

TWO SUCCESSFUL COMPANIES CROSSING THEIR ROADS

COSYLAB BECAME A NI ALLIANCE PARTNER

New Year is usually the time for all sorts of improvements resolutions and time to pave a road for great plans. In our case the timing is a pure coincidence, but this is how the Cosylab company actually started the year 2008. Once you respect your customers, understand their needs and strive to provide solutions customers endorse, you go along the right path towards the vision we all aim.

Let's describe for a moment another success story. The story of the company National Instruments, which made the "Fortune 100 Best Companies to Work For" list for the 8th consecutive year. NI is a worldwide provider of advanced testing equipment and data acquisition and processing tools. Their success is based on the user friendly graphical programming language LabVIEW and a wide range of I/O cards, which together provide out of the box solutions for what they call virtual instrumentation. NI is horizontally market oriented, providing products for all different kinds of industries. At the same time they are well aware that satisfying

customers is not just about selling products. It also means providing solutions. We probably all agree that this especially holds true for accelerators.

When trying to understand the needs of accelerator control people, NI often heard about the company named Cosylab and that it has the right expertise to provide solutions in this field. This is the reason why Yianis Pavlou, Eastern European Branch Manager, visited the Cosylab headquarters in Slovenia twice to present their view of what they can provide to accelerators and

big physics experiments and to listen to ours. We quickly found that we are a perfect match for each other and NI invited Cosylab to their headquarters in Austin, Texas for further discussions.

The visit happened during the first week of January and was hosted by James Truchard, the co-founder, president and CEO of National Instruments, who earned legendary reputation as Dr. T through 30 years of successful leadership.

The visit took two days and we quickly learned without doubt that both companies breathe in the same way, >>



Dr. T. was presented with three things Slovenia can be proud of: a collection of Euro coins with Slovenian symbols, Gorenjka chocolate and Dr. M. He kept two of the three.



MARK'S COLUMN

THE COST OF NEW PEOPLE

As we work with students and hire new personnel, we constantly experience how much it takes, before a new person that is not familiar with accelerators or control systems become truly productive and efficient.

And it is not just about the famous proverb »time is money«. An interesting calculation that I want to share with you illustrates that the cost is actually surprisingly high. Let's first define what we mean by cost. Surely, the salary and the company/institute overhead are usually the highest costs. They exist irrespective of whether the person is working or not. But we have hired the person to do work; therefore we are, rather than in pure cost, interested in the efficiency of the person, i.e. in the ratio of output versus cost. To simplify, let's assume that an efficient programmer has a ratio of output/cost of one: we get what we pay for!

Let's take some more simplistic but reasonable assumptions:

A) The first two months, the output of the new person is zero. In my experience, the new person just gets acquainted with the environment in the first month, and in the second month it gets acquainted with work. >>

This article can be found on page 4.



HOW TO GET A FREE COSYLAB T-SHIRT?

SEND US AN INTERESTING STORY AND GET A T-SHIRT.

IF YOU ARE ALREADY THE PROUD OWNER OF A VERY POPULAR COSYLAB'S T-SHIRT THAN YOU CAN ALSO CHOOSE BETWEEN VINTAGE KGB T-SHIRT, SLOVENIAN CHOCOLATE OR COSYLAB'S USB COFFEE CUP WARMER WITH MUG AND WITHOUT EPICS DRIVER.

TWO SUCCESSFUL COMPANIES CROSSING THEIR ROADS



Jozse Dedic, Jeff Kodosky and Mark Plesko. Jeff Kodosky is the creator of LabVIEW.

>> i.e. have similar company cultures and values and are complementary in technology and know-how. Of course, one of them is still making more shallow breaths. That is if we compare sizes ;). We quickly identified areas of cooperation and got right to business. Cosylab became a NI alliance partner and we immediately started working on an implementation of EPICS on NI hardware. We are confident all three parties will get a positive outcome from this synergy: Cosylab, NI and our customers.

We will leverage Cosylab's accelerator expertise with NI's superior products by first providing EPICS on the compactRIO platform. The next steps will be to port EPICS and other control system packages onto LabView RT, the real time version of LabView that runs on all NI hardware platforms. If you are considering any NI hardware you can count on our integration expertise to provide you with full support for the control system you require.

