

The Moon, Earth and Sun in an ancient solar system model

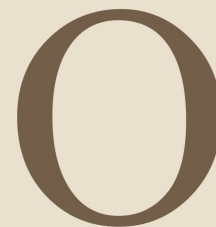
Abstract

A model of the Moon located in the desert in Libya and a model of the Earth located over Cairo, which is aligned to the ancient monuments that lie around the western edge of the city, have been identified in the previous papers in this series. Although the connection between the two models has been established there are several features that have been discovered which have not been resolved, and therefore the precise geometric mechanism for connecting the models together has not yet been identified. In this paper I show that there are two distinct modeling systems that connect the Moon, Earth and Sun model locations together, one for the outer solar system and one for the inner solar system. I separate out the two models and present their design principals within the two main sections of the paper. By doing so the architectural design system becomes fully resolved and the ground locations of the three celestial bodies' models are identified. I show that the Sun model for the inner solar system is located on Zmiinyi Island in the Black Sea, also known as Snake Island, and that much of the island's topography must be artificial. I also identify two subsidiary models of the Sun, connected to the first, which are etched into the mainland and which contain artificial land features which are 20 km in length. I show that the design of the system allows the location of the Sun model to be accurately positioned by making adjustments to the position of the Moon model and thereby extract the ranges of the Moon and the Sun from the Earth at the moment of the 2729 BCE winter solstice to a precision within the error margins of the NASA DE441 ephemeris.

ISBN 978-1-7398691-4-4



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The Great Pyramid papers

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The Moon, Earth and Sun in an ancient solar system model

In a previous paper in this series¹ it was established that there is a model of the Moon etched into the desert in Libya which connects to a model of the Earth located at Cairo, the positions of which are linked directly to a latitude and longitude system that uses modern GPS coordinates. Extensive analysis of these models and the alignment system shows that there are actually two models of the Moon in the Libyan desert, one of which is explicitly shown on the desert floor and one which is implicit within the design. These two Moon models connect to two distinct Earth models which then link to two models of the Sun. These two systems are designed to be very similar to each other so that they are particularly difficult to separate during reverse engineering and a full analysis of the systems shows that one of them provides the starting locations for a model of the inner solar system and the second provides the starting locations for a model of the outer solar system.

The locations of the planets on the two solar system models are covered in the future papers in this series. In this paper the mechanics of the two Moon, Earth and Sun systems is explained and the GPS coordinates of the center points of the three bodies is determined.

The GPS alignment

In the earlier paper¹ the path from the GPS coordinate zero point on the equator was documented, a line which first runs East along the equator and then maps geodetically up to a point labeled GPS0002 in Cairo at a latitude of 0.5231 radians. A series of points was then established from this location which define the focal points of the Earth model and the location of the Earth-Moon barycenter on a 300:1 scale model of the planet. Although the calculations were performed correctly in the previous paper, a full appreciation of the system on display in the architecture was not fully understood and the system is now further explained.

When plotting the points along the diameter of the model of the Earth's polar cross section geodetic plotting was used, resulting in the points not being set on an east-west line. To correctly model the architect's system of points what is required is to plot due east and due west from any given point by way of traversing around lines of equal latitude on the globe, which is a specialized form of geodetic plotting. The software that had been written to allow the standard geodesic paths to be plotted and then displayed as .kml files on the Google Earth application was therefore amended so that the east and west line plotting could be accomplished, and it was during the writing of this section of the software that the issue of geodetic and geocentric latitudes was encountered.

Latitudes on Earth are, by convention, geodetic latitudes. If you wish to calculate the traverse along a latitude line by a number of meters east it is necessary to first calculate the radius of the starting point on the reference ellipsoid and then calculate the small circle circumference of the Earth at that latitude so that the distance that needs to be traversed can be expressed as an angular value which can be added to the longitude of the start point to get the coordinates of the eastern end point of the traverse. This calculation needs to be done carefully because of the fact that the latitude is always expressed geodetically. What is required in the mathematics is to determine the *geocentric* latitude that relates to the geodetic latitude and use this in geometry calculations when determining the latitude's small circle circumference.

Because this was not understood when performing the calculations on the points along the diameter of the Earth model in the previous paper the radius calculations were performed as though the point's geodetic latitudes were geocentric. However the resulting lines and points correctly aligned to the monuments around Cairo and from this it was concluded that the GPS path system must require a northerly shift at the point GPS0002 to a new point GPS0002', the first of these points having a latitude of 0.5231 radians and 2

the shifted point having a *geocentric* latitude of 0.5231 radians. The east and west traverses can now be performed at the geocentric latitude and produce almost identical results in longitude as the incorrect calculations that were performed in the previous paper with a difference in longitude of only a few centimeters. Once the points along the diameter of the Earth model have been established at the geocentric latitude they can then be translated back down to the 0.5231 geodetic latitude line using standard geodetic mapping. Diagram O1 shows the principal points of the GPS alignment system in Cairo starting with the point GPS0002, the points in the system previous to this being on the equator.

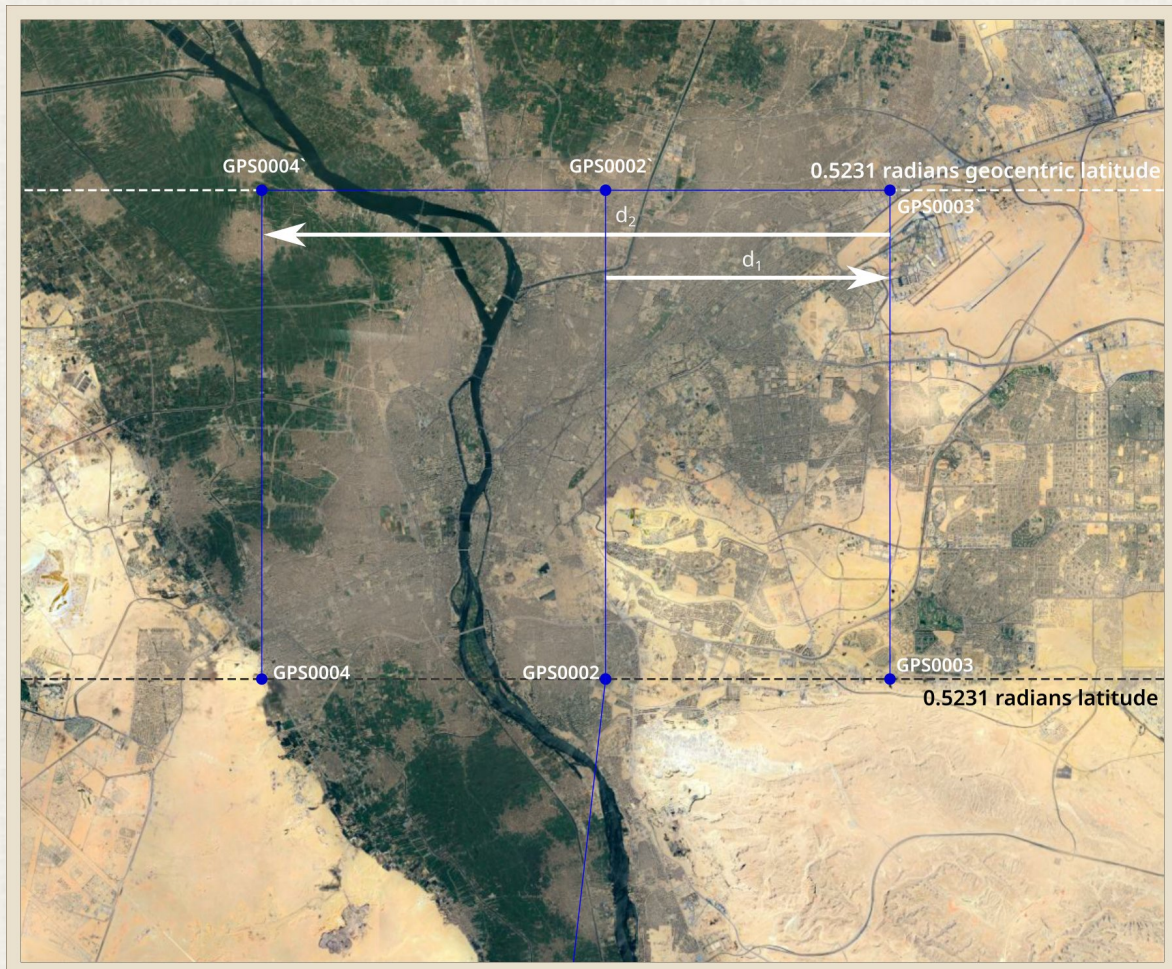


Diagram O1 - The fully resolved GPS alignment system in Cairo.

