

December 5, 2019

Fly Quiet Report

1st Quarter 2019

Prepared by:

Jim Payne
Senior Aircraft Noise Specialist
Planning & Environmental Affairs
San Diego County Regional Airport Authority

1.0 Summary of 1st Quarter 2019 Report

Each quarter, the Airport Noise Mitigation Office publishes a report that outlines the 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 1st Quarter 2019.

Last year, the Fly Quiet Report was modified to remove the Early Turn element and replace it with a new Noise Exceedance element establishing a new baseline to be compared with in the 2019 reports. In addition, a section discussing changes in the operating environment having an impact on noise was added.

Notable Noise Reduction Efforts:

- [Compass Airlines](#) improved their scores through the replacement of base model Embraer 175 aircraft with the enhanced version that has better airfield performance and a lower noise impact.
- [Hawaiian Airlines](#) improved their scores significantly by introducing the A321neo to the market for half of their operations. With no curfew violations and the fleet quality improvement, they have posted the greatest gain from the First Quarter of 2018 moving from 14th place to 4th place.
- [Spirit Airlines](#) continues their lead gained last year as a result of fleet improvement with additional A320neo aircraft.
- The use of quieter Airbus A320neo by [Frontier Airlines](#), [Alaska Airlines](#) and [Spirit Airlines](#) continues. [Southwest](#), [United](#) and [WestJet](#) have had to discontinue MAX service due to FAA grounding. The number of operations for the MAX were small, 3-4 per day. Ramp up was expected for the summer, but that will be delayed until at least the fall.
- [Virgin America](#) and [Alaska Airlines](#) completed their merger. As a result, [Virgin America](#) has been removed from the program. The addition of the [Virgin America](#) fleet, which included the A320neo, to the [Alaska Airlines](#) fleet has led to an improvement in the scores for [Alaska Airlines](#).

2.0 Fly Quiet Program Description

The purpose of the SDIA Fly Quiet Program is to encourage individual commercial operators to fly as quietly as possible in the San Diego area by acknowledging those operators that fly the quietest. By grading an operator's performance and making the scores available to the public, the program creates a participatory atmosphere for operators to actively reduce noise.

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 Goals

The overall goal of the Fly Quiet Program is to influence commercial operators to fly as quietly as possible in the San Diego area by acknowledging those operators that make the greatest effort. Monitoring, collecting, and analyzing comprehensive amounts of operational and noise data highlights both airport trends and individual operator performance on specific noise abatement programs. Fly Quiet Program data is quantified and translated into quarterly reports for each operator rated in the Fly Quiet Program at SDIA.

2.2 Reports

Fly Quiet reports communicate results in a clear, understandable format on a scale of 0-10, zero being poor and ten being the best. *(Note: an operator can have a score higher than 10 in the Curfew Violations element only, if they had no violations and also cancelled flights to avoid a Curfew Violation).* This allows for an easy comparison between operators over time. Individual operator scores are computed and reports are generated each quarter. These quantitative scores allow operator management and flight personnel to measure exactly how they stand compared to other operators and how their proactive involvement can positively reduce noise in the San Diego area. The overall airport score is tracked to measure the overall improvement over time.

2.3 Elements

Currently the Fly Quiet Program scores commercial operators on the following three elements that will be described in detail in the next section.

- Curfew Violations
- Noise Exceedances
- Fleet Noise Quality

2.3.1 Curfew Violations

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 lifeguard and emergency flights; compliance is at the discretion of the pilot or operator. Penalties may be waived if there are local issues impacting safety, such as weather or maintenance of the aircraft.

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. Each compliance period is six (6) calendar months, starting January 1 and July 1. The Fly Quiet Program formalizes the effort of working with the operators to reduce the number of curfew violations of departing aircraft to include encouraging the carriers to cancel potential violating operations. The airport's noise monitoring system documents which operator and aircraft type depart between the curfew times, this information is used to accurately assign the point value for each operation.

