WORKSWELL WIRIS & GIS ETHERNET STREAM SDK

USER MANUAL

FW Version: 1.6.17 and higher

Release date: 25th May, 2022

Revision : 220525EN

WORKSWELL

Contents

1 User Information

1.1 Typographic Conventions

Following typographic conventions are used in this User Manual:

- UPPER CASE is used for the names of keys, buttons and menu items
- COURIER is used for filenames and paths
- Italic is used for important information and document names
- bold is used for the links to other sections, for function names or Internet sites

1.2 Help and Support

For technical questions that were not answered in this User Manual please check if no newer version exists on my.workswell.eu. If your questions remain unanswered feel free to contact your dealer or create a ticket on support.workswell.eu.

1.3 Updates

The primary aim of Workswell s.r.o. company is to supply their products in a way that meets the current needs of its users and at the same time to remove all the weaknesses that were found in their use as quickly possible. For this reason, Workswell s.r.o. regularly releases updates for all their products.

Please visit https://my.workswell.eu/ to download the latest firmware release. The update process itself is described in a later section.

1.4 Firmware

Firmware is the „internal“ control program of the device. From the user's point of view, only the official firmware released by Workswell s.r.o. company can be used for update of the device.

2 Revision history

Note: The most current version is available at my.workswell.eu

1.0

- Initial release

1.1

- Added shutter settings
- Added alarm color settings
- Added Hot and Cold Rejection for WWS
- New chapter for GUI Application

1.2

- Changed palettes commads
- Changed zoom commad to return index
- Added thermal transparency command
- Added copy data from SSD command

1.3

- Added commands for setting screenshot image.
- Added commands for setting video memory location.
- Added commands for setting thermal encoded video.

210412

- Added commands for GIS, fixed some command description.

210426

- Changed supported FW version, added commands about temperature unit change and added description to commands containing temperature as a result.

210518

- Reviewed and added all supported commands, added cooldown check command for GIS 320 camera, clarified thermal camera zoom commands.

210521

- Spellcheck and correction to some commands description, revision of the SDK app section.

210521

- Spellcheck and correction to some commands description, revision of the SDK app section.

220521

- added CWSI commands
- updated FTP

220525

- added link to latest version

3 Overview

This chapter includes basic information about the WIRIS & GIS Ethernet SDK.

3.1 Basic Information

Ethernet SDK is intended to stream video from WIRIS and GIS Camera Series and to control it over Ethernet connection. It replaces the HDMI output and RC transceiver input.

The SDK is currently compatible with these models of Workswell cameras:

- WIRIS PRO (WWP)
- WIRIS SECURITY (WWS)
- GIS 320 (GIS)
- WIRIS AGRO

Not all of the commands described in this documment work for every camera. This fact will be noted in each of these special commands.

Figure 3.1 – Supported devices.

The WIRIS and GIS 320 cameras run a TCP/IP server for the control. It can be controlled with simple text commands. The opened server is similar to telnet protocol and can be used with telnet terminal software.

The WIRIS and GIS 320 also run RTSP server for streaming the visible and thermal video. it can be viewed with GStreamer, FFmpeg, VLC or other software capable of opening RTSP streams.

Lastly, the FTP server is opened for data management.

Please note that the simultaneous usage of HDMI output, keyboard and RC controller with the Ethernet SDK is not possible.

3.2 Activating the SDK

The SDK in the WIRIS and GIS 320 devices needs to be activated. The license key can be purchased from our distributors or Workswell directly. Please contact our sales at sales@workswell.eu.

It can be activated with license code using TCP/IP server command or directly through the firmware by navigating to MENU -> ADVANCED -> SYSTEM -> EHTERNET STREAM SDK: ENTER LICENSE

3.3 Example Library

We have prepared simple open-source example library for the TCP/IP communication.

It is cross-platform (Linux, Windows or Mac) and uses the Boost ASIO library.

You can ask for the package with the tutorail application by contacting us at support.workswell.eu.

3.4 WIRIS IP Address

The default WIRIS IP Address is 10.0.0.230 and the default mask is 255.255.255.0.

These values can be changed in Advanced System Menu.

3.5 Getting Help and Suggestions

The WIRIS & GIS Ethernet SDK was created as stable and robust as possible. Still, if you find any bugs, inconveniences or if you have any suggestions for improvement, please contact us at support.workswell.eu.

4 Communication protocol description

This chapter contains information about the TCP/IP communication protocol and commands.

The server description:

- Port 2240
- Text-based communication protocol
- Can be connected to with telnet software
- Each command received by the server is at least acknowledged
- The commands are case sensitive, the server responses are always in upper case
- All temperatures in the examples are in degrees Celsius. The result of the command is returned in set temperature unit of the camera. Please see 4.5

The most common responses are `OK` in case of success and `ERR` in case of error. When parameters are given or returned, they are separated by one space.

Parameter	Value
Protocol	TCP
Port number	2240

Table 4.1 – Protocol parameters

4.1 Commands - Basic

Hereby the commands for controlling the WIRIS & GIS device follow. The basic commands can be used without the Ethernet SDK activation.

4.1.1 Set commands delimiter

Set the delimiter for command messages. This delimiter is used for detecting the end of a command. Default value is `LINE` for the '\n' character. It can be changed to `NULL` for the '\0' character.

The `LINE` is used for telnet, the `NULL` is better for software development.

- Command
  - `SDLM NULL`
- Answer
  - `OK`

4.1.2 Get commands delimiter

Returns the current commands delimiter.

- Command
  - `GDLM`
- Answer
  - `LINE` or `NULL`

4.1.3 Check connection

Command used for checking the connection.

- Command
  - `HIWS`
- Answer
  - `OK`

4.1.4 Get camera serial number

Returns WIRIS or GIS 320 device serial number.

- Command
  - `GSRN`
- Answer
  - `XXXX-WWP-YYMMDD` or `XXXX-WWS-YYMMDD` or `XXXX-GIS-YYMMDD`

4.1.5 Get camera article number

Returns WIRIS or GIS 320 device article number where RRR stands for resolution, SSS stands for camera speed (either FNL or SNL for WWP and F or S for WWS) and DDD stands for ssd size (either 128, 256 or 512). XX stands for field of view of the GIS 320 camera (either 14 or 24).

- Command
  - `GATN`
- Answer
  - `WWP-US-RRR-SSS-DDD` or `WWP-SC-US-RRR-SSS-DDD` or `WWS-RRR-S-DDD` or `GIS-RRR-XX`

4.1.6 Get camera version

Returns WIRIS or GIS 320 firmware version.

- Command
  - `GFWV`
- Answer
  - `1.2.3`

4.1.7 Get CPU temperature

Returns WIRIS or GIS 320 device internal temperature.

- Command
  - `GTCU`
- Answer
  - `32.10`

4.1.8 Get thermal camera temperature

Returns WIRIS thermal camera core temperature or GIS 320 temperature on the thermal core board.

- Command
  - `GTIC`
- Answer
  - `32.10`

4.1.9 Get device temperature

Returns WIRIS or GIS 320 internal device temperature.

- Command
  - `GTIN`
- Answer
  - `32.10`

4.1.10 Start logging SBUS debug

Activate or deactivate WIRIS/GIS 320 SBUS debug logging.

- Command
  - `SLSB TRUE` or `SLSB FALSE`
- Answer
  - `OK`

4.1.11 Start logging MAVLINK debug

Activate or deactivate WIRIS/GIS 320 MAVLINK debug logging.

- Command
  - `SLMD TRUE` or `SLMD FALSE`
- Answer
  - `OK`

4.1.12 Get fan power in percent

Returns the percent value of the fan power.

- Command
  - `GFPW`
- Answer
  - `100`

4.2 Commands - Activation

All the following commands are inaccessible unless the Ethernet SDK is activated for the given WIRIS camera.

The activation needs to be done once per device. After the activation, the WIRIS/GIS 320 saves the activation code and does not need to be activated again.

4.2.1 Activate

To activate the device, send the license number with following command.

- Command
  - `ACTV ACTIVATION-NUMBER-123`
- Answer
  - `OK`

4.2.2 Is activated

Check if WIRIS or GIS is activated.

- Command
  - `IACT`
- Answer
  - `TRUE` or `FALSE`

4.3 Commands - Ethernet Mode

This command will start or stop the Ethernet Mode. In Ethernet Mode mode, WIRIS/GIS 320 will stop streaming cameras to HDMI and the RTSP server is started.

Please note that all the following commands can be used without the Ethernet Mode, but it is highly recommended to exclude the combination of Ethernet set commands and the usage of RC or keyboard.

You can still use the HDMI for thermal and visible streams and use the ethernet commands from this document with the Ethernet Mode turned off.

4.3.1 Set Ethernet Mode

Sets the Ethernet Mode ON or OFF with `TRUE` or `FALSE`.

- Command
  - `SETH TRUE`
- Answer
  - `OK`

4.3.2 Get Ethernet Mode

Returns if the Ethernet Mode is active.

