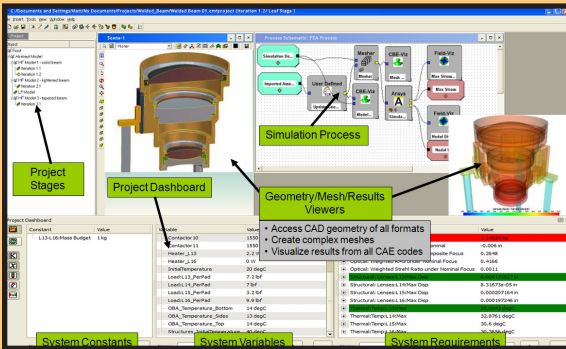
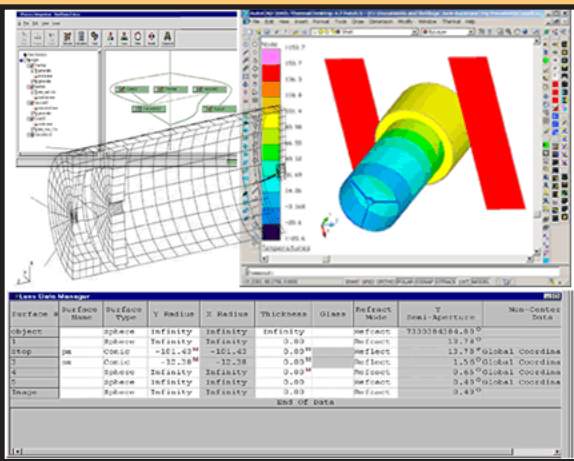


# MULTIDISCIPLINED INTEGRATED ANALYSIS

## ADDING THERMAL/FLUID SOLUTIONS TO CUSTOM MULTIDISCIPLINARY DESIGN ENVIRONMENTS



*Aras Comet SPDM's STOP: structural/thermal/optical integrated design analysis integrates Thermal Desktop®, Sigmadyne's Sigfit® and ORA's Code V®*



*Dynamic linking of SINDA/FLUINT, Thermal Desktop and NASTRAN™ for Thermal/Structural/Optical Analysis*

CRTech provides best-of-class user-extensible heat transfer and fluid flow design and analysis capabilities accessible through both geometric and nongeometric user interfaces. But we realize that some customers' needs are best served with their own custom environment or interface. We are strong proponents of system-level trade studies and other high-level design tasks that require the feedback of many specialized analyses and considerations: structural, electrical, CFD, aerothermal, optical, reliability, life cycle cost (LCC) or net present value (NPV), etc.

Therefore, not only are our tools highly extensible and customizable, and not only are they fully parametric and able to respond dynamically to model changes, but we also provide APIs (application programmer interfaces) and other tools for integrating SINDA/FLUINT and Thermal Desktop®, RadCAD®, FloCAD® solution technologies into a higher-level design evaluation system. Such capabilities are available for codes such as Microsoft Excel™, MATLAB®, or Noesis Optimus®, and we welcome the opportunity to create additional connections.

### STOP ANALYSIS EXAMPLE

Aras Comet SPDM allows each discipline to participate in a common CAD environment, marking up a central drawing as needed to guide the generation of thermal, structural, and optical models. The experienced engineer's unique skills and tools are not lost or shoe-horned into a one-size-fits-all solution. Instead, the capturing of each disciplines' methods into the central project means that design changes are readily accommodated. Team-level multidisciplinary design activities are thereby not only enabled, they are encouraged: each discipline can easily explore the ramifications that changes to their subsystem have on the key mission objective.

# MULTIDISCIPLINED INTEGRATED ANALYSIS

## ADDING THERMAL/FLUID SOLUTIONS TO CUSTOM MULTIDISCIPLINARY DESIGN ENVIRONMENTS

### OpenTD

OpenTD is a general-purpose Application Programming Interface (API) for Thermal Desktop that allows the engineer to automate many of the tasks that previously could only be performed interactively or through undocumented interfaces: building models, editing existing models, setting up and running cases, and querying results. OpenTD provides unprecedented access to Thermal Desktop models and results, and works seamlessly with units, expressions, symbols, and SINDA registers. It can connect to multiple instances of Thermal Desktop simultaneously and share data between them. It even provides tools for exploring and plotting vast amounts of results data programmatically.

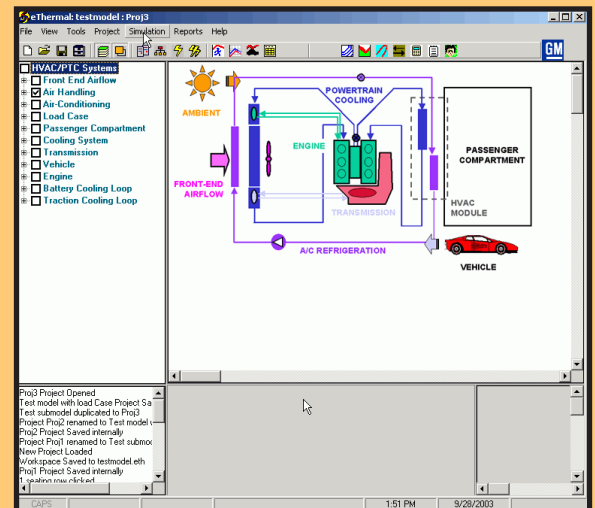
Examples of how OpenTD can be used with Thermal Desktop are:

- Translate from several other thermal model formats to Thermal Desktop.
- Provide an interface for a third-party tool to create response surface models from Thermal Desktop models.
- Run cases overnight and email the engineer when each run is completed.
- Update the geometry of a model based on the results of a different, related model.
- Create a simple interface for positioning the parts of an articulated model.
- Create temperature envelope plots for components from multiple case sets.
- Automatically generate screenshots of a frequently-updated model for inclusion in a report.

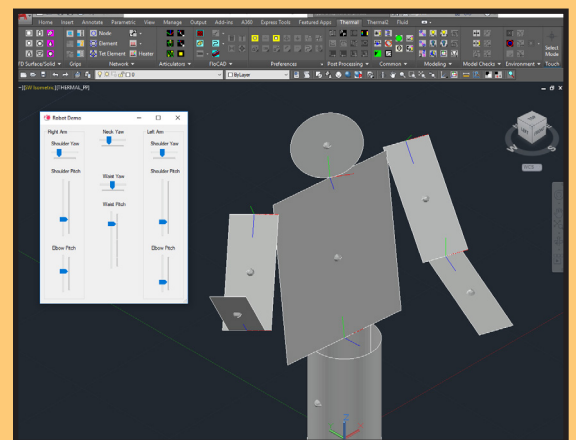
OpenTD is best accessed using a .NET language like C#, but Matlab, Python, or any system that can reference .NET assemblies can also be used.

### CUSTOM SOLUTIONS

Contact CRTech for more information about our customizable interface to SINDA/FLUINT and Thermal Desktop.



*General Motor's E-thermal is a third-party GUI interfacing SINDA/FLUINT and MATLAB®*



*Positioning Parts Using OpenTD*

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