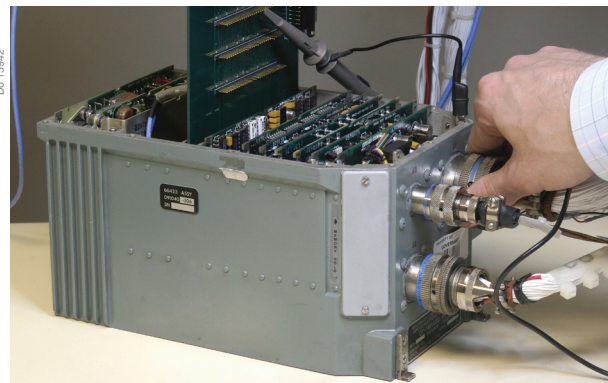


SwRI provides Operational Flight Program development to support both current and future upgrades to the Turbine Engine Monitoring System / Airborne Data Recorder (TEMS/ADR) avionics LRU in accordance with ISO 9001:2000 procedures. SwRI's proven processes have resulted in efficient and cost-effective software engineering development and simulation capabilities that allow us to successfully design, test, integrate and perform formal qualification tests in preparation for aircraft flight test.



Fighter aircraft are prepared to respond to airborne threats detected over the United States and Canada by the U.S. Air Force Atmospheric Early Warning System (AEWS). Radar consoles used by the AEWS contain electronic components, such as the circuit board shown, that are becoming increasingly hard to repair or replace. For the AEWS system, SwRI provided Form, Fit, Function (FFF) replacements of Circuit Card Assemblies (CCAs – both analog and digital), keyboards, trackballs, printers and power supplies. (Fighter aircraft photo courtesy U.S. Air Force by Staff Sgt. Bennie J. Davis.)



We welcome your inquiries. For additional information, please contact:

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Southwest Research Institute is an independent, nonprofit, applied engineering and physical sciences research and development organization using multidisciplinary approaches to problem solving. The Institute occupies 1,200 acres in San Antonio, Texas, and provides more than 2 million square feet of laboratories, test facilities, workshops and offices for more than 3,000 employees who perform contract work for industry and government clients.



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through innovative science
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Aging equipment and machinery may become outmoded, unserviceable or unable to satisfy today's high-performance requirements. To modernize or replace outdated equipment, Southwest Research Institute® (SwRI®) provides a wide range of retrofit engineering services, including:

- Redesign of mechanical, electrical and software systems, subsystems or components
- Replacement of outdated technology with modern and innovative solutions
- Increased mean-time-between-failures (MTBF) of high-failure items
- Development of efficient and effective in-house diagnostic and maintenance capabilities
- Improvement of system or subsystem reliability and maintainability

Drawing upon the Institute's multidisciplinary capabilities, SwRI engineers solve problems associated with requirements for:

- Development of Technical Data Package
- Drawings or technical data ownership
- Enhanced functionality of components or systems
- Establishment of in-house maintenance capabilities
- Identification or qualification of new vendors
- Product improvement

Using a systems engineering approach, SwRI conducts all aspects of retrofit engineering, including:

- Analysis and design review
- Design
- Simulation
- Prototype development
- Design validation
- Documentation and support

Mature Aircraft Systems Support

To support the Institute's mechanical redesign program, SwRI engineers may use the following equipment, software applications and procedures:

- Coordination of measuring machines to determine dimensions
- Optical, scanning and Auger microscopes to provide metallurgy information
- Pro/ENGINEER™ and Solidworks® to create virtual prototypes

- ANSYS™, Solidworks® and COSMOS® to provide stress and thermal modeling
- Stereolithography to produce rapid prototypes
- Temperature, humidity, vibration and electromagnetic interference and compatibility (EMI/EMC) tests to evaluate prototypes

SwRI's electrical redesign efforts may include:

- DxDesigner® to capture schematics
- Matlab® and Simulink® to model control system and DSP functions
- DXSIM® to simulate analog electrical circuits
- ModelSim® to simulate digital circuitry and programmable logic
- Synplify® to synthesize VHDL or Verilog hardware descriptions
- Xilinx® ISE™ to generate programmable logic files for Field Programmable Gate Arrays (FPGA)
- Hyperlynx® to perform signal integrity analysis
- PADS® to lay out printed circuit boards
- Automatic test equipment (ATE) and test program sets (TPS) to support new components

The Institute has improved the testing capabilities and operational flight software maintenance of the Air Force A-10's low-altitude safety and target enhancement computer. Full design disclosure included DOD-STD-2167A software documents, Cadre CASE databases, source code and drawings.

SwRI engineers redesigned the F-16 landing gear control assembly, solving numerous system mechanical and electrical problems.

After the military's sole source of supply for this component was no longer available, SwRI re-engineered the actuator arm of the C-5 landing gear to qualify new vendors.

STEPS OF TYPICAL RETROFIT ENGINEERING PROJECT

Analyze existing design and review documentation

Create new design or re-engineer existing design

Simulate to verify functionality

Assemble prototype to verify design

Validate through testing and demonstration of prototype

Generate complete technical data package to support design

