TESS a New ACD Turbosystem Design Assistant

Seamless turbosystem design requires both engineering discipline and engineering judgment. TESS, a new ACD design assistant, supports ACD Engineers with both.

TESS (**T**urbo-**E**xpander **S**izing & **S**imulation) is a modern, networked, graphical software system designed and built in-house to support ACD's specific processes. To achieve this end, ACD Engineers provided unparalleled contributions and insight.

Proposals/Projects & Versioning
- Identification
- Status
- Notes, Comments, Contacts
- System Machines

Machine Design State
- Settings, Preferences
- Layout & Components
- Fluids
- Geometry
- Performance

Workflow State
- Completed Operations
- Operation Status

Standard Data
- Frames, Screens, Valves, Bearings
- Characteristics, Limits
- Model Performance Curves

User-defined Data

Test Data

Figure 1, Data Maintained in the TESS Database

TESS supports the design process, maintains design quality, provides project traceability, and catalogs project and design data, in addition to supporting future refinements and applications.

Proposals, Projects, and Designs: Versioning, Discipline, and Traceability

With TESS, Turbosystems are defined and designed within the context of proposals and projects. Proposals and projects are retained and versioned (all revisions and release "versions" are maintained and managed)—and because TESS imposes a discipline on versioning, design, and editing—TESS provides visibility and traceability of proposals and projects as well as designs. In turn, it is ACD's clients who will derive the greatest benefits from ACD's adoption of TESS. In the proposal stage, ACD's Engineers are able to optimize the combined turbomachinery system while systematically evaluating each different off-design case.

SQL Database: A Continuous Record of Process, Design, and Performance

TESS uses a modern SQL database (a Structured Query Language relational database management system) to store the hierarchy of proposals and projects as well as design and performance data.

Furthermore, TESS continuously stores the designer's settings and preferences, along with the design, workflow, and performance data into the database.

The database also captures all of the details for standard system frames and components, their sizes, characteristics, limits, and field/test data and performance curves.

Figure 1 illustrates some of the classes of data maintained by TESS.

Managed Complexity with More Design Information for Flexibility

Engineers design using TESS's graphical interface, which highlights the operations currently available, all the while showing the status, characteristics, and performance of past operations.

TESS has abstracted design stages and operations (sizing, valves and screens, expander, compressor, seal gas analysis, etc.) and is configured to account for their interdependencies and interactions. For each of these entities TESS provides enhanced support information, limits, rules, and trial simulations. The design engineer can utilize each of these, with up-to-date performance simulations and enhanced information, for greater efficiency and flexibility in analysis, design, and workflow. Once the combined turbomachinery system is optimized, TESS uniquely specifies the geometry of each component.

TESS Software's Logical Structure

TESS software has a state-of-the-art modular structure, and is built of models (especially of individual engineering entities and processes as well as abstractions), services (which provide resources, functions, or data as needed), and messages that communicate between them.

Figure 2 breaks down some important parts of TESS's modular structure, and provides a better idea of TESS's scope.

Simulation Optimization and Future Adaptability

TESS is highly scalable and is designed to accommodate future turboexpander sizing and selection requirements. The database is structured to incorporate field/test data to improve prediction accuracy; it is possible to combine actual test performance data to adjust component characteristics with simulation algorithm to optimize TESS's simulations.

TESS not only facilitates today's Turbosystem designs but will also guide future concepts, developments, and products. For more information on ACD's line of turboexpanders, please visit www.acdcom.com.

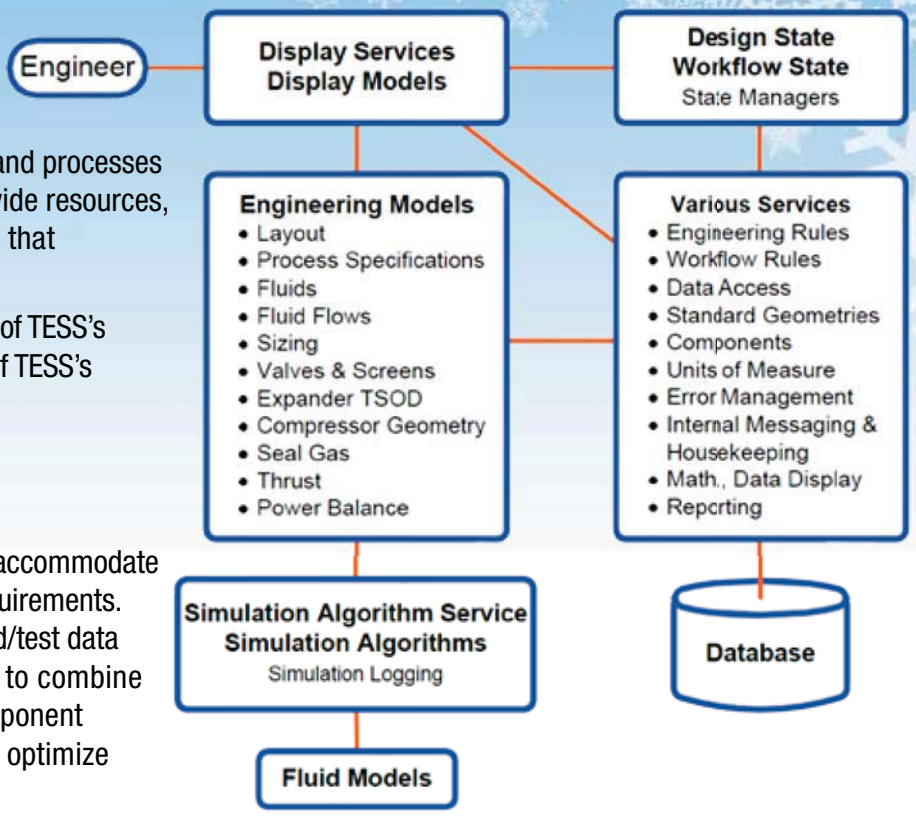

Figure 2, TESS Modular Overview