



INTEGRATING SAFETY & SECURITY SYSTEMS IN ASSEMBLY OCCUPANCIES

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COURSE DESCRIPTION



Integrating Safety & Security Systems in Assembly Occupancies – Case study of Stadiums

In the middle of our busy life style, we take time off to watch a football match, go to a movie or take a vacation to visit some Holy places or tourist destinations.

If we look around, it seems that all the above entertainment and peaceful venues are becoming places of grief and sorrow due to loss of valuable lives because of overcrowding, stampede or security lapses.

We will take the case study of Stadiums which are coming into prominence with regional events like Expo 2020 in Dubai and FIFA 2022 in Qatar.

It will give us details of Safety & Security issues from the Parking Area to the Playing Arena.

For example; the Inner perimeter from the Safety point of view where we can save lives by using Systems (locks, Turnstiles) which are suitable for escape routes that can provide a smooth egress in case of an Emergency & Panic situations.

Or the outer perimeter from the Security point of view by using body and equipment scanners, bomb proof, bullet proof and Vandal resistant readers etc.

Also, how a Single Card can give you Access to:

Parking, Ticketing, Hospitality, Fan Shop, Viewing the stands.

And how One system should give you Control over:

Access (Parking, Perimeter, Stadium); CCTV, Burglar Alarm, Fire, Escape routes, Building Management, Ticketing, Payment Solutions.

How can we, as professionals, contribute in making the Stadiums an entertaining and a Safe place?



THE PRESENTER

Nusrulha is having a Diploma & Bachelors in Instrumentation Engineering. He started his career in Factory/Industrial Automation where he got the knowledge of MESSUNG & MITSUBISHI ELECTRIC PLCs (Programmable Logical Controllers), Control Panels and HMI (Human Machine Interface) Panels. His experience in Factory Automation Systems was augmented with Building Automation Systems when he joined Johnson Controls International.

Nusrulha is competent in BMS, CCTV, Access Control System, Smart Cards & Mobile Key Technologies using low energy Bluetooth (BLE), Fire Alarm System, Perimeter Protection, ELV, Wireless Telecommunication (P2P & P2MP), PLC, SCADA and RTU.

Nusrulha is well versed with Building Management System and Access Control Systems.



He also has a Certification of Honeywell - Notifier **Fire Alarm System**, Certification of Lenel's **Access Control System & Digital Video-CCTV Certification**. Allen Bradley's - **PLC & SCADA Programming**. For **Wireless Communication** – Point to Point & Point to Multipoint, he is Netronics **Certified System Specialist**.

He has worked for different verticals & industries like Infrastructure, Hospitality, Airport, Oil & Gas.

Currently Nusrulha is working with DORMA as a Product Marketing Manager - PMM to provide the customers a Premium Access Solutions.



LEARNING OBJECTIVES

1. **Case Studies: What went wrong ?**

- a. National Stadium Disaster – Peru
- b. The Kathmandu Disaster - National Stadium, Nepal
- c. Hillsborough Disaster (Sheffield)
- d. Ohene Djan Stadium, Accra, Ghana
- e. Air Defense Stadium – Egypt

2. **Analysis based on the History of 100 years.**

3. **Contingency Plan** - the related Security & Safety Risks, and solutions.

4. How can **System Integration** help Safety & Security issues ?

The purpose of this presentation is to convey technical knowledge to the conference participants.

The presentation also contains slides with text that summarises the content of the presentation and the main learning objectives.

These may be used to update CPD records for relevant organisations including the Chartered Institute of Building (CIOB).



National Stadium Disaster – Peru

(24 May, 1964 - Peru vs Argentina. At least **328 killed** & above **500 Injured**)

- Pitch Invasion
- Panic and an attempt at a **mass exit** to avoid the gas.
- Cause of death was mostly from internal **haemorrhage** or **asphyxia**.
- **No standard gates** available. (The stadium had solid **corrugated steel shutters**)
- In the street, the crowd caused destruction on private property around the stadium.





The Kathmandu Disaster - National Stadium, Nepal

(12 March, 1988 - Janakpur Cigarette Factory Ltd Vs Liberation Army of Bangladesh.

At least **93 killed** & more than **100 Injured**)

- Structure : **No proper Roofing**
- Fans attempted to flee from a hailstorm inside the stadium.
- **Exit doors were closed.**
- Spectators rushed to the stadium's **eight exits** but found **only one open.**





Hillsborough Disaster (Sheffield)

(15 April, 1989 - Liverpool Vs Nottingham Forest . At least **96 killed** & **766 Injured**)

- Structure : **Standing Terraces**
- **Overcrowding** outside the ground before kick-off.
- **Entry** was possible only via **one of seven turnstiles**
- **Barriers** installed **did not meet** official safety **standards**.
- Firefighters with cutting gear had difficulty getting into the ground
- Cause of death was mostly from compressive **asphyxia**.





Ohene Djan Stadium, Accra, Ghana

(9 May, 2001 - Accra Hearts of Oak Sporting Club Vs Asante Kotoko

At least **127 killed** & **Hundreds Injured**)

- **Disappointed** fans throwing plastic seats and bottles onto the pitch
- **Panic** and a resulting stampede.
- Cause of death was mostly from compressive **asphyxia**.
- Some **gates were locked**, preventing escape.





