CARMANAH TECHNOLOGIES

Since its founding in 1996, Carmanah has become one of the most trusted names in solar technology, delivering reliable and cost-effective solar powered products and systems for industrial applications worldwide. Carmanah provides solutions for marine navigation, airfield ground lighting, aviation obstruction, roadway illumination, parking lot lighting and on-grid and off-grid power generation. To date, Carmanah’s products have been successfully deployed in over 400,000 installations in 110 countries with proven performance in conditions ranging from desert heat to arctic cold. Carmanah brands include Go Power! and recently acquired companies, Sol and Sabik.

CARMANAH AIRFIELD

Carmanah is an industry leader in the design and manufacture of solar airfield lighting equipment. We have installed more solar airfields worldwide than any other company. For over 15 years, our durable and reliable products have exceeded airfield industry standards including FAA and ICAO. Our products are manufactured in the USA and Canada, and are covered by an industry-leading 3-year warranty.

WHY CHOOSE CARMANAH AIRFIELD LIGHTS?

EASY INSTALL
- No trenching or specialized install crew required
- No high-voltage concerns; minimal or no cabling

SIMPLE OPERATION
- Solid state, low-maintenance and rugged
- Optional wireless control

COMPLIANT
- ICAO, FAA, ISO, FCC, CE, ANATEL, TC compliance
- Certified by globally recognized independent test agencies

LOWER COST THAN TRADITIONAL SYSTEMS
- Thrives where the grid is poor
- Cost-effective to modify and upgrade airfield
- No vault, no CCRs, no tower required

RAPID DEPLOYMENT
- Emergency or portable airfields
- Permanent and temporary installations

GREEN TECHNOLOGY
- Clean energy and no emissions
- Uses sunlight to recharge batteries
BENEFITS OF SOLAR AIRFIELD LIGHTING

NO COUNTERPOISE OR GROUNDING
NO GLASS LENS
NO BULBS
NO ISOLATION TRANSFORMERS
NO BASE CANS
NO CABLE CONDUITS
NO HIGH VOLTAGES
NO CCRS
NO VAULT
YES TO AIRFIELD SIMPLICITY!
On page 3:
- Add a new small apron towards the end of the taxiway (far right).
- At the side of the apron that meets the taxiway, make the lights (dots) red.
- Include no other lights around this apron.
- Add a callout box for “Barricade lights” with the text: "Portable safety barricades provide a reliable hazard marking solution for identifying closed runways, construction zones, and other dangerous air/field obstacles."
- Use the image of the A650 (same as apron edge lights).
PROVEN, RELIABLE SOLAR AIRFIELD LIGHTING

Our cable-free products are ideal for both temporary and permanent deployments including:

- General Aviation and Regional Airports
- International Airports
- Military Bases
- Helipads

All products are configured to meet your specific requirements including: optics, power (battery and solar), exterior finish and our secure wireless control.
Meets traditional airfield requirements in an easy-to-install, low maintenance package.

- ICAO and FAA compliant
- Third party certified
- Long-lasting batteries
- Available in three battery sizes

**Advanced Design**
- Improved optical efficiency with latest LEDs
- High-efficiency monocrystalline solar panels
- Reduced standby power consumption
- Multiple battery sizes for best value-for-performance

**Easy Installation**
Limited crew, no trenching, no airfield interruptions. Just place the A704 and it emits light dusk-to-dawn while maintaining its battery. Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away.

**Low Maintenance**
The A704 integrates solar panels, battery, electronics, and LED light source into a compact, stand-alone unit requiring minimal maintenance for 7 years.

**Reliable**
The Energy Management System (EMS) monitors all operations to provide consistent output in the harshest environments. Testing to ICAO, FAA and MIL specifications ensures high performance for many years.

**Trusted**
With thousands of installations worldwide, Carmanah solar LED lights operate year-round at over 500 airports and military bases.
### Specifications

**Optical**
- High-power LEDs meet IES LM-80 lumen maintenance, ensuring consistent photometrics for life of product
- ICAO, SAE25050 (FAA), and FAA EB 67 compliant chromaticity
- NVG-compatible infrared (IR) LEDs
- Steady-on and flash

**Energy Collection**
- High-efficiency cells with blocking diodes
- Maximum power point tracking with temperature compensation (MPPT-TC) for optimal energy collection in all solar conditions

**Energy Storage**
- On-board battery status
- Designed for 5+ year battery life; Replaceable and recyclable
- Optional port for battery charging and cabled operation

**Energy Management System (EMS)**
- Intelligent, microprocessor EMS
- On-board diagnostics and datalogger
- Push button interface for local control
- Autonomous (dusk to dawn), Temporary, and Emergency Modes

**Automatic Light Control (ALC)**
- ALC adjusts output intensity in response to unusually low amounts of sunlight to ensure continued operation

**Construction**
- Premium, UV-resistant polycarbonate lens
- Powder coated aluminum and polycarbonate chassis with integrated handle
- Waterproof, vented battery compartment

**Temperature**
- -30 to 50 °C (-22 to 122 °F) Optimal
- -40 to 80 °C (-40 to 176 °F) Maximum

**Wind & Ice Loading**
- 644 kph (400 mph) wind; 0.03 psi (22 kg/m²) ice

**Shock & Vibration**
- MIL-STD-202G and MIL-STD-810G

**Ingress**
- EN 60529 IP 67 immersion
- MIL-STD-202G immersion & damp heat cycling
- MIL-STD-810G rain & salt fog

**Compliance**
- ICAO MIRL (Annex 14, Vol. 1, 5.3.9.9)
- FAA L861 MIRL (AC 150/5345-46, EB67)
- FAA L861E & L861SE MIRL (AC 150/5345-46, EB67)
- FAA L860 LIRL (AC 150/5345-46, EB67)
- FAA L883 Portable (AC 150/5345-50)

### Configuration

<table>
<thead>
<tr>
<th>MODEL</th>
<th>COLOUR ▼</th>
<th>BATTERY SIZE ▼</th>
<th>CONTROL ▼</th>
<th>CHARGE PORT ▼</th>
</tr>
</thead>
<tbody>
<tr>
<td>A704</td>
<td>WHITE / IR (WW)</td>
<td>COMPACT STANDARD</td>
<td>NON-WIRELESS (NA)</td>
<td>MILITARY CHARGE PORT (MP)</td>
</tr>
<tr>
<td></td>
<td>WHITE / YELLOW / IR (WY)</td>
<td></td>
<td>WIRELESS (RF)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED / GREEN / IR (RG)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GREEN / IR (GG)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>YELLOW / IR (YY)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RED / IR (RI)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example:** A704-WW-Compact-RF-NA

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
“Carmanah” and Carmanah logo are trademarks of Carmanah Technologies Corp.

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Document: AVIA_A704 Spec Sheet_RevI.indd

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.
Meets traditional airfield requirements for taxiways and general purpose marking.

- ICAO and FAA compliant
- Greater than 10 cd of intensity
- Dusk-to-dawn or on-demand operation
- NVG compatible IR LEDs available

**Applications**
- Taxiway and apron edge
- Construction, barricades and fences
- Temporary or permanent markings
- Helipads
- Hazard marking

**Compliant Output**

**Easy Installation and Relocation**
No specialized work crew required. Lights are immediately operational with limited air traffic disruption. The A650 can be quickly relocated for temporary or emergency applications.

**Self-contained and Low Maintenance**
All components are incorporated within a compact, stand-alone unit. The A650 features a replaceable battery pack that extends the service life beyond five years, reducing the total cost of ownership and resulting in significant cost savings.

**Unprecedented Reliability**
Energy Management System (EMS) monitors and adapts the brightness to environmental conditions for consistent operation and long life under the toughest conditions.

