

Narita International Airport Aeronautical Ground Lighting Operation & Maintenance



Ryo Mizushima

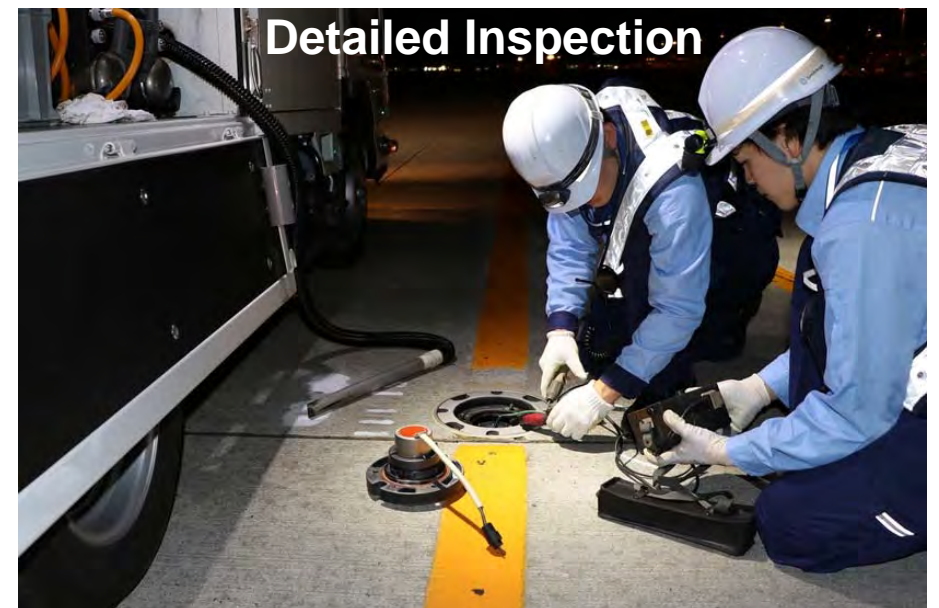
**Visual Navigation Aids
Airfield Maintenance Department
Airport Operations Division
Narita International Airport Corporation**

Narita International Airport



Maintenance of Aeronautical Ground Lighting

- **Patrol Inspection**
Daily visual inspections
- **Regular Inspection**
Scheduled inspection of individual lights
- **Detailed Inspection**
Scheduled maintenance
Replacement with serviced lights
Overhaul (dismantled and serviced at the Aeronautical Ground Lighting Maintenance Center)



Maintenance of Aeronautical Ground Lighting

Aeronautical Ground Lighting	Classification	Inspection period
REDL(In-pavement type) RCLL RTZL	Lens cleaning	Once a week
	Regular inspections	Once a month
	Detailed inspections	Every 6 months
REDL(Elevated type) ALS(Elevated type)	Regular inspections	Every 3 months
	Detailed inspections	Once a year
TCLL(Bulb type)	Regular inspections	Every 3 months
	Detailed inspections	Every 6 months
TCLL(LED type)	Regular inspections	Every 6 months
	Detailed inspections	Once a year
TEDL(Bulb type)	Regular inspections	Every 6 months
	Detailed inspections	Once a year
TEDL(LED type)	Regular inspections	Once a year
	Detailed inspections	Every 2 years

REDL : Runway edge light, RCLL : Runway center line light, RTZL : Runway touch down zone light

ALS : Approach light, TCLL : Taxiway center line light, TEDL : Taxiway edge light

Cleaning Lens of Aeronautical Ground Lighting

NAA developed its own Lens Cleaning Vehicle to clean the lens surface of aeronautical ground lighting efficiently.

Lens



Lens Cleaning Vehicle



Lens Cleaning

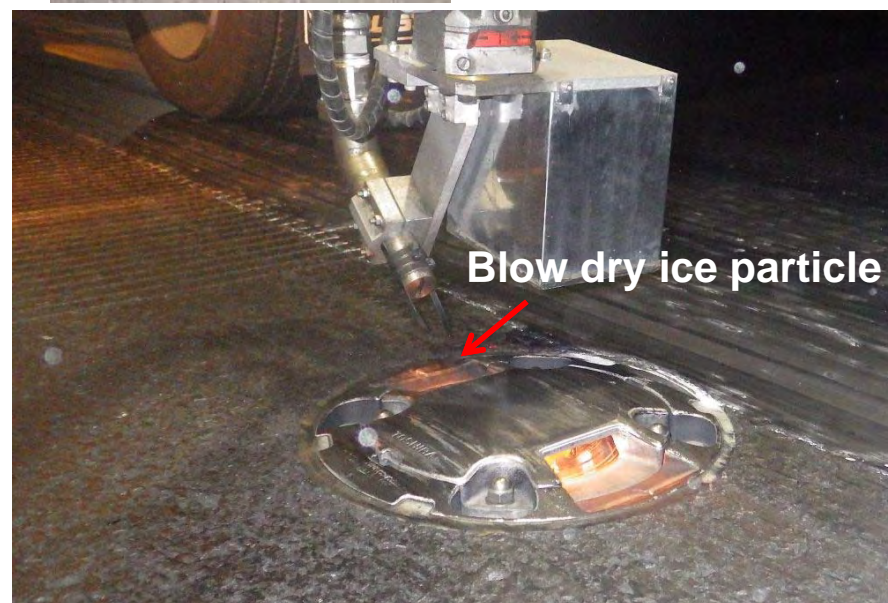
Cleaning Lens of Aeronautical Ground Lighting

NAA developed its own Lens Cleaning Vehicle to clean the lens surface of aeronautical ground lighting efficiently.

Lens



Lens Cleaning Vehicle



Lens Cleaning

Measuring Light Intensity and Distribution

NAA developed its own Aeronautical Light Measuring Vehicle to measure intensity and distribution of individual lights.



Moving Measurement



Standing Measurement

Aeronautical Ground Lighting Maintenance Center



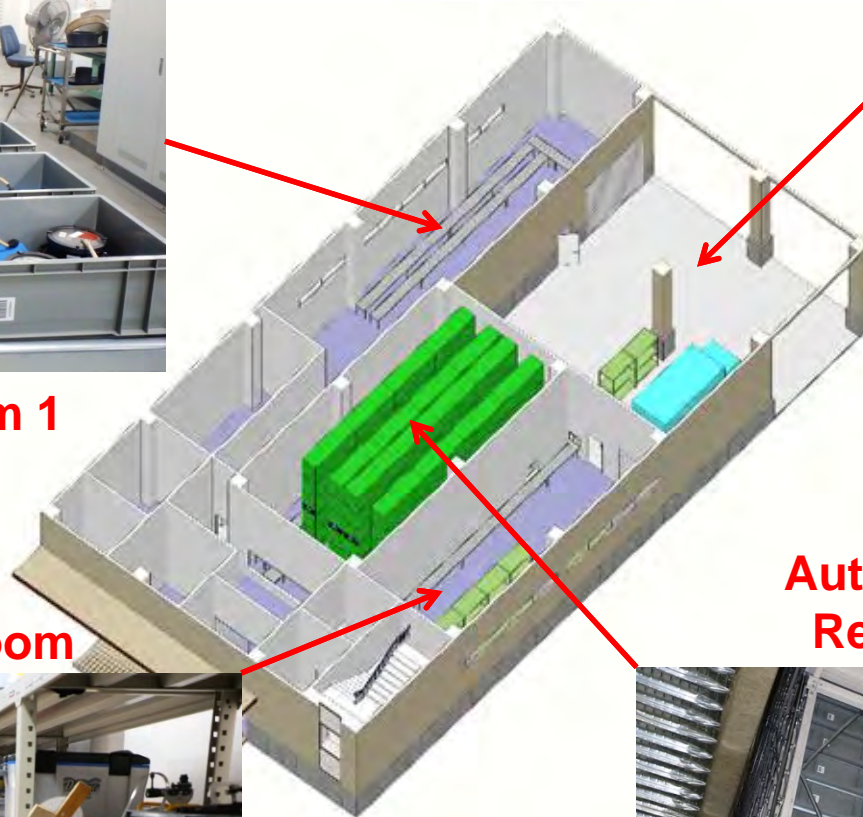
Aeronautical Ground Lighting Maintenance Center

Aeronautical Ground Lighting Maintenance Center



Maintenance Room 1

1st Floor

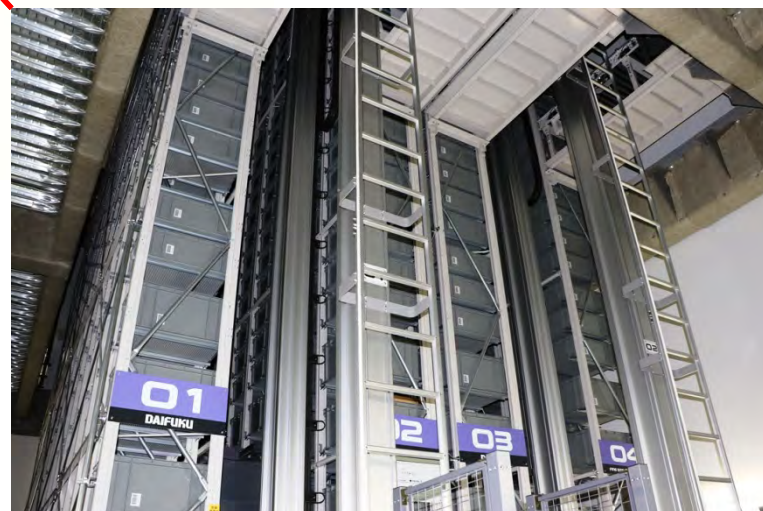


Parking

Tool & Instrument Room



**Automated Storage
Retrieval System**



Detailed Inspection of Aeronautical Ground Lighting

Light Fixture removed from Airfield



Light fixtures removed from the runways and taxiways are carried in the maintenance room 1. These are washed by the light fixture washing machine. High-pressure, hot water, temperature of 75 degrees Celsius, is sprayed surface and flange of light fixture. It takes about 3 minutes to wash each light fixture.



