**VENUS AERIAL PLATFORMS STUDY.** J.A. Cutts[1] and the Venus Aerial Platform Study Team,
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**Background and Goals:** The Venus Aerial Platform Study, which was underway in early 2017, is assessing the technologies for exploring Venus with aerial vehicles in order to develop a Venus Aerial Platform Roadmap for the future exploration of the planet. Much of this will be accomplished via two Study Team meetings in May and December of 2017. The first Study Team meeting in late May 2017 focused on the scientific opportunities offered by aerial platforms at Venus, their operating environments, and a technical review of possible aerial platforms. The second meeting in early December 2017 will emphasize establishing the feasibility of the technologies needed for operating in the severe Venus environment.

The product of this study will be a report for NASA's Planetary Science Division in early 2018. This report will guide future scientific and technical developments for NASA's Venus exploration efforts; specifically as: (1) an input for possible NASA/U.S. auxiliary payloads for the Russian Venera-D mission, (2) a Venus Flagship Mission Concept Study for the next *Planetary Science Decadal Survey*, and (3) technology investment plans for a Venus Surface Sample Return mission concept.

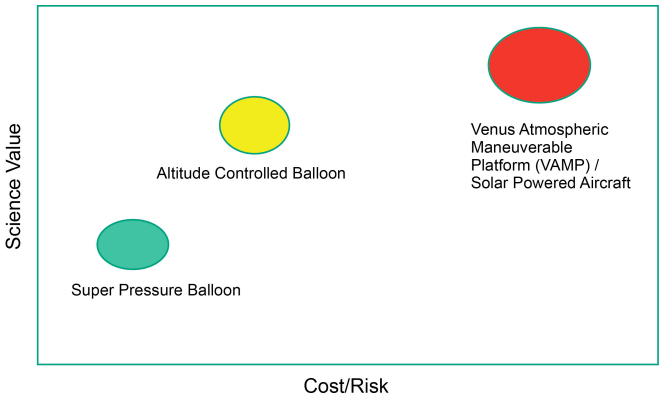
**Summary of First Meeting in May** At this first Study Team meeting in May, the Aerial Platforms Study Team analyzed which of the VEXAG's *Goals, Objectives, and Investigations for Venus Exploration* [1] could be addressed by the aerial platforms described in VEXAG's *Roadmap for Venus Exploration* [2]. In particular, the Roadmap's "sustained aerial platforms" were separated into the following categories:

**Probes and sondes** – One-time descent vehicles that would provide a single vertical profile through the deep atmosphere with little-to-no horizontal or temporal sampling.

**Constant altitude, uncontrolled** – "Classical" superpressure balloon at moderate (50–55 km) altitudes.

**Variable altitude, uncontrolled** – Vertically controlled, horizontally uncontrolled balloons that could vary in buoyancy to move up and down in the atmosphere to access different temperature/pressure regimes.

**3D control** – Powered lighter-than-atmosphere vehicles such as the Venus Atmospheric Maneuverable vehicle (VAMP) or heavier-than-atmosphere solar airplanes.




Study participants at the first meeting also developed a preliminary assessment of the Science Value of the concepts as a function of Cost and Risk. Altitude Controlled Balloons, which offer a significant gain in science capability for modest increase in cost and risk, appear to be a "sweet spot" in the overall trade space. Further analyses will be needed, incorporating other dimensions of performance, to verify and complete this assessment.

**References**

[1] *Goals, Objectives, and Investigations for Venus Exploration,* VEXAG, August 2016. http://www.lpi.usra.edu/vexag/reports/GOI-Space-Physics-Update-0816.pdf

[2] *Roadmap for Venus Exploration*, VEXAG, May 2014. http://www.lpi.usra.edu/vexag/reports/Roadmap-140617.pdf

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