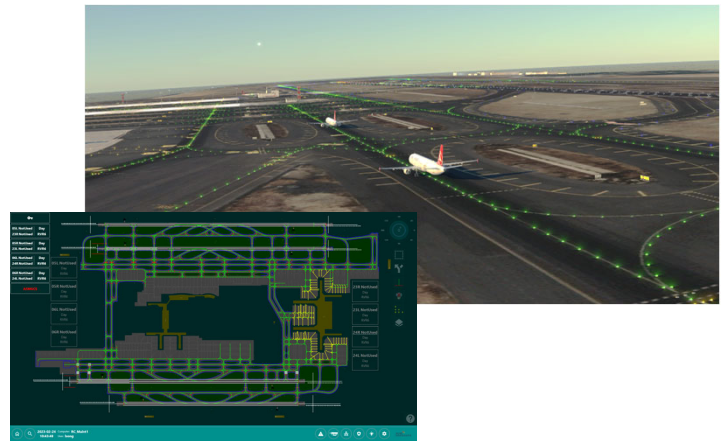


## Airfield Lighting Control and Monitoring System



### Compliance with Standards

- ICAO**
  - Annex 14, Volume I, (Aerodromes) current edition
  - Aerodrome Design Manual Part 4, 5 and 9
  - EASA CS-ADR-CSN
  - ICAO Manual of Surface Movement Guidance and Control System, DOC 9476-AN/927
  - ICAO Manual of Advanced Surface Movement Guidance and Control System, DOC 9830-AN/452

### Solutions

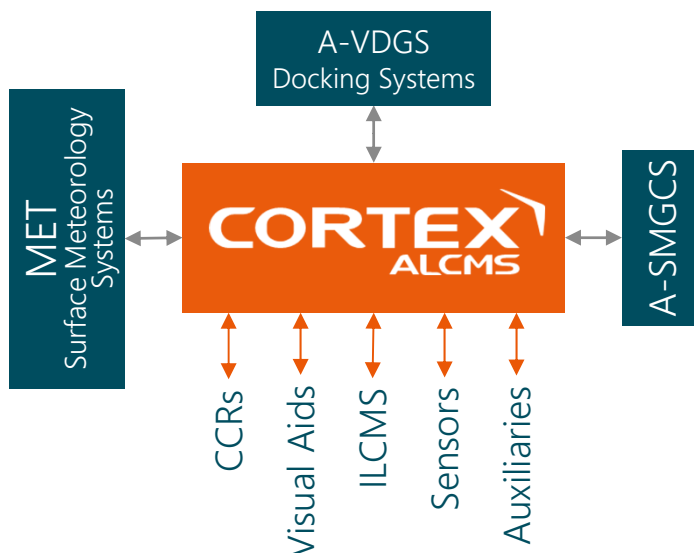
- Airfield Lighting Control and Monitoring System (ALCMS)
- Individual Lamp Control and Monitoring System (ILCMS)
- Advanced Surface Movement Guidance Control System (A-SMGCS)
- Sensor Controlled Incursion Protection System (SCIPS)
- Runway Status Light (RWSL)

### Integration with other Airport Systems

- Runway Visual Range System (RVR)
- Automated Weather Observing System (AWOS)
- Docking Guidance System (DGS)
- Deicing Stations
- Instrument Landing System (ILS)
- Multi-Sensor Data Fusion (MSDF)
- Airport Operation Database (AODB)

### System Overview

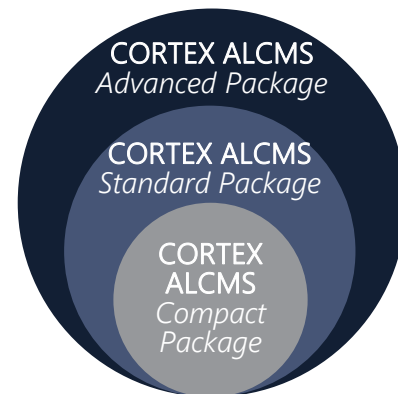
The CORTEX ALCMS enables control and monitoring of airfield ground lighting and other visual aids installed at the airport, providing increased safety of ground operations. The system architecture provides for a wide range of functionalities to support the needs of airport operations and allows for easy integration with other airport systems.



