THE GIZA PYRAMID COMPLEX AS AN ANALOGY TO THE VOYAGER MISSION

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Abstract

This paper explores a potential analogy arising from a comparison between the space missions of Pioneer 10, Pioneer 11, Voyager 1, and Voyager 2 on one hand, and the Giza pyramid complex project on the other. Within this framework, five plausible assumptions are examined. Based on their outcomes, the study demonstrates the probable message intended by the pyramid builders and identifies a potential recipient for this transmission (a planet of a specific star).

1 Introduction

Today, numerous alternative theories regarding the purpose of the Giza pyramid complex exist alongside official history. One subtle yet highly significant circumstance in alternative research and its conclusions has always been striking: multiple researchers consistently construct their hypotheses about the purpose of the Giza pyramids without reconciling the proposed intent with the immense labor costs required for their reproduction. In other words, the significance of the problem being solved is not correlated with the effort expended on constructing the monuments. This represents a substantial logical error on the researcher's part. Furthermore, this approach also conflicts with common sense. For instance, what is the purpose of electricity without electrical appliances? Consequently, we are left with an obvious absurdity. If we accept the hypothesis that an ancient, highly advanced civilization once existed, we must reason from the standpoint of the goal-setting behavior of a highly advanced civilizing agent. In this regard, utilitarian and various hedonistic purposes for constructing the pyramid complex can undoubtedly be excluded. It is probable that these ancient "civilizers" would have done everything in their power to "nurture" a new civilization across many millennia (or tens of millennia) and systematically accelerate its development in the intended direction. To achieve this, it might have been necessary, initially, to establish several centers of civilization development (likely up to a dozen), engage in the domestication of animals, the selective breeding of cultivated plants, the transfer of knowledge regarding crafts, and lay the foundations of scientific inquiry. However, it is difficult to conceive of the systematic development of these centers of civilization without their coordinated movement, and coordinated movement is impossible without means of communication. Furthermore, the very life of the "civilizers"—by analogy with modern life—is hard to imagine without what communication provides: contact with loved ones, literature, and art. Naturally, the existence of a communication technology at that time similar to modern "Starlink" internet technology would have been impossible, as such a project is far too massive and technically complex. A more "compact," modern, and technically sophisticated (compared to contemporary standards) communication technology was required. Thus, it is assumed that various pyramidal structures across the planet served as these communication devices.The Giza pyramid complex differs significantly from other similar pyramidal structures. Continuing the logical reasoning regarding the activities of the civilizers, one can consider the idea of a possible final stage of their mission: the colonization of an earth-like, habitable planet by advanced Humanity. To achieve this goal, one must know at least the approximate address of that planet's host star. The "recipient" can be indicated in various ways. However, most possible methods would be destroyed by time or human vandalism. One reliable method of information transmission appears to be an approach based on the universal language of intelligence—logic and mathematics—which, moreover, would be embodied in structures resilient to destruction.

2 The main part

By analogy with the messages carried by the Pioneer 10, Pioneer 11, Voyager 1, and Voyager 2 spacecraft, it is possible to interpret the probable "message" of a hypothetical terrestrial "Voyager" embodied in the Giza pyramid complex. In this regard, the following five assumptions about the message are formulated.

Assumption № 1: "The Giza Pyramid Complex as a Symbolic Representation of a Planetary System."

It is known that the average distance from the Earth to the Sun is approximately 150 million kilometers. The height of the Pyramid of Khufu should be determined based on calculation results that account for its original casing, where the baseline length is calculated in the ancient Egyptian unit of length—the Royal Cubit—and equals √196418 [1] (where 196418 is the 27th Fibonacci number) = 443.1907... Royal Cubits = 0.523606... Accordingly, the height of the structure will be equal to = 147.59 meters. In this respect, the height of the Pyramid of Khufu can be correlated with the minimum distance from the Earth to the Sun. In this study, we adopted the Great Sphinx monument as a symbol of a star, due to its strict alignment to the east—the rising place of the star "Sun." Extending this analogy further, the pyramids of the complex can be taken as symbols of planets, and their smaller subsidiary forms as their moons. Given that the height of the Pyramid of Khufu can be correlated with the minimum distance from the Earth to the Sun, the probable distance from the planets to a certain star was calculated in the designated arbitrary units of length, where 147.59 meters = 1 AU (Figure 1). The distance from the upper section of the Great Sphinx monument to the upper section of each pyramid was determined (using the "ruler" tool of the "Google Maps" web application) as follows: Khufu: 574 meters / 147.59 meters = 3.89 arbitrary units; Khafre: 675 meters / 147.59 meters = 4.57 arbitrary units; Menkaure: 965 meters /147.59 meters = 6.54 arbitrary units (Figure 1).

