CSI: news

A newsletter for employees and owners of Campbell Scientific, Inc.

Fall 2014

PRAGMATIC MARKETING

Paul Campbell

Led by Kevin Rhodes and other product managers at Campbell Scientific, Inc., (CSI) and also through training from a company called Pragmatic Marketing, Inc., that was presented to about 30 of us in the company, we are delving deeper into the first bullet of our mission statement, "Individual dedication to understanding the customer's needs." We usually take "customer" to mean someone who has purchased from us, but in this instance and in this article, a broader view is more apt, with the customer being someone whose need may be met through an offering from us. Let me take this opportunity to share some of my thoughts about the Pragmatic Marketing (PM) training and how it may be applied to CSI.

The PM training opened my eyes to the significance of potential contribution to the creative process through discovery of the customer's needs. In fact, I realize that I have thought about discovery more from the context of observing nature, or perhaps finding a solution to a problem I have faced, and rarely from the context of observing a customer to identify the problems they face. The PM tools that were put forward in the training offer a framework for organizing specific tasks and the progression of thought from observation of the customer's problems to definition of market needs and finally engagement of relevant technology to meet those needs. Observation and discovery of the customer's problems lead to under-

The optimum is achieved through the balanced combination of market discovery that improves the relevance of imaginative product design.

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PROTECTING SENSITIVE CIRCUITS

Evan Campbell

Fall of 1974—C-MOS logic chips were introduced shortly before Campbell Scientific was started. Low current drain was a huge plus for us, but C-MOS was sensitive to static discharge, which meant that they were easily damaged. Because of the low-current-drain advantage, C-MOS circuits were used in our first product. Learning how to protect these sensitive chips while circuits were assembled and tested became part of our journey. It is interesting to reflect on the procedures that were established that allowed us to effectively maintain the level of integrity that became our reputation.

A lot of our learning came from mistakes. Procedures were established as we found ways to avoid the mistakes. It was Eric's methodical approach that established our first rules for handling circuit boards. Habits were formed around this set of rules. Eric was diligent in policing our every move. I remember his instruction, "You must touch the surface on which the board is sitting in order to discharge any static build up before reaching for the circuit board, and you must do it right every time." He made sure that we knew that there were no second chances. When someone would hand a board off to another person, a skin to skin touch, to discharge any static build up, was critical. This quickly became an expected step in any exchange. "Touch first" became our motto.

As we moved from the basement of our parents' home, we rented office space on Second North. Our new office had shag carpet. A few steps on the carpet would produce a three inch arc between a finger and light switch. Needless to say, our new home was less than ideal for sensitive circuits. Even with the strictest of procedures this environment would not be recommended. However,

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METCOM AIRPORT WEATHER MONITORING SYSTEMS

Collin Daly

The aviation markets have always been an interest of Campbell Scientific, Inc. However, the high cost to obtain the U.S. Federal Aviation Administration (FAA) certification and the strict operational stipulations have kept us historically at arm's length. However, our group companies operating outside the FAA regulations have a different set of standards to meet, and these standards allow for a more participatory role in this market. Campbell Scientific, Ltd., (CSL) has been active in the aviation market for a number of years and is ready to take a much larger step as they expand their offerings into the broader global aviation market.

CSL has been growing their line of products in this market with recent commitments in both hardware and software. Hardware they offer includes the CS140 Background Luminance Sensor, CS125 Visibility/Present Weather Sensor, CS135 LIDAR Ceilometer, and PWS100 Present Weather/Visibility Sensor. They have been updating their aviation software and communications offering, called Metcom.

Metcom, put simply, can be at the heart of all-things-weather at an airport. From meteorological monitoring, to collecting, reporting, and communications, the Metcom software and hardware package has been in use for over 20 years. The legacy Metcom version is in use at most major airports in the U.K., such as Birmingham and Heathrow International, and many smaller airports. Metcom provides air-traffic controllers and other airport personnel with real-time weather and other airport information, such as runway conditions, to help make critical decisions. The legacy Metcom system conforms and operates to the standards defined by the International Civil Aviation Organization (ICAO) and the Civil Aviation Authority (CAA).