### One Scalable Platform

The CORTEX ALCMS (Airfield Lighting Control and Monitoring System) is based on a modular and scalable system platform that can grow with airport requirements.

The platform's three (3) packages provide design flexibility for airports to choose options to meet their requirements and budget, allowing the systems to serve small regional airports up to the world's largest international hubs.



The three (3) types of CORTEX ALCMS design packages include:

#### Compact

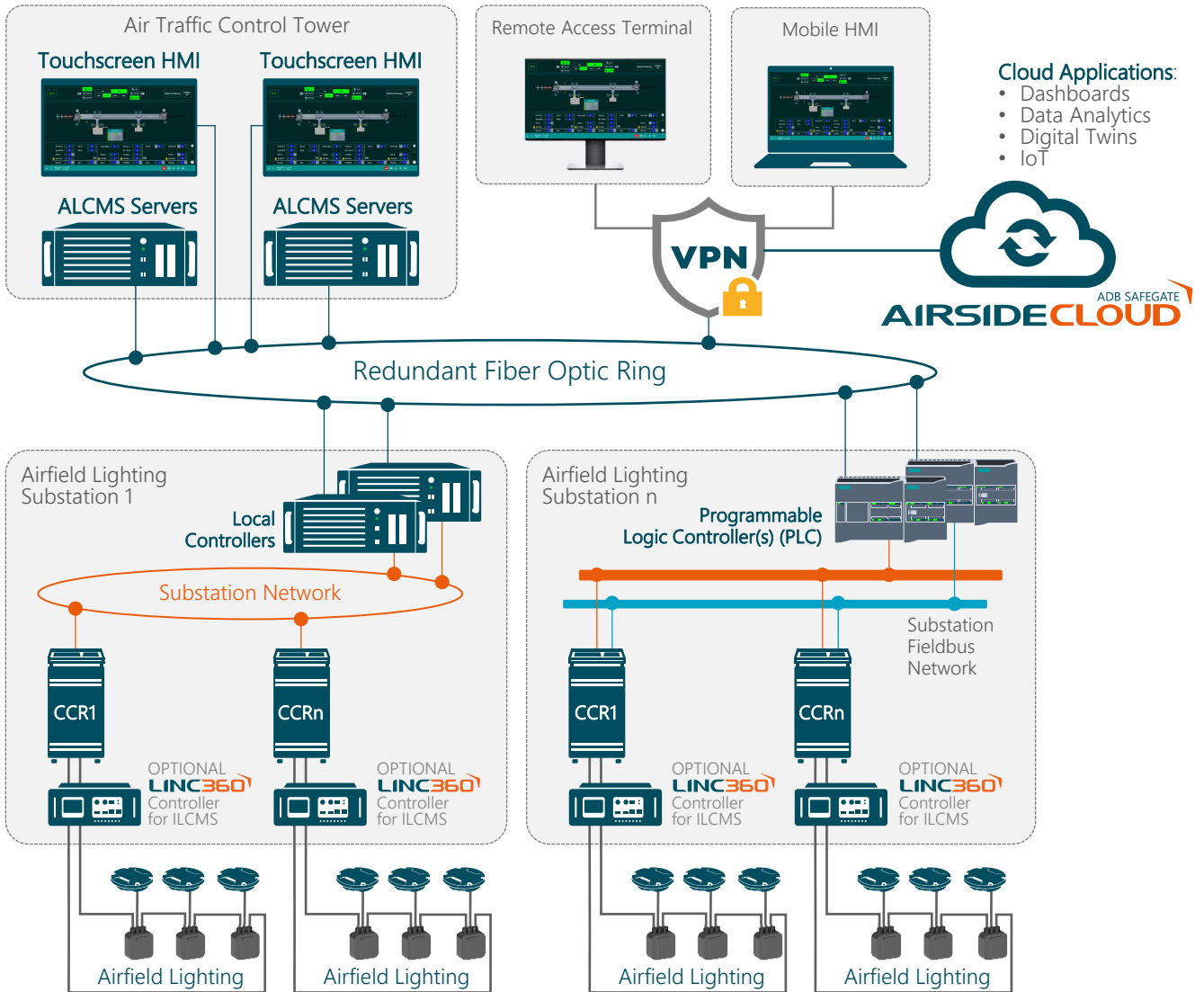
- Designed to be the most economical, designed with minimum hardware components allowing for easy deployment and reduced maintenance
- Targeting small single runway airports or heliports using mainly CCRs and circuit selectors for control of airfield lighting
- Includes a basic set of functionalities for traditional AGL on/off control, basic monitoring and tools for maintenance operations
- Typically designed to replace older style push button control panels

