

# Georgian Forest Monitoring System



## Forest Fire Prevention

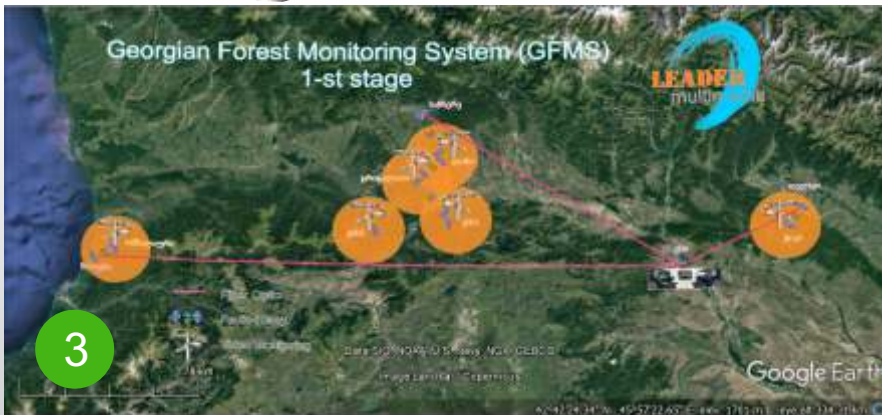
Forest has always enjoyed the reputation of "the lung of the earth"; capable of greatly absorbing CO<sub>2</sub> and constantly producing O<sub>2</sub> demanded by our human beings, and it is the rare precious wealth for us. However, forest fire can burn up large stretches of forest within a short time to destroy these precious resources. Forest fire would not only cause huge losses to forest resources and residents' life & property, but also would bring extensive and profound influence to state politics, economy, military affairs, zoology and other various aspects.



## Structure of Georgian Forest Monitoring System (GFMS)

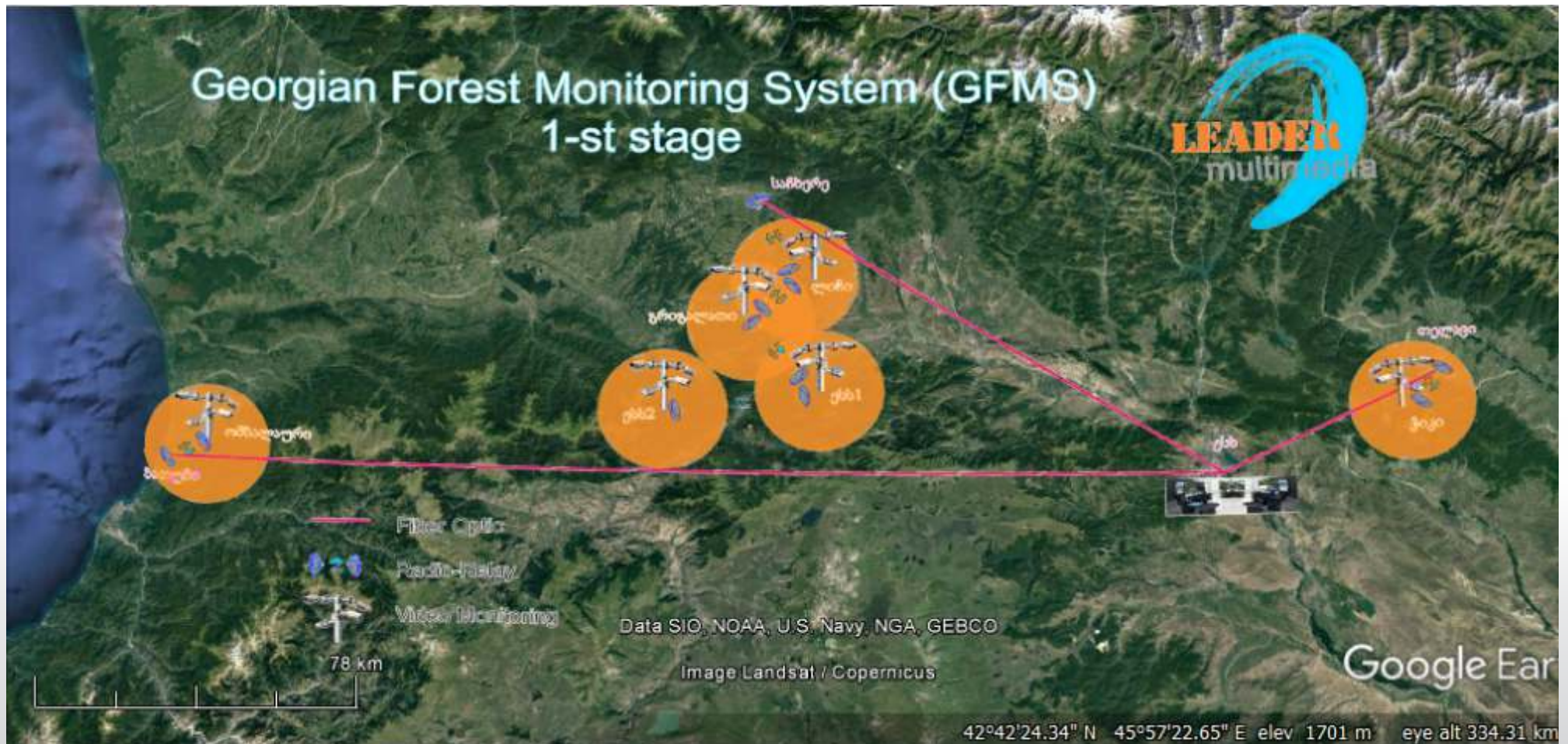
The Georgian Forest Monitoring System (GFMS) consists of the following main components:

