User Manual
HELIOS

www.framatome.com

LinkedIn: INTERCONTROLE

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Warnings

Read and following instructions in the instruction manual before any utilisation.

The use of tools must be done by trained and qualified staff.

Implement means of individual or collective protections.

Respect basic regulation relative on safety in the workplace and prevention of accidents.

During maintenance interventions, the sources of energy must be recorded (separate, conviction, dissipation of residual energies and verification).

Connection, disconnection and earthing are provided by the socket fitted to the PoE injector. This socket must be connected ton an electric equipped with a 16 A circuit breaker and having a 30 mA differential circuit breaker.

Warnings

Product conforms to the standard EM 61326 – 1 (2013) for the industrial environment.

Class product A

Warning: this product is not intended for use in residential environments and cannot provide adequate protection for radio reception in this type of environment

In the event of disturbances in the sector, camera focus may be disturbed

In the event of electrostatic discharge on the camera lens, camera focus may be disturbed. Don’t touch without precautions.

Warnings

The product guarantee is 1 year from the date of signature of the acknowledgment of receipt of the carrier by the customer.

Warranty does not cover cables or damages caused by improper use of equipment. INTERCONTROLE shall be released from its obligation of guarantee if the defect is due in particular to the intervention of a third party on the equipment during the duration of the warranty, normal wear of the equipment, improper use of the equipment, disassembly of a product component, its modification. The HELIOS product must be controlled by personnel trained and qualified in service and maintenance operations. No user replaceable spare parts are provided. The Product Acceptance Program (IC DTP 36773) can detect any serious malfunctions that require correction.

Calibration is used to verify proper operation of the equipment. The user remains solely responsible for verifying the detection and measurement performance for his application.

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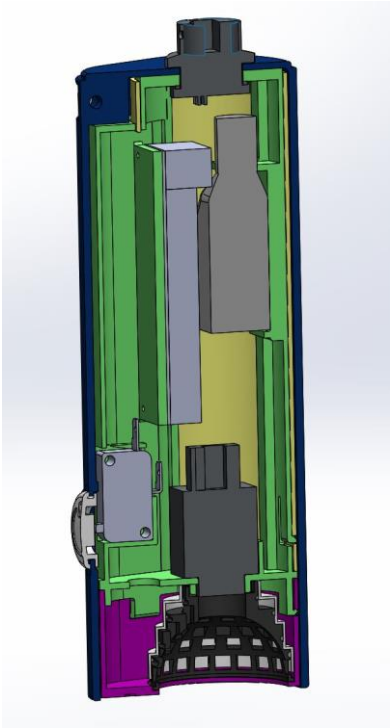
- Installation of the LUCID driver
- Troubleshooting



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1. Presentation of HELIOS

HELIOS: HEmispherical Light Oriented Sensor

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Contents of the package

HELIOS

POE injector

Ethernet cable

POE injector supply

USB key

Calibration part

Contents of the package

Contents of the package in option

Touch pad Panasonic FZ-G1

Tablet power supply

Contents of the package

Suitcase interior

HELIOS

- Multi-element approach to allow a better appreciation of the inspected surfaces
- Capable of interpreting and analyzing images from different surface lighting angles
- Evaluates the surface reflectance (BTF)
- Generates a false-color image (Normal Map) that allows a representation of the orientation of each pixel on the surface

Visual inspection

- The 56 LEDs light up successively
- 1 photo is taken by LED that is 56 photos in less than 5 s
- The acquired images make it possible to :

  - generate highly contrasted images of the relief of the surface as well as of the reflectance of the material

  - reconstruct the 3D of the surface using 2 methods, the light orientation and the Depth From Focus

Technical characteristics

High sensitivity and easy portability

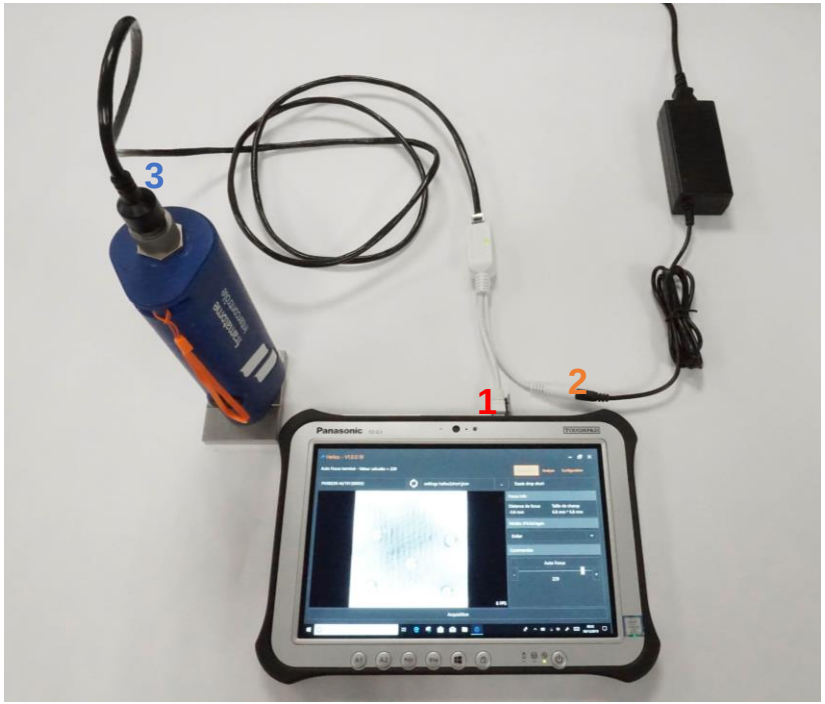
Detection of indications 2D down up 5 µm
Separation power 10 µm
Detection of the shape of 3D indications up to 30 µm
3D profile measurement with repeatability of ± 0,1 mm
Field of view on contact : 8 x 8 mm
Image resolution : 1200 x 1200 pixels
Acquisition time < 5 s

