

# MMiSS: Repository, Development Graph and Authoring Tools

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## The MMiSS Repository

The MMiSS repository is the central database maintaining MMiSS documents. Authors can add, modify or change documents using an authoring tool while the repository maintains the development with the help of fine-grained version control, configuration management, and a management of change. By *version control*, we mean the system keeps track of the different versions of a document as it is developed. Long documents usually consist of more than one file, and the *configuration management* keeps track of how different versions of an overall document are related to the various versions of its constituting parts. Moreover, in our *fine-grained* approach, constituting parts are typically clippings of files denoting semantic objects of the MMiSS document structure [2], like for instance units, groups and atoms. Version control and configuration management are operating on these, semantically oriented parts rather than files.

The MMiSS development manager implements a management of change that propagates the effects of local changes of a document to the overall repository. Since the MMiSS repository operates on a semantic basis keeping track of semantic relations between different objects (e.g. “definition  $D_8$  uses definitions  $D_4$  and  $D_2$ ”), changes are propagated along these relations to identify those parts of a document a user has to revisit or change again. To make use of such a sophisticated management of change, the user has to declare the semantic relations between objects in the first place. The input language MMiSS-L<sup>A</sup>T<sub>E</sub>X and the authoring tools provide the necessary means for declaring such relations. The graphical representation of the document structure in the authoring tools allows one to edit the relations between objects according to the paradigm of *direct manipulation*. All these techniques are well known from traditional software engineering and formal methods [1] and are now applied to the incremental development of formal (or semi-formal) documents: the MMiSS teaching material. For the author, the advantage of using the repository is improved correctness: we can no longer inadvertently delete a theorem, or change a definition without changing other parts of perhaps another document depending on it.

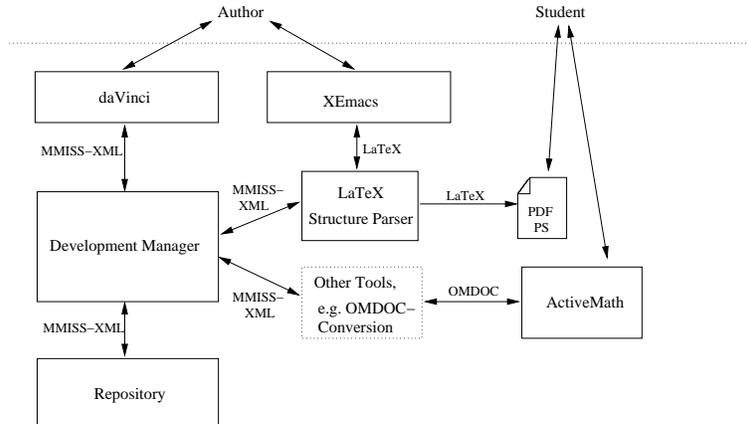


Fig. 1. MMiSS Repository System Architecture

## The MMiSS Workbench

The MMiSS workbench consists of the repository, development manager and tools to edit, convert and typeset MMiSS documents. Internally, all documents are stored in MMiSS-XML, an XML format based on the structuring facilities presented in [2]. A conversion tool allows the conversion into MMiSS- $\text{\LaTeX}$  and back, allowing high-quality typesetting with  $\text{\LaTeX}$ . The editing tools presently comprise the world's finest text editor, XEmacs, which allow users to edit their tools in  $\text{\LaTeX}$  format; a special MMiSS- $\text{\LaTeX}$  XEmacs mode assists the user by providing e.g. menus to enter the environments known in MMiSS  $\text{\LaTeX}$ . Other editing tools are planned.

Fig. 1 shows an overview over the system architecture, updated from [2]. As we can see, the user interface to the repository is given by the daVinci graph visualization system, which allows the user to navigate the version and document structure graph, and select versions, and document parts respectively, to work on. The repository and development manager exchange data in the MMiSS-XML format. Thus, any tool able to handle MMiSS-XML, or a format convertible into MMiSS-XML and back, can be connected to the repository. In particular, we are planning a bridge to the ActiveMath environment via a MMiSS-XML to OMDOC converter; from the repository's point of view, OMDOC is just another external exchange format, just as  $\text{\LaTeX}$ .

## References

1. Serge Autexier, Dieter Hutter, Till Mossakowski, and Axel Schairer. The development graph manager MAYA. In *Proc. AMAST2002*. Springer, LNCS 2422, 2002.
2. Bernd Krieg-Brückner, Dieter Hutter, Erica Mellies, and Martin Wirsing. Document structuring facilities in MMiSS, June 2002.