**R.E.A.C.H. Mk0 Outsourcing Requirements**

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

1. Develop & test a cost-effective solution for experimental testing of new concepts;
2. Mk0 aims to test a novel recovery method;
3. Set Amateur Asian Record for Altitude (Apoapsis) and Eurasian Record for Range of an Amateur Rocket;
4. Ultimately breach the Karman Line.

**Requirements of R.E.A.C.H. Mk 0**

**The project will require assistance from other organizations due to the nature of the project. Main fields of assistance are:**

| **Field Of Assistance** | **Required due to** | **Specifics** |
| --- | --- | --- |
| Long Range Communication | Non-availability of Conventional Connectivity @ 100+ Km | Satellite Communication Unit or Microwave Transceivers |
| Parts Fabrication Machines | Non-availability of Fabrications Tools for Students | Fabrication of Recovery System & Final Assembly of Rocket |
| Launching Arena | Illegalization of Rocket Launches in Populated Areas | Launch Site, Guide Rails, etc. |
| Simulations, Testing and Guidance | High computational requirements for Pre-flight Testing & Validation | Expert Guidance, Simulation Software, etc. |

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

1. **Concept Testing Framework**

*The Project provides a framework to test new concepts safely, as it has a very minimal cost & simple operation. It can also viably test concepts as it can successfully reach altitudes to simulate the environment of space accurately.*

1. **Scalability**

*The Project is extremely scalable. The Mk 0 can be up scaled into a vehicle to launch payload upwards of 40Kg in stable Low Earth Orbit, with most of launch apparatus being recoverable. This up scaled model would be less than 10m tall with a similar radius with a slightly sophisticated multi-ignition motor & internal gimbal control.*

1. **Recoverability**

*The Project, with Mk 0, 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. While it is not viable to recover everything under given budget constraints, this system of Hybrid Parachute-less Recovery is theoretically applicable to any spacecraft (or part thereof) with symmetry. The Recovery is exceptionally stable due to gyroscopic effects on the body & its internal axis of rotation.*

1. **Versatility**

*The Project is applicable in many scenarios, including but not limited to Earth. One of the objectives is to apply the Recovery concept to massive, conventionally non-recoverable parts of spacecrafts, which cannot use parachutes due to practical limits & cost barriers. The Concept can also be morphed into a landing strategy, finding applications for Martian Landings where use of prolonged retro bursts are usually required.*

1. **Cost Effectivity**

*The Project is very cost effective, with the Mk 0 costing less than 40,000INR. A fully recoverable prototype which can launch payloads into Low Earth Orbit is possible in under INR 4, 00,000. 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.*