

**IESALC Government Contacts Sub-Committee Meeting  
Washington DC  
May 10, 2012**

**SAN Multisensor Fusion  
LED Runway Status Light System (RWSL)**



U.S. Department of Transportation  
Federal Aviation Administration



## CHRONOLOGY OF RWSL HISTORY AT SAN

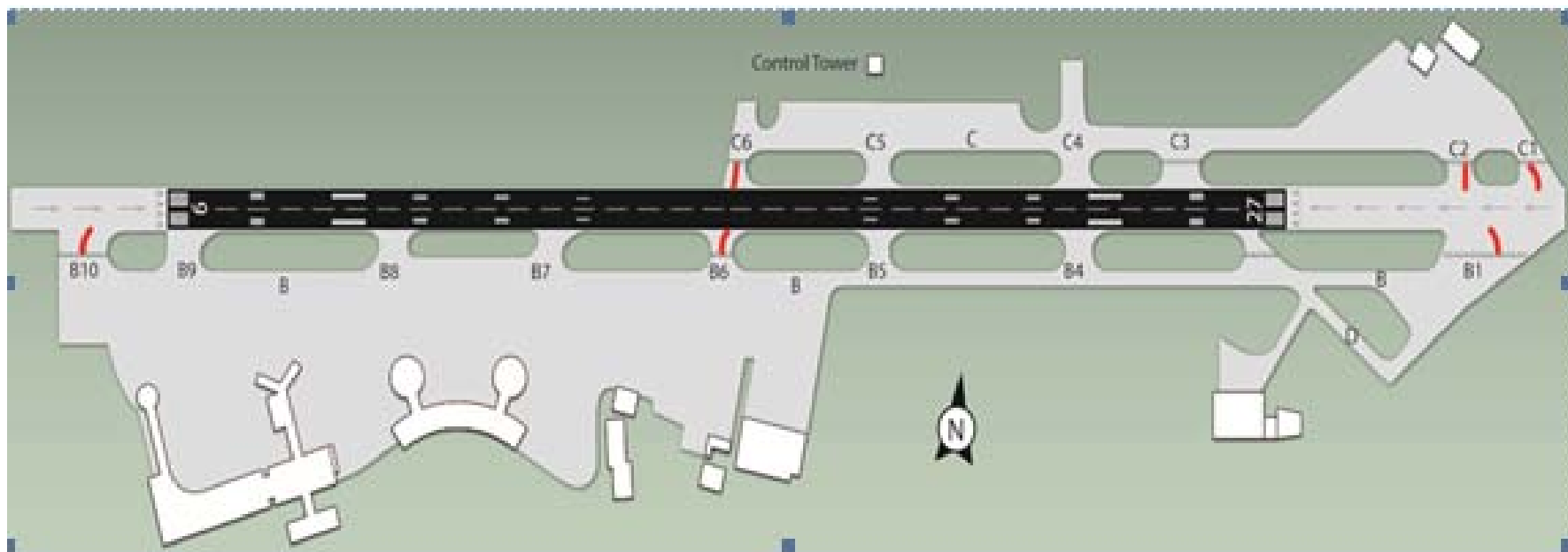
2007- Initial incandescent RWSL system installed  
ASDE-3 surface surveillance radar  
Runway Entrance Lights only

2010- Major airport taxiway project completed  
RWSL incandescent system upgraded using ASDE-X  
surveillance radar

**2011 – LED RWSL system installed**



## SAN Runway 9-27



Runway Entrance Lights (RELs) are installed on the taxiways B1, B6, and B10 on the south side of runway 9 - 27 and at taxiways C1, C2 and C6 on the north side of runway 9 - 27.



