ICZ

[LETVIS®]

System for Air Traffic Management

ALES

MEMBER OF **ICZ GROUP**

WHERE WE ARE

ICZ

We are a major player offering integrated software and network solutions within Central and Eastern Europe. We continually develop our portfolio of services and solutions to enable us to offer the broadest possible range across the entire field of information and communication technologies. We provide customers with services based on a broad spectrum of platforms and technologies, including tailor-made applications as well as information protection and security projects.

A B O U T   I C Z   G R O U P

[HELPFULNESS AND COMPLEXITY IN RELATION TO THE CUSTOMER]

Our philosophy is based on the building of a complex, long-term partnership. Our main goal is to meet all of the customer's requirements and needs. Our intention is to deliver more than just a solution; we primarily wish to treat every business as a whole.

Therefore, our complex services also includes services exceeding the traditional conception of information technology.

We are interested in the internal functioning of a business, its processes and market environment, and primarily, possibilities for improvement and the search for new opportunities.

We realise that the solution we provide is a tool for the realisation of goals and intentions of our customers. ◄

[BROAD RANGE OF SOLUTIONS ACROSS A VARIETY OF FIELDS]

For our business solutions, we have at our disposal a broad portfolio of services ranging from the supply of classic information systems to the complete, outsourcing-based assumption of responsibility for networks, including internal company systems and delegated administration. We offer our clients solutions in application software, system integration, security, communication, infrastructure and document management and administration, mainly for public administration, healthcare, telecommunications, energy, transport, financial, production and logistics sectors. We naturally also provide consultation and analytical services. ◄

[EXPANSION TO OTHER MARKETS]

Our ideas on further expansion of the company mean that it is our priority to become one of the leading suppliers of information technology in Central and Eastern Europe.

Apart from our long-term presence in the United Arab Emirates, we are significantly strengthening our position in Slovakia, the Ukraine and the Balkans region, while endeavouring to also establish ourselves in markets beyond the borders of Central and Eastern Europe. Our attention is focused on important markets such as Russia, China, the Near and Far East and North Africa. However, the most significant centre for our activities remains the Czech market, on which the expansion of our commercial activities continues. ◄

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The Air Traffic Control Systems and other related equipment offered within the ICZ Group portfolio are manufactured in ALES company, a member of ICZ Group.
ALES company was founded in 1992 and became a member of ICZ Group in 2008. Its main focus is development and manufacturing of state-of-the-art ATM Systems and Air Defence C2 systems in compliance with all necessary international and national standards
(ICAO, Eurocontrol, NATO).

▶ EN ISO 9001:2008 Quality Management Certification

▶ Type Approval Certificate for system use in civil aviation for the LETVIS® system

▶ License for Defence Articles Trading

▶ National Security Clearance Certificate – "SECRET"

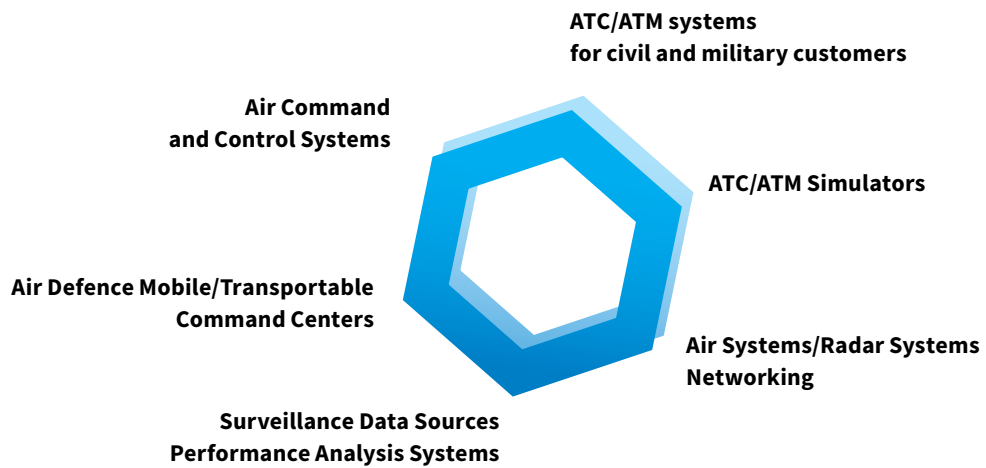▶ Facility Security Clearance Certificate – "NATO SECRET"

