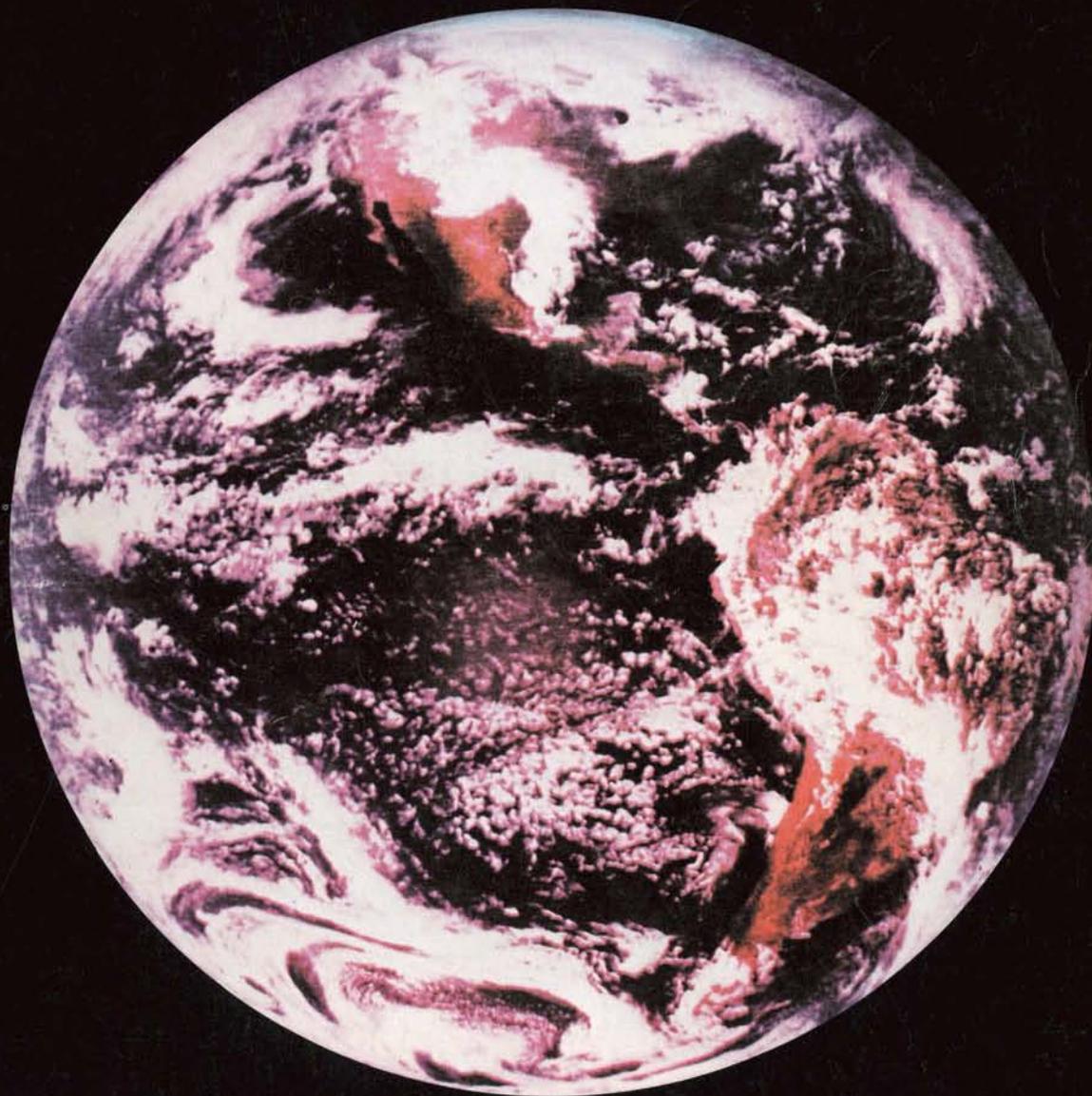


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NASA

National Aeronautics and
Space Administration

Spinoff 1976

A B I C E N T E N N I A L R E P O R T

National Aeronautics &
Space Administration
Technology Utilization Office

by Neil P. Ruzic, National Space Institute

SP5121