Air Defense Stadium – Egypt

(8 Feb, 2015 - Zamalek Vs Enppi, **22 killed** & **Dozens Injured**)

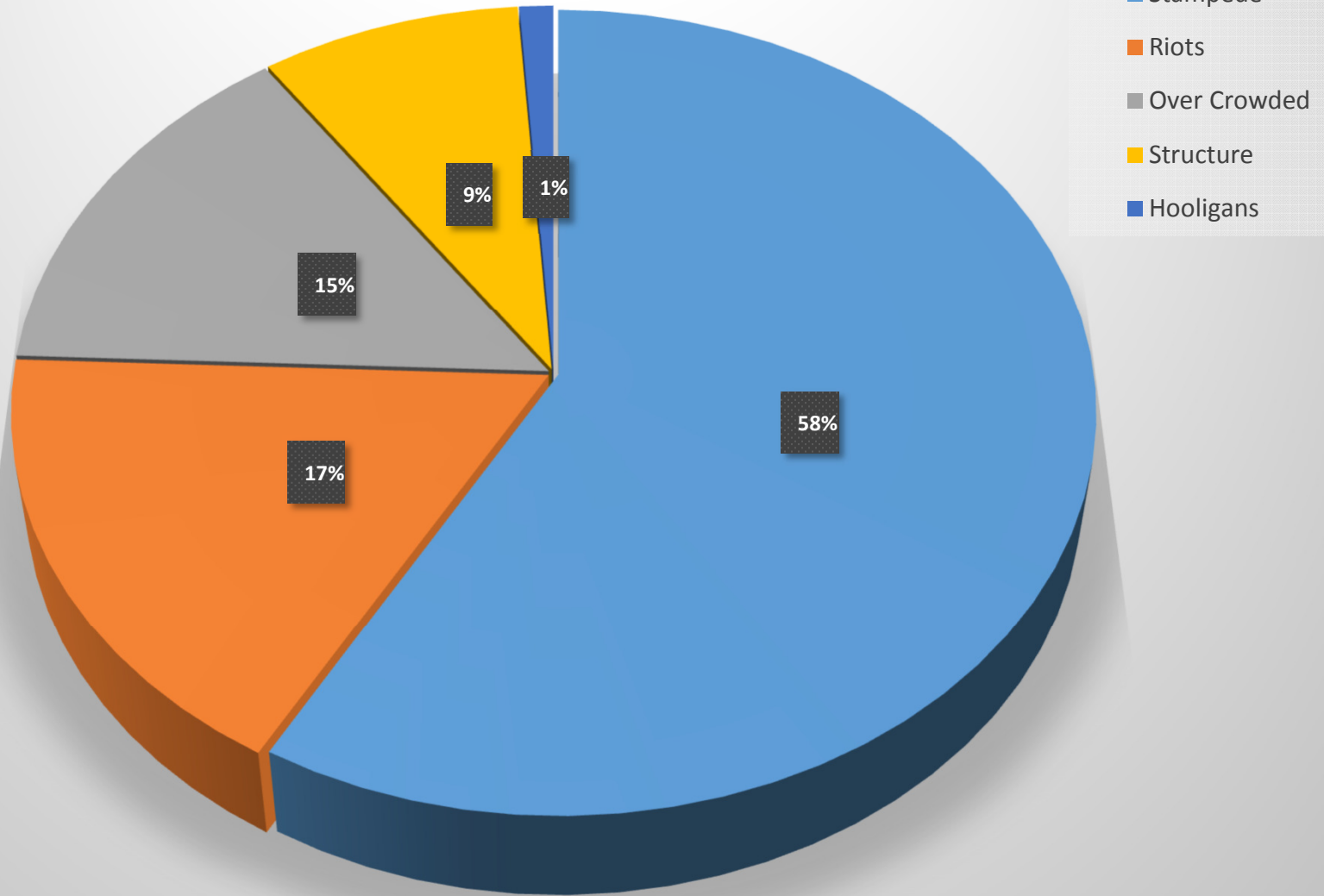
- No proper check on the no. of tickets issued and no. of fans gathered
- No proper Access Control System – fenced-in passageway
- Instead of a Turnstiles a customized Iron cage was put for Access Control
- No Crowd Management
- No proper Fencing - Forced Entry
- People were crushed in a stampede.





Cause of the Incidents - Analysis based on the 100 years of History

Precious Lives Lost





The main Risks for an Event:

A. Before the Event

1. Ticketing
2. Ingress
3. Fan Separation
4. Structure Design (The View from the Crowd)
5. Extremism

B. During the Event

1. Excited Moments (a Goal, a Foul, a Penalty, a Wrong decision etc)
2. Weather / Natural Calamity (Hailstorm, HVAC, Rain, Earthquake etc)
3. Riots
4. Egress due to Emergencies

C. End of the Event

1. Egress (Access Control and Escape Route Systems needs to be balanced)
2. Alternative means of Egress.
3. Crowd Management – Based on Behavior of the winning team fans and losing team fans





