

# Therm-Jett™

## High Capacity Air Cooling For ATCA, PICMG and Computing Chassis

Product of  
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January, 2009

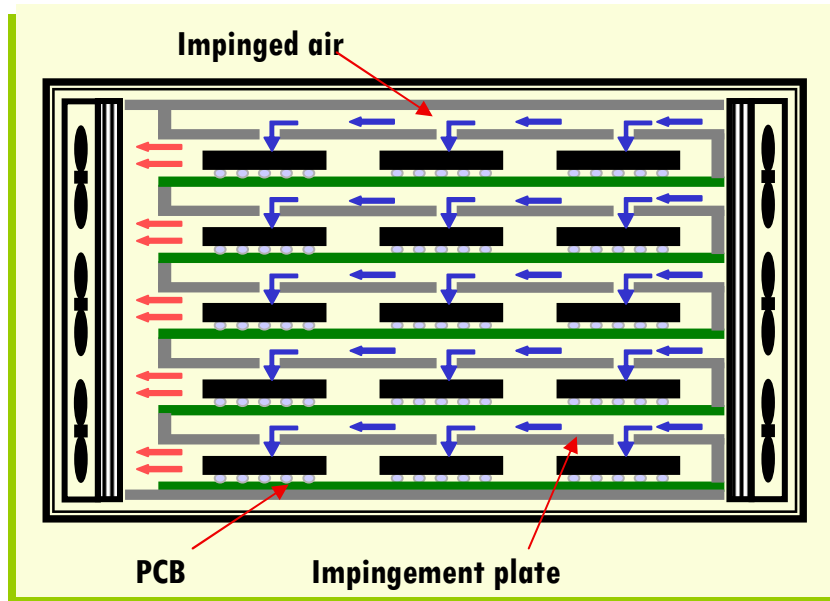
Rev. 4



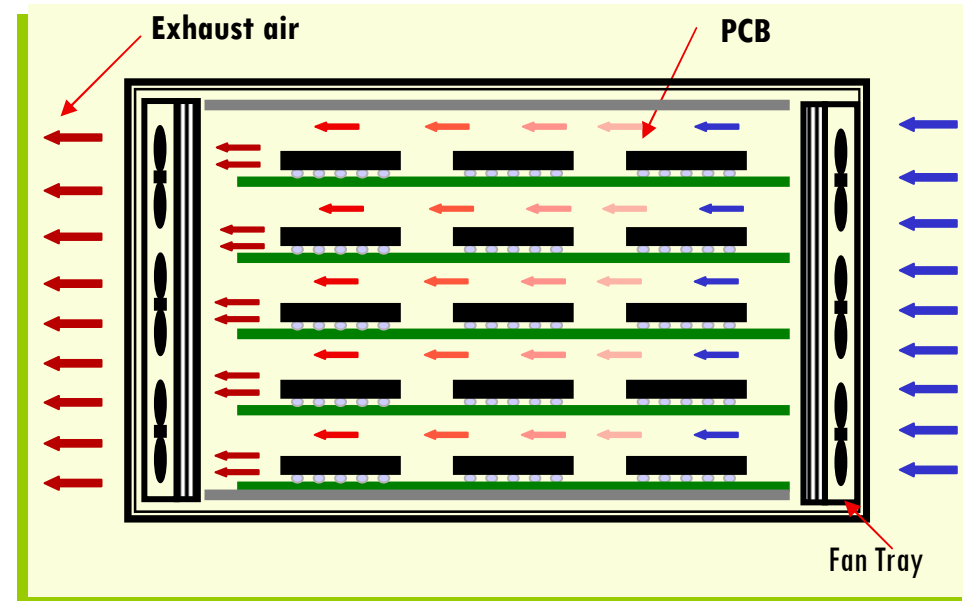
**ATS** ADVANCED  
THERMAL  
SOLUTIONS, INC.

Innovations in Thermal Management®

## Therm-Jett™ cooling



## Conventional cooling



- **Conventional cooling** for an ATCA or PICMG chassis has lower cooling capacity because of the air flow being parallel with the PCB.
- **Therm-Jett™** increases the cooling capacity since the flow is near-normal to the PCB – much higher heat transfer coefficient.
- **Therm-Jett™** has better cooling than complicated liquid cooling techniques with significantly lower cost and increased reliability.

