



CONFIGURABLE GROUND SYSTEMS (CGS)

High-Performance Multi-Mission Modular Software Framework

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.

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.

Process and archive data at rates of up to 1.5 Gbps per channel

INPUT & OUTPUT

- TTL, RS-232, RS-422, LVDS, and ECL
- 10/100, Gigabit, and 10-Gigabit Ethernet
- 70 MHz analog IF with diversity combination
- SDDS and VITA Radio Transport (VRT) V49.0/V49.1 digitized IF

Create custom processing profiles from a variety of modular functional blocks

CODING & MODULATION

- BPSK, QPSK, and S/OQPSK modulation to 1 dB of theoretical for typical waveforms
- Selectable NRZ-L/M/S and Biphasel-L/M/S conversion
- Reed-Solomon, CRC, Convolutional/Viterbi, and BCH encoding and decoding

Process and simulate both CCSDS and non-CCSDS protocols and data formats

SIMULATION & ANALYSIS

- Selectable PRBS generation and verification
- Bit, burst, and Gaussian (AWGN) error simulation
- Bit- and packet-level error statistics
- Spectral measurement and analysis
- Point-to-point latency and channel phase delay measurement
- Pattern and file comparison

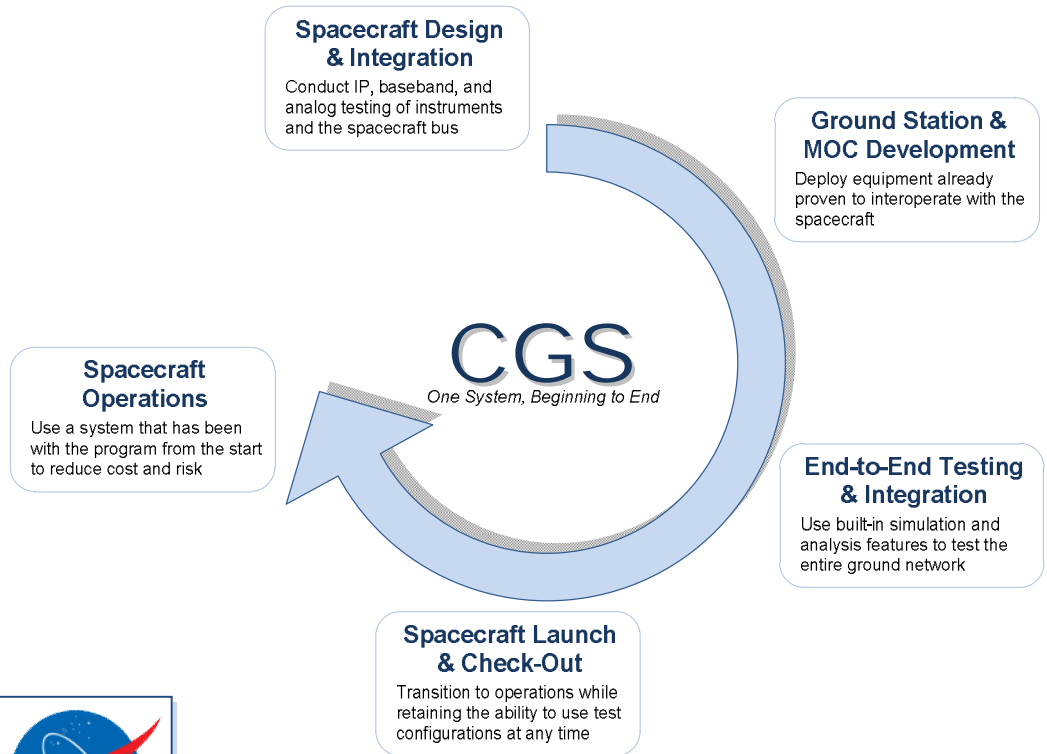
DATA PROCESSING & ARCHIVING

- 64-bit frame synchronization with configurable search/lock strategy
- CCSDS Version 1 (Conventional) and Version 2 (AOS) Telemetry (TM)
- CCSDS Telecommand (TC) and CCSDS Command Operations Procedure (COP-1)
- CCSDS Space Link Extension (SLE) transfer services, including Forward CLTU (FCLTU), Forward Space Packet (FSP), Return All/Channel Frames (RAF/RCF), and Return OCF (ROCF)
- CCSDS File Delivery Protocol (CFDP) Class 1 and 2 services
- ECSS, HDLC, and NASCOM framing
- TDM major/minor frame decommutation
- Adaptive rate adjustment and time-data correlation (TDC)
- Channel ambiguity resolution and relative prioritization
- Real-time archiving and playback and integrated store-and-forward operation
- Automated archive management and disk cleanup

Ingenicomm specializes in the standardization of ground network elements, enabling interoperability while providing customized solutions to meet the unique requirements of individual missions. For more information, or to request a price quote, please contact us at info@ingenicomm.net or at +1-703-943-7236.