Light Fixture Washing Machine



Detailed Inspection of Aeronautical Ground Lighting

After Light Fixture washed

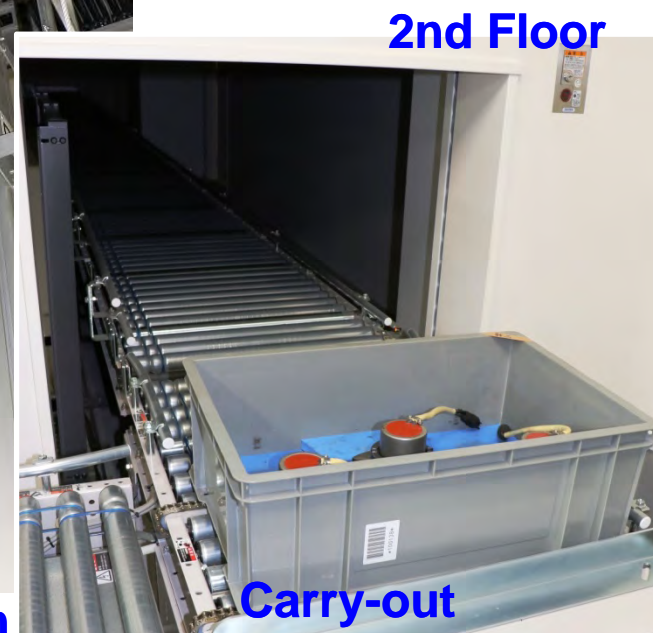


- All light fixtures are attached bar-code.
- Each light fixture's information is input into the warehouse management system.



Warehouse Management System

Detailed Inspection of Aeronautical Ground Lighting



Automated Storage Retrieval System

Aeronautical Ground Lighting Maintenance Center



2nd Floor

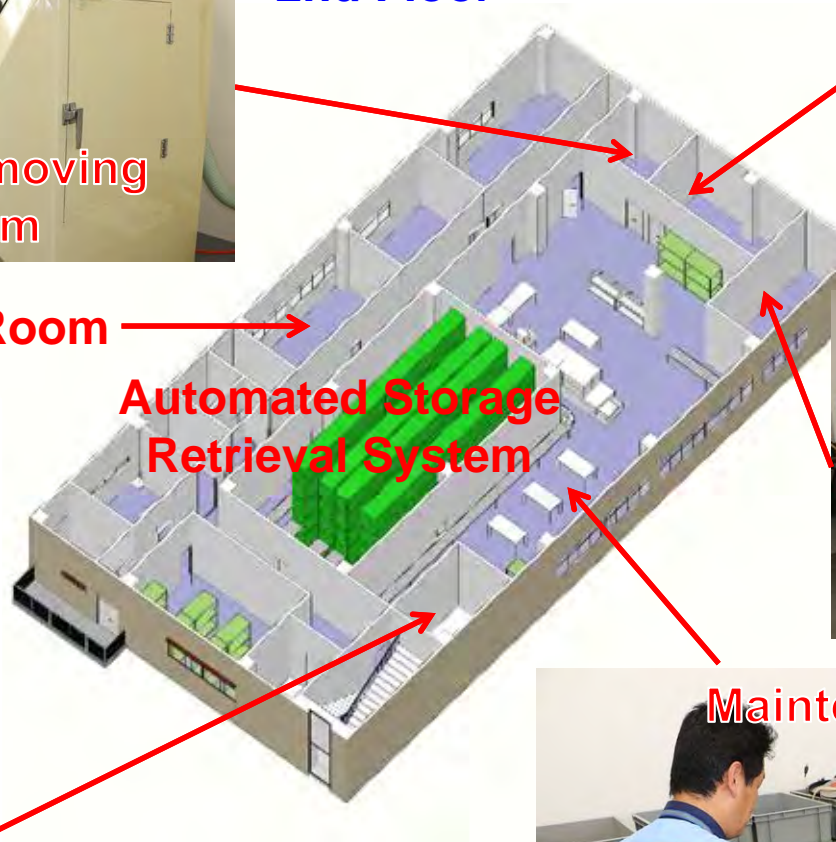


Testing Room

Automated Storage
Retrieval System

Workshop

Vertical Carrousel
Storage System

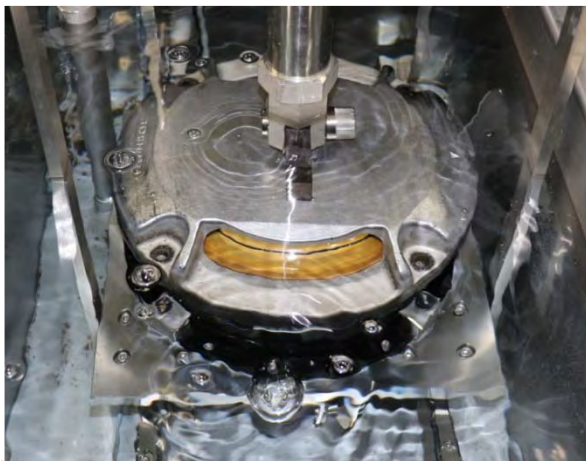
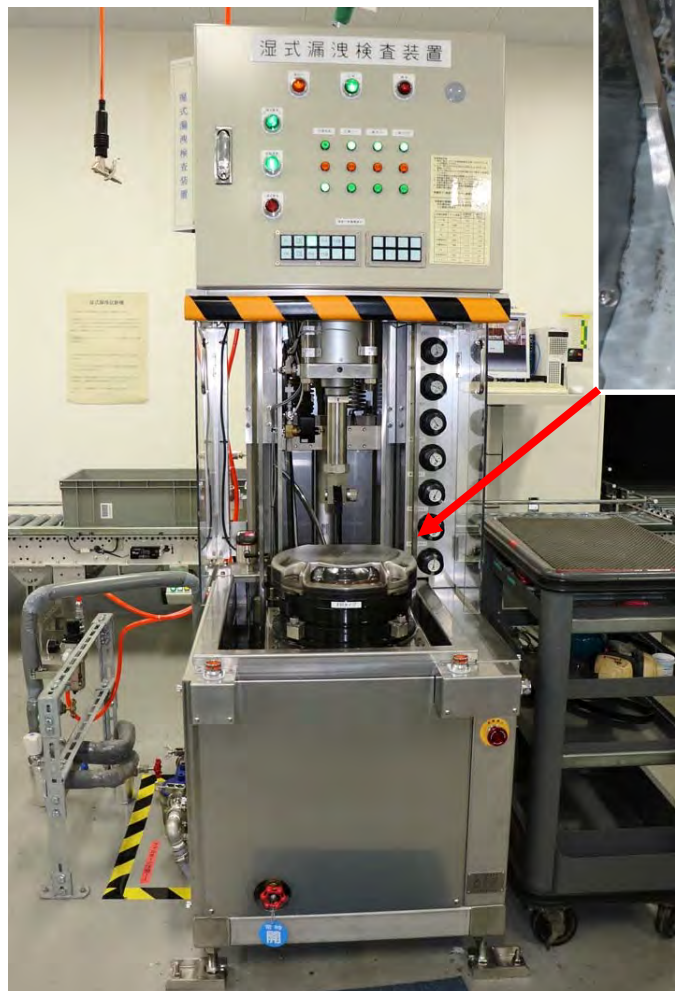


Detailed Inspection of Aeronautical Ground Lighting



Light fixtures are dismantled at the maintenance room 2, cleaned and rust is removed.

