SUMMARY

To achieve an environment conducive to effective verbal communication, it is important that background noise levels are kept as low as possible. In hot-humid country schools are designed to have large openings in the form of windows to ensure natural light and ventilation. This makes them vulnerable to outdoor noise sources. Singapore with an area of 650 square kilometer (approx.) has one commercial airport and three military air bases located at various parts. Aircraft noise has become a critical factor in the selection of sites suitable for schools development.

The objectives of this study are to understand the extent and impact of aircraft noise on Singapore’s schools, to propose a suitable methodology for aircraft noise survey, and to propose guidelines for the selection of school sites with respect to the impact of aircraft noise. In the process of proposing a set of guidelines, this study aims to examine and recommend an acceptable noise criterion for schools in Singapore.

Methodology is divided into three stages, which include literature review, data collection and analysis of the collected data. Literature review provided the basis of establishing a viable method of monitoring the aircraft noise, as well as major findings of work conducted elsewhere.

Two sets of parameters were used to monitor aircraft noise. One was the Percentile Noise Level descriptor ($L_n$) along with Equivalent Continuous Sound Level ($L_{eq}$). The second set of parameters used for event-based monitoring of aircraft noise was Effective Perceived Noise Level ($L_{EPN}$), Equivalent Perceived Noise Level ($L_{PN_{eq}}$).
and Maximum Perceived Noise Level (Max. PNL). One of the air bases in Singapore (Jurong) was selected for data collection.

Final phase of the study was to analyze the collected data. Measured data were analyzed in relation to various parameters including aircraft flight operating (landing / takeoff) position, distance of the measurement site from the flight path, altitude of the aircraft and surrounding urban context etc.

The results of the study indicated that $L_{eq}(thr)$ may be used as an alternative approach for aircraft noise monitoring. This is because it can be measured with simple sound level meter which is less expensive and easy to use. $L_{eq} \leq 55\text{dBA}$ is suggested as the acceptable noise exposure level of sites for school development. At the same time maximum noise exposure level is suggested as $65\text{dBA}$.

Guidelines proposed in this study include various aspects of aircraft noise like noise exposure level of the sites, distance from the flight path, altitude of the aircraft, and frequency characteristics of aircraft noise. The study includes a decision tree for the site selection procedure of sites for school development whenever noise data is not available for the site under consideration. Proposed guidelines include the detail procedure of aircraft noise monitoring for selection of sites as well as precautions to be taken during monitoring.