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Evaluation of critical parameters for the front fuselage design of a fighter aircraft

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The aim of this paper is to analyse the forward body design criteria of a fighter aircraft that can serve for the air support needs of a wide range of potential end users ranging from national air force to other ally nations' airforces. A fighter aircraft requires a highly complex structure to perform complicated capabilities during various combat modes. By definition, a fighter aircraft is a high-speed air force or naval jet airplane designed for air-to-air combat missions and with high speed manoeuvrability to intercept enemy aircraft, as opposed to a bomber which is designed to attack ground targets by dropping bombs. The hallmarks of a fighter jet are small size, high speed and high manoeuvrability. The aerodynamic design considerations deal with forward body shaping, forward camber, fore body length, asymmetric vortices, forward body fineness ratio, nose effect on stability, nose strakes, nose bluntness, radar and laser-ranging installations besides influence of the crew accommodations. Some of the major design criteria that need to be considered for the structural design of such aircraft's forward fuselage are flight loads, landing gear loads, cockpit pressure, drainage, heating-cooling system, visibility, canopy and access doors, avionics systems and also skin material effect. In this paper, above mentioned aerodynamic and structural design solutions which are mentioned above will be compared step by step with other similar aircraft design solutions and also under the effects of these criteria's, the structural and aerodynamic behaviours of the aircraft will be analysed.

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