Technical characteristics

High sensitivity and easy portability

2 m PoE cable as standard (up to 50 m optional)
No internet connection required
Classic power supply (230 V, 16 A), 20 W
Internal diameter of the head of 50 mm, height 210 mm
Head weight : 600 g
Operating temperature range : 5-55°C
Storage temperature range : > 0 - 55°C
Operating humidity range : < 80%
Tablet operated Windows 10 option (Intel Core i5-7300U vPro, screen 10'' TFT WUXGA 800 cd/m², IP55)
IP68 waterproof option (up to 20 m)

Connectors



1. Ethernet cable from the POE box connected to the tablet

2. Cable connected to the mains supply

3. Ethernet cable connecting HELIOS and the POE power supply

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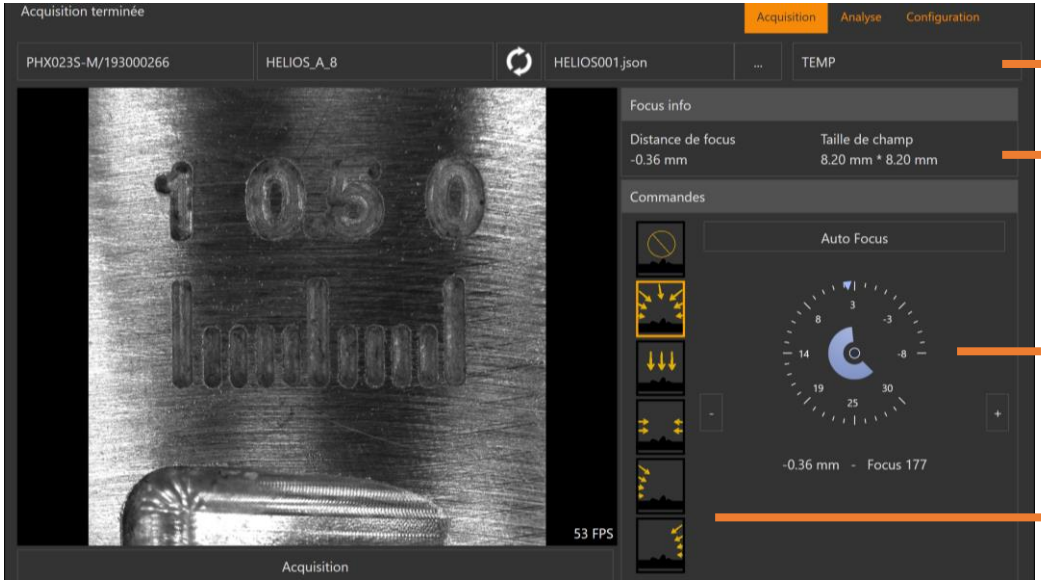
2. Software HELI – OS

Software introduction HELI-OS

« Acquisition » tab



Name a scan

Focus distance & field size calculated

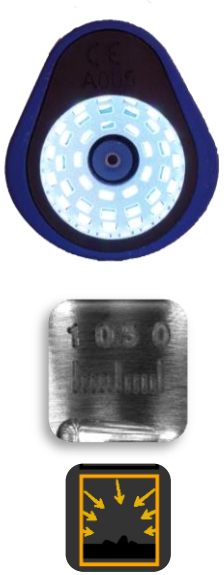
Variable range of focus

Different lighting modes

Software introduction HELI-OS

Lighting modes

All on



Direct mode

Low angle mode

Left mode

Right mode

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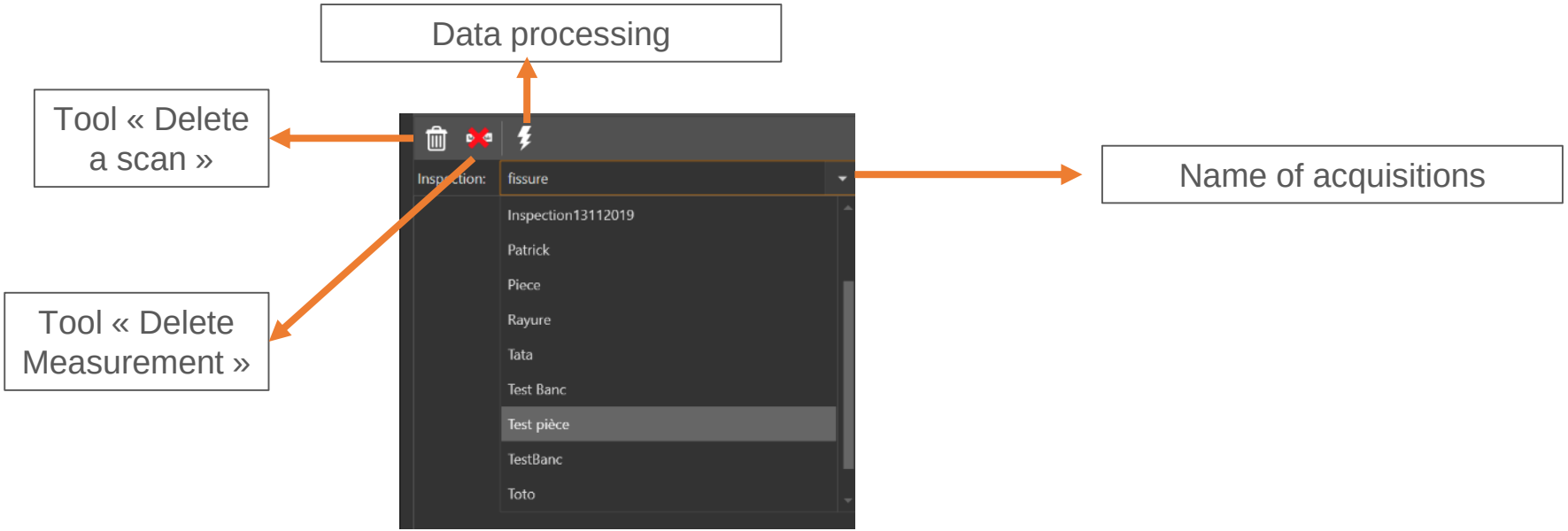
Software introduction HELI-OS