Over the past two years CSL has been completely rewriting the Metcom software and redesigning the hardware. The original Metcom software has seen incremental updates, but not any major reworkings in quite some time, and it needed some refreshing. What transpired was a complete rewrite from the code underpinnings to the polished user interface. And the Metcom update is more than just software. Additional new hardware has been created. The brand new Metcom Controller simplifies the deployment of arrival and departure Automatic Terminal Information Service (ATIS) information, which is a continuously updated audio broadcast loop of weather data, runway access, hazards, and other pilot information obtained through a pilot's microphone keyed input known as push-to-talk. CSL has also designed a brand new instrumented runway visual range (IRVR) controller that is built around a Campbell Scientific datalogger and serves as an input controller for processing and displaying of an IRVR system and is compatible with the Campbell Scientific line of aviation sensors. Both of these new hardware units are mountable on 19 in. racks.

Metcom is also highly scalable. A small airfield may require only a simple logger-based solution (Metcom Solo), while medium-sized airports would prefer a single PC with a touch interface (Metcom). Large commercial airport operations, such as hubs and international airports, will appreciate the rack-mountable, dual-server configuration with automatic failover (Metcom Server).

Sensor input into Metcom is flexible, accepting input from RS-232, RS-422, RS-485, or IP. Feeds can be brought in individually or aggregated through a Campbell datalogger. Meteorological sensors can include the standard meteorological suite of aviation sensors, such as air temperature, relative humidity, wind speed and direction, and barometric pressure, plus aviation-specific sensors such as cloud-layer heights, vertical and horizontal visibility, present weather, and instrumented runway visual range.

The Metcom interactive display is where it all comes together, and the new interface is clean and the graphics are meaningful and engaging. The Metcom interactive displays present a large amount of data broken down into smaller, customizable, easy-to-read screens, and only the data required by the specific operator is presented. The display can range from a touch-screen interface using an HTML5-supported tabbed browser such as Internet Explorer, Chrome, or Firefox, to large-screen passive displays, or distributed using multicast video over IP.

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Pragmatic Marketing—*continued from page 1*

standing needs, and ultimately to finding the best solution possible.

Eric Campbell, who founded CSI along with Evan Campbell in 1974, was gifted with the ability to observe customers' problems and needs and at nearly the same time envision creative solutions using available technology. Observations about customer problems and relevant technology are shared between application engineers and design engineers working shoulder to shoulder to feed each other's awareness in the process of developing new products. So we have a background of culture that takes into account many of the tasks in the PM model as we work on new product design, but the process has been rather informal.

Our customers do not usually have the same depth of understanding as we do of possible technology, and so our customers may not know what they want in a future product until it is available, either from us or from a competitor. Companies that exclusively follow their customer's lead nearly always find themselves lagging the market when a competitor offers a product the customer didn't know they want until they see it. An analogy of playing ice hockey comes to mind. One must be aware of where the puck is (analogous to customer's present need), but skate with anticipation of where the puck will likely be (analogous to customer's future need when new product will be available) to compete effectively.

Our challenge is to find the real, economically compelling needs that are pervasive among customers, even needs they may not yet perceive or fully understand, and our imaginative solution to meet those needs. There should be:

- Active exploration and discovery through observation of customers' practices and problems
- Consideration of the adequacy or inadequacy of existing available products
- Analysis of our competitive successes and failures
- Understanding of our distinctive competencies
- Assessment of competing offerings
- Up to date knowledge of appropriate technology that will address market needs

The optimum solution is neither product-driven nor market-driven to the exclusion of the other. The optimum is achieved through the balanced combination of market discovery that improves the relevance of imaginative product design. Implementation of PM tools may not require more travel or different labor resources than we already have. In the first instance, the tools will help us structure our work and be more aware of opportunities to capture observations of customers in their work environment and share those observations in ways that lead to better identification and understanding of pervasive customer needs.

Our culture of focus on excellence of product design has served us well, and it can be improved with the addition of PM tools aimed at discovery of market needs. I hope that we can bring about an improvement in our culture through communication of and respect for the inputs of both marketing and engineering in solutions that make Campbell Scientific the supplier of choice.

Protecting Sensitive Circuits—*continued from page 1*

for the next year we conducted business, putting together circuits and testing them in that office.

Our present-day procedures include conductive totes and bags. The floor and work surfaces are made of conductive material and are connected to a common ground. Workers wear conductive heel straps. The integrity of systems and procedures are routinely checked. The depth of present day procedures leaves one to wonder how we were able to function at all in that office. Needless to say, there are some of our employees where the habit of "touch first" is still remembered.