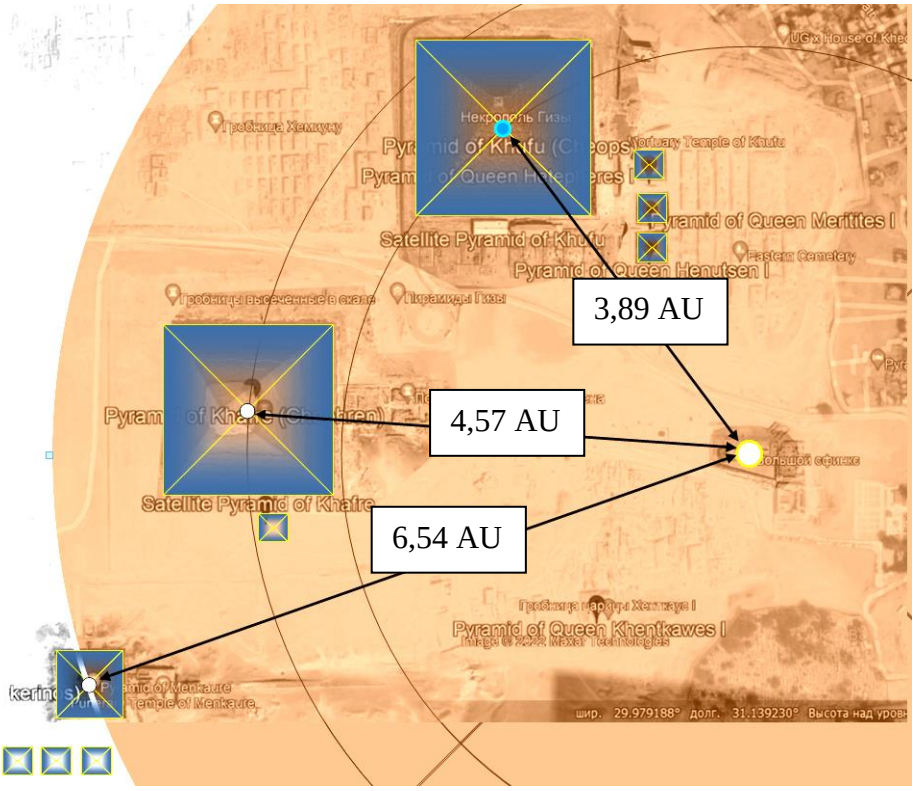

Figure 1. Schematic top-down view of the Giza pyramid complex and the Great Sphinx monument, where: circles on the summits of each of the three pyramids indicate planetary designations, and the star designation is shown above the head of the Great Sphinx monument; the distances from the head of the Great Sphinx monument to the pyramid summits are calculated based on an arbitrary unit of length, where 147.59 meters = 1 AU (the distance from planet Earth to the Sun)

In this respect, a possible analogous message—similar to the one carried by the Pioneer spacecraft—points to the planets of a certain star and, specifically, to the planet of the message's sender (or recipient). In this case, the sender (or recipient) of the message is presumed to be the Pyramid of Khufu, which symbolically represents the planet closest to the star (located, according to our calculations, at a distance of 3.89 AU from the star) (Figure 1).

Assumption № 2: "The Areas and Arrangement of the Giza Complex Pyramids, the Geometry of the King's Chamber in the Pyramid of Khufu, and the Niche of the Queen's Chamber as Standards of Length Measurement, Mathematical Operations, and the Fibonacci Sequence."

