

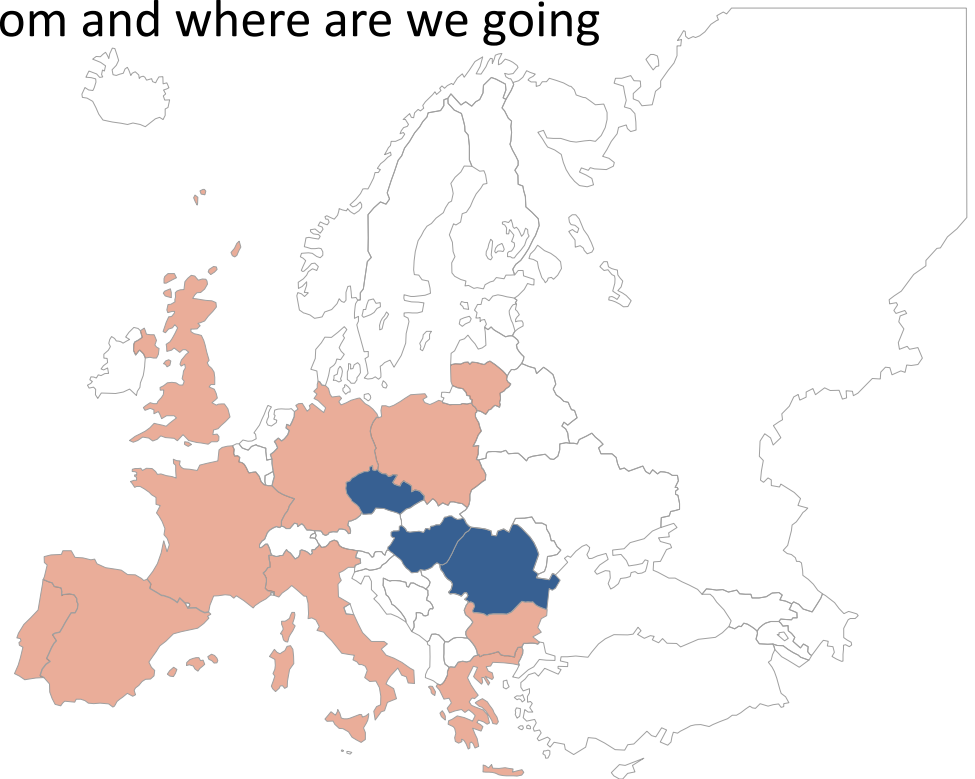
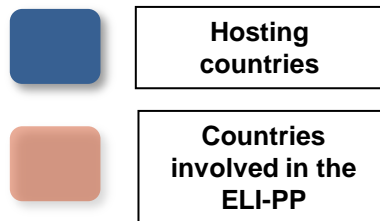
***AIME on Control Systems for
Accelerators and Detectors
December 2-3, 2013***

