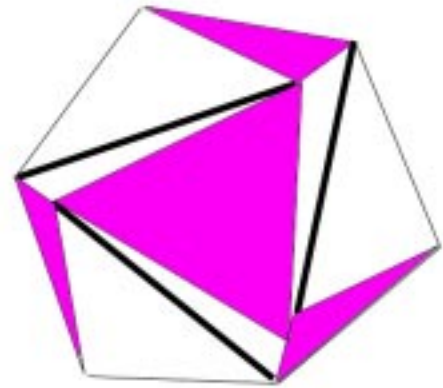


The Journey

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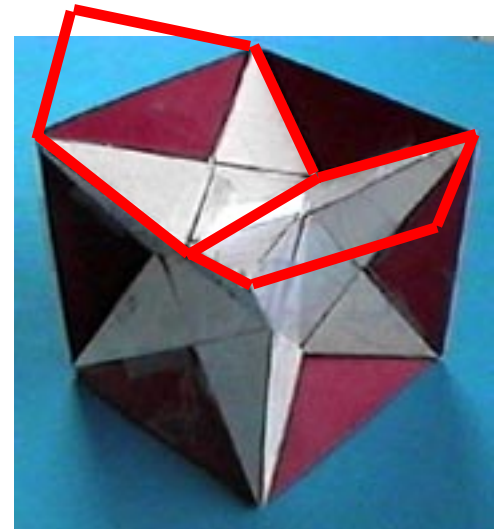
LEHMAN TENSEGRITY ICOSAHEDRON OVERVIEW

This paper illustrates a novel connection between Buckminster Fuller's tensegrity icosahedron and the regular pentagonal dodecahedron.



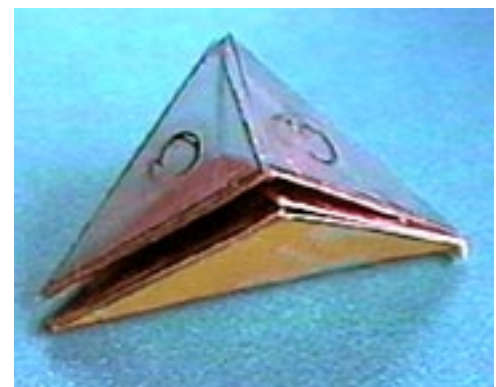
The Lehman concave dodecahedron is a concave dodecahedron with webs (invisible red membranes) between the spires. The webs make it easier to see relationships between the pentagon and the cube.

Two faces of the concave dodecahedron (white form) are extended with regular pentagons (red lines) to illustrate where the face of the regular pentagonal dodecahedron seats on the concave dodecahedron when it is in a space filling matrix.



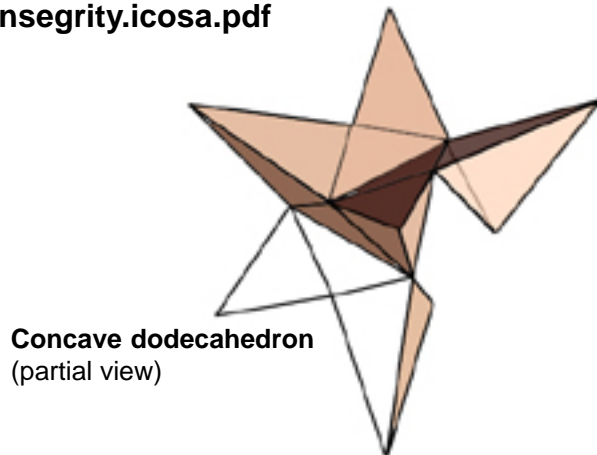
**LEHMAN CONCAVE
DODECAHEDRON**

The rybo-tetrahedron is discussed as a form that fills a trough in the icosahedron. And the S Quanta Module Packet, consisting of four S Modules housed under a canopy is shown to nest with the rybo-tetrahedron to form the corner of an octahedron.



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Concave dodecahedron
(partial view)



When the spires of the concave dodecahedron are removed, the L. tensegrity icosahedron is formed. This polyhedron is characterized by:

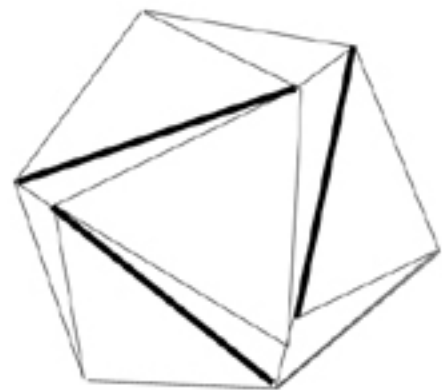
- 30 edges (24 outer & 6 inner)**
- 12 vertices**
- 20 faces (8 outer & 12 inner)**

Each of the 8 spire bases of the concave dodecahedron rest on a face of the icosahedron. When these spires are removed, the concave dodecahedron is truncated into a polyhedron with 8 equilateral triangles and six valleys. The keel of the trough is shown as a dark black line. As noted by Fuller, referring to the tensegrity icosahedron, 724.31, "These eight triangles are the eight transforming triangles of the symmetrical contraction of the vector equilibrium "jitterbug."