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PRODUCT PORTFOLIO

The main activity of ALES is focused on the field of automated aviation-related ground systems, mainly the design, development, production, system integration, maintenance, modifications and testing of:

**ATC/ATM systems
for civil and military customers**

**Air Command
and Control Systems**

ATC/ATM Simulators

**Air Defence Mobile/Transportable
Command Centers**

**Air Systems/Radar Systems
Networking**

**Surveillance Data Sources
Performance Analysis Systems**

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LETVIS® – SYSTEM FOR AIR TRAFFIC MANAGEMENT

REFERENCES

▶ CZECH REPUBLIC
- Military ATM system (Air Force - MACC, MAPP and MTWR at all airbases)
- Civil ATC system (Civil ATS Vodochody)
- ATC simulators (Civil ATS Vodochody, Air Force, Military University)
- Integration of surveillance and air defence radars into ATC and C2 systems (Air Force)
- SAR centre (Military)
- Surveillance data accuracy analysis systems (Air Force)

▶ SLOVAK REPUBLIC
- Military ATM system (Air Force - MACC, MAPP and MTWR at all airbases)
- Civil ATC systems (Civil ATS - ACC Bratislava, APP int'l airports Košice, Poprad and Sliač)
- ATC simulators (Civil ATS, Air Force, Military University)
- Integration of surveillance and air defence radars into ATC and C2 systems (Civil ATS, Air Force)
- Radar systems refurbishment (Air Force)
- Radar upgrades - PSR and PAR (Air Force)
- SAR centre (Civil ATS, Military)
- Surveillance data accuracy analysis systems (Civil ATS, Air Force)

▶ UKRAINE
- ATC simulator in the Flight Academy (Kirovograd)
- National ASM/AMC system (Kyiv-Boryspil)

[THE SYSTEM SUPPORTS THE PROVISION OF SERVICES FOR]

▶ ACC – Area Control

▶ APP – Approach

▶ TWR - Tower

[ADDITIONAL KEY ALES PRODUCTS]

▶ LETVIS® ATC Simulator

▶ Universal Radar Data Interface (URDI) - a system for radar/surveillance data distribution and format conversion

▶ Consoles for Air Traffic Control and Simulations

The company provides the industrial design and manufacturing of specialized furniture required to house the controller's workplace / consoles for the specific needs of various users. The furniture can be delivered either as a part of systems supplied by ALES or as specific-purpose furniture to accommodate equipment provided by other manufacturers.

[ROBUST AND DEPENDABLE BASE ARCHITECTURE]

Operational benefits of ALES products and solutions include:

▶ Redundancy and hot swapping

▶ 100% Commercial-off-the-shelf' (COTS) hardware available worldwide

▶ UNIX/Linux operating system

▶ C++/Objective C portable source codes

ATM Solutions and System Integration

All the ALES solutions are characterized by modular design based on open systems, and the overall system architecture assures exceptional flexibility and scalability. While ALES provides full customer support, the actual operation is independent of external services and the end-user is in full control of the entire process.

[OPERATIONAL BENEFITS]

Operational benefits of ALES products and solutions include:

▶ Full customer support, including consulting services. operator training, updates

▶ Full end-user command of the operations, independent of ALES run-time services, where the operator controls the entire operating environment, including system and operational configuration such as radar sources update, airspace description reconfiguration, sector configuration, strip format setting and others;

▶ Low life-cycle costs.

[USER-ORIENTED AND CUSTOMIZED DESIGN]

▶ Our company's philosophy is to supply user-tailored products meeting user requirements with respect to local standards, operational procedures and equipment in use. Although providing the customer with a top performance reliable operational system, the pricing stays on the competitive level.

