Airport Security, Safety, Lighting and Incident Management

ECSI International

Airport Security

Vision Statement

Increase airport efficiency and establish the highest level of security while maintaining:

- Passenger flow and flight schedules

- High level of passenger service satisfaction

- High revenue based on airport concessions - Maximized passenger free time

The Airport Environment

Multiple Locations

Multiple Stakeholders

Multiple Authorities

Multiple Threats

Potential of Mass Casualties

- Terminals
- Transportation centers
- Critical sites

- Airport
- City
- Airline companies

- Airport Security personnel
- Law enforcement agencies
- Local and national authorities

- Terror
- Crime
- Drug Smuggling

- Large number of passengers
- Vital and critical Locations
- National gateway

The Threat

- Aviation transportation faces multiple threats
- Airports act as gateways to countries, states and cities
- Configured as international, national or local
- Airports are central hubs for the transfer of valuables and goods in and out of countries
- Criminal activity in airports and their surrounding infrastructure, is also on the increase

The Vulnerability (some examples of Terror threats)

MANPAD

Anti-tank missile from perimeter

Shooting attack inside terminal

Car bomb / Suicide bomber

Coercion

Hijacking

Telephone threat

Cyber threat

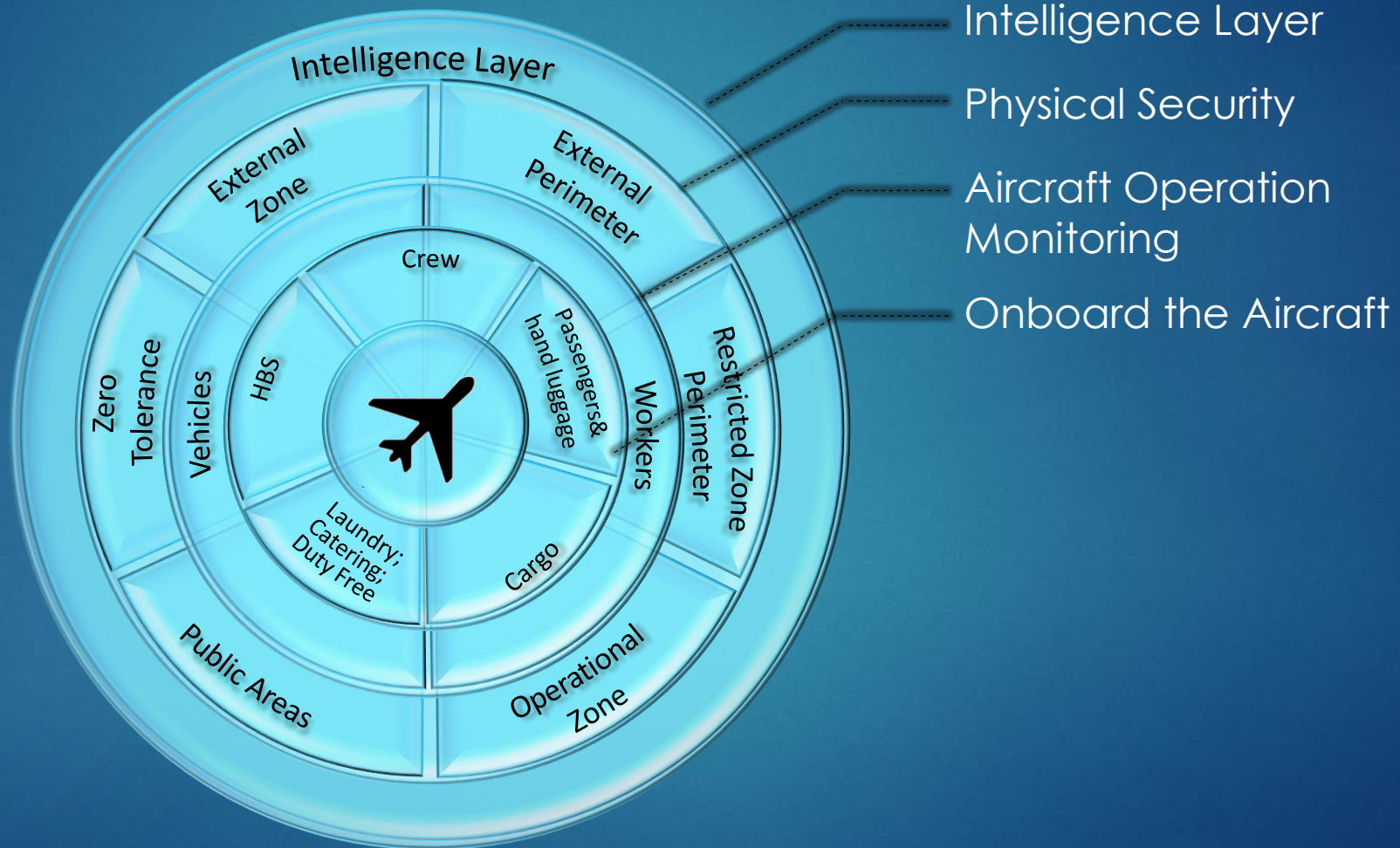# The Vulnerability (some examples of Criminal threat)

Violence

Theft

Smuggling

Contraband

The Solution

Airport Operations

- Prepare, predict, prevent and manage any potential event
- Decision support and process management

Passengers & Visitors

- Enjoyable experience
- Easy access
- Safe feeling

Airport Businesses

- Increase revenues by allowing more passenger "free time".
- Larger variety of services.
- Direct communication link to potential customers.

