Magic Flying-V Wing Angle Proposed

Hans Hermann Otto

Materials Science and Crystallography, Clausthal University of Technology,
Clausthal-Zellerfeld, Lower Saxony, Germany

E-mail: hhermann.otto@web.de

Abstract

We found a new magic angle by analyzing relations between paired entities. This angle is around $\alpha_1 = 50.95°$. It is proposed to apply this magic angle, which connects life, physics and cosmos, as the V-shaped blended wing opening by the construction of a Flying-V aircraft. At time the wing opening angle is only marginally larger around 52.6°. For comparison, the base angle of the Great Pyramid is $\alpha = 51.823°$.

Keywords: Flying V Aircraft, Stingray Drones, Blended Wing Opening Angle, Magic Angle, Paired Entities, Great Pyramid

1. Magic Blended Wing Angle for Flying-V Aircraft

Along with experience, intuition is a sharp scientific sword even for engineers. We present here some ideas to further optimize the highly energy efficient aircraft with V-shaped wings.

The German engineer *Hugo Junkers* already in 1910 patented the so-called *Nurflügler* [1] and in the following years *Reimar Horten* constructed the Ho229 V3, which can be considered as a precursor model of the Flying-V blended wing aircraft. The Horton aircraft can be visited at the *Smithsonian Udvar-Hazy* air and space center in *Chantille*, Virginia, USA.

At the time, the main wing opening angle of the pioneering Flying-V aircraft was optimized to around 52.6° [2] [3] [4]. However, just recently we found a magic angle when discussing geometric facts in relation to paired entities as there are composed elementary particle pairs such as electron pairs, boson pairs or pairs of holes, photons as composed entities of electrons and positrons, double stars, and last but not least division of living parent cells into two daughter cells [5]. The approach we described is the Split-Sphere-Volume approach. The magic angle was found to be about $\alpha_1 = 50.95°$. It can be determined by

$$\alpha_1 = \arccos\left(\frac{1}{2} \cdot \sqrt[3]{2}\right) = 50.952789° \ldots \quad (1)$$

or by the approximation

$$\alpha_1 \approx 360 \cdot (\pi - 3) \quad = 50.973355° \ldots \quad (2)$$

where π is the circle constant.

It is recommended to apply this angle to further optimize the efficiency of the Flying-V aircraft by keeping this angle constant and optimize all other relevant parameters of the construction as well as the wing surface. Small deviations can often cause large alterations of physical properties.

Interestingly, an angle near the above considered ones is the base angle of the Great Pyramid at *Giza*. This angle is [6]

$$\alpha = \arccos(\varphi) = 51.82729° \ldots \quad (3)$$

where $\varphi = \frac{\sqrt{5}-1}{2} = 0.6180339887 \ldots$ is the golden mean.

For other angle approximations and the connection to *Sommerfeld*'s structure constant see again reference [5].

From Great Pyramid geometry we recently also deduced a nuclear fusion inertial confinement shockwave concentrator [7].

2. Efficient Drones with Stingray Shape

Drones with shapes modeled on nature in the Blended-Wing-Body-Design are most efficient as air cargo systems [8]. For their construction a flat, wide hull with a stingray shape seems to be ideal. Such drones may also be designed with the magic angle of 50.95° between the 'blended wings'.

3. Surface of the Wings

Superhydrophobic rough wing surfaces consisting of a mesh of nanocrystalline pyramids showing a golden mean based quasicrystalline pattern, in contrast to a hexagonal one, can more effectively reduce the frictional resistance of the air and at the same time prevent the wings from icing up. For the sputtered pyramidal particles or foils embossed in the same way it is recommended to apply the golden geometry of the Great Pyramid [6].

4. Conclusion

Every idea, no matter how small, is valuable when it comes to protecting the environment through effective use of energy. Aviation is an important source of energy waste. We present an approach to improving the effectiveness of aviation and space transport by varying the angle of the V-shaped blended wings of modern aircrafts to the magic value of 50.95°. Literarily spoken but scientifically manifested, this magic angle connects life, physics and the cosmos. Engineers should again learn from nature as they had already done by using rough wing surfaces to reduce the frictional resistance of the air and icing up.

This contribution is dedicated to little girl *Flora*, the upcoming astronaut.

References

[1] Junkers, H. (1910) *Patentschrift* DE253788C, Kaiserliches Patentamt, 1. February 1th 1910, November 14th 1912.

[2] Benad, J. (2015) The Flying V – A New Aircraft Configuration for Commercial Passenger Transport. Deutsche Gesellschaft für Luft- und Raumfahrt, Lilienthal-Oberth e.V.

[3] Oostereom, W. J., Vos, R. (2022) Conceptual Design of a Flying-V Aircraft Family. AIAA Aviation Forum, Chicago.

[4] Hillen, M. (2020) Parametrisation of the Flying-V Outer Mold Line. Master Thesis, TU Delft.

[5] Otto, H. H. (2023) Creation of Paired Entities is Ever Governed by the Golden Mean: About the Nested Repeatability of Living and Cosmic Processes and the Origin of the Universe.

[6] Otto, H. H. (2020) Magic Numbers of the Great Pyramid: A Surprising Result. *Journal of Applied Mathematics and Physics* **8,** 2063-2071**.**

[7] Otto, H. H. (2023) Nuclear Fusion Inertial Confinement Shockwave Concentrator Deduced from Great Pyramid Geometry. *ResearchGate*, 1-5.

[8] Natilus Company, California (2017). *Wikipedia*