- Command
  - `GETH`
- Answer
  - `TRUE` or `FALSE`

4.4 GPS

4.4.1 Get GPS coordinates

Get the current GPS coordinates as long as it is provided to the camera; it relies on external source. Returns either `N/A` when GPS is not connected, `INVALID` when GPS data is not valid or the coordinates in following format:

```
LATITUDE 14.4444 S
LONGITUDE 57.5555 W
AlLTITUDE 156.156
```

- Command
  - `GGPS`
- Answer

- `INVALID`, `N/A` or coordinates

4.5 Units

In this section you will find commands to set the temperature unit for the camera. The results of other commands that are sending temperature values will take this setting into considiration and send the result calculated accordingly.

4.5.1 Get temperature unit

Returns the current temperature unit setting. The possible camera temperature units are degree Celsius (C), Farenheit (F) or Kelvin (K).

- Command
  - `GTUT`
- Answer
  - `C`, `F` or `K`

4.5.2 Set temperature unit

Sets the temperature unit to degree Celsius, degree Farenheit or Kelvin.

- Command
  - `STUT C`, `STUT F` or `STUT K`
- Answer
  - `OK`

4.6 Range

Please refer to the WIRIS Pro or GIS 320 User Manual for more indepth explanation of these parameters.

Range settings is available only for WIRIS Pro and GIS 320.

4.6.1 Get range mode

Returns the current range mode.

- Command
  - `GRMD`
- Answer
  - `AUTOMATIC`, `MANUAL` or `SPAN`

4.6.2 Set range mode

Sets the thermal range mode to `AUTOMATIC`, `MANUAL` or `SPAN`.

- Command
  - `SRMD AUTOMATIC`
- Answer
  - `OK`

4.6.3 Get manual range

Returns the currently set manual thermal range minimum and maximum.

- Command
  - `GRMM`
- Answer
  - `20.0 40.0`

4.6.4 Set manual range

Sets the thermal manual range minimum and maximum

- Command
  - `SRMM 20.0 40.0`
- Answer
  - `OK`

4.6.5 Get span range

Returns the current span range window and center.

- Command
  - `GRWC`
- Answer
  - `10.0 30.0`

4.6.6 Set span range

Sets the manual range window and center

- Command
  - `SRWC 10.0 30.0`

- Answer
  - `OK`

4.6.7 Get environment

Returns current thermal environment (absolute temperature range) setting for WWP or GIS

- Command
  - `GREN`
- Answer for WWP
  - `-25.0 150.0` or `-40.0 550.0` or `100.0 1000.0` or `400.0 1500.0`
- Answer for GIS
  - `-40.0 -10.0` `-10.0 30.0` or `10.0 60.0` or `30.0 350.0`

4.6.8 Get list of environments

Returns the list of available thermal environments. Each line is one environment.

- Command
  - `GREL`
- List of environments for WWP:
  - `-25.0 150.0`
  - `-40.0 550.0`
  - `100.0 1000.0`
  - `400.0 1500.0`
- List of environments for GIS:
  - `-40.0 -10.0`
  - `-10.0 30.0`
  - `10.0 60.0`
  - `30.0 350.0`

4.6.9 Set environment

Sets the environment settings. Use just the maximum value of the range. This command can take up to 10 seconds to perform. The GIS 320 camera needs to have the lens cap placed in front of the lens before sending this command.

- Command
  - `SREN 150.0`

- Answer
  - `OK`
- List of possible commands for WWP:
  - `SREN 150.0`
  - `SREN 550.0`
  - `SREN 1000.0`
  - `SREN 1500.0`
- List of possible commands for GIS:
  - `SREN 30.0`
  - `SREN 60.0`
  - `SREN 350.0`

4.7 WIRIS Security thermal parameters

Specific parameters for WWS thermal camera.

4.7.1 Get time stabilization

Returns thermal camera time stabilization in seconds.

- Command
  - `GTST`
- Answer
  - `2.4`

4.7.2 Set time stabilization

Sets thermal camera time stabilization in seconds.

- Command
  - `STST 2.4`
- Answer
  - `OK`

4.7.3 Get hot rejection

Returns hot rejection in percent.

- Command

    - `GHRJ`
- Answer
    - `2.4`

4.7.4 Set hot rejection

Sets hot rejection in percent.

- Command
    - `SHRJ 2.4`
- Answer
    - `OK`

4.7.5 Get cold rejection

Returns cold rejection in percent.

- Command
    - `GCRJ`
- Answer
    - `2.4`

4.7.6 Set cold rejection

Sets cold rejection in percent.

- Command
    - `SCRJ 2.4`
- Answer
    - `OK`

4.8 WIRIS AGRO thermal parameters

Specific parameters for WIRIS AGRO thermal camera.

4.8.1 Get CWSI mode

Returns CWSI mode.

- Command

    - `GCWM`
- Answer
    - `THEORETIC`

4.8.2 Set CWSI mode

Sets CWSI mode by name. The available modes are `EMPIRICAL`, `THEORETIC` and `DIFFERENTIAL`

- Command
    - `SCWM EMPIRICAL`
- Answer
    - `OK`

4.8.3 Get air temperature

Returns air temperature in degrees. Works only for `THEORETIC` and `DIFFERENTIAL` mode.

- Command
    - `GCAT`
- Answer
    - `20.0`

4.8.4 Set air temperature

Sets air temperature in degrees from 0.0 to 60.0. Works only for `EMPIRICAL` mode.

- Command
    - `SCAT 20.0`
- Answer
    - `OK`

4.8.5 Get 100 % stress level

Returns CWSI camera 100 % stress level in degrees. Works only for `EMPIRICAL` mode.

- Command
    - `GUSL`
- Answer
    - `25.5`

4.8.6 Set 100 % stress level

Sets CWSI camera 100 % stress level. Works only for `EMPIRICAL` mode. Without parameters

- Command
  - `SUSL`
- Answer
  - `OK`

4.8.7 Get 0 % stress level

Returns CWSI camera 0 % stress level in degrees. Works only for `EMPIRICAL` mode.

- Command
  - `GLSL`
- Answer
  - `25.5`

4.8.8 Set 0 % stress level

Sets CWSI camera 0 % stress level. Works only for `EMPIRICAL` mode. Without parameters

- Command
  - `SLSL`
- Answer
  - `OK`

4.8.9 Get crop

Returns crop index. Works only for `THEORETIC` mode.

- Command
  - `GCRP`
- Answer
  - `1`

4.8.10 Set crop

Sets crop by index from 1 to 3. Works only for `THEORETIC` mode.

- Command
  - `GCRP 1`

- Answer
  - `OK`

4.8.11 Get relative humidity

Returns relative humidity in percent. Works only for `THEORETIC` mode.

- Command
  - `GCHY`
- Answer
  - `50.0`

4.8.12 Set relative humidity

Sets relative humidity in percent from 0.0 to 100.0. Works only for `THEORETIC` mode.

- Command
  - `SCHY 40.0`
- Answer
  - `OK`

4.8.13 Get d1

Returns d1 constant. Works only for `THEORETIC` mode.

- Command
  - `GEDF`
- Answer
  - `1.40`

4.8.14 Get d2

Returns d2 constant. Works only for `THEORETIC` mode.

- Command
  - `GEDS`
- Answer
  - `-0.40`

4.8.15 Get intercept baseline

Returns intercept baseline value. Works only for `THEORETIC` mode.

- Command
  - `GINB`
- Answer
  - `1.21`

4.8.16 Set intercept baseline

Sets intercept baseline value from 0.0 to 10.0. Works only for `THEORETIC` mode.

- Command
  - `SINB 1.1`
- Answer
  - `OK`

4.8.17 Get slope baseline

Returns slope baseline value. Works only for `THEORETIC` mode.

- Command
  - `GSLB`
- Answer
  - `-1.21`

4.8.18 Set slope baseline

Sets slope baseline value from -5.0 to 0.0. Works only for `THEORETIC` mode.

- Command
  - `SSLB -1.1`
- Answer
  - `OK`

4.8.19 Get CWSI cross value

Returns the percents of CWSI for each cross or `OUT_OF_RANGE`. Returns `OFF` if this option is off.

- Command
  - `GCWP`

- Answer
  - `MAXIMUM 30.12`
    `MINIMUM OUT_OF_RANGE`
    `CENTER OUT_OF_RANGE`

4.8.20 Get CWSI graph ratios

Returns the percents for each part of the CWSI graph or `NOT_ENOUGH_DATA`.

- Command
  - `GCGR`
- Answer
  - `10.0 20.0 30.0 40.0 0.0`

4.8.21 Get current lens

Returns current lens index.

- Command
  - `GLEN`
- Answer
  - `0`

4.8.22 Get lens list

Returns lens list with indexes.

- Command
  - `GLEL`
- Answer
  - `0 640P-45D-13MM`
    `1 640P-32D-19MM`

4.8.23 Set lens

Sets current lens by index.

- Command
  - `SLEN 0`
- Answer
  - `OK`

Following commands refer to UI settings available only for WIRIS AGRO.

4.8.24 Get show center CWSI Value

Returns true if the Center CWSI cross is shown.

- Command
  - `GCWV`
- Answer
  - `TRUE`

4.8.25 Set show center CWSI Value

Sets if the Center CWSI cross is shown.

- Command
  - `SCWV TRUE`
- Answer
  - `OK`

4.8.26 Get GPS info option

Returns GPS info option.

- Command
  - `GGPI`
- Answer
  - `TRUE`

4.8.27 Set GPS info option

Sets GPS info option. Variants are: `POSITION` and `ALTITUDE_SPEED`.

