Re: Docket Number FAA–2023–0855

Comments re the FAA Noise Policy Review
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Thank you for the opportunity to comment on the FAA's Aircraft Noise Policy Review. I have been a resident of the City of College Park, Georgia ("College Park" or "CP"), home of KATL, the world's busiest airport, since 2005. All KATL aircraft operations arriving to the East, and departing to the West, pass over College Park - 3 separate arrival tracks and 4 separate departure tracks. In fact, planes landing to the east on the northernmost runway (8L) pass over Main Street in downtown College Park at about 200 ft AGL.

I began working with my Ward Councilman, our City Manager, and City Attorney after the opening of KATL's 5th runway in May of 2006 to help the City address noise from aircraft overflights in areas where there had been none, and still should have been none. My scientific and engineering background enabled me to learn how to track flight paths, and measure noise. Later after being elected to City Council in 2008, I worked with the KATL Tower and TRACON to adjust flight paths to minimize the noise impact on City residents, while meeting the safety and efficiency needs of FAA Flight Operations. The cooperation that we have received from the A80 TRACON, KATL Tower, and KATL staff has been exemplary. They have been particularly responsive when I have tracked and questioned occasional variations from normal traffic patterns. This year I am concluding my fourth 4-year term on City Council.

Through CP's membership in the National Organization to Insure a Sound-controlled Environment (N.O.1.S.E.), I became a representative on the Research Advisory Board to the Director of the FAA's PARTNER COE and its successor, the ASCENT COE. Thus, I am intimately familiar with aircraft noise as an impacted resident, local elected official, operator of noise measurement hardware & software, and a reviewer of ongoing noise research.

At the same time, I have acquired knowledge of air traffic operations (and observe them using ADS-B aircraft tracking hardware and software), noise research advances and limitations, and flight management technology such as ADSB, RNAV, and RNP. I bring this knowledge/personal experience to bear in my following responses to the FAA request for comments on the Noise Policy Review's specific issues and questions:

1. ***Vehicle Type.*** *What types or elements of current or future air vehicle activity (e.g., unmanned aircraft systems (also known as UAS or drones), advanced air mobility, rotorcraft, subsonic fixed wing, supersonic, or commercial space) should the policy describe and disclose?*

Ideally, the policy would describe and disclose all of the above. But from a practical standpoint, unless there are constraints on the flight paths, realistic metrics on some of these air vehicles would be virtually impossible to establish except in immediate proximity to the takeoff and landing points of each flight.

2. ***Operations of Air Vehicles.***

a. What elements of aircraft operations (e.g., en-route, takeoff, landing) should the noise metric evaluate and disclose.

Although aircraft noise can be psychologically annoying in a quiet environment, even from flights at higher altitudes, more substantive impacts occur during operations at lower altitudes. At ground level, a noise level of 60 - 65 dBA is sufficient to: disrupt conversation (e.g., interfere with teaching, supervising, communicating in general), break mental concentration (e.g., distract from reading/working), or decrease the depth of sleep (even if not awakening the sleeper). From ongoing research, this last impact, sleep disruption, appears to translate into physical impacts which link to diabetes and hypertension, which can precipitate other negative health effects. In CP I have routinely measured outside noise at ground level, from takeoffs on runway 26L, to be 80 - 85 dBA (To the ear, this sounds 4 times the apparent loudness of a conversation at a distance of 1 meter.). One such location is in a residential neighborhood located ~2.3 miles from DER (Designated End of Runway) of runway 26L, and ~0.24 miles SSW perpendicularly from the

flight path. **Thus, takeoffs are prime candidates for evaluation/disclosure/decision-making at least where they overfly locations within ~3 miles from DER.**

Landing aircraft descend on a 3-degree glide slope with engines throttled back. The noise produced by air flowing past the wings, flaps, fuselage, and landing gear is more dominant and higher in frequency than the lower frequency sound of the throttled-back engines (in contrast to the dominant roar of the engines on takeoff). For example, I have measured the sounds from arriving planes as low as ~200 feet AGL and 200 feet laterally from the flight path. Although the sound can reach 90+ dBA for a second or two, it is unnoticeable when a block away. The higher frequency sound appears to be more readily blocked by foliage and buildings, and does not propagate as far along, or perpendicularly to, the flight path. **Thus, landings also should be considered for evaluation/disclosure/decision-making, but impacts are significant at locations laterally closer to the flight path, and further out from DER, than for takeoffs.**

In some metroplex situations, the need to maintain altitude separation between multiple layers of traffic (on some flight tracks) may require that some aircraft be constrained to maintain altitude at a low level for several miles (e.g., business jets transitioning the KATL Class B airspace in level flight at ~4,000 ft. on the T-319 North-South Transition Route above the airport).

