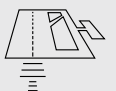


Deployable Airfield Ground Lighting

ADB
Airfield Solutions

We get you safe and sound to the ground.
Anywhere. Anytime.





General concept

Airfields are often few and far between in disaster areas, war zones and developing countries. Temporary ones make it possible to deliver aid where it is needed quickly and safely. Even modern airports sometimes require temporary landing areas.



Deployable Airfield Ground Lighting (DAGL) provides a flexible ground lighting solution that is easy to install and allows airplanes and helicopters to land and take off safely. It is reusable over the short and the long term and meets all current standards without having a major impact on the surroundings. All necessary training and replacement parts are available from ADB. And this at a cost of little more than that of an engine for a private plane!



A new landmark in AGL

ADB can deliver DAGL systems either as a standard product line or in support of a high-priority, short lead-time operation.

Primarily designed to meet emergency and temporary AGL needs, DAGL has evolved into a complete system for both airstrips and helipads. This makes it ideal for use in support of extended operations such as:

- Military interventions
- Humanitarian aid
- Disaster relief
- Commercial exploration
- Visual aids for indicating restricted-use areas

Compliance with standards

The system meets the photometric requirements of:

- ICAO Annex 14, Volume I for non-instrument operations
- STANAG 3534 (Portable Airfield Lighting)

It is easily expandable to meet the requirements set out in:

- ICAO Annex 14, Volume I for non-precision or CAT1 operations
- UFC 3-535-01 (US Military)
- STANAG 3316
- ICAO annex 14, Volume II (Heliports)

dealing with Visual Flight Rules (VFR), non-Instrument or limited Instrument Flight Rules (IFR/LIRF), non-precision runways and helipads.

Functional use

DAGL has diverse and multiple uses. Temporary lighting solutions are already the norm during construction at airports or for military interventions. The DAGL solution from ADB is also suitable in other situations – from commercial exploration to disaster relief and humanitarian aid.

Disaster relief

Example: tsunami in South-East Asia

Rapidly deployable and usable with generators, DAGL can be made operational in a minimum of time. While engineers clear and prepare the runway surface, DAGL can initially be used to provide minimum operating capability for dropping off emergency teams and supplies. In the meantime, an ICAO-compliant solution can be set up to allow wide-body aircrafts to deliver large-scale relief supplies.

Humanitarian aid

Example: Darfur, Sudan

DAGL can be set up and ready to use on any suitable surface in a matter of days. Rugged, reliable and proven in scenarios ranging from short bush strips to fully operational configurations, DAGL is the perfect solution for humanitarian agencies with activities around the world.





Commercial exploration

Example: oil & gas exploration

Whether for oil, gas or mineral exploration or recovery, DAGL is the perfect solution for temporary airfields and landing strips during construction of a more permanent infrastructure. Deployable and recoverable within very short time frames, and equipped with its own power source and above-ground wiring, a DAGL system will leave virtually no environmental footprint and can be reused time and again with minimum overhead costs.

Military intervention

Example: theaters of operation

Originally designed to meet the needs of military clients worldwide, DAGL has been successfully deployed in Europe, the Middle East, Africa and South America.

Built to the requirements of STANAG 3534 and ICAO Annex 14 for semi-permanent full-scale support operations, DAGL capability can be expanded to meet a variety of operational needs.



Airport upgrading, repair and fall back solution

Example: any airport where repair or upgrading work is going on

DAGL equipment can be rapidly deployed at operating airports to supplement the existing infrastructure and mark construction areas and temporary hazards. Operating on 6.6 A constant current (the industry standard), existing circuits can be supplemented with portable or temporary units to maintain capability following breakdowns or catastrophic incidents. DAGL's power regulators can easily interface with all control systems to allow full operation of the system from a tower or other control centre.



Operational use

DAGL has been used for large-scale, non-permanent installations of up to 4 km runways and 6 km taxiways. A complete system can be deployed on a prepared site and made operational by a team of trained workers in 2 weeks. Initial operational capability can be provided within a much shorter time frame, however.

This makes DAGL your most cost-efficient solution for temporary operations.

How reliable is a DAGL system?