- Command
  - `SGPI POSITION`
- Answer
  - `OK`

4.8.28 Get image interpolation

Get thermal camera image interpolation value (ON / OFF). This command is supported only by WIRIS AGRO.

- Command
  - `GIIN`
- Answer
  - `TRUE` or `FALSE`

4.8.29 Set image interpolation

Set thermal camera image interpolation ON / OFF. This command is supported only by WIRIS AGRO.

- Command
  - `SIIN TRUE` or `SIIN FALSE`
- Answer
  - `OK`

4.9 Appearance

4.9.1 Get main camera

Returns camera for main display: `THERMO` or `VISIBLE`.

- Command
  - `GMCA`
- Answer
  - `VISIBLE`

4.9.2 Set main camera

Set camera for main display: `THERMO` or `VISIBLE`.

- Command
  - `SMCA THERMO`
- Answer
  - `OK`

4.10 Zoom

4.10.1 Zoom in signal

Zooms current main camera in. This command works for thermal camera only outside of the ethernet mode while you work with the camera stream connected to the HDMI output.

- Command
  - `SZIN`
- Answer
  - `OK`

4.10.2 Zoom out signal

Zooms current main camera out. This command works for thermal camera only outside of the ethernet mode while you work with the camera stream connected to the HDMI output.

- Command
  - `SZOT`
- Answer
  - `OK`

4.10.3 Get thermal camera zoom

Returns thermal camera current zoom index and zoom ratio.

- Command
  - `GZTV`
- Answer
  - `3 2.5`

4.10.4 Get list of thermal camera zooms

Get list of all available zooms of thermal camera. Each line has index number and zoom ratio value.

- Command
  - `GZTL`
- Answer
  - `0 1.0`
  - `1 2.0`
  - `...`

4.10.5 Set thermal camera zoom index

Sets the thermal camera zoom index number.

Thermal camera has only digital zoom, so the stream is not inflicted by the zoom value. The zoom changes the area where maximum and minimum values are looked for. This command works only outside of the ethernet mode while you work with the camera stream connected to the HDMI output.

- Command
  - `SZTN 1`
- Answer
  - `OK`

4.10.6 Get zoom simultaneously option

Returns zoom simultaneously option (`TRUE` or `FALSE`). Available only in `DUALSCREEN` mode.

- Command
  - `GZSM`
- Answer
  - `TRUE`

4.10.7 Set zoom simultaneously option

Sets zoom simultaneously option (`TRUE` or `FALSE`). Available only in `DUALSCREEN` mode.

- Command
  - `SZSM TRUE`
- Answer
  - `OK`

4.10.8 Get visible camera zoom

Returns visible camera current zoom index and zoom ratio.

- Command
  - `GZVV`
- Answer
  - `3 2.5`

4.10.9 Get list of visible camera zooms

Get list of all available zooms of visible camera. Each line has index number and zoom ratio value.

- Command
  - `GZVL`
- Answer
  - `0 1.0`
  - `1 2.0`
  - `...`

4.10.10 Set visible camera zoom index

Sets the visible camera zoom index number.

- Command
  - `SZVN 1`
- Answer
  - `OK`

4.10.11 Focus GIS 320 Auto

Automatically focuses the GIS 320 camera. This command is only available for the GIS 320 device.

- Command
  - `SGFA`
- Answer
  - `OK`

4.10.12 Focus GIS 320 Infinity

Focuses the GIS 320 camera to infinity. This command is only available for the GIS 320 device.

- Command
  - `SGFI`
- Answer
  - `OK`

4.10.13 Get differential gas mode

Returns if the differential gas mode measurement is running. This command is only available for the GIS 320 device.

- Command
  - `GDGM`
- Answer
  - `TRUE` or `FALSE`

4.10.14 Set differential gas mode

Start or stop differential gas mode measurement. This command is only available for the GIS 320 device.

- Command
  - `SDGM TRUE` or `SDGM FALSE`
- Answer
  - `OK`

4.10.15 Get high sensitivity mode

Returns if the high sensitivity mode measurement is running. This command is only available for the GIS 320 device.

- Command
  - `GHSM`
- Answer
  - `TRUE` or `FALSE`

4.10.16 Set high sensitivity mode

Start or stop high sensitivity mode measurement. This command is only available for the GIS 320 device.

- Command
  - `SHSM TRUE` or `SHSM FALSE`
- Answer
  - `OK`

4.10.17 Get cooling down time

Returns the cooling down time in seconds of the camera. This command is only available for the GIS 320 device. The GIS 320 camera will start streaming thermal iamge after this time reaches 0. If the cooling down time is -1,

the GIS 320 camera is not turned on.

- Command
  - `GCDT`
- Answer
  - `60`

4.11 Palettes of thermal video stream

These commands don't work for WIRIS AGRO.

4.11.1 Get palette

Returns current palette index and name.

- Command
  - `GPTE`
- Answer
  - `0 GRAY`

4.11.2 Get palette list

Returns all the available palettes. Each line is one palette index and name ("0 GRAY").

- Command
  - `GPTL`

4.11.3 Set palette

Set palette by name.

- Command
  - `SPTE GRAY`

4.11.4 Set palette by index

Set palette by index.

- Command
  - `SPTI 0`

4.12 Colourmap

These commands work only for WIRIS AGRO

4.12.1 Get colourmap

Returns current colourmap name.

- Command
  - `GCMP`
- Answer
  - `CROP_MAP`

4.12.2 Get colourmap list

Returns available colourmap list.

- Command
  - `GCML`
- Answer
  - `0 CROP_MAP`
    `1 CROPSTEP_MAP`
    `2 WATER_MAP`
    `3 WATERSTEP_MAP`

4.12.3 Set colourmap

Sets current colourmap by index.

- Command
  - `SCMP 0`
- Answer
  - `OK`

4.13 Capture and record

4.13.1 Capture

Triggers the image capture. The command returns an acknowledgement right away, but the capture itself can take up to several seconds depending on the settings. Returns `NOT_READY` in the case the capture cannot be initiated due to the last one not being finished yet.

- Command
  - `CPTR`
- Answer
  - `OK` or `NOT_READY`

4.13.2 Is capturing

Check if capture in progress.

- Command
  - `ICPT`
- Answer
  - `TRUE` or `FALSE`

4.13.3 Recording start

Start recording thermal and visible video according to settings.

- Command
  - `RCRS`
- Answer
  - `OK` or `NOT_READY`

4.13.4 Recording finish

Stops recording of thermal and visible video.

- Command
  - `RCRF`
- Answer
  - `OK` or `NOT_READY`

4.13.5 Is recording

Check if recording is in progress.

- Command
  - `IRCR`
- Answer
  - `TRUE` or `FALSE`

4.13.6 Image correction(NUC)

Triggers NUC.

- Command
  - `IMCR`
- Answer
  - `OK`

4.13.7 Get periodic image capture option

Returns periodic image capture option (`OFF` or 1-60).

- Command
  - `GPIC`
- Answer
  - `5`

4.13.8 Set periodic image capture option

Sets periodic image capture option (0-60).

- Command
  - `SPIC 30`
- Answer
  - `OK`

4.13.9 Get geofencing trigger option

Returns geofencing trigger option (`OFF` or `ON`).

- Command
  - `GGFT`
- Answer
  - `OFF`

4.13.10 Set geofencing trigger option

Sets geofencing trigger option (`OFF` or `ON`).

- Command
  - `SGFT ON`

- Answer
  - `OK`

Following commands work only if geofencing trigger is `ON`.

4.13.11 Get capture start flight level

Returns capture start flight level in meters.

- Command
  - `GBFL`
- Answer
  - `60.0`

4.13.12 Set capture start flight level

Sets capture start flight level(`40.0-400.0`) in meters.

- Command
  - `SBFL 60.0`
- Answer
  - `OK`

4.13.13 Get capture stop flight level

Returns capture stop flight level in meters.

- Command
  - `GEFL`
- Answer
  - `60.0`

4.13.14 Set capture stop flight level

Sets capture start flight level(`0.0-capture start flight level`) in meters.

- Command
  - `SEFL 60.0`
- Answer
  - `OK`

4.13.15 Get capture speed below level

Returns capture speed below in meters per second.

- Command
  - `GCSB`
- Answer
  - `6.0`

4.13.16 Set capture speed below level

Sets capture speed below (0.1-10.0) in meters per second.

- Command
  - `SCSB 6.0`
- Answer
  - `OK`

4.14 Alarms

4.14.1 Get alarm mode

Returns current alarm mode.

- Command
  - `GALM`
- Answer
  - `OFF`, `ABOVE`, `BELOW`, `BETWEEN`, or `OUTSIDE`

4.14.2 Set alarm mode

Set alarm mode `OFF`, `ABOVE`, `BELOW`, `BETWEEN`, or `OUTSIDE`.

- Command
  - `SALM OFF`
- Answer
  - `OK`

4.14.3 Get alarm values

Get alarm thresholds; below and above.

- Command
  - `GALV`
- Answer
  - `20.0 40.0`

4.14.4 Set alarm values

Set alarm thresholds; below and above.

- Command
  - `SALV 20.0 40.0`
- Answer
  - `OK`

4.14.5 Get alarm colors

Get alarm colors: above, between and below. Possible colors are red, green or blue.

