Agenda

Final Workshop with National Officers of Public Institutions and stakeholder engagement workshop with finance agencies

„Building an integrated monitoring and early warning forest fires detection system in the Borjomi - Kharagauli National Park using innovative remote sensing tools."

Date: 22 May 2025

(10:00 – 15:00)

Venue	Courtyard Marriott Tbilisi, 4 Freedom Square, 0105 Tbilisi, Georgia
9.30–10.00	**Registration of participants**
10.00–10.20	**Opening session and welcoming remarks** **Moderator: David Tsiskaridze,** **Speakers:** **David Tsiskaridze, Team Leader; Toma Dekanoidze, Deputy of Head of Agency of Protected Area of Georgia; Teimuraz Mgebrishvili, Head of Emergency Management Agency of Georgia TBC; Nino Chkhobadze, Head of Greens Movement of Georgia/Friends of the Earth**
10:20-11:45	**Workshop I- Presentation of the project activities and outputs(Deliverables);** **Georgian project team-IBEDC: David Tsiskaridze, Consultants-Ioana lazar, Davit Kurdgelaidze and Merab Machavariani;**
11–45 12.00	**Coffee break**
12.00–13.30	**Workshop II-Presentation of the Project Proposals related an integrated monitoring and early warning forest fires detection system and discussion with potential donors and finance agencies to find funding opportunities-Ioana Lazar and Merab Machavariani;** **A stakeholder consultation workshop will be organized in presence of the financial sector in Georgia, including but not limited to banks, multilateral funds (GCF representatives, UN representatives, WB representatives), as well as any other sources of financing that could support the implementation of the designed system. During this workshop, the importance of implementing an integrated monitoring and early warning forest fires detection system for the Borjomi - Kharagauli National Park will be presented. The main goal of the meeting will be to understand what the financial sector would require to scaling up the implementation of the system to other the national parks of Georgia.**
13.30–14.00	**Final remarks&future plans**
14:00-15:00	**Lunch**

Note:
The workshop will be held in hybrid format in Tbilisi, Georgia.

LEPL AGENCY OF PROTECTED AREAS OF GEORGIA

CTCN AFRICA REGIONAL MANAGER

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Georgia:

Building an integrated monitoring and early warning forest fires detection system in the Borjomi - Kharagauli National Park using innovative remote sensing tools

Tbilisi - May 22, 2025

BACKGROUND

- **Objective**: To benchmark, select, design, and test an integrated monitoring and early warning forest fire detection system in Borjomi-Kharagauli National Park
- Technical assistance granted by UNEP through CTCN to Georgia Agency for Protected Areas
- IBEDC – service provider selected by tender

BACKGROUND

- Location: Borjomi-Kharagauli National Park, Georgia
- Duration was 17 month, but extent 4 month due to seasonal conditions.
- Technology Solution: Development of Integrated monitoring and early warning forest fires detection system.
- Project was funding under Technical assistance granted by UNEP through CTCN. Beneficiary is Agency for Protected Areas of Georgia; IBEDC – service provider selected by tender.
- UNEP CTCN grant: USD 248,440
- The project supports a total of 174 135 beneficiaries, including 1020 direct beneficiaries and 173115 indirect beneficiaries; Among the total beneficiaries, 52.16% are women and 15% are youth.

BACKGROUND

- The objective of this project (Integrated Monitoring and Early Warning Forest Fire Detection System Implementation Project) is to implement a monitoring and early detection system for forest and landscape fires. The system enhances early detection capabilities, provides real-time monitoring, and facilitates quick response to potential fire incidents. The system is installed on the Customer's local server and will provide secure access to authorized users through a web interface.
- The primary objective is to reduce the risk of uncontrolled forest fires in Borjomi-Kharagauli National Park by implementing an advanced monitoring and early warning system. This system will allow for early detection of the hazards, enabling swift action.

BACKGROUND

- **Project Key Objectives are:**
- Develop an integrated monitoring and early warning system for forest fires.
- Utilize innovative remote sensing tools to enhance fire detection capabilities.
- Establish a standard operating procedure for the system's use.
- Train personnel on the new system for effective implementation.

PROJECT DESCRIPTION

- Identification, design and build suitable fire detection system in the protected area
- Provide training to users and administrators of system
- Develop and implement a monitoring policy that allows local populations with high risk of exposure to forest fire hazards to take action to avoid or reduce risk and to prepare effective responses

ACTIVITIES

Output 1 - Contextualize, map stakeholders, analyze current practices to monitor forest fires and **assess** risk, organize stakeholder working group

Output 2 - Benchmark, select and design the integrated monitoring and early warning forest fires detection system, cost analysis and stakeholder meeting

Output 3 - Develop and Test the system
in one specific area of the National Park, train users

Output 4 - Define a standard operation procedure for an efficient use of the designed integrated monitoring and early warning forest fires detection system, organize workshop

Output 5 - Dissemination modules to demonstrate advantages of system, organize workshop with Ministry of Environmental Protection and Agriculture and the Agency of Protected Area of Georgia, organize stakeholder engagement workshop with finance agencies, redact Concept note

Example of Forest Fire Risk Assessment

Risk assessment formula:
Risk (R)=Likelihood (L)*Impact (I)
*For example: if the threat probability score is 4 and the impact assessed with 2 points, forest fire risk will be assessed as medium (R=4*2=8)

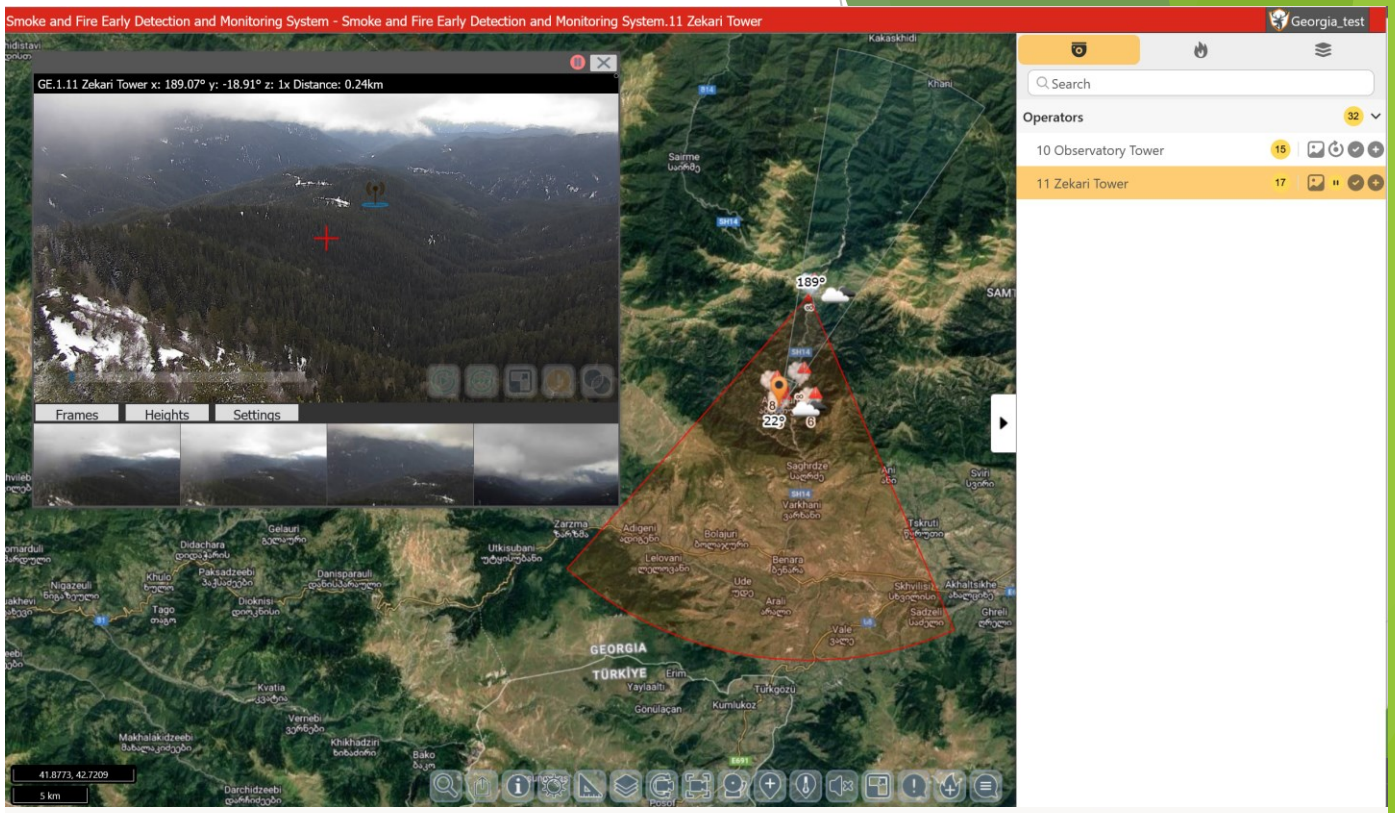
Hazard Likelihood (L) Degree	Score	Hazard Impact (I) Degree	Score
too frequent	5	very strong	5
Frequent	4	strong	4
Moderately frequent	3	Moderate	
Rare	2	weak	
Very rare	1	very weak (insignifica	

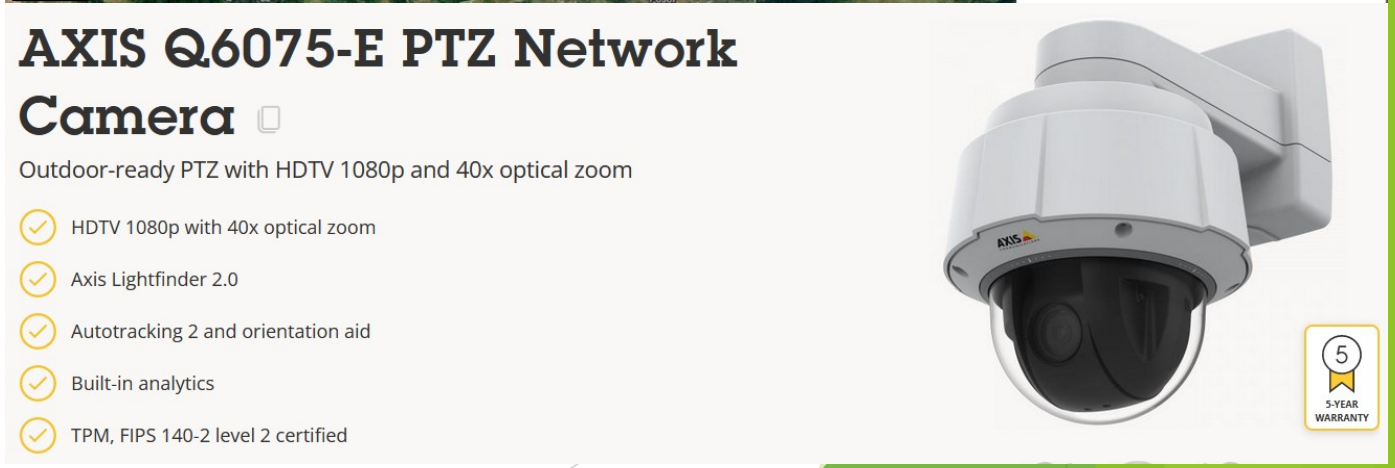
Score (total)	Risk level	Mapping
16-25	Critical	
10-15	High	
5-9	Medium	
1-4	Low	