- It is as reliable as a conventional AGL system.
- Upwardly compatible with emerging technologies, DAGL incorporates ADB's standard range of products, thus ensuring quick availability of spare parts and through life support.
 - Powered by a 6.6 A constant-current circuit terminated in stand-alone regulator vaults, the whole system is controllable from the main tower. Blackout capability is provided and full electrical safety compliance with IEC 61821 is ensured.
 - The complete system can be powered from available supplies or by generators, which can be configured to provide emergency backup with a switch in less than 15 seconds.

Is there more than one possible configuration?

The four major characteristics of DAGL are flexibility, versatility, multifunctionality and reusability. Originally developed from a military Operational User Requirement to meet a core capability, DAGL can now be used in a number of configurations:

- Scaled down to meet the requirements of STANAG 3534 Type 1 and 2 systems
- Scaled up to provide non-precision runway capability with minor additions
- An extensive ICAO-compliant DAGL system will comprise a twin-ended simple approach, 4-units of PAPI bars and threshold illumination lighting to aid conspicuity
- Support for displaced thresholds
- Runway-edge lighting is provided (omnidirectional for circling guidance) and distance-coded with a bi-directional higher intensity component along the runway
- Runway stoplights and optional overrun



A skilled design team

Not only does ADB offer a first class DAGL solution, it also has a qualified design team, ready to fully and quickly grasp all the requirements in a specific situation and able to deliver a sound and customized solution within the shortest possible deadline. Our team is at your service.

Options and specific operational applications

Available options are:

- Taxiway edge lighting
- Elevated yellow flashing Wig Wags (anti-runway incursion measure)
- Illuminated wind socks and apron floodlighting
- Interleaving at all circuits

Specific operational applications can also be supported:

- Operations with use of night-vision goggles (NVG)
- Unmanned aerial vehicles (UAV)
- Helicopter landing zones (HLZ)

How about the installation and implementation?

The DAGL system and equipment:

- Is simple to install
- Can be installed by a small team of trained people
- Requires only minimal infrastructure
- Does not require highly skilled maintenance personnel

What is the impact on the environment?

- The RPL light units are designed to sit securely on the ground, mounted on stakes or on specially designed frangible bases.
- DAGL is designed to be fully recoverable and easily transferable between locations, while leaving a minimal environmental footprint.



DAGL in bird view

- A complete AGL package for both airstrips and helipads
- For all kinds of operations – military, humanitarian, commercial – or temporary AGL needs
- Compliant with all official standards and as reliable as a conventional AGL system
- Flexible, versatile, multifunctional and reusable
- The most cost-effective solution for temporary operations

Advantages of DAGL

- No heavy investments in infrastructure works
- Reusable
- Minimal footprint
- Fast and easy installation
- Minimum skill level
- Low personnel requirements

International references

ADB's deployable airfield ground lighting system has been installed at many airports and airbases worldwide, to the satisfaction of all our customers. E.g. letter Sean Mayers, UK Royal Air Force Squadron Leader.

From Squadron Leader Sean Mayers BSc RAF



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Date: 21 May 03

RECENT SUPPLY OF DEPLOYABLE AVIATION GROUND LIGHTING TO THE ROYAL AIR FORCE

Dear Ira,

in January 2003 ADB was selected, against strong competition, as the preferred company to provide two DAGL systems to the RAF. An urgent operational requirement had arisen to provide lighting in support of RAF and Coalition air operations in Iraq. At the time, our existing DAGL systems were deployed elsewhere which left the RAF with a capability gap.

