SSCL-338

Superconducting Super Collider Laboratory

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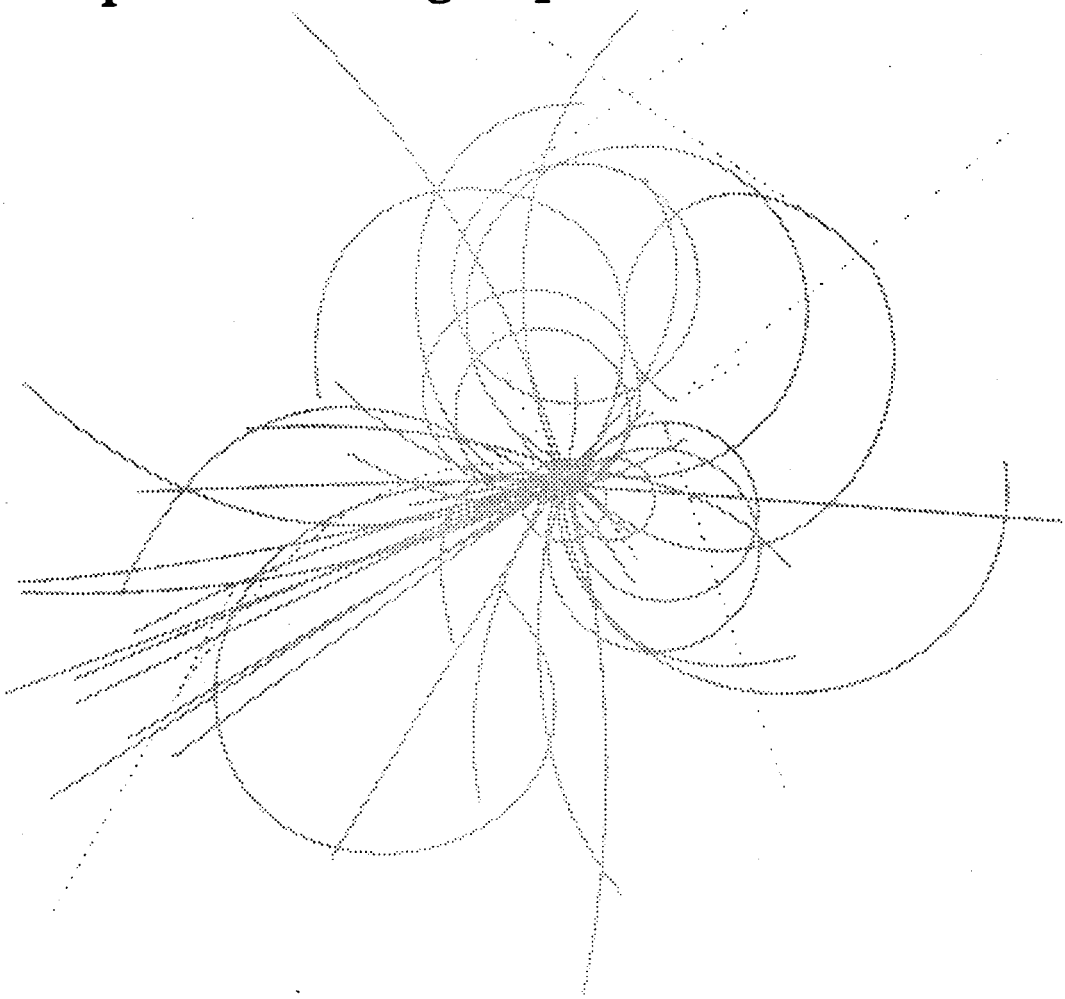

Prototype Document Tracking and Storage System for the Superconducting Super Collider Laboratory (SSCL)

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PROTOTYPE DOCUMENT TRACKING AND STORAGE SYSTEM FOR THE SUPERCONDUCTING SUPER COLLIDER LABORATORY (SSCL)*

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Abstract

The design and development of the detectors for the SSCL will be facilitated by a central system to track and store the design documents and drawings. Collaborators and SSCL personnel need a single system that they can access from a terminal on their desk and be able to locate and view the latest version of a document. The SSCL is developing a prototype system to track documents and drawings, and to make them accessible via the local and wide-area networks. The prototype will be used to refine the requirements and to develop the procedures for a larger system that will be acquired later. This paper discusses the system requirements, architecture, and status.