By analogy with the information carried by the Pioneer and Voyager spacecraft (the neutral hydrogen radio line), it is assumed that the Pyramid of Khufu contains an indication of a unit of length.Based on the selection of potential mathematical criteria for the arrangement of the Giza complex pyramids, a criterion of mathematical equality between the areas of two triangles formed by the summits of the Giza plateau pyramids and the summit of the Great Sphinx monument was identified. The following two triangles were obtained, with sides measuring 574; 508.5; 675 meters (S = 142134.946) and 675; 463.4; 965 meters (S = 142151.917). The calculated areas were converted into the "Royal Cubit" length system, where 1 Royal Cubit = (√5+3)/10 meters. With a high degree of approximation, the resulting area of the triangles equals the 29th Fibonacci number, which is 514229. The exact same total surface area—the sum of the base area and the visible surface area of the Pyramid of Khufu—was obtained when measuring the total surface area of the Pyramid of Khufu (the base area and the visible surface area of the Pyramid of Khufu correlate as the 27th and 28th Fibonacci numbers, with a sum equal to the 29th Fibonacci number: 196418 and 317811, expressed in Royal Cubits).Calculations in the metric system for the base area and the lateral (visible) surface area of the Pyramid of Menkaure revealed numerical values that virtually coincide with the 21st and 22nd Fibonacci numbers: 10946 m² and 17711 m², respectively (with a base side length of 104.6 m and a height of 66.5 m). Calculations for the base area and visible surface area of the Pyramid of Khafre also revealed figures close to the 24th and 25th Fibonacci numbers: 46368 m² and 75025 m² (with a base side length of 215.3 m and a height of 137.5 m). The dimensions of the pyramids recorded today differ slightly from the calculated values (being smaller by an amount of no more than 5%), which can be attributed to the loss of the original casing and the degradation of the structures (Table).

Table. Linear dimensions of the Giza pyramid complex

Pyramids	Fixed dimensions, m			Estimated dimensions, m		
	Length of the sides of the base		Height	Length of the sides of the base		Height
	Side 1, 2	Side 3, 4		Side 1, 2	Side 3, 4	
Khufu	230,45; 230,25	230,36; 230,39	138,75	232,057		147,59
Khafren	210,5	210,5	136,4	215,3		137,5
Menkaure	102,2	104,6	62	104,6		66,5

It is probable that the builders of the Giza pyramid complex demonstrated a knowledge of the Fibonacci numbers across two distinct systems of length measurement: the "Royal Cubit" (where the base area and the visible surface area of the Pyramid of Khufu equal the 27th and 28th Fibonacci numbers, with a sum equal to the 29th) and the "meter" (where the base area and the visible surface area of the Pyramid of Khafre correspond to the 24th and 25th Fibonacci numbers, with a sum equal to the 26th, and those of the Pyramid of Menkaure correspond to the 21st and 22nd Fibonacci numbers, with a sum equal to the 23rd). Consequently, a sequential series of Fibonacci numbers with indices 21, 22 (sum = 23), 24, 25 (sum = 26), 27, and 28 (sum = 29) is obtained. Based on an analysis of the geometry of the "King's Chamber" in the Pyramid of Khufu, the distances of a right triangle inscribed within the geometry of this room are interpreted as an indication of a unit of length equal to the modern standard of measurement, the "meter" (Figure 2). The figure illustrates two right triangles inscribed within the geometry of a rectangular cuboid (the "King's Chamber" room), where 2.618... represents the square of the "golden ratio" ($1.618...^2$), the

smaller edge (AD) equals 2× 2.618... (5.236…m), and the height of the figure (DB) equals √5×2.618... (5.854…m). Notably, the right triangle A-D-C possesses unique properties (rendering it entirely distinct in this regard) in that the numerical value of its area coincides with both the value of its perimeter and the value of the square of its shorter leg (Figure 2). The uniqueness of the lower triangle depicted in Figure 2 is based on the following facts. Among the infinite set of right triangles where the values of area and perimeter are equal, there exists a one-of-a-kind triangle: a right triangle in which the numerical values of the area, the perimeter, and the square of the shorter leg all coincide (Figure 2). These properties of the inscribed triangle manifest exclusively when it is represented in the metric system. Finding this equality via formulas for a right triangle with non-integer sides (irrational numbers) is mathematically highly complicated, as the calculation requires the use of a transcendental equation rather than an algebraic one.

