



Custom Application Development Finds a Home in Vermont

by Denny Atkin

When you're seeking an innovative development house that can tackle custom handheld applications ranging from clinical charge capture to timing Indy cars, you'd probably think to look in California's Silicon Valley. Or perhaps in New York's Silicon Alley. But Vermont's Champlain Valley? That's where we found the first subjects of our new developer profile series, in which we'll regularly take a look behind the scenes of creating handheld software for the enterprise.

Green Mountain Software is nestled next to the huge Lake Champlain. Looking out the office windows, the sharp blue lake and the looming Adirondack mountains compete for your attention. In this beautiful Colchester, Vermont location hides a company that was one of the pioneers in handheld software development.

Green Mountain Software started life in 1993 as an Apple Newton developer, tackling cutting-edge technologies such as wireless data collection long before Palm announced the Pilot 1000. Today the company develops for both the Palm OS and the Pocket PC. While some of its products are utilitarian (but important) data-collection apps, others such as AdAlive's "viral" airport-based infrared marketing application are on the cutting edge. Sitting down with company President Lou Krieg and Vice President Ann Pettyjohn, it's obvious that, while the handheld market has changed dramatically since the Newton days, it's never gotten boring.

Variety is the Spice

Green Mountain Software's creations for the Palm OS range from consumer programs developed for a variety of clients who then market them under their own name to extremely specialized industrial applications. The Baseball and Football Statware programs created for Digital Scout, for instance, are real-time statistics collection applications for baseball and football. Pettyjohn says that Digital Scout's statistics and scouting products are used by thousands of high school, club, and youth teams, in addition to collegiate and professional programs. This



Lou Krieg's desk sports a wide variety of handheld computers, old and new.

easy-to-use Palm app lets scorekeepers tap in game events as they happen, and then pull out extremely detailed team and player statistics.

On the specialized end of the scale is a bootstrap loader for soft drink machines. The client was responsible for maintaining soda machines, and updating the software used in refilling the dispensers. Previously, service technicians had to lug around laptops to the machines in order to update the dispensers' firmware. Now, with the Bootstrap loader software and a special cable, the technicians can just carry along an inexpensive Palm handheld and a special serial cable. They attach the Palm to the soda machine, launch the app, and follow an onscreen checklist that walks them through the firmware download. Now a \$129 Palm m100 can do the job that previously required a more expensive—and more fragile—laptop computer.

One of Green Mountain Software's most intriguing recent projects is the application it built for AdAlive.com, a Waltham, Massachusetts company that's installing infrared transmitters next to hallway billboards in airports. Palm users with time to kill between flights can stop at one of these transmitters and download restaurant, hotel, and recreational information, as well as (and this is the "killer app" part) their email. To simplify the beaming process, the software that Green Mountain built first loads a small application that can then receive the city guides, email, and other information without the user being forced to manually "accept" each component as it's beamed down. The system is currently undergoing testing at the JFK and Pittsburgh airports.

Racing into Handhelds

As slick as the AdAlive.com project is, it's only one of the company's most recent forays into pushing the innovation envelope. Long before people started talking about rolling out 802.11b, Bluetooth, and other currently trendy wireless networks, Green Mountain built the Shot Logger app for Production Magic, which was a wireless video logging application for the Apple Newton. More recently, the company built a networked application, NewTrak, for the Indy Racing League that tied together dozens of Newton handhelds with a central database.

"In the auto racing world there's actually a scoring person acting as a manual backup for every car on the track," Krieg explains. "So there's a person who's writing down the time of the master clock every time that the car they're scoring goes by the start-finish line. Those manual paper records were ultimately used to reconstruct the history of the race and determine who the winner was. But it took until the next morning to do that, after which time it was apparent the wrong person was in the victory lane celebrations, and it's obviously very difficult and very embarrassing when that sort of thing happens as it has from time to time in the history of racing.

