Experiments orchestration and control software layer for SIRIUS accelerator and beamlines

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ICALEPCS EPICS Collab
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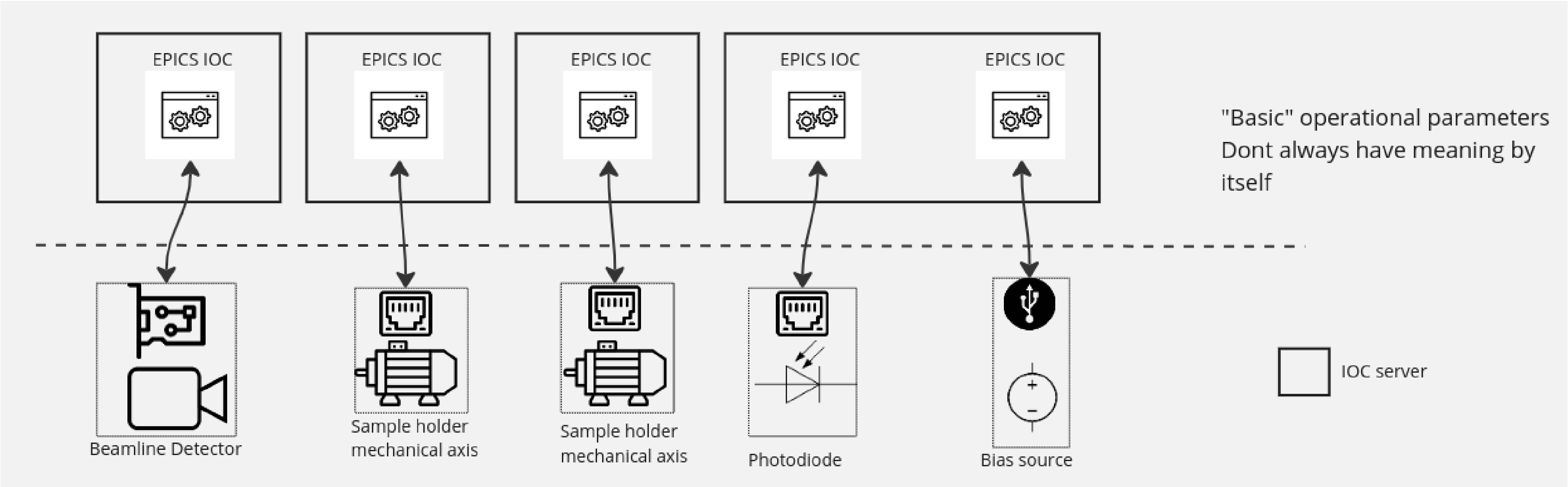
Overview

- Basic control software architecture in Sirius
- Beyond the basic I/O: current challenges in orchestration
- Possible solutions and current implementations