Although not flying over College Park, a similar situation exists with business jets departing from Fulton County Airport (KFTY) on a southwest heading (~240 degrees) which I have tracked flying at 2,000 ft AGL for greater than 18 miles.

Thus, low altitude en-route operations should also be considered for evaluation/disclosure/decision-making. The impact of this low altitude en-route noise would depend on the assigned flight level and air speed.

Takeoffs and landings also produce impactful "ground noise"; from the 15 second bursts of reverse thrust on landings, to the several seconds of high velocity thrust as takeoff roll commences (with sound decreasing as the plane continues down the runway), to start-stop noise as planes taxi to the takeoff runway. During a busy period at KATL, planes take off on two runways every minute or less (I have monitored 4 single aisle planes consecutively take off on runway 26L with only ~35 seconds separating them.), depending on wake turbulence restrictions. Overlapping during the same period, planes also can be landing on three runways.

My home is located ~1.4 miles NW from the west end of runway 8L. There, the combination of the above operations can produce a significant background roar punctuated by periodic sound bursts of reverse thrust from landings, and "start of roll" bursts from takeoffs. On a busy Monday morning, if planes are taking off and landing to the east, depending on wind velocity, I can measure 60 dBA of background roar, punctuated by 70 dBA thrust bursts. **Thus, ground noise also should be considered for evaluation/disclosure/decision-making, but impacts are quite dependent on wind velocity (runway headwind/ crosswind components, and wind speed).**

b. What interests or concerns do communities in the vicinity of airports have? How can these concerns be addressed using noise metrics? What noise metrics would address these concerns?

KATL is the busiest airport in the world and the experience of its neighboring communities should be particularly instructive to this review. The CP community forms a crescent bordering KATL on the north, west, and south sides. The Domestic Terminal and Concourses T, A, and part of B lie in the corporate limits of College Park. As stated previously, all planes landing to the east, and taking off to the west, overfly CP. Also, corporate jets traveling north-south overfly (level flight) CP at ~4,000 feet. **As a city adjacent to the airport, residents of College Park are concerned about the disruptions in verbal communication, concentration, peace and quiet, and sleep caused by the**

various forms of aircraft noise, which worsen depending on wind velocity. The headwind component determines whether planes land and takeoff to the east, or to the west. The crosswind component, working in conjunction with the headwind component, determines whether noise is carried (impacts residents) more toward the north or the south.

Please see my answers to Questions #3 and #5, re DNL and alternative metrics, regarding what interests or concerns these noise metrics would address.

c. What concerns do overflight communities have? How can these concerns be addressed using noise metrics? What noise metrics would address these concerns?

For locations close to the airport, I have addressed low level overflights under Question 2a. Residents located below the flight path, who are further from the airport, experience noise events at lower sound levels **(assuming that aircraft have climbed to higher altitudes)** but their distance to the overflying aircraft and the level of the received noise varies less, as the aircraft traverses a given ground distance, than it would if the plane were flying lower. **If the planes on a flight path are packed closely enough** (compressed, e.g., during a "push" to facilitate departures) the sound at ground level of one plane begins to overlap that from the previous one. During a compressed period, the noise sounds more continuous. This may explain why residents living further from the airport are now more acoustically (and visually?) annoyed with more "pushes" along more precise, narrower flight paths, even though the dB levels for single overflight events are unchanged from less crowded time periods. Furthermore, the higher the aircraft are flying, the wider the corridor of sound (and visual) overlap effect below it. Thus, more residents potentially experience similar (although lower) levels of noise exposure (i.e., the 10 dB falloff distance from the level at the centerline of the flight path increases with aircraft altitude). Thus, for a given sound level emitted by an aircraft, the perceived noise in the annoyance corridor is different with varying altitude. Therefore, the noise annoyance metric needs to be different for

higher altitude overflights. **In this case, an averaging method such as Leq, measured over the period of the "push", would appear to be a good measure of the annoyance, since the sound intensity is more "even".**