Calculation of Rating:

An operator that does not log any curfew violations during the time period is automatically assigned a score of 10 points. Every operator starts with a score of 10 points. Scores are then adjusted based upon the following:

1. Number of Curfew Violations that are Penalized (Fined):

If the Airport's Curfew Violation Review Panel (CVRP) determines that a flight violated curfew and will be penalized, the score will be adjusted by subtracting 2 points.

2. Number of Curfew Violations that are Not Penalized (Not Fined):

If the Airport's Curfew Violation Review Panel (CVRP) determines that a flight violated curfew and will not be penalized, the score will be adjusted by subtracting 1 point.

To encourage cancelling potential violations, one (1) point will be added to any operator's score that cancelled a flight in order to avoid violating curfew.

2.3.2 Noise Exceedances

Eliminating loud aircraft noise events is a long-standing goal of the Airport, as a result, the Airport has established an element that identifies the loudest 10% of aircraft arriving and departing at SDIA, as measured at Remote Monitoring Terminals (RMT's) #1 and #7¹, respectively. RMT #1 is located approximately one (1.0) mile from the arrival end of Runway 27 and RMT #7 is located approximately one-half (0.5) mile from the departure end of Runway 27.

Each RMT has established thresholds to identify aircraft. Whenever an aircraft produces a noise level higher than the threshold, a noise exceedance occurs. A noise exceedance may take place during arrival or departure and are logged by the exact operation along with the aircraft type and airline name.

¹ For a map of the Remote Monitoring Terminals, go to the Airport's online flight tracking site:
<http://webtrak.bkems.net/san>

Calculation of Rating:

The Noise Exceedances Score for each operator is determined based upon the total number of noise exceedances for the quarter compared with their total number of operations at the airport. Arrivals and departures are sorted separately, and then combined into the overall score. This is reflected as a “percentage of operations”. The percentage of exceedances (exceedances divided by total operations for the period) is then multiplied by a factor of 10 to develop a score between 0 and 10 points.

2.3.3 Fleet Noise Quality

The Fleet Noise Quality score evaluates the noise contribution of each operator’s fleet as it actually operates at SDIA. Operators generally own a variety of aircraft types and schedule them according to both operational and marketing considerations. The Fly Quiet Program assigns a higher rating or grade to operators flying quieter, new generation aircraft, while operators flying older, louder technology aircraft would rate lower. The goal of this measurement is to fairly compare operators – not just by the fleet they own, but by the frequency that they schedule and fly particular aircraft into SDIA.

Historically airports have rated fleet noise quality by the relative percentage of Stage 2 vs. Stage 3 operations². 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 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 is a Stage 4 aircraft type, applicable to aircraft with a type certification issued after January 1, 2006; all aircraft manufactured today that are over 12,500 pounds meet these Stage 4 standards.

The method used here bases an operator’s Fleet Noise Quality Rating 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 sideline³. 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 rating method for the Fleet Noise 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. Aircraft with the greatest number of decibels below Stage 3 threshold are rated the best.

Similar to and consistent with 14 CFR Part 36, the Fleet Noise Quality Rating 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 the single event metric Effective Perceived Noise Level (EPNdB), which accounts for different frequency characteristics of noise, such as low frequency.

Calculation of Rating:

The Fleet Noise Quality rating calculation takes the takeoff, approach and sideline noise difference 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 total difference of 14.7 dB.

Table 1 – B737-700 Aircraft Example

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 Noise Quality rating 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 Noise Quality Sub Score. The example airline has four different aircraft types in their fleet that operate at SDIA. The number of operations is multiplied by the Cumulative Noise Level of the aircraft type generative a product of cumulative noise. The product of cumulative noise is then divided by the sum of operations for the carrier to create a fleet average Sub Score.

Table 2 – Example for Computing the Fleet Noise Quality Sub Score.

Aircraft Types	Cumulative Noise Level	Operations	Sum of Cumulatives Noise
B737	14.3	80.0	1144.0
B737MAX	25.2	10.0	252.0
B738	13.1	50.0	655.0
B738MAX	25.3	10.0	253.0
Fleet Avg (sum of CNEL divided by Total Operations):			15.4

Table 3 demonstrates the impact to a particular Fleet Quality score as they incorporate quieter aircraft, like the 737Max or A320neo into their operation at the airport.