The Solution Foundation

Airport
External Zone

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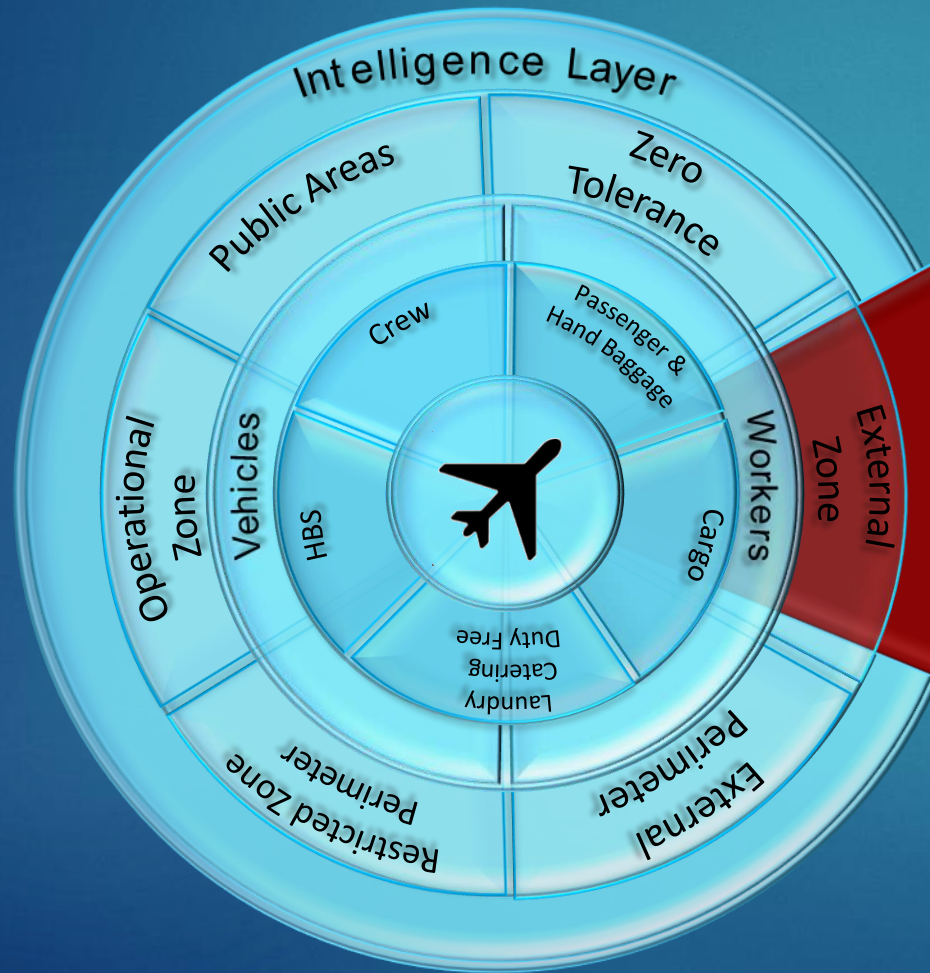
The external security solution affords recognition and response to any threat approaching the airport perimeter, or threats to departing and approaching aircraft
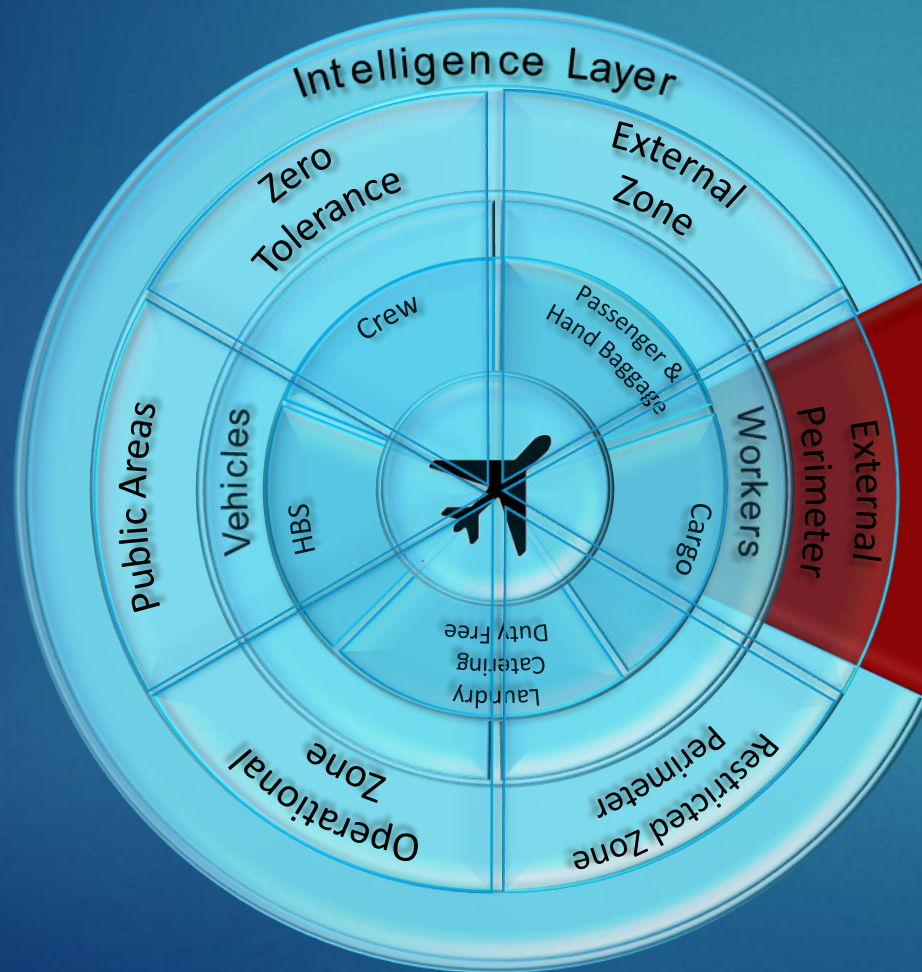
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Airport
External Zone

- Sensor Towers
- LR/MR Radars
- LR/MR CCTV Optics
- UAV

Airport
External Perimeter

Intelligence Layer

Zero Tolerance

External Zone

Crew

Passenger & Hand Baggage

Public Areas

Vehicles

Workers

External Perimeter

HBS

Cargo

Duty Free

Catering

Laundry

Operational Zone

Restricted Zone

Perimeter

The external perimeter will afford maximum control of all persons and goods entering the airport internal zone
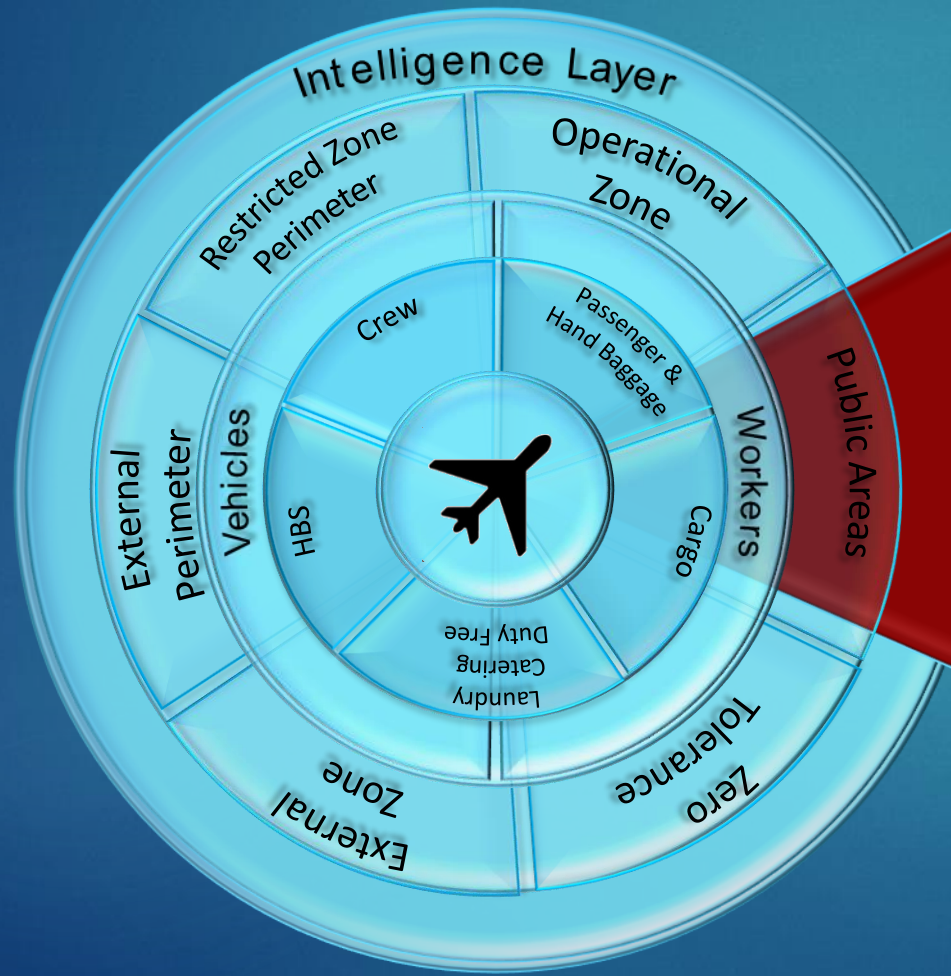
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Airport
External Perimeter

