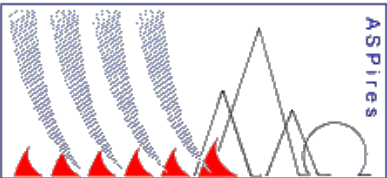




SOFTWARE  
INNOVATION



Advanced systems for prevention  
and early detection of forest fires

# Workshop 09.11.2018 Bansko, Bulgaria

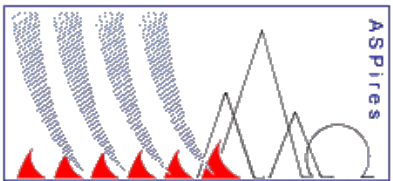
Advanced Systems for  
Prevention & Early  
Detection of Forest fires

# ASPires

Images are from: <https://unsplash.com>

# Multi Sensor Module for Fire Detection based on Cameras

Images are from: <http://www.optixco.com/>



Advanced systems for prevention and early detection of forest fires



# Workshop BANSKO, November 2018, Bulgaria

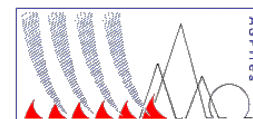
## NCITES

### Multi Sensor Module for Fire Detection based on Cameras

Dipl. Ing. Boris Popov

Mag. Plamen Kirov

Project financed under the Civil Protection Programme Call 2016:  
Agreement No.: ECHO/ SUB/742906/PREV03 by European Commission:  
DG for European Civil Protection and Humanitarian Aid Operations (ECHO)



Advanced systems for prevention  
and early detection of forest fires

# ASPIres-GEO

Main Objectives, Components,  
Components Interaction



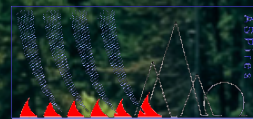


## Main Objectives

ASPires-GEO is based on already available hardware and software components on the market.

The main objectives are:

- to build a real model of a stationed monitoring system for early warning of forest fires
- the model will be used to prove the opportunities of the platform ASPires