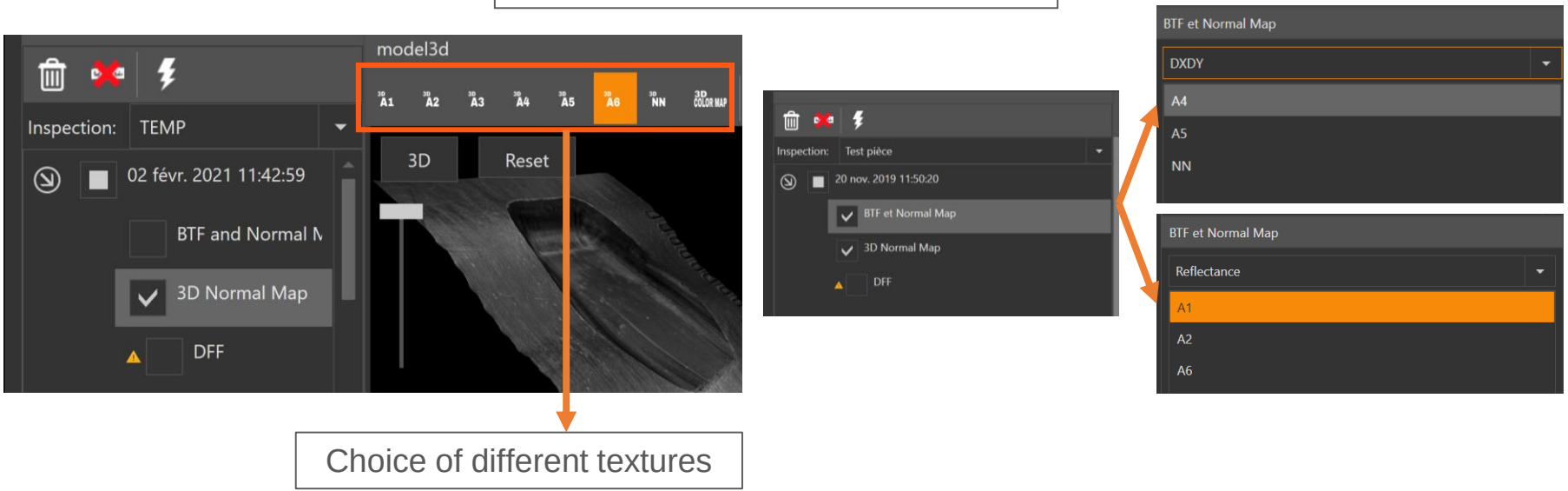
« Analysis » tab



Introduction logiciel HELI - OS

« Analysis » tab

Choose the desired display mode



Choice of different textures

Software introduction HELI-OS

« Analysis » tab

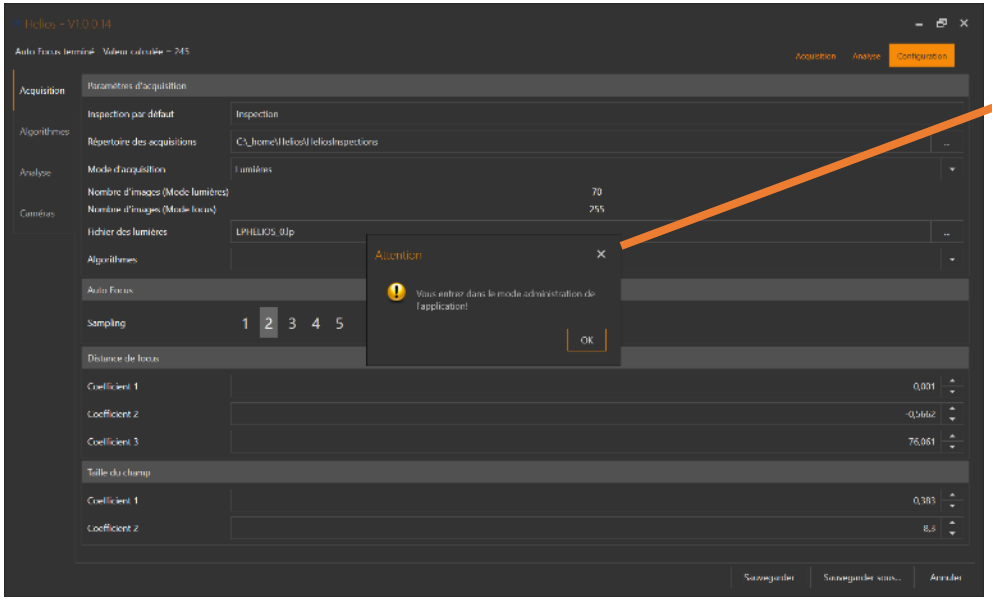
Use tools to characterize your area

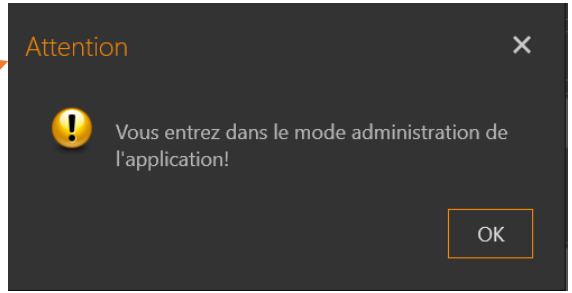
A line for ploting grey values or depth datas

Rectangle and circle for measure an area

Software introduction HELI-OS

« Configuration » tab

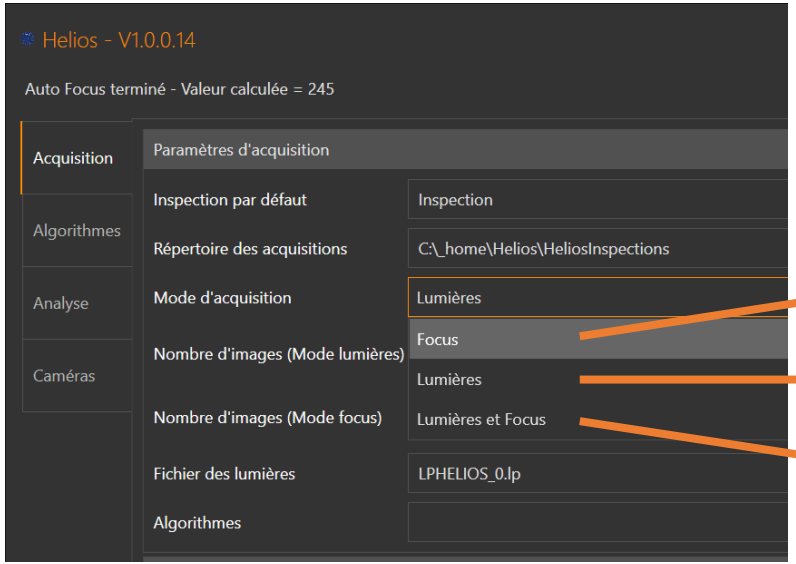




A warning indicates that you are in administrator mode where parameters can be modified

