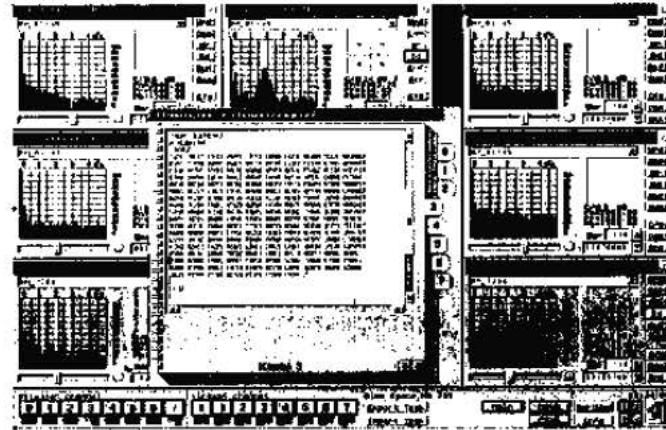


CRYPTON-M



HF Networks Monitoring System



COMPREHENSIVE SOLUTION FOR INTERCEPTION AND
MONITORING IN TELECOMMUNICATION NETWORKS

CRYPTON-M Ltd.

Tel. +380444667083, Fax +380442514133, e-Mail: syrov@ukrpack.net



INFOSTREAM

*The Information Stream
Technology InfoStream*

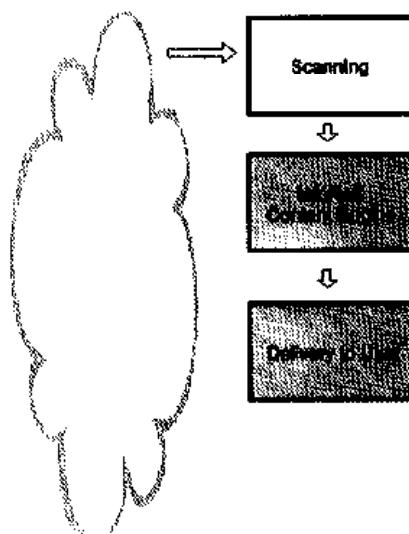
The information stream technology InfoStream is intended for the tasks of information retrieving from the Internet sites, its processing, systematization, generalization and providing access to it.

This technology provides:

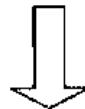
- Obtaining of the current news from the Internet;
- Forming of subject-matter information channels which are characterized by completeness of the information;
- Forming of personal information channels through special inquiries;
- Interactive access to information from workstations in search and viewing modes through corporate network;
- Forming of automatic subject-matter digests, construction of the phenomena interrelations tables and phenomena distribution diagrams.

The core of the InfoStream content engine is the information retrieval system InfoRes-XL. The system provides information processing in three basic modes:

- Information selective distribution (ISD);
- Interactive access to full text databases;
- Content monitoring.



InfoStream



The Information Collection and Processing Stream-Center

The Stream-Center of the Access to DataBases

The Content Monitoring Stream-Center

The ISD mode is used in two basic processes - for the information search on stored users' inquiries and for the classification of the system input information.

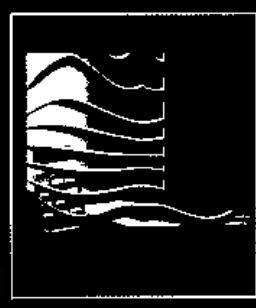
The mode of the interactive access to the databases is offered as corporate decision. As the basis for its implementation there are programmed and technological means of databases with documents received from the Internet creation and of providing an access to them. In this mode data reviewing, search and displaying are provided for the users. In addition, users have the opportunity to refer to the original documents in the Network.

Perspective direction of the InfoStream technology development today is the content-monitoring - means to accomplish the tasks of forming of subject-matter information channels, digests, phenomena interrelations tables and separate phenomena distribution diagrams.

