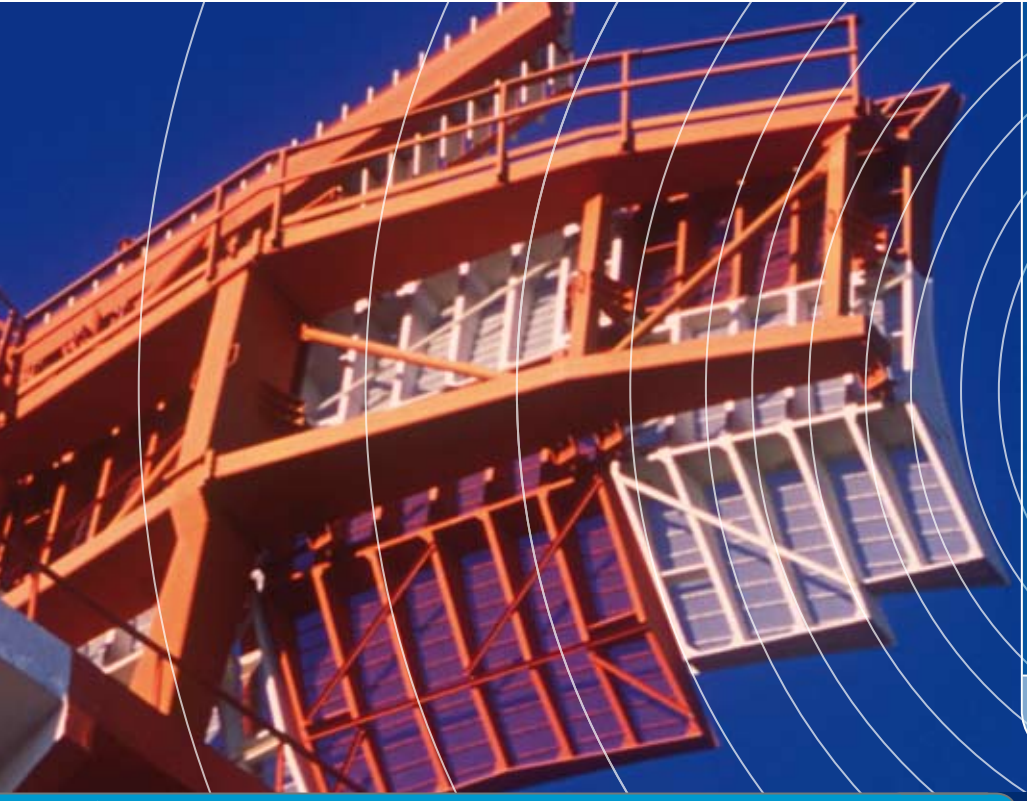


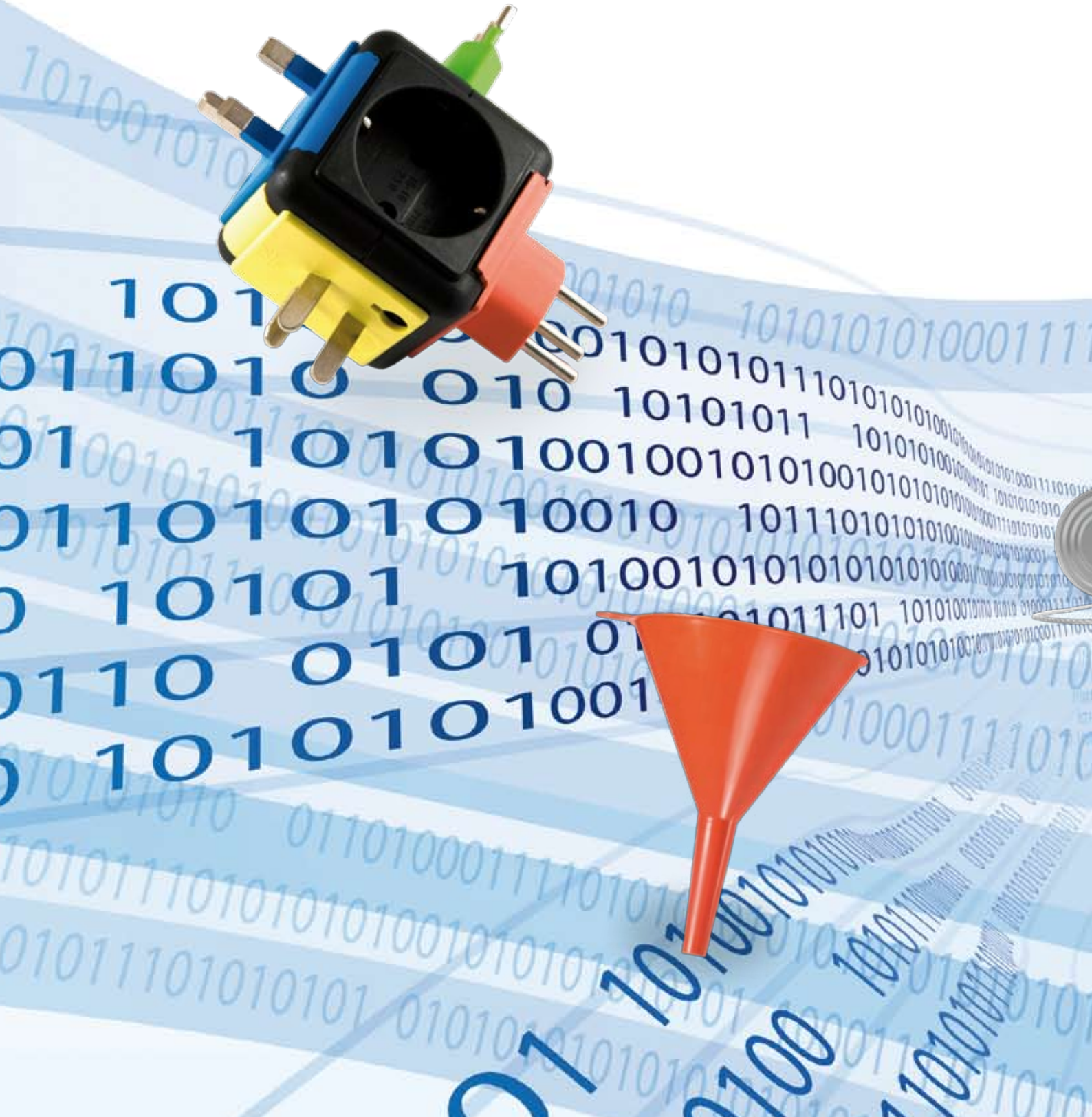
ADR

ALL-PURPOSE DATA STREAM REPLICATOR

HIGHLIGHTS

- Wide range of data format and protocol support
- Powerful conversion and filtering functions
- Modular design and high adaptability
- Linux and Intel based server platform
- SNMP based supervision and control
- Mono radar tracking per data stream (optional)
- Mobile configurations (optional)
- Redundant architecture with hot standby features (optional)

COMSOFT



ADR is an advanced and universal PC-based front-end processor for surveillance systems in heterogeneous ATC/ATM environments. Its highly flexible architecture makes it the perfect link between any kind of sensor and processing system, independent of their characteristics and vendors.

ADR is a scalable, highly efficient surveillance message conversion and communication system. Its main task is the replication, filtering and processing of a wide range of different radar formats and communication protocols.

Optionally, ADR offers mono radar tracking for individual radar channels.

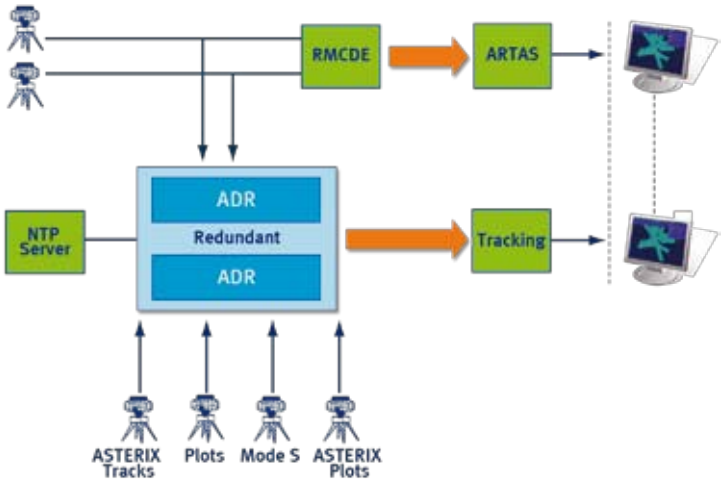
ADR is equipped with intelligent communication boards, which support all standard LAN protocols, in addition to a rich variety of serial data streams. The system's architecture can optionally be extended to full redundancy, which guarantees an utmost degree of reliability.

Today, around 120 ADR systems are in operational use in approximately 20 control centres around the globe.

AREAS OF APPLICATION

The systems are used in multiple scenarios and for different applications, e. g.

- as passive fallback system, actively taking over the supply of the fallback chain with surveillance data in case of a main system's failure;
- as front-end processor, adapting the surveillance data from radars located in neighbouring countries or from military radars;
- as communication gateway to allow the forwarding of data streams between serial lines and modern LAN architectures;
- as input and output LAN with supervision of standby unit's output LAN;
- as data filter, suppressing or sorting out certain data or message types;
- for reformatting ASTERIX Mode S surveillance data to ASTERIX classical PSR/SSR data;
- to convert native non-ASTERIX data formats into ASTERIX and vice versa.