TECHNOLOGY UTILIZATION PROGRAM REPORT

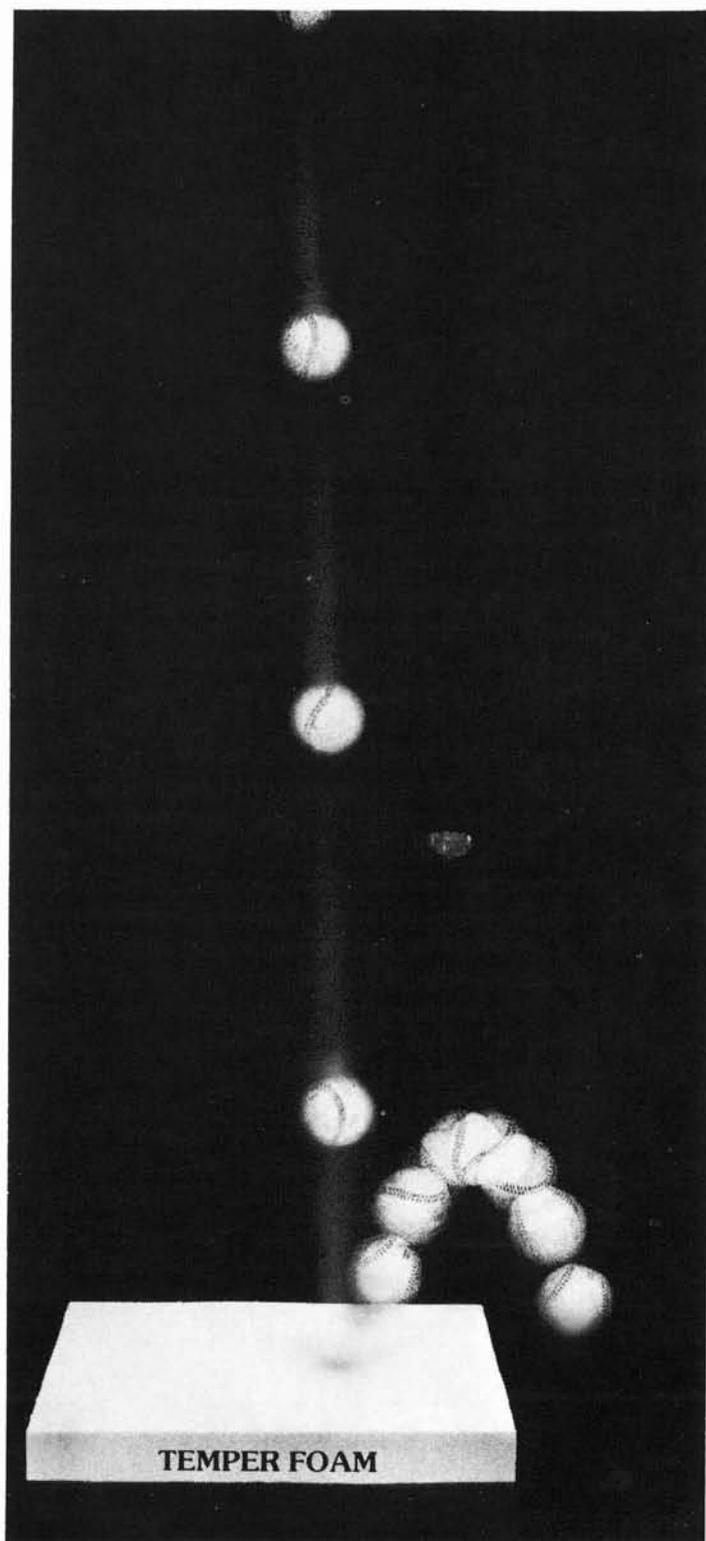
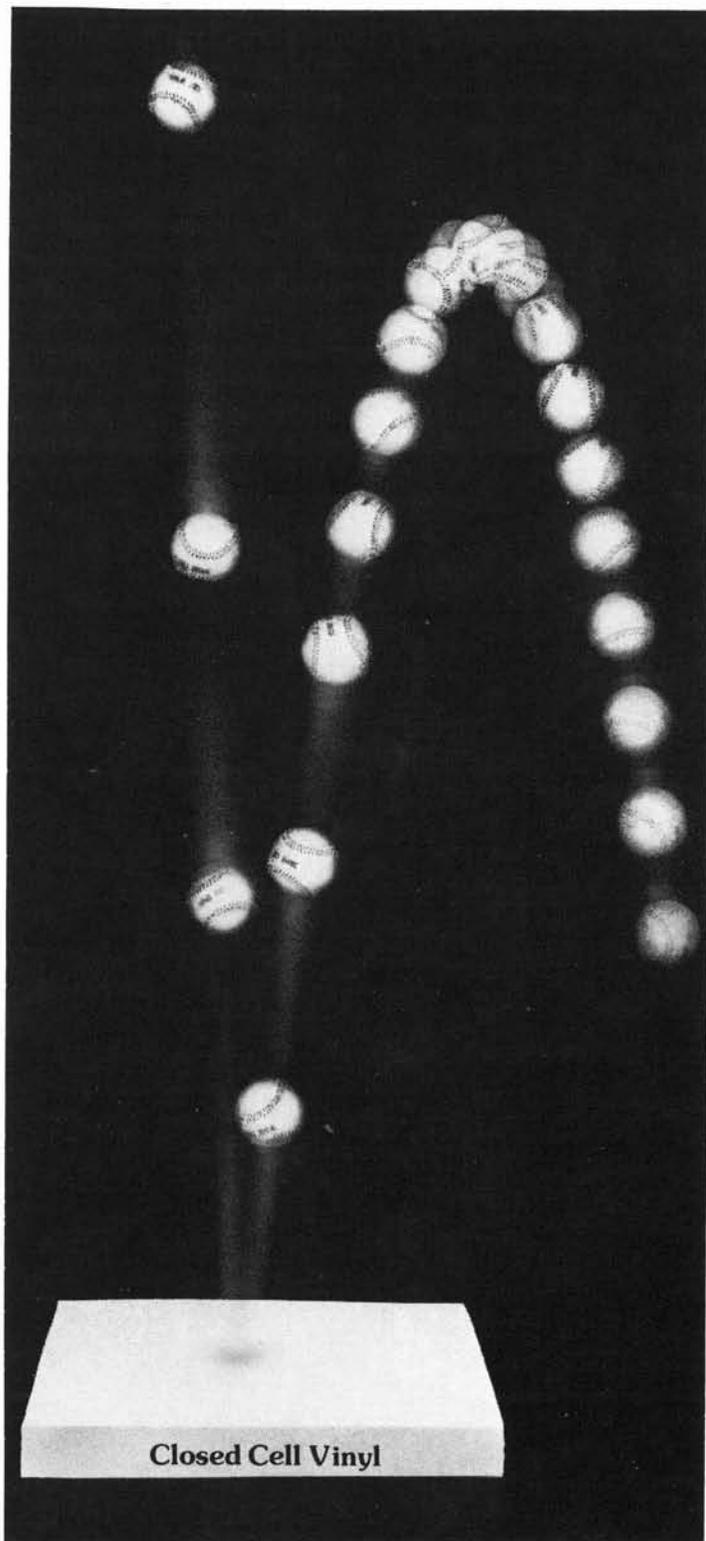
Acknowledgments: Todd Anuskiewicz, Informatics Information Systems Co., for coordinating the preparation of this report; F. Douglas Johnson, Denver Research Institute, for supplying much of the information; and Rob Shultz, Plumridge Advertising.

