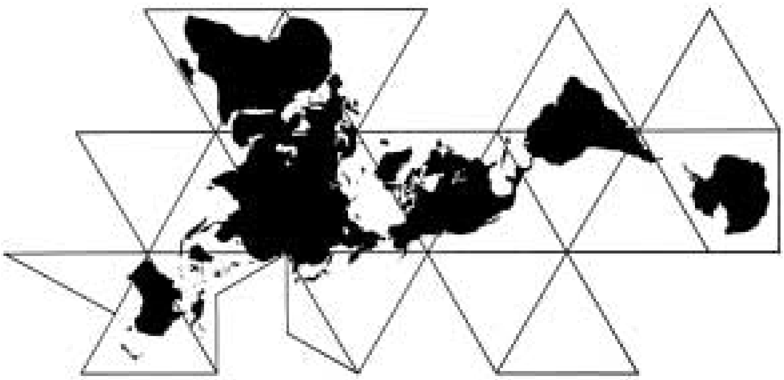
THE FULLER PROJECTION
Dymaxion™ Air-Ocean World



A map of the Earth which presents geographic information in a single, comprehensive picture without breaks in any of the continental contours, or any visible distortion of the relative shapes or sizes of the landmasses.

A world projection with negligible distortion which can accurately display at-a-glance global information such as human migration patterns and the distribution of natural resources.

A New Perception of Earth

World maps are symbolic tools which help to shape our perception of the Earth. Every world map projection must make certain compromises as information is transferred from a spherical globe to a flat surface. With this in mind, as early as 1927 Buckminster Fuller, an educator, engineer, architect, author, cartographer and futurist, set out to develop the world's most accurate 2-dimensional world map. He wanted to provide a view of the whole Earth at once which would have the ability to reveal major trends in world affairs and show the shortest air routes between land masses. Fuller predicted even then that global travel would shift from the sea to the sky and anticipated the emergence of what he termed "a One-Town Air-Ocean World."

Designing for Accuracy

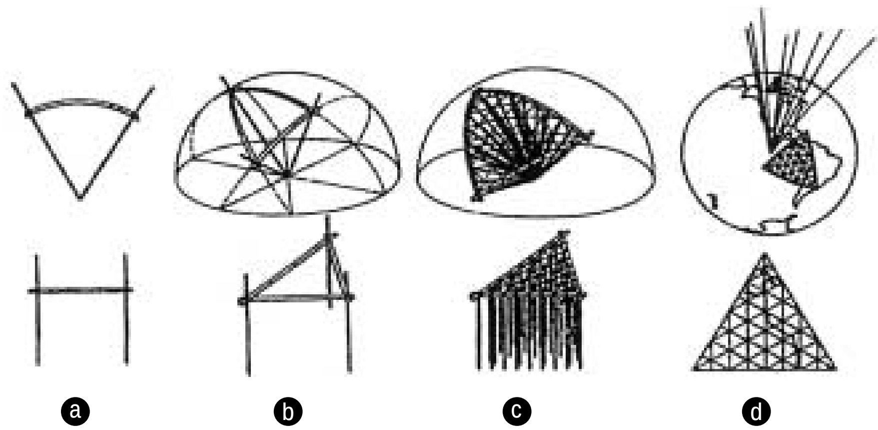
It took almost a quarter of a century for Fuller to fine-tune the mathematics that could render an accurate view of Earth as a flat world map. While perfecting his "great circle" mapping techniques, Fuller first published his final icosahedral version of the map in 1954. Using the form of an icosahedron, a polyhedron with 20 triangular faces, Fuller was able to accurately depict the whole earth on a flat map with only the tiniest bit of distortion, not even visible to the human eye, distributed among the triangles uniformly. The outer edges of each triangle display the information with absolute accuracy.

Fuller called his final map projection the "Dymaxion Air-Ocean World." (the term "Dymaxion" was coined in the 1930's from Fuller's most commonly used words, dynamic, maximum and tension.) In the late 1970s, Fuller's associates, Robert Grip and Christopher Kitrick added to the accuracy of the Dymaxion Map by using computer generated algorithms for latitude and longitude information.

A Tool for Global Responsibility

With our increasing global awareness, a world map is needed which enables us to highlight the relationships among all nations and cultures of the world. Environmental concerns are becoming a central focus of our international agenda. Therefore, we must learn to see what unites us rather than what separates us and to chart global resources, population and distribution patterns which characterize the complex trends and critical needs of the world today. In Fuller's own words, the Dymaxion Map reveals a One-World Island at the bottom of an "air-ocean" which helps us to view the world as one interdependent system of relationships.

dynamic + maximum + tension=
Doing More With Less



< Fuller's Projection Method

Fuller superimposed a spherical icosahedron grid onto the Earth's sphere. Each of the grid's edges are arcs of "Great Circles" a which show the shortest routes between two points on a sphere's surface.

When the Great Circle arcs are unfolded, the arc-edges of the spherical icosahedron become the straight edges of the regular icosahedron b and the twenty spherical triangles become twenty plane triangles. c

Since the arc-edges are unfolded, their lengths remain undistorted. Minute distortion in the middle of each triangle is distributed evenly throughout the map. d Fuller referred to his map as "a constant zenith projection."

Commonly asked questions about the Fuller Projection

What is meant by 'no visual distortion?'

All flat world map projections contain a considerable amount of distortion either in shape, area, distance or direction. For instance, on a standard Mercator world map projection, Greenland is three times its normal size and Antarctica appears as a long thin strip of land. Even the popular Robinson Projection, an elliptical map that was officially adopted as National Geographic's standard in 1988 and now used in most schools, still contains a large amount of distortion—with Greenland 60 percent larger than it really is. The Peters projection, on the other hand, sacrafices shape to preserve relative accuracy in overall land area, distortions which are obvious when comparing it to the globe. However, there are no visible shape discrepancies in any of the landmasses on Fuller's map when it is compared to a globe. Minute area and shape distortions can be detected mathematically and are equally distributed throughout the map. Visually, however, these distortions are negligible.

Why an icosahedron?

A polyhedron is a many-sided 3-dimentional object. An icosahedron is a polyhedron with 20 triangular faces. Of the five Platonic polyhedra (all of which have equal faces in size and shape), the icosahedron most closely approximates a sphere. Fuller found that the best way to lay various polyhedra flat while keeping all the landmasses unbroken was to use the icosahedron. With only two exceptions, all the breaks needed to lay the icosahedron flat occur completely within the oceans, and, therefore, keep the division of the land masses to a minimum. With minor adjustments to two triangular faces, Fuller's Dymaxion™ Air-Ocean World Map provides us with a flat view of all the Earth's landmasses as unbroken islands in a single world ocean.

Why are the oceans broken up?

Try peeling an orange while keeping the skin in one piece. Then lay the skin out flat. Notice how it needs breaks, or "sinuses" in many different places in order to lay flat. The more breaks introduced, the flatter the orange peel will lay. When an icosahedron is unfolded and laid flat, breaks need to be introduced, just as in the case of the orange peel. The question is then where to introduce these breaks? One way of doing this is to introduce the breaks in the ocean as much a possible. This provides a world-view in which the landmasses are unbroken.

Fuller's map was actually designed to have all of the icosahedron 's triangles separable. This allowed the map to be dynamic. By rearranging the triangles, with the South Pole at the center of the map, navigation routes by sea became readily apparent, just as air routes across the North Pole are obvious in the original configuration. Fuller explored more than 25 different useful configurations of the Dymaxion™ Air-Ocean World Map. Each configuration introduces breaks in different places and allows different aspects of the world to be emphasized.

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