Supervision of hazardous work area

SKY LASER TEMPLATE

CAUTION: Read this manual before using the device

MODIFICATION'S DIRECTORY

Rév.	Subject of Amendments	Date and Author
1.00	CRÉATION	05/2019 C.Polge
1.01	Booklet format	12/2019 T Hubert
1.02	Warning label for Laser	01/2020 T Hubert
1.03	Advertisement and safety	01/2022 C Polge

This manual is important for your safety. Read it carefully in its entirety before using the equipment and keep it for future reference.

SUMMARY

This document is the user guide for the **SKY LASER TEMPLATE (*GASKYL*)** product. It describes how to commission the device as well as the different running modes to facilitate its use.

1. SAFETY INFORMATION

1.1. Safety recommendations

Please read this manual carefully before configuring or using the device. Be careful of all the hazard notices and warnings.
Failing to respect the instructions could lead to serious injuries to the operator or damage the device.
To guarantee the suitable protection of this device, do not use or install it in conditions other than those described in this manual.

1.2. Following the safety recommendations

HAZARD: Indicates an immediate or potential hazard which, if not avoided, would lead to serious or fatal injuries.

WARNING: Indicates a potentially hazardous situation that could lead to superficial or moderate injuries.

Note: Information that needs to be highlighted.

1.3. **Warning labels**

Read all the labels and statements fixed to the instrument. If the instructions are not respected, physical injury or damage to the instrument may occur.

⚠	Symbol requiring reference to the instruction manual for instructions concerning operation or safety recommendations.
⚡	Dangerous Voltage
∼	Ac current
IP 65	IP standard – Protection against dust and water
🗑	Do not throw away with household waste
☢	laser radiation **class 1**

2.OVERVIEW

This product is designed to **monitor boundaries and objects**.

It is **complementary** to classic signage around a works zone near structures considered to be hazardous (HVA/HVB lines in sub-stations, live transformers, SNCF HV lines, etc.).

The purpose is to create:

- Either a horizontal plane to monitor,

- Or a virtual wall that is not to be crossed.

This monitoring is provided using a **laser scanner**

The principle is to create a template (plan) created using LIDAR technology (laser).

2.1.Operating principle

The active laser scanner is a two-dimensional, contactless detection system that sweeps a freely programmable zone. Using an invisible infrared laser beam, the detection is immune to parasite light, even in total darkness.
As soon as a person enters the detection zone, the laser scanner sends a signal that can be used to trigger audible and visual alarms.

This laser detection solution runs effectively in all weather (masking of all ambient factors (fog, rain, etc.), lighting, size and type of object)
.

3.CONNECTION.

Power supply:
- o Internal battery (7 hours autonomy)
- o Mains, using the external specific **SKY LASER TEMPLATE** power supply.

4.INSTALLATION.

- Mount the SKY Laser template on its stand.
The LIDAR must be at the edge of the zone.

- Start the device by pressing the [⏻] key.
Wait for initialisation to complete (20 seconds).
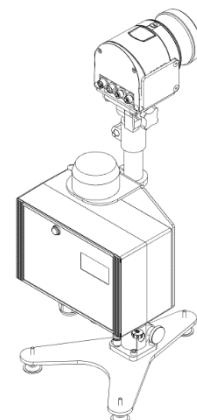
- Select the "zone selection" menu.
Validate the required zone: configuration 1 to 4
(Refer to the device configuration sheet).

- Select the "teach-in" menu.
Wait for auto teach-in to complete (10 seconds)

CAUTION: keep the zone free of all obstacles during this phase.

- Carry out a detection test in the required zone to check the correct choice of configuration.

Note:
The system is operational when the red rotating light turns off.
If the zone is entered, the system triggers its audible (buzzer) and visual
(rotating light) alarms.

4.1. <u>**Device position to monitor a "virtual wall".**</u>

Wall monitoring zone

Right and left monitoring zone

Left monitoring zone
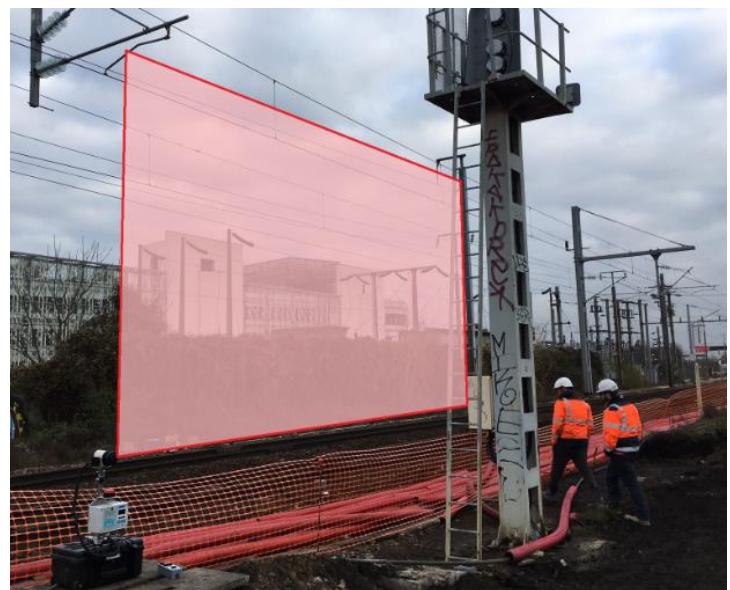
Left monitoring zone

Example of use by Eurotunnel to secure the platform.

