Additively Manufactured Cold Plate

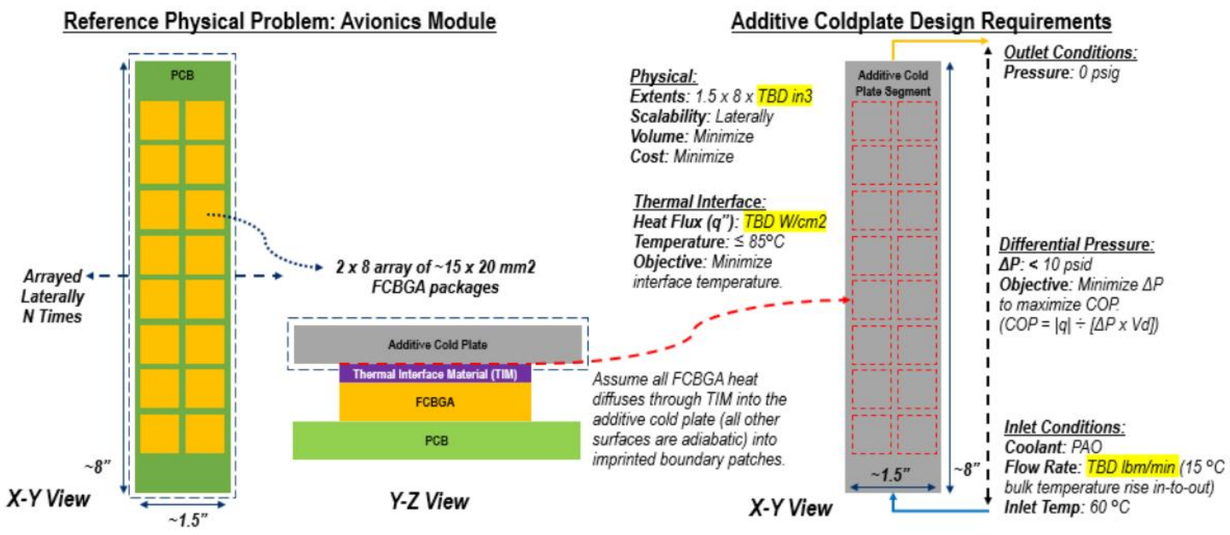
Objective: While working alongside Lockheed Martin, the team will investigate, analyze, procure, and test AM cold plate designs which are representative of designs under consideration for use in high heat dissipating electronic module assemblies. This project is a continuation of the academic year '22-'23 "Additively Manufactured Cold plate" project. The '23-'24 team shall leverage the work completed by last year's team which analyzed and developed AM cold plate designs.

Problem Statement: The ability to remove heat from next generation electronic module designs is becoming an increasing challenge using traditional aluminum cold plate designs. With maturing additive technologies there may be opportunities now to change course to take advantage of better thermal performance through AM cold plate designs.

Design Component: The team shall produce, and order AM cold plate designs based off a generic LM design along with supporting artifacts including analyses, CAD models, and drawings that will provide sufficient heat transfer for an electronic module assembly defined by Lockheed Martin. This design will be evaluated against the specific requirements by a combination of analysis, similarity, and test, as agreed upon by the student design team and LM.

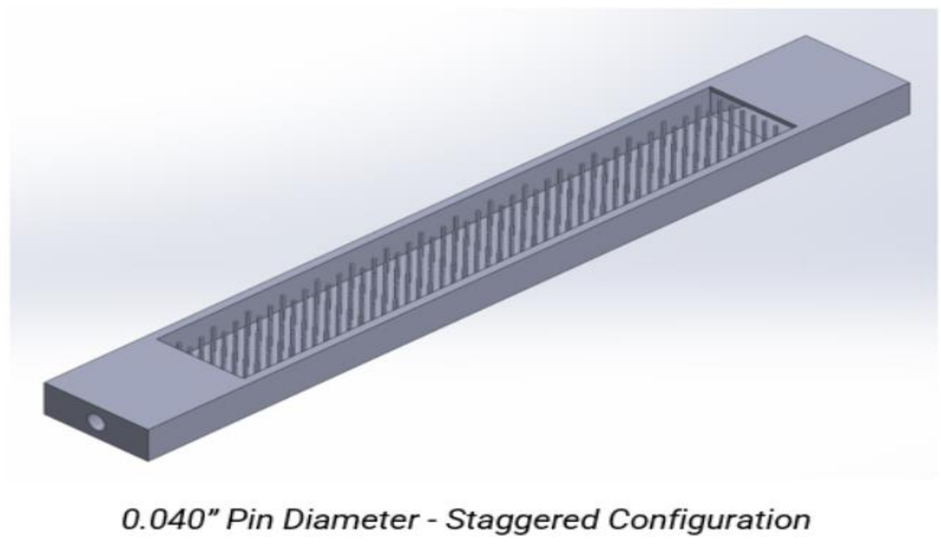
Deliverables: Lockheed Martin is requesting the SU project team analyze, order, and test recommended AM cold plate design(s) and provide the following:

