Vision Light Tech
creating optical solutions

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triniti™ technology
Expert control of Machine Vision lighting… made easy

triniti™ is a new, enabling technology from Gardasoft, which provides expert control, operational intelligence and full integration of Machine Vision Lighting – all within a 'plug-&-play' environment.

With **triniti**, Machine Vision systems with LED Lighting are now much easier to create, configure and commission, while, at the same time, offering increased functionality.

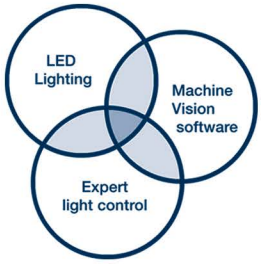
This is because complex control techniques have now been made very easy to implement.

triniti delivers many benefits to users, including that it:

- enables non-expert users to use expert Machine Vision lighting techniques
- revolutionises the integration of lighting parameters right through to application level software
- addresses the industry's identified need for a highly flexible system that is also readily 'plug-&-play'
- provides a stability of brightness, long-term, that helps to enhance the reliability of Machine Vision systems, over many years.

Interworking between Machine Vision product manufacturers

As a system-enabling technology, **triniti** embraces a collaborative approach with leading manufacturers of LED Lighting and providers of Machine Vision software.



LED Lighting – Two of the world's most prominent Machine Vision product manufacturers, CCS and Smart Vision Lights, are the leading **triniti** partners for LED Lighting.

CCS Creating Customer Satisfaction

smart vision lights

Machine Vision APIs – The **triniti** API is already proven with Image Processing Software from leading suppliers that include Cognex, Stemmer Imaging and National Instruments.

COGNEX STEMMER® IMAGING NATIONAL INSTRUMENTS

triniti™ comprises three key technological elements:

1 Integration of Lights into software

triniti-enabled LED lights are seamlessly integrated into Machine Vision networks, providing diagnostic and configuration benefits through Imaging and Application processing software.

2 Expert Light Control

triniti systems incorporate the control functionality of Gardasoft Vision's patented LED light controller technology, in either discrete or embedded form.

3 Light Identification and Operational Data

triniti chips are mounted into partner lights or light cabling, thereby enabling:

– knowledge of light parameters
– easy light connectivity
– light operational data.

A Collaboration of Machine Vision manufacturers: LED lighting; image processing software; expert light control

triniti™ products and developments

As part of the collaborative development programme, **triniti** deliverables include core hardware and software elements that are integrated with, or embedded into, products from leading LED Light hardware and Machine Vision software manufacturers.

b) triniti Protocols

The GigE Vision protocol has been implemented in the **triniti** Controllers so that intelligent cameras and applications and libraries which support GigE Vision or GenICam can interface directly to **triniti** Controllers.

triniti also exploits standard Machine Vision networking and communication architectures such as GigE Vision and GenICam, in order to ensure that the resulting solutions are fully integrated (as illustrated above, and as follows):

a) triniti Machine Vision Software Interface (API)

triniti-enabled LED lights are seamlessly integrated into Machine Vision networks and provide diagnostic and configuration benefits through Image Processing Software.

c) triniti Controller

These are LED Light Controllers which inherit the patented Gardasoft functionality, and combine this with **triniti** communication and GigE Vision compatibility.

d) triniti Chip

The **triniti** chip has been built into partners' lights or light cabling. It holds manufacturer's data on the lights, stores dynamic usage data and can return measurements from sensors within the light.

triniti™ Software

triniti provides very close integration of lighting into the whole machine vision system, enabling the user's application to easily configure and see the status of all the lights in the system. The application can be (or can use) any one of the following:

- Industry-standard image processing package
- User's own image processing code
- Smart Camera with its own image processing.

The application can be written in any .NET language, including C#, VB, and C++, or it can be a native application written in C++.

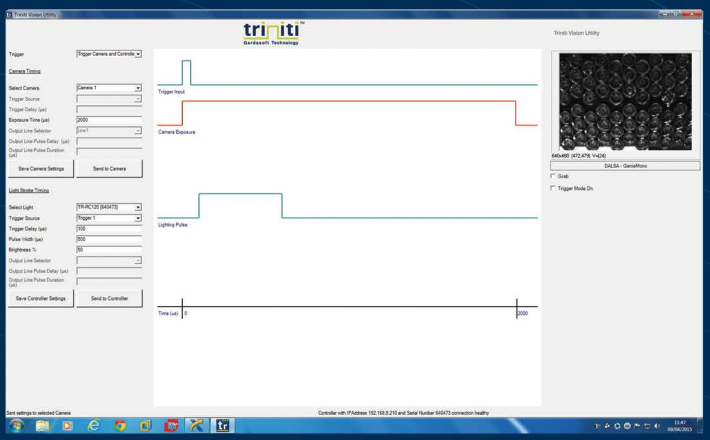
The image processing packages supported include Stemmer's Common Vision Blox, Cognex's VisionPro and National Instrument's LabVIEW. The Smart Cameras supported are those of Cognex's Insight range.

triniti™ Vision Utility

The **triniti** system makes machine vision techniques easier to use. One example of this is the Triniti Vision Utility, which enables the user to set up the timing for a whole machine vision system, with cameras and strobe-mode lighting, all from one place (strobe-mode being very useful for increasing the lifetime of lighting and providing increased light output).