ADR as passive Fallback System

FEATURES

DATA DISTRIBUTION

- 1:n distribution of plot and track data from any source
- Real time transport with a minimum end-to-end delay (< 40 ms)
- Supports wide range of LAN/WAN interface types and protocols
- Intelligent passive listening on data lines (e.g. HDLC-LAPB) and further processing/distribution of data
- Supervision of external data lines (timeout, modem failure, protocol supervision) with automatic takeover
- Alternative data path with automatic selection of used input source

TIME SYNCHRONISATION

- UTC time processing (NTP, GPS, DCF77)
- Various time sources selectable
- System deployable as NTP Server (stratum 1) within NTP networks

CONVERSION

- Conversion between a large number of civil and military formats, applicable to sensor plot, sensor track and multi-radar data
- UTC time stamping/calculation of original plot detection time
- Support of latest ASTERIX standards
- Support of custom-specific ASTERIX applications
- Conversion modules for legacy interfaces are easy to integrate due to an object-oriented architecture

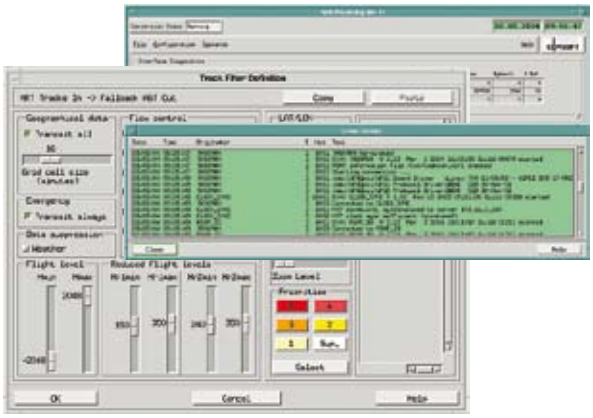
TRACKING

- Mono radar tracking for any number of data streams
- Tracking parameters can be tailored individually according to the user's need
- Coasting in case of detection misses

FEATURES

FILTERING

- User-definable filtering for plots and tracks
- Message type filtering
- Message attribute filtering
- Weather filtering
- Height band filtering
- Geographical filtering
- Data reduction actions configurable dependent on load factor



Data Filtering

CONTROL/SUPERVISION

- High-resolution graphical user interface with X-Windows/OSF-Motif
- Access control (login user/password) with different access levels (optional)
- Context-sensitive online help
- Possibility to run graphical user interface on remote PC connected via LAN (degraded solution)
- Supervision and control via SNMP, offering a detailed enterprise-specific MIB
- Configuration management via import/export functions

DIAGNOSTICS

- Detailed diagnostics for each interface: connection status, throughput, protocol errors, etc.
- Conversion diagnostics (per data stream): message types count, invalid messages
- Mono radar tracker diagnostics (per data stream): number of tracks, coasted tracks, terminations
- Filter diagnostics (per data stream): messages in/out
- Load diagnostics per data sink
- System message logging
- Data flow supervision (configurable per interface and per data stream): report by events/SNMP traps/ current status shown in diagnostics

ARCHITECTURE

- Intel-based server technology
- Highly scalable interface technology
- High performance owing to intelligent communication boards
- Optionally redundant configuration with hot standby features
- LINUX operating system with X-Windows and OSF/Motif
- Open architecture, easily expandable object-oriented software design

Scope of Functions

DEPLOYMENT

Due to its extreme scalability and the use of standard components, ADR can be hosted on many different hardware platforms, which can be chosen in accordance with the given infrastructural conditions and spatial requirements on site.

The standard ADR solution is integrated into one single cabinet, including the keyboard and mouse in a drawer. Moreover, an integrated solution with TFT monitor, keyboard and KVM switch in one drawer is available. The ADR units are based on 19" rack-mountable servers.

On demand the ADR COTS components can also be implemented into the customer's existing cabinets.

