Vacuum Chamber Nasa

This book provides unique access to the story of how scientists were accepted into the American Space Programme, and reveals how, after four difficult decades, the role of the heroic test pilot astronaut has been replaced by men and women who are science orientated space explorers.

The problem: In the development of ion rocket engines using hydrogen as a propellant, vacuum test facilities are required to provide high pumping speeds at pressures as low as one-tenth micron of mercury. The cryopumping of gaseous hydrogen at such low chamber pressures would require condensers cooled to the temperature of liquid helium (4.30K). The problem is to develop a practical method for cryopumping of hydrogen in vacuum test chambers.

An open circuit wind tunnel designed to operate in a large vacuum chamber was built at NASA-Ames to investigate saltation threshold, flux, deflation rates, and other aeolian phenomena on the planet Mars. The vacuum chamber will operate at pressures as low as 4 mbar, and the tunnel operates at windspeeds as high as 150 m/sec. Either air or CO2 can be used as a working fluid. It was found that, to a first order approximation, the same dynamic pressure was required at Martian pressure to entrain or saltate particles as was required on Earth, although wind and particle speed are considerably higher at Martian pressure. A 2nd wind tunnel, designed to operate aboard the NASA KC-135 0-g aircraft to obtain information on the effect of gravity on saltation threshold and the interparticle force at 0-g, is also described and test data presented. Some of the experiments are summarized and various aspects of low pressure aeolian entrainment for particles 12 to 100 micron in diameter are discussed, some of them unique to low pressure testing and some common in Earth pressure particle transport testing. The facility, the modes of operation, and the materials used are described. Leach, Rodman and Greeley, Ronald and Pollack, James Ames Research Center NCC2-346...

The problem: In tests simulating the vacuum environment of space, molecules escaping from the surface of the test item rebound from the chamber walls and strike the test item many times before being removed by the vacuum pump. Some of the molecules will adhere to the test item surface. Since this will not occur in space, where escaping molecules have a mean free path in the order of hundreds of kilometers, an accurate picture of the life in space of the test item surface cannot be obtained using only a vacuum chamber. The solution: An omnidirectional, anistropic chamber fabricated to enclose the test item at the intersection of its six truncated pyramids.

Welding in the vacuum of space represents an important and fundamental problem for space exploration. Repairs or connection of metal components on orbit or during travel to the moon or distant planets may be required. Cracks or holes in spacecraft skin or supporting structures external to the pressurized section will require some type of repair that must be permanently made to the skin or support by welding. The development of a translation/positioning system that will permit research into welding of metal samples in a small vacuum chamber located at Marshall Space Flight Center (MSFC) is addressed. The system and associated software was tested to the extent possible without the availability of the welder power supply or control computer that must be supplied by MSFC. Software has been developed for straight line welding. More extensive and varied translations are possible with simple alterations to the operating software to use the full capabilities of this three axes system. The source code 'VW.BAS' has been provided to serve as an example for further development of the vacuum welder translation system. Smith, James E., Jr. and Cashon, John L. Unspecified Center NAS8-36955...

Is your picosatellite ready for launch? Can it withstand rocket thrusts and the vacuum of space? This do-it-yourself guide helps you conduct a series of hands-on tests designed to check your satellite’s readiness. Learn precisely what the craft and its electronic components must endure if they’re to function properly in Low Earth Orbit. The perfect follow-up to DIY Satellite Platforms (our primer for designing and building a picosatellite), this book also provides an overview of what space is like and how orbits work, enabling you to set up the launch and orbit support you’ll need. Go deep into the numbers that describe conditions your satellite will face Learn how to mitigate the risks of radiation in the ionosphere Pick up enough formal systems engineering to understand what the tests are all about Build a thermal vacuum chamber for mimicking environment of space Simulate the rocket launch by building and running a vibration shake test Use a homebuilt centrifuge to conduct high G-force tests Get guidelines on scheduling tests and choosing an appropriate lab or clean room

