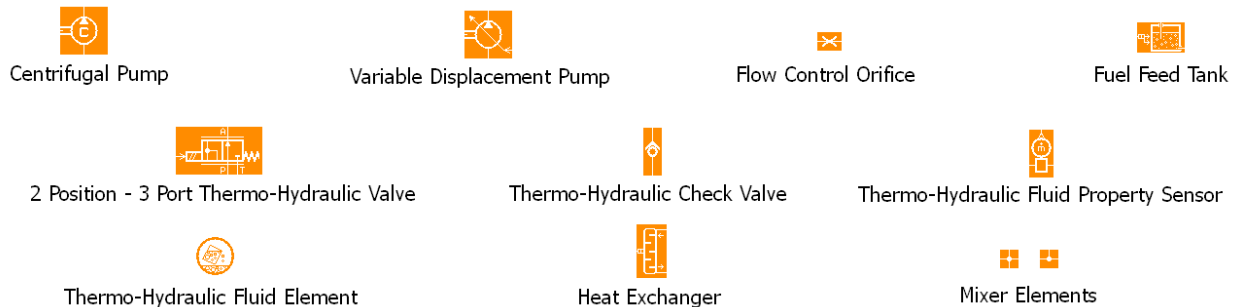


## Accelerating Innovation: Avetec at a Glance

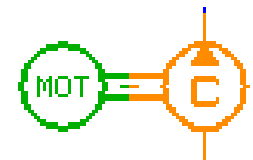
### Avetec Completes Fuel Thermal Management System Model with AMESim

Avetec researchers developed a dynamic model of a generic aircraft fuel thermal management system using AMESim software by LMS International. In typical modeling and simulation software programs, the designer must create a schematic concept, translate that design into a mathematical formulation, then code the system. However, in AMESim, the schematic becomes the dynamic model. Thus, the formulation of the mathematics and associated coding becomes a drag and drop process from extensive multi-domain libraries. The physics is automatically contained in the icons and their connections.

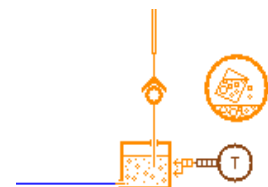
Due to data restrictions the system cannot be shown here. However, a typical system would include fuel tanks, heat exchangers, pumps, valves, and an assortment of other specialized components. The figure below shows some of the typical components that might be part of a generic fuel system as they appear in AMESim libraries.



A designer would drag and drop a component of choice onto a work space next to its component mate. For example, a motor driving a centrifugal pump with an input and output flow would look like the figure at the top right. User defined parameters finalize the connection. All dynamics are captured by the components and their connections.

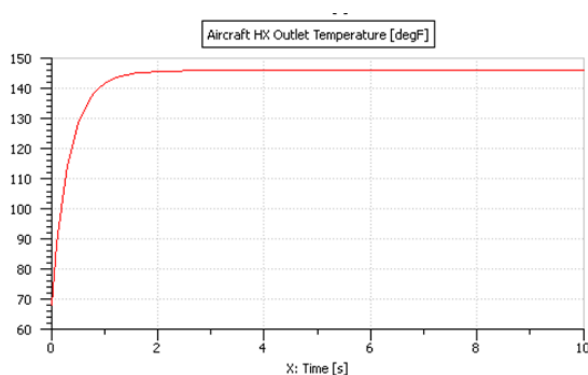


Another example is shown by the figure in the bottom right depicting a fuel tank connected to a check valve on the return line. The top right circle contains specific fuel chemical and physical properties, for most aircraft applications this would be for JP8. The circle with the “T” represents the tank’s surrounding environmental temperature. Some automatically calculated quantities include mass



flow rate, enthalpy, pressure, temperature, height and mass of the remaining fuel.

It is easy to see how quickly a fuel system can be put together and dynamically operated. AMESim also contains numerous built-in analysis tools allowing not only a speedy initial design but completing tradeoff studies in hours or days instead of weeks or months. The figure at the left shows a fuel system’s fuel/oil heat exchanger outlet temperature as a function of time that can be easily displayed in AMESim.



For more information contact Dr. Tony Corvo at (937) 322-5000 x2065 or at [tcorvo@avetec.org](mailto:tcorvo@avetec.org).