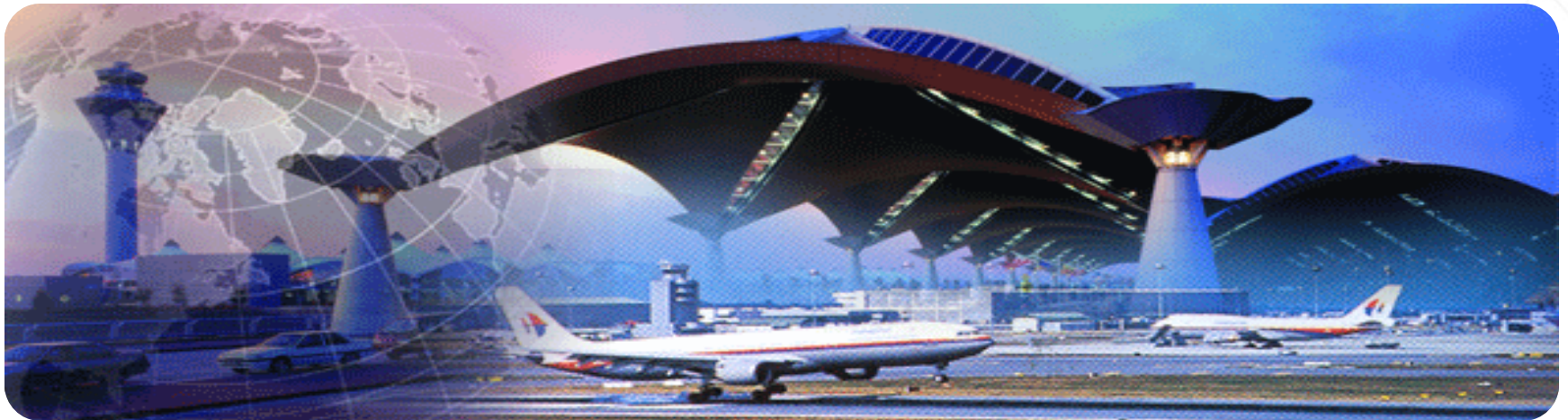


Aeronautical Ground Lighting (AGL) at KLIA



Presented by: Mohd Sabri Abd Aziz

1. INTRODUCTION

FACILITATOR'S PROFILE



Name : Mohd Sabri Abd Aziz



Company : Malaysia Airports (Sepang) Sdn Bhd



Designation : Manager, AGL/EPS KLIA



**Qualification : Bachelor of Electrical Engineering, Gannon University, USA ;
Graduate Diploma in Business Administration, National University of
Singapore;**



Work Experience : Operation & Maintenance of Airport Facilities since 2001

AIRPORTS OPERATED BY MALAYSIA AIRPORTS



Malaysian Airports Operated by Malaysia Airports



39 Airports in Malaysia:

- 5 International
- 16 Domestic
- 18 STOL ports

Overseas Airports Operated by Malaysia Airports

Malaysia Airports has a proven track record in managing overseas international airports and has gained global recognition for airport management. Since 1995, we have been expanding our expertise overseas and managing a total of 6 international airports to date from Cambodia, Kazakhstan, The Maldives, India and Turkey.



Cambodia

Siem Reap International Airport (1995-2005)
Phnom Penh International Airport (1995-2005)



Kazakhstan

Astana International Airport (2007-2009)



Maldives

Ibrahim Nasir International Airport, Male (2010-2012)



India

Indira Gandhi International Airport, New Delhi (2007-Present)
Rajiv Gandhi International Airport, Hyderabad (2003-Present)



Turkey

Sabiha Gocken International Airport, Istanbul (2008-Present)

KLIA INFO

LAND AREA

- 10,000 Hectares or
- 25,000 Acres

NOS OF RUNWAY

- 2 Parallel Runways
- 4000 m x 60 m



FIRE CATEGORY

- Category 9

NOS OF AIRCRAFT BAYS

- 46 Contact Bays
- 59 Remote Bays
- 1 VVIP Parking Bays



TERMINAL DESIGN CAPACITY

- 25 MPPA

TOTAL FLOOR AREA

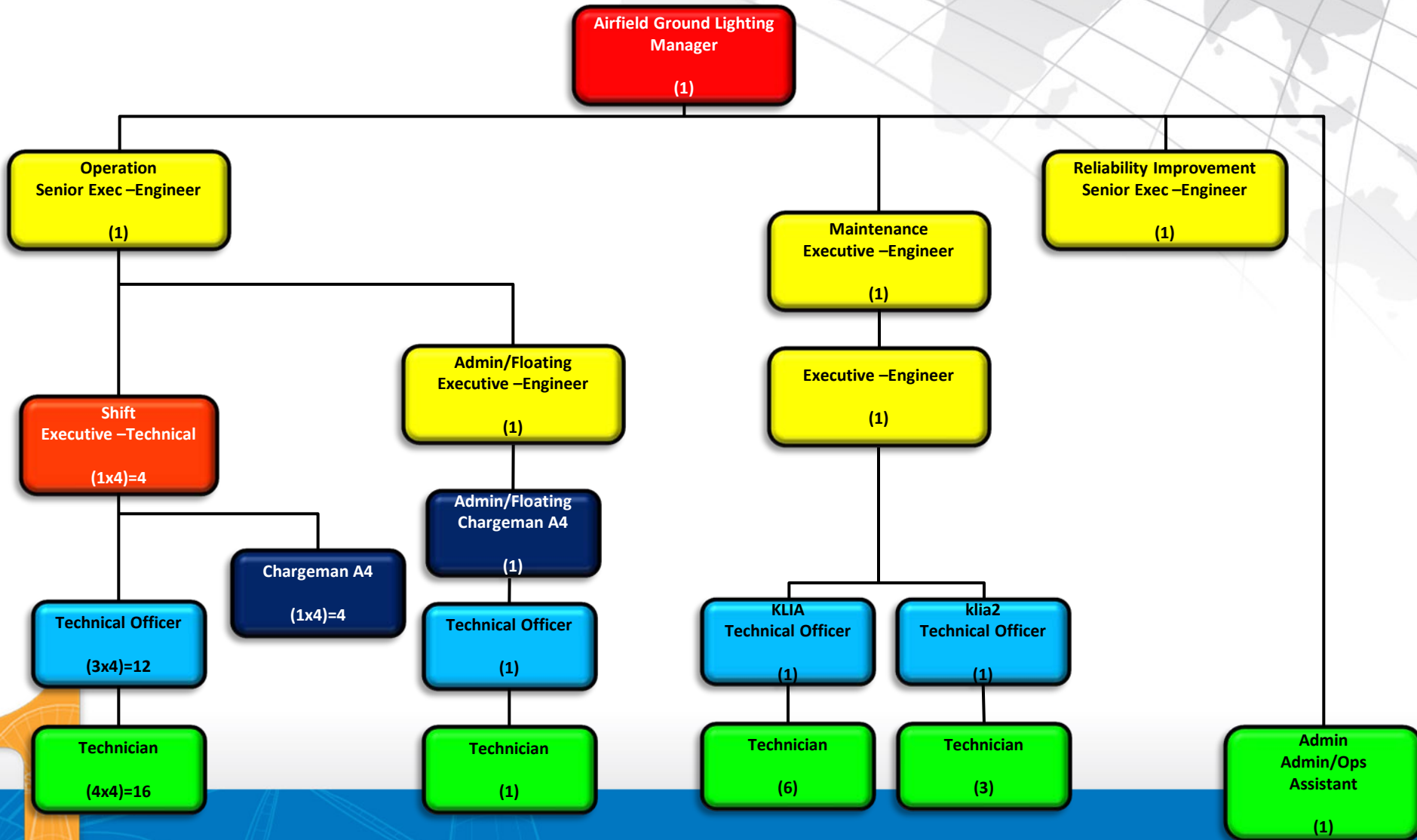
- MTB (241,000 SQM)
- Contact Pier (95,000 SQM)
- Satellite (143,404 SQM)



CHECK IN COUNTER

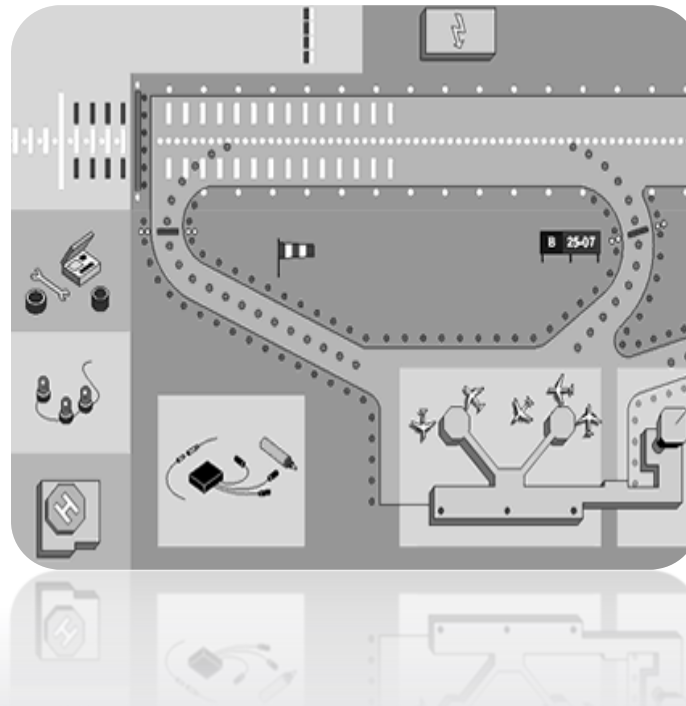
- 6 Check In Island
- 144 Counters for Int. Dprt & 72 Counters for Dom. Dprt

