Software for the New General detector Controller
Developing the software for a common Optical/Infrared detector controller

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NGC is the ESO New General detector Controller, designed to handle the detectors of both optical and infrared new instruments, for scientific imaging as well as advanced signal sensing applications. It is being developed on the base of the experience with the current ESO standard controllers - FIERA (for the optical domain) and IRACE (for the Infrared) - and the requirements coming from the new generation of detectors.

To merge optical and infrared detector controllers is an interesting challenge also under the software point of view. Different requirements come from the different domains: huge on-the-fly processing of the acquired data (infrared), shutter handling (optical), strict timing requirements (interferometry or high time resolution imaging or spectroscopy), synchronization with external signals (multiple cameras, va-et-vien, nodding, chopping), interface to real-time-computers (adaptive optics), fast image assembly and storage in FITS files (big detector mosaics), continuous readout and storage in FITS files (shift-scanning).

All these functionalities must be achieved along with stiff performance requirements (speed, time accuracy, error recovery, etc.).

Moreover, the experience has shown that it is important that the same code which is used for operation at the telescope is also used in the advanced signal sensing applications. It is being developed on the base of the experience with the current ESO standard controllers - FIERA (for the optical domain) and IRACE (for the Infrared) - and the requirements coming from the new generation of detectors.

In order to guarantee reusability, the software for the NGC has also started to define Use Cases and Design Patterns which should become the future "building blocks" in the ESO control software area. All this is developed within the framework of the ESO VLT control software paradigm.

Software development

- **Maintenance**: software must be simple, open to evolution of requirements (functionalities) and environment (new hardware and software)
- **EUIP (Enterprise Unified Process)**, iterative approach is being used
- **Extensive usage of Use cases** (see below) has been the base for the software requirements.
- DOORS usage: tool for easy management of requirements/design/implementation/test documentation, with mutual references and easy traceability
  - high and intermediate levels: the differences between Optical and Infrared operations suggest having different designs for Optical and Infrared
  - **low level**: implementation can be common.

At this level, a Controller Interface provides modular objects to control the Sequencer and the ADCs on the front-end modules, for interfacing to the Acquisition Process and for the Asynchronous Data Reception. The objects can be assembled in an arbitrary way to reflect all functionalities of any NGC hardware configuration.

A graphic tool for the pattern creation is under development.

Use Case example