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EDMS USER REQUIREMENTS LIST

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EDMSReqUser: List of user requirements from the key stakeholders in the EDMS system

Executive summary:

Compared to the planning assumptions during the writing and evaluation of the E-JADE proposal, the ILC schedule has significantly shifted in time; we now do not expect a positive decision about the construction of the machine before 2018.

This delay has significant impact on the ILC community, which faces (among other things) increased funding difficulties and delays in many sub-projects that cannot be tackled in a meaningful way without the overall definition of an international ILC project.

For the same reason, the work required for the EDMSReqUser deliverable is experiencing significant delays, so that this deliverable cannot be met in a satisfactory way within the pre-defined timescale.

1. INTRODUCTION

A large-scale and global endeavour like the International Linear Collider (ILC) requires sophisticated management tools that are capable of facilitating smooth cooperation of hundreds to thousands of scientists and engineers from all over the world. Such a system must contain the basic technical and administrative information, but it must also be capable of keeping track of its changes. EDMS – engineering data management systems – are key tools to enable such a workflow. They have been in use for a while already, not least during the design and construction of the European XFEL at DESY, and during the technical design phase (TDP) of the ILC that ended with the publication of the Technical Design Report (TDR).

Every large project has its own and unique specifics and problems, and therefore, EDMS solutions need to be tailored to the needs and requirements of its users. It is at this point that the EDMSReqUser deliverable kicks in: It is supposed to collect the relevant requirements and design considerations for an EDMS system for the ILC from all stakeholders. This is by no means a trivial task.

2. THE STATUS OF THE ILC

In contrast to the belief during the E-JADE proposal phase, the ILC has not yet matured into a funded project. Instead, the Japanese ministry responsible for science (MEXT) has appointed an expert panel and installed several sub-committees with the task of reviewing the technical and financial soundness of the ILC TDR[1] (published in 2013) and the human resources situation at the participating institutions. After the publication of an Interim Report[2] of the expert panel in 2015, the community is now awaiting the final report and for a subsequent decision by MEXT and the Japanese government.

This unclear overall situation of the ILC is showing first detrimental side effects: It is getting more and more difficult for non-Japanese institutions to provide funding for ILC-related tasks. For this reason, activities that are part of an engineering design phase, have not been started yet .

3. THE EDMS SYSTEM

3.1. EDMS PRECURSORS AND STATUS

All ideas for an ILC EDMS system are based on the implementation provided for and used during the ILC Technical Design Phase. This EDMS contains the technical documentation of the ILC machine and of the envisaged detectors as well as the necessary information for costing the accelerator and related infrastructure. The system, developed under the supervision of the ILC Global Design Effort (GDE), is being maintained and is being further developed. It is based on the same EDMS system used for the European XFEL at DESY, Hamburg, where a lot of long-standing expertise has accumulated. It will most likely be the model upon which future developments will be based.

[1] https://www.linearcollider.org/ILC/Publications/Technical-Design-Report

[2] http://www.mext.go.jp/component/b_menu/shingi/toushin/__icsFiles/afieldfile/2015/08/05/1360596_3.pdf

The latest significant change to this EDMS system was the introduction of a change management procedure [1,2] that allows keeping track and curating of the existing ILC design – a highly non-trivial task.

3.2. EDMS AND CHANGE MANAGEMENT

Pending the start of the engineering phase of the ILC project, the focus of the current project phase lies on the preservation and evolution of the baseline design that has been formulated in the Technical Design Phase. To ensure an orderly and methodical approach to design changes that also involves all relevant stakeholders from the participating institutions around the world, the EDMS team and the LCC management collaborated in the definition of a change management (CM) process.

The CM process is applicable to all changes (including refinements) to the baseline design. It regulates who can submit a Change Request (CR), and how the CR is reviewed and decided upon by the Change Management Board (CMB), and finally implemented. All documentation pertaining to a CR is stored and processed with the EDMS. All design documentation that defines the baseline design must also be stored in EDMS, where it is subject to version control.