Detailed Inspection of Aeronautical Ground Lighting

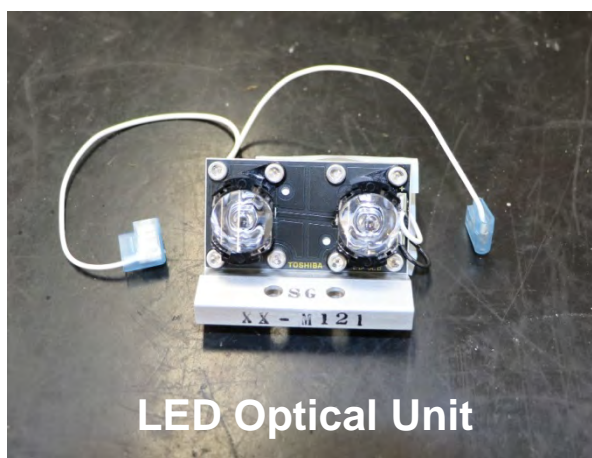


Wet Type Leakage Detector



Light Fixture Dryer

Detailed Inspection of Aeronautical Ground Lighting



Parts Inspection

Detailed Inspection of Aeronautical Ground Lighting



Vertical Carousel Storage System

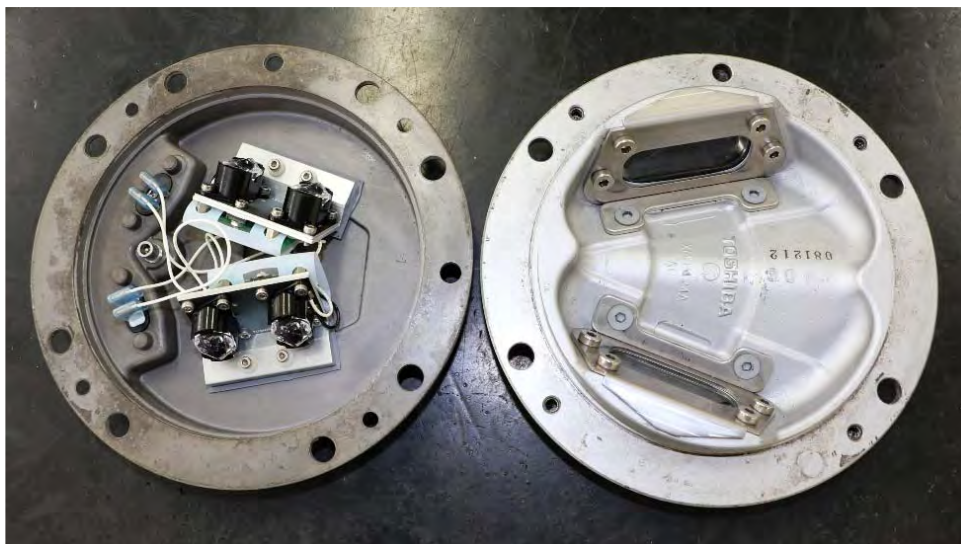
Components such as light bulbs, optical units, or filters are stored in the vertical carousel storage system which has 44 sections of shelving. Software automatically retrieves the items for picking.

Detailed Inspection of Aeronautical Ground Lighting



Cleans all of the component parts

Detailed Inspection of Aeronautical Ground Lighting



**LED type
Taxiway Centerline Light**

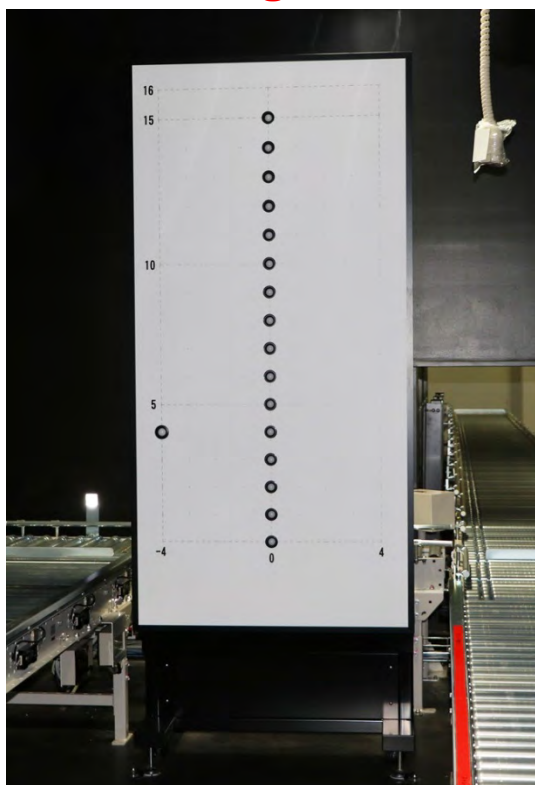


LED Unit Tester

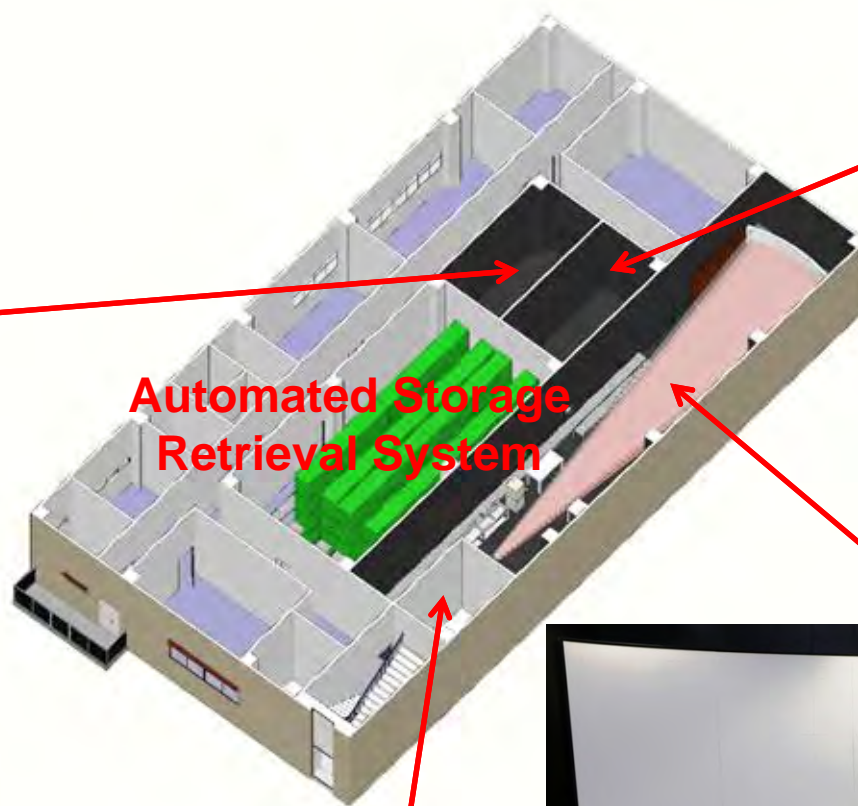
Aeronautical Ground Lighting Maintenance Center