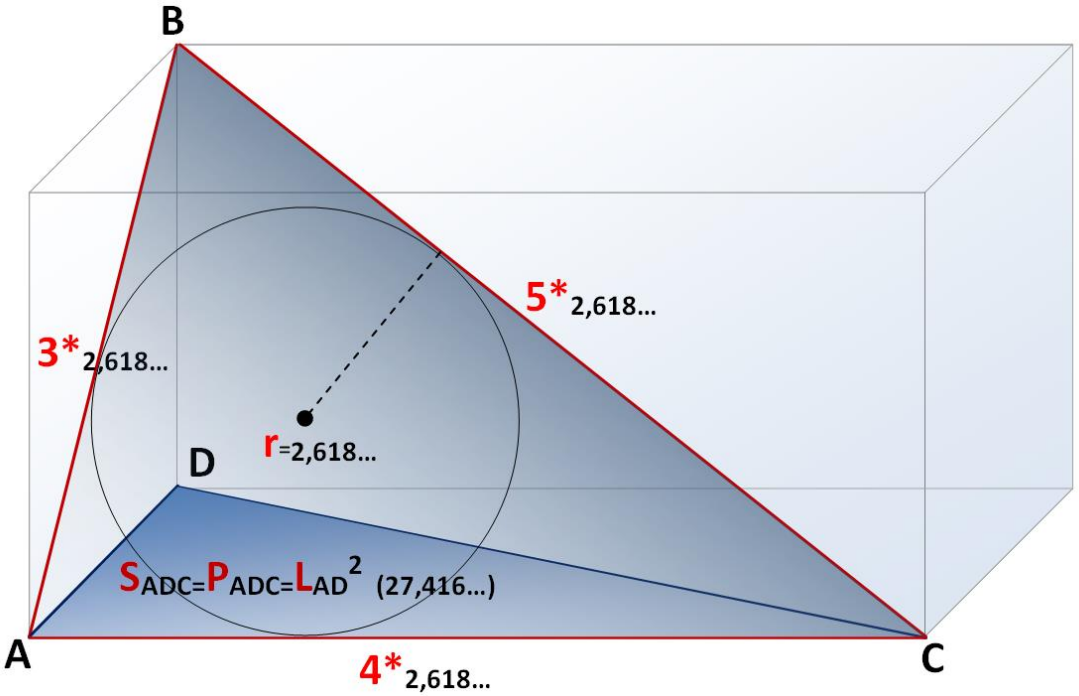

Figure 2. Schematic representation of the "golden" proportional ratios within the geometry of the "King's Chamber" room in the Pyramid of Khu fu, where: 2.618... is the square of the "golden ratio" ($1.618...^2$), the smaller edge (AD) = 2×2.618... (5.236… m), and the height of the figure (DB) = √5×2.618... (5.854…m)

By analogy with the information presented in the diagrams of the Voyager spacecraft, the geometry of the stepped niche in the "Queen's Chamber" room of the Pyramid of Khufu has been interpreted (Figure 3). Based on the calculation results, Figure 3 demonstrates:– integer and fractional values of the "Royal Cubit" unit of length (0.5236 meters) for the heights of the five cuboids comprising the niche;– the lengths, frontal surface areas, and volumes of the five niche cuboids, expressed in meters, which exhibit the following "peculiarities": the sum of the heights of the 1st and 2nd cuboids of the stepped niche equals 2.618... m = Φ^2), and their heights differ by a factor of 2; the frontal surface areas and volumes of cuboids No. 3, No. 4, and No. 5 differ by exactly an integer or a fraction; the surface area and volume of cuboids No. 1 and No. 5 differ by exactly a factor of 10.In this regard, Assumption 2 is formulated.

