EMBEDDED CONTROL NETWORKING PIONEER
CONNECTING DEVICES INTO NETWORKS FOR 25 YEARS

1988
- Founded by AC Markkula

1990
- Launched LonWorks® control networking platform

1998
- IPO on NASDAQ

2000
- Honeywell selects platform for building automation
- Enel licenses platform for 30M+ smart meters

2005
- 1st utility to embrace smart grid solution platform
- Vattenfall

2008
- Selected by Philips street lighting

2009
- Siemens ships 1M room controllers

2010
- First China street light win

2011
- Duke Energy commits to platform
- Siemens

2013
- Lighting: Paris, Beijing, Cambridge, 600+ Cities/sites
- IzoT™ Platform (IIoT)

2014
- Lumewave Acquisition
- RF Lighting

Industrial Internet of Things (IIoT)

Powering 110M+ devices!
1000’s of Customers
WW
LIGHTING CONTROLS LEADER

Over 600 cities/sites and growing!
Over 2,000,000 Lights under control use LONWORKS

Paris  Oslo  Hanoi  Beijing
Proven RF products, experience, coverage for U.S. market with Manufacturers Rep Channel

Positions Echelon as a stronger independent controls provider

* Northeast Group
ENERGY SAVINGS WITH CONTROLS

Greater savings based on demand response such as peak usage times

50% Saving

20% to 35% Additional Savings
SMART LIGHTING CONTROLS

ENERGY SAVINGS

✧ **18,000** Auto Dealerships N. America (plus 3,000 Truck Dealerships)

✧ **$2.3B** in energy costs/yr. (Avg. **$110K+**/yr. per dealership)

✧ Avg. Auto Dealer profit margin 2.2% (2013)

Based on National Auto Dealers Association “Avg. Dealer Profile 2014, Esource, and Energy Star estimates
Wasted Energy - Lost Revenue: No controls results in over lighting during unoccupied, non-business hours

Reduce Over Lighting
- Eliminate complaints (too bright, light trespass) after LED upgrades
- Reduce light pollution - ‘Dark Sky’ requirements

Security - Enable alerts, both on-site and/or for remote monitoring
ADAPTIVE LIGHTING - LEDS ALONE NOT ENOUGH
UP TO 60% SAVINGS

- **Constant Light Output**
  - Potential savings up to 10%
  - Compensate loss of light output over time

- **Virtual Power Output**
  - Potential savings > 10%
  - Create any power lamp desired - avoid lock in to specific lamp - eg. 150W

- **Fixed time dimming & astronomical clock**
  - Potential savings > 25%
  - Dimming based on planned activity

- **Dynamic / Follow Me Lighting™**
  - Potential savings > 15%
  - Motion detected, lights ramp from dim to 100% in direction of travel, lighting path ahead
Wireless Outdoor Lighting Control Systems

Campus Level
Street, Pathway, Area, Parking & Exterior Building Lighting Control

TOP900 Wireless Control Module
- GPS Located
- Revenue Grade Metering (1%)
- 0-10V Level Control
- Multi-Level Step Switching
- Motion Detector Input
- Emergency Call Button Input
- Over-The-Air Re-programming
- FCC
- UL
- IP66 Rating

Control
- LED
- HID
- Induction
- Plasma (LEP)
- Fluorescent

IEEE 802.15.4

Software
- Scheduled Control
- Time of Day
- Astronomical Time
- Power Usage Logging
- Vacancy Response
- Demand Response
- Operation Monitoring
- Fault Diagnostics & Reporting

Gateways
- USB
- Ethernet
- Wi-Fi
- Cellular
KEY SYSTEM COMPONENTS

1. Wireless Control Nodes

2. Central Lighting Management Software LumeStar

3. Gateways
TOP900 SERIES RF LIGHTING CONTROL DEVICES

- Top900TN (Threaded Nipple), Top900TL (Twist Lock)
  - Now TLX (136.41 connector, samples)
- IEEE 802.15.4, 902-928MHz
- Operating Voltage: 120-277Vac
- Low Power consumption <1W
- RF Power +25dbm, 1+ Mile LOS
- Superior reach, noise immunity to Comp 2.4GHz
- 0 to 10V Dimming
- Integrated Photocell
- 345J Protection
- Zero Cross Switching
Lumestar Software provides local and enterprise level central management of all your facilities outdoor light fixtures.
LUMESTAR SOFTWARE
APPLICATION OVERVIEW - BEST PRACTICE

- Lighting Plan
  - Anticipate need for dimming, especially if upgrading light fixtures

- Ensure new fixtures are ‘controls ready’ with ANSI C136.41 connector

- Improve scheduling through astronomical clock or fixed time dimming
GROUP FIXTURES for selective 0-10V dimming – e.g. Brighter lighting for cars in forecourt or latest models, lower lighting in back lot

Unified Group Operation – improves security by bringing up an entire group of lights based on motion detector

Revenue Grade Metering – Enables monitoring of energy usage and fixture health for predictive maintenance, higher system ROI
LIGHTING controllers and Motion detectors in each fixture

- Motion detected by one controller is shared by all in the grid
- All Grid lights turn on
- After time out, all lights return to original setting—dim or off
USE CASE - VACA VALLEY HOSPITAL, CA

◆ Need
  – CPUC 2020 goal of 60-80% lighting energy consumption by 2020
  – Replace patchwork of induction, HPS and metal halide luminaires with Echelon’s Lumewave Lighting Controls and LED lamps
  – Ability to adjust lighting schedules, dimming, monitor energy use, receive automated alerts for maintenance

◆ Solution
  – Lumewave Top 900 RF OLC solution with MWX- LVE -90 Microwave sensors

◆ Benefits
  – Energy savings 66%
  – Lower maintenance costs
  – Improved safety, lighting quality- 88%
  – Positive feedback from end users
USE CASE - BIG RIG TRUCK PARKING

Need
- Reliable wireless connectivity
- Energy Savings, cost reduction
- Dimming controls, green initiative

Solution
- Implemented Echelon’s Lumewave Lighting controls on 122 Induction Lighting fixtures
- Parking lot and exterior of the complex

Benefits
- Cost savings – invested in controls vs. LED retrofit
- Ease of installation, set up of controls
- In reliable operation for 5 months
- Management software easy to use
**USE CASE - PARKING LOT, AUTO DEALERSHIP**

- **Need**
  - Energy Savings, cost reduction
  - Dimming controls, motion sensing

- **Solution**
  - Echelon’s Lumewave Lighting Controls, IR Motion sensor

- **Benefits**
  - 32% energy reduction
  - Added Video surveillance on same light pole
  - Ease of installation, set up of controls
  - Plan to expand to other locations with LED upgrades for greater savings
Echelon’s Lumewave products are tailored for the N. American market

Ease of install, user friendly software enable small to mid size applications- car dealerships, parking lots, malls

Proven, reliable RF solution

Established N. America customer base includes Universities, cities
Thank you!

Q & A

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