

## The Why behind the founding of RedBird LED

Jonathan Eppstein, September 25, 2019

In early 2005 I crystallized my vision that LEDs were going to be the future of all general commercial, industrial and residential lighting. These new LED lights would last longer, save energy, cutting global greenhouse emissions, while providing a superior full spectrum output.

Even though the state of White-Light-LED technology was still in its infancy, I was convinced that LEDs would be the chosen replacement solution for the current crop of incandescent, fluorescent and High Intensity Discharge (HID) lighting products. I did not come to this belief overnight, but after spending 30 years developing in electronic and electro-optical systems for medical applications and laser measurement tools. I had grown up watching LEDs evolve from the first reported infra-red devices invented by James R. Biard and Gary Pittman while working at Texas Instruments in 1961, which led to their seminal patent titled "Semiconductor Radiant Diode" i.e., the LED. Followed shortly by TI's introduction of the first commercial LED product (the SNX-100) in 1962 which emitted in the near infra-red at 890 nm wavelength. Simultaneously, the first visible-spectrum (red) LED was developed in 1962 by Nick Holonyak, Jr. while working at General Electric as reported in the journal "Applied Physics Letters" December 1, 1962. It wasn't until 1968 that an affordable, dim, red LEDs were commercially available as the result of a collaboration between Hewlett-Packard and Monsanto. As a teen aged budding electrical engineer, these were the first LEDs I used in various projects. While I found these tiny devices almost magical in 1968, I had no idea that 30 years later LEDs would be poised to revolutionize the lighting industry.

### **BLUE LED BREAKTHROUGH:**

On the path to develop a white-light LED, another key invention was required, a high output blue LED. This breakthrough occurred in 1993 when Shuji Nakamura of Nichia Corporation developed the device. These blue LEDs now form the core of all white light LEDs. (In 2014, Shuji Nakamura shared the Nobel Prize in physics for his contribution to the development of these devices while working at Nichia Chemical.)

As VP of R&D at SpectRx, a medical startup I co-founded in '93, I was one of the first buyers of Nakamura's revolutionary blue LEDs. In '97 I purchased 100 pcs, at the astronomical price of \$45.00/each. (Today's price on a better version of these LEDs is ~ \$0.025/each, an 1800-fold price reduction!) While \$45/each sounds expensive, they were still less costly the current blue light source required for the diagnostic system we were developing. These tiny LEDs replaced an expensive and short-lived system comprised of a fiber coupled, 500-Watt, Xenon Arc-Lamp (~4,500/each), a narrow band optical filter to pass only the blue light needed. This was then focused into the subject's eye where it induced a fluorescent response. The measuring this fluorescence had diagnostic value for detecting early onset diabetes. I still recall the excitement these new, intensely bright, blue LEDs created in the lab.

### **BLUE LEDs LEAD TO FULL SPECTRUM WHITE-LIGHT LEDs**

Researchers in '93 patented a white light LED which used the blue LED output energy to pump a rare-earth phosphor which converted a portion of the blue light to the green and red portions of the visible spectrum. Since that time, the phosphor converted white-light LED has been greatly refined and improved to the point where today's white-light LEDs are 3-5 times more efficient than the early versions, routinely operating at > 200 lumens/watt efficacy.

My direct experience with modern white-light LEDs started in 2003 while I was building a deck on the back of my house. With the structure completed, I wanted to add some subtle, tasteful lighting to be hidden under the deck rails. Of course, I went looking for a suitable LED Lighting system only to discover that nothing existed that met his requirements. Not to be deterred, and being an engineer, I decided to build my own LED Deck Lights. They are still running today. As folks stopped by they were impressed with the deck lighting. Many asked where they could get some of these nifty lights for their own outdoor lighting needs. This planted the germ of an idea in my mind.

Looking back, I can say unequivocally that when I built this first set of LED deck lights, I had no idea that this would ultimately lead to the creation of RedBird LED. Having sold my medical company, and not being ready to retire, I decided to start a company to build high-end LED Lighting systems. Thus, RedBird LED, Incorporated was born in 2005.

## **2005, REDBIRD LED IS BORN!**

White-light LEDs were rapidly evolving in these early days of the LED Lighting Revolution. Since its inception, the RedBird Credo can be simply stated as below:

1. Design and Build the highest quality LED lighting products available.
2. Stay in touch with the latest technical developments in the field to ensure we are always specifying and employing the best components in all portions of the Lighting System or Fixture.
3. Continually strive to ensure all RedBird products are operating at the very highest level of efficacy possible with real-world components.
4. Make excellent customer service our first and last priority.