I live about 7,000 ft perpendicular to the ground track of Runway 26L departures (to the west). At that point planes are 1,500 to 2,000 ft AGL. So the hypotenuse distance from the aircraft is still ~7,000 ft. As mentioned earlier, even though I am in the same community as those with overflights located more immediately above, I tend to experience noise as if I lived in a community where planes fly over at 7,000 feet or more. **Thus, in the same "community" locations "under" the flight path may require "Number Above", and others require Leq, to adequately measure "annoyance". Please see my answers to Questions #3 and #5, re DNL and alternative metrics.**

d. What interests or concerns do communities in the vicinity of commercial space transportation operations have? How can these concerns be addressed using noise metrics? What noise metrics would address these concerns?

Although not personally familiar with that noise, space launches appear to be similar to single flight events. I would suggest LCeq max as the metric to capture impact due to vibration from low frequency sound. Also, LCeq as the metric for the duration of the launch period that the one second value of LCeq stays above 55 dBC.

e. What interests or concerns do communities in the vicinity of UAS (drone) package delivery or other newly emerging technology operations have? How can these concerns be addressed using noise metrics? What noise metrics would address these concerns?

I would suggest that consideration be given to **Number Above Per Period (NAPP)** but using "A"(vs "C") weighting to exclude

lower frequency environmental noise and focus on the likely higher frequency of the UAS sound. It also may require incorporating some measure of "tonality" of the sound, which I believe some people will find more annoying.

3. DNL. *What views or comments do you have about the FAA's core decision making metric, DNL? How would these views regarding DNL be resolved if the FAA employed another noise metric (either in addition to, or to replace DNL) or if the FAA calculated DNL differently?*

The National Curve (noise annoyance curve) resulting from the FAA's recent "Neighborhood Environmental Survey" (NES) shows a substantial increase in the percentage of people who are highly annoyed by aircraft noise over the entire range of aircraft noise levels considered, including at lower noise levels. Since by existing noise measurement standards modern aircraft are considered quieter, this result could be interpreted as people today simply being more sensitive to noise. However, I believe that there are factors contributing to this high annoyance that are unaccounted for by DNL. **I believe that different noise metrics are needed to account for these factors, and as implied previously, they are situational.**

Modern aircraft have larger, high bypass engines that are more efficient and are considered to be quieter as measured on the A-weighted decibel scale (dBA). From my experience, they "appear" to radiate more noise energy in lower frequency 1/3 octave bands when departing or applying reverse thrust on landing. The sound is more like rolling thunder. This might explain some of the NES study's citizen comments regarding annoyed respondents being "startled, frightened, or awakened".

For example, my home is located 1.4 miles NW from the western end of northernmost runway 8L. During a Monday morning rush hour when wind is from the East at the right velocity, I experience a constant rumbling punctuated by spikes from

reverse thrust on 8L, and runup and start of roll on 8R, for periods of 30 minutes or more. Larger aircraft cause the house to vibrate, which sometimes induces higher frequency, more audible sound from rattling windows, etc. The dBA measurement scale discounts lower frequencies, whereas measurements on my back porch using the C-weighted dB scale run about 10 dB higher, i.e., C-weighting more accurately reflects the degree of annoyance from these newer aircraft. **A new noise metric should consider C-weighted dB measurements to accommodate the more "ominous" lower frequency sound of newer aircraft engines, e.g., LCeq vs LAeq.**

There is an excellent diagram on the FAA Aviation Noise web site that explains how a 65 DNL rating can be achieved with three different numbers of overflights having three different levels of resulting ground level noise. Another diagram characterizes these levels in terms of sound associated with everyday events. In the first diagram, one aircraft overflight producing the noise of a rock band is equivalent to ten overflights, each producing the noise of a car horn at 3 ft., or 100 overflights, each producing the noise of a gas lawnmower at 3 ft. Despite producing the same average level of noise, I don't believe they produce the same level of annoyance. If I had a choice, I'd prefer the one very loud overflight at, say noon, vs the 10 less loud throughout 24 hours, especially if one or more of the ten were late at night. And I would prefer the 10 less loud flights over the 100 least loud flights. I believe that the number and magnitude of excursions during 24 hours from the normal ambient noise level (noise floor) makes a difference. It is important to note that if I lived on a busy street with sirens, car horns, and traffic noise, the degree of excursion from the ambient noise floor would be less significant, and probably less annoying.

