



Customer: Prototek Corporation

Location: Seattle, USA

App Name: Transmitter Locating Solutions

App Function: Transmit location from any location including from within steel pipes

Industry: Utilities, Petroleum, Engineering, Machine and Process Control

Developed on: Mac

Deployed on: Radio Transmitter

Result: Solution of choice

About:

Prototek is a leading Engineering Research Design and Product Development company.

Business Need:

Develop a low cost way to transmit a signal from a steel pipe

Benefits of LiveCode:

LiveCode is the easiest language to use. It is ideal for software testing; systems can be developed in a fraction of the time it would take using traditional languages, thus delivering significant financial savings.

Transmitter Based Location Solutions to Detect Blockages in Pipe Networks used by Utility and Petroleum Companies

Introduction

In the Utility and Petroleum industries speed and accuracy for detecting the exact location of a blockage within a steel pipe network is vital for maintenance and production purposes, delays can be very costly. ProtoTek has created the market leading blockage detection solution and built it using LiveCode.

Charlie Faddis, Technology Director and co-founder of Prototek Corporation chose LiveCode to create a low frequency radio receiver, which runs on a virtual machine on an embedded chip. This device is pushed through pipes to clean them and is used to locate the plug if it gets stuck. He wrote both the radio frequency receiver and the virtual machine for the embedded device using LiveCode.

"In the USA when you see the lines painted over the streets by Utility companies undertaking maintenance works they have usually used our technology to detect the correct location in the underground asset.

Prototek make the only radio system in the world that will transmit through solid steel. Most physicists will tell you that that's impossible because it's a Faraday cage. However many Utilities companies such as the petroleum industry requires this because their pipe lines are made of thick steel and they have to put plugs in the pipes to clean them. They'll push these foam rubber plugs through the pipe for 10, 20 or even 50 miles to clean the pipe. If the plug gets stuck then they have a very serious problem because it takes that line out of service until they can find the plug. They've had to dig up as many as 10 miles of pipe in order to find the problem."

"So we designed this transmitter that goes into the plug, using a very low frequency of just 16 Hz. Now the problem with building a radio receiver at that frequency in hardware is that it would have to be the size of a skyscraper and not terribly portable! So we had to build that receiver in software rather than in hardware. We built that receiver in LiveCode and it functions very well. We're having trouble keeping product on the shelf because it's functioning so well"

"The receiver runs on the embedded microprocessor. We had to change the target machine of LiveCode in order to get it to run on that microprocessor. So we constructed a virtual machine that would have the foundation we needed to execute a subset of the LiveCode language.

"It took about a week and a half to write the virtual machine, because we built the virtual machine itself using LiveCode. It really is the world's easiest programming language!"

"The three most important aspects of programming are testing, testing, testing. The wonderful thing about LiveCode when using it for development on something like a microchip is that it's so easy to add a new test. My development screen is split up so that around about 80% of the screen is devoted to testing functions, with the remaining 20% dedicated to writing and debugging code. So if I conceive of a test I simply drag and drop a button onto the screen, it talks through the USB port to the chip and I can run a test. Once I've defined that test it's always there right next to the source code. If I modify that source code a year from now all I have to do is click that button and it will run that test. Some of those buttons are sliders, maybe a field of data that comes back."and look at the waveform and say that you need to adjust one coefficient or another."

"Given we are working with radio waves in real time, one of the key things we needed was to create a graph like an oscilloscope. So we inserted a feature that looks like a breakpoint you put in a source code. But it's really what we call a probe point, because a breakpoint stops the code but when you're processing radio signals in real time you really don't want to stop execution. The probe point causes the handler to send data back through the serial port asynchronously in the remaining machine cycles that are available in our embedded chip. The interrupts take care of the main processing so whatever extra capacity the process has can be used to transmit that data back and LiveCode beautifully graphs it in color just like an oscilloscope with waves. My analog engineer can come over

Charlie Faddis, Technology Director and co-founder of Prototek Corporation

"If we had chosen C++ to undertake this work we would be looking at year or two of effort to design such a thing. And we were way over budget and behind schedule. So I said, we're not going use C++, we'll do it in LiveCode and get it done in about 8 weeks. Which we achieved – well perhaps in 12 weeks!"
"Thank you for a great product. It has saved me hundreds of thousands of dollars of engineering budget. No question about it."



About RunRev

Founded in 1997, RunRev is a technology company committed to making scalable software development fun, easy and accessible to everyone. To achieve this RunRev has created LiveCode.



About LiveCode

LiveCode is an award winning, high level, cross platform, integrated development environment. Its compile free work flow and highly efficient single code base enables Apps to be developed on Windows, Mac and Linux and deployed on all popular platforms including Mobile, Desktop, Cloud and Server. LiveCode is used around the world by organizations of all sizes to solve real world business problems.

Today millions of people use Apps built using LiveCode.

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