- Command
  - `GALC`
- Answer
  - `RED GREEN BLUE`

4.14.6 Set alarm colors

Set alarm colors: above, between and below. Possible colors are red, green or blue.

- Command
  - `SALC RED GREEN BLUE`
- Answer
  - `OK`

4.15 Thermal camera

Thermal camera settings are currently supported only for WIRIS Pro and some are supported by GIS 320, others by WIRIS AGRO. The commands that are supported by GIS 320 or WIRIS AGRO will have the fact noted in the description.

4.15.1 Get emissivity

Returns current thermal camera emissivity. This command is supported by both WIRIS Pro and GIS 320, but not WIRIS AGRO.

- Command
  - `GTEM`
- Answer
  - `0.95`

4.15.2 Set emissivity

Set thermal camera emissivity from 0.5 to 1.0. . This command is supported by both WIRIS Pro and GIS 320, but not WIRIS AGRO.

- Command
  - `STEM 0.95`
- Answer
  - `0.95`

4.15.3 Get reflected temperature

Get thermal camera reflected temperature from -40.0 to 100.0. This command is supported only by GIS 320.

- Command
  - `GTRT`
- Answer
  - `20.0`

4.15.4 Set reflected temperature

Set thermal camera reflected temperature from -40.0 to 100.0. This command is supported only by GIS 320.

- Command
  - `STRT 20.0`
- Answer
  - `OK`

4.15.5 Get atmospheric temperature

Get thermal camera atmospheric temperature from -40.0 to 100.0. This command is supported only by GIS 320.

- Command
  - `GTAT`
- Answer
  - `20.0`

4.15.6 Set atmospheric temperature

Set thermal camera atmospheric temperature from -40.0 to 100.0. This command is supported only by GIS 320.

- Command
  - `STAT 20.0`
- Answer
  - `OK`

4.15.7 Get image interpolation

Get thermal camera image interpolation value (ON / OFF). This command is not supported by WIRIS Security.

- Command
  - `GTII`
- Answer
  - `TRUE` or `FALSE`

4.15.8 Set image interpolation

Set thermal camera image interpolation ON / OFF. This command is not supported by WIRIS Security.

- Command
  - `STII TRUE` or `STII FALSE`
- Answer
  - `OK`

4.15.9 Get shutter period

Get thermal camera shutter period in seconds. This command is not supported by GIS 320.

- Command
  - `GTCP`
- Answer
  - `120`

4.15.10 Set shutter period

Set thermal camera shutter period in seconds 120-1800. This command is not supported by GIS 320.

- Command
  - `STCP 120`
- Answer
  - `OK`

4.15.11 Get synchronous shutter settings

Returns the current synchronous shutter settings. This command is not supported by GIS 320.

- Command
  - `GTSC`
- Answer
  - `TRUE` or `FALSE`

4.15.12 Set synchronous shutter settings

Set the synchronous shutter option on or off, `TRUE` or `FALSE`. This command is not supported by GIS 320.

- Command
  - `STSC TRUE`
- Answer
  - `OK`

4.15.13 Perform thermal camera shutter

Performs the thermal camera shutter immediately. This command is supported by both WIRIS and GIS 320. You need to place a shutter in from of the lens when sending this command for the GIS 320 camera (cap of the lens). GIS 320 does not have integrated shutter.

- Command
  - `DTSR`
- Answer
  - `OK`

4.15.14 Get seconds to next thermal camera shutter

Returns the number of seconds to next shutter or ”N/A” if asynchronous. This command is not supported by GIS 320.

- Command
  - `GTSN`
- Answer
  - `123` or `N/A`

4.15.15 Get seconds from last thermal camera shutter

Returns the number of seconds from last thermal camera shutter. This command is not supported by GIS 320.

- Command
  - `GTSL`
- Answer
  - `123`

4.16 Image and video settings

WWS, WIRIS AGRO and GIS do not support the super-resolution and WWS does not support the TIFF images. WWS captures and records the thermal image and video instead of the radiometric image and video.

4.16.1 Get radiometric JPEG image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `GIRJ`
- Answer
  - `TRUE` or `FALSE`

4.16.2 Get radiometric TIFF image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WIRIS AGRO, WWP and GIS cameras.

- Command
  - `GIRT`
- Answer
  - `TRUE` or `FALSE`

4.16.3 Get CWSI TIFF image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported only by WIRIS AGRO.

- Command
  - `GICT`
- Answer
  - `TRUE` or `FALSE`

4.16.4 Get screenshot JPEG image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `GISS`
- Answer
  - `TRUE` or `FALSE`

4.16.5 Get super-resolution image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP camera only.

- Command
  - `GISR`
- Answer
  - `TRUE` or `FALSE`

4.16.6 Get visible image settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `GIVI`
- Answer
  - `TRUE` or `FALSE`

4.16.7 Get radiometric video settings

Returns whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WIRIS AGRO, WWP and GIS cameras.

- Command
  - `GVTH`
- Answer
  - `TRUE` or `FALSE`

4.16.8 Get thermal encoded video settings

Returns whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `GVTE`
- Answer
  - `TRUE` or `FALSE`

4.16.9 Get visible video settings

Returns whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `GVVI`
- Answer
  - `TRUE` or `FALSE`

4.16.10 Set radiometric JPEG image settings

Sets whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `SIRJ TRUE`
- Answer
  - `OK`

4.16.11 Set radiometric TIFF image settings

Sets whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WIRIS AGRO, WWP and GIS cameras.

- Command
  - `SIRT TRUE`
- Answer
  - `OK`

4.16.12 Set CWSI TIFF image settings

Sets whether the image should be captured, `TRUE` or `FALSE`. This command is supported only by WIRIS AGRO.

- Command
  - `SICT TRUE`
- Answer
  - `OK`

4.16.13 Set screenshot JPEG settings

Returns whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `SISS TRUE`
- Answer
  - `OK`

4.16.14 Set super-resolution image settings

Sets whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP camera only.

- Command
  - `SISR TRUE`
- Answer
  - `OK`

4.16.15 Set visible image settings

Sets whether the image should be captured, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `SIVI TRUE`
- Answer
  - `OK`

4.16.16 Set radiometric video settings

Sets whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WIRIS AGRO, WWP and GIS cameras.

- Command
  - `SVTH TRUE`
- Answer
  - `OK`

4.16.17 Set thermal encoded video settings

Sets whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `SVTE TRUE`
- Answer
  - `OK`

4.16.18 Set visible video settings

Sets whether the video should be recorded, `TRUE` or `FALSE`. This command is supported by WWP, WIRIS AGRO, WWS and GIS cameras.

- Command
  - `SVVI TRUE`
- Answer
  - `OK`

4.16.19 Get image location

Return the current image location settings.

- Command
  - `GILC`

- Answer
  - `SSD`, `SD_CARD` or `FLASH_DRIVE`

4.16.20 Set video location

Set the memory for saving the video (thermal and visible). This will change the memory where the video is captured, `SSD`, `SD_CARD` or `FLASH_DRIVE`.

Use caution, it is not recommended to save video to other memory than to SSD disk. Thermal video can be up to 18 MB/s, visible video is between 2 - 8 MB/s. This is over the SD card speed and way over the flash drive speed (for the WIRIS and GIS platforms). This means that there can be missing some frames in video, the video can be corrupted and the image saving time would be much longer when recording. This all depends on the SD card speed and thermal camera used and the type of stream you are recording (temperature data or encoded stream).

- Command
  - `SVLC SSD`
- Answer
  - `OK`

4.16.21 Get video location

Return the current video location settings.

- Command
  - `GVLC`
- Answer
  - `SSD`, `SD_CARD` or `FLASH_DRIVE`

4.16.22 Set image location

Set the current image location settings. This will change the memory where the images are captured, `SSD`, `SD_CARD` or `FLASH_DRIVE`.

- Command
  - `SILC SSD`
- Answer
  - `OK`

4.17 Date and time

4.17.1 Get date and time

Return the current date and time in strict format `yyyy/MM/dd-hh:mm:ss`.

- Command
  - `GDTI`
- Answer
  - `2019/06/21-10:44:51`

4.17.2 Set date and time

Set the date and time in strict format `yyyy/MM/dd-hh:mm:ss`.

- Command
  - `SDTI 2019/06/21-10:44:51`
- Answer
  - `OK`

4.18 Memory

There are three types of memory: `SSD`, `SD_CARD` or `FLASH_DRIVE`.

The following commands returns the status of each memory on one line like:
`SSD SOME_STATUS`
`SD_CARD SOME_STATUS`
`FLASH_DRIVE SOME_STATUS`

4.18.1 Get saving time

Return the current saving time in seconds.

- Command
  - `GEST`
- Answer
  - `1.4`

4.18.2 Get memory status

Return the current memory status, each line one memory type.

- Command
  - `GMST`
- Answer
  - `READY`, `CONNECTED` or `N/A`

4.18.3 Get memory size

Return the current memory size in bytes, each line one memory type.

- Command
  - `GMSI`
- Answer
  - `SSD 123456789`

4.18.4 Get memory free

Return the current free memory in percent, each line one memory type.

- Command
  - `GMFR`
- Answer
  - `SSD 88.88`

4.18.5 Get captured images

Return the current captured images, each line one memory type.