In comparison with traditional technologies the introducing of the InfoStream provides following advantages:

- Fast access to the most topical information as it appears in the Internet;
- Work with a checkable set of sources;
- Connecting of the operators workstations to information space, duly reminding and pushing the profile information;
- Providing operators purposeful work, elimination of the attention diverting factors that are intrinsic to the Internet;
- Control the information retrieved by corporate network workstations;
- Reliability of the information delivery;
- Protection of the data, confidentiality.

Due to the high search characteristics of content engine (efficiency, completeness and relevance), as well as the presence of the indivisible protected interface, the InfoStream technology promotes significant increase of the efficiency and quality of analytical work.



ANALYSIS

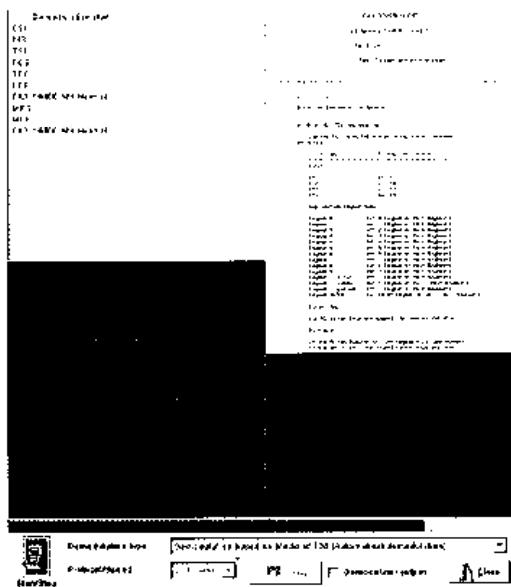
Analysis Operator Workstation (AOW)

Purpose:

AOW is designed for the technical analysis and automatic or manual demodulation setting of the facsimile and modem messages parameters, which are incorrectly processed by a facsimile or modem server, or are processed with many errors or are incorrectly classified and are sent by the operator for re-processing.

The software package of a analysis operator work station includes more than 100 functions, on the basis of which the following operations of the analysis are possible:

- Time and frequency analysis of sessions;
- Correction and editing of sessions (frequency shift, change of sampling frequency, conversion of a record format, filtering of signals etc.);
- Demodulation of facsimile transmission;
- Demodulation of modem transmission.



The programs of a time-and-frequency analysis allow to:

- view the time form of sessions and its spectral representation on areas which length is equal 128, 256, 512, 1024, 2048, 4096, 8192 samples;
- produce measurement time, amplitude and frequency characteristics of a signal with the help of cursor;
- view variation of a signal spectrum in time.

The programs of demodulation of facsimile transmissions.

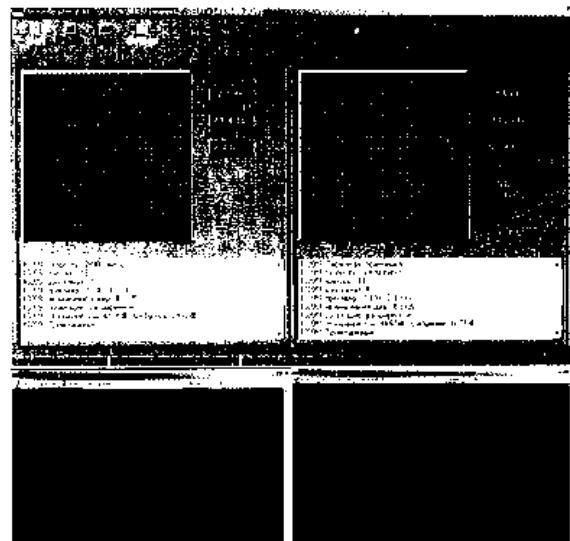
The programs of demodulation of facsimile transmissions provide demodulation of files of records of facsimile sessions. The program allows to process sessions appropriate to the following ITU-T's recommendations:

- V.27, V.27ter, V.29, V.17.;
- Processing of fax sessions Group 3 (T.30 and T.4) and Group 4 (T.6);
- Decoding and error correction of MH, MR, MMR, ECM protocols and proprietary protocols of the fax machines manufacturers.

