

LIBRA

The airborne launch-pad

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Libra is a system designed for the launch of multiple nano-satellites.

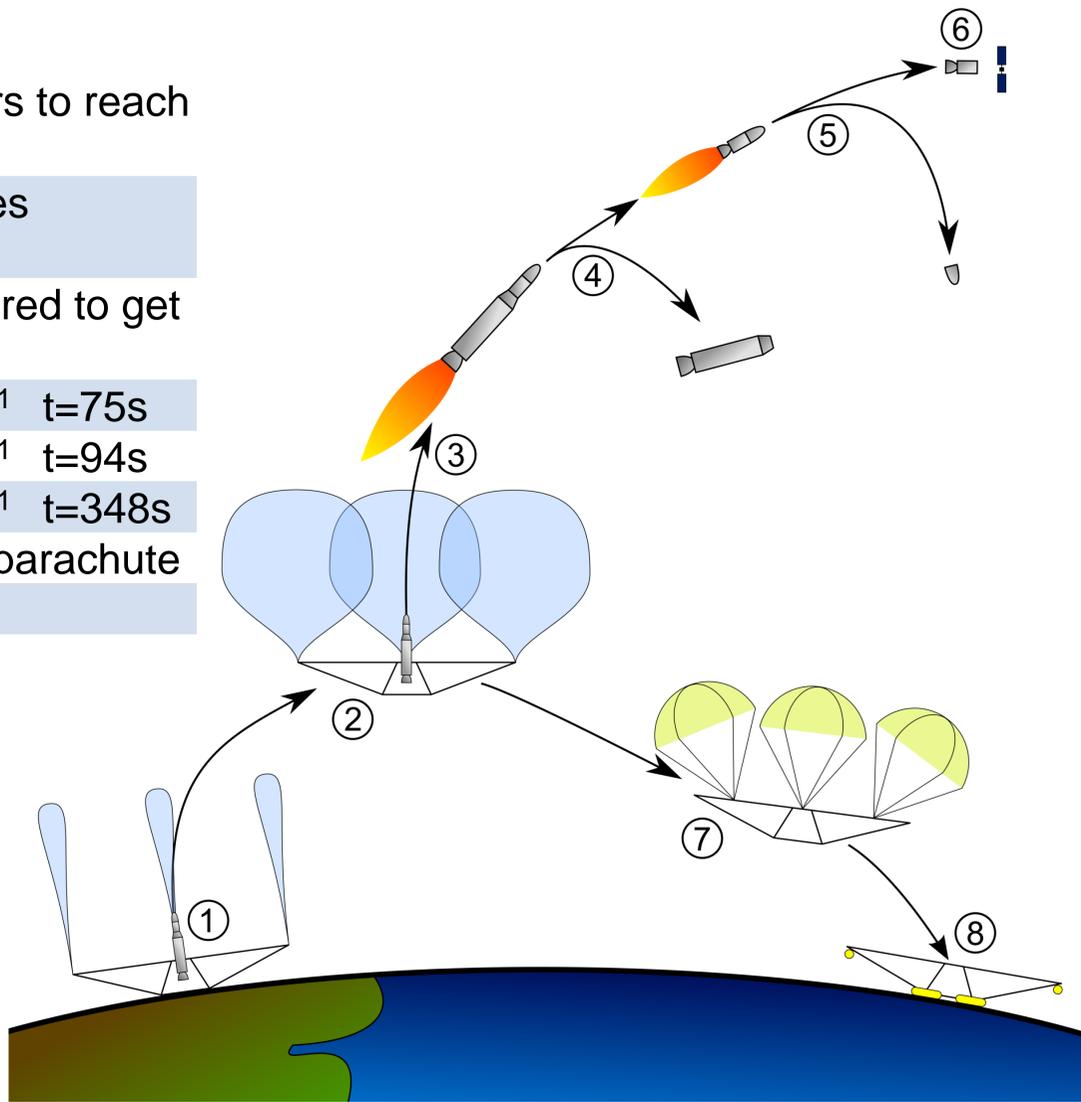
The concept is to exploit a reusable airborne launch pad weighing approximately 12 tons to launch a small rocket. This rocket will weigh from 2 to 4 tons.