Humans react to more than "average" noise. I believe the number of noise excursions above the ambient noise floor, greater than a defined dB, over a given time period, is a more accurate predictor of annoyance from low altitude overflights

from takeoffs, landings, and "level" transitions. **This implies a NAPP metric.**

During a "push" (rush hour) at KATL, planes can take off concurrently on 3 runways, and I have measured them taking off on one runway an average of 45 seconds apart for 20 minutes, before beginning to be spaced further apart as the push wanes. Residents who are directly under the flight path tell me that they learn to time their outdoor conversations to stop speaking for a few seconds every 45 seconds or so. I know that under the right conditions when I am speaking at an outdoor City event, I have learned to do so as well. **I believe that situational parameters associated with the NAPP metric include: ambient noise floor (varying by time of day), threshold in dB above the noise floor to trigger counting, the length of a time period (compressed or not), and the number of compressed time periods per day.**

4. Averaging. *DNL provides a cumulative description of the noise events expected to occur over the course of an entire year averaged into a representative day, described as an Average Annual Day (AAD).*

a. Do you believe an AAD is an appropriate way to describe noise impacts?

Even if DNL were a valid measure (I believe it is not), averaging good and bad days does not show how many bad days an impacted location has.

b. If not, what alternative averaging schemes to AAD should be considered and why? What information would the use of an alternative averaging scheme capture that AAD does not?

A better measure that would show the number of days that a particular location was subject to undesirable levels of noise based on whatever metric/standard was appropriate for it (e.g., LCeq, LAeq, NAAP, etc.).

5. Decisionmaking Noise Metrics. *The FAA currently uses DNL as its primary decision making metric for actions subject to NEPA and airport noise compatibility planning studies prepared pursuant to 14 CFR part 150.*

a. Should different noise metrics be used in different circumstances for decision making?

Yes.

b. If the answer to Question 5.a. is "yes," please identify: the metric, the information it provides that DNL does not, and explain when and how it should be employed by the FAA in its system.

Different noise metrics should be used depending on the circumstance. As discussed in my answers to Questions #2 and #3, circumstantial variables are: Aircraft operational Procedure being executed (climb, level, descent), AGL altitude range in Feet (e.g., nominally: 0<Alt1<3,300<Alt2<10,000<Alt3); level of the ambient noise floor in dBA (e.g., nominally: 0<dBA1<45<dBA2<60<dBA3<75); Day/Night (nominally: Day=7:00 AM to 10:00 PM, Night=10:00 PM to 7:00 AM), lateral distance from flightpath.

c. If the metric should be used in combination with another metric, please describe how they should be used together for decision making.

For simplicity I believe that only one metric should be applied in a given situation. However, as mentioned above and previously (see my answers to Questions #2 and #3), the situation which dictates the metric is determined by a combination of factors: arrival/departure, altitude, etc.

d. If the answer to Question 5.a is "no," should DNL remain the core decision making metric or should another metric be substituted in all circumstances?

e. How would the use of the metrics that you recommend support better agency decision making?

I believe the metrics identified above are more likely to correlate with annoyance when applied to the particular circumstance for which each metric is recommended. This is similar to using piecewise approximation, using various mathematical functions, to more accurately characterize physical phenomena.

6. Communication.

a. Please identify whether and how the FAA can improve communication regarding changes in noise exposure.

With the advent of RNAV and RNP, aircraft arrive/depart via precise highways in the sky. Just as people who are relocating need to be aware of whether their future place of residence is next to a freeway, or on a neighborhood cul de sac, they need to be aware of whether they will be "under" (near aircraft) flying an invisible flight path above them. They also need to be aware of whether the aircraft overhead are departing at advanced throttle, or arriving with engines nearer to idle, "gliding" on a 3-degree slope. **Ground-level arrival and departure sound are very different in audio frequency, time duration, and ground propagation distance (both along the flightpath and laterally from its centerline).**

In the case of KATL, I have created straight line plots of the departure and final approach paths for its 5 parallel runways. I watch planes precisely follow my plots, with minor variance at turning points (where planes departing on runway heading from either two or three runways, transition to four different flight paths), and with no variance on approach. These plots are embedded in presentations posted on my website.