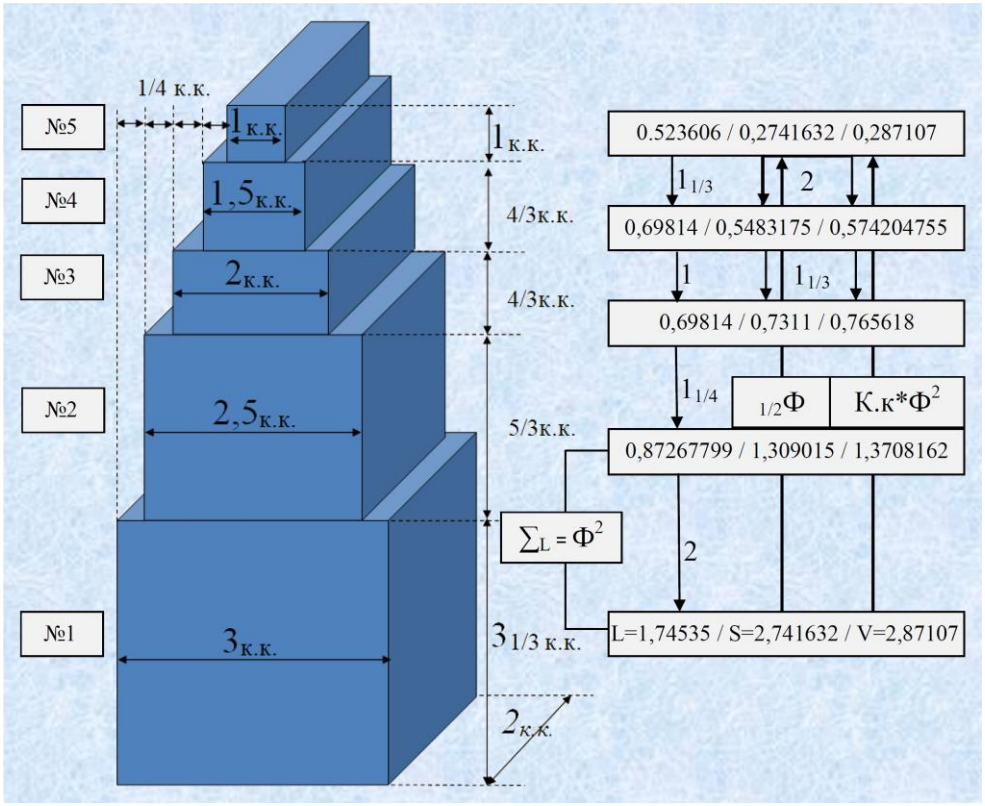

Figure 3. Schematic representation of the geometry of the stepped niche within the "Queen's Chamber" room in the Pyramid of Khufu, where: R.C. is the "Royal Cubit" unit of length, which equals 0.5236 meters (also referred to as the ancient Egyptian unit of length "Royal Cubit" (0.5236 meters = 1/5 of the square of the Golden Ratio, (2.618...)); the values for the lengths, surface areas, and volumes of the five niche cuboids are expressed in meters

Assumption № 3: "The Location of the Pyramid of Khufu Indicates Knowledge of the Numerical Value of the Speed of Light, Expressed in Modern 'Meter' Units of Length."

Due to the high precision of speed-of-light measurements, the modern "meter" unit of length remains tied to the unit of time—the second—and is defined as the distance light travels in 1 / 299,792,458 of a second. Considering the equator as the precise baseline for measuring latitude, we correlate the latitude value of the summit of the Pyramid of Khufu (29.9792458º N) with the value of the speed of light, 299,792,458 m/s (±1.2 m/s).

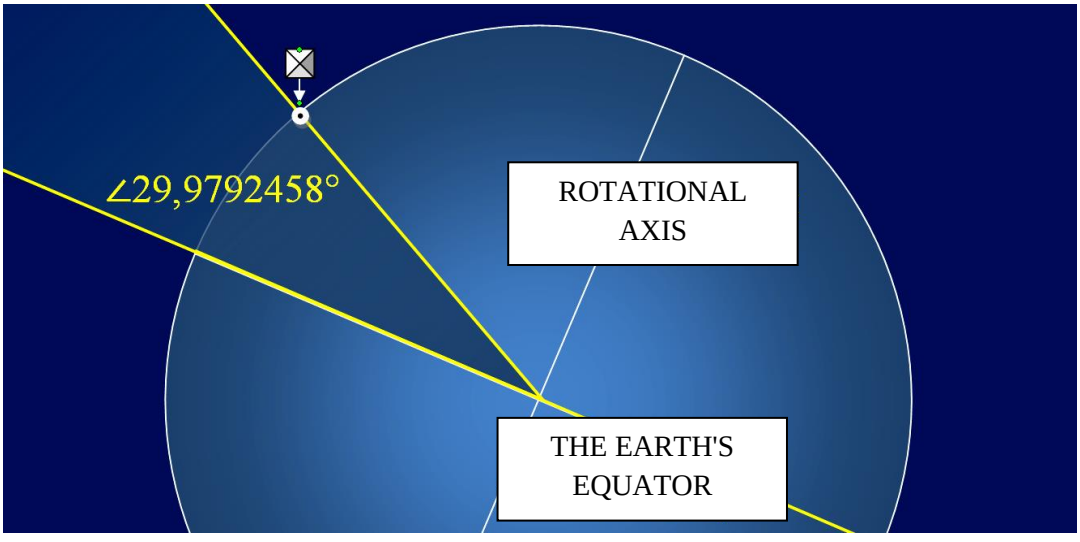

Figure 4. Angle formed by the projections of the Earth's equator line and a line starting from the midpoint of the planet's rotational axis to the location of the summit of the Pyramid of Khufu

Assumption № 4: "The Four Shafts of the Pyramid of Khufu Are Aligned with the Brightest Stars and Are Thus Intended for Orienting the Pyramid's Gallery toward a Certain Planetary System."

