S-Force to the Rescue!

Alan Earls, Contributing Editor -- Design News, October 8, 2008

The PCI Industrial Computer Manufacturers Group, PICMG is a consortium of over 400 companies that collaboratively develops open specifications for high performance telecommunications and industrial computing applications. In recent years, much of the group's effort has been focused on the Advanced TeleComputing Architecture (ATCA) family of specifications, which aim to provide foundations for a set of common platforms with a large selection of interchangeable modules from many companies, to meet the needs of the telecommunications industry for many years to come.

In particular, ATCA has been developed to help the industry to standardize around the same shelves and racks for every part of the network. With ATCA, cards, shelves and components of different manufacturers can be combined in one unit.

But standardization doesn't necessarily help with problems like heat dissipation. In the case of one company, their ATCA chassis was being developed using six standard 119mm tube-axial fans. This would have yielded an air flow of around 400CFM or less. But engineers knew the specific chassis components would generate heat requiring an air flow of about 590-600 CFM (an approx 50% increase in flow).

This seemingly simple problem was not going to be easy to solve. For one thing, the packed enclosure was demonstrating an air resistance curve that showed simply adding a higher rated fan wouldn't be enough. In other words, any attempt to put more flow through the chassis would simply mean higher static pressure rather than better air flow. In fact, to achieve the desired the 600CFM of air flow through the enclosure system would require an increase in a static pressure of over 100% -- far beyond the capability of ordinary cooling fans.

This is where the new **ebm-papst S-Force fan** came to the thermal engineer's rescue. These fans show a moderate improvement in "wide open" air flow numbers but provide *incredible* improvements when compared at high static pressures of today's systems.

Achieving that kind of high performance in a standard size fan required ebm-papst to introduce major improvements in fan design, including motor technology, aerodynamics and electronics, beginning with computer simulations that ensured precise calculation of critical parameters. Furthermore, all components of the fan were tested at nominal speeds of up to 14,000 rpm. Special attention was given to the design of the actual impellers and blade and the venturi housing, which are central to the fan's function.

With six of the ebm-papst 4100NH7 family of fans in the enclosure the required 600CFM was achievable even with the high static pressure seen in the ATCA chassis, solving the customer's cooling problem in one step.

By offering a performance profile higher than what the industry expects, ebm-papst helps to make sure "future" cooling requirements are available today.

Five sizes of S-Force series fans are available, with diameters from 80 x 80 mm to 172 mm and air performance from 190 to 950 m^3/h (free-flowing), with pressure build-up of up to as much as 1200 Pa.