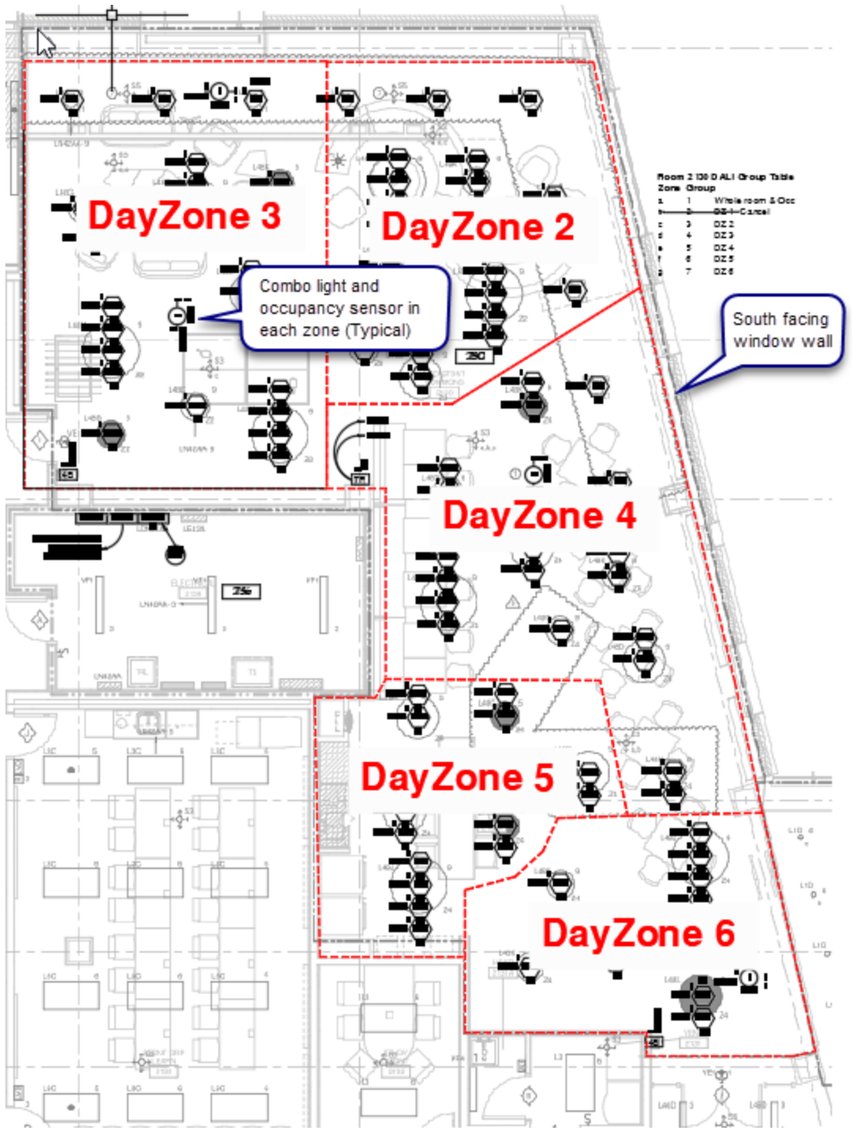


Five Zone Daylighting System

Multi-Zone Daylighting

2/23/2018
Wayne Morrow
Starfield Lighting Automation

Summary

Starfield's adaptive setpoint daylighting introduces a new era of daylighting as evidenced by this analysis of a five zone daylighting system. Each zone is independently controlled, required no manual setup, and seamlessly interacts with user adjustments.

Features

- Full room daylight harvesting
- Unlimited number of daylighting zones
- Continuous operation with low setpoints
- Operates in both perimeter and interior zones.
- Self setting, self calibrating, and maintenance free with no manual setup
- Close-loop and user interactive
- Estimated 14% greater energy savings [1].

Introduction

Conventional daylighting systems are neither energy efficient nor user friendly. As originally described by Francis Rubeinstein[2] in 1988, the central problem is ceiling mounted sensors further compounded by the more recent requirement to interact with user adjustments. The industry "solution" has been a variety of measures including high fixed setpoints, open loop logic, proportional settings, sliding setpoints, sensor location algorithms, and disabling daylighting to avoid interfering with user adjustment. The unsurprising result has been complicated systems that are both inefficient[1] and labor intensive.

