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DEVELOPMENT OF A LOW COST, LOW ALTITUDE TEST VEHICLE FOR HIGH DYNAMIC
PRESSURE PARACHUTE TESTING**Abstract**

In order to increase the reliability of parachute systems, Delft Aerospace Rocket Engineering (DARE) required a test vehicle that could reach dynamic pressures comparable to a Stratos-type mission. This project became known as the DARE Parachute Investigation Project or PIP.

The initial PIP launcher flies to an apogee of about 1000 meters where the test section separates from the engine section. The test section follows a ballistic trajectory until the parachute is deployed. The engine section has a parachute that allows for safe recovery and reuse. When launched to one kilometre, the deployment conditions are expected to reach dynamic pressures of about 5 kPa.

Currently, there are four versions of PIP considered for flight. The first version is the proof of concept that allows for demonstrating the capabilities of the launcher. The second version is meant to be used for parachute tests. This version allows for modifications to the mass of the test section to tailor the test conditions to the requirements of the user. The third version has a second parachute in the nose cone to allow for testing of smaller parachutes that do not decelerate the test section enough to allow for safe landing and reuse. The fourth version can reach an altitude of around 2500 meters to increase the test envelope.

The paper focuses on the feasibility of low altitude sounding rockets for testing main parachutes for the Stratos like missions. The first test flight of PIP was completed on in September 2019 and was partially successful.