



IsoTherm Panel

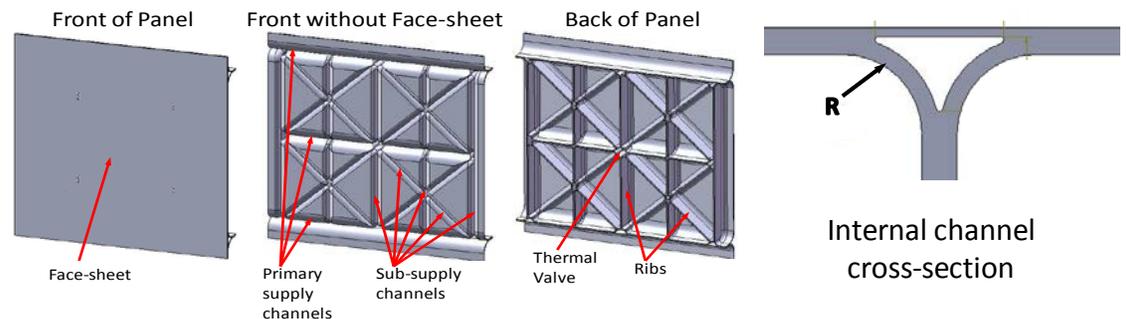
Inventors: Brandon Arritt, Greg Busch, Derek Doyle, Derek Hengeveld, Eric Lyall, Lee Underwood, Andy Williams

Background:

There are many applications where mass is the primary design driver: automotive, biomedical, aerospace, portable electronics, etc. For virtually every one of these applications, the structure only provides load bearing and component attachment points. This approach simplifies design by decoupling systems but does so at the expense of overall system efficiency. By integrating functionality more effectively and moving beyond the point where the structure only provides load bearing capability, the overall efficiency of the entire system can be dramatically improved. Structures with multi-functionality provide a means to combine disparate elements into an integrated system leading to a symbiotic relationship that improves the performance of both elements.

Technology Description:

The IsoTherm panel technology is a highly efficient grid-stiffened structural panel that integrates fluid channels directly into the ribs and facesheet without degrading mass efficiency through a novel fabrication approach. The channels are integrated into the panel in such a way as to provide large fluid flow volume while improving the structural efficiency of the facesheet to rib bond, which is the primary weak point of this type of panel. The integration of fluid channels in the panel provides added functionality including thermal control, self-healing, and general fluid distribution or transport.



In addition to integrated fluid channels, the IsoTherm concept provides a mechanism for thermal sensing and characterization that is not achievable via any other means. Using integrated piezoelectric actuators and sensors, the IsoTherm panel can interrogate joints and interfaces to instantaneously determine their loading and thermal behavior providing real time diagnostic capability and failure prediction. The sensing capability has utility for both real time assembly and quality assurance verification as well as field usage monitoring and prognostic maintenance capabilities.

Key Advantages

- Structurally efficient panel with integral fluid channels for added capability
- Fluid channels provide cooling, self-healing, or fluid transfer capability
- Integrated approach eliminates heavy parasitic mass for tubing/plumbing
- Integrated fluid channels increase the structural performance of the panel
- Thermal sensing provides real time diagnostics and failure prediction

For more information about this technology, please contact:

Dr. Andrew Williams
505-846-0396
andrew.williams.24@us.af.mil

For information about AFRL New Mexico technologies contact AFRL's Technology Engagement Team:
505-846-2707
engage@afrlnewmexico.com