The programs of demodulation of modem transmissions.

The programs of demodulation of modem transmissions provide demodulation of files of records of modem sessions. The program allows to process sessions appropriate to the following ITU-T's recommendations:

- V.21, V.22, V.22bis, V.26, V.26bis, V.27, V.29, V.32, V.32bis, V.33, V.34, V.90;
- V.42, V.42bis and MNP 1-5 protocols;



The operator has a possibility over a wide range to change a tuning of parameters of demodulators (frequency carrier, type of the protocol, character rate, parameters of an echo-compensator etc.).

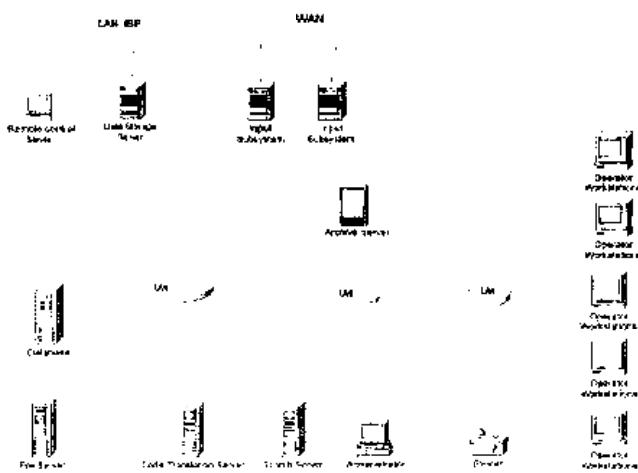
Visual inspection of the program of demodulation is provided. The basic information on operation of the demodulator is displayed on monitor screen as signal constellation. The additional information the operator gets on the screen of monitor in form of the messages about status of an output file of the task and condition of the demodulator with possibility of review of results of demodulation in bit form.

The programs of correction and editing of communication sessions allow:

- to set a frequency shift;
- to adjust a sampling rate;
- to convert record formats;
- to change amplitude;
- to insert pauses;
- to generate tone and DTMF;
- to eliminate a constant component;
- to carry out a filtering of a session.

**Purpose**

The system is intended for reception and processing of sessions transmitted in data networks.

Components and Block Diagram

Monitoring of data networks is based on processing of information transmitted in LAN/WAN lines of the INTERNET service providers (ISP).

The Data Monitoring System is a geographically distributed system: the part responsible for input and preliminary processing of layers 1 - 3 of OSI ISO protocols is located in ISP premises, and the part responsible for processing of sessions is located at a monitoring center. Both parts are connected between themselves by means of the local area network through WAN communication lines.

The system consists of the following subsystems:

- Input Subsystem;
- Subsystems of Processing Sessions;
- Management and Administration Subsystems.

The system may include a number of Input Subsystems, which are responsible for monitoring LAN/WAN line of different ISPs.

Structure and Purpose of Subsystems**Input Subsystem**

- Reception of 32 simplex E1 trunks;
- Reception of information on the Ethernet 10/100 Mb interface;
- Detection of IP addresses of transmitting and receiving parties;
- Selection of sessions by IP addresses (with the table of selection not less than 16,000 addresses), with assignment of an appropriate priority to the selected message;
- Selection of sessions by domain names (with the table of selection not less than 16,000 names), with assignment of an appropriate priority to the selected message;
- Transmission of selected sessions to a monitoring center.

Data Storage Server

- Recording of up to 10 Gb of data transmitted from the monitoring equipment installed at ISP nodes;
- Decoding and unpacking of the received sessions;

- Temporary storage of the processed data;

Remote Control Station

- Remote control on WAN-LAN interface of the monitoring equipment installed at ISP nodes;
- Functionality control of the monitoring equipment installed at ISP nodes.

Database Server

- The addresses of interest table contains not less than 20,000 records;
- Search of the session-related and accompanying information of required sessions;
- Possibility of generating and processing of complex and cross database queries;
- Possibility of storage of up to 1,000,000 records.