- Command
  - `GMCP`
- Answer
  - `SSD 1234`

4.18.6 Get recorded thermal video

Return the recorded radiometric video in seconds.

- Command
  - `GTRC`
- Answer
  - `1234`

4.18.7 Get recorded visible video

Return the recorded visible video in seconds.

- Command
  - `GVRC`
- Answer
  - `1234`

4.18.8 Copy data from SSD to external memory

Copy all data from SSD to other memory, either SD card, or USB flash disk. This operation can take a lot of time (up to hours in case of full SSD disk).

Thus this commands has two parts. Firstly, start the copying. Then periodically check the status.

Please check that the memory has enough space, otherwise the `ERROR` answer is returned.

- Command
  - `CPST SD_CARD`, `CPST FLASH_DRIVE`
- Answer
  - `OK`, `N/A`, `ERROR`

Status can be `OK` for done, `ERROR` for any error during the copy procedure, and number `0` to `100` as a progress in percent.

- Command
  - `CPSS`
- Answer
  - `OK`, `ERROR`, `23`

4.19 Stream

4.19.1 Get thermal camera resolution

Return the resolution of thermal camera - width and height.

- Command
  - `GTRE`
- Answer
  - `640 512`

4.19.2 Get thermal extremes

Return the current thermal camera extremes. The extreme consists out of coordinates X and Y and the extreme value in the currently set temperature unit (in degrees Celsius, Farenheit or Kelvin). Each extreme takes one line like:

```
MAXIMUM X Y VALUE
MINIMUM 300 100 10.000
CENTER 320 256 25.555
```

WWS returns only the positions of extremes, without the values.

- Command
  - `GTEX`

4.19.3 Get palette values

Returns current palette values used for creating the thermal image from gray image.

The palette consists out of 256x3 values. Each line is RGB pixel represented by three values from 0 to 255.

The top most value is the hottest color, the bottom values is the coldest color. Here is short example of answer:

```
0 0 0
2 0 2
4 0 4
.
.
.
```

- Command
  - `GPLV`

4.20 Trigger

In this section you can find commands to set and get trigger options. This commands work on all cameras.

4.20.1 Get trigger

Returns actual trigger option.

- Command
  - `GTRG`
- Answer
  - `RECORD`

4.20.2 Set trigger

Sets actual trigger option. Variants are: `CORRECTION`, `CAPTURE`, `RECORD` and `NA`(not available)

- Command
  - `STRG NA`
- Answer
  - `OK`

4.21 System

4.21.1 Default settings

Set the default settings, can take up to 10 seconds. This command will exit the Ethernet Mode.

- Command
  - `SDST`
- Answer
  - `OK`

4.21.2 Reboot

Reboot the WIRIS or GIS 320 device.

- Command
  - `REBT`
- Answer
  - `OK`

5 RTSP Video Server

This chapter contains information about the RTSP server and video streams.

When the Ethernet Mode is activated, the RTSP server is opened on standard port. The address is:

- Thermal stream
  - rtsp://10.0.0.230:8554/thermal
- Visible stream
  - rtsp://10.0.0.230:8554/visible

The IP address may differ according to the settings.

The server uses RTP protocol for media stream delivery. Currently only the stream can be opened, no other commands are available.

The video streams are H264 encoded. The resolution of visible stream is always HD (1280x720) with 20Hz.

The resolution of thermal stream depends on the model:

- WWP
  - 640x512, 30Hz or 8.5Hz
- WWS
  - 800x600, 25Hz or 8.3Hz
- GIS
  - 320x240, 30Hz

The settings of the zoom has no effect on the thermal stream (digitally zoomed for the HMDI output), however the optical zoom fot the visible camera can be set.

Following software was tested to be working with the RTSP streams. The software is free and cross-platform.

5.1 GStreamer

The best result with lowest delay can be achieved using GStreamer.

- https://gstreamer.freedesktop.org/

The command for launching the video stream is:

- `gst-launch-1.0 rtspsrc location=rtsp://10.0.0.230:8554/visible latency=100 ! rtph264depay ! avdec_h264 ! autovideosink`

5.2 VLC

The streams can be opened using VLC media player.

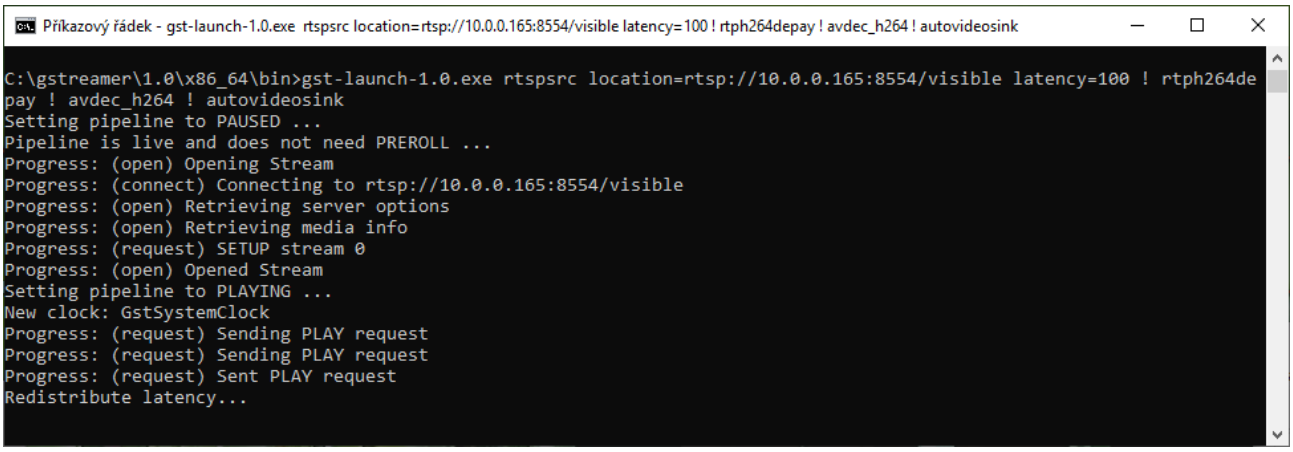


Figure 5.1 – Windows console with the GStreamer command.

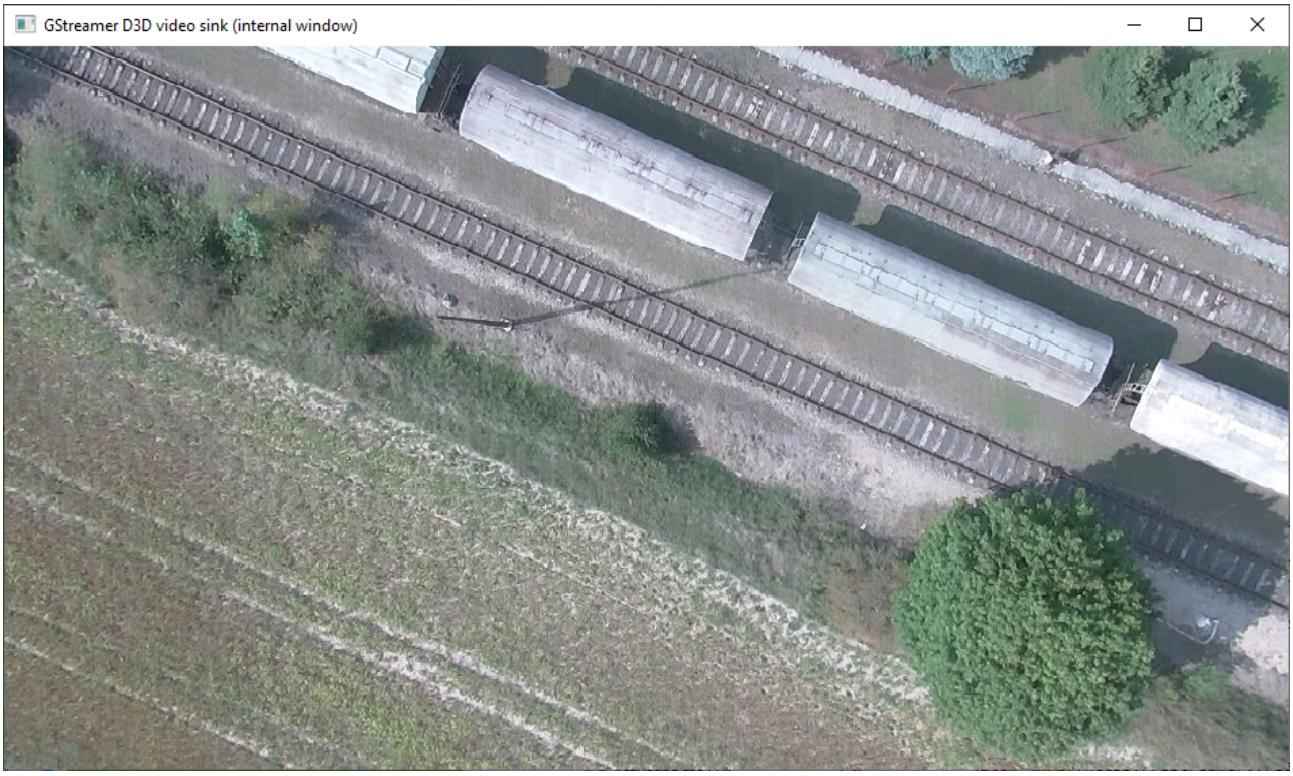


Figure 5.2 – Windows GStreamer video stream.

