big noise over the Grand Canyon

Tourist attractions may become too popular. This is the fate of the Grand Canyon National Park (GCNP), where over-flights for "armchair" tourists are bringing increasing noise to what was once a place with only natural sounds. In an effort to bring the noise under control, the National Park Service has initiated a study to derive an evaluation methodology for air tour operations over the GCNP. A two zone system is being considered for impact assessment, leading to substantial restoration of natural quiet.

Since its "discovery" by Don Lopez de Cardenas in 1540, the Grand Canyon has been a source of interest and fascination. It has been estimated that the Colorado River took between 3 million and 6 million years to carve out the Canyon. This is numerically similar to the annual number of visitors, estimated at about five million in recent years.

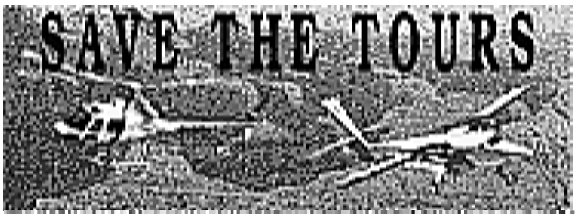
"The best way to see the Grand Canyon has always been from above" is a typical claim of air tour operators. For example, you can have a 100 mile flight in a 19 seat converted Twin Otter Vistaliner for only $75. The conversion includes panoramic windows and "two whisper quiet propellers, especially designed to reduce external noise levels".

But the growth of air tours has brought a noise problem to the 2000 plus square mile GCNP and the Park Authorities are implementing noise control through zoning . In the first zone, covering about one-third of the Park area, including the western end and developed areas such as the South Rim, which is popular with ground visitors (and avoided by air tours) the criterion will be 'noticeability'. This requires the average A-weighted level to be no greater than ambient plus 3dB. In the second zone, which covers the middle and eastern portions, the criterion is audibility. That is, the level at which aircraft can begin to be heard by people with normal hearing. Here the requirement is that the noise level is 8dB below average A-weighted ambient. The use of A-weighting has limitations, as the spectrum of aircraft noise is not the same as that of the ambient noise. Ambient levels may be as low as 15dBA on still days in the quietest locations, but higher in wooded areas.

The attempt to restore the 'natural quiet' in the GCNP and to protect it from the adverse effects of overflights is progressing without a clear definition of natural quiet, other than that it was the condition which existed before overflights began. The restrictions stem from Public Law 100-91, passed by Congress, which aims to provide large areas where the public can experience the Park free from aircraft sound intrusions and where the sound from aircraft travelling adjacent to the flight-free zone is not detectable in most locations. In view of this, the GCNP policy is that 50% of the Park reverts to natural quiet for 75-100% of the day. Here the day is the averaged 12 hours daylight.

Field work has included observers at a number of sites in the Grand Canyon, who taped recorded background sound whilst listening for tour aircraft and indicated on the tape whenever aircraft could be heard. In examining effects across wide areas, computer modelling is necessary. The Integrated Noise Model (INM) is used in the USA to predict A-weighted levels, but this does not give a direct computation of audibility, because the frequency information is suppressed. However, the INM may be used to indicate the time that an aircraft exceeds a specified level and thus give an approximation of the time that an aircraft will be audible. Each major area of the GCNP has a different audibility threshold, depending on the background level.

Comparisons were made



between five different national park spectra and eight different aircraft spectra. From this it was concluded that helicopter sounds became audible, on average, when their level was 7.2dB below A-weighted ambient. Propeller aircraft became audible when their level was 9.5dB below A-weighted ambient. The average of these is 8.4dB and, rounded down to 8dB, was taken as the typical difference between natural ambient and aircraft noise at onset of audibility.

Spectral peaks affect the audibility. Whilst the 8dB A-weighted difference criterion might be satisfied in the measurement, a specific high third octave level leads to audibility. In one instance, although the A-weighted plane noise was 11dB lower than the A-weighted ambient, an aircraft peak in the 125Hz band was 4dB higher than the corresponding ambient band level, and clearly audible.

Obviously, the air tour industry is not happy with these restrictions, even suggesting that they might lead to the demise of the air tour business, whilst others pointed to a dangerous clustering of flights in those areas where flying complied with the regulations. The industry has commenced a "Save the Tours" campaign, claiming that the whole attempt to control flights is misguided and based on a poor understanding and interpretation of acoustics, as there are only about 30 complaints of aircraft noise a year. Additionally, 95% of all GCNP visitors surveyed, reported that their enjoyment was "not adversely affected by aircraft noise"

Legislation to give the National Park Service (NPS) jurisdiction over National Park airspace was defeated in Congress in 1997, after opposition by air tour operators who, fearing the environmental agenda of the NPS, argued that FM should keep control over the air space. The air tour operators point out that ambient minus 8dB may be close to the hearing threshold for many adults, and below the wind noise in wooded areas. Commercial aircraft flying 40 miles away, general aviation and military aircraft would not meet this rule, but are exempted.

The Arizona segment of the air tour industry flew over 240,000 visitors in 1998, leading to a revenue of nearly $22 million. It is estimated that about twice this number flew from southern Nevada, whilst there are also flights from the Los Angeles and other regions. Thus, the air tours are a substantial business and have applied their resources to criticism of the National Parks Service's interpretations of the INM noise model. For example, the air tours' acoustical consultants claim that the National Parks Service manipulated data by:

- Eliminating lateral ground attenuation
- Making incorrect assumptions on helicopter speeds
- Overestimating aircraft numbers
- Using a 12 hour day rather than a 24 hour day
- Failing to include all screening effects of terrain
- Using vigilant observers for field measurements.

This may be one of the few times that the FM aircraft noise model (INM) has been subjected to such detailed public criticism, as local protest groups around commercial airports do not normally have the financial resources

Restrictions are, by definition, always unwelcome to somebody but, even with the new proposals, it is estimated that the rules will permit air tours to number 88,000 flights a year, or about 250 a day.

It will still be a busy airspace at the canyon!

noise notes

planes dodging quieter routes

Only about half of the United Airlines planes that should by flying special, noise-reducing routes out of Denver International Airport are doing so, according to a DIA noise abatement officer, Mike McKee. His view is that it is because United has so many daily flights at DIA, it has been difficult to get its flight operations department to ensure that the noisiest planes are all taking off on noise-reduction.