

ASP-SafeControl
Control and monitoring of airfield lights

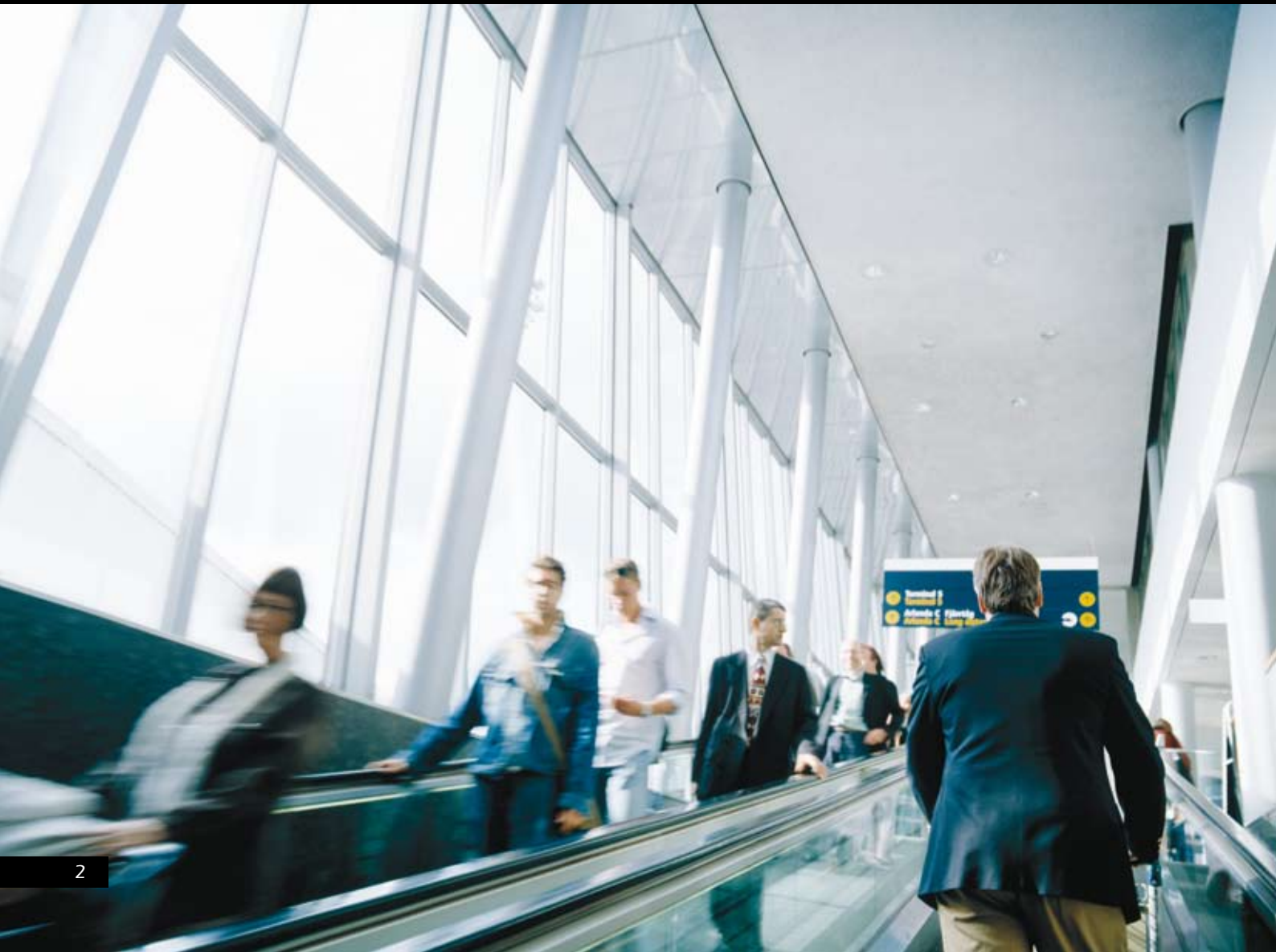


Tuning up airfield accessibility to new levels



Has your capacity ever been limited by:

- ▶▶ Complicated and time-consuming circuit changes that are necessary due to traffic increase or new regulations?
- ▶▶ Delays caused by new or additional stop bar installations that include extensive digging, massive cabling and large time consumption?
- ▶▶ Airplanes put on hold or airport downgrade because maintenance team has to rush off to investigate possibly critical alarms?
- ▶▶ Unknown operational status of light segments, leading to insecurity regarding ICAO compliance?
- ▶▶ Inability to know status of light segments before entering CAT II operations?





Faster and safer ground movements

Safegate Group has over 20 years of experience of ASP-SafeControl, an Individual Light Control and Monitoring System that makes ground movements safer and faster while it visually complements the verbal communication between tower and pilots.

ASP-SafeControl is the market leading solution with over 50 percent market share at airports using addressable light systems. It solves issues such as runway incursions, limited capacity and maintenance requirements. In addition, ASP-SafeControl provides the tower with real-time status and it seamlessly integrates with any existing system.

ASP-SafeControl has a number of highly valuable advantages, which can be divided into the areas design, installation, maintenance and operation. We show how you can get great advantages in all these four areas, summing up to a strong increase in your airport's efficiency and capacity.

DESIGN

The decisions made in the system design phase will greatly affect the whole function from beginning to end. So this is the time to really look at the big picture, and also evaluate what functionality that will be desired further down the road.

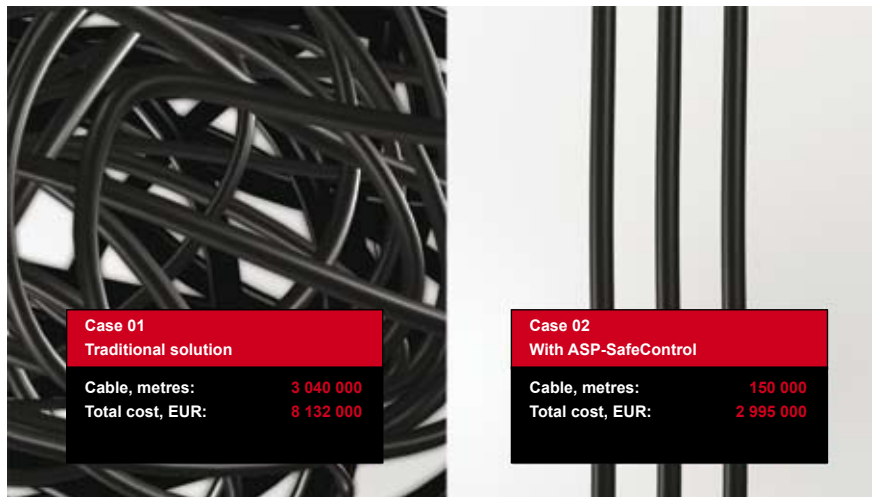
The traditional design, with CCR and cable, will give both complicated and expensive installation and require a lot of cable. And more cable means higher power consumption, also leading to higher CO₂ emissions. To be able to handle more segments you will need more CCRs and maybe new substations. All this work is very time-consuming and demands a lot of digging. It also leads to greatly decreased airport accessibility.

The smart solution, with ASP-SafeControl, can be installed in your existing system and require significantly fewer CCRs and a lot less cable. It is suitable for airports of all sizes and very easy to upgrade later on.



Save millions on your series circuit design

Traditionally segments are designed and created using CCRs and circuit selectors, resulting in thousands of kilometres of cable and numerous CCRs. Changes to the circuits are needed every year, resulting in high cost and substantial disruption of traffic.



Using ASP-SafeControl and software-based segmentation allow a significant increase in the number of lights per circuit resulting in significant decrease in the number of CCRs and cable.