If the keel lines are instead thought of as rigid bars and the edges of the colored triangles are imagined as tension wires, the L. tensegrity icosahedron is configured exactly the same as the Fuller tensegrity icosahedron. Based on the L. hierarchy of embedded forms, the keel measures 1.0 and the triangle edges .618.

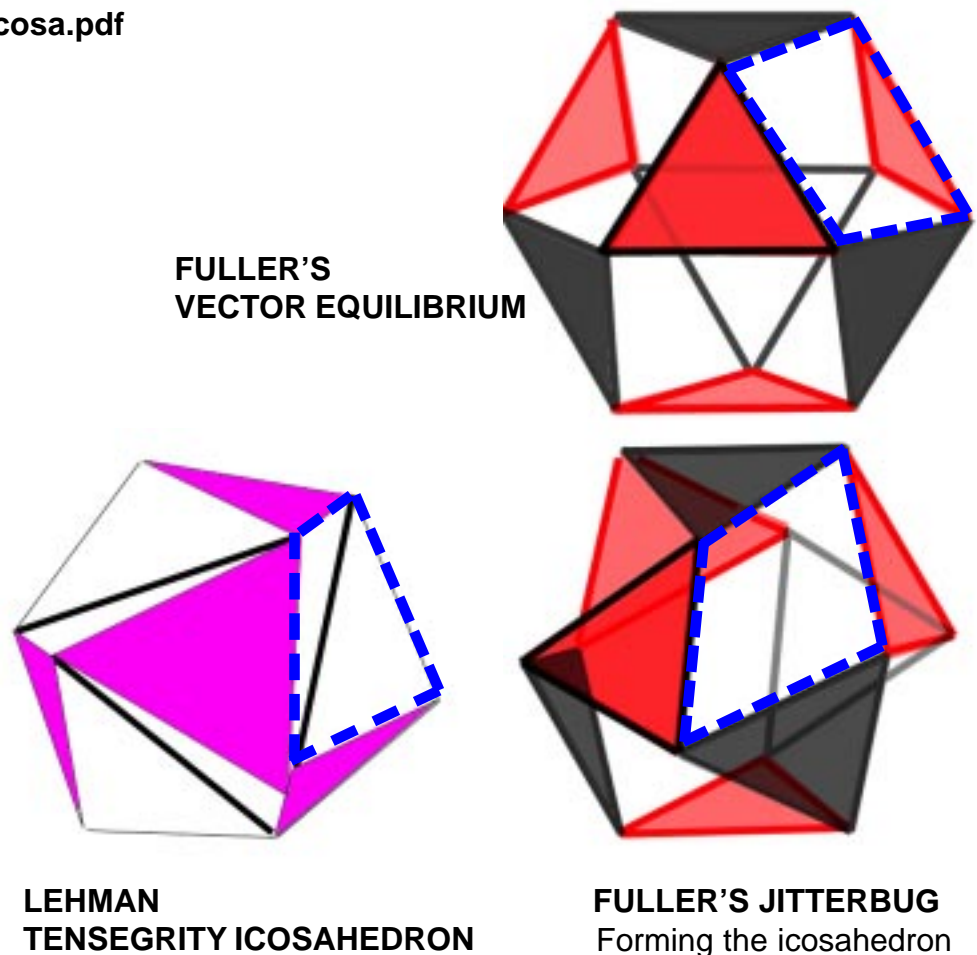


**LEHMAN TENSEGRITY
ICOSAHEDRON**



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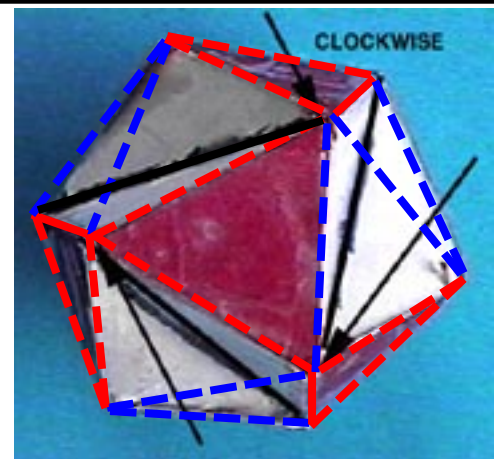


The blue dashed lines show the transformation from the square face of the vector equilibrium to the rhombus, consisting of two equilateral triangles, of the icosahedron. Fuller calls this transformation the jitterbug. The L. tensegrity icosahedron is the fixed, frozen relationship between the internal compression members of Fuller's tensegrity icosahedron and the exterior tension lines. Angles of the regular pentagon are involved in this inside/outside relationship.