4.2.<u>**System position for horizontal monitoring.**</u>

Right monitoring zone
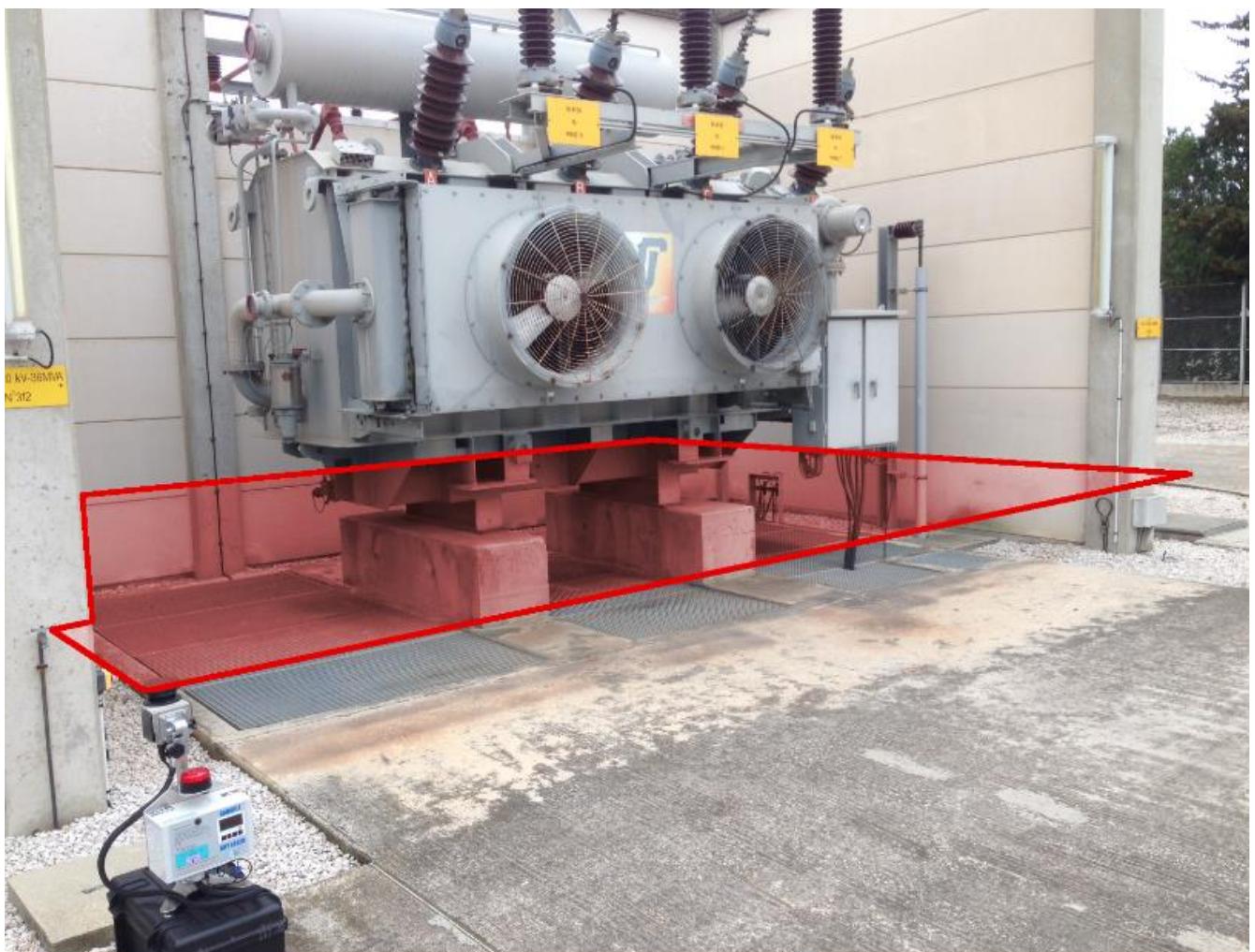
Left monitoring zone

Example of use on the TIGF work site fitted to the top of a 6m high mast, 20 x 25 metre zone. Alarms triggered in the cabin

4.3.<u>**System position for corner zone monitoring.**</u>

The principle is to place the device in a corner (vertical laser position) and it will monitor a corner zone (from the left, front view of the device)
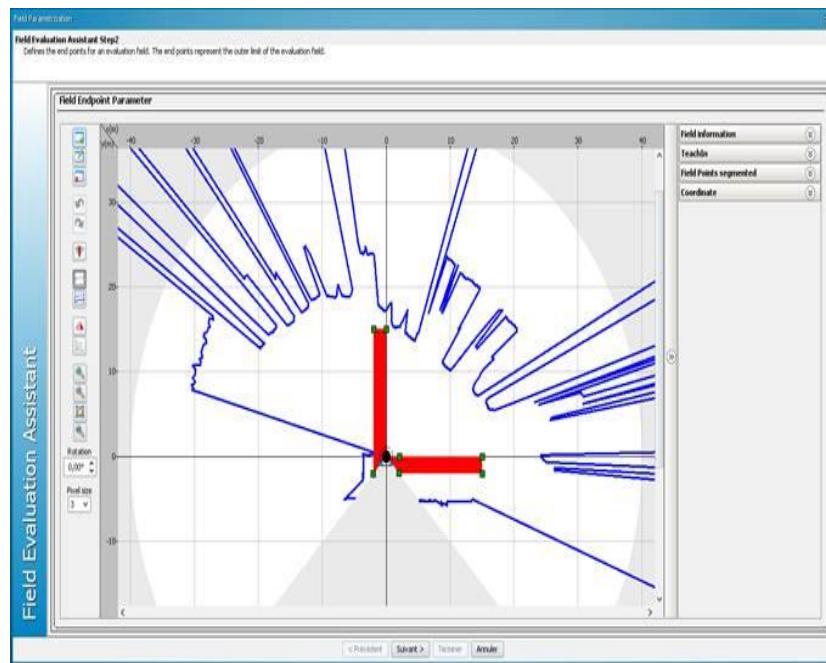
5. LOG.

The system has a real time clock combined with non-volatile memory which it uses to record its events.

Examples of information, from the log:

```
02-22;14-25-28->#1236 22/02/17_11:08:39 Start up F_cpt_stck 1236/7281 (code 21, opt1: 1236, opt2: 7281)
02-22;14-25-28->#1237 22/02/17_11:08:52 SYSTEM Error START (code 23, opt1: 1, opt2: 0)
02-22;14-25-28->#1238 22/02/17_11:08:58 SYSTEM Error END (code 23, opt1: 0, opt2: 0)
02-22;14-25-28->#1239 22/02/17_11:09:02 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1240 22/02/17_11:11:32 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1241 22/02/17_11:11:36 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1242 22/02/17_11:11:50 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1243 22/02/17_11:11:53 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1244 22/02/17_14:24:59 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1245 22/02/17_14:25:03 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1246 22/02/17_14:25:12 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1247 22/02/17_14:25:27 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1248 22/02/17_14:25:52 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1249 22/02/17_14:25:57 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1250 22/02/17_14:26:25 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1251 22/02/17_14:26:32 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1252 22/02/17_14:26:36 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1253 22/02/17_14:26:48 ALARM Entry END (code 22, opt1: 0, opt2: 1)
02-22;14-25-28->#1254 22/02/17_14:28:35 ALARM Entry START (code 22, opt1: 1, opt2: 1)
02-22;14-25-28->#1255 22/02/17_14:28:55 ALARM Entry END (code 22, opt1: 0, opt2: 1)
```

Associated software can be used to read this data:

6.EXAMPLE OF USE.