#### Standard

- Provides additional ALCMS functionality for airports operating from CAT I to III
- Includes more advanced control and monitoring options including ILCMS, sensors and integrations with other airport systems
- Scalable design to support multiple airfield lighting substations with no HMI workstation limitations
- Provides additional operational functions and automations to reduce ATC workload and improve maintenance efficiency

#### Advanced

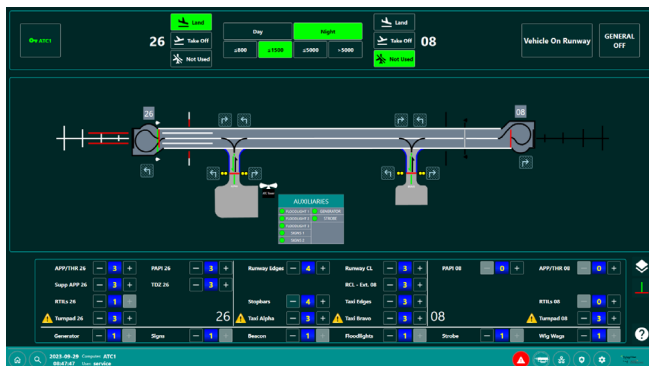
- Provides the highest level of ALCMS functionality including surveillance, semi-automated routing and guidance functions
- Designed to support airports with complex layouts and busy operations that require advanced aircraft surface movement routing and guidance including follow-the-green (FtG)
- Allowing integration with surveillance systems to provide a complete visual awareness of airside movements



### Airfield Lighting Control

Multiple HMI stations can be integrated within an ALCMS. Each HMI may share control of an airfield or have a specific area of control (ALCMS Standard & Advanced). Each HMI operates independently of one another and provides complete redundancy for airfield lighting control and monitoring.

- High-definition airfield graphic representation
- High-contrast, anti-glare LCD touchscreen displays



### Intuitive User Interface

- Intuitive user interface provides 'pop-up' buttons that lead the air traffic controllers through lighting control tasks
- Highly flexible AGL intensity controls according to weather conditions, runway usage and landing directions
- Activation of general lighting settings using an ICAO-compliant preset table per visibility conditions and day, twilight, night parameters

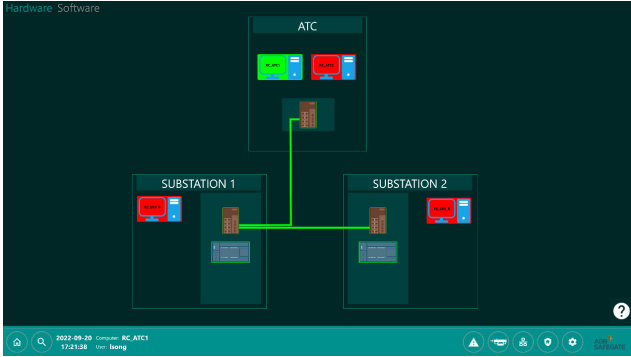


## Real-time Status Monitoring

The ALCMS can be enhanced to increase system monitoring and maintenance support by providing detailed real-time status information and alarming from all local or remote workstations. These maintenance options allow for efficient troubleshooting and diagnostics.