Metcom—*continued from page 2*

Airport integration of a system such as Metcom is a large undertaking. Due to the regulatory approval processes and proper safety requirements, an airport can take anywhere from a few months up to a year to completely integrate and install the full Metcom Server system. With this in mind, the Metcom solution is designed to be a flexible system, a system that can be installed in an existing airport with existing architecture or a new installation where equipment may not have been in place previously. The Metcom system has the integrator in mind, with a comprehensive configuration tool built in, allowing for specific site characteristics and tailored operation definitions.

The new Metcom solution is in beta test and has not been released as of yet, and pricing is being considered.

CAMPBELL SCIENTIFIC DO BRASIL

Andrea Deho

2014 was a very successful year for Campbell Scientific do Brasil (CSB). The increase of CSB datalogger sales compared to the previous year was significant, more than twice the 2013 sales, having reached the milestone of over 900 units of the various models manufactured by Campbell Scientific. Just to give the readers an idea, the numbers below express the number of loggers sold during the last fiscal year. It is a lot, and the numbers reflect the support received from Campbell Scientific USA and the enormous efforts of the Campbell Scientific do Brasil team.

MODEL	LOCAL	INTNL	TOTAL
CR1000	46	158	204
CR200X/206X	50	34	84
CR3000	2	13	15
CR6	2	0	2
CR800	173	466	639
			966

Not least, the sales of sensors, transmitters, and accessories grew as well, allowing Campbell Scientific do Brasil to supply complete and integrated solutions to our clientele. Sometimes our small office looks even smaller than it is with all these enclosures around, and people seem to hide behind it all. But in the end, Campbell do Brasil used our skills and resources to complete satisfactorily, within the contractual deadlines established by the clients, all the jobs related to the purchase orders we had received, being small or big orders, simple or complex, including importation, production, integration, testing, field installation, technical support, etc.

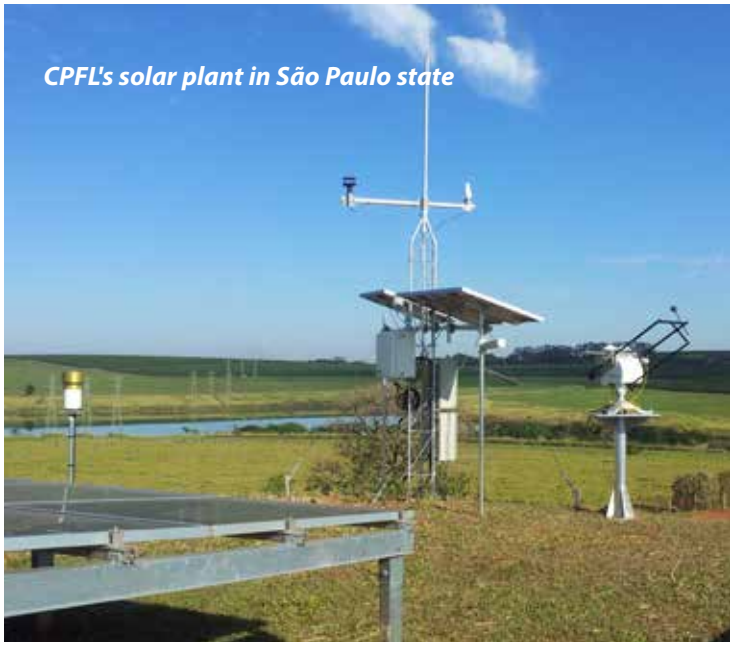
During 2014, the main areas of activity at CSB were geotechnical projects, hydrology, meteorology, renewable energy, and research. Some of the main projects developed during 2014 by Campbell Scientific do Brasil are as follows.

Natural Disaster Monitoring

Prototype tests at CEMADEN

For some years now, Brasil has suffered from environmental disasters caused by climate changes, improper land use, long droughts, floods, landslides, and air pollution, besides other causes. Campbell Scientific do Brasil was hired by CEMADEN to supply 115 hydrological stations for flood warning—including Campbell Scientific Canada's CC5MPX camera—and 135 geotechnical stations for landslide warning with Sentek's 3-m-long soil-water content profiler, with the purpose to warn the populations that live close to risky areas.