Basic control software architecture

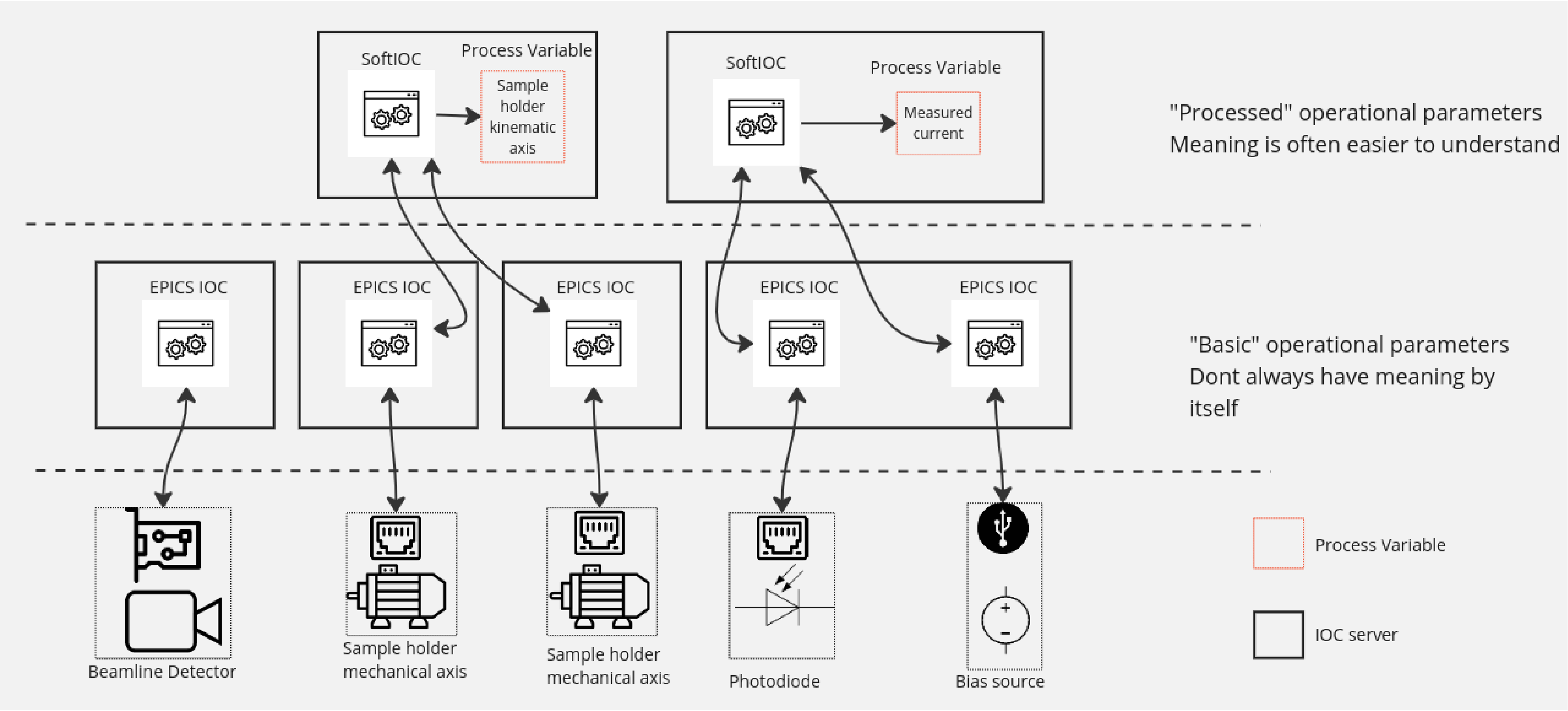


- Multiple equipment controlled by EPICS IOCs

- "Raw" parameters sometimes have little meaning to the end user

Basic control software architecture

- Software-only IOCs process basic operational parameters, extracting meaning;
- E.g.: voltage and sensitivity of photodiode are converted into current, a set of mechanical axes are converted into kinematic axes...



