Southwest Research Institute® (SwRI®) is a world-renowned supplier of mission-critical systems for the aerospace industry. With a long history of successful space flight missions, we have core competencies in software development, computer networking, real-time operating systems, and systems engineering.

**Space Flight Systems**

**Space Flight Software**

With more than two decades of experience, we have developed software and systems for many government and commercial space flight missions:

- Earth observing systems
  - Magnetospheric Multiscale (MMS) mission
- Satellite Systems
  - Cyclone Global Navigation Satellite System (CYGNSS) mission
- Ultraviolet imagers and spectrographs
  - New Horizons mission to Pluto
  - Rosetta mission to Comet 67P/Churyumov-Gerasmenko
  - Juno mission to Jupiter
- X-Ray instruments
  - Fermi Gamma-Ray Space Telescope
  - Swift Gamma-Ray Burst mission
- Avionics and command and data handling software
  - Many government and commercial missions
- Space networking modeling and simulation
  - Architecture design, modeling and simulation
  - Integration and testing

**Capabilities and Experience**

- Reusable flight core:
  - Established command and data handling application software that can be reused for new programs
  - Reduces non-recurring engineering (NRE) costs
- Processors:
  - BAE Systems’ RAD6000 (IBM POWER), BAE Systems’ RAD750 (PowerPC), Motorola 603E (PowerPC), Freescale MPC8548E, Atmel TSC695 (SPARC ERC32), Atmel AT697F (SPARC LEON2), Aeroflex-Gaisler GR712RC (SPARC LEON3), ARM Cortex, Harris RTX2010, Intel 8051
- Operating Systems:
  - VxWorks®, VxWorks 653, RTEMS, uCOS, Linux and custom executives
- Device Drivers:
  - Spacewire, Ethernet, MIL-STD-1553B, I2C, SCSI, Flash, EEPROM, CRAM, MRAM, PCI, Serial (various)
- Backplanes:
  - VME, CompactPCI, I2C and custom
- Bootstrap software
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 nearly 3,000 employees who perform contract work for industry and government clients.

Mission Roles

- Instrument and spacecraft flight software development
- Ground systems development
  - GSEOS
  - ITOS
  - ASIST/FEDS
  - OASIS
  - LabVIEW
  - LabWindows CVI
- System engineering
- Independent review, verification, and validation

Systems Engineering

- Capability Maturity Model Integration (CMMI) level 5
- System design and architecture
- Requirements and software lifecycle management
- Modeling and simulation
- DO-178 (software considerations in airborne systems and equipment certification)
- Extensive experience working with other organizations to support joint/shared flight software development

Space Internetworking

- Research and development into rapid integration and dynamic topologies
  - Space plug-and-play avionics (SPA)
  - OPNET modeler
  - Fractionated spacecraft

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