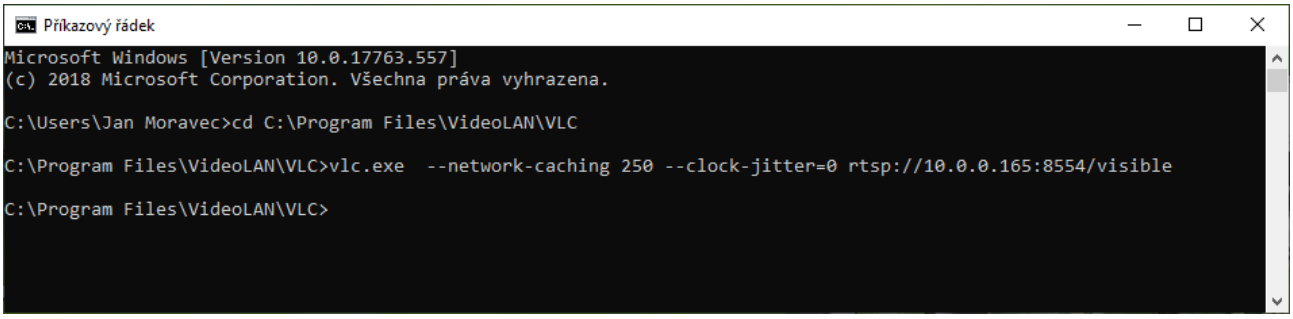


Figure 5.3 – Windows console with the VLC command.

- https://www.videolan.org/vlc/index.cs.html

The command for launching the video stream is:

- `vlc --network-caching 250 --clock-jitter=0 rtsp://10.0.0.230:8554/visible`

The network caching parameter sets the video delay. Too low value may cause instability.

5.3 FFmpeg

The FFmpeg libraries can be also used for the video stream.

- https://ffmpeg.org/

The command for launching the video stream is:

- `ffplay -fflags nobuffer -flags low_delay -framedrop -strict experimental -rtsp_transport tcp -sync ext -i "rtsp://10.0.0.230:8554/visible"`

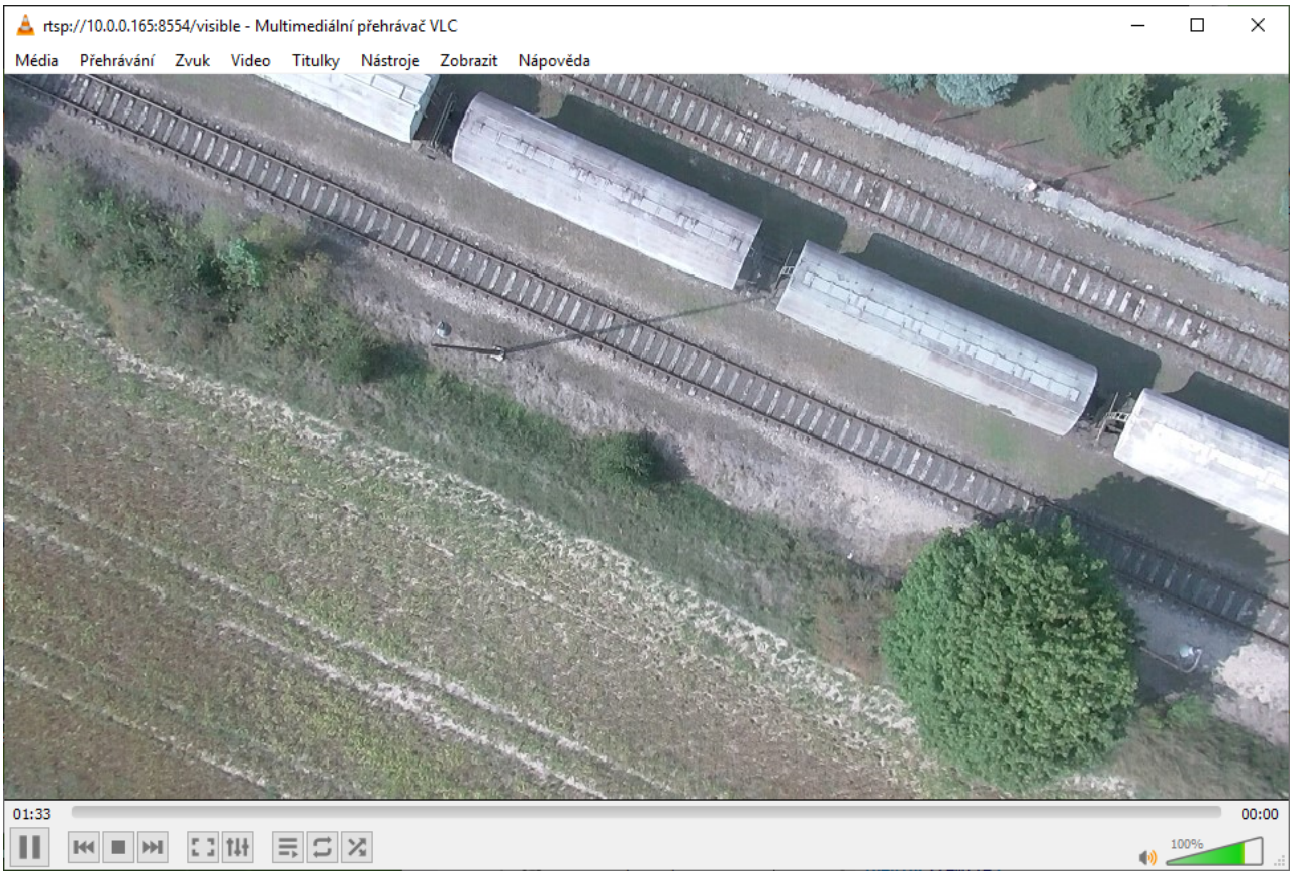


Figure 5.4 – Windows VLC video stream.

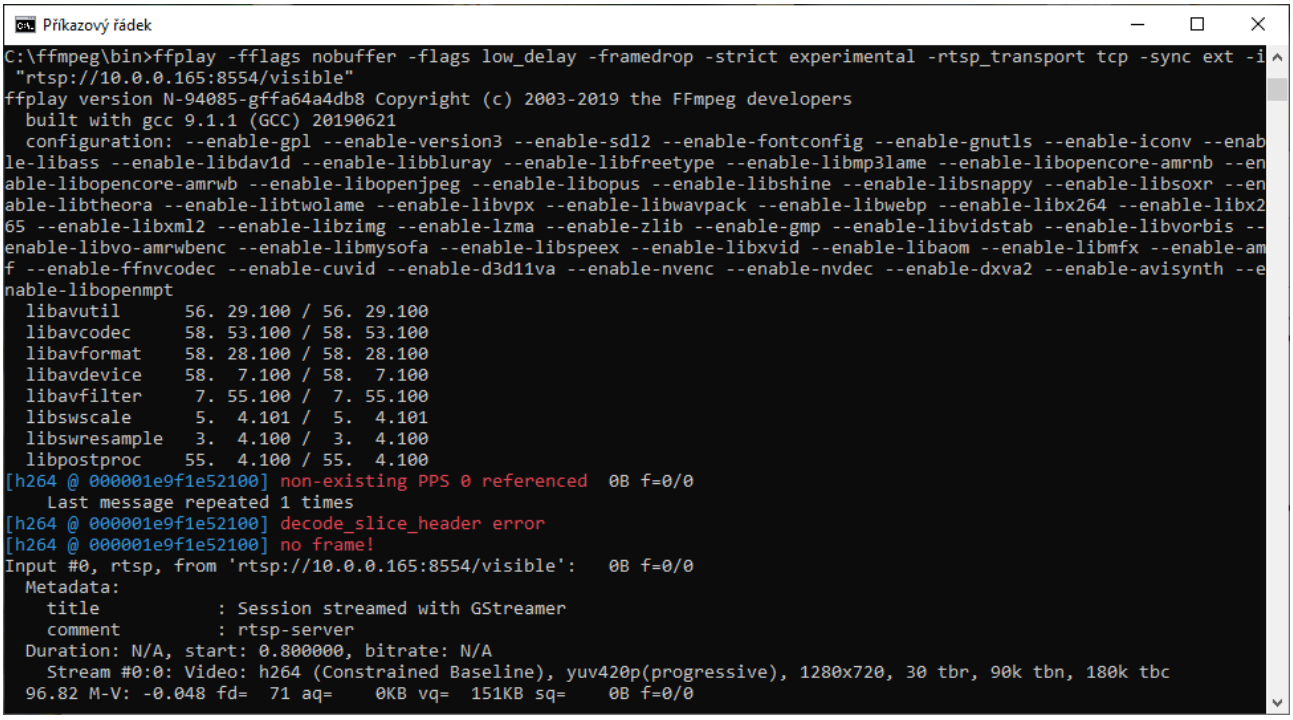


Figure 5.5 – Windows console with the FFmpeg command.

Figure 5.6 – Windows FFmpeg video stream.

6 FTP data access

This chapter contains information about the FTP server and WIRIS & GIS data access.