Software introduction HELI-OS

« Configuration » tab



Choose the acquisition mode according to your needs to optimize the control time

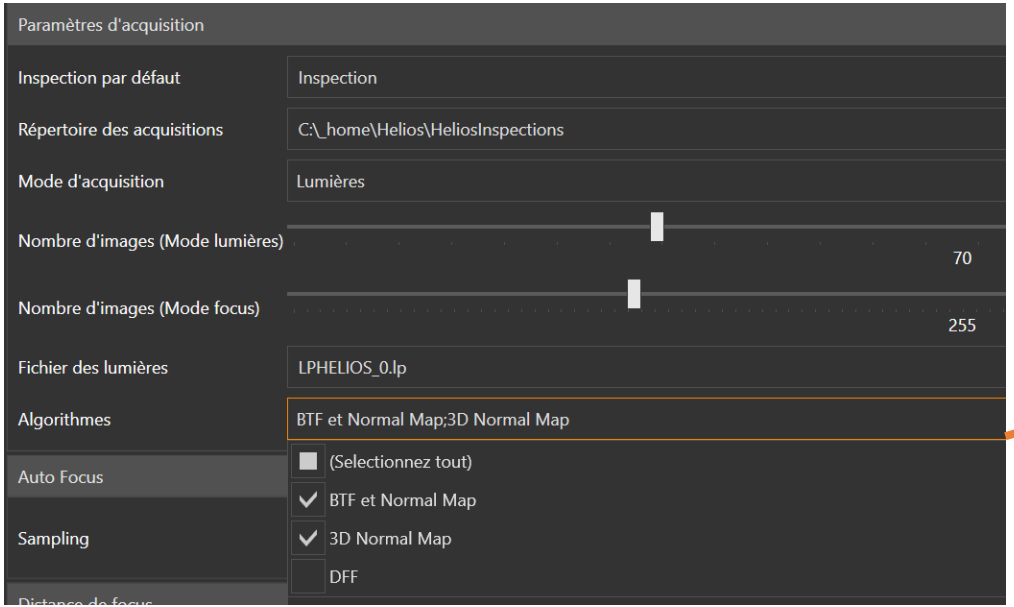
Only DFF

BTF and Normal Map

DFF, BTF and NormalMap

Software introduction HELI-OS

« Configuration » tab



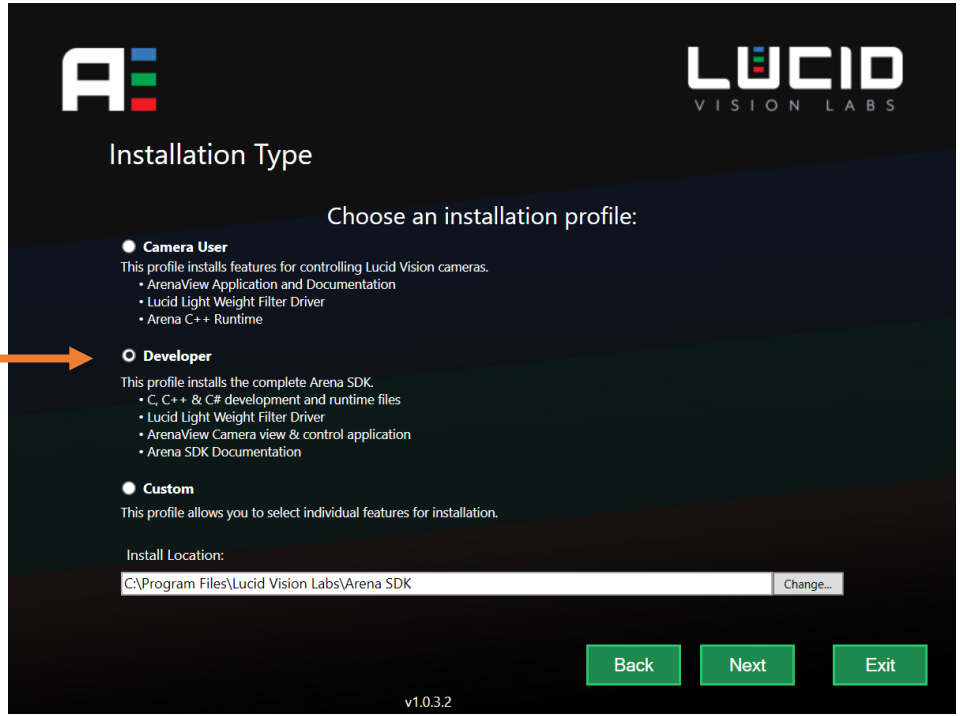
Check algorithms you need to configure processing