1. Stationary remote video monitoring points.
2. The central point of collection and processing of video information.
3. Radio-relay and fiber-optic communication lines.
4. Unmanned monitoring systems of medium and low altitude.
5. Remote microphones and CCTV cameras camouflaged for natural objects.



## Stationary remote video monitoring points

At the first stage installation of stationary posts of video monitoring is supposed in following points: Ambalauri, ESS1, ESS2, Grigalati, Lichy, Tsivi.

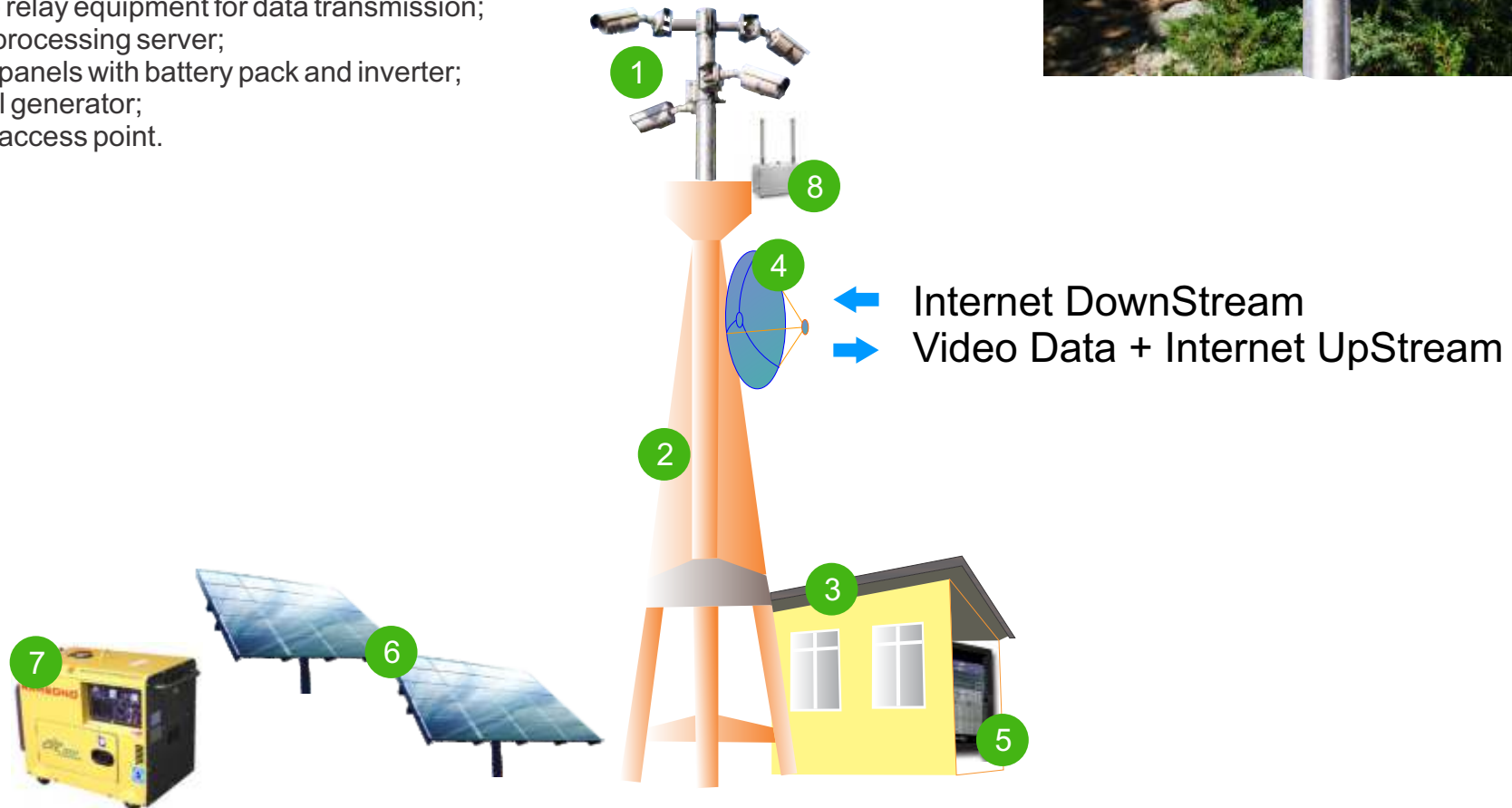


## Forest Monitoring System

Stationary points of video monitoring are located at high points, which provide a maximum view of forest areas. It is assumed that the radius of coverage of each point reaches 20 km. Of course, the exact boundaries of the effective monitoring zone can be indicated after the technical project work. Based on the results obtained during the operation of the equipment installed at the First Stage, it will be possible to very accurately design the mounting locations for the equipment of the Second Stage.

The composition of the stationary point of video monitoring:

1. HDTV cameras in the visible and infrared ranges;
2. Tower;
3. Service building;
4. Radio relay equipment for data transmission;
5. Data processing server;
6. Solar panels with battery pack and inverter;
7. Diesel generator;
8. Wi-Fi access point.



## Forest Monitoring System

The technical design team will be required to indicate the exact location of the towers and service buildings. Depending on the terrain and climatic conditions, it is possible to use various modifications of towers, from light metal to stationary concrete ones.

