iPAMM HOT RACK SOLUTIONS

SCEC Endorsed

(*i*PAMM is the trademark for Intelligent Plenum Air Management Module)

Major breakthrough in high density server cooling for top security systems

A Canberra security technology company, Server Racks Australia (SRA), has developed a breakthrough new cooling system for tomorrow's powerful, high-security, high-density computer server systems.

The new product provides one of the missing links in the quest to match effective cooling requirements with increasingly powerful server systems without compromising the rack's security SCEC endorsement.

The **"cleaner, greener"** system is designed to keep computers operating at top efficiency by shedding heat rapidly, with N+1 redundancy, without impacting on security, as happens with most existing systems.

Solving the cooling problem with high density computers has been regarded by experts as unattainable.

*i*PAMM now opens the door for development of more powerful computer systems by government and industry and the saving of valuable server room floor space. *i*PAMM has put Australia at the forefront of global developments in a multi-billion dollar segment of the mammoth IT security market.

SRA, based at Queanbeyan, near Canberra, can solve many of the major technical problems plaguing the rapidly-growing Australian and international defence, national security and other government and commercial high density server markets where sensitive information is handled.

SRA recently launched what it describes as its "revolutionary equipment cooling system" for server racks – specifically designed with tomorrow's increasing central processor (CPU) density and heat dissipation requirements in mind.

SRA's CEO, Bob Campbell, said the new system was up to four times more effective than existing cooling systems.

It has already been endorsed by the Australian Government's Security Construction and Equipment Committee (SCEC), a standing inter-departmental committee responsible for administrative and physical security.

"SRA was approached by the Department of Defence and a number of other agencies around a year ago with a requirement to make an SCEC-endorsed rack operate more effectively," he said.

"There is a lot of interest and ever-increasing sales are growing strongly in Australia and overseas. The new equipment has the added advantage of overcoming computer air-flow warranty problems, where over-heating associated with big, high-security racks, runs the risk of voiding manufacturer's warranties. It also addresses the mean time between failure (MTBF) issues."

Mr Campbell said SRA had manufactured 19-inch racks for over 20 years. In 2003, SRA's Class B and Class C rack designs were endorsed by the SCEC.

"One of the problems plaguing the development of more and more powerful high-security computer systems has been concern about cooling requirements compromising security," he said.

Technically Speaking

"The secret of our new system is an Intelligent Plenum Air Management Module or *i*PAMM," Mr Campbell said.

[A plenum is simply a space completely filled with matter, the opposite of a vacuum, in this case, chilled virgin air.]

"We were prompted by the cooling issues associated with these high security racks and the ever increasing density of servers within them as well as costly space requirements for server rooms.

"*i*PAMM directs the chilled 'virgin' air directly into the equipment, using clean, conditioned, pressurised air from the building supply to remove heat from the rack without over-cooling the server room.

"The operating principle is very simple, but extremely effective – an *i*PAMM can now remove more than 10 kW of heat per rack, without auxiliary cooling. This compares with a rate of 2-3 kW with current SCEC-endorsed racks on the market.

"For server rooms with plenum floors the module is mounted under the rack and does not compromise the SCEC rating. Where there is no plenum floor, a top-mounted model is available.

"Inside the front of the rack, a plenum is created by sealing off the face of the servers to the cabinet. The N+1-redundancy *i*PAMM contains two very efficient, backwards curved high-pressure, **thermostatically-controlled, variable speed fans** which draw the cold air directly from the under-floor plenum (for raised floor server rooms) or from an overhead ceiling duct via flexible ductwork to the top of the rack (if the floor is not raised).

"This air from the main building air conditioning system is usually in the range of 15^{o}C to 17^{o}C, but for new room designs, can be as low as 11^{o}C, for even higher cooling capacity.

"Cold air from the building air conditioning system is therefore focused directly onto the hot spots in the equipment, where it needs to be!

"An intelligent control module displays and monitors cooling system status, including current temperature, over temperature and door open alarms.

"Precision control of the server room environment is not required and no additional infrastructure needs to be installed to take advantage of the benefits of *i*PAMM.