**Extreme Light Infrastructure (ELI)
Science and Technology at the ultra-intense Frontier**

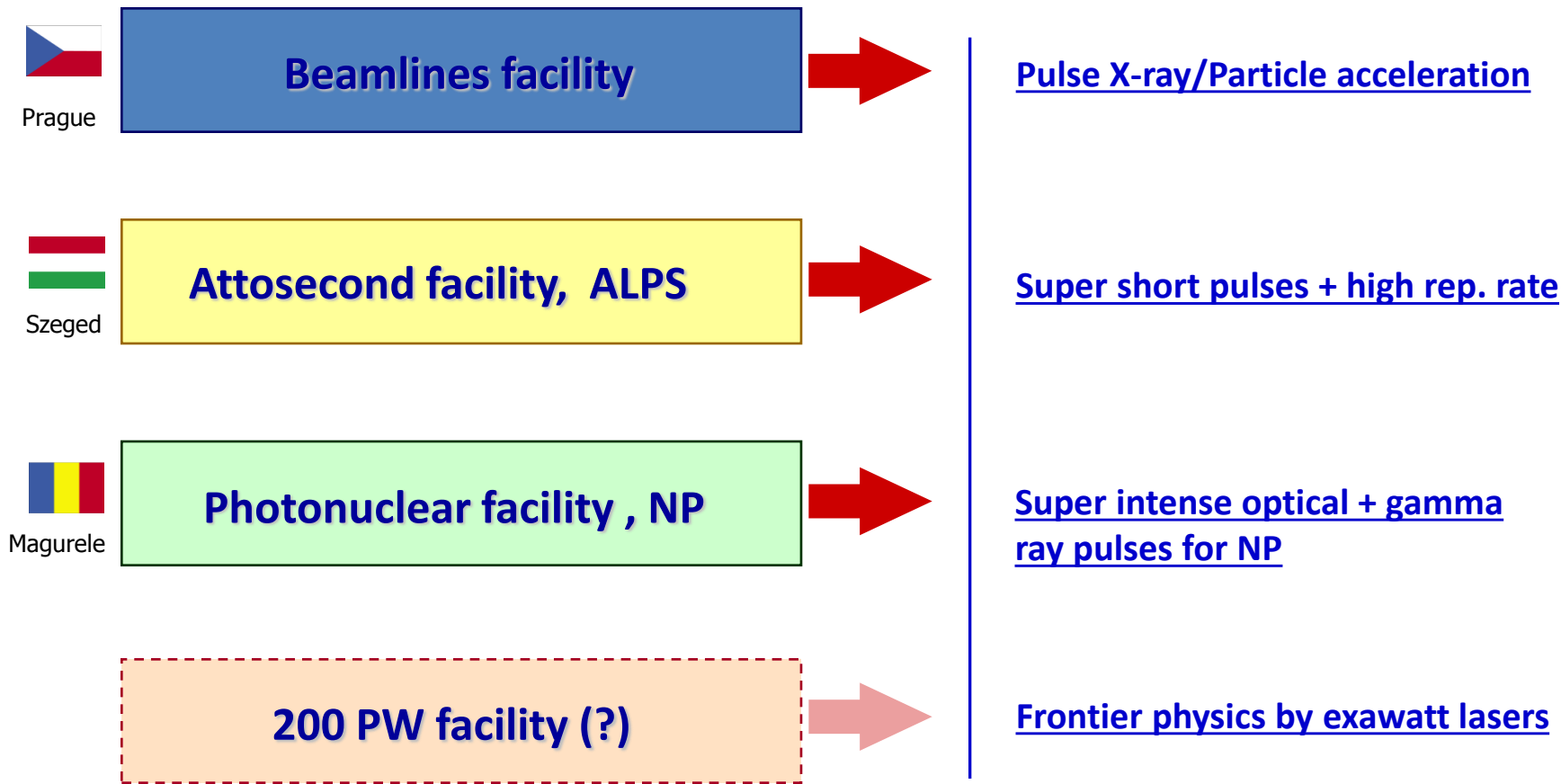
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**On behalf of Bruno Le Garrec, Georg Korn, Bedřich Rus and the ELI-Beamlines team
Institute of Physics v.v.i., Prague
Czech Republic**

- What is ELI
 - Where are we coming from and where are we going
- ELI-Beamlines
 - In the Czech Republic
- ELI-ALPS and ELI-NP

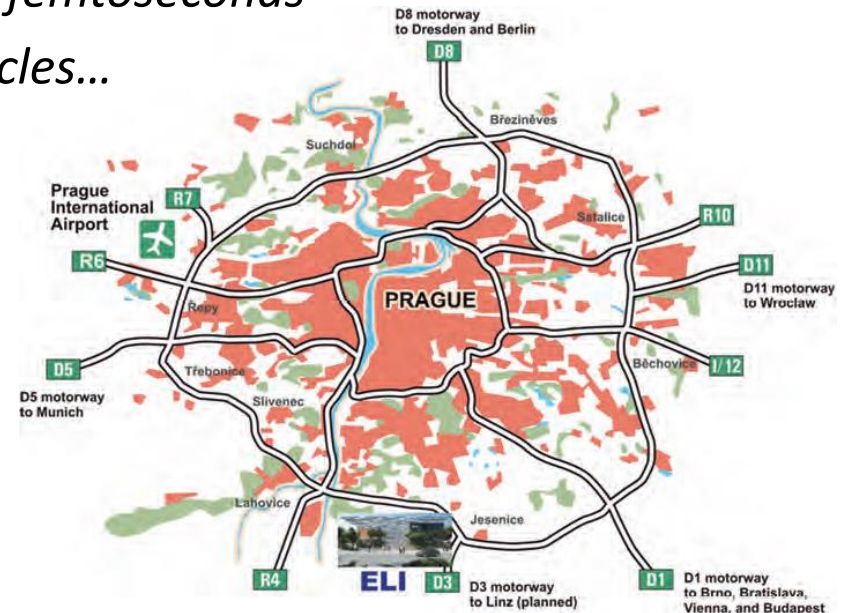


Structure of implementation of the ELI project



What is ELI-Beamlines?