Contingency Plan



FIRE



TERRORIST
ATTACK



BUILDINGS
AND
SERVICES



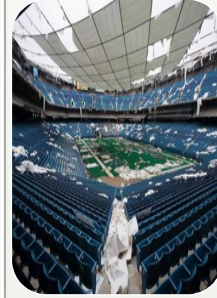
SAFETY
EQUIPMENT
FAILURE



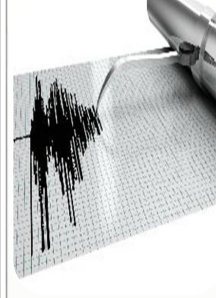
CROWD
CONTROL



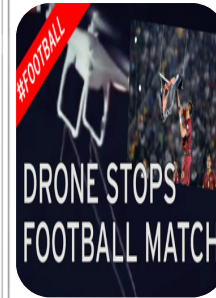
EMERGENCY
EVACUATION



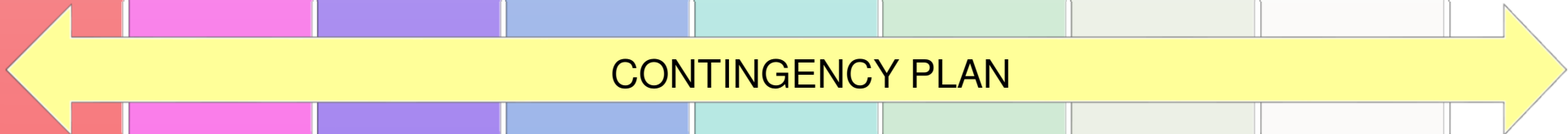
ADVERSE
WEATHER



NATURAL
DISASTERS



MATCH
ABANDONED
or
POSTPONED

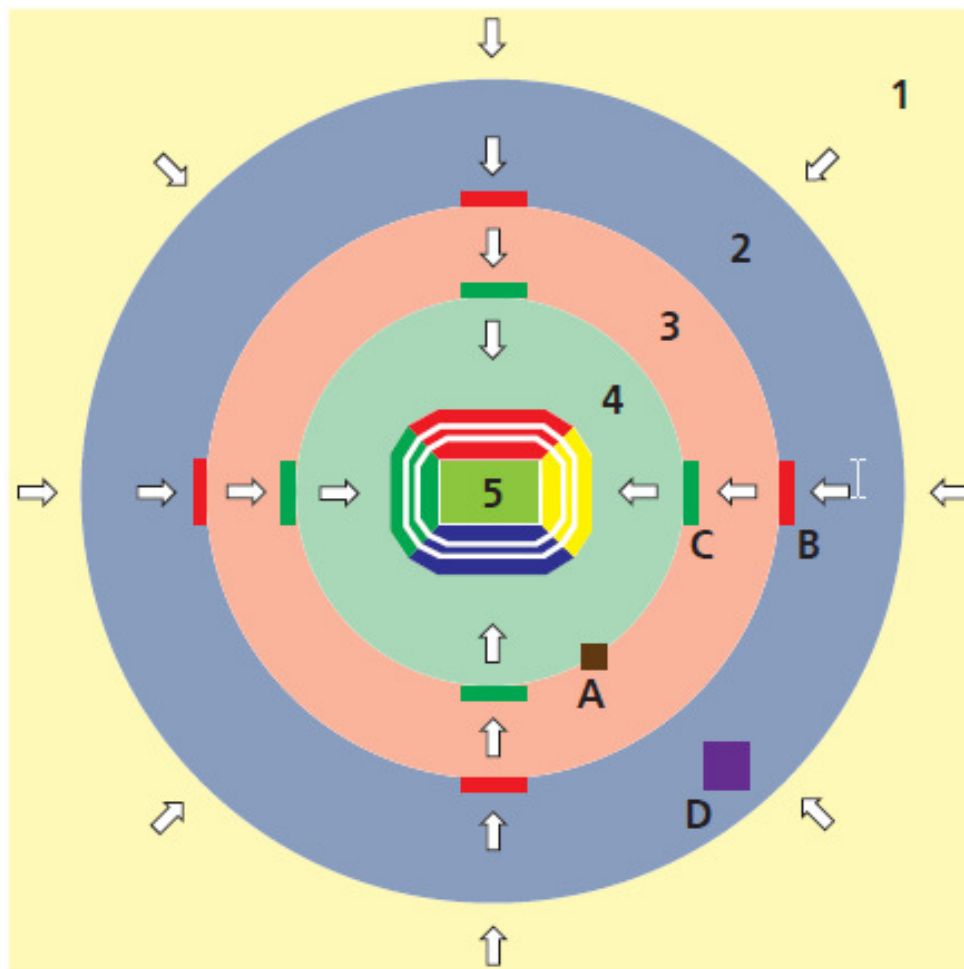


CONTINGENCY PLAN



Stadium Areas & Zones

Stadiums used during FIFA events are divided into five distinct perimeters, as follows:



- 1. The public zone
- 2. The exclusive zone
- 3. Outer perimeter
(visual ticket check)
- 4. Inner perimeter
(electronic access control)
- 5. The stands
- A. TCP
- B. Mags & bags
- C. Turnstiles
- D. STC

Notes:

TCP: Ticketing clearing point
 STC: Stadium ticketing centre



Air Defense Stadium – Egypt : Access Control System - Zones

■ The Public Zones

Check points- Few Kms away from the Stadium

■ The Outer Perimeter

Check points- Few 100 meter away from the Stadium

■ Inner Perimeter

(Access Control System)

Check points- Stadium wall or inside the Stadium





Case Study : Air Defense Stadium: Egypt Access Control System

Public Zone

- Check points- away from the Stadium
- Checking of Cars, No. plate recognition
- Checking people and bags etc





Case Study : Air Defense Stadium: Egypt Access Control System

■ Outer Perimeter

Check points- Few meters away from the Stadium or Stadium Material





Case Study : Air Defense Stadium – Egypt

Access Control System – Outer Perimeter

- Checking of tickets, Manually & Mobile or Handheld devices
- Check points – Few meters away from the Stadium
- CCTV with Video Analytics
- Body & Bag Scanners
- Tickets issued and no. of fans gathered



Case Study : Air Defense Stadium – Egypt

Access Control System

■ Inner Perimeter

Check points-
Stadium wall or Few
meter away from the
Stadium





Access Control System - Inner Perimeter



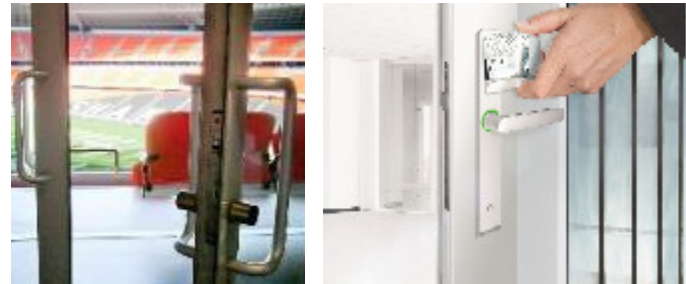
1. Main Entrances

- Turnstiles, barriers and revolving doors - **control throughput**
- An Intelligent Ticketing System



2. Internal Doors, Stands & Virtual Fences

- Hardware for the protection of the Doors and walls against heavy impact
- Delayed action as standard for ease of access
- Electro-mechanical hold-open function for single-leaf fire / smoke control doors



3. Exit or External Doors

- Door locking system and door terminal for electronic escape route control system

