1. **Name** "AVANPOST" Autonomous Video and Thermal Imaging Surveillance System
2. **Image**

3. **Purpose**

"AVANPOST" Autonomous Video and Thermal Imaging Surveillance System (hereinafter referred to as Avanpost, system) is intended to arrange security and intellectual video surveillance of large open spaces and the state borders.

The system provides for 24/7 visual control of the ground and surface situation with detection of stationary and moving targets of various types at distances up to 10 km. It allows for displaying and archiving video information and alarm events in real time mode at the observation post located at a distance of up to 30 kilometers from the installation site of the linear part of the system.

The system solves the following tasks:

– intellectual video surveillance of large open spaces in real time mode;

– automatic detection of moving targets using STS-177 radar (if available) and targets tracking with PTZ camera and thermal imaging camera – operation in video detection mode;

– manual target selection for tracking from a number of detected targets;

– operation in panning mode;

– ensuring the system internal security;

– stand-alone power supply of the system based on the energy of the sun, wind and local electric station (the availability and number of power supply sets depends on the supply contract);

– arrangement of communication channel with remote monitoring station, including through the use of repeaters.

Distinctive features:

– human detection range is up to 10 km;

– option of joint operation with the radar developed by Stilsoft, on land- and water-based targets;

– intelligent central management of weather-sensitive chargers;

– enhanced reliability of chargers due to the lack of mechanical parts – fans;

– web interface for monitoring and configuring the power supply and audio warning systems;

– storage battery charge with maximum power point tracking.

Structurally, Autonomous Video and Thermal Imaging Surveillance System consists of station and linear posts.

Station post includes equipment providing for reception and storage of information from the linear post components and its display in real time mode.

The linear post consists of equipment installed along the facility perimeter, which allows for processing and transmitting the information to the station part of the system. The line post is completely autonomous and does not require connection to an industrial mains and creating the communication lines.

The system implements leading edge video analysis capabilities: FineTrack – intelligent motion detector, used in operation with SDP-883 pan/tilt unit with SDP-8083 long-range video camera and SDP-8615M thermal imaging camera, allowing for not only detecting the motion in the frame, but also provides for a range of additional features and tools for analyzing the behavior of objects. With its help, one can analyze the objects movement trajectory, control the entry and exit from areas specified by the user. The automatic moving objects tracking function with the help of PTZ camera allows personnel for easy controlling the situation within the large territory.

Avanpost Standalone Surveillance System runs under Avanpost SSW based on Linux operating system.

When ordering "Avanpost" Autonomous Video and Thermal Imaging Surveillance System, a free energy calculation is made taking into account: average annual cloud cover, temperature and efficiency fluctuations, deterioration of the properties of the power system components for a long time; and graph of electric energy consumption during the first year based on pseudo-random weather fluctuations in the area is also provided.

4. Scope of Delivery.

Name	Q-ty	Purpose in Brief
Station Post	1 set	
Station post components:		
Avanpost video server	1 pc.	It is intended for storing, displaying, transmitting (to central server or Avanpost AWS) information

		received from video cameras, thermal imaging camera, controllers and detectors.
Avanpost AWS	1 pc.	Equipped with 2 monitors. It is intended for remote viewing the video channels in real time mode, as well as for viewing video archive hosted on Avanpost AWS video server hard drives. Avanpost AWS allows for controlling the system linear post equipment. It is possible to connect to 9 different Avanpost servers, while ensuring their control from one working station.
STS-507 Communication Controller	1 pc.	It is intended to arrange a high-throughput wireless communication channel between two points.
Parabolic 5GHz antenna	1 pc.	It is intended for sharing with communication controllers.
STI-100 IP Telephone	1 pc.	It is intended to provide for audio communication between station post and linear one.
STS-10465 Server Cabinet	1 pc.	It is designed to accommodate network equipment. The cabinet height is 10U.
Network Switch	1 pc.	It is intended for connecting the station post equipment to Ethernet network.
Power filter	1 pc.	Grounded power filter is intended for connection to UPS.
1kW Uninterrupted Power Supply	1 pc.	It is intended to provide for uninterrupted power supply of the linear post equipment.
Linear Post	1 set	
Linear post components:		
STM-18090 mast	1 pc.	It is designed to accommodate linear post equipment. The mast design provides for safe accommodation of equipment. Overall dimensions of the mast are 10x2.6x2.3 m.
STM-28161 mast	1 pc.	It is designed to divert lightning discharges from structures and equipment located outdoors. Overall dimensions of the mast are 18.6x2.7x2.7 m.
SDP-8615M Thermal Imaging Camera	1 pc.	It is intended to arrange 24/7 video surveillance in thermal range of large open spaces in a wide range of weather conditions.
SDP-8083 Long Range Video Camera	1 pc.	It is intended for video surveillance of large open spaces; it is implemented in sealed protective casing, and is equipped with intelligent heating system and with a motorized lens with focal length from 15 mm to 360 mm.
SDP-883 Pan-Tilt Unit	1 pc.	It is intended for mounting a long range video camera and thermal imaging camera. It allows for positioning the camera to the target with high accuracy, scanning the territory at specified speed and pointing the video camera with thermal imaging camera to preset positions. The pan/tilt unit, thermal imaging camera, the camera lens and