AGL UNIT ENGINEERING STRUCTURE



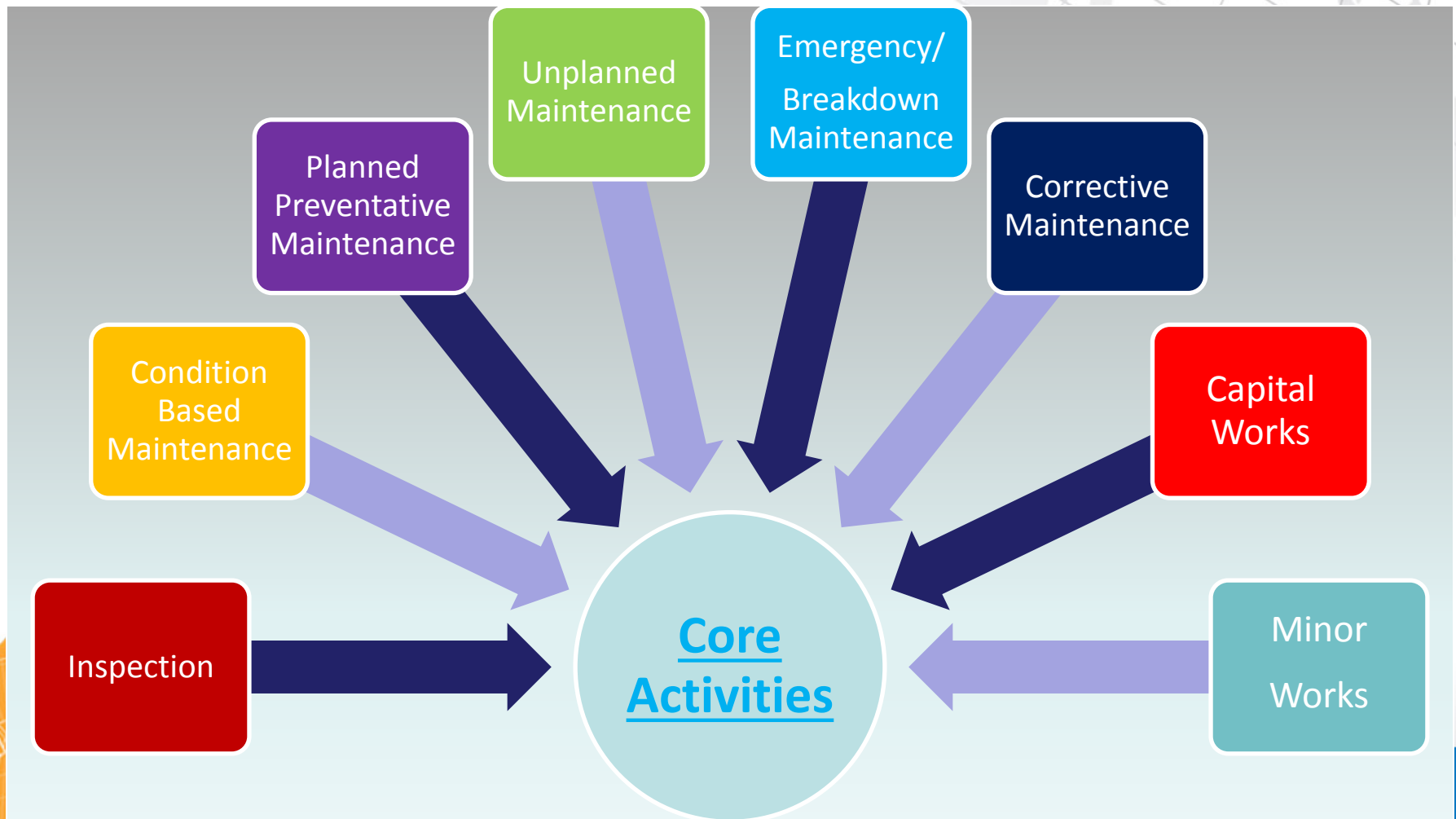
INTRODUCTION

At the end of the briefing participant will be able to know and understand what is AGL KLIA unit core activities and operations all about.



CORE ACTIVITIES

The objective is meeting the Customer requirements with the priority on Continuous Improvement



SCOPE OF SERVICE

This scope for operation and maintenance services of KLIA AGL system are **managed by KLIA AGL Unit.**






The requirements specified are aimed primarily at **meeting the contractual obligations** of the KLIA Operation and **achieving customer satisfaction** by preventing non-conformity with regard to the operation and maintenance services specification.

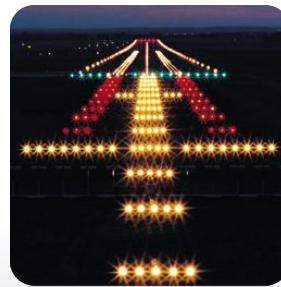


SCOPE OF OPERATION AND MAINTENANCE SERVICE

LIGHT FITTINGS




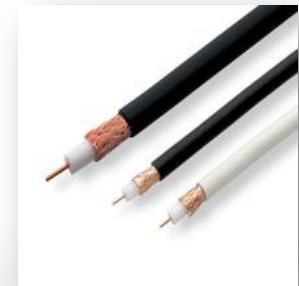
-  Fittings cleaning
-  Replacement faulty lamps
-  Fittings alignment



CABLES



-  Insulation Resistance Measurement
-  Ground Resistance Measurement



SCOPE OF OPERATION AND MAINTENANCE SERVICE

- Electrical system maintenance
- A/C maintenance
- Replenish fuel tank
- Maintain generator set
- Maintain CO2 system

SUBSTATION



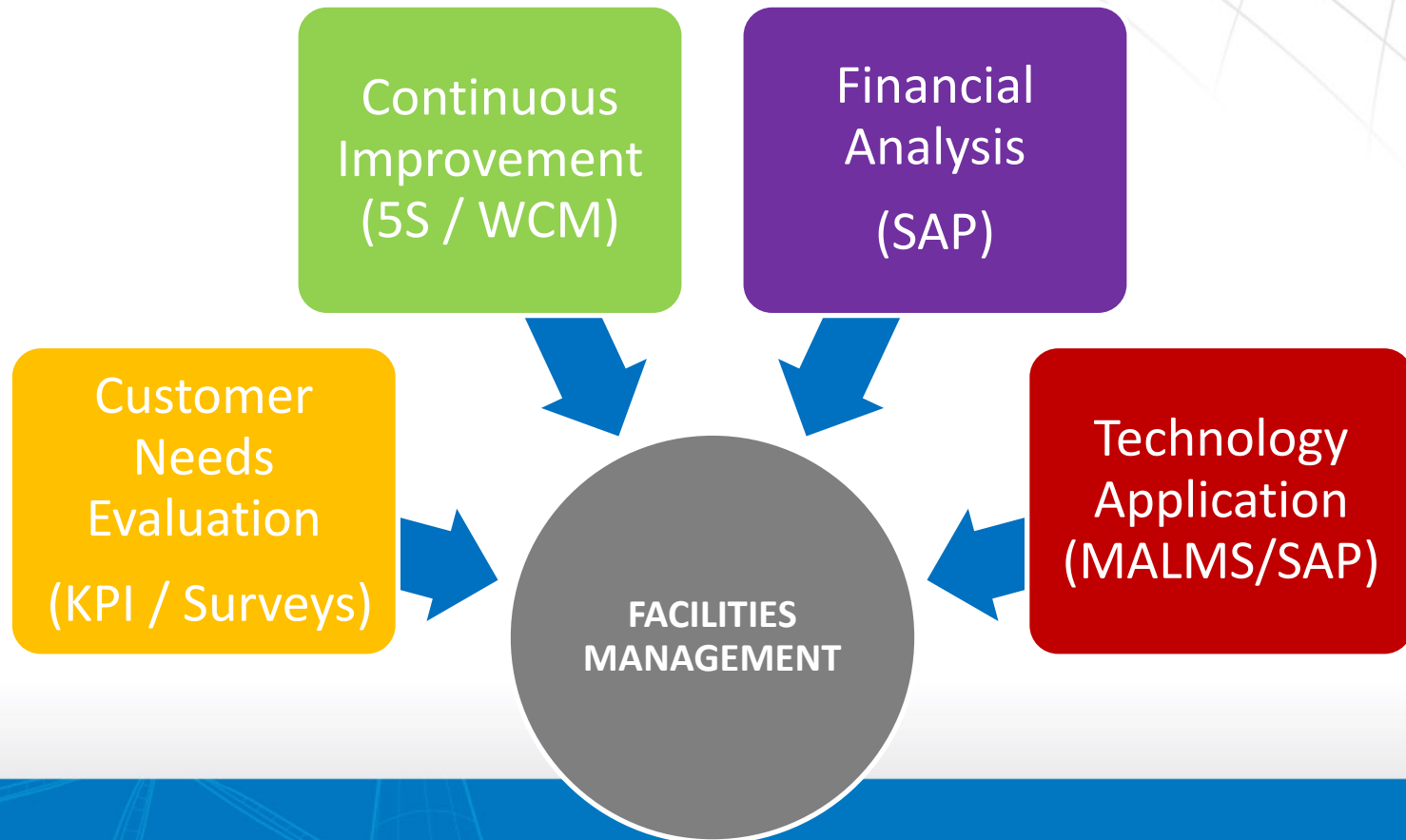
- Maintain and replenish consumable items (i.e. printer paper, cartridges)
- Maintain Video Display Unit (VDU)
- Maintain/calibrate stopbar sensors

