Venus Science Coordination group (VeSCoor)

TERMS OF REFERENCE

June 2022

This document contains the Terms of Reference (ToR) for the Venus Science Coordination group (VeSCoor) established by NASA and ESA. This ToR defines the group's purpose, tasking, composition, and operation. The VeSCoor will not provide recommendations or advice to ESA or NASA.

1. Background

In 2021, ESA and NASA selected three missions to Venus, as follows:

- VERITAS, a NASA orbital mission currently planned for launch in 2027-2028, will study the surface and interior with a radar and infrared instrument that provide global topography, imaging, rock type, and targeted surface deformation, plus radio science for interior structure;
- DAVINCI, a NASA descent probe mission currently planned for launch in 2029-2031 to determine the composition and history of Venus' atmosphere as well as make other measurements of the planet's surface and atmosphere. The mission consists of a spacecraft hosting a carrier and a descent probe, hosting seven in-situ, imager and spectrometer instruments; and
- EnVision, an ESA orbital mission in collaboration with NASA, currently planned for launch in 2031-2032, will be the first mission to simultaneously investigate Venus' history, activity and climate, from its inner core, to its surface, and further up to its upper atmosphere. EnVision's science payload consists of five instruments (radar, spectrometers, sounding radar and radio science experiment).

These missions will offer an unprecedented complementary view of Venus and determine fundamental characteristics of the planet. The missions are also designed to assess the most compelling questions about Venus including:

- How have the surface and interior of Venus evolved?
- How geologically and tectonically active is Venus today, and how active has it been over the past billion years?
- How are Venus' atmosphere and climate shaped by geological processes?

- Did Venus have oceans – and could evidence of past water remain in the oldest rocks found on Venus' surface?
- What is the habitability of Venus now and throughout its history?
- What caused Earth and Venus to develop so differently?
- How does Venus lose heat, and when and why did the runaway greenhouse effect begin at the planet?
- What are the lessons from Venus that can be applied to the study of exoplanets?

NASA and ESA selected these missions under separate competitive proposal processes. While the profiles, objectives, and requirements of these missions were set at their selection, ESA and NASA recognize that there are potential synergies to improve science outcomes. Furthermore, science from these missions benefits from engaging in discussions with the broader Venus scientific community as well as a number of other international entities and commercial ventures that are planning missions to Venus in the same timeframe. Consequently, the agencies determined that it would be beneficial to establish a coordinating group to foster dialogue with the broader Venus scientific community.

2. Purpose

VeSCoor is a Venus missions forum for dialogue within the broader Venus scientific community, in support of the upcoming ESA and NASA missions to Venus. VeSCoor's primary goals are to identify new, unanticipated scientific approaches and outcomes based on synergies among the missions to Venus and suggest studies to enhance overall scientific return.

VeSCoor will not evaluate or propose changes to the current mission profiles, scientific objectives, or requirements.

3. Convening Authorities and Terms

ESA and NASA are the joint convening authorities for VesCoor. The ToR may be amended or terminated at any time by mutual accord of NASA and ESA.

VesCoor is initially set for 5 years from the date of NASA-ESA's ToR document concurrence, but may be renewed at the discretion of NASA and ESA.

4. Statement of Task

VeSCoor will serve as a forum for discussion of synergistic science and identify the scientific connections among Venus missions and will undertake the following tasks:

- Develop a Rules of the Road (RoR) document, to be approved by ESA and NASA, to establish the day-to-day modus operandi for VeSCoor;

- Identify scientific complementarity between the future Venus missions, enhancing the emerging insights and interests of the broader Venus science community;
- Provide a yearly (at minimum) report to NASA and ESA including:
    - any new science that may be enabled by synergistic activities among the missions;
    - enhanced science that may be achieved by combined mission activities and outcomes; and
    - optimization of planned science returns.

Outcomes will be released publicly in the form of presentations and papers with coordination from ESA and NASA.

Expected initial activities

VeSCoor is expected to develop ideas in specific research areas for Venus science in coordination with the current missions, and in consideration of past and future Venus missions, as well as the reports of national and international Venus working groups. These identified research areas may be addressed through scientific means such as coordinated multi-mission science observations, ground- and space-based observations, computer simulations, laboratory research, and field-based research on planetary analogues. This would include, but not be limited to:

- research approaches that could enable greater scientific return
- pre-launch or other cross-mission sensor calibration strategies
- opportunities for cross-mission data analysis
- potential joint or enhanced data product generation

The initiatives promoted by the VesCoor should not overlap and/or pre-empt the scientific activities and data processing/analysis plans implemented by the ESA and NASA mission science teams.

Meetings

VesCoor will meet twice per year with alternate hosting by NASA and ESA (possibly back-to-back with other planned international scientific meetings). These semi-annual meetings will be public and open forums. If in person meetings are planned, a hybrid option with web conferencing will be offered. Additional sub-group discussions may occur more frequently.

5. VesCoor Leadership and Membership

Leadership

VeSCoor will be led by two co-chairs, selected from the community; one appointed by ESA and the other by NASA. The term will be two years for the co-chairs and may be renewable.

Membership

VeSCoor membership outside of the co-chairs will be comprised of the following:

- One member per mission science team, proposed by the mission science teams to ESA or NASA, and appointed to VeSCoor by ESA or NASA, as relevant.
- Initially up to ten additional members-at-large representing the Venus science community with five appointed by NASA and five appointed by ESA based on each agency's preferred means.
- Additional members could be invited by ESA and NASA to represent other entities interested in contributing to VeSCoor activities. This may include international agencies, private sector, and non-profit organizations. These members would be responsible for supporting their own participation.

The term will be two years for the members and may be renewable.

The NASA-appointed members will be selected from scientists from US governmental or inter-governmental entities, laboratories, research centers, and academia which participate and are interested in Venus space science activities and are capable of contributing to or carrying out Venus science. NASA will provide travel and per diem support to these scientists and technologists for attending VeSCoor meetings.

The ESA-appointed members will be selected within ESA's Member States; the selection will be open to scientists from scientific institutions and other science organizations. ESA will provide travel and per diem support to these scientists for attending VeSCoor meetings (maximum twice per year).

Agency Science Coordinator Members

ESA and NASA will each appoint a single non-voting member to VeSCoor.

LORI GLAZE Digitally signed by LORI GLAZE
Date: 2022.06.15 15:43:09
-04'00'

Dr. Lori Glaze

Director
Planetary Science Division
NASA

Date:

Dr. Fabio Favata

Head of the Strategy, Planning, and Coordination Office
Science Directorate, ESA

Date: July 8, 2022