

Findings and Resolutions from VEXAG Meeting #15
November 14 – November 16, 2017 meeting

Findings

Finding #1

VEXAG requests that NASA begin implementation of a balanced program of Venus exploration, consisting of elements drawn from Flagship, New Frontiers, Discovery, and smallsat missions. NASA has indicated that a new Venus Flagship study will be funded in 2018, whose flight selection will depend on prioritization in the 2020 Planetary Science Decadal Survey. Competed opportunities exist in New Frontiers and Discovery. The PSDS3 and Venus Bridge smallsat studies, all yet to be completed, may reveal classes of missions that perform useful science with acceptable risk. VEXAG does not view smallsats as replacements for larger missions but rather as pathfinders and, as the Venus Bridge name intends, a way to reinvigorate the US Venus community toward directed or competed, later and larger missions. If viable missions are identified through PSDS3 or Venus Bridge and NASA should decide to commit to one or more smallsats through a Venus-dedicated call, VEXAG urges NASA to move forward as quickly as possible, because interplanetary ride-along opportunities will exist beginning in the early 2020s.

Finding #2

VEXAG recognizes the value of NASA's continued engagement in international missions to Venus. As the only active mission at Venus, JAXA's Akatsuki has provided exciting and important new insights into the atmospheric dynamics of Venus and the Akatsuki Participating Scientist program has contributed to support of Venus science in the US. The Venera-D Joint Science Definition Team is laying the groundwork for a large strategically directed mission that may unite the US and Russia in addressing some of the greatest challenges in Venus exploration. US participation may be possible in potential ESA and Indian missions as they mature. These future missions also present NASA with opportunities for smallsat shared launches or ride-alongs. We encourage NASA to continue to identify specific opportunities for US participation on future international missions, in parallel to NASA's development of its own Venus exploration mission portfolio.

Finding #3

VEXAG reaffirms its endorsement of the Venus Gravity Assists Science Opportunity (VeGASO) Program. We appreciate that the BepiColombo mission (BC) has already agreed to operate its science instruments during the Venus flybys. NASA and ESA appear amenable to VEXAG's suggestion for a simple two-step sequence for VeGASO implementation (Proposal Information Package followed by

Participating Scientist call) that assures broad community input and detailed science justification. VEXAG urges completion of this plan as BC approaches launch in September 2018 and further encourages continued science dialogue about the forthcoming Venus gravity-assist opportunities with Solar Orbiter, Europa Clipper, and other future missions.

Finding #4

VEXAG encourages NASA to continue the HOTTech program and solicit new proposals in the ROSES 2018 calls. Technology development and infrastructure to enable new science capabilities is a foundation for future Venus exploration. VEXAG applauds the direction of the HOTTech program, which is developing technology that will enable significant advances in Venus surface science. VEXAG encourages new HOTTech proposal calls in 2018 not only for targeted component technologies (e.g., increased power density or surface imaging capabilities), but also the development of subsystem/system capabilities. Key to such future developments is the GEER facility. VEXAG fully supports the continued operation and open access of GEER as a central Venus community resource for technology development and science investigation, and foresees an increasing role for the facility. VEXAG further encourages PESTO objectives alignment with VEXAG technology needs, and that a coordinated response be initiated across multiple programs to enable future Venus mission capabilities.

Finding #5

VEXAG supports the ongoing Venus Aerial Platforms (VAP) study and requests a new competed program to continue technology development. The VAP study is defining the science capabilities of aerial platforms, the maturity of the different aerial platform concepts, and the technology investments that will be needed. Furthermore, the VAP study will serve as a model for critically analyzing exploration concepts for the unique Venus environment. VEXAG has previously identified aerial platforms as one of four key technologies for Venus exploration and it is currently the only one that is not funded. A new competed program will enable development of a variety of platforms that could be considered as stand-alone or auxiliary components (e.g., Venera-D).

Finding #6

VEXAG encourages NASA support for a Venus Surface Platform Study to assess the increasing science that is enabled by increasing surface lifetime, mobility, and landing precision. This study should also assess the technology for exploring Venus' surface with landers and probes, and to lay out a roadmap for the future exploration of the planet by this means. It is envisioned that this study will be modeled on the current Venus Aerial Platform Study. The Surface Platform study will merge knowledge gained from recent results of mission studies (PSDS3 and Venus Bridge)

and new technology advances. The product of this effort will be a report for use by the Venus science community and NASA's Planetary Science Division. The objective is to use this work to help inform future scientific and technical development applicable to Venus surface exploration and possible future Missions.

Finding #7

VEXAG encourages NASA to resume annual solicitation for the Early Career Fellowship (ECF) Program and to continue supporting other opportunities for early career scientists. Because the ECF was not solicited as part of ROSES-2017, some early career scientists missed an opportunity to receive a unique credential and funding that would greatly assist their efforts to secure long-term employment. We encourage NASA to extend the eligibility for future solicitations so that a cohort of planetary scientists is not unfairly excluded by this gap in the program. We appreciate that reestablishing the ECF as a stand-alone program is important to the goal of supporting key individuals to achieve high impact science. VEXAG also encourages PSD support of opportunities for early career scientists beyond the ECF, including travel support to conferences that encourage participation from early career scientists.

Finding #8

VEXAG encourages NASA to form a cross-divisional research program for Comparative Climatology of the Terrestrial Planets (CCTP). It is essential to understand Venus, Earth, and other solar system worlds in the context of exoplanets, and to leverage our detailed knowledge of Earth and our solar system to understand new data on exoplanets. Understanding Venus and other worlds in the context of solar/stellar forcings is, by its very nature, an interdisciplinary endeavor. Collaborations with the Earth climate research community have already provided important expertise and tools to understanding Venus and other worlds, which have been evident at prior CCTP meetings. The CCTP meetings have been a model of cross-divisional support and other cross-divisional programs (NAI, NLSI/SSERVI, NeXSS) have been successful. It was our understanding that a new CCTP element was planned but deferred. We urge NASA to implement this important opportunity.

Resolution #1

In order to share international planning and foster communication, **VEXAG supports the requests by the International Venus Exploration Working Group (IVEWG) to the Program Committees of the 2018 COSPAR and the 2018 IAC meetings to include a two-hour panel discussion** at each venue with planetary exploration representatives of space agencies considering or already involved in Venus exploration.

Resolution #2

In order to foster consistency in the naming conventions for Venus, **VEXAG intends to request the IAU to change the names of Maxwell Montes, Alpha Regio, and Beta Regio to names of appropriate Goddesses, Giantesses or female Titans.** We encourage public input into the renaming, which will improve the visibility of and excitement about the study of Venus.