**The BoomBot**

The BoomBot falls under the category of law enforcement, as it is designed to be a disposable, multipurpose military/police robot. It can be used for reconnaissance, demolition, and EOD (Explosive Ordnance Disposal). It is lightweight and reasonably fast and is still able to drive over rough or wet terrain, making it ideal for surveying an area. It also can carry up to 5 Lbs. of C4 or other explosives, which has enough power to demolish a large truck. It can even use a small amount of explosive to remotely destroy a vehicle that is known to have a bomb in it, instead of risking a human.

The robot itself is powered by six motors, each directly connected to an “Omni-Wheel” giving it plenty of power to move the robot. They are arranged in a format known as “H-Drive” which allows it to not only move forwards, backwards, and turn, but also side-to-side. This will allow it to maneuver more effectively in a small space, such as a building or alley. The design is simple, as it does not use any manipulators or other moving devices such as gears or pneumatics, making it cheap to mass-produce.

I first saw the challenge while looking for parts on the Vex Robotics website. I had learned how to use Autodesk Inventor at my school, and decided to use what I learned. I got the idea for the robot from an unlikely source, “Call of Duty: Black Ops”. In the game, an explosive is put on an RCX car and used to detonate an object from a distance. I decided that my robot would be an improvement on the design.

Designing the robot was relatively easy, as it does not feature many complicated parts. At first, I had a small robot, approximately 12” x 12”, but I decided that this was not very sturdy and did not have the power to cross over rough terrain. I decided to build a larger, more robust design and ended up with it being 17.5” x 17.5”. However, I then realized I needed something to make the robot unique. I analyzed the RCX car and my own design and noticed that it had a large turning radius, making it difficult to operate in a small space. I decided that the best solution to this problem would be to give it an alternative to turning, moving sideways. “Omni-Wheels” were obviously the best choice for this, as they have rollers which allow them to easily move from side-to-side.

Sub-assemblies were a very helpful tool in Autodesk Inventor, as it allows you to duplicate an arrangement of parts, saving the user much time, since they won’t have to assemble the same objects more than once. I used this by creating a “Wheel Assembly”, which contained all parts relating to the wheels, which made it so I wouldn’t have to create the same thing six different times.