ASPires



## Components

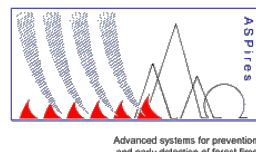
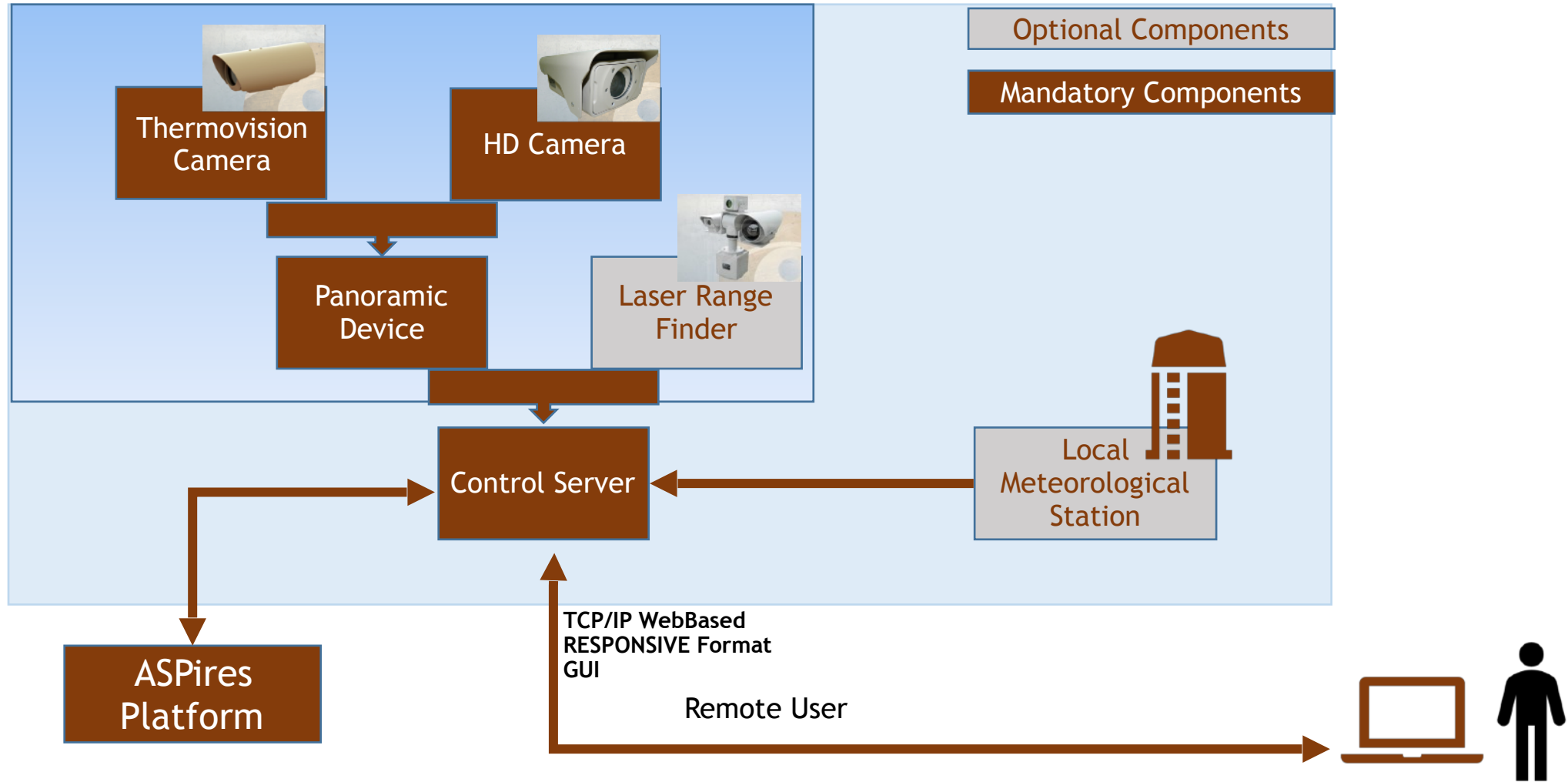
Studies have shown that the main components of such a module are:

- ❑ HD CCD/CMOS and Thermographic cameras
- ❑ Pan/Tilt device
- ❑ Laser pointer
- ❑ Meteorology station
- ❑ Intelligent software for fire detection



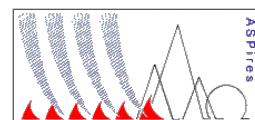
www.comjcon.com

# Components Interaction





- ❑ The hardware and software equipment, produced by the Bulgarian company OPTIX, was hired for the experiment.
- ❑ The equipment is mounted on the roof of the business building of CANTEK, a Bulgarian company and a member of NCITES.
- ❑ <https://aspires-geo.aspires.eu>

