



CGS | CONFIGURABLE GROUND SYSTEMS SOFTWARE

IngeniComm's Configurable Ground Systems (CGS) software framework represents the next generation of ground system technology. CGS combines high-performance, multi-mission data processing capabilities with flexible, user-configurable feature sets to provide a comprehensive range of functionality for both CCSDS and non-CCSDS ground systems.

Modular Architecture

The CGS software family consists of modular functional blocks that provide a variety of I/O, modulation and coding, data processing and simulation, archiving and playback, and measurement and analysis capabilities. The modularity of the CGS framework allows a single system to support multiple missions with equal ease. The functionality of a CGS system can be fully configured by the end user, with no need for costly vendor reconfiguration or time-consuming returns to the factory.

One System, Beginning to End

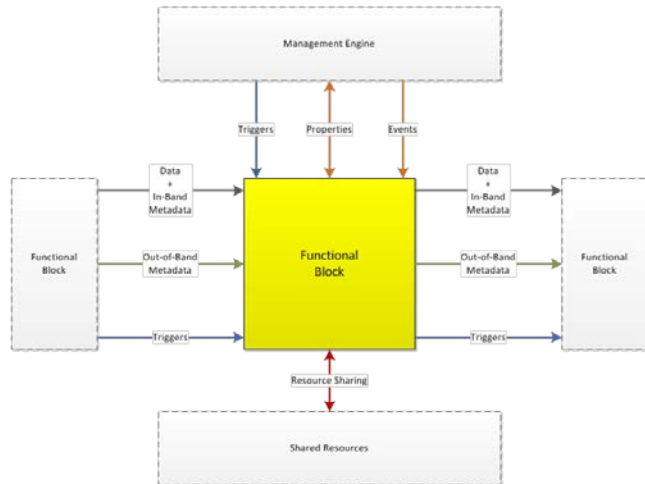
The concept of operations envisioned by the CGS model relies on the inherent flexibility of the modular software architecture and the comprehensive configurability of individual functional blocks to allow a single system to remain useful for the entire lifecycle of a project, program, or mission. A CGS-based system can support development and prototyping during the design and integration phases of a mission, transition to test and certification activities once development completes, and finally undergo deployment into live operations, allowing immediate deployment of an already proven solution and avoiding unnecessary procurement of multiple systems for each program phase.

Easy Local and Remote Configuration

The CGS software can be controlled either locally or remotely via a highly flexible web-based graphical user interface. A full-featured command-line interface is also provided to allow easy scripting and automation, and service-oriented cluster management components are available to allow single-point control of multiple CGS software instances simultaneously.

Integrated Simulation and Automation Tools

The CGS framework is designed for flexibility from the ground up, and provides a full range of integrated data simulation and analysis, latency and performance measurement, and scripting and automation capabilities.



Key Features

- Flexible and modular multi-mission data processing architecture
- Full range of data decoding, extraction, and manipulation capabilities
- Integrated archiving, playback, and data management
- Integrated test data generation and verification
- Integrated scripting and automation engine
- Platform-independent, web-accessible user interface
- Easy integration of user-written software components
- Available on multiple operating systems for ease of IT security compliance

IngeniComm, Inc. is a leading provider of ground and range equipment and enterprise engineering services for civil and commercial aerospace programs, as well as the defense and intelligence communities. To learn more about IngeniComm's service and product offerings, visit <http://www.ingeniComm.net> or contact IngeniComm at info@ingeniComm.net or +1-703-943-7236.



Standard Functional Blocks

The CGS software includes a selection of standard functional blocks that provide capabilities including serial and network I/O, data processing, encoding and encapsulation, and monitoring and test.

Monitoring and Test

- **Pattern generation and verification**
Standard BERT, arbitrary LFSR PRBS, user-defined
- **Error simulation**
Bit error, burst error, packet loss, AWGN
- **Delay measurement**
Path delay, round-trip delay, multi-channel phase delay

Serial and Network I/O

- **Serial receive and transmit**
RS-422, RS-232, TTL, ECL, LVDS
- **Network receive and transmit**
TCP/IP, unicast/multicast UDP/IP, AX.25
- **PCM code conversion**
NRZ-L/M/S, Biphas-L/M/S
- **Frame synchronization**

Data Processing

- **CCSDS telemetry processing and simulation**
Conventional TM, AOS
- **CCSDS telecommand processing and simulation**
- **Telemetry commutation and decommutation**
- **CCSDS Space Link Extension (SLE)**
RAF, RCF, ROCF, FCLTU, EFCLTU, FSP
- **CCSDS File Delivery Protocol (CFDP)**
Class 1, Class 2
- **CCSDS Communications Operations Procedure 1 (COP-1)**
- **Archiving and playback**

Encoding and Encapsulation

- **Encryption and decryption**
DES, AES
- **Transform encoding and decoding**
Randomization/scrambling, base shift, MIME
- **FEC encoding and decoding**
Reed-Solomon, Convolutional/Viterbi, CRC
- **Encapsulation and de-encapsulation**
NASCOM, LEOT, SFDU, AXAF, ACE, HDLC

User-Written Functional Blocks

To enhance users' ability to develop additional capability without dependency on the vendor, the CGS software framework provides the capability to integrate user-created functional blocks directly into the CGS software. This allows end users to develop prototype software and seamlessly use it within the CGS framework.

To allow a user-developed software package to be integrated into CGS as a functional block, CGS provides an external functional block adapter that acts as a proxy between the external functional block and the rest of CGS. A user-developed software package interacts with the external functional block adapter through a defined API that exposes the data, metadata, and management interfaces to the user-developed software.

When the CGS software is deployed on a Linux platform, external functional blocks are integrated at run-time as shared object files or dynamic link libraries. The external functional block adapter allows users to select particular shared object files to be instantiated as functional blocks; these functional blocks can then be accessed and controlled using the same interfaces as those which are part of the CGS software itself.

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