Intervention zone (locked out)
Direct SKY Laser template monitoring zone
Indirect SKY Laser template monitoring zone
SKY   laser   template
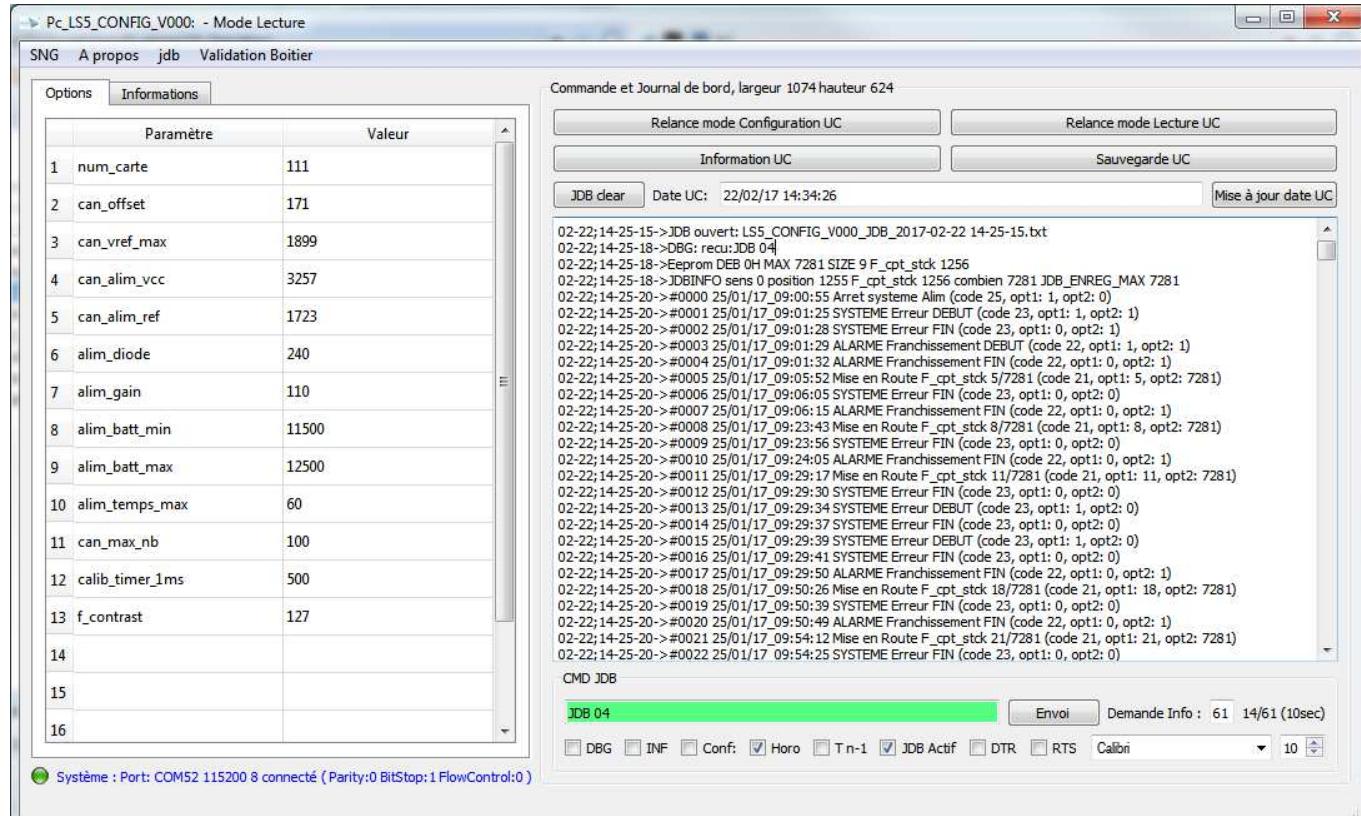
Intervention zone (locked out)
Direct SKY Laser template monitoring zone
Indirect SKY Laser template monitoring zone
SKY   laser   template

7.SKYLASER TEMPLATE OPERATING SOFTWARE.

The software is supplied free of charge on a USB thumb drive.
"Configurateur Gabarit Skylaser VX.XX .exe"

If communication with the scanner is needed, first connect the supplied Ethernet cable between the scanner and the PC.
Note that for laptops without an Ethernet port, there is an adapter available contact us.

To recover the log, connect a USB cord between the Skylaser Template CPU and the PC.

7.1.Installation.

By default, the software installs in "C:\Made-SA\Configurateur Gabarit Skylaser"
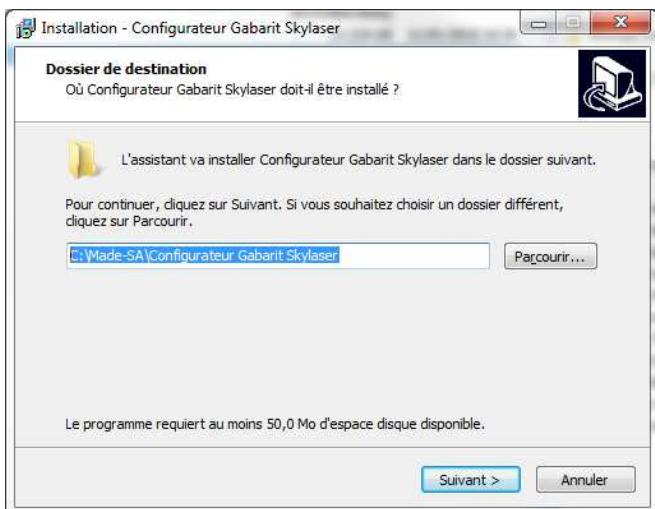
Caution: the scanner has a static IP address of 192.168.0.1
You therefore need to adapt your PC configuration to this address range

Note: for some PCs, you first need to disable WIFI access in order to avoid conflicts with the existing network

See PC configuration in the appendix

7.2. **Principle.**

The Skylaser Template Configuration software is composed of a page and a banner.