The point GPS0000 is at the origin of the modern day GPS system with a latitude and longitude of zero. The point GPS0001 lies 3127.5470623885127 pkm (perfect kilometers) to the East of the GPS origin on the equator and the length of the line from this point to GPS0002 is exactly one third of the distance from the north pole to the equator and is defined as terminating at the latitude 0.5231 radians. These first three points in the GPS alignment system form a contained calibration system in which the longitude of the point GPS0002 is 31.275470623885127 and is equal to one hundredth of the length of the line from GPS0000 to GPS0001 transposed into degrees.

The point GPS0002' has the same longitude as the point GPS0002 but has a geocentric latitude of 0.5231 degrees and is determined by creating a geodesic line of length 18.48982366508112 pkm at an azimuth of zero degrees from the point GPS0002.

The point GPS0003' has the same longitude as the point GPS0003 and defines the longitude of the center of the Earth model that is to be formed over Cairo. The point GPS0004 is the primary reference point on the Wall of the Crow and the points GPS0004' and GPS0003' are determined from the two distances d_1 and d_2 shown on diagram O1. These are values derived from numerical data extracted from the floor stones of the upper chamber and ante-chamber of the Great pyramid those numbers being 2.397696542 from the antechamber and 7.292123 from the upper chamber.

The second of these two values is the angular velocity of the rotation of the Earth on its axis at the moment of the 2729 BCE winter solstice expressed in radians per second and needs to be converted into a sidereal day length of 23.9344461413271 hours which is then plotted as a perfect kilometer distance from the point GPS0003' west to the point GPS0004'.

The first of the values is true anomaly of the Earth-Moon barycenter (EMB) expressed in radians and is therefore a variable quantity which depends upon the range of the Moon. The Moon range can be determined by taking a line from the center point of the Moon model which runs through the reference point at the Wall of the Crow and which terminates on the longitude of the point GPS0003. Once the Moon's range has been determined it can be used to calculate the EMB range from the center of the Earth which then allows the distance d_1 be re-calculated on the 1:300 scale model of the Earth. This process needs to be repeated until the system stabilises and the alteration to the length d_1 becomes insignificantly small when the calculation loop is repeated.

The GPS location of the Great Pyramid base center

The location of the base center of the Great Pyramid is used in the construction of the Moon-Earth system for the outer solar system model and therefore needs to be determined exactly in GPS coordinates. From the point GPS0004 it was established in a previous paper² that a line needs to be mapped across the Giza plateau that terminates on one of the latitude lines of the grid system of the pyramids thereby determining the north west corner of the casing stones of the Great Pyramid at the point GPS0006. Further analysis of this system shows that a line can be then taken from the north west corner of the casing stones at an azimuth of 135° to the cubit definition reference latitude that is given in the numerical data of the shaft's stonework and which was shown in table N7 of the previous paper³ to be at the latitude of 0.523222606613581 radians, which is also the latitude of the south wall of the upper chamber of the Great Pyramid. The center of the base of the Great Pyramid is situated 90% of the way along this line, and so can be plotted by geodetically mapping back along the reverse azimuth by 10% of the connecting line length from the line's end point.



Diagram O2 - The GPS aligned base center point of the Great Pyramid.

Diagram O2 shows the GPS mapping of the base center point of the pyramid GPS0008 and it should be noted once again that because the alignment is dependent upon the location of the point GPS0004 and therefore on the Earth-Moon barycenter location the exact latitude and longitude cannot be determined until the position of the Moon has been established, from which the Moon's range and then the barycenter location determined.

The purpose of the geodetic and geocentric latitude lines in the GPS alignment shown in diagram O1 can now be fully understood because the bearing of the line from GPS0004 to GPS0006 is determined directly from the radius of the Earth's reference ellipsoid at the point GPS0004 and this must be the geodetic radius of this point because of the way that the GPS mapping system specifically differentiates between the two latitude types where GPS0004 is explicitly defined as being a geodetic latitude.

The moon model

In order to plot the model of the Moon the system that was identified in the previous paper needs to be used and analysis of the overall system shows that a simplified version of the system, which creates a second moon model, needs to be established.

The moon model in the previous paper was positioned by taking a geodesic line from the point GPS0005 at the Wall of the Crow that is rotated by pi radians from East and then its length determined by defining it as being 365 perfect kilometers (pkm) per radian. This line marked off a preliminary point in the desert onto which an additional distance was then added which was the ratio of the Moon's sidereal orbit period relative to that of Earth. The simplified system uses just the first section of this line to the preliminary point at which juncture the second model of the Moon is then created in exactly the same manner as the first. This construction is shown in diagram O3.