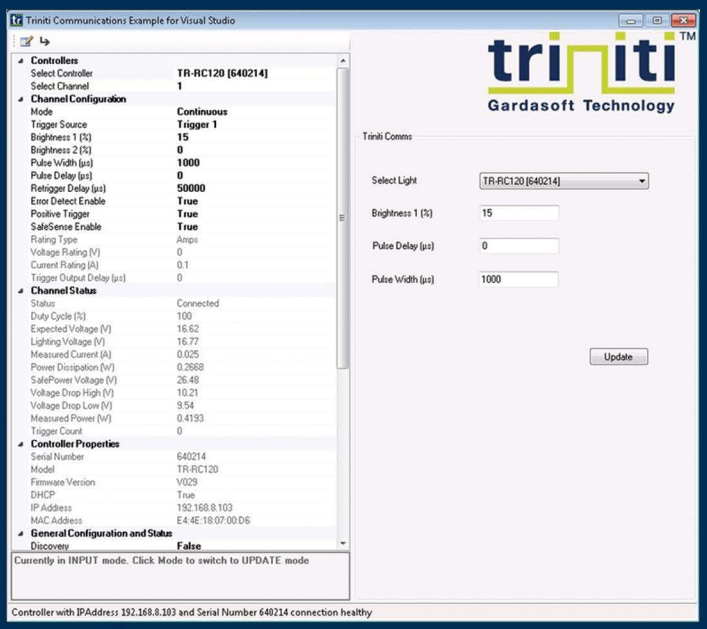
The Vision Utility uses the licence for the supported image processing packages so it can work with any camera that they support (which is generally any camera compatible with GigE Vision or GenICam).

The Utility provides a diagram, which shows the timing of the camera exposure and the lighting pulse on one screen. It's easy to see when the two are not aligned, and a live camera image shows the effect of the settings. The timing can be changed and saved interactively.



triniti™ Configuration Utility

This Utility enables users to configure their Lighting Controller, to show its status, and to edit certain lighting control parameters, via a PropertyGrid (as shown below).



triniti™ SDK

The SDK comprises: an API (Application Programming Interface) for .NET programming support; example WinForms program in C#.NET, and one in VB.NET, showing the use of the API, and Data Source objects (which provide a view of the controllers and lights in the system).

The API provides immediate access to controller and lighting properties, enabling controller connection, status reading and parameter changing. It can be used with applications that have custom image processing, or that use a third-party package (e.g. Stemmer CVB or Cognex VisionPro). It is provided through a DLL for .NET support.

Data source objects can be bound to TreeView and PropertyGrid .NET User Controls, to generate graphical views of controller and lighting values.

Plugins for third-party applications

National Instruments LabVIEW: A Virtual Instrument (VI) is provided, which can be put into a LabVIEW diagram, giving access to any networked Triniti controller and light.

Cognex Insight Code Snippet: Triniti provides a Code Snippet, which can be put into an Insight spreadsheet, enabling all the status and parameters of a lighting controller to be available to the Insight camera.

triniti Lighting

- **triniti**-enabled lights include: LDR2, HPR2, FPQ2, LDL2, TH, HPD2, LFV3 and LFV Series
- Direct connection to Gardasoft **triniti** Controller via M12 Connector
- For further details, visit **www.ccs-grp.com**

- **triniti**-enabled S75 and L300 Series for initial launch
- Direct connection to Gardasoft **triniti** Controller via M12 Connector
- For further details, visit **www.smartvisionlights.com**

triniti Controllers

- Single channel LED lighting controllers
- Compatible with **triniti** Intelligent Lighting platform
- GigE Vision compliant
- Pulsing up to 10A
- Continuous output to 1.25A
- 30W maximum output
- Pulse timing to 100µs
- Ethernet and push-button interfaces.

SPECIFICATIONS:	TR-RC120	TR-RC122
User interface	Ethernet and Push-button	
Output channel	One constant current output with Safesense™ and SafePower™	
Output current	Up to 1.2A continuous or 2.0A pulsed	Up to 1.25A continuous or 10.0A pulsed
Output power	Maximum 25W	Maximum 30W
Trigger input	Smart input compatible with 3v-24V, TTL, NPN, and PNP. Input impedance (nom): 8Kohm	
Pulse timing	From 100µs to 100ms in steps of 100µs	
Delay from trigger to pulse	From 2µs to 100ms in steps of 100µs	
Timing repeatability (Delay)	+/-5µs (Delay + Pulse up to 60ms); otherwise, +/-50µs	
Timing repeatability (Pulse width)	+/-1µs (Delay + Pulse up to 1ms); +/-5µs (Delay + Pulse from >1ms to 60ms); otherwise, +/-50µs	
Switch mode latency	Maximum 100µs	
Trigger rate	Maximum 100Hz	
Output voltage	0V to 32V	0V to 48V
triniti interface	**triniti** standard M12 lighting connector	
triniti communications interface	GigE-Vision v.2.0, GenICam, UPD/TCP, Third-party protocols	
Supply voltage	Regulated 24V DC +/-10%. A SELV power supply is required.	
Dimensions (excluding DIN fixing)	101mm long x 35mm wide x 120mm high	101mm long x 60mm wide x 120mm high
Weight	175g	340g
Mounting	DIN rail mount	
Operating temparature	-20°C to 50°C	
Humidity	Up to 95% non-condensing	
Standards	CE, RoHS	

Specifications are subject to change without notice.

triniti™ Gardasoft Technology

Gardasoft Vision Ltd

GARDASOFT Industrial LED technology

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