Eric Grasshoff and Clint O'Conner are the principals of True Balancing.

Eric Grasshoff, the inventor of True Balancing, is an EE with 49 years of hands-on experience in design and development of electronic systems. Eric has strong experience in analog circuit design, as well as design of digital and mixed analog/digital systems. Expertise in low-level control firmware embedded in microprocessors and microcontrollers. Extensive experience in real-world product development including military worst-case design; medical device electronics; industrial and commercial electronic systems; verification & validation (V&V) of medical device software; and industrial design-to-cost for small size, low power and low production cost.

Eric has a BS in Physics from Texas A&M University.

Clint O'Conner manages business development for True Balancing. He has 34 years of experience managing development of new products and technologies in the fields of consumer electronics, medical devices, industrial controls, aerospace and automotive.

Clint has an AB in Applied Mathematics/Economics from Harvard University.

Eric and Clint are based in San Diego County, California.

True Balancing

Background of True Balancing

We became aware of the out-of-balance problem while developing a new product that is powered by a lithium-ion battery pack. It might be more accurate to say the problem hit us in the face.

We were preparing to test a new prototype of the product. We pulled a battery from the warehouse and connected it to the prototype – and the BMS presented a warning light that indicated a dead battery that could not be recovered.

The batteries in the warehouse had been in storage for nearly one year. During the storage period the cells had self-discharged at varying rates. The overall battery had a low SOC, and the SOCs of the cells varied quite a bit. We disassembled the battery and determined that the individual cells were fine. None of them were dead. Each cell, one-by-one, could be brought back up to full charge. But the battery had drifted into a state that the BMS could not manage, so the BMS indicated a dead battery that would have to be returned to the manufacturer for replacement.

We decided to look into this further, and that was the beginning of this venture. Our initial goal was to try to develop a charge management system that could bring a battery in this condition back to a fully charged, fully functional battery.

We subsequently redefined our goal: Completely eliminate the out-of-balance problem in lithium-ion batteries.

Our work on this problem led to the technology that is now called True Balancing. Extensive tests on three generations of True Balancing systems demonstrate unambiguously that we achieved our goal. True Balancing completely eliminates the out-of-balance problem in any kind of battery.

Additional testing has revealed benefits of True Balancing that we hadn't anticipated. True Balancing increases battery capacity, extends battery life, provides greater insight into the health of the battery – and more. Please visit www.truebalancing.com to learn about a technology that is raising the standards for what a battery management system can achieve.

Intellectual Property

US 10,910,847 – Active Cell Balancing in Batteries Using Switch Mode Dividers

Additional patents pending in the US, EU, Japan, Korea, China and India

Presentations

Presentation and demonstration of True Balancing at The Battery Show, Novi, MI, September 2019