CURTISS-WRIGHT

3U AFT (Air Flow Through) - Why do we need another cooling standard?

Ivan Straznicky, Technical Fellow

Curtiss-Wright Defense Solutions

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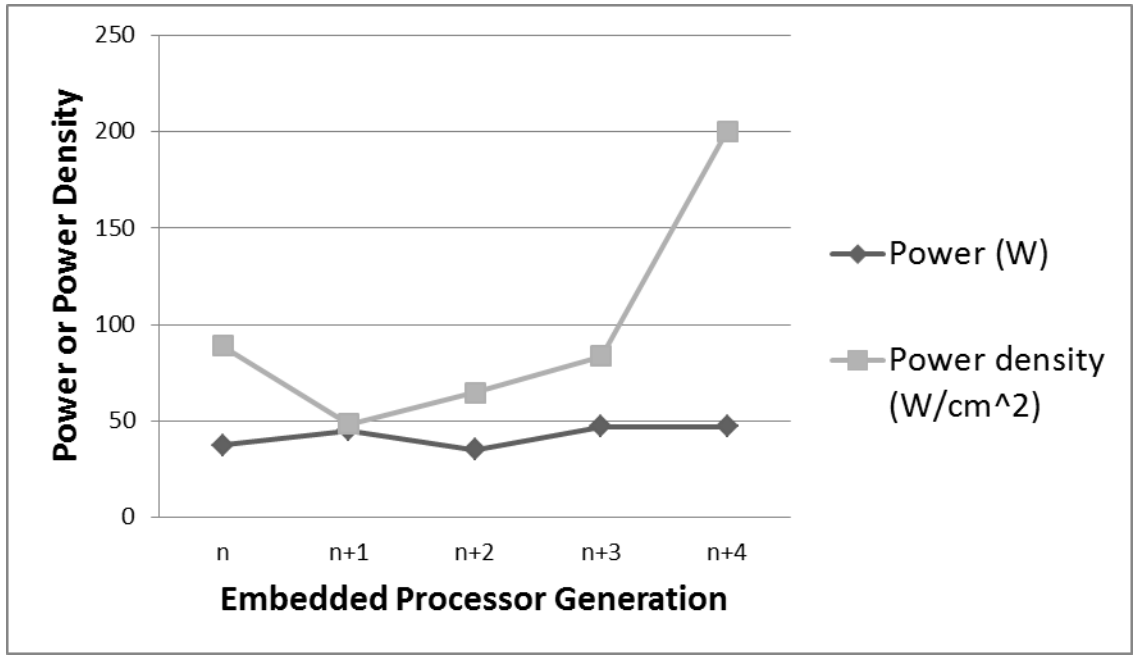
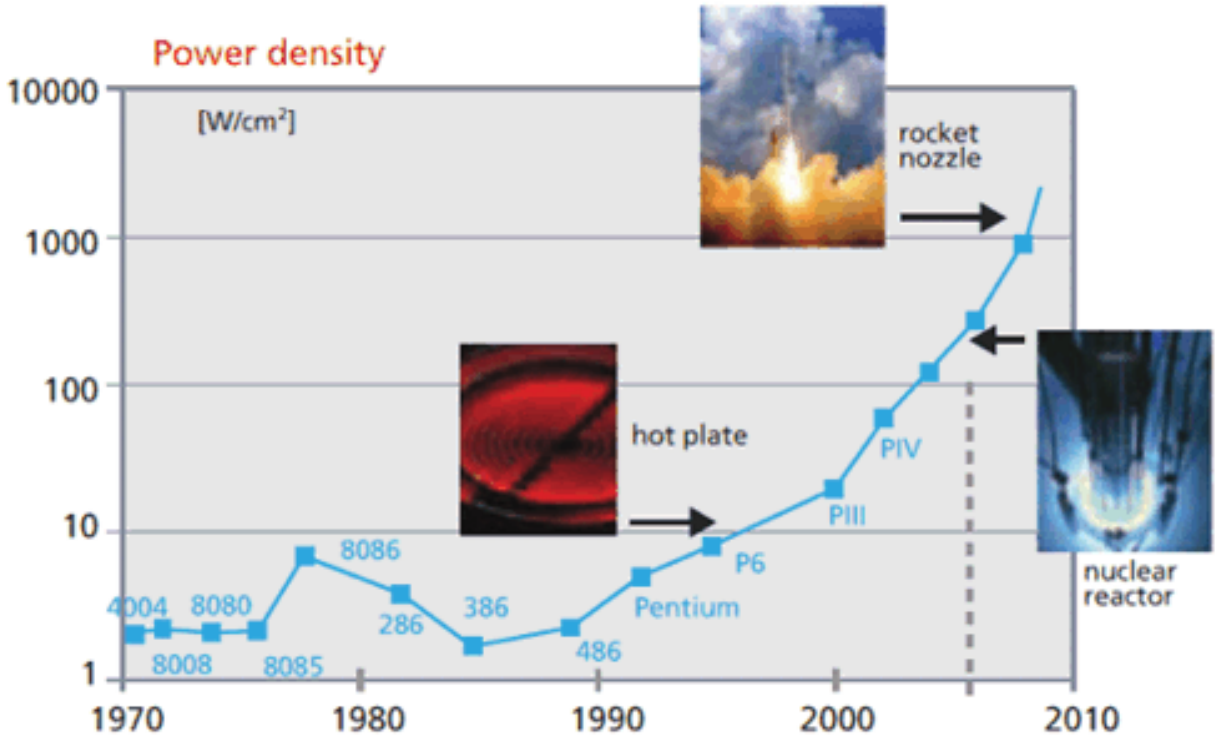
- ANSI/VITA 48.1 (Mechanical Specification for Microcomputers Using REDI Air Cooling)
- ANSI/VITA 48.2 (… Conduction Cooling)
- ANSI/VITA 48.5 (… Air Flow Through Cooling)
- ANSI/VITA 48.7 (… Air Flow By™ Cooling)
- VITA 48.4 (… Liquid Flow Through Cooling)