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Test below illustrates superior ability of "Temper Foam" to absorb shock or bounce from impact. Baseballs are dropped from the same height on two same-sized pieces of padding material. The baseball at far left falls on conventional closed-cell vinyl and the other on the new open-cell polyurethane-silicone plastic foam transferred to a host of recreational and other uses from its original NASA application as better airplane seats.

Versatile padding

When NASA-Ames scientists began work on a padding concept in 1968 they were looking for a better airplane seat. They found it in a new foam material that today has all kinds of additional applications including wheelchairs, X-ray table pads, off-road vehicle seats, skiboats, and football helmet liners.

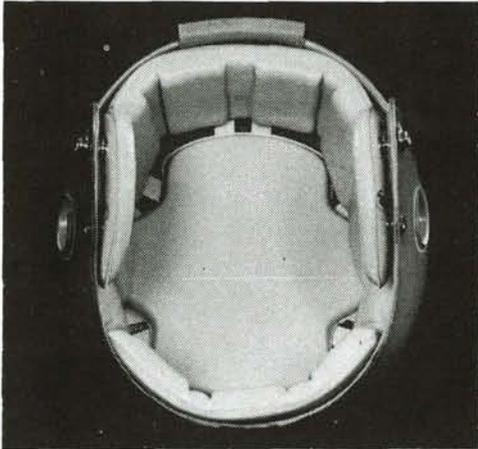


The material is an open-cell polyurethane-silicone plastic foam that takes the shape of impressed objects but returns to its original shape even after 90% compression. It absorbs sudden impacts without shock or bounce. For instance, the manufacturer claims a 3-in. thick pad can absorb all the energy from a 10-ft fall by an adult.