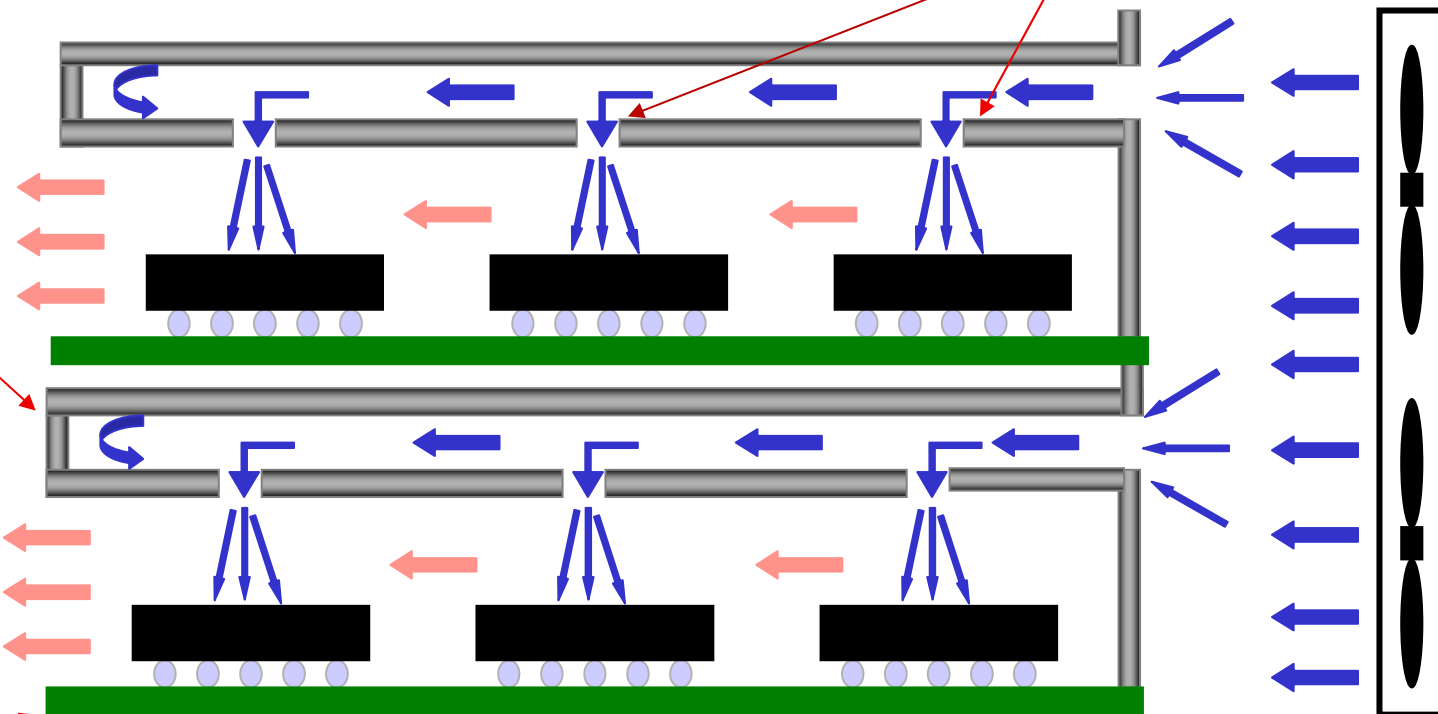
# Therm-Jett™ Operational Principle

Delivering high capacity cooling (jet impingement) by introducing a perforated plenum in between PCBs or on top of a single PCB.