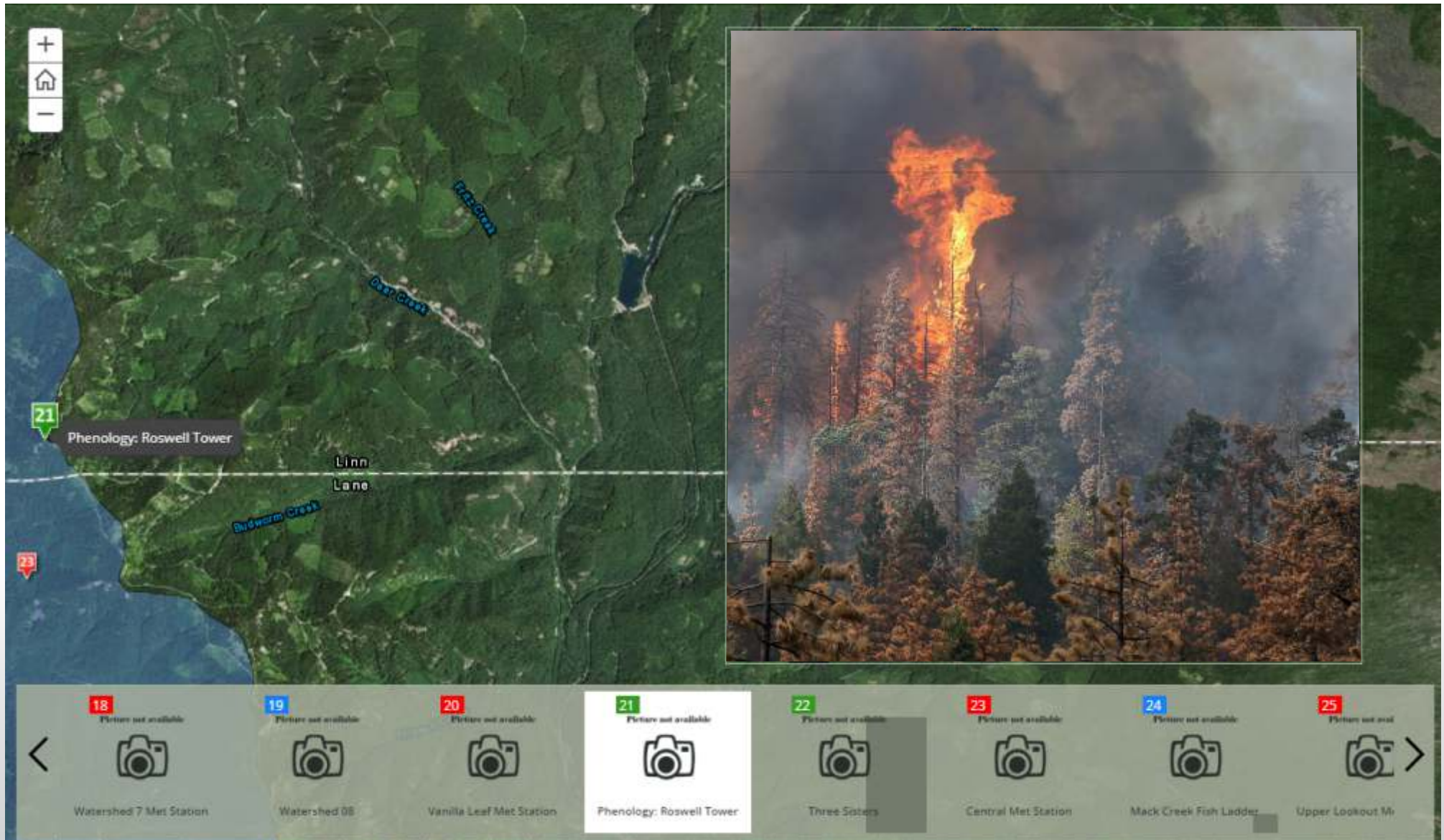


## The Central Point of collection and processing of video information

Videodata received from stationary points and from unmanned drones arrives at a Central Point located in Tbilisi. Video from all surveillance cameras is displayed on monitors. The operator has the ability to remotely control the cameras in order to get the best quality and the necessary image magnification. At the same time, all data is stored on the main and backup video