Traditional solution versus ASP-SafeControl EXAMPLE		
Case facts		
760 segments for 4 000 lights. Cable trench 80 cm deep and 10 cm width for each cable. Each CCR equipped with circuit selector allowing for 4 circuits per CCR. We have assumed that common ducts can be used for 50% of the cabling.		
Installed primary cable	EUR	2 per meter
Digging and backfilling per m ³	EUR	20 per m ³
Scope	Trad. solution	ASP-SafeControl
Number of segments	760	760
Number of circuits	760	25
Average length of circuit (metre)	4 000	6 000
Total cable length (metre)	3 040 000	150 000
Cable cost (EUR)	4 560 000	225 000
Digging and backfilling (EUR)	2 432 000	120 000
CCR cost (EUR)	1 140 000	150 000
ASP-SafeControl cost (EUR)	0	2 500 000
Total cost (EUR)	8 132 000	2 995 000

Savings with ASP-SafeControl: $8\,132\,000 - 2\,995\,000 = 5\,137\,000$ EUR



INSTALLATION

Installation work is an inevitable part of the everyday activities at an airport. When using traditional systems, the installation will take long time and be very expensive. More cable and more digging are required. Parts of the airport may need to be shut down, and staff will have to work overtime. This will create a significant decrease of airport accessibility, leading to delays, dissatisfied customers, revenue loss and bad will.

With a system like ASP-SafeControl, you will need less cable and less digging, leading to much quicker and easier installations, avoiding a lot of totally unnecessary problems.

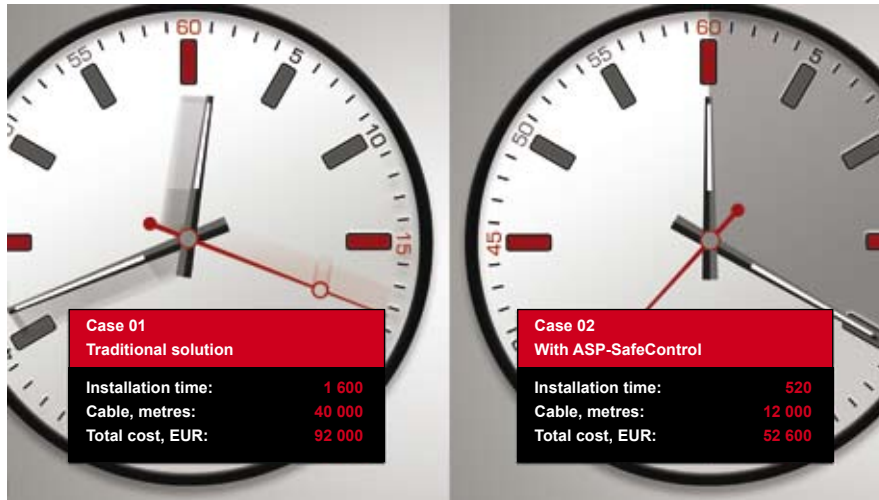
Easy installation of stop bars for enhanced safety

On average, every airport experiences at least one runway incursion per year – only chance decides whether it remains a mere incident or becomes a fatal accident. Statistics from Eurocontrol show that runway incursions are as regular during good weather as during bad weather conditions. ICAO, Eurocontrol and other international organisations clearly state that stop bars are one of the most effective factors for preventing runway incursions in both high and low visibility.



Save time installing your stop bar

A standard-sized airport installing stop bars typically uses CCRs with circuit selectors, resulting in extensive digging, massive cabling and prolonged installation.



By using ASP-SafeControl, time is no longer a critical factor. With a lot of time saved compared to the traditional solution, airports, airlines and passengers can continue their daily operations. In addition the stop bars are monitored and controlled, making it possible to improve the safety level by avoiding runway incursions.