So, what's the problem, Houston?





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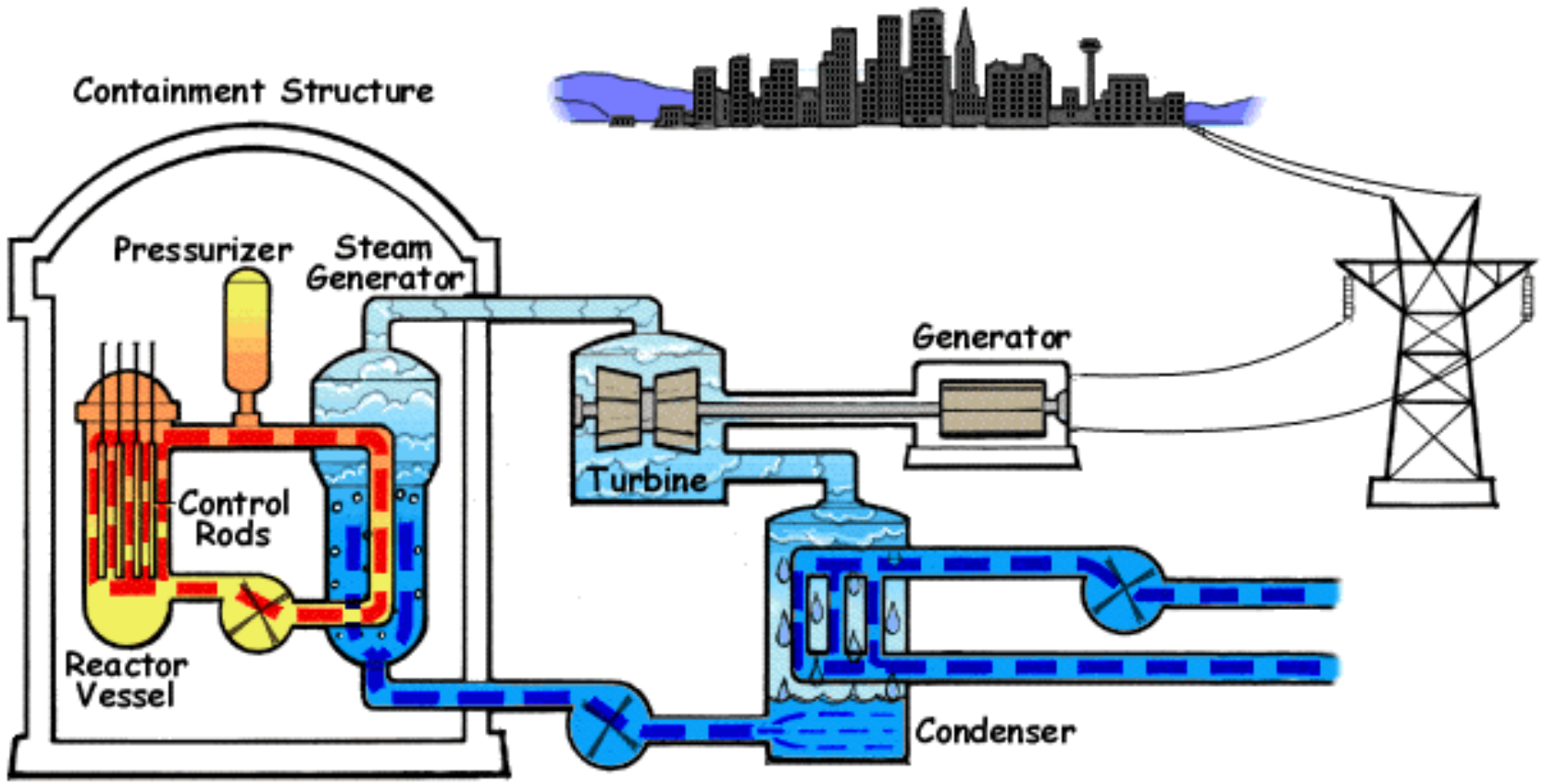
How do we solve (cool) high heat density?