servers. Fiber-optic communication lines from a large Internet Service Provider must be connected to the Central Point. All equipment must be connected to an uninterruptible power system. The room in which storage servers are installed must be provided with an air conditioning system.



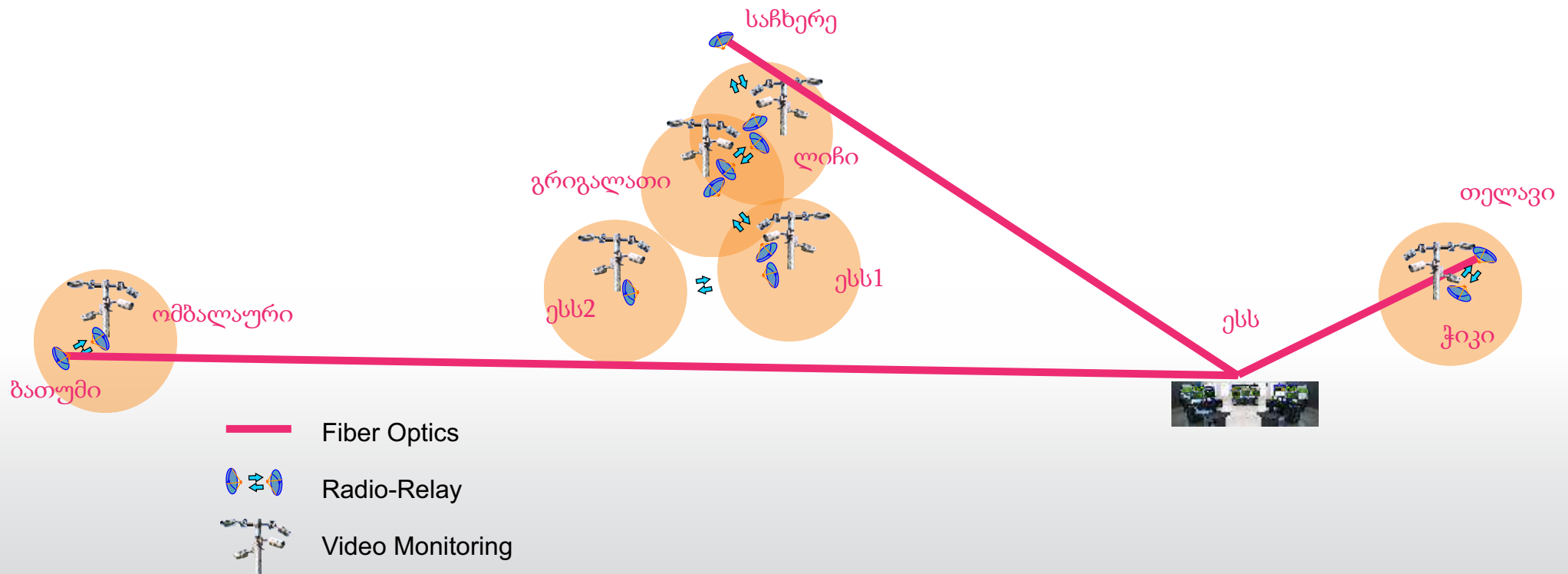
The special SoftWare provides convenience to work with remote video cameras. Map-based dashboard lets view real-time data from 125 different sensors.





