

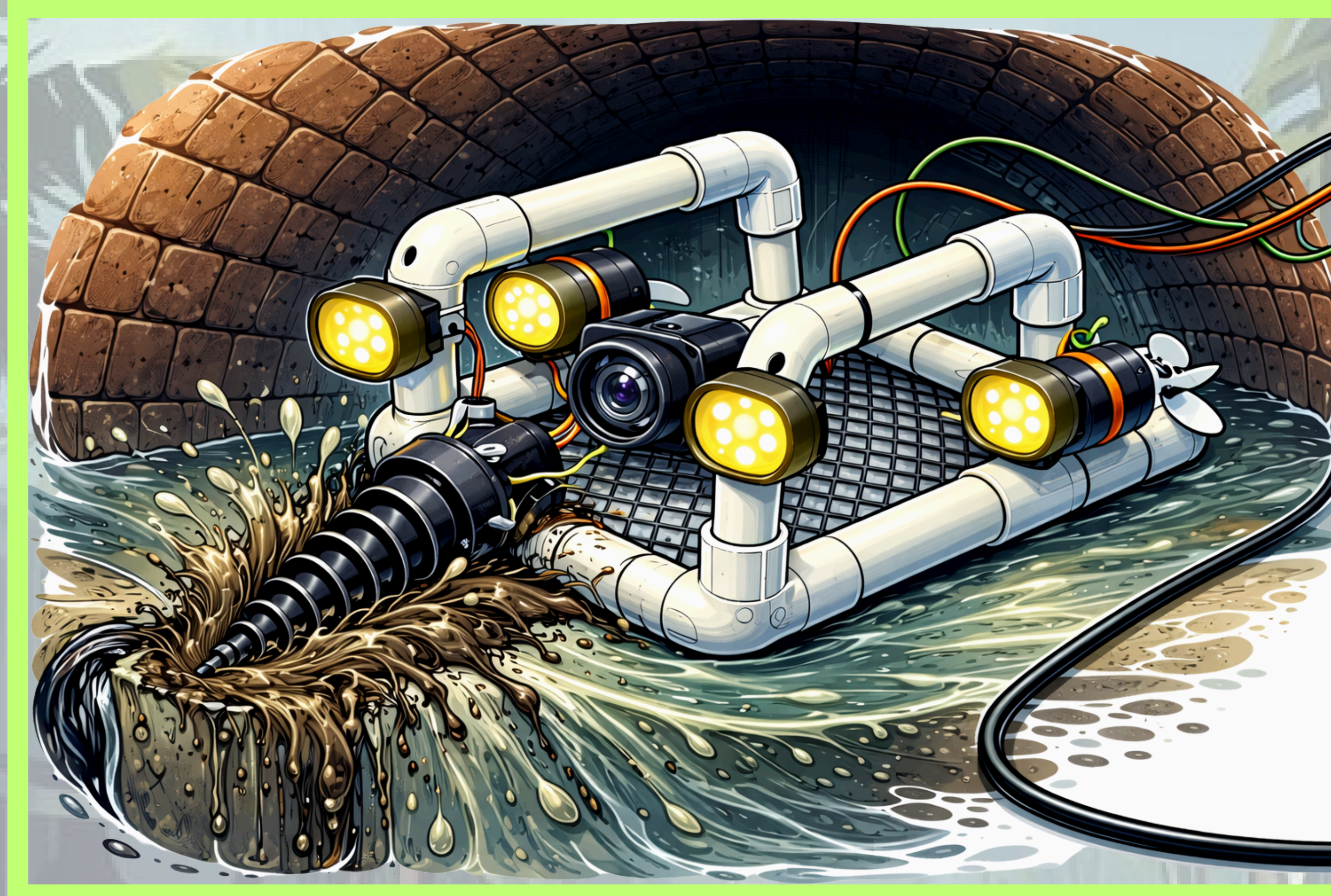
# DRAIN DEFENDER

## TEAM STORM CHASERS

River City Science Academy Southeast (Jacksonville, Florida, United States of America)

### Project Overview

After heavy storms, neighborhood drains can become clogged with trash and debris, which can lead to flooded streets. Since these pipes are too narrow and murky for a person to safely enter, our ROV can be sent in as an underwater scout. Using its thrusters to push through runoff and its onboard camera to see through the mess, the SeaPerch can locate exactly where the clog is hiding. Instead of city crews having to guess where the problem is, our ROV provides a “robot’s-eye view” so they can clear the blockage and get the water flowing again quickly.