--- Smart Fence System

MR Cameras

Gate Complexes

- License Plate Reader
- Cargo screening
- Luggage Screening
- Traffic management
- Entrance management
- Barriers
- Gate complex Management System

Airport
Public Areas

- Surveillance Cameras
- Parking Management Sys.
- Public Transportation Management
- Entrance Gates
  - People screening
  - Luggage Screening
  - Biometrics
  - Entrance Management System

Parking Management System

▶ Traffic load alert system – for overloaded or blocked entrances/exits

▶ Vehicle capturing

▶ Vehicle counting

▶ Parking ticket issuance

▶ Intercom system

▶ Barriers

▶ Pay stations

Parking Management System

Allows for the monitoring and management of internal parking areas

CCTV with video analytics identifies the traffic load or congestion

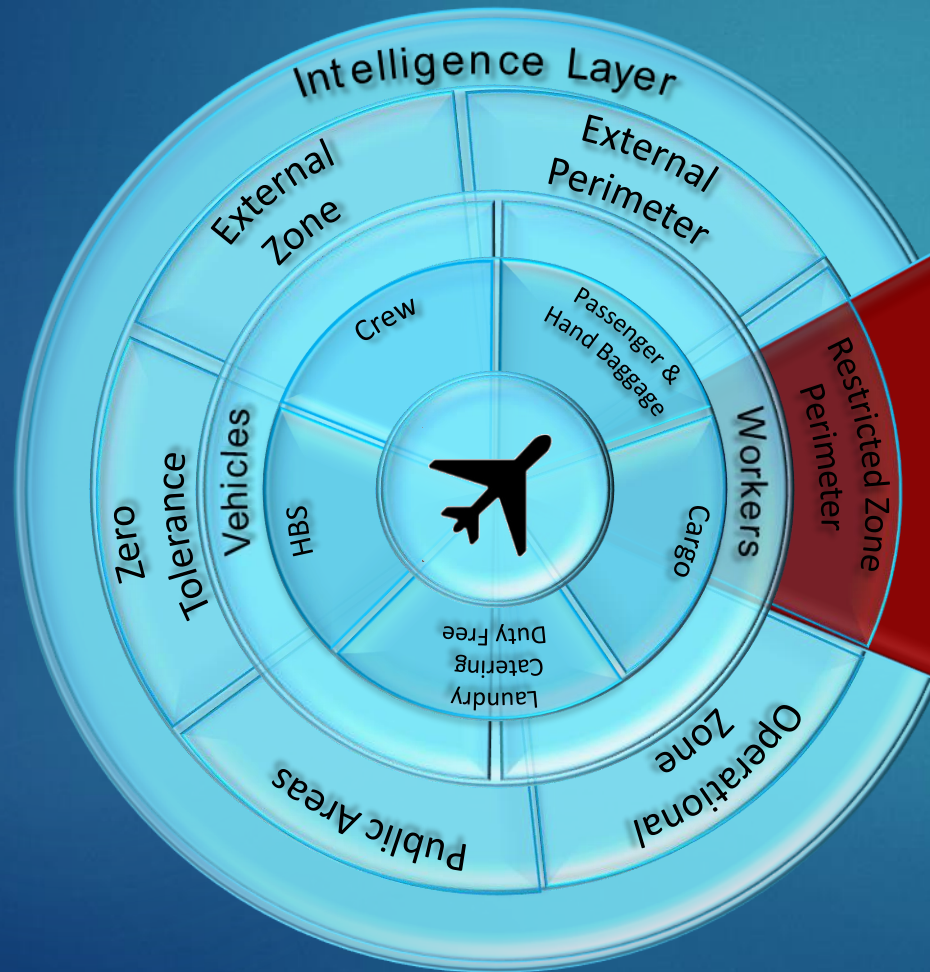LPR system monitors and identifies the exact parking location/area

Space detectors, indicators, and vehicle counting provides accurate status updates for each place/area and diverts traffic to alternate areas when needed

Face recognition and cellular number interception identifies drivers and passengers

Airport
Restricted Zone Perimeter

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Intelligence Layer

External Zone

External Perimeter

Crew

Passenger & Hand Baggage

Workers

Restricted Zone Perimeter

Zero Tolerance

Vehicles

HBS

Cargo

Laundry Catering Duty Free
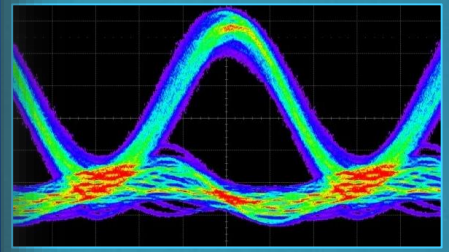
Public Areas

Operational Zone

The Restricted Zone Perimeter will afford full control of all authorized and permit carrying persons and goods entering this zone
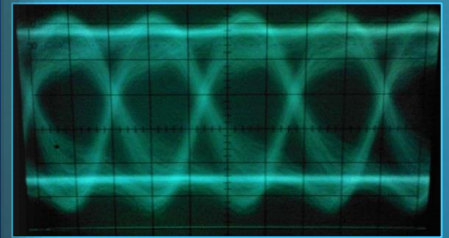
Access Management System

ACCESS MANAGEMENT SYSTEMS

- Access Management
- Gate Management
- Multi level Security Management
- Intelligence system

Defines patterns of interest for highlighting violation and potential thereat.

Pattern analysis.

Alerts generation per defined patterns.
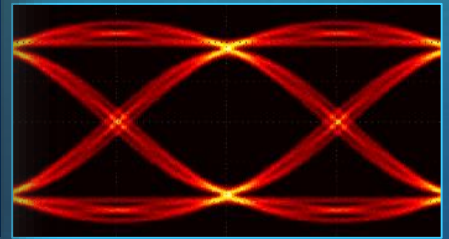
Report Generation – dynamic report generation by the system for data support.