3rd Floor

Light Distribution
Measuring Room 3



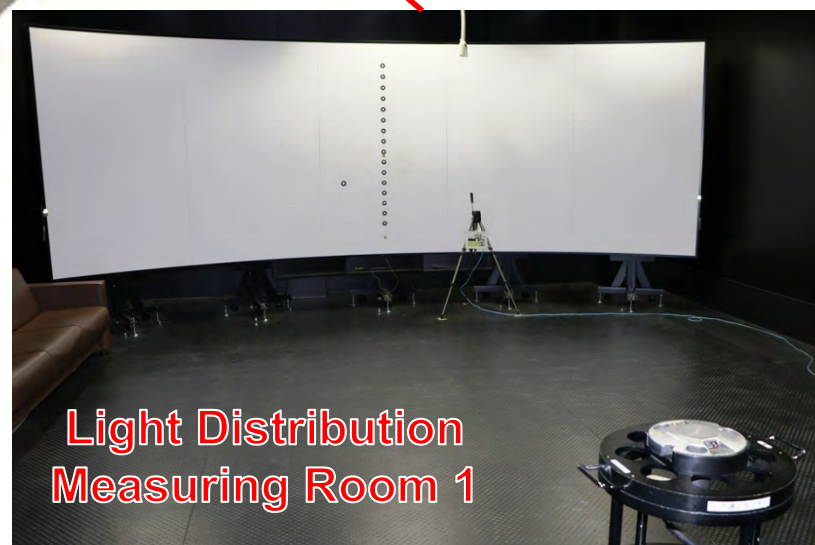
Automated Storage
Retrieval System



Light Distribution
Measuring Room 2



Vertical Carrousel
Storage System



Light Distribution
Measuring Room 1

Detailed Inspection of Aeronautical Ground Lighting



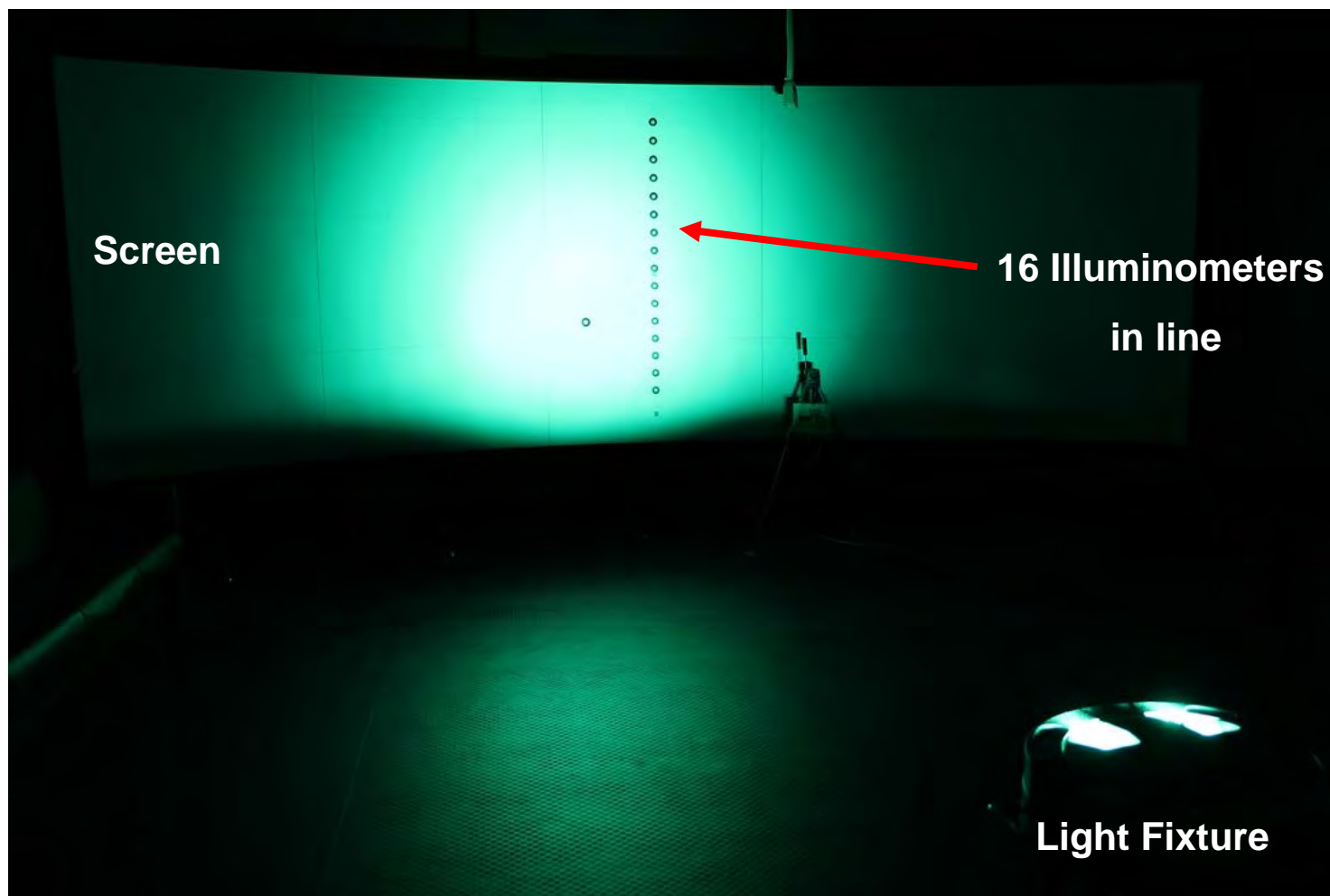
Dry Type Leakage Detector



Overhauled light fixtures are tested with the dry type leakage detector to make sure that each light fixture has been assembled accurately.

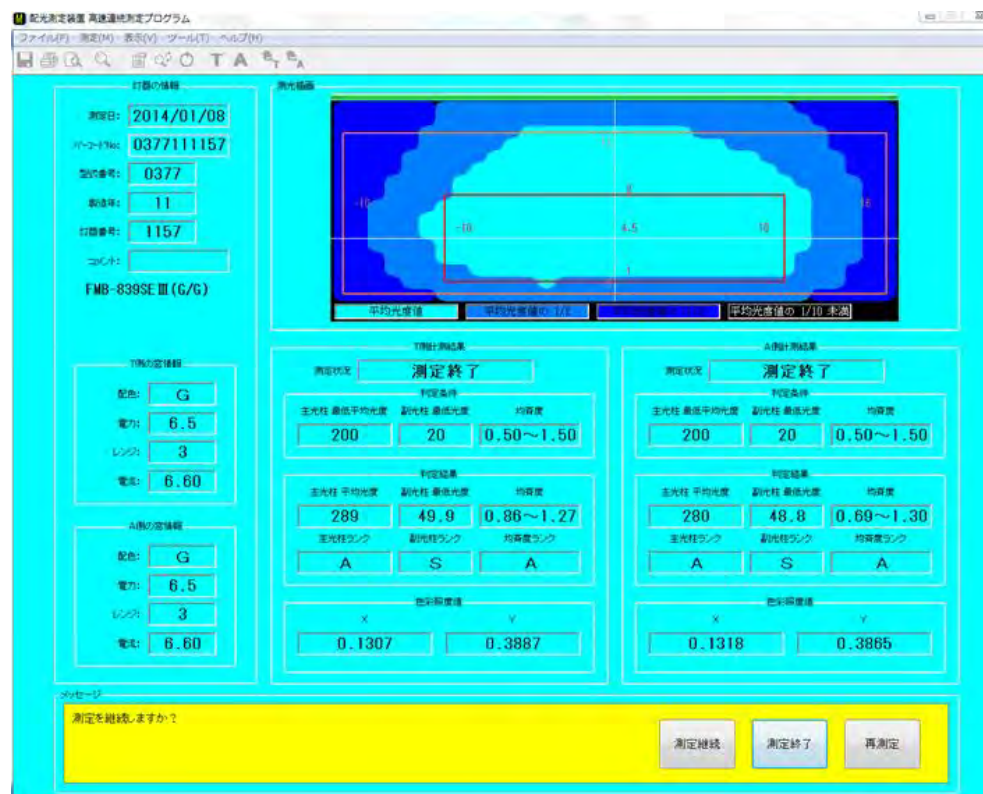
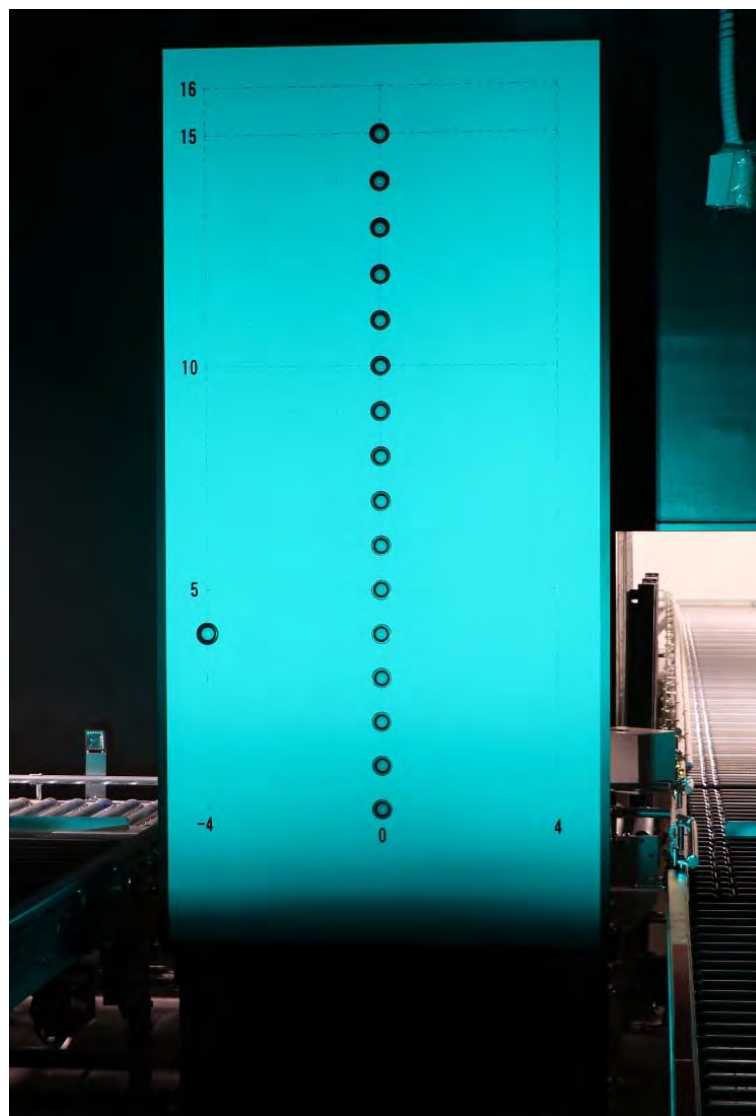
Various pressures are applied on light fixtures according to the type of it.