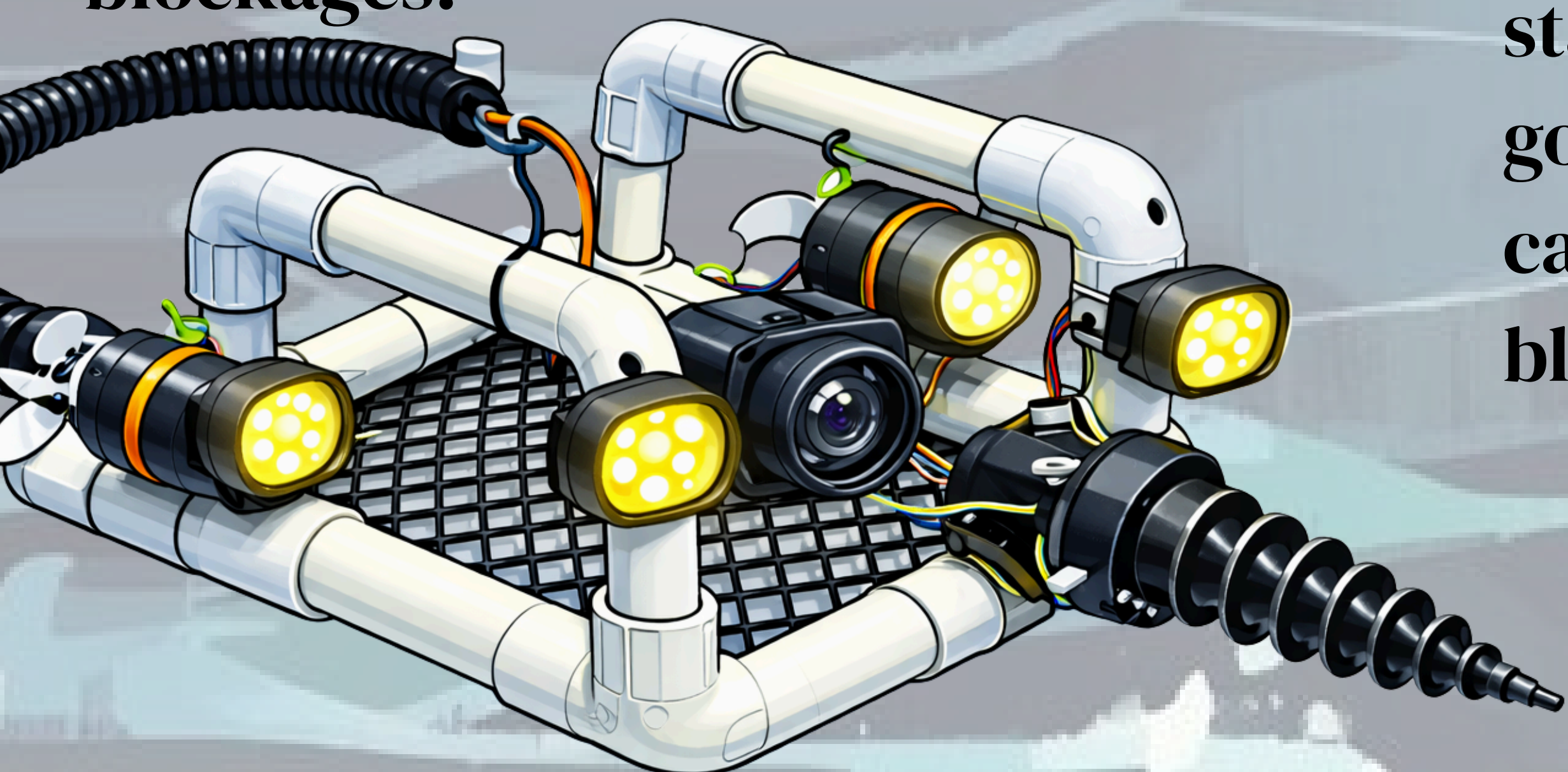
### Real-World Impact

The Drain Defender takes the classic SeaPerch out of the pool and puts it to work solving a messy, real-world problem: neighborhood flooding. By sending our ROV in as a scout, we can pinpoint exactly where a clog is hiding without anyone having to get their hands dirty. This simple use of technology helps maintenance teams see the problem right away, allowing them to clear the blockage before the next big rain floods the streets. We are using robotics to help keep our communities dry and our infrastructure running smoothly.

**Storm drains and drainage pipes can become blocked by trash, branches, and sediment after heavy rain. A modified SeaPerch ROV could help first responders safely inspect underwater drainage systems to find blockages.**

### Background & Motivation

Living in Florida, we see firsthand how a single afternoon thunderstorm can turn our streets into rivers because our flat terrain relies so heavily on clear drainage. This motivates us to address the problem and make it easier for first responders to quickly locate blockages.



### Proposed Approach

We propose modifying a SeaPerch ROV to work in the harsh, low-visibility conditions of storm drains. Our design includes a slim PVC frame to reduce snagging, LED lights and a waterproof camera for visibility in murky water, and adjusted thrusters to help the ROV stay steady near heavy clogs. Our goal is to create a simple tool that can safely and efficiently locate blockages.

### Discussion & Reasoning

We believe one of the biggest challenges may not be depth, but turbidity, which is when the water becomes too cloudy to see through. Even a small amount of trash could completely block a pipe, making a “robot-eye view” a valuable safety improvement for city workers. This project could help reduce inspection time and allow teams to identify where a blockage is located more accurately. We also expect to learn that successful innovation involves balancing strong motors with a smooth design so the robot does not become stuck in the clog itself.

### Next Steps

The next phase of the Drain Defender project focuses on creating a prototype and improving performance in low-visibility water. We also plan to design attachments, such as a gripper or small rake, to help the ROV clear minor blockages. The next steps would be to build the prototype and test it after a storm in realistic conditions. If the prototype works, our goal is to share our findings with local public works departments and demonstrate how affordable, student-built robotics can help protect community infrastructure from future flooding.