

OFFICE OF THE UNITED STATES COMMISSIONER GENERAL
CANADIAN WORLD EXHIBITION, MONTREAL, 1967
800 VIGOTIRA SQUARE, SUITE 2022
MONTREAL, P.Q., CANADA. AREA (514) US 1-1776

UNITED STATES PAVILION: ARCHITECTURE

The United States Pavilion will be a Geodesic Skybreak bubble, 250 feet in spherical diameter and 200 feet in height. The bubble encloses a volume of 6,700,000 cubic feet and has a surface area of 141,000 square feet. The space frame configuration is the result of a sustained program of testing and refinement in order to produce a lightweight frame of minimum visual obstruction. Dr. Fuller's extensive work with lightweight structures has been exploited to achieve a clear spanning lacy filigree of metal, which will appear weightlessly poised against a background of cloud and sky.

The structural frame is a welded spherical space frame of steel pipes, 3- $\frac{1}{2}$ inches in diameter for the exterior chord members, and 2- $\frac{7}{8}$ inches in diameter for the web and interior chord members. The wall thickness of the pipe varies with the loads in the structure, being thinnest at the top, and thickest at the bottom and around the openings. There are 27 miles of pipe weighing a total of 600 tons. The pipes are welded to cast steel hub connectors. There are 5,900 hubs of two basic types with a total weight of 120 tons.

The bubble is enclosed by a transparent acrylic plastic surface, made up of 1900 molded domical panels. These panels are the largest size so far manufactured from a single sheet of this material, being up to 16 feet by 12 feet in dimension. In order to control the quality of light in the enclosure and minimize skyglare, the plastic is colored a green-bronze tint, to have 93% light transmission at the bottom of the bubble through a four-step gradation to 45% light transmission at the top. 250 of these panels at the apex of the dome are pierced to provide ventilation, with 2 feet diameter openings which are capped with smaller domes of the same material to keep rain out. The panels are mounted in the frame at the interior chord and are held in place by extruded aluminum glazing strips.

On the interior surface of the skin are affixed 4,700 aluminized fabric triangular shades to keep the direct rays of the sun from striking the platforms. The triangular shades are grouped in units of 18 (3 hexagons of 6 shades each) which are drawn and retracted by 261 motors which are controlled by a punched tape program. There are six basic daily programs to cover the life of the Fair with each daily program having a shading configuration change occurring every 20 minutes to follow the sun on its path across the sky. By this strategy, only the minimum area of shades necessary to shield the

platforms is actuated at any one time and the open transparent effect of the total bubble is maintained. The combination of transparent acrylic skin and mechanically actuated, aluminized, triangular shades will provide dynamic modulation of the interior climate of the bubble. From the inside there will be uninterrupted visual contact with the exterior world, the sun and moon will shine in, the landscape and sky will be completely visible, but the unpleasant effects of climate, heat, dust, bugs, glare, etc., will be modulated by the skin to provide a "Garden of Eden interior."

The pavilion can be regarded as a prototype "environmental valve", enclosing sufficient space for whole future communities to live in a benign physical microcosm though still situated and visually related to a hitherto climatically hostile environment. Thus, man may extend his urban settlements into Arctic regions — or establish permanent communities on the moon.