Reporte de Actividades

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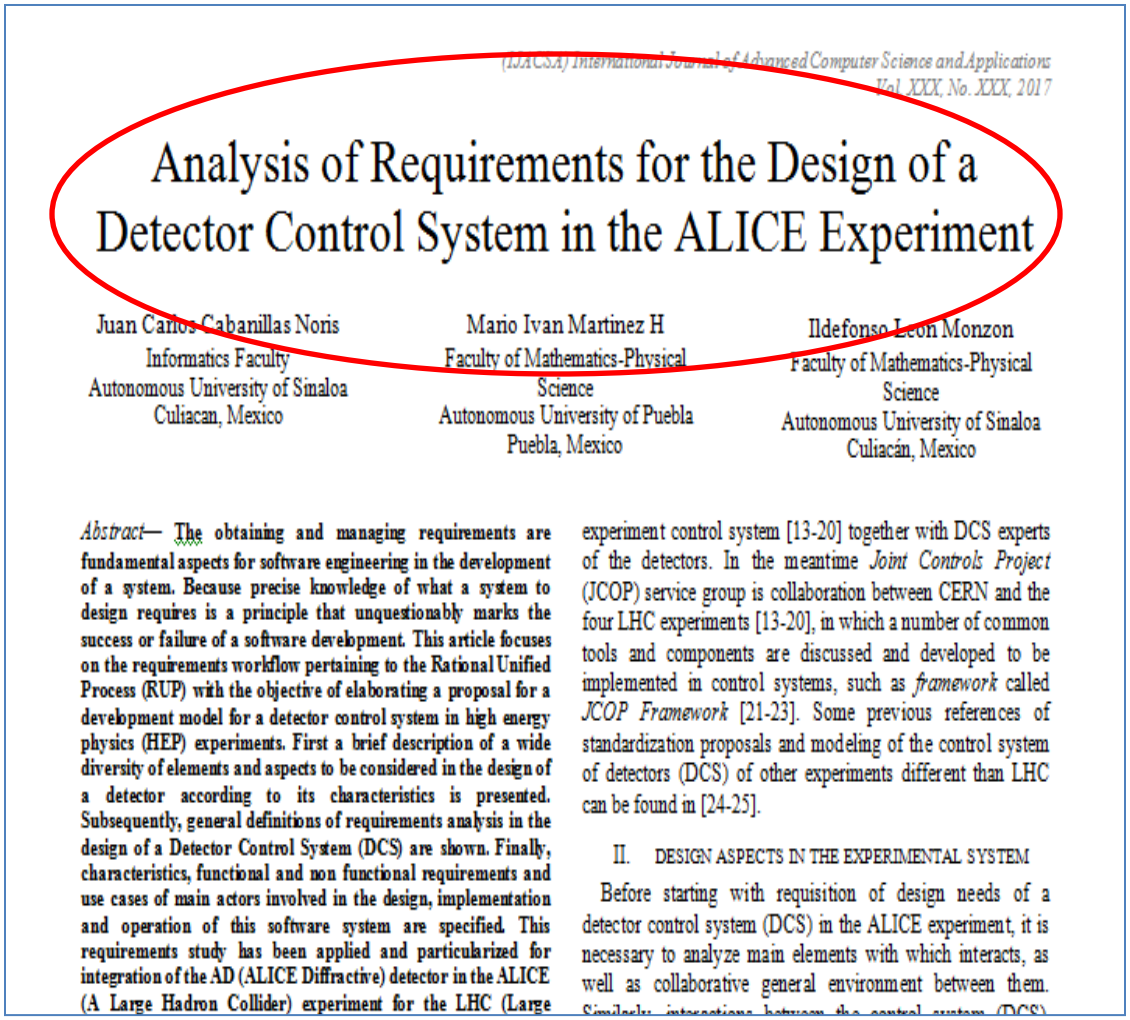
24-Jun-2017

Revisión del Trabajo de Tesis

- Atención a las observaciones del Dr. René Rodríguez respecto al tema de Ingeniería de Software (tesis-artículos):
  - Integración y descripción del modelo RUP en el desarrollo
  - Mapa de Ruta del modelo
  - El papel de los diagramas UML en el modelo RUP
  - Integrar bibliografía adicional
- Actualización de formatos del documento de tesis
  - Índice automatizado, división por secciones, pie de páginas.

