# EXACT TIME SERVERS

## NTP-CLIENTS, SYNCHRONISATION

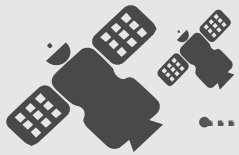
JCOM IOT

# PURPOSE OF ETS - EXACT TIME SERVER

## EXACT TIME SERVER LINE OF ETS:

- Receives the REFERENCE TIME SCALE From the global navigation satellite system Glonass/GPS (or receives external signals from the line);

- GENERATES AND OUTPUTS FREQUENCY AND TIME SIGNALS in different sequences and codes (1PPS (1 Hz), 10 MHz, IRIG, NMEA, NTP, PTP, 2,048 MHz, 2,048 Mbit/s, etc.).



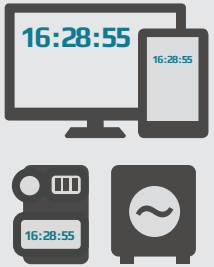
GLONASS / GPS / Galileo / Beidou

SATELLITES

RECEIVING SIGNALS FROM SATELLITES

EXACT TIME SERVER

ETS transmits the received information to the devices and servers via Ethernet




ELECTRONIC DEVICES
Receive the exact time via the NTP protocol

# AREAS OF APPLICATION OF THE EXACT TIME SERVER

Weather control system

Business centers, hotels and other administrative buildings

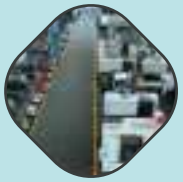
Environmental monitoring

Airports

Agricultural industry

Sport centers

Energy sector


Manufacturing enterprises

Transport services

Military facilities

Road services

State Rapid Response Service

- Computer and computing networks LAN, WAN, MAN;
- Digital fixed and mobile telecommunication networks SDH, NGN, LTE, WiMAX;
- Tele-radio communication networks DAB, DVB;
- APCS (Automated process control system), ASCAPC (Automatic system for commercial accounting of power consumption, AMIS EPFA (Automated measuring and information system for electric power fiscal accounting);
- Security system;
- Industrial automated production;
- Energy oil and gas systems and complexes;
- Metrology systems;
- Other areas where time-frequency synchronization is necessary.

# LINE OF EXACT TIME SERVERS «STV-01»

**«STV-01»** the main line of ETS with housing 19 inches

- **«STV-01»** with built-in generator
- **«STV-01»** with additional functionality
  - **BASIC**
  - **ADVANCED**
  - ...

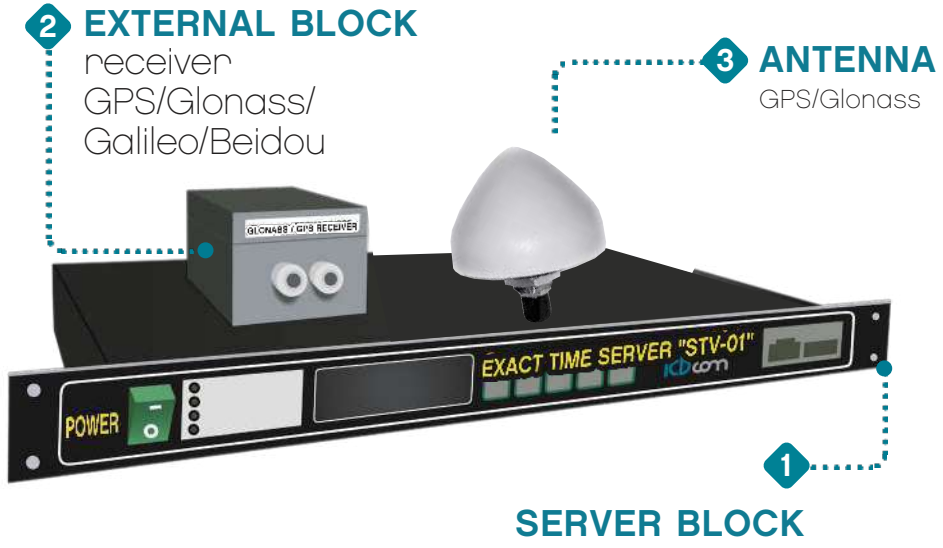
1. **SERVER BLOCK** – an exact time server located on premises, usually in telecommunication cabinets and marked as Exact Time Server “STV-01”;

2. **EXTERNAL BLOCK,** which is a GPS/Glonass signal receiver NAVIOR-24S in a protected all-weather housing, placed outdoors;

3. **ANTENNA** GPS/Glonass with lightning discharger;

4. **CONNECTING CABLES**
   of all-weather design for connecting the server. external blocks and GPS/Glonass antenna to each other.

