

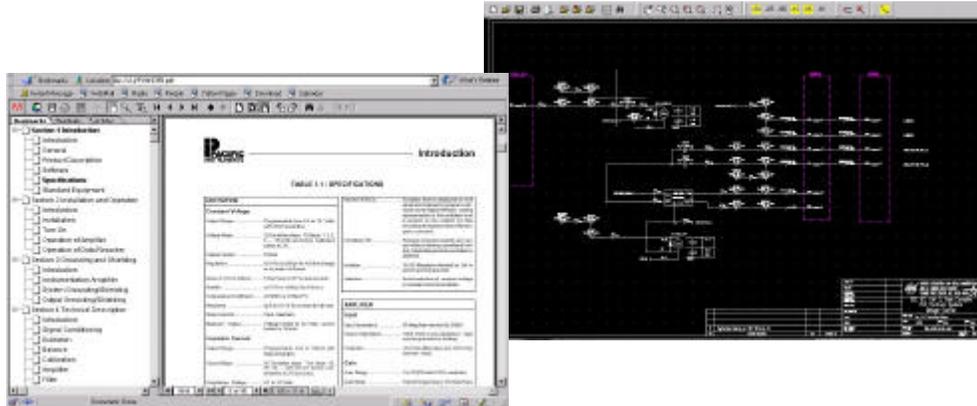


# NASA Office of Technology Transfer

## John C. Stennis Space Center

### Enhancements Expand Promis.e Capability

*Top of the line intelligent software delivers for control system design and documentation.*



**Specifications lists, wiring schematics, bills of materials and panel layouts can be generated and stored quickly and efficiently**

In an effort to develop a real-time, on-line database system that tracks documentation changes in NASA's propulsion test facilities, engineers at Stennis Space Center teamed with ECT International of Brookfield, WI, through the NASA Dual-Use Development Program to create the External Data Program and Hyperlink Add-on Modules for the **promis.e** software. **Promis.e** is ECT's top-of-the-line intelligent software for control system design and documentation. With **promis.e** the user can make use of the automated design process to quickly generate control system schematics, panel layouts, bills of material, wire lists, terminal plans and more. NASA and its testing contractors currently use **promis.e** to create the drawings and schematics at the E2 Cell 2 test stand located at Stennis Space Center.

Stennis Space Center provides testing of the Space Shuttle main engines, rocket propulsion systems and related rocket engine components. Stennis has several test facilities with a number of different cells, or positions, to perform propulsion testing. Each test typically has different measurement and control system requirements; thus modifications must be made to accommodate changing test articles and data requirements. All measurements, control system changes, upgrades and data associated with each test must be accurately and efficiently documented.

### HOT Points

- **Quick and efficient**
- **Flexible and easy to use**
- **Provides updated information to multiple locations**
- **Allows for the independent design of database structure, creates forms and generates reports**
- **Provides increased storage of information**

As a result, accurate drawings of test configurations often did not exist. There were even instances where multiple, disparate copies of drawings existed at the same time.

Because engineering and technical support ground rules vary between test complexes and from system to system, expertise tends to be compartmentalized. Sharing personnel tended to be counter-productive, as there is a steep learning curve to be fully effective. Other drawbacks include inefficient resource utilization, excessively high inventory levels, and multiple spare parts/inventory locations. Access to this accurate work documentation along with complete and timely dissemination of technical data would greatly improve the process.

By integrating the newly developed External Data Program and Hyperlink application into the Stennis developed 3MCS package instrumentation, engineers were able to facilitate the documentation of instrument systems, electrical control systems and data process requirements.

The External Data Program provides the capability to store and manage information through an external database that is linked to an AutoCAD drawing. This module will keep track of **promis·e** information in a Microsoft Access 2000 database, which may be edited by making changes on the drawing or by making changes directly to MS Access.

The Hyperlink application allows the addition of hyperlink information to the symbols in the project. These attributes can create a direct link from the schematic to an Internet site, web page, CD, the network or the users hard drive. Users can obtain information directly related to specific part numbers necessary to setup, maintenance, or troubleshooting. The hyperlinks are even made active on DWF files exported from **promis·e**. This allows the drawings and hyperlinks to be viewed in a Web browser without an installation of **promis·e** or AutoCAD.

The development of these two add-on modules has provided more flexibility and ease-of-use in the way data related to individual devices is entered and edited. Once a database has been created, links between the External Data Program and **promis·e** allow updated information to be reflected in both locations. Along with storing **promis·e** data, other information can be accessed by adding custom fields to the database. The application also allows a user to design their own database structure, create forms and generate reports of values that are relevant to their application.

In whole, **promis·e** is an intelligent software program providing users with a powerful set of drawing functions including symbol libraries, macros, and automatic line (wire) breaking. Additionally, **promis·e** automatically performs many value-added tasks such as ID assignment, cross-referencing,

automatic wire numbering and list generation. These tedious operations are performed not only much faster but also with fewer errors. The software includes its own Application Programming Interface, or API, which allows for creating applications, which generate or extract schematic information and custom applications such as the NASA project.

Through the Dual-Use Technology Development program, ECT has been able to expand the capabilities of their standard **promis·e** software package. The Hyperlink option is unique to this line of documentation software programs. Currently, **promis·e** is primarily used to control systems for aeronautics, automobiles, power and switchgears. The application expands the use of **promis·e** past its typical use for initial circuit design to uses in maintenance and testing. Users can now store maintenance data such as replacement information, servicing schedules, operating parameters, capacities, and have all of the data accessible from the graphical environment of their schematic drawings. Users involved in testing can send their results to the MS Access database and have the information available in **promis·e**. Since many of the control devices currently used in industry are programmable, the programming data can be stored and easily accessed by viewing the drawings in the field on a laptop. This can allow personnel to quickly discover system problems by analyzing both hard wiring and programmed settings from the same applications.

The dual-use concept of product development is based on the sharing of costs, risks and successes between the government and a commercial partner. In these projects, NASA can contribute technology development, unique facilities, know how and potentially some part of the funding. Commercial partners contribute unique resources, facilities, manufacturing and marketing capabilities. The result is an approach that provides considerable flexibility and draws upon the capabilities of both parties.

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