BLED: A top-down approach to accelerator control system design

Jaka Bobnar
Klemen Žagar

COSYLAB

Bottom-up vs. Top-down

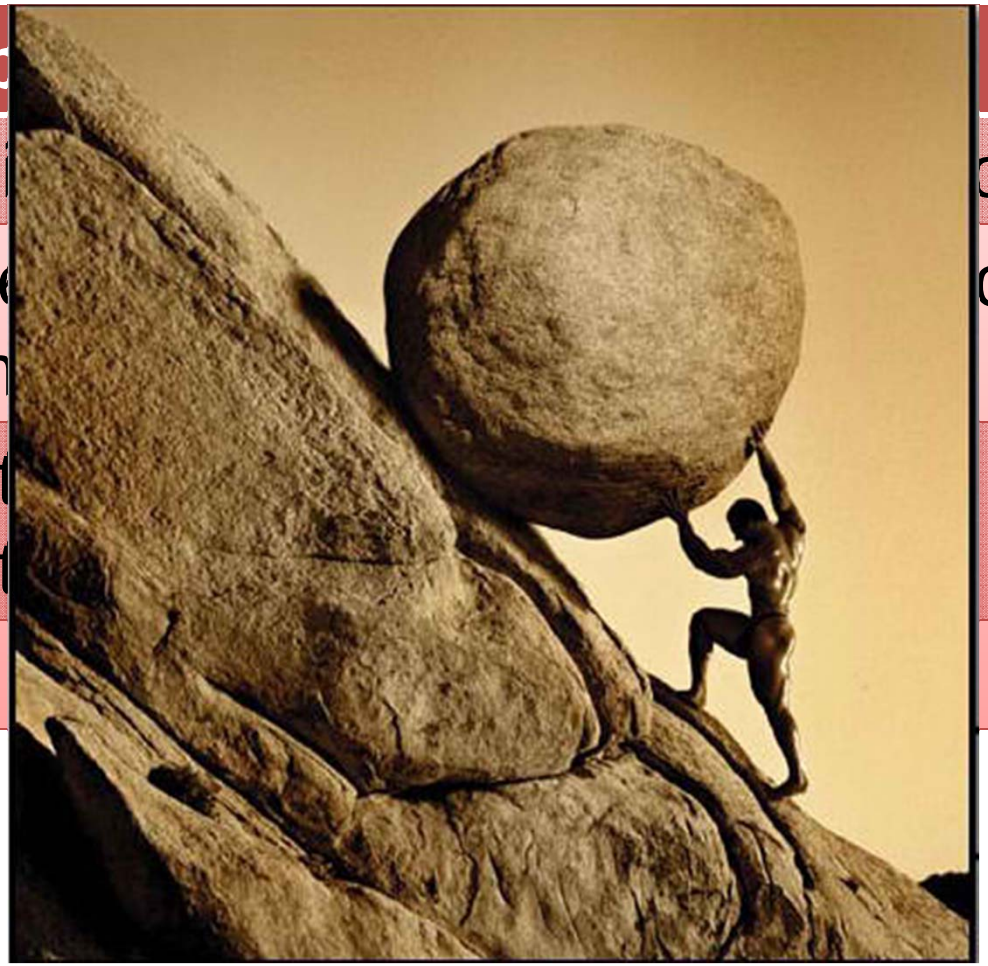
COSYLAB

Bottom-up	Top-down
Responsibility is divided	Easier to outsource
Easy to sneak-in cutting edge technologies	Unified interfaces
Quick solutions & intermediate results	Requires very skilled architects
…	….