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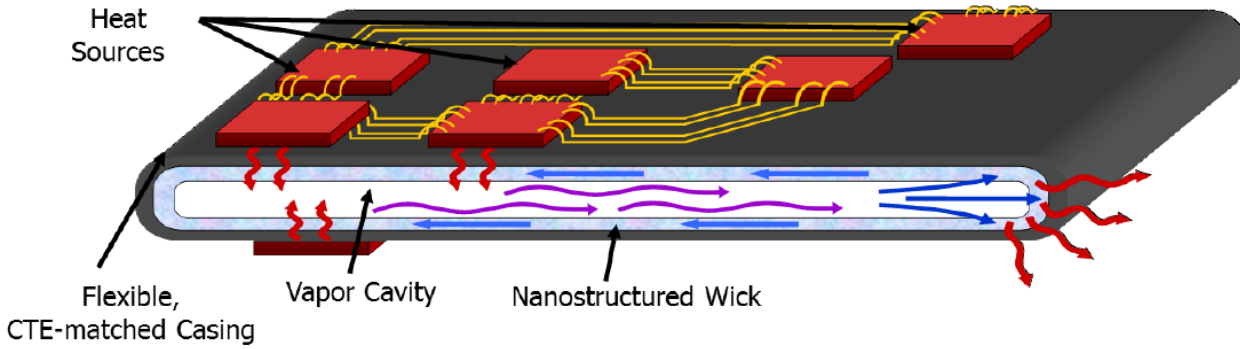
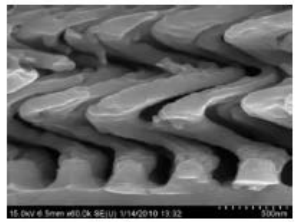
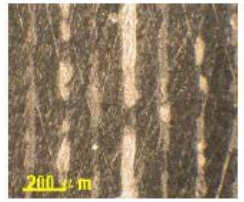


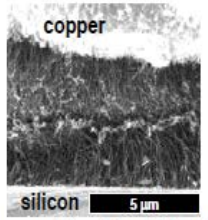
Thermal Interface Material (TIM)



