Goals and strategies in the global control design of the OAJ Robotic Observatory.

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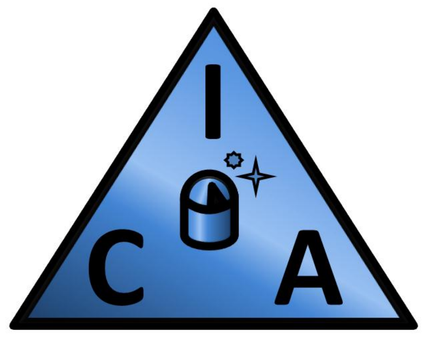
Abstract

The Observatorio Astrofísico de Javalambre (OAJ)[1] is a new astronomical facility located in the Sierra de Javalambre (Teruel,Spain). The observatory will host two telescopes, an 83cm telescope with one 9.2kx9.2k CCD[2] and a 2.55 telescope with 14 CCDs 10.5Kx10.5K
The OAJ control system has been designed from a global point of view including astronomical subsystems as well as infrastructures and other facilities. We strongly believe that the best approach for a success design of a new observatory is to consider it as whole and to focus on overall efficiency basically integrated by several systems. The relationship between systems has to be optimized in order to facilitate coordination and best performance of observatory functionality as a whole.

Introduction

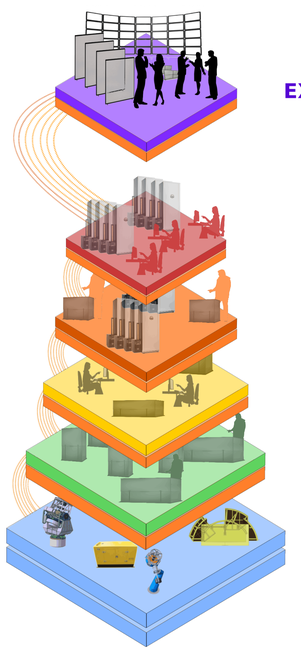
Our approach of an Observatory Control System (OCS) goes one step further than the tradictional approach, we will reduce errors, resources, time and cost with a new strategies, we consider the observatory as a global entity not only as isolated systems, we propose **CIA (Control Integrated Architecture)** design and **OEE (Overal Equipment Effectiveness)** as a revolutionary approach in the control systems of observatories

A new global control concept



Control Integrated Architecture

Easily adaptable layers

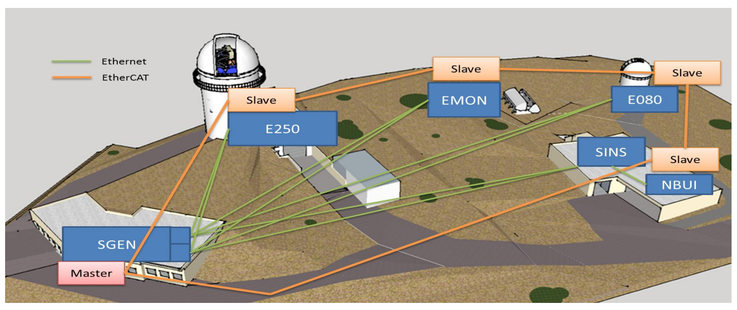


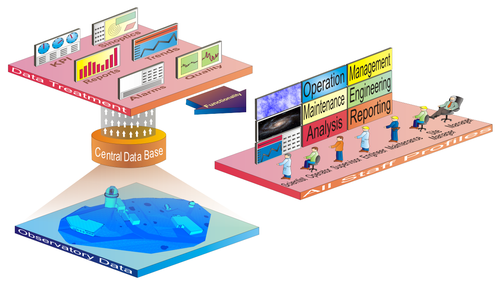
One of the most hard tasks for engineers in CEFCA, is to be able to design a system based on layers which allows us to adapt us to changes with easily.

CIA - Control Integrated Architecture

We must develop a new programmable tool for controlling and managing the whole observatory, **it's a new concept called CIA**.

- **Control:** It doesn't have the classical meaning of control loop applied to a systems, now the users must close the loop. To do that we must:
  - Measure performance, **by mean of Key Performance Indicators (KPI)**
  - **Quality Indicators and alarms in real time or as historical data. (QI)**
  - Have feedback about procedures, system reports, summarized alarms, historical alarms, etc.
- **Integrated:** The analysis of systems interrelations, behavior and responses is absolutely essential; therefore we think that integration through layers, standardization and systems integration will allow us to create a flexible and easily adaptable OCS
- **Architecture:** We must build a tool which can give functionality in all areas, all profiles and cover all requirements at the observatory.

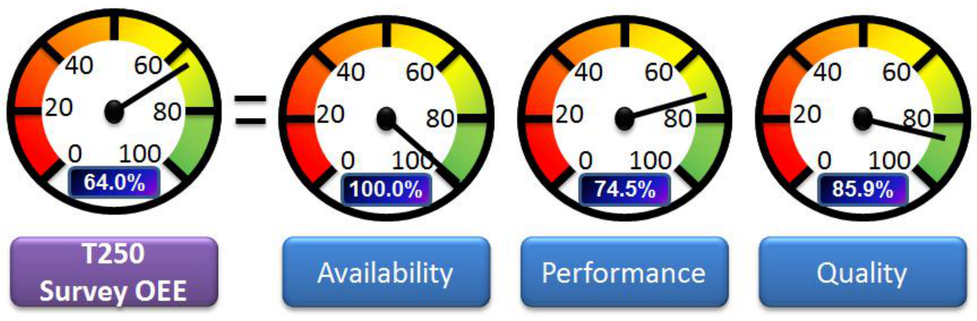




OEE - Overall Equipment Effectiveness

The question is **"How can an observatory optimize the performance of their existing facilities?". Our answer tho this questions is to use OEE**[3]. OEE is a well-known tool for the automation manufacturing industry, both fields are completely different (observatories and manufacturing industry), but there is something that both have in common; both have to minimize downtimes, that is why we truly believe that OEE is an effective tool to benchmark, analyze, and improve observatory processes.

$$OEE(\%) = Availability(\%) \cdot Performance(\%) \cdot Quality(\%)$$



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