Campbell Scientific do Brasil also signed a contract with a local integrator called Tecnal, who is supplying 550



CPFL's solar plant in São Paulo state

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CSB—*continued from page 4*

soil-humidity stations to CEMADEN, using our CR800, to monitor the drought in the semi-arid region of north-east Brasil that is causing significant losses to the local farmers and agriculture in general. Besides other sensors, this specific project uses 1,100 model C-50 soil-moisture sensors, manufactured by Decagon.

Solar-Power Prospecting

Solar Station at Arena Pernambuco stadium

2014 was also very good for business in renewable energy, mainly in solar power prospecting for electricity production, when Campbell Scientific do Brasil sold over 20 complete solar stations, combining Campbell Scientific and Kipp & Zonen equipment on the solutions offered, including CR1000, SOLYS2 solar trackers, second-class pyranometers, and remote GPRS and IRIDIUM data communication.

Soccer fans were also able to visit the solar-power plant that supplies electricity to the Pernambuco Arena located in Recife (Pernambuco State—Northeastern part of Brasil) during the soccer World Cup last June-July 2014. This was an important project for Campbell Scientific do Brasil in the field of renewable energy, but it also made a mark in the field of sports and represents the second project in large stadiums where Campbell Scientific products are installed.

A view of Fernando de Noronha Island

One of the most beautiful Brazilian ecotourism paradises is Fernando de Noronha Island. It is a group of 21 islands, located 543 km (~338 mi) East of the Northeast Brazilian coast, with very limited fresh-water and electricity sources. Campbell Scientific do Brasil has a presence in Fernando de Noronha after supplying a solar station for the only solar-power plant, as well as a water-quality station to monitor the fresh-water reservoir.

Much more was done and many other systems were sold in Brasil! These are just some few cases of Campbell Scientific do Brasil activities during 2014. Our reduced 15-person team, working in conjunction with Campbell Scientific in the USA and other local and international partners, allows Campbell Scientific do Brasil to do a lot and to get proper recognition from the market, opening new opportunities for 2015.

Staff at Campbell Scientific do Brasil

INSTALLATION OF A COMPREHENSIVE PRECIPITATION MONITORING STATION ON THE QUELCCAYA ICECAP, PERU

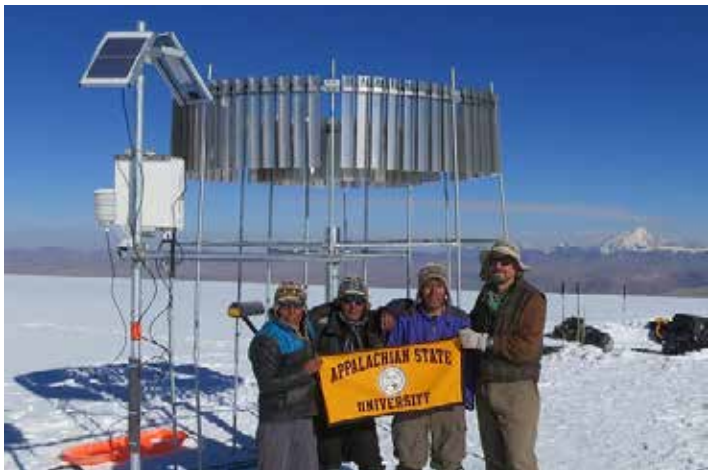
Baker Perry, PhD, Appalachian State University

[Note: Dr. Perry's stations make use of many Campbell Scientific products: CR1000 dataloggers; CH100, BP21, and BP24 power products; SP10 solar panels; SR50A snow-depth meter, CS300 pyranometer; HC2S3 temperature and humidity probe; 05103 wind monitor; TX320 GOES transmitter; RF401 radios; and NL200 network interfaces.]

Introduction from ICECAP website: Integrated Climate Research and Education: Central Andes Precipitation Project (ICECAP) is a five-year project initiated in the Spring of 2014 with funding support provided through the National Science Foundation. The project is part of a larger research effort in the tropical Andes Mountains led by researchers at Appalachian State University. ICECAP promotes collaborative interdisciplinary research, education, and outreach activities designed to advance scientific understanding of the multi-scale atmospheric processes responsible for precipitation delivery in the tropical Andes Mountains.

We have now completed the installation of a comprehensive precipitation monitoring station at 5,650 m (18,537 ft) on the Quelccaya Icecap in the Cordillera Vilcanota of Peru. The Quelccaya Icecap is the largest glacier in the tropics and an important site for the study of past climates, using ice cores.