**REQUEST FOR PROPOSAL (RFP)**

**LIGHT EMITTING DIODE (LED)  
RUNWAY STATUS LIGHTS (RWSL)**

**JANUARY 26, 2011**

**GLOBAL ENGINEERING & MANAGEMENT SERVICES  
(GEMS) INCORPORATED  
1025 Connecticut Avenue, NW  
Suite 1012  
Washington, DC 20036**



# The Proposed Design Concept

The LED high efficiency, reliability, extremely long life, lower current requirements(DC) and mode of failure may make it possible to consider alternative RWSL System designs and hardware requirements which will contribute to lower cost of system operation and increased reliability. The benefits of using LEDs and the envisioned supporting infrastructure include the following:

- Improved Signal Conspicuity
- Improved System Reliability
- Reduction in Energy Consumption
  - Reduced Maintenance Cost
- Reduced Risk of Electromagnetic Interference



# The Concept Design Requirements

- 1) Assign each of the three REL taxiway entrance groups (C1/C2/B1, C6/B6, and B10) a dedicated series circuit running from its power supply in the electrical vault.
- 2) In lieu of power line carrier data transmission consider addressing two alternative methods of monitoring and transmitting Field Lighting System (FLS) data.
- 3) REL lights at each set of taxiway entrances (group) will be controlled directly by the Constant Current Regulator (CCR) that powers this group.



# The Concept Design Options

- 1) Use of CCRs or CCR/Circuit Selector (CSS )
- 2) Series Circuit Current (6.6A?)
- 3) Method of Brightness Control
- 4) Group or individual fixture monitoring (EB67)



# Concept Design Limitations

- 1) Use existing power distribution infrastructure
- 2) Use existing fixture housings and wiring junction boxes
- 3) Limited funding and procurement window
- 4) Limited installation time
- 5) Classed as SAN Maintenance Project to minimize time

