

Using Workflow Technology in a System to Support Concurrent Engineering

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Concurrent Engineering is increasingly being adopted by organisations to improve quality, reduce costs and reduce the time-to-market of new products. These benefits require team members from all stages of the development process to work together so that tasks, wherever possible, are run in parallel to provide the shortest critical path.

Concurrent Engineering is a complex process involving design co-operation between engineers from different disciplines, different teams and different sites. Engineering products tend to be structurally complex and are made up of many levels of individual and combined components such as assemblies, sub-systems, and systems. The embryonic product may be subject to many changes during its development lifecycle and can generate a vast amount of product data. It is a difficult task to manage the product information and control the change process.

The research group at Cardiff University is exploring mechanisms to manage engineering product data and control the change process. Previous research by the group provides a means to store and manage the engineering data and changes. However, it lacks a means of co-ordinating and controlling the change process. Workflow Technology provides the monitoring, coordination and control of tasks and processes that is needed.

After considerable research we chose Stateframe from Alia Systems, in part because of the potential capabilities of its underlying state-event model. Stateframe is easy to use and gives the benefits that we were looking for:

- **Change notification** - Stateframe can be used to trigger change notification as part of processes. It can pass information or artefacts to appropriate team members for examination and action.
- **Managing the change process** – Stateframe can be used to model and control the change approval and release process. For example the process ensures that approval forms are sent to the correct signatories and that the instigator is notified of the result of that task.
- **Process design** - Stateframe provides a channel for the design to be examined by all involved, which is particularly important for processes that are shared across departments. It can keep track of the results of the examinations and hi-light those that are outstanding at user level. It also provides a controlled environment to try out changes to task order or flow.
- **Sub-processes** – The overall process of developing a new product will be unique for each product, but there will be many sub-processes that are common between products. Stateframe allows the reuse of existing processes as part of new processes so that effort is not duplicated in their creation.
- **Design rationale** – The information from a process can be combined with other data, for example, version histories to give detailed feedback on design rationale.
- **Tracking processes** - Allows users to track tasks within processes to glean process statistics, which can be used to improve process management.

Stateframe provides a flexible and powerful workflow toolkit which is capable of supporting different representations of the team members, concurrent processes, sub-processes, distributed processes, process tracking, dynamic processes and different message mechanisms. Cardiff University is currently focusing on developing the engineering versioning processes with better support for change notification and have found StateFrame to be very effective, flexible and easy to use in controlling and managing the changes in product development.