Bottom-up vs. Top-down

COSYLAB

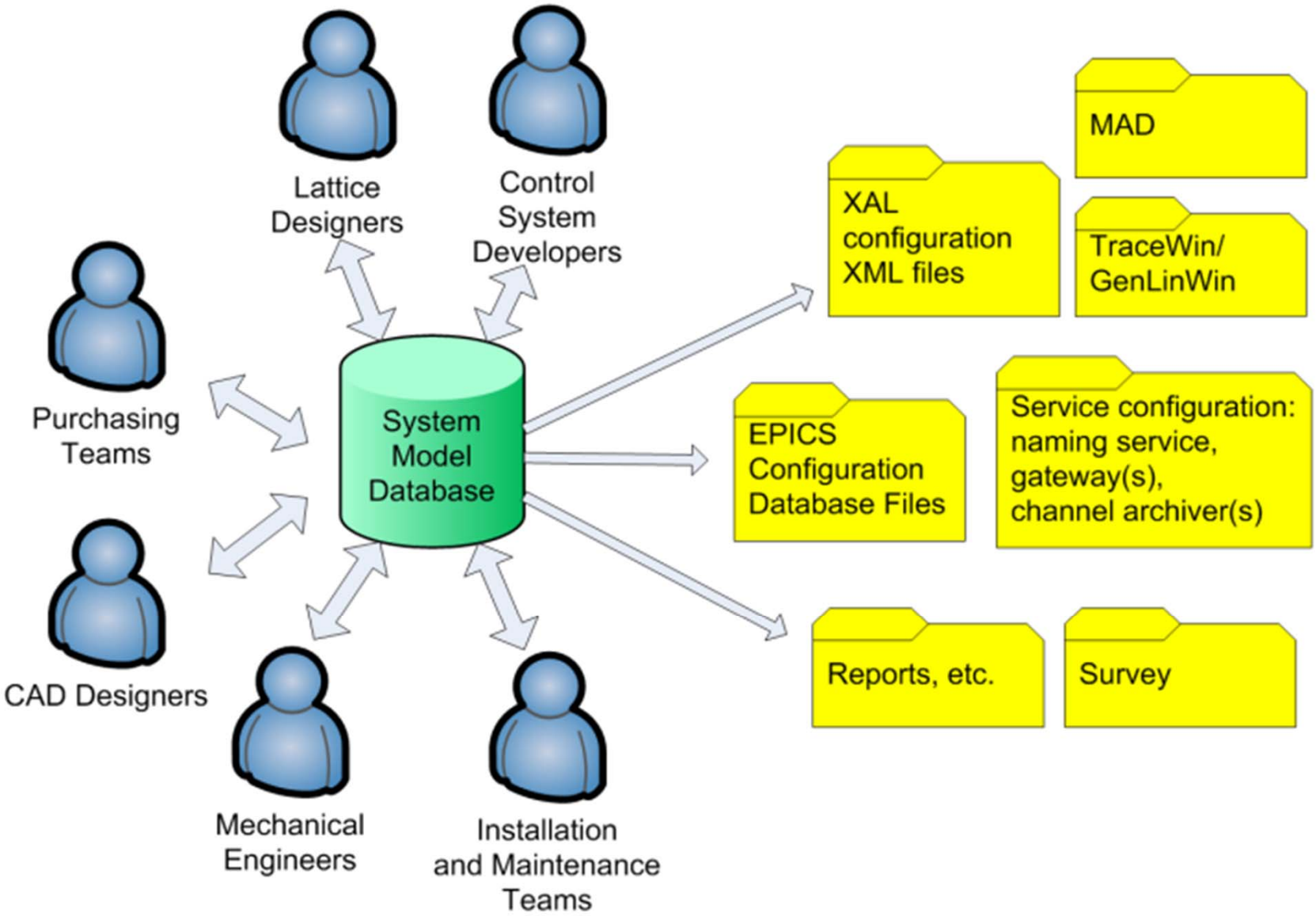
Bottom-up	
Responsibi	ource
Easy to sn	ces edge techn
Quick solut	skilled intermediat
…	



