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AVIATION SECTOR: TECHNOLOGY AND INNOVATIONS

SHAMASHAD BEGUM

Research Scholar, Ph. D in Aviation
CMJ University, Jorabat, Meghalaya, India

ABSTRACT

The aviation sector has always been at the forefront of innovation and technology, constantly pushing the envelope to improve passenger experience, efficiency, and safety. The aviation business is still advancing due to technology and innovation, which will shape air travel in the future by providing safer, more effective, and environmentally friendly options. The aviation sector has been greatly impacted by innovation and technology in the following important areas:

- **Design and Materials of Aircraft**

More ecologically friendly and fuel-efficient aeroplanes have been developed as a result of developments in materials science, aerodynamics, and manufacturing processes. In order to reduce weight and increase performance, aeroplane building is increasingly using composite materials like carbon fibre.

- **Technology in Cockpits and Avionics**

With the advent of digital flight displays, fly-by-wire systems, and sophisticated navigation and communication systems, cockpit technology has grown dramatically. The efficiency and safety of flying have increased because to cockpit automation, which includes flight management systems and autopilot.

- **Engine Technology**

Fuel consumption and pollutants have decreased as a result of the increased power and efficiency of petrol turbine engines. The development of engine technologies like geared and high-bypass turbofans has made aeroplane operations more ecologically friendly and quieter.



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- **Air Traffic Control**

Radar, satellite navigation, and data transmission systems are examples of modern air traffic management technologies that enable more effective aircraft routing, lowering traffic and enhancing safety. Airspace management and capacity are further improved by next-generation technologies like Collaborative Decision Making (CDM) and Automatic Dependent Surveillance-Broadcast (ADS-B).

- **Experience of The Passenger**

With in-flight entertainment systems, onboard Wi-Fi, and networking becoming common equipment on many aeroplanes, technology has completely changed the in-flight experience. Additionally, airlines are spending money on amenities that improve passenger comfort, such mood lighting, ergonomic seating, and quieter interiors.

- **Maintenance Repair and Overhaul (MRO)**

Airlines can now track the health of their aircraft in real time and take pre-emptive measures to fix maintenance issues before they cause disruptions thanks to predictive maintenance systems, which are driven by data analytics and machine learning. In order to improve productivity and cut costs, 3D printing and robotics are also being used for component manufacture and maintenance jobs.

- **Sustainable Aviation**

The aviation industry is investing in alternative propulsion technologies like as hydrogen fuel cells, electric and hybrid-electric propulsion systems, and Sustainable Aviation Fuels (SAF) in response to growing environmental concerns. These developments are meant to lessen the industry's environmental impact and cut down on carbon emissions.

- **Urban Air Mobility (UAM)**

New urban transport options are being made possible by the development of autonomous aerial vehicles and electric vertical take-off and landing (eVTOL) planes. UAM offers quick and effective airborne transport for people and goods inside cities, which has the potential to completely transform urban mobility.