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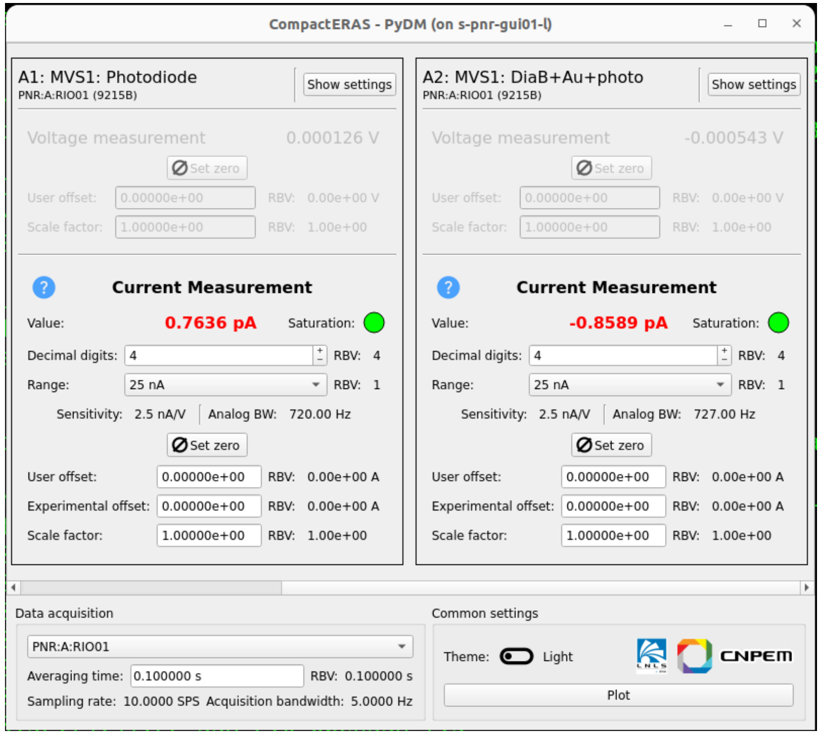