"On-site testing by IT service providers, using 'real' equipment (blade servers) at the Department of Defence was limited by the physical capacity of the rack.

"By fully loading a 42 RU rack with state-of-the-art, high density servers; they were only able to achieve an equipment load of 7 kW, which was the maximum heat the equipment could generate," he said.

"In these tests, the 7 kW load produced a steady state (>30 hours) temperature rise differential of only 8^{o}C (ΔT) as it passed through the equipment. Extrapolation of these results indicates that because the relationship is close to linear, very much higher capacities are achievable by this system.

"By supplying cooling *direct* to the equipment hot spots, *i*PAMM removes the need for auxiliary cooling systems and precision temperature control of server rooms."

Mr Campbell said the *i*PAMM range would be available in two versions – for nominal cooling capacities of 5 KW and 10 kW, for top or bottom mounting, and will be supplied as options on all SRA's commercial and SCEC-endorsed 19-inch equipment racks.

SRA is also producing commercial and SCEC-endorsed racks that are *i*PAMM-ready as well as *i*PAMM Inrow. This means that if it is decided to retro-fit an *i*PAMM 5 or 10 kW unit at a later stage, it can be done easily with no down-time and minimal cost.

Why YOU Need *i*PAMM

The main advantages include lower capital cost, use of less space and a 30 per cent energy saving.

*i*PAMM is less than half the price of competing overhead secondary cooling systems and side-mounted retrofitted units.

No additional infrastructure needs to be installed to take advantage of the benefits of *i*PAMM

Server rooms can now be designed without the need to arrange equipment in "hot" and "cold" aisles. "If a top mounted *i*PAMM is used, even the raised plenum floor can be eliminated, which allows server racks to be placed anywhere within the building," Mr Campbell said.

"It also provides an improved working environment for IT staff. Cold air does not enter the server room directly (floor perforations should be sealed), so staff do not have to work in a 'cold' room.

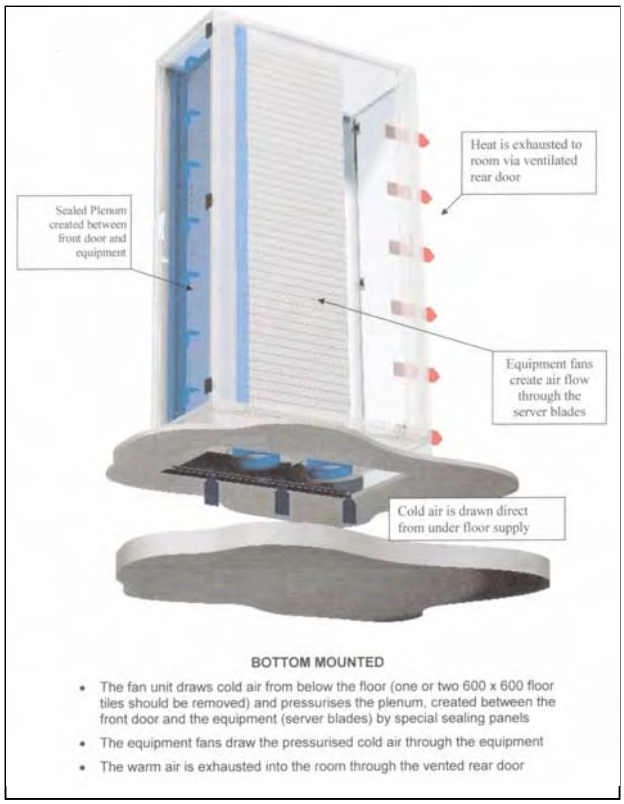
"Noise levels are typically lower than for auxiliary cooling systems, and optional acoustic damping is easily fitted.

"It also has the advantage of being a no maintenance/no liquids system and uses building air i.e. no water, glycol or refrigerants are required (no plumbing, no leaks or specialised trades). The only scheduled maintenance is filter replacement."