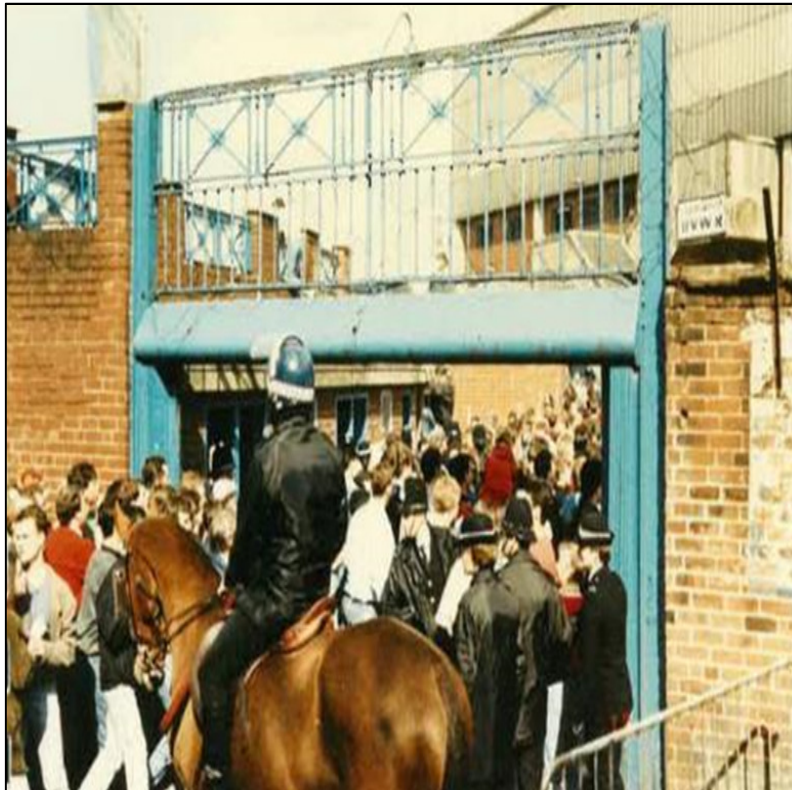




Access Control System - Inner Perimeter



1. Main Entrances



Access Control System - Inner Perimeter



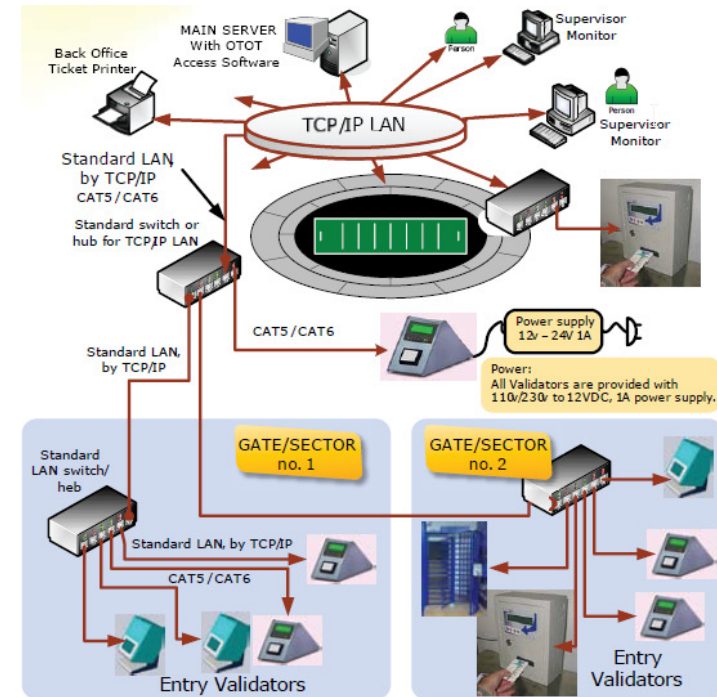
1. Main Entrances





Integration of ACS with the Ticketing System

- System has to **count the people** per block .
- Ticketing System should give **an alarm**, if the maximum number is reached.
- Fan **Separation**.



All network is standard TCP/IP LAN, By CAT5/6 cables or WiFi or Fiber Optic, etc.



Access Control System - Inner Perimeter



Main Entrances – Access Points or Readers

1. Vandal Proof & Bullet Proof readers



Bullet & Vandal Proof
Access Card Readers



Access Control System - Inner Perimeter



Main Entrances – Full Height Turnstiles

- For High Security
- Control and regulate throughput

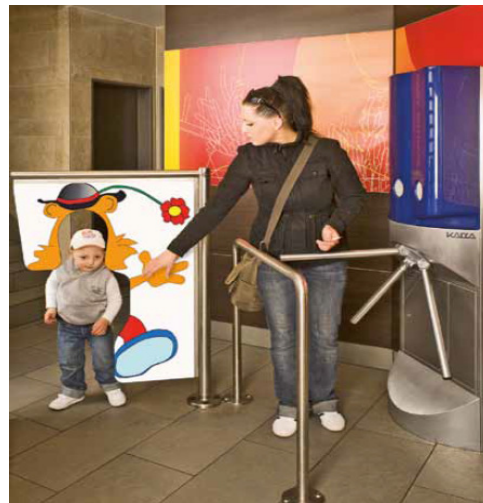




Access Control System - Inner Perimeter

Main Entrances –

- Half Height & Full Height Turnstiles for people with Special Needs
- Way to Carry Trolleys





Access Control System - Inner Perimeter

Main Entrances – Carpark Control

- Physical protection of cars/lorries,





Access Control System - Inner Perimeter

Main Entrances – VIP

- Elegant design as per the entrance areas
- Adaptable design
- Matches the Aesthetics of architectural design
- Silent





Access Control System - Inner Perimeter



Main Entrances – Other Areas

- Fan shop
- Press Center
- Office Areas





Access Control System - Inner Perimeter

2. Internal Doors, Stands & Fences

- No solid fence between fan block and playing field
- Fan Separation, through security people & ACS.
- One seat per fan, no standing fangroups.
- Restriction of numbers of fans per entrance block
- Entrance via card for a certain block.

