Video Script Ideas – 3 minute video

**Problem – 1min**

Turtles spend most of their lives in bodies of water. In Ontario, these habitats include lakes, ponds, rivers, marshes, and bogs.

However, when it comes time to lay eggs, turtles seek higher ground and bury their eggs in loose, sandy substrate. This makes the shoulders of roadways, construction sites, and power generation sites common locations to find turtle nesting areas. Research on the effects of ground vibrations from these sites is lacking.

The Davy Lab at Carleton University is a research group that specializes in conservation of turtles local to Southern and Eastern Ontario. They want to find out what effects ground vibrations from human activity have on the development of turtle eggs.

During turtles’ embryonic development, baby turtles communicate with one another in the nest through mechanical vibrations [1]. This communication has been shown to affect and even initiate hatching among some species of turtles. The Davy Lab is investigating whether ground vibrations from human activity could have detrimental effects on the embryonic development of local turtle species.

**Solution – 15 sec**

Since observing turtle nests in the wild is extremely time consuming and difficult, group 44 developed a shake table device that can simulate ground vibrations felt near roadways and highways in a controlled, lab environment. With customizable settings, the device allows research groups like the Davy lab to efficiently study these vibration effects on turtle egg development.

Group 44 developed a shake table device capable of simulating ground vibrations of roadways and highways in a laboratory setting. The vibrations targeted were between 0.1 – 1 mm of displacement at a frequency of 5 – 20 Hz. The device currently is capable of vibrations between 0.02 – 0.04 mm of displacement, and 6 – 26 Hz, with more vibration options planned for future development. [Displacement values to be finalized once Meia can do another test; Frequency values must be finalized by Talal]

* Explain briefly costs and why we chose to make a custom solution -> **Lead: Shawaiz**
  + The existing shake tables were expensive and therefore inaccessible. Outright costing upwards of $6,000 and not being able to meet all the Davy Lab criteria. Consequently, we devised our own custom solution. One that is under $1000 and is simple enough to assemble with detailed supplemental instructions. (Roughly 17 seconds)

[TODO]

**Demo** [Please flesh out] – ~1-1.5 minute

* [If time!] Quick system overview -> See system diagram in final report (not poster slides) -> **Lead: Rani**
  + The illustration displayed is the system block diagram,
  + The system comprises of three interacting subsystems.
  + The User Interface is hosted using a Raspberry Pi and the control system comprises of a microcontroller and sensors.
  + The Raspberry Pi communicates with the microcontroller system using an I2C connection.
  + The microcontroller manages data collection using a temperature and humidity sensor, and an RPM sensor is used to calculate frequency.
  + To adjust motor speed|, a feedback system involving the motor driver and RPM sensor is utilized.
  + Rotational motion generated from the DC motor is converted into linear motion using a linear FLEXURE.

UI and how to start an experiment (does not need to be in depth of every setting and feature, just how to do it) -> **Lead: Marwan**

* Table demonstration of what happens during the experiment (actuator) -> **Lead: Meia, but someone else can work on script in the mean time!**
* Motor demonstration (either working demo, or explanation of what should happen and why it does not exist) -> **Lead: Talal**
* Demonstration of the theory behind the actuator and motor system (can use simulation videos and 3D models that have been developed) -> **Lead: Rani**
  + The 3D model replica of the Mirror actuator of James Webb Space Telescope served as the design foundation.
  + <SWITCH/>
  + We altered the Flexure and camshaft to achieve our desired displacement there by modelling and simulating it on Fusion 360 and then 3D printed it.
  + A target displacement of 0.105 mm was attained by adjusting the flexure dimensions and scaling up the design by a factor of 1.3mm.
  + <SWITCH/>
  + We replaced the original gears of the design with spur gears which can also be 3D printed. >

<switch/>

* + A coupling bracket was designed to mount the flexure which offers more customization.

**Conclusion** [TODO] – 10-20 sec

* Quickly explain how we hope this helps with research, and that we chose to make the project open source so that the Davy Lab and other research groups can use the device for future conservation research -> **Lead: Shawaiz**
  + We hope our work will provide valuable insights and aid in the conservation efforts for these endangered species which is why we've chosen to make our project open source, so that not only the Davy Lab, but other research groups can build upon and benefit from our device for future conservation research. Thank you for watching. (Roughly 17 seconds)