Table 3 – Example of Fleet Noise Quality Improvement

Aircraft Types	Cumulative Noise Level	Operations	Sum of Cumulatives Noise
B737	14.3	70.0	1001.0
B737MAX	25.2	20.0	504.0
B738	13.1	40.0	524.0
B738MAX	25.3	20.0	506.0
Fleet Avg (sum of CNEL divided by Total Operations):			16.9

The Fleet Noise Quality Score for each operator is determined based upon what range the sub score falls under. The following is a list of the Fleet Noise Quality Scores and corresponding sub score ranges.

- 0 Points; Sub Score between 0 and 5
- 1 Point; Sub Score between 5 and 10
- 2 Points; Sub Score between 10 and 11
- 3 Points; Sub Score between 11 and 12
- 4 Points; Sub Score between 12 and 13
- 5 Points; Sub Score between 13 and 14
- 6 Points; Sub Score between 14 and 15
- 7 Points; Sub Score between 15 and 16
- 8 Points; Sub Score between 16 and 17
- 9 Points; Sub Score between 17 and 18
- 10 Points; Sub Score 18 or Greater

In the example of Table 2, the sub score is 15.4 and therefore the operator’s final Fleet Noise Quality score would be 7.0. In Table 3, that same score increases to 8.0 through the utilization of newer aircraft.

3.0 Reports

The following pages contain the individual element reports and summary report for the 1st Quarter of 2019. The Fly Quiet Summary Report contains the total Fly Quiet score and ranking of the commercial operators.

Curfew Violations Report							
San Diego International Airport's Fly Quiet Program							
1st Quarter 2019 (January -March, 2019)							
Airline Code		Number of Operations	Percent of Total Operations	Number of Curfew Violations Penalized	Number of Curfew Violations Not Penalized	Number of Cancellations	Curfew Violations Score
AAI		4,054	8.4%	0	1	4	13.0
SWA		18,940	39.2%	0	0	0	10.0
UAL		4,469	9.2%	0	0	0	10.0
DAL		4,025	8.3%	0	0	0	10.0
CPZ		1,816	3.8%	0	0	0	10.0
NKS		852	1.8%	0	0	0	10.0
FFT		645	1.3%	0	0	0	10.0
FDX		621	1.3%	0	0	0	10.0
HAL		360	0.7%	0	0	0	10.0
UPS		208	0.4%	0	0	0	10.0
JAL		181	0.4%	0	0	0	10.0
BAW		179	0.4%	0	0	0	10.0
ROU		165	0.3%	0	0	0	10.0
GTI		128	0.3%	0	0	0	10.0
DLH		114	0.2%	0	0	0	10.0
WJA		112	0.2%	0	0	0	10.0
SCX		104	0.2%	0	0	0	10.0
AAY		71	0.1%	0	0	0	10.0
SKW		5,303	11.0%	0	1	0	9.0
ASA		4,673	9.7%	0	1	0	9.0
JZA		525	1.1%	0	1	0	9.0
JBU		798	1.7%	1	1	1	8.0
Total		48,343	100%	1	5	5	
Average							9.9