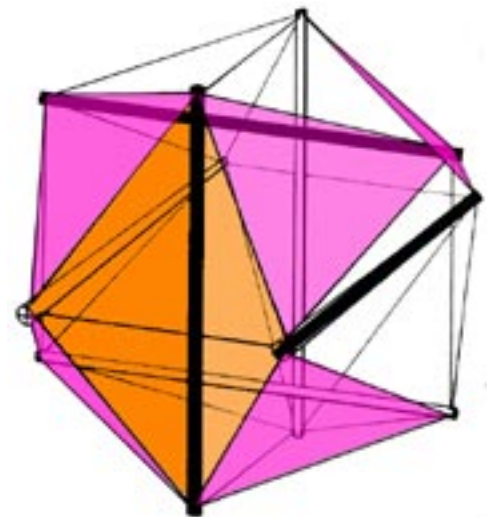
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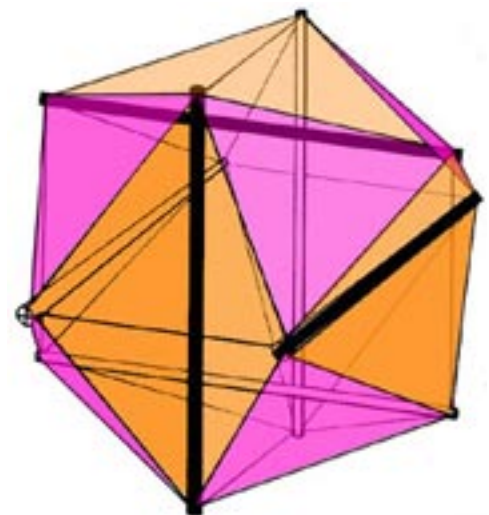
The image on the right shows the transition triangles (red) in the icosahedron position. This forms the L. tensegrity icosahedron as a polyhedron. The positions of the compression “sticks” are seen in black here and in the form below.



The heavy black lines are “sticks” and the thin lines are “wires” of this tensegrity icosahedron.



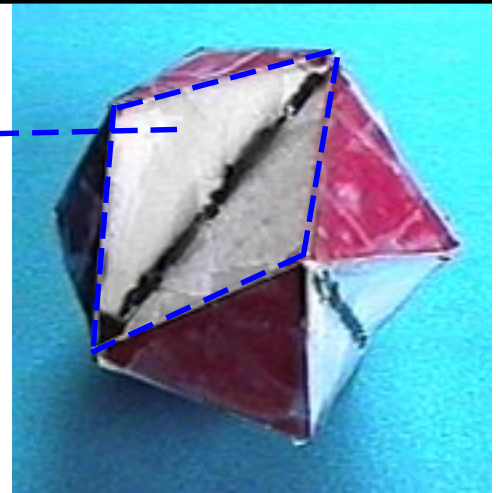
The yellow areas are the valleys and the magenta shows the transition triangles of Fuller’s jitterbug.



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The blue lined rhombus face changes to a square (see page 3) in the Fuller jitterbug when the 8 triangles are rotated. In this form, the jitterbug relationships are frozen in the icosahedron stage.

