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Bigger is Better Flight Basket

Introduction:

This document provides information on how the new flight basket was designed and built. All the units are in imperial units for simplicity.

Smaller Flight Basket:

For a reference, the smaller flight basket was measured, allowing for calculations to determine how the new basket was built. Table 1 shows these measurements as they were taken. These measurements allowed Kairos to find the calculated flight basket diameter using equation 1. The difference between the total edge length and the rod length was used in determining the new rod length.

Table 1: The table below shows the four (4) measurements of four (4) different edges and four (4) different rod lengths for the original flight basket. The average is also shown. Lengths are shown in inches.

	1st Measurement	2nd Measurement	3rd Measurement	4th Measurement	Average
Rod Length	2.332	2.329	2.336	2.333	2.333
Edge length	2.897	2.812	2.920	2.847	2.869

The average measurements allowed us to find the calculated flight basket diameter using equation 1 and find the difference between the total edge length and the rod length which is needed to accurately calculate the new rod length.

$$Equation\ 1: D_m = 4.85410197 * a$$

Where "D_m" is the inner sphere diameter and "a" is the edge length. Details on this equation are given in another document. The calculated inner diameter was =13.925 inches. The difference between the edges and the rods is 0.536 inches.

New rods:

The new inner diameter needed to be 1.5 inches longer than the original. This was added to the original inner diameter and found to be 15.4 inches. Using the inverse of the equation 1 and the new inner diameter we found that the new edge length needed to be 3.2 inches and the new rod length was 2.6 inches. Factoring in the thickness of the blade and a buffer zone, the rods were cut at 0.05 inches longer. Each rod was taped and marked individually in the areas to be cut. The band saw was then used to cut them. There was still some error in cutting the lengths of rod. Machining a fixture to cut at the required length would significantly reduce any error.

Assembly:

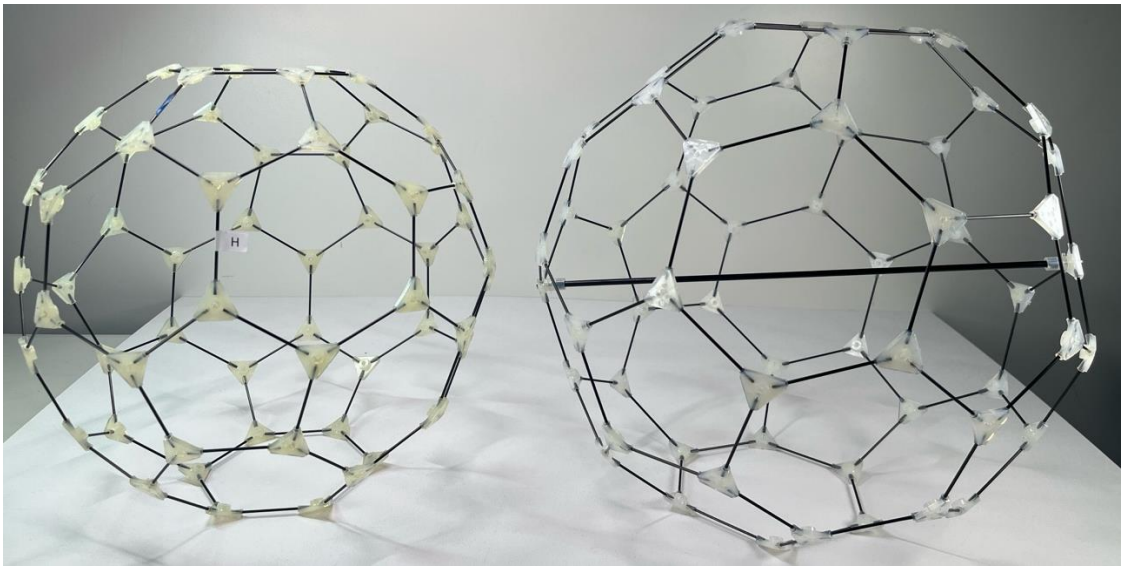
None of the old tools machined for making flight baskets worked for assembling this larger basket. Once the length of the rods was confirmed they were used as the 90 required edges.

The same 60 vertices that are normally used in a flight basket were used again and aligned in the same fashion. This implies bigger versions of our current tools could be used in assembly.

Once the basket was fully assembled measurements were taken for the center axis. The average length was found to be 15.6 inches. Considering displacement with the plastic holds, the center rod was cut at 15.12 inches.

Conclusion:

The larger flight basket, without the center axis, had a mass of 0.3210 pounds. The smaller basket has a mass of 0.3098 pounds. The difference, 0.0112 pounds, is about the mass of a quarter. Creating tools for assembly would assist greatly in this task by reducing error in rod lengths, and expediting production.



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Revisions

Name/Signature	Date	Description
Cameron Miller	07/31/2024	Original Draft