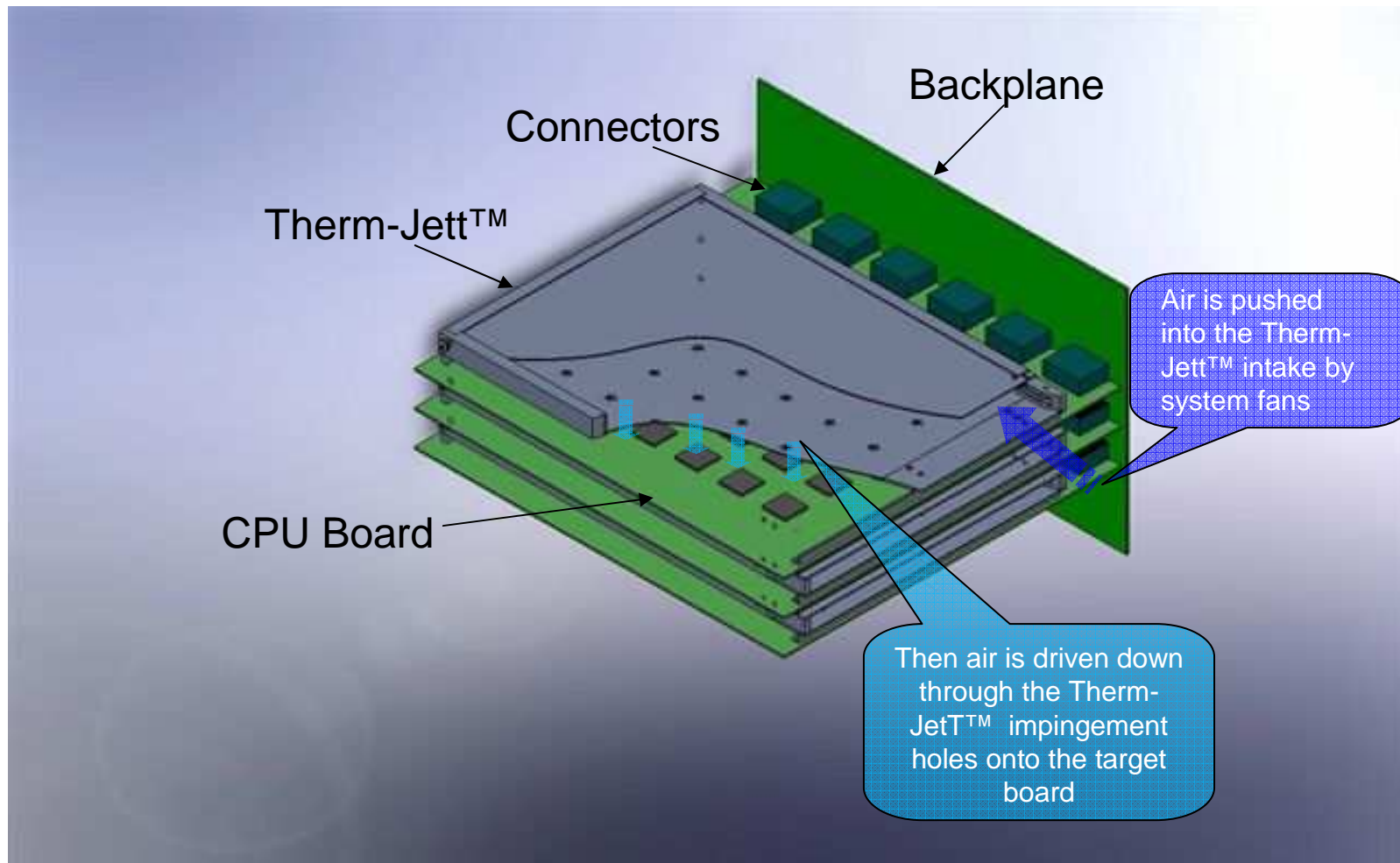
High heat transfer coefficient jet impingement

Perforated plenum made of sheet-metal – mounted either on the PCB or as integral part of the chassis