File Server

- Storage of session-related information of E-mail messages not less than 5 days;
- Possibility of storage of 36 Gb of E-mail messages records.

Code Translation Server

- Automatic recognition of layers 5-7 of OSI ISO protocols and processing of session files with a total size of up to 10 Gb per day;
- Generating output session files according to the original format of the intercepted files.

Search Server

- Recognition of file coding type ;
- Recognition of the language used in an intercepted message;
- File conversion to ASCII format;
- Indexing of text files;
- Search in text files for keywords and strings of characters (keywords combinations).

System Administrator Workstation

- System management and functionality control;
- System Administrator controls the work of operators, defines their tasks and distributes workload between them;
- System Administrator generates information on the configuration of the equipment and software of the system and saves it in the database for use by other system components;
- System Administrator generates the lists of the users and targets and saves them in the database;
- System Administrator defines access rights of all users to resources and data of the system.

Operator Workstations

- Execution of the job defined by the System Administrator;
- Generating search queries in the database for obtaining access to the recorded sessions and session-related information;
- Analysis of sessions by listening to or viewing them;
- Generating a report file about the contents of sessions after listening to or viewing them.



Purpose of the System

The system is designed to extract and process voice, fax and modem sessions from digital trunks

Composition of the System

- Input Subsystems;
- Database;
- File-Server;
- Fax/Data Processing Server;
- OCR (Optical Character Recognition) Server;
- Archive Server;
- System Administrator;
- Operator Workstations;
- Print-Server.

Extraction of Information From Duplex or Simplex Digital Trunks

- The system can detect the following types of duplex or simplex digital trunks:
 - G.703 HDB3;
 - V.35
 - Synchronous data (information plus clock cycles).
- One Input Subsystem can handle from 4 to 8 two-way trunks;
- Number of input subsystems - from 1 to 8.

Processing of Signalling Data and Number Analysis

- The system can detect and process voice, fax and modem sessions which are transmitted using the following signaling standards:
 - Telephone Signaling Standard #5, R1, R1.5, R2, DTMF, R2D, SS#7, ISDN, EDSS.
 - Called and calling subscriber number can be determined;
 - Search of sessions by a complete or a partial number;
 - Database can store up to 20,000 numbers each with relevant priority to support session search by telephone number.

Detection of Session Type (Voice, Fax or Modem) and Recording of Sessions

- Classification of sessions by type: voice, fax, modem in real time;
- Possibility of filtering sessions by type (voice, fax, modem);
- The system can compress voice sessions in 2:1, 4:1 or 10:1 ratio;

Storage of Session-Related and Additional Information

- Session-related and additional information is stored in relational database;
- Database interacts with all system components and handles search queries of Operators and System Administrator;
- Numbers of interest list can contain at least 20,000 entries;
- Search of session-related and additional information of required sessions;
- Possibility to create and handle advanced and cross queries;
- The system can detect Database tables fill and automatically delete sessions and entries using a predetermined algorithm;
- Automatic archiving (recovery) of Database tables;
- Automatic backup of information in Database tables.

Demodulation and Decoding of Fax Sessions

- Processing of Group 3 (T.30 and T.4) and Group 4 (T.6) fax sessions;
- Demodulation of fax sessions in accordance with the follow-

ing ITU-T recommendations:

- V.27, V.27ter, V.29, V.17.

- The following decoding and error correction protocols are supported:

- MH, MR, MMR, ECM;

- proprietary protocols.

- Convert fax image into TIFF format and save in the required directory;

- Fax-server can process up to 50 sessions simultaneously or more than 60,000 pages per day.

Demodulation and Decoding of Modem Sessions in Leased and Dial-up Channels

- Demodulation of modem sessions in leased channels in accordance with the following ITU-T recommendations:

- V.22, V.22bis, V.26, V.26bis, V.27, V.29, V.32, V.32bis,

- V.33;

- Demodulation of modem sessions in dial-up channels in accordance with the following ITU-T recommendations:

- V.21, V.22, V.22bis, V.32, V.32bis, V.34, V.90.

