

On-location Lightning Warning

TOA

Global Lightning Network

Visual Warning System

From the industry innovators who first developed modern lightning location technology, a premium-quality visual and audible warning system designed to provide unattended, automated monitoring and conspicuous outdoor and/or indoor alerting of approaching lightning activity.

As one of the world's leading providers of technology and information on lightning detection and location, TOA Systems, Inc. has teamed up with Campbell Scientific, Inc.[®], the market leader for rugged and reliable outdoor hardware solutions.

The result is an enterprise-level integrated lightning data, software and hardware warning solution that is second-to-none for a wide range of locations.



About TOA Systems, Inc.

US technology and lightning detection network company TOA Systems, Inc. has been providing lightning data since 2004. Numerous organizations worldwide rely on TOA's data for critically important lightning information, safety and risk management.

TOA Systems' origins are at the very beginning of global lightning location. Company founder and co-owner, Dr. Rodney Bent, has been developing lightning detection and location science and technology since the 1960s, and in the 1980s registered the original 'time-difference-of-arrival' patent for lightning location. This led to the USA's first nationwide system, contracts with NOAA's National Weather Service and a number of major government organizations including the US Navy, NASA and the FAA, as well as the first worldwide system deployment.

TOA Systems has over 500 sensors globally in its long-range Global Lightning Network (GLN) as well as multiple high-definition regional and country networks around the world.

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Overview

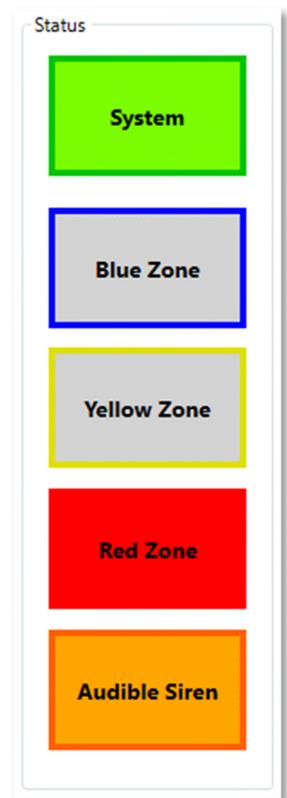
TOA Systems' Visual Warning System (VWS) connects data from any TOA lightning detection network to Campbell Scientific's RA110 visual and audible outdoor alarm hardware to enable remote location of one or several alarm systems for high-profile safety alerting.

Optionally, indoor visual and audible Patlite Corporation® LR5 Series alarm hardware is also available for placement in operations rooms, for example.

Utilizing TOA's VWS software, customizable alert regions, thresholds and warning types are established for each VWS alarm system based on the customer's assessment criteria for potential risk to its people and infrastructure.

When the TOA network detects lightning within one of the customer's defined regions, the VWS system triggers visual and/or audible alarms that warn anyone in the vicinity of the possible dangers approaching.

The VWS lightning warning criteria are highly configurable and can be set to escalate as lightning risk increases, determined by user-defined severity and proximity.



Each TOA Visual Weather System consists of:

- TOA's VWS Processor software to integrate the hardware with TOA's lightning network data feed;
- for each alarm hardware device, a CR800 datalogger, a power supply, a communication device and an enclosure; and
- one or more outdoor RA100 Remote Strobe and Siren Alarms, and/or indoor LR5 LED Signal Tower Alarms.

Additional optional elements include:

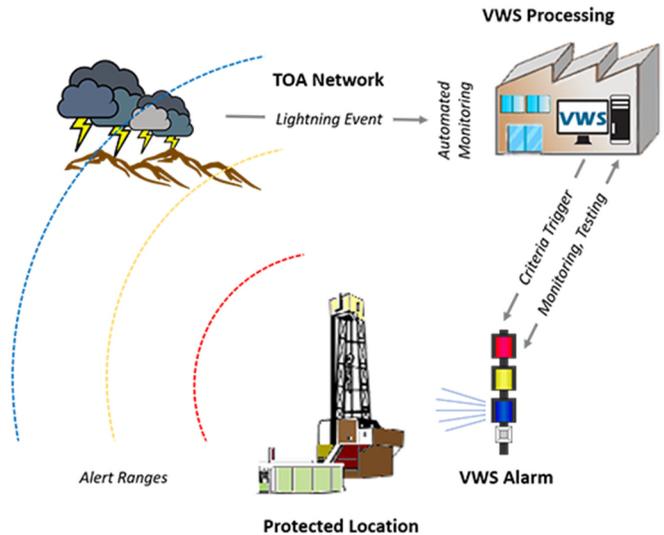
- TOA's VWS Display user interface software for visualization of VWS lightning activity, and for remote status monitoring and testing of the VWS hardware;
- communication options for connection of the system to alarm hardware over ethernet, fiber or spread-spectrum radio; and
- various alternatives for mounting the enclosure and the outdoor and indoor alarm hardware to suit different settings.