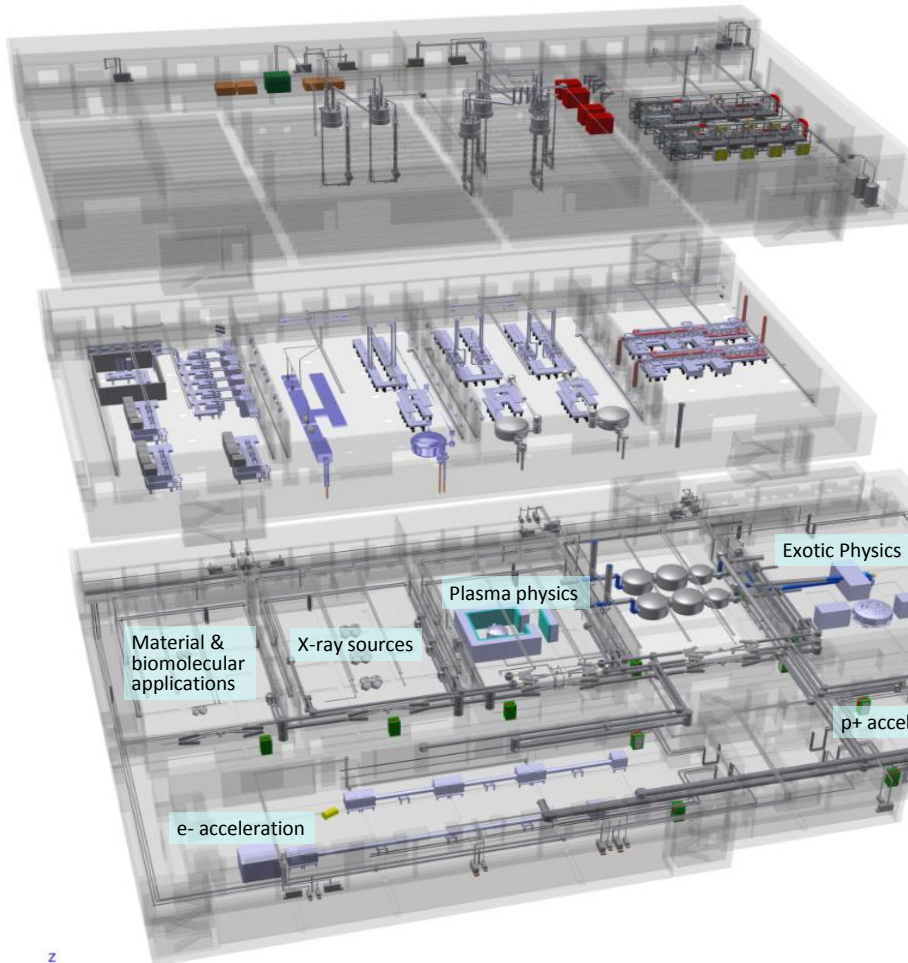
- Modern laser facility
 - *Delivering: ultra short laser pulses – femtoseconds*
 - *Producing: pulses of radiation, particles...*
- Location
 - *Prague – Dolní Břežany*
 - *New building*
- 4 beamlines “L1, L2, L3 and L4”
 - *L1 kHz rep-rate*
 - *L2 and L3 PW at 10 Hz*
 - *L4 10 PW and high energy “kJ” beam*
- 6 experimental halls



ELI project background

2007-2010	ELI Preparatory Phase project (13 countries)
Oct 1, 2009	ELI-PP Steering Committee approves the conception of three ELI pillars (Beamlines, Attosecond, Nuclear Physics)
May 2010	ELI-Beamlines pre-approved for funding
Apr 2011	ELI-Beamlines funding approved by EC
Aug 2011	Funding (278 M€) signed by the Czech Rep's Ministry of Education
Dec 2012	Agreement from EC to deliver facility after 2015 ERDF-European Regional Development Fund (infrastructural funds)
May 2013	Construction start
<hr/>	
Sept 2015	Start of installation of laser systems
Dec 2015	Phase I completed: two laser units + support installed
2016-2017	Phase II: lasers & experiments installed Facility commissioned