CMS



FACILITIES MANAGEMENT

Processes to ensure that the services provided is effective to support the overall airport operations in supporting and contributing to the objective of the company



KNOWLEDGE DEVELOPMENT AND ENHANCEMENT

Training provision based on the gap exist in yearly performance appraisal.

Competency enhancement through oversea training by the manufacturer for executives

KNOWLEDGE DEVELOPMENT

Exposure to the staffs during SIRIM (ISO 9001:2008, ISO 14001 - Environment & ISO 18001 – Safety and Health) audit and DCA audit

Chargeman training and examination arrangement

AGL - Maintenance

maintenance

- **24 hours** day to day Operation and Maintenance
- Lighting and signage on approach, apron, taxiways and runways

maintenance

- Maintain **5 units of substations -128 numbers of circuits**
- Comprise **4 groups** of staff which working on **Shift** and **1 group Office Hour**

maintenance

- Shift personnel as **front-liner**, carried out schedule maintenance, control and monitor all facilities via **Maintenance Working Position (MWP)**
- Office Hour personnel focused on primary cable maintenance

AGL - Maintenance

MONTHLY

- 750 KVA Generator
- 300 KVA Generator (UPS) and Battery bank
- Constant Current Regulator, Transformer Module
- Air-conditioning, Fire Protection
- All inset and elevated fittings
- Control and Monitoring lamps via MWP
- 5 nos. 11kV Substation – LV



6 MONTHLY

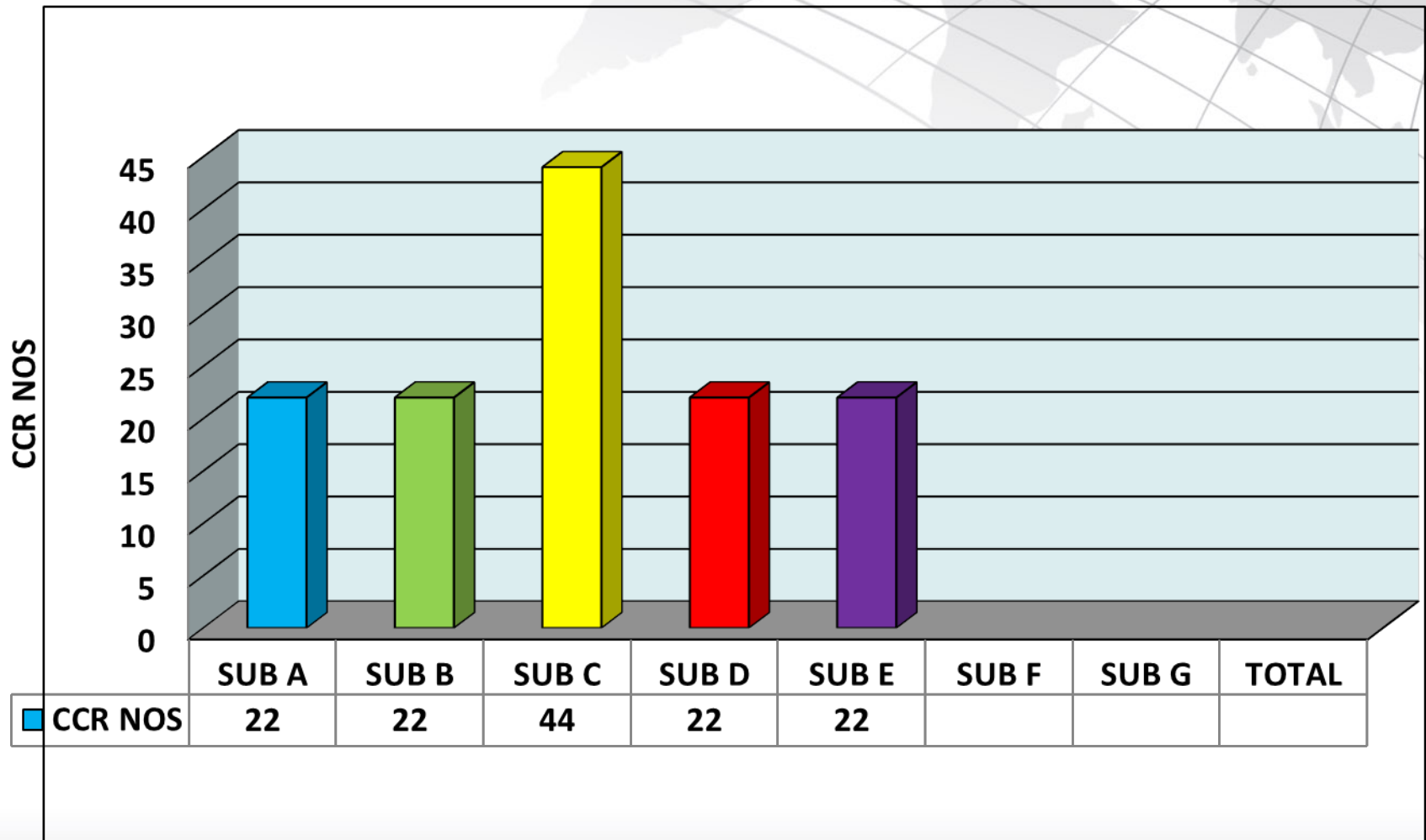
- Movement Sensor
- Primary Cable Insulation Test

18 MONTHLY

- Low Voltage (LV) Maintenance at all Substations

2. CONSTANT CURRENT REGULATORS (CCR)

CONSTANT CURRENT REGULATORS (CCR)



CONSTANT CURRENT REGULATORS (CCR)



Honeywell



ADB
Airfield Solutions



HONEYWELL



ADB



? NOS



? NOS



YEAR
PURCHASED
(1997)



YEAR
PURCHASED
(2013)



CONSTANT CURRENT REGULATORS (CCR)



AGL CCR Cabinet

CONSTANT CURRENT REGULATORS (CCR)

- During any period of Cat I operations shall have its objective that all:
 - And that in any event at least:

- Approach Lighting System
- Runway Edge
- Runway Threshold
- Runway End

are **SERVICEABLE**

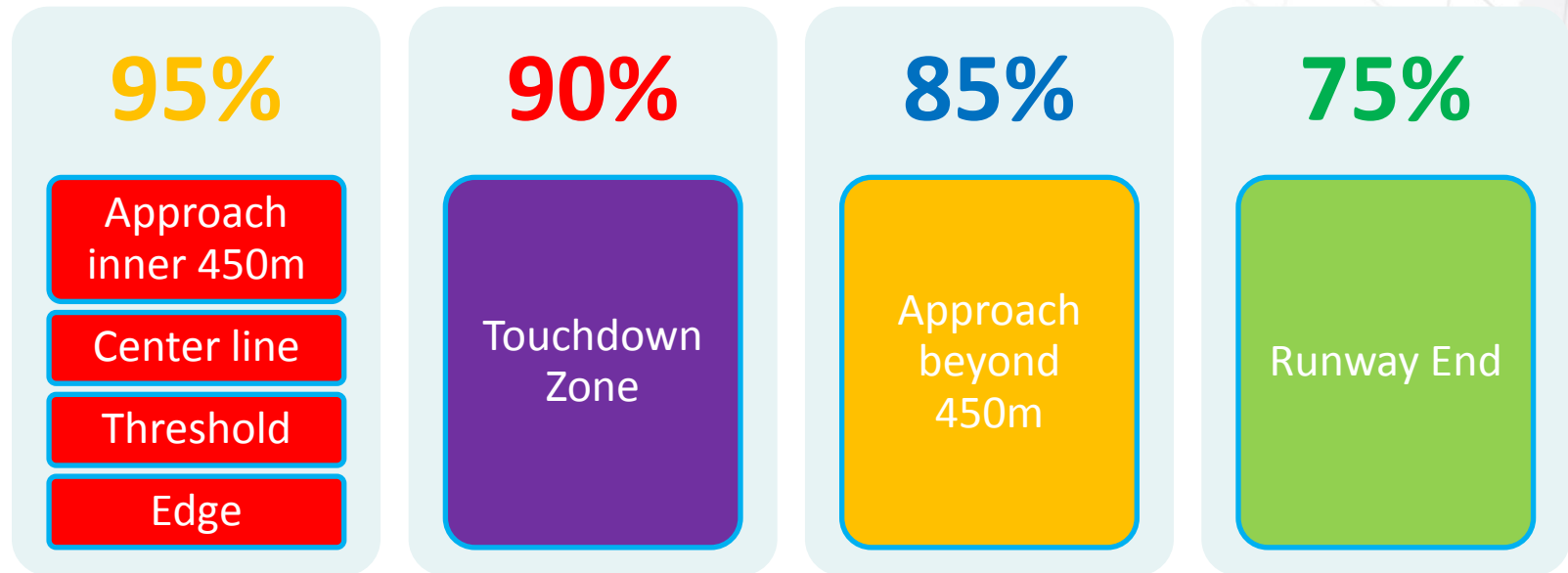
85%

Serviceable

(Annex 14 – 10.4.10)

CONSTANT CURRENT REGULATORS (CCR)

- During any period of Cat II operations shall have its objective that all:
- And that in any event at least:

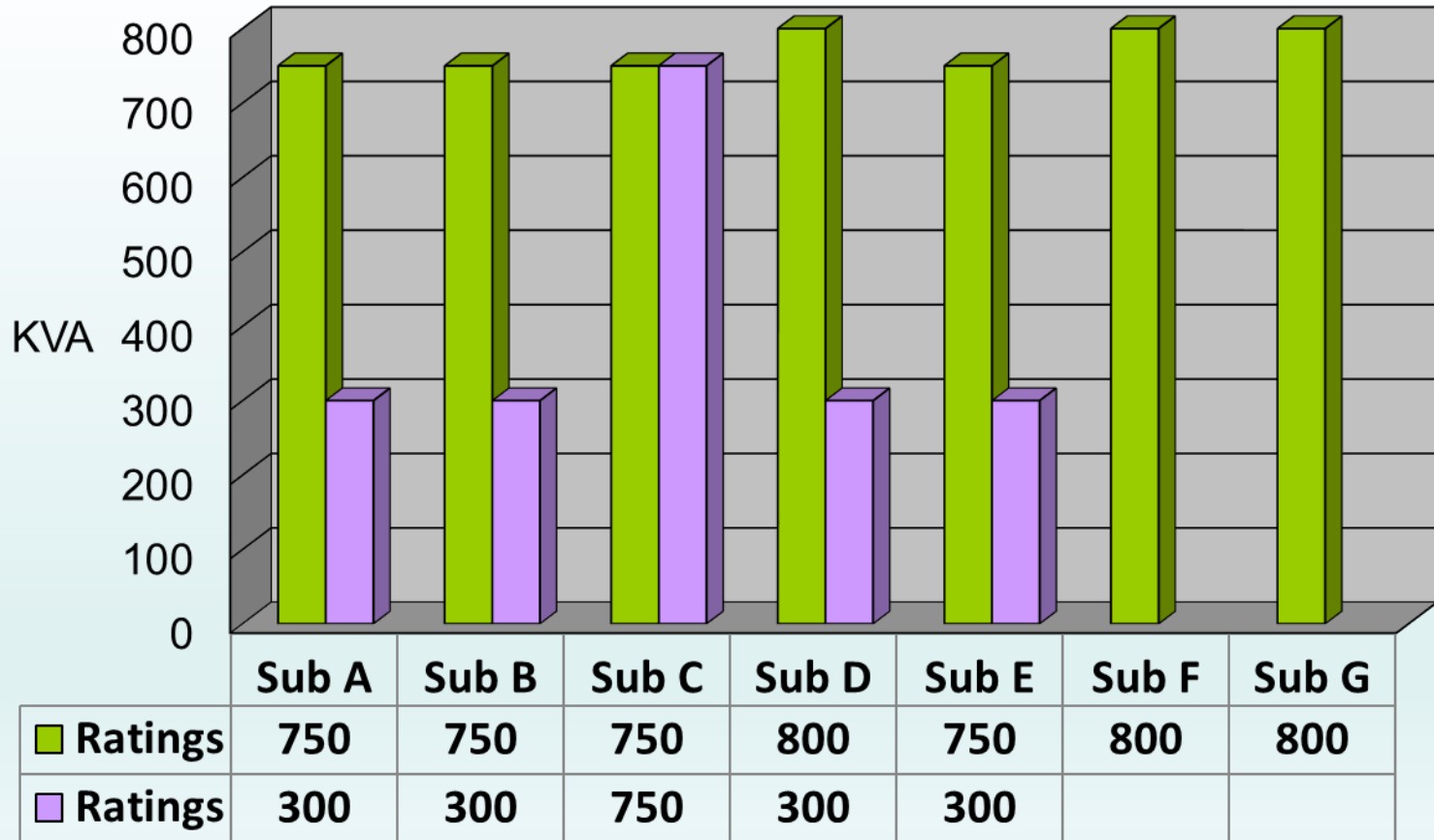


Serviceable

(Annex 14 – 10.4.7)

3. GENERATOR SET

GENERATOR SET FOR KLIA



GENERATOR SET

SUB A

- Kohler (750 KVA) – 1 unit
- Scania (300 KVA) – 1 unit

SUB B

- Kohler (750 KVA) – 1 unit
- Scania (300 KVA) – 1 unit

SUB C

- Kohler (750 KVA) – 1 unit
- Kohler (750 KVA) – 1 unit

SUB D

- Kohler (800 KVA) – 1 unit
- Scania (300 KVA) – 1 unit

SUB E

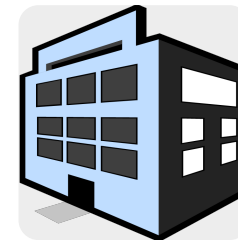
- Kohler (750 KVA) – 1 unit
- Scania (300 KVA) – 1 unit