Traditional solution versus ASP-SafeControl EXAMPLE

Case facts

Adding five interleaved stop bars to one runway. Traditional solution: 4 CCRs, with 4 circuit selectors each, versus ASP-SafeControl

Installed primary cable	EUR	2 per metre
Digging and backfilling per m ³	EUR	20 per m ³

Scope	Trad. solution	ASP-SafeControl
Number of segments	10	10
Number of circuits	10	2
Average length of circuit	4 000	6 000
Total cable length	40 000	12 000
Supply and installation of cables	60 000	18 000
Digging and backfilling	32 000	9 600
ASP-SafeControl cost	0	25 000
ASP-SafeControl installation	0	1
Grand total price	92 000	52 600
Total time consumption in weeks	40	13

MAINTENANCE

Making maintenance running as smooth as possible is one of the keys to a successful airport, both from a safety and an efficiency point of view. With a traditional system there is for example no possibility to differentiate between a critical and non-critical lamp failure. Not knowing which lamps are not working give time-consuming, costly and disturbing maintenance operations, leading to delays, fuel and CO₂ burns, and loss of revenue.

With ASP-SafeControl you get a detailed status presentation, pointing out exactly where a problems occurs and distinguishing between critical and non-critical alarms. This leads to significantly quicker maintenance, and a lot of the activities can be planned to be done when they cause minimal disturbance and staff is ready to perform.

No status awareness is very costly

With a traditional solution, an airport can only identify a percentage of faults on the circuit. This often results in an immediate reaction from the maintenance team to make sure different light segments don't downgrade the airport from CAT III to CAT I conditions. As a consequence ATC may put an aircraft on hold while the alarm is investigated. The aircraft will burn fuel unnecessarily, causing pollution, delays and dissatisfaction.

No status awareness leads to inefficient work methods, staff overtime and stress, which in turn results in an inability of CDM (collaborative decision making), recognised as a main factor to avoid incidents.



Are your approach lights always ICAO compliant?

For a CAT III airport to be ICAO compliant, two unserviceable lights can't be adjacent to each other. If the airport is equipped with a traditional CCR solution for monitoring the approach lights, there is no ability to differentiate between critical and non-critical lamp failure and it is not possible to determine if the airport meets the ICAO standards or not.



With ASP-SafeControl the airport is given individual lamp monitoring and control, and will always be able to see if the failure is critical or not, thus keeping the airport informed about its operational and ICAO status. The maintenance team can identify the failure immediately, which significantly improves operational flexibility and makes the decision process much easier.

This accident could have been prevented:

▶▶ **SPAIN** 14 September 1999, report nr: A-054/1999 Technical report

Accident: The aircraft touched down hard and bounced, causing damage to the landing gears, and slide 1 900m into a field

Reason: The weather was bad and the plane was destabilised below decision height. At a late stage of the landing, the airfield lighting failed for a few seconds. Loss of visual references and automatic height callouts resulted in touchdown with excessive descent rate and a nose-down attitude. The rescue team was delayed because the airport crew was not able to locate the plane until 18 minutes after the accident.

Solution: Better planning and clearance procedures, related to meteorological information. Safer surveillance systems on ground.

For an airport to be profitable the challenge is to get everything up and running, with no disruptions of any kind, and be able to successfully handle as much traffic as possible. A traditional system offers a lot of opportunities for problems and delays – from complicated installation work, acute maintenance measures, to aircraft on hold and massive fuel burn. All this causes high workload for staff, increasing stress reactions and the risk for incidents and accidents.

With ASP-SafeControl you get full control of everything that happens at the airfield, giving the very best conditions for guiding aircraft the safest and fastest way to and from the gate, resulting in increased accessibility and optimal turnaround time.

Small investment with great return

Moving traffic effectively is good business practice for any airport. In an airport with some 15 million passengers, a mere 2% increase in movements can mean added profits of 5 000 000 EUR. An enormous return on a relatively small investment. It is not a matter of building new runways, new terminals or employing new personnel – at Arlanda Airport, the number of arrivals increased from 60 to 72 per hour with no additional runway needed. The solution is more effective operations within the existing airport structure.



Runway guard lights synchronisation and monitoring for free

The runway guard lights system is highly visible and warns pilots when they are about to enter an active runway. A traditional installation requires extensive digging, a new series circuit connected to an additional CCR, and backfilling, often resulting in operational disturbances. The work, aimed to improve safety, still doesn't meet the requirements in ICAO due to the inability to monitor and synchronise the runway guard lights.