**Designed and Tested to Tough Industrial Standards**

**User Friendly**
Easy configuration and programming options including:
- on-board user interface, infrared remote and device manager software through USB connection or optional wireless control system offering secure 900 MHz.
A650
SOLAR TAXIWAY AND BARRICADE LIGHT

SPECIFICATIONS

Solar Panel
High-efficiency cells with bypass and blocking diode function
Maximum power point tracking (MPPT) for optimal energy collection

Battery
Tool-less, replaceable and recyclable best-in-class battery pack
with extreme temperature range
Battery status feedback of Good, Charge or Bad (Replace)

Light Source
High power LED
Colour-specific temperature corrected LED drivers provide consistent intensity under all operating conditions

Intensity
Greater than 10 cd intensity, steady-on (see photometric plots)

Flash Patterns
256+ (non-wireless)
Steady-on mode and flash patterns (wireless)

Construction
Premium grade UV resistant, polycarbonate/polysiloxane co-polymer body and lens material
Double O-ring sealing with waterproof vent

Colours
Blue, Red, Yellow, Green and White
ICAO and SAE25050 (FAA) compliant chromaticity
NVG-compatible infrared (IR) LEDs (wireless only)

Operating Temperature
-43 to 51 °C (45 to 124 °F) ambient temperature
The A650 will function up to 190 °F (88 °C) internal and surface temperatures

Storage Temperature
-43 to 80 °C (-45 to 176 °F)

Colour Indicator
Yes, FAA Eng. Brief 67 compliant

Weight
1.6 kg (3.5 lb)

Wind Loading
644 kph (400 mph)

Automatic Light Control (ALC)
When enabled, ALC will dynamically reduce brightness in response to unusually low amounts of sunlight to ensure continued operation

Radio Receiver
900 MHz ISM (wireless)

Range
4 km (2.5 m) (wireless)

PHOTOMETRICS

A650 NON-WIRELESS

Vertical Angle

A650WIRELESS

Vertical Angle

CONFIGURATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OUTPUT</th>
<th>SWITCH</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A650</td>
<td>RED</td>
<td>NON-SWITCHED</td>
<td>NON-WIRELESS</td>
</tr>
<tr>
<td></td>
<td>GREEN</td>
<td>SWITCHED*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>YELLOW</td>
<td></td>
<td>*A650 Wireless version must have switch.</td>
</tr>
<tr>
<td></td>
<td>WHITE</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>BLUE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DIMENSIONS

SIDE VIEW

BOTTOM VIEW

SWITCHED VIEW*

Total height including wireless antenna is 10.9” (276 mm)

Also available with 71mm* (200 mm) bolt circle adapter

Specifications subject to local environmental conditions.
Specifications may be subject to change.

* Carmanah and Carmanah logo are trademarks of Carmanah Technologies Corp.
A practical, compact and low-maintenance solution for marking barricades, fencing, construction areas, ground obstacles and other hazards on the airfield.

- Dusk to dawn operation, designed for ease of use
- Advanced optics, high-efficiency solar panels and premium materials
- Excellent value and extremely reliable operation

**Easy Installation**
- Installs in minutes; “out-of-box” operation
- Flange-mount and pole-mount options
- Automatic dusk-to-dawn operation or optional on/off switch
- Optional mini IR remote accessory

**Low Maintenance**
- Replaceable batteries: AA NiMH, high-temperature-rated
- Next generation, energy-saving Automatic Light Control; five-day data trending regulates intensities for longer battery life and optimal performance 12-months a year.

**Reliable**
- Premium grade, UV resistant polycarbonate body and lens material
- Waterproof; IP 68 immersion
- Ventilated battery compartment
- Life expectancy over 15 years; 3 year warranty

**Trusted**
With thousands of installations worldwide, Carmanah solar LED lights operate year-round at permanent and temporary installations.
SPECIFICATIONS

Optical
- High Power LED
- Red, Green, White, Yellow, Blue
- Proprietary optical design

Energy Collection
- Best-in-class high-efficiency solar cells: 0.6 W

Battery
- Three high-temperature NiMH AA batteries rated for -40 to 185 °F (-40 to 85 °C)
- Designed for 5+ year battery life; Replaceable and recyclable

Energy Management System (EMS)
- Intelligent, microprocessor EMS

Automatic Light Control 2.0 (ALC 2.0)
- When enabled, ALC adjusts output intensity in response to unusually low amounts of sunlight to ensure continued operation

Programming
- Programmable with optional infrared programmer

Construction
- Premium grade UV resistant, polycarbonate body and lens
- Waterproof battery compartment with Gore® vent
- Colour indicator matches LED colour

Temperature
- -22 to 122 °F (-30 to 50 °C) operating
- -40 to 176 °F (-40 to 80 °C) storage

Weight
- Flange Mount: 0.8 lbs (0.37 kg)
- Pole Mount: 0.9lbs (0.40 kg)

Mounting
- Flange or pole-mount options. Refer to dimensional diagram for details

Wind Loading
- 140 knots (72 m/s)

Ice Loading
- 0.03 psi (22 kg/m²)

Shock & Vibration
- MIL-STD-202G (for Shock and Vibration)

Ingress
- IP 68 immersion, 24 hrs at 1 m (3 ft)
- MIL-STD-202G immersion & damp heat cycling
- MIL-STD-810G rain & salt fog

Compliance
- RoHS; WEEE
- FCC, CE

ORDER KEY

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OUTPUT</th>
<th>MOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A550</td>
<td>RED, GREEN, WHITE, YELLOW, BLUE</td>
<td>FLANGE MOUNT, FLANGE MOUNT - WITH SWITCH, POLE MOUNT</td>
</tr>
</tbody>
</table>

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.

Specifications subject to local environmental conditions.
Specifications may be subject to change.

US and International patents apply. "Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.
The LED PAPI is the most advanced on the market and has the widest range of configurations:

- Visible and IR output
- Portable and permanent
- ICAO / FAA / STANAG Compliant
- Several power options

**Applications**
- Permanent airfields
- Temporary airfields
- Emergency airfields
- Military & NVG operations

**Advanced Optics**
The PAPI and the Abbreviated PAPI (APAPI) use patented, LED-based optics to achieve the lowest power consumption, highest intensity and sharpest white/red transition. It exceeds ICAO / FAA / STANAG requirements to provide a clear approach path to the aviator.

**Easy Installation**
The PAPI works equally well in permanent or temporary locations. Permanent mounting is easy with standard frangible mounting. Temporary deployment is fast with retractable legs and a lightweight, compact form factor.

**Power Supply Versatility**
The low power consumption of the PAPI makes it mate well with several available power supplies:
- Solar kit
- Generator kit
- Battery kit
- AC only

**Controllable**
Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away. There is also 3 and 5-step, wired control and local control available.

**Trusted**
Deployed around the globe, from military to civilian airfields and from the Middle East to the Arctic Circle, the PAPI has proven it is robust. LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.
**PAPI**

**PRECISION APPROACH PATH INDICATOR**

**SPECIFICATIONS**

- **Optical**
  - High-power LEDs with proper heat management ensure consistent photometrics for life of product
  - NVG-compatible infrared (IR) LEDs
  - FAA L-880/881 & E-3007 (2 & 4 LHA) compliant
  - ICAO Annex 14 PAPI (2 & 4 LHA) & APAPI (2 LHA) compliant
  - STANAG 3316 PAPI (2 & 4 LHA) & APAPI (2 LHA) compliant
  - UFC 3-635-01 (4 LHA) compliant
  - Ultra-low, 55W / LHA power consumption make solar possible

- **Power Options**
  - Solar kit: Solar panels and mounting, batteries and enclosures; air transportable container; AC input for backup
  - Generator kit: Gas or diesel generator; AC input for backup
  - Battery kit: Batteries & enclosures; AC input for backup
  - AC only: 100 – 240 VAC 50/60 Hz; 3 and 5-step current input

- **Control Options**
  - Non-Wireless: AC input of 3 and 5-step current; local control
  - Wireless: 4 km (2.5 m) control range with optional Handheld Controller; local control

- **Construction**
  - Powder coated aluminum chassis with integrated handles
  - Aviation orange standard, yellow and other colors available
  - Stainless steel and anodized aluminum hardware
  - Integrated digital level
  - Optical glass lens

- **Temperature**
  - -40 to 60°C (-40 to 140°F) ambient

- **Wind Loading**
  - 161 kph (100 mph)

- **Ingress**
  - NEMA 4 & EN 60529 IP 55

- **LHA Weight**
  - 12.7 kg (28 lbs)

**PHOTOMETRICS**

**PAPI ISOCANDELA**

**WHTIE (cd)**

- 0 - 10000
- 10000 - 20000
- 20000 - 30000
- 30000+

**RED (cd)**

- 0 - 5000
- 5000 - 10000
- 10000 - 15000
- 15000+

**DIMENSIONS**

**PERMANENT**

- **PORTABLE**

**CONFIGURATION**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SIZE</th>
<th>MOUNTING</th>
<th>OUTPUT</th>
<th>POWER</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAPI</td>
<td>ABBREVIATED 2 LHA STANDARD 2 LHA STANDARD 4 LHA</td>
<td>PERMANENT PORTABLE</td>
<td>VISIBLE / IR</td>
<td>SOLAR KIT GENERATOR KIT BATTERY KIT AC</td>
<td>NON-WIRELESS WIRELESS WIRED, STYLE B</td>
</tr>
</tbody>
</table>

Options: carrying case, tactical battery pack, tilt switch (for FAA), low temperature arctic kit, custom chassis color

US and International patents apply. Other patents pending.