Balance is best

Top-Down Approach

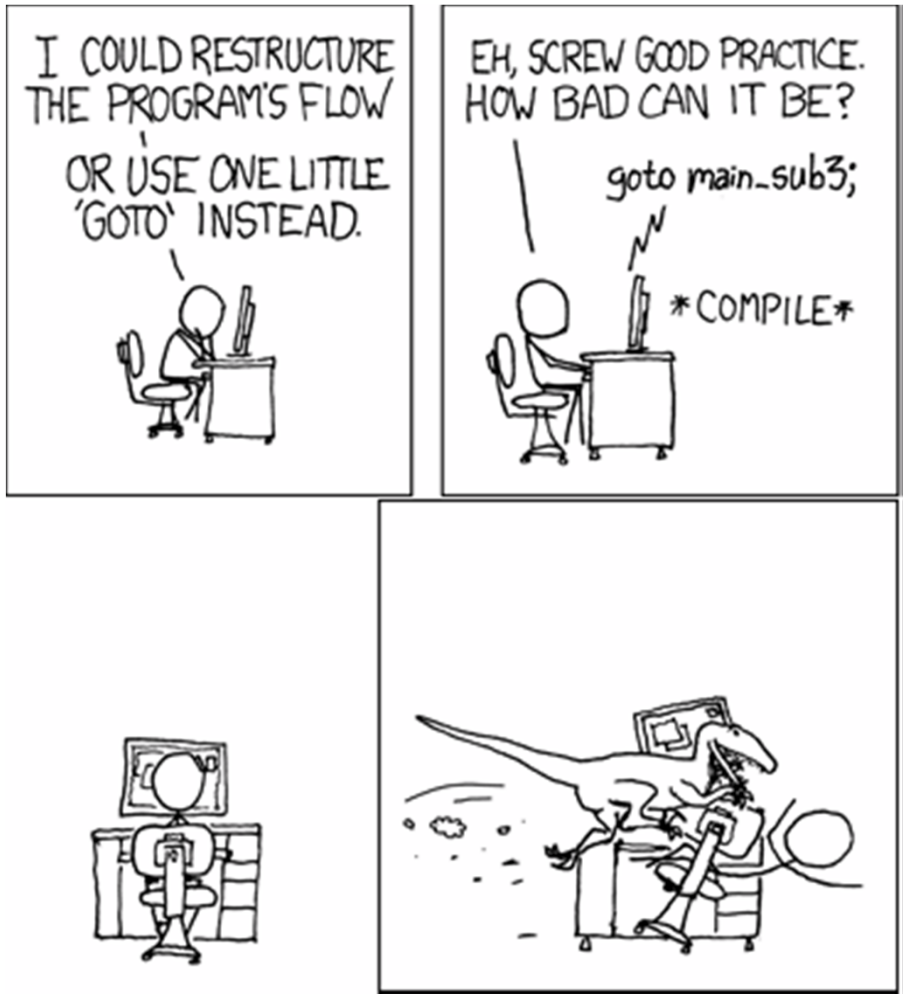
COSYLAB



Naming Convention

COSYLAB

- Enforcing naming convention presents a high organizational risk
  - Try to automate naming of components as much as possible
  - System takes care of names verification during import




BLED

What is BLED?

COSYLAB

What is BLED?

COSYLAB

BeamLine
Element
Database

What is BLED?

What is BLED?

BEAST

BEAUtY

BOY

What is BLED?

COSYLAB

~~Beamline Element Database~~

BEAST

BEAUtY

BOY

Best and Leanest* Ever Database

What is BLED?