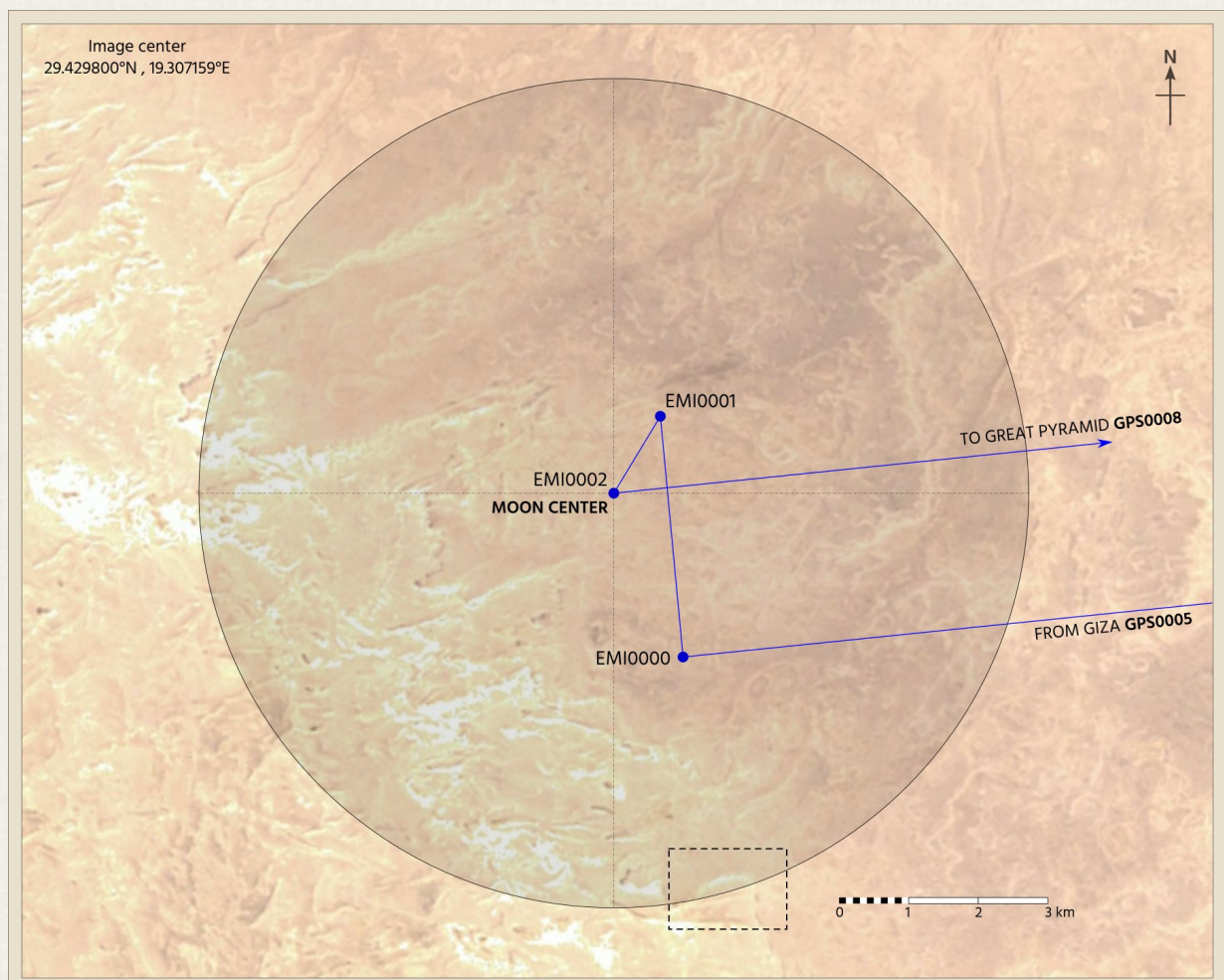


Diagram O3 - The second model of the Moon in the Libyan desert.

The line from the second Wall of the Crow point in Giza, GPS0005, is shown coming in from the east in diagram O3 to the point EMI0000, the 'EMI' lettering code for the point being *Earth Moon Inner* solar system because this model of the Moon is used exclusively for the inner solar system model construction. From this point the lines to EMI0001 and then to EMI0002 are formed in the same manner as the original moon model shown in the earlier paper⁴. From the moon center a line is then taken back through the base center point of the Great Pyramid GPS0008 and onward *to the longitude* of the point GPS0003 shown in diagram O1.

The rectangle shown by the dotted lines towards the bottom of illustration O3 is where the alignment system for this second moon model is located, the details of which are shown in diagram O4.

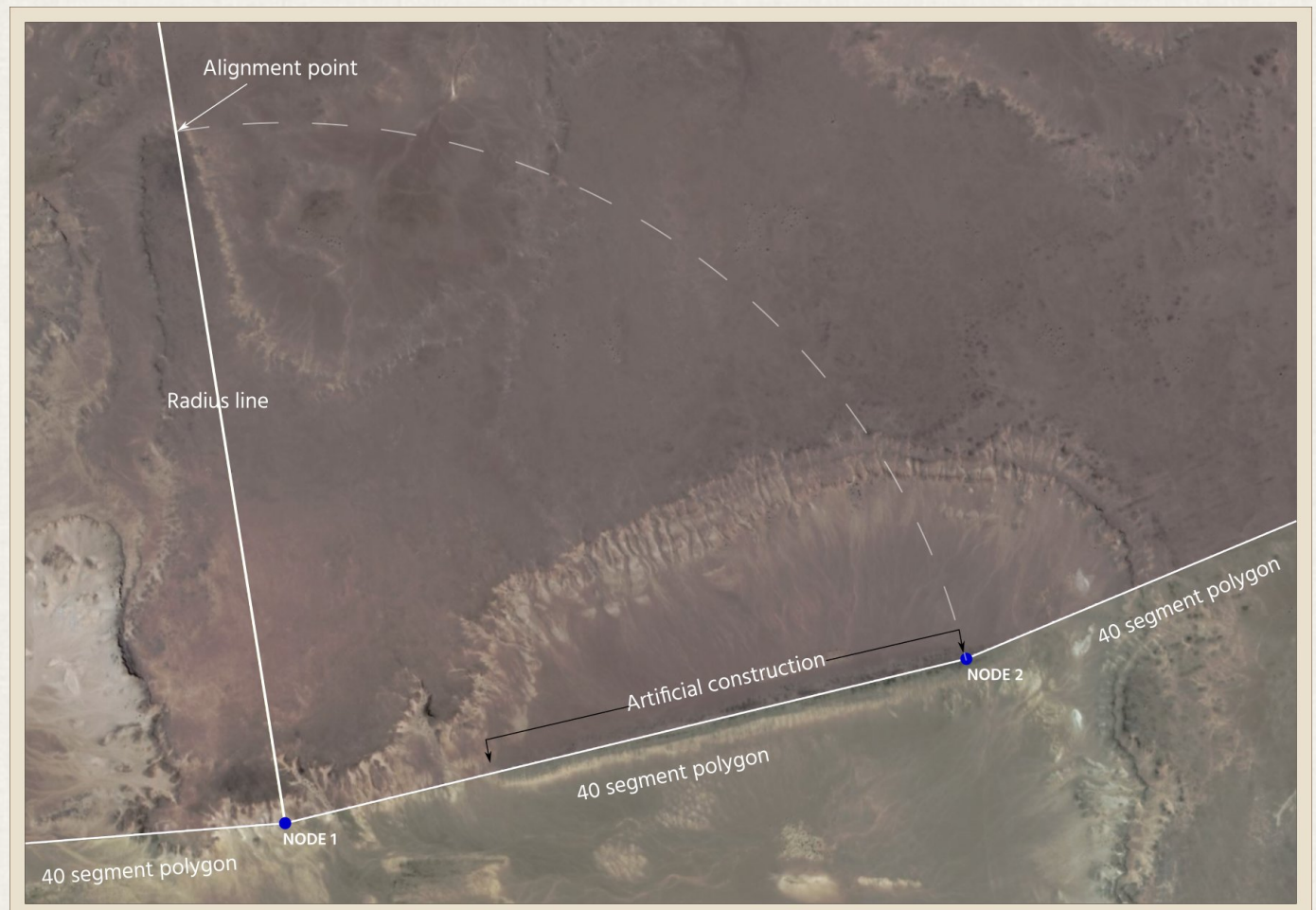


Diagram O4 - The alignment ground features.

The artificial construction that was identified in the previous paper⁵ serves as the alignment mechanism for the Moon model and dictates that the moon model has an equatorial radius of 6 pkm, has no rotation applied to it, and is constructed using a 40 sided polygon.

During the analysis, as the distance of the line from Giza is increased the moon model moves to the west due to the increase in line length and also to the north due to the increase in the forward azimuth of the line from Giza which is directly related to its length by a ratio of 365 pkm per radian. Consequently it is possible to adjust the line length so that the moon model's polygon side fits the center line of the artificial construction which occurs at a line length of 1147.046 pkm and a corresponding sidereal orbit period for the Earth of 365.116 days. It is the alignment point to the north in diagram O4 that allows the polygon side count to be determined and assists with the precise alignment of the moon model.

The distance from the center of this moon model to the Earth center can now be determined using a point-to-point geodesic calculator. The line from the center of the Moon to that of the Earth is defined as running

through the base center of the Great Pyramid and terminating at the longitude of the point GPS0003, that being the center of the Earth model over Cairo that is established in the GPS alignment system. When this distance is calculated it can be seen to be a 1:333.33333 scale model of the Earth-Moon system giving the Moon's range at the winter solstice of 2729 BCE as 390676.547031812 km which has a time error relative to the Moon range given in NASA's DE441 ephemeris at the winter solstice of 23 minutes and 29 seconds.

