Executive Summary Senior Design Group ECE.09 Bird Foraging Puzzle Project

Project Problem and Design Solution:

The purpose of this project is to provide a foraging puzzle that will measure the force produced by the red crossbill (*Loxia curvirostra*) while it forages for seed. The physical device will hang from the side of a cage and apply a variable force to a hinge that the birds will open for seeds. The force produced will be then examined to determine different feeding behaviors in risk-reward scenarios and how willing they are to work for food. The goal of this project is to find a way to accurately measure the force produced by the red crossbill so the information can be used for research purposes.

Project Phases and Approach:

Our approach to designing the system was to break the system into sections and components in order to assign them the team member who was best suited for that section. We focused on each individual team member's strengths and assigned sections based on who was most capable of producing the best version of each section. Once we had a finalized design we individually built our sections to the best of our ability. The individual sections were completed thus ending the building phase and we then moved to the integration phase. Integration involved a basic assembly process and then an evaluation of how to best fit all the system sections together most effectively. Some system changes were necessary in order to complete the final system, but the end result was successful.

el Crockett, Shengmei Hu, Brieanna Jeibn nn, Bradley Marin Project Partner: Jamie Cornelius TASK TITLE TASK OWNER START DATE DUE DATE STATUS Problem Definition 10/6/21 10/12/21 Complete N/A Complete Contact Project Partner Team Complete Research Project Topics 10/6/21 10/8/21 10/22/21 Section 1 Documents Team Complete Preliminary Design Section 2 Docu Team 10/15/21 10/20/21 Complete Create Project Requirements Team 10/15/21 10/29/21 Complete Individually 10/10/21 12/3/21 Design Concept Research Complete Section 3 Document 11/05/21 11/19/21 Complete Team Build Proof of Concept (Tech Team 11/05/21 12/3/21 Complete Modular Testing Team Indivdual Block 1 Construction 1/3/22 2/27/22 Individually Complete Indivdual Block 1 Verification 2/28/22 3/1/22 dividually Complete Indivdual Block 2 Construction Individually 1/3/22 3/13/22 Complete Indivdual Block 2 Verification 3/14/22 3/15/22 Complete Individually System Level Testing ect blocks to full System Team 4/1/22 4/15/22 Complete Full System Adjustments and Team 4/15/22 5/1/22 Complete Full System Verification 5/2/22 Team 5/4/22 Complete Presentation Preperation 5/13/22 Create Poster Team 4/1/22 Complete Complete 6/3/22 6/3/22 Project Closing Final Documentation 4/1/22 5/6 Complete Closing Tasks 5/3/22 5/6/22 Complete Team

Timeline:

Bird Foraging Puzzle Project

Key Lessons:

- The importance of project planning in project success.
- The importance of strong team communication in effective collaboration.
- The effectiveness of fundamental engineering principles.
- Good teamwork delegates tasks to those who are best suited to the tasks.
- Not every idea works out, but failures can lead to changes that result in a better project.
- Flexibility is a crucial component of project success.