**MEASURING AND COMPUTING COMPLEX**
THE ETS line, regardless of the design, structurally consists of the following blocks:



# EXACT TIME SERVER «STV-01»

«STV-01» the main line of ETS with housing 19 inches

«STV-01»
with built-in generator

| Parameter | Technical Specification |
|---|---|
| Receiver | GLONASS/GPS external block |
| Internal generator, accuracy | TCXO, ± 1,5; ± 1 |
| Network protocols | NTP, SNTP |
| PTP v2, PTP (1588v2) support | no |
| number of tracking channels | 40 |
| Processor | ARM9 400MHz, 64 MB RAM |
| Operating system | Linux (incl. PPSkit) |
| Network interfaces | 1xEthernet 10/100BaseT |
| RS-232 interface | 1 |
| USB ports | - |
| Frequency outputs, relay | 10 MHz (TTL) и PPS (1 Hz) |
| Communication interface with GPS/Glonass receiver | RS-422 |
| Power supply | 100 .. 264 V AC |
| Power consumption | 20 W |
| Display | LCD/LED |
| Internet protocols | IP v4 |
| Operating temperature | 0 .. +60°C |
| Mounting | into the 19-inch chassis of the server cabinet |

## PURPOSE OF THE PRODUCT

- Measurement (maintenance) of current time and date values with synchronization by signals of GLONASS and/or GPS satellite navigation system
- and output of current date and time values via network interfaces.

## COMPLEX «STV-01»

is designed to function as part of **automated measuringand information systems** for electric power fiscal accounting (AMIS EPFA) for **synchronization of current time and date values**, as well as for synchronization of time scales of communication base stations and security systems at security and industrial facilities.

# Exact time server «STV-01» with additional functionality

«STV-01» the main line of ETS with housing 19 inches

«STV-01» with additional functionality

- BASIC
- ADVANCED

Various modifications «STV-01»

Possibility of improvement

| Parameter | |
|---|---|
| Receiver | GLONASS/GPS external block |
| Internal generator, accuracy | TCXO, ± 1,5; ± 1 |
| Network protocols | NTP, SNTP |
| PTP v2, PTP (1588v2) support | no |
| number of tracking channels | 40 |
| Processor | AMX |
| Operating system | Linux (incl. PPSkit) |
| Network interfaces | 5 independent ports Ethernet 10/100BaseT |
| RS-232 interface | 2 |
| USB ports | + |
| Frequency outputs, relay | 10 MHz (TTL) и PPS (1 Hz) |
| Communication interface with GPS/Glonass receiver | RS-422 |
| Power supply | 2 power sources (primary and backup) |
| Power consumption | 20 W |
| Display | LCD/LED |
| Internet protocols | IP v4 |

# EXACT TIME SERVER «STV-01» on the DIN rail

«STV-01» on the DIN rail

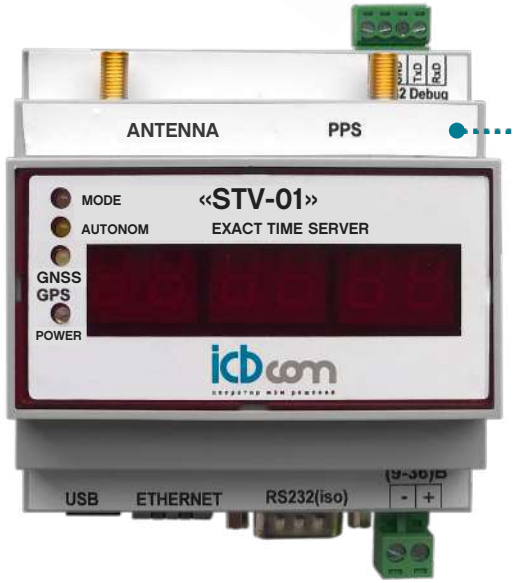
2 ANTENNA
GPS/Glonass

**MEASURING AND COMPUTING COMPLEX**
**Structurally consists of the following blocks:**

1. **SERVER BLOCK** – an exact time server placed in a room with a built-in GPS/Glonass signal receiver;

2. **ANTENNA** GPS/Glonass with lightning discharger;

3. **CONNECTING CABLES**
   of all-weather design for connecting the server. external blocks and GPS/Glonass antenna to each other.




