

IMPROVING MISSION FLEXIBILITY WITH THE HIPPOGRIFF PROPULSION MODULE. Robert C. Steinke¹, ¹SpeedUp, LLC (2207 Rainbow Avenue, Laramie, WY 82070, rsteinke@bresnan.net).

Introduction: SpeedUp, LLC is developing a hydrogen peroxide hybrid rocket propulsion module called the Hippogriff. The primary benefit of the Hippogriff will be to improve flexibility in mission planning by allowing incremental increases in the propulsion capability of a launch system. The Hippogriff will be able to increase the apogee and/or payload mass of a suborbital launch. Hippogriff modules are intended to be clustered with additional modules easily added to accommodate payload weight growth.

Technology: The Hippogriff is based on our hydrogen peroxide monopropellant rocket entered in the Northrop Grumman Lunar Lander Challenge. A hybrid rocket is a straightforward evolution from a monopropellant rocket providing the most bang for the buck: medium performance at low cost.

The Hippogriff will use a catalyst based ignition system where the oxidizer and fuel ignite on contact. This provides extremely high ignition reliability, similar to a hypergolic system, but with much easier to handle and more environmentally friendly propellants.

The Hippogriff provides simplicity, reliability, and low cost while giving mission planners the flexibility to tailor the performance of a launch system to their payload.

Performance: The Hippogriff is still under development so all performance numbers are projected. The Hippogriff will have a gross mass of about 130 kg, and be approximately 230 cm long by 45 cm in diameter. Table 1 gives the payload mass to an apogee of 100 km and the apogee of a 100 kg payload assuming a nominal first stage that can lift 100 kg to 100 km and a variable number of Hippogriffs.

Number of Hippogriffs	0	1	2
Payload to 100 km	100 kg	145 kg	165 kg
Apogee of 100 kg payload	100 km	150 km	180 km

Table 1: Using the Hippogriff to increase payload mass or apogee