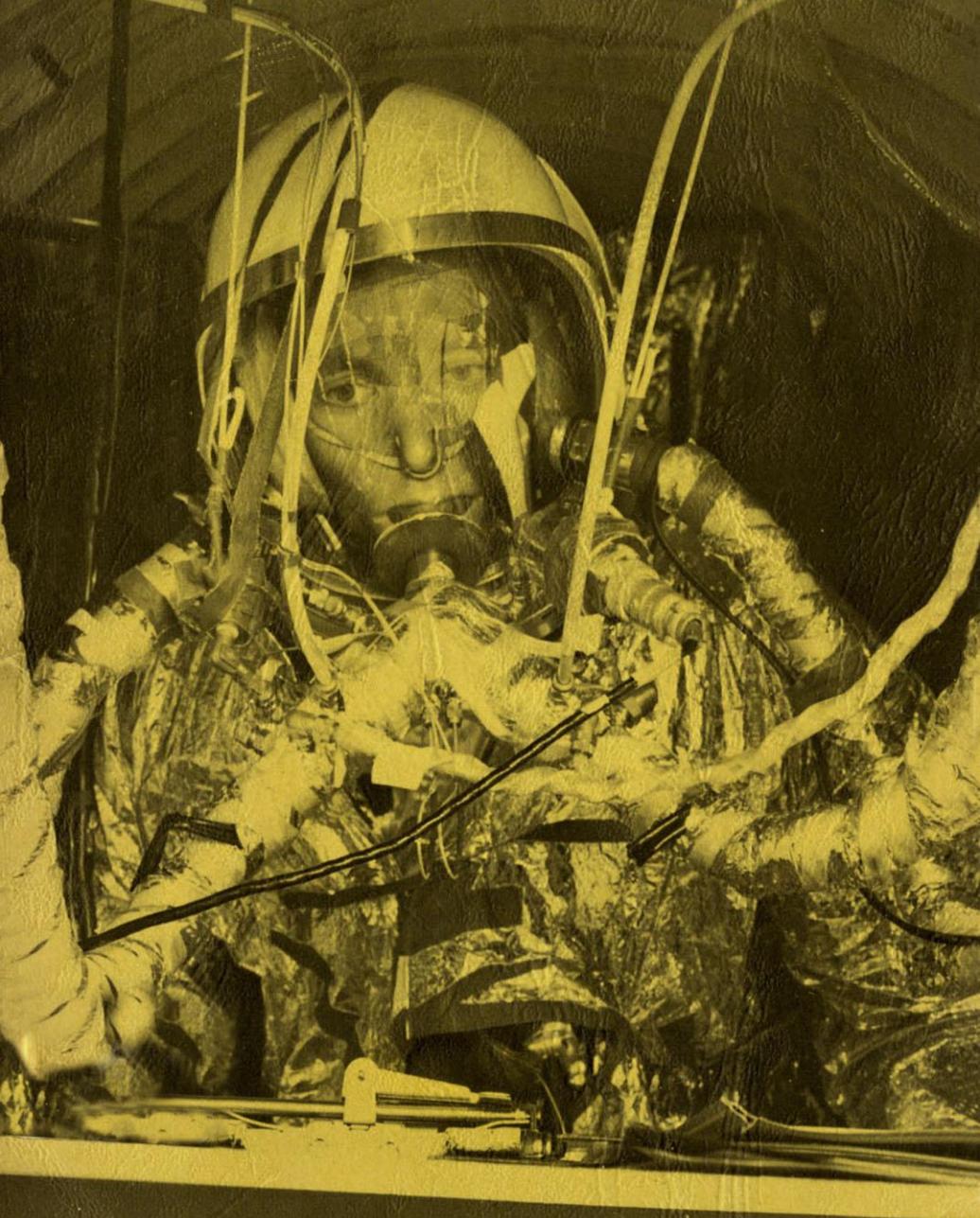


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# **IN THE OPERATION OF MANNED SPACE CHAMBERS**



**PUBLISHED BY THE AMERICAN SOCIETY FOR TESTING AND MATERIALS**

# FACTORS IN THE OPERATION OF MANNED SPACE CHAMBERS

A Symposium  
presented at the  
Fifth Pacific Area  
National Meeting,  
AMERICAN SOCIETY FOR  
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## Foreword

As the Gemini and Apollo programs proceed toward their ultimate goals, the role of man in space becomes more important to the success of the missions. To perform his extra-vehicular assignments, he will be asked to venture from the relatively safe confines of the space capsule to the more hostile environment of space. To determine his effectiveness as well as that of his support equipment, and his compatibility with his assigned mission and the vehicle that will carry him, it is vital that tests be conducted in a simulated space environment.

To simulate this environment, several large space chambers throughout the United States have been or are in the process of being "man-rated," that is, equipped and certified for occupancy by man. It was the intent of this symposium to bring together the various disciplines and agencies involved to disseminate information on past, present, and future problems associated with "man-rating" and manned operation of space simulators. The papers in this volume present information concerning the need, facility requirements, and operational problems associated with man-rating space simulators, and also the biomedical and physiological aspects associated with man in the simulated environment.

The papers in this volume were presented at a Symposium on Man Rating of Space Simulation Chambers, held at the ASTM Fifth Pacific Area National Meeting, Seattle, Wash., Oct. 31–Nov. 5, 1965. The symposium was cosponsored by the National Aeronautics and Space Administration and ASTM Committee E-21 on Space Simulation. The symposium chairman was K. H. Houghton, Douglas Aircraft Co.; vice-chairman was George Brooks, NASA.

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*John C. Simons, Jr.*<sup>1</sup>

## Introduction

The symposium at which the papers in this volume were presented constitutes a landmark, since it is the first open meeting concerned exclusively with the new discipline of "man-rating." Man-rating in the patois of the space environmental simulation fraternity is the process of modifying a space chamber to permit safe occupancy under simulated space conditions by men in protective space suits or inside a spacecraft under test.

Of greater significance, however, is the impact of the symposium upon the Apollo program to land U. S. astronauts on the moon in 1969. To reduce both the risk to human life and the probability of mission failure to acceptable values compatible with a multibillion dollar investment requires exhaustive ground testing and training under realistic environmental conditions. While only three man-rated space chambers are actually operational in the United States today, three to six more will be added to the roster in the next twelve months. All are directed toward providing the test capability required by our manned space programs. Ninety percent of the organizations directly involved have participated in this symposium, and most of these are active in the work of the Man-Rating Section of ASTM Committee E-21 which sponsored it. The papers of this symposium and the ensuing discussions, both on the floor and in the corridors, have materially aided in solving mutual technological problems.

In fulfilling its role to develop standards for space environmental simulation, Committee E-21 is proud to have fostered this technical interchange and the contribution which it makes to the national space effort. Our thanks go to all who have participated, and especially to the symposium committee.

This volume also constitutes a living memorial to H. B. (Bud) Robison, who conceived the symposium and served as chairman until June, 1965, when he lost a courageous battle to cancer.

<sup>1</sup> John C. Simons and Associates, Weston, Mass. Chairman of ASTM Committee E-21 on Space Simulation.

