

# RUGGED & DEFENSE

WHERE RUGGED MEETS THERMAL



## Applications

Embedded Computing | Radar & Satellite Electronic Warfare | Avionics & Guidance Systems  
Electronic Jamming Equipment | Communications  
Electronic Rugged Enclosures | Mission Processing  
Command and Control | Video and Image Processing



WAKEFIELD THERMAL



Thermal control, technical standards and precise machining requirements are well practiced routines for our technical team. Our top engineers have decades of experience solving the industry's specific challenges. The Thermal Solutions Segment (TSS) will provide your rugged and defense solutions with confidence, and within your mission critical timelines.

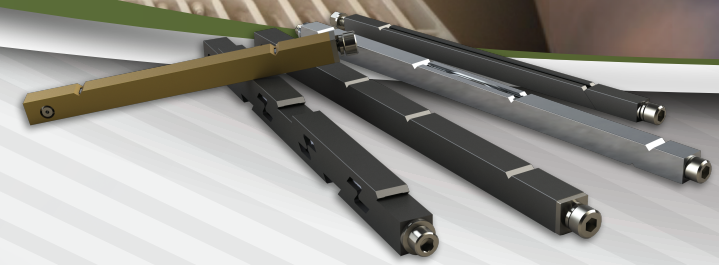




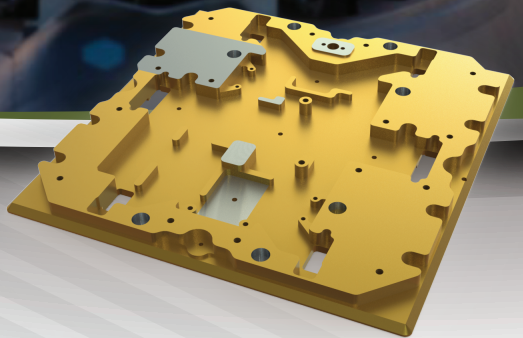
# COMPLETE THERMAL SOLUTION



Vacuum & Dipped Brazed Chassis



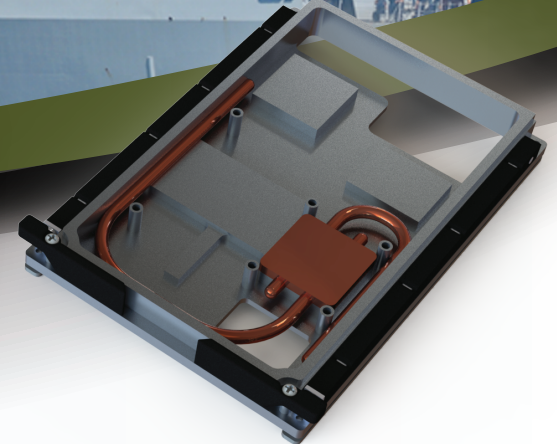
Card Retaining Wedgelock



RF Housing/ 5-Axis High Precision Machining



Heat Frames  
Liquid Flow Through  
Liquid Flow By  
Air Flow Through  
Air Flow By



Conduction Cooled Heat Frame with Integrated Heat Pipe Technology

## The Road to Success

From CFDs to cold plates, CAD assemblies to brazed chassis, and from initial concept to production, we will provide support along the way. Reach out to our team of engineers at any point in your design cycle for high level collaboration and solutions. TSS is excited to turn your challenge into innovative components.

## Dedicated Manufacturing Locations

Rugged and defense solutions demand the leading edge in manufacturing. Vacuum and dip brazing, stir welding and 5-axis CNC capabilities are our edge in your fight. Complex, simple, large, or small, TSS is ready to deploy your solution within its 400,000 sq. ft. of manufacturing space worldwide.





# COOLVATION

Innovative Thermal Solutions

COOLED BY WAKEFIELD THERMAL

# 5 STEP THERMAL ENGINEERING GUIDE From Concept To Cooling

COOLVATION provides thermal management engineering services to improve products' thermal performance while applying cost effective solutions to eliminate unnecessary manufacturing costs. COOLVATION is a seamless resource extension for our customers' thermal & mechanical engineering teams from ideation to lab testing.



## Customer Thermal Challenge

- Physical limitations
- Power constraints
- Air flow/ fluid conditions
- Environmental conditions
- Component specifications
- Define ideal state



## Execution

- Concept analysis  
(CFD-ansys/ ice pack, fin optimizations software)
- Solid model
- Analysis & verification
- Cost analysis



## Global Manufacturing

- Global manufacturing facilities
- Global warehousing
- Global labs to support future program

01  
STEP

02  
STEP

03  
STEP

04  
STEP

05  
STEP



## Collaboration

- Review conditions
- Statement of work to customer
- Historical consideration along with cutting edge technologies to provide cost effective solution



## Solution & Verification

- Dedicated new product development center
- Prototype
- Physical thermal lab testing
- Prove manufacturability