"all three parties will get a positive outcome from this synergy"

"There is no such thing as free-beer: you had to think about that in advance"

From the CS to motors and position feedback devices of four-axes electrostatic injection septum. microIOC-M-Box-PMAC and microIOC-Power-Drive-Case – a standard motion control solution at the GSI.

Flexible motion control?

ARE YOU DESIGNING A MOTION CONTROL THAT NEEDS TO BE FLEXIBLE?

Every accelerator facility features several hundreds motorized mechanical systems. Being fairly simple or highly complex, micro- or millimeter precision, one or multiple axis – the system designer has to tackle specific interfacing issues. Market offers plethora of motion controllers providing advanced motion control features. To enable integration into the control system, it must be expanded with a computer running an operating system, usually some *nix flavor or a real-time system. You can have it either tightly integrated or dislocated. And then it comes also to HW-side of the integration. Maybe

there are some signals that don't fit directly to motor drivers, or there are some custom per-axis signals that have to be handled (e.g. brakes, external interlock conditions, etc.), or you have a nasty environment and you must separate the motor controller from the drivers by a couple of hundreds meters, etc. This is the time when you ask yourself, what's with the component off-the shelf plug & play capability someone wrote about in the data-sheet. And when you address all these issues, a minor change arises because one of the externally attached components has changed. If you thought

of this before and made a HW interface flexible enough, your hair will not turn gray due to after-hours work. It is easy to replace some jumpers or reconfigure a programmable circuitry, but only if you had them there already. It's a matter of minutes and then you can join your colleges at Friday beer time. But there is no such thing as free-beer: **you had to think about that in advance.**

To learn about a solution where all this and even much more had been addressed, go to the www.microioc.com/M-Box.htm. This design has been chosen as a standard motion control solution at the GSI (www.gsi.de/).



The new LOCO-LOCO2

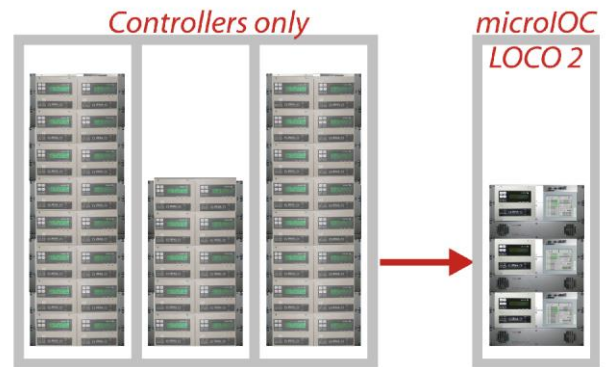
Logarithmic COnverter (LOCO) is a popular specialized microIOC used as a high-voltage power-supply distribution system for vacuum ion pumps.

It does not only provide power, but also measures current running through every pump to determine pressure at the pump. If the measured pressure is too high, the pumps are switched off to avoid pump damage. It was designed to reduce the number of ion-pump power supplies and thus the costs and rack space in storage ring or booster vacuum systems, where a

large number of smaller pumps are used.

Driven by customers' requests we decided to upgrade LOCO based on suggestions we received. Switches were added to enable control over the number of channels being switched off when an interlock condition appears. This functionality is required on x-ray beamlines for example, where a single isolated sector has only a small number of vacuum pumps and it is desired to control every sector separately, i.e. being able to vent a sector without tampering with pumps in other sectors.

To make the vacuum system more compact, the new LOCO can have Varian Dual controller, IOC and an LCD already integrated with the original LOCO in a single unit. With the new LOCO the customer gets an ion-



pump power supply for up to 16 ion-pumps, with a total pumping power and the functionality of Varian Dual Controller, but at a significantly smaller cost and size. In addition the device can be directly integrated into the control system of your choice. LOCO2 orders are already being collected and the first units are expected to be shipped to final customers in the middle of 2008. For more information, please visit

<http://www.microIOC.com>



Control SH!T

ONE LINE, TWO STATES, COUNTLESS POSSIBILITIES

BY: GASPER PAJOR

When I was asked to write something about the dark side of controls, I scratched my head and started to fast forward through my control system experiences. It wasn't long before a certain memory popped up. It was four years ago, but from the technology point of view it could have easily been twenty-four years. And it came up every year after that, similar, but never the same.

Merely thinking about that, I knew I had it – the control system integration of serial devices.