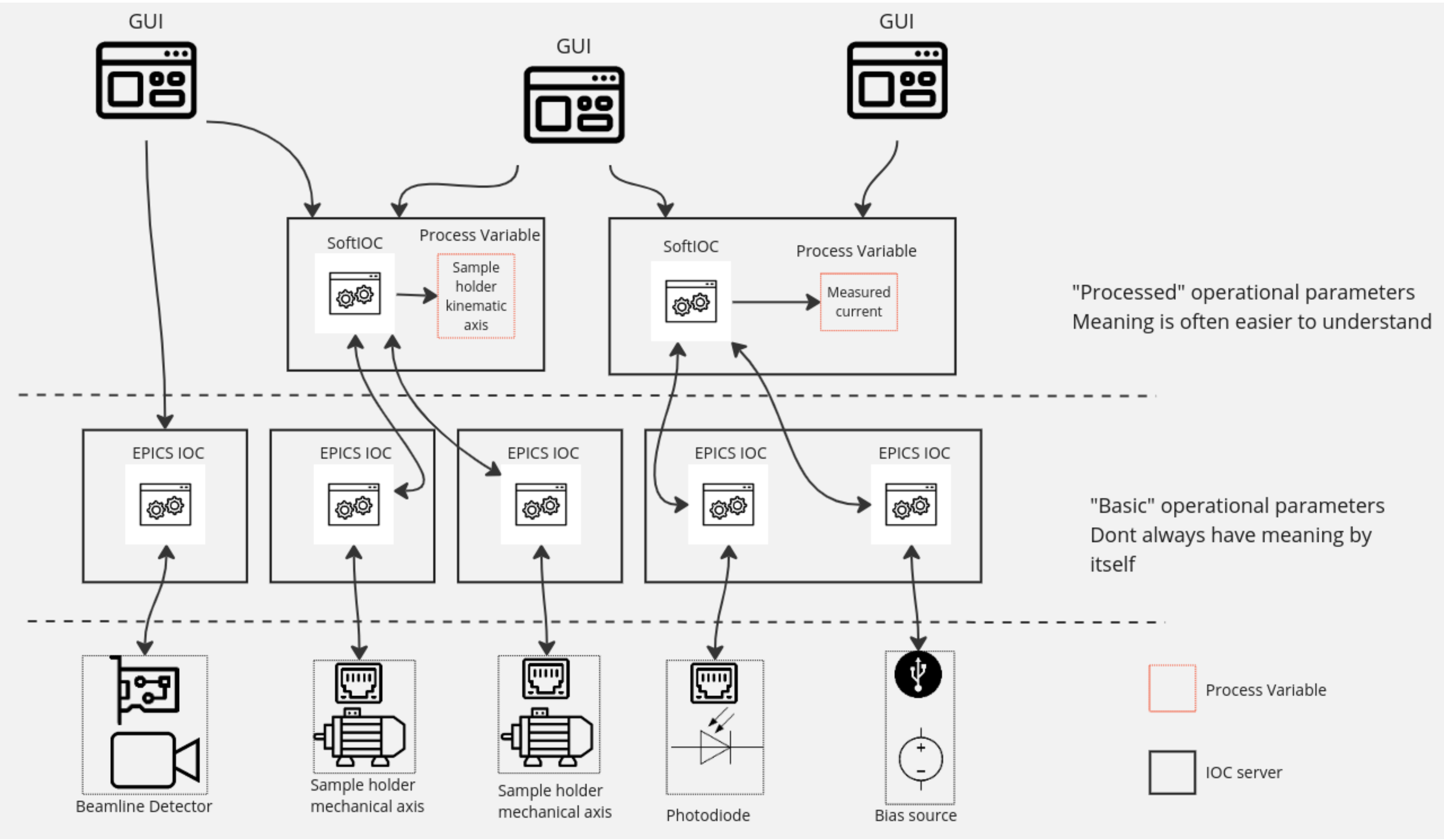
- Finally, users interact with parameters of interest via GUIs.