Examples of Early Detection Systems:

Video Cameras and Management Systems using AI

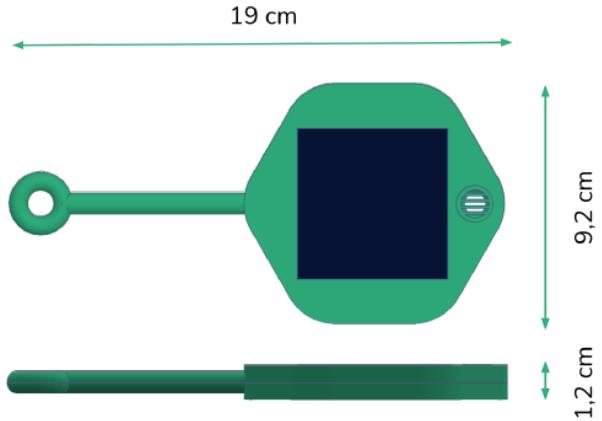
- Mast or other buildings
- Power Supply System
- Internet connection, secure communication network
- Video Cameras
- Centralized management system





Detection with Sensors

- Wireless sensors: Silvanet Wildfire Sensor – https://www.dryad.net/wildfiresensor



- Detection of hydrogen, carbon dioxide, carbon monoxide;
- Working radius, average 30 meters
- 4-5 sensors per hectare, depending on geography

Unmanned Aerial Vehicles

- Long-range industrial drones,
- Autopilot functionality,
- Real-time monitoring,
- Monitoring of unreachable places,
- Monitoring on request,
- Functioning in patrol mode.

Summary

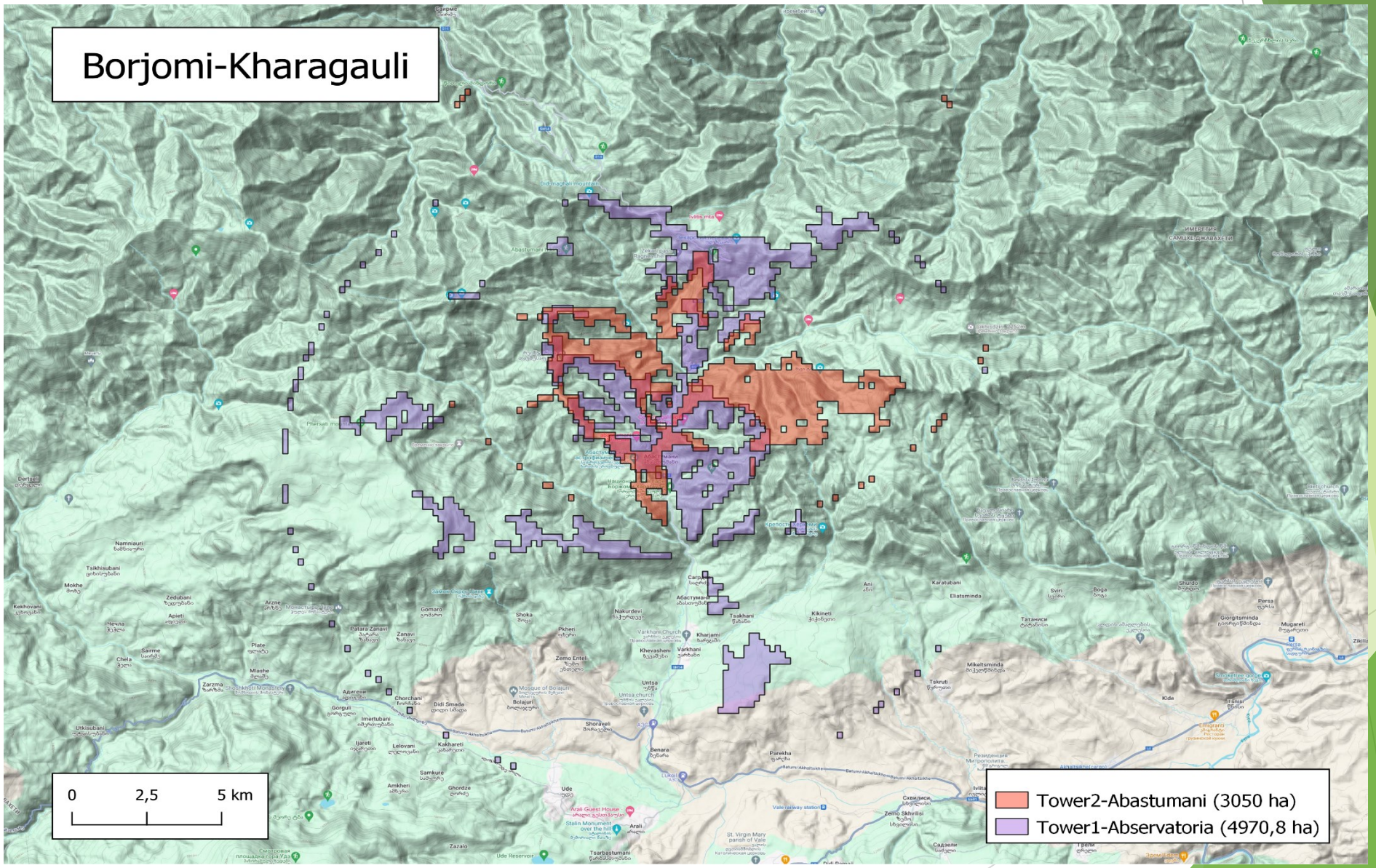
- On the base of selection of Stakeholders working group, we build an early warning forest fire detection system with video cameras and control management system;

Advantages over other systems:

- ✓ Less dependent on climatic conditions;
- ✓ Detection and management is carried out in real time;
- ✓ It is possible to produce video/photo history of the surveyed forest area; Technology is well known, the hardware is commonly available;
- ✓ It is possible to use devices of different manufacturers;
- ✓ It's easy to service the system;
- ✓ The system is easily expandable;
- ✓ It's easy to get staff, system operators, administrators

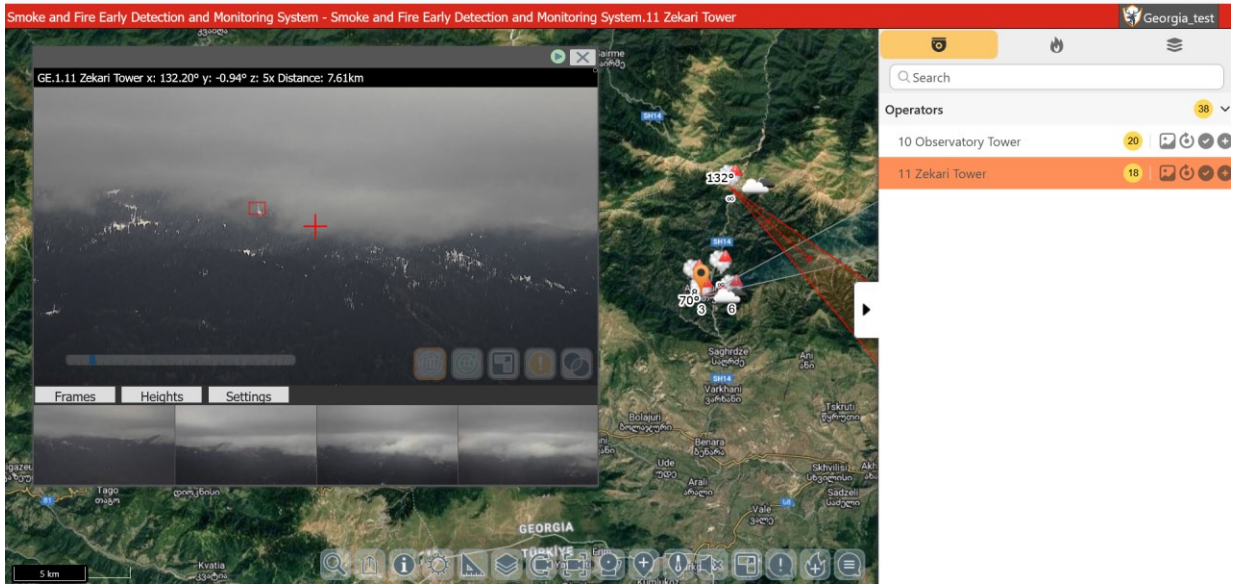
Hardware infrastructure:
Communication mast, solar panels, shelter with network equipment, lighting protector and video cameras set