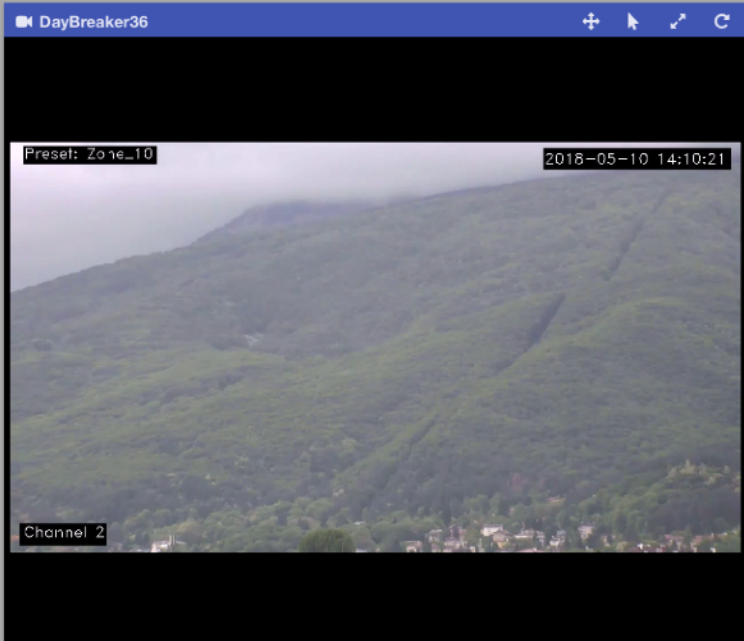


Advanced systems for prevention and early detection of forest fires



Live  
Demo



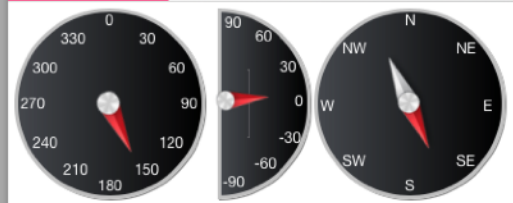


**Log**

[2018-05-10 14:10:04] Detection: No fire detected, visualizing hottest point (X: 16, Y: 479, T: 32°C).  
 [2018-05-10 14:09:53] Detection: No fire detected, visualizing hottest point (X: 465, Y: 479, T: 31°C).  
 [2018-05-10 14:09:00] Detection: No fire detected, visualizing hottest point (X: 12, Y: 357, T: 31°C).  
 [2018-05-10 14:08:49] Detection: No fire detected, visualizing hottest point (X: 623, Y: 477, T: 33°C).  
 [2018-05-10 14:08:28] Detection: No fire detected, visualizing hottest point (X: 635, Y: 466, T: 32°C).  
 [2018-05-10 14:08:04] Detection: No fire detected, visualizing hottest point (X: 637, Y: 479, T: 30°C).

NVIS CH1 CH2 PT

NAVIGATION



PTZ PRESETS TOUR



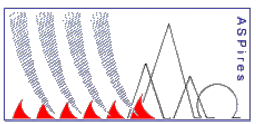
- ASPIres Vitosha [Pause] [Stop] [Close]
- Test [Play] [Close]
- Test\_3 [Play] [Close]

HOME IR DAY FIRE

**Digital**

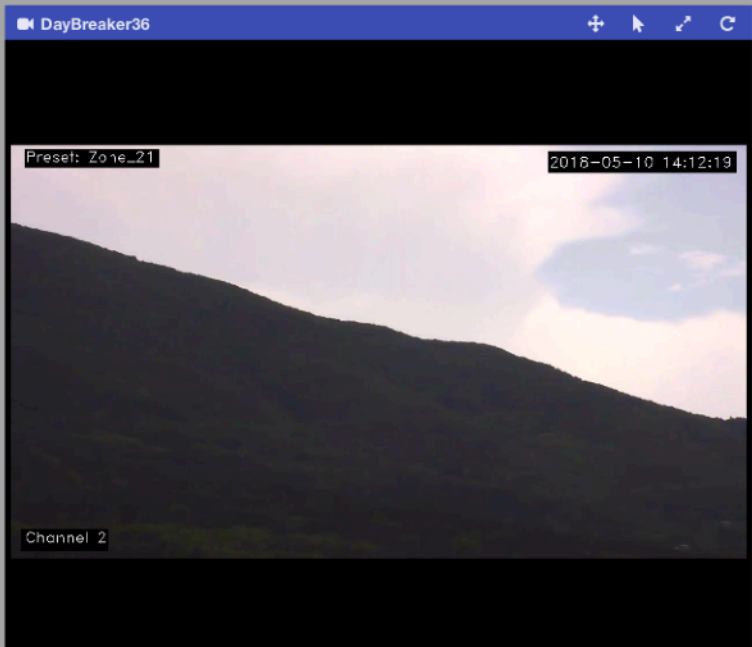
- +

POLARITY NUC FOG  On  Off



Advanced systems for prevention and early detection of forest fires

PATROLLING (ASPIRES VITOSHA)



**Log**

[2018-05-10 14:12:13] Detection: No fire detected, visualizing hottest point (X: 0, Y: 477, T: 25°C).