[OPEN AND MODULAR SYSTEM ARCHITECTURE]

Due to modular architecture, the system is highly scalable and flexible and may be extended in a number of ways. Benefits of this approach include:

▶ Scalability - as the customer's needs grow, the system may grow correspondingly and may be enhanced both in size and in functionality. Modular design allows integration of additional modules and subsystems, and the number of workstations may be increased without limitation. Corresponding to increased demands, the effective system performance may be also enhanced.

REFERENCES

▶ HUNGARY
  • Military ATM system (Air Force – MAPP, MTWR at Kecskemét airbase)
  • ATC simulator (ZMNE Air Force Academy Szolnok, Airport Kecskemét)
▶ YEMEN
  • Civil ATC system ACC (Sana'a)
  • Civil ATC simulator (Sana'a)
▶ NEPAL
  • Civil ATC system ACC, APP, TWR Main, Backup (Kathmandu)
  • Civil ATC simulator (Kathmandu)
▶ AZERBAIJAN
  • Civil ATC system TWR (Qabala)
▶ BANGLADESH
  • Civil ATC system APP, TWR (Chittagong)
  • Military ATC system (Dhaka airbase)
▶ GEORGIA
  • Civil ATC system TWR (Kutaisi)
  • Civil ATC ACC, APP Contingency System (Tbilisi)
  • Civil ATC simulator (Tbilisi)
▶ UNITED ARAB EMIRATES
  • Civil ATC system TWR, APP (Fujairah)
  • Civil ATC simulator (Fujairah)

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LETVIS® ATM System

All the ALES solutions are characterized by modular design based on open systems, and the overall system architecture assures exceptional flexibility and scalability. While ALES provides full customer support, the actual operation is independent of external services and the end-user is in full control of the entire process.

The LETVIS® ATM system is designed for radar and/or procedural control and planning of air traffic at any level of air traffic services provided by air traffic control centres for civil, military or joint operations. Controllers are provided with an integrated air situation picture of air traffic, including information on the structure and utilization of airspace and other supplementary data/support capabilities.

The LETVIS® ATM system can be delivered in a variety of customer-specified configurations, ranging from workstations/modules to a comprehensive ATM system that, together with other sub-systems and equipment, permits

▸ Modernization of existing ACC APP TWR
▸ Back-up system to main ACC APP TWR
▸ Contingency system for ACC APP TWR

[MISSION]

The system provides all ATM capabilities at ACC /APP /TWR to the full extent while enabling:

▸ Control and planning of air traffic at ACC /APP /TWR according to ICAO and Eurocontrol standards and recommendations
▸ Integration of planning and control of civil/military air traffic

[GENERAL CAPABILITIES]

▸ Surveillance Data Display (LETVIS® RDD)
▸ Flight planning, support for procedural control (LETVIS® FDP)
▸ Data collection and multi-sensor surveillance data tracker (LETVIS® MST)
▸ Ground-based Safety Nets support according to the latest standards and recommendations (LETVIS® ATCT)
▸ Data/voice recording and integrated playback (LETVIS® ARCH)
▸ System supervision and administration, continuous and on-line monitoring and diagnostics of data sources, including their remote control (LETVIS® SUP)

[EXTENDED CAPABILITIES]

▸ Data exchange with cooperating / lower level ATCCs, aircraft operators
▸ Inter-sector or civil/military coordination
▸ Networking capability to collect data for processing by LETVIS® modules and distribution of an integrated air picture
▸ Operational planning and control of military air traffic, airspace management (LETVIS® FDP/OPL)
▸ Controller / operator training (LETVIS® SIM)

[CAPABILITIES INTENDED FOR OTHER UNITS]

Depending on the ACC structure, the following capabilities can be integrated:

APP functions

▸ Digitization of analogue radar data and plot/track processing (LETVIS® EXT/S)
▸ Radar control for precision approach and landing (LETVIS® RDD/PAR)

AMC functions

▸ For flexible use of airspace through allocation, management and coordination with its users, CFMU, ACC, AMC

SAR functions

▸ For support of air search and rescue operations (LETVIS® SAR)

[FEATURES]

The high level of modularity, open system architecture, portability, and advanced object-oriented technology provide:

▸ Competitive price/performance ratio
▸ Low life-cycle costs
▸ Maximum efficiency at minimum cost through utilization of customer's existing equipment

▸ Custom-tailored design
▸ System platform options with Linux or Solaris operating systems

[SYSTEM FOR ANALYSIS OF POSITIONAL DATA SOURCES PERFORMANCE (LETVIS® SDAA)]

SDAA is a tool capable of estimating the positional accuracy of various types of radars in a fast, cheap and simple way. SDAA system is able to estimate all detection and quality performance parameters of radar sensors, surveillance data processing systems and other surveillance data sources such as e.g. multilateration systems.