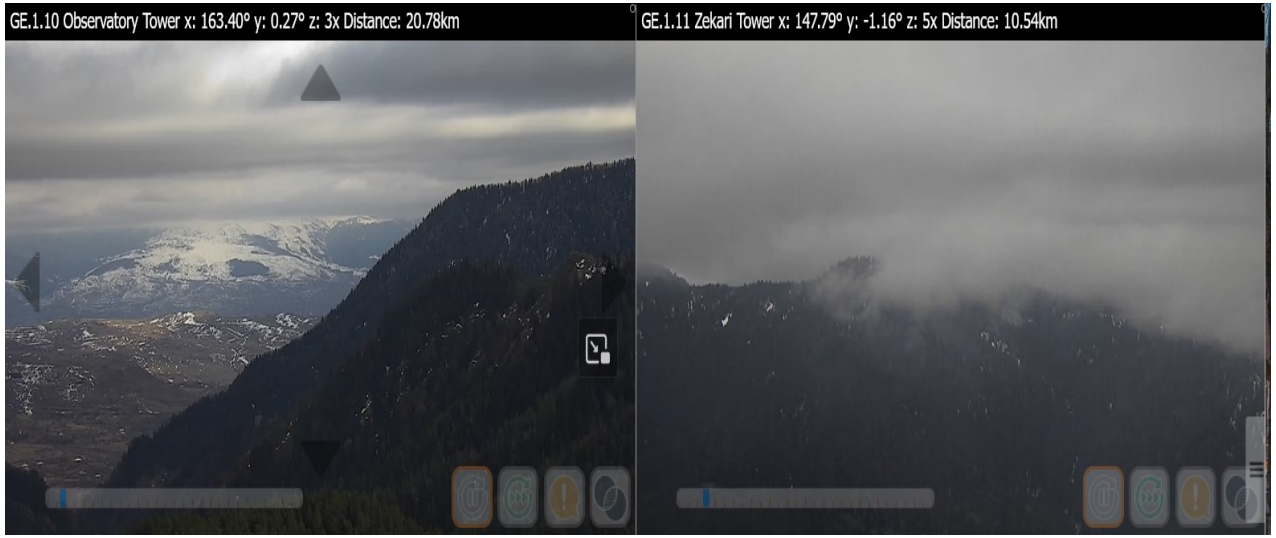
Selected Locations

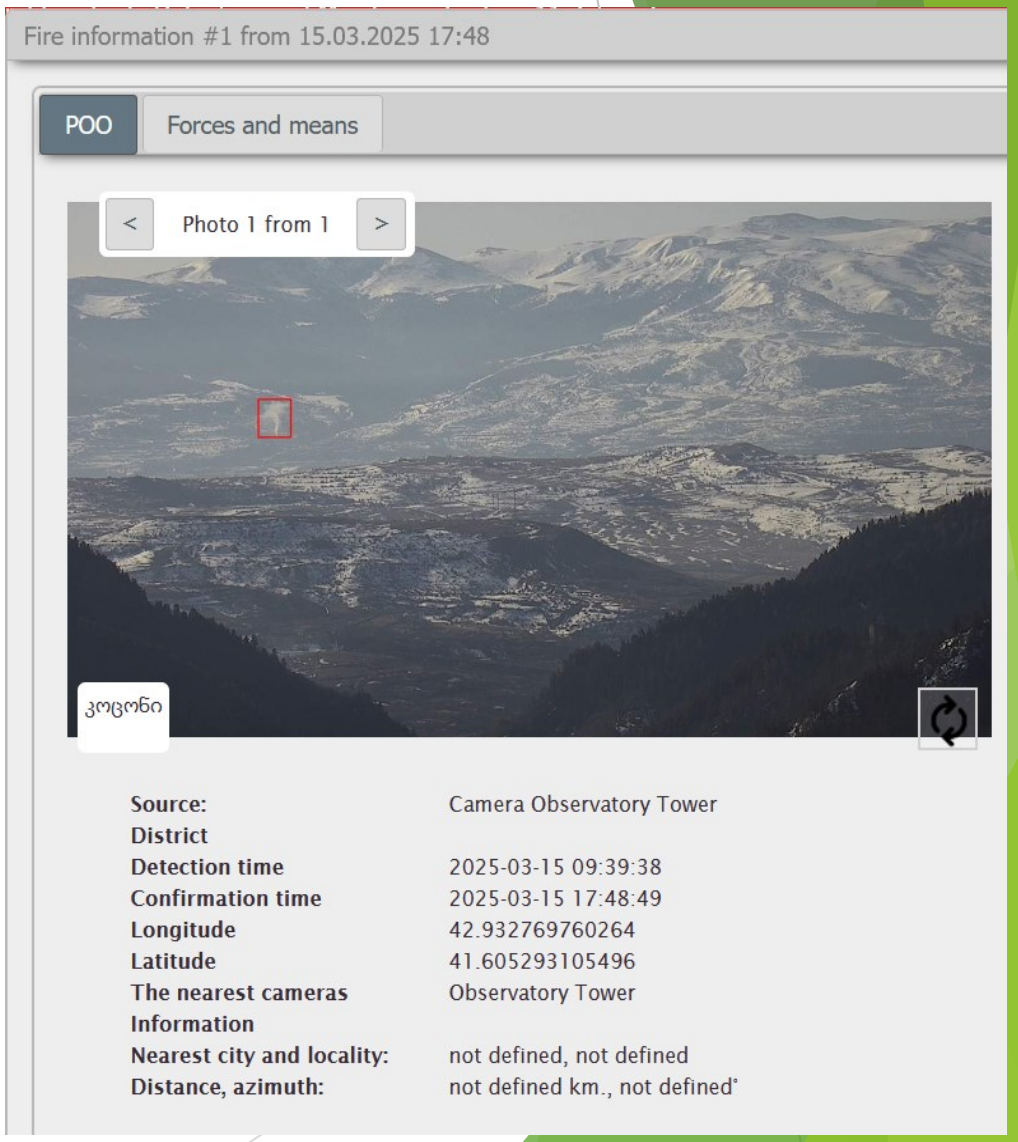


Software: Centralized Management System

The System is based on the geographic information system, integrated with video surveillance cameras.
It utilizes artificial intelligence video stream processing for smoke and fire detection.
An incident involving automatic smoke detection using a video camera. The smoke area is visible in the red square (bonfire).







Centralized Management System Video

Output 4 Define a standard operation procedure for an efficient use of the designed integrated monitoring and early warning forest fires detection system,

Proposed operation procedure is based on best international experience, which consists from following components:

- Forest fire prevention
- Preparedness
- Response
- Restoration

To ensure effective implementation of these principles project did recommend introduction of Annual Operational Plan as part of forest fire management plan and provided relevant draft template.

MAIN HIGHLIGHTS

- The project is based on a consultation processes with stakeholders and use of feedback in the deliverables
- Gender balance and an adequate representation of vulnerable groups are important for all project activities
- The scope identifies the best solution for early fire detection & warning and also identifies financial resources for scaling up the pilot project across protected area

ADAPTATION FUND

UN environment programme

CTCN
UN Climate Technology Centre & Network

Thank you!

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ADAPTATION FUND

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Mandatory Output and Output 1 - Deliverables within the project ”Building an integrated monitoring and early warning forest fires detection system in the Borjomi - Kharagauli National Park using innovative remote sensing tools”

Tbilisi - May 22, 2025

OUTPUTS

- The mandatory output consisted in ”communication documents” meant to communicate tasks, results and indicators among the three parties (Direct Beneficiary, Service provider, Donor)
- Output 1 - Contextualize, map stakeholders, analyze current practices to monitor forest fires and assess risk, organize stakeholder working group

MANDATORY OUTPUT DELIVERABLES

- Implementation Plan
- Monitoring & Evaluation (M&E) Plan
- Impact Statement (at the beginning of the project)
- Impact Description Document (at the end of the implementation)
- Closure and Data Collection Report

MAIN OUTPUT 1 DELIVERABLES

- Stakeholders mapping report containing a complete stakeholder list
- Risk assessment of forest fires procedures and technologies used in Borjomi – Kharagauli National Park

THE DETAILED IMPLEMENTATION PLAN

- Built as a Gantt graphic
- Included:
  - a distribution of tasks between IBEDC as a service provider and the direct Beneficiary (Agency for Protected Areas of Georgia)
  - A budget breakdown per activities / subactivities and deliverables

THE M&E PLAN

- Sections:
  - Basic information (the project in a nutshell)
  - Table regarding:

(A) Outputs and Activities as described in the Response Plan	(B) Indicator	(C) Expected results	(D) Method and frequency for data collection	(F) Comments

Methodological aspects regarding M&E Plan (I)

- Main methods used for data collection:
  - Surveys (e.g. for stakeholders' identification and mapping)
  - Documentary studies / desk research (e.g. for risk identification, used fire prevention methods)
  - Headcounts during events (lists of participants)

Methodological aspects regarding the M&E Plan (II)

- Data processing:
  - multi-criteria analysis for selection and prioritizing key technologies
  - financial analysis of alternatives (with an in-depth CBA for the chosen scenario including socio-economic and environmental benefits of prioritized technologies)

Methodological aspects regarding the M&E Plan (III)

- Stakeholders involvement (Stakeholders Working Group):
  - Presentations in front of the stakeholders
  - Questionnaires and interviews with the stakeholders
  - Incorporation of feedback into deliverables

Main stakeholders

- **Public (State) Authorities**
  - Ministry of Environmental Protection and Agriculture of Georgia
    - Agency of Protected Areas
    - Department of Environment and Climate Change
    - Department of Biodiversity and Forestry
  - LEPL National Forestry Agency
  - Ministry of Internal Affairs
    - Emergency Management Service
  - Adigeni Municipality

- **Civil Society Organizations**
  - Greens Movement of Georgia/ Friends of the Earth Georgia
  - Imereti Scientists' Union "Spectri"

The mapping process

High power and general interest	**High power and high interest**
Public bodies – general interest: - Ministry of Environmental Protection and Agriculture of Georgia and its departments • Department of Environment and Climate Change • Department of Biodiversity and Forestry	**Public bodies with direct responsibilities:** - Agency of Protected Areas - Administration of the Borjomi – Kharagauli National Park - LEPL National Forestry Agency - Ministry of Internal Affairs - Emergency Management Service
Less power and general interest	**Less power but highly interested organizations**
Civil Society organizations - Greens Movement of Georgia/ Friends of the Earth Georgia - Imereti Scientists' Union "Spectri"	- Local communities - Adigeni Municipality

Risk analysis

- Presented in front of the stakeholders
- Based on the existing legal basis and institutional setup
- The risk assessment formula that was used:
  - Risk (R)=Likelihood (L)*Impact (I)
  - *For example: if the threat probability score is 4 and the impact assessed with 2 points, forest fire risk will be assessed as medium (R=4*2=8)
- Risk probability assessment (score 1 – 5, expected pobability from very unlikely to high probability)

Comments section of M&E Plan

- Challenges and risks:
  - availability of public bodies to appoint representatives in SWG
  - availability of appointed persons and interest in the topics
  - access to detailed data related to operating costs of the benchmarked systems
  - design of a solution that can be developed into a pilot project with the existing financial resources within the project
  - design of a clear and efficient procedure
  - availability and interest of future system administrators to participate in the training sessions

INDICATORS ROLE

- Meant to measure the increased resilience to climate variability and change at a local and regional level including the communities in the target area

Core Indicator 3

- Number of beneficiaries:
  - Direct and indirect beneficiaries: 174,055 inluding local population and direct participants to project activities
  - Gender and age segregation:
    - 52.16 % women (within the general population in the area)
    - 15 % young people

Gender aspects related to Core Indicator 3

- Gender disaggregated data were provided for each workshop and meeting
- At the level of the project team there were equal opportunities for both women and men based strictly on their professional expertise
- Considering that the project area is a mountainous area, other disadvantaged groups have better living conditions following the implementation, that is people in remote communities and people working under harsh conditions such as the shepherds.

Indicators related to Infrastructure

- Outcome 1 - Reduced exposure to climate-related hazards and threats
  - Output 1.1 Risk and vulnerability assessments conducted and updated
- Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress
  - Output 5: Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability
- Related indicators:
  - Number of Early Warning Systems - target value: 1 (implemented pilot project)
  - Natural assets protected or rehabilitated – target value 1 (accomplished value 1 natural protected area partially covered by the early warning system)

Indicators related to Capacity Building (I)

- Outcome 1 - Reduced exposure to climate-related hazards and threats
  - Output 1.2 Targeted population groups covered by adequate risk reduction systems
- Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes
  - Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning

Indicators related to Capacity Building (II)

- Related indicators:
  - No. of targeted institutions with increased capacity to minimize exposure to climate variability risks – target value 5 (accomplished value 5)
  - No. of staff trained to respond to, and mitigate impacts of climate-related events – target value 25 (accomplished value 25)
  - No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders – target value 1 (accomplished value 1 procedure guidelines)

THE IMPACT STATEMENT

- Anticipated impact: The implementation of the pilot project of a forest fire detection and early warning system to contribute to increased adaptation and climate change risk related reduction in the target area

ANTICIPATED CO-BENEFITS

- The project will enable a better management of the Borjomi Kharagauli National Park Administratio. This will protect the ecosystems and biodiversity of the National Park.
- The early warning and integrated monitoring systems will establish procedures to inform the population living in the area
- The early warning system will enable a more efficient forest fire management, will avoid further destruction of forest land, and will reduce the emissions of unexpected greenhouse gases (GHG) which result from forest fires.