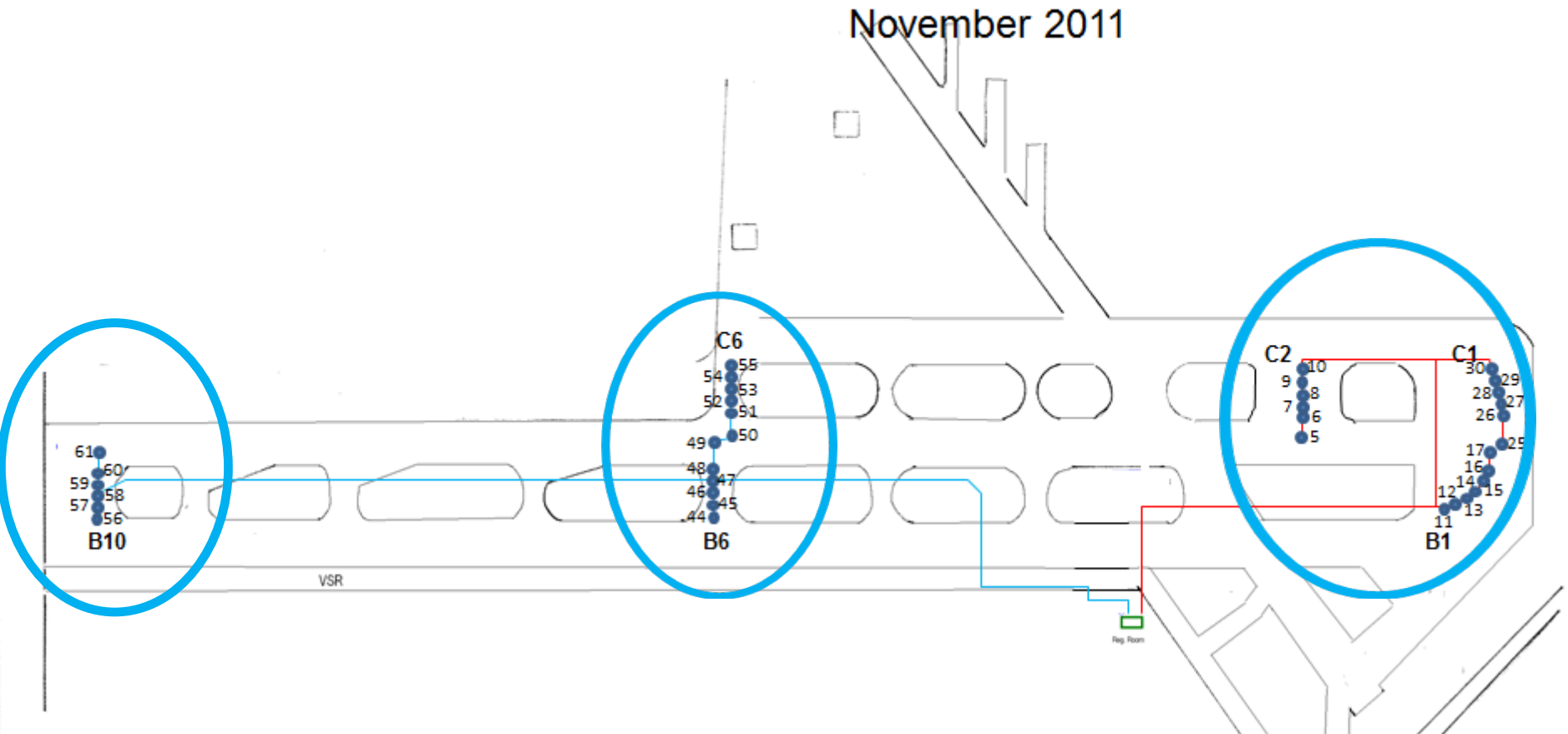


# Three REL Taxiway Entrance Locations



RWSL LED REL Locations with Assigned Numbers

November 2011





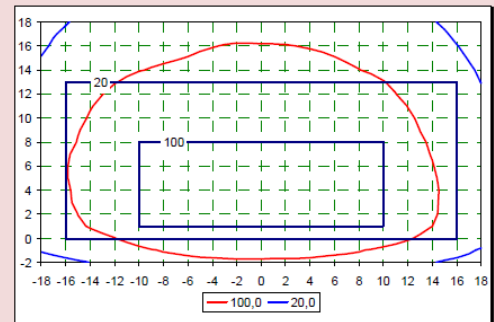
# The Concept System Results

1. One **Liberty Airport Systems** 4kW, 480V, 6.6A CCR with associated four circuit selector switch.
2. L-890 circuit and fixture monitoring.
3. CCR and all circuits may be controlled locally.
4. Maintenance program may be locally or remotely activated to determine status of EB67 REL fixture monitoring.



# The Concept System Results

5. SAFEGATE wide beam 8" diameter fixture with 12" adaptor for mounting on existing L-868 base.
6. Main beam spread  $20^{\circ}$  with minimum 300 cd average in red.
7. Utilizes 4 LEDs and compliant with EB67 fixture monitoring requirements.
8. Fixture certified to FAA AC 150/5345-46 dimensional and structural requirements.



Wide Straight (4 LEDs)

I average: 340 cd

I max/I min: 2.5

# Post Installation Data



## Estimated Yearly Power Usage

### Incandescent System

Estimated total daily kWh = 60.00

Estimated annual power usage = 21,900 kWh

Estimated annual cost at .15kWh = \$3,285 (San Diego rate)

### **LED System**

Estimated total daily kWh = 6.38

Estimated annual power usage = 2,336 kWh

Estimated annual cost at .15 kWh = \$363 (San Diego rate)

