits increase with weight, so that larger aircraft, serving more passengers, are not penalized as compared to smaller types.

The scoring method for the Fleet Quality totals the difference between each aircraft's certified noise levels at all three measuring points (takeoff, approach and sideline) and the Stage 3 standard for that aircraft type, weight and engine type.

Similar to and consistent with 14 CFR Part 36, the Fleet Quality Scoring allows for higher noise levels for larger aircraft. It is important to credit larger aircraft serving more passengers, because they offer more air service in fewer flights and less total noise than multiple operations in smaller aircraft types.

[2] Stages 1-4 were established by a Federal Aviation Regulation called 14 CFR Part 36 which mandated the allowable noise levels for the manufacture of aircraft. Over time both Stage 1 and Stage 2 aircraft have been phased out of operation in the U.S. as a result of subsequent federal regulations.
[3] 14 CFR Part 36 standards are measured in terms of Effective Perceived Noise Level (EPNdB), which accounts for different frequency characteristics of noise, such as low frequency.

Calculation of Score:

The Fleet Quality scoring calculation takes the takeoff, approach and sideline noise sum of the allowable Part 36 Stage 3 limit from the Part 36 certification level and then produces a total. Table 1 demonstrates this methodology for a B737-700 aircraft where the difference between the Stage 3 limit and certificated value is 4.1 dB on takeoff, 3.8 dB on approach and 6.8 dB for sideline noise; for a cumulative sum of 14.7dB.

Table 1 – B737-700 Aircraft Example[4]

B737-700 Aircraft	Takeoff (EPNdB)	Approach (EPNdB)	Sideline (EPNdB)	Total dB Below Stage 3 Limits
Part 36 Stage 3 Limit	91.2	99.7	96.6	-
Part 36 Certification Level	87.1	95.9	89.8	-
Difference	**4.1**	**3.8**	**6.8**	**14.7**

The Part 36 certification database for commercial aircraft is very extensive in listing many different noise values for variations on the same aircraft type depending on weight, flap settings, engine types, and other specifications. The Fleet Quality scoring methodology looks at each operator at SDIA and their specific aircraft fleet. Certifications values for each aircraft type are averaged together per operator.

Table 2 provides an example for computing the Fleet Quality sub–score. The *example* airline has two different aircraft types in their fleet that operate at SDIA. The Cumulative Noise Level of each aircraft type is multiplied by the total Operations for that aircraft. The product (number) is then divided by the total Operations for the Air Carrier, to create the Fleet Quality sub–score.

Table 2 – Example for Computing the Fleet Quality Sub–Score[5]

Aircraft Type	Cumulative Noise Level	Operations	Product of Cumulative Noise Level and Operations
B737	14.3	75	1073
B738	13.1	75	983
Fleet Avg. (total Cumulative Noise Level divided by total Operations):			**13.7**

[4] Table 1 contains an example of the sum of Cumulative Noise Levels calculation. Data in this table is for conceptual purposes only.
[5] Table 2 contains an example of Fleet Quality sub–score calculations. Data in this table is for conceptual purposes only.

Table 3 demonstrates the impact to a particular Fleet Quality sub–score, as Air Carriers incorporate quieter aircraft, like the Boeing 737MAX or Airbus 320neo into their operation at the Airport.

Table 3 – Example of Fleet Quality Improvement Sub–Score[6]

Aircraft Type	Cumulative Noise Level	Operations	Product of Cumulative Noise Level and Operations
B737	14.3	70	1001
B737MAX	25.2	20	504
B738	13.1	40	524
A320neo	25.3	20	506
Fleet Avg. (total Cumulative Noise Level divided by total Operations):			**16.9**

The final Fleet Quality Score for each operator is determined based upon the sub–score, with a target cumulative noise level of 30 dB. The sub–score is divided by 30 then grossed up to 10-points, to determine the final Fleet Quality Score. As Stage 5 aircraft become significant enough to be measurable, a target Cumulative Noise Level of 40 dB can be used.

In the Table 2 example, the sub–score is 13.7 and therefore the operator's final Fleet Quality score would be 4.57 (13.7/30*10). In Table 3, that final Fleet Quality score increases to 5.63 (16.9/30*10), through the introduction of newer aircraft. In this example, with the introduction of newer and quieter B737MAX and A320neo aircraft, and with the same number of total Operations (150), the total Fleet Quality score improves from 4.57 to 5.63.

[6] Table 3 contains an example of Fleet Quality Improvement sub–score calculations. Data in this table is for conceptual purposes only.