The concept of operations envisioned by the CGS framework 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.



SAMPLE APPLICATION
Measuring Latency and Performance in NASA's Space Network



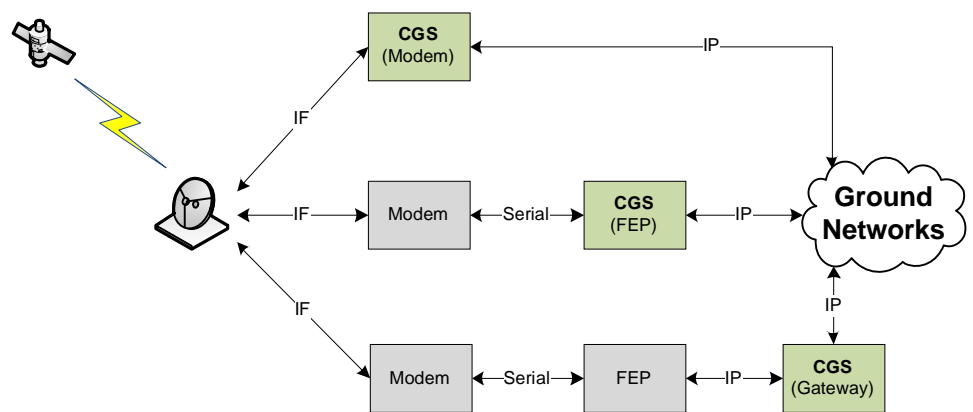
Efficient operation of the NASA Space Network (SN) requires precise measurements of channel latency and data integrity across the SN ground links between NASA White Sands and NASA Guam. A pair of Ingenicomm icITS-25p Portable Test Sets provides quick-to-deploy integrated test solutions for both remote sites, while the comprehensive path and channel analysis capabilities of the CGS software deliver accurate real-time measurements across the network.

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.

At the same time, 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. The CGS framework is designed for flexibility from the ground up, and provides a variety of user interfaces, a full range of integrated scripting and automation capabilities, and an ability to directly interface with user-written software.

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The flexibility of the CGS framework allows a CGS system to perform a number of roles within a single ground station or an entire ground network. In a typical single-system deployment scenario, the CGS system will be configured as a modem, front-end processor, or network gateway, and deployed within the data path between the ground terminal antenna electronics and the ground network providing connectivity to the ground station site. In a single-system configuration, all of the capabilities of CGS are deployed on a single physical system to provide a complete end-to-end solution.



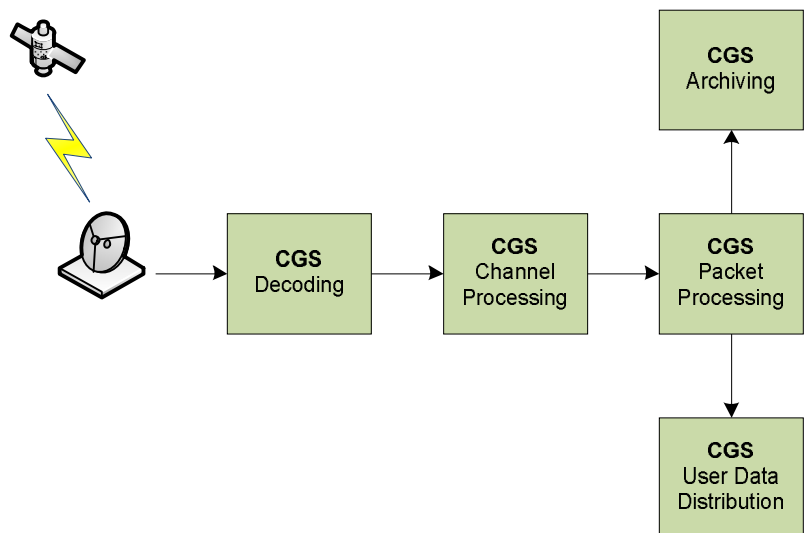
An alternative configuration to the single-system deployment is a multi-system deployment, where the CGS framework is deployed on multiple systems to provide a layered processing mechanism. This can provide additional opportunities for subsystem redundancy or allow load-balancing in high data volume scenarios.

