



### Virtual International Symposium on Sustainable Aviation (ISSA 2020)

By Adjunct Prof. Ts. Ricky Liew Chee Leong

Adjunct Prof. Ts. Ricky Liew Chee Leong is currently a committee member in Mechanical Engineering Technical Division (METD).



The International Sustainable Aviation and Energy Research Society (SARES) had recently conducted a Virtual International Symposium on Sustainable Aviation 2020 from 09 Nov to 11 Nov 2020. The theme was entitled "Affordable and Clean Energy". The virtual session was chaired by Dr. Syaril Azrad Md. Ali, senior lecturer of Department of Aerospace Engineering, Faculty of Engineering, Universiti Putra Malaysia. The keynote speech no. IV of the symposium was delivered by Ricky Liew, who is a committee member of Mechanical Engineering Technical Division, IEM and is currently the Head of Engineering of SR Aviation Sdn. Bhd.

The speaker is a Licensed Aircraft Maintenance Engineer with aircraft maintenance engineer license from Civil Aviation Authority United Kingdom and Malaysia. He has 31 years of aircraft engineering and maintenance experience and has completed his Masters of Business Administration from Victoria University, Melbourne, Australia in 2010. Currently the speaker is an Adjunct Professor in the Department of Aerospace Engineering, Faculty of Engineering, Universiti Putra Malaysia.

The keynote speech kicked off with the introduction of the speaker by the session chair. The speaker started his presentation with the brief history of aircraft evolution and the initial tough challenges and focus (pre-Wright Brothers successful flight) of achieving enough lift to carry the weight of pilot by an aircraft, controllability, ability to sustain speed/altitude and skills required to fly an aircraft. The speaker then move on to mention that after Wright Brothers successful flights, there was an era of exponential aircraft/engines design and technology development. Aircrafts started with initial single occupants to hundreds of occupants with inter continent capabilities. The growth was tremendous but beginning from 1960s litigation issues began to rise due to the aircraft noise impact to human health. The noise impact on human health is shown in figure 1.

## Health Impact Due To Noise From An Aircraft

Hearing impairment  
 Hypertension  
 Heart disease  
 Annoyance  
 Sleep disturbance  
 Decreased school performance.  
 Hearing loss  
 Stress  
 Increased workplace accident rates  
 Stimulate aggression  
 Anti-social behaviors.  
 Airport noise has been linked to high blood pressure.



Figure 1: Aircraft Noise Health Impact on People

With **aircraft noise** perceived as **environmental pollution** by the regulators and aviation authority, rules and regulations are being promulgated to control aircraft noise impact to the society as shown in figure 2. Therefore, engineers have to develop new solutions by designing their products or processes that meets regulatory evolving requirements that demand for quieter and quieter aircrafts.



**Federal Aviation Administration**

Title 14 Part 36 – Noise Standards: Aircraft Type and Airworthiness Certifications



**ICAO**  
INTERNATIONAL CIVIL AVIATION ORGANIZATION

ICAO Goal:  
Limit or reduce the number of people Affected by significant aircraft noise

**ICAO Annex 16 Volume 1**  
Latest safe and airworthy noise reduction technology is incorporated into aircraft design Enables the reductions in noise experienced by communities

**ICAO Doc 9829**  
-Guidance to the Balanced Approach to Aircraft Noise Management



**EASA**  
European Aviation Safety Agency

JAR OPS 1.235  
Noise Abatement Procedures

Environmental Protection

**2. ICAO Type Certificate Details**

Manufacturer:	Cessna Aircraft Company
Type Certificate:	A27CE
Issued by:	Federal Aviation Administration
Model:	501, Citation
MCTOW:	11,850 lb. [5375 kg.]
Max. No. of Seats:	9
Noise Standard:	FAR Part 36
Engine:	Pratt & Whitney Canada JT15D-1A or -1B
Type Certificate:	E-11
Issued by:	Transport Canada

Figure 2: Regulatory Requirements Governing Aircraft Noise Standards and Certifications

These needs for solutions are not always well defined. The complex nature of the aircraft noise problems with myriad of mechanical/avionics integration presents many challenges to develop the appropriate solutions to comply with the regulatory requirements. The effort requires more than technical knowledge from engineers. New ideas and innovation is crucial for engineers to overcome the challenges and move forward into the sustainable future.

Sources of aircraft noises are shown in figure 3. However, aircraft noise “stake holders” involves various parties as indicated in figure 4 and figure 5. Therefore, it is vital for a synergistic effort to work on different areas affected by aircraft noises. The issues of complex aircraft noise problems become complicated due to multiple parties and areas involved as shown in the figures.