A New Approach

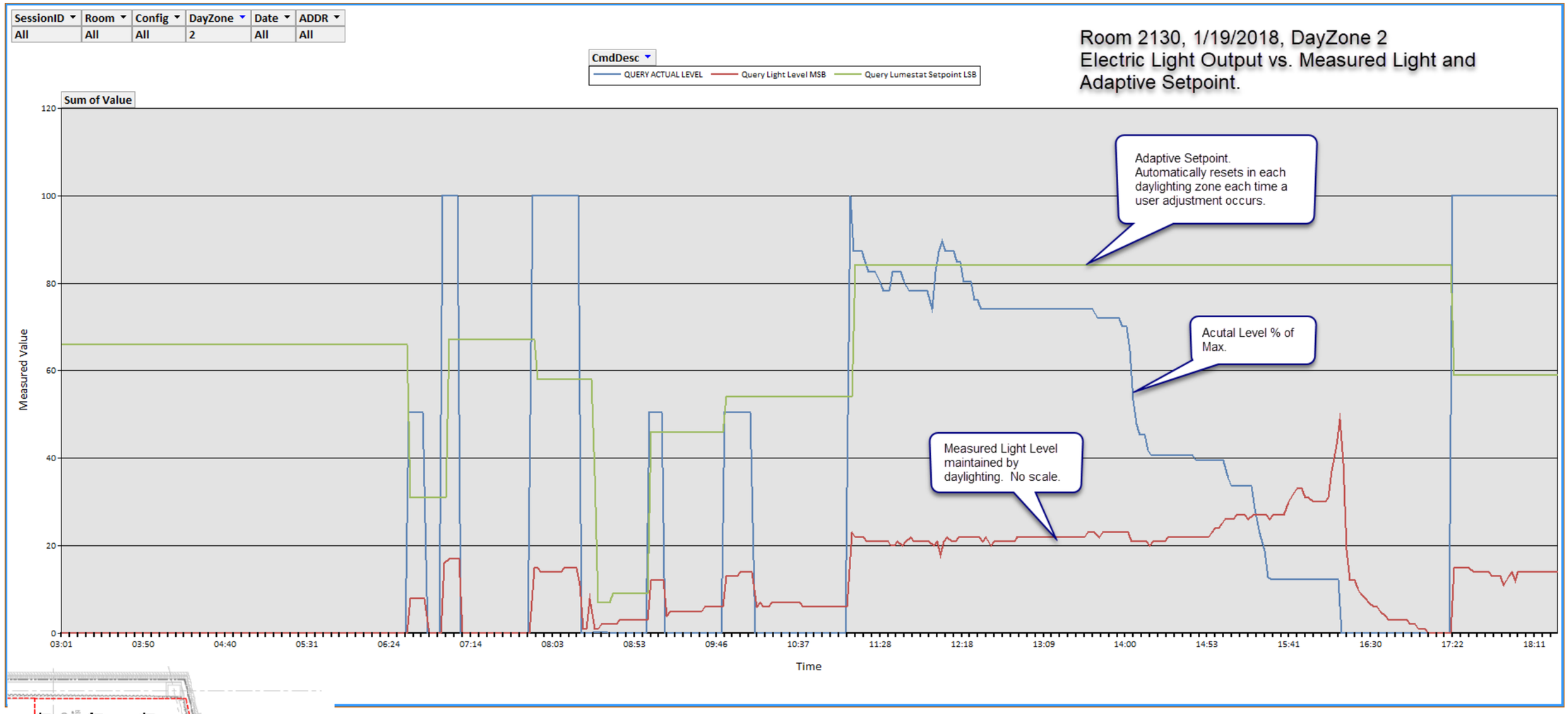
Adaptive Setpoint Daylighting[3] changes that. With this new patented technology, the daylighting paradigm has been changed from saving energy to serving users and the result is inherently better systems that are cheaper to buy and install, work better, and supports both single or multi-zone applications.

References:

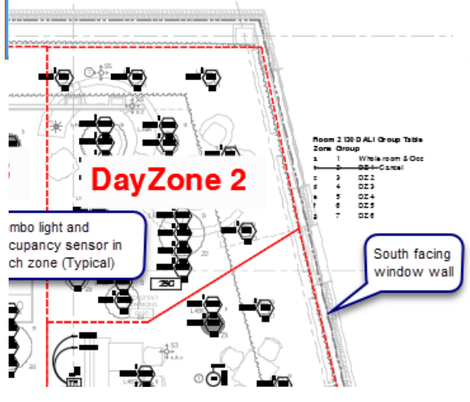
[1] Sarith Subramaniam, 2013, Multi-zone Control of Daylight-Responsive Lighting Control Systems, Pennsylvania Stare University.
[2] Francis Rubenstein et al, 1988, Improving the Performance of Photo-Electrically Controlled Lighting Systems, LBL-24871, UC-350,
[3] Adaptive Setpoint Daylighting, Starfield Lighting Automation, US patent US9084308B2

Starfield Lighting Automation LLC Boulder, CO 303.427.1661 www.SLAauto.com	SUNY Buffalo Medical Center Room 2130 Five Zone Daylighting Analysis			
	Title and System Summary			
	SIZE: B	FSCM NO: 3079	DWG NO:	REV: 1.0
	SCALE: none	2/23/2018	SHEET: 1 OF 4	

SessionID	Room	Config	DayZone	Date	ADDR
All	All	All	2	All	All



Room 2130, 1/19/2018, DayZone 2
Electric Light Output vs. Measured Light and Adaptive Setpoint.