Detailed Inspection of Aeronautical Ground Lighting



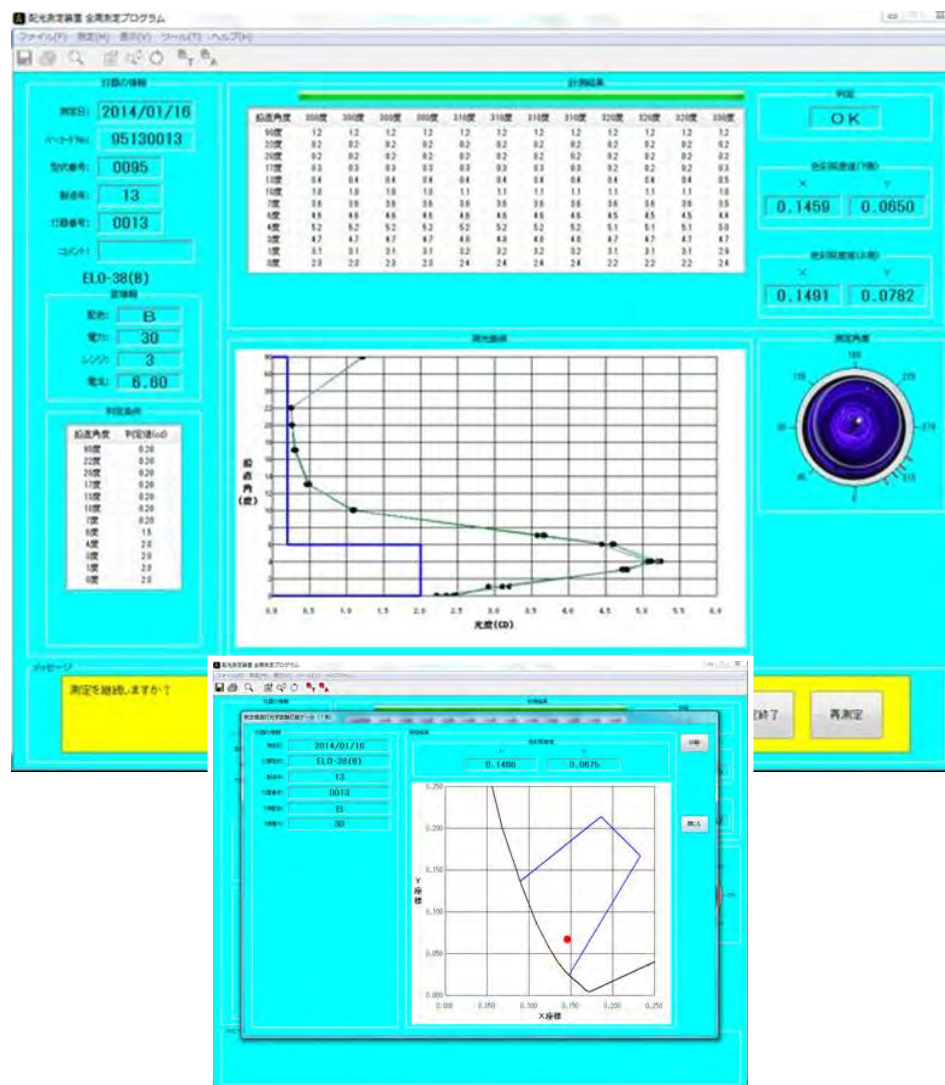
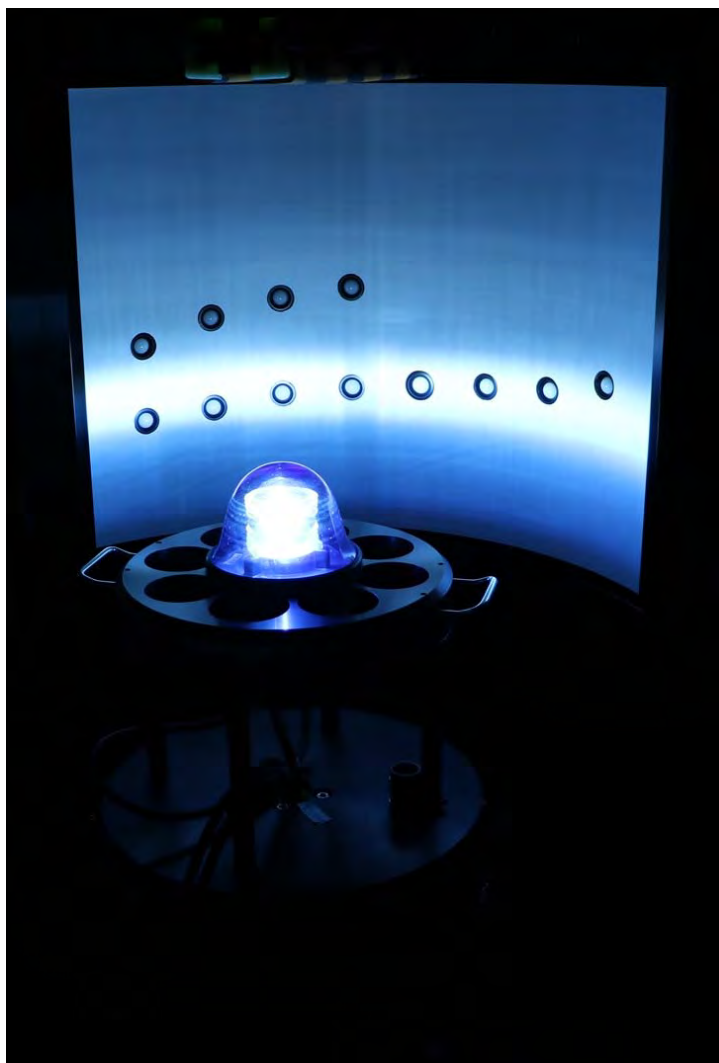
Automated Light Intensity and Distribution Measuring Equipment

Detailed Inspection of Aeronautical Ground Lighting



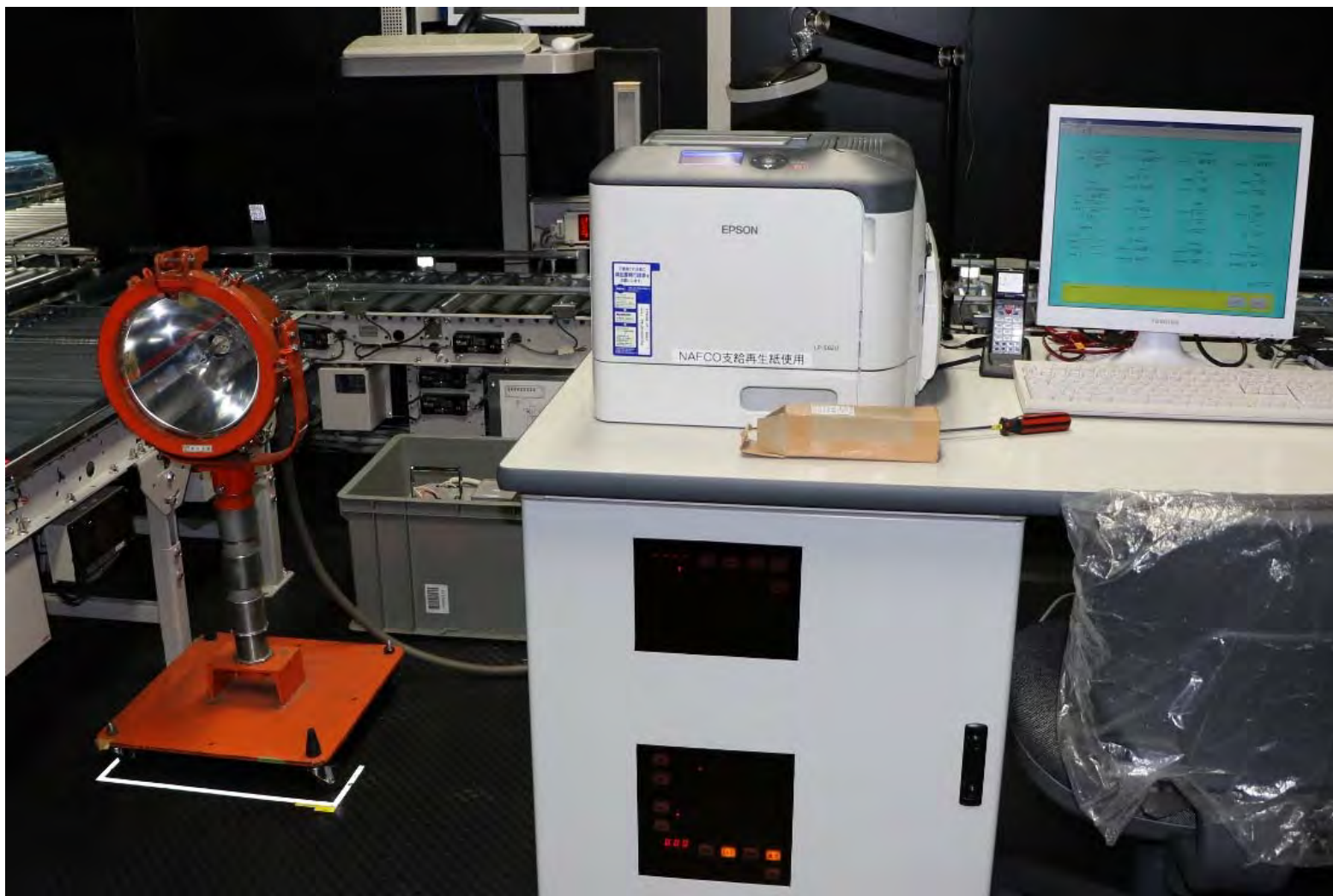
Automated Light Intensity and Distribution Measuring Equipment

Detailed Inspection of Aeronautical Ground Lighting



Automated Light Intensity and Distribution Measuring Equipment for Taxiway Edge Light

Detailed Inspection of Aeronautical Ground Lighting



**Automated Light Intensity Measuring Equipment
for Sequenced Flashing Light**

Storage of Aeronautical Ground Lighting

Light fixtures that have passed inspection are stored in the automated storage retrieval system, can accommodate 2,350 boxes, which selects light fixtures by computer management whenever we are required.

Automated Storage Retrieval System



Data Management of Aeronautical Ground Lighting

- **Light fixture data management**

Light fixture details such as date of manufacture, date of detailed inspection, bulb replacement date and light distribution measurement results etc. are stored in the maintenance and management database and each item is managed individually. The information is used for assessing bulb service life and optimizing inspection cycles.

- **Defect data management**

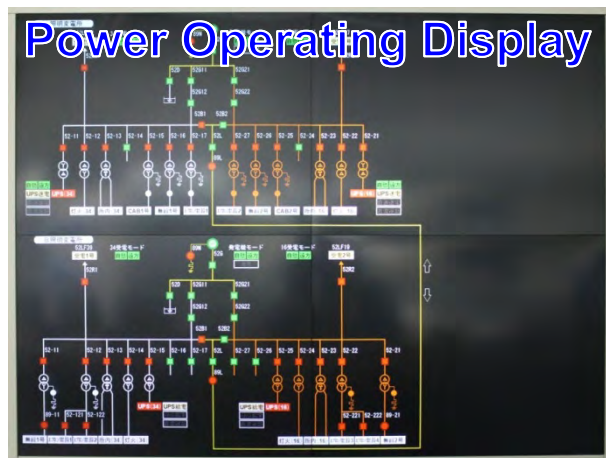
Details on defects and malfunctions found in light fixtures are stored in a database. The database enables easy tracking of facility operability by analyzing trends in defects.