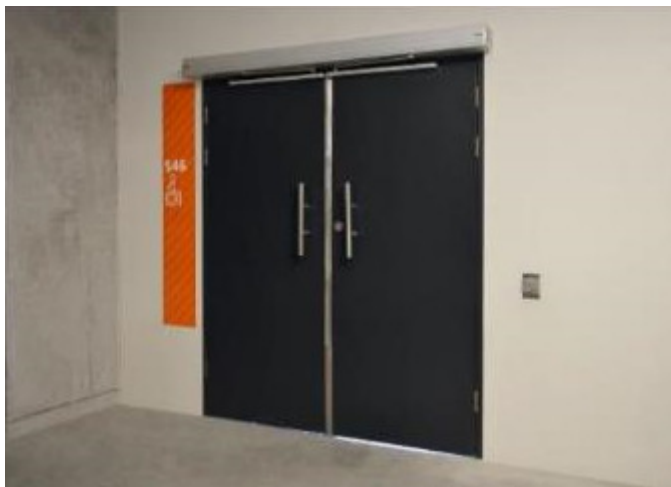




Access Control System - Inner Perimeter

2. Internal Doors

- Equipped with adjustable **back-check** as standard
- Protects the wall and door against heavy impact
- Optionally with delayed action for ease of access – also for fire and smoke control doors
- Electro-mechanical hold-open function for single-leaf fire / smoke control doors

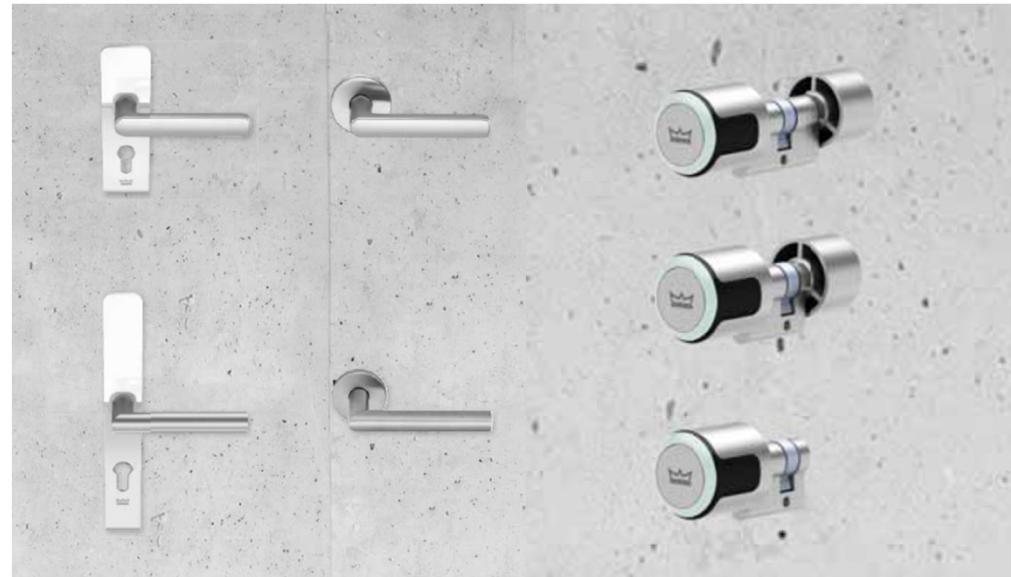




Access Control System - Inner Perimeter

2. Internal Doors

- In the VIP Areas Convenience and flexibility for visitors
- Locker Rooms & Changing Facilities
- Electronic Cylinders, Fittings & Readers





Access Control System - Inner Perimeter

3. Exit or External Doors





Access Control System - Inner Perimeter

3. External Doors – Emergency Exit Doors

- Panic Bars with Magnetic Latch Retraction (MLR) function for immediate Egress
- Should be Remotely operable for Magnetic Dogging
- Delayed Egress Panic bars (also EMDE) for delayed Egress

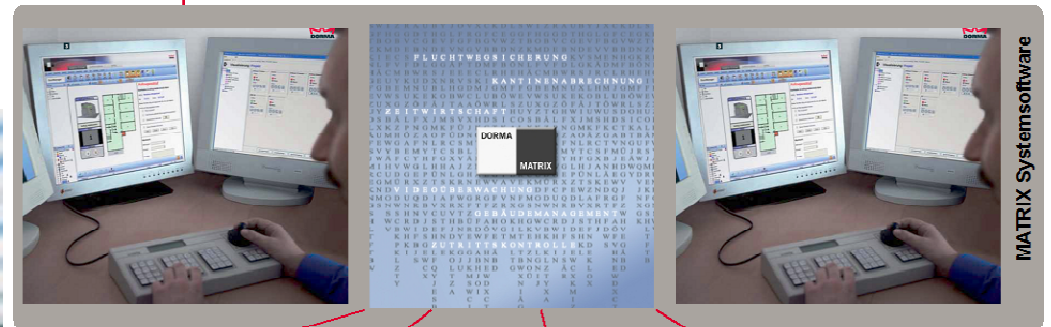
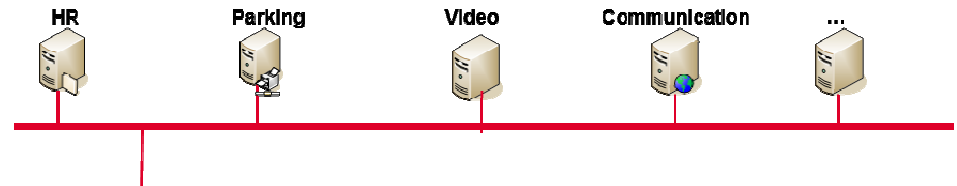