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Cost-effective, low-maintenance solution for improving safety at temporary, permanent and emergency airports and heliports.

- Internally or externally LED illuminated
- Powered by a robust Solar Power Supply (SPS)
- Designed to meet L-806(L) or L-807(L) FAA AC 150/5345-27
- Compliant with ICAO Annex 14, Volume 1, 6th Edition

**Easy Installation and Relocation**
No specialized work crews required. Limited air traffic disruption and functions immediately upon installation. Optional Handheld Controller allows for wireless operation including mode changes for enhanced visibility in poor weather conditions up to 4 km (2.5 m) away.

**Rugged, Weatherproof Design**
Sealed bearings for precision vaning and true wind direction in all types of weather and wind conditions. Additional bearing covers provided for protection against dirt and moisture. Water-repellent and color-fast nylon sock is resistant to rot and mildew. Standard orange or white/orange sock.

**Reliable Performance**
The SPS provides power to the wind cone in a simple to install package. Nominal 10 day autonomy (operation without solar charging) ensures consistent performance with a minimum 5 year battery service life.
SPECIFICATIONS

MODELS

L-806  Frangible, 8 foot windsock, unlit, internally, or externally lit
L-807  Non-frangible, size 1 or size 2 windsock, unlit, internally, or externally lit with centre hinge

OPERATING CONDITIONS

Temperature  -45 to +55 °C (-49 to +131 °F)
Humidity  0 - 100%

SOLAR POWER SUPPLY (SPS)

Installed Weight  50 watts (2 batteries) - 39 kg (86 lb)
135 watts (2 batteries) - 121.6 kg (268 lb)
Shipping Weight  50 watts - 129 kg (285 lb)
135 watts - 179 kg (395 lb)
Installed Dimensions  Height: 940-1400 mm (37-55 in)
Width: 840 or 1500 mm (33 of 59 in)
Operating Temperature  -40 to +55 °C (-40 to +131 °F)
Storage Temperature  -40 to +55 °C (-40 to +131 °F)
Chassis  Weather and corrosion-resistant construction of steel and powder coated aluminum
Mounting  Frangible couplings and floor flange mounts
Wind loading  193 kph (120 mph) min. for 135W installed at 65° tilt
Tilt  25° - 65° in 10° steps
Diagnostics  On-board feedback indicators for: battery and system status
Certifications  CE, FCC

BATTERY

Power  2x 12 VDC 100 Ahr Standard
Type  Replaceable and recyclable, absorbent glass mat (AGM) SLA. Standard with one battery
Charger  Temperature-compensated, maximum power point tracking (TC-MPPT)

PV PANEL

Power  50, 135 W
Type  High-efficiency polycrystalline, IEC 61215
Lifetime  12 years at 90% output

DIMENSIONS

<table>
<thead>
<tr>
<th>WIND CONE</th>
<th>OVERALL HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-806</td>
<td>3099 mm (122 in)</td>
</tr>
<tr>
<td>L-807 size 1</td>
<td>6248 mm (246 in)</td>
</tr>
<tr>
<td>L-807 size 2</td>
<td>6706 mm (264 in)</td>
</tr>
</tbody>
</table>

Installation

The Wind Cone should be installed according to FAA AC 150/5340-30. The Solar Power Supply (SPS) should be installed on a level concrete pad between a minimum of 12 feet and a maximum 15 feet from the wind cone.

Operation

The operation of the Wind Cone is entirely dependent on the direction and relative velocity of the surface wind. Movement of the wind through the open throat of the cage and into the sock causes the tail to inflate. The tail of the inflated sock indicates true wind direction for velocities as low as three knots through a 360° circle about the vertical shaft.

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and international patents apply. Other patents pending.
“Carmanah” and Carmanah logo are trademarks of Carmanah Technologies Corp.
Carmanah solar LED airfield signs are a simple solution for airfields that experience difficulties with grid access or for those that require a quick, minimally disruptive addition to an existing airfield.

- Includes an L-858Y, L-858R, L-858L, or L-858B solar-powered sign and a Solar Engine Power Supply (SEPS).
- SEPS incorporates the latest technology in solar technology, hardware and software to provide a reliable and sustainable power source.
- High quality LED light source virtually eliminates runway shutdowns, reduces re-lamping expenses and on-going maintenance costs.
- Battery life: 5+ years.
- Easy installation and relocation: no specialized work crews required.
- Limited air traffic disruption and functions immediately upon installation.
- Optional Handheld Controller allows for remote, wireless operation including mode changes for enhanced visibility in poor weather conditions.
- Engineered for reliable performance, the Energy Management System (EMS) monitors and adapts the brightness to environmental conditions for consistent operation and long life under the tough conditions.
- Minimum autonomy (operation without solar charging) 7+ days - scalable to meet requirements up to 40 days.

Compliance with Standards

FAA: Designed to meet L-858Y, L-858R, L-858L and L-858B AC 150/5345-44 (Current Edition) and the FAA Engineering Brief No. 67 “Light Sources other than Incandescent and Xenon for Airport Lighting and Obstruction Lighting Fixtures.”

CE: Complies with the requirements of the EMC Directive 2004/108/EC.

ICAO: Please inquire about ICAO compliant options.

Construction

Corrosion-resistant sign construction requires minimal maintenance:
- Aluminum housing
- Acrylic sign legend panels
- Stainless steel hardware Retroreflective sheeting.

Installation

Each sign is furnished complete with mounting flanges for installation on a concrete pad, which is the recommended method of installation. Contact Carmanah for more information on sign installation hardware.

The Solar Engine Power Supply (SEPS) should be installed on a level concrete pad within 20 feet of the solar sign.

For a temporary application, the wiring between the SEPS and the sign can be above ground. Both the sign and SEPS contain side conduits for cabling access.

**MODELS AVAILABLE**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PURPOSE</th>
<th>LEGEND COLOR</th>
<th>BACKGROUND COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-858Y</td>
<td>Direction, Destination &amp; Boundary</td>
<td>1490 mm (58.6 in)</td>
<td>Yellow</td>
</tr>
<tr>
<td>L-858R</td>
<td>Mandatory Sign</td>
<td>1820 mm (71.6 in)</td>
<td>Red</td>
</tr>
<tr>
<td>L-858L</td>
<td>Runway/Taxiway Location</td>
<td>Yellow</td>
<td>Black</td>
</tr>
<tr>
<td>L-858B</td>
<td>Runway Distance Remaining</td>
<td>White</td>
<td>Black</td>
</tr>
</tbody>
</table>

**REPRESENTED IN YOUR REGION BY:**
**SOLAR AIRFIELD SIGNS**

**OPERATING CONDITIONS**
- Temperature: -40 °C to +55 °C (-40 °F to +131 °F)
- Humidity: 0 to 100%
- Wind: Mode 2 signs withstand wind velocities up to 225 mph

**Sign Dimensions**

**SIGN HEIGTHS**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>SIGN NO.</th>
<th>SIGN FACE HEIGHT</th>
<th>LEGEND HEIGHT</th>
<th>OVERALL MOUNTING HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-858Y/R/L</td>
<td>1</td>
<td>457 mm</td>
<td>305 mm</td>
<td>756 mm</td>
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<tr>
<td></td>
<td>2</td>
<td>610 mm</td>
<td>381 mm</td>
<td>908 mm</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>762 mm</td>
<td>457 mm</td>
<td>106 mm</td>
</tr>
<tr>
<td>L-858B</td>
<td>4</td>
<td>1220 mm</td>
<td>1016 mm</td>
<td>1478 mm</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>762 mm</td>
<td>635 mm</td>
<td>1060 mm</td>
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</tbody>
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**SIGN LENGTHS**

<table>
<thead>
<tr>
<th>SIZE NO.</th>
<th>1 MODULE</th>
<th>2 MODULE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>750 mm (29.4 in)</td>
<td>1490 mm (58.6 in)</td>
</tr>
<tr>
<td>2</td>
<td>910 mm (35.9 in)</td>
<td>1820 mm (71.6 in)</td>
</tr>
<tr>
<td>3</td>
<td>1090 mm (42.4 in)</td>
<td>2150 mm (84.6 in)</td>
</tr>
<tr>
<td>4</td>
<td>1220 mm (47.9 in)</td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>1080 mm (42.4 in)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**SEPS DIMENSIONS**

**PACKAGING DATA**

- Signs are shipped with frangible couplings, and floor flanges – ready for installation.