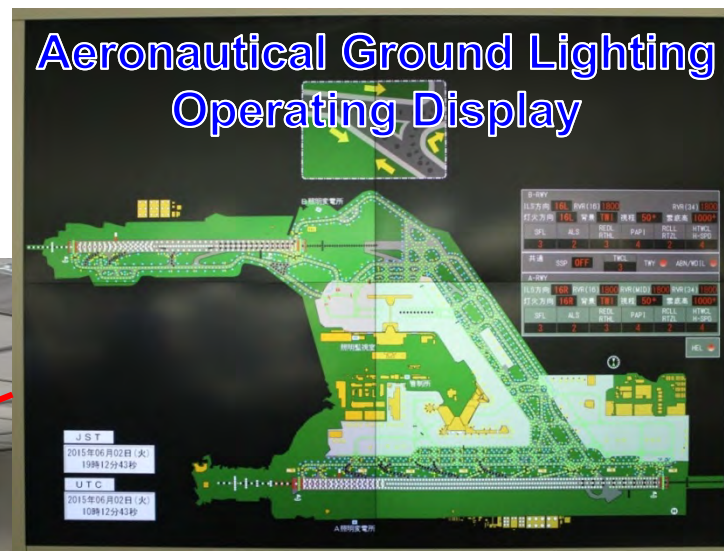
Maintenance and Management Equipment

Aeronautical Ground Lighting Monitoring Room

Power Operating Display



Aeronautical Ground Lighting
Operating Display



Aeronautical Ground Lighting Monitoring Room

Aeronautical Ground Lighting Monitoring Room



**Aeronautical Ground Lighting
Control Console**

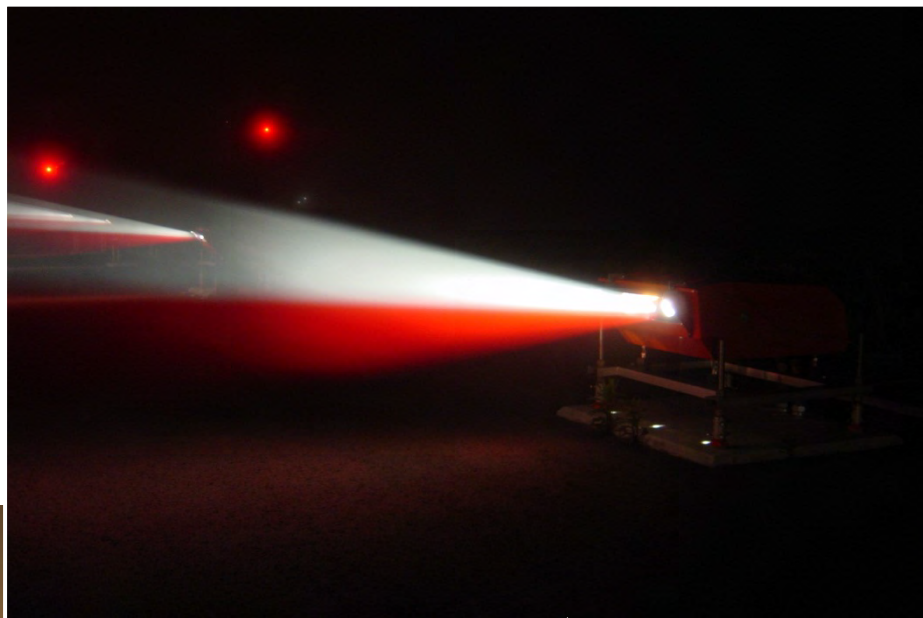


**Aeronautical Ground Lighting
Logical Control Console**

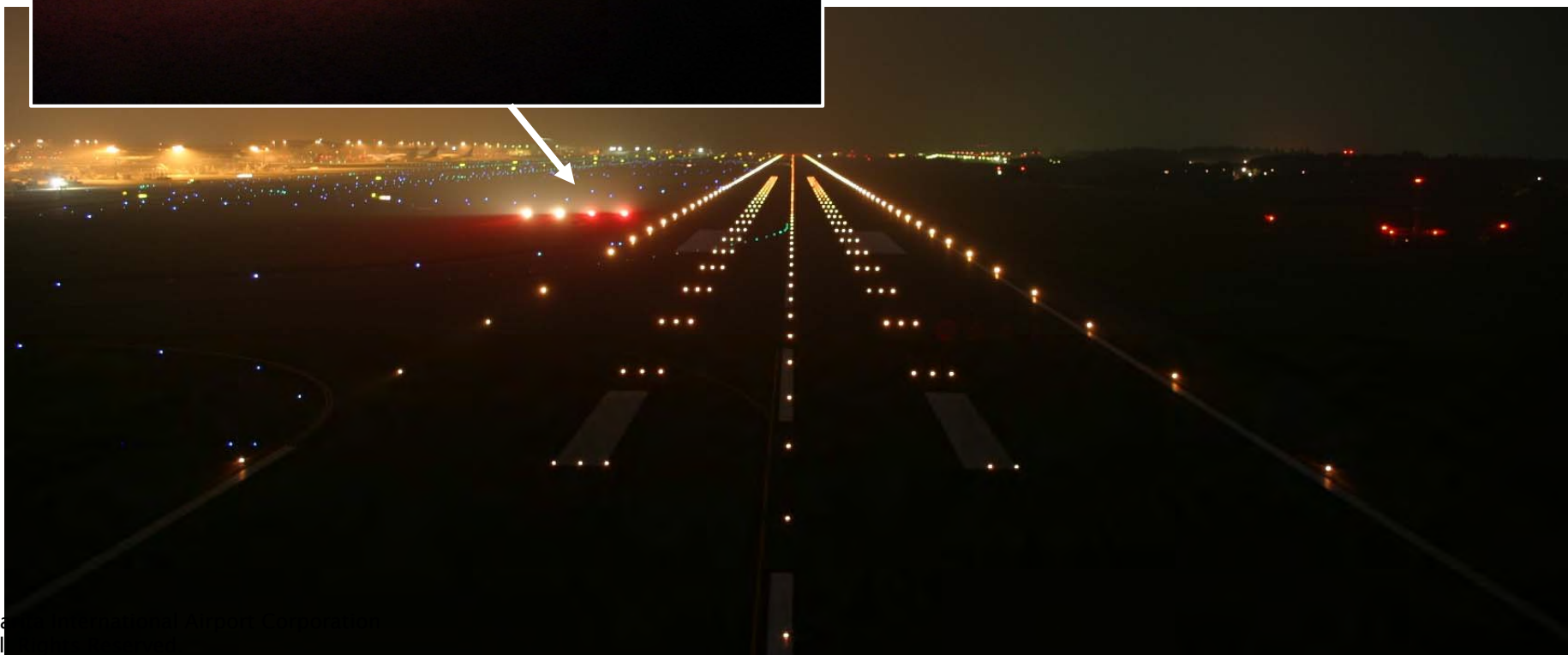


Aeronautical Ground Lighting Monitoring Room

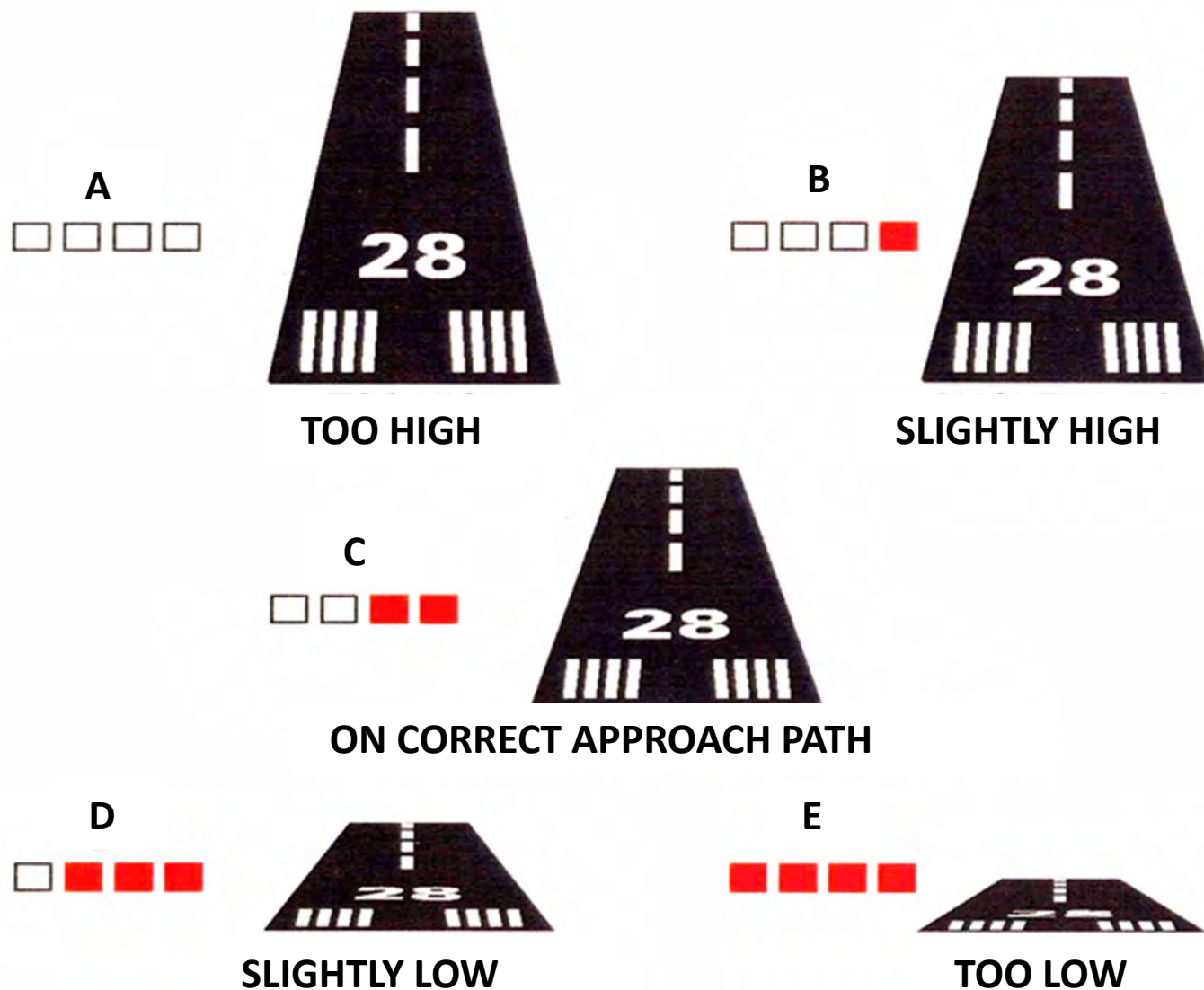
Precision Approach Path Indicator (PAPI)



