

CONTROL & MONITORING SYSTEM - EXTENDED ARCHITECTURE

HIGHLIGHTS

- Integrated CMS architecture for control centres and remote sites
- Homogeneous depiction of overall site conditions
- Devoted to latest technology for data acquisition, processing and display
- ASTERIX-based CMS communication
- User customisable rules for event processing
- Versatile and flexible end-user tailoring to differing infrastructures
- Observation of service level degree derivable from technical monitoring
- Well proven concept with highest availability and maturity level

COMSOFT



CMS/XA represents a new generation of Control and Monitoring Systems. Based on advanced COTS technology such as relational databases, graphical user interface builders and network technology for the surveillance domain, the Control and Monitoring architecture excels with utmost scalability, catering for a broad range of applications. CMS/XA is of unmatched reliability and open to any future extensions.

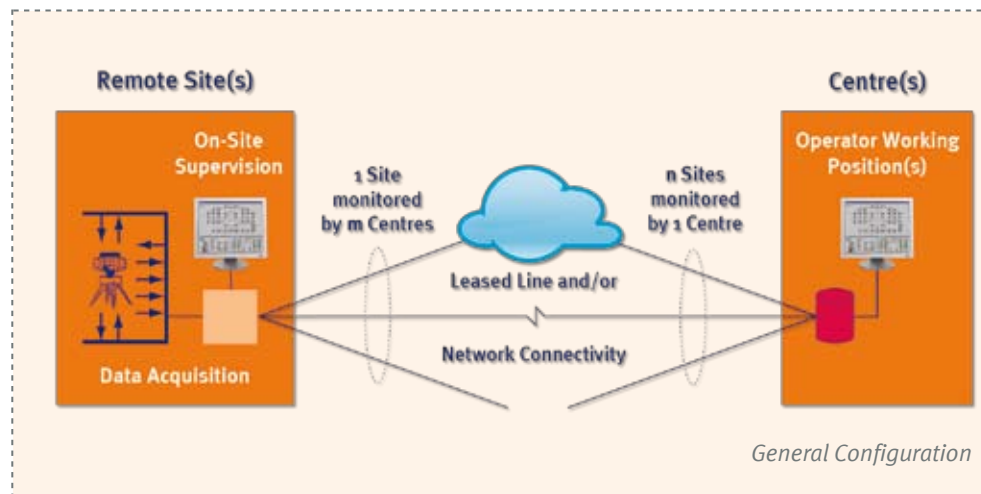
OPEN ARCHITECTURE

The CMS/XA system follows a strictly modular design with separate components for data acquisition, data communication, data processing and presentation.

This provides high architectural flexibility and enables the system to accommodate to any existing site and communication infrastructure. An arbitrary number (n) of data acquisition sites can be connected to any (m) control centre which themselves can provide data to several sub-centres.

The system provides many connectivity options ranging from dedicated serial lines to TCP based wide area networks. For all the networking options the internationally recognised surveillance standard ASTERIX is employed. Its category 253, dedicated to control and monitoring, provides further independence from proprietary manufacturer solutions.

Open acquisition technologies, e.g. PROFIBUS, Modbus etc., and a broad range of radar equipment specific protocols are offered. The system was designed to facilitate the integration of new specific acquisition protocols.



SCALABILITY

CMS/XA is scalable from a local, single-PC based equipment to a fully distributed, integrated Control and Monitoring System with multiple data acquisition sites and multiple control centres and sub-centres. Connectivity options range from the use of a few dedicated serial lines to a country-spanning CMS WAN or an intra-centre LAN topology.

RELIABILITY

Designed particularly for ATC applications, CMS/XA prioritises reliability issues. This includes redundancy concepts for all its components on hardware, software and networking level. Due to its modular architecture the system can be tailored up to the highest level of reliability requirements.

EASE-OF-USE

Configuration changes by the end-user are no longer complex and error-prone when dealing with proprietary system details. With CMS/XA to include a new sensor or to modify an alarm condition is as easy as editing a field of an underlying relational database. In the same way, designing a screen for data presentation only requires a graphics editor for selecting and placing the respective symbols. Consequently, customisation of a new radar site is only a matter of days.

In addition, the CMS/XA's architectural distinction between processing and presenting elements of a configuration allows for creating different user interfaces for the same active system, e.g. for a main centre and a sub-centre.