The Earth model

Diagram O5 shows the location of the center point of the resulting Earth model that is located over Cairo which is distinctly different from the first Earth model that is used in determining the GPS points and the monument alignments that were shown in the previous paper.

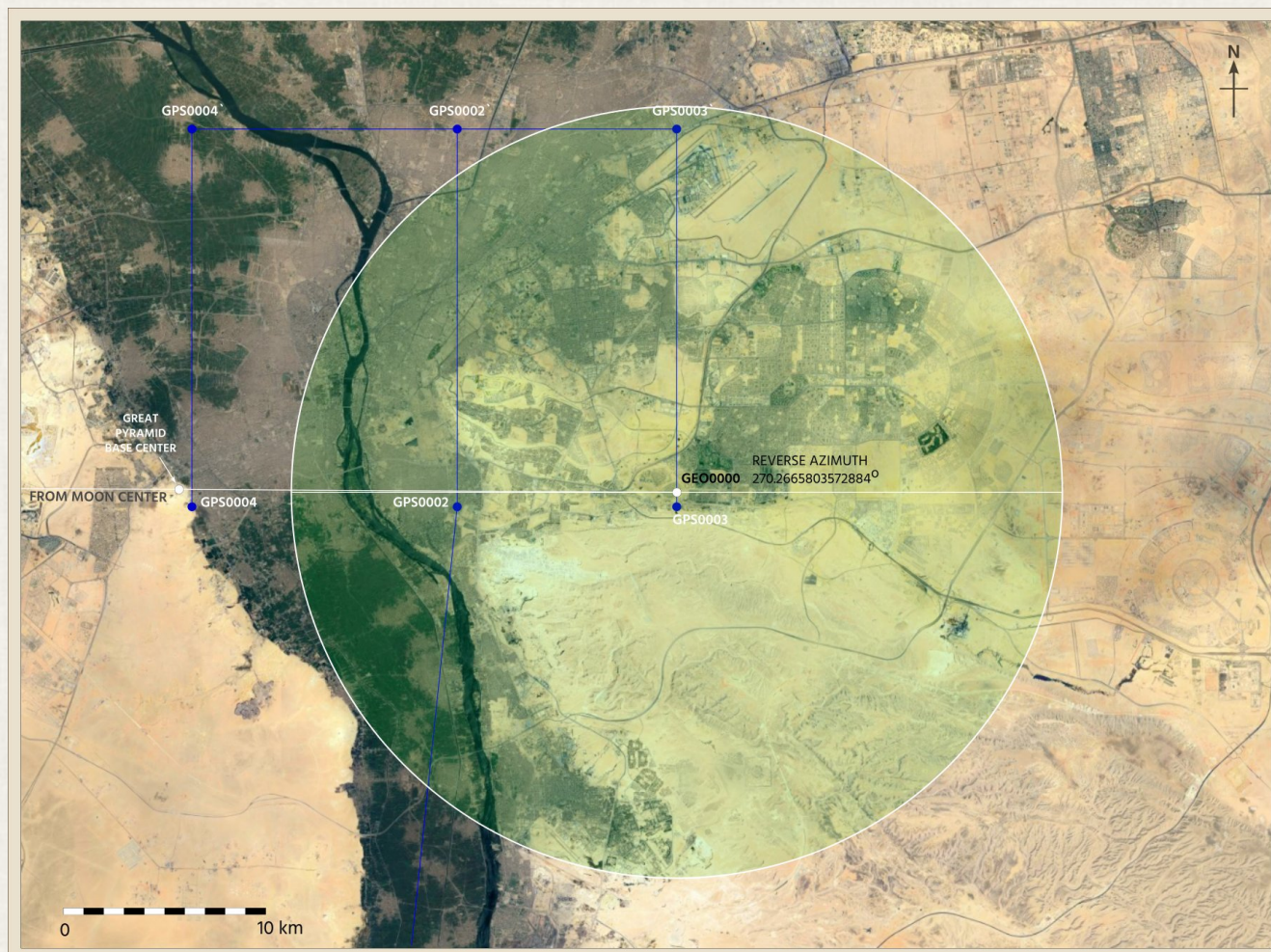


Diagram O5 - The inner solar system Earth model over Cairo.

The Earth model is drawn to a 1:333.333 scale, that being the scale of the range line from the Moon center point to the longitude of GPS0003, and therefore has an equatorial radius of 19.134 km. The center of the model of Earth is given the identifying code GEO0000. Of particular note is that the line from the Moon to the Earth model center that passes through the base center of the Great Pyramid has a reverse azimuth of 270.26658 degrees and is important because this angle is used as the reference angle for determining the exact position of the Sun. Whereas the line from the point GPS0005 to the Moon is rotated from a starting reference angle that points due East, the line that is about to be constructed from the center of the Earth model to the Sun center uses a starting reference azimuth of 90.26658 degrees and the small difference between these two angles is what allows the Sun's precise position to be determined.

The two Moon-Earth systems

The principal components of the two Moon-Earth systems that have been defined by the complex geometric systems in Libya and Cairo are shown in diagram O6.

