ATTACHMENT H

Jan 18, 2016

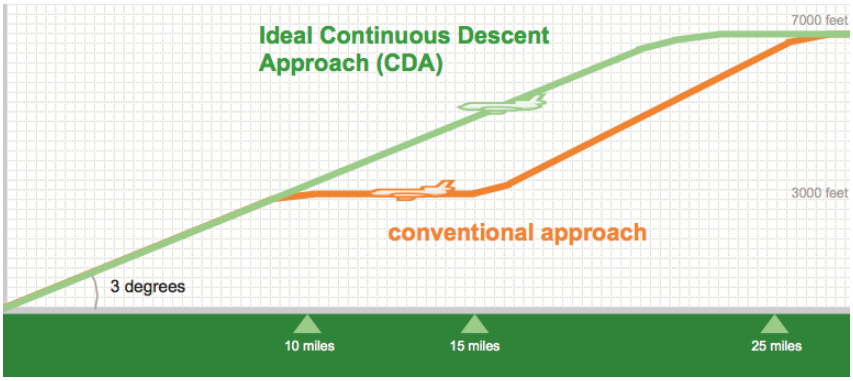
To: Mike Jeck, Airport Noise Office, Metropolitan Washington Airports Authority

From: Mike Rioux, Fairfax County Mount Vernon District Rep to MWAA Airport Noise WG

Subj: Recommendations for addressing DCA Noise issues:

1. The FAA should reevaluate all the DCA RNAV arrival and departure procedures in both North and South operations to determine whether amendments or new procedures could be designed and implemented to provide noise benefits. It should include assessment on whether higher altitudes for initial turns, compound procedures or extended distances on initial headings will reduce noise impacts.

2. A Continuous Descent Approach (CDA) should be developed by the FAA for each arrival runway. The CDA, also known as an Optimized Profile Descent (OPD), essentially produces a quieter, steeper aircraft approach. It involves the development, charting and use of a flight procedure to reduce aircraft noise, create fuel savings and reduce emissions. Though not yet common in the US, Continuous Descent Approaches are standard at many airports in Europe, particularly in the United Kingdom. The FAA's Optimization of Airspace and Procedures in the Metroplex (OAPM), is a national (NEXTGEN) program used to refine procedures and maximize efficiencies for each major airport. Continuous Descent Approaches are often a part of an OAPM study, to streamline arrivals, reduce noise and fuel use. The following figure depicts a Continuous Descent Approach vs. a conventional arrival procedure.

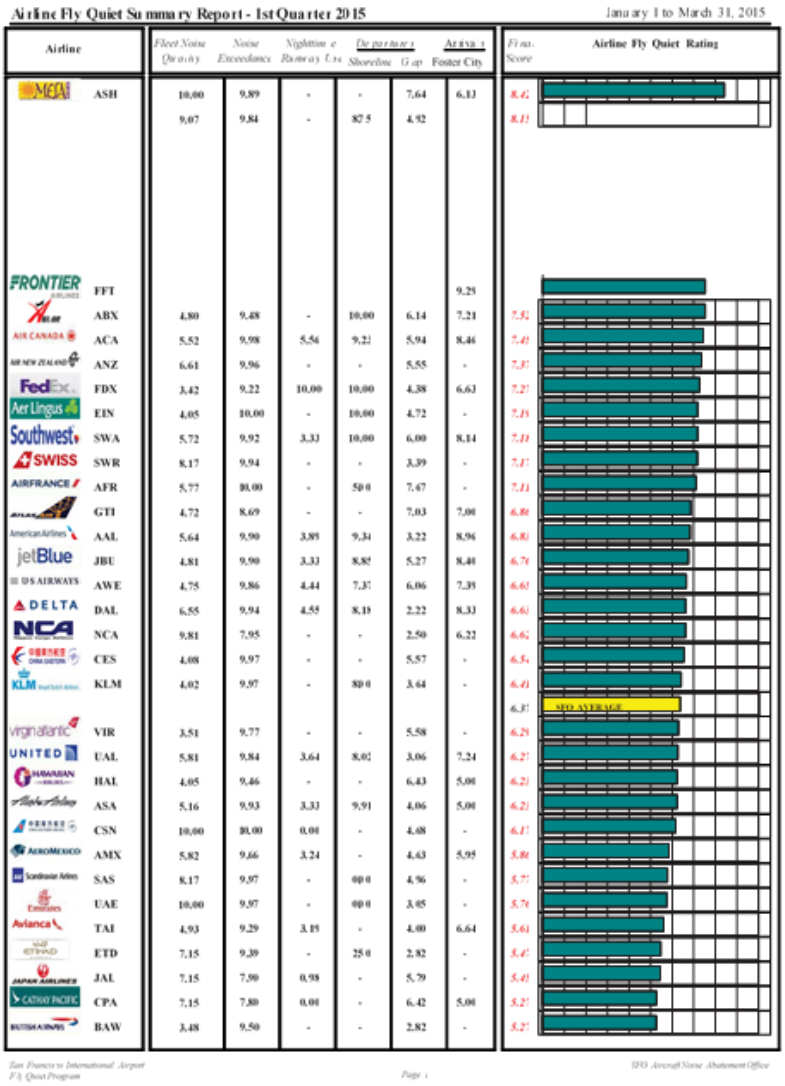


A CDA eliminates a level off that is a standard component of instrument approaches. Without Continuous Descent Approaches, ATC vectors aircraft toward the final approach course (runway ILS localizer, or extended runway centerline). Aircraft are typically given an altitude at which to level off, until the pilot approaches the localizer and turns onto final approach. The aircraft travels several miles or more, most commonly at 4,000' to 6,000' for arrival aircraft. This segment contributes to noise