Command banner

Scanner IP address

Work zone

Scanner detection zone

Scanner position

Distance of the mouse in metres from the scanner

One square represents a 5m by 5m zone
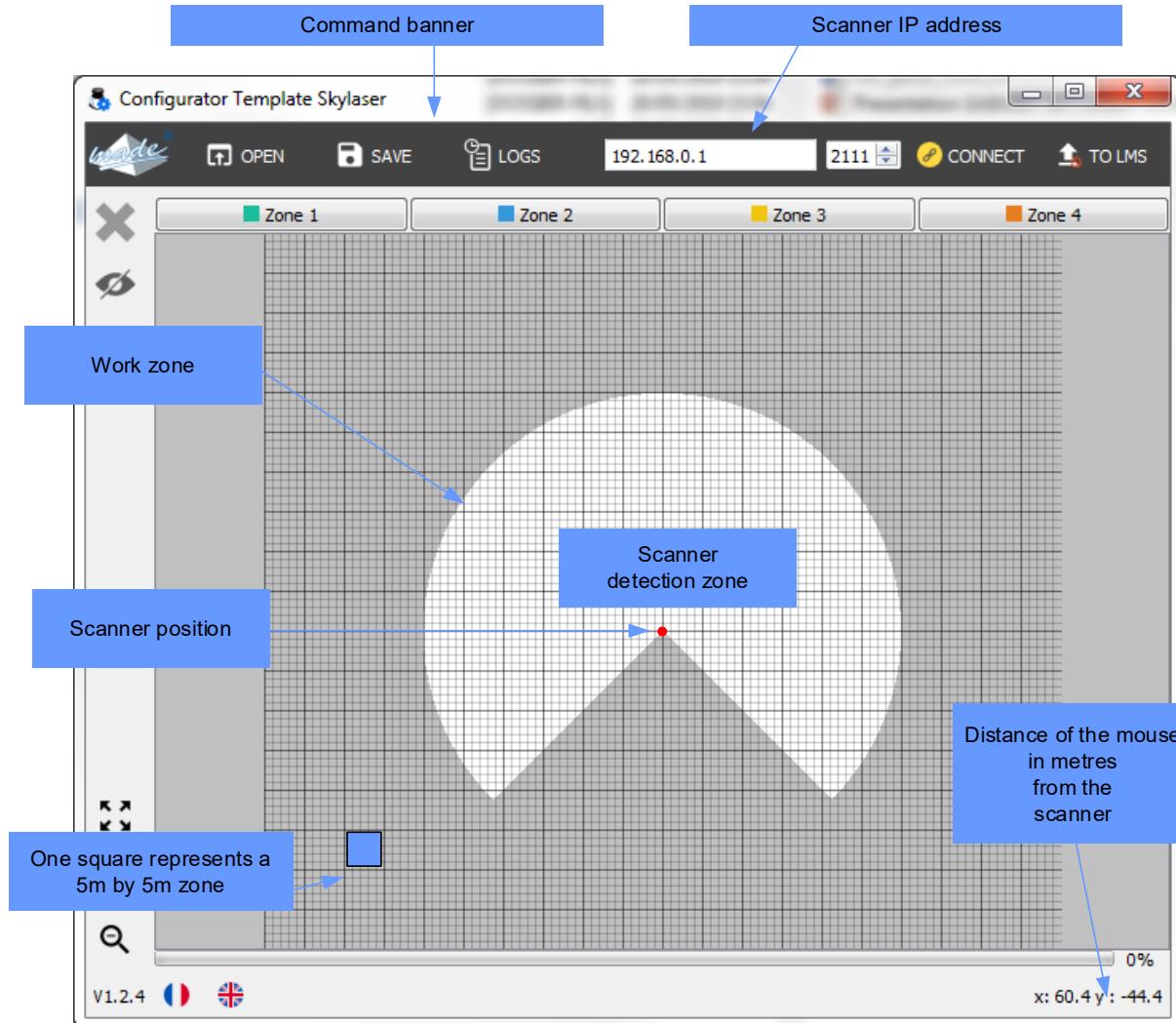
7.3. **Banner function definition.**

Open: command used to read a configuration (4 zones) already recorded on the PC

Save: Command used to save a configuration (4 zones) on the PC

Scanner IP address (by default 192.168.0.1)

Scanner port number (by default 2111)

Button used to read or re-read the scanner zones

Button used to send and save the zones defined by drawing to the scanner

Log: When the USB port is connected, a window is used to read the Skylaser template configuration and alarm information

Scanner connection status information

Red not communicating

Green communicating

7.4. <u>**Creating the 4 detection zones.**</u>

Each zone must be drawn for the required detection configuration.

Complete erasure of the active zone

Masking and unmasking of the active zone (visual only)

Button to activate the work zone

Zoom command
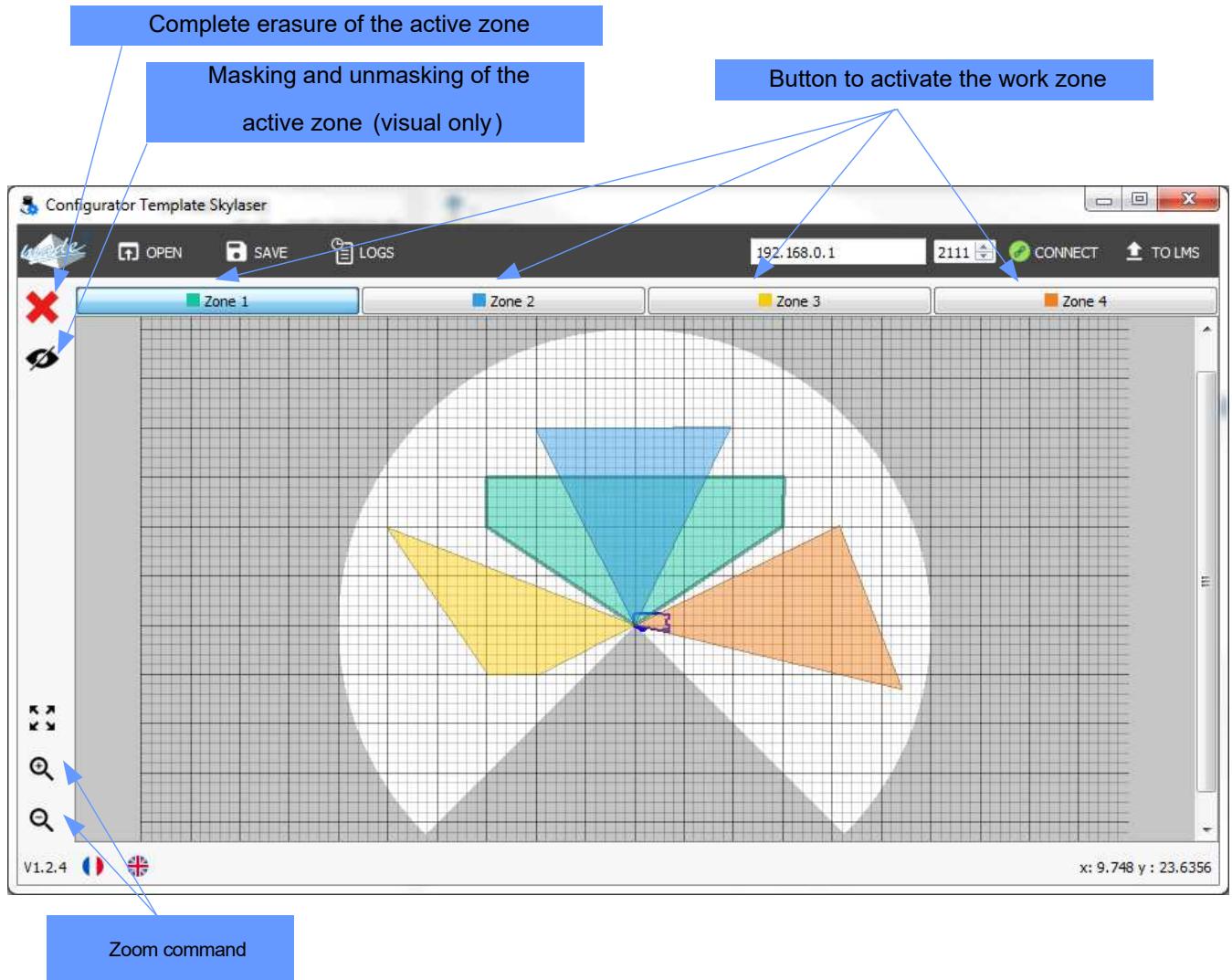
8.REMOTE ALARM MODULE.