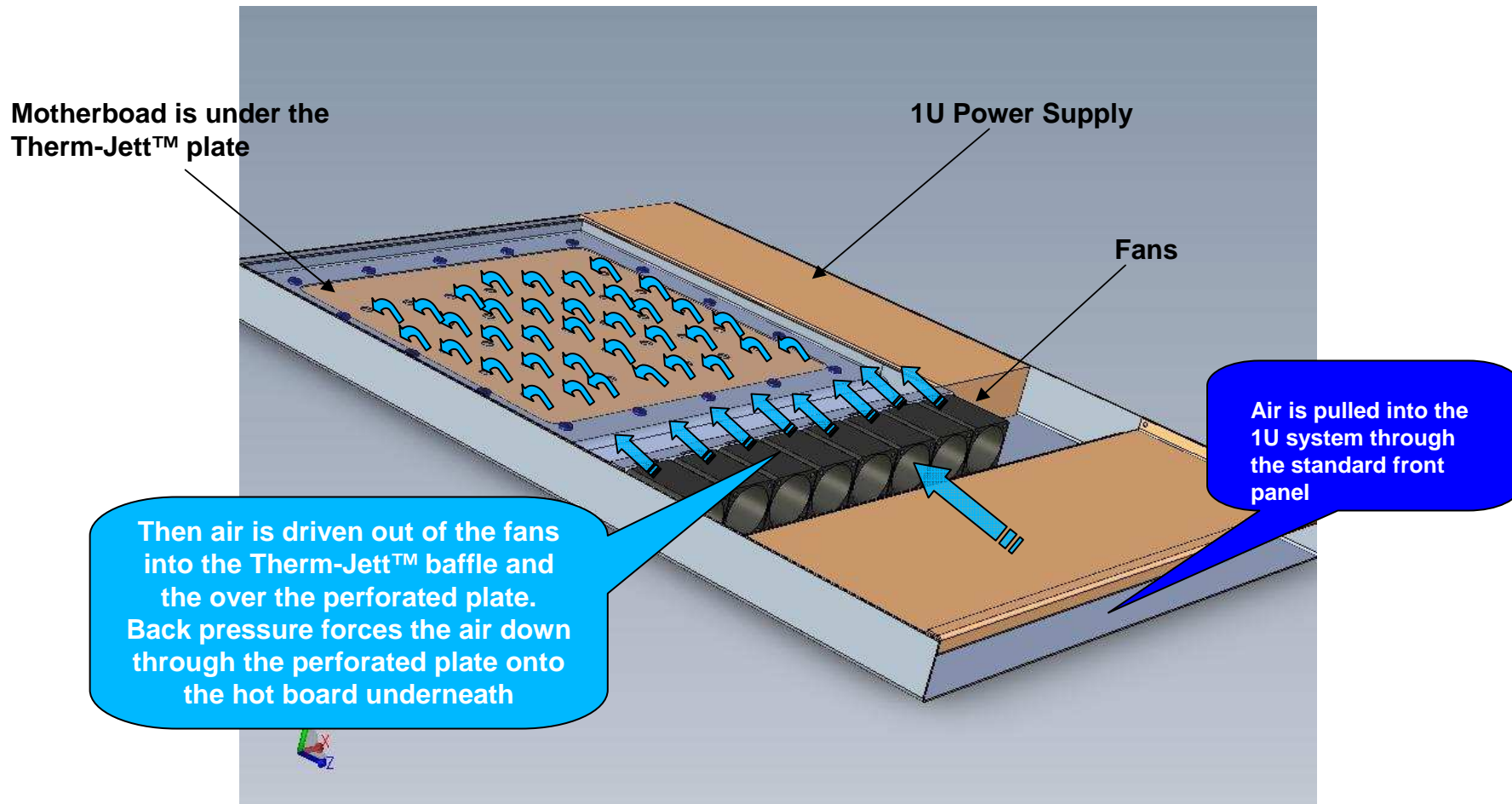
PCB



## Assembled View with Cutaway Section for boards in a blade configuration

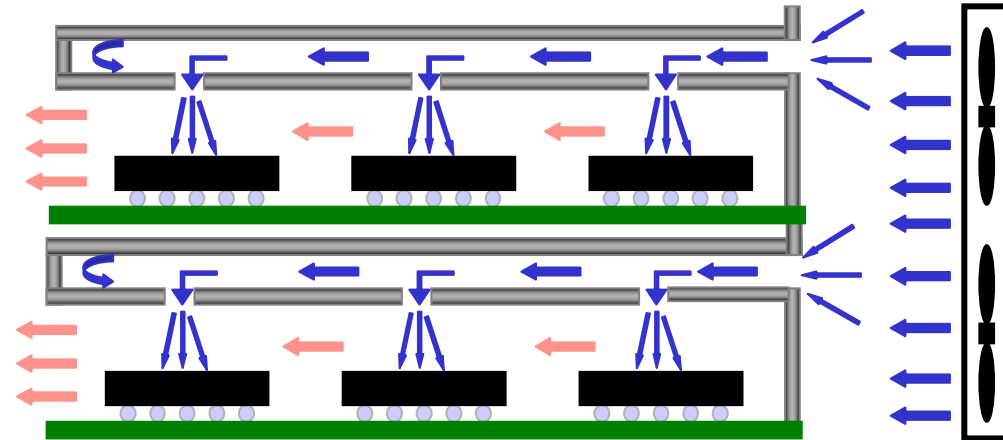


## Therm-Jett™ Technology can be applied to 1U and larger chassis as well



# Therm-Jett™

Therm-Jett – delivering **high capacity cooling** by flow impingement without compressed air or changes to chassis' overall architecture.



## Therm-Jett Action?

**Cools the targeted PCBs 20-30°C better than the conventional system. As the result, it effectively more than double the existing system power dissipation.**

## Implication?

**Extends the air cooling capability for**

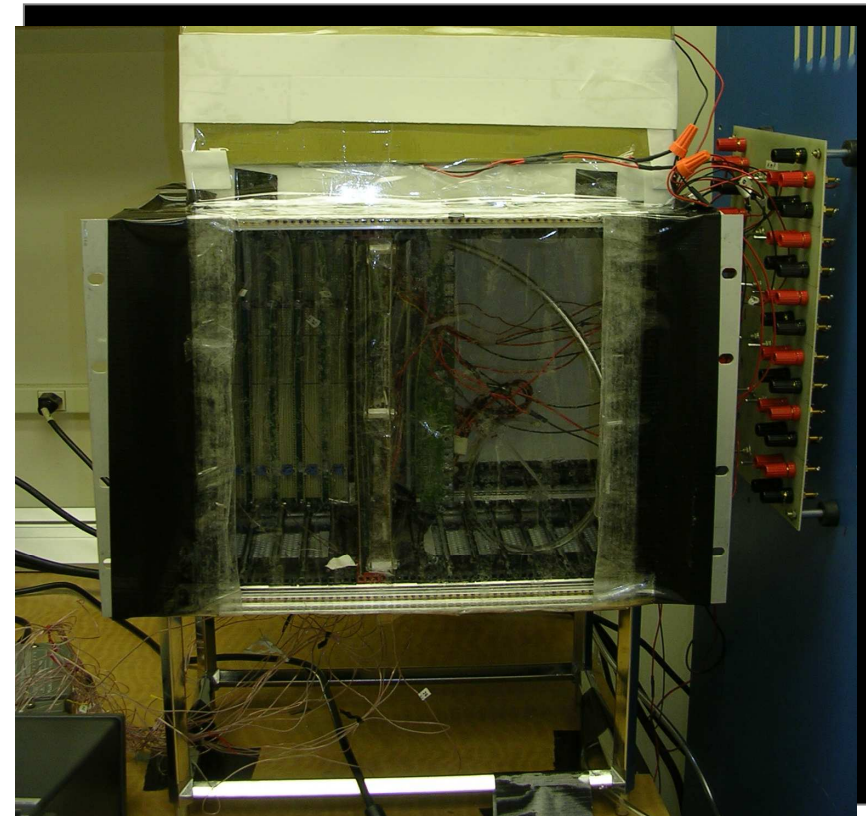
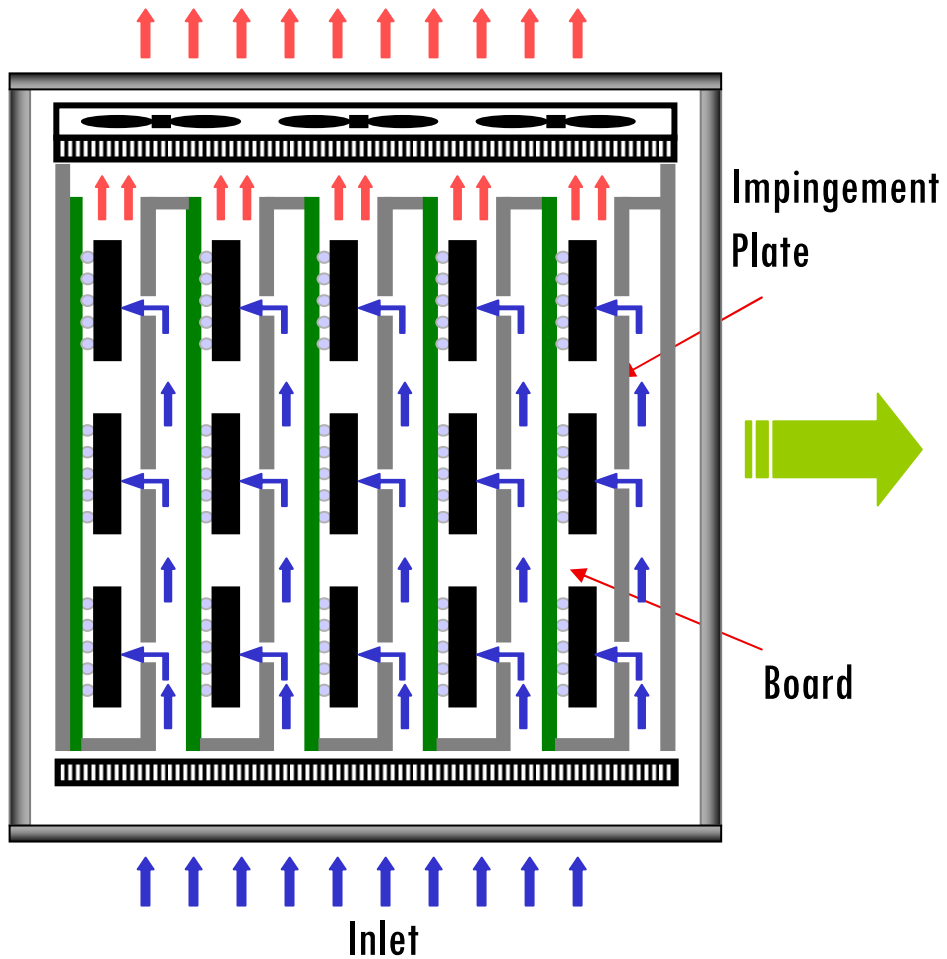
- Telecomm,
- High Performance Computing,
- Military Electronics
- Embedded Computing