[2018-05-10 14:12:02] Detection: No fire detected, visualizing hottest point (X: 0, Y: 477, T: 22°C).

[2018-05-10 14:11:51] Detection: No fire detected, visualizing hottest point (X: 105, Y: 453, T: 27°C).

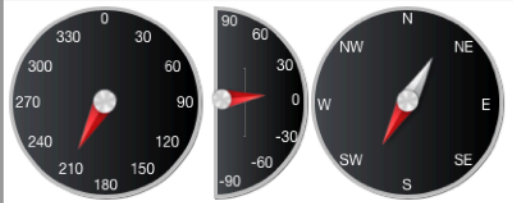
[2018-05-10 14:10:36] Detection: No fire detected, visualizing hottest point (X: 19, Y: 462, T: 31°C).

[2018-05-10 14:10:25] Detection: No fire detected, visualizing hottest point (X: 6, Y: 478, T: 29°C).

[2018-05-10 14:10:04] Detection: No fire detected, visualizing hottest point (X: 18, Y: 479, T: 32°C).

■ NVIS ■ CH1 ■ CH2 ■ PT

NAVIGATION



PTZ PRESETS TOUR



- ASPIres Vitosha [Pause] [Stop] [Close]
- Test [Play] [Close]
- Test\_3 [Play] [Close]

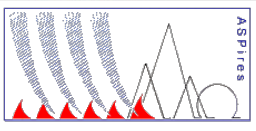
HOME IR DAY FIRE

**Digital**

- +

POLARITY NUC

**FOG**  On  Off



Advanced systems for prevention and early detection of forest fires

PATROLLING (ASPIRES VITOSHA)

Panorama

Optix IR

Preset: Zone\_06 2018-05-10 15:16:39

T: 22.1deg (C)

Channel 1

DayBreaker36

Preset: Zone\_06 2018-05-10 15:16:37

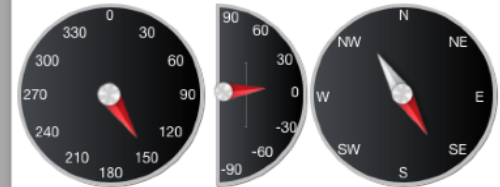
Channel 2

Log

- [2018-05-10 15:17:01] Detection: No fire detected, visualizing hottest point (X: 290, Y: 479, T: 27°C).
- [2018-05-10 15:16:50] Detection: No fire detected, visualizing hottest point (X: 18, Y: 443, T: 27°C).
- [2018-05-10 15:16:38] Detection: No fire detected, visualizing hottest point (X: 619, Y: 478, T: 22°C).
- [2018-05-10 15:16:28] Detection: No fire detected, visualizing hottest point (X: 0, Y: 477, T: 23°C).
- [2018-05-10 15:16:17] Detection: No fire detected, visualizing hottest point (X: 4, Y: 479, T: 27°C).
- [2018-05-10 15:16:06] Detection: No fire detected, visualizing hottest point (X: 12, Y: 352, T: 24°C).

NVIS CH1 CH2 PT

NAVIGATION



PTZ PRESETS TOUR

+

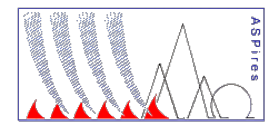
- Zone\_01 ▶ ⚙️ ✕
- Zone\_02 ▶ ⚙️ ✕
- Zone\_03 ▶ ⚙️ ✕
- Zone\_04 ▶ ⚙️ ✕

HOME IR DAY FIRE

Digital

- +

POLARITY NUC FOG  On  Off



Advanced systems for prevention and early detection of forest fires

PATROLLING (ASPIRES VITOSHA)

Panorama

Optix IR

Preset: Zone\_07

T: 26.66deg (C)

Channel 1

Menu "Gallery"