VWS Software

TOA's VWS Processor and VWS Display software can be provided on a supplied and pre-configured Windows PC for the option of plug-and-play or for installation on a customer-supplied PC meeting TOA's minimum specifications. The VWS PC can be installed at a remote location away from the VWS alarm hardware, with the distance dependent on the communication platform selected.

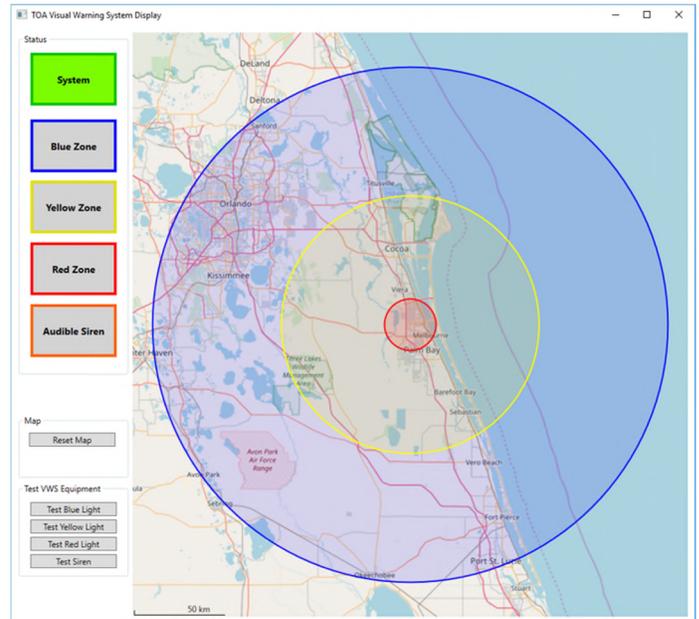
VWS Processor

- Manages and co-ordinates the VWS system components, including intercommunication between lightning data, user interface display and the remote alarm subsystem
- Runs in the background without user input or intervention
- Configured to each customer's unique requirements



VWS Display

- Provides visualization of recent lightning strokes for the VWS region on a scalable map
- Displays the configured VWS alert range rings
- Dynamic status boxes represent the current state of both the system and the connected VWS alarm lights and siren
- Test functions allow the user to manually activate individual lights and the siren



VWS Outdoor Hardware

Each TOA VWS for outdoor alerting comes with Campbell Scientific’s RA110 remote alarm system consisting of:

- one or more outdoor strobe light and audible alarms;
- a measurement and control datalogger;
- a power supply and communications device;
- a waterproof and mountable enclosure;
- brackets for mounting to a flat surface or optional pole-mounting kits.

The outdoor alarm unit includes ultra-bright red, yellow and blue 100,000-hour lifetime rating SAE Class II LED beacons and an attention-grabbing 120 dB siren.

RA110 Components – example configuration



- ① RA100 strobes and siren alarm with pole mount
- ② ENC14/16 enclosure
- ③ CR800 measurement and control datalogger
- ④ 12 Ah battery with AC-to-DC transformer
- ⑤ RF407 Spread Spectrum Radio
- ⑥ Stainless-steel pole

Customization Options

Communications	Ethernet	<ul style="list-style-type: none"> • Network Link Interface • Wi-Fi network link interface
	Fiber	<ul style="list-style-type: none"> • Fiber optic converter
	Radio	<ul style="list-style-type: none"> • Spread-spectrum • 900 MHz 1-W Spread-spectrum
Power Supplies	12 Ah AC	<ul style="list-style-type: none"> • 12 Ah battery, AC power • 12 Ah battery, AC power and UL certification
	84 Ah Solar	<ul style="list-style-type: none"> • 84 Ah battery, 50W solar panel
Mounting	Tripod	<ul style="list-style-type: none"> • 213-305cm/7-10ft galvanized-steel tubing tripod • 305cm/10ft stainless-steel instrument tripod
	Pole 61mm/2.4in OD	<ul style="list-style-type: none"> • 305cm/10ft galvanized without J-bolt mount • 244cm/8ft galvanized with J-bolt mount • 244cm/8ft 304 stainless steel with J-bolt mount • 244cm/8ft 316L stainless steel with J-bolt mount
	Strobe, Siren Alarm	<ul style="list-style-type: none"> • Flat mount • Pole mount

VWS Indoor Hardware

As an alternative or a supplement to the RA110 outdoor alarm hardware, TOA is also able supply an alarm system suitable for indoor use, utilizing Patlite hardware consisting of one or more LR5 LED light and audible alarms.

