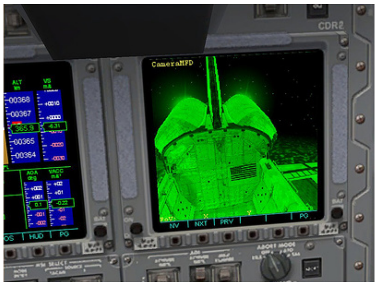
ATS ADVANCED THERMAL SOLUTIONS, INC.
Innovations in Thermal Management®

Military & Defense

THERMAL ANALYSIS & DESIGN SERVICES FOR THE MILITARY & DEFENSE INDUSTRIES

Many military electronics are often amongst the most sophisticated systems ever deployed. The unusual and rigid boundary conditions that range from a desert's surface to outer space, create unique challenges in the design and thermal management of these systems. Such military electronics are deployed in communications, weapons, reconnaissance, targeting and evasion, payload delivery and discharge. Because of mission criticality and the rapid system response required, high power dissipation makes thermal management a critical issue for such systems.

Along with power and thermal challenges, engineers must factor in remote locations, rough handling and temperature extremes, in which systems must continue to function reliably. Many military systems also require small form factors, leaving less room for conventional heat dissipation systems. Additionally, the lifespan of defense electronics systems is expected to be significantly longer than in standard commercial applications.

ATS, in its 25 year history, has been engaged with domestic and international military electronics companies. The engagement requirements have ranged from the thermal characterization of a high power RF device, to the design of a sealed system for harsh environment vehicles, to the thermal design of a portable communication for mission critical operations, to the design of a cooling system for passenger compartments in high performance aircrafts. The diversity of client challenges has provided unique exposure for ATS to these tough-to-cool applications and as the result equipped ATS to handle such problems with the highest efficiency associated with cost and time-to-solution.

"Outdoor electronics face many severe thermal events. Housing may stand up to the worst environments, but the inside conditions can get well beyond the temperature limits that the components are made for. Our thermal labs can simulate some of the harshest situations, allowing ATS to design practical and innovative solutions for thermal problems, so that electronics will work reliably despite adverse ambient conditions." - Dr. Kaveh Azar, President and CEO of ATS

CASE STUDY

An electronics design firm asked ATS to provide thermal solutions for three electronics enclosures used in outdoor military surveillance homeland security systems. The rugged enclosures contained multiple sub systems that must be kept within a specified operating temperature range under diverse ambient conditions, heat and humidity extremes. Using thermal analysis, computer modeling and airflow simulations, ATS designed effective thermal management solutions for each enclosure without making any changes to the size of the enclosure that the customer had designed. ATS tested each security chassis to characterize its thermal performance. Several scenarios simulating extreme outdoor conditions were used to determine design changes for acceptable performance under worst case conditions. These included: ambient temperatures from -20 to 50°C, relative humidity up to 80%, solar heat loading to 110 Watts per square foot and an altitude of 5,000 feet.

ATS studied airflow and temperature on all critical components, including video cameras, modems and power supplies. Testing in varied temperature and solar radiation conditions verified that the sun load was the most significant environmental factor that must be mitigated to ensure successful operation. Because of the enclosure design and choice of surface treatment by the client, solar loading was four times higher than the power dissipation of the internal electronics. Despite this unalterable source, ATS modified each chassis' internal design to manage the solar load and other temperature issues, including very cold conditions.

The design service went from initial analytical concept, to complete mechanical redesign of the enclosure, CAD modeling and using CFD for simulation of design iterations, to the prototype stage.

For more information, call 781.769.2800, email ats-hq@qats.com or visit qats.com

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