VENUS PRESSURE CHAMBER: A SMALL TESTING FACILITY AVAILABLE TO THE COMMUNITY.

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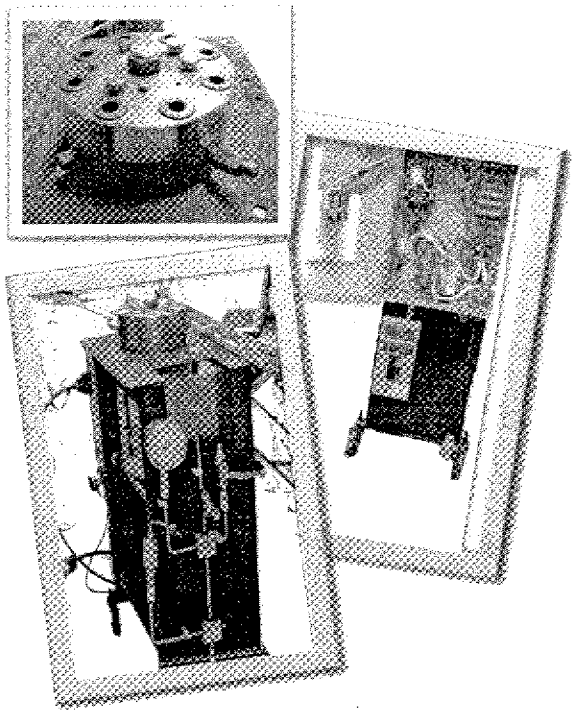
Introduction: Venus is an inhospitable planet where the surface mean temperature is ~740K and the global mean pressure is ~95 bars. The atmosphere is comprised mostly of CO_2 (~96.5%) and N_2 (~3.5%) with trace amounts of CO and other reactive gases. Although Venus is very similar in size and mass with the Earth and is Earth's nearest planetary neighbor, it has not received many visitors from Earth, especially those that can land on the surface. In fact, only the USSR's Venera and Vega programs designed landers to specifically target and survive on the surface of Venus. The challenge most often cited for this scarcity of surface probes is the workability/survivability of instruments and equipment in Venus' harsh environment. As noted in a presentation to the scientific community by the Venus Science and Technology Definition Team (VSTDT), "[The] key to enabling a Venus Flagship mission is the ability to conduct investigations and tests in Venus simulation chambers." [1]. It was noted that "pressure and temperature mitigation technologies, whether high temperature electronics or efficient cooling mechanisms, must also be developed to a high level of readiness. Sensors and transducers that operate for long periods under ambient Venus conditions will also be required."

In order to overcome this obstacle, a small pressure chamber has been acquired for use by the scientific community through the auspices of NASA Headquarters. The chamber was originally developed by Dr. William Byrd at Iowa State University through the Iowa Space Grant Consortium. It is housed at Goddard Space Flight Center in Maryland and is available to the community for testing of small flight components/instruments and short-term experiments that require high temperatures and pressures.

Specifications: The pressure vessel is constructed of 316 stainless steel and is able to maintain a temperature of 740K and pressure of 95.6 bar for ~48 hours under a carbon dioxide atmosphere. Gases that can also be used include nitrogen and sulfur dioxide (at ppm levels in a mixture). The dimensions of the chamber are five inches in diameter and twelve inches deep. The actual working space is expected to be slightly smaller because of volume taken up by monitoring sensors. The chamber is currently being tested and calibrated at Goddard. Viewing ports and/or thoughputs for data and power are potential options. Running at temperatures and pressures lower than those found at the surface of Venus are also possible. The software used with the chamber is LabView and records simultaneous temperature and pressure readings.



How do I gain access? In order to obtain time for the pressure chamber, please contact Natasha Johnson at Goddard Space Flight Center (phone: 301-286-3919 or email: natasha.m.johnson@nasa.gov). Discussions will be held to make the most of the chamber's abilities and the proposed project in both design and outcome. Funding may also be available by proposing through the NASA ROSES opportunities (see sections C.16 and C.17). This chamber is for the use by the community. If there is a project or experiment that could benefit, please contact us. This facility is meant to gain forward momentum toward exploring Venus and through discussions and well-thought out projects, we will all be steps closer in accomplishing this goal.

References: [1] Bullock M. A. (2009) *LPS XL*, Abstract #2410.

Acknowledgments: *The availability of this chamber would not be possible without the support of NASA and the Goddard Space Flight Center. Appreciation is also extended to Dr. William Byrd who originally built the chamber.*