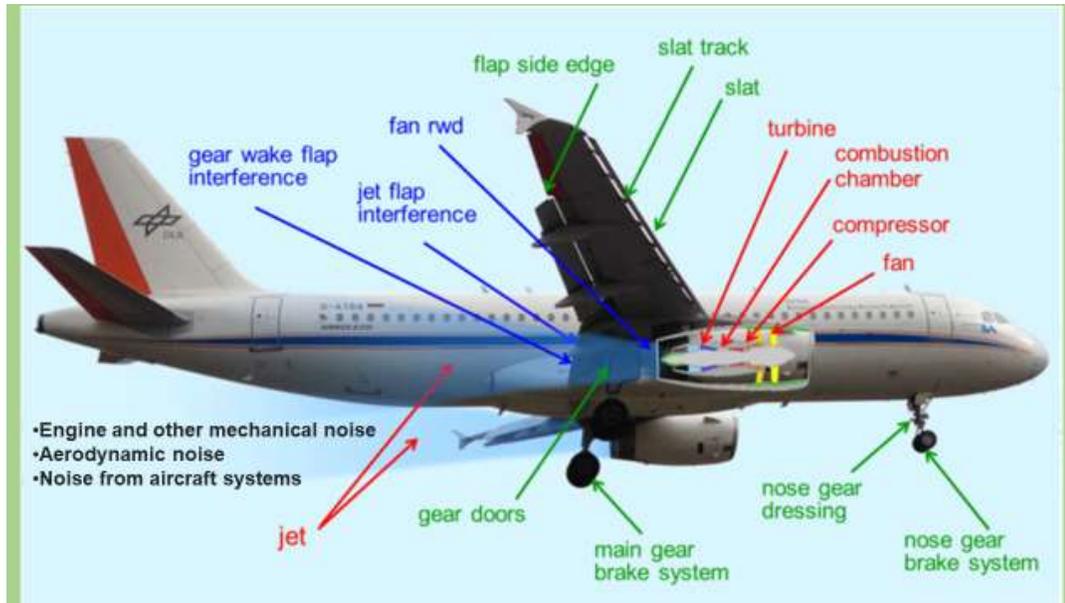


Figure 3: Sources of Noise from an Operating Aircraft

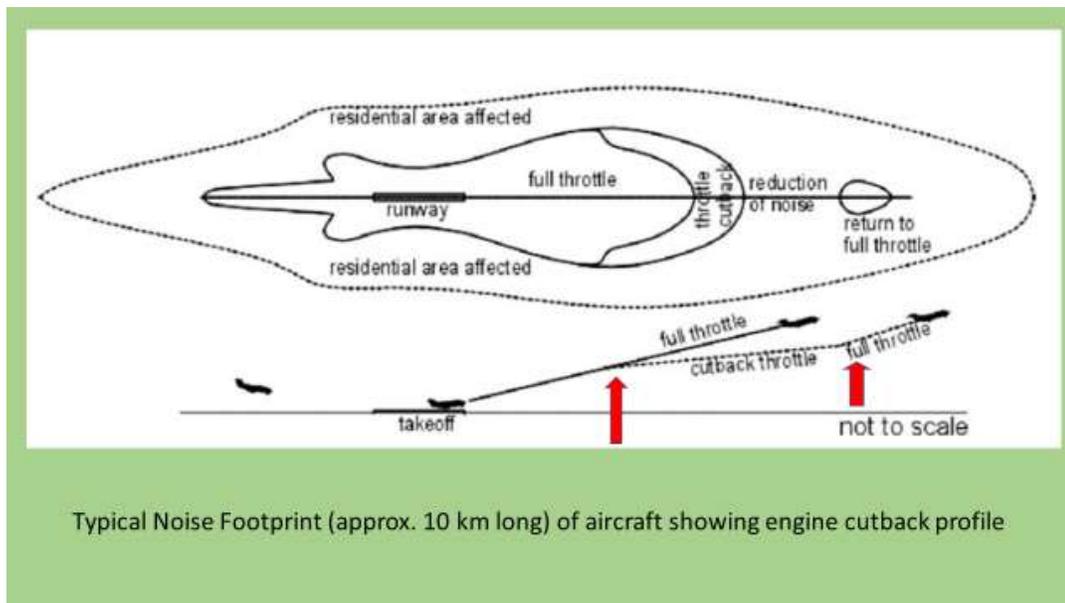


Figure 4: Residential Areas Affected by Aircraft Noise

**Noise Policy – The Balanced Approach to Noise Management**

- Guidance on the Balanced Approach to Aircraft Noise Management (Doc 9829)
- Comprises four elements:
  - Noise at source
  - Land-use planning management
  - Operational measures
  - Operating restrictions

Figure 5: Various Areas and a Balanced Approach to Manage Aircraft Noise.

The speaker continued on to encourage stronger industry-academia collaboration to address real time issues as well as developing future solutions to provide sustainable aviation operations particularly in aircraft noise abatement. This echo with the recent report in The News Straits Times that industry-academia collaborations benefits includes the enhancement of research and innovation through joint research projects, delivery of innovative commercial products, improvements in teaching, learning and enrichment of students' knowledge and their employability. Before ending his speech, the speaker shared a model of sustainable aviation long term strategies as shown in figure 6.



Figure 6: Basic Model of Sustainable Aviation Stake Holders and Industry Academia Relation

The speaker ends his keynote speech with a quote from the former Vice President of United States of America, Mr. Al-Gore that “Pollution Should Never Be the Price of Prosperity”.

The speaker also received “Company” Award from the President of International Sustainable Aviation and Energy Research Society (SARES) due to his effort in promoting industry-academia collaboration for research and development (R&D) to attain sustainable aviation. The speaker emphasized that it is not for the sake of R&D but because the world and future generation needs sustainable aviation.

Link to Ricky Liew’s Keynote Speech: <https://youtu.be/PFgvjih6K2k>



Note: This poster has a *date typo*. The actual date is 9-11 Nov 2020.