



Presentation on

# **REQUIRMENT OF PASSABLE GUIDANCE REGARDING LIGHT-EMITTING DIODES (LEDs) BASED AERONAUTICAL GROUND LIGHTING (AGL) SYSTEM INSTALLATION AND MAINTENANCE IN ICAO DOCUMENTS**

**Presented by: Pakistan**

**2 July 2025**

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

In the name of Allah, The Most  
Gracious and The Most Merciful

“Say, Can those who know & those who do  
not know become equal?”

*The Holy Quran Sura Az-Zummar Verse 9*

- **Introduction**
- **Discussion**
- **Conclusion**
- **Actions By The Meeting**

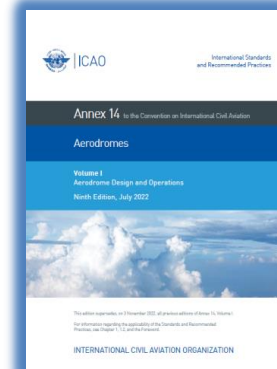
# INTRODUCTION

Growing shift toward LED-based AGL at both Greenfield and Brownfield airports

Operational & Maintenance Challenges

ICAO Annex Vol I Requirement for Aerodrome Maintenance Plan

Insufficient Guidance in ICAO Doc 9157 Parts 4 & 5 and Doc 9137 Part 9



# DISCUSSION

## Why LED AGL Require Attention ??

- ✈ LEDs are replacing incandescent/tungsten halogen lights across aerodromes



### Misconception:

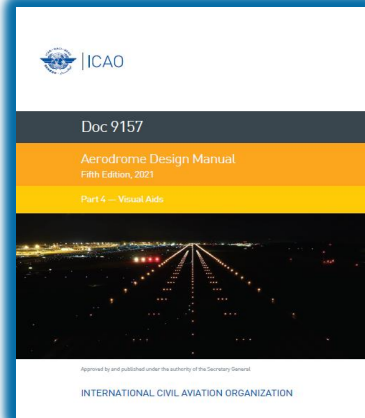
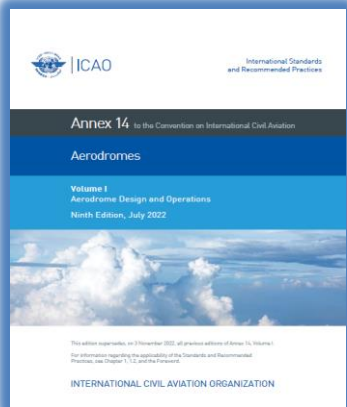
LEDs require little to no maintenance

### Reality:

LED fixtures face unique issues—infant mortality, brightness decay, and environmental vulnerability (vibration, moisture, heat)

# DISCUSSION- Current ICAO Guidance & The Gap

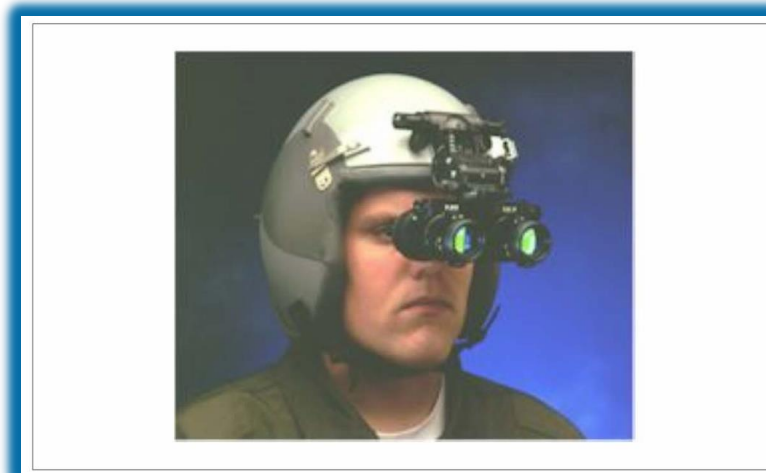
ICAO Annex 14 Vol I calls for aerodrome maintenance program whereas existing ICAO manuals offer insufficient guidance on LED AGL



# DISCUSSION- Operational feedback from Aerodromes

## Feedback from airports in Pakistan

- High rate of early failures in LED fixtures (at two Airports)
- Significant cost implications from importing spares
- Incompatibility concerns with some vision technologies (NVIS, EFVS)
- LED fixtures lack enough natural heat-affects snow/ice performance