Contribution to Sustainable Development Goals (SDGs)

SDGs – a set of 17 universal goals adopted by the United Nations in 2015 to address global challenges like poverty, inequality, and climate change

- **SDG11** - Make cities and human settlements inclusive, safe, resilient, and sustainable
- **SDG13** - Take urgent action to combat climate change and its impacts
- **SDG15** - Protect, restore, and promote sustainable use of terrestrial ecosystems, **sustainably manage forests**, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Anticipated contribution to NDC (I)

- NDC - Georgia's Updated Nationally Determined Contribution (NDC) is a national policy document of Georgia for the period of 2021-2030
  - Its main goal is to support the sustainable and balanced development of the country, equally taking into consideration climate change, environmental and socio-economic challenges.

Anticipated contribution to NDC (II)

- The project responds to the NDC's target of studying its adaptive capacity of different economic sectors to the negative effects of climate change, as well as to plan and implement the respective adaptation measures by mobilizing domestic and international resources for the sectors particularly vulnerable to climate change
  - an initial coverage area of around 5,502.00 ha of the Borjomi – Kharagauli National Park (actually covered by the implemented system 7,700 ha)
  - identification of additional financial resources for scaling up the system in other areas of the park / other protected areas

ADAPTATION FUND

UN environment programme

CTCN
UN Climate Technology Centre & Network

Thank you!

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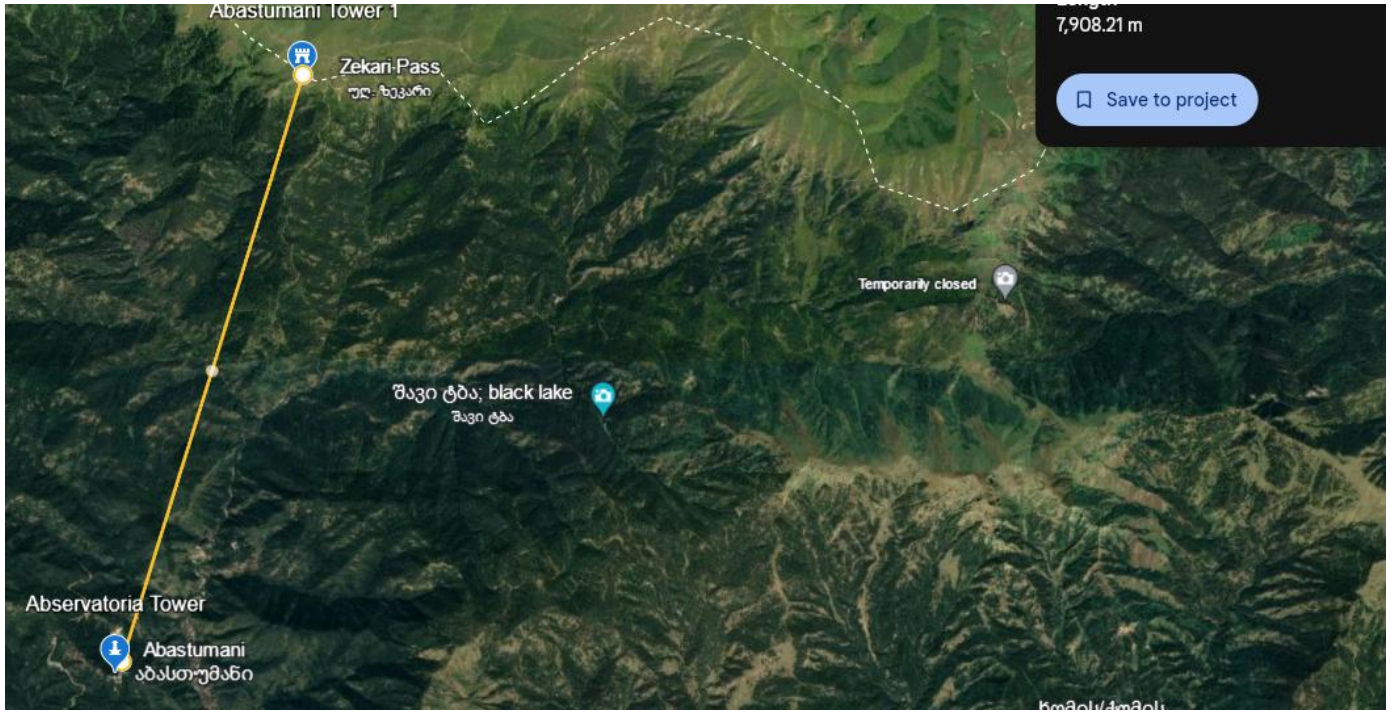
CLIMATE TECHNOLOGY CENTRE & NETWORK

Early Smoke and Fire Detection System

Tbilisi, May 22, 2025

Selected location

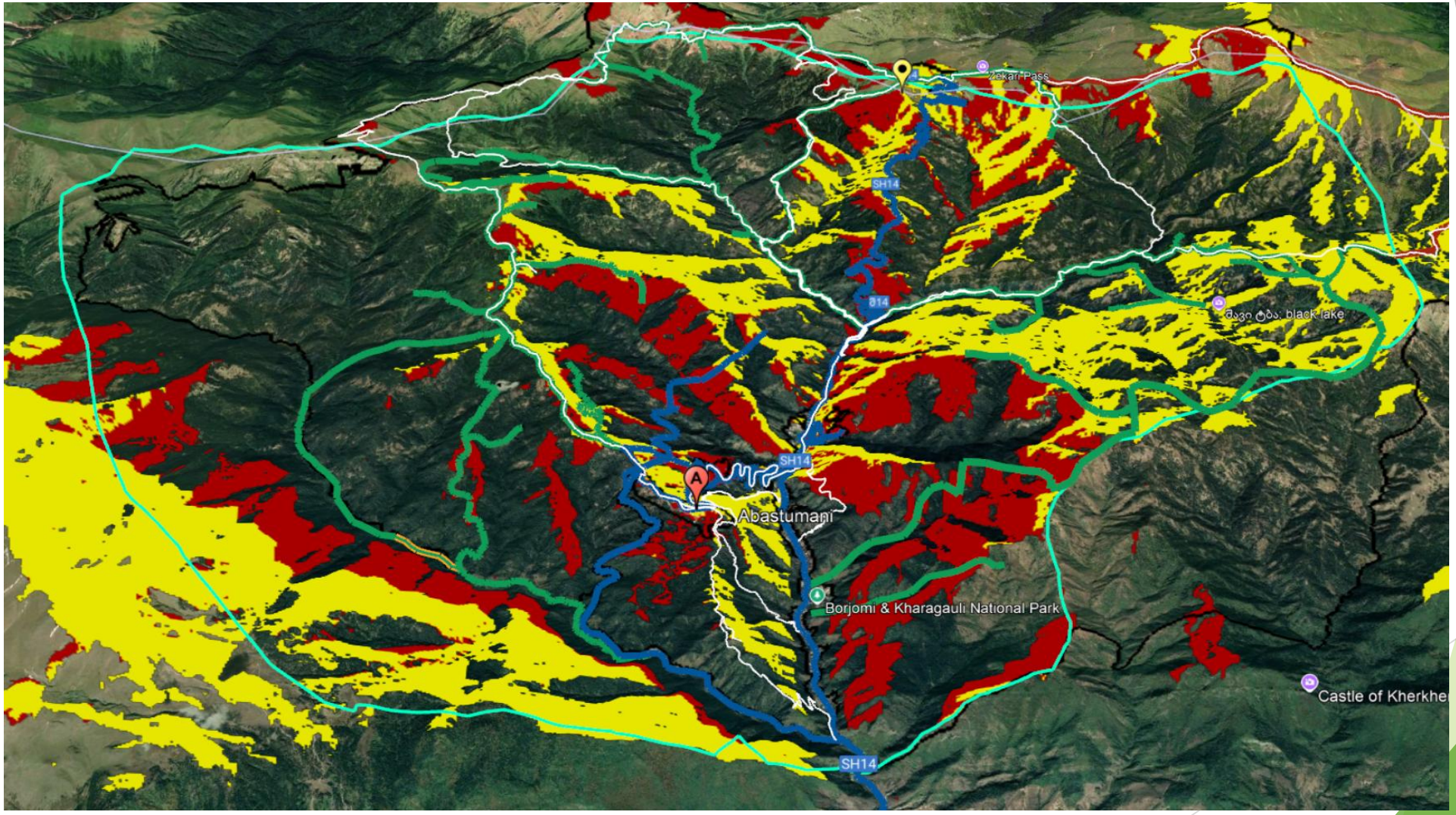
- ✓ **Abastumani observatory, existing mast – Observatoria Tower, 22 m;**
- ✓ **Zekari Pass- Zelari Tower, 6 m**



Monitoring Area

✓Observatoria (red) - 4.117 ha
✓Zekari pass (yellow) - 5.155 ha

✓Summary – 7729 ha, 52.73% from 14,658 ha



Zekari pass infrastructure components

The infrastructure of the early detection system of fire and smoke consisting of the following components:

- Video surveillance camera mast, height 6 meters;
- Lighting protector , height 9 meters;
- Equipment shelter;
- Solar power panels and equipment;
- A set of video cameras:
  - Video surveillance camera for monitoring forest areas;
  - Outdoor surveillance camera;
  - Internal Video Camera for the equipment shelter
- Network equipment and internet connection provision;

Video cameras

- Forest area monitoring - AXIS Q6075-E PTZ Network Camera, https://www.axis.com/products/axis-q6075-e#technical-specifications

AXIS Q6075-E PTZ Network Camera

Outdoor-ready PTZ with HDTV 1080p and 40x optical zoom

- HDTV 1080p with 40x optical zoom
- Axis Lightfinder 2.0
- Autotracking 2 and orientation aid
- Built-in analytics
- TPM, FIPS 140-2 level 2 certified