"So the Indy Racing League came up with a very innovative idea—to utilize Newton handheld computers for every scorer, feeding the data into a central scoring computer so that the system gave them information in real-time. And they could catch errors on the part of the scorers. They could also catch errors in the electronic timing and scoring system and basically have the back-up information there constantly throughout the course of the race. At the end of the race they have a very high level of confidence in the quality of the data they have."

Krieg is a racing fan—his desk sports a few car models—so it's not surprising to find he found this more exciting than the typical data capture custom app.

"It's really quite astonishing. It's one thing to sit in your office and to write software and know that people are going to use for keeping track and scoring of an auto race.



Green Mountain Software developed this app for Adalive.com, which lets you download city guides and email from infrared transmitters in airports.



adAlive.com's Boston city guide.

ProScore Golf & C.		7/25		📶	
HOLE	◀▶	1	2	3	(Tot)
Blue 71.2/130		322	145	456	3057
HDCP	◀▶	16	18	2	(9)
PAR		4	3	4	35
5	Lou W	5	3		8
14	Don W	4	4		8
11	Gary B	6	5		11

When the client started testing the ScoreCard app Green Mountain developed, he discovered some of his old manual golfing scorecards contained errors.

Developer Profile: Green Mountain Software

Game Information										
Date:	5/14/01			* Final *						
V:	Atlanta					H: Houston				
	1	2	3	4	5	6				
V:	0	4	0	0	0	1				
H:	0	0	2	0	0	2				
	7	8	9				R	H	E	
V:	0	0	0				5	12	0	
H:	2	0	0				6	7	0	
Scorecard Done Pitching Stats										

The Baseball Statware app created for Digital Scout.

In: 1 Outs: 0 Bat: 02 V										
1B	Tap field where ball hit:					Out				
2B						FC				
3B						DP				
HR						TP				
BB						Err				
iBB						K				
HBP						Sac				
OnBs						Other				
0	RBI	B	B	B	F	S	S	Pitches		
OK	Double					8				

The Baseball Statware app lets scorekeepers enter plays with just a few steps.

Then you actually go out to the track and there are 30 odd scorers, all sitting there with handheld computers with your software running on it all networked into a central timing and scoring computer. The green flag falls and suddenly you have cars that are lapping the track 21 or 22 seconds a lap—and things are happening very, very fast. The scoring captains are running around checking on people's manual scoring and looking at the electronic scoring and looking at the data that's coming out of the system that you wrote the software for and trying to determine whether it's all in synch or not. It's quite an incredible fire drill for up to a couple of hours during a race and there are really few breaks in the action.

"So it's kind of controlled pandemonium, something that you don't get to see from the software development side of things very often."

Conquering the Wild West

Today's market has changed, of course. In the Newton era, both developers and clients were in learning mode.

"In the early days we were working almost exclusively with people who were into the Newton, and were very much early adopters and often were private individuals who saw the incredible potential of mobile computing," Krieg remembers.

"They came up with very innovative and ambitious ideas, but they were generally self-funded and were trying to do very ambitious things on a limited budget. They had their dream application that was going to revolutionize the world, whether it was in health care, video production, print estimating, you know, all over the map. It was very exciting to work with those folks, but they were working on very constrained budgets. We were all kind of naive about it and we were trying to get proof-of-concept systems put together as quickly as possible."

Since those days, Apple prematurely euthanized the Newton, and it's currently Palm and Microsoft duking it out in the handheld arena. Many of the clients are the same, but the design and development processes have matured.

"Now, we're really dealing much more with a mainstream client that has real expectations of putting a product out into the marketplace or deploying it enterprise-wide, and we've essentially gone from toy projects to real working production systems with all the expectations and attendant obligations that that entails. We've gone really from a nascent market to pretty much mainstream development where there's still learning going on, but people have very conventional expectations about budget, schedules, reliability of the systems, and their ability to deploy them cost-effectively. It's a little bit less of the Wild West and now more of mainstream product development."