SAMPLE APPLICATION

Transporting Real-Time Telemetry from NOAA's Remote Ground Stations



Supporting NOAA's growing fleet of polar satellites requires the use of a remote terminal at Barrow, Alaska to supplement the primary ground station at Fairbanks. The icGTW-25r Network Gateway is specially ruggedized for reliable operation in Barrow's temperature conditions, and provides bandwidth-efficient real-time data transport between the two sites, as well as integrated link validation and on-site store-and-forward capabilities.



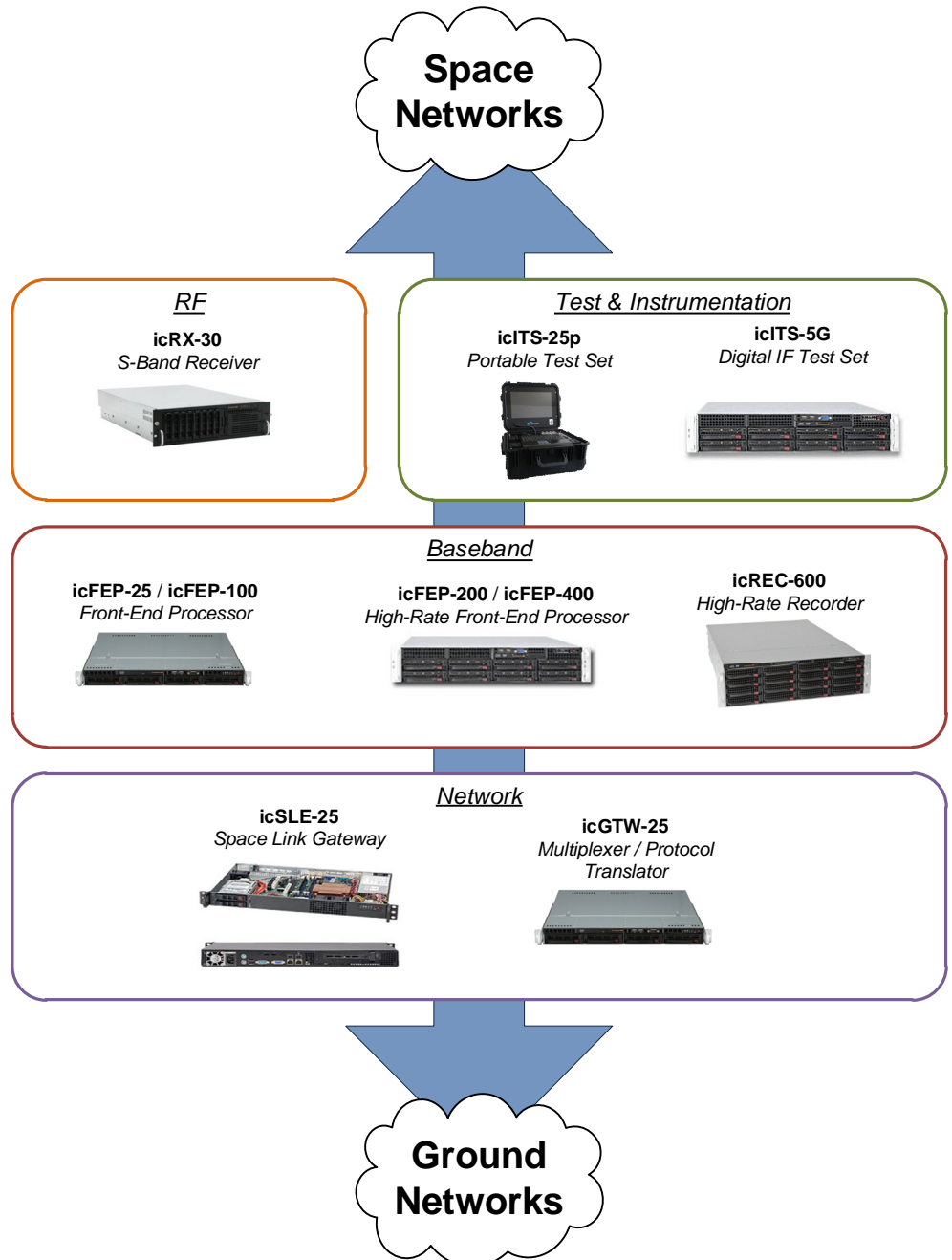
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The CGS software framework is available in a number of pre-configured system-level solutions, including receivers, integrated test sets, front-end processors, protocol gateways, and recorders/reproducers.

Easy-to-maintain systems built entirely with COTS hardware components

Portable and ruggedized system configurations available

Customized system configurations available on request



In addition, CGS is available as a stand-alone software package that can be deployed on user systems or integrated directly with user-developed software components.

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