Fast Optimal Engineering

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F O Engineering has a strong track record of designing Fast and Optimal control systems for the defense, aerospace and industrial markets. Our products encompass a broad range of technologies including high performance and reliable digital designs. Our engineers can satisfy hard to meet requirements ranging from compact design and unique environmental conditions to complex applications and challenging price points.

HeliSAS (for VFR)

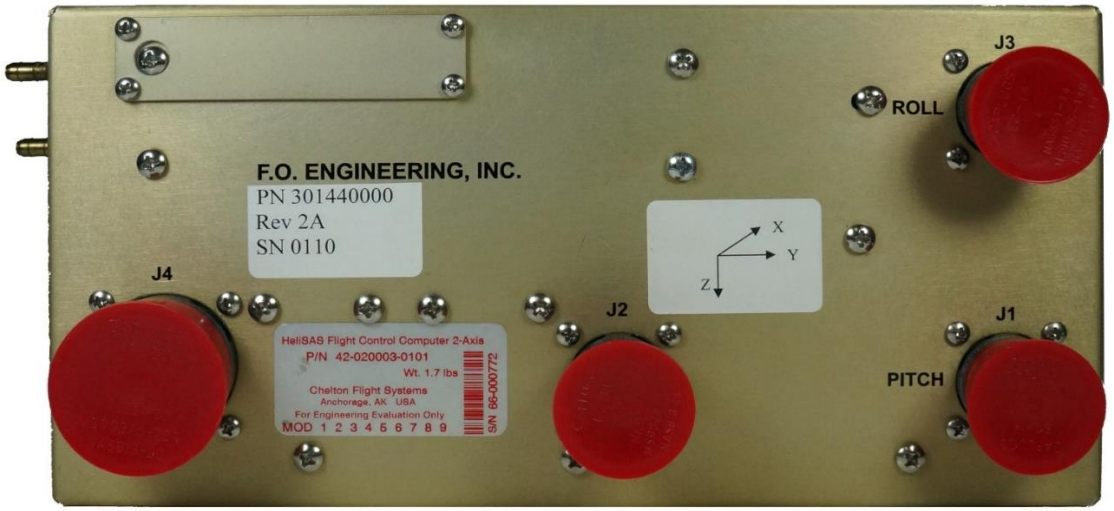

Figure 1 HeliSAS Flight Control Computer

This Flight Control Computer (FCC) was designed as a part of the Genesys HeliSAS Stability Augmentation and Autopilot System for light and medium helicopters. Genesys has STC's for several helicopter models by the major suppliers. This single channel FCC is appropriate for Visual Flight Rules (VFR) use. Figure 1 shows the controller package.

This Stability Augmentation / Autopilot is completely self-contained with all of the electronic components necessary for full functionality. The computer employs a Control/Monitor architecture as shown in figure 2. Identical code executes in the Control and Monitor processors with control law results of each being compared for data and I/O integrity. In the event of a critical mismatch, or other fault monitor decisions, the system disengages to prevent unexpected behavior.

The controller contains internal Pitot Tube for obtaining altitude and airspeed. It contains a tri-axial accelerometer and tri axial rate gyro to allow complete airframe inertial state resolution. It also supports up to 16 external analog inputs, 12 discrete inputs, and 2 discrete outputs to facilitate a variety of aircraft interfaces. Digital communication includes two ARINC 429 channels and two RS-422 interfaces. Also included are drives for two Electro-Mechanical Actuators (EMA's) to affect the computed flight solution. The EMA's use sine drive for smooth ripple

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free torque application. The use of both Hall Effect Sensors and a motor shaft resolver allow excellent self-monitoring of the actuation system.

F O Engineering provides the base code for driving and monitoring the two EMA channels and for reading and outputting of all discrete and analog I/O, and for supporting the four digital communication channels. Our customer provides and certifies all of the higher-level aircraft flight control laws.