8.1. Remote radio module.

Optionally the **SKY LASER TEMPLATE** can be fitted with 1 or more radio modules (up to 9) for remote alarms.

The radio modules have a range of about 100m.

Each radio module is standalone running on rechargeable batteries.

Radio monitoring and the power supply are permanent.

For cases where the **SKY LASER TEMPLATE** is in the high or other positions, the N°1 remote radio alarm box is used to calibrate. (Identical operation to the Select "teach-in environment" menu.)

Wait for "self teach-in" to complete

CAUTION: keep the zone free of all obstacles during this phase.

8.2.Buzzer and indicator meanings.
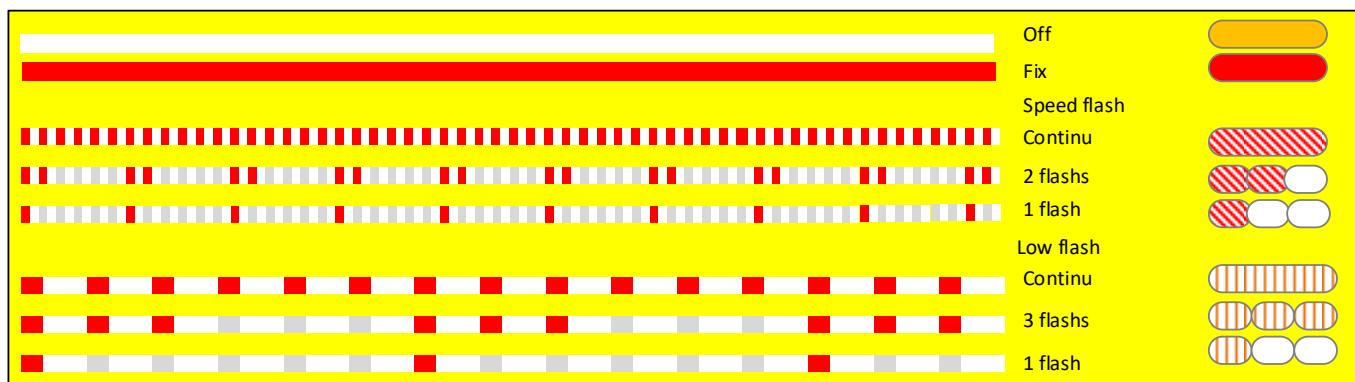
8.3. <u>View of alarms on the remote radio box.</u>

Signage available on the remote radio alarm

Buzzer: off Red indicator: off Blue indicator Fast flash 1 flash **Running**	Buzzer: Continuous fast flashing Red indicator: Continuous fast flashing Blue indicator Fast flash 1 flash **Zone alarm**	Buzzer: Slow flash 3 flashes Red indicator: On Blue indicator Fast flash 1 flash **Calibration in progress**	Buzzer: Fast flash 2 flashes Red indicator: Fast flash 2 flashes Blue indicator Fast flash 1 flash **Battery alarm**	Buzzer: Slow flash 1 flash Red indicator: Slow flash 1 flash Blue indicator Fast flash 1 flash **Radio alarm**

8.4. <u>Assignment of radio report to the CPU</u>

From version V304 of the CPU, and radio report in V110, it is possible to assign the radio report to the CPU directly on the site

To do this, follow the procedure below:

- Collect all the radio report boxes to be used with the CPU

Cut power to all radio report.
- Start the CPU, wait for the end of the initialization phase.

- Start the radio report

- Wait for it to finish initializing (if it has never been assigned to this CPU, it buzzes).

-

    o Using the Radio Affect menu.

Choose the radio assignment number from 1 to 9 and confirm.
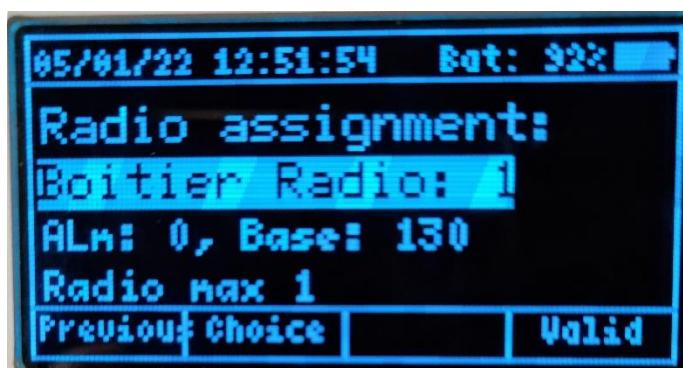
The radio report must stop buzzing.
- Stop the radio report (cut off the power to it).

Assign the next radio report with the same procedure but choosing the next assignment number.