		the temperature-proof housing heating is controlled via the Ethernet interface.
SDP-850 Camera	1 pc.	Outdoor speed PTZ network video camera with built-in IR illumination. IR illumination range is up to 250 m. Detection range of "human" type target in the day time is up to 1500m. It is used to provide the system internal security.
STS-507 Communication Controller	1 pc.	It is intended to arrange a high-throughput wireless communication channel between two points.
Parabolic 5GHz antenna	1 pc.	It is intended for sharing with communication controllers.
Audio intercom panel STS-747	1 pc.	It is intended to arrange two-way audio communications with station post via Ethernet network.
Central Management Controller	1 pc.	It provides for connection and power supply of the whole linear post. It includes all necessary chargers and power management controller. It has ventilation and heating system. It has storage battery with total capacity of 400 A*h.
10GR-38 Loudspeaker	2 pcs.	It is designed for loud-speaking warning of area, where the system is installed.
STS-125 Security Sensor	4 pcs.	Optical-electronic passive security detector for open spaces. It is used to provide the system internal security.
Set of STL-737 solar modules	1 set. *	It consists of STM-28061 mast with solar modules placed on it. The mast design provides for reliable placement of solar modules and their adjustment relative to the surface at a certain angle. The design of the solar module mounting assembly allows for changing the inclination angle depending on the terrain latitude and the duration of daylight hours. STL-717 set is connected to STS-48402 charger (from set of central management controller) and allows for providing the linear post with power supply.
Set of STL-738 Wind Generator	* set.	It consists of STM-28102 mast with a wind generator placed on it, STS-4810 ballast unloading unit and STS-10403 charger. Wind generator produces three-phase AC current. Wind generator is connected to STS-10403 charger (installed inside the central management controller) and allows for providing the linear post with power supply.
Installation Kit	1 set.	It is designed to connection linear post equipment.
STL-716 Repeater	** set.	It is intended to arrange the radio-relay communication channel between linear and station post in the absence of direct visibility between them. The communication repeater provides for arrangement of the radio relay communication channel over a distance up to 60 km with a

		transmission rate in the radio channel of at least 40 Mbit/s, with a frequency of 5150-5350 MHz.
STL-726 Local Electric Station	* pcs.	It is intended for charging the system storage batteries in case of wind generator or solar panels failure. The local electric station has a support for placing the power station above the ground. The power station uses a gasoline generator.
STS-177 Radar	** pcs.	It is intended to monitor open terrestrial, air and water spaces. It allows for displaying the movement trajectory and the distance to various moving objects, such as a human, vehicle, boat, etc.
"**Mongoose-P**" **Mobile Perimeter Protection System**	** pcs.	It is intended for mobile protection of open areas and perimeters, approaches and routes; it is used as a quickly deployed auxiliary security aid. The system operation principle is based on the intruder detection by the detectors and the transmission of alarms to the data collection and processing unit.

