

Description

The Missile Fins Control design demonstrates an example of a closed-loop actuator control system implemented on an FPGA. The Missile Fin is attached to a typical electromechanical actuator used in missile's autopilots. The actuator's angular position is controlled using three embedded loops: controlling position, velocity, and torque of the actuator.

Control inside the loops is implemented using a proportional-integral-derivative (PID) controller designed in DSP Builder Advanced Blockset, the high-level model based design tool from Altera. In addition the design shows the System-In-the-Loop methodology using Altera FPGAs. The mechanical system is modeled in Simulink®, while the controller portion is implemented in the FPGA. When the developer executes the Simulink, the simulation communicates with the FPGA to execute the controller portion. The results are collected and sent back to Simulink to use as part of the simulation. Such methodology can accelerate system simulation, expose system level accumulated errors and allow early design when mechanical hardware isn't readily available.

For more information:

www.altera.com/literature/wp/wp-01208-hardware-in-the-loop.pdf

For additional information, please contact us at mil@altera.com or *contact your local Altera sales representative.*

Features

- Closed loop control system
- Parameterizable PID controller
- Floating point
- Altera's System-in-the-Loop with MATLAB®
- Designed with Simulink/Advanced DSP Builder

Applications

- Missile and UAV Avionics
- Motor Control

Figure 1: System-In-the-Loop Methodology in Missile Fins Control Demo