Each such indoor alarm connects to the same hardware as the outdoor alarm system: the datalogger, a power supply and communications. Various options for desk- or wall-mounting are additionally available.

LR5 Features

- Bright LED and lens construction for even light and high-profile visibility
- Completely enclosed sound module with substantial water and dust protection, producing loud, omni-directional sound
- Sleek, smooth form factor and a rugged body construction for performance in harsh environments, with IP65 protection rating



Mounting Options

Direct	<ul style="list-style-type: none"> • Flat onto horizontal surface
Poles	<ul style="list-style-type: none"> • 100mm, 300mm, 500mm, 800mm, 1m • 3.9in, 11.8in, 19.7in, 31.5in, 3.3ft • Threaded or non-threaded
Pole Brackets	<ul style="list-style-type: none"> • With L-bracket • With circular bracket • With folding bracket
Other	<ul style="list-style-type: none"> • Wall-mount bracket • Circular multi-pitch bracket • Mounting accessories (on request)



Specifications

Software

VWS Processor VWS Display	Desktop Operating System	<ul style="list-style-type: none"> Windows 10 (32-bit and 64-bit), or Windows 8 (32-bit and 64-bit), or Windows 7 (32-bit and 64-bit)
	Other	<ul style="list-style-type: none"> Microsoft .Net 4.5

Outdoor Strobe and Siren Alarm (RA110)

LED Beacons	Light Output	<ul style="list-style-type: none"> SAE Class 2
	Rated Lifetime	<ul style="list-style-type: none"> 100,000 hours
	Voltage, Current Drain	<ul style="list-style-type: none"> 0.65A peak @ 12.8v DC 0.26A average @ 12.8v DC
	Dimensions	<ul style="list-style-type: none"> Diameter: 14cm / 5.5in Height: 16.3cm / 6.4in
Siren	Sound Output	<ul style="list-style-type: none"> 120 dBA
	Temperature Range	<ul style="list-style-type: none"> Operating: -20° to +65°C / -4° to +149°F
	Voltage	<ul style="list-style-type: none"> 4.8 to 14.4v DC
	Current Drain	<ul style="list-style-type: none"> 0.62A maximum 0.02A average
Pole	Dimensions	<ul style="list-style-type: none"> 1.5m x 7.6cm x 3.8cm / 4.8ft x 3.0in x 1.5in
Extension Pole	Wind Rating (<i>installed to specifications</i>)	<ul style="list-style-type: none"> 233.4km/h / 145mph wind gust 180.3km/h / 112 mph steady winds (safety factor 1.25)
	Dimensions	<ul style="list-style-type: none"> 1.15m x 7.6cm x 3.8cm / 3.5ft x 3.0in x 1.5in

Indoor LED Signal Tower Alarm (LR5)

Tower	Light Output	<ul style="list-style-type: none"> 2300 mcd
	Sound Output	<ul style="list-style-type: none"> 90dB at 1m / 3.3ft (4 selectable types, set by DIP switches)
	Voltage, Current Drain	<ul style="list-style-type: none"> 4.4W peak @ 12v DC
	Dimensions	<ul style="list-style-type: none"> Diameter: 50mm / 2in Height: 253.5mm / 10in
	Weight	<ul style="list-style-type: none"> 0.55kg / 1.2lb
	Temperature Range	<ul style="list-style-type: none"> Operating: -20° to +50°C / -4° to +122°F

Datalogger and Enclosure

Datalogger	Temperature Range	<ul style="list-style-type: none"> Operating: -25° to +50°C / -13° to +122°F
	Voltage	<ul style="list-style-type: none"> 9.6 to 16v DC
	Current Drain	<ul style="list-style-type: none"> Idle: 0.7 mA @ 12v DC Active (average): <ul style="list-style-type: none"> 1mA (1Hz sample rate @ 12v DC without RS-232 communication) 16mA (100Hz sample rate @ 12v DC without RS-232 communication) 28mA (100Hz sample rate @ 12v DC with RS-232 communication)
Enclosure	Color	<ul style="list-style-type: none"> White
	Materials	<ul style="list-style-type: none"> Fiberglass-reinforced polyester enclosure with door gasket, external grounding lug, stainless-steel hinge, and lockable hasps
	Classification	<ul style="list-style-type: none"> NEMA 4X (prior to any cable-entry modification)
	Dimensions	<ul style="list-style-type: none"> Internal: 40.6 x 35.6 x 14cm / 16 x 14 x 5.5in External: 4.27 x 39.19 x 19.58cm / 17.43 x 15.43 x 7.71in