3. Quick start

Quickstart

1. Connect USB key into your computer / tablet

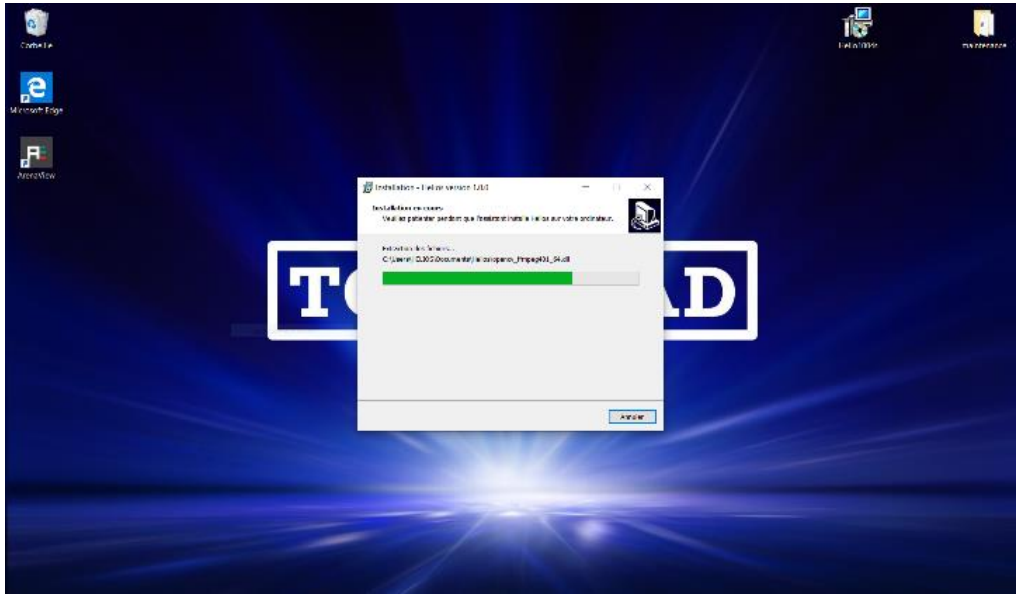
2. Install Arena SDK and check this box



Quickstart

3. Install the HELI-OS software

4. Open the software when the installation is done

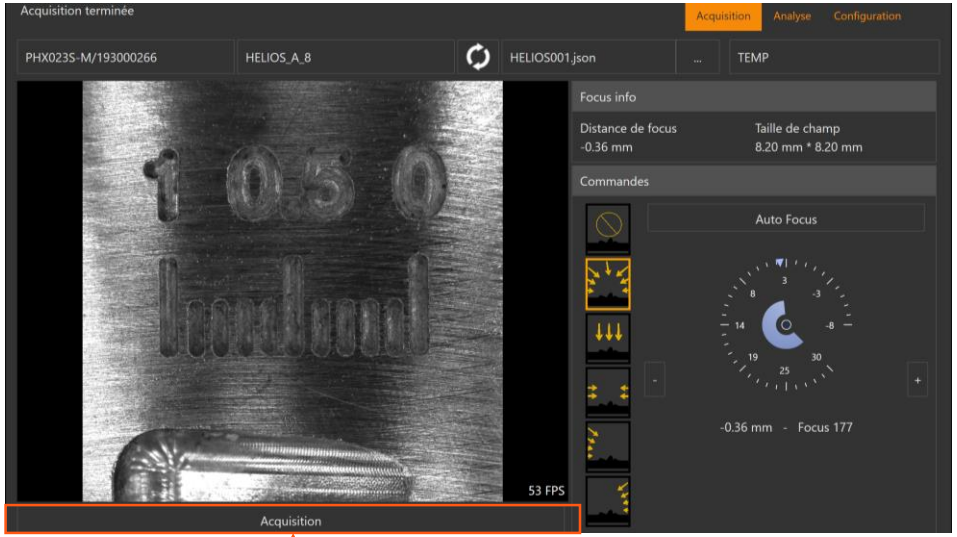


Note : The tablet supplied in option already includes

Quickstart

4. Place HELIOS on the defect to be analysed

Start the acquisition by pressing :
- either on the HELIOS push button
- either on the “acquisition button of the software



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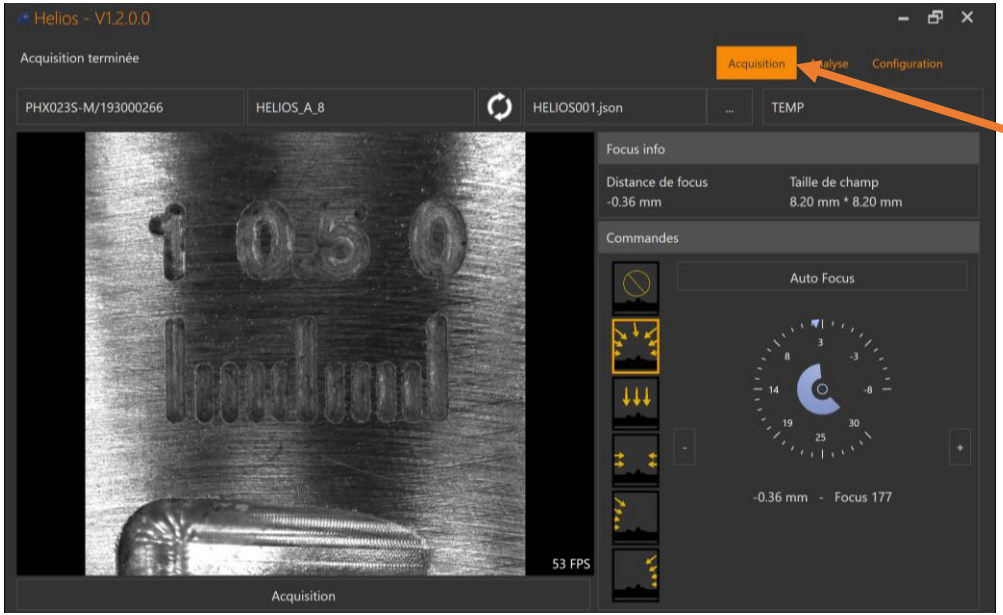
Quickstart

