

Team: Tell us about yourself / the team. Where have you worked? Where did you go to school? What did you study? Where do you have expertise?

Our team is made up of three students, Andrew Klonitsko, Andrew Gates, and Reagan Stovall. We all study Computer Engineering at UWT and are currently in our final year. Between the three of us, we've had an array of jobs and experiences ranging from retail to machine shop before going back to school in a field we were all interested in. We hope to use what we've learned from our program in the development of our project, and what we've learned from our experiences in the workforce for marketing and manufacturing.

Project Title: Please specify a title for the project

Automation Station

One Liner: Project description in one sentence.

A device for the average "do it yourselfer" to automate any project via an intuitive UI.

Hypothetical Press Release: Leap into the future and imagine that your project has launched. Now, write the press release to tell the world about it. The press release will be used by the evaluation committee to evaluate your idea on its inventiveness, elegance, clarity, persuasiveness, and benefit to society.

Seattle WA (GeekWire) - *July 1st 2017*

New product hits the market that allows customers to monitor and control... well anything. The device targets the do it yourselfers, it's main purpose being personal automation projects and boasts an intuitive elegant interface that anyone can use. The starting "Control Box" provides 16 sensor ports, 8 dc dual direction variable power ports, and 8 set voltage ports. The device connects with your android phone so you can manage your projects from anywhere. All necessary hardware configurations are managed internally, letting the user focus solely on their projects. Drop-on boxes are available for extending sensors,

bidirectional motors, and high powered outputs for those serious projects that may run the risk of flipping a breaker. No coding experience needed, and tutorials are provided for identifying your sensor or power needs.

One of the designers and owners of the company, John Stovall says “Our goal is to bring automation to the average Joe. Automation on large scale usually sucks for Joe, but what if Joe wanted to start his own business and just needed something cheap and reliable to help monitor and handle the basic stuff? We can do that now, and that’s what this is.”

Joe, a beta tester, had this to say, “I honestly never use [my] smartphone much, mostly just for FaceBook and ESPN, but the app with this little guy [The Automation Station] is great. It’s simple, reliable, and just fun to see all the different sensors running on my home projects.”

While this device is targeted towards the Joes out there, Megan, Head Brewer of a local micro brewery (going against the gender norms) had this to say, “I’m currently using this device and a few of the drop-on modules for testing new recipes. The saved data and fine control allow me to control variables that I normally wouldn’t be able to.”

If you’re interested in personal automation, check out their website at AutomationStation.com or follow them on twitter.

-Anonymous Reporter

Problem: What is the problem that you are addressing? Why is it important?

The problem our project seeks to address is the disconnect between what is doable for personal automation projects, and what the average human knows how to do. Right now if anyone want’s to automate a project, they have to either spend years as hobbyist researching on their own, have a degree in some form of technology and research the rest, or spend hundreds to thousands of dollars

on a system specifically designed for their project which is not always even available.

Solution: What are you proposing to do to solve this problem? What is the “project” that you would like to carry out over the course of the grant period?

Our goal is to make personal automation available for anyone without all the current constraints by providing the hardware and interface for all automation projects.

Who Benefits? Who cares about your solution? Who is the “customer” so-to-speak?

Our customers would be “do it yourselfers” who want to monitor their hydroponics system. Homeowners checking that they locked their doors. They would be worried pet owners who forgot to feed their dogs. A bakery owner who wanted their ovens to turn on before they arrived in the morning, or a microbrewery that wanted a finer control of their product, the biologist who wants to run an experiment on twenty plants for half a year, the farmer who wants to measure moisture content in his fields, any hobbyist or small business owner who wants to bring automation to their projects.

Why Now? What is new about what is being proposed vs. what has been done in the past? Why doesn’t this solution currently exist?