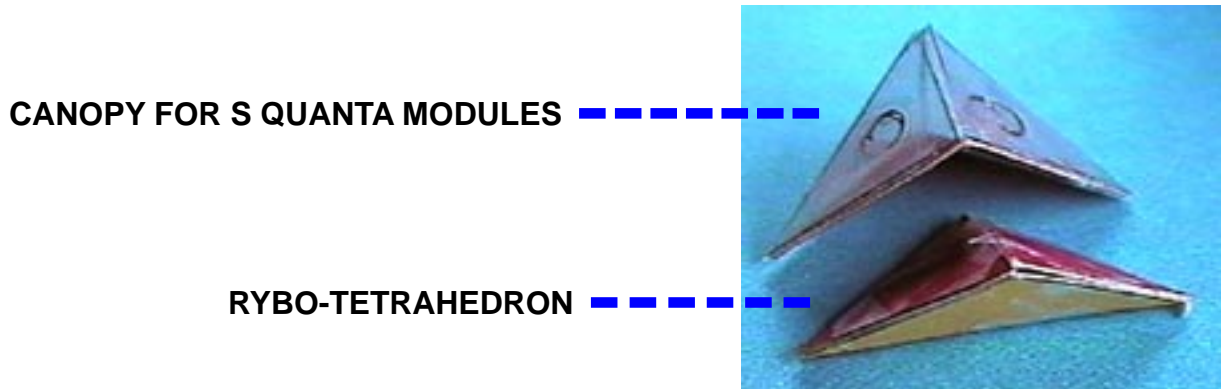
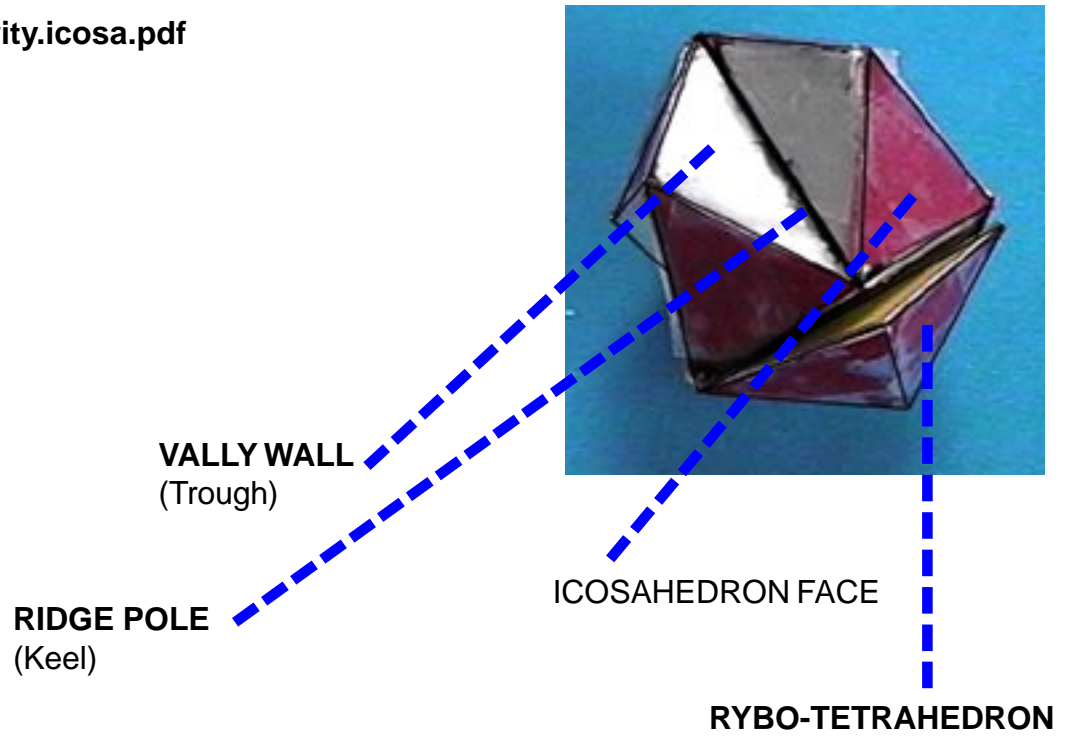


Opposite keels are compression “sticks” and are at right angles to one another.