SUB F

- Kohler (800 KVA) – 1 unit

SUB G

- Kohler (800 KVA) – 1 unit

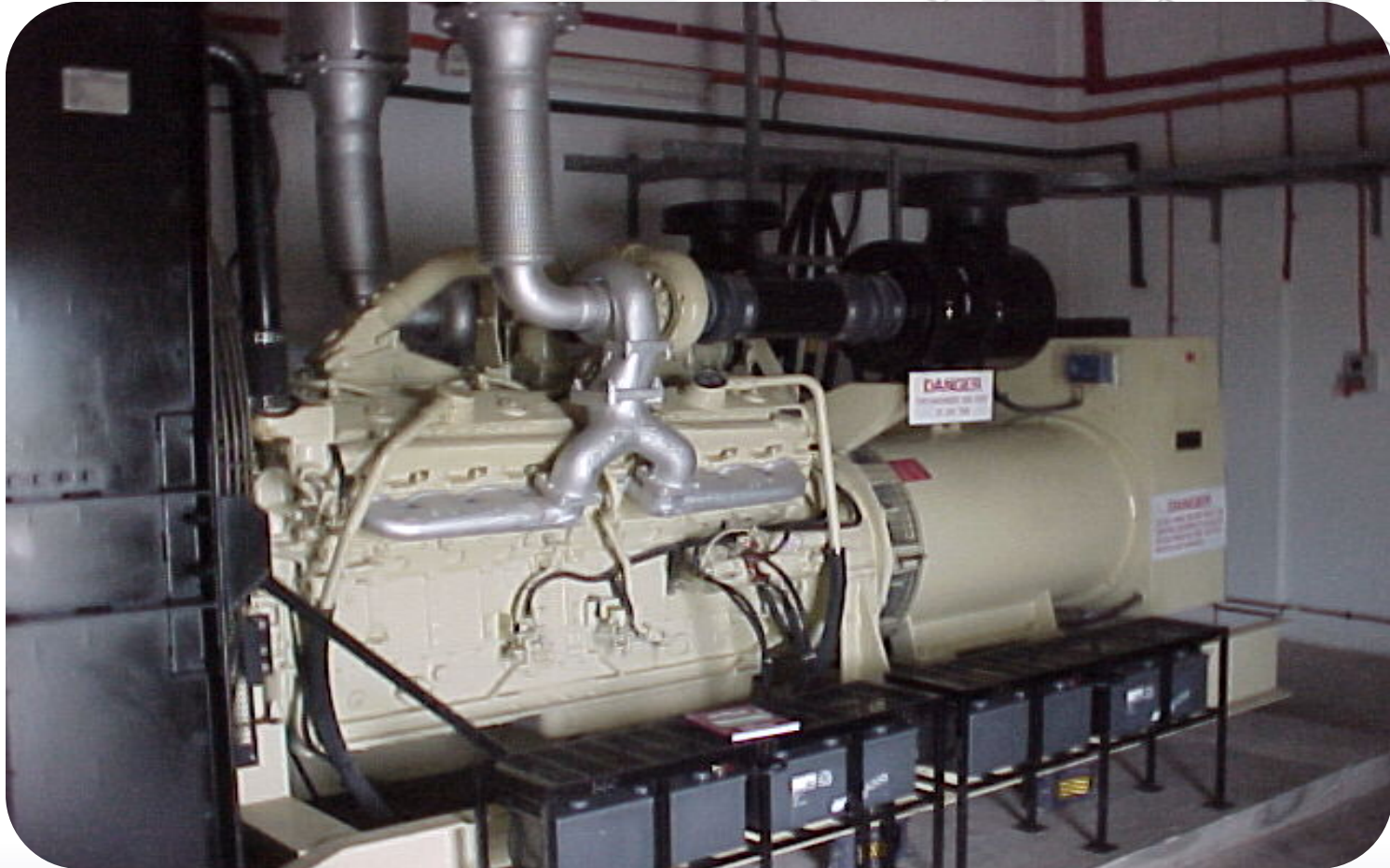


7



12

750KVA Standby Generator



GENERATOR SET REQUIREMENTS

- Secondary Power Supply Requirements for Precision Approach Category II/III:

- Runway Edge
- Approach – Other parts

- ❖ Approach – Inner 300m
- ❖ Runway Threshold
- ❖ Runway End
- ❖ Runway Centreline
- ❖ Runway Touchdown zone
- ❖ All Stopbars

- Maximum Switch-over time



1 Second



15 Seconds

(Annex 14 – Table 8-1)

3. AIRFIELD LIGHTING SYSTEM

Airfield Lighting System

Runway Lights

- 2 systems, 32L14R and 32R14L

CAT II Approach Lights

- 4 systems, 32L,14R,32R and 14L

Taxiway & Cross Taxiway Lights

- 4 parallel taxiways, 4 cross taxiways
and 125 taxiways

Precision Approach Path Indicator Lights (PAPI)

- 4 systems

Airfield Lighting System

Guidance Signs (MAGS)

- 440 sets

Constant Current
Regulators (CCR)

- 128 circuits

Single Lamp Control
and Monitoring System
(SLCMS)

- 15,000 lamps

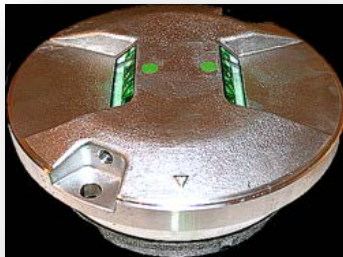
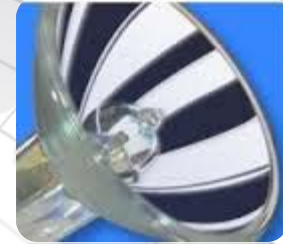
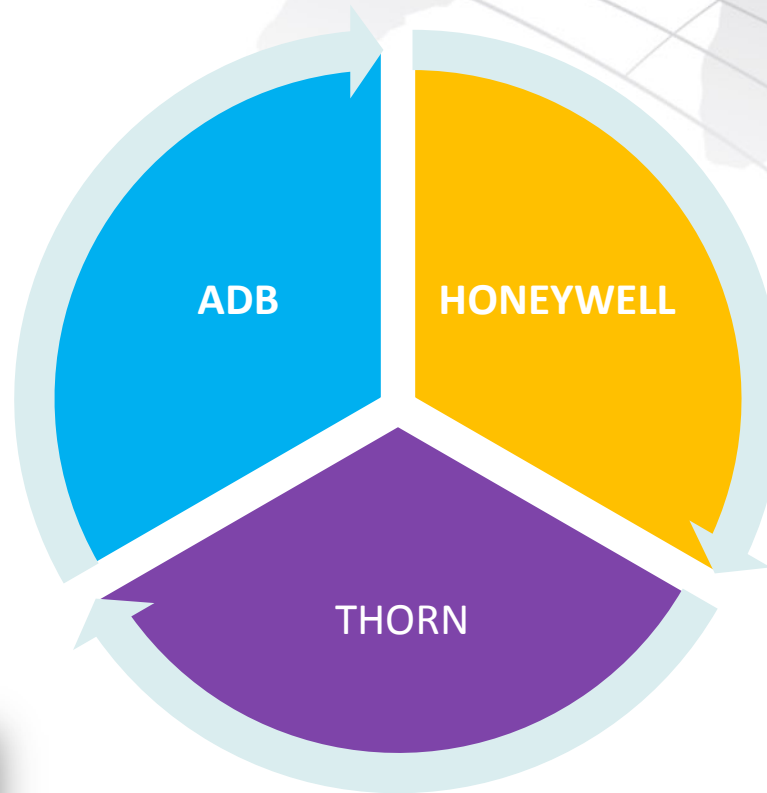
Miscellaneous Lights

- 4 illuminated wind directional indicator and 22 traffic lights.

Airfield Lighting System



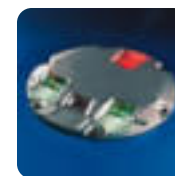
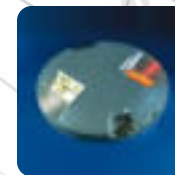
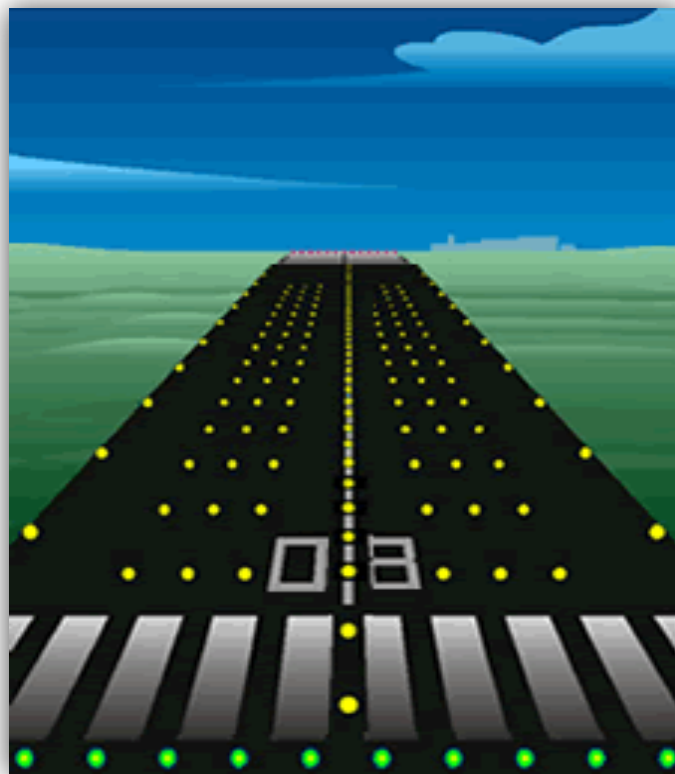
ADB
Airfield Solutions



