The company that I have chosen to exemplify the design process is Northrop Grumman because they are a very well known and reputable aviation company that is very involved within the drone and technology industries. This is exemplified by the fact that they have contracts with the U.S. military to design and build the b-2 stealth bomber, as well they also design all of their own code and cyber security for their creations.Northrop Grumman was also selected as an excellent engineering company because not only do they do what they do very well, but also because they,just like vex vrc are trying to help foster the next generation of engineers by allowing people to come and visit their facilities. They are even allowing the robotics and engineering programs to come visit one of their facilities right here in North Dakota this February.

Other than their website which offers a variety of excellent resources to learn more about their company, Northrop Grumman has been invited to and attended many different career expos hosted by high schools, universities and the community at large. Through the many experiences I have heard seeing the company and hearing of them the message has stayed the same.That message being that they are a company dedicated to serving the U.S. military with their aviation and cyber security needs, but also to serve the engineering community through the opportunities I mentioned previously.

To explain how Northrop Grumman uses the engineering design process I feel that it would be pertinent to first explain what the components of the design process are as defined by Project Lead The Way, the main organizer of most high school engineering programs. The first component to the design process is to define the problem through a design brief, then to generate concepts, after that you develop a solution including all technical information like measurements, drawings, and charts, then you develop your prototype and test it, you then evaluate your results, and finally you take your improvements and tests and present them as a final product. Now to apply this to Northrop Grumman, one of the largest aspects of their company is cyber security, so the design process for one of their software programs would look something like asking what the program needs to do, let's say it's basic threat detection. They would then make several test codes divided amongst different teams. Then they would rigorously test each program against different hacking attempts that the software will very likely be facing, and finally the engineers would pick the best one improve upon and then present the final product.

The process for my team is generally the same between the professional community and the VEX robotics program in that we generally follow the same steps of developing a solution to a problem, testing and improving the problem and then having a final product. The big difference I see with VEX and the real world is that in VEX your product is never truly final because you're not selling it to anyone, so you can constantly change your design and philosophy. However that level of freedom has caused some problems in the past because we keep changing ideas for a while until one sticks, but that process seems to guarantee a good final product that performs well, especially because we have access to good builders/ designers, excellent coders, as well as a notebooker that does a great job conveying our thoughts to someone who may not even know what we're doing or who we are.

The VEX robotics programs main benefit I feel is learning team cooperation skills because every year you have at least one or two new members on your team that you have to work with to find their strengths and weaknesses, so that you can all function as a team. Learning to work with others will always pertain to STEM because while you may know Buzz Aldrin you'll never hear Buzz Aldrin the man who built his own spacecraft, flew himself to the moon using his own calculations with no peer review, who also designed his own spacesuit, and piloted the spacecraft single handedly back to Earth. This is because just about every famous scientist, engineer, and mathematician had a team that allowed the problem defined in the first step of the design process to be solved. In addition to team skills I have also learned a fair amount about STEM concepts like motors that use differing amounts of speed and torque to achieve a certain result, wiring crucial to the functioning of the robot, as well as structural components of robots autonomous or not that may have to experience the force of another robot colliding with it. Even weight distribution just like in the real world plays a role in VEX because if your robot is too heavy in one area such as the back like my teams robot was than it can begin to tip or even completely fall over, which is why we test and correct those issues before the robot goes onto the field just like you wouldn't want the Mars rover to tip over because of an unexpected pebble.