### **Summary**

LED system uses an estimated 85-90% less power than the incandescent system

# Post Installation Data



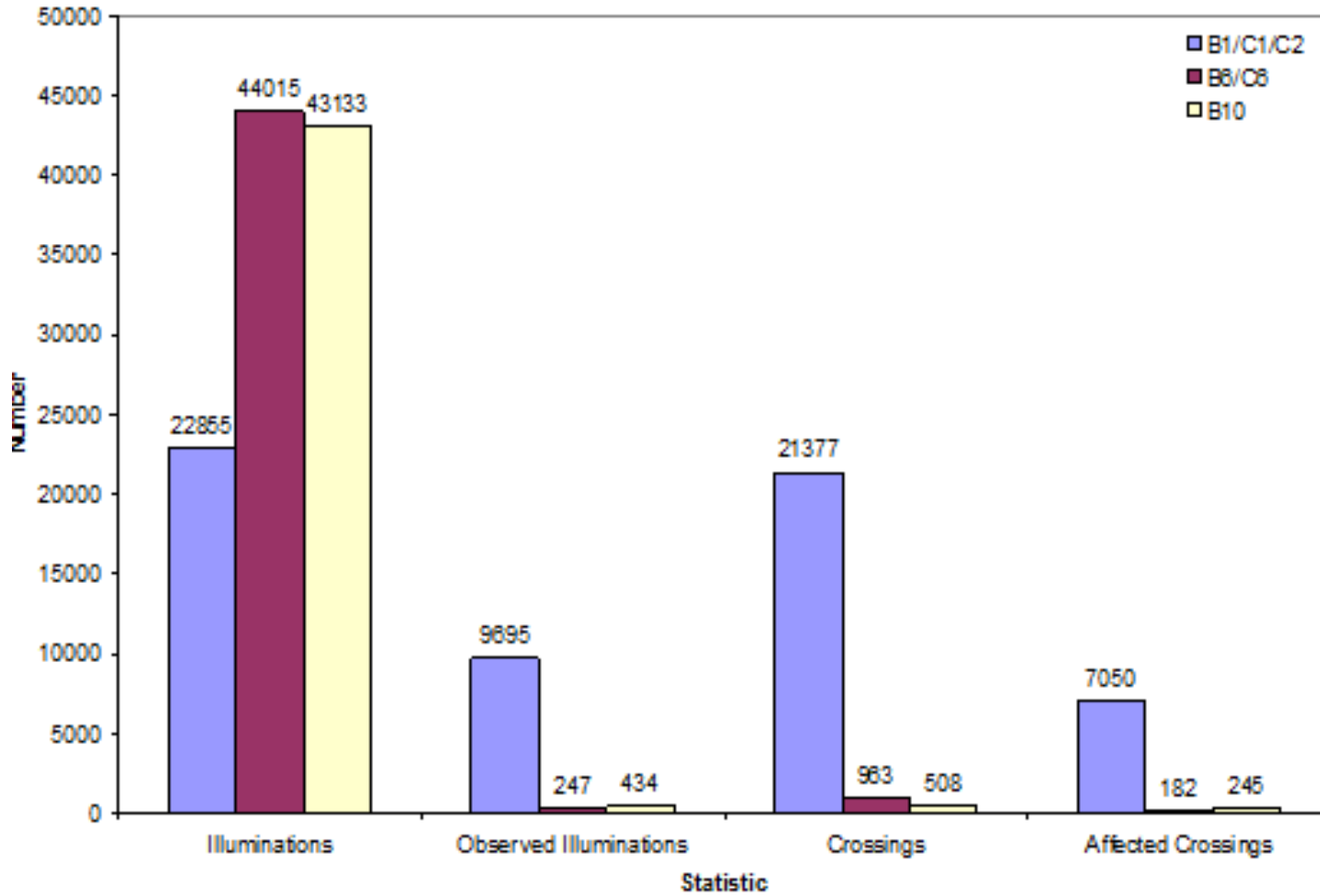
## Operations (November – January 2012)

<b>Runway</b>	<b>Departures</b>	<b>Arrivals</b>	<b>All Operations</b>
27	21679	20689	42368
9	388	957	1345
<b>All equipped runways</b>	<b>22067</b>	<b>21646</b>	<b>43713</b>

# Post Installation Data



REL Activity



Crossing activity and REL light activity by REL location.