2.3.2 Noise Exceedances

Eliminating loud aircraft noise events is a long–standing goal of the Airport, as a result, the Airport has developed metrics that identify the loudest aircraft departing SDIA. These metrics are called Noise Exceedances. Arrival and departure Noise Exceedances are captured at Daytime, Evening and Nighttime levels.

- The locations of the monitors where Noise Exceedances are captured are as follows:
    - RMT [7] #2 – Approximately 4 nautical miles (6.5 km) from the start of Runway 9 takeoff roll, along the departure path to the east of the Airport.
    - RMT #14 – Approximately 4 nautical miles (6.5km) from the start of Runway 27 takeoff roll, along the departure path to the west of the Airport (straight out departures).
    - RMT #24 – Approximately 4 nautical miles (6.5km) from the start of Runway 27 takeoff roll, along the departure path to the west of the Airport (right–turn departures).

Calculation of Score:

The Noise Exceedance Score for each operator is determined by adding the different categories of Noise Exceedances together and adjusting them to the number of operations to generate a score of up to ten (10) points. Current Sound Exposure Level (SEL)[8] threshold settings are 90 dB for daytime departures (7:00 a.m. to 7:00 p.m.), 85 dB in the shoulder hours (7:00 p.m. to 10:00 p.m.), and 80 dB for nighttime departures (10:00 p.m. to 7:00 a.m.). Multiple Noise Exceedances for a single departure may be captured if they exceed the thresholds at both RMT #14 and RMT #24. As Stage 4 and 5 aircraft use increases, these threshold levels can be adjusted downward to reflect the noise improvements of the fleet and maintain measurement validity in fleet comparisons.

[7] RMT – Remote Monitoring Terminal is a component of an Airport Noise and Operations Monitoring System (ANOMS).
[8] SEL – Sound Exposure Level is a measure of the total sound energy of an event, accounting for its duration.

2.3.3 Curfew Compliance

SDIA has had a curfew in place since 1976. SDIA's curfew is governed as part of the Airport Use Regulations and may result in a monetary fine if an operator violates the curfew. All departures are restricted from 11:30 p.m. to 6:30 a.m. Aircraft may arrive at SDIA 24 hours a day.

The departure curfew is mandatory; however, there are exemptions for Emergency/Mercy flights. Compliance is at the discretion of the pilot or operator. Penalties may be waived in certain circumstances. Typical circumstances include local maintenance issues discovered near departure time, weather that significantly disrupts the SAN operation, or other operational issues such as FAA system outages that preclude an aircraft from an on-time departure due to FAA implementation of ground delay programs. This component is designed to encourage a cancellation, even under these circumstances, rather than depart during the curfew window. Fee waivers are done through a review of the individual circumstances.

The curfew violations system includes administrative fines if $2,000 for the first violation by a particular operator in a compliance period; $6,000 for the second violation in a compliance period, and, $10,000 for the third violation in a compliance period. Additionally, a multiplier is added to reflect the number of violations from the previous compliance period. The Fly Quiet Program formalizes the effort of working with the carriers to reduce the number of curfew violations.

<u>Calculation of Score:</u>

An operator that does not log any curfew violations in a quarter will receive a score of ten (10) points. The ten (10) point score is adjusted based upon the following:

1. Curfew Violations:

   If a carrier violates the curfew, they will be assessed a penalty of one (1) point.

2. Curfew Violations that are fined:

   If the Airport's Curfew Violation Review Panel (CVRP) determines that a fine should be imposed on a curfew violation, they will be assessed an additional penalty of one (1) point.

It is possible that a carrier will receive a negative score in this category. If a carrier continues to violate the curfew, an excessive number of violations will become more punitive to the final overall score.

3.0 Score Sheets

The following pages show the scores for the carriers in each element for the evaluation period.

- The first three charts show the scoring in each element for a given carrier, there is no ranking associated with the individual elements. There is no preference for a given operator.

- The summary page shows the total points in each element and rankings by carrier group utilized for the awards to the best carrier in each operating category.