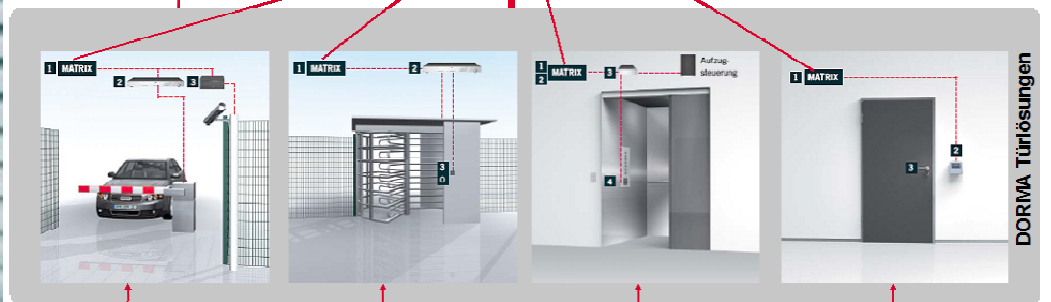
Access Control System - Inner Perimeter

3. External Doors – Emergency Exit Doors

- Door Management System for electronic escape route control.
- Door locking system
- Door terminal for electronic escape route control system



MATRIX Systemsoftware
DORMA security application

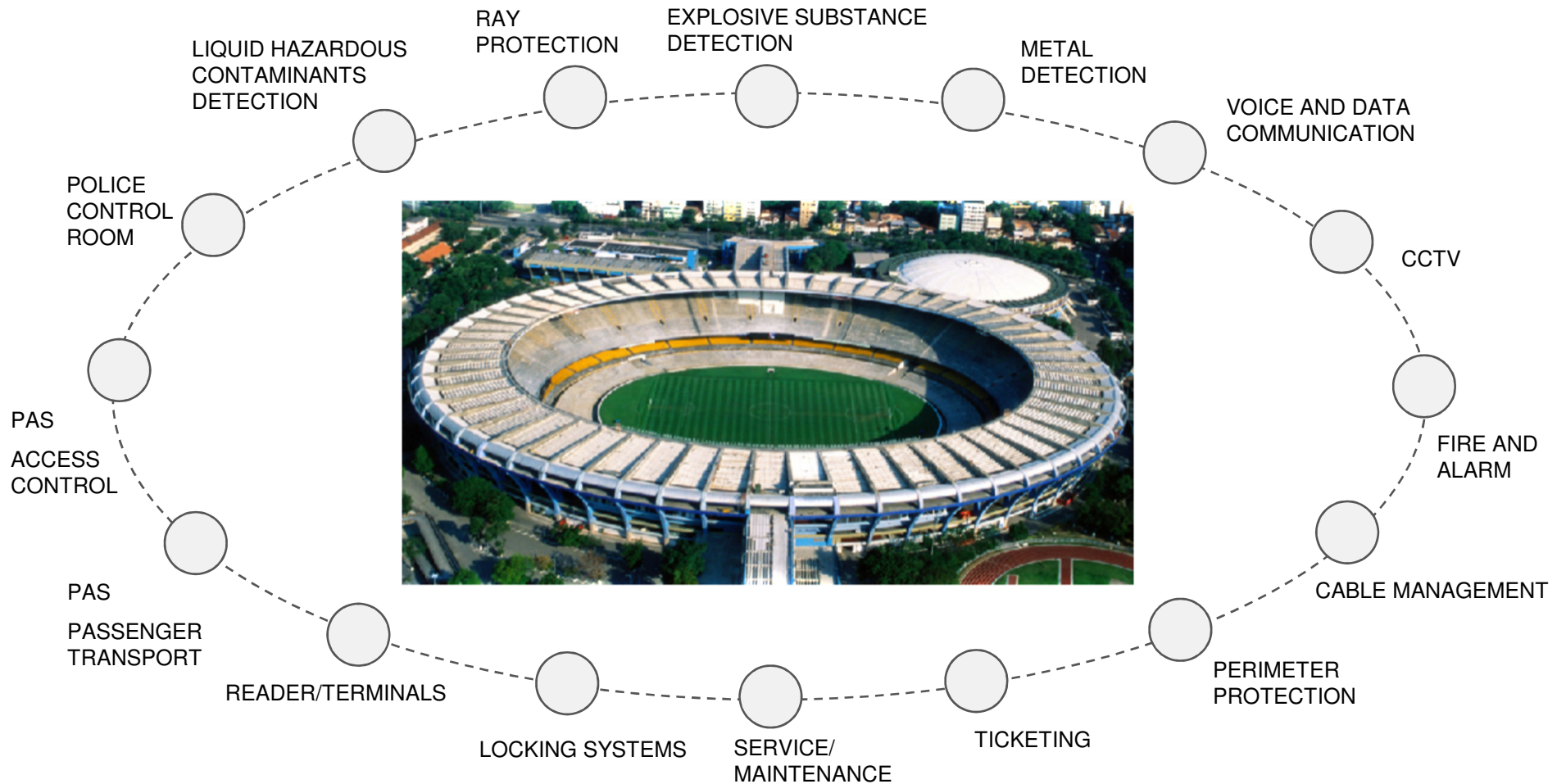