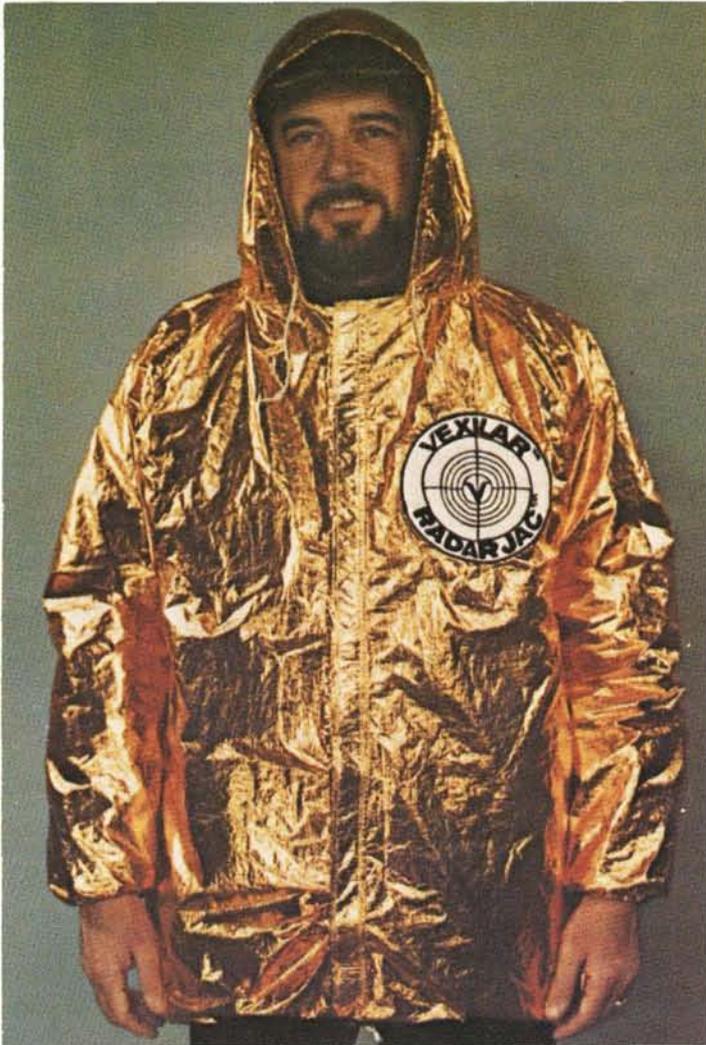
The material is temperature-sensitive, getting softer when warmed and firmer when cooled. Some

formulations can be "frozen" at 60 F, yet take sustained temperatures in excess of 300 F—which also means the material can be dry-sterilized.

After the initial Ames work to improve safety and comfort in aircraft passenger seats, a contractor's employee invented the material, which he called "Temper Foam," and started Dynamic Systems Inc. to produce it. In 1974 the product line was bought by the Edmont-Wilson division of Becton, Dickinson &



Temper Foam, exhibiting about 340% less shock from impact, lines football helmets. The versatile padding today is utilized in wheelchair and hospital pads and off-road vehicle seats.



Co. in Coshocton, O., which last year began to make it in greater quantities.

Patients who could spend only a few hours at a time in standard wheelchairs now can use their chairs three times longer. Used in hospitals for orthopedic and other cases, it greatly reduces pain and bedsores.

Inside football helmets, it adjusts to the shape of the wearer's head without putting undue pressure on any one point. The helmet is safer because the new foam material absorbs far more of the impact energy than conventional padding used in the lining of most helmets.

The Dallas Cowboys have started to use the new helmets, along with other teams and schools. This year Temper Foam will be incorporated into a variety of athletic equipment such as body pads, chest protectors, and shin guards.

Comfort for sportsmen

Aluminized mylar developed originally for NASA-Goddard to make the Echo satellites more reflective, to insulate cryogenic fluids, and for space-suit insulation has been spun off to a variety of consumer products. Sportsman's blankets and jackets, ski parkas, sleeping bags, and even life-raft canopies (see "Rescue at sea" under "Your Mobility" in the first section of this report) are among them.

The sportsman's blanket, weighing only 12 oz, can be used equally well to keep heat away or to keep available heat in. It has many uses for the outdoor enthusiast because of its large size (4½ x 7 ft).

The emergency rescue blanket has heat reten-