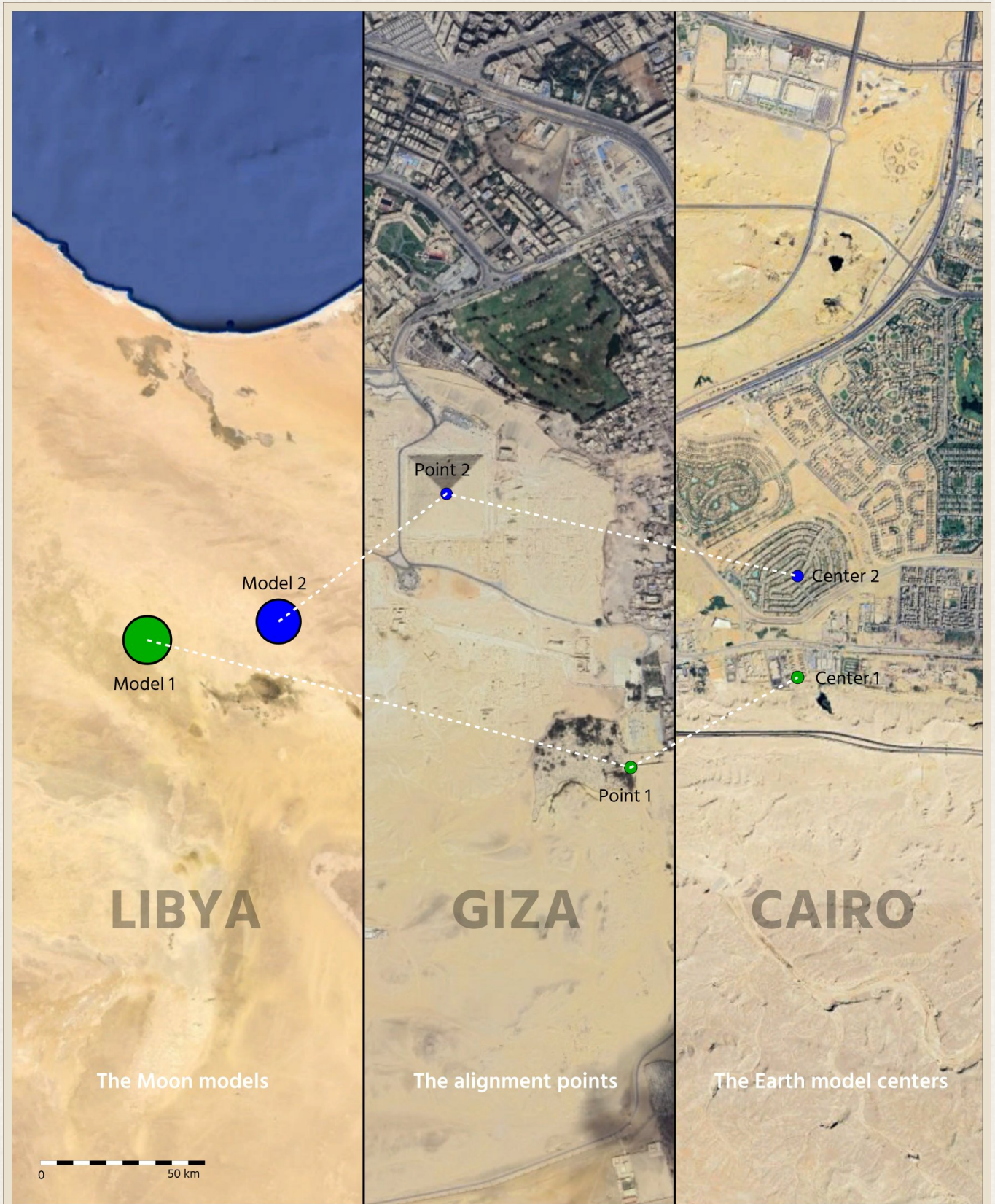


Diagram O6 - The two Moon-Earth systems.

In diagram O6 the inner solar system Moon and Earth system is shown by the blue marker points and the outer solar system Moon and Earth system is shown by the green marker points. The dotted lines are for illustrative purposes only and represent the geodesic lines that run between the various points. The center points of the two Earth models shown in the right panel are located 359 meters apart and fall on the longitude of the GPS0003 point by definition. These two systems are completely separate from each other but are constructed in such a similar manner that they are deliberately very difficult to separate. The reverse azimuths of the geodesic lines at the Earth center points is the reference direction used in the solar system geometry and is fractionally different for each model.

The inner solar system Sun model

Of all of the architectural constructions that have been seen so far, the Sun model is by far the most remarkable and surprising. The system for locating where the model should be involves taking the range of the Earth from the Sun at the winter solstice from the DE441 ephemeris of 148606642 km, creating a scale model of this distance at the scale of the Earth model contained within the Great Pyramid, 87500:1, and starting with this line emanating from the center of the Earth model just created, center 2 on diagram O6, at the azimuth of the Moon-Earth line of 90.26658 degrees. The line is then rotated around the Earth center point clockwise by an angle determined by using the same method as for the Moon line where for every 365 perfect kilometers of length, the line is rotated by 1 radian. Diagram O7 shows an overview of the Moon, Earth and Sun models when this system is used to position the Sun model.



Diagram O7 - The inner solar system Earth, Moon and Sun models.

Starting the determination of the Sun model position by using approximate numerical values whilst measuring from a due East reference, the line from the Earth model to the Sun model is 1698.4 km in length, giving an angle of 266.55 degrees from East as the rotation angle of the line. This results in the Sun model being located within a few hundred meters from Zmiinyi island in the Black Sea, also now known as "Snake Island" and which has become globally well known due to the war in the region.

If instead of using the due East reference line at the Earth model the reverse azimuth of the line from the Moon model is used as the reference angle, as marked on the diagram, then it becomes possible to accurately align the Sun model with the features of the island and moreover the logic of the construction becomes apparent. By using the reverse azimuth of the Moon-Earth line as the starting reference for the Sun line then any change in the position of the Moon will result in a change in position of the Sun.

Because of the large length of the line to the Sun, tiny changes on the Moon position make significant changes in the Sun's position. The geometric design acts as an error amplifier and the Sun model can be accurately aligned only after the Moon's position has been firmly established.

Once the Moon position is fixed then the distance of the line from the Earth to the Sun model can be adjusted to make the final alignment with the island's features. This action detaches the model from the DE441 ephemeris data and firmly establishes an independent value for the Earth's range at the moment of the 2729 BCE winter solstice.

Diagram O8 shows the geometric alignments to the the topography of Snake Island. The lower model of the Sun has a 100 perfect meter (pm) radius , the upper model of the Sun is scaled at 1 to 2.5 million and the two models are connected by a 365 pm line which runs from the geographic north of the lower model to the geographic south of the upper model. In addition the coastline of the island is also geometrically constructed (right side of illustration) where the straight section of the southern coast is formed from a 120 pm long line set at an azimuth of 60 degrees and the west coast from a line of $333\frac{1}{3}$ pm in length at an azimuth of $333\frac{1}{3}$ degrees.

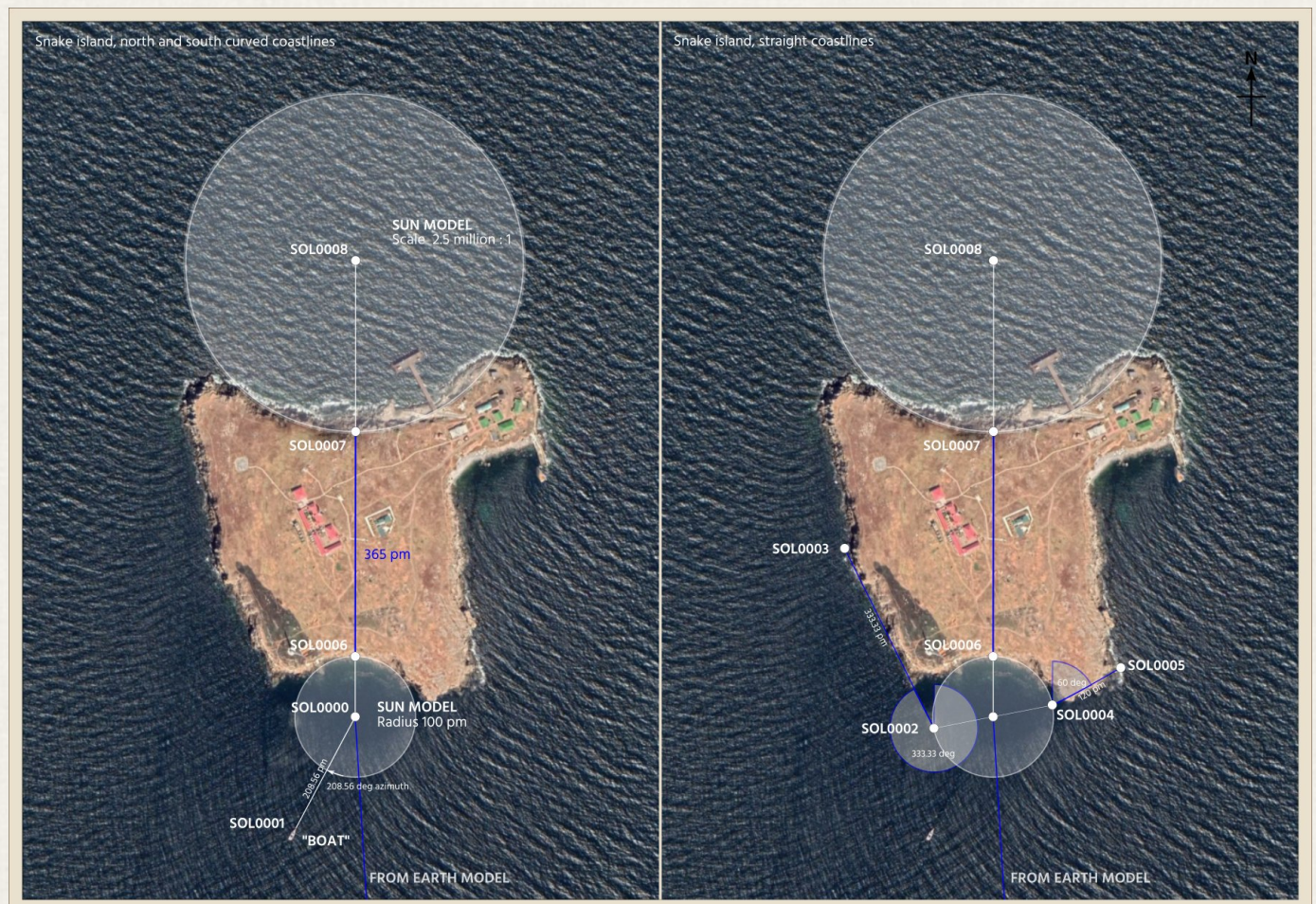


Diagram O8 - The geometric and topographical features of Snake Island.