- The following error correction protocols are supported:

- ITU-T V.42 recommendation, MNP 1 through 4.

- The following data compression protocols are supported:

- ITU-T V.42bis recommendation, MNP 5.

Optical Character Recognition in Fax Sessions.

Information Search in Recorded Sessions by Keywords (Key Expressions)

- Recognition of a text header in a fax session;

- Detection of graphic images and their comparison against graphic images bank;

- Recognition of English, German, French and Russian letters;

- Recognized characters are written to a file in ASCII code;

- Scanning of ASCII files for keywords and character strings (keywords groups);

- Automatic creation of a report (annotation) about a fax session.

Search, Playback and View Recorded Sessions by Operators

- Operators perform tasks determined by System Administrator;

- Operators can create database search queries to access recorded sessions and session-related information;

- Session analysis through playback or view functions;

- Production of a report file about session contents after playing back or viewing the session.

System Management, Functionality Monitoring and Maintenance

- System management, functionality monitoring and maintenance are performed from System Administrator workstation;

- System Administrator controls Operators, determine their tasks and workload;

- System Administrator determines hardware and software configuration of the system and stores this information in the system Database to make available to the other system components;

- System Administrator determines user groups and target lists and stores them in the system Database;

- System Administrator determines access rights for all users to the system resources and data.



Multichannel system of reception and information processing of satellite channels POISK

The POISK system is a multichannel system of reception and information processing of satellite channels which provides radio monitoring of the information transmitted in satellite communication systems channels (such as Intelsat, Eutelsat, etc.).

The POISK system provides signal reception in L-band, demodulation, decoding and descrambling of up to 80 carriers simultaneously and transmission of information to a local area network (LAN) for further processing.

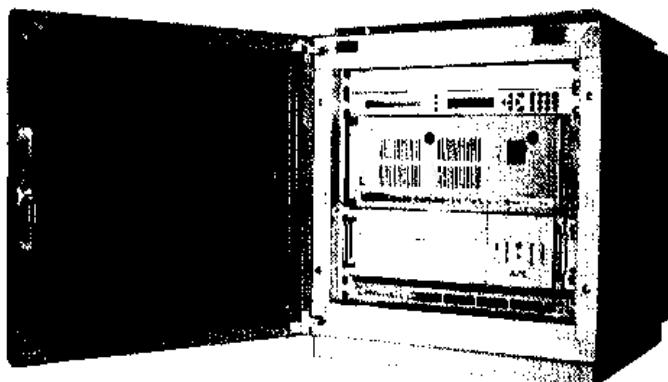


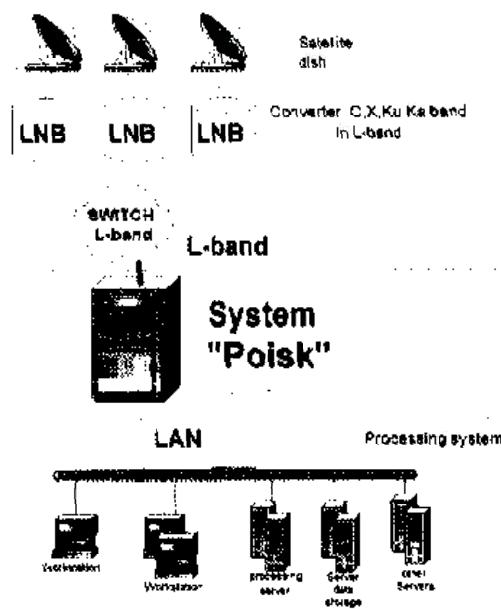
Fig. 1 Appearance of the POISK system (minimum configuration) and its application in a radio monitoring system of satellite communication channels

The POISK system represents a hardware-software complex with its main components combined by a local area network (LAN) that provides optimum resource allocation of the system, easy upgrade of resources and functions, transparent multipoint access to output data streams on the part of end users.

