Team 17: Improved Dog Grooming Tool

Team 17:
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Sponsors:
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Goal Statement

Design and develop a dog grooming tool that provides the user and dog with a pleasant, stress free, and time efficient grooming experience.

Project Objectives

- Design a tool for use by domestic dog owners, dog groomers, and animal rescuers
- Untangle and order pet's hair without harm to the pet
- Develop tool that is stress free on the dog as well as the groomer

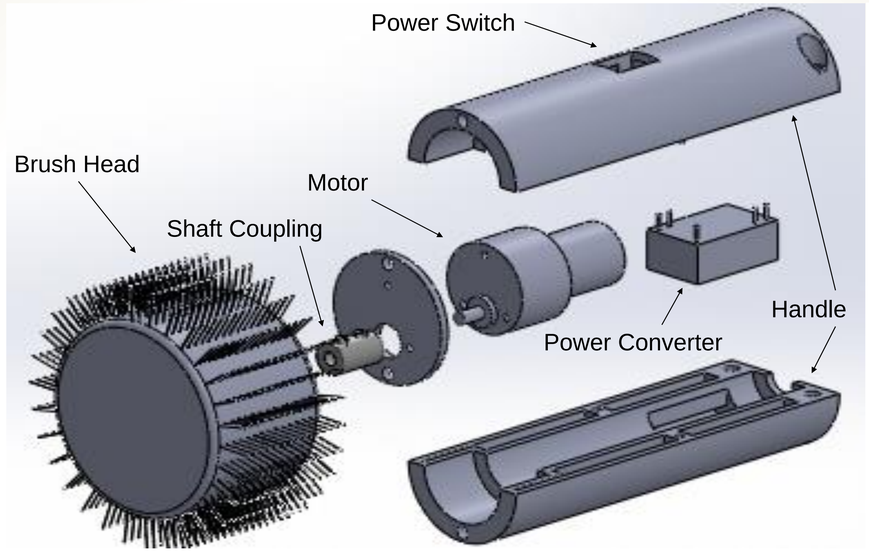
Project Constraints

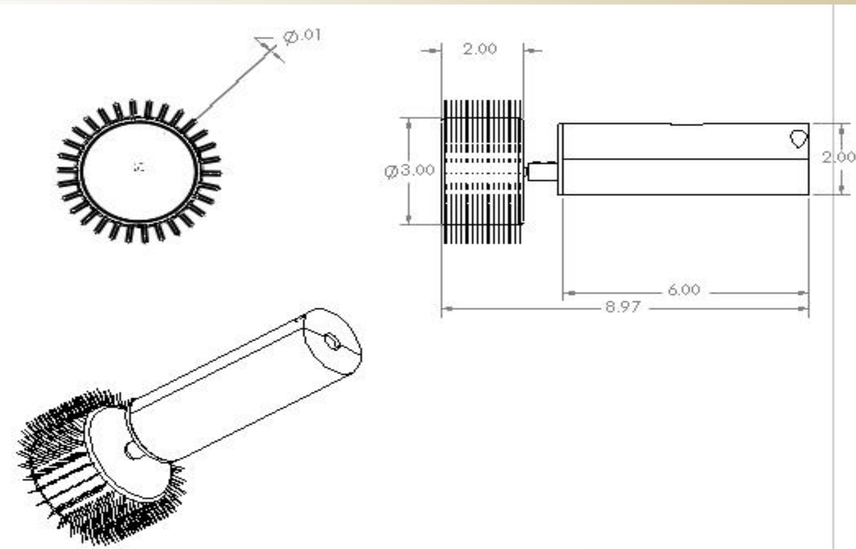
- Tool is handheld and ergonomic
- Tool works at low RPM to prevent injury and further entanglement
- Tool is easy to clean and sterilize
- Battery lasts at least 2 hours at 50% duty cycle
- Total weight is 1 pound or less

Future Work For Spring 2016

Phase II (January - March)	*75 days*	*Mon 1/4/16*	*Fri 4/15/16*
Test and Analysis I	**24 days**	**Mon 1/4/16**	**Thu 2/4/16**
Test Motor Speed	10 days	Mon 1/4/16	Fri 1/15/16
Analyze Ergonomics	10 days	Mon 1/4/16	Fri 1/15/16
Test Power Source	10 days	Mon 1/4/16	Fri 1/15/16
Test Electrical Components	10 days	Mon 1/4/16	Fri 1/15/16
Test Tool Effectiveness	10 days	Mon 1/4/16	Fri 1/15/16
Test Tool Effeciency	14 days	Mon 1/4/16	Thu 1/21/16
Troubleshoot Issues	10 days	Fri 1/22/16	Thu 2/4/16
Voice of the Customer II	**11 days**	**Mon 1/18/16**	**Mon 2/1/16**
Redesign	**30 days**	**Fri 2/5/16**	**Thu 3/17/16**
FMEA	3 days	Fri 2/5/16	Tue 2/9/16
Design Approval	3 days	Wed 2/10/16	Fri 2/12/16
Build Prototype	10 days	Mon 2/15/16	Fri 2/26/16
Test and Analysis I	14 days	Mon 2/29/16	Thu 3/17/16
Field Trials	**21 days**	**Fri 3/18/16**	**Fri 4/15/16**
Voice of the Customer Report	**54 days**	**Tue 2/2/16**	**Fri 4/15/16**

Final Prototype Design





Key Design Features

- Ergonomic, comfortable handle
- Stainless steel bristles; .01” diameter
- Electric motor rated at ~4 in-lbs
- Input Power: 110V AC
- Brush head spins at ~2 rev/sec
- Ambidextrous design allows for left and right handed users without motor reversing
- Simple, lightweight design
- 3” diameter brush head keeps hair from wrapping around barrel

Failure Modes and Effects Analysis

Function	Potential Failure Mode	Potential Effects of Failure	Severity (1-10)	Potential Causes of Failure	Occurrence (1-10)	Process Controls	Detection (1-10)	RPN	CRIT	Action Plan
Detangle Matted Fur	Motor not powerful enough to brush through fur	Motor overheats from excessive loading, Brush becomes stuck in hair, Product does not meet spec	10	Incorrect motor size	7	Select motor with minimum torque needed	4	280	70	Test force needed to pull through matt
				Bad motor installed	1	Test motor before installing	1	10	10	Have multiple motors on hand
				Motor/ shaft binding	5	Check tolerances and check for debris	2	100	50	Design to keep debris out, Test life cycle of product, determine test plan for aplied forces
	Bristles to soft and don’t break up matt	Brush doesn’t meet initial goals	9	Incorrect size wire installed	6	Ensure correct tolerances for manufacturing	2	108	54	Measure bristles on existing brushes
				Length of Bristles	6	Ensure correct tolerances for manufacturing	3	162	54	Measure length of bristles on current brushes