Biometric Recognition

Facial Recognition

Iris Recognition
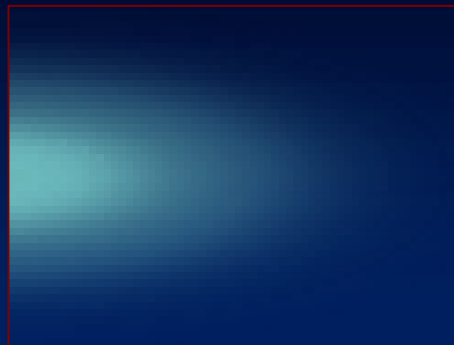
Remote Iris & Facial Recognition

Fingerprint Recognition

Palm Recognition

Voice Recognition

Video Analytics

LPR

People Counting

Loitering

Unattended Baggage

People Tracking

Video Synopsis

Airport
Operational Zone

The Operational zone monitoring affords management the monitoring of authorized personnel and vehicles within the operational restricted zone

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Intelligence Layer
External Perimeter
Restricted Zone Perimeter
Crew
Passenger & Hand Baggage
External Zone
Vehicles
HBS
Workers
Cargo
Operational Zone
Laundry Catering Duty Free
Zero Tolerance
Public Areas

Airport
Operational Zone

- 🗼 Sensor Towers
- 📡 LR/MR Radars
- 📷 LR/MR Electro Optics
- 🚗 Vehicle Monitoring System
- 🚪 Pedestrian gates
  - 🧳 Luggage Screening
  - 🧍 People screening
  - 🎴 Card Reader
  - 🎫 Access Management System

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Airport
Aircraft Operation Monitoring

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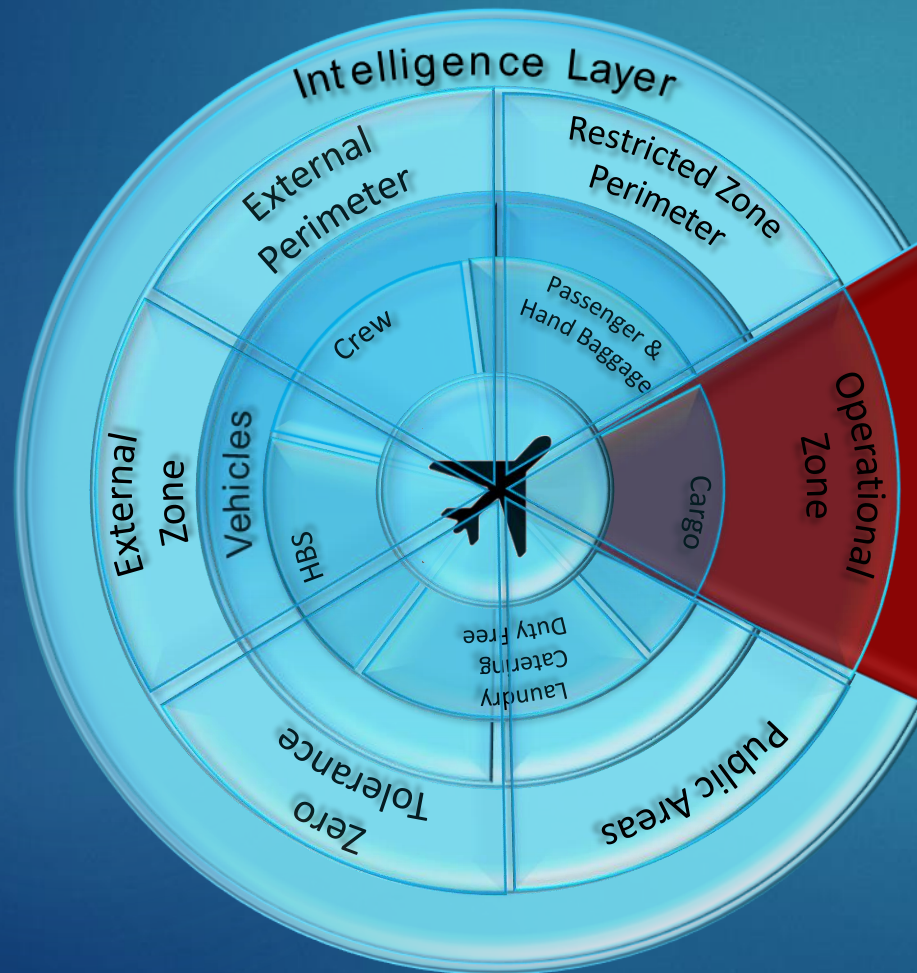
- A multi-layered solution which will prevent unauthorized persons from approaching aircraft.
- All vehicles and personnel approaching the aircraft should be screened and monitored.

Airport
Passenger & Luggage
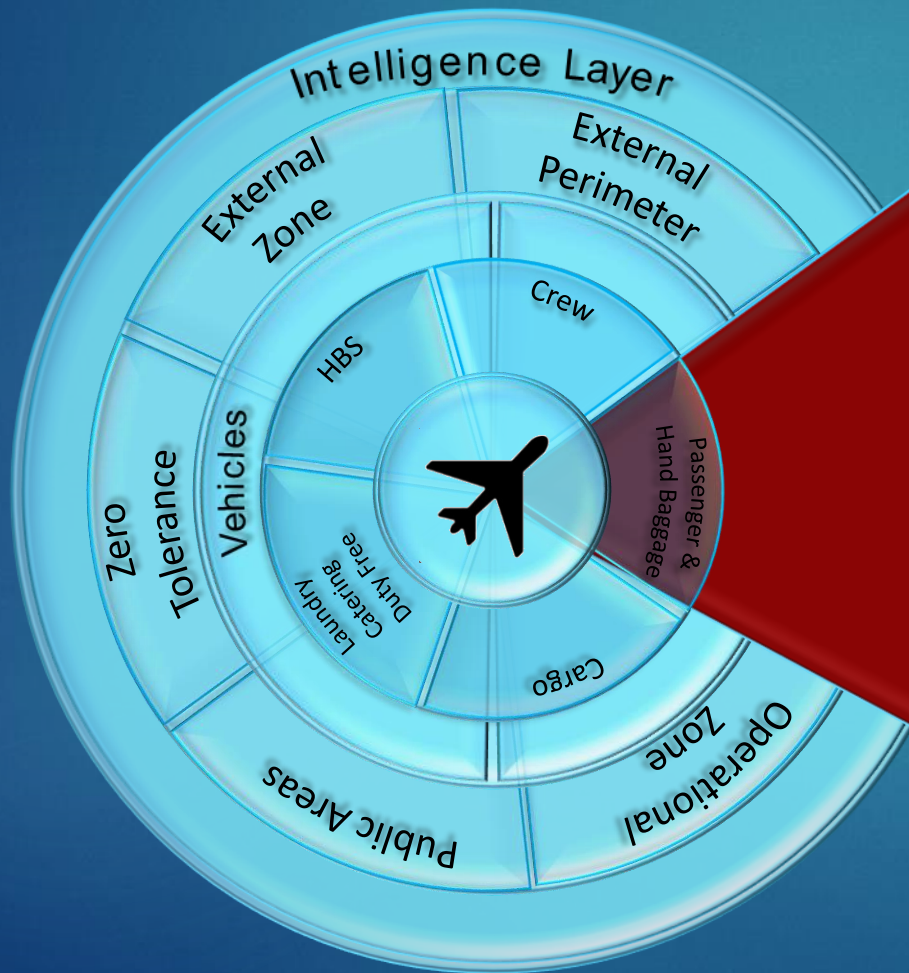
All passengers and their luggage will be screened according to their risk level, providing the highest security level.

