

*Venus Exploration Analysis Group
(VEXAG)*

*Town Hall
Lunar and Planetary Science XLVIII*

Robert Grimm, Chair

Martha Gilmore, Deputy Chair

March 23, 2016

Houston, TX

Venus Town Hall - Agenda

Welcome

Bob Grimm (VEXAG Chair) and Marty Gilmore (Deputy Chair)

Recognition

Meetings

Missions

Comments by Jim Green, Director, NASA Planetary Science Division

Discussion

Adjourn

Recognition

- Welcome New Steering Committee Members
 - Lynn Carter, (UofA), Gary Hunter (NASA GRC), Kevin McGouldrick (CU), Allan Treiman (LPI).
- Thanks for the continued efforts of the Steering Committee
 - Giada Arney, Jim Cutts, Lori Glaze, Noam Izenberg, Paul Steffes, Con Tsang.
- Thank you – Tibor Kremic.
- Happy Retirement – Buck Sharpton.

Recap of VEXAG Annual Meeting 2016

- 2.5 days of science, exploration, and technology.
 - Minor revs to Venus Goals, Investigations, and Objectives (GOI)
- Findings
 - (1) Request reassessment of Venus Flagship prior to next Decadal
 - (2) Reaffirmed endorsement of VeGASO
 - (3) Appreciation of support for international collaboration and encouragement to extend
 - (4) Engage broader community for Venera-D
 - (5) Continue facilities and technology investments
 - (6) Support a program for Comparative Climatology of Terrestrial Planets
 - (7) Study synergies presented by human path to Mars via Venus flyby
 - (8) Encourage support for new initiatives

Recap of Planetary Science Vision 2050

- VEXAG's abstract (Cutts et al.) emphasized that a detailed roadmap exists and implementing it by 2050 would be swell.
- Near-Term (now to 2030)
 - Orbital remote sensing (radar imaging, infrared emissivity, gravity, topography), sustained aerial platform, deep probe, short-duration lander, multiple probes/dropsondes, flyby opportunities.
- Mid-Term (now to 2040)
 - Multiple deep probes, short-duration tessera lander, long-lived geophysical lander.
- Far-Term (now to 2050)
 - Surface (or near-surface) platform with regional mobility, long-lived seismic network, sample return

Upcoming Meetings of Interest

Venus Modeling Workshop / Venus Science Priorities for Modeling and Experiments May 9–11, 2017, Ohio Aerospace Institute, Cleveland, Ohio
Program posted and registration opens tomorrow (Friday)

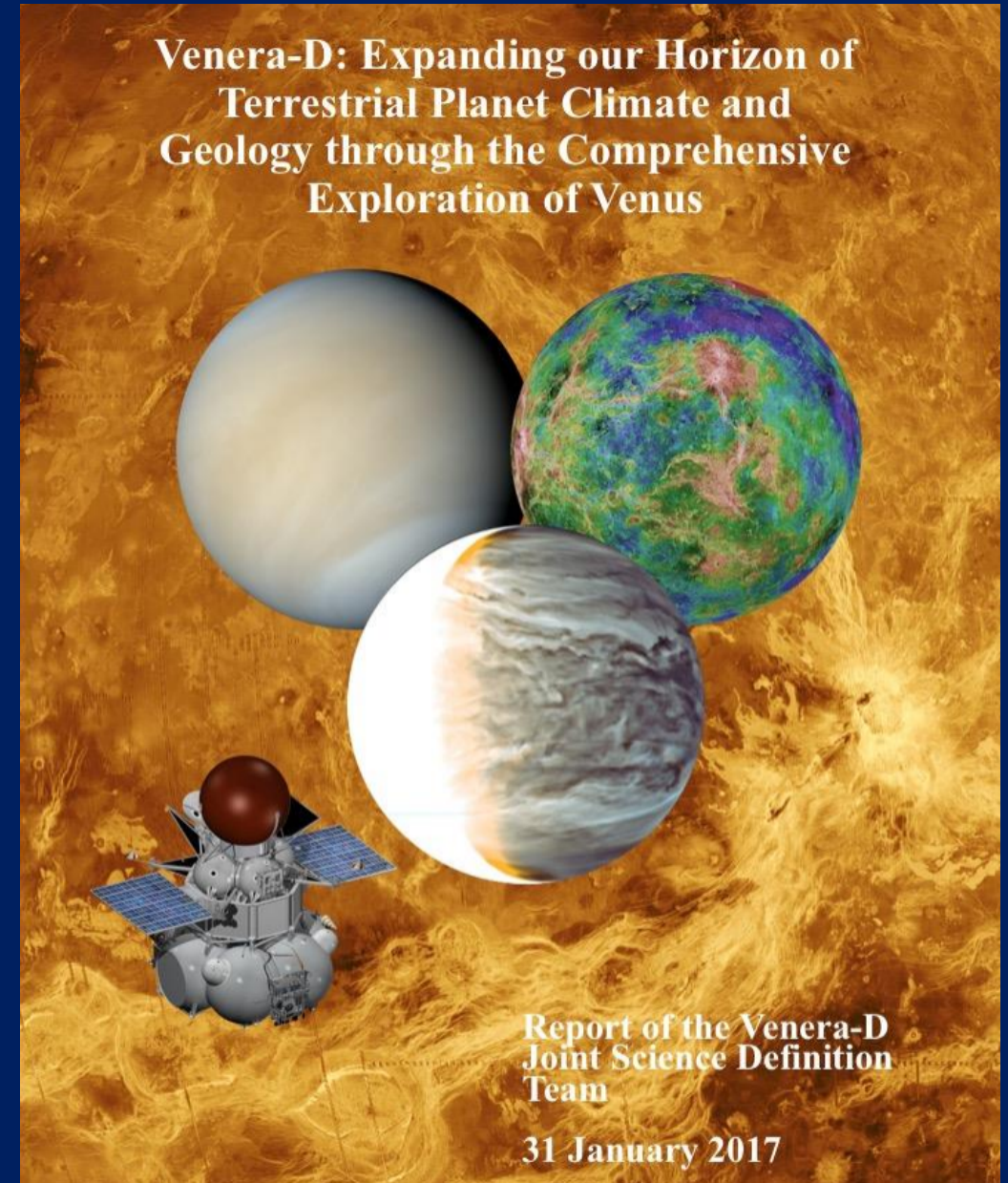
Venera-D Modeling Workshop
October 5-7, 2017, Moscow, Russia