6.1 FTP connection

There is a standard FTP server running on the WIRIS and GIS 320 device. You can access it with the device IP address and following login:

- User: `wiris-pro`, `wiris-pro`, `wiris-security`, `wiris-agro` or `gis`
- Password: License number of the camera

Both password and user name are case-sensitive and should be in lower-case. You have full access to the saved data. You can download, rename and delete the files.

You can also connect as anonymous user, but anonymous user does not have the write access.

6.2 Restrictions and warnings

Since the full access is given, it should be use with caution. These are the restrictions:

> Warning: Do not delete or alter the current folder in use!

If these restrictions are broken, it can cause the WIRIS and GIS 320 to crash and reboot.

6.3 Software

The server can be accessed with web browser (Firefox, Chrome, Opera, ...). For details please refer to the support of the browser.

We recommend using the Filezilla software.

- https://filezilla-project.org/.

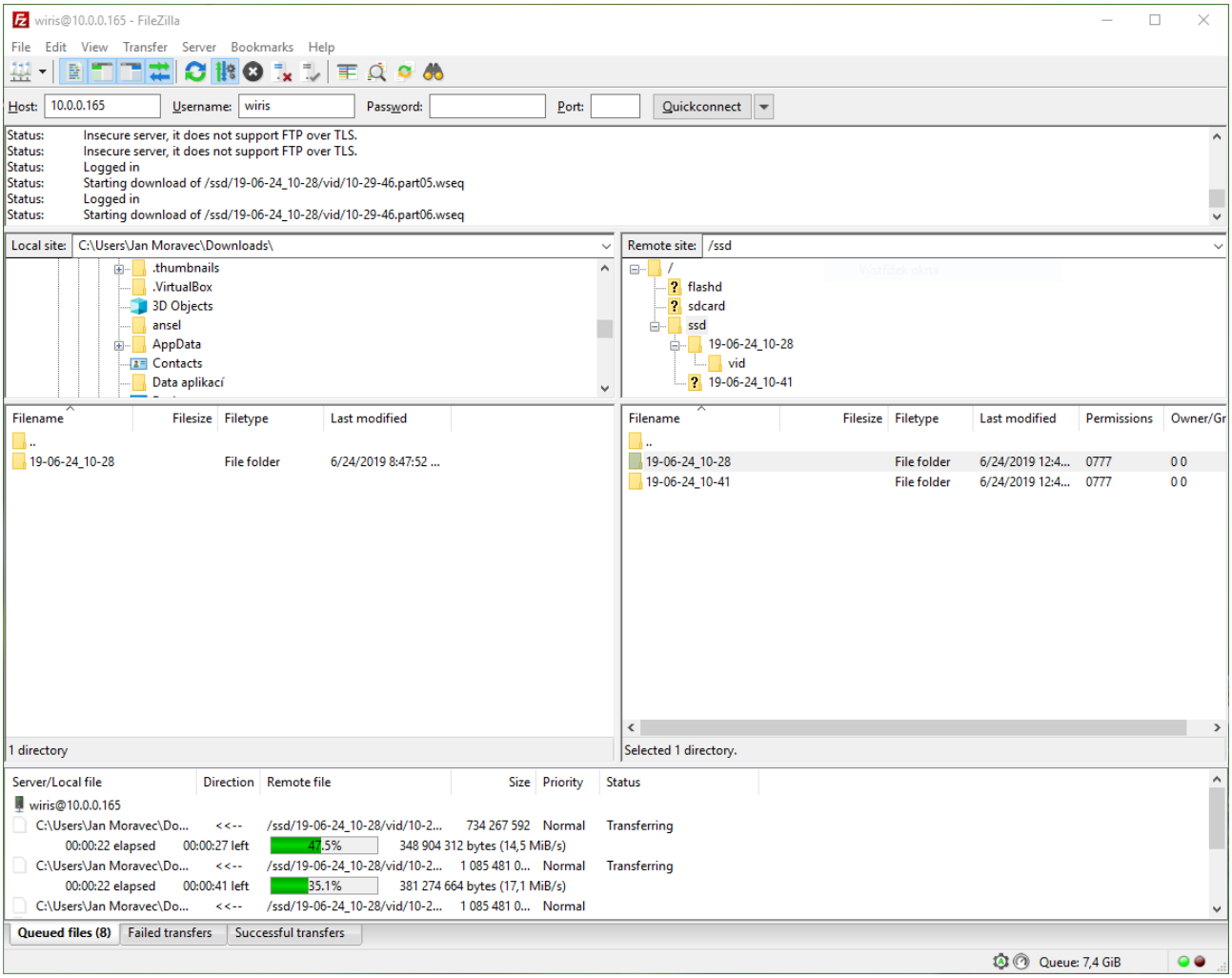


Figure 6.1 – Connecting to FTP server with Filezilla.

7 WIRIS & GIS Ethernet Stream SDK GUI Application

This chapter contains information about WIRIS & GIS Ethernet Stream SDK GUI application, which was developed to demonstrate possible usage of this SDK.

7.1 Introduction

7.1.1 Installation

The app can be downloaded directly from https://my.workswell.eu/.

WIRIS Ethernet Stream SDK GUI is fully open source, therefore you can access all source files, which can serve as an example for developing your own application. You can find them on GitHub:

- https://github.com/SoftwareWorkswell/EthernetStreamSDKGUI

Note that the most important part of this project is ”ControllerCore” class (with its dependencies like Thread classes and NetworkClient class), which demonstrates basic usage of SDK, other files are platform dependent and may not be so interesting

7.1.2 First launch

On first startup application requires you to:

- Fill in your WIRIS or GIS 320 IP address
- Fill in your activation code

After filling IP adress and clicking OK, application will try to contact your WIRIS or GIS 320 device, this step can fail if your device is unreachable or your Wiris / GIS Firmware is too obsolete and is not supported by the application.(Application will always show you the cause) When connected to WIRIS or GIS via HDMI, IP address and mask can be changed in Advanced - System settings

When successfully connected, application may ask you to fill in your activation code (but only if it has never been activated in the past)

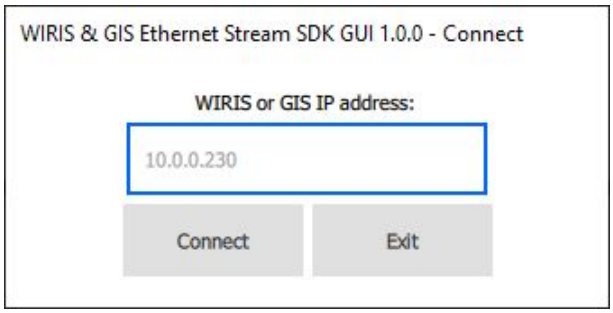


Figure 7.1 – WIRIS & GIS Ethernet Stream SDK GUI - Connection Window

After completing these initial steps you should be able to see main application window.

7.1.3 Startup default settings

Most settings are read from WIRIS and GIS 320 during startup, except some of settings which application set to default values:

- Image storage is set to SSD
- Alarm mode is set to OFF
- Zooms are both set to 1
- All measure settings are set to OFF

7.2 Main Window

WIRIS & GIS Ethernet Stream SDK GUI visuals are strongly inspired by native look of WIRIS and GIS 320 HDMI output - user should be familiar with most of included features - reading the user manual for your camera before continuing is recommended:

- https://my.workswell.eu/homepage/documents

This brief manual includes mainly parts of the application, that differ from native WIRIS & GIS output.

The main window is divided into 4 main parts:

- Main stream window - in the center, displays thermal stream by default, you can also find currently selected palette on its right side together with current range mode indicator on its very top
- Secondary stream window - in the right upper corner, displays visible stream by default
- Main menu - left side of the main window, keeps all items that are included in native WIRIS
- Quick menu - at the very bottom(replaces original Status bar), is used for some of frequently accessed features
- Inspection panel - on the right, below secondary stream window, includes status bar and some extra information

7.3 Main menu

Main menu appearance is identical with native WIRIS Main menu but each item contents can slightly differ.

7.3.1 Range

Range contents are identical, however they are slightly differently styled, you can now use radio button at the top to toggle between AUTOMATIC, MANUAL and SPAN ranges and there is also new radio button for changing eviroments.

