Payload Fairing Mechanism

For transporting payloads (Mini Tesla, CanSats,…)

Our Payload Fairing Mechanism (PFM) allows payloads to be released in the same way as a real space rocket! The payload fairing is divided into two halves and separated. With this mechanism, we have simulated the launch of a Tesla Roadster with the Falcon Heavy, but it is also suitable for transporting payloads such as CanSats or probes.

Materials and components

Important: Besides the 3D printed components you need some other materials to complete the construction.

- **3D printed:** PFM adapter*
- **3D printed:** Fairings 1&2 (not identical)
- **3D printed:** probe (with Tesla mount)
- Rubber band
- Tommy timer (from wind-up toys)
- Cable ties (3x small, 1x large)
- Nylon cord
- Springs or elastic foam

*adapters: There are different versions available (connection to Phoenix 3D or rocket vessel).

▷ **Download the 3D printing files here**

3D printing the components

The components are offered as printable STL files but also as editable and customizable CAD files. You can use the free software FreeCAD to optimize the components for your own needs.

▷ **Download FreeCAD for free**

FreeCAD
Open Source parametric 3D CAD modeler

You have to convert the STL files with software (depends on your 3D printer or 3D printing shop) to a printer specific format. It is maybe necessary to rotate and to move the components before printing. You also have to optimize the printing settings so that an optimum print quality is ensured.

The correct operation of a 3D printer requires experience and knowledge of the materials and print settings used. Incorrect print settings can cause damage to the printer and inoperable components. The print process should therefore only be controled by persons with enough experience. DLR_next and DLR_School_Lab Lampoldshausen/Stuttgart cannot guarantee the functionality of the components, as the 3D printing of the parts cannot be influenced nore controlled. Before usage, detailed tests should always be done in a safe environment.
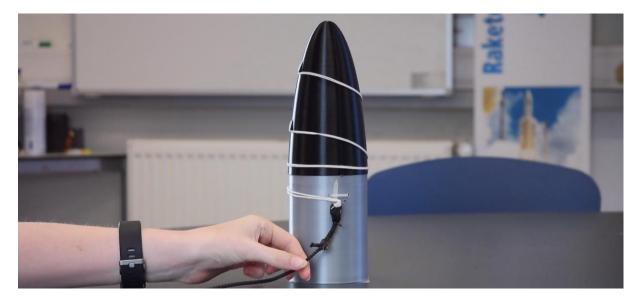
Set-up of the mechanism

Put the probe or CanSat on top of the adapter. Put the spring or foam in place so that it pushes the probe away from the adapter.

Wrap the rubber band around the two fairings and hook it into the tommy timer. This step works the same as on the Phoenix 3D parachute system. Now you can wind up the timer and use the trigger to hold it in place until launch.

Launching a Tesla with the PFM

We have used this mechanism for the first time in July 2018 to launch a mini Tesla with one of our water rockets. Watch the video to see the mechanism in action:

▷ **Video: Launching a Tesla with a Water Rocket**

Important note

All 3D components offered on this site were designed and tested in DLR_School_Lab Lampoldshausen/Stuttgart with the help of Raketfued Rockets. The German Aerospace Center (DLR) is one of Europe's largest and most modern research institutions and offers children and young people an opportunity to discover for themselves the fascinating world of research. After filling in the application form, students and classes can visit the School_Labs, which are located at many DLR sites in Germany, for free. To succeed with the construction of a water rocket, you will have to work very precisely and carefully. Especially some of the adhesives are pretty dangerous. Thus, please wear gloves when working with adhesive or epoxy and don't breathe in the gases. It is recommended to work outside whenever toxic gases could develop. The launch of a water rocket may needs permission from the competent authority, depending on your location. You need the permission of the landowner if you launch on foreign territory. Please wear safety goggles when pressure testing or launching your rocket. Keep a safe distance to the pressurized rocket. We can not guarantee the accuracy, completeness or feasibility of any our tutorials. We are not responsible for any damage or harm on objects, animals or humans. We do not guarantee that the information provided on this web site is complete, accurate and always current. This applies also to all links cited on this website points, either directly or indirectly. We are not responsible for any damage or harm to objects or individuals.