ASP-SafeControl enables the runway guard lights to be installed using existing CCRs and series circuits at a much lower cost, whilst also providing an accurate and reliable synchronisation and monitoring of the runway guard lights as required by ICAO. The installation time is drastically reduced by up to 90% with no operational disturbances, resulting in normal airport operations during the entire process.

Traditional solution versus ASP-SafeControl EXAMPLE		
Case facts		
Adding guard lights to 1 runway on an airport equipped with stop bar		
CCRs	EUR	5 000 per CCR
Installed primary cable	EUR	2 per meter
Digging and backfilling per m ³	EUR	20 per m ³
Scope	Trad. solution	ASP-SafeControl
Number of circuits	1	0
Circuit length	1 500	0
Total cable length	1 500	25
Supply and installation of cables	3 000	0
Quantity of CCRs	1	0
Total CCR cost	5 000	0
Cost of digging and backfilling	2 400	0
ASP-SafeControl cost	0	10 700
Time consumption in weeks	3 weeks	0 weeks
ASP-SafeControl installation	0 day	1 day
Grand total price	10 400	10 700
Total time consumption	3 weeks	1 day



Frequently Asked Questions

Which response time can ASP-SafeControl guarantee?

▶▶ Command and true back indication within 2 seconds for stop bars and any individual light segment (normally within 1 second). Sensor detection signal available to host system within 1 second after actual detection occurred. Failed lamp detection response time is less than 5 seconds.

Does ASP-SafeControl work with a LED light?

▶▶ Yes, provided the LED light is equipped with fail open technology.

In the SafeLED IQ, all parts are integrated with power converter, which enables monitoring and control.

Can ASP-SafeControl work with any CCR or are there any special requirements on CCRs to be used?

▶▶ No special requirements on thyristor (SCR)-, ferro-resonance- or other types of conventional CCR techniques. Consult Safegate Group if CCRs with switching techniques are used.

Which CCR(s) has been working together with ASP-SafeControl?

▶▶ Manufacturers (for some of them several models): IDMAN, Induperm, Danaid, Crouse-Hinds, Westinghouse, ADB, Honeywell, Hitachi, Liberty and Augier among others. ASP-SafeControl works with all CCRs and regardless of kVA size.

In a circuit, if none of the lights/signs are on, does ASP-SafeControl still pass a minimum amount of current in the circuit to monitor the lights/signs? If no, how is ASP-SafeControl monitoring the status of the lights/signs?

▶▶ To be able to monitor lights if all are switched off, ASP-SafeControl still needs to pass 2.5A through the circuit.

Can ASP-SafeControl provide lamp-flashing functionality?

▶▶ Yes.



Is ASP-SafeControl immune to all exposures on the airfield, such as jet fuel, oil, etc.?

▶▶ Yes, all parts are completely moulded in polyurethane. The degree of protection is IP 68.

What is the failure rate of ASP-SafeControl observed for operational field installations?

▶▶ Typical measured failure rate is 0.3%.

Will ASP-SafeControl be capable of handling future expansion without changing existing components?

▶▶ Yes.

What problems can be faced when connecting ASP-SafeControl to a PLC based control system compared to PC based? What are the main issues to identify for an airport that has a PLC based control system?

▶▶ For ASP-SafeControl it does not matter if it is a PLC based control system or if it is a PC based. A PC based control system is more flexible since it is usually not tied to a particular manufacturer for adding functionality (hardware and software) to the system. Software and hardware products from many different manufacturers can be easily found and used.

The future airport

Increased air traffic and tighter time schedules make it necessary to control every movement within and around an airport. All ground vehicles and aircraft must be kept at a certain distance apart, especially in low visibility. Developing an integrated system that not only controls ground movements but also air traffic close to the airport is therefore of the highest interest. The answer to this need is A-SMGCS, Advanced Surface Movement Guidance and Control System, as described by the International Civil Aviation Organization (ICAO).

