3DEXPERIENCE®

FLIGHT DYNAMICS LIBRARY
CATIA SYSTEMS ENGINEERING

ACCURATELY SIMULATE THE FLIGHT DYNAMICS OF AIRCRAFT AND UNMANNED AERIAL VEHICLES
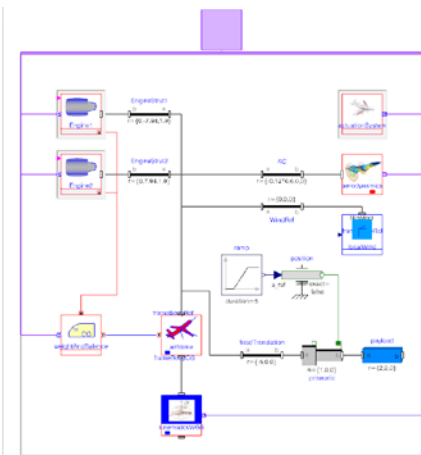
The Modelica based Flight Dynamics library enables the rapid modeling, simulation and analysis of the flight dynamic characteristics of a wide range of flight vehicles. The library is ideal for the multi-disciplinary development of accurate flight control laws as well as for use in real-time flight simulators for commercial and military aircraft, unmanned aerial vehicles (UAVs), airships and rotorcraft.

TYPICAL USE CASES

- **Aircraft Design**
  Assess the impact of aircraft design configuration changes on flight characteristics early in the design process.

- **Flight Control Law Design**
  Design and analyze multi-disciplinary flight dynamic control laws for flight and system dynamics.

- **Mission Simulation and Optimization**
  Rapidly execute mission simulations to assess flight performance or to optimize flight trajectories to minimize fuel burn, emissions and flight time.

- **Real-Time Simulation**
  Leverage accurate flight dynamic models and realistic visualization to create real-time simulators for training pilots and product marketing.

KEY FEATURES

- **Full compatibility with standard libraries**
  Develop and interconnect airframe and systems models using standard mechanical connectors.

- **Scalable complexity**
  Quickly switch between point mass or full six-degrees-of-freedom equations of motion, local geodetic or WGS'84 position states, velocity states in body or flight path coordinates via a single parameter.

- **Detailed Environment Models**
  Simulate one or more aircraft in a single model using a common detailed gravity, magnetic field, terrain, wind and atmospheric models.

- **Accurate Trimming**
  Accurately initialize flight dynamic models to their desired initial state.

LIBRARY CONTENTS

Flight Vehicle Components

- Aerodynamics and Propulsion base classes
- Airframes and Kinematic components
- Weight and Balance components
- Sensor and Control systems

Environment Models

- Earth and Terrain models
- Atmosphere and Wind models
- Ground Objects

Interfaces

- Flight Gear visualization
- External Devices input

BENEFITS

- True multi-disciplinary modeling and simulation of aircraft flight dynamics

- Supports simulation from on-ground operations through to high speed and high altitude flights

- Model complexity can be easily scaled to enable analysis and simulation at any stage of the design process

- Improved model maintenance through the use of a single tool for modeling, control and simulation

- Ability to integrate with a wide range of other compatible Modelica libraries

Typical Flight Dynamics Model

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