University of Southampton; CANOPUS-LOCOL-CADS

Project Summary

Timely access to space for small payloads is one of the problematic areas highlighted by the NSTS – we propose a key step towards a radically new way of addressing this.

Our proposed solution is a low cost concept based on a flying launch platform: a glider that exploits autonomous soaring technologies to reach a launch altitude of ~7,000m with the rocket and its launch pad on board. The high launch altitude means that small payloads can be launched atop extremely cheap, solid fuelled rockets, achieving suborbital flights in the first phase of the project (see diagram), followed by low Earth orbit insertions later. A serendipitous effect of this concept is the benign payload vibration environment.

Here we propose a 4½ month feasibility study (carried out by a technical designer supervised by a team of four academics), designed to compute the boundaries of the payload mass – altitude / orbit – launch cost space of the concept, laying down the groundwork for and significantly de-risking the main, development phase of the project, targeted for the 2016-2022 period.

While new to launch vehicle development, the University can build on solid foundations in unmanned air systems simulation, design and operations, and rocket engine/satellite research.

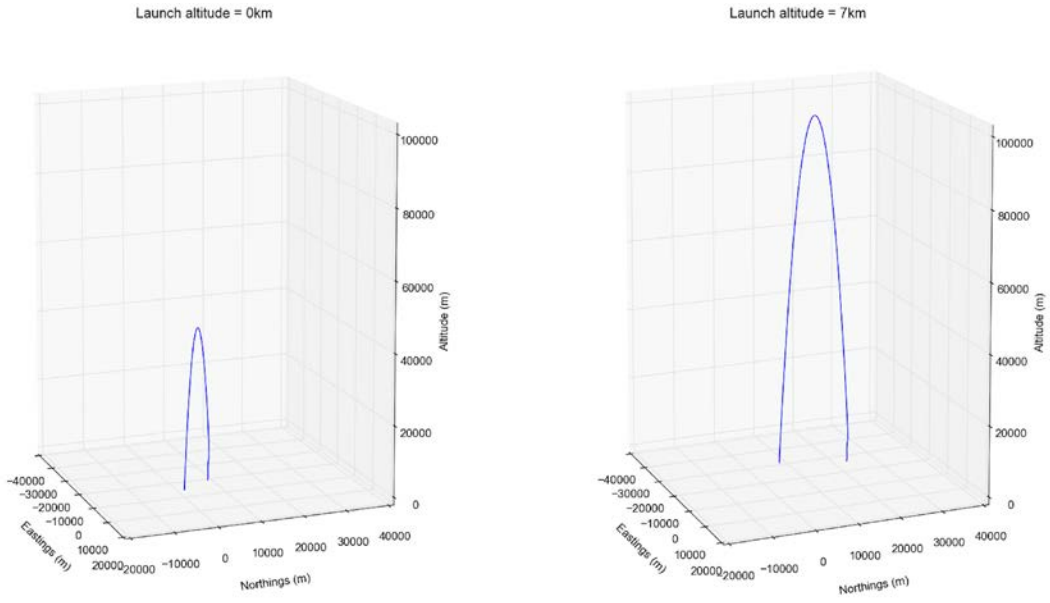

Figure showing the results of two exploratory simulations, indicating that a 37kg 'Black Streak' sounding rocket launched from sea level will attain an apogee of around 40km (left plot), while launched from 7km altitude, will attain an apogee of around 100km (right plot). This particular rocket is parachute recovered and the parachute descent trajectory is also shown (the horizontal blue line represents sea level, the horizontal black line represents the 7km level).