## Status?

- Technology proven.
- Patents Pending
- Proof of Concept Chassis design in place
- Technology available today for licensing or joint development

# Therm-Jett™ - Tested

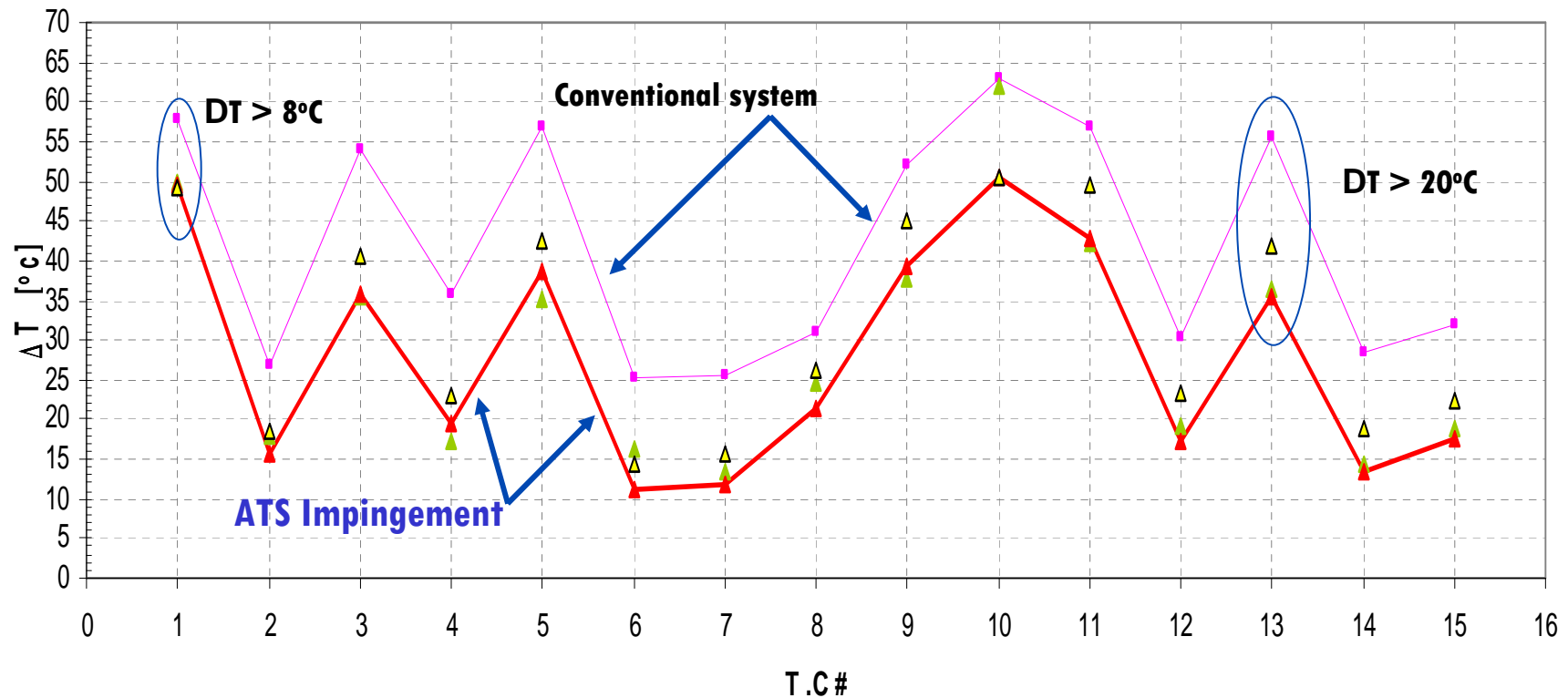
## ATS Therm-Jett – a jet impingement cooling system