COSYLAB

~~Beamline Element Database~~

BEAST

BEAUtY

BOY

Best and Leanest* Ever Database

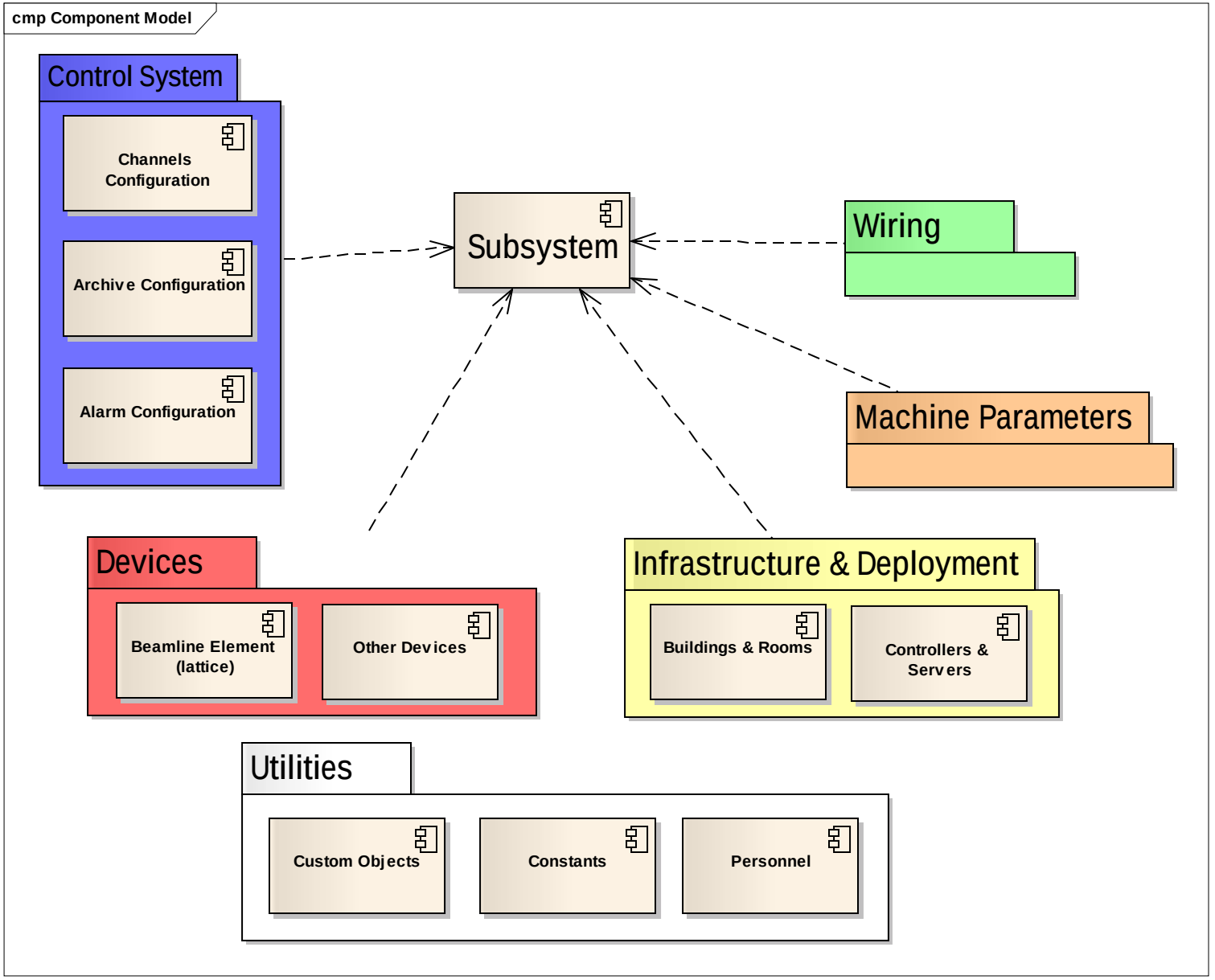
* Lean & mean

What is BLED?

COSYLAB

- Lattice database
- Machine parameters database
- Inventory database
- Control system configuration database
- Set of tools to work with the database