- The operating categories are:

    - Large Domestic Carrier
    - Small Domestic Carrier
    - Air Cargo Carrier
    - International Carrier

Fleet Quality Report
San Diego International Airport's Fly Quiet Program
January - December 2022

Airline		Operations	Percent of Operations	Sub Score	Fleet Quality Score
AAL	American Airlines	14,804	8.3%	14.31	4.77
AAY	allegiant air	997	0.6%	16.98	5.66
ACA	AIR CANADA	1,091	0.6%	22.82	7.61
ASA	Alaska	18,246	10.2%	15.27	5.09
BAW	BRITISH AIRWAYS	633	0.4%	25.84	8.61
DAL	DELTA	16,662	9.3%	13.53	4.51
DLH	Lufthansa	354	0.2%	31.30	10.43
FDX	FedEx	3,006	1.7%	15.28	5.09
FFT	FRONTIER	3,857	2.2%	22.64	7.55
HAL	HAWAIIAN AIRLINES	1,457	0.8%	20.50	6.83
JAL	JAPAN AIRLINES	491	0.3%	27.78	9.26
JBU	jetBlue AIRWAYS	3,585	2.0%	15.69	5.23
JZA	Jazz	1,038	0.6%	13.80	4.60
NKS	spirit	3,402	1.9%	20.86	6.95
SCX	sun country airlines	533	0.3%	12.69	4.23
SKW	SkyWest	21,273	11.9%	10.55	3.52
SWA	Southwest	67,516	37.7%	15.69	5.23
SWQ	DHL	668	0.4%	12.98	4.33
UAL	UNITED	18,337	10.2%	16.63	5.54
UPS	ups	848	0.5%	15.97	5.32
WJA	WESTJET	354	0.2%	14.71	4.90

Noise Exceedance Report
San Diego International Airport's Fly Quiet Program
January - December 2022

Airline		Operations	Daytime Exceedances (90+ dB)	Evening Exceedances (85+ dB)	Nighttime Exceedances (80+ dB)	Total Exceedances	Noise Exceedance Score
AAL	American Airlines	14,804	379	1,787	4,605	6,771	5.43
AAY	allegiant air	997	3	84	47	134	8.66
ACA	AIR CANADA	1,091	7	64	49	120	8.90
ASA	Alaska	18,246	881	2,908	3,620	7,409	5.94
BAW	BRITISH AIRWAYS	633	64	249	10	323	4.90
DAL	DELTA	16,662	545	1,984	4,925	7,454	5.53
DLH	Lufthansa	354	5	3	6	14	9.60
FDX	FedEx	3,006	143	582	1,564	2,289	2.39
FFT	FRONTIER	3,857	7	273	925	1,205	6.88
HAL	HAWAIIAN AIRLINES	1,457	79	411	301	791	4.57
JAL	JAPAN AIRLINES	491	4	0	0	4	9.92
JBU	jetBlue AIRWAYS	3,585	84	1,365	559	2,008	4.40
JZA	Jazz	1,038	2	20	165	187	8.20
NKS	spirit	3,402	13	338	163	514	8.49
SCX	sun country airlines	533	44	56	12	112	7.90
SKW	SkyWest	21,273	55	864	2,356	3,275	8.46
SWA	Southwest	67,516	628	8,142	7,632	16,402	7.57
SWQ	DHL	668	51	242	61	354	4.70
UAL	UNITED	18,337	2,268	2,604	3,451	8,323	5.46
UPS	ups	848	24	262	491	777	0.84
WJA	WESTJET	354	5	0	0	5	9.86

Curfew Compliance Report
San Diego International Airport's Fly Quiet Program
January - December 2022

Airline		Operations	Violations	Penalized Violations	Curfew Penalty Points	Curfew Violation Score
AAL	American Airlines	14,804	12	1	13	-3.00
AAY	allegiant air	997	5	4	9	1.00
ACA	AIR CANADA	1,091	0	0	0	10.00
ASA	Alaska	18,246	22	8	30	-20.00
BAW	BRITISH AIRWAYS	633	0	0	0	10.00
DAL	DELTA	16,662	11	4	15	-5.00
DLH	Lufthansa	354	0	0	0	10.00
FDX	FedEx	3,006	3	0	3	7.00
FFT	FRONTIER	3,857	2	2	4	6.00
HAL	HAWAIIAN AIRLINES	1,457	0	0	0	10.00
JAL	JAPAN AIRLINES	491	0	0	0	10.00
JBU	jetBlue AIRWAYS	3,585	11	9	20	-10.00
JZA	Jazz	1,038	1	1	2	8.00
NKS	spirit	3,402	1	1	2	8.00
SCX	sun country airlines	533	0	0	0	10.00
SKW	SkyWest	21,273	0	0	0	10.00
SWA	Southwest	67,516	2	2	4	6.00
SWQ	DHL	668	0	0	0	10.00
UAL	UNITED	18,337	3	0	3	7.00
UPS	ups	848	0	0	0	10.00
WJA	WESTJET	354	0	0	0	10.00