When RedBird was founded in 2005, it was truly a pioneer in the Lighting industry being one of only a handful of lighting companies focused exclusively on LED products. Over this past 14 years, I have watched thousands of 'NEW' LED Lighting companies' pop-up only to flounder and disappear in a year or two.

### **What makes RedBird so special?**

#### **How did RedBird thrive, while thousands of would be competitors fell by the way?**

The simple answer to these questions lies in the RedBird's core values, background and experience. In those early days of the LED lighting industry (2005-2010), RedBird LED was one of the few startups which possessed the physics, chemistry and engineering skills required to succeed in commercializing LED technology for general lighting applications. In addition to technical skills, RedBird also had a founder with 25 years as a successful entrepreneur. We were able to keep RedBird on course through those topsy-turvy years, avoid the many technical pitfalls that waylaid others, persevere through the tough times, recover from the inevitable missteps and reinvent the company when needed.

In retrospect, it's clear that white light LED technology was not developed enough to support a successful LED Lighting company until around 2010. Since 2010, LED Efficacy levels have more than doubled, projected lifetimes are now commonly > 100,000 hours and the quality of the Spectrum Produced is now approaching that of natural daylight.

As RedBird LED forged ahead through these difficult early years, we continually improved our products, expanded our deep knowledge of the core technologies. At the same time, RedBird solved the logistical and supply chain issues inherent when working to commercialize a disruptive technology, which LEDs certainly were to the established lighting industry. By 2012, RedBird achieved international fame by becoming the first company to earn recognition on the Qualified Product List (QPL) of the Design Lights Consortium (DLC) for their LED Tube Light. The magnitude of this achievement was huge and brought global attention to RedBird. At that time, the general feeling within the LED industry was that the DLC set the Tube Light qualification requirements so high that they would be impossible to meet. Our announcement of this qualification at LightFair in 2012 literally shook the industry. **For more than 8 months RedBird had the ONLY LED Tube Light on the DLC's Qualified Product List.** In addition to the QPL listing, the our Cardinal LED Tube Light was recognized with the prestigious Progress Committee Award from the Illumination Engineering Society's (IES). The 'OSCAR' in the lighting world.

Throughout our history, RedBird products have consistently been at the highest efficacy levels of ALL products listed on the QPL. As commercial adoption of LED products increased RedBird refined our product focus to specifically target the commercial/industrial sectors of the market. Specifically, RedBird launched two new products, both built in our US manufacturing plant near Atlanta GA. These two products are:

1. The Stripit Kit®. An ultra-high efficacy LED Retrofit system designed to upgrade existing fluorescent fixtures
2. The Cardinal High Bay fixture. A complete luminaire designed to be a 1:1 replacement for the 400-watt HID fixtures commonly installed in warehouses, production facilities and big-box retail stores.

All RedBird LED products share the following key performance metrics:

1. **Operating efficacy of 190 lumens/watt.** This allows the RedBird products to deliver the required light levels with much less energy consumption than competitor products. (Typical efficacy levels in this type of competitor product run between 130 and 150 lumens/watt.)
2. All products are **100% Made-In-USA** and Buy American Act compliant.
3. All products have a **ten-year full replacement warranty.**
4. All products have an **operational lifetime of 100,000 hours**
5. All products have an LM80/TM21, **L70 point in excess of 240,000 hours.** (L70 point is defined as how many hours of on time an LED fixture can operate until the Light Output level has dropped by 30%. For the Stripit Kit® the L70 point is > 1,000,000 hrs.)
6. All products typically ship from stock in 2-3 days ARO.

#### **Other Noteworthy RedBird Facts:**

1. In 2010-2011 supplied the LED products for the largest multinational retrofit program for more than 5600 7-11 stores across the US and Canada.
2. Have supplied all branches of the US military as well as the FDA, Justice Department, USDA, EPA, VA.
3. Our Stripit Kit product line is covered by pending patents protecting the proprietary design and manufacturing processes.
4. RedBird worked with the customer to design and now builds the complete Light-Engine module for an OEM customer who installs the lights in large industrial clean rooms.
5. RedBird has 128 product listings on the DLC's QPL.
6. RedBird has both UL and TUV listings on its products.
7. RedBird's Founder and President holds 41 issued US Patents and more than 200 international Patents