Database Schema



Lattice

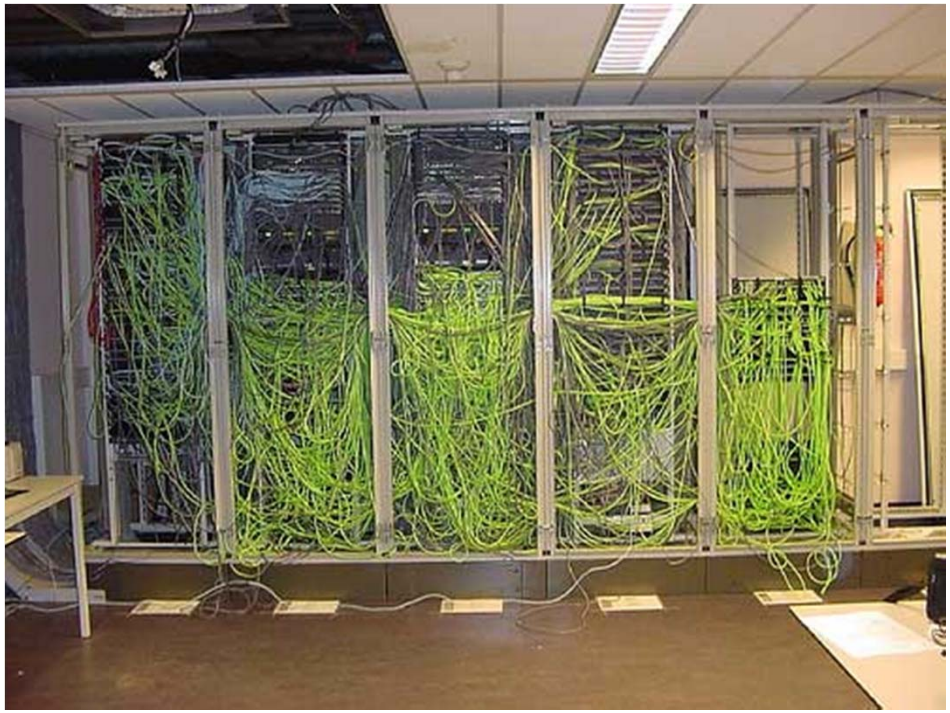
COSYLAB

- Complete information about the accelerator lattice
  - Every device is a subsystem
  - Contains physical, geographical & geometrical data
- Import data from lattice design tools
  - MAD,
  - TraceWin,…
- Allows export to different formats
  - Lattice design tools
  - Survey data

Inventory

COSYLAB

- Lists every single piece of equipment in the system
  - Desktops, racks,…
- Infrastructure
  - Buildings, rooms,…
- Cabling
  - All interconnections within the machine



Control System Configuration

COSYLAB

- Focused on EPICS
  - IOC applications
  - EPICS database templates with channels (and fields)
  - EPICS macro substitutions
  - List of configurations for archive & alarm systems
- All channels have relations to the inventory part
- All entities are versioned, history is stored in the database

Machine Parameters

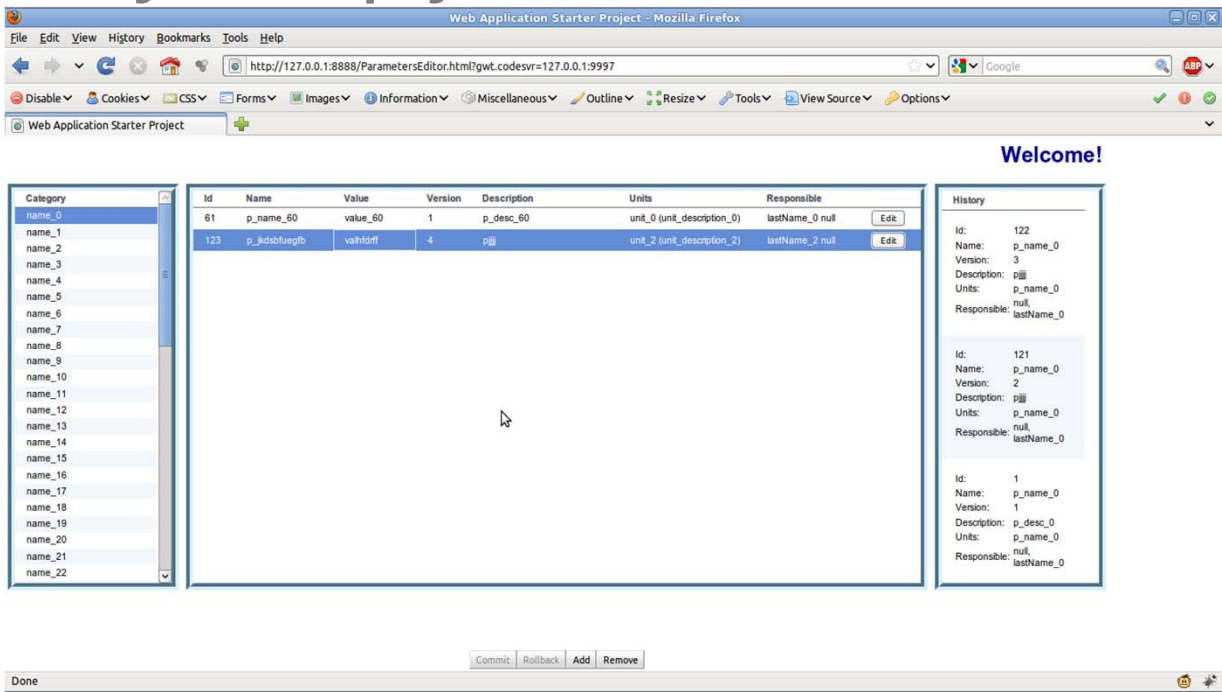
COSYLAB

- Non-physical description of equipment
  - Energy, minimum spot size …
- Associated with personnel tables, subsystems,…
- Will replace the parameters list excel sheets in ESS

BLED Tools

COSYLAB

- Required for maintenance and import/export
  - Bulk imports, single entries
- Perform verification of the database and all imports so they comply with the rules
- Implemented using web technologies (GWT)