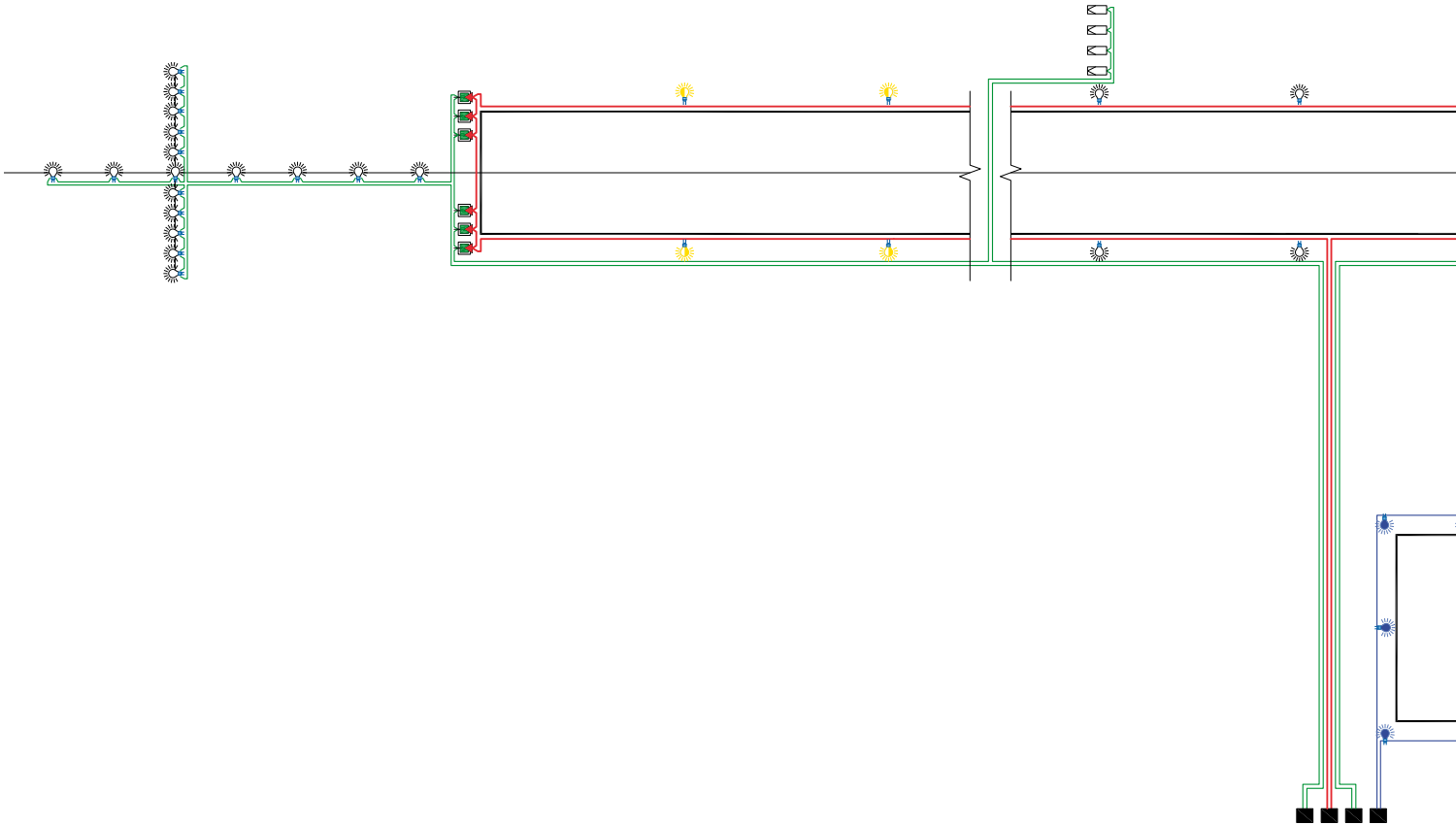
I would be grateful if you would accept, and convey to all the staff at ADB, our thanks for the enormous effort that went into meeting our order. We acknowledge that our demands were challenging, in particular that we required delivery of a comprehensively specified capability in an extremely short time scale. However, it is gratifying to know that in ADB, we chose a supplier that responded magnificently to the challenge. Your advice in system design, particularly regarding the rapid installation aspects and on minimising the bulk of the system, was invaluable. It was also reassuring to see that staff at all levels within ADB were prepared to 'get their hands dirty' to ensure that the lighting system met our specification and was delivered on time. You will be delighted to know that the engineers and technicians have reported favourably on transportability and installation of the system; it is currently installed at an RAF controlled airfield in the Middle East, where it is an essential element in enabling 24 hr ops to take place.

Overall, we have been impressed with ADB's proactive involvement in this project from conception to delivery. Once again, please convey our gratitude to all involved.