9.TECHNICAL FEATURES

9.1.SKY Laser template

Characteristic	
Transport case dimensions	546*347*247 mm (l*w*h)
Total SKY LASER dimensions	300*300*500 mm (l*w*h)
Weight of the loaded transport case	15 kg
Weight of the SKY LASER alone	3 kg
Protection rating	IP65
Power supply voltage	14 - 19 Vdc
Consumption	10 Watt max
Battery autonomy	7h
Maximum range	Radius 30 Meters
Operating temperature	25°C to +60°C
Sound level	90 dB
Presence of fog and particle filters	
Laser scanner status monitoring	alarm if out of order or if cells obstructed
Option	Addition of a reset to stop the alarms when the zone is entered

9.2.Remote alarm module

Characteristic	
dimensions	230*77*85 mm (l*w*h)
weight	0.4 kg
Power supply voltage	5 Vdc
Consumption	average 10mAh (500mA on load)
Response time	1 second

9.3. Radio module specifications

LE50-868 Functional Characteristics

ERC/REC70-03 Frequency (MHz)	Band g 863.000 - 870.000	Band g1 868.000 -868.600	Band g2 868.700 - 869.200	Band g3 869.400 - 869.650	Band g4 869.700 -870.000
Global					
RF data rate	(1): 4.8 kbps (2): 9.6 kbps				
Numbers of channels	60 (1) 60 (2)	12 (1) 12 (2)	10 (1) 10 (2)	1 (1) 1 (2)	6 (1) 6 (2)
Channel width	50 kHz	50 kHz	50 kHz	250 kHz	50 kHz
Channel 0	865.025 MHz	868.025 MHz	868.725 MHz	869.525 MHz	869.725 MHz
Total Bandwidth	3 MHz	600 kHz	500 kHz	250 kHz	300 kHz
Transmission					
Duty cycle	≤ 1%	≤ 1%	≤ 0.1%	≤ 10%	No requirement
Modulation	GFSK with ±7 kHz deviation (1) GFSK with ±7 kHz deviation (2)				
Max permitted e.r.p	25 mW	25 mW	25 mW	500 mW	5 mW
e.r.p	8 levels from -8dBm to +14dBm (except for g4 band, 6 levels from -8dBm to 7dBm)				
	25 mW	25 mW	25 mW	25 mW	5 mW
Reception					
Sensitivity for PER < 10^{-3}	(1): Max - 109 dBm (2): Max - 108 dBm				
Remaining PER	< 1.10-6				
Saturation for PER < 10^{-3}	Up to - 10 dBm				

9.4. Emission in the ISM 868Mhz band.

NE50-868 Functional Characteristics

ERC/REC70-03 Frequency (MHz)	Band g 863.000 - 870.000	Band g1 868.000 -868.600	Band g2 868.700 - 869.200	Band g3 869.400 - 869.650	Band g4 869.700 - 870.000
Global					
RF data rate	38.4 kbps				
Numbers of channels	10	1	1	1	0
Channel width	200kHz	250kHz	250kHz	250kHz	-
Channel 0	865.6 MHz	868.300 MHz	869.000 MHz	869.525 MHz	-
Total Bandwidth	7 MHz	600 kHz	500 kHz	250 kHz	-
Transmission					
Duty cycle	≤ 1%	≤ 1%	≤ 0.1%	≤ 10%	-
Modulation	GFSK with ± 40 kHz deviation				
Max permitted e.r.p	-	25 mW	25 mW	500 mW	-
e.r.p	8 levels from -8dBm to +14dBm				
	25 mW	25 mW	25 mW	25 mW	5 mW
Reception					
Sensitivity for PER < 10^{-3}	Max - 101 dBm				
Remaining PER	< 1.10-6				
Saturation for PER < 10^{-3}	Up to - 10 dBm				

9.5. <u>Wave propagation reduction</u>

Examples of propagation attenuation

Factor	433 MHz Attenuation	868 MHz Attenuation	2.4 GHz Attenuation
Open office	0 dB	0 dB	0 dB
Window	< 1 dB	1 – 2 dB	3 dB
Thin wall (plaster)	3 dB	3 – 4 dB	5 – 8 dB
Medium wall (wood)	4 – 6 dB	5 – 8 dB	10 – 12 dB
Thick wall (concrete)	5 – 8 dB	9 – 11 dB	15 – 20 dB
Armoured wall (reinforced concrete)	10 – 12 dB	12 – 15 dB	20 – 25 dB
Floor or ceiling	5 – 8 dB	9 – 11 dB	15 – 20 dB
Armoured floor or ceiling	10 – 12 dB	12 – 15 dB	20 – 25 dB
Rain and/or Fog	20 – 25 dB	25 – 30 dB	*

* = Attenuations increase along with the frequency. In some cases, it is therefore difficult to determine loss and attenuation value.

Note = The table above is only indicative. The real values will depend on the installation environment itself.

9.6. <u>Authorisation to emit in the 868Mhz band.</u>

868 MHz band Requirements

The "ERC recommendation 70-03" describes also the different usable sub-bands in the 868 MHz license free band, in terms of bandwidth, maximum power, duty cycle and channel spacing. LE50-868 can operate on Annex 1 bands where "ERC recommendation 70-03" gives the following limitations.

ERC recommendation 70-03				
Band	Frequency band (MHz)	Maximum radiated power (mW)	Channel spacing (kHz)	Duty cycle (%)
Annex1 g	863.0 – 870.0	25	=< 100 for 47 or more channels	100
Annex1 g1	868.0 – 868.6	25	No channel spacing specified	1
Annex1 g2	868.7 - 869.2	25	No channel spacing specified	0,1
Annex1 g3	869.4 - 869.65	500	25 (for 1 or more channels)	10
Annex1 g4	869.7 – 870.0	5	No channel spacing specified	100

These bands are free to use but the module and the user must respect some limitations. Most of these restrictions are integrated in the conception of the module, except the duty cycle. For example, the 869.400 to 869.650 MHz band is limited to a 10% duty cycle. This means that each module is limited to a total transmit time of 6 minutes per hour. It is the responsibility of the user to respect the duty cycle.

10.MAINTENANCE, RECYCLING AND WARANTY

10.1.Maintenance.

Opening the devices is only authorized in the specific context of the operations described in this user guide.
Otherwise, it is strictly reserved to qualified staff approved by MADE.
An annual inspection can be carried out on our premises.
Never use solvent or solvent-based products to clean the device and/or its accessories.