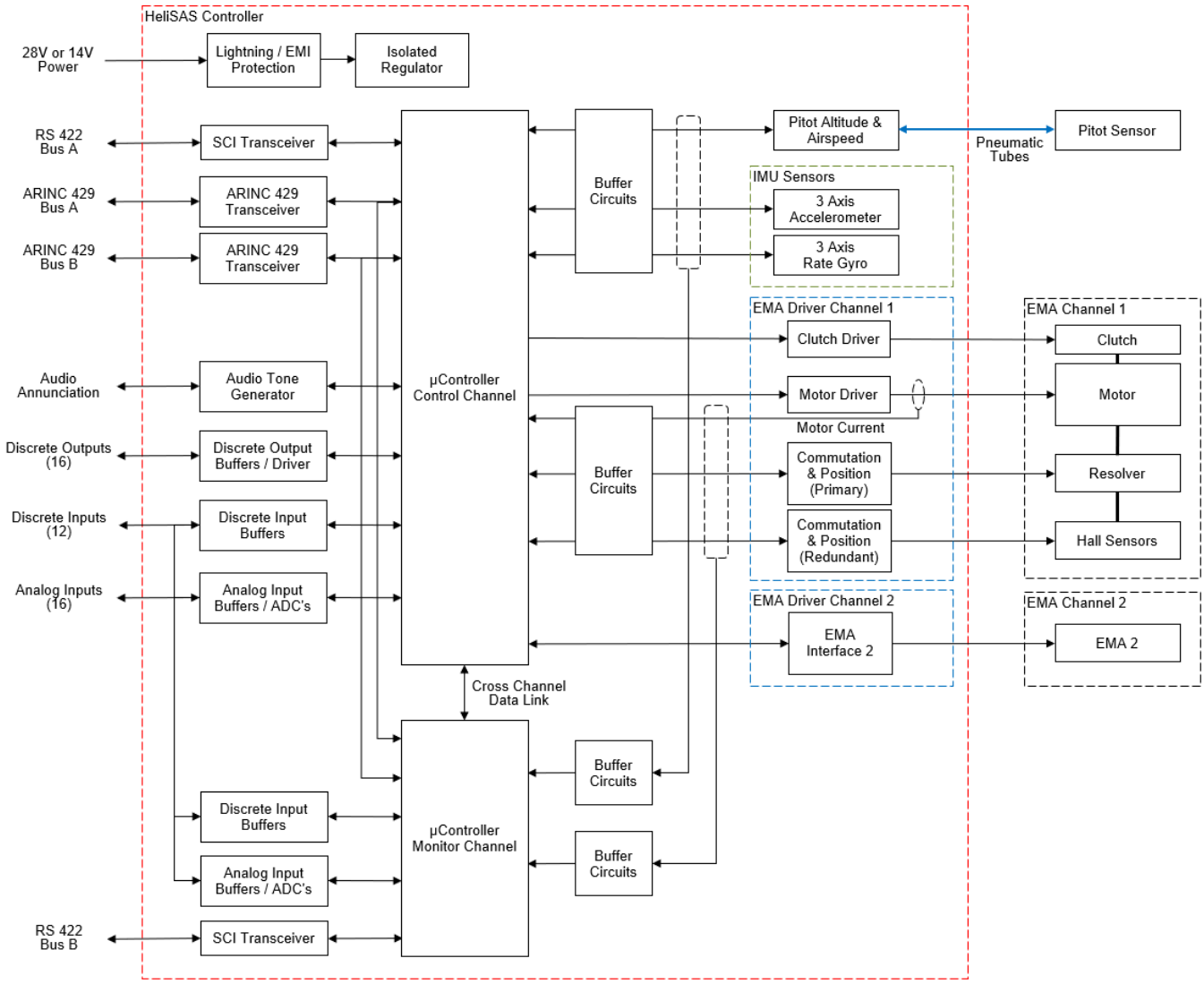

Figure 2 HeliSAS Block Diagram

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Features:

- Identical redundant Control and Monitor results are compared to provide the major method for fault detection
  - Additional monitors include:
    - Hall Sensor and Resolver mismatch
    - Runaway or slipping motor
    - Power supplies
    - Cross channel communication
    - Watchdog
  - Fault reversion mode is redundant and independently activated by either the Control or the Monitor channel
    - Disables the motor drives
    - Declutches the motor from the output
- Communication includes:
  - Two ARINC 429 interfaces
  - Two RS-422 ports
- Miscellaneous Inputs and Outputs
  - 12 Discrete inputs
  - 16 Analog inputs
  - 2 Discrete outputs
- Pitot Tube interface provides both Altitude and Airspeed data
- Tri-axial Accelerometers and Rate Gyros provide for a “Built In” Inertial Measurement Unit
- Electrical Power input is designed for either 28 or 14 Volt aircraft systems
- Qualification:
  - MIL-STD 704 28 VDC Power Requirements
  - MIL-STD 461
    - Radiated and Susceptibility Requirements
    - Pin and Cable Bundle Injection
  - Operating Temperature range -65°F to 170°F
  - Vibration and Shock levels suitable for helicopter environments
- Software Certification is DO-178B, DAL A
- Physical
  - Weight – 1.63 pounds
  - Dimensions
    - Length – 11.00”
    - Width – 4.50”
    - Height – 2.70”

We maintain an ISO9001 and AS9100 certified design and production facility in Santa Clarita, California. We welcome the opportunity to introduce you to our engineering capabilities. Please contact us with any questions you may have about our company and products.