### System Overview

- Providing status of the ALCMS main components
- Monitoring of computers, PLC hardware, backup generators, UPS, and other auxiliary equipment



### Equipment Status List

- Tabular equipment view providing real-time status of all monitored equipment, including equipment identification, intensity, alarm messaging, equipment monitored values (i.e. voltage, current, lamp fault detection, insulation resistance)

ID	Name	Alarm	Intensity	Unit	Value	Unit	Value	Unit	Value
101	LAMP_AIRACT_1	Warning	2	3.40	2000	8000	250		
102	L_TOL_WD101	Warning	2	3.40	2000	8000	250		
103	L_TOL_WD102	Warning	2	3.40	2000	8000	250		
104	L_TOL_WD103	Warning	2	3.40	2000	8000	250		
105	L_TOL_WD104	Warning	2	3.40	2000	8000	250		
106	L_TOL_WD105	Warning	2	3.40	2000	8000	250		
107	L_TOL_WD106	Warning	2	3.40	2000	8000	250		
108	L_TOL_WD107	Warning	2	3.40	2000	8000	250		
109	L_TOL_WD108	Warning	2	3.40	2000	8000	250		
110	L_TOL_WD109	Warning	2	3.40	2000	8000	250		
111	L_TOL_WD110	Warning	2	3.40	2000	8000	250		
112	L_TOL_WD111	Warning	2	3.40	2000	8000	250		
113	L_TOL_WD112	Warning	2	3.40	2000	8000	250		
114	L_TOL_WD113	Warning	2	3.40	2000	8000	250		
115	L_TOL_WD114	Warning	2	3.40	2000	8000	250		
116	L_TOL_WD115	Warning	2	3.40	2000	8000	250		
117	L_TOL_WD116	Warning	2	3.40	2000	8000	250		
118	L_TOL_WD117	Warning	2	3.40	2000	8000	250		
119	L_TOL_WD118	Warning	2	3.40	2000	8000	250		
120	L_TOL_WD119	Warning	2	3.40	2000	8000	250		
121	L_TOL_WD120	Warning	2	3.40	2000	8000	250		
122	L_TOL_WD121	Warning	2	3.40	2000	8000	250		
123	L_TOL_WD122	Warning	2	3.40	2000	8000	250		
124	L_TOL_WD123	Warning	2	3.40	2000	8000	250		
125	L_TOL_WD124	Warning	2	3.40	2000	8000	250		
126	L_TOL_WD125	Warning	2	3.40	2000	8000	250		
127	L_TOL_WD126	Warning	2	3.40	2000	8000	250		
128	L_TOL_WD127	Warning	2	3.40	2000	8000	250		
129	L_TOL_WD128	Warning	2	3.40	2000	8000	250		
130	L_TOL_WD129	Warning	2	3.40	2000	8000	250		
131	L_TOL_WD130	Warning	2	3.40	2000	8000	250		
132	L_TOL_WD131	Warning	2	3.40	2000	8000	250		
133	L_TOL_WD132	Warning	2	3.40	2000	8000	250		
134	L_TOL_WD133	Warning	2	3.40	2000	8000	250		
135	L_TOL_WD134	Warning	2	3.40	2000	8000	250		
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137	L_TOL_WD136	Warning	2	3.40	2000	8000	250		
138	L_TOL_WD137	Warning	2	3.40	2000	8000	250		
139	L_TOL_WD138	Warning	2	3.40	2000	8000	250		
140	L_TOL_WD139	Warning	2	3.40	2000	8000	250		
141	L_TOL_WD140	Warning	2	3.40	2000	8000	250		
142	L_TOL_WD141	Warning	2	3.40	2000	8000	250		
143	L_TOL_WD142	Warning	2	3.40	2000	8000	250		
144	L_TOL_WD143	Warning	2	3.40	2000	8000	250		
145	L_TOL_WD144	Warning	2	3.40	2000	8000	250		
146	L_TOL_WD145	Warning	2	3.40	2000	8000	250		
147	L_TOL_WD146	Warning	2	3.40	2000	8000	250		
148	L_TOL_WD147	Warning	2	3.40	2000	8000	250		
149	L_TOL_WD148	Warning	2	3.40	2000	8000	250		
150	L_TOL_WD149	Warning	2	3.40	2000	8000	250		
151	L_TOL_WD150	Warning	2	3.40	2000	8000	250		

