Flex Robotics is a company that has been writing software on Linux. It has a history of creating robotic models that can provide key functionality to different work environments. In 2019 it foreshadowed in the DARPA robotics cave missions. It learned about providing key information to responders in difficult environments by identifying objects. The mission in this proposal is to make deep sea environments more accessible to scientists by using autonomous robots.

Flex Robotics is proposing to employ several methods to accomplish this theme. The first goal in the mission is navigation. Establishing odometry, IMU, and a CNN during the first project month for one submersible. The submersible will be able to use the parameters for teleoperation and build a map of the environment for geolocational future planning. Goal two will deal with Knowledge based long-term autonomy by employing an Algorithm during the second project month. The result will focus on how the robot will function long-term. Not pre-programmed to handle unexpected situations. The third goal will deal with behavioral control and simulation. The approach is to create a course using Blender for object simulation and Gazebo for the physics environment. It will take place on month three. The result will be one submersible, two robot arms, three objects for arm simulation, three objects for coordinate location, and an underwater environment. The fourth goal is hardware. Create custom circuit board, frame, motor mounting brackets, battery, tray, propellers, and arms. It will take place on month four and last one month. It is for one submersible. The result will be a submersible with components to fulfill the mission. Goal five is robot control. The approach is an off the shelf controller with tether wire for preprogramming and system testing. It will take place on month five and last one month. The result is a submersible that can be dropped into a pool testbed for real world simulation. Goal six is system design. The approach is to create a docking system for the robot to upload data and recharge. It will take place on month six and last for one month. It is for one submersible and a team of scientists. The result is the submersible will be able to recharge, upload data through antenna connected to docking station, and communicate to scientists that are stationed in a lab desktop computer environment through a Wi-Fi or satellite communication depending on the vender’s preference and scaling approach.