FUNCTIONAL OVERVIEW

OPERATOR WORKING POSITIONS

- Clear, concise and expressive presentation of information
- Intuitive GUI handling by operator
- Wide range of display features for digital points, analogue points and complementary symbols
- Hierarchical computation and presentation of information
- Permanent status and summary panel
- Powerful event log and trend viewers
- Distributed operator logs, shared by all sites

TRENDING

- Trend database for analogue, digital and virtual points
- Live and historical trending
- Various scaling and zooming functions
- Stacked and overlaid trend charts
- Archiving and export of trend data in MS office compatible form
- User-definable trend templates

PORTABLES

- On-site access from each equipment room
- Remote dial-up
- Security control
- Full CMS HMI functionality

ON-SITE DATA ACQUISITION

- Suite of serial line interfaces to intelligent site equipment (e.g. Mode-S)
- Reliable and maintenance-friendly field bus technology (e.g. PROFIBUS, Modbus etc.)
- Wide range of available I/O equipment
- Optional GPS time stamping
- Deadbanding and nuisance alarm handling
- A/D conversion and alarming
- SNMP Acquisition

CMS CONTROL FUNCTIONS

- Inter-centre token synchronisation for exclusive remote site control
- Password-protected user roles and freely assignable privileges
- Extensive self-monitoring functions for all components
- Time distribution

SUB-CENTRE FUNCTIONALITY

- Replication and distribution of filtered CMS data
- Flexible addressability
- Each sub-centre individually configurable
- Support of control sharing with main centres

SUMMARY PANEL FUNCTION

- Reporting of user-definable technical events to a summary panel
- Selective audible alarm triggering for new events
- Operator accept logic for new events
- External alarming

CMS/XA NETWORKING PACKAGE

- CMS WAN option for remote connectivity
- Dedicated CMS network or use of existing surveillance data networks (e.g. RADNET)
- Using ASTERIX CAT 253 standard for CMS data
- Utmost flexibility, reliability and performance

STATISTICS

- Derived on trended information
- Provides statistical information e.g. equipment availability
- Daily/ monthly consolidation of data
- Powerful report generator with immediate graphical result depiction
- Data export in Office compatible form



Typical Control Centre Architecture

ENHANCED USER PROGRAMMABILITY

- Flexible, user-definable filtering and data abstraction features
- Separate configurability for data processing and display properties
- Automatic syntactical and semantical configuration checks
- User-defined contributor rules based on general boolean expressions (AND/OR/XOR/...) or truth tables
- Free design and placement of navigation hooks between windows
- Flexible definition of deadbands, alarm limits, reporting properties etc.

EVENT LOGGING

- Online data retrieval for configurable period of time
- Relational database search and find facilities
- Complex search conditions on event types and event parameters
- Storage and retrieval of search results
- Cascaded searches
- Archiving and export of event log in Office compatible form

USER & SYSTEM COMMANDS

- Flexible remote command execution from operator GUIs
- Command status supervision (tellback and/or timeout)
- User-definable command procedures (incl. complex supervision conditions, conditional jumps, operator messages etc.)
- Manualisation possibility for equipment points
- Choice of several log levels

HMI

- Windows-based workstation
- High resolution display or dual screen configuration
- National Instruments LabVIEW GUI builder
- Scalable number of HMIs per centre

Centre Back-End

- Intel-based server
- Linux or Windows
- Relational database (ORACLE, RAC)
- Archiving media (RAID, SAN)

Data Acquisition

- Serial lines (synchronous/asynchronous)
- Field bus equipment (PROFIBUS, EN 50170) etc.
- Intel-based server
- Single/dual PC configurations
- On-site terminal with full centre capabilities

Site-Centre Connectivity

- IP based networks and/or serial lines (2-line handling)
- Dedicated CMS network (ASTERIX CAT 253)
- Existing surveillance network (e.g. RADNET)
- Protocols: HDLC LAPB, TCP/UDP/IP
- Format: ASTERIX CAT 253 compliant

Intra-Centre Connectivity

- Ethernet LAN (TCP/IP, ...)

Centre-Subcentre Connectivity

- Serial Lines (HDLC LAPB, ...)
- Network connectivity
- Configurable filters and data preprocessing



CMS/XA SYSTEM

COMSOFT's CMS/XA system is an integrated Control and Monitoring System for Air Traffic Control environments - at the forefront of technology. An open architecture, high reliability, outstanding performance and cost efficiency form its solid base.

