Northrop Grumman has a proven development approach to Design-to-Performance or Build-to-Print honeycomb panels with embedded heat pipes, structural and thermal analyses, materials selection, panel consolidation, precision machining, panel inserts, reinforcement for local concentrated loading, application of optical coatings, contamination control, ultrasonic and radiographic testing, thermal performance and cycling testing, static load, vibration, and acoustic testing.

Facts At A Glance
- One Stop Shop Radiator Panel Provider including Design and Manufacturing
- Full Manufacturing Capability including:
  - Heat Pipe Manufacture and Test
  - Heat Pipe Network Bonding
  - Panel Consolidation
  - High Volume Production Insert Bonding
  - Precision Panel Machining
  - In Process Testing
  - In House Non Destructive Inspection
  - Optical Solar Reflect (OSR) bonding or Thermal Paint Application
  - Qualified for NASA and ESA programs
  - Qualified to Prime Specifications
  - Over 30 years of Panel Manufacturing Flight Heritage; 100% Mission Success
  - Multiple Panel Sizes Delivered for Small Payload Instruments to Large Geocomm and Radiators
Typical Materials

- Aluminum Facesheets (various alloys and thicknesses)
- Corrosion resistant primer preparation for bonding
- Silver filled adhesive for thermal bond of pipes
- Film adhesive – facesheet / heat pipe and facesheet / core
- Foaming adhesive – core splices and shear tie to inserts
- Aluminum bar – co-bonded panel inserts
- Core fill adhesive – core fill and edge closeout material
- G-10 fiberglass and ULTEM thermal isolation
- Two-part structural paste adhesive – structural bond of brackets

Tolerances and Capabilities

- Internal component height tolerances minimized to achieve best flatness minimize variations in heat pipe to facesheet and core to facesheet bondlines
  - Heat pipe tolerances
  - Core height tolerances
  - Radiator insert height tolerances
- Facesheet to heat pipe bondline controlled
- Heat pipe matrix bondlines tightly controlled to customer specifications or Northrop Grumman standards
- Large heat load capacity and large scale fixed radiator panels (6m length panel heritage)

Radiator Inspections and Process Verifications

- Visual and dimensional inspection (including flatness measurements)
- In-house laser shearography NDI inspection
- Cure cycle verification
- “T” peel testing – validates the inserts and facesheets / splice straps cleaning and priming operation
- Flatwise tension testing – validates the bonding / curing process
- Lap shear testing – validates the mixing / curing of all adhesives
- In-house thermal cycle testing validates overall workmanship

Heritage

- ISS SO heat pipe radiator system (5’ x 21’)
- ISS DDCU, RPC, BSP, zenith and nadir MDM heat pipe radiator systems
- Hubble Space Telescope thermal control systems
- SWIFT BAT detector panel
- Lunar Reconnaissance Orbiter equipment and radiator panels
- Magnetospheric Multiscale Mission (MMS) observatory decks
- GEOCOM transponder and bus radiator embedded heat pipe panels for major primes
- High temperature payloads and OMUX panels
- Iridium main mission antenna panels
- Defense and special program payloads, radiators, and panels

More Information

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