**Additional Equipment Data**

**SOLAR ENGINE POWER SUPPLY (SEPS)**

- **Installed Weight**: 59.8 kg (132 lb)
- **Shipping Weight**: Box 1 (SEPS) - 34.4 kg (76 lb), Box 2 (battery) - 30.8 kg (68 lb)

- **Installed Dimensions**: 759 H x 1089 W x 441 D mm (*with wireless antenna at 55° tilt)

**Shipping Dimensions**

- **Box 1 (SEPS)**: 647 H x 1191 W x 356.6 D mm (25.5 H x 46.9 W x 14.0 D in)
- **Box 2 (Battery)**: 210 H x 332 W x 188 D mm (8.3 H x 13.1 W x 7.4 D in)

**Temperature**

- **Operating**: -30 °C to +50 °C (-22 °F to +122 °F)
- **Storage**: -40 °C to +80 °C (-40 °F to +176 °F)

**Type**

- Replaceable and recyclable, absorbent glass mat (AGM) SLA. Standard with one battery.

**Lifetime**

- 4,000 cycles to 20% depth of discharge at +20°C (+68 °F)

**Charger**

- Temperature-compensated, maximum power point tracking (TC-MPPT)

**LED DRIVER**

- **Channel A**: 18 – 38 VDC from 0.3 – 1.4 A and 5 – 100% duty cycle, constant current
- **Channel B**: 18 – 38 VDC from 0.3 – 1.4 A and 5 – 100% duty cycle, constant current

**Automatic Light Control (ALC)**

- ALC dynamically reduces brightness in response to unusually low amounts of sunlight to ensure continued autonomous operation. Available on Channels A and B.

**Control, Autonomous Mode**

- Dusk-to-dawn, steady on

**Load Cabling**

- 6.7 m (22 ft) cable can exit onto the surface or down into a ground pot

**PV PANEL**

- **Power**: 95 W
- **Type**: High Efficiency Monocrystalline, IEC 61215

**Lifetime**

- 10 years at 90% output

**WIRELESS**

- **Range**: 4 km (2.5 m)
- **Frequency**: 900 MHz ISM Band, FHSS
- **Encryption**: 256-bit AES

**Control, On-demand Mode**

- Seamless integration with existing Carmanah wireless solar products
- Up to 8 independent groups
- Flash Mode, Emergency Mode, Autonomous Mode
- On-demand Temporary Mode (High, Medium, Low)
- Configuration Mode, ARCAL

**OPERATING CONDITIONS**

- Temperature: -30 °C to +55 °C (-22 °F to +122 °F)
- Humidity: 0 to 100%
- Wind: Mode 2 signs withstand wind velocities up to 225 mph

**SIGN LENGTHS**

<table>
<thead>
<tr>
<th>SIZE NO.</th>
<th>MODULE 1</th>
<th>MODULE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>750 mm (29.4 in)</td>
<td>1490 mm (58.6 in)</td>
</tr>
<tr>
<td>2</td>
<td>910 mm (35.9 in)</td>
<td>1820 mm (71.6 in)</td>
</tr>
<tr>
<td>3</td>
<td>1090 mm (42.4 in)</td>
<td>2150 mm (84.6 in)</td>
</tr>
<tr>
<td>4</td>
<td>1220 mm (47.9 in)</td>
<td>N/A</td>
</tr>
<tr>
<td>5</td>
<td>1080 mm (42.4 in)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Note**: Sign depth is 238.5 mm (9.39 in).

**PACKAGING DATA**

- Signs are shipped with frangible couplings, and floor flanges – ready for installation.

**DESCRIPTION**

- **GROSS WEIGHT**: 21 (46), 36 (78), 32 (71), 47 (104), 37 (81), 60 (131), 54 (120), 39 (85)
- **DIMENSIONS**: 870 x 864 x 330, 870 x 1600 x 330, 1020 x 1020 x 330, 1020 x 1900 x 330, 1170 x 1170 x 330, 1170 x 2260 x 330, 1580 x 1320 x 330, 1170 x 1170 x 330
- **CARTON**:
  - 34 x 34 x 13
  - 34 x 63 x 13
  - 40 x 40 x 13
  - 40 x 76 x 13
  - 48 x 48 x 13
  - 46 x 46 x 13
  - 62 x 52 x 13
  - 48 x 48 x 13

**Specifications subject to local environmental conditions.**
**Specifications may be subject to change.**

US and international patents apply. Other patents pending.

“Carmanah” and Carmanah logo are trademarks of Carmanah Technologies Corp.
Carmanah’s Solar Elevated Runway Guard Light (ERGL) provides a distinctive warning to pilots that they are approaching a runway holding position and are about to enter an active runway. The ERGL has a high intensity LED light source and is powered by our industry leading solar engine power supply (SEPS).

- Provides 24-hour unidirectional marking at runway and taxiway intersections
- Installs in minutes and can be relocated just as quickly
- Includes LED lights, frangible column and tether
- Fixture flash-rate is controlled from an intelligent lighting control system module located in the SEPS; alternating flashes, 45-50 per minute
- Can be aimed both vertically and horizontally and has an adjustable Light Beam: 0° to 20° vertically; ±20° horizontally
- Significant reduction of maintenance costs and re-lamping expenses through long-lasting LED technology - average LED life of 56,000 hours under high-intensity conditions and more than 100,000 hours under actual operating conditions
- Engineered for reliable performance, the Energy Management System (EMS) monitors and adapts brightness to environmental conditions for consistent operation and long life under tough conditions
- Autonomy (operation without solar charging) 7+ days - scalable to meet requirements up to 40 days
- Battery life: 5+ years

**SEPS Models**

The ERGL is available in two SEPS models: Standard and Wireless. With the standard SEPS, the unit will activate automatically between dawn and dusk with pre-set illumination. The wirelessly controlled SEPS allows the unit to be activated remotely via a handheld controller.

**Fixture Construction**

The ERGL fixture is fabricated from corrosion-resistant materials and all exterior surfaces are painted aviation yellow for added protection and visibility. Includes high-strength ERGL base plate. The two ERGL light sources are surrounded by a black face plate and independent visors to reduce the amount of incident sunlight, thereby maximizing the contrast during the LED ON/OFF cycle.

**Installation**

ERGL systems are typically installed in pairs with one unit on either side of the taxiway holding position. The ERGL should be installed according to FAA AC 150/5340-30. The SEPS should be installed on a level concrete pad within 20 feet of the ERGL. For a temporary application, the wiring between the SEPS and the ERGL can be above ground. Both the ERGL and SEPS contain side conduits for cabling access.

**Represented in your region by:**
**OPERATING CONDITIONS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>-40 °C to +55 °C (-40 °F to +131 °F)</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 100%</td>
</tr>
<tr>
<td>Wind</td>
<td>Withstands wind velocities up to 480 kph (300 mph)</td>
</tr>
</tbody>
</table>

**SOLAR ENGINE POWER SUPPLY (SEPS)**

<table>
<thead>
<tr>
<th>Installed weight</th>
<th>59.8 kg (132 lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipping weight</td>
<td></td>
</tr>
<tr>
<td>Box 1 (SEPS)</td>
<td>34.4 kg (76 lb)</td>
</tr>
<tr>
<td>Box 2 (battery)</td>
<td>20.4 kg (45 lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Installed dimensions*</th>
<th>759 H x 1089 W x 441 D mm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>29.9 H x 42.9 W x 17.4 D in</td>
</tr>
</tbody>
</table>

* with wireless antenna at 55° tilt

<table>
<thead>
<tr>
<th>Shipping dimensions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Box 1 (SEPS)</td>
<td>647 H x 1191 W x 356 D mm</td>
</tr>
<tr>
<td>Box 2 (battery)</td>
<td>210 H x 332 W x 188 D mm</td>
</tr>
</tbody>
</table>

**BATTERY**

- Power: 12 VDC 105 A-hr at C/100 discharge rate
- Type: Replaceable and recyclable, absorbent glass mat (AGM) SLA
- Lifetime: 4,000 cycles to 20% depth of discharge at +20°C (+68°F)
- Charger: Temperature-compensated, maximum power point tracking (TC-MPPT)

**LED DRIVER**

- Channels: 2 independent channels
- Channel A: 18 – 38 VDC from 0.3 – 1.4 A and 5 – 100 % duty cycle, constant current
- Channel B: 18 – 38 VDC from 0.3 – 1.4 A and 5 – 100 % duty cycle, constant current
- Automatic Light Control (ALC): ALC dynamically reduces brightness in response to unusually low amounts of sunlight to ensure continued autonomous operation. Available on Channels A and B.
- Control, Autonomous Mode: Dusk-to-dawn flashing or 24-hour flashing
- Load Cabling: 6.7 m (22 ft) cable can exit onto the surface or down into a ground pot