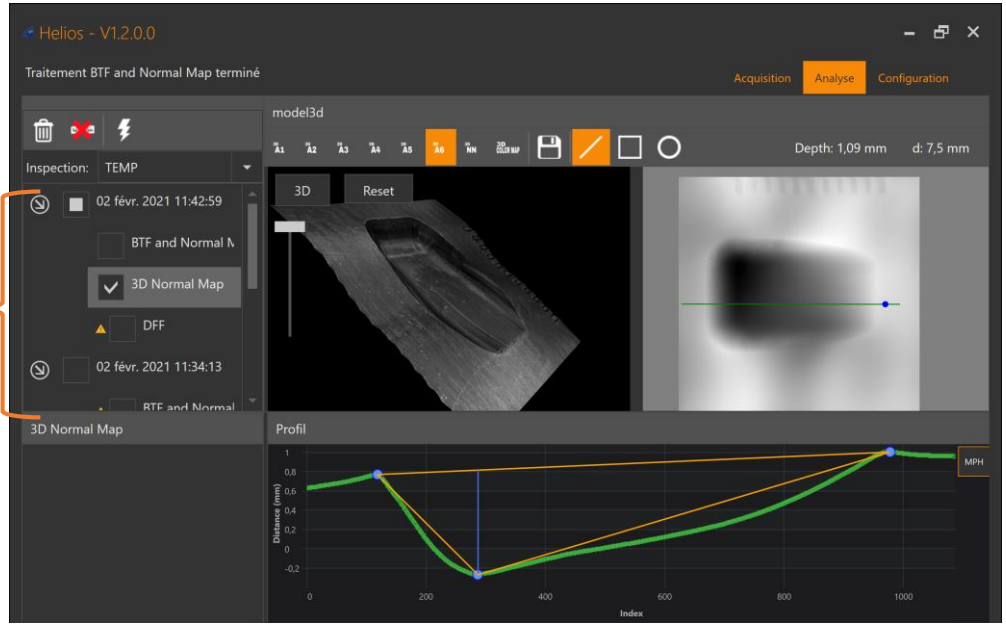


7.After acquisition, go to the « Analysis » tab

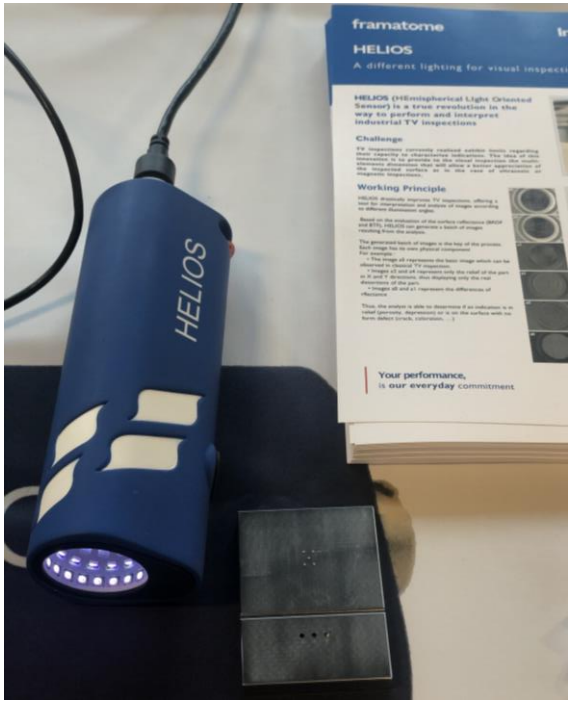
Quickstart

8. Select your acquisition

9. Observe the result and/or mesure it using the 3 points

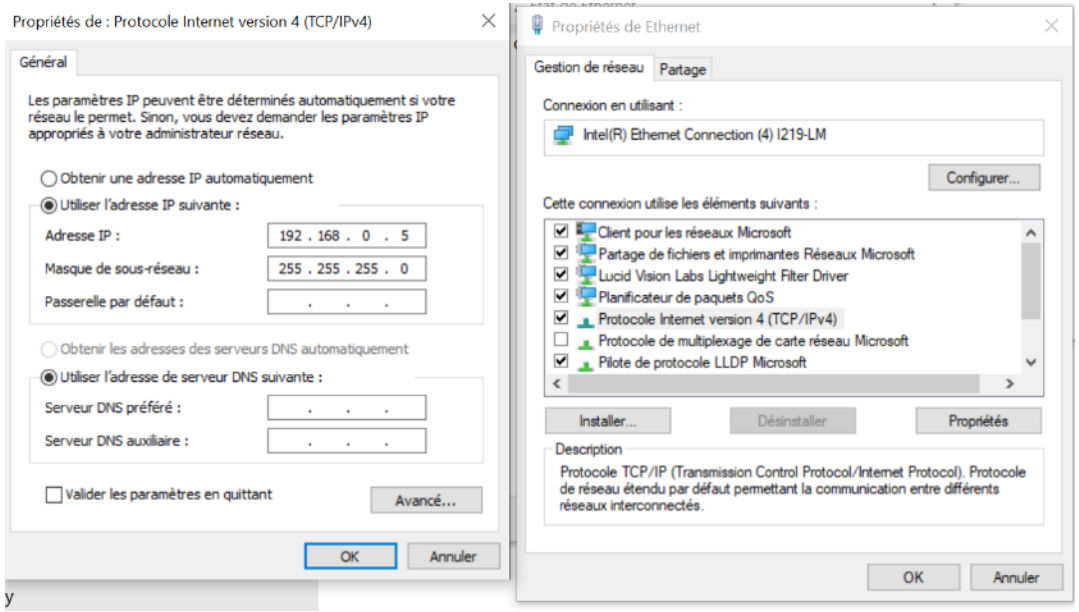


4. Specific operations



IP configuration

Go to the settings of the network device and fix IP adress to the value of 192.168.0.5

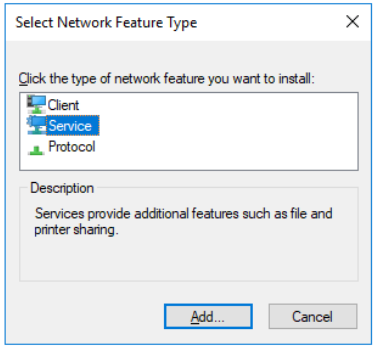


Installation of the LUCID driver

See LUCID document « *Helios driver gigE* »

You can also install the LUCID Lightweight Filter Driver manually using the following steps:

- Open **Network and Sharing Center**
- Right-click on your Ethernet adapter and click **Properties**
- Click **Install** in the Ethernet adapter's properties window
- Choose **Service** in the Network Feature Type window