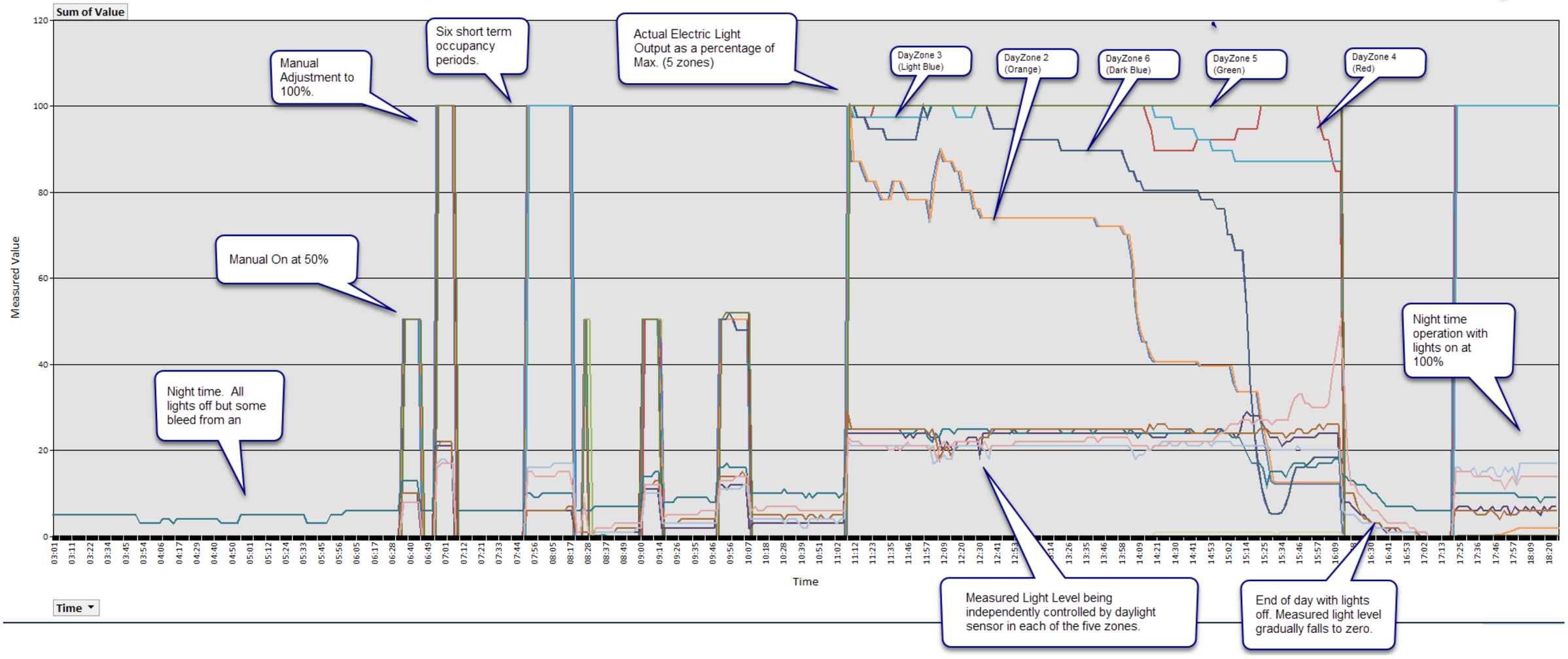


Zone 2 Trend – One zone from the composite analysis showing measured light (**red**), electric light output percent (**blue**), and adaptive setpoint (**green**). The trend starts at night and then covers five occupied periods before noon followed by a long period covering most of the afternoon and finally moving into night.

Starfield Lighting Automation LLC Boulder, CO 303.427.1661 www.SLAauto.com	SUNY Buffalo Medical Center Room 2130 Five Zone Daylighting Analysis			
	DayZone 2 Detail - Actual Level and Measured Light			
	SIZE: B	FSCM NO: 3079	DWG NO:	REV: 1.0
	SCALE: none	2/23/2018	SHEET: 2 OF 4	