**PV PANEL**

- Power: 95 W
- Type: B1215 High Efficiency Monocrystalline, IEC
- Lifetime: 10 years at 90% output

**WIRELESS**

- Range: 4 km (2.5 m)
- Frequency: 900 MHz ISM Band, FHSS
- Encryption: 256-bit AES
- Control, On-demand Mode: Seamless integration with existing Carmanah wireless solar products
- On-demand Temporary Mode (High, Medium, and Low), Configuration Mode, ARCAL

**FIG. 1. SEPS DIMENSIONS**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>527 mm</td>
<td>20.75 in</td>
</tr>
<tr>
<td>60.5 mm</td>
<td>2.38 in</td>
</tr>
<tr>
<td>676 mm</td>
<td>26.6 in</td>
</tr>
<tr>
<td>391 mm</td>
<td>15.4 in</td>
</tr>
<tr>
<td>449 mm</td>
<td>17.7 in</td>
</tr>
<tr>
<td>525 mm</td>
<td>20.7 in</td>
</tr>
<tr>
<td>561 mm</td>
<td>22.1 in</td>
</tr>
<tr>
<td>55°</td>
<td>15°</td>
</tr>
</tbody>
</table>

*Note: height and width dimensions will vary as angle of unit is increased to 55° tilt max

**FIG. 2. ERGL DIMENSIONS**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>609 mm</td>
<td>24.0 in</td>
</tr>
<tr>
<td>609 mm</td>
<td>24.0 in</td>
</tr>
<tr>
<td>333 mm</td>
<td>13.1 in</td>
</tr>
<tr>
<td>314 mm</td>
<td>12.4 in</td>
</tr>
</tbody>
</table>

Specifications subject to local environmental conditions. Specifications may be subject to change. US and international patents apply. Other patents pending. “Carmanah” and Carmanah logo are trademarks of Carmanah Technologies Corp.

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The management system governing the manufacture of this product is ISO 9001:2008 certified.

Carmanah is a trademark of Carmanah Technologies Corp.
Wirelessly control Carmanah’s solar airfield lighting system from up to 4 km (2.5 m) away. Features include:

- Instantaneous control of an unlimited number of airfield products
- Individual communication with each light
- Separately control up to 8 groups of lights
- Uninterrupted, secure, MIL-grade encryption

**Wireless Control**
Enables remote operation of an airfield lighting system including mode changes for enhanced visibility in poor weather conditions or blackout or infrared (NVG) modes in response to immediate threat.

**Multiple Configuration Options**
Secure, password-protected communications where one or more controllers can be keyed to a system of lights.

**Versatile Interface**
Contains a radio modem, supporting electronics and external serial interface. It also supports an interface suitable for connecting to an off-the-shelf, standalone aviation band VHF receiver (ARCAL) to facilitate pilot-controlled lighting operation.

**Rugged, Weatherproof Design**
Tested to Condition B, Method 104A of MIL-STD-202F for moisture resistance. Reliable operations in temperatures ranging from -40 to 60 °C (-40 to 140 °F). Weatherproof back-lit LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.
How Carmanah’s Wireless Control Works

Point-to-multipoint wireless system communicates with each light individually so that if one light goes out, the system still functions.

### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Range</td>
<td>Up to 4 km (2.5 mi)</td>
</tr>
<tr>
<td>Individual Groups</td>
<td>1 - 8</td>
</tr>
<tr>
<td>Frequency</td>
<td>900 MHz ISM point-to-multipoint; others available, please inquire</td>
</tr>
<tr>
<td>Encryption</td>
<td>Up to 256 bit AES encryption</td>
</tr>
<tr>
<td>Control Tower Integration</td>
<td>Via included RS-232 connector</td>
</tr>
<tr>
<td>Pilot Activated Lighting</td>
<td>Via included ARCAL connector</td>
</tr>
<tr>
<td>Password Protection</td>
<td>User and Admin modes</td>
</tr>
<tr>
<td>Operation</td>
<td>12 hrs of continuous use on single charge (1 operation / min.)</td>
</tr>
<tr>
<td></td>
<td>1250 hrs of storage on a single charge</td>
</tr>
<tr>
<td>Modes</td>
<td>Visible, IR (NVG), flashing, steady on, standby, off, autonomous, temporary, emergency, diagnose</td>
</tr>
<tr>
<td>Antenna</td>
<td>Removable antenna included</td>
</tr>
<tr>
<td></td>
<td>External antenna options</td>
</tr>
<tr>
<td>Battery</td>
<td>Lithium-ion, long cycle life</td>
</tr>
<tr>
<td></td>
<td>3.75 V, 6.8 Ah</td>
</tr>
<tr>
<td></td>
<td>Battery status indicators</td>
</tr>
<tr>
<td></td>
<td>Universal battery charger included</td>
</tr>
<tr>
<td>Construction</td>
<td>Powder coated aluminum</td>
</tr>
<tr>
<td></td>
<td>Backlit, waterproof, silicone keypad</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to 80 °C (-40 to 140 °F)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-40 to 80 °C (-40 to 140 °F)</td>
</tr>
<tr>
<td>Weight</td>
<td>1.4 kg (3 lb)</td>
</tr>
<tr>
<td>Ingress</td>
<td>Waterproof, vented battery compartment</td>
</tr>
<tr>
<td></td>
<td>MIL-STD-202, Method 104A for immersion</td>
</tr>
<tr>
<td>Compliance</td>
<td>FCC, ANATEL</td>
</tr>
</tbody>
</table>

Specifications subject to local environmental conditions. Specifications may be subject to change.
Allows pilots to activate and manage the intensity of airfield lights on approach. Ideal for unmanned airfields and control towers.

Compliance with Standards

FAA: L854 AC 150/5345-49 (Current Edition)
ETL Certified
ICAO: Aerodrome Design Manual, Part 5 para. 3.4.6
FCC: 47 CFR, Part 15:2007 (Class A)
Canada: TP 312 - Aerodromes Standards and Recommended Practices

The Carmanah ARCAL system provides air-to-ground (Type I) radio control of Carmanah solar airfield products. Pilots can remotely activate and change intensities of our products by simply keying the microphone button of their standard VHF communication transmitter.

Airport operators benefit from maximum runway usage while minimizing energy expenditure and increasing the performance capabilities of our solar airfield products.

- Designed for outdoor, unattended all-weather operation
- Eliminates costly trenching and installation of control lines to remote facilities
- No special airborne equipment or adapters required
- Lights are activated remotely from the air and remain on at the selected intensity for a period of 15 minutes. Additional timer settings of 1, 30, 45 and 60 minutes are available
- Receiver may be programmed to operate on any frequency in the specified VHF range between 118.0 to 136.0 MHz
- Selectable decoder enable/disable prevents multiple relay operation during normal daytime operations
- Optional Remote Maintenance Module (RMM) available
- Configurable to Type J or Type K ARCAL via DIP switch selection (Canada)

Specifications subject to local environmental conditions. Specifications may be subject to change.

US and International patents apply. Other patents pending.
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Install airfield lighting in minutes with the PALT Portable Airfield Lighting Trailer system.

- Stores and charges 130+ lights for a complete 4000 m runway
- Configurable from 500 - 4000 m runway
- Air transportable and towable to expedite airfield light installation
- Integrated AC and solar charging system ensures airfield lights are always ready

**Applications**
The PALT combines our rugged cable and transportation trailer product line with our trusted A704, A650, and PAPI solar airfield lights. Our system is ideal for:

- Military, police, airport operators
- Night vision goggle (NVG) and covert operations
- Humanitarian, disaster, and medevac situations

**Compliant and Self-contained**
Airfield lights are a critical navigation aid for pilots and ours are:

- ICAO and FAA compliant
- Solar-powered = no cabling or civil works required
- Self-contained, integrated, and sealed against water and dust to greater than IP68

**Proven in Austere Environments**
Used worldwide in military environments for over fifteen years, our airfield lights exceed operational requirements:

- Lightweight, compact, and designed for portability with integrated handles, aviation yellow or olive drab chassis, and military charge ports
- Wirelessly controlled up to 4 km with military-grade encryption
- High efficiency, LED optics
- Third-party tested for performance

The system is easily configured to transport, charge, and control these products:

- Runway Edge Lights
- Apron and Taxiway Edge Lights
- Wireless Control
- Runway Threshold Lights
- PAPI
- ARCAL

**REPRESENTED IN YOUR REGION BY:**
TRAILER SPECIFICATIONS

The PALT utilizes a recognized platform with these key features:

- Light Tactical Trailer (LTT) chassis matches the performance of US military HMMWV and NATO requirements
- Air transportable with lifting points
- Fits in standard cargo container
- Front and rear stabilization bars easily deploy during use
- Changeable tongue for ball-mount, pintle hook, or lunette ring towing
- Hydraulic brakes, operating and blackout lights
- Rugged off-road suspension, wheels, and run-flat tires
- Chromoly steel and aircraft aluminum chassis

Dimensions

- 4286 mm (169 in) total length, 2276 mm (90 in) width, 1969 mm (78 in) height, 1840 mm (72.5 in) track width
- 1905 kg (4200 lb) max. weight
- 410 mm (16 in) min. ground clearance

To this versatile platform, we add a comprehensive Go Power! industrial-grade solar charging system.