By analogy with the information presented in the diagrams of the Pioneer and Voyager spacecraft regarding the position of the Sun relative to pulsar stars, it is assumed that a specific method of orientation is incorporated within the Giza pyramid complex to locate a particular star for message transmission purposes. The simplest solution in this regard is to align the "transmitter gallery" relative to the stars by anchoring the entire pyramid complex to specific marker stars. In this context, the "shafts"—channels specially designed for this purpose within the mass of the Pyramid of Khufu's body—could serve as guides pointing toward these marker stars. An analysis of the potential alignments of these shafts with stars possessing high apparent magnitudes revealed that the two shafts on the northern side of the pyramid are aligned with the stars Thuban (a white giant in the constellation Draco, apparent magnitude 3.647) and Kochab (the second brightest star in the constellation Ursa Minor after Polaris, apparent magnitude 2.08), while those on the southern side are aligned with Alnitak (a star in the constellation Orion, which is the brightest O-class star, apparent magnitude 1.7) and Sirius (a star in the constellation Canis Major, the brightest star in the night sky, apparent magnitude –1.46) (Figure 5).

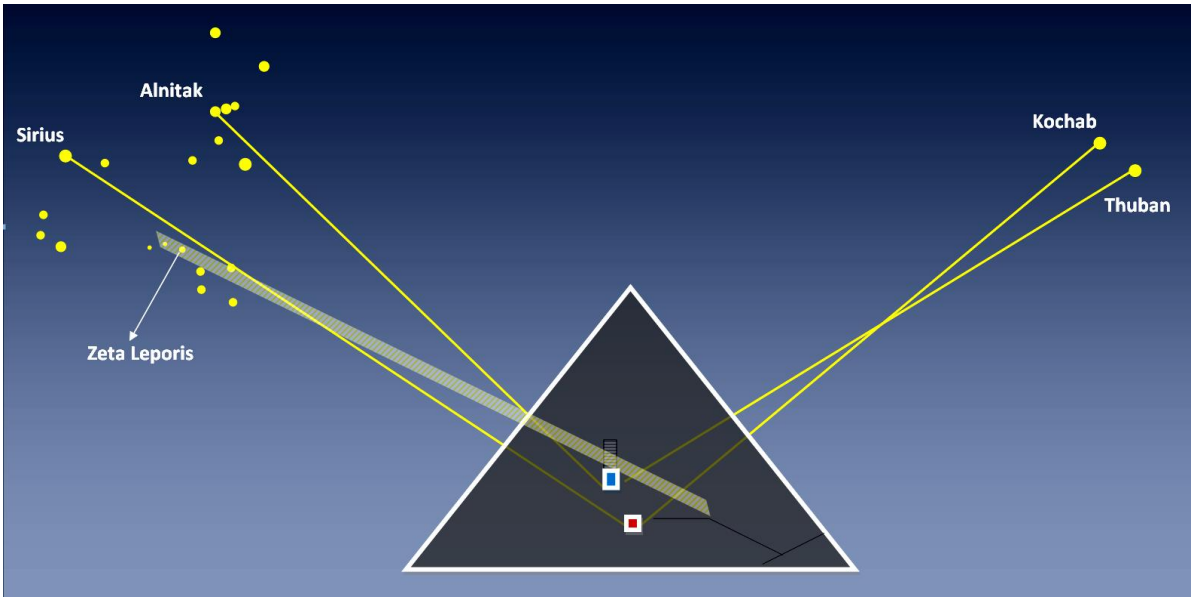

Figure 5. Schematic representation of the alignment of the shafts and the gallery of the Pyramid of Khufu, where: the arrow indicates the star Zeta Leporis, toward which the gallery of the Pyramid of Khufu is oriented relative to the corresponding alignments of the shafts with the stars Kochab, Thuban, Sirius, and Alnitak

Assumption № 5: "The Giza Pyramid Complex Is a Directional Communication Device for Transmitting Information to the Sector of the Starry Sky Indicated by the Structure of the Pyramid of Khufu—Specifically, to a Certain Planetary System with a Planet Suitable for Biological Life."