## Radio-relay and fiber-optic communication lines

Fiber-optic communication lines are the most high-quality and high-speed medium for videodata&Internet transmission. Unfortunately, fiber-optic lines do not pass at the points provided for the construction of the first stage of the Forest Monitoring System. For this reason, the system will use a comprehensive (hybrid) solution. Videodata and the Internet will be transmitted to the nearest optical nodes using radio-relay communication. After that, the videodata will arrive at the Central Point via fiber communication lines.



## Unmanned monitoring systems of medium and low altitude

Unmanned aerial vehicle medium-low altitude monitoring system is characterized in flexibility, quickness, low cost, simple maintenance and operation, etc., it has the ability to rapidly and real-timely inspect and monitor the ground and it is a novel medium-low altitude real-time television imaging and infrared imagery fast acquisition system. It has unique advantages in the aspects of resources and environment monitoring, forest fire monitoring and rescue commanding in the vehicle/people unavailable area.

### I. Daily forest fire prevention patrol

### II. Flow of forest fire prevention

1. Quick positioning fire point.
2. Fast determination of fire behavior.
3. To provide the optimum evacuation route for fire fighting forces.

### III. Capable of effectively improving the maneuvering and search-and-rescue efficiency via loading different external loads

1. Uncooled dual channel infrared imager special for UAV;
2. High-resolution digital camera;
3. High-definition digital video;
4. Supplies delivery equipment;
5. Others: broadcasting, lighting and radio repeater.



As a new system of fast acquiring real time TV imaging and infrared imaging from low altitude, the drone is qualified for fast real time surveillance, featuring for quick mobility, low use cost and easy maintenance operation. It remains unique advantages on resources environment detection, forest fire detection and rescue command and so on.