INTRODUCTION

The SSCL and the collaborations have a requirement for a system to track and store the documents and drawings being used to design and develop the detectors. The system should also be usable for tracking and storing physics papers. With the geographical separation of detector developers, it is important that a central system be provided so the latest version of a document or drawing is available for a collaborator working on that component or on the interface to another component. The goal is to have a system that can be accessed via the SSCL local area net or the E-Mail network so the information is available to physicists and engineers from their desks. To be useful, the system not only has to handle information on a detector, but on the detector's interfaces to the detector hall and its utilities, and to the accelerator components.

Current technology does not support the error-free exchange of information between the many computer-aided design (CAD) and word processing systems in use at the institutions involved. In a limited survey of the processing systems in use by the Solenoidal Detector Collaboration (SDC), 20 different CAD and 15 separate word processing systems were in use by the collaborators. The challenge is to develop a system that provides interoperability and does not require the replacement of hardware and software currently in use.

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Operating procedures within the SSCL and in some of the collaborations are still being developed. With the human interface and the procedures for use of the system being such important considerations, a prototype system is being developed in-house to ensure that a large and expensive system is not acquired until we know exactly how it will be used. The prototype also provides experience that will help specify the complete system that will be developed or acquired later. The plan is to get a limited-capability system on line as soon as possible to work out the human/procedural issues and refine the technical requirements for the larger system to come later.

REQUIREMENTS

System requirements include the following:

- A database management system (DBMS) for tracking the documents and drawings.
- Processing and storage devices for hosting the DBMS and the documents/drawings.
- Local and wide-area networks for communicating with the system.
- Document entering and retrieval via menu selection and not by use of a database language.
- Access controls to keep unauthorized personnel out of the system. A public area that will contain documents and drawings available to everyone. A private area where collaborations and collaborators can store documents and have the access restricted.

- A system to control changes to documents so unauthorized personnel do not modify them without permission.
- The capability to scan and store A and B size documents and drawings.
- An inexpensive path for upgrades and enhancements.
- The capability to add a configuration management capability to the initial system.

ARCHITECTURE

The system architecture is shown in Figure 1. Users log into the system from their terminal at their desk just like they would do for accessing the SSCVX1 VAX except that the log in address is different. The current E Mail system and procedures will continue to be used. (The address and details will be distributed when the system is on line.)

Two Sun SparcStation 1+ workstations with 2.5 GB of storage each are on the network. Each has tape capability for backups and for mailing large files. The Sybase database management system is on one of the workstations and contains the index of all of the documents and drawings in the system. This database (similar to a card catalog in a library) can be searched for subjects, authors, keywords, etc. When the desired document or drawing is found, it can be accessed electronically.

There are many problems to be solved so a user can view or transfer a document or drawing at his/her workstation without having to replace the existing hardware and software. Current technology does not provide error-free translations between the many word processors and CAD systems in use by the physicists and engineers developing the collider and detectors. The prototype will initially use ASCII for text documents and IGES (Initial Graphics Exchange Specification) for drawings as the standards for interoperability. Other standards will be evaluated to determine the best way to provide a format to meet the needs of most users.

The database and document storage will provide the capability for universal access to all data in the public area and for restricted access so collaborators can keep documents private until they are ready to release them. Users will have access to the public area and to the appropriate restricted areas of the database.