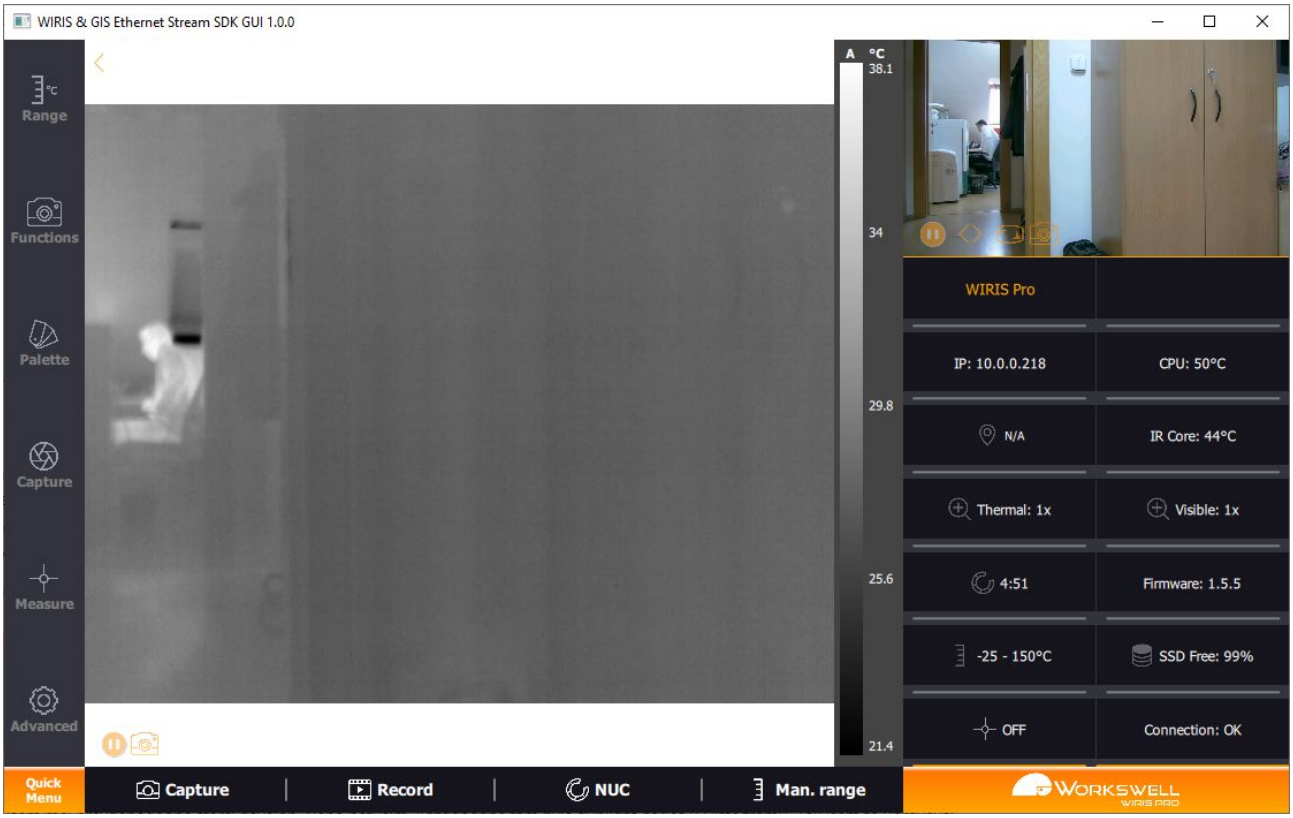


Figure 7.2 – WIRIS & GIS Ethernet Stream SDK GUI - Main Window

7.3.2 Functions

This section now includes both thermal and visible zoom and Main Camera toggle. However there are no settings for Image opacity, Layout and Lock Zoom.

7.3.3 Palettes

This section is identical to the Palettes from the firmware of the camera and allows the user to select apropriate palette for the thermal stream.

7.3.4 Capture

You can find both Capture and Record button here with ability to set periodic capture and check whether it has been started, Image Correction (Shutter) was moved to quick menu.

7.3.5 Measure

Extremes settings are identical. Alarms functionality stayed the same but is now interpreted graphically by a slider.

7.3.6 Advanced

A couple of submenus from this item has been removed. Only following submenus can be found here:

- Thermal Camera - Emissivity and shutter period can be found here
- Images and Video - This submenu is identical except Image Screenshot JPEG option
- Alarms - You can set alarm colors here
- Memory - You can find status of all storage devices here
- System - This submenu is identical, however Language and Units option cannot be changed
- Info - This submenu is identical

7.4 Quick Menu

Quick Menu consist of several actions that are likely to be used frequently:

- Capture - initiates capturing according to Image and Video settings (Advanced/Images and Video submenu), it can also initiate periodic capture(if set in Capture menu)
- Record - initiates recording according to Image and Vid settings (Advanced/Images and Video submenu)
- Shutter - performs the thermal camera shutter immediately
- Range - toggles range to manual mode and allows user to quickly adjust range

Figure 7.3 – WIRIS & GIS Ethernet Stream SDK GUI - Secondary Stream Window

- Pause - pauses or continues the main camera stream - can be used to lower bandwidth requirements

7.5 Inspection Panel

Standard Status bar can be found, there are also some additional features:

- Camera Type - Wiris Pro/Wiris Security/GIS 320
- Camera IP Address
- CPU temperature
- IR Core temperature
- Camera Firmware version
- Camera Serial Number
- Latency
- Current alarm mode info
- Connection state

7.6 Secondary Stream window

This window is used to display either visible or thermal stream, you can find following buttons here:

- Switch stream windows - is used to switch stream windows quickly
- Pause stream - pauses or continues the secondary camera stream - can be used to lower bandwidth requirements
- Separate window - opens new resizable window with secondary stream

7.7 WIRIS Security

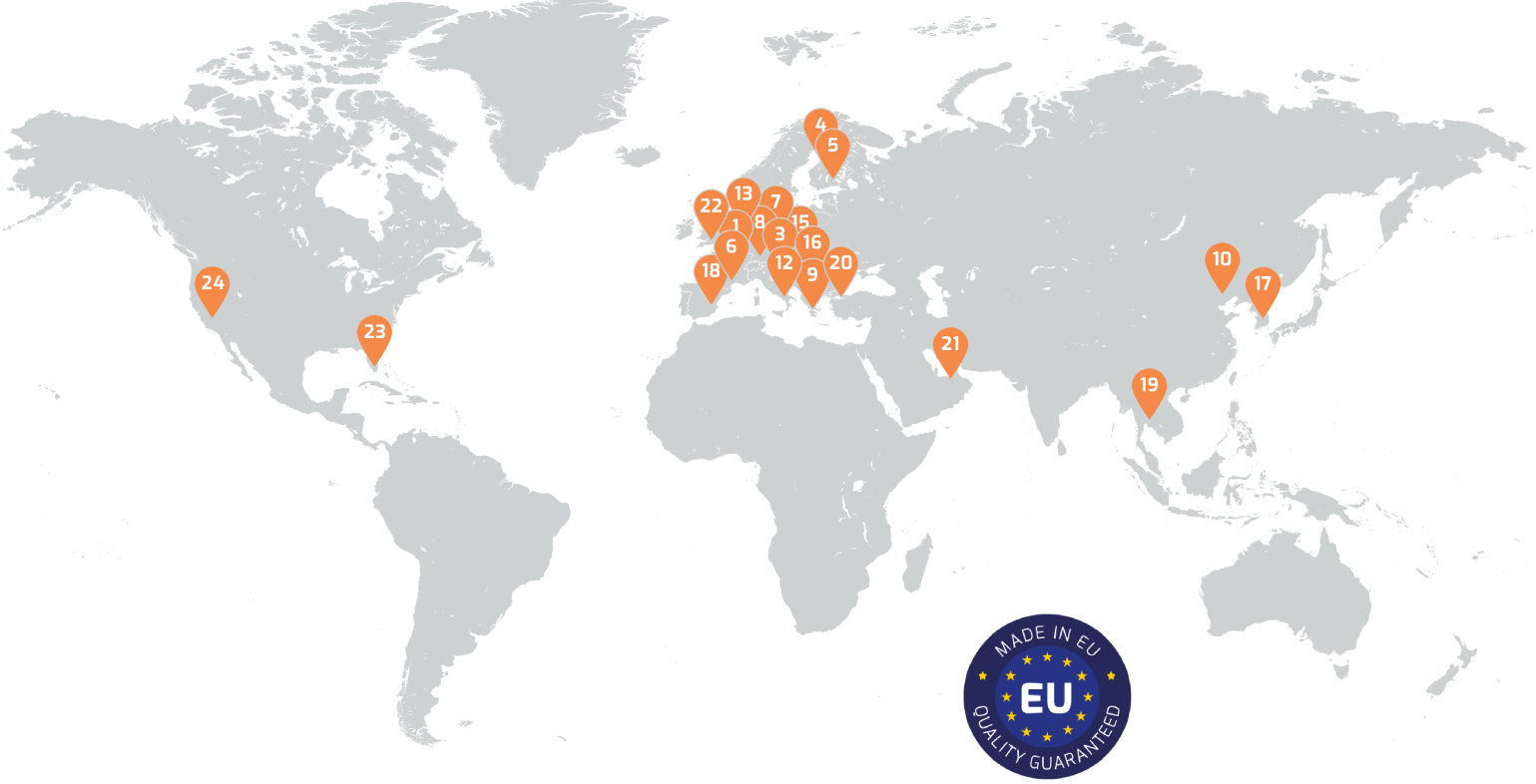
If you are using WIRIS Security device which doesn't provide the same SDK interface as WIRIS Pro, the application lacks of these following features:

- Range in Main menu cannot be accessed
- In Measure, Show temperatures option is disabled and alarms cannot be set
- In Advanced - Thermal Camera and Alarms submenus are hidden, in Memory - radiometric settings have been removed
- Inspection panel lacks of Alarm and Environment info
- Quick menu - NUC and Man. range have been removed
- Main stream window - palette values are hidden

7.8 WIRIS AGRO

If you are using WIRIS AGRO device which doesn't provide the same SDK interface as WIRIS Pro, the application lacks of these following features:

- There are no layouts.
- Colourmaps are instead of palettes.
- In Advanced there are no Network Interface, MAVLink Interface, S.Bus and Herelink Interface and Command Control Protocol settings



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