Overview
The team was tasked with determining if ultrasonic vibrations could help reduce the amount of asphalt adhering to a paver screed and compactor drum. A screed is heated to 300°F to prevent asphalt sticking. A compactor drum is consistently sprayed with water to prevent asphalt sticking. These methods are time consuming and expensive for the company, and Volvo Construction Equipment wants to investigate alternatives to reduce these deficiencies. Phase 1 of this project built a screed test rig that the team used to begin its evaluation.

Objectives
- Modify and test screed test rig with realistic operating conditions
- Design, manufacture, and test drum test rig with realistic operating conditions
- Determine if ultrasonic vibrations alter the amount of asphalt that adheres to the screed or drum

Approach
- Found an amplifier capable of providing the appropriate voltage to operate the ultrasonic transducer
- Obtained 5 gallons of asphalt to test each of the test rigs
- Completed initial testing of the screed test rig
- Designed a drum test rig with the capability to apply a load of 1500 pounds using SolidWorks
- Purchased all materials needed to assemble the drum test rig
- Manufactured drum test rig based off technical drawings
- Made modifications to the screed test rig based off results from Initial testing
- Executed final testing for the screed test rig
- Tested the assembled drum test rig

Outcomes
- Both the initial and modified screed testing showed that more asphalt stuck to the plate when ultrasonic vibrations were used
- The heated screed plate, which is what is used on existing machines, performed the best in these tests by a wide margin
- Drum testing showed a similar trend to what was observed in screed testing

Recommendation
The team recommends not to move forward with this patent due to the results, and that there are no ultrasonic transducers that have a maximum operating temperature over 250°F.