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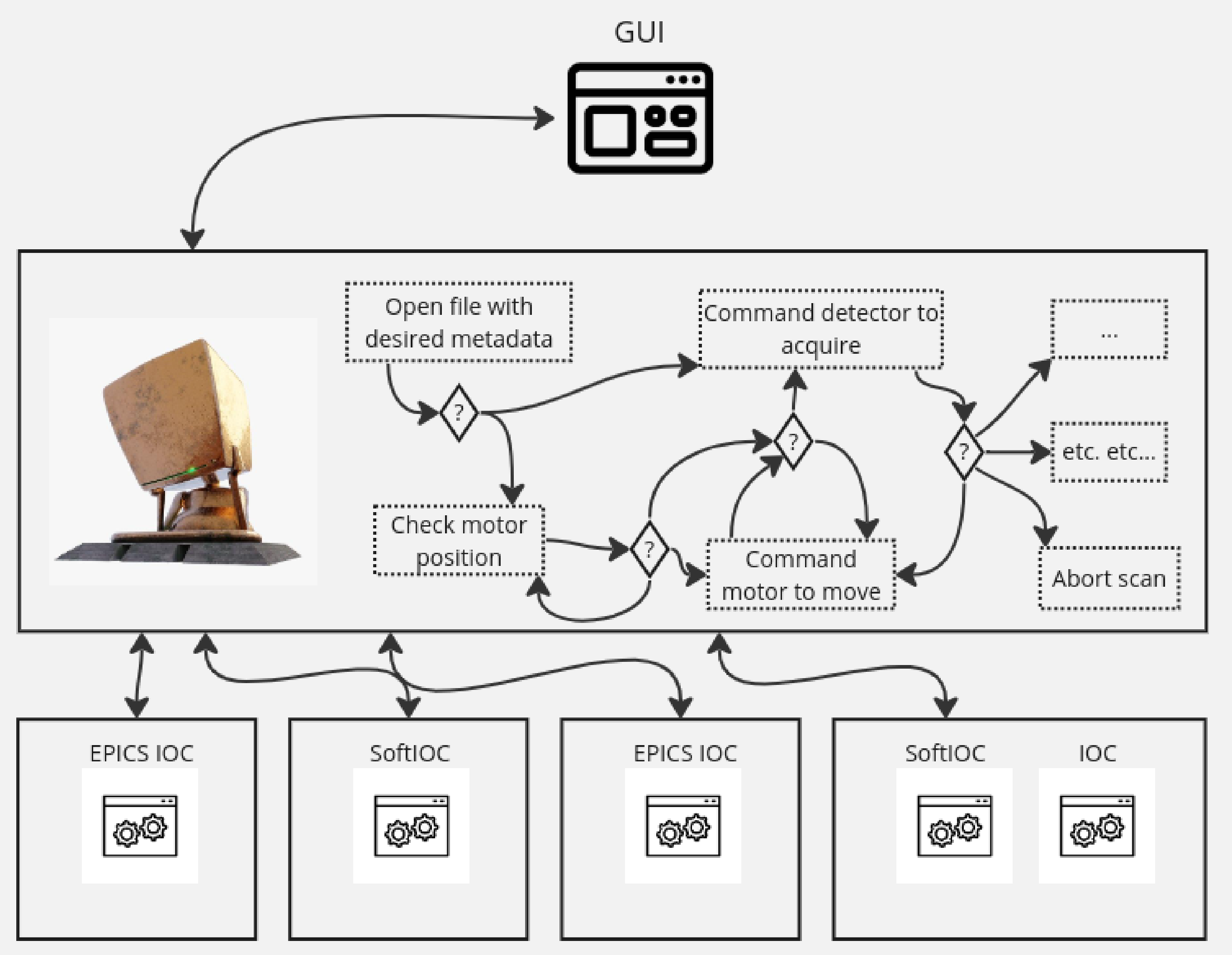
Current challenges in orchestration