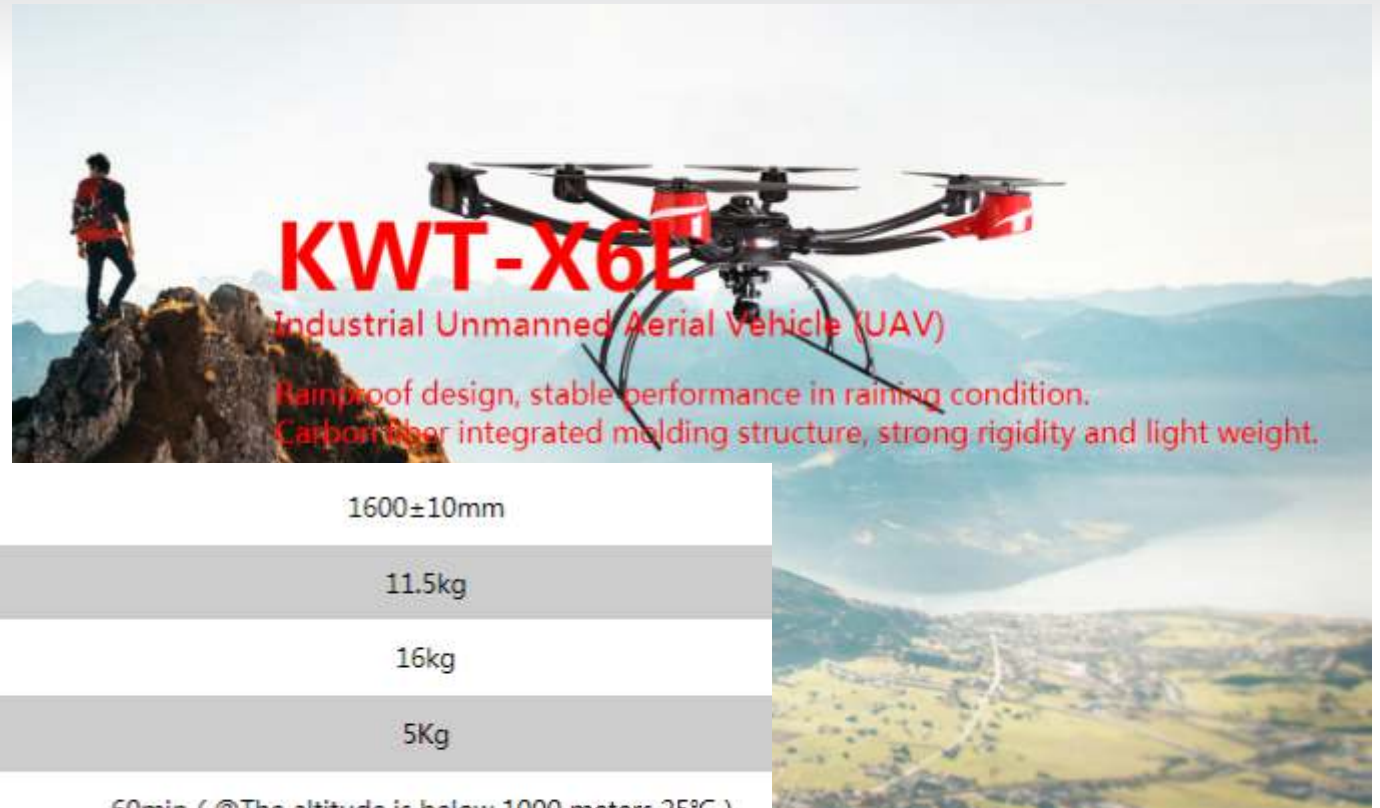


The drone is mainly used for forest prevention daily surveillance, monitoring on forest fire situation, rescue assistance work and so on. The remote sense device mounted on the drone can be used to make daily surveillance on forest fire status and detect high temperature fire point and so on rescue work, truing to nip forest fire in the bud.

UAV forest fire prevention use follows characteristics:

1. Full carbon fiber design for industrial triple defense, strong environment suitability, workable under complex environments such as fire high temperature place with foggy and harmful gases.
2. Multi payloads for day and night work, perform tasks all weather anytime.
3. High efficiency with surveillance speed up to 10m/s and surveillance range up to 10km; stable network topology can be made by several drones for daily forest surveillance and proactive monitoring.
4. Comprehensive view not only for global monitoring to master the fire spread direction, but also for snapshot of high temperature fire point to make partial key surveillance, serving as key factors for decision making.
5. High safety: maximum protection of life by taking the place of firefighters for fire detection.
6. Portable convenience, easy operation, fast response and low environment demands for take-off and landing.





Diagonal Wheelbase	1600±10mm
Standard Take-off Weight	11.5kg
Max Take-off Weight	16kg
Max Operating Payload Weight	5Kg
Max Flight Time	60min ( @The altitude is below 1000 meters,25°C )
Wind Loading Rating	14m/s
Max Flight Speed	15m/s
Max Relative Flight Height	3000m
Max Working Altitude	5000m
GPS Position Accuracy	Vertical : ±1.5m ; Horizontal : ±2m
Remote Controller Distance	7km
GS Control Distance	10km

Upturned arm design increase power plane and excellent wind resistance ability.  
Brushless DC motor and jumbo size propellers enhance the efficient of motor, for 60 minutes endurance.