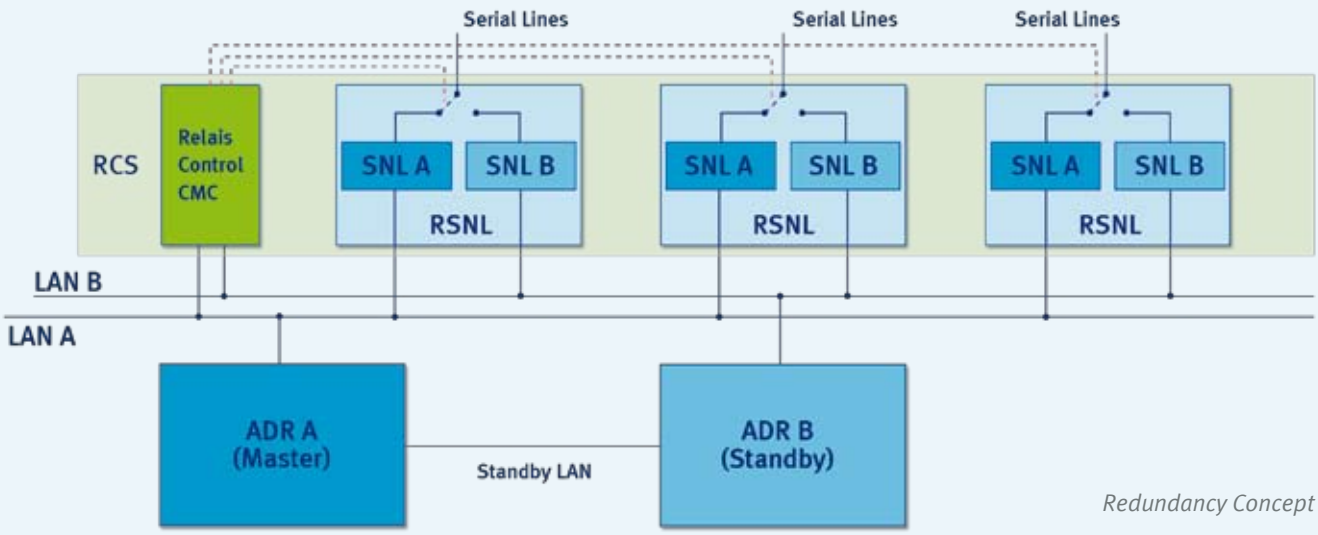
A portable version is available with integrated communication boards for mobile application.

THE REDUNDANCY CONCEPT

To achieve redundancy, two ADR units run in a master/standby configuration connected via a standby LAN. In general the master unit (ADR A) is active and processes the data; the other unit (ADR B) is in standby mode. Because both ADR units constantly supervise each other via the LAN, the standby ADR can take over operational services in case of failure of the master unit instantly.

By using COMSOFT's redundant communication system (RCS) technology it is possible to decouple the serial network link (SNL) interface units from the ADRs. Furthermore, availability can be increased by using redundant SNL (RSNL) units. In that case each RSNL unit provides two serial interfaces whereas a relay board switches over between the two elements. During regular operation only one SNL (e. g. SNL A) is active and occupies the lines of the relay board, the other SNL remains on standby. In case of a failure the relay passes the data transfer over to the former standby SNL which immediately takes over all operations.

Each ADR unit uses an independent LAN for SNL communication. The two units are connected by means of a standby LAN.



Redundancy Concept

REFERENCES

Today, more than 120 ADR systems are in operational use in approximately 20 control centres around the globe. The following list describes the most typical applications:

- As fallback component:
  - In case of the main system's failure, ADR actively supplies the fallback system with data ASTERIX communication gateway (X.25, UDP/IP)
- As data converter for:
  - Mode S radar data into ASTERIX CAT1/2 and vice versa
  - non-ASTERIX data formats into ASTERIX and vice versa
  - ARTAS system tracks into legacy data formats
  - RDIF
  - Military formats
- As communication gateway for:
  - various protocols (e. g. X.25, UDP/IP, TCP/IP)
  - serial lines and modern LAN architectures (each combination of communication partners possible)
- As front-end processor:
  - and tracker for the supply of the fallback system using AIRCAT-500; simultaneous ASTERIX data conversion to feed the ARTAS tracker with standard ASTERIX data
  - and data conversion system for the country-wide distribution of surveillance data
  - and conversion system for the integration of foreign radar sensors into the main system
- As data filter:
  - suppressing or sorting out certain data or message types
- As mobile data integrator (HDLC-Frame, LLC1, UDP/IP):
  - in connection with an analysis tool for flight inspections

TECHNICAL DATA

Serial Interfaces

Up to 32 (V.24 or V.11)

LAN

LAN: up to eight (10/100/1000 Mbit/s, Ethernet, others on request)

Formats

ASTERIX, AIRCAT, CD2, RDIF, RDE, EUROCONTROL, RLD, ALENIA, SVE, various military formats (additional formats on request)

Supported ASTERIX Categories

CAT-0, 1, 2, 3, 8, 9, 21, 23, 30, 34, 48, 61, 62, 63, 65
(other categories on request)

Protocols

UDP/IP, TCP/IP, LLC1, TP4, X.25, HDLC-LAPB, HDLC-FRAME, AIRCAT, CD2, RDE, EUROCONTROL, various proprietary protocols

Time Services

NTP, GPS, DCF-77, crystal backup

Supervision

Integrated HMI, SNMP V1.0 with application MIB

Availability (computed)

single 0.9993 / redundant 0.99999996

Throughput

> 5.000 plots/sec

Delay

< 40 ms

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