A-SMGCS will rely, more than systems currently in operation, on automated processes to give pilots and air traffic controllers information on positioning and directions. The main difference from the situation today is that every ground and air movement can be monitored and controlled within one superior system. This will make airports incorporating A-SMGCS both safer and more effective.

Safegate Group delivers complete A-SMGCS solutions as well as vital parts pertaining to it. Let us make your airport ready for tomorrow – today.



How does Safegate Group support A-SMGCS?

▶▶ Level 1 – Improved surveillance and procedures

The aim is to make use of improved surveillance and procedures, covering the manoeuvring area for ground vehicles and the movement area for aircraft. The procedures concern identification and the issuance of ATC instructions and clearances. The controllers are given traffic position and identity information that is an important step forward from the traditional Surface Movement Radar (SMR) image.

Safegate Group supports:

In level 1 there is no requirements on the airfield lighting system. But airports at Level 1 normally operate at CAT II-III whereas Safegate Group can support with compliance to ICAO requirements for the airfield lights.

▶▶ Level 2 – Adding safety nets

The next step is to add safety nets to protect runways, designated areas and the associated procedures. Appropriate alerts are generated for the controllers in case of conflicts between vehicles on runways or incursion of aircraft onto designated restricted areas.

Safegate Group supports:

Control and monitoring of stop bars and lead-on segments interconnected with local sensors provides real-time guidance to drivers and pilots, and real time status to Air Traffic Control. This gives a basic control capability that covers the most critical areas of guidance and routing. The solution helps preventing runway incursions, simplify maintenance and increase traffic flow density.

▶▶ Level 3 – Detection of all conflicts

This level involves the detection of all conflicts on the movement area as well as improved guidance and planning for use by controllers.

Safegate Group supports:

In practice, level 3 is often translated into pre-defined routing, and this is believed to require an extensive investment. But by adding a small modem to each fitting and define segments in software the airport gets a flexibility that enables quick and easy adaptation to various operating conditions.

▶▶ Level 4 – Conflict resolution, automatic planning and guidance

The last level of A-SMGCS involves resolutions of all conflicts, automatic planning and automatic guidance for the pilots as well as the controllers.

Safegate Group supports:

When it comes to light fittings and pilot guidance, level 4 is easy to reach for airports already operating at level 3. By just adding an interface in connection with the ground radar the airport gets automatic routing. And when building a new airport, level 3 and 4 can even be achieved at a lower cost compared to a typical AFL system, due to software-based segments for lamp control.

Check in to the future

How many aircraft can your airport handle today? Can this number be increased without adverse effects on the airport's safety level? It is a known fact that traffic volume will rise in the foreseeable future. More movements will demand monitoring of the entire airport. Requirements will be sharpened and the development of an integrated system control-

ling not only ground movements but also air traffic close to the airport is of the highest interest. The International Civil Aviation Organization (ICAO) already describes A-SMGCS, Advanced Surface Movement Guidance and Control System, as the answer to the future modern airport need to control the entire airport space in one superior system.

To a larger extent than today's systems, A-SMGCS will rely on automated processes to give both pilots and traffic controllers exact information about positions and directions. Safegate Group delivers complete A-SMGCS solutions already, as well as all vital parts relating to it. Safegate Group can check your airport into the future – today!



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THORN **IDMAN**
Airfield Lighting

SAFEGATE
GROUP 

Safegate Group offers solutions for increased safety, efficiency and environmental benefits to airports around the world. The company was founded in 1973 and has its headquarters in Malmö, Sweden. Safegate Group has over 70 partners around the globe in order to be close to its customers. The latest members of Safegate Group, Thorn AFL and Idman, have both over 40 years of experience in airfield lighting solutions for airports and heliports worldwide. Safegate Group's complete range of products and services, a "one-stop shop", provides solutions to customers and airborne travellers around the globe.

For more contact information and details:

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