Introducing ClearCase as a Process Improvement Experiment

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\textbf{Abstract.} This paper describes the experiences gained in the CMEX project, an ESSI Process Improvement Experiment on revising the change control system in one department of Sysdeco GIS AS, a Norwegian software house. The aim of the project was to install ClearCase, a configuration management system, and to measure and evaluate the impact of the new system on processes and products. This paper describes the company background, CMEX, and some quantitative and qualitative results of the project.

\section{Introduction}

This document describes the experiences gained and results achieved during the CMEX project. CMEX was a \textit{process improvement experiment} (PIE) within the ESPRIT ESSI, \textit{Software Best Practice}, initiative. A PIE should measure and report on the effect of one specific process improvement step in one company. Process improvement experiments could be to introduce new methods, techniques, tools, or process and organizational changes. The measured results are reported to ESSI and should also be disseminated to a wider community.

CMEX has been concerned with revising the change control system of the graphic tools department of Sysdeco GIS AS (SGIS), a Norwegian software house in the GIS sector (Geographic Information Systems). The earlier configuration management (CM) system, which was based on SCCS and Make, was replaced with ClearCase \cite{3,2}, and the change processes, especially those concerned with management of change requests and defect reports were slightly revised. The new CM system was expected to improve the quality and efficiency of the change processes, and to reduce the number of CM-related problem reports and defects. The initial process improvement goals of CMEX were to reduce the number of CM-related defects by 10\% and increase the relative development effort by 5\%.

The CMEX project was carried out by SGIS in cooperation with the Norwegian University of Science and Technology, assisting in process modeling, measurements, CM system evaluation, and dissemination. The project started early 1996 and went on for 22 months and was recently concluded. ClearCase has been
successfully installed and is being used in development as well as in maintenance of a released product version. The measurement activities have focused on product quality and the maintenance and delivery processes. The project has been successful in meeting the initial goals by a good margin.

In the following sections we will present the company, their products and the current CM practice. We will then describe the motivations for introducing a new change control system and the process of introducing ClearCase. We will then shortly describe the measurement activities within the project, and show some preliminary results, followed by a conclusion.

2 Background

2.1 Company and Products

Sysdeco GIS makes end-user systems for different mapping areas such as topographic mapping, utility mapping, systems for power plants, fleet management (GPS) etc. The customer database consists of national mapping organizations, power plants, local authorities, utility companies, insurance companies, software houses, etc. Consultants from Sysdeco GIS build end-user applications using a tool-kit made by the graphic tools department at SGIS. However, Sysdeco also sells the tool-kit to other companies. This puts strong requirements to the tool-kit regarding robustness and documentation.

SGIS has around 150 employees in Europe and Asia and 40-50 at the main office in Norway. The graphic tools department is a small product group, consisting of 1 director, 8-10 developers, and 3 persons working on technical support, software building and system administration. Sales and first line support is handled by SGIS.

The graphic tools department delivers two main products: Tellus and Tellus Vision. Tellus, which was originally developed for various UNIX environments in the late 1980’s, provides developers with a hybrid raster and vector tool-set for layered color maps and includes a proprietary programming language (TCL) for application dependent code. Tellus is supported on seven different UNIX platforms (HP/UX 9.05, HP/UX 10.01, DEC Ultrix, DEC OSF/1, SUN Solaris, SunOS and IBM AIX) with four database connections (Oracle, Sybase, Mimer and Ingres).

The newest product is Tellus Vision, which in addition to offering Tellus on a PC platform, couples Tellus with QBE Vision, a Microsoft Windows-based 4GL tool-kit. This is also a Sysdeco product. This combination not only makes Tellus available to PC users, but also integrates QBE Vision’s 4GL and DBMS functionality as well as the QBE Basic programming language. Tellus Vision is targeted as the main development effort in the future. It is available for Microsoft Windows NT and Windows 95 and supports Oracle, Sybase, Informix, SQL*Server and ODBC databases.