We need something to...



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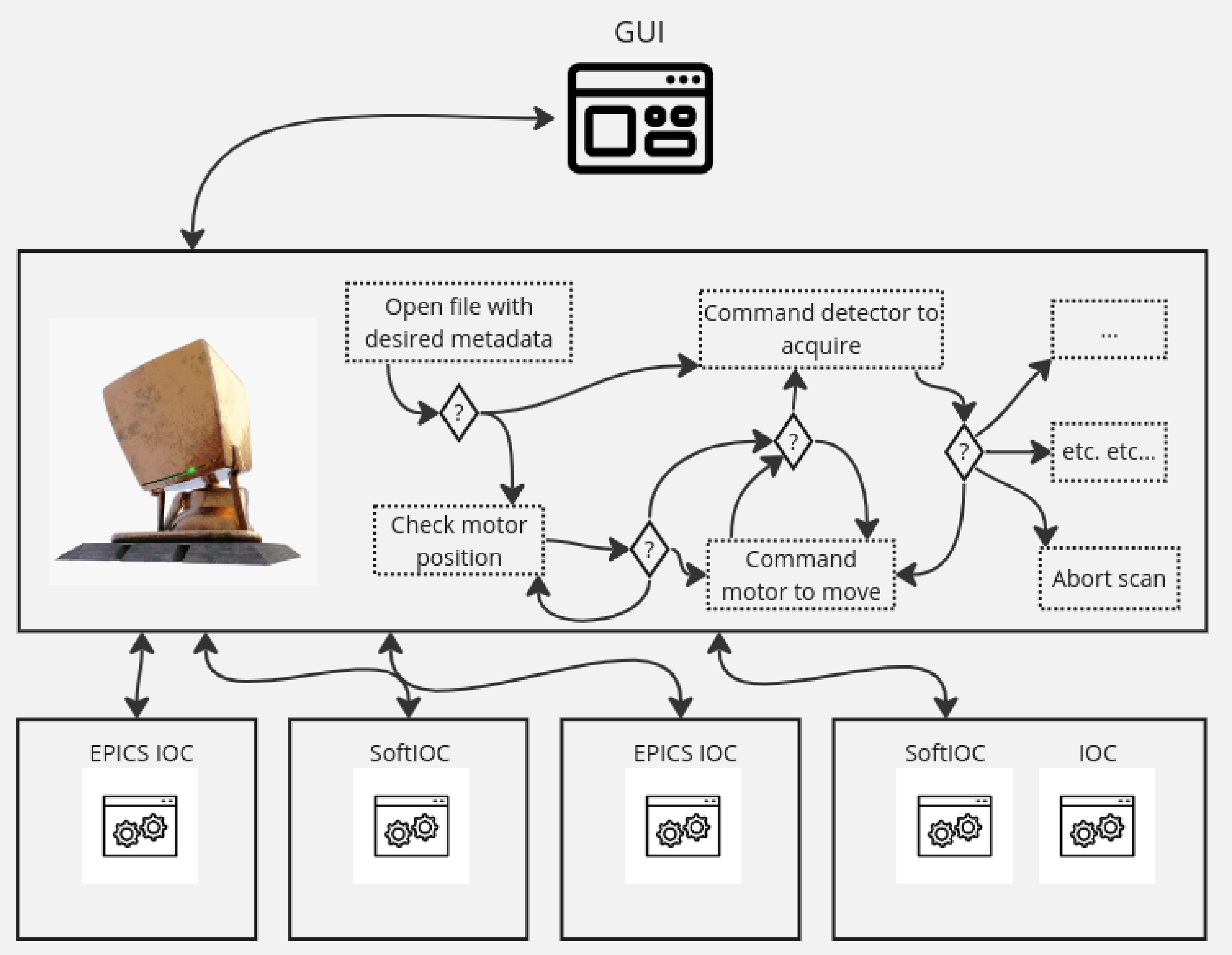
Current challenges in orchestration