Package diagram

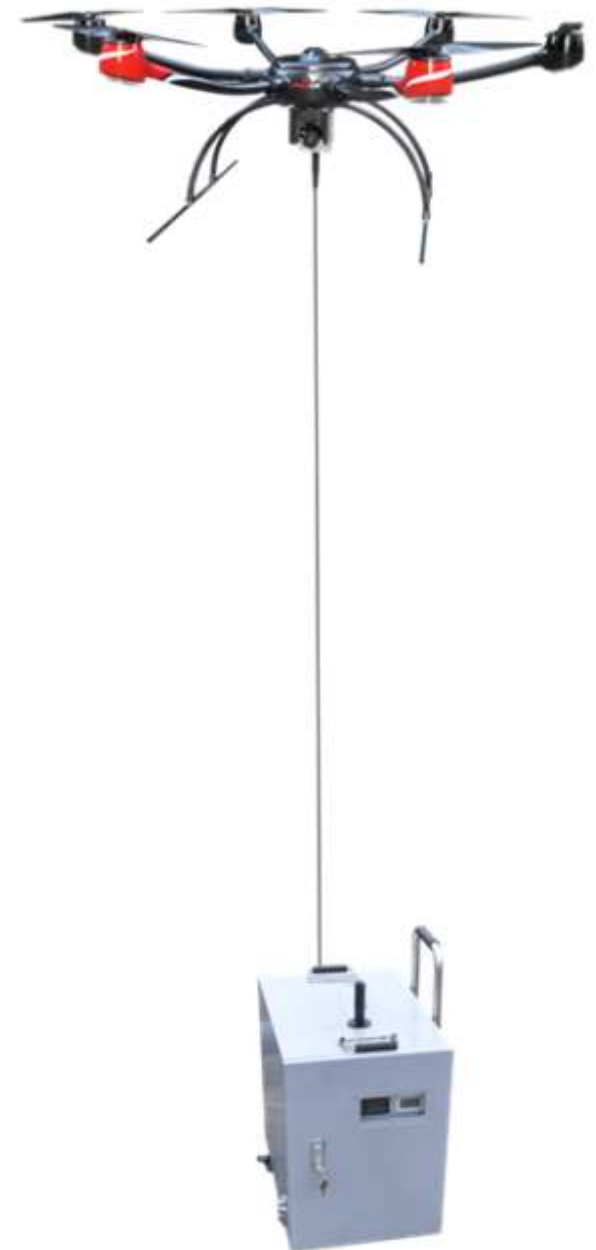
Arms packing dimension: 1120×430×470±10mm

Body packing dimension:1070×530×375±10mm



## Forest Monitoring System

The drone of a special design is intended for the organization of a temporary video monitoring post. Due to this solution, it is possible to monitor in those areas remote from stationary posts. All equipment is placed in three compact cases. The deployment time of the temporary monitoring post does not exceed 15 minutes.



## 4-CH multifunction portable suitcase video receivers MV2025RH7/4-AJKYZ

- 4-CH ASV signal simultaneously receiving;
- Built-in 4-CH A/V synchronous hard disk video recorder for video recording;
- video file play and backup;
- COFDM demodulation and high receiving sensitivity (single antenna - 92dBm, diversity receiving - 96dBm)
- Dual antenna design for diversity receiving;
- Duplex-audio communication function and GPS positioning capabilities optional;
- En/decryption transmission;
- Full-featured PTZ camera remote control;
- MPEG-2/MP@ML/420 DVD decoding standard;
- Narrow audio transmitting bandwidth and high channel utilization;
- Feed short circuit protection and indication.





## Remote microphones and CCTV cameras camouflaged for natural objects.

An additional function of the monitoring system can be the collection of information on vehicles moving along forest roads. Automatically fixing car numbers is possible. Also, remote data acquisition devices can record the sounds of a chainsaw operation and indicate the sector in which such work is done.

Remote devices operate within the range of the wireless WiFi access point installed on the tower, which is 2-3 km. Remote devices can be camouflaged for stones, stumps, etc. The power supply of these devices allows for continuous operation for 7-10 days. The operating personnel must regularly replace and charge the batteries.

Remote devices will allow to control the unauthorized cutting of trees. Video and audio data coming from remote sensors will be stored in real time on the servers of the central point of collection and processing of information, which will allow to promptly search for poachers.

