PROSPECTS FOR INTERNATIONAL COLLABORATION FOR VENUS EXPLORATION

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VEXAG TOPICAL GROUP ON INTERNATIONAL COLLABORATIONS

12TH VEXAG MEETING, HAMPTON, VA, 9 APRIL 2015

SUCCESSES

- **ESA-NASA collaboration on Venus Express**
  - Participating Scientists and Interdisciplinary Scientists, Education and Public Outreach
- **JAXA-NASA collaboration on Akatsuki (Venus Climate Orbiter)**
  - Participating Scientists and Scientist in Residence. Orbit insertion in late November 2015 with a nominal 2-year mission in a long equatorial orbit
- **Roscosmos-NASA Collaboration on Russia's Venera-D mission**
  - Joint Science Definition Team solicited and selected in February 2014
  - Two telecons conducted and first face to face meeting was planned to take place in Moscow in April 2014
  - All dialog halted due to diplomatic tensions following the Ukraine conflict fallout

VEXAG should request PSD to consider re-opening the VENERA dialogue!

ISRO

- **First Venus workshop held in July 2012 at Indian Institute of Science and Technology, Thiruvananthapuram, Kerala, India**

- **India-Belgium workshop on Mars and Venus held in Bangalore in May 2013**

- **First (India-Belgium workshop) on Venus held in June 2014**
  well attended by ISRO senior staff
  First call for a community proposal for a mission to Venus
- **Second ISRO sponsored Venus meeting held in October 2014 in Hyderabad to discuss science ideas for a mission to Venus**

- **Report from the workshop has been submitted to ISRO HQ.**

ISRO MISSION TO VENUS?

www.prl.res.in/~rajiv/planexnews/oldPlanexpdf/Volume%20-5,%20Issue-1.pdf

Volume -5, Issue-1, Jan 2015

EVENTS

2ND VENUS WORKSHOP – NGRI

The second workshop on Venus was held on Oct. 28-29, 2014 at the National Geophysical Research Institute, Hyderabad in collaboration with PLANEX-PRL. The workshop was organised to explore scientific objectives for a probable Indian Venus expedition in the near future. The main aim was to expose the students and researchers to the intricacies of Venusian Science. The proceedings included new scientific payloads, proposals, past/current studies (geomorphic, atmospheric), mission launch possibilities and orbital ephemeris.

Dr. Y. J. Bhaskar Rao, Director, NGRI delivered the opening remarks by highlighting the contributions made by NGRI to terrestrial science, which acts as a foundation for planetary explorations. Early earth process like archean aged rocks, tectonics of earth and the clues for understanding the evolution of our own planetary body were the highlights of the talk. He also mentioned that Venus may also have some of their clues hidden within it, which is yet to be deciphered. He suggested the researchers to find out new and intelligent ways to explore the early Venus surface. He expressed his gratitude in involving young researchers and students in such workshops. Following this, Prof. J. N. Goswami, PRL emphasized on the real challenges involved in targeting Venus, which is much more complex than Mars or Moon. He advised to aim for a long, dedicated and thorough study of Venus in order to achieve scientific and technological breakthroughs in an Indian mission to Venus. He shared his experiences with the past planetary missions and studies on planetary bodies, and mentioned that even though Earth and Venus are of almost similar mass and size their geological make-up is different and they pose different challenges. Thus, the variation among the two nearby planetary bodies is a puzzle to be solved.

NASA – ISRO Collaboration

A Mars Joint Working Group has been formed between NASA and ISRO in

First meeting held in Bangalore in February 2014

Would be useful to have:

A NASA-ISRO Venus Science Working Group in the near future will be timely

Mutual access to the planetary mission data collected by the two agencies through the respective data archives

Encourage collaboration on any proposed ISRO mission to Venus and consider offering communications relay hardware (e.g. Electra) at least

Archiving Data from past NASA and international Venus missions

Venus Express data have been archived at ESA's Planetary Science Archive and accessible through NASA's PDS

A lot of unique and valuable data from Venera missions has NOT been archived but still available with experiment providers

Raw data from Pioneer Venus Probe and Orbiter missions still exists but not in NSSDC or PDS holdings

VEXAG should consider suggesting:

- *NASA-IKI dialog on archiving the invaluable Venera*
- *NASA-ISRO dialog on transparent two-way access between PDS to ISRO's Planetary Science Data Archive (Chandrayaan, MOM)*

Summary

International collaboration is the norm for exploration of Venus and has demonstrably successful

Suggested VEXAG Actions

Request PSD/SMD to re-open the Venera-D dialogue and continue the effort of the JSDT

Request PSD/SMD to approach IKI to implore archiving the Venera data

Suggest a NASA-ISRO Science Working Group on Venus

Suggest approaching ISRO for mutual access to respective planetary data archive