### Alarm Log and Reporting

- Operational alarm list providing warning and alarm status of the AGL equipment and system components
- Extensive searching and reporting capabilities
- Alarming tolerances are configurable to adjust sensitivity
- Alarm and event filtering provides flexibility to control which alarms are reported to ATC, maintenance and other users
- Events can be searched and sorted based on date, range of dates, circuit, regulator, reported location and type of alarm
- Information reports can be hard-copy printing or exporting to electronic file

ID	Message	AlarmType	Status
33782144372681	Function Warning Disconnection	System	Function
33782144372682	Function Warning Disconnection	System	Function
33782144372683	Function Warning Disconnection	System	Function
33782144372684	Function Warning Disconnection	System	Function
33782144372685	Function Warning Disconnection	System	Function
33782144372686	Function Warning Disconnection	System	Function
33782144372687	Function Warning Disconnection	System	Function
33782144372688	Function Warning Disconnection	System	Function
33782144372689	Function Warning Disconnection	System	Function
33782144372690	Function Warning Disconnection	System	Function
33782144372691	Function Warning Disconnection	System	Function
33782144372692	Function Warning Disconnection	System	Function
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33782144372694	Function Warning Disconnection	System	Function
33782144372695	Function Warning Disconnection	System	Function
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33782144372697	Function Warning Disconnection	System	Function
33782144372698	Function Warning Disconnection	System	Function
33782144372699	Function Warning Disconnection	System	Function
33782144372700	Function Warning Disconnection	System	Function
33782144372701	Function Warning Disconnection	System	Function
33782144372702	Function Warning Disconnection	System	Function
33782144372703	Function Warning Disconnection	System	Function
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33782144372709	Function Warning Disconnection	System	Function
33782144372710	Function Warning Disconnection	System	Function
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33782144372713	Function Warning Disconnection	System	Function
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33782144372797	Function Warning Disconnection	System	Function
33782144372798	Function Warning Disconnection	System	Function
33782144372799	Function Warning Disconnection	System	Function
33782144372800	Function Warning Disconnection	System	Function

## Maintenance & Operations Toolkit Options

Additional maintenance support screens can be designed to provide advanced user-friendly tools for monitoring status of constant current regulators (CCRs), PAPIs and other integrated visual aids. This additional toolkit supports maintenance with corrective and preventative maintenance and detailed fault indication

### Substation Equipment View

- Provides additional information regarding the state of the controlled and monitored AGL equipment using graphical objects and icons
- Enables maintenance to open a detailed object view (pop-up window), by clicking on any of the AGL graphical objects
- Detailed object views contain additional status information about the equipment and a set of tools easing the maintenance activities on the equipment.



### Airside Level of Service Dashboard and KPI's

- ILCMS monitoring capabilities provide the ability to create 'Level of Service' dashboards to display an airport's entire airside operational status according to current category of operations

Category	Item	Estimated Service Level	Status
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## ILCMS Integration

The CORTEX ALCMS can optionally be enhanced with our LINC 360 to create an Individual Lighting Control and Monitoring System (ILCMS) that provides the ability for controlling and monitoring individual runway lights, taxiway centerline lights and stop bars. The main LINC 360 components include:

### LINC 360 Controller

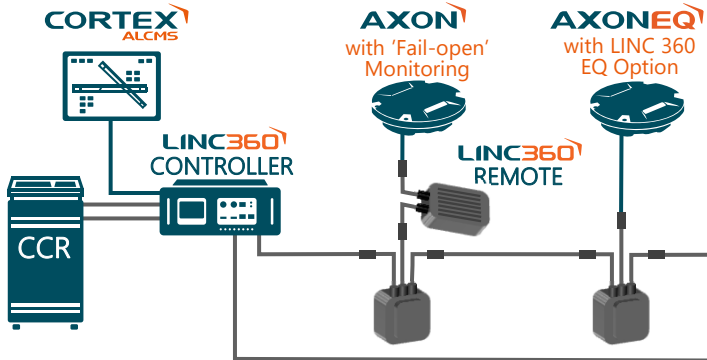
Located on the output of the CCR, it controls and monitors individual Remotes or Axon EQ fixtures with powerline communications using the existing airfield series circuit cabling (powerline). For more information, see the LINC 360 data sheet on our website product center.