5
5-YEAR WARRANTY

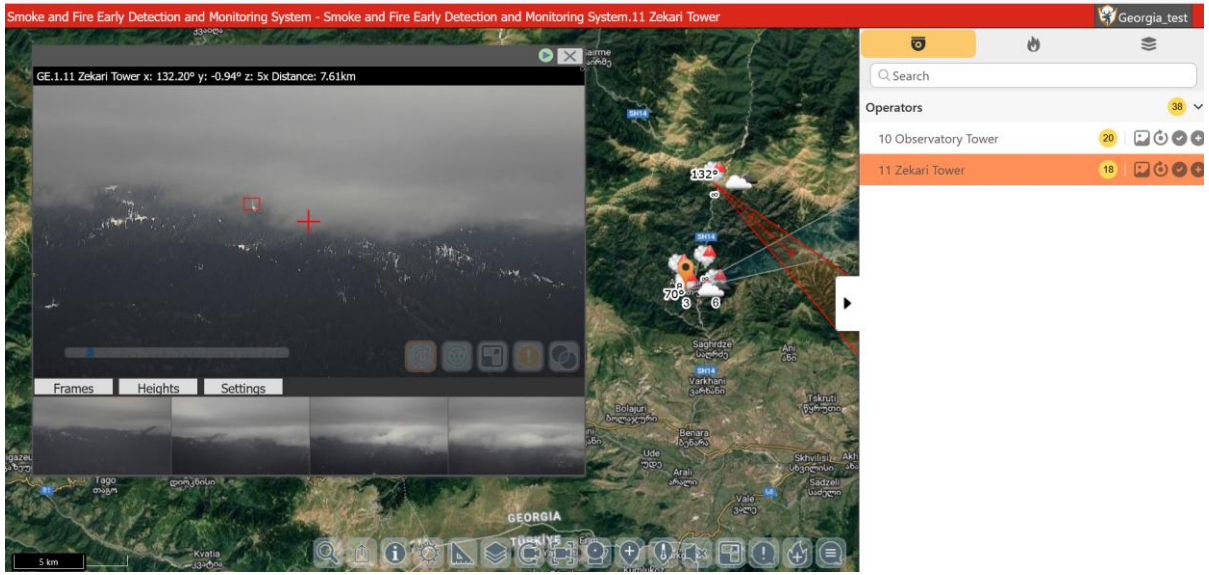
Infrastructure

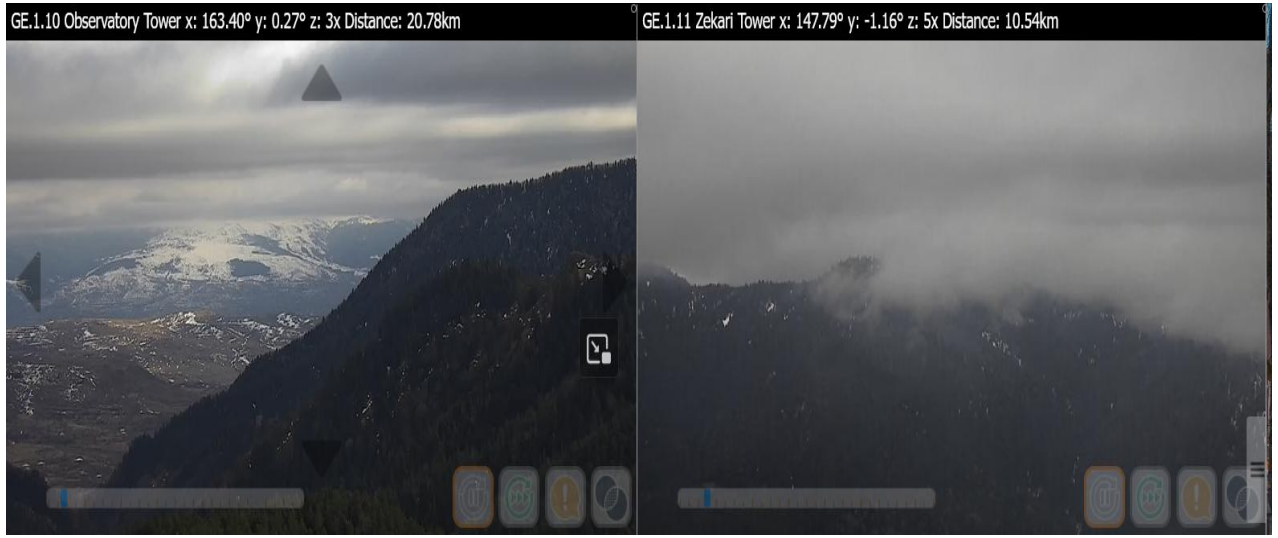
Secure room

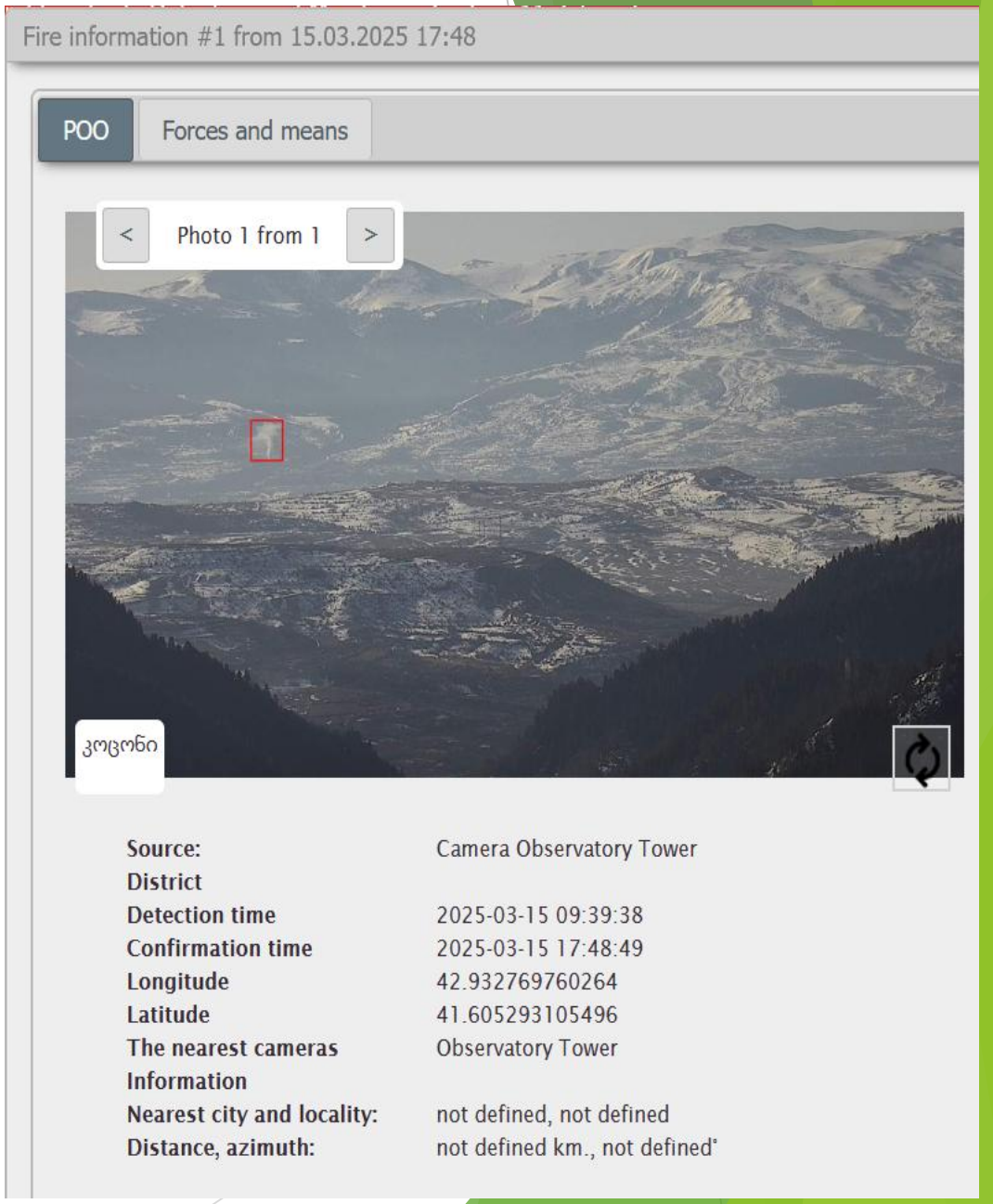
Solar panel and lighting protector

Software - Centralized Management System

An incident involving automatic smoke detection using a video camera.
The smoke area is visible in the red square (bonfire) - https://youtu.be/vR56b6pDsLU







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Thank you!

Implementation of an integrated forest fire monitoring and early warning system

Legal Framework and Institutional Arrangement

Law of Georgia on Civil Security, Article 4, Paragraph 3 :

„ The leading body of the national system in peacetime is the **Emergency Management Service,** with its Fire and Rescue Department serving as the main operational force of the national system“.

Implementation of an integrated forest fire monitoring and early warning system

- **Rules for conducting fire extinguishing and emergency rescue operations (Order of the Minister of Internal Affairs #85, 31.12.2021)**

„ 4. When extinguishing forest fires, it is necessary to:

a) conduct reconnaissance over a large area using motor vehicles and aircraft, as well as cartographic materials or satellite imagery of the area;

b) Reconnaissance of local outbreaks accompanied by forestry specialists and individuals who are familiar with the area;

c) Determining the type and extent of the fire, the terrain of the area, predicting the spread of the fire based on weather forecasts, and identifying areas where its intensive development is possible;

d) Developing **a Tactical Fire Suppression Plan**, including defining the containment boundaries, identifying the required resources and personnel, assigning them to specific fire suppression areas (sectors), organizing communication, and adjusting the plan as the situation evolves;

e) Determining the method of extinguishing the fire, determining access roads, as well as the presence and possibility of using natural water sources;

f) Establishing natural barriers to serve as protective lines or support lines for launching counterfires;g) Identifying fire shelters and access routes for service units and other response forces, and appointing individuals responsible for ensuring compliance with safety requirements.";

g) Organizing interaction with emergency services; i) coordinating decisions made by the head with relevant agencies“.

Implementation of an integrated forest fire monitoring and early warning system

Legal documents directly related to forest fires

Rules for the Protection, Restoration, and Maintenance of Forests" (Government Resolution No. 383, dated 27 July 2021):

- Establishes the principle of dividing forests into fire hazard classes;
- Establishes short-term and long-term preventive measures for forest fire protection;
- Sets forest fire danger levels;
- Establishes fire safety measures in the forest;
- Establishes measures to eliminate fire and its consequences.

- **Forest fire protection measures are planned and implemented by forest management authorities within their respective areas of responsibility.**

Implementation of an integrated forest fire monitoring and early warning system

Legal documents directly related to forest fires

Forest Management Plan of a specific forest area/protected area, in this project case the Borjomi-Kharagauli National Park Forest Management Plan (2021), which :

- Divided the forests of the National Park according to fire hazard classes;
- Listed basic fire prevention measures and necessary inventory.

Implementation of an integrated forest fire monitoring and early warning system

Borjomi-Kharagauli National Park Forest Fire Management Plan

Developed in conjunction with the US Forest Service (2022), according to which:

- The forests of the National Park have been divided into fire management priority zones with an indication of future management measures for each zone;

- Recommendations for preparedness and response actions have been prepared;

- Recommendations were prepared on initial fire risk assessment, subsequent monitoring, and other organizational issues.

