CONTROL AND ANALYSIS SOFTWARE DEVELOPMENT AT THE EUROPEAN XFEL

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Agile Project Management (Agile PM), coupled with the DevOps concept, has been worked out as a fundamental approach in a highly uncertain and unpredictable environment to achieve mature software development and to efficiently support concurrent operation. At the European XFEL, Agile PM and DevOps have been applied to provide adaptability and efficiency in the development and operation of its control system: Karabo. In this context, the Control and Analysis Software Group (CAS) has developed in-house a management platform composed of the following macro-artefacts: (1) Agile Process; (2) Release Planning; (3) Testing Infrastructure; (4) Roll-out and Deployment Strategy; (5) Automated tools for Monitoring Control Points (i.e. Configuration Items[5]); and (6) Incident Management[6]. The software engineering management platform is also integrated with User Relationship Management to establish and maintain a proper feedback loop with our scientists who set up the requirements. This article aims to briefly describe the above points and show how agile project management has guided the software strategy, development and operation of the Karabo control system at the European XFEL.

Karabo at European XFEL

In the last three years, the CAS group has managed an increase of its size from 12 to 28 while efficiently integrating the newcomers to the group structure by applying mentorship and a welcome structure with a training program. A good and motivating atmosphere has been achieved where the group members are happily volunteering to help one another or even take on-call support duties. During this period, a workable system was delivered in spite of a difficult task prioritization management environment. The Karabo control system has been made stable and reliable, and is ready to integrate newer and more sophisticated features.

As the stability and robustness of the system has increased, the amount of required support by on-call has measurably decreased; the execution of experiments became more mature.

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Software Engineering Management Platform

Agile Management

CAS Agile Process 3.0

- Agile Process
- Release Planning
- Testing Infrastructure
- Roll-out and Deployment Strategy
- Automated tools for Monitoring Control Points
- Incident Management

User Relationship Management

- Engagement by taking PO roles (Squads, and Chapters)
- Regular feedback collection
- Release demos, trainings, “Did you know?" snippets

Roadmap Management

- Roadmap prepared for 1-1.5 years in advance

Software Quality Assurance

- Development process with unit tests, Gitlab code review, CI, acceptance tests
- Automated Squish GUI tests, hw-in-the-loop and regression tests

Roll-out, Deployment Management

- Final tests on special hardware in shutdown
- Ansible playbooks to maintain deployment
- Only hotfixes between deployments
- Support for on-the-fly development

Monitoring and Incident Management

- Incidents and related actions are logged
- OCD Manager monitors all device serves in the control system
- Weekly review of incidents
- OCD Manager monitors all device serves in the control system

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