1 SERVER BLOCK

# LINE OF EXACT TIME SERVERS «STV-01»

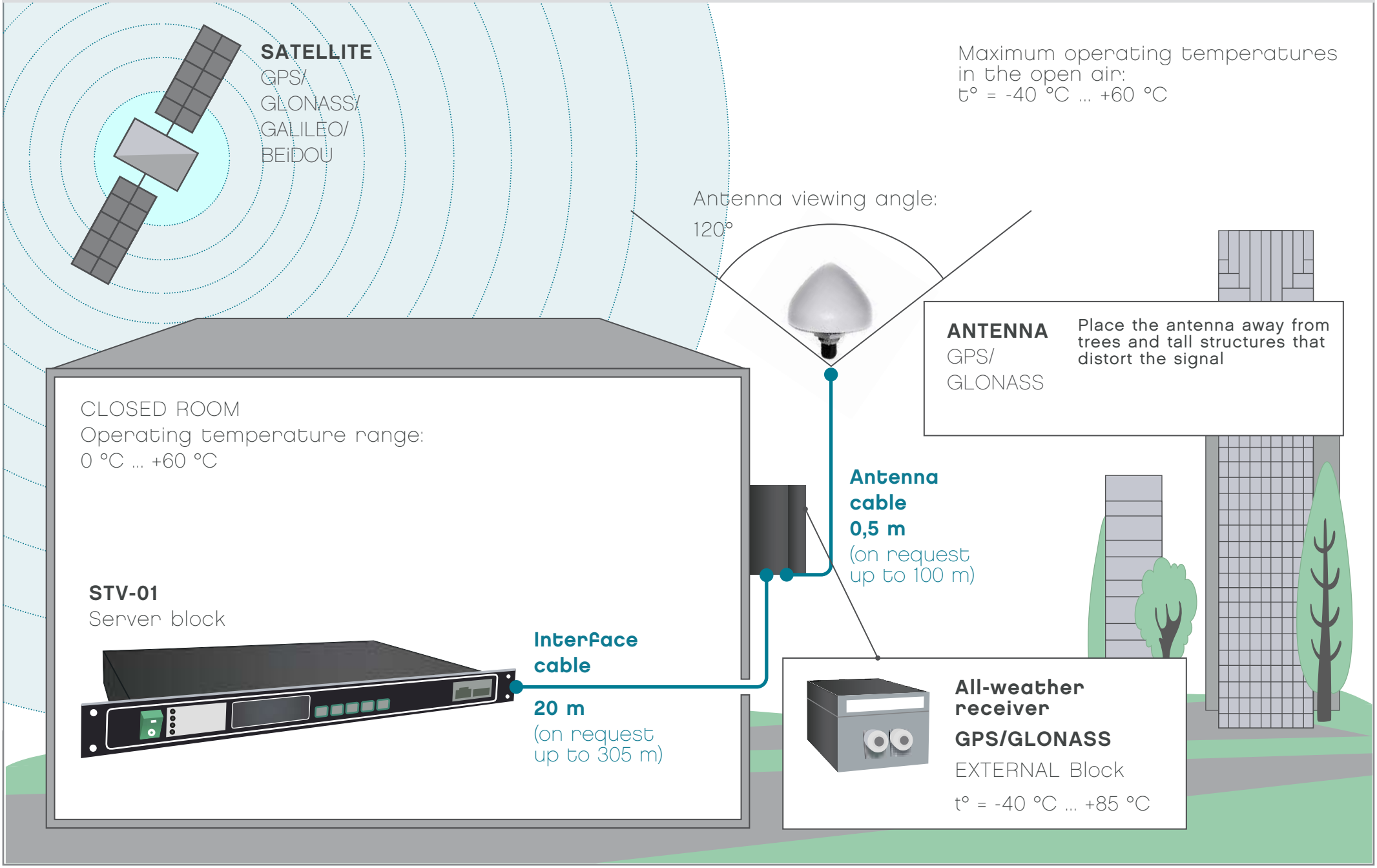
| MAIN PARAMETERS OF THE EXACT TIME SERBERS | «STV-01» on the DIN rail | «STV-01» | «STV-01» with additional functionality |
|---|---|---|---|
| OVERALL DIMENSIONS | DIN rail housing | 19’ (1U) | 19’ (1U) |
| STANDARD DELIVERY PACKAGE | Antenna with built-in lightning discharger, GLONASS/GPS without receiver block, 20 m antenna cable with installed connectors included | Antenna with built-in lightning discharger, GLONASS/GPS with receiver block, 20 m antenna cable with installed connectors included | Antenna with built-in lightning discharger, GLONASS/GPS with receiver block, 20 m antenna cable with installed connectors included |
| PRIMARY AND BACKUP POWER SUPPLY | +9 – 36 V DC | 100 – 264 V AC | 100 – 264 V AC |
| BUILT-IN RECEIVER | GLONASS/GPS, 32 tracking channels | GLONASS/GPS, 40 tracking channels | GLONASS/GPS, 40 tracking channels |
| SELECTION OF THE RECEIVING MODE | GLONASS/GPS, GLONASS, GPS | GLONASS/GPS, GLONASS, GPS, Galileo, Beidou | GLONASS/GPS, GLONASS, GPS, Galileo, Beidou |
| NETWORK INTERFACE | 1 x NTP LAN Ethernet 10/100 Мбит, RJ45 | 1 x NTP LAN Ethernet 10/100 Мбит, RJ45 | 2 x NTP LAN Ethernet 10/100 Мбит, RJ45 |
| INTERNAL GENERATOR | TCXO | TCXO | TCXO |
| LCD DISPLAY | LED LCD-display, 256 x 64 dots, with backlight | LED LCD-display, 256 x 64 dots, with backlight | LED LCD-display, 256 x 64 dots, with backlight |
| USB PORT | 1 pcs | No | 2 pcs |
| RS-232 PORT | 1xRS-232 (terminal) | 1xRS-232 (terminal) | 2xRS-232 (1 terminal port и 1 port for configuration) |
| PROCESSOR | ARM9 400 Mhz, 64 MB RAM | ARM9 400 Mhz, 64 MB RAM | AMX |
| PERFORMANCE (S)NTP | Processing 1000 requests per second | Processing 1000 requests per second | Processing 1000 requests per second |
