

# DATA NETWORKING

## Flexible Communication Systems Development

The Space Dynamics Laboratory's (SDL) data networking team provides cost-effective data network systems and development services to Government and military agencies. SDL's network expertise ranges from low- to high-speed communication solutions, including technologies supporting up to 100 Gbps data rates. SDL implements multiple platforms that support airborne and ground-based data communications.

In addition to network interfaces, SDL's systems typically include embedded processing capability for data analysis. SDL's platforms leverage COTS components when possible and are readily adaptable to meet customer needs. A typical architecture implements a Linux OS running on a multi-core CPU coupled to one or more field-programmable gate arrays (FPGAs) over a high-speed PCIe link. SDL's networking devices exemplify years of experience in sophisticated digital design, high-speed networking, and hybrid embedded Linux/FPGA/PCIe architectures.



SDL couples data networking expertise with an excellent record of on-time, on-budget program execution. When needed, the data networking team draws on the larger SDL organization for additional manpower and expertise. As a nonprofit University Affiliated Research Center (UARC), SDL provides data with unlimited use rights to Government customers. SDL is flexible in its contracting options, and its ISO certification is indicative of a commitment to high-quality engineering practices.

### SDL DELIVERS:

#### Flexibility

- Functionally adaptable for custom applications
- Physically adaptable to mission & environmental constraints
- Multiple network protocols supported
- Ground-to-air; ground-to-ground; air-to-air

#### Capability

- Variety of line rates up to 100 Gbps
- Data receiving, analyzing, recording & retransmitting
- Network analysis
- Data simulation/troubleshooting
- Cyber-resilient designs compliant with latest security requirements

#### Heritage

- Over 60 years of sophisticated digital designs & hardware development
- Experts in embedded Linux/FPGA/PCIe architectures
- Over 200 data networking devices delivered to DoD clients
- Systems fielded in DoD, Intelligence Community & Department of Homeland Security operations

## AIRBORNE SENSOR RECEIVER, RECORDER & SIMULATOR

SDL's family of airborne sensor receivers receive, record, and simulate various airborne reconnaissance sensors, including common data link (CDL) and asynchronous transfer mode (ATM) platforms such as Global Hawk and U2. SDL's systems translate these sensor protocols into a Gb Ethernet for ground station consumption, supporting up to 15 TB of memory for up to 30 days of mission storage and playback. Airborne sensor receivers are built on a powerful and flexible Linux-based server, offering dual Intel CPUs in a 1U rack-mount configuration. Their PCIe sensor interface cards can be configured as needed to support multiple sensor types. Custom PCIe expansion cards can be implemented for full mission support.



### Features

- Dual 2.6 GHz multi-core CPUs
- 1U rack-mount configuration
- CDL & ATM PCIe I/O boards
- Up to 15 TB storage capacity
- Sensor data record & playback
- Expansion using PCIe add-in cards
- Flexible system with various expansion options

### Sensors Supported

- ATARS (CDL)
- Global Hawk (CDL)
- ASARS (ATM)
- SYERS (ATM)

## NETWORK ANALYSIS

SDL develops state-of-the-art network analysis devices with the most advanced technologies to protect and manage critical communication channels. These devices provide data transfer prioritization, adaptation to network link speeds, and remote client command and control, all while achieving almost complete bandwidth usage and meeting strict data security requirements. They can examine and analyze the baseline behavior of multi-layered networks to identify and flag out-of-character data transmissions.

Packaging options for SDL's network analysis devices include IBM BladeCenter™ blade, 1U or 2U rack mount, or conduction-cooled chassis. These devices implement high-powered CPUs connected to SDL's custom-designed network packet processor cards through a high-speed PCIe architecture. This processing power, along with a hardware-based content-addressable memory, offers line-rate data analysis up to 100 Gbps. System command and control, status, and network analysis results are communicated via an application programming interface or remote graphical user interface.



### Features

- 4 core 2 GHz CPU
- PCIe + FPGA architecture
- Blade, 1U/2U & conduction-cooled configurations
- 4 GB DDR3 & 512 GB SSD for storage
- Client/server system

### Protocols Supported

- Up to OC-1092/STM-640 SONET/SDH
- OTN, PDH
- FEC, enhanced FEC
- 100 Gb Ethernet (optical)
- 10 Gb Ethernet (optical)
- 1 Gb Ethernet (copper)

Questions? SDL welcomes all inquiries. For more information about SDL's data networking services, please contact:

**David Brenchley** | Branch Head

**Matt Cupal** | Cyber Technologies and Networks Program Manager

**Bennett Keller** | Modernization Program Manager

**Shawn Nielson** | Modernization Program Manager

435.713.3930

engineeringssupport@sdl.usu.edu