# Post Installation Data



## Quarterly Photometric Testing (AC 150/5340-26)

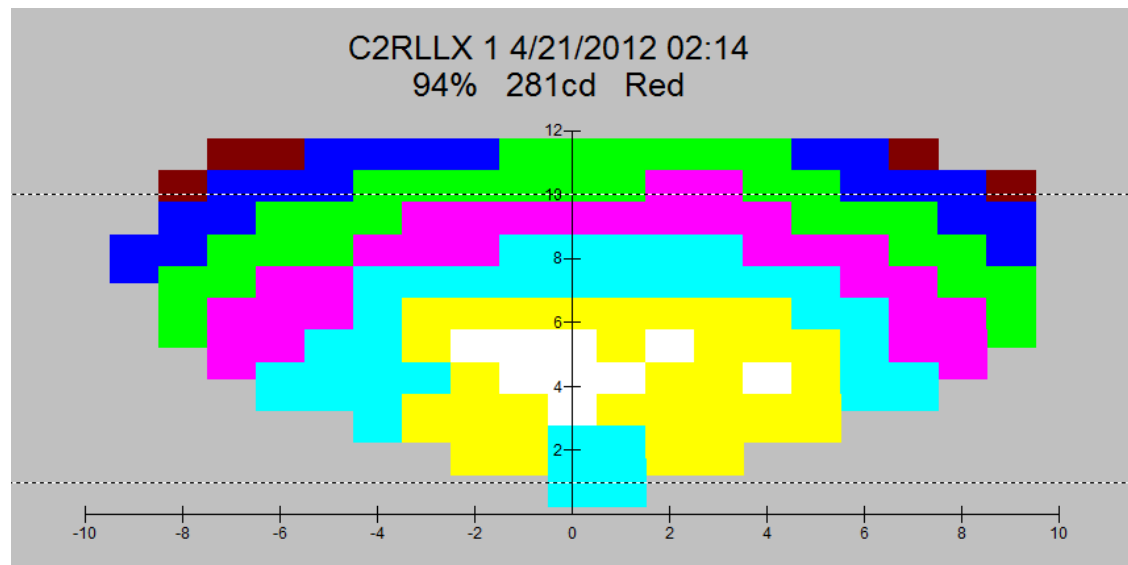
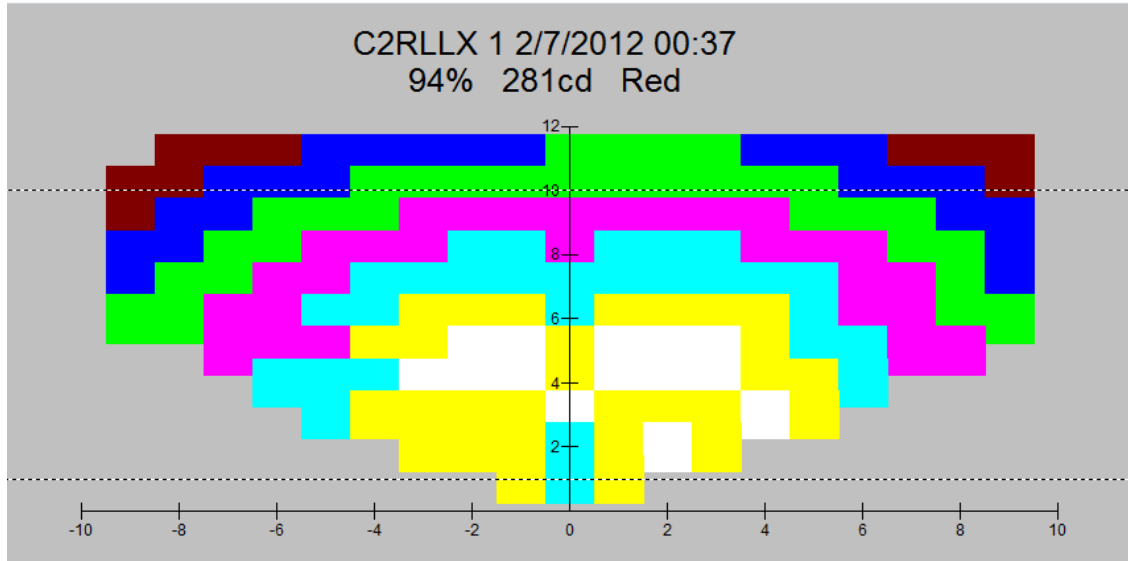
- ✓ Lumen Maintenance Excellent
- ✓ No Fixture Failures



