



## **Release Lanyard Project**

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**David Lofgreen** 

## Overview

- Problem Statement
- Current Design
- Design Analysis
- Top Designs
- Gantt Chart
- Conclusion
- References

### **Problem Statement**

- Issues with freezing temperatures and debris
- Issues not activating weapons system
- Issues with poor installation

### **General Constraints**

- ► Temperature Range –50°C to 150°C
- Activation Force of 50N
- Breaking force of linkage 75N

### **Current Lanyard Design**



**Carly Siewerth** 

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# **Design Analysis**

- Mechanics of Material
- Material Science
- Vibration
- Fluid Mechanics
- Heat Transfer
- Manufacturing

## **Design Areas**

- Cable Guide Components
- Cable Options
- Activation System

## **Design Ideas**

- ▶ DuPont<sup>™</sup> Krytox<sup>®</sup> Lubricants
- Wide Temperature Range: -70 °C to 399 °C
- Suborbital, orbital, deep space flight, commercial, corporate and military aviation applications

## **Design Ideas**

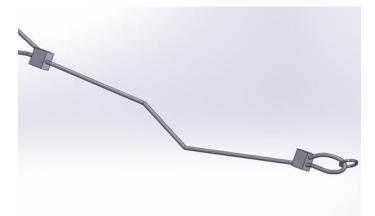
- Cap for Guide Pipe
  - Required Temp. range -50 to 150°C
- Fluorosilicone Rubbers
  - Temp. range -74 to 175°C
- Silicone
  - Temp. range -60 to 200°C





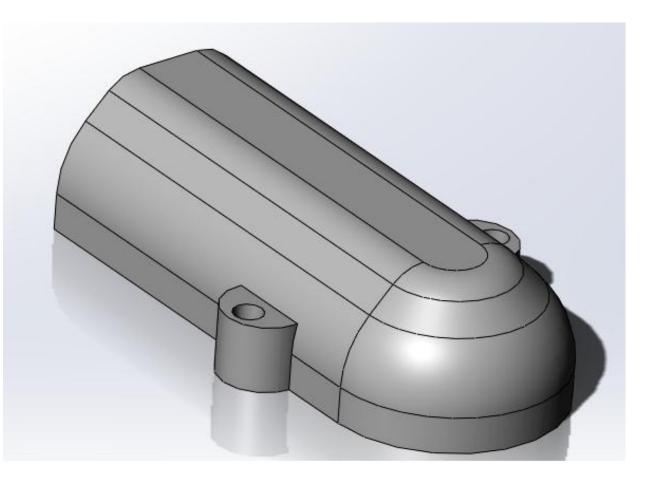
## **Design Ideas**

- Cable Coatings
  - Required Temp. Range of -50 to 150°C
- Tyvek Wrap
  - Temp. Range of -73 to 135°C
- Teflon Wrap
  -73 to 204°C



## **Top Design**

#### Housing



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#### **Top Design**

#### Servos





### **Gantt Chart**

		Oct				Nov						Dec				
16 Sep 23	Sep 30	Oct 7	Oct 14	Oct 2	1 Oc	t 28	Nov	4 Nov	11 Nov	18 Nov 2	25   Dec 2	Dec 9	Dec 16	Dec 23	Dec	
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											Final Desi	ign				
											Report an	d Presenta	tion			
											Prototype	ofLanyard	1			

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Milestone Presentation
 Milestone Report

**Andrew Baker** 

## Conclusion

- Problem Statement
- Current Design
- Design Analysis
- New Design Area of Focus
- Top Designs
- Gantt Chart

### References

- Stephen Larimore
  - Raytheon Department Manager

#### Kelly Convington

Raytheon Mechanical Engineer

#### Internet

- <u>http://www.ahpseals.com/tech/materials.php</u>
- <u>http://www.materialconcepts.com/products/tyvek/sheets/</u>
- <u>http://www.boedeker.com/teflon\_p.htm</u>
- <u>http://www2.dupont.com/Lubricants/en\_US/industries/Aerospace\_Industry.html</u>

#### **Questions?**

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**Andrew Baker**