Following the approval of the CM process document by the LCC associate director, the CMB was constituted and started regular meetings. Presently, nine CRs have been decided, and three more are under review. Several CRs had a scope that affected the whole accelerator layout, or the conditions provided for the experiments, most notably:

- ILC-CR-0002: A proposal from the accelerator group to harmonize the position of the final focus quadrupole between the two experiments ILD and SiD, in order to improve the beam optics and set-up time.
- ILC-CR-0003: A proposal to provide a vertical access shaft to the experimental hall to allow a CMS-like assembly procedure of the detectors (assembly of large detector parts above ground and lowering them by means of a 4000t gantry crane), which decouples the schedules of hall excavation and detector assembly and thus reduces schedule risk.
- ILC-CR-0004: A proposal to increase the length of the accelerator by 3km, in order to ensure the proper timing of the positron source and mitigate the risk associated with the possibility that cavities might have to be operated at a lower average gradient than assumed in the TDR.

These CRs were thoroughly reviewed by the members of dedicated Change Review Panels, with additional discussions at various workshops. Implementation was conducted by Change Implementation Teams.

The Change Management process has proven to be a highly successful way to systematically and methodically evolve the baseline design. It relies heavily on the existing EDMS and its capabilities.

3.3. EDMS: NEXT STEPS AND STAKEHOLDERS

The necessary next steps for the creation of the envisaged requirements document would first and foremost need the existence of a project, with committed parties and a defined goal for the next project phase.

Once such a project is in place, the stakeholders are known and can be contacted in order to elucidate the requirements for the coming project phase. This will require dedicated person power, a budget, and a mandate.

In the current situation, in which there is no project, there are no stakeholders for an EDMS system. Consequently, no requirements based on the needs and wishes of individual stakeholders can be formulated, and the EDMSReqUser deliverable cannot be fulfilled in the foreseen manner.

3.4. EDMS STAKEHOLDER ROLES

For the purpose of defining requirements for an Engineering Data Management System, the following stakeholders or stakeholder roles have to be considered:

- There are organization-level stakeholders: Organizations that will use, operate, or finance the system. Obvious partners in this respect are the Japanese KEK laboratory (an E-JADE partner) and DESY, the ICFA-appointed Linear Collider Collaboration (LCC), or – once established in the future – an ILC Project Office. These stakeholders will likely contribute requirements pertaining to operation and licensing costs and conditions, access policies, hosting of data and intellectual properties.
- Stakeholders from the management will use the system to support managerial activities such as project planning, execution, monitoring and controlling. The system will support business processes such as distributing, reviewing and approving of documents and designs. Requirements from this stakeholder group are likely to impact how access rights, roles and responsibilities are treated, and which business processes shall be supported. They will also need reporting capabilities.
- Scientific and engineering personnel constitute another stakeholder group. They will be responsible for defining and implementing the requirements and implementing the technical description of the future machine. They will have technical requirements pertaining to issues such as data exchange, file formats, access speed, and connection to authoring systems, in particular CAD systems. These stakeholders will also have requirements on different design and review processes from areas such as collaborative engineering, requirements engineering, quality assurance, and systems engineering.
- The final level of stakeholders are the EDMS users from the ILC community who will access the system in order to retrieve information relevant for their specific task in the fields of machine or detector development and construction, or physics analysis. These stakeholders will have additional requirements regarding usability, browse and search capabilities, support for different client systems and languages.

It is with the first of these communities – that will form according to the development of the ILC project - that E-JADE will further be in touch in order to fulfil the EDMSReqUser deliverable, based upon the potential input of the second community (that will only form after the first). It is obvious, that E-JADE physicists will be playing leading roles in this, given their experiences and fields of expertise.

4. CONCLUSIONS

Compared to the planning assumptions during the writing and evaluation of the E-JADE proposal, establishing an ILC project has been significantly shifted in time; we now do not expect a positive decision about the construction of the machine before 2018.

Without the context of a project and a project organization, the work for the EDMSReqUser deliverable cannot be conducted, as neither the stakeholders are known nor the extent to which an EDMS system shall be used are defined.

Nonwithstanding this situation, the EDMS installation created by DESY for the Global Design Effort is in continuing use in the LCC, and continues to support the design activities that take place despite the difficult resource situation. The system evolves to support more processes, such as the recently introduced formal Change Management process. The experience from this continued activity will form the basis for a requirements document as soon as the project proceeds to a new phase.

5. REFERENCES

[1] List B., Harrison M. and Walker N. (2014) Change Management for the ILC, https://edmsdirect.desy.de/edmsdirect/file.jsp?edmsid=D00000001057375

[2] ILC Change Management web site: http://ilc.desy.de/cm/