Summary Report							
San Diego International Airport's Fly Quiet Program							
January - December 2022							
Airline Code		**Number of Operations**	**Fleet Quality Score**	**Noise Exceedance Score**	**Curfew Violation Score**	**Total Fly Quiet Score**	**Category**
AAL	American Airlines	14,804	4.77	5.43	-3.00	7.20	Large Carrier
AAY	allegiant air	997	5.66	8.66	1.00	15.31	Small Carrier
ACA	AIR CANADA	1,091	7.61	8.90	10.00	26.51	International
ASA	Alaska	18,246	5.09	5.94	-20.00	-8.97	Large Carrier
BAW	BRITISH AIRWAYS	633	8.61	4.90	10.00	23.51	International
DAL	DELTA	16,662	4.51	5.53	-5.00	5.03	Large Carrier
DLH	Lufthansa	354	10.43	9.60	10.00	30.04	International
FDX	FedEx	3,006	5.09	2.39	7.00	14.48	Air Cargo
FFT	FRONTIER	3,857	7.55	6.88	6.00	20.42	Small Carrier
HAL	HAWAIIAN AIRLINES	1,457	6.83	4.57	10.00	21.41	Small Carrier
JAL	JAPAN AIRLINES	491	9.26	9.92	10.00	29.18	International
JBU	jetBlue AIRWAYS	3,585	5.23	4.40	-10.00	-0.37	Small Carrier
JZA	Jazz	1,038	4.60	8.20	8.00	20.80	International
NKS	spirit	3,402	6.95	8.49	8.00	23.44	Small Carrier
SCX	sun country airlines	533	4.23	7.90	10.00	22.13	Small Carrier
SKW	SkyWest	21,273	3.52	8.46	10.00	21.98	Small Carrier
SWA	Southwest	67,516	5.23	7.57	6.00	18.80	Large Carrier
SWQ	DHL	668	4.33	4.70	10.00	19.03	Air Cargo
UAL	UNITED	18,337	5.54	5.46	7.00	18.00	Large Carrier
UPS	ups	848	5.32	0.84	10.00	16.16	Air Cargo
WJA	WESTJET	354	4.90	9.86	10.00	24.76	International

Rankings Report							
San Diego International Airport's Fly Quiet Program							
January - December 2022							
Airline Code		**Number of Operations**	**Fleet Quality Score**	**Noise Exceedance Score**	**Curfew Violation Score**	**Total Fly Quiet Score**	**Category**
SWQ	DHL	668	4.33	4.70	10.00	19.03	Air Cargo
UPS	UPS	848	5.32	0.84	10.00	16.16	Air Cargo
FDX	FedEx	3,006	5.09	2.39	7.00	14.48	Air Cargo
DLH	Lufthansa	354	10.43	9.60	10.00	30.04	International
JAL	Japan Airlines	491	9.26	9.92	10.00	29.18	International
ACA	Air Canada	1,091	7.61	8.90	10.00	26.51	International
WJA	WestJet	354	4.90	9.86	10.00	24.76	International
BAW	British Airways	633	8.61	4.90	10.00	23.51	International
JZA	Jazz	1,038	4.60	8.20	8.00	20.80	International
SWA	Southwest	67,516	5.23	7.57	6.00	18.80	Large Carrier
UAL	United	18,337	5.54	5.46	7.00	18.00	Large Carrier
AAL	American Airlines	14,804	4.77	5.43	-3.00	7.20	Large Carrier
DAL	Delta	16,662	4.51	5.53	-5.00	5.03	Large Carrier
ASA	Alaska	18,246	5.09	5.94	-20.00	-8.97	Large Carrier
NKS	Spirit	3,402	6.95	8.49	8.00	23.44	Small Carrier
SCX	Sun Country Airlines	533	4.23	7.90	10.00	22.13	Small Carrier
SKW	SkyWest	21,273	3.52	8.46	10.00	21.98	Small Carrier
HAL	Hawaiian Airlines	1,457	6.83	4.57	10.00	21.41	Small Carrier
FFT	Frontier	3,857	7.55	6.88	6.00	20.42	Small Carrier
AAY	Allegiant Air	997	5.66	8.66	1.00	15.31	Small Carrier
JBU	JetBlue Airways	3,585	5.23	4.40	-10.00	-0.37	Small Carrier