The POISK system kernel is formed by up to 8 sections of preliminary processing and distribution of data flows (SPDS). Each SPDS section is responsible for reception, preliminary processing and routing of data flows to LAN. Each SPDS section can process up to 10 satellite channels (input data flows), form output streams of data, perform their preliminary processing and routing them to 100 Mbit/s LAN segment.

The system provides effective maintaining of operating temperature inside its industrial case and early diagnostics of a voltage failure, control of UPS resources and correct closing of the operating system at reduction of these resources before critical values.

SPECIFICATION	
Number of channels	Up to 80
Tuning:	950 MHz to 2,150 MHz. Resolution better than 1 kHz.
Nominal Receive Level:	-45 dBm = $10 \log(8192/R)$ (dBm) R = data rate in Kbps.
Range with respect to nominal	+1-20 dB
Max Input Power Level:	<25 dBm
Input Impedance:	75 ohms
Input Return Loss:	> 9 dB
Input Connector:	Type F, Female
Output Connector:	Ethernet 100TBase RJ-45 for 10 channel groups and RS-422 for every channel
Carrier Acquisition	Programmable up to ±2 MHz, in 500 Hz steps.
Re-acquisition	1 second, with 95% probability, following short-term outage
Min Eb/No	4.0 dB, Viterbi operation
Scrambling	V35 (CCITT)
Modulation Format	QPSK/BPSK (PSK 16 QAM in future)
Data Rates	64 to 8192 Kbps QPSK, (or higher - option) 32 to 1024 Kbps BPSK
FEC	1/2, 3/4 and 7/8 rate Constraint Length 7 Viterbi Intelsat Decoding 1/2, 3/4 and 7/8 rate DVB compliant Concatenated Reed Solomon/Viterbi Decoding (option)
Filter	no / IDR / IBS (or other - option)
Framing	no / G.704 # time slot
Power	180 - 260V (or 90-132 V), frequency 47-63 Hz



Possible Configuration the POISK System Depending on the Customer Requirements							
Type of order	1	2	3	4	5	6	7
Number of channels	1-10	11-20	21-30	31-40	41-50	51-60	61-70
Number of SPDS sections	1	2	3	4	5	6	7
Number of UPS-700BA	1	1	-	-	-	-	-
UPS-1400BA	-	-	1	1	2	2	2
Number of LAN-SWITCH	1	1	1	1	1	1	1
Useful height of a case (U)	10	13	18	27	27	31	36
							40

CRYPTON-M



Inmarsat Monitoring System

CRYPTON-M Ltd. offers a comprehensive solution for interception and monitoring in telecommunication networks. The system is designed to intercept and monitor traffic on Inmarsat mobile communication channels. It includes a specialized receiver and processing unit that can handle multiple channels simultaneously. The system is highly reliable and can be integrated into existing network infrastructure. It is also easy to install and maintain. CRYPTON-M Ltd. is committed to providing high-quality products and services to its customers. We offer a range of services including installation, configuration, and maintenance. Our team of experts is available 24/7 to provide support and assistance. We are always looking for ways to improve our products and services. We are confident that our system will meet your needs and exceed your expectations. Please contact us for more information.

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The system is designed to extract and process voice, fax, modem sessions and Short Message Service (SMS) from GSM Networks.

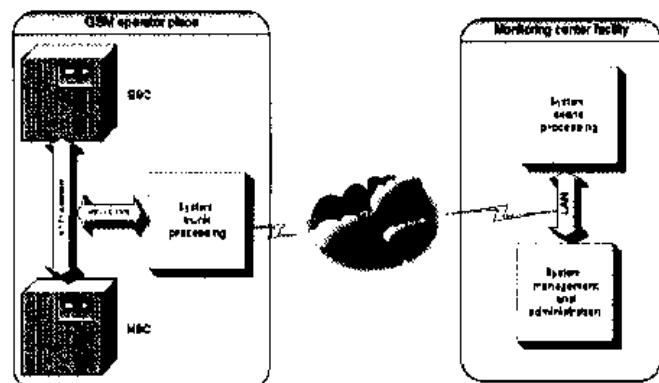
System Architecture and Block Diagram

Monitoring of GSM networks is based on processing E1 trunks between BSC and MSC.

