

Application of Balloon Support Platform for Use in Descent and Landing Testing

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Spontaneous Concept

Project Objective:

The objective of this study was to identify potential uses of emerging low cost balloon services for the use in the development and testing of Entry Descent, and Landing Technologies as well as identifying the potential benefits and approach.

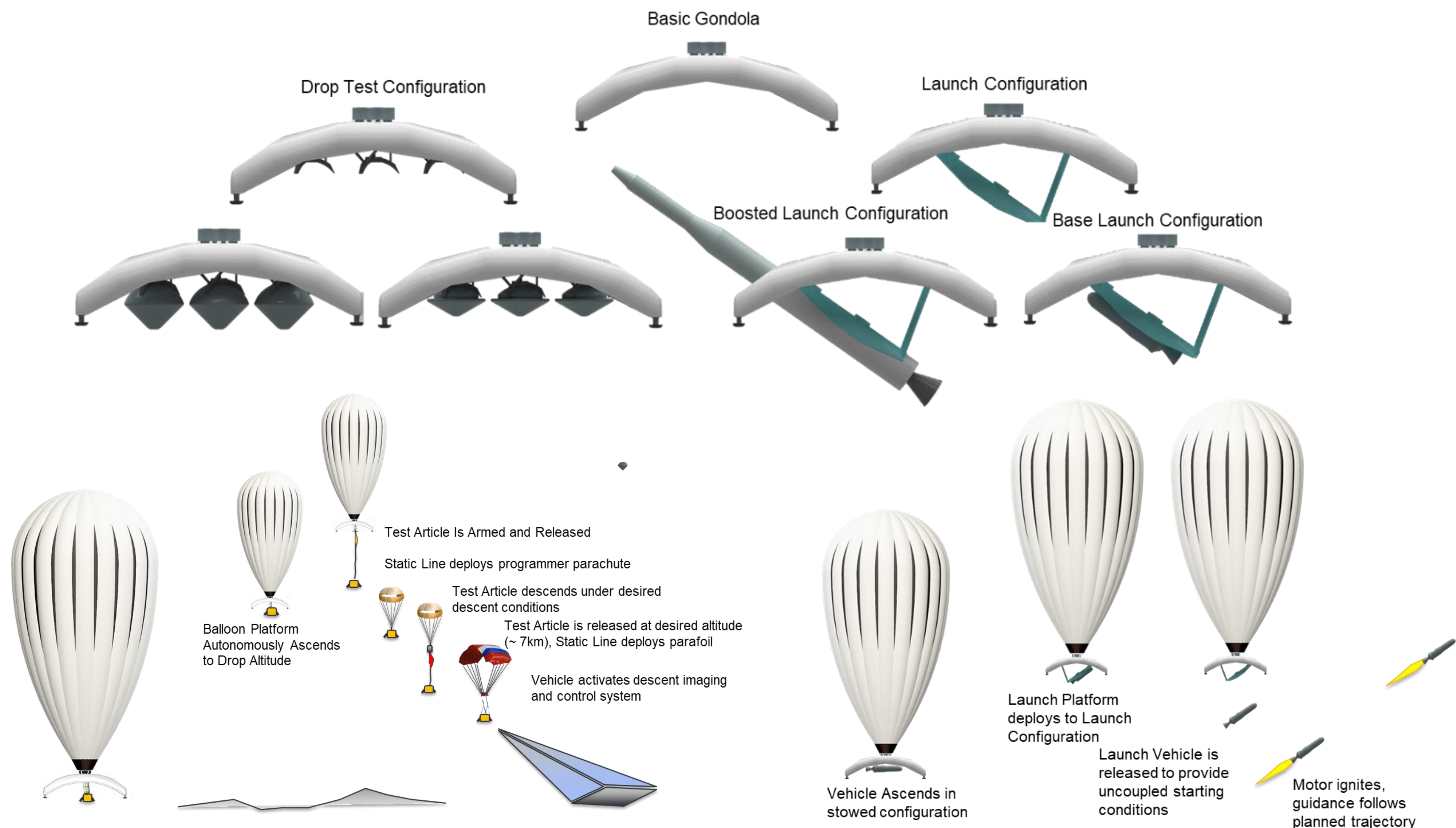
FY18/19 Results:

Several potential near term and long term applications have been identified and detailed including use of balloons as a launch platform for decelerator testing, drop test platform, sensor test bed platform, and as a test observation platform. JPL worked with Leo Aerospace (a space technology startup) to assess the feasibility of each concept and platform capabilities. Some of the applications identified are:

- Supersonic Parachute Inflation testing
- Mars Ascent Vehicle testing
- Earth Entry Vehicle testing
- Titan Parafoil drop test
- EDL Sensor testbed
- Atmospheric reconstruction
- Test observation

Benefits to NASA and JPL:

Commercial balloon services can potentially reduce drop test services by a factor of 3 or more, enabling earlier testing and/or more frequent testing, leading to significant risk reduction. An interesting possibility is the performance of multiple drops during a single flight. For example, the flight characteristics of a blunt body during terminal descent in the lower atmosphere of Earth is greatly affected by the stochastic processes of atmospheric turbulence. A robust platform capable of multiple drops in a single flight, plus rapid turn around, can allow developing of larger amounts of data under similar conditions allowing refined model validation and performance verification.



Titan Parafoil Drop test concept for verifying performance at 30-40 km altitude equivalent conditions

Mars Ascent Vehicle flight testing at Mars Surface relevant conditions

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