Automotive

THERMAL ANALYSIS & DESIGN SERVICES FOR THE AUTOMOTIVE INDUSTRY

As automobiles continue to deploy advanced electronics, heat dissipation is increasing at a rapid rate and thermal management is becoming more of a driving force than ever before. The computing sophistication that currently exists in most cars and trucks, rivals some of the complex telecomm and datacomm equipment on the market, with a major challenge of having uncontrolled ambient conditions that uniquely face automotive electronics. With the proliferation of electronics in smart-vehicles, vehicle-to-vehicle communications, vehicle-to-central office data exchanges, engines, cabins, lighting and environmental controls, effective thermal analyses must be undertaken to avert potential heat related issues that may put the operation of a vehicle in jeopardy.

For example, airflow studies on body shapes and appendages, e.g. mirrors, spoilers, etc., can help designers reduce drag, vacuum and lift. Knowing airflow patterns in auto cabins can help to optimize climate and ventilation systems. Profiling airflow into engines and vapor flow from tailpipes is useful for achieving better engine performance.

With experience and continued exposure to the automotive engineering industry, ATS is well-versed in automotive thermal management schemes. Thermal modeling and actual testing, which includes the use of wind tunnels and multi-point data collection, are regularly exercised in a typical thermal management consulting engagement for automotive and other electronics applications.

"Automotive electronics present a unique challenge to thermal design with respect to the dynamic environment that it operates within. Designing a cooling solution with broad spectrum boundary conditions, along with the spatial constraints, requires a dedicated and methodical analyses supported by independent data to verify the design. Reliance on just simulation or experimentation is deep pit that many engineers fall into, since the complexity of the problem and the ambiguity of the electronics operations mandates solution verification. This results in product launch delays or cost over runs." - Dr. Kaveh Azar, President and CEO of ATS

CASE STUDY

A major automotive company approached ATS for help in designing an instrument that could be used to evaluate vehicle sub-parts in their new hybrid vehicle. The client was very interested in the existing ATVS-2020™ instrument, but needed additional modifications to be made in order to successfully meet their requirements. ATS redesigned the instrument to allow a combination of temperature and velocity sensors to be used to measure data simultaneously and customized existing sensors to meet the dimensional constraints and the required temperature and velocity ranges.

Additionally, the data collected from the hot wire anemometer needed to be integrated into the company's existing data logger system, so that the specific parameters measuring temperature, rotation, torque, engine control unit, etc., could be properly integrated and analyzed in the same instance of time. Therefore, the data needed to be converted from digital to analog voltage, in order to provide seamless and automatic data transport between different equipment and the data acquisition system.

ATS designed a new instrument, the DAC-200™, which produces an output whereby the voltage is linearly proportional to both the air velocity and temperature for the ATVS product family. ATS also designed the stageDAC™ software, which enabled the customer to specify and select dedicated channels for temperature or velocity measurements. ATS design and fabrication capabilities enabled the customer to successfully complete their R&D testing for their new hybrid vehicle model.

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