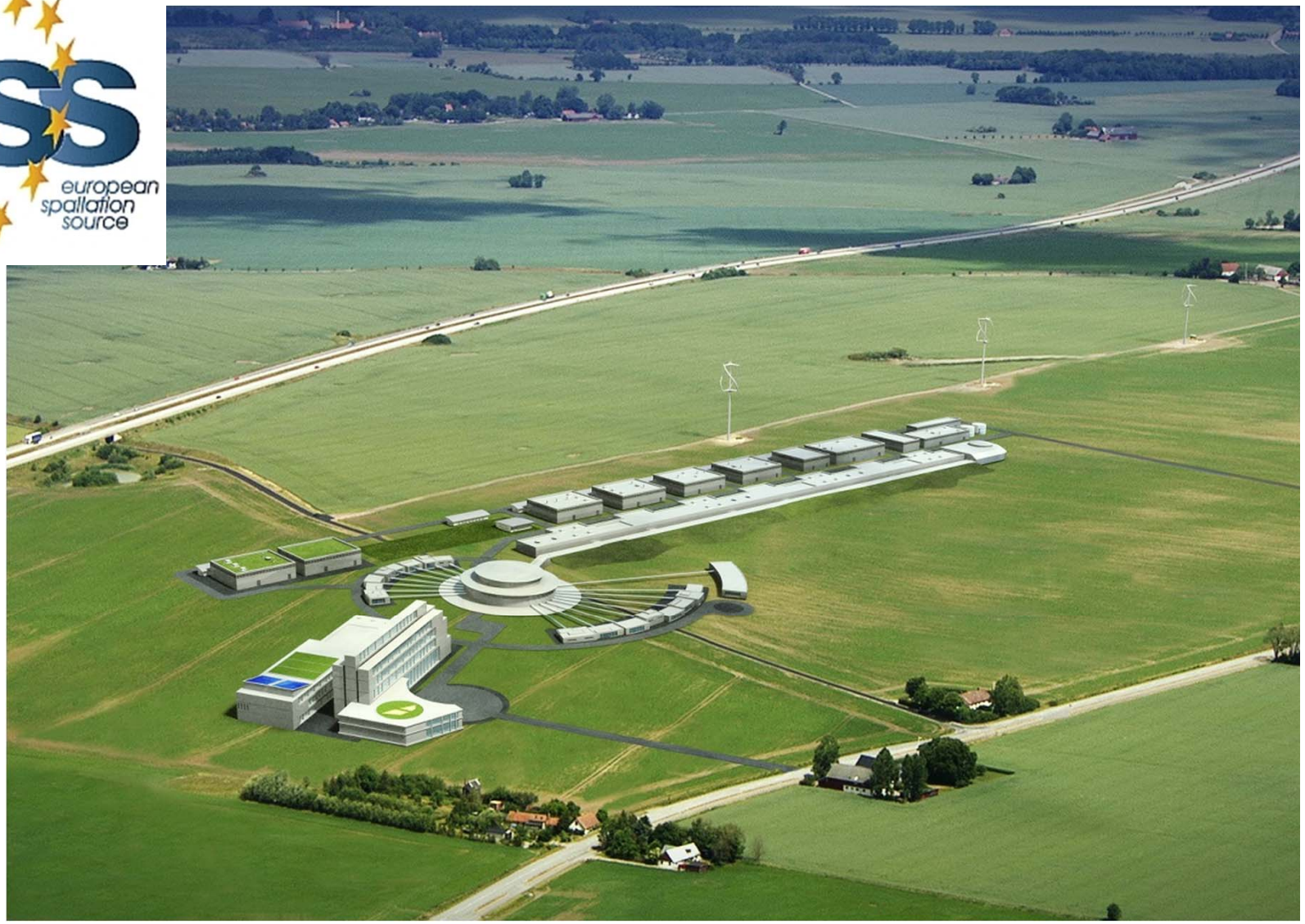
Future Plans?

COSYLAB

Future Plans?

COSYLAB

ess european spallation source



COBIK
Center odličnosti za biosenzoriko, instrumentacijo in procesno kontrolo

THANK YOU!

Jaka Bobnar
COSYLAB
Web: www.cosylab.com

COSYLAB