Higher Number = Better Score

Noise Exceedances Report							Higher Number = Better Score
San Diego International Airport's Fly Quiet Program							
1st Quarter 2019 (January -March, 2019)							
Airline Code		Number of Operations	Percent of Total Operations	Total Noise Exceedances	Sub Score	Noise Exceedances Score	
AAY		71	0.1%	0	1.00	10	
SKW		5,303	11.0%	6	1.00	10	
JZA		525	1.1%	1	1.00	10	
NKS		852	1.8%	3	1.00	10	
CPZ		1,816	3.8%	9	1.00	10	
SCX		104	0.2%	1	0.99	10	
SWA		18,940	39.2%	294	0.98	10	
WJA		112	0.2%	3	0.97	10	
JAL		181	0.4%	7	0.96	10	
FFT		645	1.3%	52	0.92	9	
ASA		4,673	9.7%	408	0.91	9	
UAL		4,469	9.2%	557	0.88	9	
JBU		798	1.7%	110	0.86	9	
AAL		4,054	8.4%	741	0.82	8	
DAL		4,025	8.3%	762	0.81	8	
HAL		360	0.7%	99	0.73	7	
FDX		621	1.3%	192	0.69	7	
GTI		128	0.3%	40	0.69	7	
UPS		208	0.4%	73	0.65	6	
ROU		165	0.3%	59	0.64	6	
DLH		114	0.2%	77	0.32	3	
BAW		179	0.4%	167	0.07	1	
Total		48,343	100%	3,661			
Average					0.8	8.1	

Fleet Noise Quality Report					
San Diego International Airport's Fly Quiet Program					
1st Quarter 2019 (January -March, 2019)					
Airline Code		Number of Operations	Percent of Total Operations	Sub Score	Fleet Noise Quality Score
JAL		181	0.4%	27.7	10.0
DLH		114	0.2%	21.4	10.0
HAL		360	0.7%	20.4	10.0
NKS		852	1.8%	19.3	10.0
AAY		71	0.1%	19.2	10.0
UPS		208	0.4%	16.0	8.0
FDX		621	1.3%	15.9	7.0
UAL		4,469	9.2%	15.4	7.0
ASA		4,673	9.7%	15.0	7.0
JBU		798	1.7%	14.7	6.0
BAW		179	0.4%	14.6	6.0
SWA		18,940	39.2%	14.6	6.0
WJA		112	0.2%	14.6	6.0
JZA		525	1.1%	13.8	5.0
AAL		4,054	8.4%	13.5	5.0
SCX		104	0.2%	12.9	4.0
SKW		5,303	11.0%	12.9	4.0
FFT		645	1.3%	12.3	4.0
DAL		4,025	8.3%	12.2	4.0
CPZ		1,816	3.8%	12.1	4.0
GTI		128	0.3%	9.3	1.0
ROU		165	0.3%	8.8	1.0
Total		48,343	100%		
Average				15.3	6.1

Higher
Number =
Better Score

Higher Number = Better Score
Summary Report Ranks by "Quietest" to "Loudest" Operator
Tie Breaker is the "Number of Operations"

Summary Report							
San Diego International Airport's Fly Quiet Program							
1st Quarter 2019 (January -March, 2019)							
Airline Code	Number of Operations	Percent of Total Operations	Curfew Violations Score	Noise Exceedances Score	Fleet Noise Quality Score	Total Fly Quiet Score	Ranking
NKS 	852	1.8%	10	10	10	30	1
JAL 	181	0.4%	10	10	10	30	1
AAY 	71	0.1%	10	10	10	30	1
HAL 	360	0.7%	10	7	10	27	4
SWA 	18,940	39.2%	10	10	6	26	5
UAL 	4,469	9.2%	10	9	7	26	5
AAL 	4,054	8.4%	13	8	5	26	5
WJA 	112	0.2%	10	10	6	26	5
ASA 	4,673	9.7%	9	9	7	25	9
CPZ 	1,816	3.8%	10	10	4	24	10
FDX 	621	1.3%	10	7	7	24	10
JZA 	525	1.1%	9	10	5	24	10
UPS 	208	0.4%	10	6	8	24	10
SCX 	104	0.2%	10	10	4	24	10
SKW 	5,303	11.0%	9	10	4	23	15
JBU 	798	1.7%	8	9	6	23	15
FFT 	645	1.3%	10	9	4	23	15
DLH 	114	0.2%	10	3	10	23	15
DAL 	4,025	8.3%	10	8	4	22	19
GTI 	128	0.3%	10	7	1	18	20
BAW 	179	0.4%	10	1	6	17	21
ROU 	165	0.3%	10	6	1	17	21
Total	48,343	100%					
Average			10	8	6	24	