Cleaning the optics cover

The detection sensor is largely maintenance-free. The optics cover on the detection sensor should however be cleaned regularly and if it is contaminated (Dust…). The frequency of cleaning is defined by the local ambient conditions.
Do not use aggressive detergents.
Do not use abrasive cleaning agents.

Important:
Static charges cause dust particles to be attracted to the optics cover.

How to clean the optics cover:
   1.Use a clean and soft brush to remove dust from the optics cover.
   2.Wipe the view window of the optics cover with a clean and damp cloth.

10.2.Hazard warnings and operational safety

Caution Laser radiation
The LMS1xx Security/LMC1xx VdS operates with a infrared-light laser diode. The laser beam cannot be seen with the human eye.
Laser radiation!
The LMS1xx Security/LMC1xx VdS corresponds to laser class 1 (eye safe) as per EN 60825¬ 1:2014.

Identical laser class for issue EN/IEC 60825-1:2007 Complies with 21 CFR 1040.10 with the exception of the deviations as per Laser Notice No. 50, Juin, 2007.

• Incorrect usage can result in hazardous exposure to laser radiation. Do not open the housing (opening the housing will not switch off the laser).

Pay attention to the laser safety regulations as per IEC 60825¬1 (latest version).

10.3.**Caution**

– Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. It is not possible to entirely rule out temporary disorienting optical effects, particularly in conditions of dim lighting.

Disorienting optical effects may come in the form of dazzle, flash blindness, afterimages, photosensitive epilepsy, or impairment of color vision, for example.

Important
No maintenance is necessary to ensure compliance with laser class 1. Laser power.
The laser operates at a wavelength $\square$ = 905 nm (invisible infrared light).
The radiation emitted in normal, appropriate operation is not harmful to the eyes and human skin. Laser output aperture.
The laser output aperture is the window of the optics cover on the LMS1xx Security/LMC1xx

Optical cover window

CLASS 1
LASER PRODUCT

IEC 60825-1:2007. Complies with
21 CFR 1040.10 and 1040.11
except for deviations pursuant to
Laser Notice No. 50, June 2007

The housing screws of the detection sensor are sealed. Claims under the warranty against MADE-SA will be rendered void if the seals are damaged or the device opened. The housing is only allowed to be opened by authorized service personnel.

10.4. **Warranty.**

Our warranty and general sales are available and sent by MADE-SA at the customer's request

10.5. **Copyright.**

© All reserved rights. The distribution and the copying of this document, as well as the use and the communication of its content, are forbidden without written authorization of MADE.

The content of this document is destined for use only as information. It can be modified without prior notice and must not be considered as an obligation by MADE.

MADE declines all responsibility for mistakes or inaccuracies that the present document may contain.

11.APPENDIX

11.1.IP address configuration

Configuration panel\Network and Internet\Network connections
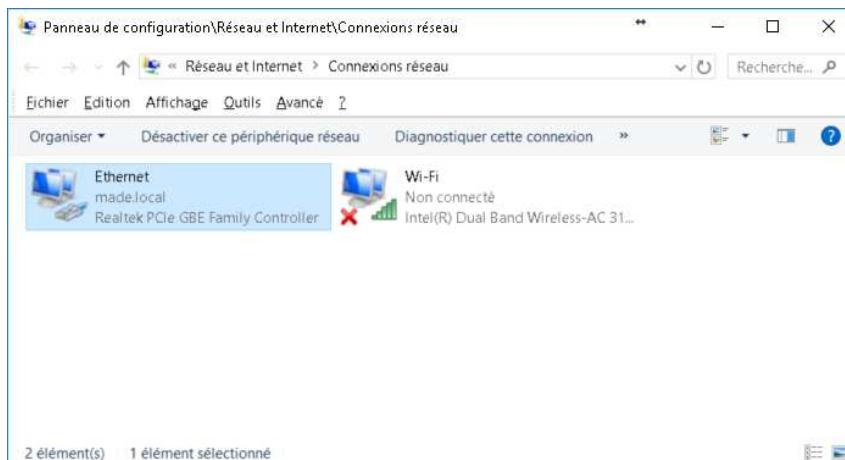
Go to properties using the right mouse button.
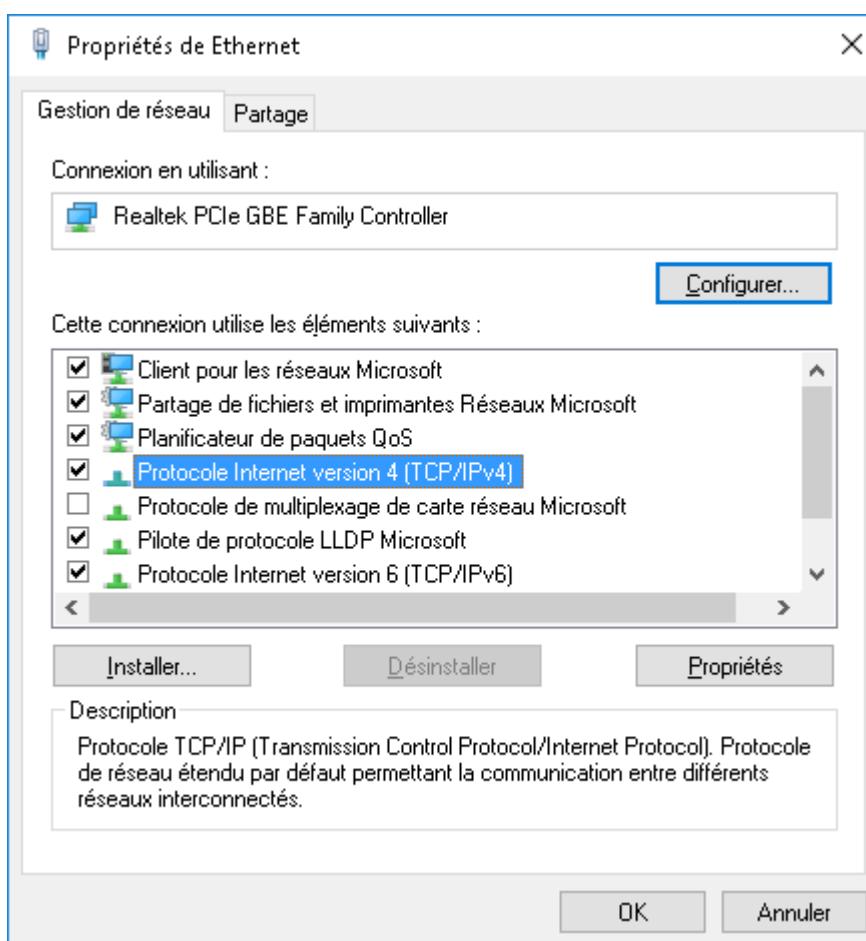
Click on Internet protocol version 4 and click on Properties

Propriétés de : Protocole Internet version 4 (TCP/IPv4) ✕

Général

Les paramètres IP peuvent être déterminés automatiquement si votre réseau le permet. Sinon, vous devez demander les paramètres IP appropriés à votre administrateur réseau.