Inflatable aperture reflector antennas are an emerging technology that NASA is investigating for potential uses in science and exploration missions. As inflatable aperture antennas have not been proven fully qualified for space missions, they must be characterized properly so that the behavior of the antennas can be known in advance. To properly characterize the inflatable aperture antenna, testing must be performed in a relevant environment, such as a vacuum chamber. Since the capability of having a radiofrequency (RF) test facility inside a vacuum chamber did not exist at NASA Glenn Research Center, a different methodology had to be utilized. The proposal to test an inflatable aperture antenna in a vacuum chamber entailed performing a photogrammetry study of the antenna surface by using laser ranging measurements. A root-mean-square (rms) error term was derived from the photogrammetry study to calculate the antenna surface loss as described by the Ruze equation. However, initial testing showed that problems existed in using the Ruze equation to calculate the loss due to errors on the antenna surface. This study utilized RF measurements obtained in a near-field antenna range and photogrammetry data taken from a laser range scanner to compare the expected performance of the test antenna (via the Ruze equation) with the actual RF patterns and directivity measurements. Results showed that the Ruze equation overstated the degradation in the directivity calculation. Therefore, when the photogrammetry study is performed on the test antennas in the vacuum chamber, a more complex equation must be used in light of the fact that the Ruze theory overstates the loss in directivity for inflatable aperture reflector antennas. Welch, Bryan W. Glenn Research Center NASA/TP--2008-214953, E-16182 WBS 439432.04.04.01 REFLECTOR ANTENNAS; VACUUM CHAMBERS; PHOTOGRAMMETRY; LASER RANGING; ROOT-MEAN-SQUARE ERRORS; RADIO FREQUENCIES; APERTURES; INFLATABLE STRUCTURES; NEAR FIELDS; LOSSES; SPACE MISSIONS

Reviews the cooperation between NASA & DoD since May 1996 to develop a national perspective on aerospace test facilities. Determines (1) the extent to which NASA/DoD working groups (alliancesÓ) on major test facilities have been operating on a regular basis, (2) NASA's & DoD's actions in response to a future need to test an engine for new Air Force rockets, (3) whether NASA & DoD prepared a congressionally required joint plan on rocket propulsion test facilities, & (4) whether NASA & DoD are implementing a DoD assessment team's recommendation in March 1997 to jointly manage with NASA certain aeronautical test facilities.

These proceedings are based upon the invited review papers and the research notes presented at the NATO Advanced Research Institute on "Artificial Particle Beams in Space Plasma Studies" held at Geilo, Norway April 21-26, 1981. In the last decade a number of research groups have employed artificial particle beams both from sounding rockets and satellites in order to study various ionospheric and magnetospheric phenomena. However, the artificial particle beams used in this manner have given rise to a number of puzzling effects. Thus, instead of being just a probe for studying the ambient magnetosphere, the artificial particle beams have presented a rich variety of plasma physics problems, in parti~ular various discharge phenomena, which in themselves are worthy of a careful study. The experimental studies in space using artificial particle beams have in turn given rise to both theore tical and laboratory studies. In the laboratory experi ments special attention has been paid to the problem of creating spacelike conditions in the vacuum chamber. The theoretical. work has addressed the question of beam plasma-neutral interaction with emphasis on the wave generation and the modified energy distributions of the charged particles. Numerical simulations have been used extensively. With the advent of the Space Shuttle in which several artificial particle beam experiments are planned for the 1980's, there is a growing interest in such experiments. Furthermore, there is a need for coordinating these studies, both in space and in the laboratory.

The problem: Tests conducted in a vacuum environment may require that radio-freqncy signals be sent thorough the wall of the vacuum chamber. It is essential to eliminate ground loops and interference pickups when coaxial cables are connected from the inside to the outside of a metal chamber wall. The solution: Modification of a standard radio-frequency coaxial connector so that a plastic insulating sleeve can be mounted in the wall of the vacuum chamber. Only a modest amount of machining, or other work, is required.