Layout of ELI-Beamlines laser building



First floor (80 x 40 m)

kJ laser for L4

Support technologies, cooling systems, cryogenic systems

Ground floor (80 x 40 m)

4 laser halls (L1 to L4)

Basement (110 x 60 m)

Compressor(s) of L4 10-PW laser(s)

Vacuum pulse distribution

6 specialized experimental halls (E1 to E6)



Layout of ELI-Beamlines laser building



Layout of ELI-Beamlines laser building

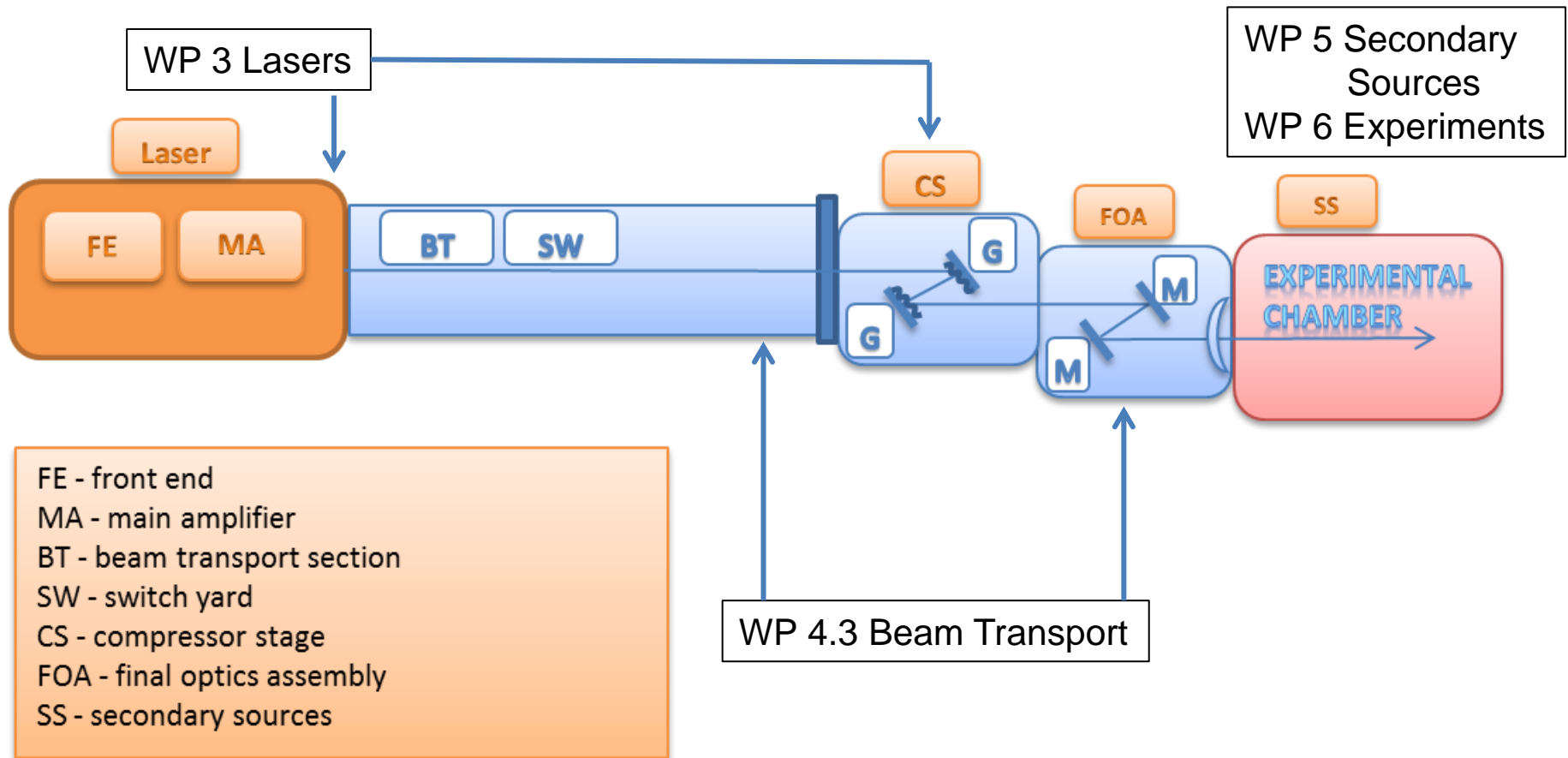


- L1: 100 mJ 1kHz DPSSL / ps pump for OPCPA
 - *Mostly developed and built at the Institute of Physics in Prague*
- L2: 10 Hz DPSSL – Yb:YAG cryo-cooled multi slabs (Dipole type)
 - *First step 10J/10Hz bought from STFC*