The main method of estimation of surveillance data sources quality performance parameters is the analysis of these sources output data using reference data. The reference data are obtained by means of DGPS. To do so, it is necessary to make a test flight with the aircraft on board of which a special measuring and recording equipment, being a part of SDAA system, is installed. When the test flight is finished, computation of the reference data is carried out off-line from the GPS pseudo-distances measured and recorded during the test flight by special on-board equipment and from the data recorded during the same time at the output of ground-based GPS reference receiver.

LETVIS ATM CHARACTERISTICS

Positional data sources	multi-plot/track processing of up to 64 sources as follows: ▸ PSR, SSR, MSSR ▸ ADS data ▸ multilateration (MLT) and passive surveillance systems (PSS) ▸ automatic direction finders (ADF) ▸ external systems output (in ASTERIX or other format)
Surveillance data update	from 4 to 10 sec, adjustable
Track capacity	up to 2000 system tracks
FPL or other plan inputs	standard (AFTN, AMHS, OLDI, FMTP, IA-5, IFPS, ATFM, etc.) or other comm. interfaces with messages in standard data formats (Doc.4444, AMA, OLDI, TSGA, AUP/UUP, CRAM, NOTAM, ADEXP, IFPS, ATFM, etc.) or specific ones (e.g., military messages)
Meteo-data inputs	▸ standard text messages (WMO) ▸ non-standard or agreed text messages ▸ weather radar output, PSR meteo-channel, satellite pictures ▸ wind aloft, temperature forecast
Air situation display	▸ single display of up to 4Kx2K resolution ▸ multi-screen display (2–8) for one operator ▸ large-screen display ▸ multiple air situation windows
Flight data display	▸ electronic flight strip display including strip printing feature ▸ flight list data display
Safety Nets and ATC tools	▸ optional centralized or decentralized evaluation of safety warning ▸ support for STCA, MSAW, APW, LBA, NCW warnings ▸ support for MTCD tool
Recording and replay	recording of data/voice communication, operator actions, system status synchronous replay and analysis of records, data reduction
System redundancy	through modularity, incl. main/stand-by switch-over

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LETVIS® ATC Simulator

The LETVIS® SIM simulator provides simulation of the comprehensive airspace situation in the area of interest

The system operates in a variety of custom-tailored configurations ranging from single training positions up to comprehensive specialized training.

[GENERAL FEATURES]

▸ For the presentation of the most important features of a real situation and operational conditions: starting from single training positions (e.g., at a reserved aerodrome sector for refresher training, with an interface to an existing workstation) up to more advanced configurations.

▸ Full-size replica of an existing operational controller working position required to represent all the tasks in the simulated environment (e.g., with the identical MMI, equipment arrangement, data processing and external interface simulations…)

[MAIN FUNCTIONS]

Exercise preparation

▸ sessions preparation in an operational context with the capability of using pre-defined datasets

▸ flight scenario preparation using special flight control language and pre-defined standard flight procedures

▸ user-maintained database of standard flight procedures: SID, STAR, missed approach procedure, frequent en-route flights, circuit flights

▸ flight trajectory definition language derived from AIP description

Allocation of pseudo-pilot and trainee training groups for real-time full-task simulation

High accuracy simulation of real aircraft manoeuvres in the airspace based on the real aerodynamic and performance characteristics of programmable aircraft types

Air traffic generation and simulation using

▸ interactive flight simulation by pseudo-pilots

▸ flight generator based on prepared lessons and scenarios

▸ flight generator based on planning information

Simulation of the real airspace environment (e.g., system degradation)