The altitude of 30 km will be reached using Archimedes's principle using helium filled balloon. At this altitude the drag will be almost negligible.

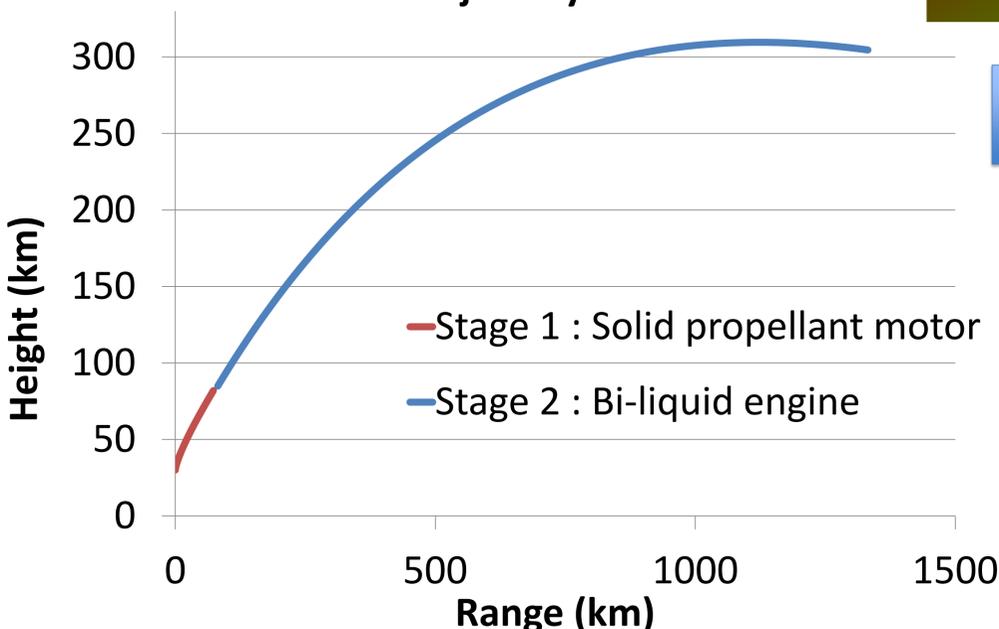
All mass in (kg)	Versions		
	Light	Medium	Heavy
Payload	15,5	28,5	45,0
Stage 2	153.7	232.2	340.2
Stage 1	1792	2554.7	3590.6
TOTAL	1975,9	2834,0	3999,3

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|--|--|
| 1 Platform Liftoff | Ascending time: 2 hours to reach the altitude of 30 km |
| 2 Maximum altitude of the platform reached | Stabilization over 2 axes
Preparation for liftoff |
| 3 Liftoff | Vertical trajectory required to get over the balloons |
| 4 Stage 1 Burnout | h=83 km v=3.4 km.s ⁻¹ t=75s |
| 5 Fairing jettisoning | h=110 km v=3.5 km.s ⁻¹ t=94s |
| 6 Stage 2 Burnout | h=300 km v=7.8 km.s ⁻¹ t=348s |
| 7 Parachute Opening | Controlled descent by parachute |
| 8 Water Landing | Inflation of the buoys |

This project directly pertains to AAS because university students are more likely to test new equipment in space with this launch system, what will increase development efforts and creativity.



Trajectory



Since a lot of countries and institutions using nano-satellites don't have a vast space program the use of Libra will decrease the cost of launch, due to the lower mass of the rocket and the reusable airborne launch pad, and then increase the accessibility to space.

Everyone will experience the telecommunication accessibility even in today's uncovered area. Some developing countries are already using nano-satellite constellations to develop telecommunication networks.

This project have been conducted under the supervision of the CNES for the PERSEUS program. Original project included Quentin Bianco.
Thanks to Jeremy Corpening (NASA) for his help over this project.