SCREENSHOTS VIDEO FIRE

| Name                        | Date                | Size    |   |   |
|-----------------------------|---------------------|---------|---|---|
| day_10-05-2018_07-42-54.mp4 | 2018-05-10 10:34:39 | 1,303KB | ▶ | ✕ |
| ir_10-05-2018_07-42-54.mp4  | 2018-05-10 10:34:38 | 1,669KB | ▶ | ✕ |
| ir_10-05-2018_10-34-26.jpg  | 2018-05-10 10:34:26 | 107KB   | ▶ | ✕ |
| day_10-05-2018_10-34-26.jpg | 2018-05-10 10:34:26 | 160KB   | ▶ | ✕ |
| day_10-05-2018_07-42-54.jpg | 2018-05-10 07:42:55 | 123KB   | ▶ | ✕ |
| ir_10-05-2018_07-42-54.jpg  | 2018-05-10 07:42:54 | 88KB    | ▶ | ✕ |

Log

[2018-05-10 15:17:56] Detection: No fire detected, visualizing hottest point (X: 637, Y: 479, T: 23°C).

[2018-05-10 15:17:46] Detection: No fire detected, visualizing hottest point (X: 22, Y: 462, T: 26°C).

[2018-05-10 15:17:34] Detection: No fire detected, visualizing hottest point (X: 10, Y: 479, T: 25°C).

[2018-05-10 15:17:23] Detection: No fire detected, visualizing hottest point (X: 605, Y: 472, T: 24°C).

[2018-05-10 15:17:12] Detection: No fire detected, visualizing hottest point (X: 15, Y: 479, T: 30°C).

[2018-05-10 15:17:01] Detection: No fire detected, visualizing hottest point (X: 260, Y: 479, T: 27°C).

NVIS CH1 CH2 PT

NAVIGATION



PTZ PRESETS TOUR

+

- Zone\_01 ▶ ⚙️ ✕
- Zone\_02 ▶ ⚙️ ✕
- Zone\_03 ▶ ⚙️ ✕
- Zone\_04 ▶ ⚙️ ✕

HOME IR DAY FIRE

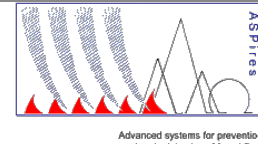
Digital

- +

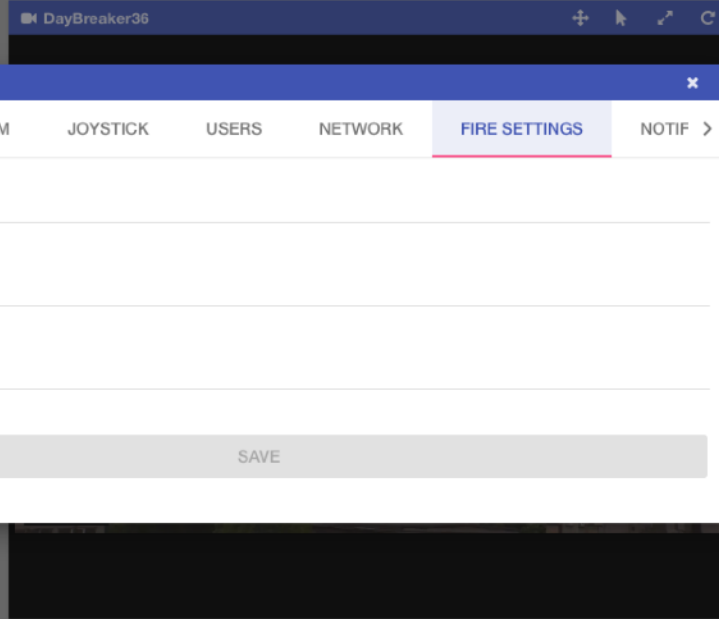
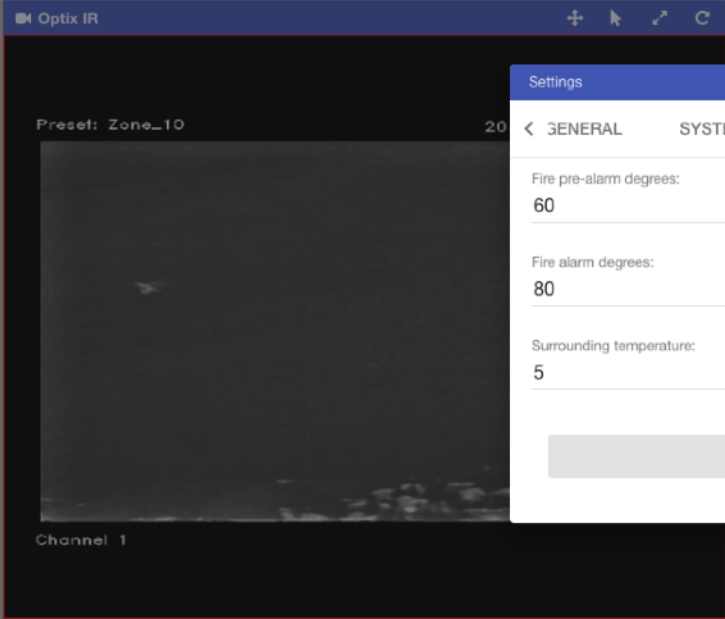
POLARITY NUC FOG