| OPERATION SYSTEM | Linux | Linux | Linux |
| FREQUENCY OUTPUTS | 1 x 1PPS (1HZ) | 1 x 1PPS (1HZ) | 1 x 1PPS (1Hz) \ 1 x 10 MHz \ 1 x 2,048 MHz |
| NETWORK TIME PROTOCOL (NTP) | v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4, SNTP v3 (RFC 1769), SNTP v2c (RFC 1158), SNTP v4 (RFC 2030) | NTP v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC 5905), SNTP v3 (RFC 1769), SNTP v2c (RFC 1158), SNTP v4 (RFC 2030) | v2 (RFC 1119), NTP v3 (RFC 1305), NTP v4 (RFC 5905), SNTP v3 (RFC 1769), SNTP v2c (RFC 1158), SNTP v4 (RFC 2030), IEEE 1588-2008 PTP default profile |
| ACCURACY NTP | 0.2 ms (LAN) / 10 ms (WAN) | 0.2 ms (LAN) / 10 ms (WAN) | 0.2 ms (LAN) / 10 ms (WAN) |
| NETWORK PROTOCOLS OSI LAYER 4 (TRANSPORT LAYER) | TCP, UDP | TCP, UDP | TCP, UDP |
| NETWORK PROTOCOLS OSI LAYER 7 (APPLICATION LAYER) | SSH (incl. SFTP, SCP), HTTP, SNMP | SSH (incl. SFTP, SCP), HTTP, SNMP | SSH (incl. SFTP, SCP), HTTP, SNMP |
| SUPPORT FOR AUTO-CONFIGURATION OF NETWORK INSTALLATIONS | IP v4 \ IP v6: Dynamic Host Configuration Protocol - DHCP (RFC 2131) | IP v4 \ IP v6: Dynamic Host Configuration Protocol - DHCP (RFC 2131) | IP v4 \ IP v6: Dynamic Host Configuration Protocol - DHCP (RFC 2131) |
| TIME PROTOCOL (TIME) | Time Protocol (RFC 868) | Time Protocol (RFC 868) | Time Protocol (RFC 868) |
| DAYTIME PROTOCOL (DAYTIME) | Daytime Protocol (RFC 867) | Daytime Protocol (RFC 867) | Daytime Protocol (RFC 867) |
| ADDITIONAL POWER SUPPLIES | No | No | 2 power supply (main + backup) |
| UPDATING INTERNAL SOFTWARE | Free Lifetime Ethernet\USB upgrade | Free Lifetime Ethernet\USB upgrade | Free Lifetime Ethernet\USB upgrade |
| TIME TO FAILURE | MTBF more than 100 000 h. | MTBF more than 100 000 h. | MTBF more than 100 000 h. |

