

GROUND SYSTEMS

SYSTEM DESIGN, TESTING, AND INTEGRATION

A well-developed ground system is imperative for effective communication, data flow, and operation of flight systems. The Space Dynamics Laboratory (SDL) provides complete ground system development and support. Our experienced team solves technical challenges early on through comprehensive system design, testing, and integration, ensuring the readiness of the many components that make up these critical systems.

SDL has invaluable experience integrating mission operations, ground terminals, and spacecraft through highly modular and configurable systems. SDL's software manages communications between these stations and includes antenna pointing, satellite tracking, software-defined radios, mission scheduling, system health and status monitoring, and automated terminal operations. Built on common web standards and messaging protocols, the software is easy to deploy and operate. The coordinated communication it provides will minimize the manpower needed to support a large number of missions simultaneously.

The ground systems team at SDL is experienced in ground compatibility testing and can accommodate a variety of ground networks. SDL also assists with system integration, accreditation, and administration, offering customers complete system implementation from a single expert vendor.

FEATURES

MISSION MANAGEMENT

- Ground resource management software
- Secure cloud configuration & management
- Ground network monitoring
- Modular distributed software design
- NIST 800-53 compliant status code analysis & reporting
- ISO-9001 compliant
- Unlimited rights to Government with no licensing fees
- Flight heritage with Government customers

END-TO-END INTEGRATION

- Ground hardware integration & control
- MC3, KSAT, AWS Ground network compatibility
- Front-end processor design & integration
- Hardware/software encryption integration
- Packet encapsulation
- Physical network connectivity

SOFTWARE-DEFINED RADIO

- Software-defined radio (SDR) development
- Graphics processing unit (GPU) parallelization
- Over the air radio frequency (RF) testing
- Multi-band frequency operations & testing
- OQPSK, GFSK & GMSK waveforms
- Commercial and open source SDR integration
- Software Doppler adjustment & testing

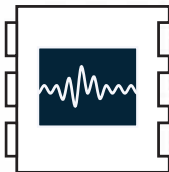
WHY CHOOSE SDL?

As a University Affiliated Research Center (UARC) and trusted agent of the Government for over 60 years, SDL is in a unique position to provide independent assessment, respond quickly to evolving requirements, and develop solutions that include Government unlimited rights.

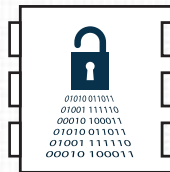
MODULAR • FLEXIBLE • RELIABLE • SECURE



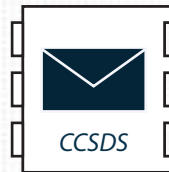
**On-orbit
Operations**



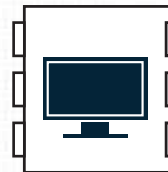
**Signal
Processing**



Encryption



**Processing
Packetization**



**Mission
Operations
Software**



**Ground System
Control**

Space Dynamics[™]
LABORATORY
Utah State University

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GROUND SYSTEM SOFTWARE

SDL's ground system software is distinctive for its ease of use. Through a simple client interface, mission operators schedule missions and connect with ground terminals to perform live space-to-ground communication. Operators can easily uplink commands and obtain telemetry data without the need to understand the underlying complexity of the ground network. The flexible and extensible design facilitates the addition of new hardware and ground systems to the active ground network.



SDL's ground software architecture also enables each mission to interface with customized plugins to meet specialized mission requirements. Plugins can be used for scheduling algorithms, hardware control (radios and positioners), and interfacing with additional ground networks.



The software is SDL's interface for bent-pipe, encrypted communication between the spacecraft and the ground, meaning that data is passed from the satellite to the operator without interpretation, manipulation, or decryption. This process ensures the data is sent and received securely.



ISO-9001 COMPLIANT

SDL developed its ground system software suite in compliance with its ISO-9001:2015 registered Quality Management System software development procedures. These procedures include a documented method to control and verify software development to ensure that the finished product meets specified requirements within schedule and budget. This is accomplished through measurable benchmarks and traceability using:

- Feature-driven agile development
- Formal inspections & peer reviews
- Static & dynamic code analysis
- Formal validation & acceptance tests
- Automated regression tests
- Managed configuration control & change processes
- Deficiency tracking & reporting

