

Naval Air Station Whidbey Island

Navy Noise Assessments



How does the Navy assess noise?

The Navy assesses noise for its environmental and planning documents. As part of the National Environmental Policy Act (NEPA), the Navy assesses noise impacts of proposed actions. As part of the Air Installations Compatible Use Zones (AICUZ) program, the Navy assesses noise impacts and presents recommendations for land uses development compatible with its flying mission.

When sound interferes with your daily activities, it becomes noise. Sound is measured in decibels. The loudest sound you can comfortably hear is one trillion times greater than the softest sound perceived by your ear. Because of the large numbers too unwieldy to work with, we use a logarithmic scale. Consequently, noise energy doubles with every three decibel increase. For example, while one aircraft flying over might be at 80 decibels (dB), two aircraft would be at 83 dB. Our ears, however, cannot sample all the noise energy in an event. Consequently, while we could notice the difference three decibels can make, it would take a 10 dB increase to have a perceived doubling of the aircraft noise.

Factors

There are several factors that influence our perception of noise. To aid in assessing aircraft noise, the Navy uses a metric called Day Night Average Sound Level (DNL) which combines several factors that influence our perception of noise (loudness, total energy of events and time of day)

When an airplane flies over, we first hear it off in the distance, with the noise level peaking as the aircraft flies by, and gradually drops off with distance. This "peak" is often referred to as the maximum sound level, or L_{max}.





SEL is a good representation of single event noise.

Growler and Prowler Comparison

At NAS Whidbey Island, the EA-18G Growler replaced the older EA-6B Prowler. At 500 feet from the aircraft on departure, the EA-18G is up to 115 dB SEL whereas the Prowler was 130-133 dB SEL, which means the Prowler would be perceived as more than twice as loud. On approach, however, the EA-18G is up to 3 dB louder than the Prowler.

Besides including the loudness of the events, DNL also considers the total energy of each event. For instance, if one aircraft flies over, is it the same 10 aircraft or 100? If an aircraft runs up its engines for 45 seconds prior to departure, is it the same as a 45-minute maintenance run-up? The number and duration of determines the total noise energy. The total noise energy for each event is referred to as Sound Exposure Level (or SEL).

There are other factors that can influence the perception of aircraft noise. The EA-18G has more low frequency content than the Prowler it replaced. Close to the airfield, there might a slight increase in potential for noise-induced vibration in areas where the peak sound levels exceed 110 dB.

Additionally, DNL also factors in the influence of night operations, which tend to be more noticeable than daytime operations. To factor in the nighttime operations, the Navy adds a 10 decibel penalty to each operation after 10 PM and before 7 AM.



DNL combines the SEL for all events during a 24-hour period and adds in the nighttime penalty where applicable to get DNL. DNL is a good measure of community response to noise and is used in land use planning throughout the United States (except California, which uses a similar metric).

While DNL is used for land use planning, we use other metrics, such as SEL, to evaluate speech interference and sleep disturbance.



Flight characteristics also affect the noise footprint for the EA-18G and the Prowler. The EA-18G has a better thrust to weight ratio than the Prowler, meaning that the EA-18G can climb to altitude quicker and get out of the area faster than the Prowler, reducing noise impacts. An analysis of SEL levels for the EA-18G and the Prowler showed that the 100 dB SEL contour for Ault Field departures was 60% greater for the Prowler than the EA-18G. In an area like Coupeville, where all operations are close to the field, the 100 dB SEL contour is still twelve percent smaller for the EA-18G.