experienced on the ground before the aircraft turns final approach, typically in areas to the side of the extended arrival runway centerlines and 10 to 20 miles from the runway. A CDA flown from 10,000 feet can reduce noise by as much as 5 dB within certain areas under the approach, save 220.5 lbs. of fuel per aircraft and 661.4 lbs. of emissions.

3. While it is acknowledged that DCA has noise abatement procedures and limited flights during late night hours, it would be beneficial to develop a comprehensive, aggressive DCA Fly Quiet program with a strong mission statement demonstrating its commitment to the highest level of resources to establish and maintain the quietest environment practical for all nearby communities. A Fly Quiet program provides more focus and emphasis on airport noise and would underscore the importance of addressing noise issues to air carriers, Airport and ATC personnel as well as communities and stakeholders something like: *"In 2016, MWAA announced that airlines operating at DCA agreed to use designated noise abatement flight procedures in accordance with the Fly Quiet Program. The DCA Fly Quiet Program was implemented in an effort to further reduce the impacts of aircraft noise on the surrounding neighborhoods."*

   Items under a Fly Quiet program that could be considered are:
   a. The FAA should encourage operational decision-making personnel to avoid terminating Fly Quiet departure procedures prematurely.
   b. ATC compliance with recommended procedures, through on-going recurrent controller education efforts, timely compliance reporting and follow-up activity.
   c. A mechanism to facilitate the periodic review of a Fly Quiet Program, to ensure that it is up-to-date and continues to reflect changes at DCA and whether they are actually achieving the goal of operating flights over less-populated areas and revised as required to minimize population impacted by noise.
   d. A Fly Quiet program can be specific to a certain time of day or address types of approaches such as Visual Approaches. An aircraft angling in on a visual approach and/or descending below 4000' is randomly generating noise in areas where it's not normally expected nor intended. In addition, pilots who are flying visual approaches sometimes make more frequent power adjustments because of the lack of glide slope and localizer information until they are on final approach. Power adjustments can create additional unwanted noise.
   e. Include a report card program to measure and publicly report on airlines and noise mitigation performance metrics. A Sample of the SFO Fly Quiet report Card follows:



Airline Fly Quiet Summary Report - 1st Quarter 2015

January 1 to March 31, 2015

Airline		Fleet Noise Quality	Noise Exceedance	Nighttime Runway Use	Departure Shoreline	Departure Gap	Arrival Foster City	Fina. Score	Airline Fly Quiet Rating
MESA	ASH	10.00	9.89	-	-	7.64	6.13	8.42	
		9.07	9.84	-	87.5	4.92		8.13	
FRONTIER	FFT						9.25		
	ABX	4.80	9.48	-	10.00	6.14	7.21	7.52	
AIR CANADA	ACA	5.52	9.98	5.56	9.21	5.94	8.46	7.41	
AIR NEW ZEALAND	ANZ	6.61	9.96	-	-	5.55	-	7.37	
FedEx	FDX	3.42	9.22	10.00	10.00	4.38	6.63	7.27	
Aer Lingus	EIN	4.05	10.00	-	10.00	4.72	-	7.35	
Southwest	SWA	5.72	9.92	3.33	10.00	6.00	8.14	7.33	
SWISS	SWR	8.17	9.94	-	-	3.39	-	7.37	
AIRFRANCE	AFR	5.77	10.00	-	50.0	7.47	-	7.33	
	GTI	4.72	8.69	-	-	7.03	7.00	6.86	
American Airlines	AAL	5.64	9.90	3.85	9.31	3.22	8.96	6.83	
jetBlue	JBU	4.81	9.90	3.33	8.85	5.27	8.40	6.79	
US AIRWAYS	AWE	4.75	9.86	4.44	7.37	6.06	7.35	6.65	
DELTA	DAL	6.55	9.94	4.55	8.13	2.22	8.33	6.63	
NCA	NCA	9.81	7.95	-	-	2.50	6.22	6.62	
	CES	4.08	9.97	-	-	5.57	-	6.54	
KLM	KLM	4.02	9.97	-	80.0	3.64	-	6.41	
								6.37	SFO AVERAGE
virginatlantic	VIR	3.51	9.77	-	-	5.58	-	6.29	
UNITED	UAL	5.81	9.84	3.64	8.01	3.06	7.24	6.27	
HAWAIIAN	HAL	4.05	9.46	-	-	6.43	5.00	6.23	
Alaska Airlines	ASA	5.16	9.93	3.33	9.91	4.06	5.00	6.23	
	CSN	10.00	10.00	0.01	-	4.68	-	6.13	
AEROMEXICO	AMX	5.82	9.66	3.24	-	4.63	5.95	5.86	
Scandinavian Airlines	SAS	8.17	9.97	-	00.0	4.96	-	5.77	
Emirates	UAE	10.00	9.97	-	00.0	3.05	-	5.76	
Avianca	TAI	4.93	9.29	3.15	-	4.00	6.64	5.61	
ETIHAD	ETD	7.15	9.39	-	25.0	2.82	-	5.47	
JAPAN AIRLINES	JAL	7.15	7.90	0.98	-	5.79	-	5.41	
CATHAY PACIFIC	CPA	7.15	7.80	0.01	-	6.42	5.00	5.27	
BRITISH AIRWAYS	BAW	3.48	9.50	-	-	2.82	-	5.27	