▸ simulation (generator) of primary, secondary and multi-radar processing

▸ jamming and drop-out of radar information

▸ simulation of meteorological conditions (wind, cloudiness)

▸ emulation of the other system activities and coordination messages

▸ safety warnings simulation for the training of emergency situations

▸ airspace sectorization and silent handover simulation for the training

Control of simulated flights is carried out through:

▸ automatic or manual mode with the possibility of switching between them

▸ manual control of selected flight parameters while retaining automatic control of remaining flight parameters
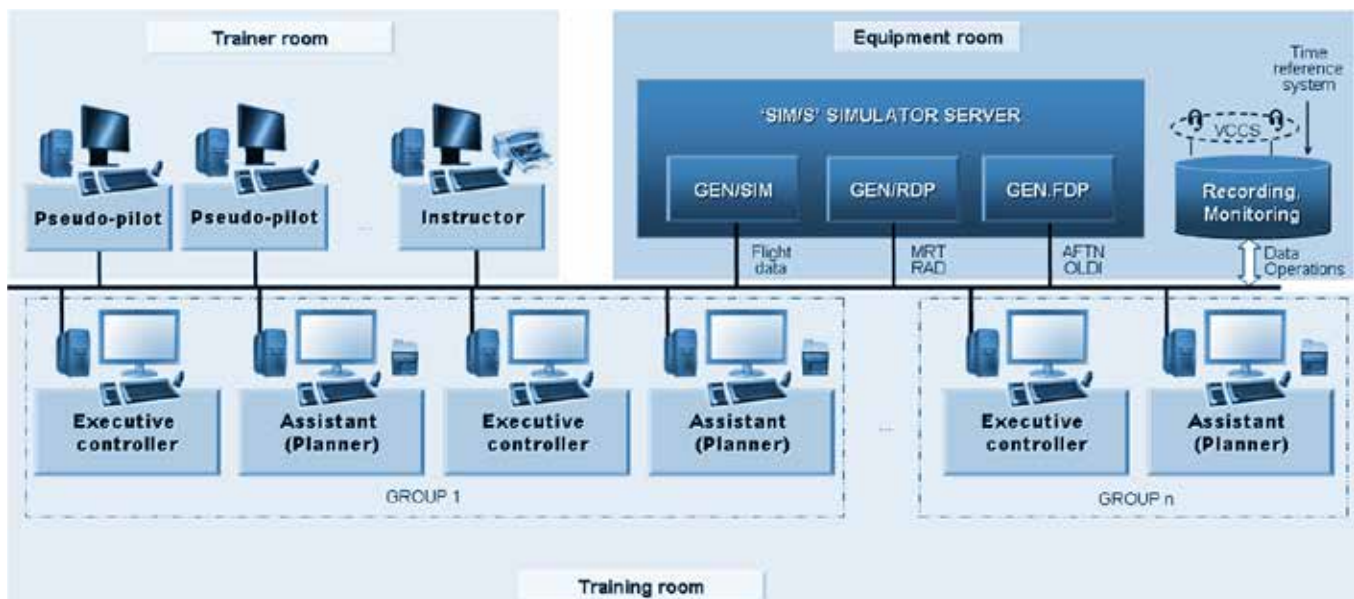
Specialized pseudo-pilot functions, e.g.:

▸ simulation of different flight phases (e.g., instrumental procedures for departure/arrival, holding)

▸ ILS guidance simulation

Training/evaluation support:

▸ freezing the simulated image to enable static picture analysis of the given traffic/situation

▸ archiving the entire training course and regressive analysis of the course of exercises

[SIMULATOR MODULES]

SIM/S simulator server as a complex simulated air traffic generator includes following modules:

▸ GEN/SIM: generator of highly accurate simulated flight data

▸ GEN/RDP: generator of radar data processing simulation and multi-radar data processing

▸ GEN/FDP: generator of flight data processing and external interfaces simulation

▸ SIM/INS instructor position for the preparation, setup, control and evaluation of a lesson

▸ SIM/PSP pseudo-pilot position for flight control

[SUPPORTING MODULES]

Modules for voice and data recording (ARCH) and evaluation (ADP), system administration modules (SUP)

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LETVIS® Universal Radar Data Interface

Universal Radar Data Interface (URDI) is a system for radar/surveillance data distribution and format conversion

Input data from data sources (input channels) are processed, filtered as necessary, modified, converted into the requested output data format (conversion machine) and consequently distributed to customer-defined output channels.