These flight paths should be published on the airport website, along with appropriate noise metric statistics. E.g., NAPP for a sufficiently granular number of locations, directly below, along the arrival or departure flight path, for each half hour, during 2N sets of "typical 24-hour days" (2, so as to show a day for forward, and a day for reverse runway headings, if applicable). N should be a sufficient number to show at least minimum, median, and maximum traffic days. **This would provide a noise baseline.**

Any proposal (or combination of proposals) that would significantly change the flight paths, density of flights at various times of day, type of aircraft, non-stop departure route length changes (change of fuel load impacts departure altitude), etc. could be quantified using the appropriate circumstantial metrics along the affected flight paths, and communicated to the public via the airport website. **This would provide public notification of changes to the noise baseline.**

b. Should the FAA consider revisions to its policy on the use of supplemental noise metrics in the FAA's NEPA procedures? decisions that affect noise.

Please see my answer to Question #5.b.

c. What information about the change in noise resulting from civil aviation operations (e.g., UAS or drones, helicopters, fixed wing aircraft, rockets/commercial space transportation vehicles, and new entrant technologies) should the noise metric communicate to the public?

Although the change to precision flight paths has created new noise issues, it has also created the opportunity to describe their impact more precisely, by using new metrics to quantify them. Until more precise flight paths are mandated for the non-fixed wing aerial vehicles, I believe it will be difficult to quantify their impact for the public.

d. Please explain how the public will benefit if the FAA implements your proposal in response to Questions 6.a and 6.b.

Several years ago, I was contacted by one of our state legislators who had received complaints from constituents on the other (east) side of the airport who were suddenly experiencing overflights, when previously they had none. She asked me if I could look into it. I plotted the new aircraft routes using my ADS-B equipment and then consulted the active NOTAMS using my pilot software. The flight path changes were the result of a several week closure of a departure runway for maintenance. I was able to explain which constituent areas were affected and why. I also told her when the runway was due to re-open. **A lot of constituent angst and legislative resolution time could have been saved if this temporary change to the baseline had been communicated on the airport website using flight path plots.**

As stated in the FAA solicitation to comment, there is no FAA commitment to apply the results of this study to established Metroplexes. For them however, full, realistic disclosure of the baseline noise impacts in the established metroplex area would benefit both the community and the FAA.

7. NEPA and Land Use Noise Thresholds Established Using DNL or for Another Cumulative Noise Metric.

The FAA has several noise thresholds that are informed by a dose-response curve (Schultz Curve), which historically provided a useful method for representing the community response to aircraft noise. Two of the noise thresholds informed by the Schultz Curve are the FAA's significant noise impact threshold for actions being reviewed under the National Environmental Policy Act and the land use compatibility standards established in 14 CFR part 150, Appendix A. Both of these rely on the cumulative noise metric DNL and are referred to collectively in this question and questions 8–10 as "the FAA noise thresholds." On January 11, 2021, the FAA published the results of the Neighborhood Environmental Survey, a nationally representative dataset on

community annoyance in response to aircraft noise. The Neighborhood Environmental Survey results show higher percentage of people who self-identify as "highly annoyed" by aircraft noise across all DNL levels studied in comparison to the Schultz Curve.

a. How should the FAA consider this information (i.e., the Schultz Curve and Neighborhood Environmental Survey findings) when deciding whether to retain or modify the FAA noise thresholds established using the DNL metric or to establish new FAA noise thresholds using other cumulative noise metrics? Please explain your reasoning.

The Schultz and NES curves plot annoyance against A-weighted DNL "averaged" over 24 hours. However, today's aircraft fly precision flight paths (vs dispersed), have larger high by-pass engines (which generate noise in lower frequency bands that trigger sympathetic vibrations in more audible bands), descend on more continuous glide slopes (vs "stepped" descent), have more departures at late-night/early-morning, have more and longer departure "pushes" and arrival periods, with more closely and evenly spaced overflights, etc. DNL does not effectively capture the annoyance caused by long periods of relentless, repetitious, concentrated noise, even when it is at a lower dBA level. **Alternative metrics, with thresholds appropriate to the measurement circumstances, should be adopted.**

b. Should the FAA consider other or additional information when deciding whether to retain or modify the FAA noise thresholds that were established using the DNL metric or to establish new FAA noise thresholds using other cumulative noise metrics? Please describe the reason for the recommendation and identify the data, information, or evidence that supports the recommendation.