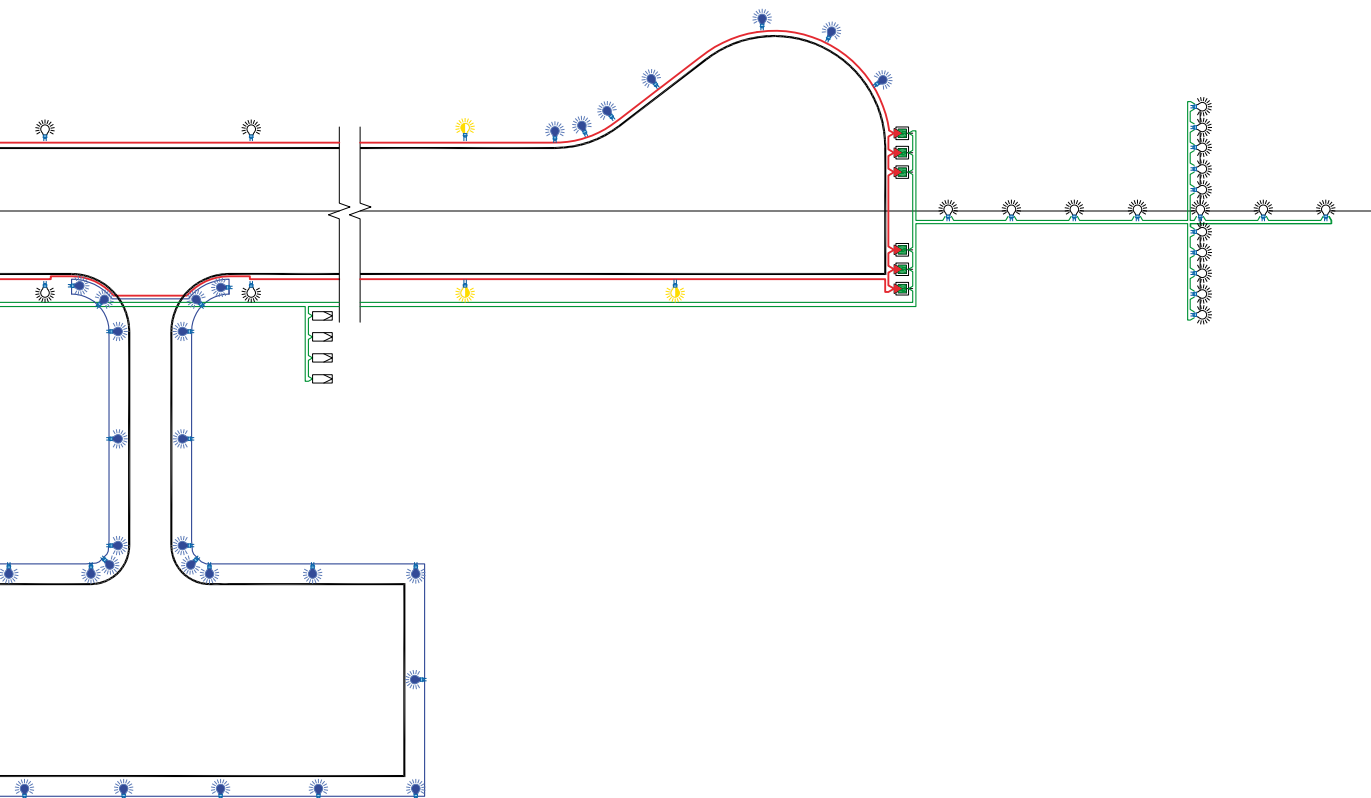
With sincere thanks,

Sean Mayers

DAGL lay-out



- Approach light
- ▭ PAPI
- Runway Threshold / Runway End light
- 💡 Runway edge light
- 💡 Runway edge light
- 💡 Taxiway edge light
- CCR constant current regulator