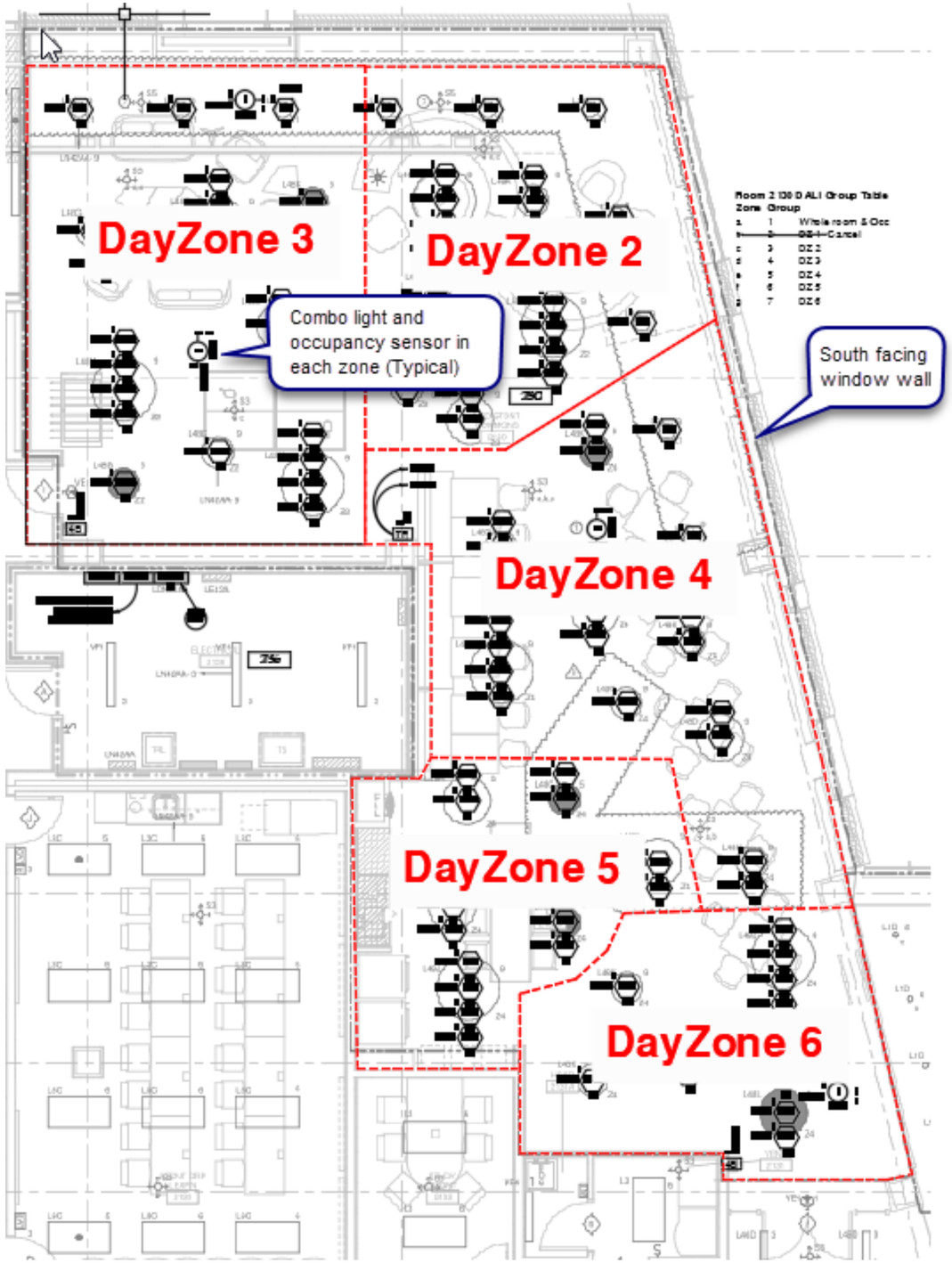
SessionID	Room	Config	DayZone	Date	CmdDesc
All	All	All	All	All	(Multiple Items)

ADDR: 20003, 20005, 20007, 20027, 20031, 20101, 20120, 20137, 20146, C20001, C20002, C20003, C20004, C20005, C20006



Five Zone Composite Analysis – Shows both measured light and actual electric light output in each zone over a daylong period with 8 periods of occupancy and user adjustment.

Starfield Lighting Automation LLC Boulder, CO 303.427.1661 www.SLAauto.com	SUNY Buffalo Medical Center Room 2130 Five Zone Daylighting Analysis			
	Composite Analysis - Actual Level and Measured Light			
	SIZE: B	FSCM NO: 3079	DWG NO:	REV: 1.0
	SCALE: none	2/23/2018	SHEET: 3 OF 4	



Five Zone Daylighting System

Starfield Lighting Automation LLC Boulder, CO 303.427.1661 www.SLAauto.com	SUNY Buffalo Medical Center Room 2130 Five Zone Daylighting Analysis			
	Reflected Ceiling Plan with Daylighting Zones			
	SIZE: B	FSCM NO: 3079	DWG NO:	REV: 1.0
	SCALE: none	2/23/2018	SHEET: 4 OF 4	