**LINC360**  
Controller

### LINC 360 Remote or Axon EQ Fixtures

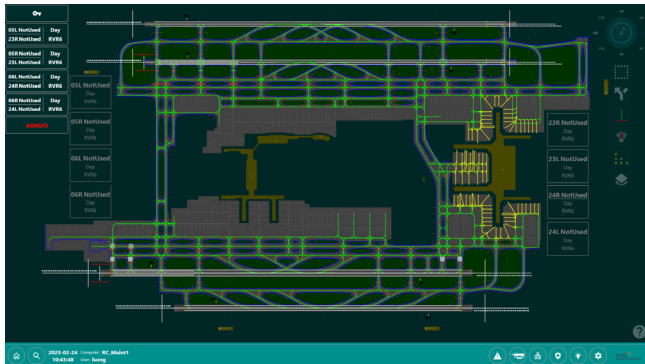
AGL fixtures requiring individual control and monitoring can be connected to a **LINC 360 Remote** or the lights can be pre-equipped with the integrated LINC 360 with the **Axon EQ fixtures**.



## A-SMGCS Ready

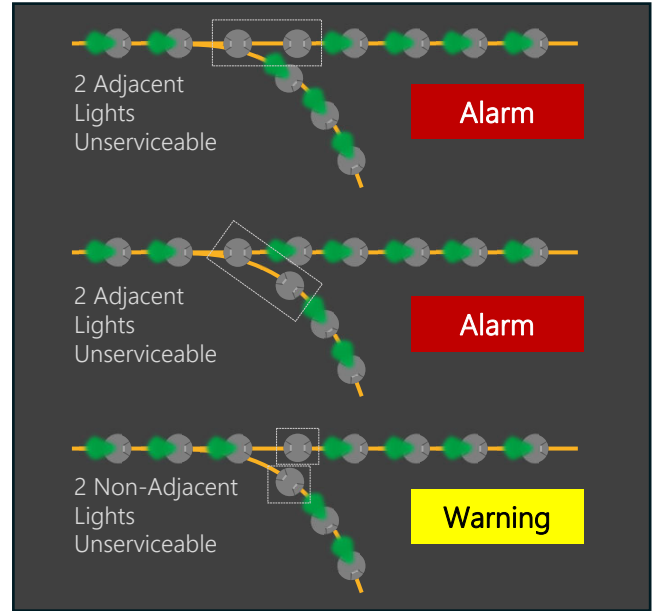
The addition of an ILCMS provides even greater control and monitoring capabilities typically needed as part of an airport's Advanced Surface Movement Guidance and Control System (A-SMGCS). This allows for the design of...

- Dynamic routing and visual guidance along taxiways for automated taxiing procedures, increased safety and throughput
- Stop bar and interlocked taxiway lead-in lighting control with automated stop bar reset via timer, field sensors or surveillance
- Follow-the-Green (FtG) and other advanced operations
- Enhanced operational awareness with the display of track position and flight information labels based on a Multi-Sensor Data Fusion (MSDF) input



## ILCMS Advanced Monitoring

The ILCMS provides advanced individual fixture monitoring allowing airports to comply with all international aerodrome maintenance and monitoring regulations for both fixture serviceability percentage and adjacency monitoring requirements. The system can detect adjacency and critical pattern outages for runway and taxiway circuits that standard lamp fault detection (LFD) monitoring cannot determine.



## Cyber Security

Designed to mitigate cyber threats, proactive measures are taken at all levels of the ALCMS design. Based on an airport's risk assessment, customized cyber security solutions can be optionally implemented to protect the ALCMS infrastructure and software against the identified risks.



- **Network Security:** Segmentation, segregation, whitelisting, disabling of unused ports, routers and VPN for external connection,...
- **Hardening of Endpoints:** Firewall, antivirus, blocking of USB, ...
- **User Access Protection:** Login based access, role-based functionalities, event logs, domain controller
- **Data Encryption:** Encryption of communication data, configuration files and more

For more information about the product, please see the Product Center on the ADB SAFEGATE website: [www.adbsafegate.com](http://www.adbsafegate.com).