

VEXAG Status Update

by
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<http://www.lpi.usra.edu/vexag/>

Decadal Survey Inputs: White Papers

White Paper Topic	Lead(s)	Status as of July 7, 2009
Venus Exploration Goals, Objectives, Investigations, and Priorities	Sanjay Limaye & Sue Smrekar	Due end of July
Technologies for Venus Exploration	Jim Cutts and Tibor Balint	Due end of July
Venus Atmosphere	S. Limaye with G. Chin, C. Covey, M. Bullock, K. Baines, & others	Under discussion with potential contributors
Comparative Climatology of Venus, Earth, and Mars	David Grinspoon & Mark Bullock	In progress
Report of the LPI Workshop : "Venus Geochemistry: Progress, Prospects, and Future Missions," February 2009	Allan H. Treiman, David S. Draper, & M. Darby Dyar	Completed
Venus STDT Final Report	Mark Bullock & Dave Senske	Completed
Astrobiology (to be coordinated by NASA Astrobiology Institute)	David Grinspoon for Venus Habitability	In progress
Inter-Solar System Habitability	David Grinspoon for Venus	In progress

All Decadal Survey inputs on Venus will be available to the Sub-panel by August

Recent Developments

Completed:

- **Sue Smrekar & Sanjay Limaye** appointed as "acting" co-chairs of VEXAG in June 2009
- Developing **Decadal Survey inputs**:
 - Venus White Papers on different topics (see next page)
 - Mission Concepts
- **International** Venus Exploration **activities**
- Comparative Planetology – **AGU Fall Meeting Session** in 2008
- **ESLAB Conference** on Venus-Earth-Mars in May 2009 (at ESTEC)

Upcoming:

- Next **VEXAG Meeting** scheduled in conjunction with the Inner Planets Decadal Panel Meeting (28-29 October 2009, California)
- Brief community meetings planned for **DPS and AGU**
- **Chapman conference** on Comparative Planetology, 2010

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VEXAG Community White Paper

Contacts: Sue Smrekar & Sanjay Limaye

Venus White Paper for the Decadal Study Panel titled: Venus Exploration Goals, Objectives, Investigations, and Priorities

This document has recently been **revised to include**:

- updates from the **Venus Flagship report** by the VSTDT
- the **Venus Express** Mission
- the recent **Venus Geochemistry Workshop**, and
- **revised and prioritized objectives and investigations** from the February VEXAG meeting.
- The **technology** section has been split off to create a **separate white paper**

Venus Technology White Paper



Contacts: Jim Cutts & Tibor Balint

Objective:

The Technology White Paper provides an overview of all key technologies, relevant to future Venus exploration missions. It was created to provide input to the NRC DS Inner Planets Sub-Panel.

The material was **compiled from**:

- the **Venus Flagship Report** by the VSTDT
- the **Extreme Environments Technologies Report**
- the **Chapman Monograph** Chapter on Venus Technologies
- the technology section of the **NASA 2006 SSE Roadmap**, and
- the technology section previously covered in the **VEXAG white paper** (Goals, Objectives, Investigations and Priorities)

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DS Input on Mission Concepts



- The recently completed report, titled: *“Venus Science & Technology Definition Team: Venus Flagship Mission Study” (Bullock et al. 2009)* identified a **multi-element mission architecture**, including:
 - Two cloud level **balloons**,
 - Two **landers**, and
 - A science / telecom relay **orbiter**
- All of these elements are relevant to the Decadal Survey
 - Either as a Flagship architecture, or
 - Any of these elements span out our smaller missions
- Report now available on the web at: <http://vfm.jpl.nasa.gov/>
- **Additional mission concepts** are **solicited from the community**, as with white papers.

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International Venus Exploration Efforts



Can or should VEXAG play a role?

- **Venus Climate Orbiter (VCO)** to be launched by **JAXA** in May 2010
- **European Venus Explorer (EVE)** being developed for proposal to **ESA**'s Cosmic Vision Program
 - EVE will be re-proposed in 2010
- **Venera-D** being developed by **Russia**
- **Venus Flagship Mission** Study Completed
- **New Frontiers** and **Discovery** Proposals

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8th Low Cost Planetary Missions Conference (IAA)



31 August – 4 September 2009

- Space agency representatives invited to present plans for planetary missions
- It is likely that contributed papers on Venus missions under development or in conceptual stages will be submitted
 - (Abstract deadline is 15 July 2009)

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Comparative Planetary Climatology

Focus Group

Objective:

- Develop links to the terrestrial and martian communities to make progress on studies of climate, dynamics, space physics by identifying key strengths and needs.

Strategy:

- Continue to seek input from Earth, Mars, Venus, Titan, and Solar science communities.
- Begin planning a conference or series of workshops on Comparative Planetary Climatology.
- Explore the possibility of an amendment to ROSES 2009, for a Research Program in Comparative Planetary Climatology.

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Venus STDT Recommendations



On technology development needs for future missions

- Sample Acquisition and Handling System
 - Do a detailed design to understand more accurately the resource needs and technology development steps needed to meet the DRM objectives.
- Lander Design
 - The rotating pressure vessel and rough terrain landing approach need detailed design to refine the resource requirements and scope the technology development plan.
- Long-lived Seismometry and Meteorology
 - These were the top rated science investigations that were not included in the DRM. Detailed study is required to address the many questions concerning which technical approach will be most fruitful and what performance can be achieved.
- Humans-in-the-loop Lander Missions
 - Mission robustness will be improved if the lander lifetime can be extended long enough to enable meaningful humans-in-the-loop interactions. Detailed study is needed to quantify how much lifetime is required for different levels of interaction and the technological advances required to provide that lifetime.
- Near-surface Aerial Mobility
 - This was another very highly rated science investigation not included in the DRM. Detailed study is required to assess both refrigerated and non-refrigerated options.

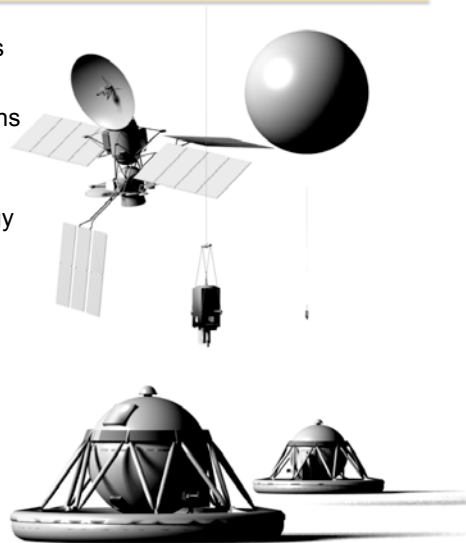
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Summary of VEXAG Activities



- Inputs to Decadal survey: white papers & mission concepts
- Following up on recommendations from Flagship STDT
- Support Comparative Climatology initiative
- Develop international links and cooperation
- Next (7th) VEXAG Meeting: October 28–29, 2009
Irvine, California
In conjunction with the Next NRC DS Panel meeting on October 27–28, 2009



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