- Performing an industry survey on additively manufactured cold plates to identify key suppliers and details on their offerings & capabilities
- What algorithms and/or optimization techniques are used to maximize thermal performance along with other items such as cost, weight, producibility, size limitations, lead time, etc.?
- What material options are available for building an additive cold plate and what advantages/disadvantages do these material options have in terms of thermal performance, cost, weight, producibility, size limitations, lead time, etc.
- Order and assemble a cold plate test setup to characterize thermal performance of recommended AM cold plate designs
- Complete an analysis vs. Test comparison of thermal performance of recommended AM cold plates
- Thermal performance comparison between standard techniques vs. Additively manufacturing techniques

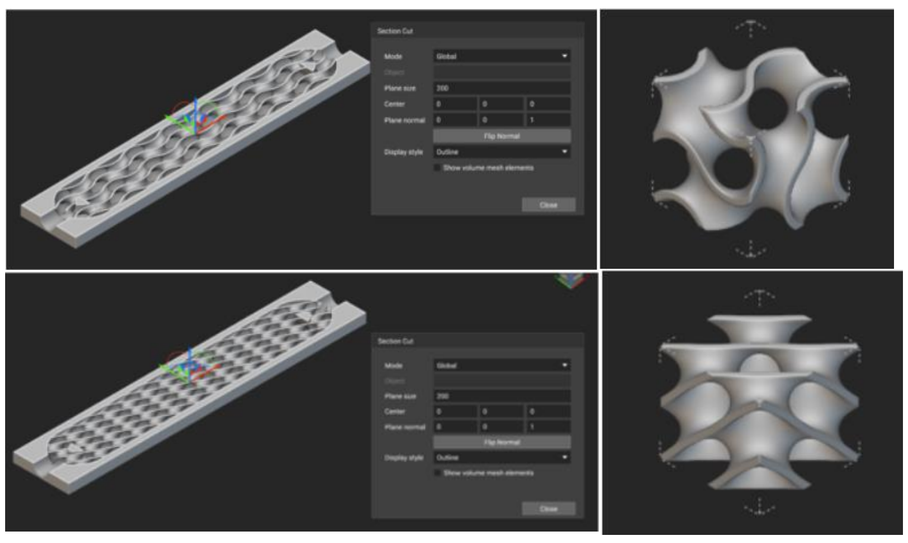


Lockheed Martin - AN/TPQ-53 Radar System

Design from AY '22-'23



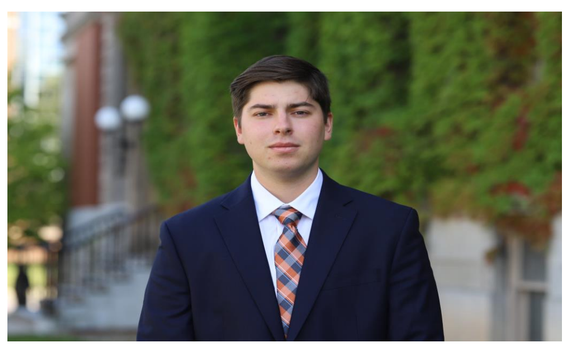
0.040" Pin Diameter - Staggered Configuration



Mr. Jeremy Rosh

Mr. Taj Whitney

Mr. Jake Sheridan



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LOCKHEED MARTIN

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