Fifth International Planetary Dunes Workshop
May 16–19, 2017, Dixie State University, St. George, Utah
Indications of Interest are due by Tuesday, April 4, 2017

15th Meeting of the Venus Exploration Analysis Group
November 14–16, 2017, Applied Physics Laboratory, Laurel, Maryland

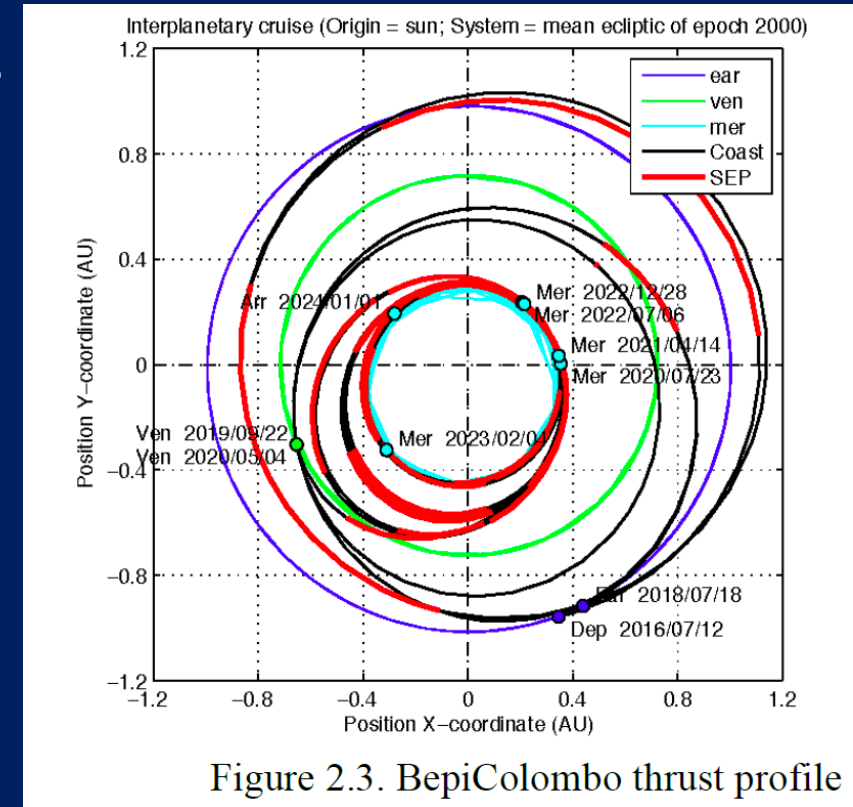
Venera-D Joint Science Definition Team Report

- Orbiter
 - Atmospheric superrotation, radiative balance, composition.
- Lander
 - Chemistry and mineralogy of surface materials, atmospheric composition during descent.
- Subsatellite or Aerial Platform?
- Launches in 2026-2029 studied
- See Announcement for Moscow Workshop, 5-7 Oct 2017.