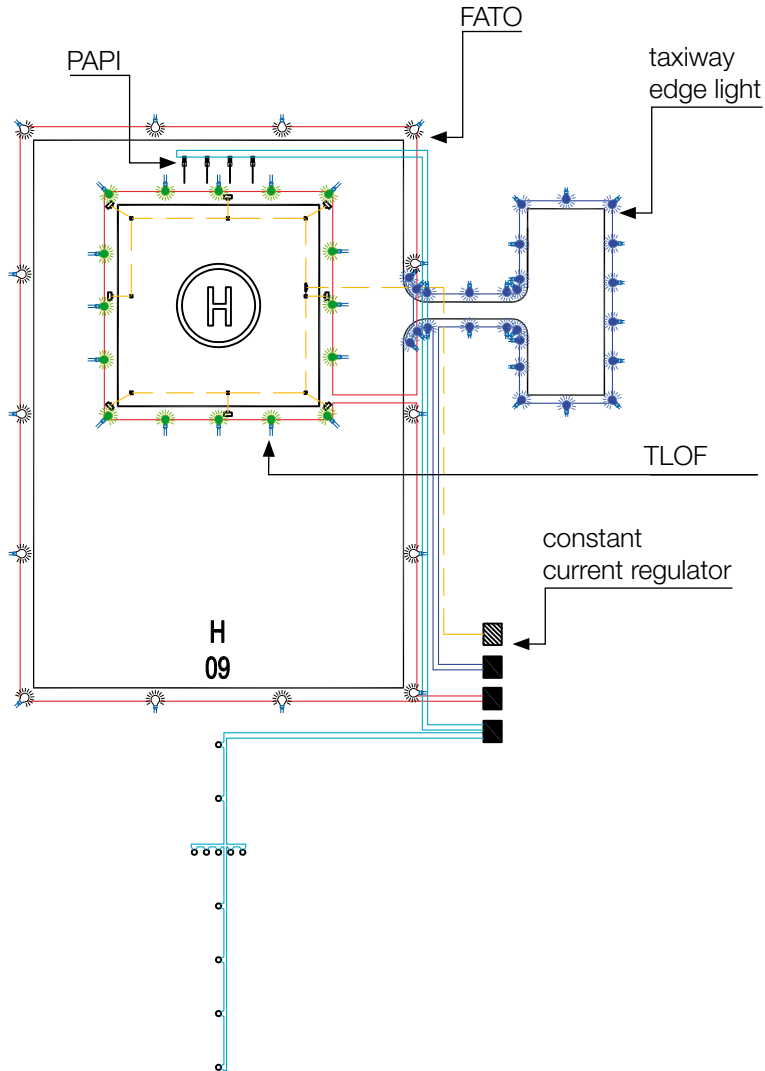
DAGL CAPABILITIES AND OPTIONS

		3534 Type 3	Non Instrument	Non Precision
Approach	Short T (NATO - 210M)	X		
	Simple Approach Lighting (420M ICAO T)		X	X
	Approach slope indicator (2 unit)	X	O	
	Approach slope indicator (4 unit - 1 side)		X	X
	Approach slope indicator (4 unit - 2 side)		O	O
Airfield	Circling Guidance lights	X	X	O
	Runway edge lights (60 ⇔ 100 M separation)	X	X	
	Runway edge lights (<60 M separation)			X
	Runway edge (circling guidance)	X	X	X
	Runway threshold lights	X	X	X
	Runway end lights	X	X	X
	Stopway lighting		X	X
	Taxiway lighting	O	X	X
	Runway threshold Wing Bars		O	O
	Runway lead-in lights			O
	Runway threshold identification lights		O	O
	Runway guard lights			O

X required
O optional

		3534 Type 3	Non Instrument	Non Precision
Power & Control	Electrical supply (Basic)	X		
	Electrical supply (ICAO Compliant)		X	X
	Interleaving of Circuits		O	X
	5 Stage Brilliancy control (Minimum)		X	X
	Simple Lighting Control System	X	X	
	Lighting Control and Functional Monitoring System		O	X
	Obstacle lighting (AGL Infrastructure)		X	X
	Blackout capability	X		
	Emergency Lighting Power			X
	Illuminated Windsock		O	O
	ICAO Compliant maintenance & availability		O	X
NVG Capable	X			
Supplementary	Runway Visual Range Determination			O
	Road holding position lights (Red Flashing only)			O
	Frangible Fittings	O	X	X
	Apron floodlighting		O	O
	Runway Distance Marker Boards		O	X
	Illuminated Guidance sign			X
	Aerodrome Identification Beacon		O	O
	Arrestor cable markers	O	O	O
	Illuminated Weapons sign (Military)	O		
	Helicopter Landing Zone & UAV Support	O		

Heliport - wiring diagram



DAGL CAPABILITIES AND OPTION for helipads		ICAO Civil	Military
Landing Zone	Steady burning approach	O	
	Perimeter lighting	O	
	Visual approach slope indicator	X	X
	Final approach and take off area lights(FATO)	X	
	Touchdown and lift off area lights (TLOF)	O	X
	Winching area flood lighting	X	O
Taxiway- Hooverway	Taxiway lights	O	O
	Visual aids for denoting obstacles	O	O

X required

O optional

Equipment

Standard equipment

Multipurpose Transformer Light

Combination of a specially designed 100 W 6.6 A/6.6 A transformer and a standard ADB elevated light.