Versión del Artículo en el formato de la Revista



(IJACSA) International Journal of Advanced Computer Science and Applications
Vol. XXX, No. XXX, 2017

Analysis of Requirements for the Design of a Detector Control System in the ALICE Experiment

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Abstract— The obtaining and managing requirements are fundamental aspects for software engineering in the development of a system. Because precise knowledge of what a system to design requires is a principle that unquestionably marks the success or failure of a software development. This article focuses on the requirements workflow pertaining to the Rational Unified Process (RUP) with the objective of elaborating a proposal for a development model for a detector control system in high energy physics (HEP) experiments. First a brief description of a wide diversity of elements and aspects to be considered in the design of a detector according to its characteristics is presented. Subsequently, general definitions of requirements analysis in the design of a Detector Control System (DCS) are shown. Finally, characteristics, functional and non functional requirements and use cases of main actors involved in the design, implementation and operation of this software system are specified. This requirements study has been applied and particularized for integration of the AD (ALICE Diffractive) detector in the ALICE (A Large Hadron Collider) experiment for the LHC (Large

experiment control system [13-20] together with DCS experts of the detectors. In the meantime *Joint Controls Project* (JCOP) service group is collaboration between CERN and the four LHC experiments [13-20], in which a number of common tools and components are discussed and developed to be implemented in control systems, such as *framework* called *JCOP Framework* [21-23]. Some previous references of standardization proposals and modeling of the control system of detectors (DCS) of other experiments different than LHC can be found in [24-25].

II. DESIGN ASPECTS IN THE EXPERIMENTAL SYSTEM

Before starting with requisition of design needs of a detector control system (DCS) in the ALICE experiment, it is necessary to analyze main elements with which interacts, as well as collaborative general environment between them. Similarly, interactions between the control system (DCS)

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Versión de la propuesta de artículo adicional

Application of a Software Engineering Methodology in the Control System Design of a Single Detector in the ALICE Experiment

First A. Author, *Fellow, IEEE*, Second B. Author, and Third C. Author, Jr., *Member, IEEE*

Abstract— This document presents the development of a methodology to model the design and operation processes of a control software required for a single detector in the ALICE (A Large Ion Collider) experiment at the Large Hadron Collider (LHC) applying software engineering techniques. This proposal uses Rational Unified Process (RUP) to model a control system of a detector considering the workflow of requirements, analysis, coding and tests for all phases of this model.

Firstly a brief description of the control system architecture and main aspects of the experiment is presented. Subsequently, the results of RUP workflows are presented, such as: analysis and design requirements. The description of these workflows in RUP is done through application of associated UML models.

Finally, operation and performance of this modeling methodology of the control system for AD (ALICE Diffractive) detector installed in the experiment are evaluated. This analysis is a way to know the impact and relevance of the detector control system (DCS) for the performance of the AD detector and, in general, of the ALICE experiments.

Index Terms—ALICE, CERN, Detectors, JCOP, LHC, RUP, UML Diagrams.

kaons, etc.).

ALICE detector weighs aproximatelly 10,000 tons and is 26 m long, 16 m high and 16 m wide. The experiment is located in a cavern below ground level, near St Genis-Pouilly community in France. The ALICE collaboration has more than 1,000 scientists from more than 100 physics institutes in 30 countries. Currently, the ALICE experiment is composed of 19 detectors for operation during the Run 2 of LHC that started in march 2015 and will end up in december 2017.

II. DETECTOR CONTROL SYSTEM (DCS)

A. General description

One of the key systems of this experiment is the ALICE control system, which performs all control activities in order to ensure safe and proper operation of this experiment [2]. The ALICE control system consists of four online systems: *Detector Control System* (DCS), *Data Acquisition* (DAQ), *Trigger* (TRG) and *High Level Trigger* (HLT), interconnected through the *Experiment Control System* (ECS).

In particular, DCS permits to the shifter of the experiment to control, monitor and configure experimental equipment

- Revisión de las revistas para una publicación.
- Integración de recomendaciones.
- Reestructuración del contenido respecto a la versión anterior.

Políticas publicación de artículos técnicos en ALICE

7.4 Technical Publications

The purpose of an ALICE Technical Publication is to communicate technical information about the ALICE detector and its performance, including both hardware and software, to the Scientific Community. The authorship of these papers shall be defined by the appropriate Project leader.

The Project leader circulates the draft among all members of the Project for comment, and approves it for submission to the EB, along with a recommendation for the journal. The EB referees the draft and either returns it to the Project leader with comments or approves it for publication.

The EB chair or a person in charge submits the manuscript to the journal and post it on the arXiv. Response from the journal and referee reports will be circulated among all members of the Project for comment, and resubmission will follow the same procedure as the initial submission.

** http://alice-collaboration.web.cern.ch/sites/alice-collaboration.web.cern.ch/files/documents/editorial_board/ALICE%20Policy%20for%20Publications%20and%20Presentations_28%20March%202014.pdf

TODO

- Reunión con la Coordinadora de Posgrado
- Reunión con los directores de tesis:
  - Fechas de estancia en CERN (Service Task)
  - Fechas de entrega de revisión de Tesis
  - Envío de artículos de Ing. Software
  - Solicitud de prórroga
- Seguimiento del proceso de publicación