Graphical and textual visualisation of known radar data types is also possible (plots, tracks, scan) as well as byte-level interpretation of all data.

System components:
▶ High-performance server
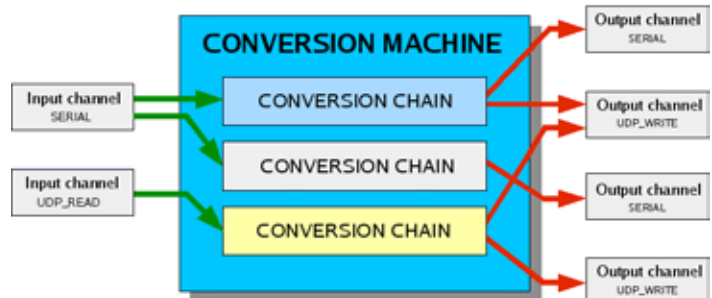▶ Remote connectable graphical client interface

[DEVICE SERVER]
▶ Maintains data reception from all input channels
▶ Allows data processing, input data filtering, data modification and transformation
▶ Ensures data distribution to output channels
▶ Creates log files

Conversion scheme
Logical structure:
▶ Input and Output channels
▶ Conversion machine

Input and Output channels

URDI device supports data collection and release for various data transport layers (Ethernet, asynchronous, synchronous links …).

Each channel is specified with a full set of relevant user-defined parameters (e.g., IP address, UDP port, PIT coder type…)

Conversion machine

Used for routing, modification, filtering and data transformation requirements. Various modes of processing and output routing can be specified for all input data types.

Each transport definition is independent and described by its conversion chain.

A conversion chain consists of the following parts:

▸ Input channel radar data acquisition

▸ Data decoding process – support for various protocols from groups

   ▸ Asterix – Eurocontrol protocols – Asterix CAT 1, 2, 34 ,48 ,03, 62, etc. including support for user application protocol

   ▸ Scan – scan (raw-video) protocols

   ▸ FPL – Flight Data Plan protocols

▸ RAW – support for unknown data protocols – byte-oriented operations

▸ Information transformation – filtering and modification of decoded items on mathematical and logical bases - operations (and, or, <,=,>, valid, invalid).

   (e.g., target altitude suppression for altitude values less than a specific value)

▸ Encoding data in another compatible protocol

▸ Data routing to selected output channels

[GRAPHICAL CLIENT INTERFACE]

The graphical client interface ensures local or remote connection to a server via a TCP-IP connection and implements the following functionality:

▸ Connection to server through login and password

▸ Auxiliary display for server-processed data

▸ Editing, modification and creation of input and output channel definitions

▸ Editing, modification and creation of conversion machine chains

▸ Log file view mode window

▸ Graphical display for selected surveillance data

▸ User-configurable properties (password change, implicit client behaviour…)

▸ Application version information (Help)

