

Prabhmeet Jhinjar  
CYSF Logbook 2026

# CYSF Logbook

Date	Big Changes	Notes
October 2-6th	Project Finalized	<ul style="list-style-type: none"> <li>- How can we clean up space debris chosen from 3 projects, the neurochip, and hyperloop (both research projects)</li> </ul>
October 14-16th	Background Slides made	<ul style="list-style-type: none"> <li>- Space Debris is man-made junk that comes from space involvement, especially from broken satellites or single-use rockets</li> <li>- Why is space debris dangerous?</li> </ul>
October 20- 29th	First Prototype Plan made	<ul style="list-style-type: none"> <li>- The first prototype has a chromium superelastic alloy spring, and three motors, one for push back, one for holding, and one for reloading</li> </ul>
November 13th	First Prototype Motors Made	<ul style="list-style-type: none"> <li>- The motors and sensors were added into the body of the Space Debris Vehicle</li> <li>- The spring has not yet arrived</li> </ul>

November 17th	Spring Added and Testing Started	<ul style="list-style-type: none"> <li>- The spring arrived. The motor was too slow to release</li> </ul>
November 18th	Hold/Release Motor Gear Ratios added	<ul style="list-style-type: none"> <li>- Increased Acceleration allowed spring to launch at full power</li> <li>- However, the spring cannot go at a power that is enough to push the ball</li> </ul>
November 28th	Larger Spring Ordered	<ul style="list-style-type: none"> <li>- My Birthday!</li> <li>- Ordered big spring</li> </ul>
December 2nd	Larger Spring Arrived and Installed	<ul style="list-style-type: none"> <li>- Did not work</li> <li>- Motor could not push</li> <li>- Carboard holding the spring bent back</li> <li>- This version scrapped</li> </ul>
December 8th	Project Scrapped	<ul style="list-style-type: none"> <li>- This original project was scrapped in exchange for a technique I learned at First Tech Challenge worlds competition</li> </ul>
December 18th	New Project Made	<ul style="list-style-type: none"> <li>- This new strategy involves two very fast spinning wheels that would launch the net at a high speed in the physical prototype</li> <li>- Acceleration 5x</li> </ul>
December 22nd	Acceleration Adjust	<ul style="list-style-type: none"> <li>- Acceleration increased to 25x</li> </ul>
January 7th	Research Materials	<ul style="list-style-type: none"> <li>- Materials Researched</li> </ul> <p>Chromium Tungstein Stainless Steel Rubber (For wheels)</p>

January 9th	Materials Scrapped	Some of the Materials, such as rubber and chromium, don't work at too much of a temperature range Further Research Required
January 10th	Research on Superelastics	New material, titanium aluminum chromium superelastic. Vanadium for temperature control
January 11th	Propulsion Research	It turns out wheels spinning still cannot move the net at the speed we want it to in the theoretical model
January 13-15th	Project Scrapped and Research Done	Scrapped Wheels idea (again). I did research on propulsion so I could have a final prototype
January 15-27th	New Project Prototype Drafted	<ul style="list-style-type: none"> <li>- This time I truly learned my lesson and conducted thorough research</li> <li>- Materials:</li> </ul> <p>The launching materials cannot be scaled down to the prototype size, but they can still be visualized:</p> <p>Titanium Aluminum Chromium Superelastic shape memory alloys - This strong 'elastic' is good for hitting the aluminum tank attached to the net which would ignite and send the net at the speed we need (8 km/s). We use this rubber because it is strong and could be suitable for space, and also can have an impact at enough speed to start breaking down the Phlegmatizer lead azide</p>

		<p>Titanium/Stainless steel - These strong materials are very good at resisting a lot of damage from debris and are used in many satellites. Stainless Steel is also going to build up the barrel because it is 'explosion proof.'</p> <p>Phlegmatized Lead Azide - Lead Azide is a substance that has very unstable molecules. The molecules inside of it are require little energy to break down and create an exothermic reaction</p> <p>Compressed Hydrogen - This material can ignite very easily, and when the lead azide would explode, it would ignite the hydrogen and propel the net to around 8 km/s, which is faster than space debris and could easily catch it</p> <p>Polyethylene - This material is perfect for the balloons which slow down the space debris once the net has caught it, so it falls out of its orbit and burns up in the atmosphere</p>
February 2 <sup>nd</sup> -6 <sup>th</sup>	Propulsion Research Slide Made	Final Research For Movement: Short thruster firings

		<p>Allows for minimal fuel to be used while also allowing steering</p> <p>Since space is a vacuum, there is nothing to stop the ship when its moving forward</p> <p>The ship will move forward after being released from the main rocket</p> <p>The 1 second thruster firings would allow for turning with minimal fuel</p> <p>Liquid Fuel</p> <p>This is better than rocket fuel because it is lighter (because there is less of it in a space)</p> <p>Solid Fuel is generally used for liftoff, while liquid fuel is used more for once an object is in space</p>
Feb 6 <sup>th</sup> -7 <sup>th</sup>	Net Planning	
Feb 8 <sup>th</sup>	Net Slide Made	<p>Tightly knit Kevlar - The tightly knit kevlar can capture a lot of debris at once, despite the size</p> <p>Impact Sensor - An impact sensor will be located in different parts of the net. Once more than two have been triggered, the sensors will send a signal to electromagnets on the edges of the net, which will activate and close the net up</p> <p>Polyethylene balloons - these are used in space, and will slow down the net and take it out of orbit so</p>

		that it will fall into the atmosphere and burn up
Feb 10th	Trifold Planning Started	I decided to make a circle following thing. Section 1, 2 on bottom of middle, 3 on right and four on top (center of attention)
Feb 11th	Slide Printed	I printed the slides
Feb 12th	Placement of Slides	I placed the slides and cut out the title and put them on the trifold But once cut out they looked too small
Feb 13th	Reprinting the Slides	I reprinted the slides in legal size because it is slightly bigger and looks better
Feb 14th	Replacement and gluing of the slides	I glued on the SLIDES but had to redo the title
Feb 15th	Glued on title	I glued on the title
Feb 16th	Glued on pieces of debris for aesthetics	Glued on pieces of debris for aesthetics
Feb 17 <sup>th</sup> - 19th	Practice Speech	I practiced the speech
Feb 20th	InterSTEM Science Fair	In house science fair
Feb 24th	Email sent out to Graeme Sabiston	Email sent!
Feb 27th	Zoom Meeting	Mr. Sabiston gave me a lot of advice which I incorporated into the trifold.
March 1st	Completed suggested changes	Suggested changes completed
March 2nd	Slight prototype Redesign	The prototype was slightly redesigned to allow for easier barrel loading (automated) to look more like it would in space
Mar 2 <sup>nd</sup> - 4th	Put into CYSF Website	Although I put some stuff into the CYSF website before hand, I finalized everything by midnight of March 3 <sup>rd</sup> , and March 4 <sup>th</sup>

		was reserved for any last minute changes.
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