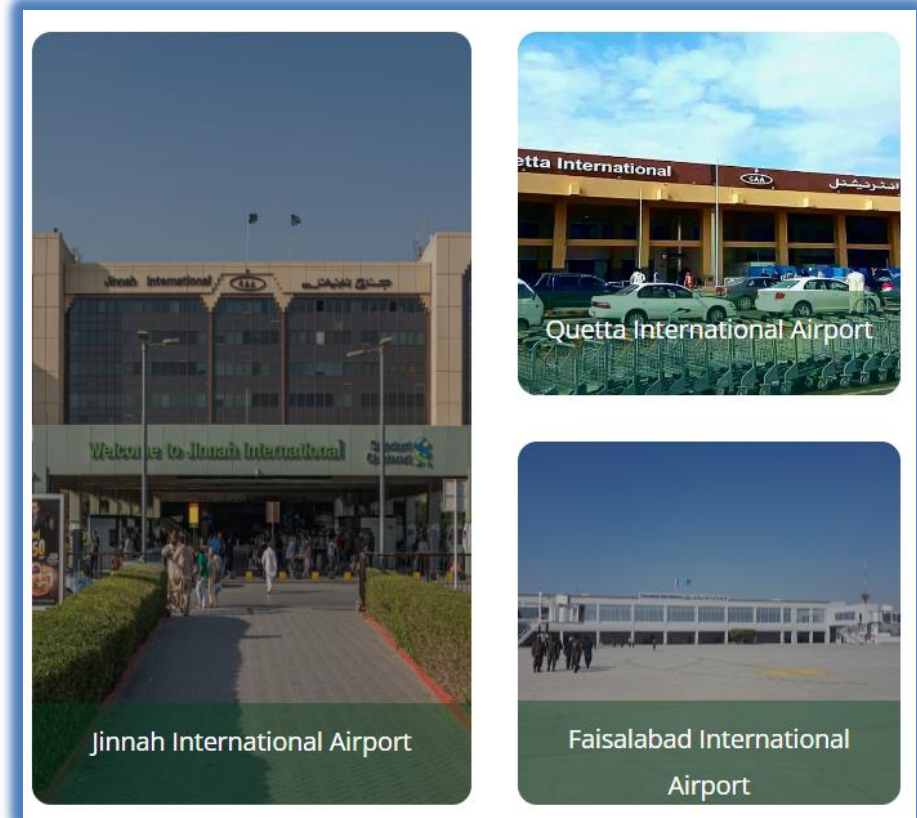
# DISCUSSION-Case Studies

## Pakistan's Experience of LED AGL implementation at:

- Allama Iqbal Int'l Airport Lahore (CAT III)
- Quetta Int'l Airport (CAT II)
- Faisalabad Int'l Airport (CAT I)
- Ongoing: Jinnah Int'l Airport Karachi (CAT I Planned)

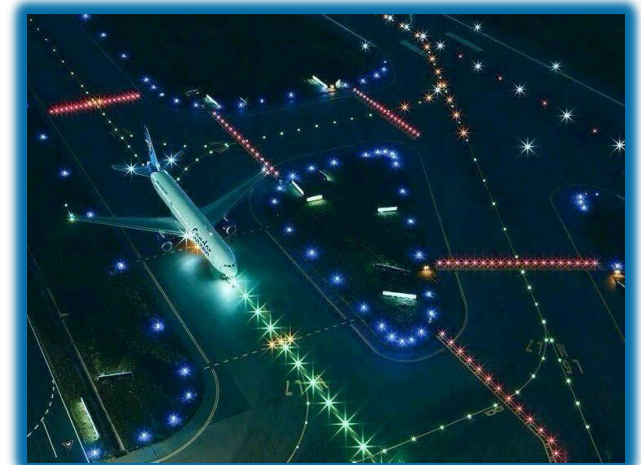
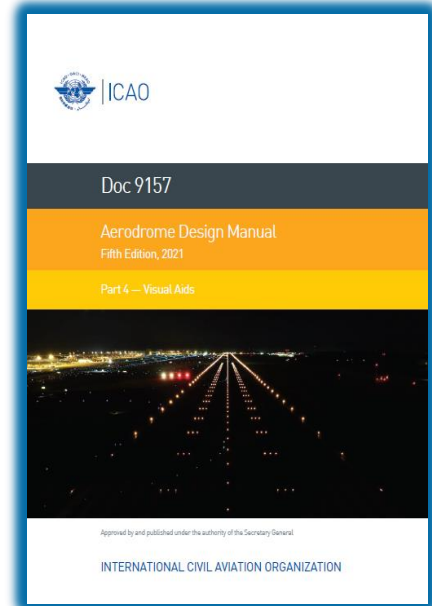
## Issues encountered:

- High infant failure rate
- Environmental degradation
- Spares & support challenges



# DISCUSSION- Recommendations

- ✈ Publish specific ICAO guidance for LED AGL covering:
  - ✈ Installation and commissioning practices
  - ✈ Preventive and corrective maintenance
  - ✈ Sensor integration (moisture, vibration, temperature)
  - ✈ Training best practices
  - ✈ Original Equipment Manufacturer (OEM) warranty considerations



# DISCUSSION - Conclusion

- LED is the future of AGL but it has some limitations
- Global guidance is essential for safe, reliable, and cost-effective implementation
- ICAO guidance will empower States to optimize investments and ensure operational safety



# ACTIONS BY THE MEETING

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- ✈ **Note the need for guidance updates in ICAO documentation.**
- ✈ **Share national experiences and challenges.**
- ✈ **Collaboratively propose best practices for LED AGL system operation and maintenance.**



# THANK YOU

Questions?