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Airport
Cargo, Laundry, Catering, Duty Free
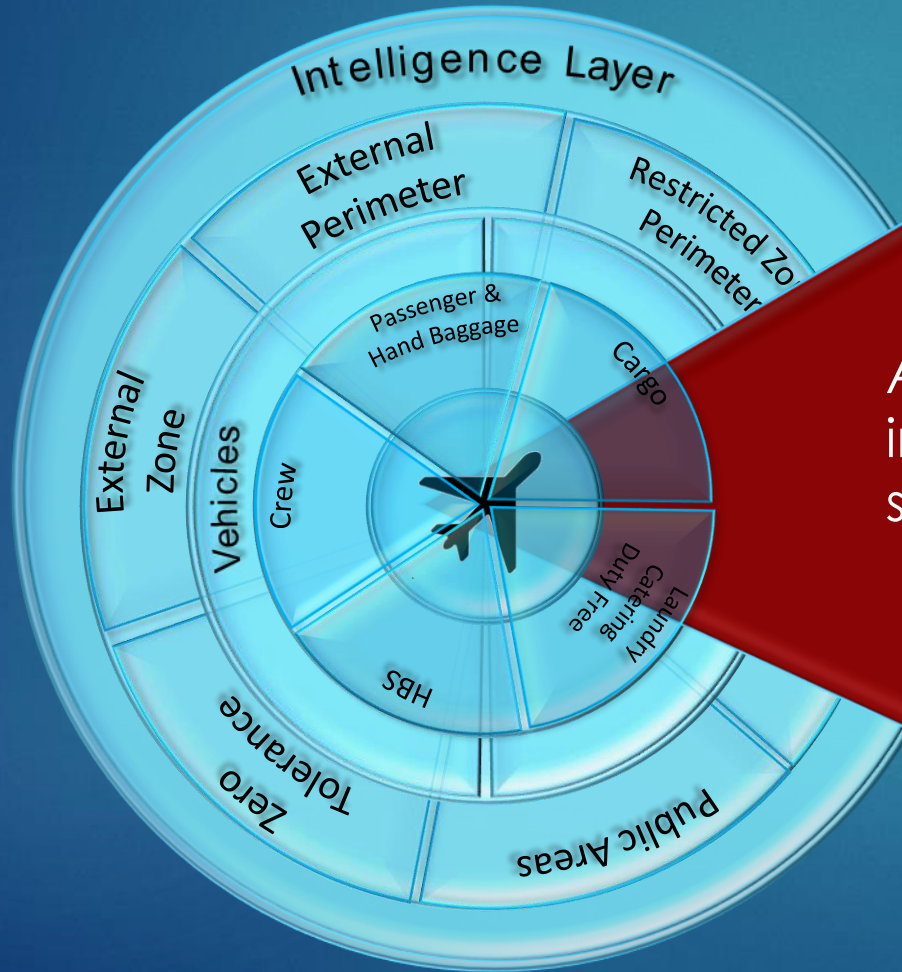
All cargo and goods loaded into the aircraft will follow the security screening procedures

Interoperable Device Management System

▶ Comprehensive integration of security systems (transparent to the end user

▶ Open architecture allows integration of new legacy systems – ability to monitor and control systems simultaneously through one easy-to-use interface
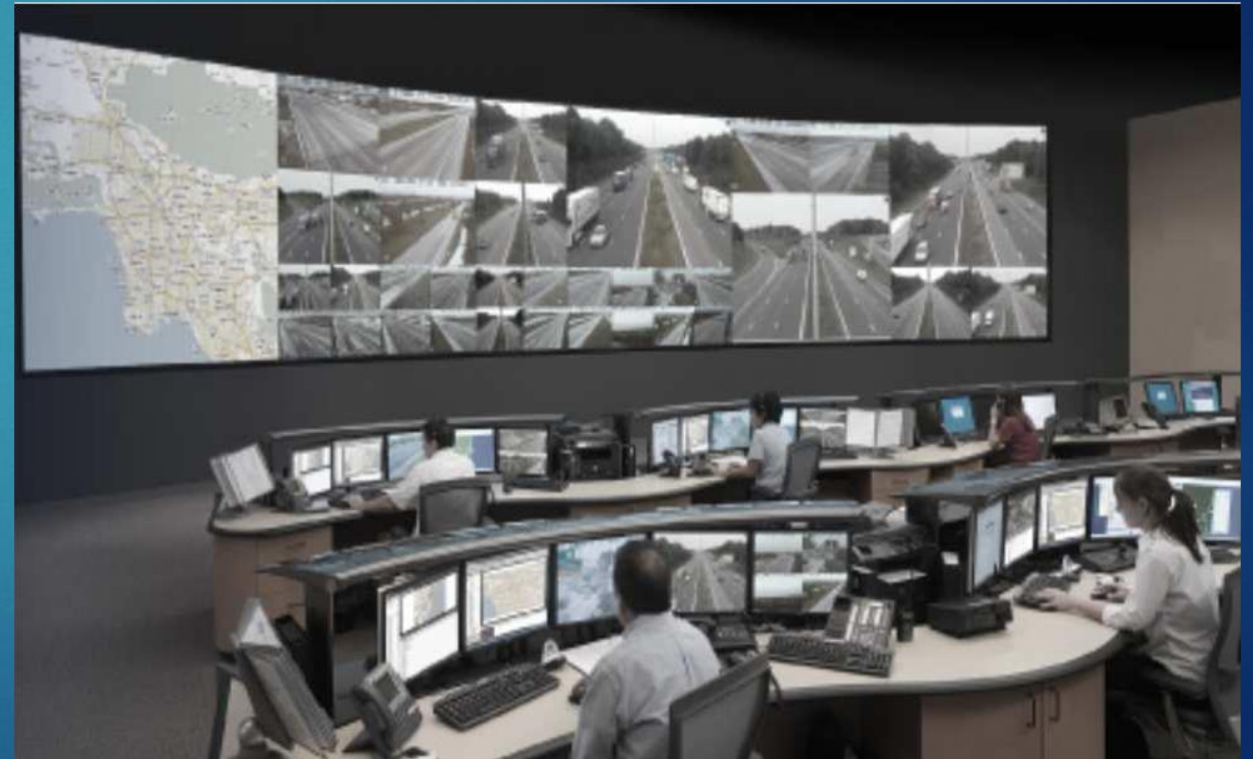
Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) Center

Strengths

Comprehensive	Adaptive	Smart	Focused	Flexible
Better communication and coordination via unified platform	Integration of best-of-breed technologies with legacy sensors,	Advanced big data analytics, automation & decision support tools	Reduced implementation time from planning to handover	Customer requirements vs. technical specification and balanced to ROI

Cost-effective custom solutions with proven ROI

The Operational Concept - Planning Cycle

| Security Survey | Risk Assessment | Operational Planning | Tailored Solution Deployment | Training and Procedures |

Fire and Life Safety Systems in Airport Safety Management

▶ **Overview**

  ▶ Safety Management System

  ▶ Life Safety Systems

  ▶ Case Studies

Fire and Life Safety Systems in Airport Safety Management

Safety Management System (SMS)

► A Formal, Top-down Structured Approach to Managing Safety Risk.

► It includes:

  ► Policies

  ► Systematic Procedures

  ► Practices

The ultimate goal is the management of safety

Safety Management System (SMS)

▶ **Safety**

▪ The state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management.''

▶ **Management**

▪ Management's commitment to safety should be formally expressed in a statement of the organization's safety policy. This policy should reflect the organization's safety philosophy and become the establishment of the SMS. The safety policy outlines the methods and processes that the organization will use to achieve desired safety outcomes.