 - *Second step 100J/10Hz bought by HILASE from STFC*
- L3: 10 Hz DPSSL – Nd:Glass He cooled multi slabs (Mercury like)
 - *50J/10Hz*
 - *Contract with LLNI signed in September 2013*
- L4: kJ/ 1 sht/mn flashlamp – mixed glass (Apollon pump laser type)
 - *Tender process has started in October 2013: 5 applicants*

- Production of new secondary sources driven by lasers
 - *Flashes of x-rays and gamma-rays*
 - *Accelerated particles*

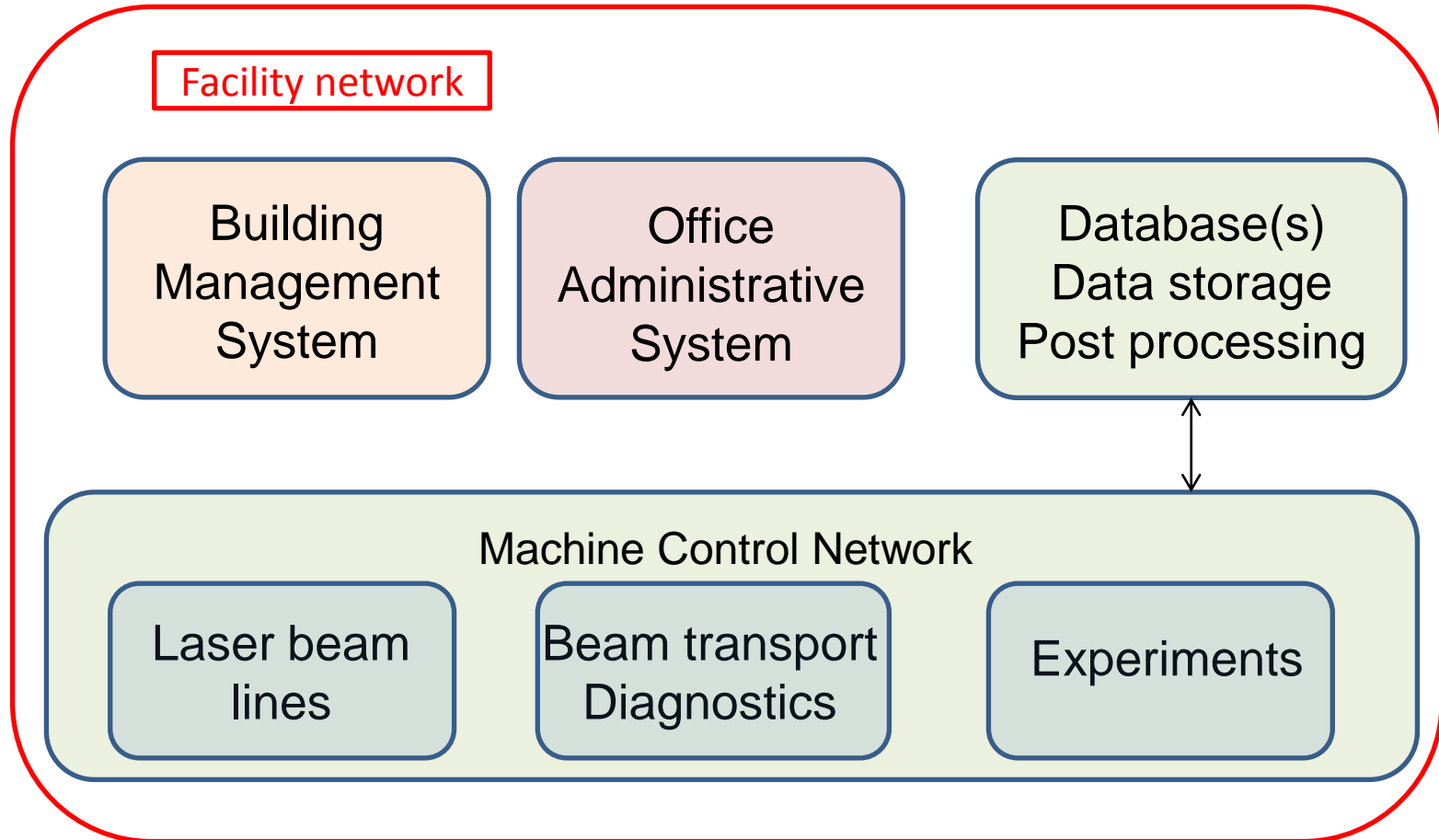
- 6 experimental chambers → 6 research areas
 - *Apps. in molecular, biomedical and material sciences*
 - *XUV/X-ray generation*
 - *Plasma physics*
 - *High-field physics*
 - *Particle acceleration by lasers*