San Francisco International Airport
Fly Quiet Program

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SFO Aircraft Noise Abatement Office

"In 2016, MWAA announced that airlines operating at DCA agreed to use designated noise abatement flight procedures in accordance with the Fly Quiet Program. The Fly Quiet Program was implemented in an effort to further reduce the impacts of aircraft noise on the surrounding neighborhoods."

4. Conduct a review of Noise Abatement Departure Procedures (NADPs); a NADP review would include flight tests for each runway direction with noise measurements of several aircraft types in various metrological conditions with the NADPs being revised as appropriate.

   There are several variations in how turbojet aircraft can be flown immediately after takeoff. In 1993, the FAA published Advisory Circular AC 91-53A, Noise Abatement

Departure Profiles.[1] The document describes aircraft speed, thrust and airplane configurations for two departure profiles known as "Close-in" (NADP 1) and "Distant" (NADP 2). Airport operators were to specify to air carriers which profile should be flown from each runway, dependent upon the proximity of noise sensitive areas. The Close-in NADP was designed to benefit areas within 3.5 nautical miles from the start of takeoff. The distant NADP was designed for use when noise sensitive areas are further from the airport[2].

Roughly, the NADP 1 provides a steeper initial climb to 3,000', after which the flight crew reduces power, "cleans up" the aircraft (i.e., flaps) and accelerates. The NADP 2 provides a shallower climb to 3,000', with the pilots reducing power, cleaning up the aircraft and accelerating after just 800'. There are fuel considerations as well. Reduced thrust takeoffs can be used with either procedure, which can create a quieter climb out, but with a slower ascent to altitude.

NADPs should be part of a Fly Quiet Program. I could not find what analysis was conducted for DCA per the Advisory Circular, to specify which NADPs should be used. Some airports have documented extensive effort to identify and coordinate the most beneficial NADPs for their situation. At MSP for example, this included extensive cost benefit and parcel compatibility analysis.

5. Correlate noise complaint numbers with population density and flight track analysis. Use this data to re-assess whether new RNAV or other noise reduction procedures/programs are effective.

6. Encourage airlines to avoid operating MD80 (old generation aircraft) at DCA. In 2000, large Stage 2 turbojet aircraft were prohibited from operating within the United States. There were several variations of aircraft that were unaffected, but barely conformed to Stage 3 requirements. These included the McDonnell Douglas MD80 and DC10, among others. While the operators of many of these aircraft have indicated they intend to phase-out or retire these older aircraft, there is no requirement to do so. Fleet improvements can be affected by business plan and economic changes.

   Unfortunately, the aircraft noise levels for these aircraft, some 35 years old, are noticeably higher than more modern aircraft. Noise levels are published within the FAA's Aircraft Noise Levels database[3] as well as within Advisory Circular AC 36-1H.[4] Measurements are provided for takeoff, sideline and approach configurations.

[1] http://www.faa.gov/documentLibrary/media/Advisory_Circular/ac91-53.pdf
[2] http://www.boeing.com/resources/boeingdotcom/commercial/noise/minneapolis.html
[3] https://www.faa.gov/about/office_org/headquarters_offices/apl/noise_emissions/aircraft_noise_levels/
[4] http://www.faa.gov/documentLibrary/media/Advisory_Circular/AC%2036-1H.pdf

7. Coordinate with other major airport operators and collectively urge air carriers using A320 aircraft to retrofit their fleets with vortex generator modifications for reducing airframe noise. "Researchers in Europe have identified a high-pitched noise from the older A320 family of aircraft as the aircraft descends for landing, caused by air flowing across open cavities under the wing. The noise can be heard several miles from the runway before the deployment of landing gear. Researchers have developed a simple solution called the Vortex Generator that solves this particular problem. The Vortex Generator is a small metal device placed in front of the open cavities that changes the air flow and reduces the noise by 2 dB to 6 dB. Airbus is already placing vortex generators on newly manufactured aircraft and European operators are retrofitting their existing aircraft that operate in Europe."

8. Establish a permanent MWAA Noise Advisory WG (don't disband after this work is done). The permanent WG could meet quarterly or semiannually to continue to address noise issues, review data/reports, be part of the Fly Quiet process and make recommendations to the MWAA and the FAA.