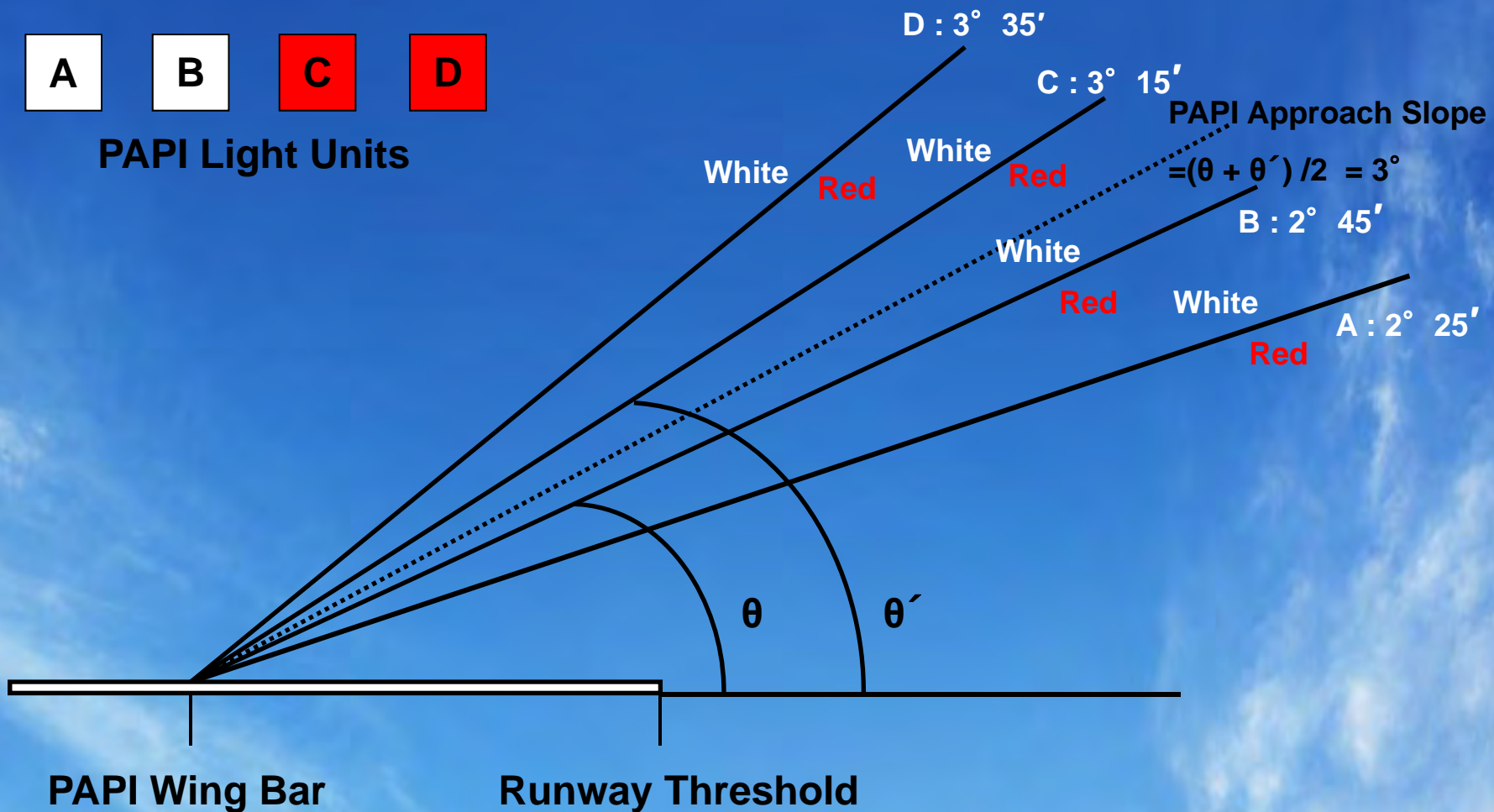
PAPI system provides pilots with visual glide slope guidance during approach for landing.



Precision Approach Path Indicator (PAPI)



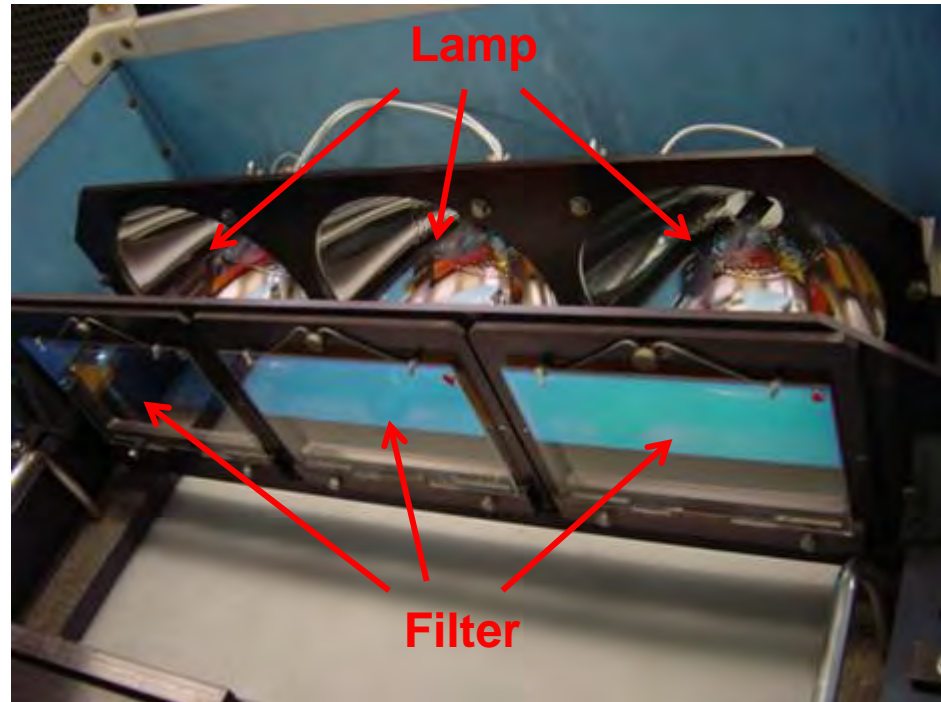
Angle of Elevation Setting of PAPI



Precision Approach Path Indicator (PAPI)



PAPI Light Unit

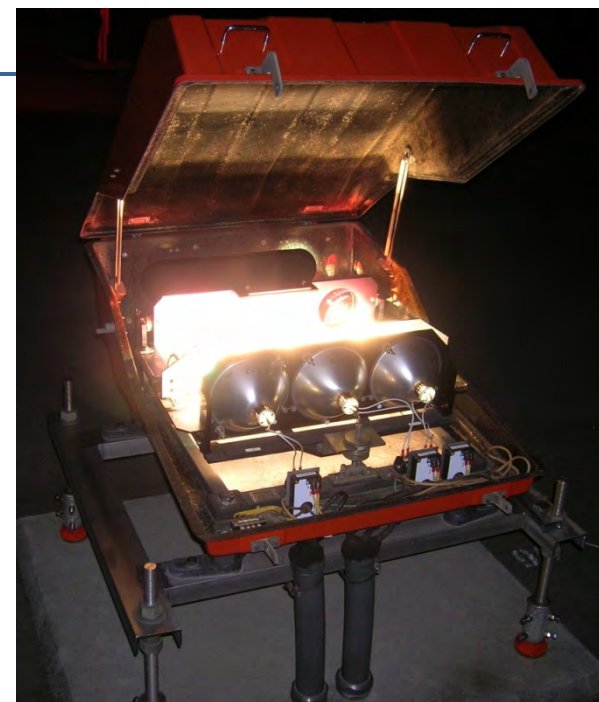


Inside of PAPI Light Unit

- **Each PAPI light unit contains 3 lamps.**
- **Red and white lights are emitted through the filters.**