THORN
LIGHTING PEOPLE



Runway Lightings



Runway Lightings

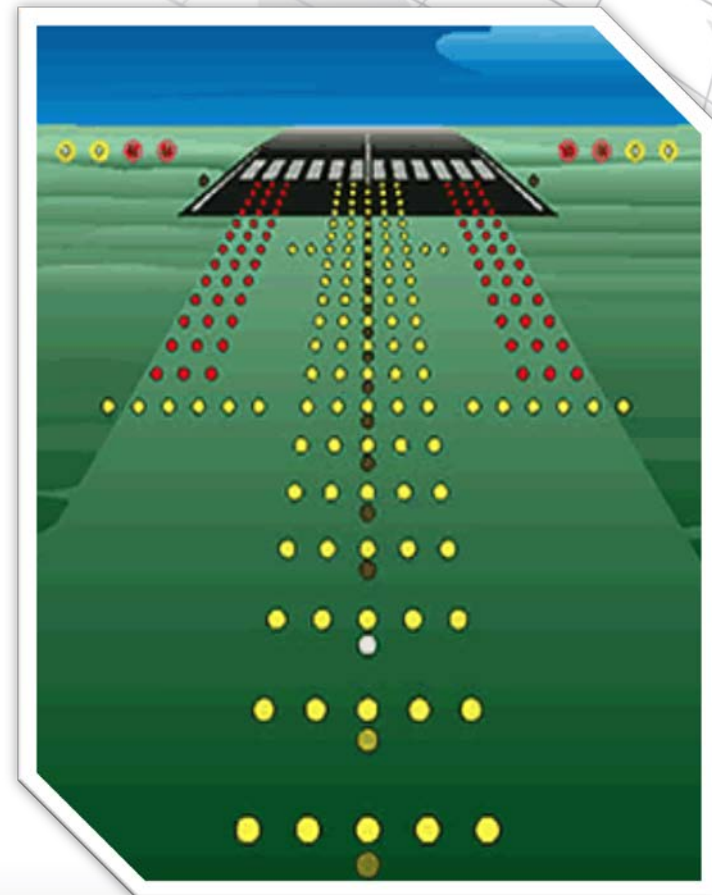
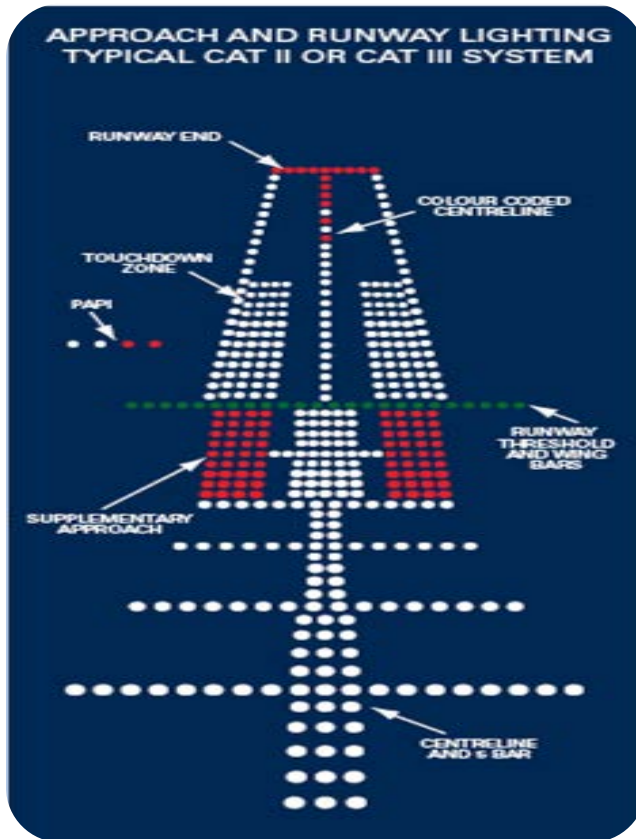


Runway Center, Touch Down Zone, Runway Edge Light & Taxiway Center



Threshold Light & End Lights

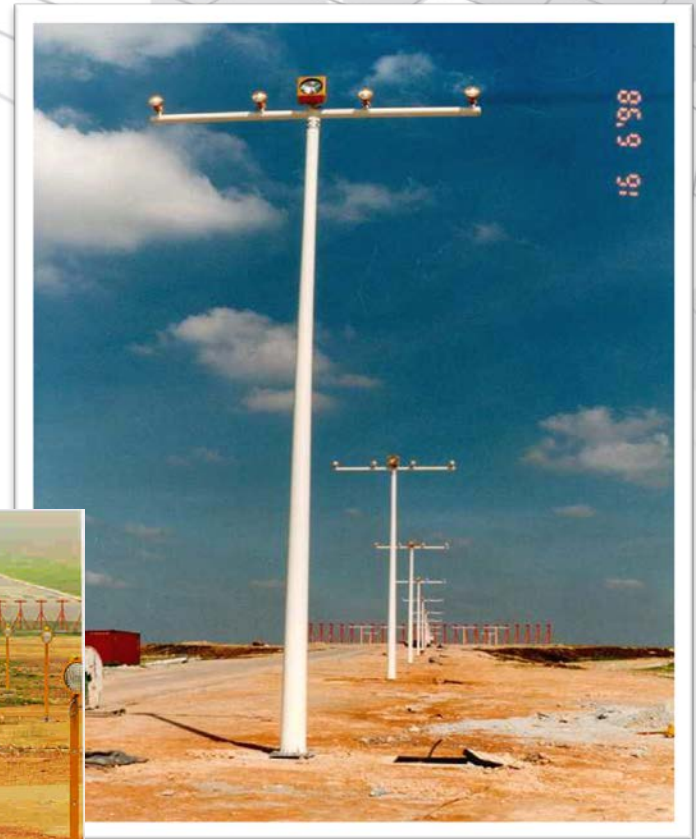
Approach Lightings



Approach Lightings



Approach 32R – CAT II System



Approach 14R – CAT II System

Taxiway Lightings



**Taxiway Edge &
Taxiway Center**



PAPI



Miscellaneous Fittings



Traffic / Stop-Bar Guard Lights



Illuminated Wind Direction Indicator

Movement Area Guidance Sign



Mandatory Sign



Information Sign – Location and Direction

4. CONTROL & MONITORING SYSTEM

Control & Monitoring System

Individual Lamp Control via Power Line Control Signal

Pre-defined Runway Lighting Selection

Selectable uni-directional or bi-directional taxiway lighting as required

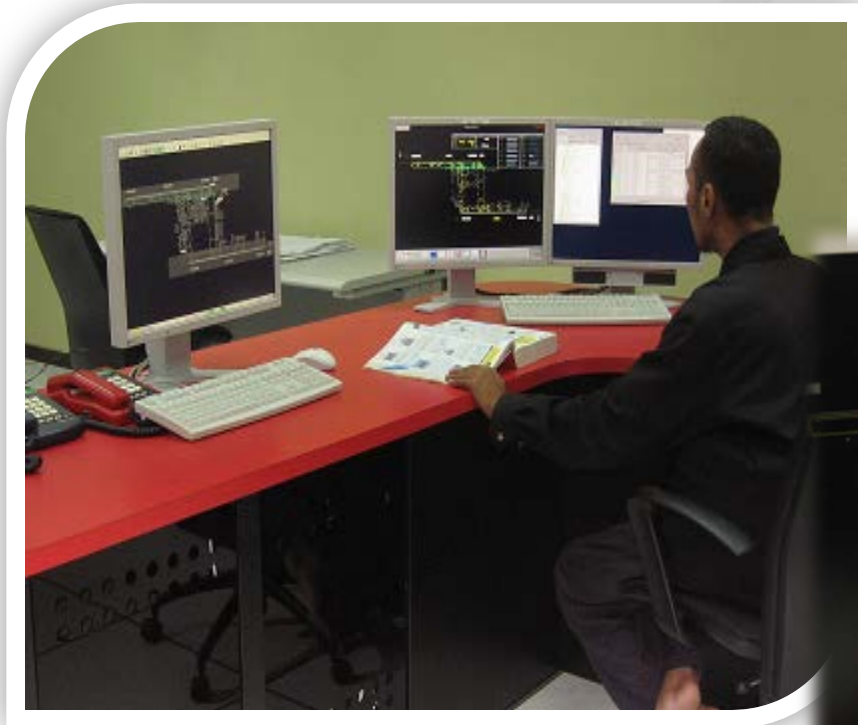
Fast Reaction Panel (FRP) and Touch Screen Input Devices