▶ **System**

▪ An integrated set of elements that are combined in an operational or support environment to accomplish a defined objective. These elements include people, hardware, software, firmware, information, procedures, facilities, services and environment.

Fire and Life Safety Systems in Airport Safety Management

► **Safety Management** is based on the premise that there will always be safety **Hazards** and **Human Errors**.

- ► *This approach will subsequently improve an organization's overall level of safety.*

► SMS established processes to improve communication about these risks and take action to minimize them.

- ► *This process includes goal setting, planning, documentation, and regular evaluation of performance to ensure that goals are being met.*

Fire and Life Safety Systems in Airport Safety Management

▶ **SAFETY MANAGEMENT SYSTEM**

  ▶ Safety Policy

  ➤ Safety Risk Management

  ➤ Safety Assurance

  ▶ Safety Promotion

Fire and Life Safety Systems in Airport Safety Management

▶ **SAFETY RISK MANAGEMENT**

▶ Safety Risk Management (SRM) is at the heart of any Safety Management System. It is through the SRM process that an organization identifies hazards, determines potential risks, and designs appropriate risk mitigation strategies

▶ **SAFETY ASSURANCE**

▶ Safety Assurance includes self-auditing, external auditing, and safety oversight. Safety oversight can be achieved through auditing and surveillance practices, given the diverse activities at commercial airports.

System Safety Process
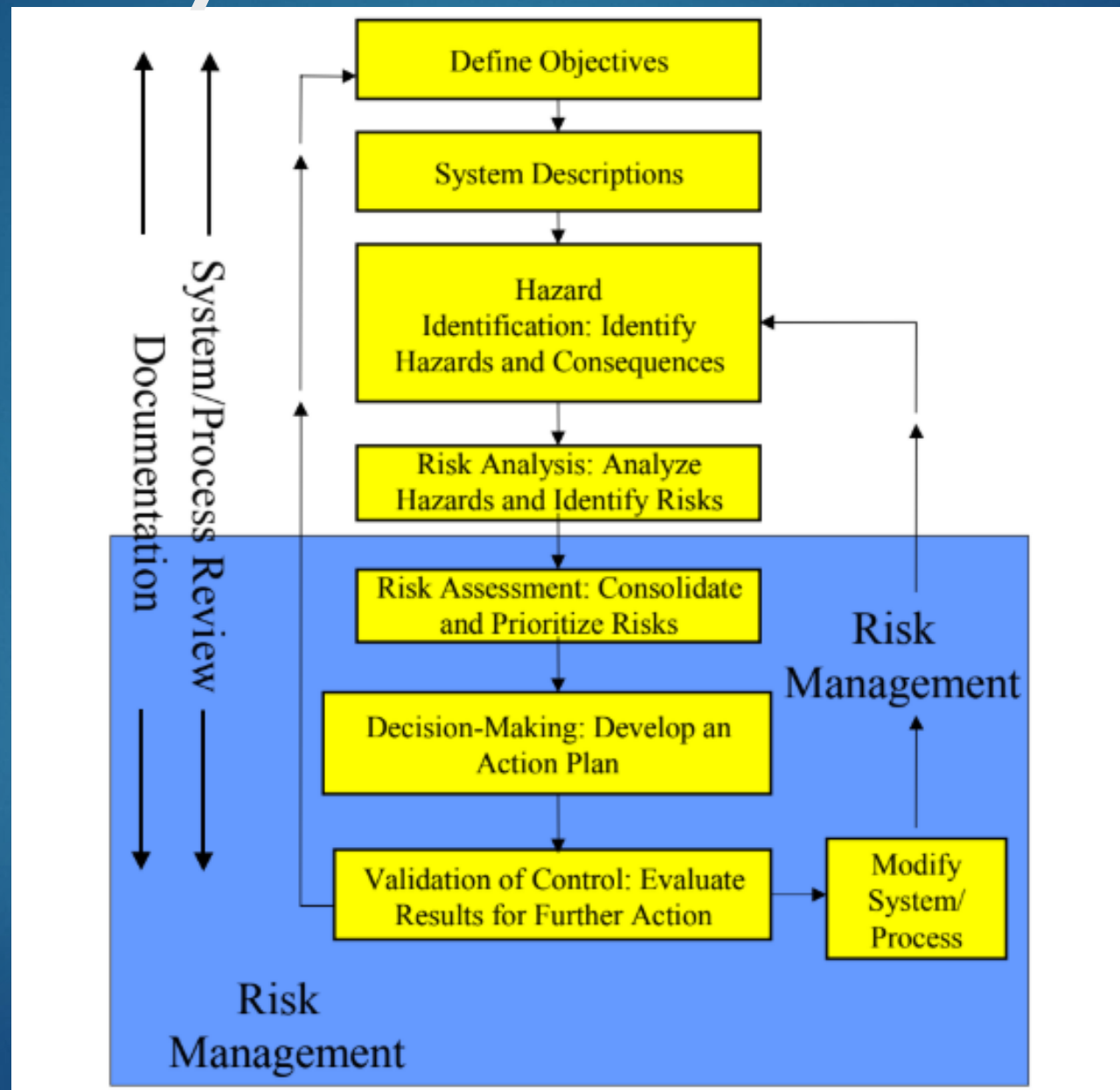
Fire and Life Safety Systems in Airport Safety Management

► **Life Safety System Design**

▶ **Life Safety Systems are an integral part of Airport Operations**

▶ **An Outcome of the System Safety Process**

▶ **A Means of Hazard Risk Mitigation**

▶ **Driven by Established Codes and Practices**

▶ **Impacted by:**

➤ Changes in occupancy type.

➤ Reconfiguration of walls and/or spaces.

➤ Installation of bulky or noisy equipment that may affect visual or audible notification.

➤ Multimedia installations in public areas, such as dynamic advertising displays.

Fire and Life Safety Systems in Airport Safety Management

▶ **System Definitions**

▶ **The Life Safety System can include the following systems:**

- ▶ Emergency Communication System (ECS)
- ▶ Fire Detection and Alarm Systems
- ▶ Emergency Alarm System
- ▶ Fire Protection Systems
- ▶ Smoke Control Systems

Fire and Life Safety Systems

▶ **Emergency Communication System**

▶ The ECS installed in the Terminal Complex is comprised of a network of audio loudspeakers, as well as visual textual notification systems. The ECS, together with the Fire Alarm System, provides audible and visual mass notification during emergency events.

Emergency Communication System (ECS).
Fire Detection and Alarm Systems.
Emergency Alarm System.
Fire Protection Systems.
Smoke Control Systems.

Fire and Life Safety Systems

▶ **Fire Detection and Alarm Systems**

▶ Fire detection and alarm systems are utilized to provide automatic smoke and fire detection, as well as mass visual notification during emergency events.

▶ The Terminal Complex utilizes a networked Fire Alarm System with central controls, and operates in conjunction with the ECS.

▶ Facilities that are outside the Terminal Complex are typically furnished with Fire Detection and Alarm Systems.

Emergency Communication System (ECS).
Fire Detection and Alarm Systems.
Emergency Alarm System.
Fire Protection Systems.
Smoke Control Systems.

Fire and Life Safety Systems

▶ **Emergency Alarm Systems**

▶ Emergency alarm systems are utilized to provide indication and warning of emergency situations involving hazardous materials used.

