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DevPylon, DevVimba: GAME CHANGERS AT LULI

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Abstract

Apollon, LULI2000 and HERA are three Research Infrastructures of the Centre national de la recherche scientifique, École polytechnique, Commissariat à l'Énergie Atomique et aux Énergies Alternatives and Sorbonne University. Past-commissioning phase, Apollon is a four beam laser, multi-petawatt laser facility fitted with instrumentation technologies on the cutting edge with two experimental areas (short—up to 1m—and long focal—up to 20m, 32m in the future). To monitor the laser beam characteristics and control it from pilote through the interaction chambers, more than 500 devices are deployed in the facility and controlled through a Tango bus. This poster focuses on two linked software components: DevPylon and DevVimba. Each affected to a type of cameras: Basler via PyPylon wrapper interface of Pylon Software suite and Prosilica via Vimba's software development suite library, respectively. These two Tango devices are Python scripts constructed and generated via Code Generator POGO. They offer a specific way to monitor more than 100 CCD cameras in the facility at an image acquisition and display rate up to 10 Hz for a maximum of 300-shot at 1-minute rate per day and on an always-ON mode throughout the day.

MULTI-PETAWATT APOLLON LASER FACILITY

In this chapter are presented some key figures of the facility, and some photos for a better comprehension of the areas of the facility. For the context, the Laboratoire pour l'Utilisation des Lasers Intenses (thereafter LULI) runs three facilities: historically LULI2000, Apollon and HERA. Apollo is the first of the three which was implemented with Tango control system [1].

- The Facility covers about 4,500m²
- LASER hall: ISO8 cleanroom
- Experimental rooms cover surfaces of 280m² and 490m² (focal lengths of 10+m)
- 5 m-thick concrete walls provide full radio protection
- 3PW on target in 2023, 8PW in 2025
- 500+ devices

With more than 500 devices running in the facility, a distributed control system was obviously needed. Tango was not so obvious ten years ago. Looking back, it was a good choice as the community is very helpful; larger and larger with new projects every year, and the system runs smoothly.

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Some photos inside the facility, for the different rooms.

Figure 1: Supervision control room.

Figure 2: Long Focal Area (420m^2).

Figure 3: Compression and switchyardlaser subsystem.

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Figure 4: Short Focal Area (210m^2).

Figure 5: A laser expert during alignment protocol.

DevPylon AND DevVimba

We work with different people (be scientists, laser experts or operators) and they all have different needs for a camera acquisition device server. All combined, we need high-cadence (up to 10Hz) and always-ON use for two types of camera depending on vacuum capabilities. So we developed a new device server in Python using POGO to address these specificities. It was DevPylon in first place, then DevVimba as the HMI for the Basler camera was wanted by the users for monitoring the Prosilica ones, too. Developing this second device server the same way as the first, combined with a computation device server (DevCalculs), we were able to provide a single HMI for users. They then could switch from a camera type to another fluently without wasting time to re-adapt to different HMIs. An example of the Graphical User Interfaces (GUIs) the control-command system team uses and specifically a GUI monitoring a camera, a Basler or Prosilica as the final user will not notice the differences, unless knowing it *a priori* as seen in Figure 6. These scripts are available to download via our LULI Gitlab repository [2] and via the Tango classes catalogue web page [3].

REFERENCES

[1] Tango, https://www.tango-controls.org

[2] LULI_Tango gitlab, https://gitlab.in2p3.fr/stephane.marchand1/LULI_tango/-/tree/master?ref_type=heads

[3] Tango-control classes catalogue website, https://www.tango-controls.org/developers/ds

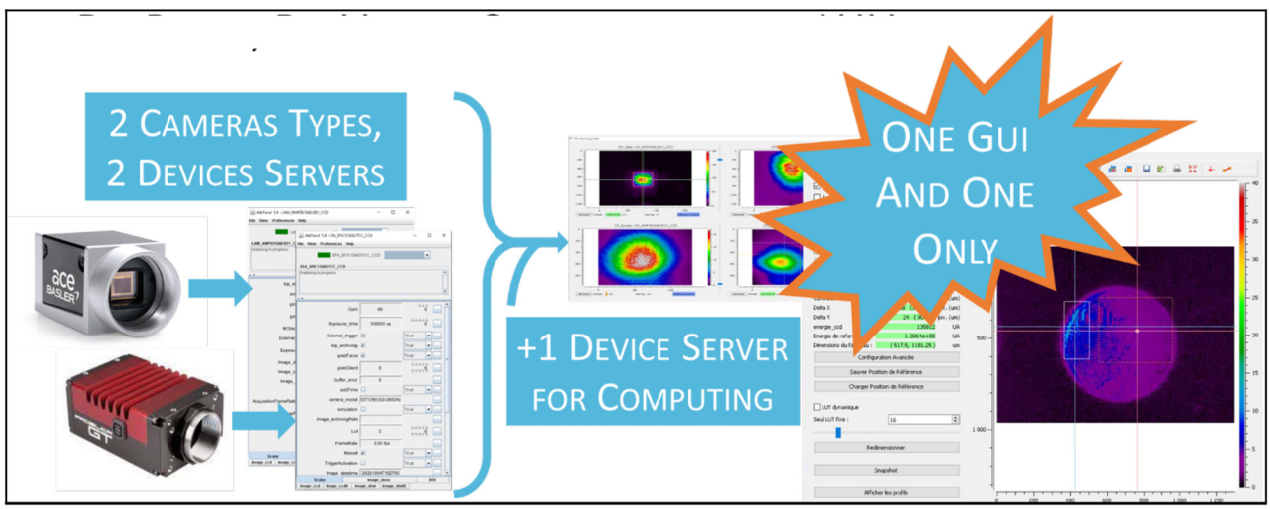

Figure 6: Last slide of the mini-oral transparents. 2 cameras imply 2 devices servers but only one Graphical User Interface.