# «STV-01» with additional functionality (BASIC and ADVANCED)

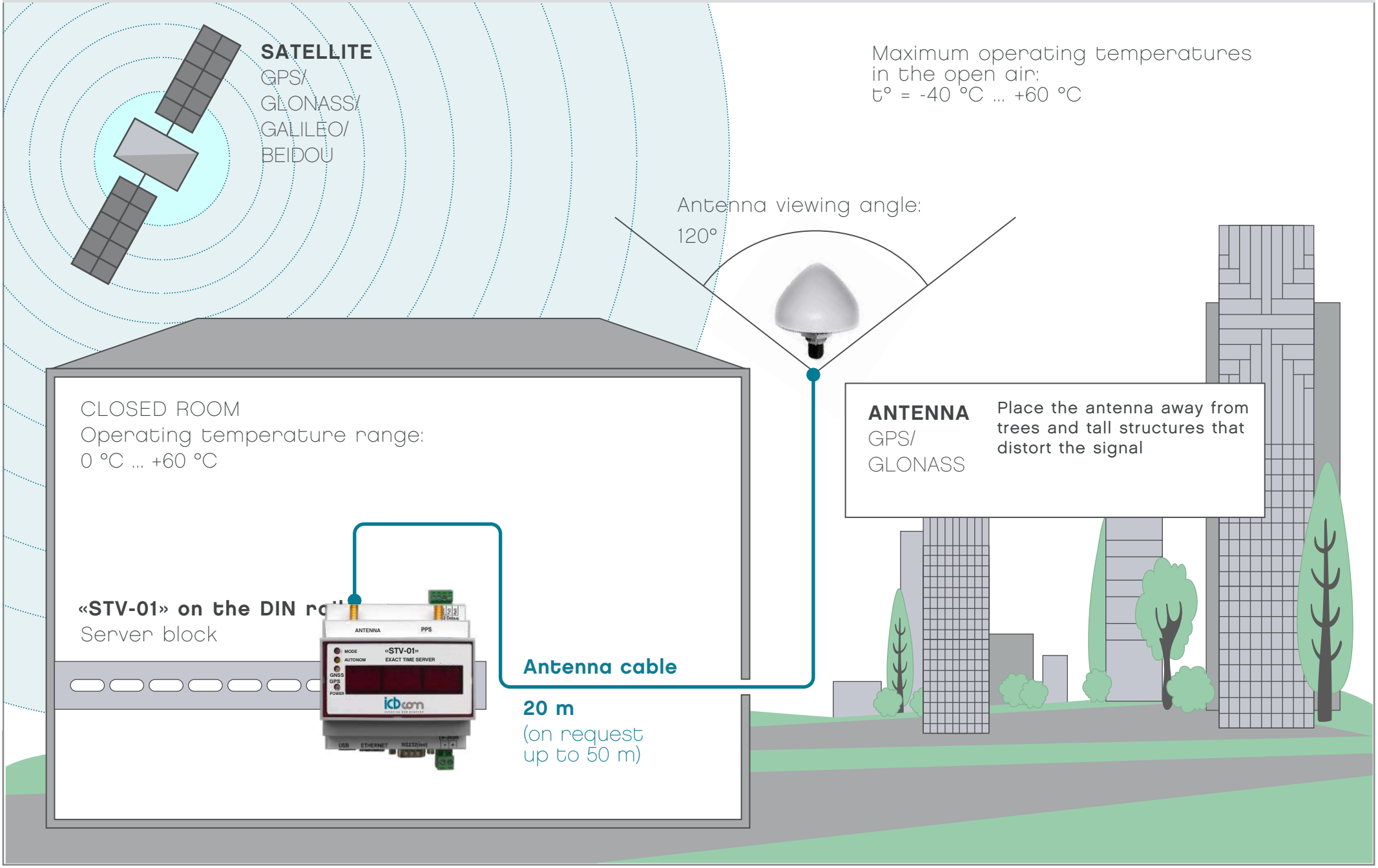
## «STV-01» with additional functionality

| OPTION | BASIC functionality | ADVANCED functionality (specified when ordering) |
|---|---|---|
| Power supply | 100 .. 264 V AC | Backup power supply - additional power supply unit 100 .. 264 V AC<br>+9 -18 V<br>+9 -36 V DC<br>+18-36 V DC<br>+36-72 V DC |
| Internal generator | TCXO | OCXO-LQ<br>OCXO-MQ<br>OCXO-HQ<br>OCXO-DHQ rubidium generator |
| Interfaces | 2xNTP LAN Ethernet 10/100 Mbit, RJ45<br>2x RS232<br>2xUSB | + 2xNTP LAN Ethernet 10/100 Mbit, RJ45<br>+ 4xNTP LAN Ethernet 10/100 Mbit, RJ45<br>1xNTP LAN Ethernet 10/100 Mbit, RJ45<br>1xNTP LAN Ethernet 10/100/1000 Mbit, RJ45<br>1xNTP LAN Ethernet 10/100 Mbit, RJ45<br>3xNTP LAN Ethernet 10/100/1000 Mbit, RJ45<br>1 x RS422, 9pin D-Sub<br>3 programmable pulse outputs (400 V, 150mA)<br>6 programmable pulse outputs (55 V, 50mA) |
| Output frequency signals | 1 x 1PPS (TTL), 50 Ohm, BNC | + 1 x 1PPS (TTL), 50 Ohm, BNC<br>+ 3 x 1PPS (TTL), 50 Ohm, BNC<br>+ 1 x 10MHz (TTL), 50 Ohm, BNC<br>+ 3 x 10MHz (TTL), 50 Ohm, BNC<br>4 x 10MHz (sine) 1.2Vpp, 50 Ohm, BNC |
| Output telecommunication signals | | 4 x 2,048MHz 120 Ohm, RJ45<br>4 x 2,048Mbit/s 120 Ohm, RJ45<br>4 x 2,048MHz 75 Ohm, BNC<br>4 x 2,048Mbit/s 75 Ohm, BNC<br>1 x 2,048MHz 120 Ohm, RJ45<br>1 x 2,048MHz 75 Ohm, BNC<br>1 x 2,048Mbit/s 120 Ohm, RJ45<br>1 x 2,048Mbit/s 75 Ohm, BNC |
| Output IRIG signals | | 1 x Time Code AM (B12x), 3Vpp, 50 Ohm, BNC<br>1 x Time Code DCLS (B00x), TTL, 50 Ohm, BNC<br>2 x Time Code AM (B12x), 3Vpp, 50 Ohm, BNC<br>2 x Time Code DCLS (B00x), TTL, 50 Ohm, BNC |

# Communication organization scheme «STV-01» and «STV-01» with additional functionality



# Communication organization scheme «STV-01» on the DIN rail



# SATELLITE NAVIGATION RECEIVERS

## «SNP-01-v2» – satellite navigation receiver

**“SNP-01”** is used to get the **current values of the exact UTC time and date.** The data is sent to the satellite receiver using the GLONASS, GPS, GALILEO and BeiDou satellite navigation systems. The information is transmitted to a computer or other paired devices via **RS-232 and RS-422 ports.**

The operation of the receiver is based on the **parallel reception and operational processing** of information simultaneously by **88 channels** of signals coming from GPS, GLONASS, GALILEO and Beidou satellite navigation systems.