ELI-Beamlines baseline

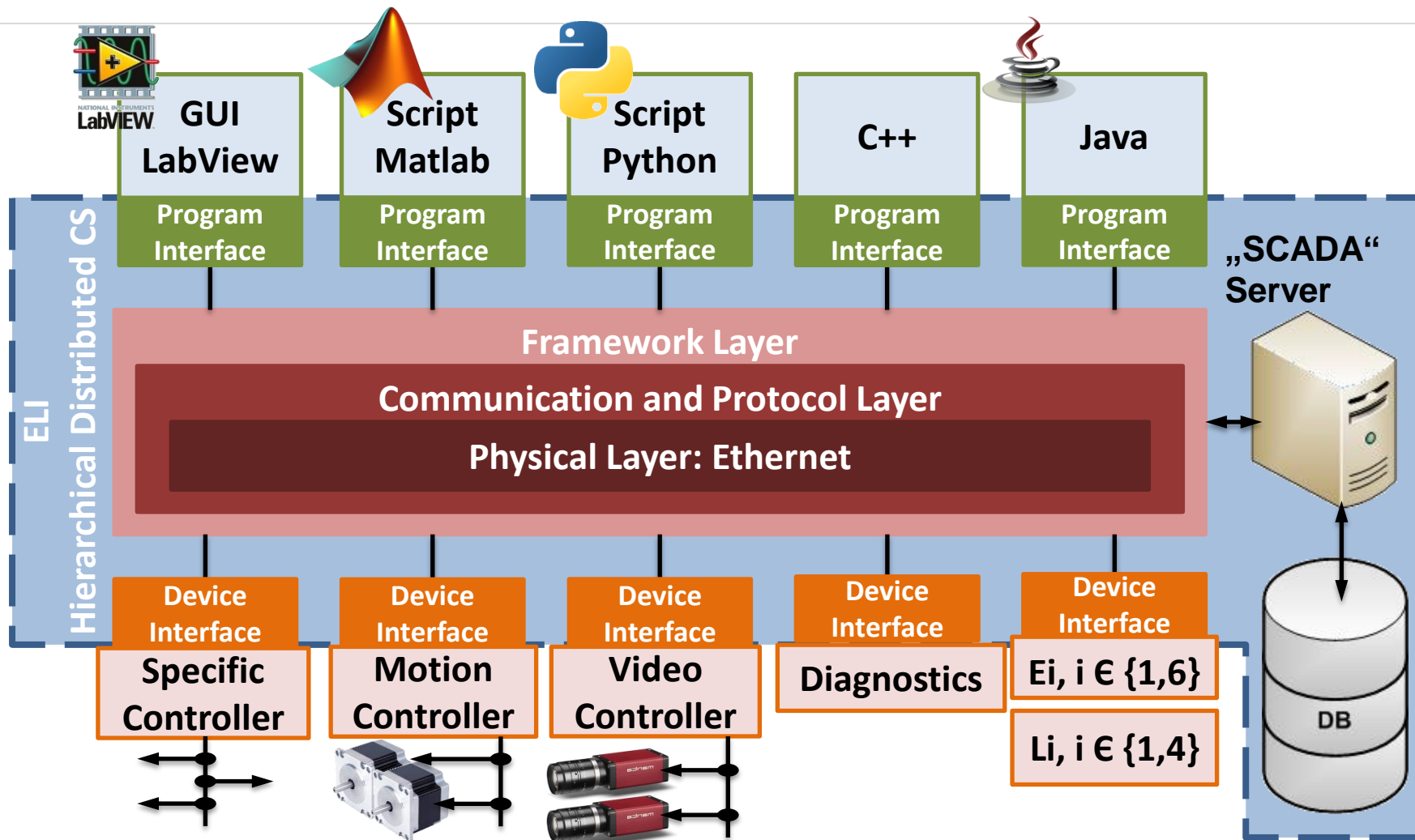


WP = work package

Control System: block diagram



Control System: what we want

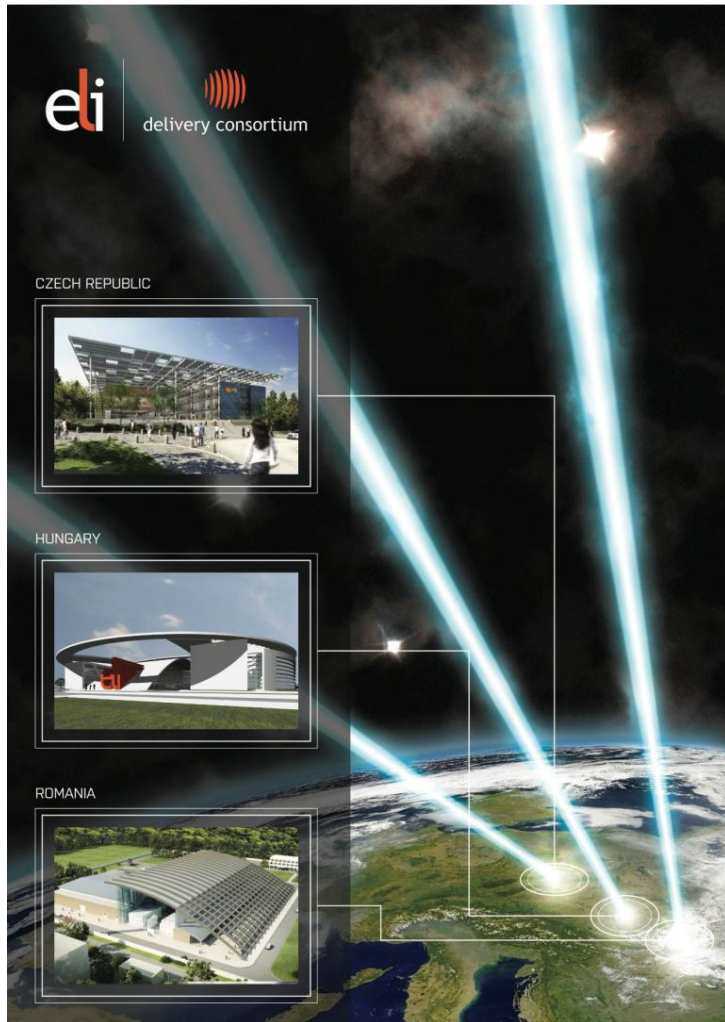


Control System: where we are

- OS: *Linux, Open source ... decided* ✓
- System framework:
 - *TANGO “expected” – almost decided*
 - *EPICS “under consideration”*
 - *A report about TANGO/EPICS is ready to be released=> mid December 2013...*
- Hardware: *Procuring HPC cluster (1000 cores + data storage) as a test bed for experiments* ✓
- Designing network: *mainly fibers (included in the building contract)* ✓
- Facility performance: *Virtual Beam Line*
- Timing system

TANGO: what can we rely on

- From Apollon laser
 - *Timing system based on Greenfield technology*
 - *Overall architecture*
 - *Drivers for devices already used at LULI and ELFIE*
- From ESRF and other European synchrotron facilities
 - *Drivers for motorized devices*
 - *Image processing*
- **ELI-DC support**
 - ELI-Delivery Consortium



- Delivery Consortium ELI DC
 - *Delivery plan*
 - *Establishment of ERIC*
- European RI Consortium ELI ERIC
 - *“Establish and operate RI”*
 - *Joint operation of the ELI facilities*
 - *Central management of the access policy*
- 1st ELI-DC meeting **Nov 1st, 2012**
about 10 PW lasers
- 2nd ELI-DC meeting **Nov 13th, 2013**
about TANGO/EPICS for Control System

- ELI-Beamlines:
 - *mid 2015 building ready*
 - *end 2015 develop and buy most of the technology*
 - two beamlines available
 - Beam transport, support technologies
 - *2016-2017: 4 beamlines, commissioning*
 - *2018 starts experiments and toward a users' facility*
- High political advantage at the EU level to **decide a common CS standard**

- Thank you!



<http://www.eli-beams.eu/>

