

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 organisations 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.

2. Scalability

The Project is extremely scalable. The Mk 0 can be up scaled into a vehicle to launch payload upwards of 10Kg 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.

3. 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.

4. 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.

5. 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.