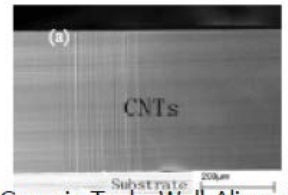
General Electric: Copper Nanosprings



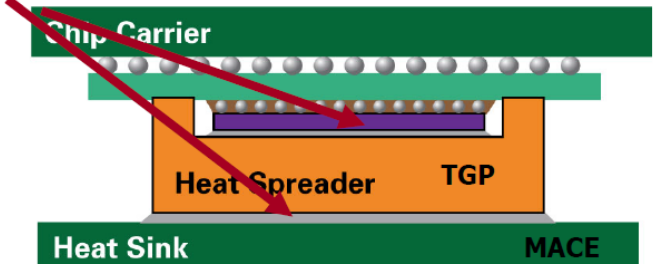
Teledyne: Laminated Graphite and Solder



Raytheon: Double-sided Multi-walled Carbon Nanotubes



Georgia Tech: Well-Aligned Open-End Carbon Nanotubes



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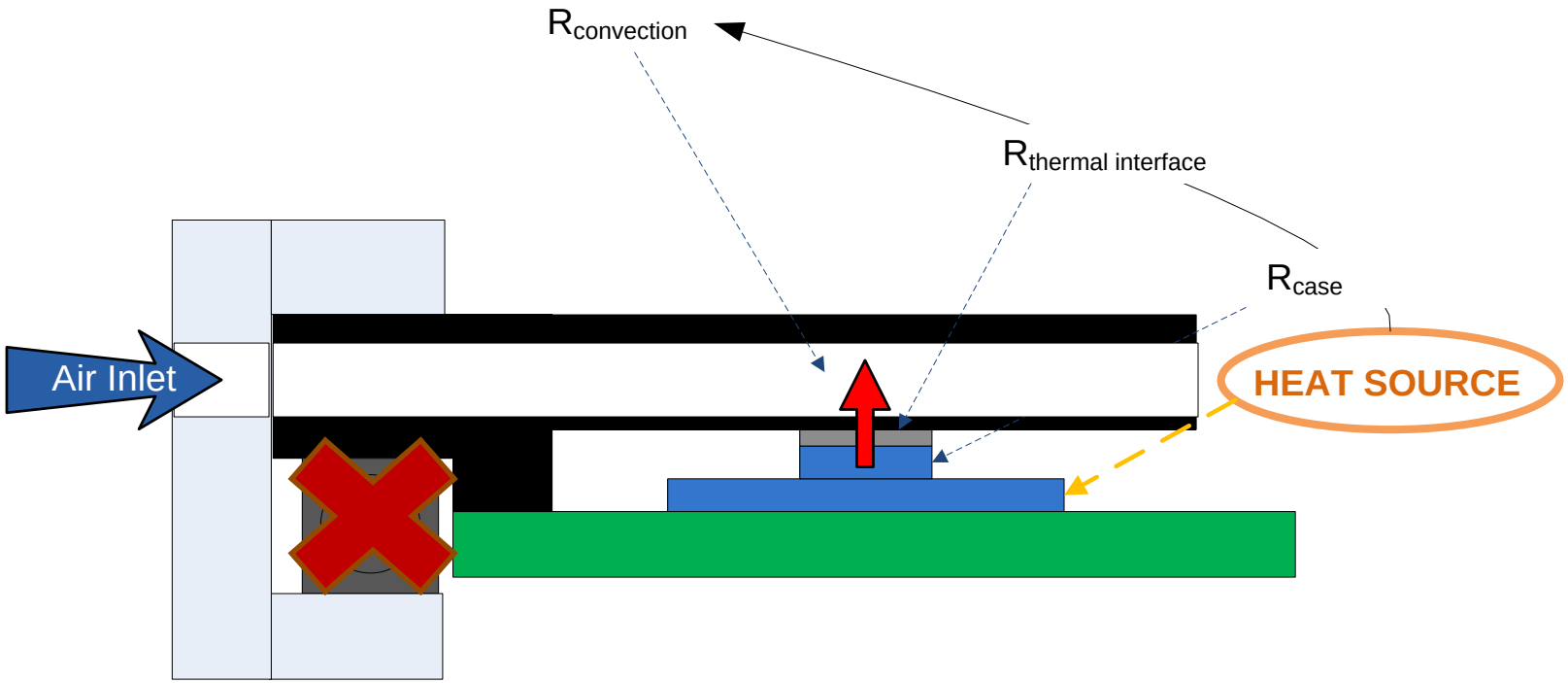
How do we solve high heat density affordably?



Why do we need a new AFT (Air Flow Through) standard?

SWAP-C (Size, Weight, Power, and Cost)

VITA 48.8 – Mechanical Standard for VPX using AFT

Abstract

This document describes an open standard for the design requirements for an air-flow-through cooled plug-in module having 3U and 6U form factors while retaining the VITA 46 connector layout. Unlike using cooling air impinged directly upon the components and circuit boards, this plug-in module uses a finned heat exchanger frame located within the central section of the assembly to top cool primary circuit board components as well as mezzanine board components. Both 3U and 6U standard form factors are offered using 3 defined pitch spacings, with an option to have alternate air flow intake and exhaust paths. The plug-in modules of this standard exhibit a weight reduction and cost savings by eliminating both wedge retainer usage and lever usage by way of using light weight jack screws for plug-in module insertion and extraction into a subrack chassis. The intention of this standard is to **optimize SWAP-C**.