On  Off

PATROLLING (ASPIRES VITOSHA)



Advanced systems for prevention and early detection of forest fires



Settings

GENERAL SYSTEM JOYSTICK USERS NETWORK **FIRE SETTINGS** NOTIF

Fire pre-alarm degrees: 60

Fire alarm degrees: 80

Surrounding temperature: 5

SAVE

Log

[2018-05-10 15:18:51] Detection: No fire detected, visualizing hottest point (X: 0, Y: 471, T: 23°C).

[2018-05-10 15:18:40] Detection: No fire detected, visualizing hottest point (X: 615, Y: 468, T: 23°C).

[2018-05-10 15:18:29] Detection: No fire detected, visualizing hottest point (X: 19, Y: 442, T: 23°C).

[2018-05-10 15:18:18] Detection: No fire detected, visualizing hottest point (X: 21, Y: 479, T: 25°C).

[2018-05-10 15:18:18] optix opened menu 'Settings'.

[2018-05-10 15:18:07] Detection: No fire detected, visualizing hottest point (X: 638, Y: 479, T: 24°C).

NVIS CH1 CH2 PT

NAVIGATION



PTZ PRESETS TOUR



- Zone\_01 [play] [gear] [x]
- Zone\_02 [play] [gear] [x]
- Zone\_03 [play] [gear] [x]
- Zone\_04 [play] [gear] [x]

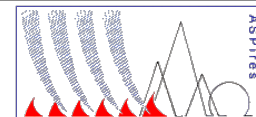
HOME IR DAY FIRE

Digital

- +

POLARITY NUC FOG  On  Off

PATROLLING (ASPIRES VITOSHA)