In the left side of the illustration there is a boat image that is marked which perfectly aligns with the center of the lower Sun model and is set at an azimuth of 208.56 degrees and the bow of the boat is at a distance of 208.56 pm from the Sun model center. The boat image has to be a digital edit on the satellite photograph.

The construction of Snake island takes the architecture into a new realm and is the first construction that has been encountered which on first appearance appears to be a natural geographic feature but is in fact artificial. Because this is a particularly large step to take in terms of understanding who has constructed the system and what is on display, the artificial nature of the island's features is confirmed with a second set of

'natural architecture' which is more dramatic as the first.

The mean anomaly of the Earth at the winter solstice of 2729 BCE and the true anomaly of the Earth at the same instant have been added by the architects to the Sun model system, the true anomaly being constructed starting from the lower Sun model center and the mean anomaly constructed from the upper Sun model center. Diagram O9 shows these constructions along with the enormous 33333.33 scale models of the Sun which are positioned at the ends of the true and mean anomaly lines.

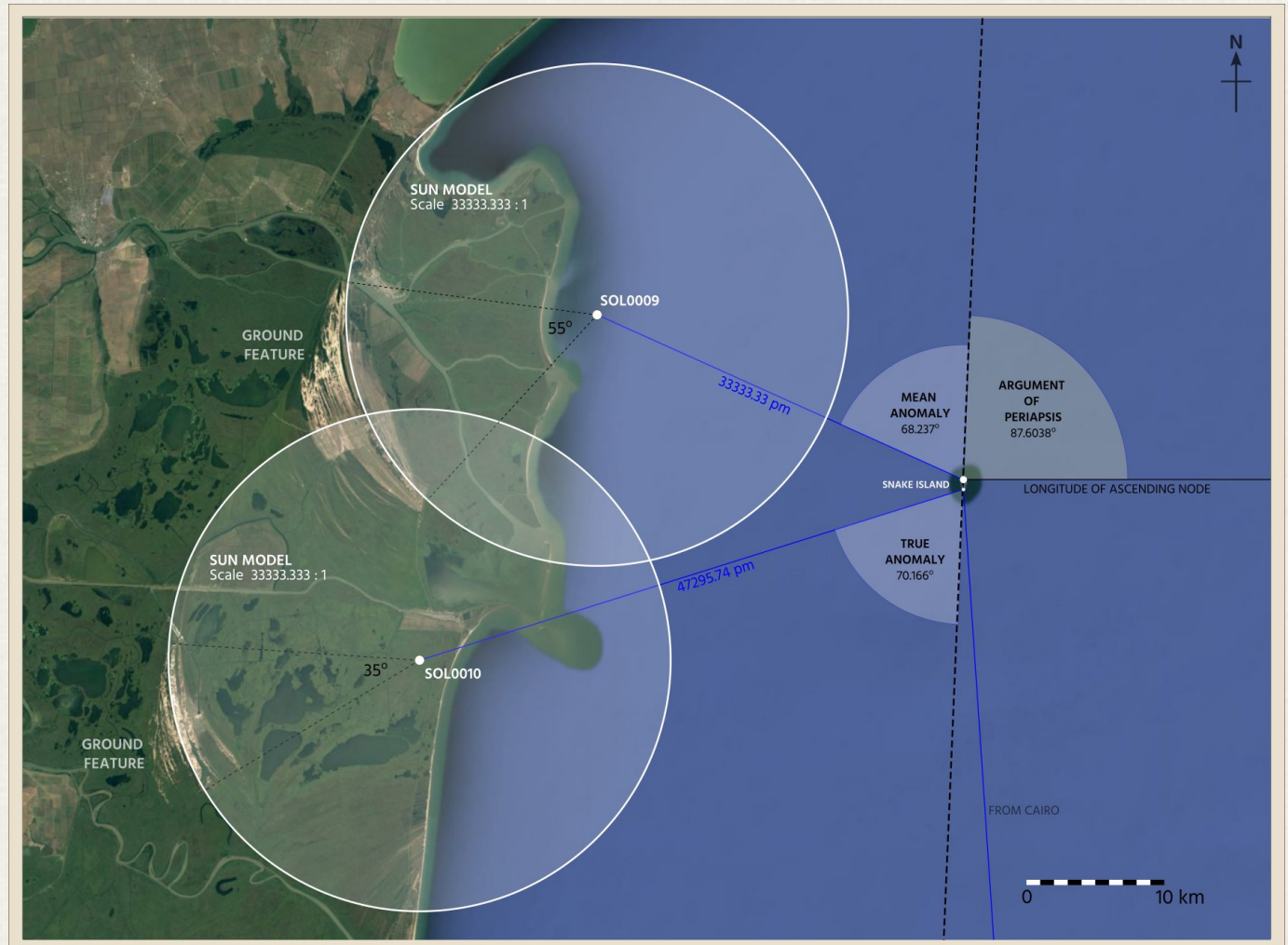


Diagram O9 - The true and mean anomaly lines and models of the Sun.

Snake island is shown on the right of the illustration by the two small white circles which are the two previously constructed Sun models and the dark area of sea around them is a figment of the satellite image on which that area of the sea is a cut out satellite image. The astronomy angles and construction are scientifically accurate. The longitude of the ascending node of the Earth's orbit is defined as eastwards along the Cairo easterly reference direction, the argument of periapsis is then drawn correctly as an anti-clockwise angle from the ascending node. The mean anomaly is then correctly added to this angle and a 33333.33:1 scale model of the Sun is drawn at a distance of 33333.33 pm from the Snake island northerly Sun's center point. The true anomaly is plotted from the extension of the periapsis line to the south and is rotated clockwise from this angle. A second 33333.33:1 scale model of the Sun is located along this bearing at a distance of 47295.74 pm which is the range of the Earth from the Sun divided by one million pi. The manner of the two constructions shows that the mean anomaly is plotted astronomically correctly and the true anomaly is only plotted geometrically and is invalid astronomically.

There are two enormous ground features that mark out the two massive Sun models. The upper one of these ground features is 20 km from end to end and subtends an angle of 55° with the center of the Sun model. The lower ground feature is 12 km in length and subtends an angle of 35° with its Sun center.

With the accuracy of the astronomy data, the correct astronomical construction method and the upper Sun scale and distance being numerically equal there can be very little doubt that these ground features are deliberate artificial constructions. The scoring out of the 20 km long arc ground feature from the bedrock at the time of construction was apparently well within the technical abilities of whoever built this system indicating an ability to create technically correct and accurately surveyed physical constructions on a massive scale, with ease.

The outer solar system models

The outer solar system models of the Moon, Earth and Sun are formed in a similar manner to those of the inner solar system. The difference between the two sets of models is that the Moon's position is located on the outer solar system model further to the west in comparison to the inner solar system model. Because the Moon's position dictates the reverse azimuth of the end point of the line that connects the Moon to the Earth and the Sun's position is set relative to this angle, the Sun's position also changes. The line running from the Moon to the Earth model passes through the base center of the Great Pyramid on the inner solar system model and through the Wall of the Crow point GPS0005 on the outer solar system model and therefore the position of the Earth center is significantly further south on the outer solar system model.

