The part that we created is a perpendicular junction standoff that is compatible with the common Vex Robotics standoffs. We believe that the function of this standoff can be used for structural support in small and large conditions based on the size of standoff that we created. We were trying to solve the problem of supporting robot parts with the lightest weight that is possible. We have usually had to make our own, makeshift part out of the currently available standoff. This caused us to have to use an excess amount of steel parts that added a unneeded amount of weight. The problem that we faced would be solved with our solution of the perpendicular junction standoff because it would be made of an aluminum frame with a hollow threaded interior.

The new part could be used in numerous ways in a standard robot design. In our current robot design for In The Zone, we could use the part in place of the supports that we have for the towers of our lifting mechanism, which would allow us to access more space, have a cleaner way to wire manage without adding additional bearing blocks to the exterior of the robot, and cut off some weight from the entire robot itself. In some instances standoffs are screwed into the drive base to connect them to each other allowing us to lose the weight of larger supports spanning the drive area. This would be useful because it allows for a larger more open design that, in turn allows also for more intricate designs that can shrink the overall height of the robot.

We used Autodesk Inventor 2017 to create our part. We started by creating two seperate standoffs with one standoff being a half the length of the other standoff. These standoffs were created by drawing a hexagon in sketch mode and dimensioning it to the correct width. Then we extruded the sketch to the desired length for each piece. We then sketched a circle on the end of the standoffs and extruded it all the way through. The thread function was then used to thread the inside of the standoff. The standoffs were then painted aluminum and jointed together in assembly mode. We repeated this for each assembly we did.

From this CAD project we learned a lot of useful things that can help us in the engineering field. We had to follow the design process, in which we found a large problem and we also created a solution to this problem. We learned about a lot of the overall drafting process for parts for uses in the robotics and mechanical engineering fields. Most of the people on our team are enrolled in the PLTW engineering courses that are offered in our school. In which we use Autodesk Inventor for most of the projects in the courses. This added experience allows us to have the benefits of using these advanced functions. We also had to go through the process of deciding what goes into the making of a Vex part or even a Engineering part in general. We had to weigh the pros and cons of the different ideas that we had through the engineering process, and we also had to figure out what would work and how it would work. Ultimately we decided to go with this design because we thought it would be the most practical and most beneficial idea that we had.