Based on an analysis of the stellar positions within the celestial sector toward which the Grand Gallery of the Pyramid of Khufu is oriented, the constellation Lepus was identified. Applying the information from Assumption 1 ("The Giza Pyramid Complex as a Symbolic Representation of a Planetary System") and according to Formula 1, the conditions for a planet to reside within the habitable zone were determined: the stellar luminosity for the closest planet in this system must not exceed 15 solar luminosities. Within this constellation, through a selection process of candidate stars based on their luminosity indices, the star Zeta Leporis (ζ Leporis) was isolated. This star is located in the constellation Lepus at a distance of approximately 70 light-years from the Sun and possesses a luminosity of 15 L⊙) (see Figure 5). If an Earth-like planet suitable for biological life does exist within the planetary system of the star ζ Leporis, it must be located at a

distance of 3.9 AU within the so-called habitable zone, which lies precisely at the center of the presumed asteroid belt (the habitable zone was calculated using Formula 1, well-known in scientific literature, given that the recorded luminosity of the star ζ Leporis is (15 L⊙).

$$D_{AU}=\sqrt{L_{STAR}/L_{SUN}}, \text{ where:} \quad (1)$$

D_{AU} is the average radius of the habitable zone in astronomical units;
L_{STAR} – bolometric indicator (luminosity) of a star;
L_{SUN} – bolometric indicator (luminosity) The sun.

According to Assumption 1 ("The Giza Pyramid Complex as a Symbolic Representation of a Planetary System"), the distance from the upper section of the Great Sphinx monument to the upper section of the Pyramid of Khufu is 3.89 arbitrary units, which coincides with the calculated data for the potential habitable zone of the star ζ Leporis. An asteroid belt similar to the one located between Mars and Jupiter in the Solar System has been discovered around the star ζ Leporis (Figure 6, left). The thickness of the discovered belt is 5.4 AU. It is situated 2.5 AU away from its host star, is highly massive, and is estimated by researchers to be 200 times heavier than the Solar System's asteroid belt. Based on contemporary astronomical data, the results of our own calculations using Formula 1, and the data from Assumption 1, a model of the potential planetary system of the star ζ Leporis has been created (Figure 6, right).

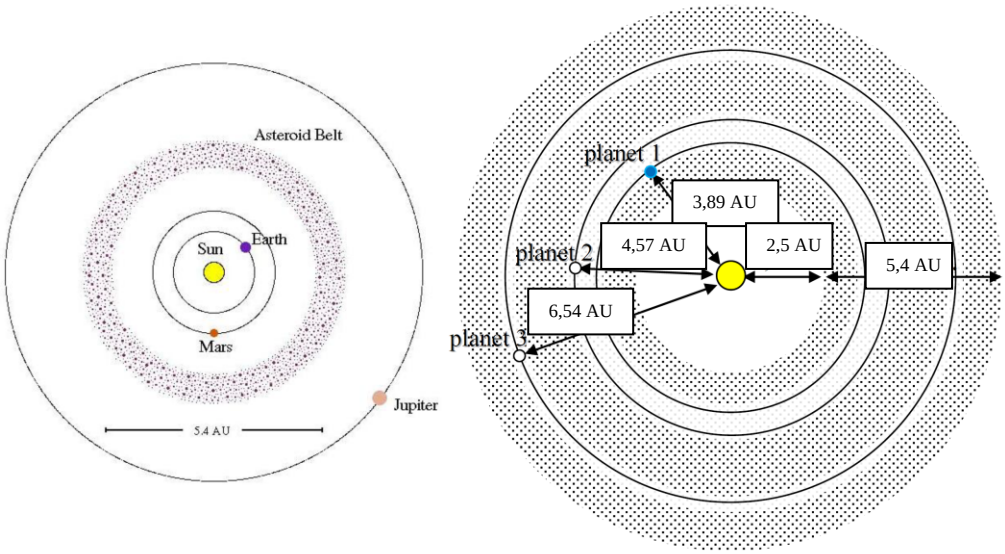

Figure 6. Schematic representation of the asteroid belt in two planetary system models: the Solar System (left) and the proposed system of the star Zeta Leporis (right), where: planet 1, planet 2, and planet 3 are the hypothetical planets of the star Zeta Leporis

3 Conclusion

1. Five plausible assumptions regarding the purpose of the Giza pyramid complex have been examined.
2. Based on the analysis of these five assumptions, the probable message intended by the pyramid builders and a potential recipient for this transmission (a planet of a specific star) have been demonstrated.

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