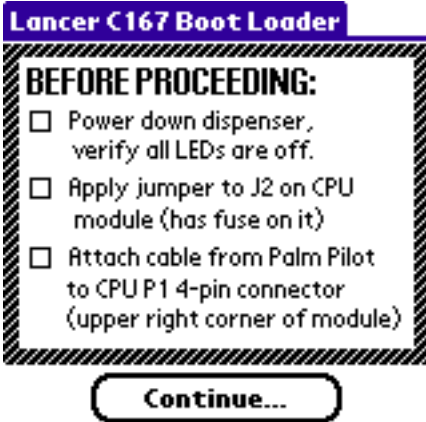
Of course, there are still many clients just now deploying handhelds, and they're occasionally surprised by the differences compared to desktop deployment.

"I think most clients are surprised by the cost of software development," Krieg says. "In many cases our clients have been developing software for years in-house, but come to us to develop handheld software for them, whether it's for enterprise use or for resale."

"Handheld development is still a very specialized business, the development tools and environments are not yet at the stage of desktop systems. So, for example, people who have been accustomed to running IT shops doing VB and database programming for years are pretty surprised to find out what a custom handheld solution takes to develop.

"A big component of that is communications, which is a completely new aspect for a lot of clients," Krieg explains. "They understand what it takes to put together an appli-

Developer Profile: Green Mountain Software



The app created to update firmware in soda machines includes an easy-to-use checklist for the technician.



The Boot Loader application lets an inexpensive Palm replace a laptop for in-the-field firmware updates.

tion that runs in a networked desktop environment where you have full-time connectivity to your databases. But it requires a very different architecture when you're going to take a part of your database away, work with it all day in a mobile computing environment, and then ultimately have to synchronize those changes back with your systems. And most cases we end up working with legacy databases that may not have been designed really to accommodate that kind of an operational model. It's just not building the handheld app, it's all the things that you need to do around that to make it work as part of your legacy system."

Green Mountain Software's current projects are split between Palm OS and Pocket PC; the exact breakdown varies from month to month. Krieg says that companies looking for consumer applications gravitate to the Palm first because of its overwhelming market penetration. In the enterprise market, there's usually more initial discussion of which platform will work best.

"Many of the vertical app folks are trying to do very sophisticated things, and there are still the challenges of memory and screen size on the Palm," Krieg says. "Loading large amounts of data is difficult on the Palm OS." Krieg also says a bigger screen—not just a higher resolution screen—would be welcomed by enterprise clients.

Inexpensive Homes and a Long Ski Season

We asked Krieg if he had any advice for developers considering entering the handheld market. "I'd say you've missed the window," he warns. "We got involved in this starting in 1993, got to make all of the mistakes before it became too costly, and now that this is a rapidly maturing market, you should go find some other entry level market to attack." If that doesn't phase you, though, Krieg has one more question for you. "Have you ever considered the advantages of living in Vermont?"

"We often hear how hard it is to recruit great high tech people here in Vermont," says Ann Pettyjohn. "We feel imminently lucky to have the crew that we have here; Green Mountain Software would not be what it is today without the energy, dedication and immense talent of the people who work with us here."

Green Mountain Software remains a relatively small company, with seven employees including Krieg, Pettyjohn, and programmers Tom Jaros, Suzanne Gagnon, Steve Little, and James Wanner, Ph.D. Yet its products are in use worldwide, on Indy tracks, on the set of This Old House, in hospitals and ambulances, on golf courses, even in department store security systems.

"One of the most enjoyable and fun aspects of this business is that we've worked with clients in so many diverse industries from emergency medical services to food safety inspection, sports scoring, security for stores, to video logging," says Krieg. "It's just all over the place. You're constantly learning, and that's what really makes it exciting and fun. You rarely do the same thing twice."



Green Mountain Software's Vermon location offers a unique working environment.