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 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
  - Polarimeter to UNify the Corona and Heliosphere (PUNCH) mission
- Ultraviolet imagers and spectrographs
  - New Horizons mission to Pluto
  - Rosetta mission to Comet 67P/Churyumov-Gerasimenko
  - 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
  - Reduced 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), Aero ex-Gaisler GR712RC (SPARC LEON3), ARM Cortex, Harris RTX2010, Intel 8051, RISC-V
- Operating Systems:
  - VxWorks, 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


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 3
- 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

Edge Computing
- Explore how to solve demanding computational problems on resource-constrained platforms
- Deploy machine learning (ML) models on space-grade HW platforms
- Decisions at edge intelligently reduce data volume and help solve bandwidth limitations
- Applications include space, UAS, connected vehicles, and smart cities

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

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Southwest Research Institute is a premier independent, nonprofit research and development organization using multidisciplinary services to provide solutions to some of the world’s most challenging scientific and engineering problems. Headquartered in San Antonio, Texas, our client-focused, client-funded organization occupies 1,500 acres, providing more than 2.3 million square feet of laboratories, test facilities, workshops, and offices for approximately 3,000 employees who perform contract work for government and industry clients.

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