Data sheet - CCS5 and TSC

CCS5 and TSC are the latest spacecraft operations and testing products from Terma. CCS5 is a multi-user, with TSC the much lighter single user version. They can support single and multiple satellite configurations.

USAGE

CCS5 is used:
- for all phases of operations, from preparation and launch through to routine operations
- as the central part of an EGSE for assembly and integration testing (AIT/AIV).

TSC is a single user, lightweight version of CCS5 that can be used for a variety of purposes including instrument/payload testing.

FEATURES

Automated operations execution using TOPE procedure language.

Telemetry reception, frame processing (VC filtering, gap detection, authentication, decryption), parameter monitoring and display (including alphanumeric, graphic and synoptics).

Commanding including manual stack, CLTU generation, COP-1 handling and flow control, and command verification history.

TM/TC database support.

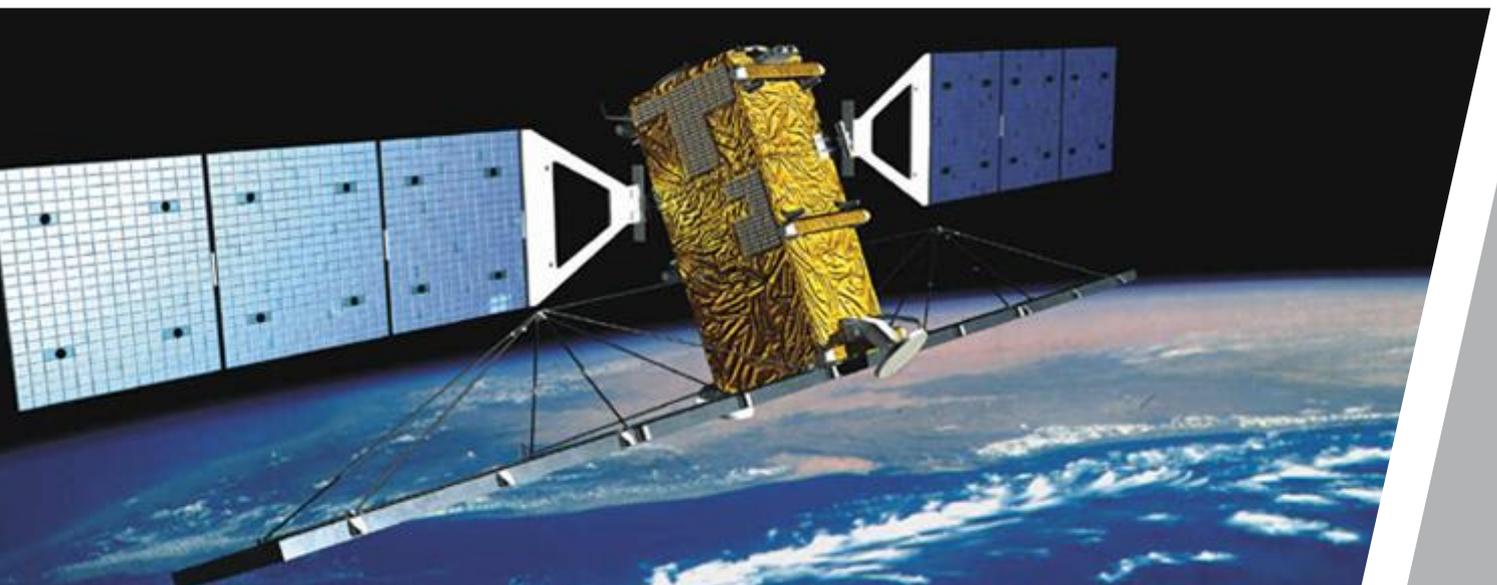Ground segment equipment interfaces.

Session management.

Reporting tools.

Archiving and retrieval facilities.

Hot redundancy.

TMTC DATA BASE

SCOS2000 MIB ICD 7.2 extended: (e.g.) unlimited field lengths, drop & load multiple databases, deduced parameters in TM & TC, variable parameters globally

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accessible & limit-checked, fine control of variable length parameters, big & little-endian parameters, VPD_CHOICE, dynamic HK definition.
Online MIB table browser available.
All tables accessible from TOPE.
Full details in user manual. Not supported: TC sequence tables (use TOPE or command stack files).

AUTOMATION LANGUAGE

TOPE (includes Tcl/Tk 8.6).
Numerous Tcl extension packages included including Tk, [incr Tcl], database access.

ARCHIVE

Open format: raw binary segmented files, containing header & content, index stored in RDBMS: MySQL, PostgreSQL.
TOPE supports retrieval of any archive object, from current or previous sessions, including TM and TC parameters in specific packets.

GRAPHICAL DISPLAYS

Native user interface based on Qt. User-defined schematic diagrams via SYN tool, with editor, uses XML file format "sxl" files. QML (Qt Meta Language) allows scripting of fluid touch-enabled displays. Tk toolkit allows classic user-scripted graphical user interfaces to be written from TOPE.
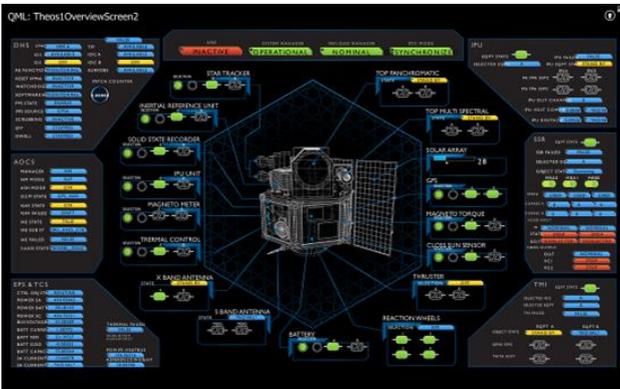
SPECIAL FEATURES

SVF Mode: operation with simulator running in simulated time.

TM simulation: inject raw data, or generate TM according to its MIB definition.
TC modelling: model and verify commands sent by another entity.
Secure installation option, automated test & quality metrics.

STANDARDS & PROTOCOLS

Packet & Frame Coding & Flow Control:
ECSS-E-ST-50-01C, 03C, 04C; ESA PSS-04-106,107,151; CCSDS 102.0-B-5, 201.0-B-3,202.0-B-3, 202.1-B-2, 301.0-B-3.
Packet Utilization (PUS): ECSS-E-70-41A, 41C.
Flexible plugin & driver architecture; select protocol at installation.
Main protocols:
Checkout & EGSE: EDEN, C&C.
Ground Station: ZDS Cortex, ESA NIS
SLE (RAF & F-CLTU) with uNIS option.

OPERATING SYSTEMS

Windows®: works on all recent versions. Automated installer.
Linux® works on all recent distributions, installed as RPM. Tested on RHEL7.

SOFTWARE PLATFORM

C++ based on Qt5.7 commercial. Tcl/Tk libraries included on BSD license terms. No other free (e.g. GNU) software is packaged.
IPR owned by Terma.

SUPPORT

Standard license price includes 1 year warranty & email support. Standard training packages available on request.

More information from http://tgss.terma.com

WIKI and access to bug-tracking system available to licensed customers.

PRODUCTS

CCS5 - multi-user spacecraft command and control software for operations and testing
TSC - single user version of CCS5
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