Solar System

- Large 4x AGM battery bank to recharge the airfield lights’ batteries during storage
- 320 W solar panel array recharges the battery bank when no AC power is available
- 75A battery charger recharges the battery bank quickly when connected to AC power

Electrical

- Integrated user readout including battery status, voltage, LVD
- NEMA electrical box with circuit breakers for easy maintenance

AIRFIELD LIGHTING SPECIFICATIONS

- FAA and ICAO compliant lighting
- A704 white and white/yellow runway edge lights (quantity depends on runway length) + 10x A704 red/green threshold lights + optional A704-VL blue taxiway lights
- Visible and NVG-compatible infrared (IR) output
- Wireless control from up to 4 km (2.5 miles) away
- -40 to 80 ºC (-40 to 176 ºF) max. operating temperature

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
“Carmanah” and Carmanah logo are trademarks of Carmanah Technologies Corp.

PALT PORTABLE AIRFIELD LIGHTING TRAILER

Simply open the easy-access doors, disconnect charge port, remove A704 solar airfield light, and place on the ground to assemble your airfield.

CONFIGURATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RUNWAY LENGTH</th>
<th>CHASSIS</th>
<th>OPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALT</td>
<td>500 M</td>
<td>DESERT TAN</td>
<td>PERMANENT LIGHTING MOUNTS</td>
</tr>
<tr>
<td></td>
<td>1000 M</td>
<td>OLIVE DRAB</td>
<td>TAXIWAY LIGHTS</td>
</tr>
<tr>
<td></td>
<td>2000 M</td>
<td>AVIATION YELLOW</td>
<td>PAPI SYSTEMS</td>
</tr>
<tr>
<td></td>
<td>3000 M</td>
<td>WHITE</td>
<td>PILOTACTIVATED ARCAL</td>
</tr>
<tr>
<td></td>
<td>4000 M</td>
<td>OTHERS AVAILABLE</td>
<td>OTHERS AVAILABLE</td>
</tr>
<tr>
<td></td>
<td>OTHERS AVAILABLE</td>
<td>OTHERS AVAILABLE</td>
<td>OTHERS AVAILABLE</td>
</tr>
</tbody>
</table>

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.
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Solar helipad lighting systems are a dependable alternative to generator or grid-powered lighting for ground, rooftop, offshore, temporary or remote heliports. Carmanah provides customized systems for the world’s toughest environments.

Carmanah’s configurable and compliant solar-powered helipad lighting products include:

- FATO – Final Approach and Take Off
- TLOF – Touchdown and Lift Off
- Landing Direction Lights
- Taxiway Lights
- HAPI – Helicopter Approach Path Indicator
- Wind Cones

**Solar Wind Cone**
- Orange Windsock

**HAPI**

**Solar Helipad Lighting**

**Military Compliant Product Map**

**Solar Helipad Lighting**

**Taxiway**
- Model: A704-VL or A650 Blue

**Perimeter Lighting**
- Model: A704 Yellow

**Approach Lights**
- Model: A704-VL White

**Landing Direction Lights**
- Model: A704 Yellow

**Solar WInd Cone**
- Model: A704 Yellow
FLIGHT PATH ALIGNMENT
MODEL: A704-VL GREEN
1.5-3m (5-10ft)
7.6m max. (25ft)
3m (10ft)

TLOF (TOUCHDOWN AND LIFT OFF)
MODEL: A704-VL GREEN

FATO (FINAL APPROACH AND TAKE OFF)
MODEL: A704-VL WHITE

LANDING DIRECTION LIGHTS
MODEL: A704-VL GREEN
18.4m (60ft)

TAXIWAY
MODEL: A704-VL OR A650 BLUE

APPROACH LIGHTS
MODEL: A704-VL WHITE

FLIGHT PATH ALIGNMENT
MODEL: A704-VL WHITE

AIMING POINT LIGHT
MODEL: A704-VL WHITE
5m max. (16 ft)
1.5-3m (5-10ft)

SOLAR WIND CONE
ORANGE WINDSOCK
5m (16.4ft)

SOLAR WIND CONE
ORANGE/WHITE WINDSOCK
5m (16.4ft)

HAPI (HELICOPTER APPROACH PATH INDICATOR)

FATO (FINAL APPROACH AND TAKE OFF)
MODEL: A704-VL GREEN

APPROACH LIGHTS
MODEL: A704-VL WHITE

FLIGHT PATH ALIGNMENT
MODEL: A704-VL GREEN

AIMING POINT LIGHT
MODEL: A704-VL WHITE
5m max. (16 ft)
1.5-3m (5-10ft)

SOLAR WIND CONE
ORANGE/WHITE WINDSOCK
5m (16.4ft)

HAPI (HELICOPTER APPROACH PATH INDICATOR)

FATO (FINAL APPROACH AND TAKE OFF)
MODEL: A704-VL GREEN

APPROACH LIGHTS
MODEL: A704-VL WHITE

FLIGHT PATH ALIGNMENT
MODEL: A704-VL GREEN

AIMING POINT LIGHT
MODEL: A704-VL WHITE
5m max. (16 ft)
1.5-3m (5-10ft)

SOLAR WIND CONE
ORANGE WINDSOCK
5m (16.4ft)

HAPI (HELICOPTER APPROACH PATH INDICATOR)
Meets traditional helipad requirements in an easy-to-install, low maintenance package.

- ICAO and FAA compliant
- Third party tested
- Proven technology platform
- Available in three solar engine sizes

**Applications**

Helipads
- Touchdown and Lift-off area (TLOF)
- Final Approach and Take-off area (FATO)
- Taxiway lighting
- NVG operations
- Emergency operations

**Advanced Design**

- Improved optical efficiency with latest LEDs
- Up to 25% more power with high-efficiency solar panels
- Reduced standby power consumption
- Multiple solar engine sizes for best value-for-performance

**Easy Installation**

Limited crew, no trenching, no helipad interruptions. Just place the A704-VL and it emits light dusk-to-dawn while maintaining its battery. Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away.

**Low Maintenance**

The A704-VL integrates solar panels, battery, electronics, and LED light source into a compact, stand-alone unit requiring minimal maintenance. The replaceable battery extends service life well beyond 5 years.

**Reliable**

The Energy Management System (EMS) monitors all operations to provide consistent output in the harshest environments. Testing to ICAO, FAA and MIL specifications ensures high performance for many years.

**Trusted**

With thousands of installations worldwide, Carmanah solar LED lights operate year-round at permanent airfields and temporary military installations.
A704-VL
SOLAR HELIPAD LIGHT

SPECIFICATIONS

Optical
- High-power LEDs meet IES LM-80 lumen maintenance, ensuring consistent photometrics for life of product
- ICAO, SAE2650 (FAA), and FAA EB 67 compliant chromaticity
- NVG-compatible infrared (IR) LEDs
- Steady-on and flash

Energy Collection
- High-efficiency cells with blocking diodes
- Maximum power point tracking with temperature compensation (MPPT-TC) for optimal energy collection in all solar conditions

Energy Storage
- Pure-lead VRLA AGM battery with manufacturer operating range -65 to 80 °C (-85 to 176 °F)
- On-board battery status
- Designed for 5+ year battery life; Replaceable and recyclable
- Optional port for battery charging and cabled operation

Energy Management System (EMS)
- Intelligent, microprocessor EMS
- On-board diagnostics and datalogger
- Push button interface for local control
- Autonomous, temporary, and emergency modes

Automatic Light Control (ALC)
- ALC adjusts output intensity in response to unusually low amounts of sunlight to ensure continued operation

Construction
- Premium, UV-resistant polycarbonate lens
- Powder coated aluminum and polycarbonate chassis with integrated handle
- Waterproof, vented battery compartment

Temperature
- -30 to 50 °C (-22 to 122 °F) Optimal
- -40 to 80 °C (-40 to 176 °F) Maximum