“SNP-01” is widely used as an integral element of **automated systems of various types** ( data collection and transmission controller (DCTC) "PUMA", SKK BS, "Meteophone", other **monitoring and control systems**).

| PARAMETER | TECHNICAL SPECIFICATION |
|---|---|
| Power supply voltage | 12..60 V DC |
| The limits of the permissible error in determining the coordinates in the plan with a probability of 50% | <3 m |
| Navigation message format | NMEA 0183 v 4.1 |
| Operating temperature range | -30 ... + 75 °C |
| Error of synchronization of the second timestamp to the GPS, GLONASS, UTC, TC time scales, by level 60% | ±20 ms |
| Overall dimensions | 100 x 33 x 64 mm |
| Fastening | Mounting on the DIN rail |

# SATELLITE NAVIGATION RECEIVERS

## GLONASS/GPS receiver

The purpose of the **GLONASS/GPS receiver** is to obtain a **reference time scale** from the global navigation satellite system Glonass/GPS by means of a Glonass/GPS antenna connected to it.

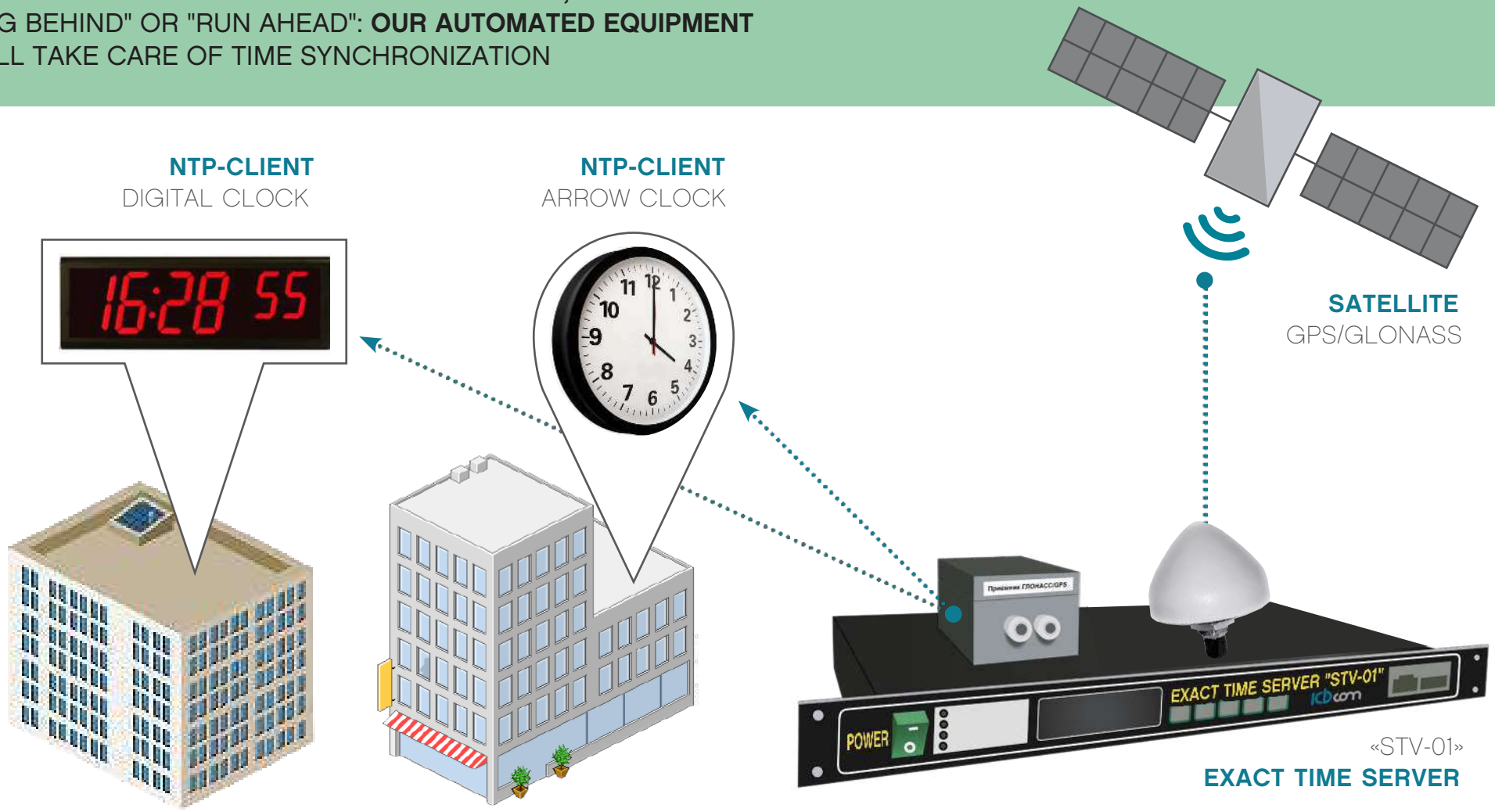
It is applicable as an integral element of **automated time synchronization systems and various monitoring and control systems**

