**Project Status Reports (one per team):**

**The purpose of the project status reports is to report on the progress of your project. The reports must be clear, concise, and complete. The status report should include:**

• A summary of the project schedule and actual progress - This should include information on personnel time (estimated and actual) and schedule milestones (met and missed).

• Explanation of any significant deviations from the project schedule; corrective action, if taken or planned, should also be clearly described

• Specific accomplishments to date - What remains to be done to complete the project. A revised schedule should be included if any significant changes have been made.

• Any modifications made to the original design during the course of implementation.

• Remaining project risks and specific contingency plans for handling them.

• Updates on tasks assigned to each team member.

**Summary:**

So far, we are on schedule with getting the equipment interfaced and have made steady progress with getting each component working by itself. We are currently waiting on a getting a part 3D printed so that we can start attaching everything to the frame for a demonstration. Once this piece comes in, we will start compiling the separate devices together to start creating a linked network for our project. Our plan is to have the functionality of the device with temporary controls set in place. Once these are in place and we have worked out the bugs, we will proceed with starting to enable the voice commands one by one until they all work.

**Arduino Tasks:**

Originally, James was going to communicate the ESP8266 with an Arduino Mega/Nano, but we are currently having trouble with that communication. To remediate the issue, James found a way to communicate two or more ESP8266 MCU 1.0 Development Boards in a server/client framework. Currently, James and Hugo are trying to communicate all the individual components to a single ESP8266 via the framework, as well as still attempting to communicate it with an Arduino Mega. The ESP8266 Server will communicate the motor, temperature sensors, as well as and the ball water valves. James is making progress on the programming portion. Additionally, he is working with Cory to attach the shower slider to the shower frame and help the other team members with their tasks, such as helping Jessica communicate the Arduino with Amazon Alexa and Amazon Web Services. Hugo is helping James with ESP8266 to Arduino communication issues. James and the rest of the groupmates should finish all programming and get Amazon Alexa communicating by the end of the month (February 2019), if not, early March 2019. Then the team will interface all working components together using the framework described, including Amazon Alexa via the Amazon Echo and Amazon Web Services (Lambda).

**Alexa Interfacing with Arduino and ESP8266:**

The current update of this part of the project would be I have completed the Alexa commands. The commands include the following: turning on/off the shower, increasing/decreasing the water temperature, and the movement of the shower head. I have created the “things” in AWS IoT that will be part of the MQTT interfacing. I have started AWS Lambda code and started the framework for the Arduino code. Once that is set I will test the code for turning on/off a LED. If all goes well I will start the second set of testing for the current commands. For the upcoming 3 weeks update I expect to have everything interfacing with each other and I will adjust the code for setting the profile for the user.

**Assembly Update:**

We ended up modifying the shower frame to reduce the dimensions so that it will fit into the presentation room. The final dimensions are 6’6” x 4’ x 2’8”. Next, we will be affixing the slider horizontally to the top of the shower frame, this will enable us to mount the stepper motor and GT2 belt with pulleys onto the frame as well. This will give the stepper motor control of moving the 3D printed mount that will be holding the shower head. Once these parts are working, we will be able to start attaching the water control valves to the back of the frame for easy access. Once this is finished, we will start working on how to articulate the head or if we need to incorporate a vertical slider as well. This portion still needs to be discussed between the team to see what is the best option to proceed.

**Water Control/Thermostat Update:**  
 Originally the system was to use solenoids. However, the solenoids didn’t allow full control of the water flow beyond fully open or closing the water flows. Currently, the water control and temperature system consists of two motorized ball valves and a thermistor. The thermistor is to be used to measure the temperature of the water that is being mixed from the hot and cold water. The hot and cold water flows are being controlled by the two motorized ball valves. Programming for the adjustment of water temperature is continuing and may be done soon.

**Modifications/Project Risk:**

The team will likely meet within the next week or two to decide if we are going to add either an articulated head, a vertical slider, or neither to add to our project. We would like to incorporate this into the project because not doing so is a deviation from our original idea. Unfortunately, we are unsure if we can produce an idea that will be able to accomodate this into the design due to technical/mechanical constraints on weight and size.

If we are unable to incorporate this into our design, then we will devise some possible work around or reasons for the inability to incorporate. This will be highly dependent if we can find anything to articulate the shower head within our constraints.

**Next Steps:**

In the near future, we will likely hope that Amazon Alexa will likely be our sole control for articulation, control, as well as our presets, but one contingency plan we have and will continue to implement is a web page based control with temperature readings. This will be our plan pending the outcome of the connections and interfaces. Secondly, we have added joystick control in case neither of those plans work.

As far as budget, the team has surpassed expectations and has currently spent less than half of our original budget proposal. We will continue to seek cost effective alternatives, as well as utilizing our own parts that we already have and ultimately conducting cost benefit analysis, pending our final project prototype.

Our goal is to meet all deadlines, ABET standards, and have a working demonstration by late March / early April.