DORMA Türlösungen



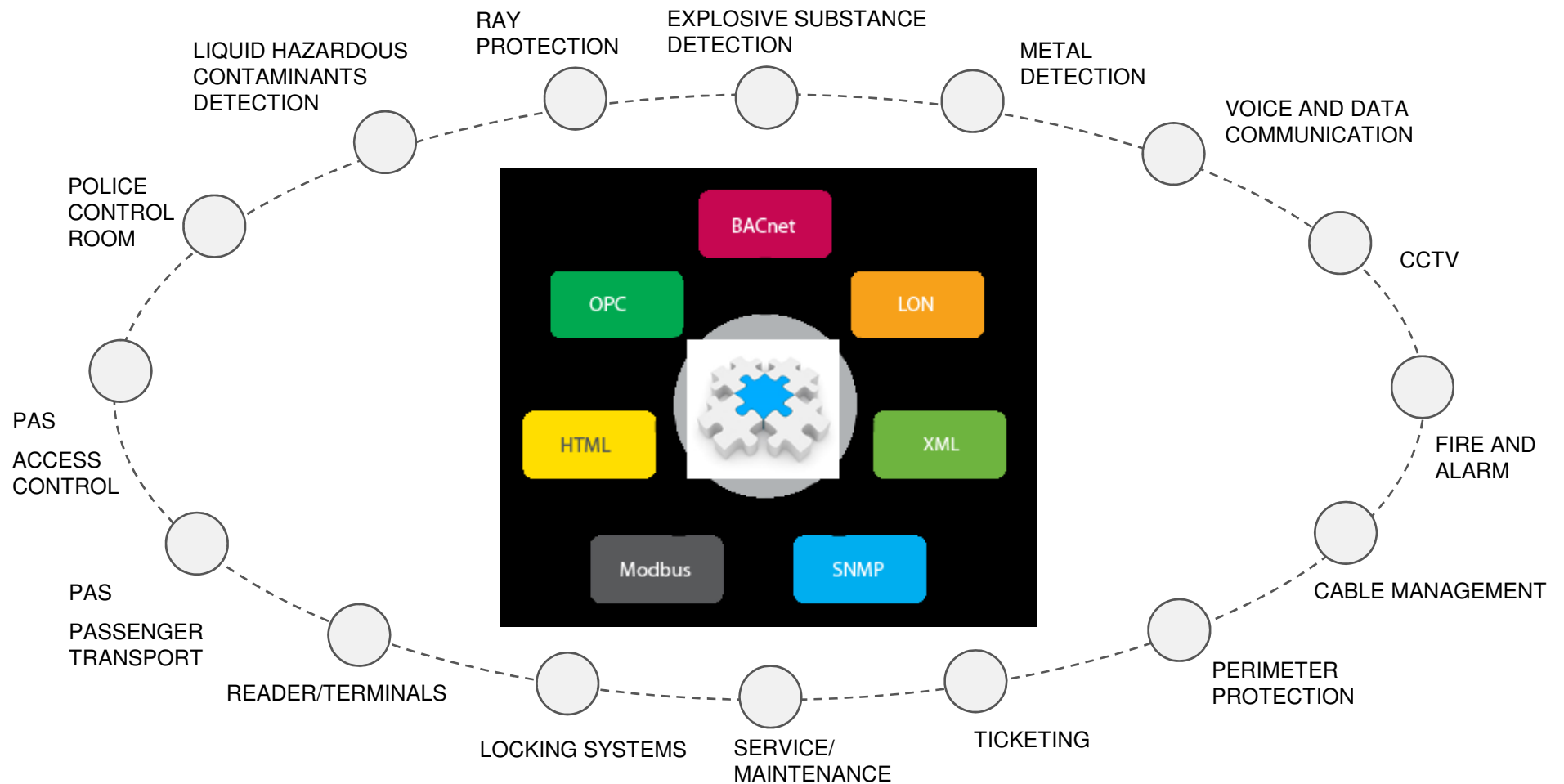


Total Solution CCC : Safety, Security & BMS as an Integrated System





Total Solution CCC : Safety, Security & BMS as an Integrated System

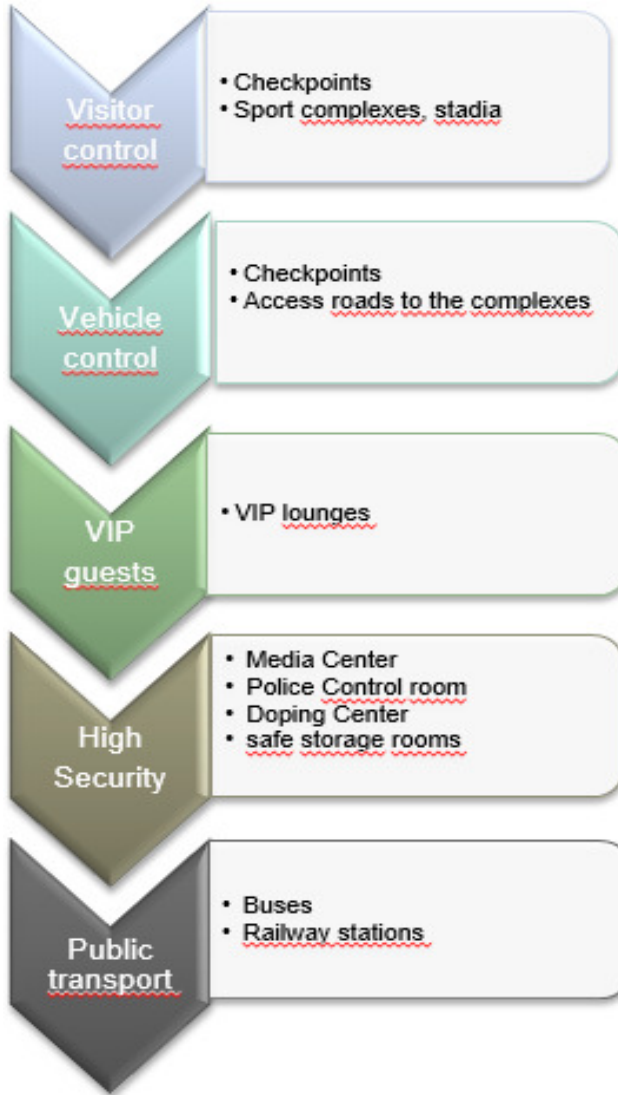




Access Control System - Inner Perimeter

One card can give you access to:

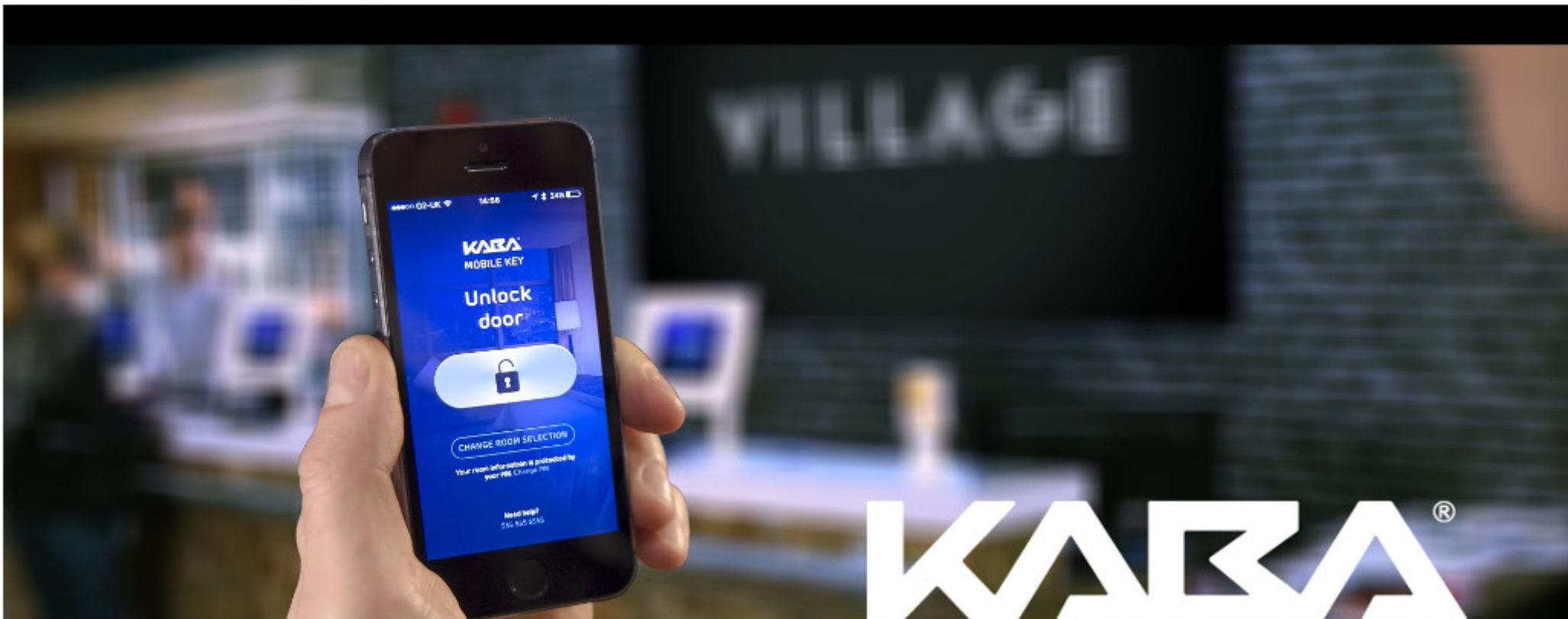
1. Parking
2. Hospitality
3. Fan Shop
4. Viewing the game





Access Control System - Inner Perimeter

One Device can give you access to:



Mobile Key



#mobilekey

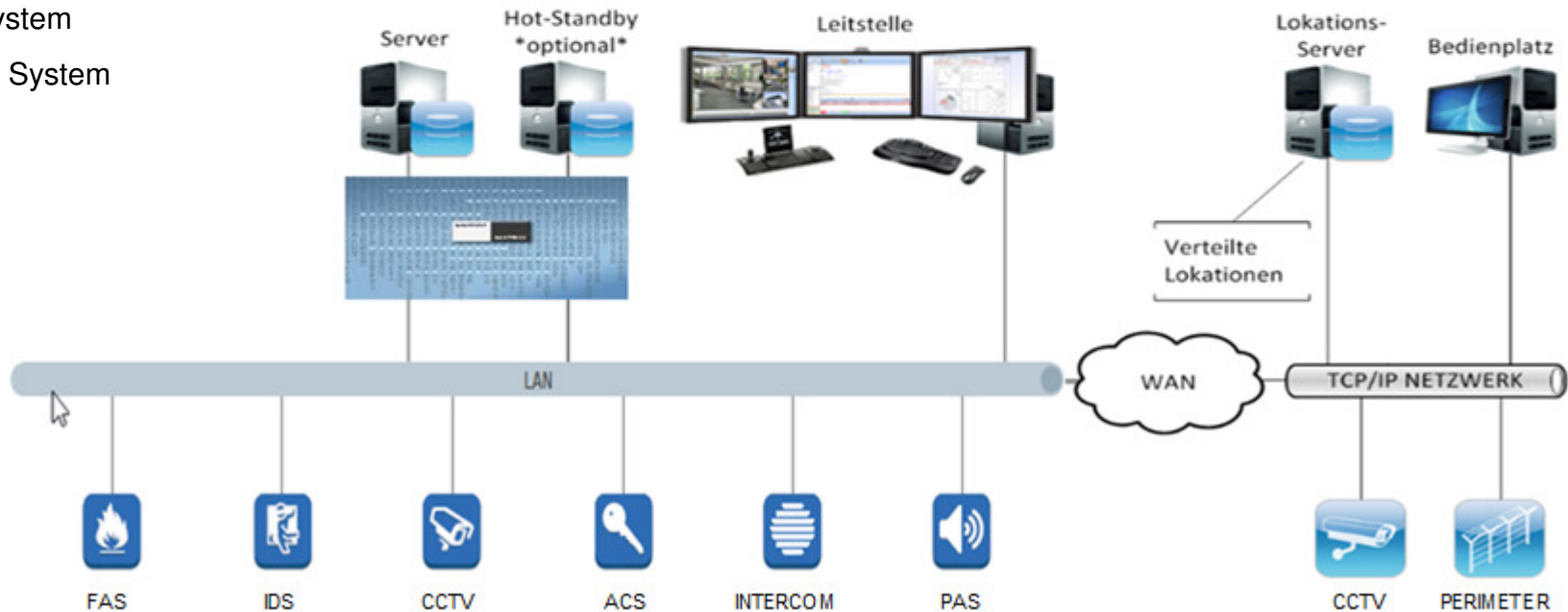
0870 000 5625
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Access Control System - Inner Perimeter

One system can give you control over:

1. Access (Parking, Perimeter, Stadium)
2. Fire Alarm System
3. Escape Route System
4. Building Management System
5. CCTV
6. Intrusion / Burglar Alarm System
7. Ticketing System
8. Payment Solutions
9. INTERCOM System
10. Public Address System



Safety Design in Buildings

Doha Conference

Crowne Plaza Doha - The Business Park, Monday, April 18, 2016



Thank you for your attention!