We need something to...

Organize all the "atomic" operation parameters into a single, coherent and meaningful set.



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Current challenges in orchestration

Four options are currently being used in different scenarios:

PyDM GUIs (quick, easy and dangerous):

- Easily customized by beamline staff;
- Small developing time;

Yes, but...

- GUI crash/close = process might be left hanging;
- Process is "stuck" to the user running the GUI.

PCASpy softIOC:

- Easily customized;
- Small development time;
- Easily managed by several users;
- Made to be constantly running;

Yes, but...

- Performance is far from ideal;
- Doesn't get CA server updates from EPICS_BASE;
- How to "port" PCASpy code to PVAccess?

Sequencer softIOC:

- Easily managed by several users;
- Made to be constantly running;
- Highly performatic;

Yes, but...

- Bigger developmenttime;
- Learning curve for non-epics developers is considerable.

Bluesky scans:

- Easily managed by several users;
- Server constantly running, clients can connect whenever they want;

Yes, but...

- Learning curve is considerable, not as much as sequencer;
- No defined GUI situation

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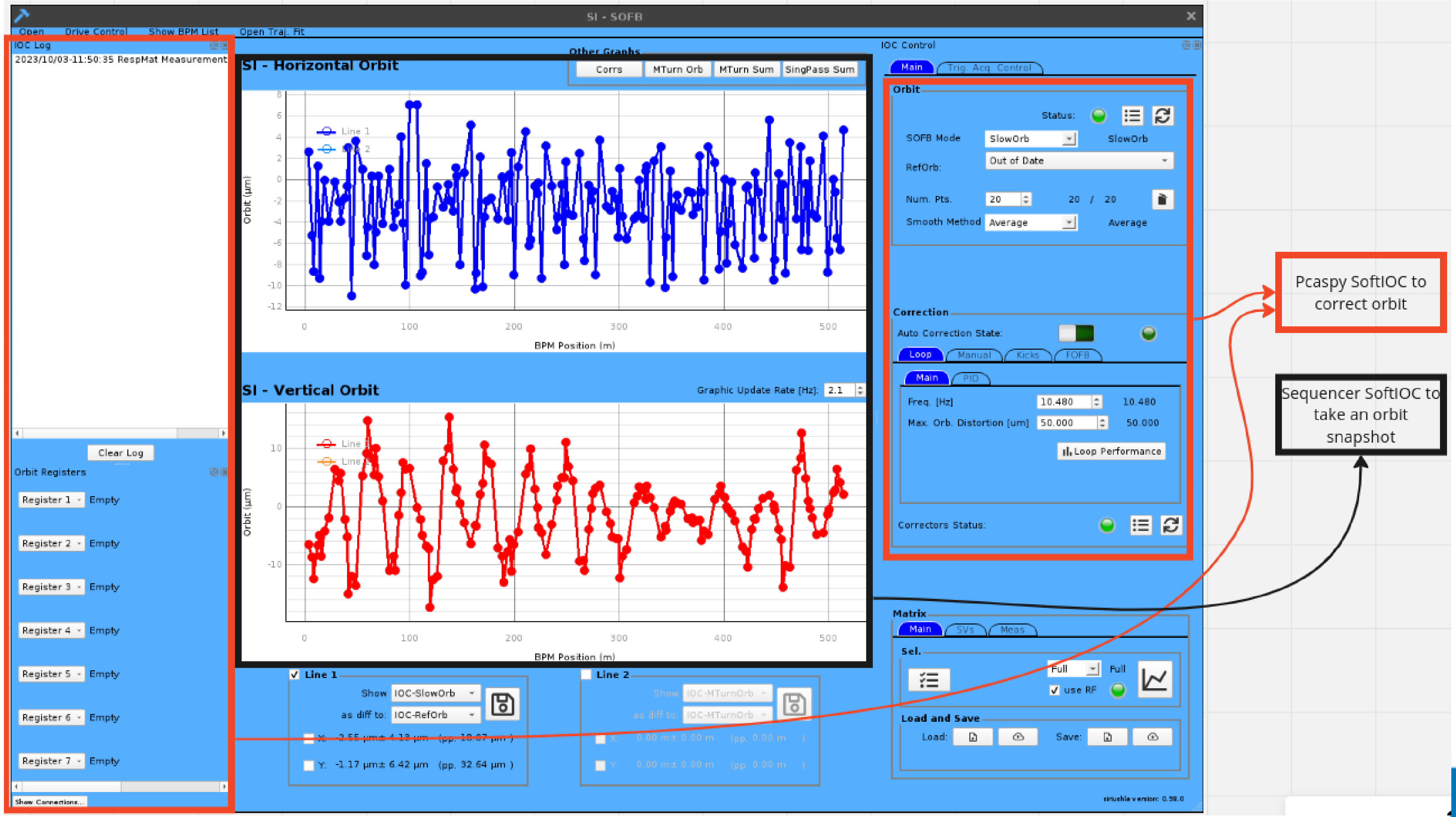
Examples and use cases...