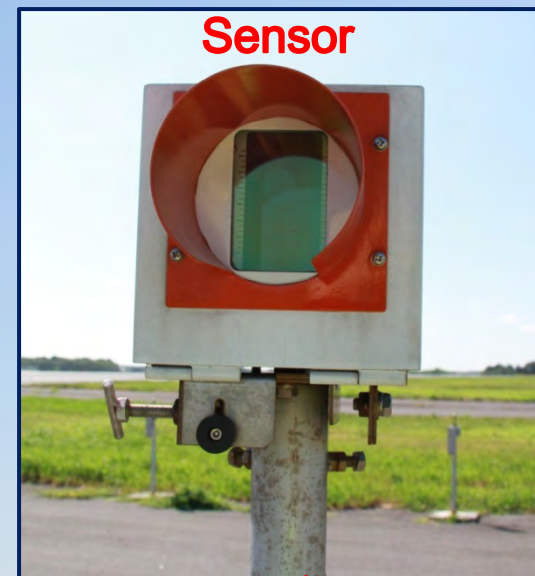
Maintenance of PAPI

- Patrol Inspection ... **Daily**
Visual inspection
- Regular Inspection ... **Every 2 weeks**
Measuring light intensity
Inspecting the angle of elevation of the light units
- Vertical Adjustment ... **Every month**
Adjustment for accurate vertical position of the light units
- Detailed Inspection ... **Every 2 months**
Replacement with serviced light units



PAPI Remote Monitoring System

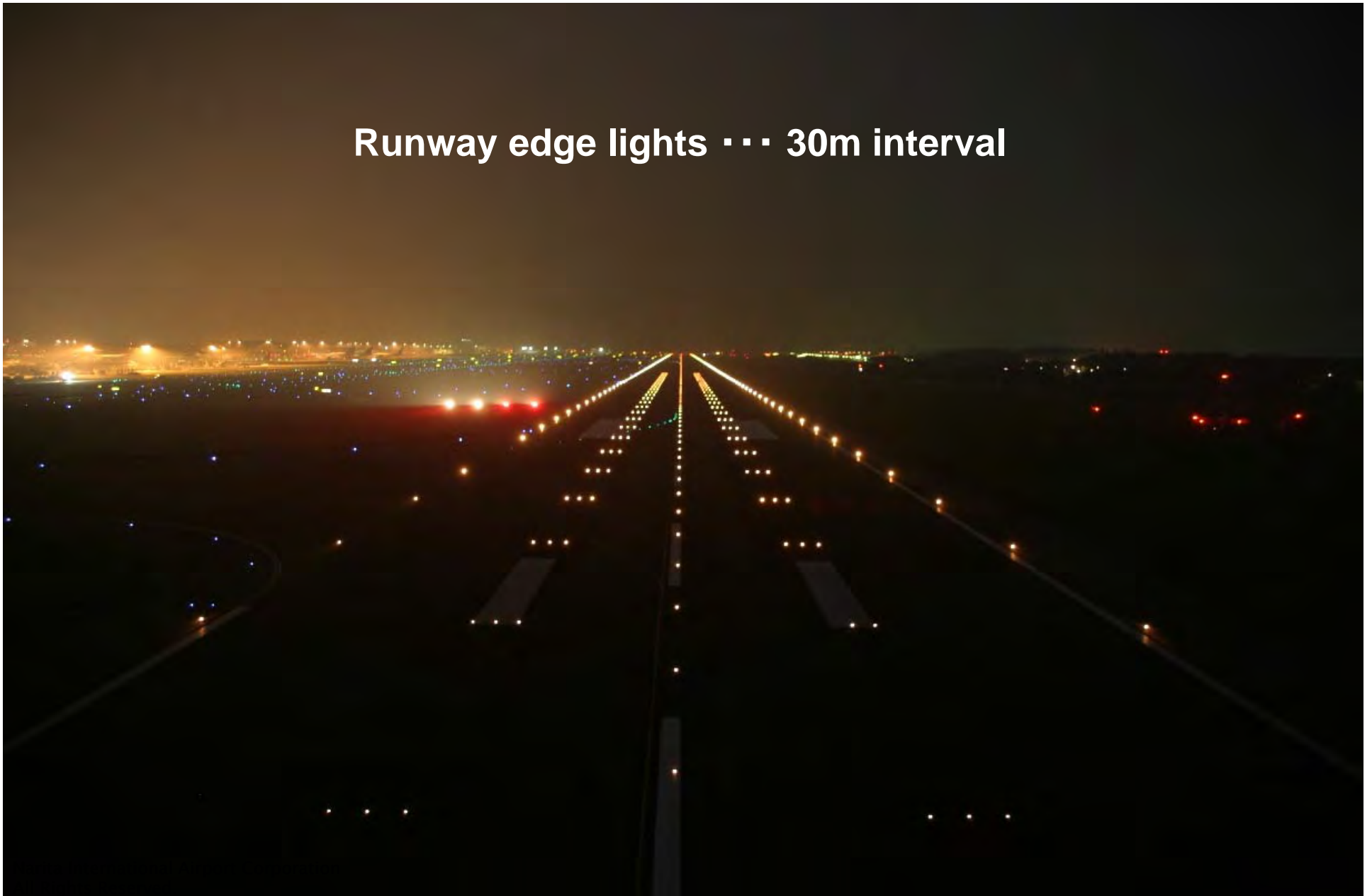
PAPI Monitoring Display (Monitoring Room)



PAPI Remote Monitoring System is always measuring the vertical angle of the light beam center.

Improve Reliability of Aeronautical Ground Lighting

Runway edge lights ··· 30m interval

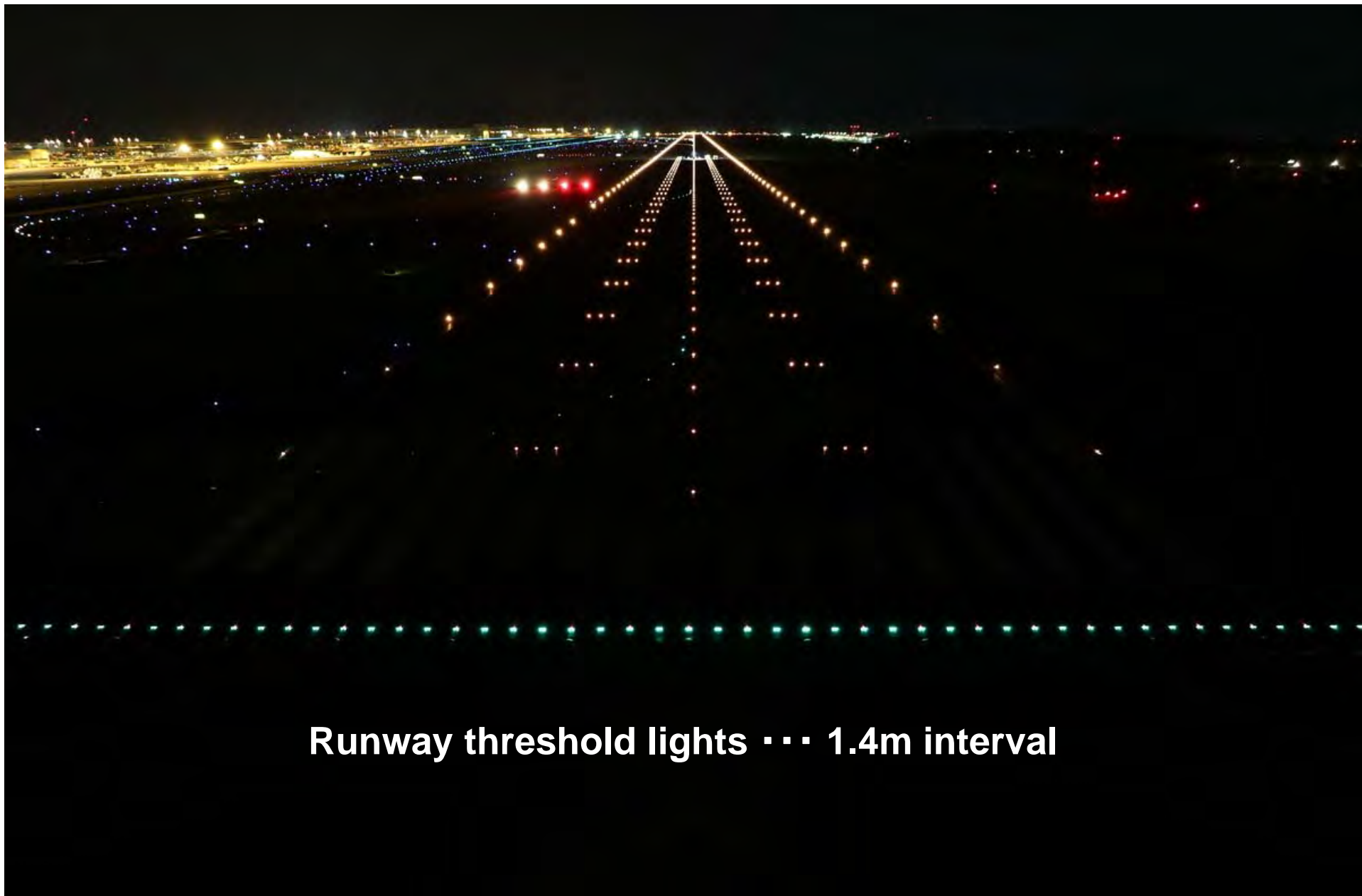


Improve Reliability of Aeronautical Ground Lighting

Runway edge lights ··· 60m interval



Improve Reliability of Aeronautical Ground Lighting



Runway threshold lights ··· 1.4m interval

Improve Reliability of Aeronautical Ground Lighting



Runway threshold lights ··· 2.8m interval

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