PRINT FORMAT ONLY NOTE: NO FURTHER DISCOUNT FOR THIS PRINT PRODUCT- OVERSTOCK SALE -- Significantly reduced list price This new book from the NASA History Series tackles an interesting duo of biological problems that will be familiar to anybody who has seen photos of Apollo astronauts quarantined after their return to Earth. Namely, how do we avoid contaminating celestial bodies with Earthly germs when we send spacecraft to study these bodies, and how do we avoid spreading foreign biological matter from space when our robotic and human spacefarers return to Earth? Biological matter from an external system could potentially cause an unchecked epidemic either on Earth or in space so strict precautions are necessary. Each time a space vehicle visits another world it runs the risk of forever changing that extraterrestrial environment. We are surrounded on Earth by a mélange of different microorganisms, and if some of these hitchhike onboard a space mission, they could contaminate and start colonies on a different planet. Such an occurrence would irrevocably alter the nature of that world, compromise all future scientific exploration of the body, and possibly damage any extant life on it. By inadvertently carrying exotic organisms back to Earth on our spacecraft, we also risk the release of biohazardous materials into our own ecosystem. Such concerns were recognized by scientists even before the 1957 launch of Sputnik. This book presents the history of planetary protection by tracing the responses to the above concerns on NASA’s missions to the Moon, Mars, Venus, Jupiter, Saturn, and many smaller bodies of our solar system. The book relates the extensive efforts put forth by NASA to plan operations and prepare space vehicles that return exemplary science without contaminating the biospheres of other worlds or our own. To protect irreplaceable environments, NASA has committed to conducting space exploration in a manner that is protective of the bodies visited, as well as of our own planet.

Unofficially they called themselves the TFNG, or the Thirty-Five New Guys. Officially, they were NASAs Group 8 astronauts, selected in January 1978 to train for orbital missions aboard the Space Shuttle. Prior to this time only pilots or scientists trained as pilots had been assigned to fly on Americas spacecraft, but with the advent of the innovative winged spacecraft the door was finally opened to non-pilots, including women and minorities. In all, 15 of those selected were categorised as Pilot Astronauts, while the other 20 would train under the new designation of Mission Specialist. Altogether, the Group 8 astronauts would be launched on a total of 103 space missions; some flying only once, while others flew into orbit as many as five times. Sadly, four of their number would perish in the Challenger tragedy in January 1986. In their latest collaborative effort, the authors bring to life the amazing story behind the selection of the first group of Space Shuttle astronauts, examining their varied backgrounds and many accomplishments in a fresh and accessible way through deep research and revealing interviews. Throughout its remarkable 30-year history as the workhorse of NASAs human spaceflight exploration, twice halted through tragedy, the Shuttle fleet performed with magnificence. So too did these 35 men and women, swept up in the dynamic thrust and ongoing development of Americas Space Shuttle program. This book on the Group 8 Astronauts, the TFNGs, is an excellent summation of the individuals first selected for the new Space Shuttle Program. It provides insight into what it took to first get the Space Shuttle flying. For any space enthusiast it is a must read. Robert L. Crippen PLT on STS-1.

Resulting from the authors’ deep research into these two pre-Shuttle astronaut groups, many intriguing and untold stories behind the selection process are revealed in the book. The often extraordinary backgrounds and personal ambitions of these skilled pilots, chosen to continue NASA’s exploration and knowledge of the space frontier, are also examined. In April 1966 NASA selected 19 pilot astronauts whose training was specifically targeted to the Apollo lunar landing missions and the Earth-orbiting Skylab space station. Three years later, following the sudden cancellation of the USAF’s highly classified Manned Orbiting Laboratory (MOL) project, seven military astronauts were also co-opted into NASA’s space program. This book represents the final chapter by the authors in the story of American astronaut selections prior to the era of the Space Shuttle. Through personal interviews and original NASA documentation, readers will also gain a true insight into a remarkable age of space travel as it unfolded in the late 1960s, and the men who flew those historic missions.

The NASA Technical Reports Server (NTRS) houses half a million publications that are a valuable means of information to researchers, teachers, students, and the general public. These documents are all aerospace related with much scientific and technical information created or funded by NASA. Some types of documents include conference papers, research reports, meeting papers, journal articles and

more. This is one of those documents.
Test process, milestones and inputs are unknowns to first-time users of Chamber B. The User Test Planning Guide aids in establishing expectations for both NASA and non-NASA facility customers. The potential audience for this guide includes both internal and commercial spaceflight hardware/software developers. It is intended to assist their test engineering personnel in test planning and execution. Material covered includes a roadmap of the test process, roles and responsibilities of facility and user, major milestones, facility capabilities, and inputs required by the facility. Samples of deliverables, test article interfaces, and inputs necessary to define test scope, cost, and schedule are included as an appendix to the guide.
The Congressional Record is the official record of the proceedings and debates of the United States Congress. It is published daily when Congress is in session. The Congressional Record began publication in 1873. Debates for sessions prior to 1873 are recorded in The Debates and Proceedings in the Congress of the United States (1789-1824), the Register of Debates in Congress (1824-1837), and the Congressional Globe (1833-1873)