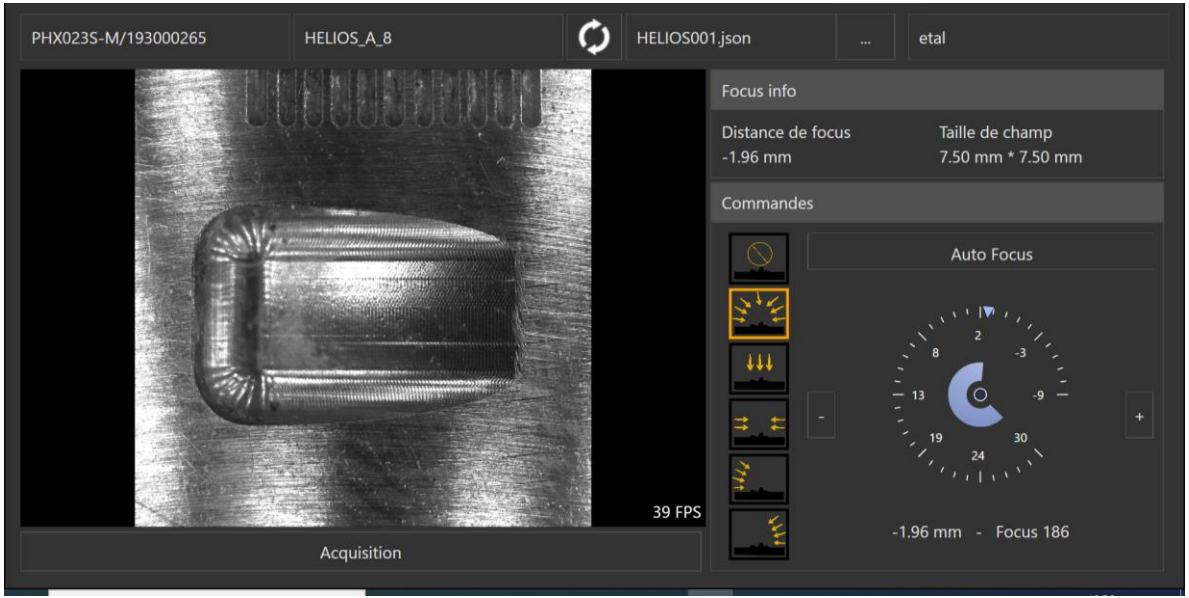


Verification of calibration BTF

1. Position the sensor over this ramp pattern

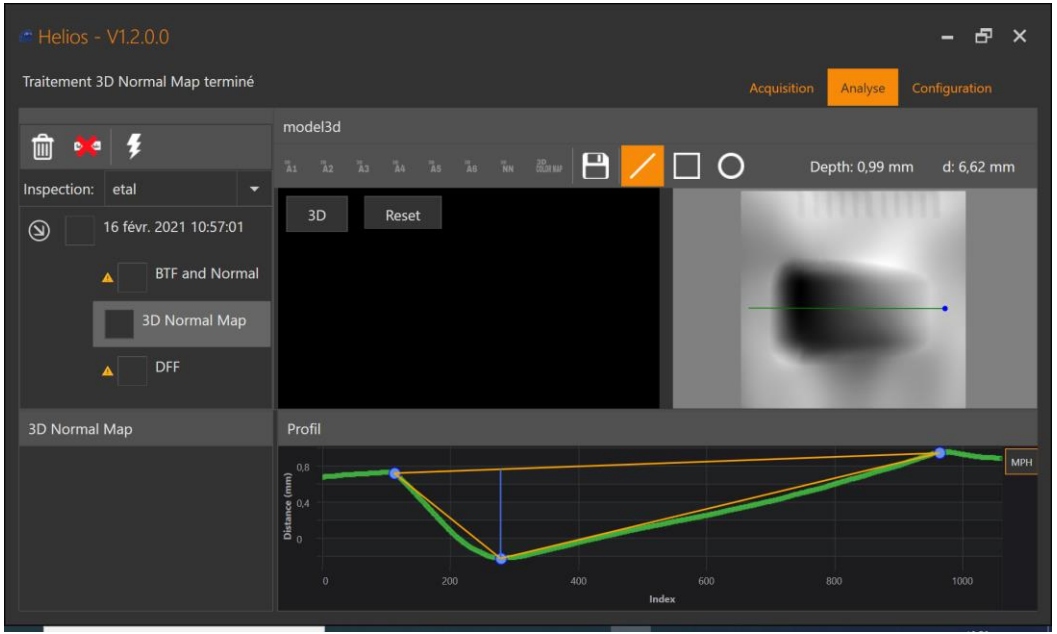
Verification of calibration BTF

2. Launch of the acquisition in light mode



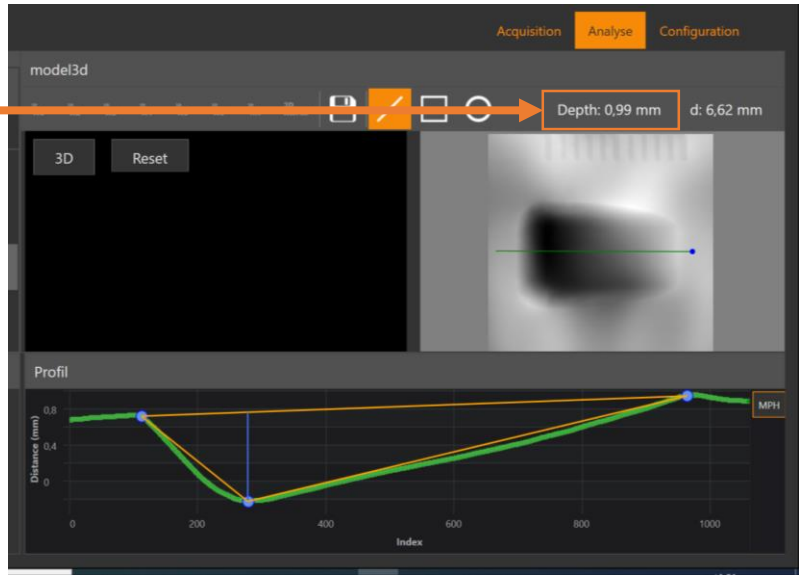
Verification of calibration BTF

3. Analysis tab: process the 3D normal map and draw the 3-point curve



Verification of calibration BTF

4. Depth check (depth) = 1
It must be mor or less 0,05 mm



5. In the event of the value is more different than 0,005 mm from the reference :

Go to the configuration tab – algorithm – 3D – K factor : adjust by dichotomy knowing that if K increase, the measurement decreases

