# Ryan Mathew

When one hears about autonomy, what often first comes to mind is a self-driving car or robot rapidly completing tasks, faster than humans. But the reality is that autonomy is more than that. It has vast applications, from the deep depths of the sea to the limitless skies and beyond. This is why I chose autonomy for unmanned systems as my STEM research topic.

Autonomy, in simple terms, is the ability for an object to be self-governing and rely solely on itself. The term, autonomy for unmanned systems, is a general term that is used to describe the various frameworks and models that are present in order for the system to function. This idea of autonomy is the basis for Artificial Intelligence (AI). Over this past school year, I have had the opportunity in my Independent Research class to research how AI is helping to combat COVID-19 pandemic. I was able to find out that autonomy has a huge impact on AI and it is the foundation for helping to identify locations where the next COVID outbreak may be, or in helping to find and isolate asymptomatic patients. This topic of autonomy for unmanned systems has wide relevance to the US Navy and Marine Corps of today. Autonomy can be used by the Navy and Marines in order to secure the waters of our country from anti-ship weapons and underwater mines. This can be done by utilizing robots that autonomously operate and are able to diffuse these dangers, without putting humans' lives at risk. The benefits of utilizing these autonomous systems are numerous. It will help the user to make better and more informed decisions, while at the same time, maximizing performance and effectiveness of the technology.

The scientist that I selected from the videos was Aamir Qaiyumi who works with unmanned systems underwater. I chose this scientist and topic for several reasons. Firstly, the topic of unmanned systems has greatly interested me from a young age. It is very closely linked with Artificial Intelligence (AI) that is rapidly becoming the future of our world today. Also, something that I found really interesting was how many departments in the government, such as the National Oceanic and Atmospheric Administration (NOAA) and US Navy, are working towards a cleaner and brighter environment for the future. Through the utilization of the unmanned underwater systems, the Navy is working to map scallop beds in an effort to improve underwater habitats for various species, especially those that are endangered. They also are working to find and prevent invasive species that are taking over underwater habitats, such as seagrass. I found this really inspiring because of the fact that I wanted to go into the computer engineering field and work with artificial intelligence. Before watching this video, I did not see the connection between AI and our environment, but now have learned that AI plays a pivotal role in the preservation and conservation of the environment. Now, armed with this knowledge, I too am confident that I can help improve the lives of citizens, in whatever small way that I can.

In the next 15 to 20 years, I predict that we will see great advances in everything that we do, especially in the technology field. Even now, technology changes can be seen, from the driverless technology in many cars to robots performing highly complex surgeries in hospitals. By the year 2040, the majority of technology that we use will be unmanned, whether for underwater purposes, in space or on land. New technologies will be a cornerstone for much of the military, especially the Navy and Marine Corps. I would imagine that much of the tasks that our troops do daily, such as investigating threats, lifting heavy

equipment, etc, will become automated. While humans may not be completely replaced, robots will probably be in the forefront, allowing humans to take a back seat. This will be much beneficial to the military due to the fact that our troops will become more protected and the risks can be greatly mitigated. This will allow our troops in the military to focus on other key priorities instead of being on the front lines.

This Naval Horizons program was a huge eye opener for me as it allowed me to see the advances the US military is making in STEM fields, especially that of unmanned systems. It has also persuaded me to look into STEM fields with the US Federal Government, and be at the forefront of cutting edge technology. Right now, we can only predict based on what we see now, but who knows what the future may bring. We can only wait and see!