It seems that the appeal of zeroes and ones on RS232 line is too much for instrumentation vendors to resist when designing a remote control op-

tion for their products. The curse of the serial communication lies in its simplicity. You plug one end of 3-wire cable into your device, the other one in the nearby PC and you are ready to give the HyperTerminal a workout – it doesn't get any simpler than that. Unfortunately it seems that this is the only communication test many of the devices have seen before finding their way to the far end of the control system cable.

The first bit of fun lies in the protocol which is somewhat like poetry; the first time you read it, it makes sense, but the more you think about it, the more you would like to know what on earth was the author thinking when was putting it together. And of course,

just like poems, no protocols are alike.

The control system does not just chat with the device; it tries to *control* it. The process of getting there can reveal the features nobody suspected: instrument not yet ready for the next command (even when saying it is), expecting more time between commands (or less), printing messages when not expected (or vice versa), internal state machine with no clear purpose or documentation etc. Not to mention the always expected exercise in the fine art of line termination.

Then, to make things more useful, somebody once said: "Hey, what about multi-drop?"



Mark's column

THE COST OF NEW PEOPLE

>> This may not be the case for an expert programmer, but remember, we talk about people, new to the field.

B) The next two months, the efficiency is 1/4. This is because the person does some useful work, but needs more time to finish it, or just needs to redo work several times until it is of production quality.

C) The following months, the efficiency increases linearly every two months by 1/4 until it becomes one in the sixth month.

D) From the sixth month onwards the efficiency remains one. This is probably too optimistic, but let's take this as an average over the second half of the year.

E) Let's not forget that the new person needs coaching. In reality, there are several people involved, but in our experience, the net effect is one full person in the first month. Then the effort of coaching halves about every two months. Let's assume that coaching is not needed from the 8-th month onwards. The efficiency is thus the output divided by the cost of the personnel doing

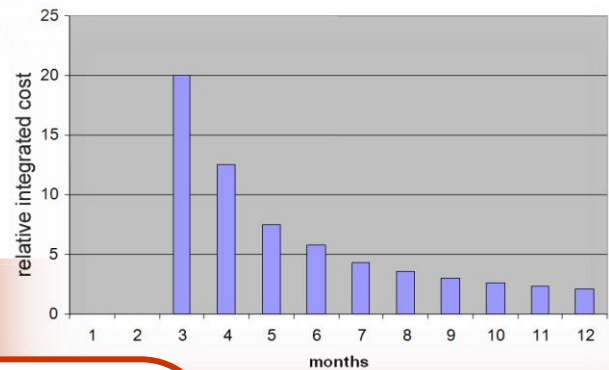
coaching plus the cost of the new person. To better illustrate the cost, let's draw the inverse of the efficiency, integrated from the beginning, which we call relative cost. The results are shown in the surprising graph below. Note that the relative cost over the whole year is still 2, although the relative cost in the second half of the year is 1. The reason for this is the initial high cost of coaching and the new person being very inefficient in the beginning. This initial inefficiency is further illustrated by the extreme relative cost of 20 in the first three months, and about 6 for the first half year.

What can we conclude from that? I'd say three things:

» Firstly: when hiring for new jobs, it is worthwhile getting experts, even though they might cost twice the salary.

» Secondly: once you have trained a person, try to keep him. The cost of losing a person is the cost of training a new one – and we can see now that it is quite a lot!

» Thirdly: don't use new people for short-term tasks. It is much better to start them on a job that they will be working on for a longer period of time.



KYMA srl

A NEW FACILITY FOR LARGE SCALE PRODUCTION OF INSERTION DEVICES

Newly constituted Italian company Kyma srl has been established as a public-private joint venture consortium between companies Cosylab, Euromisure and the Italian Institute Sinchrotrone Trieste. The company is specialized in the production of high quality insertion devices.

Already 20, mainly Apple II type, undulators for the FERMI@Elettra project had been ordered while also future developing of other types of insertion devices is conducted. Vast experience and technical expertise within the consortium are mutually divided among the

magnetic design and assembly, the control systems development and production and the mechanical construction activities. Production and development processes are taking place on three different locations, whereas the final assembly and testing activities are conducted in the vicinity of Sinchrotrone Trieste Institute.

In its production processes the consortium altogether involves over 100 highly skilled experts from different science and technology areas, over 2000 square meters of production facilities, state of the art production devices and over a dozen world patents from different technical areas.



Testing and final assembly site near the Sinchrotrone Trieste Institute.

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