Single Lamp Failure Monitoring

Automatic Monitoring and Reporting System and Element Failures

Direct Individual Unique Identification of Failed Equipment or Element

Control & Monitoring System

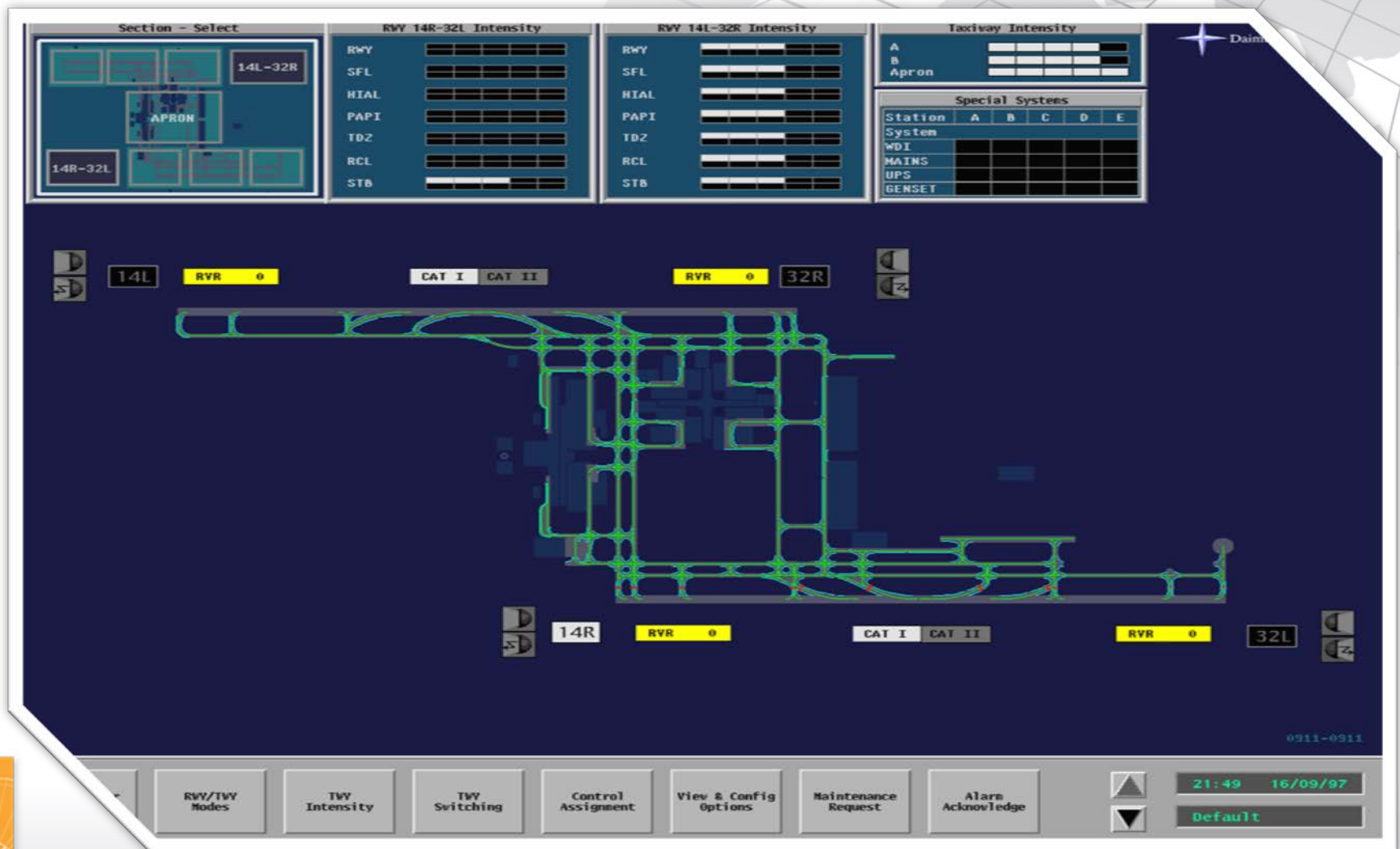


Lamp Control & Monitor - Tower



Control Tower - Controller Working Position

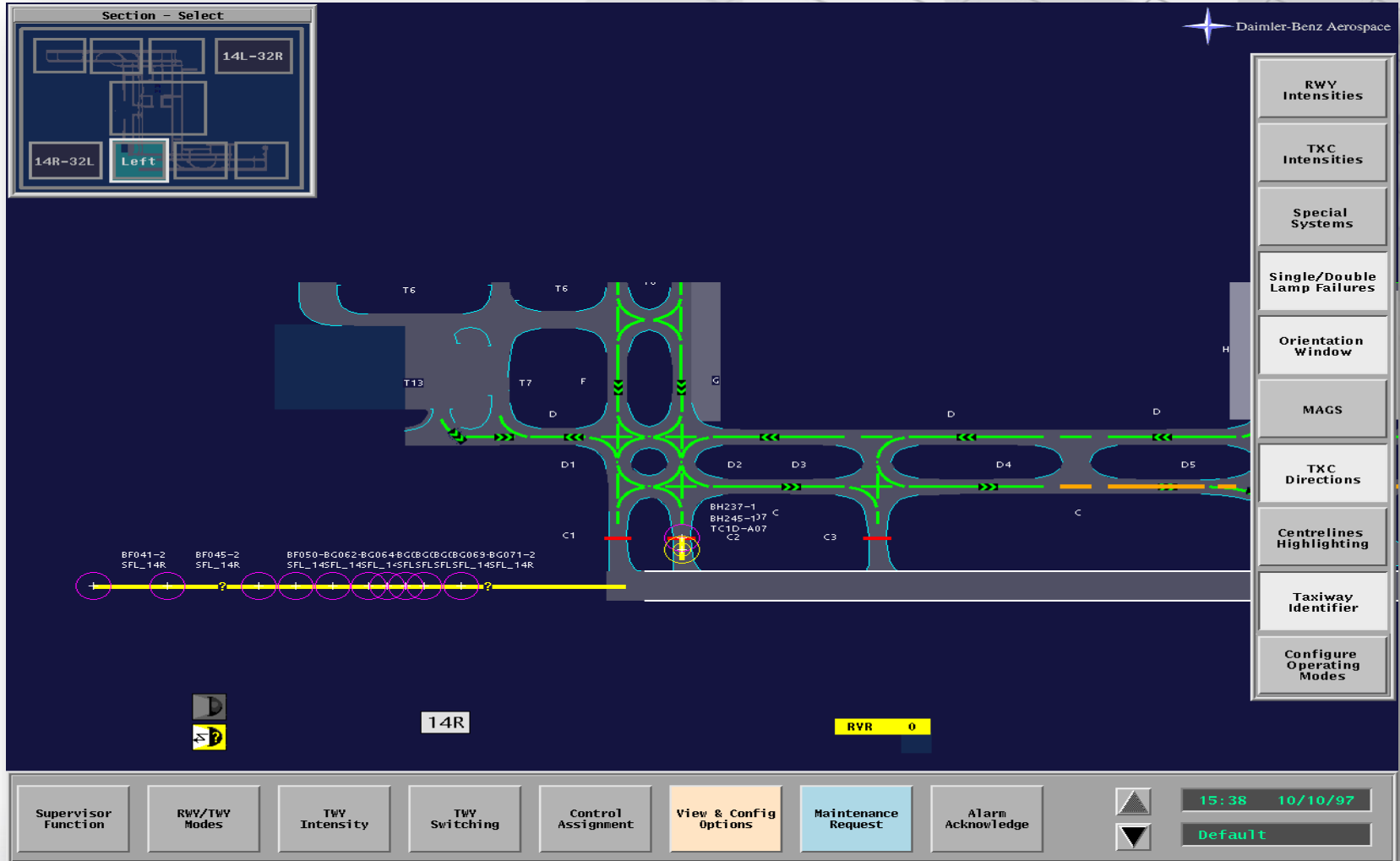
View of the Controller Working Position (CWP) Screen



The screenshot displays the Controller Working Position (CWP) interface, which is used for managing airport operations. The interface is divided into several sections:

- Section - Select:** A panel on the top left showing a map of the airport with various sections highlighted, including '14L-32R' and 'APRON'.
- RWY 14R-32L Intensity:** A panel on the top middle-left showing intensity settings for Runway 14R-32L, including RWY, SFL, HIAL, PAPI, TDZ, RCL, and STB.
- RWY 14L-32R Intensity:** A panel on the top middle-right showing intensity settings for Runway 14L-32R, including RWY, SFL, HIAL, PAPI, TDZ, RCL, and STB.
- Taxiway Intensity:** A panel on the top right showing intensity settings for Taxiway A, B, and Apron.
- Special Systems:** A table on the top right showing the status of various special systems across different stations (A, B, C, D, E).
- Central Display:** A large central area showing a detailed layout of the airport's runways and taxiways. It includes labels for '14L', '14R', '32R', and '32L', along with 'RVR 0' (Runway Visual Range) and 'CAT I CAT II' (Category I and II) indicators.
- Bottom Panel:** A row of control buttons including 'RWY/TWY Modes', 'TWY Intensity', 'TWY Switching', 'Control Assignment', 'View & Config Options', 'Maintenance Request', and 'Alarm Acknowledge'. It also features a digital clock showing '21:49 16/09/97' and a 'Default' button.