Based on state-of-the-art COTS technology COMSOFT's CMS/XA architecture describes a new generation of Control and Monitoring Systems (CMS). It caters for a world where flexible distributed availability of monitoring data, powerful event processing and expressive data presentation techniques are essential.

CMS/XA is an integrated architecture covering on-site data acquisition technology, remote communications as well as centre-based processing and visualisation equipment. Combined, it is ideally used to supervise a large number of remote sites simultaneously from one or several central locations.

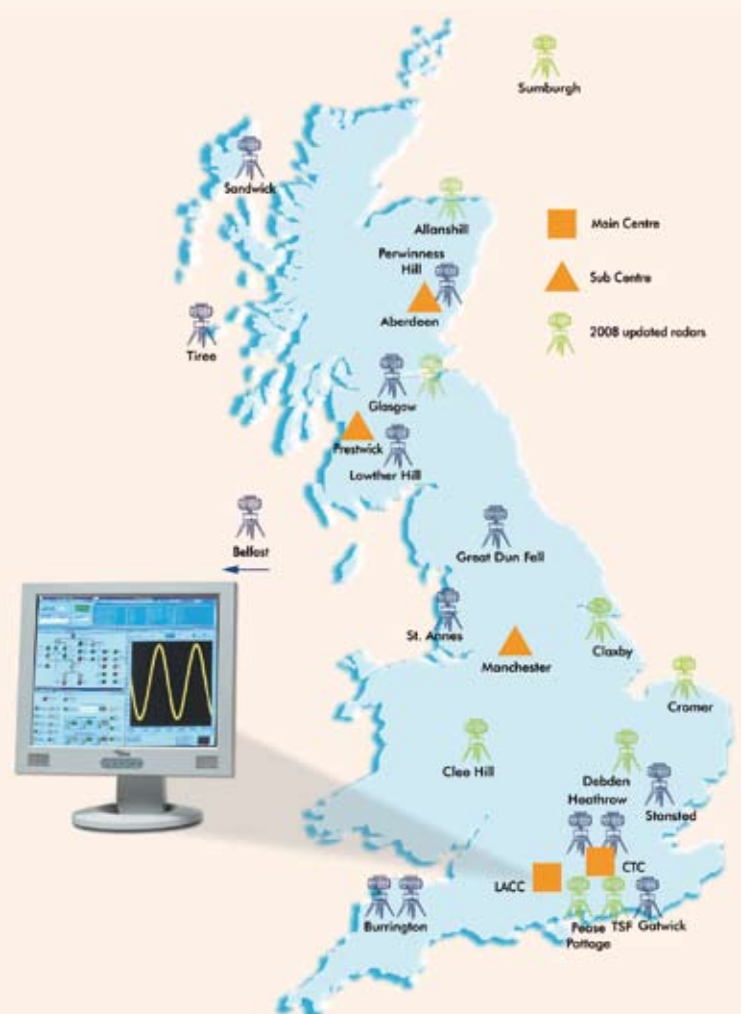
REFERENCE

As one of the most prominent references, CMS/XA forms the basis of the UK ERCAMS (En-route Radar Control And Monitoring System). It implements an integrated Control and Monitoring approach covering all UK En-Route radars as well as the country's major airport radars. The system has been running smoothly for over a decade. The challenge of a midlife-upgrade (ERCAMS-II) and new roll-out within a major radar replacement programme was mastered thanks to its flexibility and adaptability to latest developments.

In the course of the ERCAMS project, more than 23 radar sites and 5 control centres were equipped with CMS/XA technology. The contract also included the supply and installation of a country-wide CMS network, based on the ASTERIX CAT 253 standard and COMSOFT's RMCDE technology, operational at over 70 installation sites across Europe.

With ERCAMS the UK NATS is in a position to control all radars from a central Service Management Centre (SMC). A contingency centre, as well as several detached sub-centres also have monitoring feeds and can optionally control selected subsets of the radars.

The CMS/XA system's filtering and information processing features are extensively used in ERCAMS to present the user both a top-level view of the overall UK radar status, as well as the option to zoom into every single sensor of any of the connected radars. The flexibility of the system allows NATS to dynamically add new radars or upgrade existing configurations without disruption of the operational service.



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