LCSIS®

Life Cycle Support
Information System

Executive Guide

Visible
SYSTEMS CORPORATION

This manual is intended for both the end user and the administrator of the LCSIS tool suite.

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Welcome to VISIBLE LCSIS

VISIBLE LCSIS is a product data management software application developed to support and enhance product design and development, manufacturing, and in-service life cycle support. VISIBLE LCSIS was designed from conception to support sound configuration management principles and associated change control as well as provide rapid recovery and viewing of vaulted digital objects that identify and define configuration items. Through its graphical user interface design, VISIBLE LCSIS has the feel and look of the Windows environment while offering all of the advantages of client/server technology and relational data base architecture.

VISIBLE LCSIS was designed to create product baselines during initial product development and, at the same time, provide a means for the permanent storage of digital data in predefined folders tied to each configuration item created in the design. This unique design approach separates VISIBLE LCSIS from the majority of document management products offered today that are unable to create meaningful relationships between their product structures and their associated documentation. Because of this unique relationship, VISIBLE LCSIS is able to create and modify multiple baseline variants through a product's life cycle and still maintain its relationship to its documentation. As new baselines are added to create a variant of an existing product or modifications are made to existing life cycle baselines, documentation associated with configuration items is carried forward and maintained as revisions to existing documents. New reference documents can be added to enhance each configuration item's library of documents or they can be deleted if they become obsolete.

VISIBLE LCSIS offers users the ability to create four basic product baselines that are both relevant and meaningful during a product's life cycle. These baselines, defined by the Configuration Management Institute of America in conjunction with the University of Arizona are: 1) the Bill of Material (BOM); 2) the As-Planned; 3) the As-Built; and 4) the As-Modified. Each baseline is extremely important because they each establish benchmarks in a product's life cycle that are used to coordinate such activities as long lead time procurements; baseline documentation requirements; defining the product to be built, and tracking the deployed product to support both out-year product liability issues and product upgrades.

VISIBLE LCSIS incorporates the advantages of client/server technology and relational database architecture in that it allows multiple users to access data simultaneously without affecting performance. Additionally, VISIBLE LCSIS provides full system metrics for every action initiated by an authorized user. By simply defining a given period of performance, the system administrator can generate a summary of all actions undertaken for a particular time period. VISIBLE LCSIS also monitors all action undertaken by the system administrator by automatically notifying each individual program manager, with a warning message, of every change action to the database that is initiated to his product by the system administrator. In essence VISIBLE LCSIS is on guard twenty-four hours a day.

How Visible LCSIS Works

The VISIBLE LCSIS product data management application is the point of entry for a set of integrated computer programs designed for manufacturing firms that have complex data management requirements, in-house systems administration, and network resources. In order to provide experienced Windows users with an intuitively familiar workspace, VISIBLE LCSIS generally conforms to the guidelines contained in *The Windows Interface Guidelines for Software Design*.

VISIBLE LCSIS unites a set of data and process management tools into an integrated product data management system that supports ISO 9000 quality standards. VISIBLE LCSIS optimizes a company's ability to manage its concurrent product development environment by providing advanced configuration management, links to non-technical support areas, and workflow management. VISIBLE LCSIS uses a graphical user interface (GUI) to create an environment that is easy to learn and easy to operate. Users launch VISIBLE LCSIS by clicking on an icon at their own workstation; integration with other applications is transparent to the user.

VISIBLE LCSIS is used within an enterprise to organize, access, and control all data related to its products and to mange the life cycle of those products. To accomplish this, VISIBLE LCSIS accommodates administrators, end-users that create or modify product information, non-technical support personnel, and program managers. Through the Data Repository Module, the data vaults complement and support configuration management requirements by linking data files and product documentation to the product's configuration for total document management and version control. VISIBLE LCSIS is a proactive step toward ISO 9000 compliance. VISIBLE LCSIS promotes on-line workflow management through its Project Management Module. Workflow allows users to monitor and repeat successful processes. This enables managers to optimize resource utilization through reliable performance tracking. The VISIBLE LCSIS Master Configuration Module allows users to access family trees that display data for existing products. Product line variants are supported through As-Modified Baselines and uniquely serialized component tracking. The Life Cycle Module performs change control functions. VISIBLE LCSIS provides users with the capability to compile and print useful reports that reflect the product and its status. Users have fast access to meaningful change control and status accounting information.

Data Repository Module

VISIBLE LCSIS is unique because it responds to configuration management requirements by providing total document management and version control. The three VISIBLE LCSIS vaults, which are similar in architecture and operation, are designed to provide storage of, and controlled access to, the following categories of data:

- *PRODUCT DATA* - Product-related documents (such as engineering drawings) that are required by a large number of users to perform assigned product data management tasks.
- *GENERAL DATA* - Common interest documents (such as industry standards or forms) that have wide applicability to an organization.
- *USER DATA* - Any document of particular interest to the user (such as personal memoranda, schedules) to which the user may grant others access on a case-by-case basis.

The principle underlying the architecture of the product and general vaults is that the maximum number of users are provided viewing access to product-related and common interest documents, while check-out privileges are granted only to those actually authorized to make changes to those documents. VISIBLE LCSIS allows selected users to check-out, or change (check-in) data sets, documents, and other product information, and maintains multiple releases and user authorizations. This critical function is based on what each user is authorized to do within the system; once the user is cleared by the system, the system will perform the check-in/out action as requested.

