Software calibration and configuration data management

Integrated calibration and configuration parameters management for software development

Benefits

• Increase quality by linking calibration and configuration data to product requirements
• Accelerate development with accurate and consistent usage of calibration and configuration data across the design chain
• Reduce rework by establishing an enterprise-wide calibration and configuration data dictionary
• Improve quality by re-using proven calibration and configuration data across projects, products and platforms
• Improve reliability by quickly assessing the impact that changes to calibration and configuration data will have across products and variants
• Reduce time to volume production by quickly identifying the correct configuration and calibration files for installation

Features

• Manage the calibration and configuration data dictionary
• Define parameters and attributes including name, size, valid values, value descriptors and other characteristics

Summary

Teamcenter® software provides your enterprise with a secure, single source solution for managing and ensuring the consistency of the calibration and configuration parameters used by embedded software modules to define product functionality and behavior.

Business challenges

As products grow increasingly complex, software functions are embedded into virtually all of today’s newly introduced products. From aircraft and automotive vehicles to high-tech electronics, manufacturing equipment and even today’s parking meters and ATM machines, new products are controlled by embedded software functions. At the heart of these software functions are thousands, and in some cases tens of thousands, of calibration and configuration parameters that enable manufacturers or their customers to configure the product so that it will operate in a predefined manner based on specific applications requirements or user preferences.

Designed to meet the needs of multiple industry segments, Teamcenter provides a single source of calibration and configuration parameters that can be associated with a product and all of its variants across an entire product line. In this scenario, users leverage Teamcenter to define, manage, view, update, and delete parameter data.

### Configuration

**Product model 12010 – Variant X 10**

<table>
<thead>
<tr>
<th>Feature/function</th>
<th>On</th>
<th>Off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature control</td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>Lighting ON alarm</td>
<td>•</td>
<td></td>
</tr>
<tr>
<td>Lighting switch</td>
<td>mechanical</td>
<td></td>
</tr>
</tbody>
</table>

### Calibration

**Product model 12010 – Variant X10**

<table>
<thead>
<tr>
<th>Feature/function</th>
<th>Cal. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power drop threshold</td>
<td>+/-4 volts</td>
</tr>
<tr>
<td>Deceleration speed</td>
<td>3m/x2</td>
</tr>
<tr>
<td>Timing check points</td>
<td>{1, 5, 10}</td>
</tr>
</tbody>
</table>
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Features continued
- Identify and resolve parameter issues when merging data from multiple sources
- Track the history of changes made to calibration and configuration data
- Allocate calibration and configuration data across projects, products and platforms

Single source of calibration and configuration parameters
Using calibration and configuration data management, you can establish a dictionary of parameters that can be accurately and consistently used across an entire enterprise. This parameter dictionary contains all the parameter attributes to establish name, size, valid values, value descriptors, and other characteristics. The parameter dictionary also helps you to define and manage the hierarchical layout of all parameter data and parameter groups for use across multiple products and platforms. This single source of parameter data ensures that accurate and consistent parameter data is carried forward across multiple projects, products and platforms. Once parameters and values are captured and managed, they can be exported for use in downstream processes such as your calibration experimentation processes.

Consistent parameter definition
The introduction of new product variants or even new projects requires the definition of the associated calibration or configuration parameters. Teamcenter enables product teams to define and reuse the same parameters and data model across multiple products, as well as to logically group parameters. The definition and use of consistent, proven calibration and configuration parameters enables software development teams to minimize maintenance and schema changes.

To ensure an accurate and consistent definition, Teamcenter guides the engineer through the process of defining parameters, specifying value descriptors and assigning values. Since multiple engineers sometimes work on the same project simultaneously, parameter data validation and verification routines help teams to quickly identify whether any parameters in a group have overlapping or missing data. As projects progress, design teams can track changes to specific parameters and values and assess their impact on current or planned products.

Accurate product configuration management
To manage growing product complexity, as well as a more complex and expanded design chain, design teams require functionality above and beyond simple product data management. Today, they need mechanical data and configuration management capabilities that encompass software and electronics.

Using existing Teamcenter applications, such as Structure Manager, My Teamcenter, and Platform Designer, you can create software calibration and configuration dictionaries that enable you to better determine and define parameters, algorithms and function relationships that cross multiple projects, products and platforms. These can then be used and applied across multiple projects and product configurations.

During the systems integration process, software generated by a world-wide supply chain can quickly be brought together, configured and calibrated for use across multiple products and product variants. In production, manufacturing teams can easily identify which calibration and configuration files are needed for upload into the control unit to support each product variant and design intent.

By managing the structure and architecture of calibration and configuration parameters across multiple products and variants, enterprises are able to increase design re-use and better determine the type and size of memory required to adequately address all possible product variants.
Data re-use and integrated change management

Users can also group related parameter definitions together and associate parameter values to a project. This hierarchy of parameter groups can be used to collect and combine applicable parameter values with specific projects, thereby increasing the re-use of proven software modules. It also enables teams to re-use the same data across multiple products and logically group parameters for better performance and access control.

With Teamcenter, you can make modifications to re-used parameters groups. You can use this data to assess the impact of a potential change as well as track the history of changes to parameters and values, thereby ensuring that all projects using these values adhere to product specifications. Using Teamcenter you can also leverage these modifications in workflows and attach release status to manage the entire change process.

During the introduction of new parameters or the modification of existing parameters, software configuration and calibration data management helps team members to identify and resolve issues when merging parameters from multiple sources. Software development teams can take advantage of this approach to minimize maintenance and schema changes.