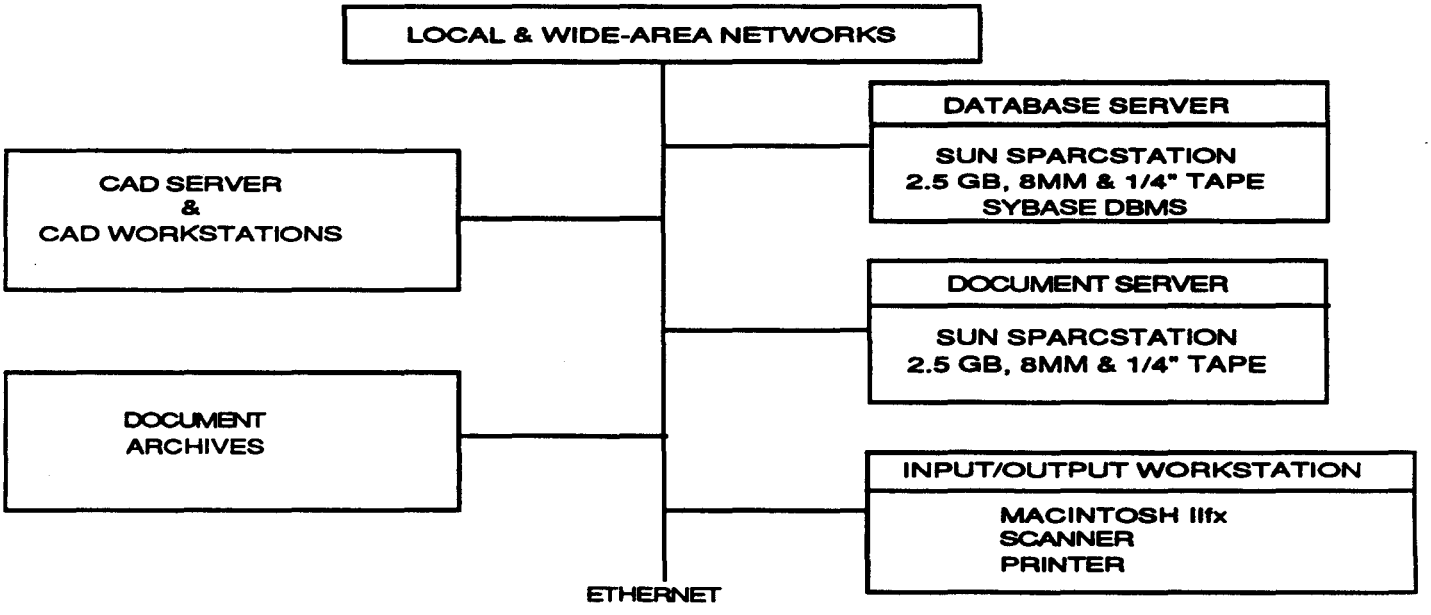

FIGURE 1: SYSTEM ARCHITECTURE

Current plans are for the users to enter the data into the system and to E Mail the documents into the storage system. Data entry will be done by filling in the blanks on a screen. Knowledge of the database language will not be necessary. Electronically transmitting the document files to the SSCL will follow the procedures currently in use by the E Mail system.

Users will have to translate text documents into ASCII and drawings into IGES on their workstations prior to sending them to the prototype for storage. Future upgrades may do away with this requirement.

An input-output workstation in the form of a Macintosh IIfx with an A/B size scanner and laser printer is also part of the system. The scanner will provide the capability to scan documents that are not received or generated electronically. Hand-written documents can be entered in to the system in this manner.

Intergraph workstations are connected to the system via the local area net and provide the capability to generate and translate CAD drawings.

The document and drawing archive system of the SSCL will be accessible via the local area net and will be able to store inactive documents.

STATUS

The system hardware has been installed and is being used to develop the application software with the Sybase database management system. An initial capability is expected by December 1990. The prototype will be developed incrementally by starting with a limited group of users and a subset of the final capabilities to work out the problems. Enhancements and increased capabilities will be added to meet the full requirements of the system.

Procedures will be developed both for system operation and for information transfer among the detector and collider developers. These procedures developed for the prototype will also be used to help determine the requirements for the larger system that will be needed to provide such features as configuration management.

A major issue to be resolved is how to achieve interoperability among the various word processing and drawing systems in use. The SSCL has demonstrated that a text and graphics file could be generated in Microsoft Word and transmitted via the E Mail system to another location where it was successfully read. However, since many word processors are in use, additional work is necessary to devise a system that will provide interoperability among them. ASCII files will be used initially for text transfer.

Two–dimensional CAD drawings have been transferred between systems with few problems. Three-dimensional CAD transfers are a known problem and will require more work.

SUMMARY

A prototype document/drawing tracking and storage system is being developed at the SSCL to provide a single source for accessing the latest collider and detector design data. The hardware is in place with the application software in development. An initial capability is expected by December 1990.

The system will provide a capability quickly and will be used to develop the procedures for transferring information electronically among the detector and collider developers. The prototype will also help develop the technical capabilities for transferring data among the various word processing and CAD systems in use by the SSCL and the collaborations.