Wind & Ice Loading
- 644 kph (400 mph) wind; 0.03 psi (22 kg/m²) ice

Shock & Vibration
- MIL-STD-202G and MIL-STD-810G

Ingress
- EN 60529 IP 67 immersion
- MIL-STD-202G immersion & damp heat cycling
- MIL-STD-810G rain & salt fog

Compliance
- CE compliant (non-wireless model only)

DIMENSIONS AND WEIGHTS

<table>
<thead>
<tr>
<th>MODEL</th>
<th>OUTPUT ▼</th>
<th>SOLAR ENGINE ▼</th>
<th>CHASSIS ▼</th>
<th>CONTROL ▼</th>
<th>CHARGE PORT ▼</th>
</tr>
</thead>
<tbody>
<tr>
<td>A704-VL</td>
<td>WHITE / IR</td>
<td>COMPACT</td>
<td>YELLOW</td>
<td>NON-WIRELESS</td>
<td>NONE</td>
</tr>
<tr>
<td></td>
<td>BLUE / IR</td>
<td>STANDARD</td>
<td>OLIVE DRAB</td>
<td>WIRELESS</td>
<td>CHARGE PORT</td>
</tr>
<tr>
<td></td>
<td>GREEN / IR</td>
<td>LARGE</td>
<td></td>
<td></td>
<td>MILITARY CHARGE PORT</td>
</tr>
</tbody>
</table>

Optional
- 4 km (2.5 km) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

Optional
- Handheld Controller
  - 4 km (2.5 km) control range
  - 900 MHz with encrypted signal

Optional
- Wireless Control

Optional
- Military Charge Port

Specifications subject to local environmental conditions. Specifications may be subject to change.

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### Third Party Validation: Photometric Compliance

Refer to table below for additional details.

1. ICAO FATO (Annex 14, Vol. 1, 5.3.7.4)
   - ICAO FATO (Annex 14, Vol. 2, Appendix 1)
2. FAA L-861T (AC No. 150/5345-46D, EB67)
   - ICAO (Annex 14, Vol. 1, 5.3.18.8)
3. FAA L-860E/HR, TLOF
   - FAA L-861 FATO
4. FAA L-810 vertical divergence; 850 - 890 nm peak

### Peak Intensity

<table>
<thead>
<tr>
<th></th>
<th>Auto Low (cd)</th>
<th>Auto Medium (cd)</th>
<th>Auto High (cd)</th>
<th>Temp Low (cd)</th>
<th>Temp Medium (cd)</th>
<th>Temp High (cd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FATO (ICAO) 1</td>
<td>4</td>
<td>10</td>
<td>18</td>
<td>27</td>
<td>83</td>
<td>266</td>
</tr>
<tr>
<td>Taxiway and Apron Edge 2</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>TLOF (ICAO &amp; FAA) &amp; FATO (FAA) 3</td>
<td>7</td>
<td>14</td>
<td>27</td>
<td>43</td>
<td>113</td>
<td>288</td>
</tr>
<tr>
<td>NVG Operations (mW/sr) 4</td>
<td>16</td>
<td>34</td>
<td>80</td>
<td>16</td>
<td>34</td>
<td>80</td>
</tr>
</tbody>
</table>

#### Intensity (Candela)

- **A704-VL Top of Lens**
- **A704-VL Compact Models**
HAPI
HELICOPTER APPROACH PATH INDICATOR

The LED HAPI is the most advanced on the market and has the widest range of configurations:

- Visible and IR output
- Portable and permanent
- ICAO / FAA / STANAG Compliant
- Several power options

**Applications**
Permanent helipads
Temporary helipads
Emergency helipads
Hospital helipads
Remote helipads
Military & NVG operations

**Advanced Optics**
The HAPI uses patented, LED-based optics to achieve the lowest power consumption, highest intensity and sharpest green/red transition. It exceeds ICAO / FAA / STANAG requirements to provide a clear approach path to the aviator.

**Easy Installation**
The HAPI works equally well in permanent or temporary locations. Permanent mounting is easy with standard frangible mounting. Temporary deployment is fast with retractable legs and a lightweight, compact form factor.

**Power Supply Versatility**
The low power consumption of the HAPI makes it mate well with several available power supplies:

- Solar kit
- Generator kit
- Battery kit
- AC only

**Controllable**
Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away. There is also 3 and 5-step, wired control and local control available.

**Trusted**
Deployed around the globe, from military to civilian airfields and from the Middle East to the Arctic Circle, the HAPI has proven it is robust. LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.

**REPRESENTED IN YOUR REGION BY:**
**HAPI**

**HELICOPTER APPROACH PATH INDICATOR**

### SPECIFICATIONS

#### Optical
- High-power LEDs with proper heat management ensure consistent photometrics for life of product
- NVG-compatible infrared (IR) LEDs
- FAA AC 150/5390-2C HAPI compliant
- ICAO Annex 14, Volume 2 HAPI compliant
- STANAG HAPI compliant
- Ultra-low power consumption make solar possible

#### Power Options
- Solar kit: Solar panels and mounting, batteries and enclosures; air transportable container; AC input for backup
- Generator kit: Gas or diesel generator; AC input for backup
- Battery kit: Batteries & enclosures; AC input for backup
- AC only: 100 – 240 VAC 50/60 Hz; 3 and 5-step current input

#### Control Options
- Non-Wireless: AC input of 3 and 5-step current; local control
- Wireless: 4 km (2.5 m) control range with optional Handheld Controller; local control

#### Construction
- Powder coated aluminum chassis
- Aviation orange standard, yellow and other colors available
- Stainless steel and anodized aluminum hardware
- Integrated digital level
- Optical glass lens

#### Temperature
- 

#### Wind Loading
- 161 kph (100 mph)

#### Ingress
- NEMA 4 & EN 60529 IP 55 (IP 66 available with marine upgrade kit)

### DIMENSIONS

#### PERMANENT

#### PORTABLE

### CONFIGURATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>MOUNTING</th>
<th>OUTPUT</th>
<th>POWER</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPI</td>
<td>PERMANENT PORTABLE</td>
<td>VISIBLE VISIBLE/IR</td>
<td>SOLAR KIT GENERATOR KIT BATTERY KIT AC</td>
<td>NON-WIRELESS WIRELESS</td>
</tr>
</tbody>
</table>

Options: carrying case, tactical battery pack, tilt switch (for FAA), low temperature arctic kit, marine upgrade kit, custom chassis color

Specifications subject to local environmental conditions. Specifications may be subject to change.

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Carmanah’s A704 Series Airfield Lights come with a range of accessories including durable mounting hardware, frangible couplings, and a selection of replacement parts.

### MOUNTING HARDWARE

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64559</td>
<td>16 x 16&quot; rubber mat and hardware</td>
</tr>
<tr>
<td>2A</td>
<td>71757</td>
<td>Standard bolt kit, 700 series (4x stainless steel bolts)</td>
</tr>
<tr>
<td>2B</td>
<td>71884</td>
<td>Security bolt kit, 700 series (2x bolts, not including keys)</td>
</tr>
<tr>
<td>-</td>
<td>53288</td>
<td>Security bolt kit, bolt key/driver bit</td>
</tr>
<tr>
<td>-</td>
<td>53289</td>
<td>Security bolt kit, nut key/driver bit</td>
</tr>
<tr>
<td>3A</td>
<td>65714</td>
<td>Standard mounting plate (18&quot; installed height)</td>
</tr>
<tr>
<td>-</td>
<td>65717</td>
<td>Extended mounting plate (26&quot; installed height)</td>
</tr>
<tr>
<td>3B</td>
<td>74239</td>
<td>Helipad mounting bracket</td>
</tr>
<tr>
<td>4</td>
<td>65711</td>
<td>Frangible coupling, 1.5” pipe x 2 thread</td>
</tr>
<tr>
<td>5</td>
<td>50144</td>
<td>Floor flange, 2” thread</td>
</tr>
<tr>
<td>6</td>
<td>46397</td>
<td>Anchor bolt kit</td>
</tr>
<tr>
<td>7A</td>
<td>38925</td>
<td>2” hub stake - 15” long</td>
</tr>
<tr>
<td>7B</td>
<td>38964</td>
<td>2” hub stake - 30” long</td>
</tr>
<tr>
<td>-</td>
<td>Inquire</td>
<td>Grass guard kit</td>
</tr>
</tbody>
</table>

### BATTERY/CHARGER

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>72890</td>
<td>Battery kit, A704 Compact</td>
</tr>
<tr>
<td>-</td>
<td>72891</td>
<td>Battery kit, A704 Standard</td>
</tr>
<tr>
<td>-</td>
<td>72892</td>
<td>Battery kit, A704 Large</td>
</tr>
<tr>
<td>-</td>
<td>74314</td>
<td>Battery charger, A704 with military charge port, 100-240 VAC, 50/60 Hz</td>
</tr>
<tr>
<td>-</td>
<td>69885</td>
<td>Battery charger, A704 battery pack and barrel charge port, 100-240 VAC, 50/60 Hz</td>
</tr>
</tbody>
</table>

### OPTICS

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>74680</td>
<td>Optical shield, 180 degree, several models</td>
</tr>
<tr>
<td>-</td>
<td>Inquire</td>
<td>Head kit, several models</td>
</tr>
</tbody>
</table>

### MISCELLANEOUS PARTS

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>40865</td>
<td>A704 series bird deterrent</td>
</tr>
<tr>
<td>9</td>
<td>56150</td>
<td>Replacement antenna</td>
</tr>
<tr>
<td>10</td>
<td>48473</td>
<td>Handheld Controller (see pg. 3 for additional wireless control options)</td>
</tr>
<tr>
<td>-</td>
<td>48984</td>
<td>Installation tool kit with 5/32” security bit for head/battery changes and small socket set</td>
</tr>
</tbody>
</table>

Specifications may be subject to change.