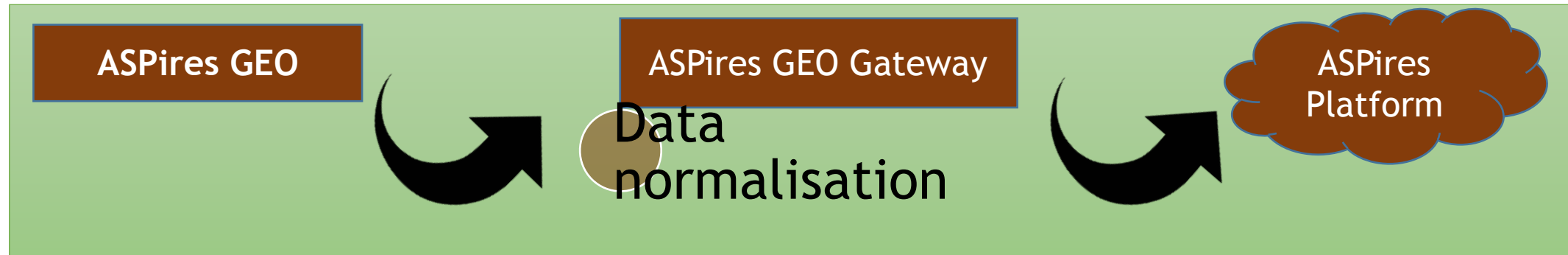


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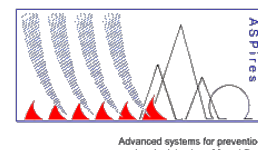
Basic principles for the use of  
ASPIRES-GEO



## ✓ First Principle



- ❑ The communication between ASPIres-GEO and the ASPIres platform is implemented through an intermediary, called ASPIres-GEO-Gateway.
- ❑ The Gateway concept allows the provision of normalised data to the ASPIres platform.
- ❑ Data normalisation allows their universal use, both individually and in conjunction with data from other types of sensors.

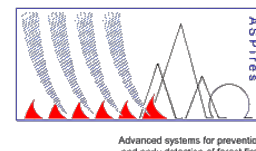




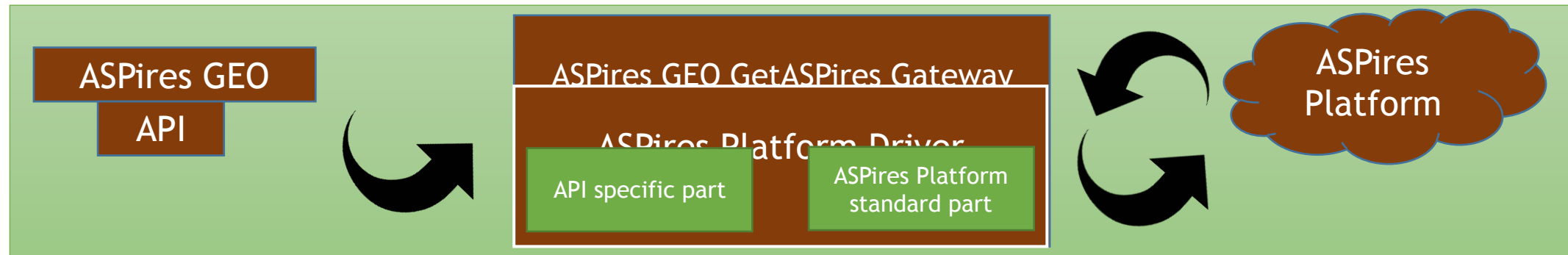
## ✓ Second Principle



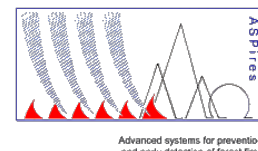
- ❑ The pan tilt device on which the cameras are attached is manageable.
- ❑ This allows the pre-defining of points of the forest area of the scanning area.
- ❑ Each point (PRESET) has a fixed area depending on the distance of the cameras to the scanned area.
- ❑ The Intelligent software, an element of ASPires-GEO, defines the warmest point within each PRESET.
- ❑ If the warmest element has a temperature higher than the predefined, then an alarm signal is generated.



## ✓ Third Principle

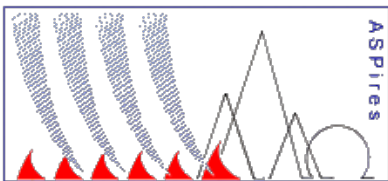


- ❑ ASPires-GEO provides an API interface.
- ❑ The API interface is specific to each technical implementation of a monitoring module.
- ❑ Through this interface, the data received from the sensors is transmitted to ASPires-GEO-Gateway.
- ❑ ASPires-GEO-Gateway includes a specialised ASPires Platform driver.
- ❑ This driver is engineered for any existing platform.





SOFTWARE  
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# ASPiRes

Thank You !