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Abstract	<p>Simulating fixed wing airplanes is a challenging field that uses different approaches to model the behavior of aircraft dynamics. In most cases flight test data for different points of the envelope are generated and used as look-up table for simulation. For existing airplanes this method is expensive and for aircraft in the preliminary design phase it is not feasible. Therefore a flight simulation has been developed, which uses solely the geometric data of the aircraft to simulate its dynamics. The first step was to design a flexible and modular structure of the complete simulation followed by the definition of appropriate module requirements. Following this specific real-time models for aerodynamics, landing gear and engine thrust have been created. The flight simulation including input/output interfaces was realized using Matlab-Simulink[<symbol>] and embedded C-code. A certified full flight simulator (FFS) has been used to preliminary validate the chosen approaches. The results of the validation process have proved promising with respect to this particular first step approach.</p>