| PARAMETER | TECHNICAL SPECIFICATION |
|---|---|
| Power supply voltage | 9..40 VDC |
| Interface | RS-422 |
| Output signal | PPS (differential pair) |
| Type of receiver in the device | NV08C-CSM |
| Supported global navigation satellite systems | GLONASS, GPS, GALILEO |
| Supported exchange protocols | EC61162-1 (NMEA 0183),<br>BINR (standard of CJSC "KB NAVIS»), RTCM SC 104 |
| Connector type on the unit<br>for power supply and interfaces | 2PM – cylindrical |
| Type of connector on<br>the antenna connection unit | N-type |
| Maximum length of the interface cable | Up to 200 m |
| Operating temperature range | -40 до + 60 °C |
| Housing material | aluminum |
| Housing protection | IP65 (sealed) |

# NTP-CLIENTS, TIME SYNCHRONIZATION

**NTP digital/arrow clocks** are an indispensable solution for any enterprise or network of organizations - they show a **single time**, are synchronized with the **ETS**, which is located in the district IT department and regulates the time in an automated mode.

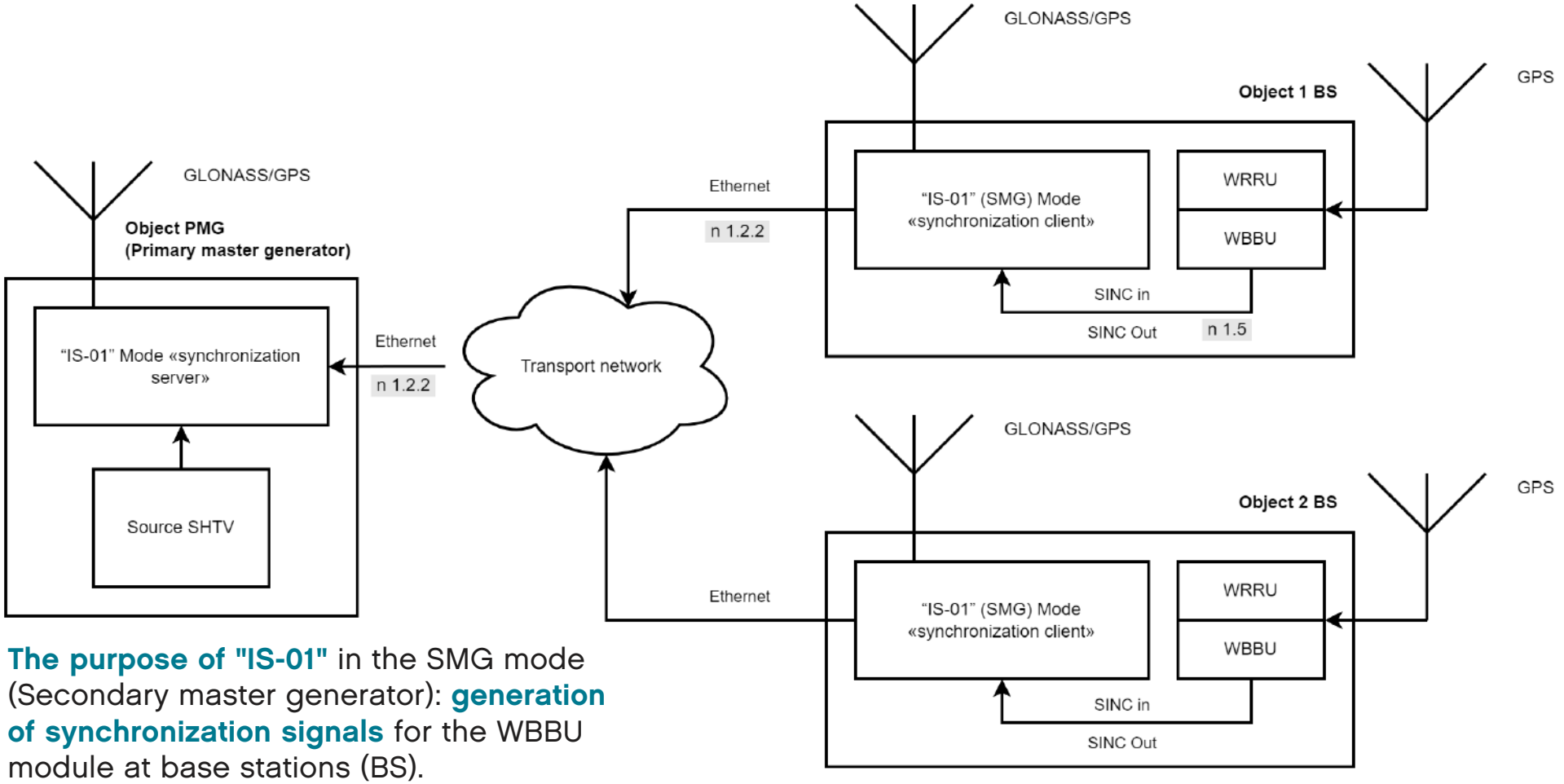
YOU **NO LONGER NEED TO ADJUST THE CLOCK,** THEY WILL STOP "LAG BEHIND" OR "RUN AHEAD": **OUR AUTOMATED EQUIPMENT** WILL TAKE CARE OF TIME SYNCHRONIZATION