Also, no essential IP to license

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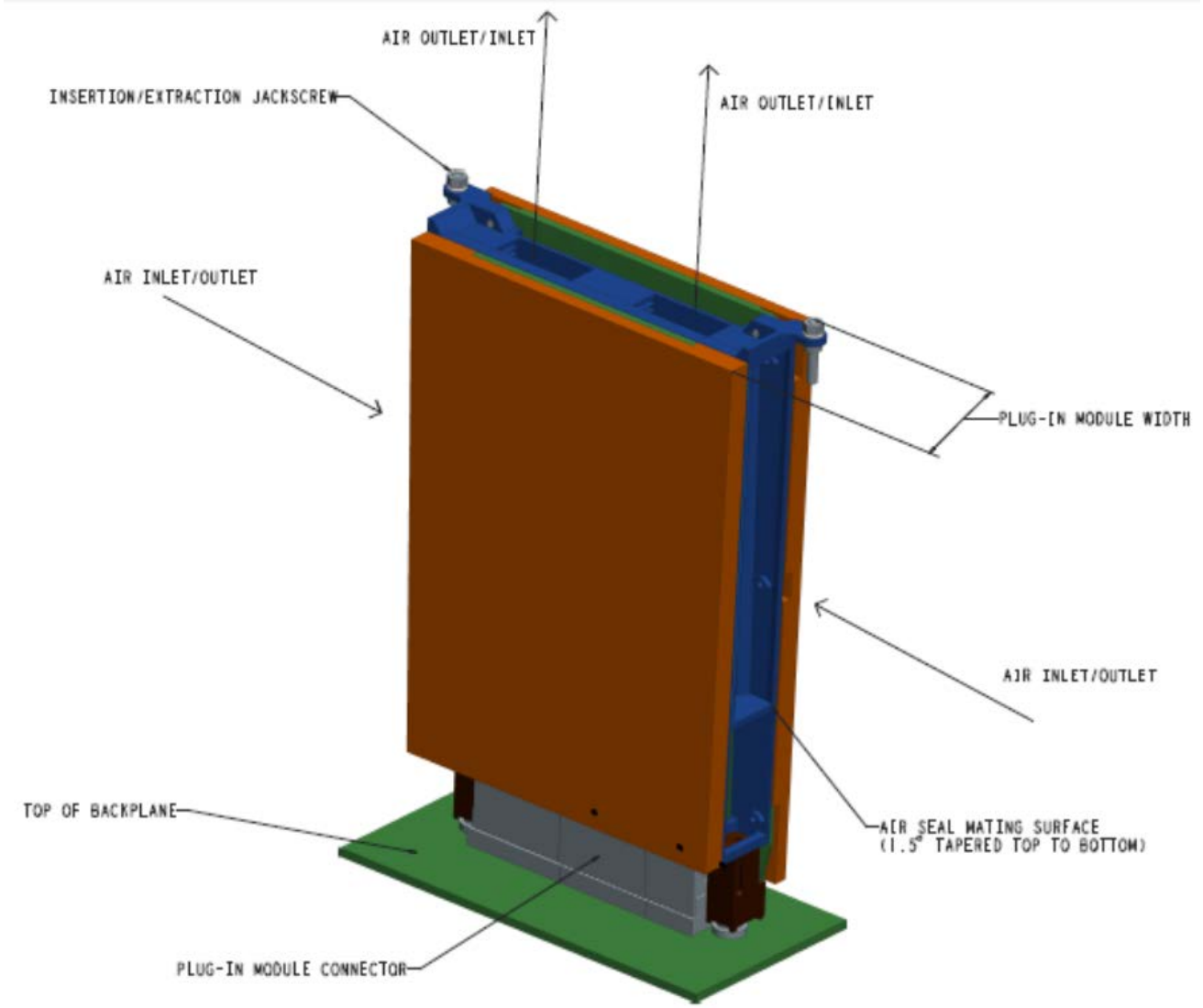
Alternative Air Flow Path [for both 3U and 6U]