# Post Installation



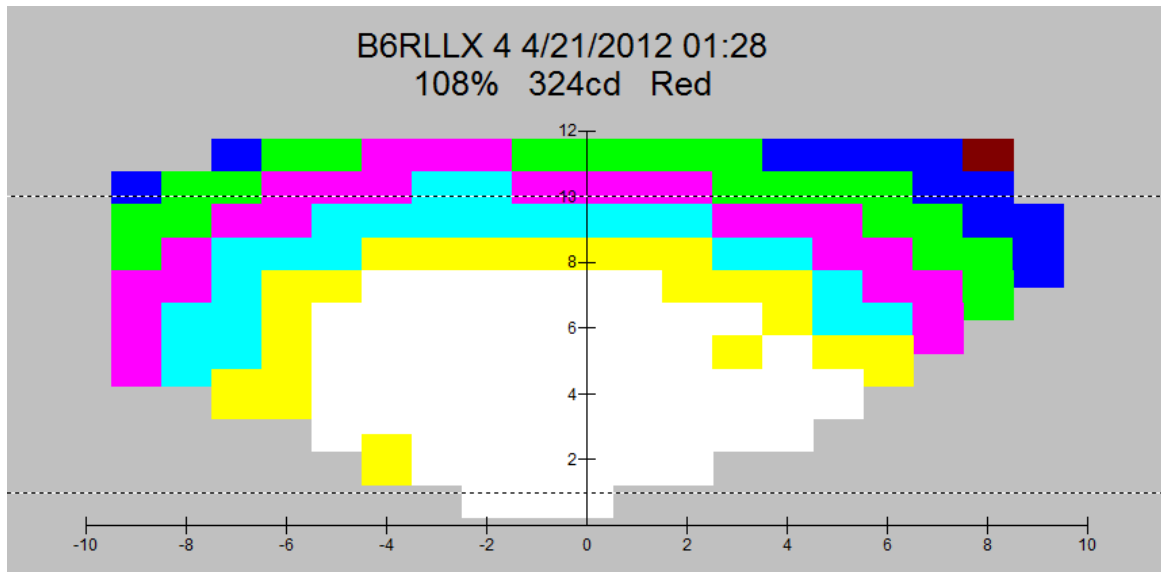
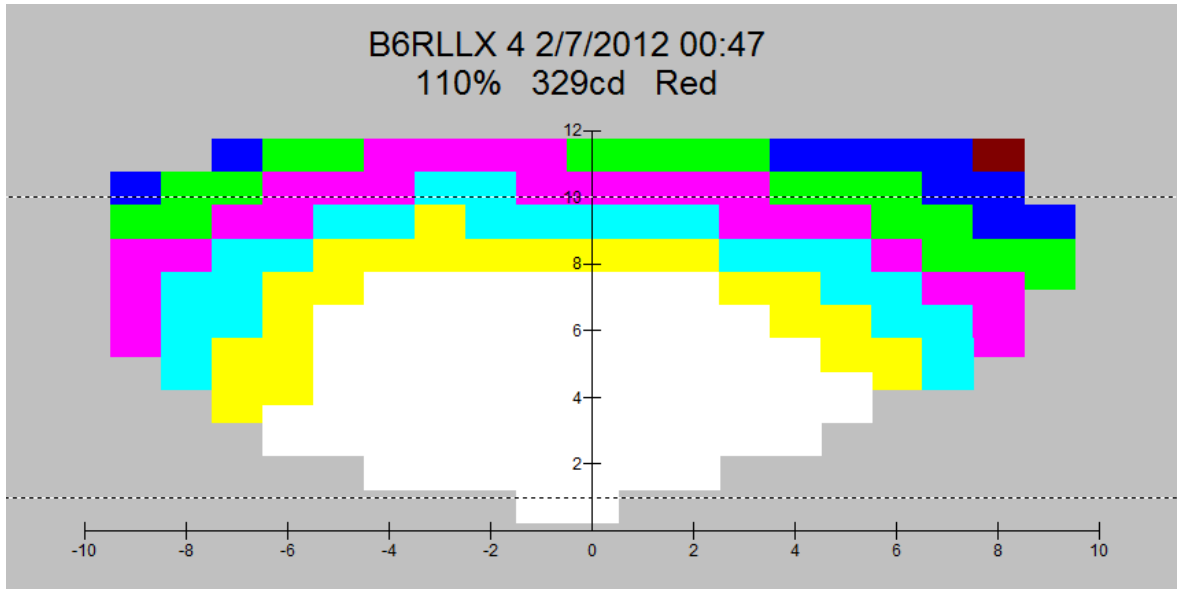
## Lumen Maintenance Checks





# Post Installation

## Lumen Maintenance Checks



# Post Installation Data



## Quarterly Photometric Testing (AC 150/5340-26)

- ✓ Lumen Maintenance Excellent
- ✓ No Fixture Failures
- ✓ No System Maintenance