  ▶ **For example**:

    ▶ beverage dispensing

    ▶ inert gas applications

    ▶ compressed gas storage applications

Emergency Communication System (ECS).
Fire Detection and Alarm Systems.
Emergency Alarm System.
Fire Protection Systems.
Smoke Control Systems.

Fire and Life Safety Systems

▶ **Fire Protection Systems**

▶ Fire protection systems are installed within facilities to mitigate the extent of fire damage and to maximize occupant survivability during emergency events.

▶ Many facilities and specialty areas are provided with various types of fire protection systems.

Emergency Communication System (ECS).
Fire Detection and Alarm Systems.
Emergency Alarm System.
Fire Protection Systems.
Smoke Control Systems.

Fire and Life Safety Systems

▶ **Smoke Control Systems**

▶ Smoke control systems are installed within the Terminal Complex

  ▶ Remove Smoke from Occupied Areas

  ▶ Enable Occupants to Exit to a Safe Area

  ▶ Minimize smoke-related hazards during emergency events

Emergency Communication System (ECS).
Fire Detection and Alarm Systems.
Emergency Alarm System.
Fire Protection Systems.
Smoke Control Systems.

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Case Study 1 Austin-Bergstrom International Airport

- The $350m Barbara Jordan Terminal and apron expansion project included

  - setting up nine gates,

  - construction of an outdoor terrace overlooking the airfield

  - new baggage claim area.

- 175,000ft² terminal expansion project included 88,359ft² of concourse space,

- 2,282ft² of apron level space for baggage makeup conveyors, additional inbound baggage systems, and airline operations space.

- 28,205ft² of mezzanine and platform level space

- 5,770ft² of outdoor east terrace.

The original has capacity to accommodate 11 million travelers per annum. The airport welcomed 15.8 million passengers last year.

Case Study 1 Austin-Bergstrom International Airport

▶ The Aircraft Rescue and Firefighting Division (ARFF) is a unit of the Austin Fire Department.

▶ It oversees all activities related to fires on the Airport and provides initial response to medical calls.

▶ ARFF staffing includes a battalion chief, captain, lieutenant, and firefighters, who provide the Airport with 24 hour per day coverage.

▶ The Fire Department and Airport mutually agree to the staffing levels. These levels include 7 persons per shift. Overtime is minimal.

▶ Dispatching for fire services comes from the Airport Communications Center or from the Central Texas Communications Agency (911).

Case Study 2 Denver International Airport

Elements include a new train station
servicing the RTD FasTracks
commuter
rail connection to and from
downtown
Denver, a new 500-key Westin hotel
and
conference center, and an outdoor
public plaza linking the hotel,
conference center and train station
to the existing Jeppesen
Terminal.

Requirements

▶ Code Consulting and Compliance Analysis, including Accessibility

▶ Fire Suppression System Design

▶ Fire Alarm System Design

▶ Emergency Communications System Design

▶ Fire Modeling

▶ Smoke Management System Design

▶ **Egress System Design and People Movement Studies**

▶ Design Criteria for Emergency Response, including a formal "Emergency Response Plan"

▶ Construction Administration

▶ **Commissioning and Systems Testing**

▶ Overseeing DIA Specification Updates

▶ **Third Party Code Compliance Review for the Hotel.**

Airport Lighting

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Dallas Fort Worth International Airport

Architectural Element Incorporating Lighting
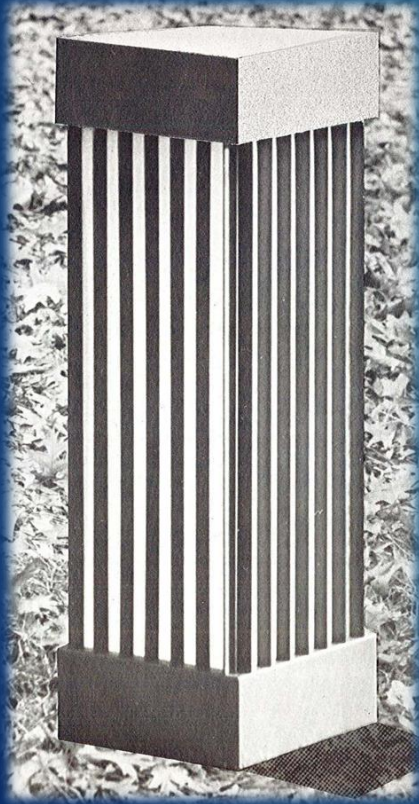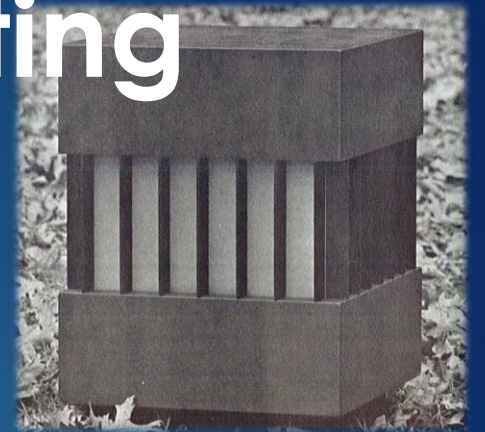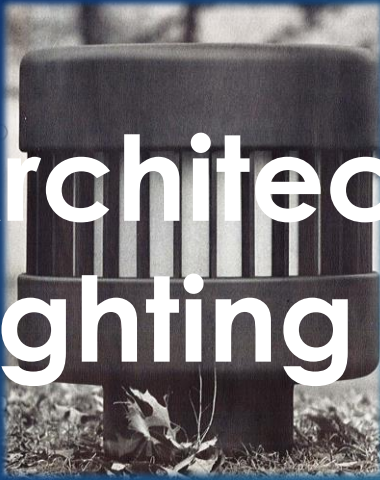
Architectural Element Incorporating Lighting
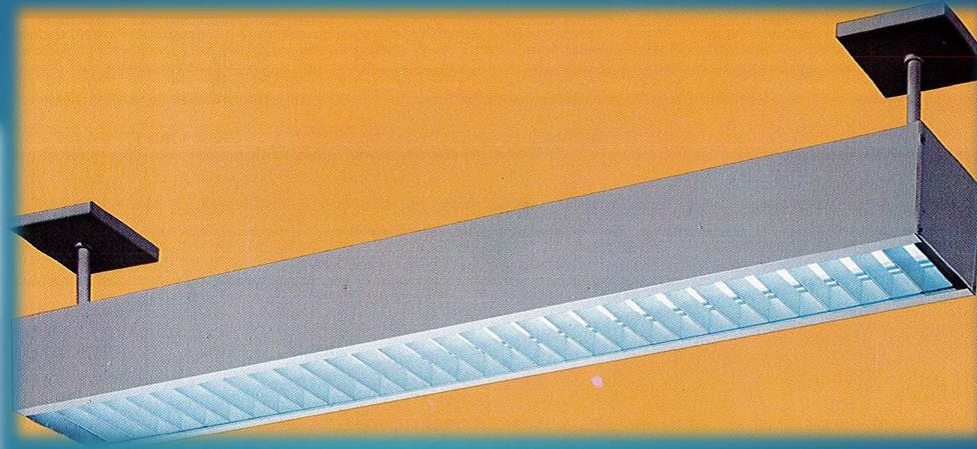
Airport LED Lighting Applications

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Next Generation Airport Lighting

▶ Engineering advancements

▶ Unprecedented energy efficiency and custom optics

▶ LED airport lighting instruments

Outdoor Lighting Around an Airport

▶ Serves the important functions of safety and security

▶ The FAA has mandated standards for aeronautical ground lighting systems

▶ Recommended Practice guide

▶ The recommendations included the IES Aviation Lighting Committee document IESNA-RP-17-1987

▶ Combined and updated to IES RP-37-15.