The Moon model

The positioning of this model was explained in the earlier paper⁶ and the line that starts from the Wall of the Crow surveying point GPS0005 in Giza to the Moon is composed of two sections. The first section emanates from the start point with an azimuth of 270° , has a line length of 365 pi perfect kilometers and is the line that defines the rotation values used in the whole of the architectural design, 365 pkm per radian. The integrity of this line is fundamental to the overall design system and the length of the sidereal year for Earth is not involved in its construction in any way. The length of the second section of the line is calculated by taking the sidereal orbit period of the Moon as a proportion of the sidereal orbit period of the Earth, a value of about 13.5, giving the total line length a value of $(365+13.5)$ pi perfect kilometers.

So that the Moon model can be precisely positioned the value of the sidereal orbit period of the Moon needs to be specified in the architecture. In the previous paper⁷ the sidereal orbit period of the Earth was decoded from the walls of the gallery in the Great Pyramid and therefore the value of sidereal orbit period of the Moon must also be given in the same location.

A further analysis of the wall joints of the gallery room was undertaken in which 3D video footage of a walk through of the room was diligently decomposed so that the wall joints of the west wall at the second level of stonework could be identified and decoded.

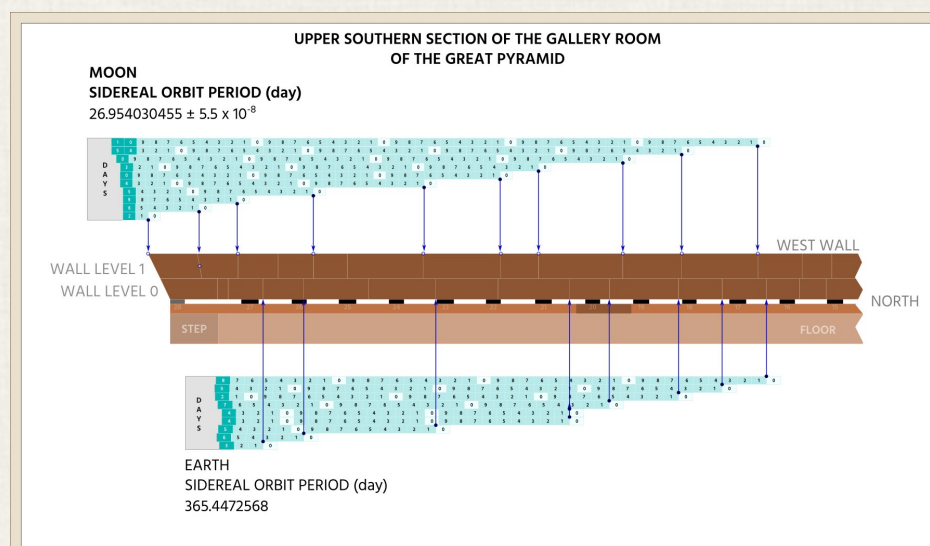


Diagram O10 - Decoding the second level of wall stones in the gallery of the Great Pyramid.

Diagram O10 shows the wall joint decoding for the Moon's sidereal orbit period at the top of the diagram and that for the Earth, which was first presented in the previous paper, shown at the bottom of the diagram. The two values are literally written in stone and the ratio of the Moon's sidereal orbit period to that of the Earth is 13.55816739, which when multiplied by pi gives the length of the second line section as 42.5942390750861 pkm. There are no variable values used in the creation of this distance, it is a fixed numerically specified constant.

During the work performed to extract the Moon's sidereal orbit period from the wall stones of the gallery it became apparent how the overall concept of the gallery room must work, and diagram O11 shows the component parts of the gallery explained.

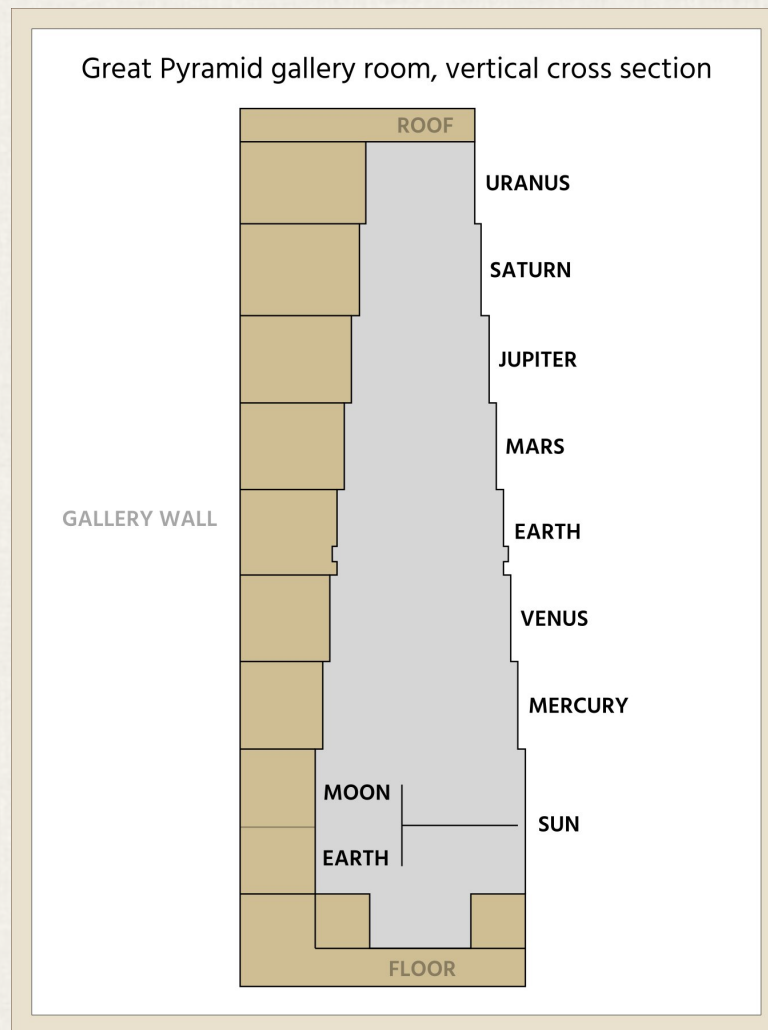


Diagram O11 - The construction concept of the gallery of the Great Pyramid.

With the length of the second section of the line from Giza to the Moon model in Libya established it is possible to now construct the center point of the Moon model for the outer solar system using the principals that were set out in the earlier paper and which were also employed in the first section of this paper when dealing with the inner solar system model of the Moon.

On diagram O12 the line at the bottom of the diagram is the line that starts at the Wall of the Crow point GPS0005 which is plotted due west to the intermediate point EMO0000 that was described above and then terminates at the point EMO0001 with the total line length being $(365 + 13.55816739) \pi$ perfect meters from the start point. From the point EMO0001 a line is then taken perpendicular to the reverse azimuth of the inbound line for a distance of 3475.58577 pm which is the equatorial diameter of the Moon scaled down by 1:1000 to give the point EMO0002. From this point a line of length 635.5502989191 pm, which is the polar radius of the Earth scaled down by 10000:1 is drawn at an angle of 31.777514945957 degrees west of south which is the polar radius of Earth scaled down by 200000:1 and transposed into degrees.