GSM Monitoring System is territorially distributed: the part of the system responsible for reception and processing of E1 trunks is located in proximity to MSC and the part of the system responsible for processing sessions is located at the Monitoring Center. Both parts of the systems are connected via LAN over WAN channels. The system consists of the following subsystems:

- E1 Trunks Processing Subsystem (located at the MSC);
- Session Processing Subsystem (located at the Monitoring Center);
- Management Subsystem (located at the Monitoring Center).

The system may include several E1 Trunks Processing Subsystems located at various MSCs.



Subsystems Architecture and Function

E1 Trunks Processing Subsystem consists of the following:

- E1 Trunks Reception and Processing Station;
- A-interface Processing Server;
- E1 Trunks Cross Connect;
- Networking Equipment.

The input of the E1 Trunks Processing Subsystem consists of duplex E1 trunks (ITU-T G.703) with A-interface communications to carry traffic between BSC and MSC.

The output of the subsystem is generated as a result of E1 trunks processing in the following forms:

- voice sessions recorded on disks in WAV format;
- fax sessions recorded on disks in TIFF format;
- modem sessions or texts recorded on disks;
- Short Message Service (SMS) texts recorded on disks.

Session Processing Subsystem consists of the following:

- Database Server;
- File Server;
- Archive Server;
- Operator Workstations;
- Target Location Station;
- Networking Equipment.

Database Server is designed to store session-related information about all sessions, received and processed by the monitoring system.

File Server is designed to receive and temporarily store files of sessions recorded by E1 Trunks Reception and Processing Station and retrieved by Database Server for Operators in accordance with their workplans.

Archive Server is designed for long-term storage of session files, processed by Operators.

Operator Workstations are designed to:

- access Database Server to retrieve information;
- playback WAV-files of voice sessions;
- display and view fax images;
- display modem, data and SMS texts.

Target Location Station is designed to visualize target location while the session is in progress. Target location can be determined as accurate as a cell's sector.

Management Subsystem consists of the following:

- System Administrator Workstation;
- System Engineer Workstation.

Management Subsystem functions:

- monitor functionality of system components ;
- perform fault monitoring and signaling, fault location and handling;
- create workplans for Operators, prepare to distribute workplans to Operator Workstations;
- generate reports about system performance.

Technical Specifications

• The system can process communications traffic with priority screening to the following types of sessions: voice (telephone), fax, modem data, Short Message Service. The system operator can filter sessions by any type of data transmitted over A-interface, e.g. telephone number (MS ISDN), IMSI, IMEI, Cell ID, date, time, session duration, etc. All data received by the system can be processed by operators. The system supports 256 levels of priority.

• The input capacity of the system - up to 128 two-way E1 trunks.

• The system can simultaneously record, process and store for predetermined time all sessions from all input trunks.

• The system provides compression of input trunks in 5:1 ratio with subsequent playback possibility using standard sound card and proprietary as well as standard software.

• The system can process Group 3 fax sessions with MH, MR, ECM, MMF coding schemes and all functions of fax communications in accordance with ITU-T T.30, T.4, T.6 recommendations. All fax images are converted into standard graphic TIFF format and can be viewed by proprietary and standard software.

• The system can process modem data utilizing ITU-T V.42 and V.42bis protocols and MNP2 through 4, MNP5 protocols developed by Microcom.

• The system supports remote users with abridged version of the session processing subsystem; such remote users perform local tasks and establish communications with the main Monitoring Center.

• To minimize the size of E1 Trunks Processing Subsystem another version of the system can be made available - for processing trunks with A-ter interface.

• The system can be fitted with additional hardware and software to meet certain operational requirements.