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MIT DEVELOPS CONCEPT FOR AIRPLANES TO COMBAT AIR POLLUTION

Relevant for: Environment | Topic: Environmental Pollution - Air, Water, Soil & E-waste

MIT develops concept for airplanes to combat air pollution. | Picture by special arrangement.

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Asthma, respiratory diseases, and cardiovascular disorders have a common enemy –nitrogen oxides or NOx. The chemical, emitted by aeroplanes and motor vehicles, pollutes the air.

Motor vehicles have an emission control system that washes out exhaust gas, limiting NOx in vehicular emission. This process could not be replicated in airplanes as the emission control system would interfere with the thrust required to lift off the aircraft.

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The noxious chemical waste from airplanes' exhaust kills 16,000 people every year globally, according to a Massachusetts Institute of Technology (MIT) research note.

To combat the rising threat, a team of researchers at MIT have developed a concept hybrid-electric aeroplane propulsion system.

The team published the details of the design, including analyses of its potential fuel cost and health impacts in *Energy and Environmental Science* journal. Their proposed concept changes the way an aeroplane's propellers are powered.

In the hybrid electric system, the gas turbine drives a generator, producing electricity to power aircraft's wing-mounted, electrically-driven propellers.

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To make this happen, they moved the power-generating gas turbine from the wings and integrated it with the plane's cargo hold – where the generator is located.

This design, the team claims, will clean the exhaust before releasing harmful chemical into the atmosphere as it ensures post-combustion emissions pass through the control system.

"This would still be a tremendous engineering challenge, but there aren't fundamental physics limitations," Steven Barrett, Professor of aeronautics and astronautics at MIT, said. "If you want to get to a net-zero aviation sector, this is a potential way of solving the air pollution part of it, which is significant, and in a way, that's technologically quite viable."

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The team estimates that the concept would eliminate 95% of aviation's NOx emissions, and thereby reducing premature deaths by 92%.

They also calculated that if such a hybrid electric system were to be implemented in a Boeing

737 or Airbus A320 aircraft, the extra weight would require about 0.6% more fuel to fly the plane.

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