

Livermore Branch of Curtis Keeps Electric Vehicles Running Smoothly

BY JEFF GARBERSON

A Livermore company that specializes in electric motor controls is among world leaders in providing the technology that allows golf carts, wheelchairs, forklifts and other electrically powered vehicles to accelerate and decelerate smoothly.

The company is a division of Curtis Instruments, a family-owned, New York-based company with about 1,000 employees worldwide and 2011 revenues of \$150 million.

The Livermore division employs 68 people. Its influence on the corporation is greater than its size suggests. The PMC Controller product line developed in Livermore accounts for roughly half of Curtis's revenues.

Accelerating and decelerating electric vehicles may be taken for granted. However, the technology is sophisticated and has evolved greatly in the company's 27 years of existence, according to Stephen Post, a Curtis vice president, board member and executive director in charge of the Livermore operation.

Post founded the company, then called PMC, that grew into Curtis-Livermore. Post himself is an inventor. That's not surprising to people who know him, given that he is the son of physicist Dick Post, a prolific inventor at Lawrence Livermore National Laboratory.

Stephen Post built his first electric car at age 12 using the six-volt generator from a 1952 Chrysler, which was then a modern car. Many years later, in 1984, he invented the first practical electric motor controller that used a sophisticated transistor technology called MOSFET, which was then beginning to transform integrated circuits.

Post received a career boost through association while working with another inventor, the late William Brobeck. Brobeck played a key role in designing and building cyclotrons for Ernest Lawrence on the Berkeley campus.

Brobeck hired Post and used his motor controller technology in a developmental hybrid car. He helped Post connect with a promising automotive propulsion research project at Lawrence Livermore involving the Laboratory's innovative aluminum-air battery. He also supported a start-up company that Post had created -- PMC, for Post Motor Controllers.

Curtis acquired PMC in 1985 after the little company came to its attention through a common client. Curtis was international by then, with offices in England and France. It had been founded in 1960, with an initial staff of four, by inventors Edward Marwell and Curtis Beusman.

Marwell became president and CEO after Beusman left the company in 1973. The company has remained in the Marwell family.

Curtis has always been known for high quality instrumentation. For example, Curtis instruments monitored electrical performance on NASA moon rover vehicles in the late 1960s and early 1970s.

Today, the company's Livermore division develops the control systems that enable electric motors to function smoothly. Its products are in demand. The local division hopes to expand from its present staff to 75-80. However, despite the slow economy, hiring is sometimes a challenge.

This is partly because the division has exacting standards, but also because some of its postings have an unusual requirement in the digital age: The ability to work with analog electronics.

Electric vehicles generally come with mechanical throttles. Drivers don't enter a number on a keyboard, they push or pull a lever to speed up or slow down or to move forward or in reverse. This is analog technology, in some ways a relic of the steam age. A fraction of Curtis's Livermore hires have to be very good at working with it as well as with today's digital technologies. It's a combination of skills that is not easy to find at a time when schools focus on digital.

The PMC controllers developed at Livermore are manufactured at plants in Puerto Rico, Bulgaria and China. They are sold worldwide. They are not simply off-the-shelf equipment but a technology that is increasingly integrated into a customer's final product. The "biggest part of our success" has been engineer-to-engineer interactions with customers, Post says.

Roger White, Livermore Engineering Manager, says, "We're being asked to be more full-service," not just provide a product. Frank Matheis, director of corporate communication in New York, calls the relationship an "absolute partnership" in which "our engineers from Livermore, especially the applications engineers, go all over the world to interact with customers."

Markets are pretty much everywhere people use electric motors to power small vehicles like golf carts and forklifts and wheelchairs. The major automobile companies tend to use their own equipment for production of very large scale products like the Toyota Prius. However, PMC motor controllers are used in the REVA, India's mass produced electric car.

Andrea Mokros, Division Services Manager in Livermore, says employees tend to stay once they are hired. The average local employee has worked there 12 years, she points out -- a sign that morale and working conditions are good.