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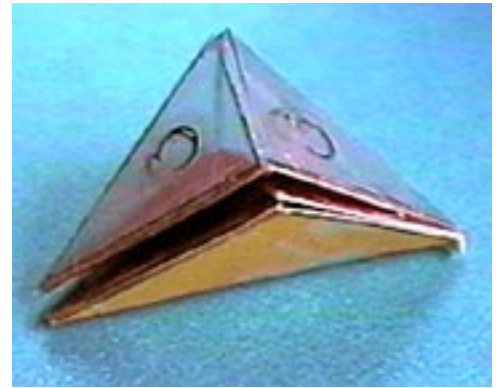
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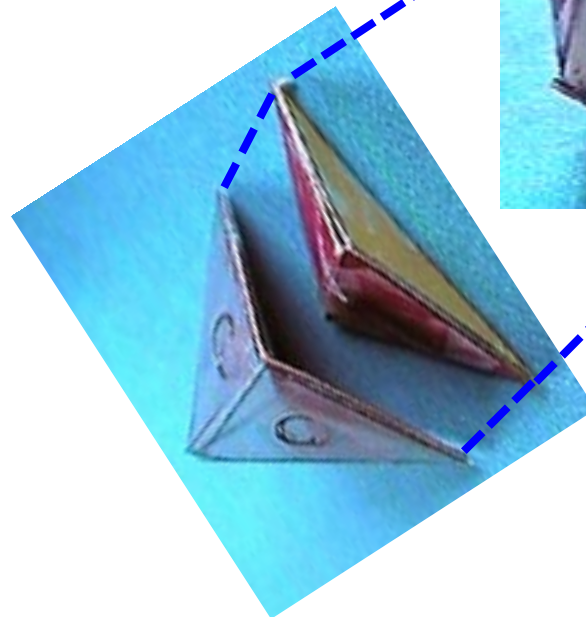
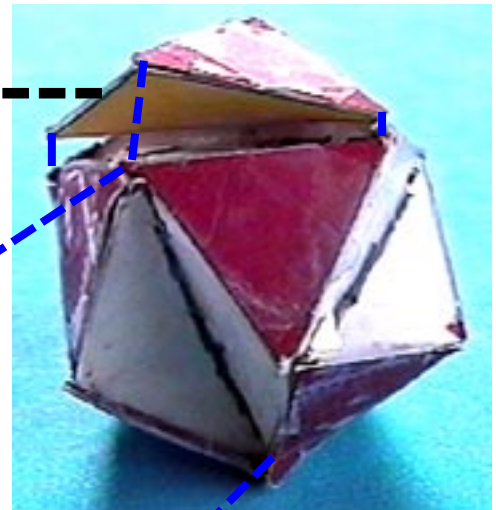
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The rybo-tetrahedron (yellow base) fills the vally in the icosahedron. The S Quanta Module Packet (contains 4-S Modules) nests against the red faces (2-triangles from the face of the icosahedron) of the rybo-tetrahedron.



RYBO-TETRAHEDRON ———
Fills the vally in the icosahedron.



The Journey

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Summary

New terms are introduced to describe the core and related areas of the concave dodecahedron.

Trough: The indent forming a valley at the base of four spires.

Keel: The edge formed in the bottom of the vally.

Ridge Pole: The keel is at times called the “ridge pole” when the top of the “tent” of a regular pentagonal dodecahedron is referred to.

Spires: The eight sharp points including a triangular base of the concave dodecahedron.

rybo-tetrahedron (rybos): Named after rybo6 who first brought my attention to wondering what the shape of the form was like that was below the two icosahedron faces down to the ridge pole.

Lehman tensegrity icosahedron (L. tensegrity icosahedron)(purple people eater): That portion of an icosahedron remaining when six rybo-tetrahedrons are removed.

S Quanta Module Packet: A grouping of four S Quanta Modules, forming an extension or “wart” on the face of an icosahedron. This wart forms one corner of an octahedron.

Canopy: The shell consisting of four “C” base triangles of the “Slice module”. This shell is also formed by the sides of four S Modules.

Lehman concave dodecahedron (webbed wonder): A concave dodecahedron with webs, which are “invisible membranes” between the spires. These webs aid in seeing relationships between the pentagon and the cube.

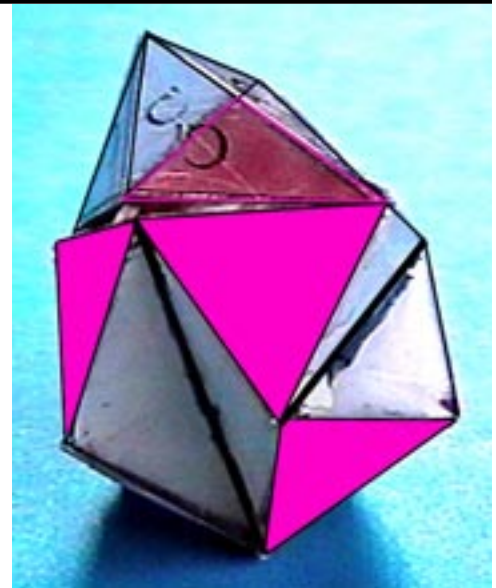
Lehman Embedded Hierarchy (L. hierarchy): A grouping of 4-fold and 5-fold polyhedra in an embedded, replicating, space filling isotropic vector matrix (IVM).

The L. tensegrity icosahedron appears to be a novel polyhedron that embodies internal and external regular pentagonal relationships positioned in exactly the same way as Fuller’s tensegrity icosahedron.

The Journey

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Thanks goes to rybo6 for coining expressions such as: “warts”, “webbed wonder”, and “purple people eater”. I feel this helps make an otherwise cold and analytical study warm, and friendly leading to better understanding on this journey towards meaning.



PURPLE PEOPLE EATER
Core of the webbed wonder
with warts and all.