The document is primarily a wish list that requires significant effort to translate into practical implementation

Implementation of an integrated forest fire monitoring and early warning system

Approach proposed within the project

Annual operational plans to be developed for each forest district or protected area separately for all forests;

- Annual operational plans should include the following information :

Implementation of an integrated forest fire monitoring and early warning system

- Description of the territory (location, area, species composition, distribution according to fire hazard classes, information about the agencies and individuals responsible for extinguishing the fire, etc..)
- Firefighting infrastructure in the area (roads, firebreaks, mineralized strips and barriers, helicopter landing sites, fire observation towers, masts, firefighting water bodies)
- Monitoring of forest fire risk and forest fires (types of monitoring, implementing agencies/persons, receipt and recording of information about forest fires, population warning system)
- Coordination actions related to fire suppression (relevant commissions, headquarters, fire brigades and their movement schemes, measures to prevent the spread to other territories)

Implementation of an integrated forest fire monitoring and early warning system

Initial Fire Assessment Table

თარიღი:	
ხანძრის სახელი*:	საგანგებო სიტუაციის ხელმძღვანელი*: სტაჟიორი:
ხანძრის ადგილმდებარეობა* გრძედი: განედი:	ფართობი*: _____ ჰა მესაკუთრე*: ___ბორჯომ-ხარაგაულის ეროვნული პარკი ___ბორჯომ-ბაკურიანის სატყეო უბანი კერძო __სხვა
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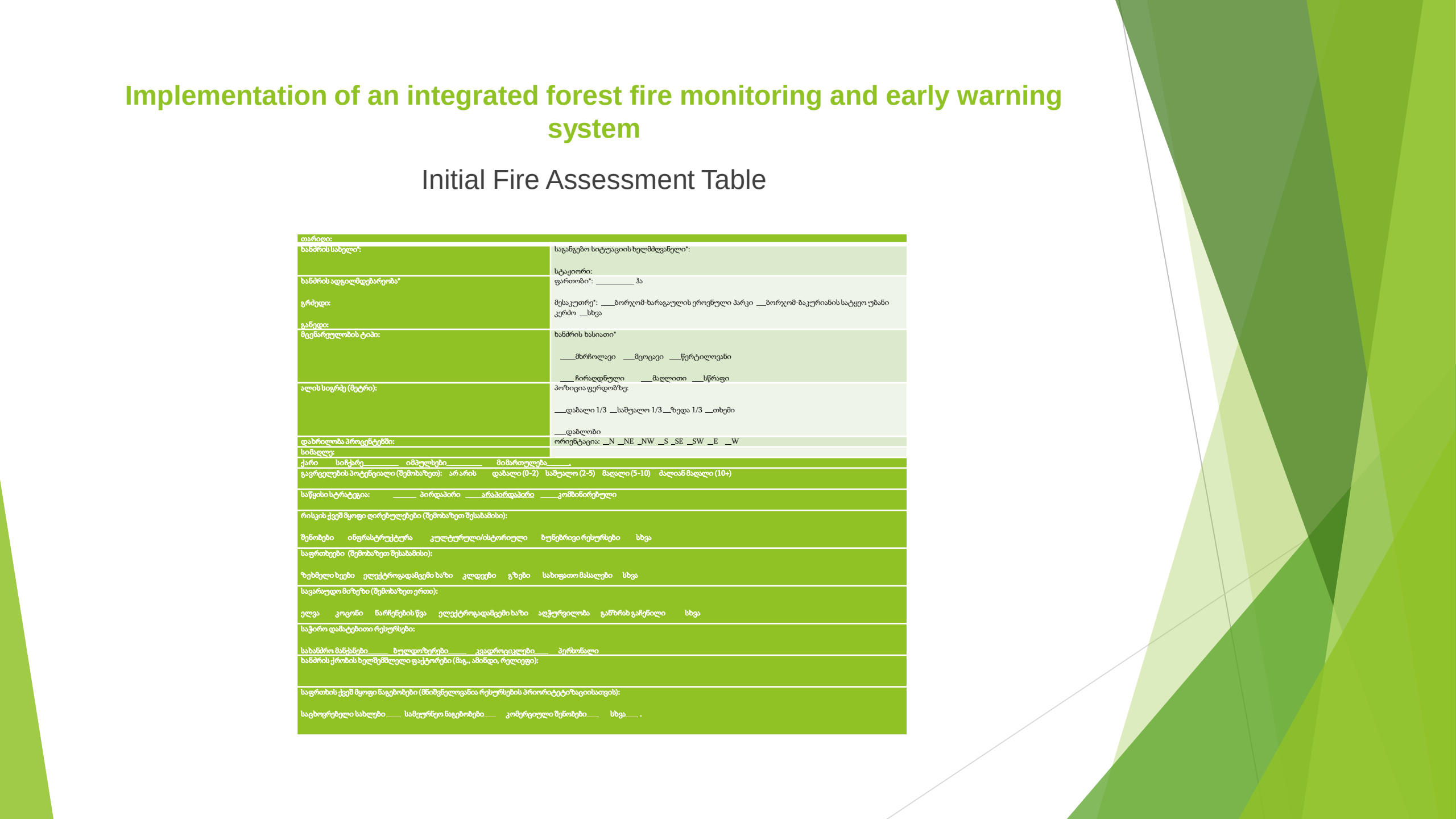
დახრილობა პროცენტებში:	ორიენტაცია: __N __NE _NW __S _SE __SW __E __W
სიმაღლე:	
ქარი სიჩქარე_____ იმპულსები_____ მიმართულება_____.	
გავრცელების პოტენციალი (შემოხაზეთ): არ არის დაბალი (0-2) საშუალო (2-5) მაღალი (5-10) მალიან მაღალი (10+)	
საწყისი სტრატეგია: _____ პირდაპირი ____არაპირდაპირი ____კომბინირებული	
რისკის ქვეშ მყოფი ღირებულებები (შემოხაზეთ შესაბამისი): შენობები ინფრასტრუქტურა კულტურული/ისტორიული ბუნებრივი რესურსები სხვა	
საფრთხეები (შემოხაზეთ შესაბამისი): ზეხმელი ხეები ელექტროგადამცემი ხაზი კლდეები გზები სახიფათო მასალები სხვა	
სავარაუდო მიზეზი (შემოხაზეთ ერთი): ელვა კოცონი ნარჩენების წვა ელექტროგადამცემი ხაზი აღჭურვილობა გაწბრახ გაჩენილი სხვა	
საჭირო დამატებითი რესურსები: სახანძრო მანქანები_____ ბულდოზერები_____ კვადროციკლები____ პერსონალი	
ხანძრის ქრობის ხელშემშლელი ფაქტორები (მაგ., ამინდი, რელიეფი):	
საფრთხის ქვეშ მყოფი ნაგებობები (მნიშვნელოვანია რესურსების პრიორიტეტიზაციისათვის): საცხოვრებელი სახლები____ სამეურნეო ნაგებობები___ კომერციული შენობები___ სხვა___ .	



Implementation of an integrated forest fire monitoring and early warning system

Risk of forest fires in Georgian forests

In forests managed by the LEPL National Forestry Agency (total area 1,738,282 ha)

	Total fire hazard class I-II forests	Total forested area, ha	%
Aspindza	8747	20575	42.5
Akhaltsikhe	20137	33042	61
Borjom-Bakuriani	15770	45895	34.4
Lagodekhi	8602,4	19476.1	44
Chokhatauri	5978.3	42404.8	14
Kharagauli	18500	46724	39.6
Akhmeta	13324	53879	25
Lentekhi	6771.6	74946.7	9
Telavi	9518.7	52482	18
Kvareli	18082.3	44157	41
Ambrolauri	18498.1	80635	23
Oni	12497,5	56812.3	22
Dedoplistskaro-Sighnaghi	1928	23644	8.2
Vani-Bagdati	1636.5	18386.5	
Total	138891.5	613059.4	23

Implementation of an integrated forest fire monitoring and early warning system

Risk of Forest Fires in Forests of Georgia

In forests managed by the LEPL Agency for Protected Areas (total area 912,862 ha)

	Total fire hazard class I-II forests	Total forested area, ha	%
Tsiv-Gombori Managed Reserve	1949,7	4747	41
Erusheti National park	15907	7478	22
Kolkheti National Park	105	16861.9	0.6
Tbilisi National Park	5322.9	20489.7	26
Tusheti Protected landscape	2067	4824.5	43
Algeti National Park	1926	7128.7	27
Lagodekhi State reserve	1343.7	13844.2	10
Lagodekhi Managed reserve	1325	1909.7	70
Tetrobi Managed reserve	1642	1820	90
Nedzvi Managed Reserve	6806	8686.4	78
Pshav-Khevsureti National Park	922	18266	5
Borjom-Kharagauli National Park	13370.6	53189	72
სულ	50737.2	159245.1	32

Implementation of an integrated forest fire monitoring and early warning system

Key Areas of Technical and Financial Assistance

Development/improvement of the existing political, legal and institutional environment for forest fire management

- Promoting forest fire management planning
- Promoting the introduction/use of modern technologies
- Training of personnel responsible for forest management
- Development of a participatory forest fire management system (with the involvement of local population)
- Promoting international cooperation.

ADAPTATION FUND

UN environment programme

CTCN
UN Climate Technology Centre & Network

Forest Fire Early Warning System - Scaling up the system in other areas of the park & other protected areas

Tbilisi - May 22, 2025

Connection to the present project

- Output 5: Dissemination modules and training of trainers
- Activity 5.4 Drafting a concept note
- Deliverable - 5.4 Concept note to support access to finance for the implementation of the integrated monitoring and early warning forest fires detection system for the Borjomi - Kharagauli National Park

Identified needs

- Extension of the implemented system in the Borjomi – Kharagauli National Park
- Creation of a similar system in the Kolkheti National Park

JUSTIFICATION - BORJOMI

- Borjomi-Kharagauli National Park (BKNP), located in central Georgia, represents one of the most significant protected areas in the Caucasus.
- As a biodiversity hotspot and a vital ecological corridor between Europe and Asia, the park plays a key role in regional and global environmental stability.

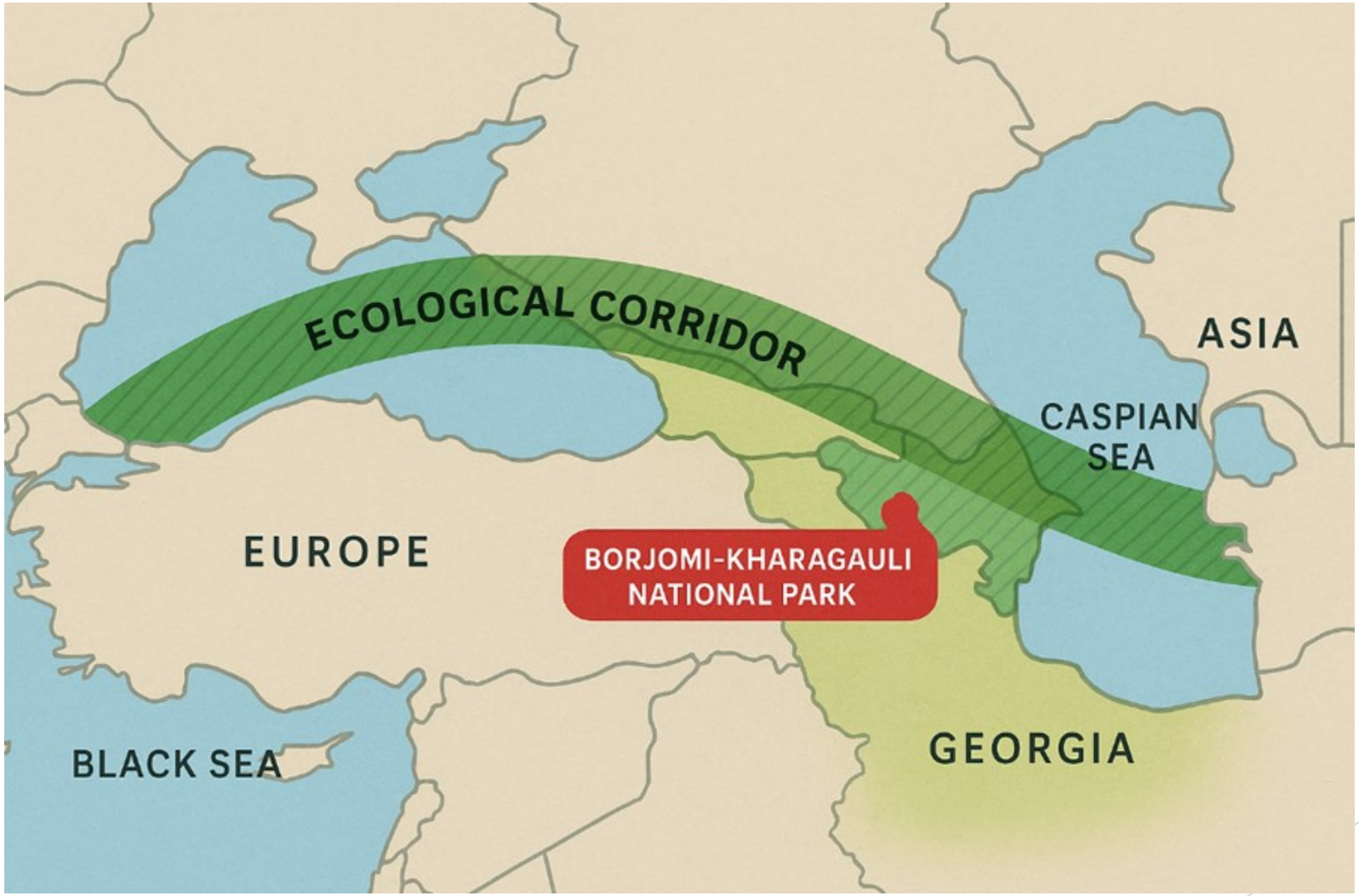
JUSTIFICATION - KOLKHETI

- Kolkheti National Park represents a unique ecosystem that includes Colchic wetlands, swamps, lakes (including Lake Paliastomi), and a stretch of the Black Sea coastline.
- The park is of international importance and is listed as a UNESCO World Natural Heritage Site under the designation "Colchic Rainforests and Wetlands."

