The Space Dynamics Laboratory's (SDL) Modular Software team specializes in ISO-certified software development and engineering services including entire spaceflight systems, responsive space functionality, individual module development, and consulting. These services also encompass process improvement, requirements development, technical coordination, advisement, and development, as well as independent verification and validation, ground support equipment development, and data post processing.

As a nonprofit University Affiliated Research Center (UARC), SDL has established itself as a trusted Government agent for developing essential software engineering technologies. Due to this partnership, any code that the Modular Software team develops is the sole property of the requesting customer.

The Modular Software team has increased process responsiveness by incorporating software engineering best practices from the general IT industry (shown in the blue box) into the traditional aerospace software development process. Because of this process modification, the resulting code is very stable and has little to no problems with regression errors.

**PRIMARY BENEFITS**

**TRANSPARENT DEVELOPMENT PROCESS**
- SDL gives customers complete access to the Redmine open-source online tool used for project management
- Customers can see all development activity, status, code commits & repository in real time as it happens

**THOROUGH CODE REVIEW**
- Efficient, remote & continual peer review; all code is reviewed before being committed to the repository
- Promotes shared knowledge in the project, increasing team flexibility

**CONTINUOUS INTEGRATION (CI)**
 SDL's CI process ensures code quality and stability and dramatically reduces regression errors.

The CI server is responsible for:
- Checking for clean, warning-free code compilation
- Executing unit & system integration suite tests
- Performing memory & static analysis
- Generating software documentation
- Checking code style
SDL’S MODULAR SOFTWARE
TEAMS EXPERIENCE

TYPES OF SOFTWARE

• Spaceflight payload & satellite Command & Data Handling (C&DH)
• Spaceflight Attitude Determination & Control Systems (ADCS)
• Ground Station Satellite (C&DH)
• Consultative Committee for Space Data Systems (CCSDS)
• AX.25 Link-Layer protocol
• Space Plug-&-Play (SPA) core infrastructure & applications
• Electronic Ground Support Equipment (EGSE)
• Assembly, Integration & Test (A&I&T)
• Verification & Validation (V&V)
• Hardware interface, instrumentation & development
• Device drivers
• Database development & management
• Post-acquisition data processing & analysis
• Image processing

TOOLS & TECHNOLOGIES

• VxWorks, Linux, Windows
• SpaceWire
• CCSDS
• XML, XSD
• CodeCollab, Jenkins, git, Redmine, Subversion, xUnit–based testing including C++
• C, C++, C#, Java
• Eclipse plugin development
• Embedded Software, 8051, AVR, SPARC, LEON-3, PPC

Comprehensive unit and integration test suites help eliminate regression errors and ensure code stability.