Zoom-in view of a section on the Controller Working Position (CWP)



Section - Select

14L-32R
14R-32L
Left

Daimler-Benz Aerospace

RWY Intensities
TXC Intensities
Special Systems
Single/Double Lamp Failures
Orientation Window
MAGS
TXC Directions
Centrelines Highlighting
Taxiway Identifier
Configure Operating Modes

T6 T6 T7 T7 T13 T7 F G D D D D D1 D2 D3 D4 D5 C1 C3 C2

BH237-1
BH245-117
TC1D-A07
C2

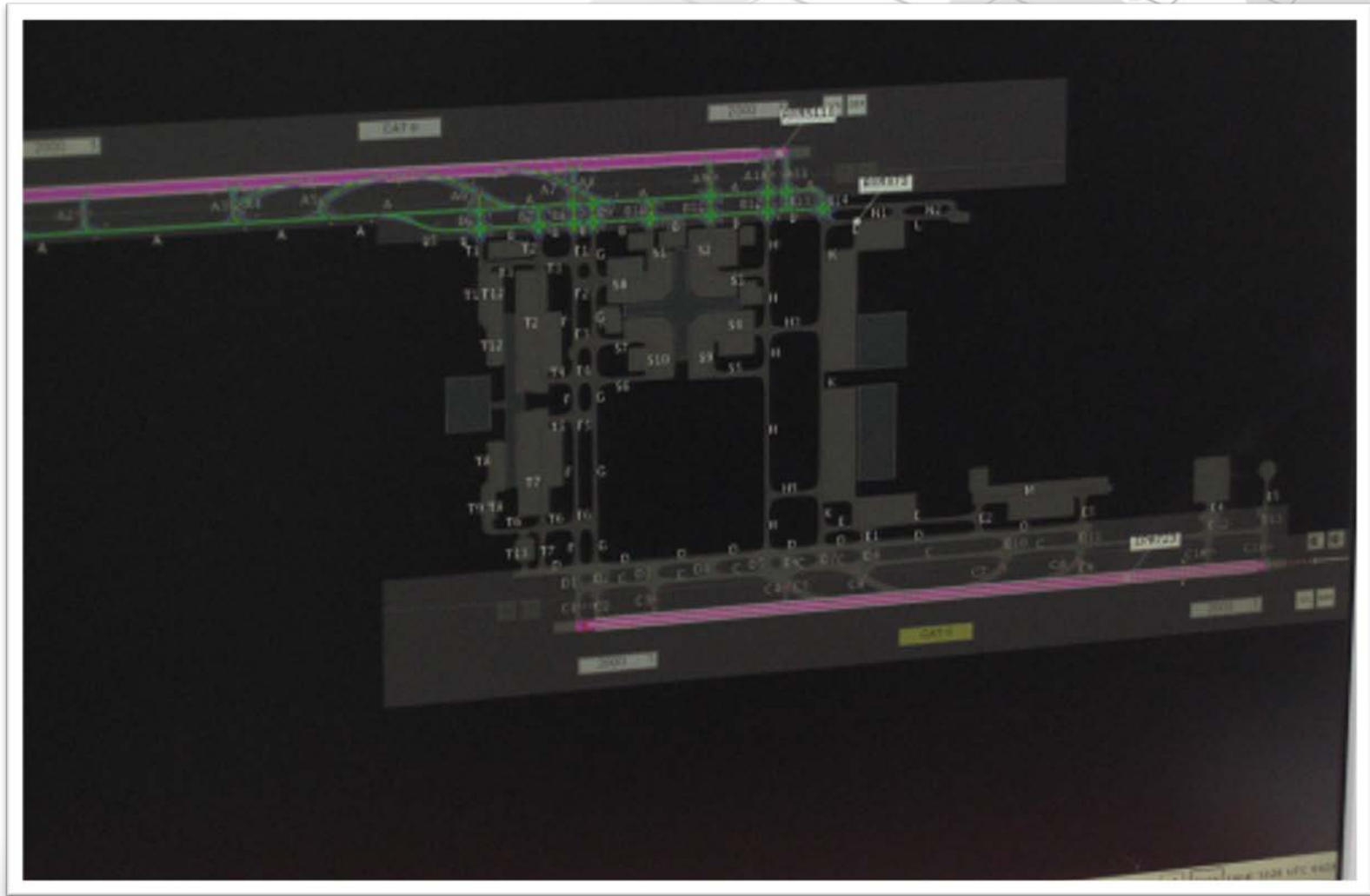
BF041-2 SFL_14R
BF045-2 SFL_14R
BF050-BG062-BG064B GEBGEB GGBG069-BG071-2 SFL_14SFL_14SFL_14SFL_14SFLSFLSFLSFL_14SFL_14R

14R RVR 0

Supervisor Function RWY/TWY Modes TWY Intensity TWY Switching Control Assignment View & Config Options Maintenance Request Alarm Acknowledge

15:38 10/10/97
Default

View of the Controller Working Position (CWP) Screen



5. POWER SYSTEM

AGL - Power System

5 nos. Substations:

4 nos. of 400m²
(footprint) + 1 no. of
570m² (footprint)

5 lots of Standby Generating System:

750KVA x 1
nos. x 4
substations +
750KVA x 2
nos. x 1
substations

5 lots of HV/LV Systems:

Switch Gear: 11KV x
5 substations
Transformer: 630KVA
x 2 nos. x 4
substations +
1600KVA x 2 nos. x 1
substations



4 lots of Uninterrupted Power Supply System Dynamic Generator Set:

350KVA x 1
nos. x 4
substations
Battery
Bank: 257 nos.
x 2 Banks
(Total
490AH) x 4
Substations

Back Indication Panel - 5 sets
Other related Distribution Boards and
Cables
22,000L Fuel Tank System - 5 sets

Typical Substations



Constant Current Regulator & Transformer Module



Transformer Module – 25KV



**Transformer Module & Constant Current Regulator
Panels**

LV Panel & ACB



350kVA UPS System



UPS Control Panel



Battery Bank



UPS Generator

5. MOBILE AIRFIELD LIGHTING MONITORING SYSTEM (MALMS)

- MALMS – Mobile Airfield Lighting Monitoring System.
- MALMS provides accurate photometric measurement of both inset and elevated Aerodrome Ground Lighting (AGL).
- Developed by Tailor Made Systems Ltd. following an extensive research program commissioned by the UK Civil Aviation Authority and Ministry of Defense.

MALMS

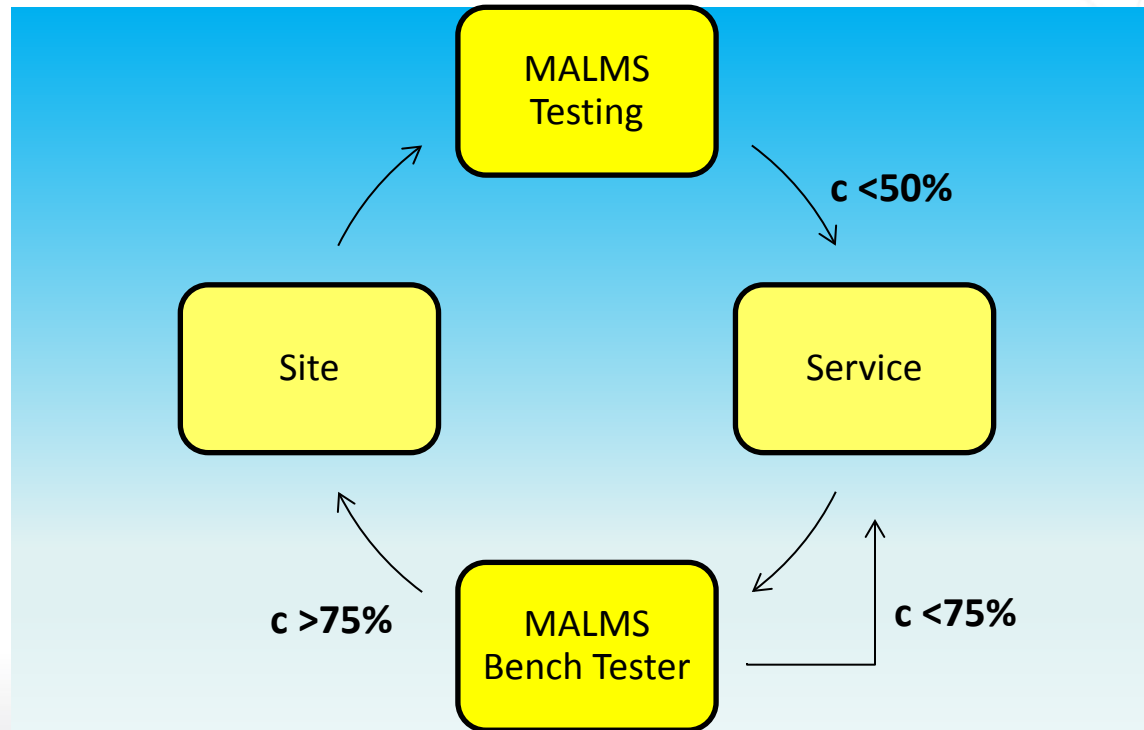
- Comply beam intensity and orientation defined by ICAO standards.
- To pinpoint lighting degradation problems.
- New AGL systems are fully compliant with the ICAO standard (commissioning or refurbishment projects).
- Help effectively target maintenance work.

- MALMS Testing

- On site
- Frequency: Quarterly

- MALMS Bench Tester

- Located at AGL Store
- Frequency: After fitting servicing



c = Candela





MALMS Front view





A word cloud centered on the phrase "thank you" in red. The word "thank you" is the largest and most prominent. Surrounding it are numerous other words in various colors and sizes, representing the word for "thank you" in many different languages. Some of the visible words include: danke (German), 謝謝 (Japanese), ngiyabonga (Zulu), teşekkür ederim (Turkish), gracias (Spanish), obrigado (Portuguese), merci (French), and many others in various scripts and colors like blue, green, purple, and orange.