IMPORTANCE

- Each National Parks functions as:
  - a transboundary ecological corridor
  - a natural carbon sink
  - a regional climate regulator.

BORJOMI – Ecological Corridor



KOLKHETI – Ecological Corridor

- Kolkheti acts in a similar way for the preservation of bioduveristy in the Euroasian region

Common Threats due to Wild Fires

- **Catastrophic Loss of Biodiversity**
  - Fires destroy rare vegetation and threaten endemic and relict species
- **Ecosystem Degradation and Delayed Recovery**
- **Negative Impact on Global Climate**
  - large wildfires can release carbon stored over decades, intensifying global warming
- **Transboundary Threats**
  - Smoke, toxic particles, and pollutants do not take into account borders

A Tested Sollution

- selected video cameras monitor the forest area with a 360-degree field of view and transmit real-time video footage to a centralized system that uses AI tools to analyze the video stream and automatically detect smoke and fire
- video cameras can be installed on towers or any suitable structures whose placement is determined using Geographic Information Systems (GIS), which identify optimal coverage zones based on visibility of high-risk areas.

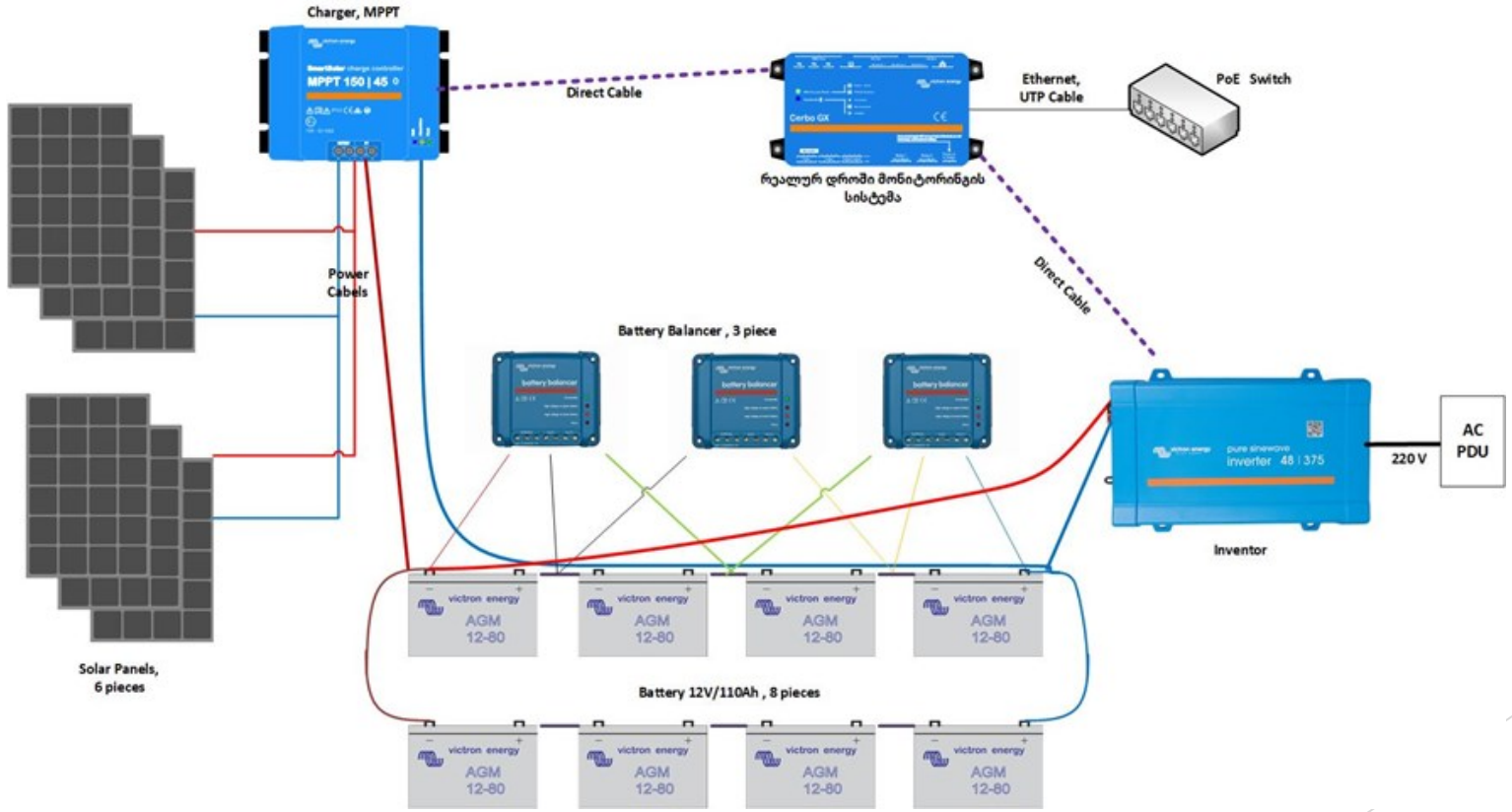
Basic Monitoring Unit Structure

- Tower for video camera installation
- Lightning protection system
- Solar power system
- Secure cabinet/room for active equipment
- Forest monitoring video camera
- Security video cameras for the tower’s perimeter
- Communication equipment for internet connectivity

Basic Monitoring Unit Structure

Solar Panel Power System

- Required power per tower: 205 W (video cameras and network equipment + internet provider)



Secure room/equipment cabinet

- Batteries, panel and battery management system, electrical distribution board with circuit breakers/switches, networking equipment, power supply unit for the forest monitoring video camera and security cameras and indoor security camera

Video Cameras

- Video Cameras for the Fire and Smoke Detection System

AXIS Q6075-E PTZ Network Camera

Outdoor-ready PTZ with HDTV 1080p and 40x optical zoom

- HDTV 1080p with 40x optical zoom
- Axis Lightfinder 2.0
- Autotracking 2 and orientation aid
- Built-in analytics
- TPM, FIPS 140-2 level 2 certified

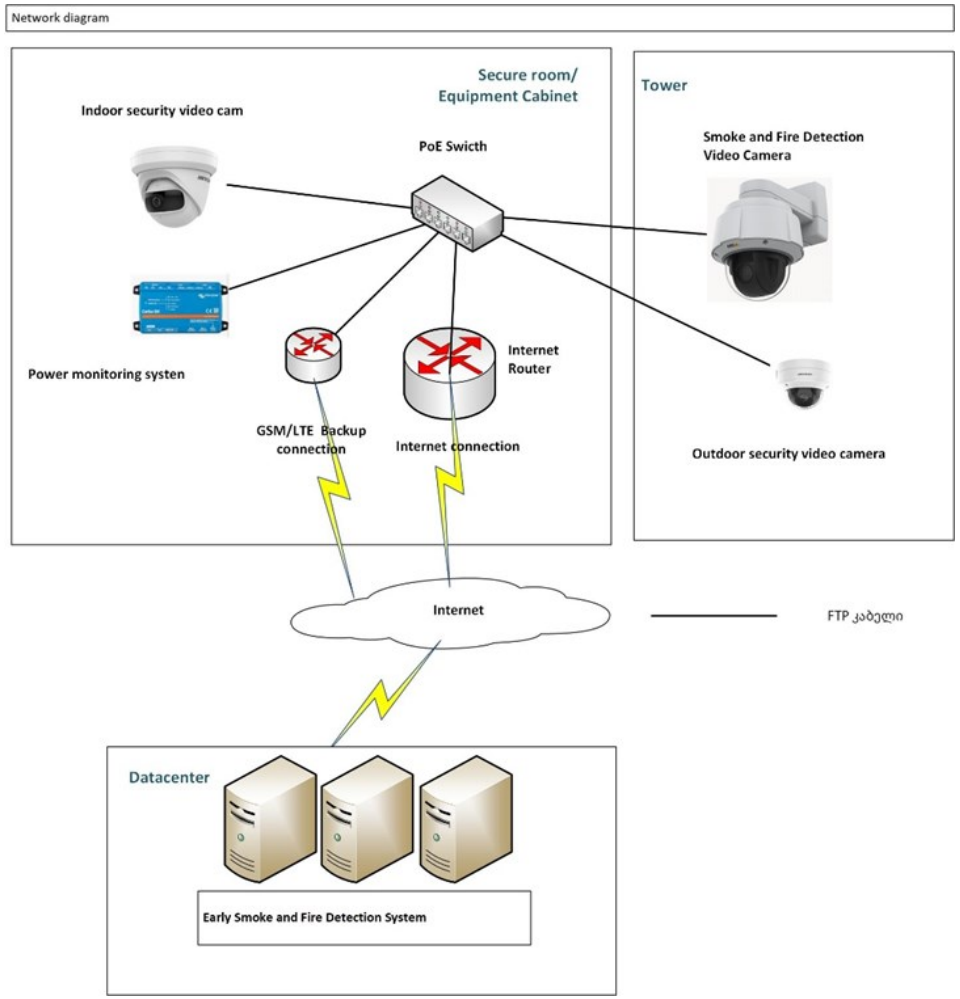
AXIS T91G61 Wall Mount

Quick connection and room for more

- Room for connectivity devices, midspans and service loop
- Protection against impacts, water, dust and corrosion
- Pre-mounted Ethernet cable with IP66 RJ45 connector
- Re-use existing holes