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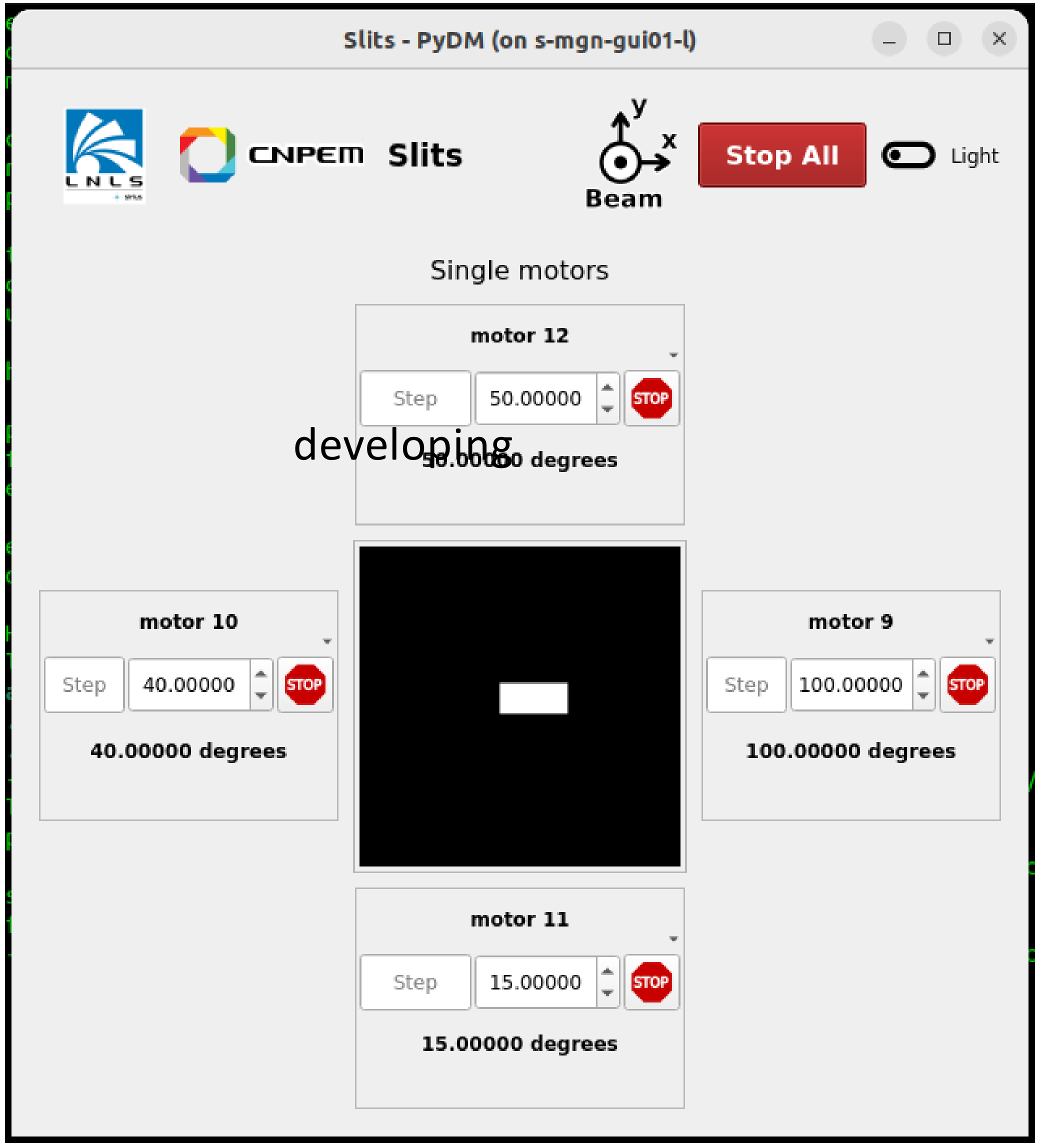
Examples and use cases...

Sequencer SoftIOC to identify and transition between desired and current slits states



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Possible solutions

Bluesky vs. SoftIOC

- Any specific criterion for choosing one vs. another?
- Is the states machine concept well embedded into bluesky?

Sequencer:
PVAccess support?

- What is the future of sequencer with PVAccess?
- Currently, sequencer has many tools to directly work with C.A. in .stt files. Will this also be true for P.V.A?

Legacy PCASpy SoftIOCs:

- We need to port old PCASpy code to more modern solutions. What are our options?
- Possibly: Python SoftIOC, PVAPy, any more...?

In conclusion

- We seek solutions for experiments orchestration and old softIOCs code portability for P.V.A. Both demands seem to ask for similar solutions;

- Several attractive tools are available. Which are the ones most aligned with the community goals/perspectives?

Thank you!

These discussions have been in happening in SIRIUS's Data Acquisition and Processing Division (DAP), Control Software Group (SwC), and in the Accelerator Physics Group (FAC).

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Eduardo Pereira Coelho – Leader of Control Software Group
Ana Clara de Souza Oliveira – (Soon to be) Leader of Control Software Group
Marco Montevechi Filho – Control Software Maintainer
Érico Nogueira Rolim – Control Software Maintainer

Please get in touch!
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