Project Deliverable C: Design Criteria and Target Specifications
GNG 1103 – Engineering Design
Faculty of Engineering – University of Ottawa

Group 20
Michael Saber
Justin Mahfoud
Ayo Akinbile
Tate Sharp
Macauley Aicken

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Description

This document describes the specific design criteria that are required for each and every aspect of our Bowie attachment. Our main goal with this attachment is to add a mechanism on the underside/back side of Bowie that has the ability to disperse objects including seeds, nuts, and salt. With this attachment we are prioritizing Bowie's ability to further help the environment (via distributing seeds) over other factors such as portability and size. This attachment is also designed to be printable (ideally using HDPE or PE), with the only non-printable trait of this attachment being whichever object the party decides to disperse.

#	Need	Design Criteria
1	The device is easy to use and can be used by anyone.	● Simple ON/OFF switch
2	The device is open-source so that anyone around the world can replicate it and print it.	● 3D printable on a standard FDM printer ● Blueprints to easily replicate component
3	The device is small enough to be easy and quickly printable. It is also lightweight and portable.	● 3D printable on a standard FDM printer ● Print time ● Material used ● Size ● Weight
4	The device is easy and inexpensive to repair and/or replace.	● Polyethylene costs roughly $0.05 / lb ● HDPE costs roughly US$ 0.685 / lb ● Reliability ● Cost
5	The device is able to attach to Bowie and can also be powered by Bowie’s batteries.	● Detachable ● Can be battery powered
6	The device is quiet and does not leave a negative footprint.	● Sound level ● Can be battery powered
7	The device operates automatically.	● Automation
8	The device has a use that can help the environment.	● Tree/Shrubbery seed disperser (in forests) ● Edible low-salt nuts for birds (on beaches) ● Disperses Uniola paniculata (on beaches) ● Disperses Salt during the winter ● Volume of Seeds

Functional Requirements

#	Design Specification	Relation (=, < or >)	Value	Units	Verification Method
1	3D Printable	=	yes	N/A	Test
2	Detachable	=	yes	N/A	Test
3	Automation	=	yes	N/A	Test
4	Disperses Seeds	=	yes	N/A	Test

Constraints

#	Design Specification	Relation (=, < or >)	Value	Units	Verification Method
1	Volume of Seeds	>	300	cm^3	Measure
2	Print Time	<	4	hours	Time it
3	Size	<	120x120x120	mm	Measure
4	Cost	<	100	$	Final Result
5	Weight	<	0.3	kg	Measure
6	Operating Temperature	=	-5 to 30	^{o}C	Test
7	Operating Conditions: Snow, Sand, Dirt	=	yes	N/A	Test

#	Design Specification	Relation (=, < or >)	Value	Units	Verification Method
	Non-Functional Requirements				
1	Aesthetics	=	True	N/A	Survey
2	Safety	=	True	N/A	Assess
3	Reliability	=	True	N/A	Test
4	Ease of Control	>	True	N/A	Test
5	ON/OFF Switch	=	True	N/A	Test
6	Can be battery powered	=	True	N/A	Design
7	Product Life	>	5	Years	Test

Conclusion:

These criterias will ensure that the seed dispenser functions at its optimal efficiency and is able to do its job properly and meet all it's expectations. It's ability to dispense various types of seeds will allow Bowie to improve its objective of helping the environment. Not only will Bowie be able to clean beaches and parks, it will also be able to plant grass, tree/shrubbery seeds, uniola paniculata on beaches and many more. This will not only make the environment cleaner but also healthier because many of these seeds that can be planted will improve the health of the ecosystem itself.

References:

https://www.plasticstoday.com/resin-pricing/weekly-resin-report-snug-supply-lifts-spot-pe-pp-prices/46599063658183