** – Additional delivery set is determined by the supply contract depending on the climatic region of installation.*

*** – Additional delivery set is determined by the supply contract.*

5. Scope of Application

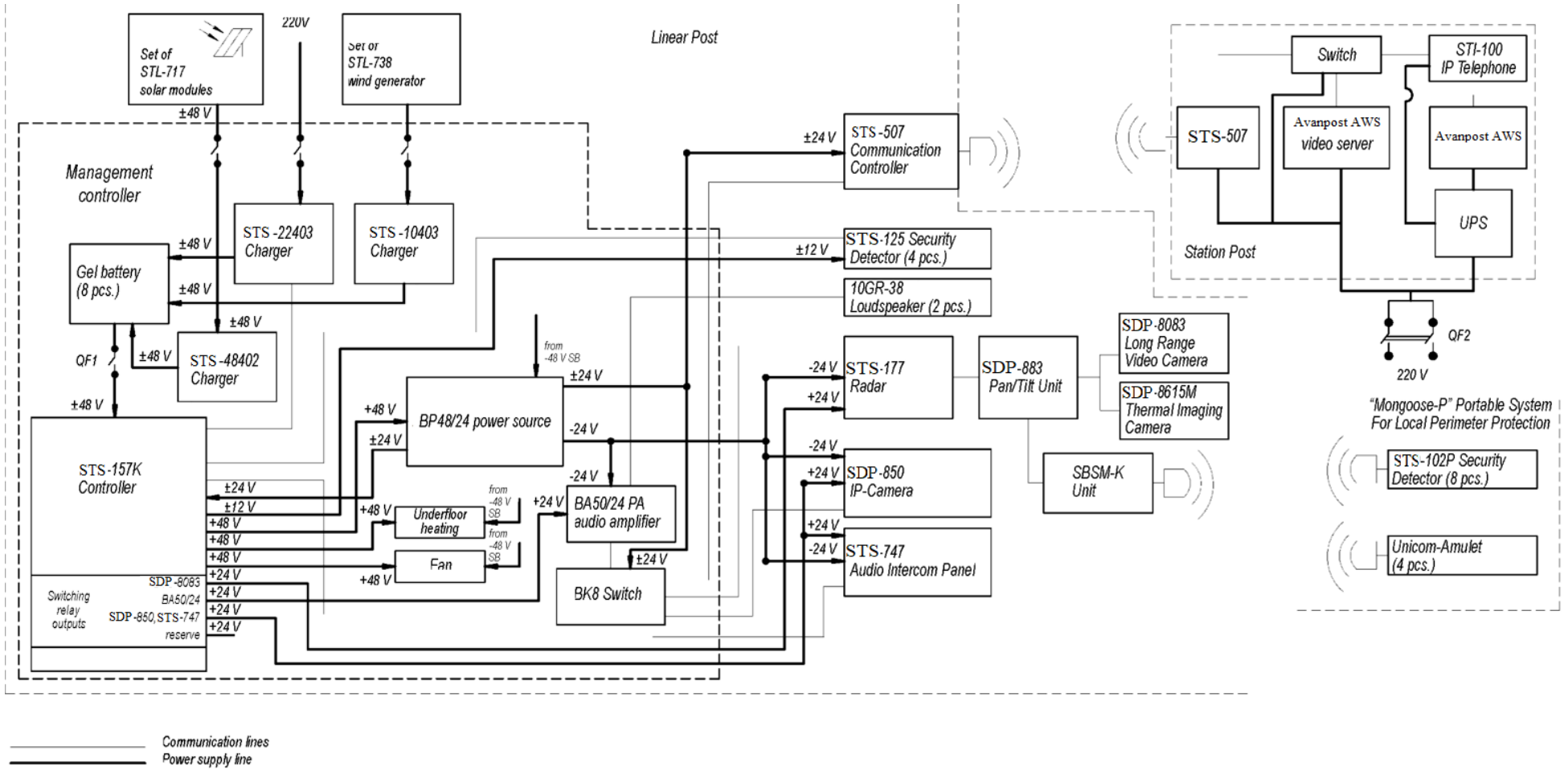
Avanpost Standalone Surveillance System is used to protect open areas and perimeters, approaches and routes to important facilities, which are away from the station parts at a considerable distance and are intended for use as the main or auxiliary level of security.