○ Obtenir une adresse IP automatiquement

⦿ Utiliser l'adresse IP suivante :

Adresse IP :   192 . 168 . 0 . 2

Masque de sous-réseau :   255 . 255 . 255 . 0

Passerelle par défaut :   . . .

○ Obtenir les adresses des serveurs DNS automatiquement

⦿ Utiliser l'adresse de serveur DNS suivante :

Serveur DNS préféré :   . . .

Serveur DNS auxiliaire :   . . .

☐ Valider les paramètres en quittant   Avancé...

OK   Annuler

Modify and fix a static IP address, for example: 192.168.0.2
Validate using OK.
You can then launch the software
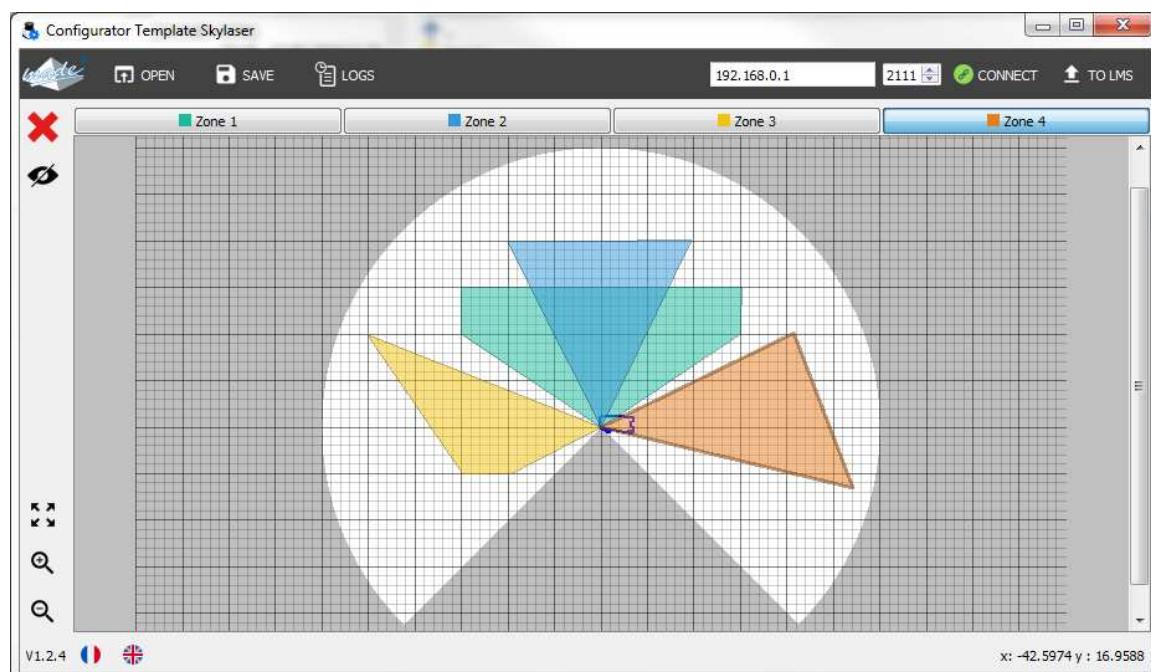
DECLARATION UE DE CONFORMITE
EU DECLARATION of CONFORMITY

Identification Produits / **Products identification** :

        Type de produits / Type of products : **GABARIT SKY LASER**.

        Modèles / Models : ***GASKYL***

Nous, soussignés, MADE SA déclarons sous notre seule responsabilité, que les produits auxquels se réfère cette déclaration, sont conformes aux exigences essentielles des Directives Européennes suivantes
We undersigned MADE SA declare under our sole responsibility, that the products to which this declaration refers, comply with essential Requirements of following European Directives:

Directive Basse tension	Low Voltage Directive
2014/35/UE	2014/35/UE
Directive CEM	EMC Directive
2014/30/UE	2014/30/UE

La conformité des produits a été évaluée en appliquant la (les) norme(s) (suivante(s) :
Product's conformity has been assessed by applying following standards(s)

EN 61010-1-Partie 1: Règles de sécurité pour appareils électriques de mesurage / safety requirements for electrical equipment for measurement

EN 61000-6-3 (01) et EN 61000-6-1 (01) EMC (Compatibilité Electromagnétique / Electromagnetic compatibility) :

- EN 55022 (98) + A3(03) : Mesures champs électriques rayonnés / Radio disturbance characteristics measurement.
- EN 61000-4-2 : Immunité aux décharges électrostatiques / Electrostatic discharge immunity.
- EN 61000-4-3 : Immunité aux champs électromagnétiques radiofréquence / Radiated, radio-frequency, electromagnetic field immunity.
- EN 61000-4-4 : Immunité aux transitoires rapides en salves / Electrical fast transient/burst immunity.
- EN 61000-4-5 : Immunité aux ondes de choc 1,2/50μs / Surge immunity.
- EN 61000-4-6 : Immunité aux tensions HF induites / Immunity to conducted disturbances, induced by radio-frequency fields.
- EN 61000-4-8 : Immunité aux champs magnétiques / Power frequency magnetic field immunity

Le produit désigné ci-dessus a été conçu, fabriqué et contrôlé, dans le cadre d'un Système d'Assurance Qualité certifié conforme à la norme : ISO 9001/2015, par l'Association Française pour l'Assurance Qualité – AFAQ, certificat : QUAL / 2015 / 24473.5 du : 03 / 08 / 2020.
The designated product has been designed, manufactured and tested in the framework of a Quality Assurance System certified as conforming to the standard : ISO 9001/2015, by the French association for quality assurance (AFAQ), certification : QUAL / 2015 / 24473.5 dated: 03 / 08 / 2020.

Apposition du marquage :
Marking : **CE**

Date d'émission / Emission date : 24/08/2020 / 2020-08-24

Responsable d'activité Activity manager	Directeur Technique Technical manager
Olivier GOEURY	Laurent ZOMERO