Motion control challenges for laser at ELI Beamlines

Jack Naylon, Tomáš Mazanec, Martin Horáček, Bedřich Himmel, Marc-André Drouin, Karel Kasl, Jakub Horáček, Pavel Škoda, Pavel Bakule and Bedřich Rus

Institute of Physics AVČR, v.v.i., Prague, Czech Republic
** Observatory Sciences Ltd., Cambridge, UK
Extreme Light Infrastructure

Network of user facilities focusing on nuclear physics, attosecond science, and secondary source generation

Managed independently and developed autonomously within host institutes until post-2018
Building status

Spot the difference!

ELI-BL Grand Opening was on Monday October 19...
ELI Beamlines Facility in Prague

- 4 laser beamlines
- 6 experimental halls
- Offices, labs and workshops for 300 staff
Photos September 2015

L3 laser hall

L4 compressor hall

Experiment floor transport corridor
The lasers at ELI-BL
Around 100 axes per laser
Very basic requirements
Miniscule budget
LabVIEW/NI solution preferred
Running for 9 months at LLNL for HAPLS project (150 axes)
Not the most elegant solution...

RMC-8354 (IOC)
L1 pulse compressor

2x1.5J/1kHz = 2x1.5kW

2x0.7J/1kHz
Three separate picosecond compressors in one 4m chamber. 68 motorized axes. Combination of supplier electronics and Phytron drives – custom integration and FPGA. Tendered with EPICS interface using NI module – working on upgrade. Assembly in March 2015.
Now in tender negotiation phase with system integrators

**Question:** Proscribe the use of an ‘approved hardware list’ NI RIO solution for standardisation (less integration risk) or allow supplier-chosen driver solution (less development risk)
Beam distribution – early concept

Pos.1

Pos.2

Pos.3
Beam switching mirror assembly
Vacuum Picomotors – opinions
Very low cost, fine-grained modular motion solutions
Subsystem integrator tenders – how to handle?
Contact:

Dr Jack Naylon
jack.naylon@eli-beams.eu
www.eli-beams.eu

Institute of Physics
Na Slovance 2
182 21 Praha 8
Prague
Czech Republic

Thanks to:

Funding bodies: ERDF and ESF under operational programs ECOP and RDIOP

Delong Instruments s.r.o.

Tomáš Mazanec and the rest of the LCS team!