On our initial expedition in early August, our team consisted of project collaborator Dr. Anton Seimon, Felipe Crispin, David Crispin, and Christian Crispin. We (well, mostly the Crispin crew!), hauled over 225 kg (500 lb) of equipment to the summit, including lots of galvanized steel pipe to mount sensors and for the construction of the double alter shield that results in more accurate measurements of snow in windy conditions (e.g., Rasmussen et al. 2012). Temperatures bottomed out at -11°C (12°F) the first night and we were confined to our tents for two hours on the second day due to thunderstorms and heavy graupel. Although we were not able to complete the installation of the station in August since many of the sensors were held up in customs in Lima, we did finish the installation of the double alter shield. The Crispin crew was absolutely amazing and Anton and I were consistently humbled by their persistence and work ethic in very difficult conditions.



On 11 October, I returned to Quelccaya with Felipe, David, and Christian Crispin, project collaborator Dr. Doug Hardy from the University of Massachusetts (who also maintains a blog on Quelccaya), a team from the Paul Scherrer Institute in Switzerland, and a group of high-mountain guides from Vicencio Expeditions. Doug operates a meteorological station on top of the Quelccaya Icecap and another station atop Mt. Kilimanjaro in Tanzania, so he made a visit to service his station and raise it up in preparation for the upcoming accumulation season. The Swiss group planned to extract a 30-meter shallow ice core to analyze a variety of chemical and isotopic parameters spanning approximately the past

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Featured Employee—Lynne Ruiz

Brittany Batt

I met Lynne Ruiz in April 2004 when we were both hired on at the Hampton Inn here in Logan. The hotel wasn't quite open yet and all of us front desk employees got to see what it was like to open a hotel from scratch. Throughout that time I learned that Lynne was a travel guru of sorts. She managed a travel agency full time and only wanted a few shifts at the hotel on the weekends in order to get the coveted employee rate at Hilton brand hotels. Lynne and her family travel a lot, so this way of getting a great discount on hotels is some pretty smart thinking on her part.

Lynne started her career in her teens at her family's travel agency. From there she worked her way into travel agency management at Morris Murdock, which gave her the skills she needed to land her job here at CSI in January of 2009. Lynne is a true workaholic, someone you'll typically find hard at work here well after 6 p.m. She is a very detailed and thorough person, and that, along with her great personality, makes the perfect travel and exhibit manager. Lynne is just the right person to help keep our CSI travelers in line as she knows all the ins and outs of travel, often thinking about the little details to help prepare them for their trips. She cares about what she does and it shows through the many successful trips that have been made. Among the many duties that come with travel and exhibits, Lynne also works as an administrative assistant to corporate executives, and coordinates the annual group company and integrators conferences. Lynne has also lent her talented hand to numerous party committees through the years. No wonder she works late!

Lynne is a Southern California girl that moved to Logan, Utah, in 2000. Lynne is married to her lifelong sweetheart, Ruben Ruiz, and they have twin boys, Garrett and Cameron, who are seniors at Logan High. Cameron and Garrett are both busy prepping for college at USU with numerous AP classes. They are so committed to school that they often decline the many classic rock concerts that the family loves going to together. Just this year, Lynne has seen Rush, Styx, The Eagles, Elton John, and many others. They also love to travel. Lynne has been to more places than I can count. At the current moment that I'm writing this, Lynne has been enjoying Disney World in Orlando and from there, departing for a 7-day cruise to the Caribbean.

Installation—*continued from page 6*

several decades. My main task was to complete the installation of the comprehensive monitoring station, which involved mounting additional pipes, installing the sensors, and loading the program for the datalogger. It was a significant challenge to complete the installation, as the sensors needed to be installed approximately 3 m (9.8 ft) above the current snow surface to allow for accumulation during the upcoming year. Therefore, I spent considerable time above the snow surface balancing on horizontal pipes in windy and cold conditions! We completed the installation on 14 October, and I am able to monitor the current conditions and station status using satellite telemetry via the NOAA GOES satellites. I plan to make one more visit to Quelccaya in November before returning to the U.S.

The data from the Quelccaya station will be very helpful in improving scientific understanding of precipitation processes and patterns, the meteorological influences on chemical and isotopic properties preserved in the snow/ice, and the influence of precipitation on glacier dynamics in the region.

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HALLOWEEN AT CSI