Please see my answer to Question 7.a. **New metrics and thresholds appropriate to those metrics should be adopted.**

c. How should research findings on auditory or non-auditory effects (e.g., speech interference, sleep disturbance, cardiovascular health effects) of noise exposure caused by civil aircraft and vehicles be considered by the FAA when it decides whether to retain or modify the FAA noise thresholds that were established using the DNL metric? How should the FAA consider this same research when deciding whether to establish new FAA noise thresholds using other cumulative noise metrics? Please explain your response.

The FAA ASCENT COE's (Center of Excellence) ongoing research is assembling a body of information on the deleterious effects of sleep disturbance. **"Number Above", for the duration of the sleeping period, seems likely to be a good metric**, but that should be deduced from the research. The **threshold needs to be determined, and is probably situational, depending on the ambient background noise. It also probably is dependent on the individual, so some practical compromise will need to be determined that is appropriate for most individuals.**

For speech interference, NAPP, with a threshold level of 50 to 60 dBA, depending on the length of the relevant period and the type of information being verbally communicated (e.g., a foreman's direction to a worker vs an educational classroom situation), would probably be a good metric.

d. In examining whether to change its metrics and thresholds for noise, the FAA needs reliable information to support any changes. One type of information that the FAA can rely on is epidemiological evidence. This means the study (scientific, systematic, and data-driven) of the distribution (frequency, pattern) and determinants (causes, risk factors) of health-related states and events (not just diseases) in specified populations (neighborhood, school, city, state, country, global). What amount of epidemiological evidence is sufficient to provide the FAA with a sound basis for establishing or modifying the FAA noise thresholds either using the DNL metric or another cumulative noise metric? Please explain your response.

This is beyond my area of expertise to attempt a correct answer. However, I would caution that teasing out the causation of noise for many health effects will be difficult given that other locational factors, such as air pollution and poverty, probably have a high correlation with the presence of noise.

e. Should the FAA consider using factors other than annoyance to establish FAA noise thresholds using the DNL metric or other cumulative noise metrics? What revisions to existing FAA noise thresholds or new noise thresholds do you recommend be established and why? Please explain your response.

I have heard several local anecdotal cases (and viewed one or two) of structural damage being attributed to aircraft noise by the structures' owners. When my house vibrates during the Monday morning push, I tend to believe that it is true in some cases. (Yes, my 1939 home has some ceiling cracks that may have been aggravated by aircraft noise.) **Although I don't think low frequency induced structural damage is a significant problem with modern construction, I would recommend for consideration a threshold of LCeq>55 dBC for older homes in locations close to sources of "ground noise" or located directly under a departure flightpath close to DER.**

8. FAA Noise Thresholds Using Single-Event or Operational Metrics.

As the FAA learned from the results of the NES, people are bothered by individual aircraft noise events, but their sense of annoyance increases with the number of those noise events. Should the FAA consider employing new FAA noise thresholds using single-event or operational metrics? If the answer is "yes," which metrics should be used to establish the FAA noise thresholds? What should be the relevant noise exposure level for the new noise thresholds you propose? Please explain your reasoning. If the answer is "no," please explain your reasoning.

Yes, metrics must be appropriate for the circumstances associated with overflights at the measurement location. Relevant factors are: operation, altitude, time of day, ambient environmental noise level. **Please see my answers to Questions #2, #3, #5.b.**

9. FAA Noise Thresholds for Low-Frequency Events.

Should FAA establish noise thresholds for low-frequency events, such as those associated with the launch and reentry of commercial space transportation vehicles authorized by the FAA Office of Commercial Space Transportation? If the answer is "yes," which metrics should be used to establish the noise thresholds? What should be the relevant noise exposure level for the new noise thresholds you propose? Please explain your reasoning. If the answer is "no," please explain your reasoning.

It seems unlikely that it will be practical to try to address these issues until spaceflight has evolved enough to provide flexibility to vary parameters that reduce noise without compromising safety or the success of the mission.