**R.E.A.C.H.**  
**Rocket for Experimental Agendas and Conquering Heights**

An amateur rocketry attempt by a group of 3 Indian high school students from Hyderabad.

**Objectives of R.E.A.C.H.**

1. Develop & test a cost effective solution for experimental testing of new concepts.
2. Set the Asian Amateur Rocketry Record for Altitude (Apoapsis).
3. Ultimately breach the Karman Line and go into Outer Space.

**Outline of R.E.A.C.H.**

1. **Concept Testing Framework:** The Project provides a framework to test new concepts safely at a very minimal cost.
2. **Scalability:** The Project is extremely scalable, with the base model capable of being upsacled into a a vehicle to launch payloads into orbit.
3. **Recoverability:** The Project aims to test a minimal system to recover the rocket along with all of its essential parts in working order, using a radically new recovery method.
4. **Versatility:** The Project is applicable in many scenarios, including but not limited to Earth.
5. **Cost Effectivity:** The Project is very cost effective at it's current stage. Hypothetically, The Concept can bring down costs of PSLV Launches by 40% (approx.) by making all parts except the 3rd stage recoverable in working condition, while not adding any new shielding for re-entry or new major costs.

**Project Statistics**

Given below are various statistics of the project as of the latest iteration (Mk. 0):

1. **Dimensions:** 2m Cylinder with 0.1 Nose Cone of 0.05m Radius
2. **Wet Mass:** 4kg
3. **Estimated Apoapsis:** 100km
4. **Propellant:** Solid Bipropellant -> (Aluminium + HTBP (Hydroxyl-Terminated Polybutadiene)) + Ammonium Perchlorate
5. **Motor Dimensions:** Aluminium Pipe with 0.04m Radius with 5-star bore

**External Assistance**

Due to the nature of this project, the team requests assistance from the Indian Space Research Organization (ISRO) and the Defence Research & Development Organization (DRDO) for the construction, testing, and execution of this project. The specific requirements as of 20th July, 2017 are:

1. **Launch Site & Launch Assistance:** Due to the nature of this project, launching the project in the urban, sub-urban or even rural areas is dangerous, and thus a dedicated launch site (preferably Satish Dhawan Space Centre, Sriharikota or Vikram Sarabhai Space Centre, Thiruvananthapuram) with other launch tools such as guide rails will be required.
2. **Vehicle Testing and Simulation:** Due to the high computational requirements for performing a physical and chemical analysis of the rocket, performing calculations or tests manually or running simulations on a Personal Computer are highly inefficient and prone to error. Thus, guidance and software for calculating various parameters of the rocket, and simulating it will be required.
3. **Long Range Communication:** Due to the high costs involved with procuring a conventional Radio Frequency Communications Unit with ranges greater than 70 – 100 km, a Satellite-Assisted Communication Unit or a pair of Microwave Transceivers will be required.
4. **Parts Fabrication Tools/Machines:** Due to the non-availability of customized fabrication tools for students for such a project, such tools will be required.’

Thanking You,  
The Team:

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Under the guidance of Mrs. Ratnamala Rao