**Experimental Setup - an off-the-shelf PCI system with Therm-Jett cooling system**

# Therm-Jett™ - Tested

Experimental data for 15 locations on a simulated board for conventional and impingement cooling



- The data from graph shows a significant decrease in  $\Delta T (T_{\text{Component}} - T_{\text{ambient}} = 8 \text{ to } 20^\circ\text{C})$  for impingement compared to conventional flow.
- **By optimizing the shape of the impingement duct, we expect to double the cooling capacity of an ATCA/PICMG chassis compared to conventional cooling method.**

# Therm-Jett™ - Experimental Verification



## Deployment of Therm-Jett in an ATCA Chassis



# Therm-Jett™ - Experimental Verification

## Deployment in ATCA Chassis



Side view of the experimental plenum of the Therm-Jett™

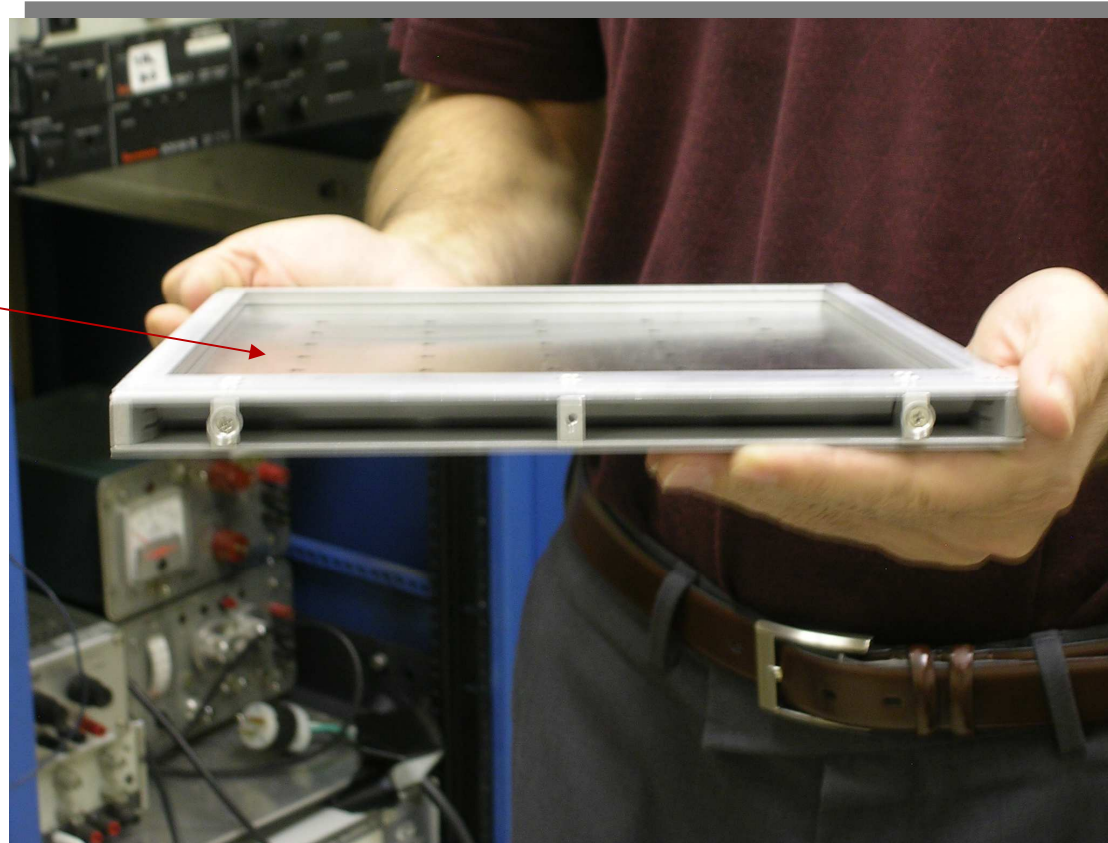
Plenum entrance for Therm-Jett™

Fan tray area

# Therm-Jett™ - Experimental Verification

## Deployment in ATCA Chassis

Perforation  
pattern in  
Therm-Jett™  
impingement  
cooling system

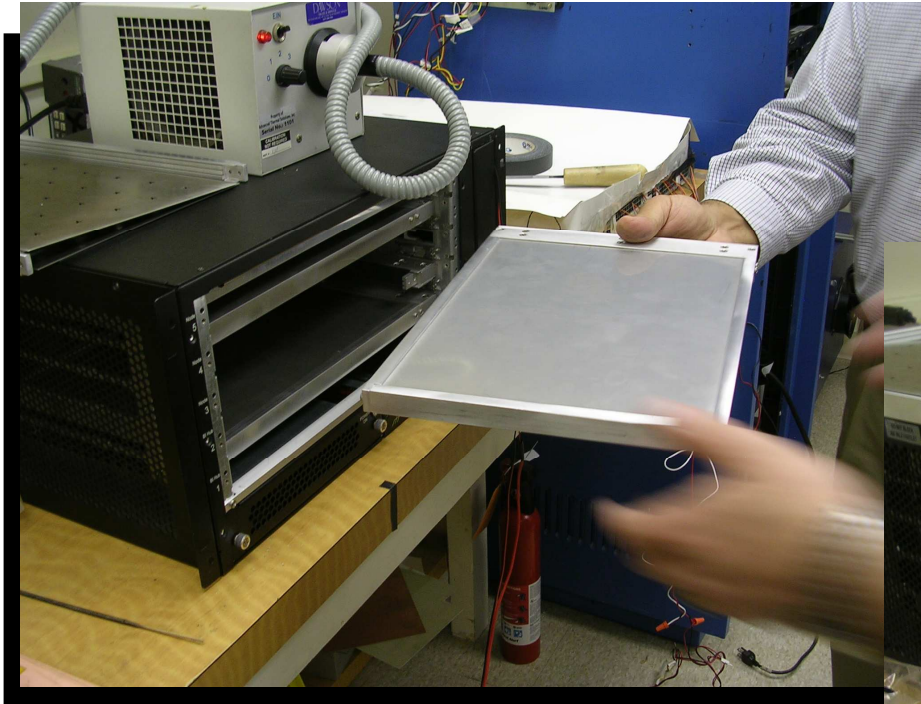


**Therm-Jett™ experimental plenum for ATCA deployment**

# Therm-Jett™ - Experimental Verification



## Insertion of the Therm-Jett™ plenum in an ATCA system



# Therm-Jett™ - Partnership

## A Paradigm Shift in Electronics Cooling



**Therm-Jett™ a unique patent pending technology to advance air cooling of electronics**