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Document: AVIA_Accessories_RevG.indd
# Accessories

## A650 Series Airfield Lights

Carmanah’s A650 Series taxiway and apron edge lights include several mounting options and a variety of additional accessories and replacement parts.

### Mounting Hardware

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64559*</td>
<td>Mat kit and hardware</td>
</tr>
<tr>
<td>2</td>
<td>61969*</td>
<td>Fence mounting kit with hardware</td>
</tr>
<tr>
<td>3A</td>
<td>38034*</td>
<td>Standard bolt kit, A650 series (3x stainless steel bolts)</td>
</tr>
<tr>
<td>3B</td>
<td>56578</td>
<td>Security bolt kit, A650 series</td>
</tr>
<tr>
<td></td>
<td>53284</td>
<td>Security bolt kit, driver</td>
</tr>
<tr>
<td></td>
<td>53285</td>
<td>Security bolt kit, socket</td>
</tr>
<tr>
<td>4A</td>
<td>66699*</td>
<td>Standard mounting plate (14” installed height)</td>
</tr>
<tr>
<td>4B</td>
<td>69752*</td>
<td>Extended mounting plate (24” installed height)</td>
</tr>
<tr>
<td>5</td>
<td>65711*</td>
<td>Frangible coupling, 1.5” pipe x 2 thread</td>
</tr>
<tr>
<td>6</td>
<td>50144*</td>
<td>Floor flange, 2” thread</td>
</tr>
<tr>
<td>7</td>
<td>46397*</td>
<td>Anchor bolt kit</td>
</tr>
<tr>
<td>8A</td>
<td>38925*</td>
<td>2” hub stake - 15” long</td>
</tr>
<tr>
<td>8B</td>
<td>38964*</td>
<td>2” hub stake - 30” long</td>
</tr>
<tr>
<td></td>
<td>61870</td>
<td>Stake mounting kit, soft ground</td>
</tr>
<tr>
<td></td>
<td>51925</td>
<td>Standard mounting plate, 1” pipe</td>
</tr>
<tr>
<td></td>
<td>50146</td>
<td>Frangible coupling, 1” pipe x 2” thread</td>
</tr>
<tr>
<td></td>
<td>61887*</td>
<td>Magnet mounting kit (3x magnets, nuts &amp; washers)</td>
</tr>
<tr>
<td></td>
<td>61876</td>
<td>Magnetic sign mount</td>
</tr>
</tbody>
</table>

### Battery/Charger

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>72835</td>
<td>Battery kit, A650 series</td>
</tr>
<tr>
<td></td>
<td>59188</td>
<td>Charger: A650, 100-240 VAC 50/60 Hz</td>
</tr>
</tbody>
</table>

### Optics

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inquire</td>
<td>Optical shield, 180 degree, several models</td>
</tr>
</tbody>
</table>

### Miscellaneous Parts

<table>
<thead>
<tr>
<th>REF.</th>
<th>PART NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>57003</td>
<td>Bird deterrent, A650 series</td>
</tr>
<tr>
<td>10</td>
<td>56150</td>
<td>Replacement antenna</td>
</tr>
<tr>
<td>11</td>
<td>48473</td>
<td>Handheld Controller (see pg. 3 for additional wireless options)</td>
</tr>
<tr>
<td></td>
<td>57392</td>
<td>Bottom cover replacement kit (with switch)</td>
</tr>
<tr>
<td></td>
<td>57393</td>
<td>Bottom cover replacement kit (without switch)</td>
</tr>
<tr>
<td></td>
<td>59198</td>
<td>Bottom cover access tool</td>
</tr>
<tr>
<td></td>
<td>48984</td>
<td>Installation tool kit with 5/32” security bit for head/battery changes and small socket set</td>
</tr>
</tbody>
</table>

---

*OL2A Series Products

Accessories marked with an asterisk (*) are suitable for use with the OL2A obstruction light. For additional information, please contact obstruction@carmanah.com.

---

Specifications may be subject to change.

US and International patents apply. Other patents pending.

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Additional accessories are available on request for all other Carmanah airfield lighting products.

### AIRFIELD WIRELESS CONTROL SYSTEMS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>48473</td>
<td>Handheld Controller</td>
</tr>
<tr>
<td>68066</td>
<td>Handheld Controller battery kit, Lith-ion 3.75V 6300mAh, for controllers manufactured in 2012 and later</td>
</tr>
<tr>
<td>68067</td>
<td>Handheld Controller battery kit, Lith-ion 3.75V 6300mAh, for controllers manufactured in 2011 and earlier</td>
</tr>
<tr>
<td>48176</td>
<td>Handheld Controller, hard shell carry case</td>
</tr>
<tr>
<td>69899</td>
<td>Infrared Programmer: A650</td>
</tr>
<tr>
<td>72373</td>
<td>L854 ARCAL integration kit for handheld controller</td>
</tr>
<tr>
<td>Inquire</td>
<td>L854 ARCAL radio control, multiple options</td>
</tr>
<tr>
<td>Inquire</td>
<td>Rugged laptop and monitoring software</td>
</tr>
</tbody>
</table>

### SOLAR ENGINE POWER SUPPLY

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEPS NW</td>
<td>For non-wireless control of Carmanah ERGL, Wind Cone or Sign</td>
</tr>
<tr>
<td>SEPS W</td>
<td>For wireless control of Carmanah ERGL, Wind Cone or Sign</td>
</tr>
<tr>
<td>32303</td>
<td>SEPS W replacement antenna</td>
</tr>
<tr>
<td>SEPS PAPI</td>
<td>Please inquire</td>
</tr>
</tbody>
</table>

### CUSTOM TRAILERS

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trailer 1</td>
<td>Custom trailer with charging</td>
</tr>
<tr>
<td>Trailer 2</td>
<td>Custom trailer without charging</td>
</tr>
<tr>
<td>Trailer 3</td>
<td>Custom cable trailer</td>
</tr>
</tbody>
</table>

If you require a part that is not included on this accessories sheet including ERGL, Wind Cone or Sign mounting accessories or replacement parts, please contact info@carmanah.com for support.

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US and international patents apply. Other patents pending.

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PIONEERS IN SOLAR AIRFIELD GROUND LIGHTING CONTINUING TO LEAD THROUGH INNOVATION
With more than 300 site installations, Carmanah is the most widely installed solution in the solar airfield industry. Our products are deployed at Military Bases, International and Domestic Airports, Helipads and Private Airfields in Africa, Asia, Australia, Europe, North America and South America.

Carmanah Airfield Installations

- Afghanistan
- Algeria
- Angola
- Aruba
- Ascension Island
- Australia
- Bahamas
- Bahrain
- Barbados
- Bonaire
- Brazil
- Canada
- Chad
- Chile
- China
- Colombia
- Costa Rica
- Croatia
- Cyprus
- Djibouti
- Dominican Republic
- Ecuador
- Equatorial Guinea
- France
- Greece
- Guyana
- India
- Iraq
- Ireland
- Italy
- Japan
- Jordan
- Kuwait
- Malaysia
- Micronesia
- New Zealand
- Nicaragua
- Nigeria
- Panama
- Peru
- Qatar
- Saba
- Saint Maarten
- Singapore
- South Africa
- Spain
- Sri Lanka
- St. Eustatius
- Switzerland
- Taiwan
- Tanzania
- Thailand
- Trinidad
- Turkey
- Turks & Caicos
- Uganda
- United Arab Emirates
- United Kingdom
- United States
- Uruguay
- Venezuela
- Zambia

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