# A COMPREHENSIVE SYNCHRONIZATION SOLUTION for THE TELECOM OPERATOR

**Task to solve:**

Building a common synchronization network of base stations using the **“IS-01”** device of the **SYNCHRONIZATION SOURCE**




**The purpose of "IS-01"** in the SMG mode (Secondary master generator): **generation of synchronization signals** for the WBBU module at base stations (BS).

# A COMPREHENSIVE SYNCHRONIZATION SOLUTION
# for THE TELECOM OPERATOR

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**Equipment**
**For BS object (SMG):**

Device "IS-01"
Synchronization source
+
Splitter
(Signal splitter)

**Equipment**
**For BS object (PMG):**

Device "IS-01"
Synchronization source
+
GPS/Glonass antenna
for outdoor installation

**"IS-01"**
Synchronization Source

Antenna
**«GPS/GLONASS G2-1»**
+ fastener kit

**Splitter**
(Signal splitter)

# A COMPREHENSIVE SYNCHRONIZATION SOLUTION for THE TELECOM OPERATOR

| Name of characteristic | Value |
|---|---|
| Structural design | Housing in a 19" inch rack |
| AC power supply voltage of the complex Main input «Pit. Vh.1» | 36-60 V DC |
| AC power supply voltage of the complex Backup input «Pit. Vh.2» | 36-60 V DC |
| Operating system | Linux |
| Limits of the absolute error in the information of synchronization signals in the absence of correction based on the signals of reference sources (autonomous operation) | No more than 1 microsecond/2 days |
| Network interfaces | Ethernet 10/100/1000 |
| Output signal 1PPS – “PPS.GNSS” | + |
| Output signal 1PPS – “PPS.Gen” | + |
| Output signal 1PPS – “PPS.Tr.Set’” | + |
| Output signal 1PPS – “PPS.GNSS” | + |
| Output signals “SyncOUT+”, “SyncOUT-” for module WBBU synchronization | + |
| SMA socket connector for connecting a Glonass/GPS antenna | + |
| Web-interface for device configuration | + |
| RS-232 interface | + |
| LCD display for displaying the status of “IS-01” and device settings | + |
| Adjustment buttons on the front panel | + |
| Overall dimensions excluding antenna and elements | 255x480x45 mm |
| Number of tracking channels of the Glonass/GPS/GALILEO receiver | 40 |

# TIME SYNCHRONIZATION SOLUTION for RTRS

TASK
to solve:

Receiving the exact time, synchronization
by means of the proposed set of devices:

+

+

Satelolite navigation
receiver **«SNP-01-v2»**

Antenna
**«GPS/GLONASS G2-1»**
+ mounting kit

Power
supply
**«HDR-15-25»**

# We are ready to help from the idea to serial production

**Types of electronic equipment development:**

1. Device hardware development:

   Changing the number of ports, adding new interfaces, connectors, channels, electrical characteristics, changing dimensions, and materials.

2. Firmware development:

   Changing or adding new software features to the device's firmware.

**Additional device protection for harsh operating conditions:**

- Design of an enclosure with the required IP rating;
- External and internal connectors with locking mechanism for use in high-vibration environments;
- Various types of enclosure mechanical modifications for installation in hard-to-reach locations;
- Additional testing and vibration resistance and electromagnetic compatibility testing according to customer-specified conditions in a climatic chamber.

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## How we work:

1. You send us the technical specifications for the product you need.
2. Dentification of development requirements, quantity of equipment in the batch and project deadlines.
3. Preparation of a commercial proposal.
4. The process of developing customization or new equipment.
5. Verification. Testing and trialing of the equipment according to the customer's specifications.
6. The process of selling and shipping the developed equipment to the end customer.

# Contacts

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