- Security Cameras for the Tower Area

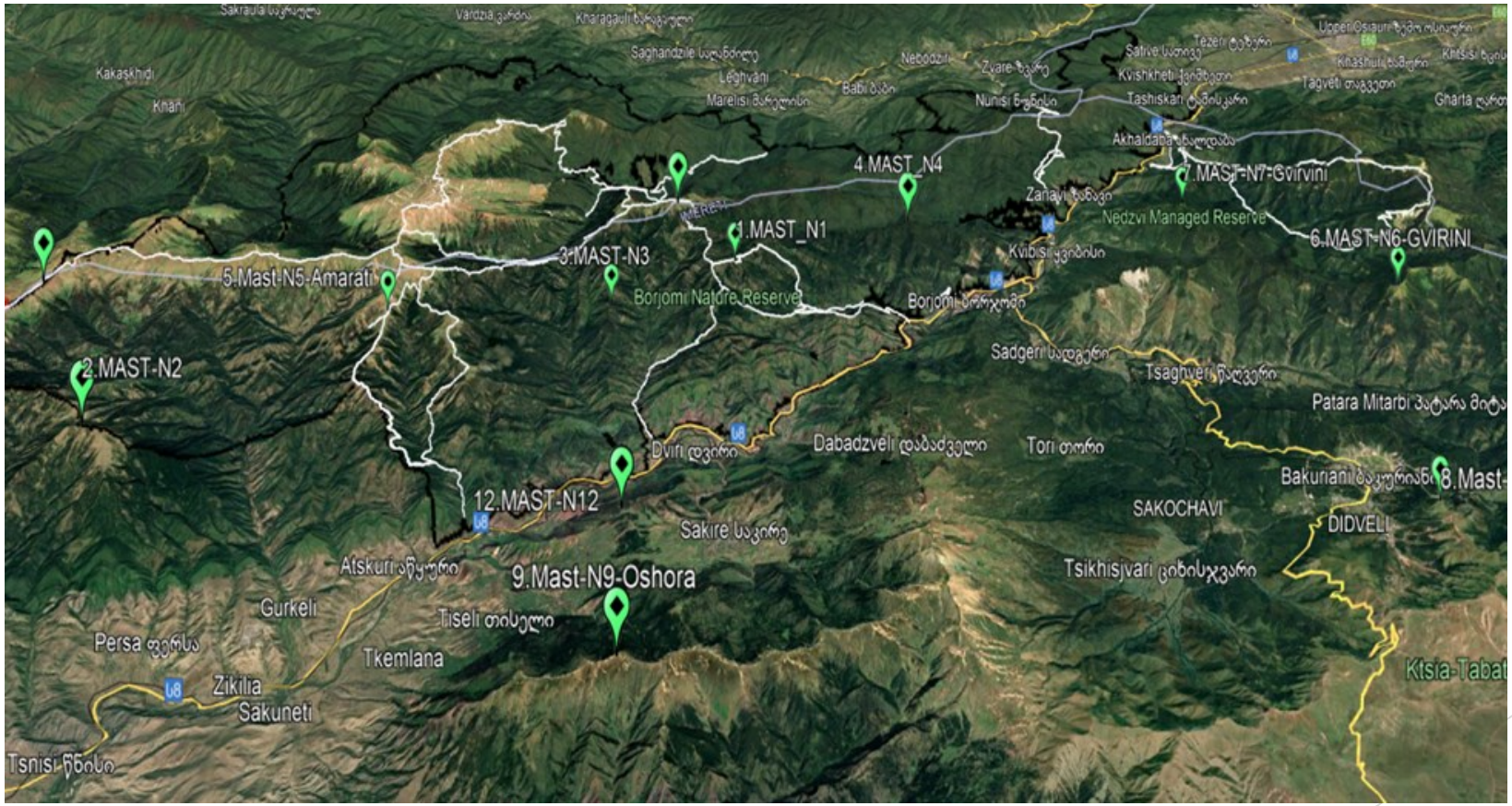
Communication Equipment and Internet Connection



Software Component

- Was developed within the current project
- Can be used for as many monitoring units as necessary without any additional costs

Provisioned Structure in Borjomi Park



Provisioned Structure in Borjomi Park – 12 masts

N	Mast Name	Mast height, M	Mast new or existing	Lattitude DMS	Longitude DMS
1	Mast N1	30	New	41°50'28.59"N	43°16'24.09"E
2	Mast N2	10	New	41°46'4.37"N	43° 1'13.29"E
3	Mast N3	10	New	41°49'25.96"N	43°13'13.87"E
4	Mast N4	40	New	41°51'55.05"N	43°21'7.54"E
5	Mast N5-Amarati	10	New	41°48'56.82"N	43° 7'31.99"E
6	Mast N6	10	New	41°49'22.23"N	43°34'6.09"E
7	Mast N7-Gvirini	10	New	41°52'14.53"N	43°28'58.56"E
8	Mast N8-Kokhta	10	**Existing**	41°44'8.99"N	43°33'12.74"E
9	Mast N9-Oshora	10	New	41°41'2.41"N	43°15'1.02"E
10	Mast N10-Tsikhisdziri	10	New	41°49'32.68"N	42°58'17.87"E
11	Mast N11-Lomisi	10	New	41°52'2.72"N	43°14'37.62"E
12	Mast N12	10	**Existing**	41°49'26.12"N	43°22'58.90"E

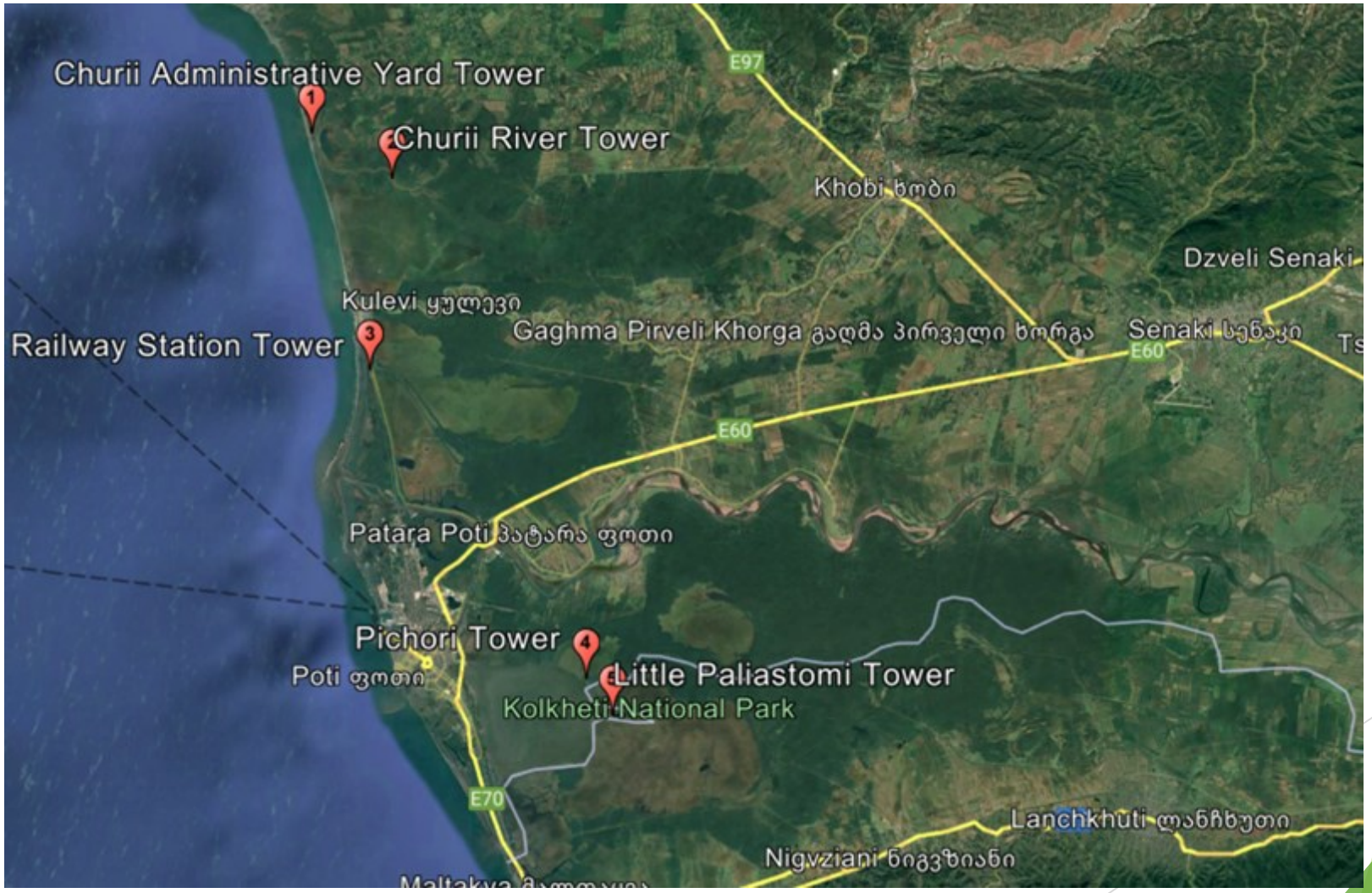
Estimated costs per components

- Mast, lightning protection system and fence, 10 locations
- Solar Panels System and Secure Room/Equipment Cabinet, 11 locations (Mast N8-Kokhta has an electric power supply system)
- Smoke and Fire Detection Video Cameras and Central Management System (starting one year after deployment in the production environment, an annual camera fee equivalent to 6,026 USD will apply)
- Security Video Cameras
- Tower Network Equipment and Internet cost

Estimate Cost per new Borjomi project

N	Description	Sum	
1	Mast, lightning protection system and fence, 10 location	$	380,000.00
2	Solar Panels and Security Room/Equipment Cabinet	$	214,379.33
3	Fire and Smore Detection System, Video Cameras	$	224,566.27
4	Security Video Cameras	$	23,387.60
5	Mast's network and Internet connection	$	143,432.51
Total, 12 Masts cost		**$**	**985,765.71**

Provisioned Structure in Kolkheti Park



Provisioned Structure in Kolkheti Park – 3 locations

N	Tower Name	Lattitude DMS	Longitude DMS	Heigth (m)
Tower 1	Churii Administrative Yard Tower	42°20'13.98"N	41°36'42.42"E	7.0
Tower 3	Railway Station Tower	42°14'58.37"N	41°38'35.97"E	7.0
Tower 5	Little Paliastomi Tower	42° 7'24.06"N	41°46'2.84"E	7.0

Estimate Costs per Components

- 3 Towers, Solar Panels System and Secure room/equipment cabinet
- 3 Towers , Video Cameras for Fire and Smore Detection System
- 3 Tower, Secure Video Cameras
- 3 Towers network cost

Estimate Cost per Kolkheti project

N	Description	Sum
1	Solar Panels and Secure Room/Equipment Cabinet	$ 58 467,09
2	Fire and Smore Detection System, Video Cameras	$ 56 141,57
3	Security Video Cameras	$ 12 130,40
4	Tower's network and Internet connection	$ 26 694,49
Total, 3 Towers cost		**$ 153 433,55**

The scope of the presentation

- Introduce the new projects that were developed according to the identified needs
- Provide a rough cost estimate for each one
  - Borjomi – 985,765 USD (12 – mast system)
  - Kolkheti – 153,433 USD (3 – mast system)
- Start discussion for potential financial support

ADAPTATION FUND

UN environment programme

CTCN
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Thank you!

IBEDC – International Business and Economic Development Center

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