NOW *i*PAMM COMES IN THREE MODELS IN SCEC ENDORSED AND COMMERCIAL GRADE:

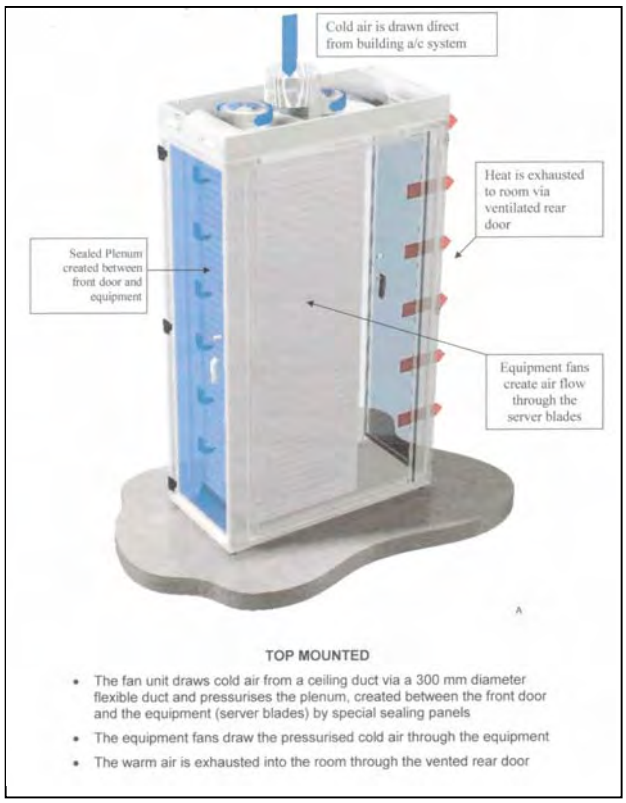
- ***i*PAMM**
- ***i*PAMM Ready**
- ***i*PAMM Inrow**

How *i*PAMM Works



BOTTOM MOUNTED

- The fan unit draws cold air from below the floor (one or two 600 x 600 floor tiles should be removed) and pressurises the plenum, created between the front door and the equipment (server blades) by special sealing panels
- The equipment fans draw the pressurised cold air through the equipment
- The warm air is exhausted into the room through the vented rear door



TOP MOUNTED

- The fan unit draws cold air from a ceiling duct via a 300 mm diameter flexible duct and pressurises the plenum, created between the front door and the equipment (server blades) by special sealing panels
- The equipment fans draw the pressurised cold air through the equipment
- The warm air is exhausted into the room through the vented rear door

Feature Summary	
***i*PAMM 5**	***i*PAMM 10**
• >5 kW capacity (depending on operating conditions)	• >10 kW capacity (depending on operating conditions)
• MTBF > 5 years	• MTBF 5 years to > 10 years depending on operating conditions
• Suits selected SCEC endorsed and commercial grade racking (600mm and 800mm rack widths and 1050mm and 1200mm depths)	• Suits selected SCEC endorsed and commercial grade racking (600mm and 800mm rack widths and 1050mm and 1200mm depths)
• Top or bottom mounting Note: For top mounting, cooling air must be supplied via a 250mm diameter flexible duct provided by the installer. The intake cowl is supplied as part of the rack.	• Top or bottom mounting Note: For top mounting, cooling air must be supplied via a 300mm diameter flexible duct provided by the installer. The intake cowl is supplied as part of the rack.
• Sealed, pressurised plenum Note: The customer must install sufficient standard 19” blanking panels around the equipment to completely seal the front plenum.	• Sealed, pressurised plenum Note: The customer must install sufficient standard 19” blanking panels around the equipment to completely seal the front plenum.
• Dual corded	• Dual corded
• N + 1 redundancy	• N + 1 redundancy
• Dual 190mm Φ **fixed speed**, backward curve fans	• Dual 250mm Φ **variable speed**, backward curve fans
• One fan runs continuously	• Both fans are speed controlled to maintain constant exhaust temperature
• Optional door open switches	• Optional door open switches
• Independent, external temperature display	• Independent, external temperature display
• Single controller, with variable switching point to thermostatically control the second fan	• Dual fan speed controllers
	• User configurable alarms for over temperature, door open, and fan failure

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BUY DIRECT AND SAVE

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