Check-in occurs when a product design is created, modified, or promoted and is placed under VISIBLE LCSIS control. When a product data element is checked in, full security, access control, and change control will be effective. When a product element is modified and the modification is approved, it will be checked in as a newly released revision. Check-out occurs when controlled product information is required by a user to use without change, to modify or change, to view, or to red-line, markup, or comment that product information item. During check-outs, the vault locks the original information to prevent users from changing or modifying the data simultaneously.

Project Manager Module

The VISIBLE LCSIS workflow function provides users with tools to define and implement change processes and workflows based on site-defined rules. Workflow provides VISIBLE LCSIS users with a flexible set of tools for handling projects ranging from structured, high-volume, transaction-based processes that are relatively static in nature to individualized, ad-hoc processes that evolve from small, dynamic workgroups. VISIBLE LCSIS notification utilities automatically notify approvers of the need for their action.

With the capabilities to identify, quantify, and repeat procedures, workflow provides a company with a path for continuous improvement.

Master Configuration Module

The Master Configuration Module provides the tools to develop, manipulate, and view the structure of any product logically. This module generates the three document sets critical to developing, tracking, and updating, a product's data throughout its life cycle: bills of material (BOM), configuration baselines, and family trees. Configuration identification functions performed and controlled by this module include:

- As-planned, as-built, as-modified configurations,
- Maintenance history and revision tracking,
- Authorized manufacturer/supplier list,
- Serialized part tracking/effectivity by serial and date, and
- Baseline comparison.

VISIBLE LCSIS allows users to create new structure elements for newly designed parts and assemblies, to create or delete a version, effectivity condition, substitute, or option for a part or assembly, and to browse up and down the product structure to find specific assemblies or parts. Different users view BOMs, product configurations, and part lists structures differently. To consider the impact of a proposed change to one part, a reviewer might use the product structure to find the other parts of the assembly to evaluate the effects of the change on those parts (used-on) and to find the other assemblies in which the part is used to evaluate the effect of the change on them (where-used). VISIBLE LCSIS provides as-designed configurations for those users interested in viewing a functional hierarchical list. VISIBLE LCSIS also provides as-built configurations for users who need to view the structure to see assembly information and relationships.

Life Cycle Module

Change control functions built into the Life Cycle module maintain secure control of documentation, allowing management to make informed decisions and allowing a company to respond effectively to circumstances leading to changes, improvements, and problem correction in product lines. Improvements may be as simple as replacing an unreliable part, or as complex as redesigning an entire product line. Products may be tailored to support a customer-defined specification for an existing product or introduce a totally new product.

Approved change requests update affected product baselines simultaneously to enhance change/improvement response cycles.

Viewer Translator Module

VISIBLE LCSIS is bundled with a universal document viewer that allows enterprise-wide viewing and markup. The user can view more than 150 file formats created from a multitude of software packages and scanning devices. Multiple documents can be viewed simultaneously in moveable windows; the viewer offers the user the capability to create, overlay, and redline files to allow data related to design changes to be relayed with the original documents.

Quantifying Benefits

Before initiating planning for implementation of VISIBLE LCSIS, the Project Team should review the potential benefits and methods for quantifying them. By using these methods, the team members will identify the needs that VISIBLE LCSIS can meet for the organization and describe the current situation that can be used as a baseline for comparison after VISIBLE LCSIS implementation. Examples of areas for consideration are reduction of process time, reduction of product cost, on time delivery, and improving management of quality. Your Team may add more items.

Reduction of Process Time

The most significant measurable result from implementing VISIBLE LCSIS will be a reduction of process time through the use of a structured and disciplined approach to task identification and control. Organizations usually experience a reduction of 30-50 percent when implementing workflow.

To obtain a quantifiable measure of improvement, you need to document the existing process times. This may be accomplished at an overall level, or at a basic level for discrete steps. If the process is changed during VISIBLE LCSIS implementation, the detailed task comparison may not be applicable. It is important to establish benchmarks at higher levels such as from time order is received to the delivery date for new, modified, or catalog products.

Reduction of Product Cost

Product costs will be reduced as a direct result of reduced process time and in the manufacturing environment from the reduction of rework or scrap rate. The configuration management process and data vaults provided in VISIBLE LCSIS will assure that the correct version of documentation is available and that the impact of changes have been fully analyzed before implementation proceeds in a process or manufacturing environment. To measure this reduction, overall product costs are required and in the manufacturing environment the monitoring of some specific items such as cost of rework and scrap rate. Rework includes number of changes that are implemented in the design stage.

Experience has shown that a healthy activity of changes early in the design process will reduce the number of costly changes after release for production, thereby reducing overall product cost. This is enabled by concurrent development activities where various design organizations have an input early in the process/product development phase. The alternative currently experienced by many organizations is a linear review process that requires extensive rework when the development of the process/product is recycled as it progresses through the various review phases.

Improving Management of Quality

VISIBLE LCSIS will assist your organization in complying with international quality standards such as ISO 9000-1. The processes and controls embedded in VISIBLE LCSIS enable compliance with the requirements of these quality standards. The automated system available through VISIBLE LCSIS will reduce the costs currently associated with maintaining the ISO documentation. A benchmark monthly cost estimate and work effort for updates of ISO documentation should be recorded for comparison after VISIBLE LCSIS implementation. If you are planning to become ISO 9000 certified, using VISIBLE LCSIS will accelerate your implementation.