Automation is quickly gaining traction in almost every field that it can be easily incorporated in, but it is still highly specialized and cost prohibitive. For industry specific applications, highly specialized automation is often a necessity. Some applications have incredibly complex timing requirements, others have high tolerances that need dedicated micro controllers to monitor and manage. For these applications, specialized hardware and software are needed. But for moderately specialized applications, even simple ones, there currently doesn’t exist a system for the average tinkerer to easily implement their own control

system. It doesn't exist because it is difficult to implement a system that can be easily used across different applications. It requires an intuitive UI, variable hardware, and customers who are not afraid of reading instructions. When there are customers who will spend thousands of dollars for a closed box system that can make beer and ping your location on an app... why reach for something more difficult. Our team is approaching this with the long arms of CES students hoping bring automation to everyone.

Time: Estimate how long it will it take to carry out the proposed project

Roughly 3 months until our Senior Project course is over. We plan to have a presentable Control-box equipped with [16 sensor connectors, 8 motor ports, and 8 relay ports] as well as a complete user interface for both a capacitive touch screen, as well as a phone App. After the course we expect roughly 1-2 months more of development if needed, so 5 months total on the high end with 3 months on the low end. Our Gantt chart is included in the Visuals section.

Cost: Estimate the amount of funding you will need to carry out the proposed project.

The estimated development cost:

Item	costs	quantity	subTotal
PCB Control Board	\$70	2	\$140
PCB Drop on boards	\$70	4	\$280
Controller Boards ect.	\$40	2	\$80
Various Motors	\$10	20	\$200
Various Sensors	\$3	50	\$150
Various Relays	\$4	10	\$40
Connectors	\$50	1	\$50

Capacitive Screen	\$30	2	\$60
Acrylic Prototyping	\$50	4	\$200
Mics Hardware, GPIO extenders, Muxes, Transistor arrays, High precision bias resistors, ect.	\$300	all	\$300
Estimated Total			1500

Milestones: What are the key hurdles or milestones you see down the road?

The three greatest hurdles for this project will be hardware expansions (drop in modules), the timing interface, and hardware identification. The drop in modules will be reliant on untested GPIO expanders. While we have identified other options, if the GPIO expanders do not work as hoped, this will prove a difficult challenge. The timing interface needs to be able to handle complex systems yet be easily and intuitively built by the user without tedious training. The hardware identification can either be generic, relying on the user to know what they have (i.e. a 12 volt bi-directional motor) or a database that user enters the serial code of the device into. Both present different problems.

Metrics: How will you know if you are successful?

Benchmark 1: Senior Project Presentation

Our Senior Project Presentation will be where we demonstrate a fully working Control Box and Specific Gravity Sensor.

1. The Sensor can be called a success if it can be accurately calibrated to a new hydrometer, and predict the Specific gravity with temperature compensation at 5% error.

2. The phone app will be able to display any single or multiple sensors over a desirable time range and make simple adjustments to the running program.
3. The Control Box will be able to read any specialized analog and digital sensors, control bi-directional motors at precise speeds, and manage relay outputs. It will also have to manage all of these in a interactive way so that a non-computer engineer can set up their own project. *(This will be a challenging test that we'll likely have to bring in volunteers for feedback)*

Our next benchmark will be demonstrating our project at a tech conference. As of yet, we are still deciding on which one would be best for our product, but we'd need to have everything fully complete. Success would be determined with the feedback form the participants on the showroom floor.

Other Options: If you are not selected for funding through the Amazon Catalyst Program, do you still plan to pursue or advance your idea? If so, how?

If we don't receive the grant, the project will continue with prototyping the interface. We will spend more time on the UI and less on the hardware aspect until we can acquire funding to pursue development. One of things we'd like to have implemented by Roll-out is an online update feature, this would be a prime target to work on as the only real associated cost is time.

Anything Else? Use this space to provide any additional information about the project that you would like us to know. It's perfectly fine to leave this space blank (100% optional).

Our project tentatively also includes making a sensor for specific gravity that can be used with our Automation Station. This was our original project idea and is still being pursued, but most of our time will be spent on the Automation Station. This would allow the user to drop in this sensor, press a few buttons for calibration, and then start measuring specific gravity in their automation systems.