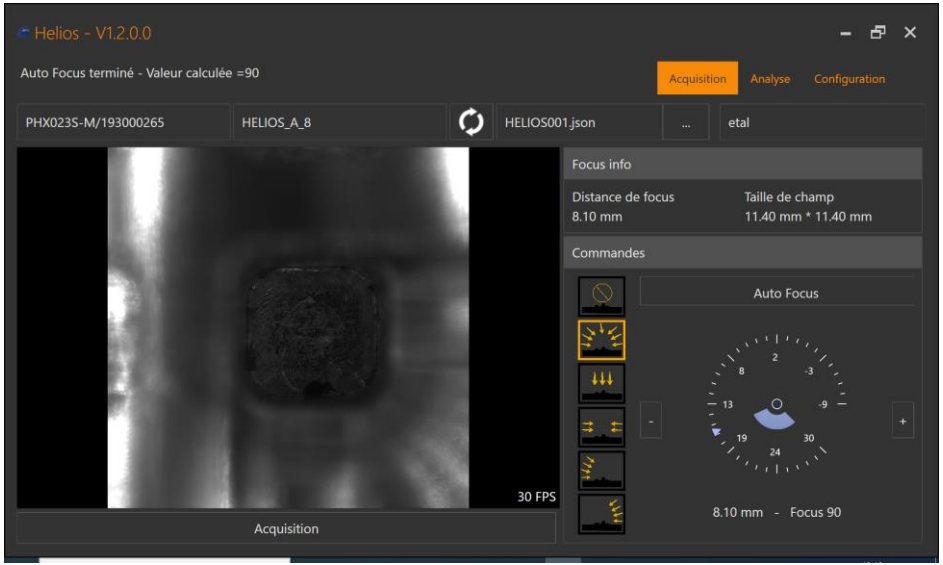
Verification of calibration DFF

The 3D focus measurement process is sensitive to temperature, calibration and measurements must therefore be made once the device has been thermalized (about 1 hour)

1. Position the sensor over this drilled holes pattern

Verification of calibration DFF

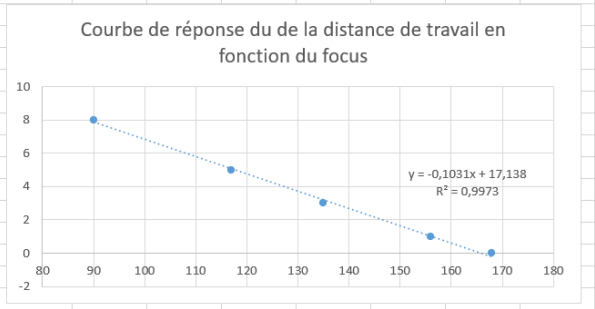
2. Focus the 4 patterns locally one by one then in the center and read the focus indices for each depth



Verification of calibration DFF

3. Open the Excel calibration utility then enter the values obtained

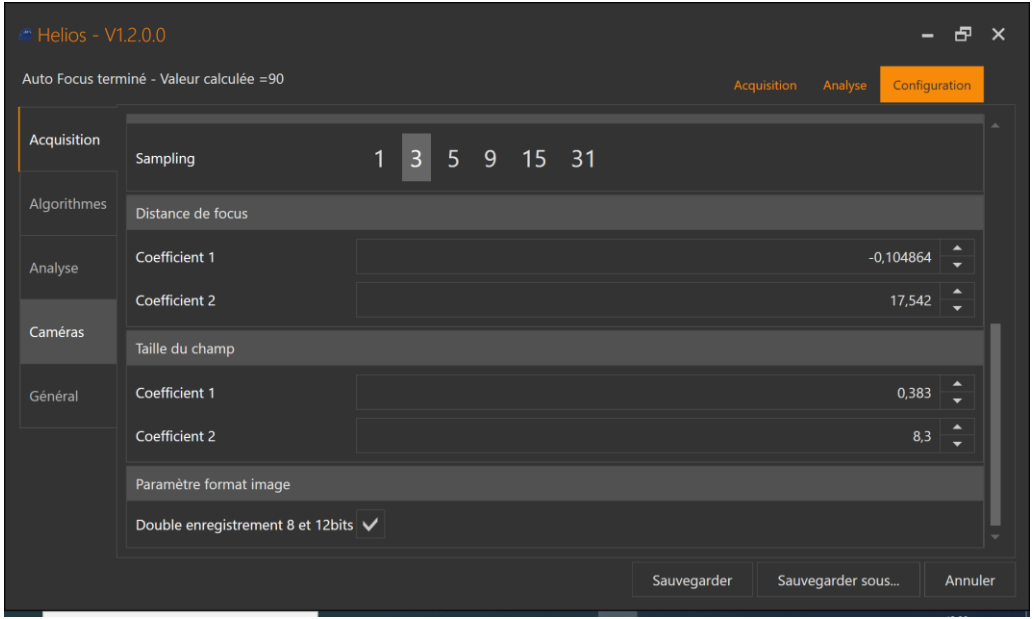
	A	B	C
1			
2			indice de focus
3	Référence 0	0	168
4	TFP (mm)	1	156
5		3	135
6		5	117
7		8	90
8			
9	coef 1	-0,10314	
10	coef 2	17,13793	



Verification of calibration DFF

4. Determine the regression coefficients 1 and 2 and record these data in the configuration – acquisition – focus distance tab

8		
9	coef 1	-0,10314
10	coef 2	17,13793
11		



Verification of calibration DFF

According to your application, this check can be repeated on flat bottom holes and/or the groove of the hold. The results are defined below

Type	Reference (mm)	Precision (mm)
Groove 1 mm	1	±0.2
TFP 3 mm	3	±0.2
TFP 5 mm	5	±0.2
TFP 8 mm	8	±0.3

Troubleshooting

Problem	Solution
Image is black but the number of FPS (in the lower right of image) is good (> 50)	- Switch on LEDs
Upon connection, The number of FPS (in the lower right of image) drops to a very low value (< 10)	- Reboot the tablet + POE
The software display « flux lost »	- Check that the POE power supply is connected (green LED on) - Check HELIOS connection - Update the flux - If ineffective, restart the software
By pressing the button, the scan does not start	- Press more than 1 s pour to start a scan
The result of BTF calibration is not in the required range	- Realise BTF calibration
I can’t find the images of my acquisitions	- They are available by following this link : c:_home\helios\heliosinspections

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