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aerospace composites are a subset of composite materials that are suitable for use in aircraft and spacecraft applications composites such as carbon fiber reinforced plastic crfp offer significant weight savings and better tensility than metals manufacturers continuously incorporate more composite materials into their aircraft designs for improved performance and cost savings the use of composite materials in commercial transport aircraft is attractive because reduced airframe weight enables better fuel economy and therefore lowers operating costs today bio composites made of raw materials of biological origin are giving engineers new insight on how to improve the environmental performance of future aircraft it may be hard to believe but five decades ago up to 70 of an aircraft was made of a single material aluminium composites are not as heavy as standard materials like aluminum additionally external factors don t wear and tear them this is a key reason why over half of both the a350 and 787 builds are made of composite materials the 787 is 50 composites by weight and by 80 volume composite materials are playing an increasingly important role in the manufacturing of modern airliners these light compounds are advantageous when it comes to saving weight thus improving the aircraft s efficiency but which models make use of them nasa has issued 50 million in awards to 14 organizations to develop manufacturing processes and advanced composite materials for aircraft structures these green technologies hold the potential to help reduce aviation carbon emissions nasa has established a public private partnership with five organizations to advance knowledge about composite materials that could improve the performance of future aircraft composites are innovative new materials for building aircraft that can enhance strength while remaining lightweight leading manufacturer airbus has been a forerunner when it comes to adding composites to their range of aircraft some 70 percent of the materials used to make every airbus a220 are advanced materials with 46 percent being composite materials and 24 percent aluminium lithium driven by market projections of composites on general aviation aircraft as well as advanced air mobility aam the composites industry is moving to develop higher performing composites that simultaneously reduce material processing and in service costs composites are versatile used for both structural applications and components in all aircraft and spacecraft from hot air balloon gondolas and gliders to passenger airliners fighter planes and the space shuttle building a composite airplane entails five stages of construction these five stages are 1 decision and planning 2 basic building and assembly 3 systems installation 4 filling and finishing and 5 inspection certification and final pre flight decision and planning lightweight composites are ideal materials for improving vehicle performance reducing mass extending range and compensating for battery weight polymer composites are enabling lower emission vehicles reducing the carbon footprint and saving energy to benefit the environment now and in the future increasingly aircraft designers have been turning to composites to help make their vehicles lighter more fuel efficient and more comfortable for passengers a composite aircraft is made up of multiple component craft it takes off and flies initially as a single aircraft with the components able to separate in flight and continue as independent aircraft 1 typically the larger aircraft acts as a carrier aircraft or mother ship with the smaller sometimes called a parasite or jockey craft the use of lightweight composite materials on critical structural components made the a350 a gamechanger in its class the sizable iterations airbus performed before finalizing the a350 design platform have made it airbus best selling twin aisle aircraft composite materials enable the design of structures and parts to overcome the limitations e g weight strength flexibility heat resistance of traditional materials and facilitate advanced structures and components polymer composites are enabling lower emission vehicles reducing the carbon footprint and saving energy to benefit the environment now and in the future thermoset and thermoplastic composites are the key to ev mobility and sustainability proven to be an effective technique to automate the layup process for thermoset composite aircraft stiffeners the process utilizes rollers and other devices to automatically lay down a full width flat ply of material and progressively form it into shape this process is then repeated and a stiffener is constructed ply by ply in airplanes composite materials contain carbon fiber to give more strength to plastic and other materials according to boeing they produce weight savings of about 20 compared with

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