The versatility of the design combined with the variety of available domes and lamp wattages allow for configurations suitable for any DAGL functionality.

RPL

Cat. Leaflet A.02.515e

Precision Approach Path Indicator (PAPI)

The world's only single-channel PAPI provides a very sharp red/white transition over the full beam with a lamp power of only 315 W.

SPL

Cat. Leaflet A.02.515e

Leads

Pre-assembled leads with molded-on primary or secondary L823 plugs and sockets available in any length. They can be supplied either by the piece or rolled on cable drums for quick deployment.

Cat. Leaflet A.06.960e

Microprocessor-Controlled Constant-Current Regulator

Constant-current regulator ranging from 2.5 kVA to 30 kVA compliant with IEC 61822 and FAA L-828/L-829.

MCR³

Cat. Leaflet A.07.360e

Control system

Basic customer-configurable Airfield Lighting Control System (ALCS) for controlling up to 11 CCR constant-current regulators and associated circuits, specifically designed for smaller airports with low traffic volumes and easy helipad layouts.

ADB Navigator

Cat. Leaflet A.09.050e

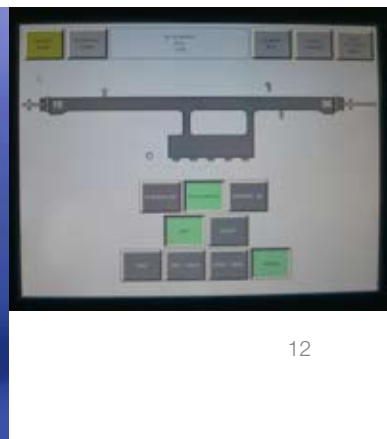
RPL
Cat. Leaflet A.02.515e

SPL
Cat. Leaflet A.02.515e

Cat. Leaflet A.06.960e

MCR³
Cat. Leaflet A.07.360e

ADB Navigator
Cat. Leaflet A.09.050e



Many AGL products have been adapted for use with DAGL systems.
Typical examples are:

Storage

Specially designed storage and transport cases and containers are available to meet the needs of the customer, the location and the application.

Some customers have particular requirements for the storage of their equipment related to the number of fittings, material, environmental conditions, color, etc.



Cable assemblies

- All cables come in various standard lengths and are preassembled with molded-on plugs and sockets in order to minimize installation time.
- Cables on drums can be color-coded to simplify layout and match the configuration of the approach, landing strip or taxiway.
- The modular cable approach with its 'plug-and-play' system allows for easy expansion of capability.

Mounting interfaces

The mounting interfaces are designed to leave a minimal footprint in case of a more durable installation.

Examples include:

- standard range of 2-inch mounting couplings
- specially designed leveling mechanisms to allow correct installation on emergency airstrips
- cradle to simplify the alignment of PAPIs and provide protection during transit
- mounting system for the approach lights
- frangible interface designed for RPL light fittings



Supplementary equipment

Most of the time DAGL systems will be deployed in remote locations where the existing infrastructure is often reduced to the bare necessities. Recognizing this, ADB has augmented the DAGL system with a complete power supply system that offers adequate protection for the electrical equipment.

Radio Controller

Air-to-ground radio controller operating runway or approach lighting.

Cat. Leaflet L-854

Emergency power supplied by generator units

To allow for autonomous operation of the DAGL system and some other instruments such as radio control of associated navigation aids, DAGL can be supplied with power from generator units consisting of:

- a diesel engine of adequate size driving a self-excited, self-regulated alternator
- a control panel to monitor engine performance
- a starting battery and fuel tank
- a distribution panel with adequate circuit protection
- a trailer to protect equipment from weather conditions (optional)

Transportation

Finally, to meet standard or special logistics requirements, all DAGL equipment can be shipped on trucks or trailers designed to customer specifications.

Containers

All equipment can be packed in customized containers. Containers with internationally standardized dimensions can simplify transportation and support the functionality of the equipment, once deployed. Containers can be equipped with:

- single or double walls
- air conditioning and protection from weather conditions
- a customer specified layout for easy installation and operational accessibility
- pre-installed ducting to protect incoming and outgoing cables
- obstruction lighting



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