6. Specifications

Parameter	Value
Target detection range by long-range video camera, up to, m - of "human" type - of "vehicle" type	 10,000 10,000
Target detection range by thermal imaging camera, up to, m - of "human" type - of "vehicle" type	 4000 7900
Real-time video display speed with simultaneous events archiving, fps	25
Pan/tilt unit angle of view, deg.: - horizontally - vertically	 360 ±45
SDP-850 camera speed, up to, deg/s - of pan – of tilt	 240 200
SDP-850 camera range, up to, deg - of pan – of tilt	 360 without restrictions -15…90 auto image flip
Maximum video image resolution, pixels – SDP-850 – SDP-8083 – SDP-8615M	 1920x1080 2592x1944 640x480

Parameter	Value
Video image compression formats	H.264, MPEG-4, MJPEG
Automatic scan mode of set control points with target detection	up to 30 points
Range of wireless communication channel (between station and linear posts, between STL716 repeater and linear and station stations), up to, km	30
Data transmission rate in the radio channel, min., Mbit/s	40
Solar module power (STL-737), max., W	800
Storage batteries capacity, Ah	400
Power of wind generator (STL-738) at wind speed of 10 m/s, W	2000
Radio-relay communications frequency band, Hz	5150-5350
Power supply voltage: – of station post, AC, V/ Hz – of linear post, DC, V	 220±10% / 50 48 (± 10%)
Personnel for operation of the system, persons	1
Restoration time, min., min	5
Autonomous operation time from fully charged batteries, min., days: - at an ambient temperature within 24 hours above 0°C; - at an ambient temperature within 24 hours below 0°C;	 9 4
Detection range of moving intruder by SDP-102P security detector (from "Mongoose-P" system), m	50
Maximum transmission range of alarm message from SDP -102P detector to STM-18090 mast under direct visibility conditions, up to, m - without use of SDP-931P repeater, up to, m; - with use of SDP-931P repeater, up to, m;	 500 1000
Stand-alone power supply of SDP-102P detector	Yes
SDP-102P detector operation time in standalone mode, min., - with communication watch 1 time per day, years - with communication watch 1 time per minute, years	 5 3
Height of STM-18090 mast, m	10
The camera pointing mode at the object by double-clicking video image with the mouse button	Yes
The camera pointing mode at the area by double-clicking terrain map with the mouse button	Yes
The targets automatic detection and tracking mode via the video channel	Yes
Intelligent power saving mode	Yes
Remote storage batteries monitoring	Yes
Remote wind generator operability monitoring	Yes
Intelligent central management of weather-sensitive chargers	Yes
Storage battery charge with maximum power point tracking	Yes
Automatic target guidance upon reception of command from the radar (if STS-177 radar is included in the delivery set)	Yes

Parameter	Value
Automatic download of a terrain map from open sources	Yes
Linking of existing terrain map to absolute coordinates	Yes
Power supply system self-testing mode with issuance of recommendations on the system operation	Yes
Real-time accounting and logging of power generated and consumed by the system	Yes
Operating temperature range, °C - linear post - station post	 from -40 to +50 from +5 to +50
Storage battery service life, min., years	3
Mean system service life, years	8


Set of STL-717 solar modules
220V
Set of STL-738 wind generator
Linear Post
±48 V
Management controller
Gel battery (8 pcs.)
STS-22403 Charger
STS-10403 Charger
STS-48402 Charger
QF1
STS-157K Controller
BP48/24 power source
from -48 V SB
±24 V
-24 V
+48 V
+24 V
±12 V
Underfloor heating
Fan
BA50/24 PA audio amplifier
BK8 Switch
Switching relay outputs
SDP-8083
BA50/24
SDP-850, STS-747
reserve
STS-507 Communication Controller
STS-125 Security Detector (4 pcs.)
10GR-38 Loudspeaker (2 pcs.)
STS-177 Radar
SDP-883 Pan/Tilt Unit
SDP-8083 Long Range Video Camera
SDP-8615M Thermal Imaging Camera
SBSM-K Unit
SDP-850 IP-Camera
STS-747 Audio Intercom Panel
Switch
STI-100 IP Telephone
STS-507
Avanpost AWS video server
Avanpost AWS
UPS
Station Post
QF2
220 V
"Mongoose-P" Portable System For Local Perimeter Protection
STS-102P Security Detector (8 pcs.)
Unicom-Amulet (4 pcs.)
Communication lines
Power supply line