Venus Gravity Assist Science Opportunity (VeGASO)

- Study aeronomy and atmosphere from fly-bys
 - Atmospheric structure and loss, induced magnetic fields
- Up to 15 gravity assists 2017 – 2028.
 - BepiColombo (ESA) - 2
 - Instruments will be active
 - Solar Probe Plus (NASA) – 7
 - Negotiations ongoing with Heliophysics
 - Solar Orbiter (ESA) – 6
 - TBD
- HQ must develop Participating Scientist program and Proposal Information Package. BepiColombo splinter meeting May 2017.
 - Contact Adriana Ocampo, NASA HQ



EnVision, New Frontiers 4

- EnVision
 - R. Ghail, Lead Proposer
 - SAR, Subsurface sounder, IR mapper
 - Submitted to ESA M5 Call
 - Passed initial technical review, in science review
 - Phase A selections this fall
- New Frontiers 4
 - Venus In Situ Explorer (VISE) specified by 2013 Decadal Survey
 - Step 1 proposals due April 28
 - Step 2 selections by end of CY.



Discovery Selection Outcome

- SMD AA Zurbuchen reached out to VEXAG a few days after the selection announcement. He stated that the results were not due to lack of interest about Venus and he offered a meeting.
- Grimm met in person with AA Zurbuchen and Director Green in mid-Feb, with Gilmore participating remotely.
- AA Zurbuchen explained his selection rationale.
 - We were instructed not to repeat it – he will promulgate.
 - After his top selection, the remainder followed his programmatic choices.
 - All missions were selectable.
 - There was no bias against Venus or for asteroids.

Venus Bridge

- Outcome of AA inquiry “what can you do for \$200M?”
- Focus Group to determine if one or more small missions can accomplish useful science or technology demonstration within nominal cost cap.
 - Gap-filling with broadest impacts; launches in early to mid 2020s
 - Launch, transfer, and comm requirements
 - Develop alternative mission sequences.
- Ideas received so far: atm entry probes (2x), solar occultation for atm. aerosols and trace gases, ion sputtering and escape, IR mapping.
 - PSDS3 “Phase A” selections: Cupid’s Arrow (C. Sotin), Cubesat UV Experiment (V. Cottini).
- Schedule: preliminary concepts Spring 2017; Integrated Design Center/other analyses Summer, final report by VEXAG in Fall.
- IF YOU HAVE AN IDEA OR WANT TO PARTICIPATE SEND BY APRIL 10

Venus Town Hall: Literature

Thumb Drive Contents

Goals, Objectives, and Investigations for Venus Exploration – August 2016

Venus Technology Plan - May 2014

VEXAG Roadmap for Venus Exploration - May 2014

Venus Exploration Themes - September 2014

Concatenated VEXAG Venus Exploration Documents

Final Report - Venus Exploration Targets Workshop – May 2014

Final Report – Venus Science Priorities for Laboratory Measurements and Instrument Definition Workshop – April 2015

Venus Bibliographies: May 2015 – Nov 2016

Hardcopy Handouts

Concatenated VEXAG Venus Exploration Documents

- Goals, Objectives, and Investigations for Venus Exploration – August 2016

- Venus Technology Plan - May 2014

- VEXAG Roadmap for Venus Exploration - May 2014

- Venus Exploration Themes - September 2014

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Venus Activities Later Today

- **Venus Oral Session**
Montgomery Ballroom, 1:30 PM – 13 Presentations
“Unveiling Venus: New Science from Earth's Sister Planet”
- **VEXAG Early Career Scholars Focus Group Informal Meet and Greet**
Acqua Lounge immediately following this afternoon's oral session
Everyone welcome – meet the “yoots”
- **Venus Poster Session**
Thursday Evening, March 23, 6:00 p.m. 28 Posters
“Venus Exploration and Science”



VEXAG

Venus Exploration Analysis Group

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The Venus Exploration Analysis Group

Unveil Venus: Why is Earth's sister planet so different?

VEXAG was established by NASA in 2005 to identify scientific priorities and opportunities for the exploration of Venus, Earth's sister planet. The group has an open membership and an 11-person Executive Committee, 3 Focus Groups, and 2 Topical Analysis Groups. Input from the scientific community is actively sought. The VEXAG provides findings to NASA Headquarters, but does not make recommendations. Stay in touch by visiting our [Twitter](#) and [Facebook](#) pages!

VEXAG Charter

The Venus Exploration Analysis Group is NASA's community-based forum designed to provide scientific input and technology development plans for planning and prioritizing the exploration of Venus over the next several decades. VEXAG is chartered by NASA's Solar System Exploration Division and reports its findings to NASA. Open to all interested scientists, VEXAG regularly evaluates Venus exploration goals, scientific objectives, investigations, and critical measurement requirements, including especially recommendations in the NRC Decadal Survey and the Solar System Exploration Strategic Roadmap.

Guiding Documents

[Goals, Objectives and Investigations for Venus Exploration: 2014 \(active version\)](#)

[Roadmap for Venus Exploration: 2014](#)

[Venus Exploration Themes: 2014](#)

[Venus Technology Plan: 2014](#)

[Goals, Objectives and Investigations for Venus Exploration: 2016 \(draft for community review\)](#)



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