VITA 48.8 – Mechanical Standard for VPX using AFT

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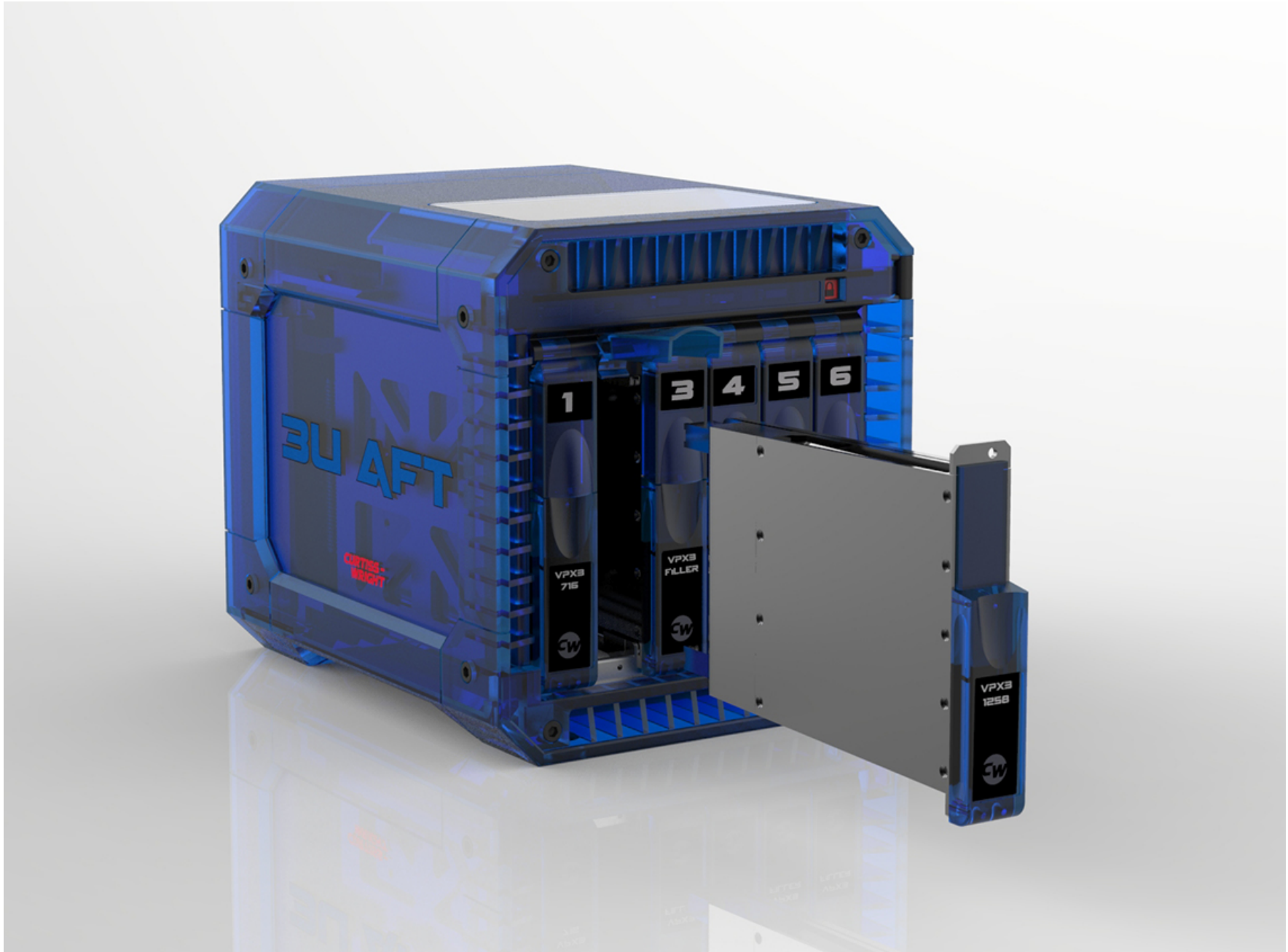
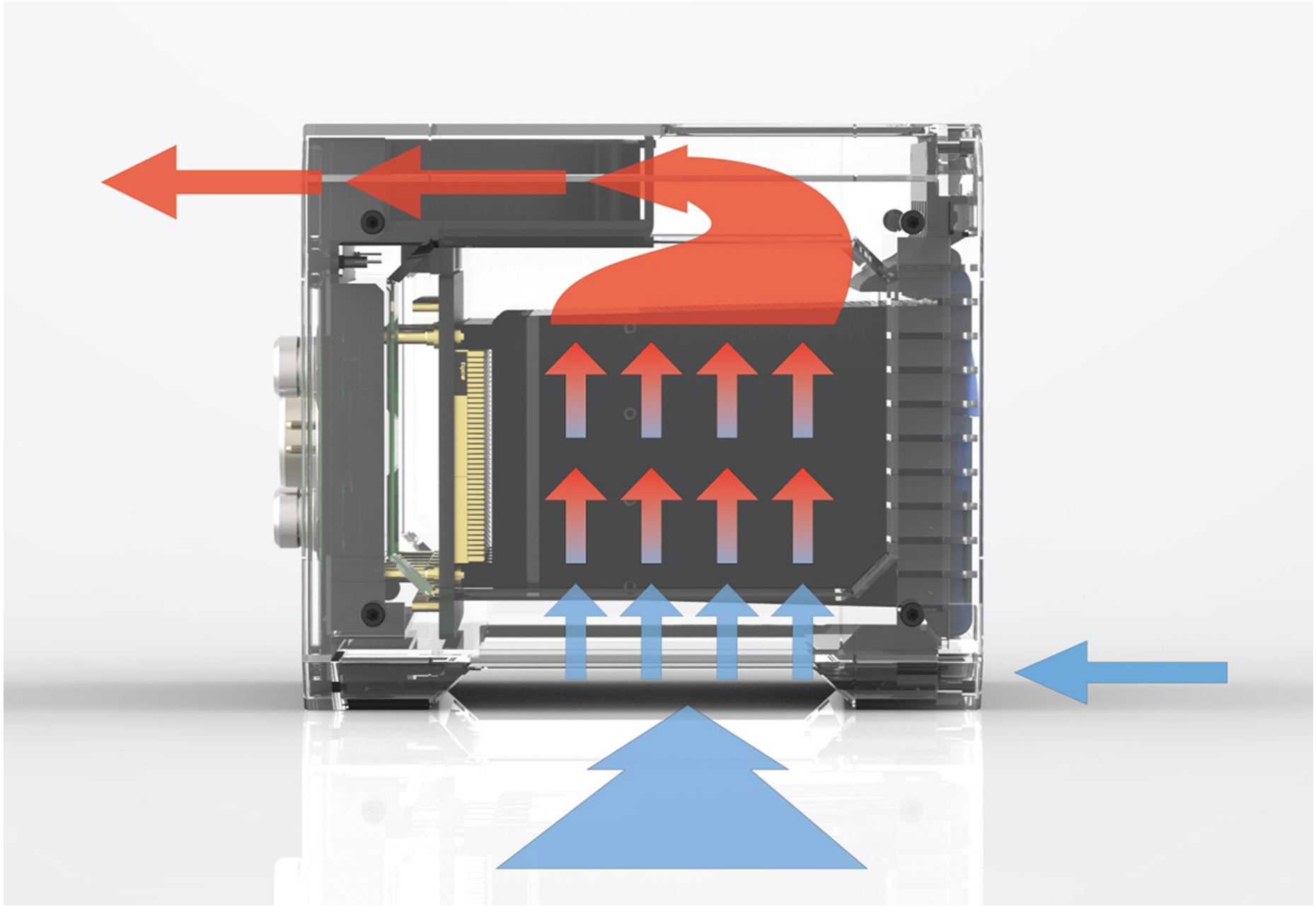
Curtiss-Wright Announces Support for New VITA 48.8 Air Flow Through (AFT) Cooling Standard Effort: Demonstrates industry's first AFT cooled 3U VPX COTS system at ETT 2016 symposium

What does a 3U AFT system look like?



How does a 3U AFT system work?



Why do we need another cooling standard? [Summary & Questions]

- Power density remains a difficult challenge
- Many platforms, old and new, need optimized SWaP (e.g. 3U, lightweight chassis)
- Affordable thermal management (limit or eliminate exotic technologies)
- IP-free standard
- Innovative AFT (alternative air flow paths)

- Curtiss-Wright has developed or is developing 3U AFT for several products (e.g. VPX3-652 Switch, VPX3-1258 SBC, VPX3-1259 SBC, VPX3-716 Graphics)
- Curtiss-Wright has developed a functioning 3U AFT demo system
  - First prototype at ETT 2016.
  - Second fully functional demo in February 2016.

Thank you

Curtiss-Wright Defense Solutions