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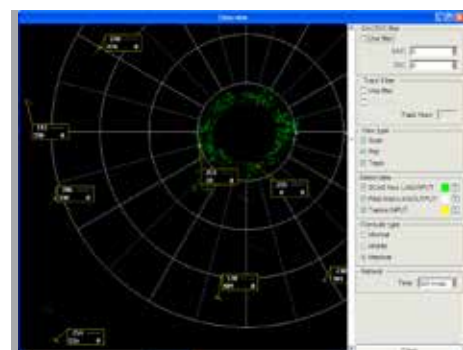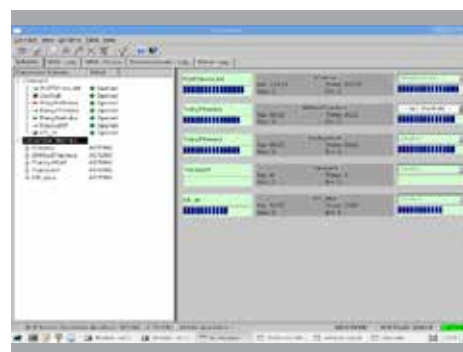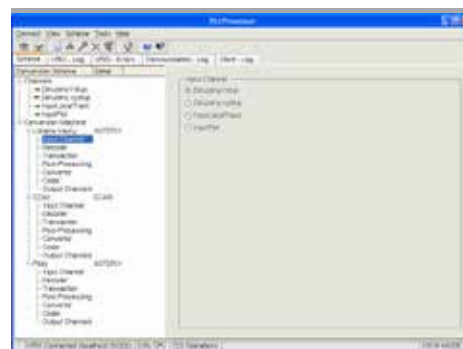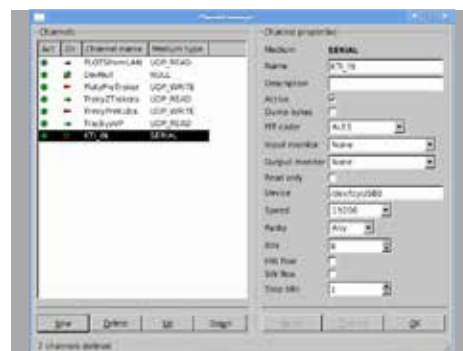
Operator's Consoles, Specialised Housings

ALES provides industrial design and manufacture of specialised furniture for centres/workplaces (including containers and vehicles) for the most critical applications and continuous duties, which thus demand high-level ergonomics and features. The specialised furniture is designed or adapted for each site individually. It is delivered either as parts of systems supplied by ALES or as independent units to sites equipped by other manufacturers.

[**DESIGNATION**]

Depending on its intended use, the specialised furniture falls into the following categories:

▸ Operator consoles: to be used for 24/7 duties with the most stringent requirements in terms of operator ergonomics and features

▸ Specialised housings: to accommodate operator workplaces and technical equipment inside means of transport (containers, vehicles, armoured personnel carriers…)

Specialised furniture is used in a wide range of the most critical applications, such as:

▸ ATC posts (ACC, APP, TWR, airport dispatching centres… ARO, SAR, AMC…)

▸ Housings for workplaces in transportable sites (e.g., radar systems, transportable airport versions)

▸ Dispatching centres, such as the police, fire service, emergency services, security service

▸ Sites of technological process control in factories and studios

[DESIGN]

Great emphasis is placed on high levels of ergonomics for safety. The materials used provide high levels of mechanical, chemical and fire resistance, and incombustibility. The furniture structure is typically implemented as follows:

The console/desk frame is made of metal and shock-proof glass, while the console/desk tablet is made of hardened, highly resistant plastic referred to as Corian.

Corian is noted for its marble-like appearance (available in more than 30 colours and 100 patterns), soft-touch surface, high thermal stability and high mechanical and chemical resistance. It is highly resistant to common causes of damage and features a 10-year warranty.

The described structural design provides the advantage of modularity and hence different configurations. This means that the shape and size of the furniture can be tailored to meet the customer's requirements and modified to suit its specific location.

The shape, size and arrangement of the console/desk tablet and the console/desk lighting (i.e., type, position, smooth intensity adjustment, etc.) conform to the technical equipment in use (especially in terms of the number and size of embedded monitors, the position of the keyboard on the console, the type of communication equipment), specialised workplace accessories (e.g., integrated illuminated plastic panels, built-in keyboards, etc.) as well as to the customer's special requirements. Moreover, customers themselves are able to add additional equipment interfaces through simple modification of the console/desk tablet. Specialised functions may also be added to the consoles/desks (e.g., electric control of console/desk tablet height, monitor angle, etc.)

The technical equipment can be installed in 19-inch racks with various heights built into the consoles. The interior parts are zinc coated; the frame is finished with baked polyurethane varnish with a fine-grain structure and with anti-noise padding. The cabinet interior may incorporate a circuit with independent air-conditioning.

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