IES RP-37-15

▶ The document discusses lighting of the non-runway areas

▶ Many examples of light levels for various areas

- ▶ Non-Runway Areas
- ▶ Movement of aircraft
- ▶ Workers
- ▶ Pedestrians
- ▶ Airport traffic

▶ This document will 'shine a light' on some of the RP-37 recommendations

Airport Lighting Design & Engineering

► Outdoor lighting in the airfield's protected environment illuminates

   ► Aircraft parking

   ► Passenger boarding and deplaning

► Proper lighting specifications are critical to engineering an environment with ample safety and illumination for these important tasks.

Airport Lighting Design & Engineering Cont.

▶ Traditional lamps i.e.. HPS M H&MV
are plagued by:

  ▶ Cold temperatures

  ▶ Reduced lamp life

  ▶ Reduced light output

  ▶ Premature burn out

  ▶ Color shifting

▶ LED's are much more reliable in
outdoor environments

Advances in LED Airport Lighting

▶ LED fixture can produce a higher CRI (Color Rendering Index) for those performing important tasks.

▶ Baggage handlers often make routing decisions based on sorting tags containing colors.

▶ Fueling specialists use color to discern different fuel types.

▶ Green, blue, and purple are present in piston aircraft fuel types, while turbine engine colors are typically straw, clear, or red.

▶ Aircraft maintenance often includes recognizing specific colors of wires, hoses, and connectors.

▶ Lighting is important for face recognition and security observation.

Airport Apron Lighting

▶ Airport apron lighting is extraordinarily important because of its close proximity to the active airfield.

▶ Equally important is the light control from the apron to minimize glare and spillover.

▶ Pilot directed glare can diminish the visibility of directional signs, and painted markings on the airfield.

▶ Tower directed glare, backscatter, and reflections can distract tower personnel.

Airport Apron Lighting Cont.

▶ Distributing the light to come from many sources means that at any one instant the glare is only from a small percentage of the overall illumination sum.

▶ The multiple source approach also minimizes shadows and leads to better overall uniformity.

▶ It is stressed in RP-37-15 that field verification of coverage and uniformity will be necessary to optimize the lighting for all interested parties.

▶ Certain LED apron lights have optional glare shields and baffle options to assist in reducing troublesome glare.

Airport Apron Lighting Cont.

▶ The adjustable baffle option can be used as a tool to find the optimal shield.

▶ When the apron pavement is covered in snow, it may be necessary to dim or lighting.

▶ Being able to dim and control the apron lighting remotely is becoming more popular for these reasons.

▶ When designing the lighting systems, both maintenance and control of the lighting system should be considered.

▶ Centralized controls to keep the LED drivers more accessible so that service can be performed without giving up the entire area to a boom truck.

LED Lighting for Airport Parking & Garages

▶ Airport parking facilities for long and short term passengers need special consideration near an airport to reduce glare, and light leakage into other areas.

▶ These light containment issues are best handled early in the design phase using well designed fixtures and photometric data for modeling and simulation.

▶ There is no substitute however for actual testing and tweaking as the real-life situation presents itself.

▶ Be sure to specify fixtures with known photometrics, and optional baffles to help shape the light output.

▶ Consult the manufacturer for adjustable baffles useful for testing or as a permanent solution for future flexibility.

LED Lighting for Airport Parking & Garages Cont.

▶ Parking lots and connected areas are increasingly adding cameras for passenger safety, surveillance, and increased law enforcement for crime prevention.

▶ When motion is detected on an approaching pathway or access point, lights can be brought up to higher levels, lighting the exit roadway or other control scenarios which can save energy and extend the fixture lifetimes.

▶ Poles and obstacles closer to the airfield can exceed this obstacle limitation surface and require appropriate visual aids to avoid a collision.

▶ One such example is lighting on the top level of a parking garage or tall poles on an apron.

▶ Typically, the top of the pole will need to add an approved obstruction light such as an illuminated red L-810 fixture.

Airport LED Lighting Solutions

▶ **Passenger Safety**

With ample, even lighting, your passengers will notice the difference. Well-lit airport areas increase your customers' sense of safety and security in areas like:

▶ Airport Walkways

▶ Airport Perimeters

▶ Airport Hangars

▶ Airport Atriums

▶ Building Entrances

▶ Parking Structures

Security Fire/Life Safety and Lighting Integration For Incident Management

ECSI International

System Integration For Incident Management

▶ Security and Surveillance

▶ Access Control

▶ Fire and Life Safety Systems

▶ Lighting

System Integration For Incident Management

▶ **Integration Infrastructure**

　▶ Power Distribution

　▶ Voice Data and Video Data Communications

　▶ Command and Control

Integration Infrastructure

▶ **Power Distribution**

  ▶ Utility Feeds

  ▶ Dedicated Circuits for Critical Systems

   ▶ Security, Access Control and Surveillance

   ▶ Life Safety

   ▶ Lighting

  ▶ Emergency Generators

  ▶ UPS/Battery Backup

  ▶ Power Monitoring at All Levels

Integration Infrastructure

▶ **Voice Data and Video Communications**
Airport wide Communications Backbone

  ▶ Multi media system

    ▶ Fiber

    ▶ Copper

    ▶ Wireless

    ▶ Radio

  ▶ Redundancy for Critical Systems

  ▶ Status Monitoring and Reporting

Command and Control for Incident Management

▶ **Normal Operations**
  ▶ Segmented by Operational Function
  ▶ Managed by Different Departments
    ▶ Security
    ▶ Parking Management
    ▶ Fire Department
    ▶ Facility Management
  ▶ Monitored and Controlled by Disparate Systems
    ▶ Not Designed to Work with Other Systems
    ▶ Requires Customization to Achieve Information Access
    ▶ Results in Less that Optimal Critical Information Sharing

Command and Control for Incident Management

▶ **Emergency Operations**

> ▶ Dedicated Emergency Operations Center
>
> ▶ Independent of Normal Systems Operation
>
> ▶ Capable of Oversight of all Critical Systems
>
> ▶ Requires Immediate Situational Awareness
>
> > ▶ Real time data and information availability
> >
> > ▶ Common Operating Picture
>
> ▶ Communications across operational departments
>
> ▶ Communications with Local Support Agencies
>
> > ▶ Local Law Enforcement
> >
> > ▶ Fire Department
> >
> > ▶ FBI

Command and Control for Incident Management

▶ **Effective Incident Management Requirements**

  ▶ Effective Planning Involving Internal and External Organizations

  ▶ Part of Safety Management System

    ▶ Risk Assessment

    ▶ Risk Management

  ▶ Incident Management Policies and Procedures

  ▶ Training

  ▶ Periodic Drills

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Thank you...