Take AIM

Smith institute

Noise Pollution: Our Enemy Against Green Aviation

TakeAIM 2019 Runner-Up:

Marianthi Moschou,
University of Manchester

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It's 11pm, a quiet Thursday night. I am scrolling down my Twitter feed when an article by CNN International pops up...

"The British band Coldplay cancel their tour for environmental reasons!".

While reading the article, my phone rings. An email from an airlines company informs their customers: "Our aim to offset carbon emissions from all our flights". Surprised by this coincidence, I keep refreshing the Twitter newsfeed.

The hashtag #flightshame is flooding my screen… This new movement has inspired people to quit flying because they concern about the aviation industry's impact on climate change…

The question is though, what if we could use advanced aircraft technology, more efficient in terms of fuel consumption? The contra-rotating open rotor (CROR) is a future propeller design expected to consume approximately 16% less fuel! Yet, it comes with a drawback. It is prohibitively noisy!

The mechanics underlying noise generation by a CROR propeller aren't fully understood, hence further work is needed to successfully predict and ultimately reduce noise. In our research we tackle the problem mathematically, modelling the propeller blades in such a way that we can study the various physical phenomena and approach the problem with tools from the theory of diffraction of waves; equations and formulae mixed together in an effort to find a rigorous mathematical solution accurately describing the acoustic waves generated by the blades of a turbine, i.e. noise.

Hopefully, tackling these major noise problems could expand the commercial applications of the high performance and lower CO_2 footprint CROR propellers.