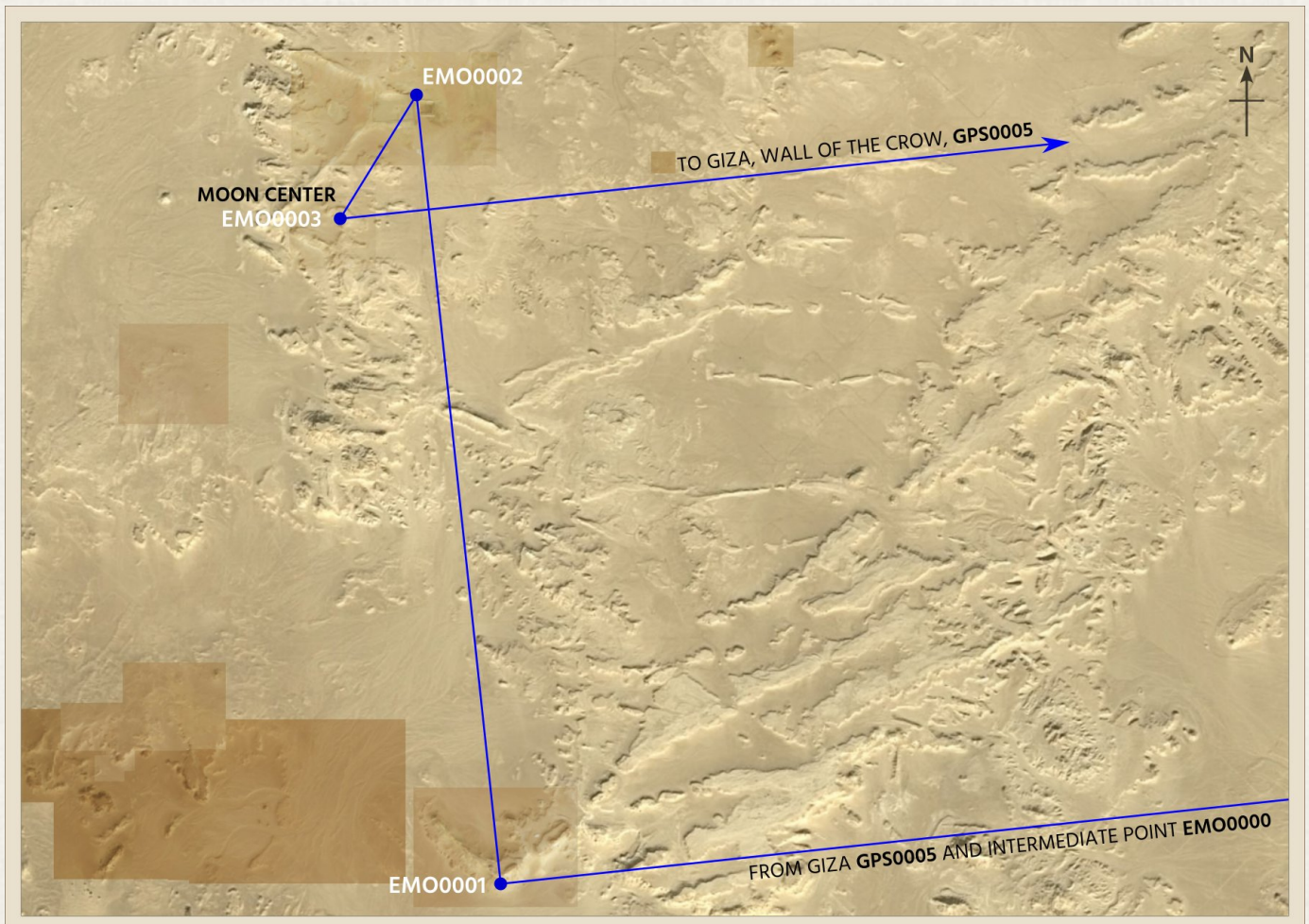


Diagram O12 - The moon center point construction for the outer solar system.

This is the same construction system that was used to form the center point of the model of the Moon for the inner solar system earlier in the paper in diagram O3.

Diagram O13 shows the details of this construction for the points EMO0002 and EMO0003.

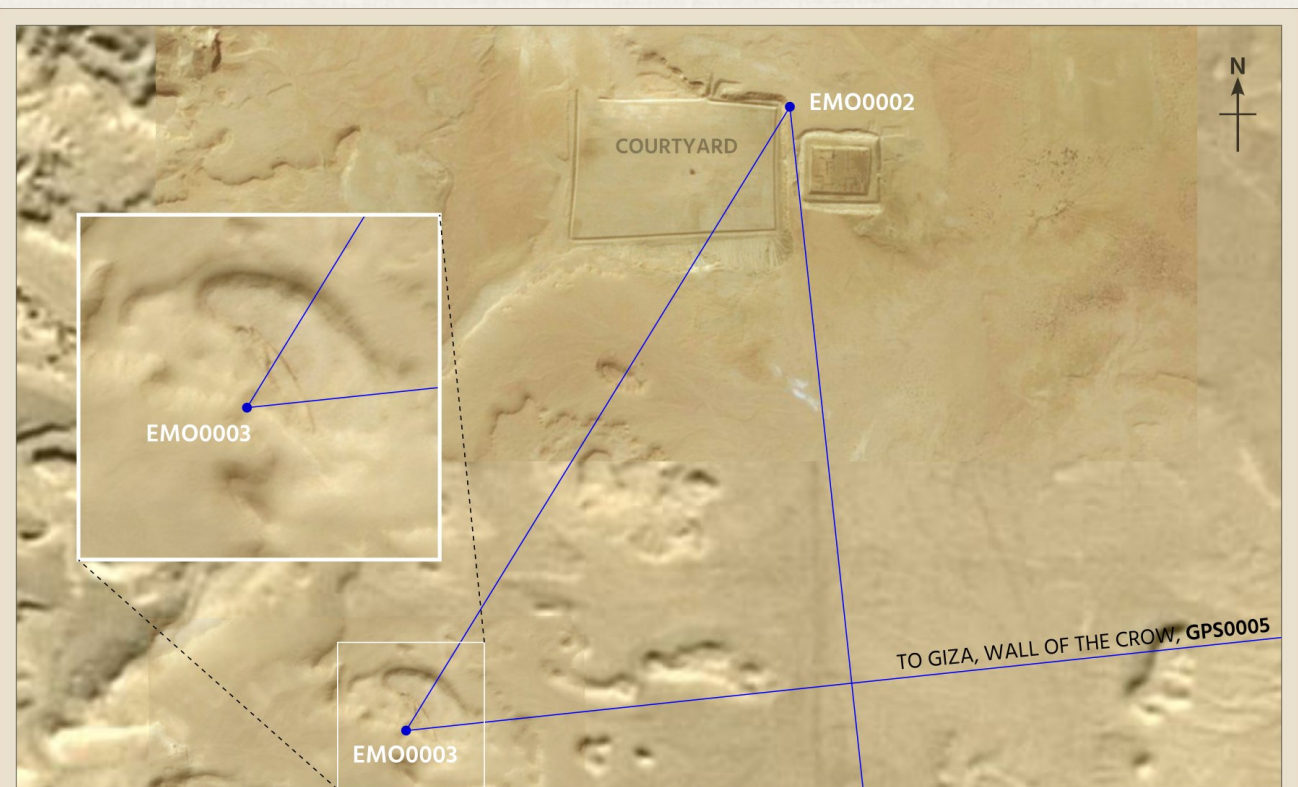


Diagram O13 - The details of the moon center point construction showing the ground features.

As the inset drawing in diagram O13 shows, the Moon center point falls exactly on the center of the clock etching in the desert floor with the alignment error on Google Earth being around 3 m, which is well within the tolerance of the application's geo-referencing for satellite image placement.

The Earth model

The model of the Earth over Cairo is near identical to that of the inner solar system model shown in diagram O5, the only difference being a change in the latitude of the center point. The Earth model over Cairo for the outer solar system is shown in diagram O14 on which the Earth has been tilted by 4.57313 degrees relative to the reverse azimuth of the inbound line from the Moon so that the Moon and the Earth axial tilts are correctly represented relative to each other.

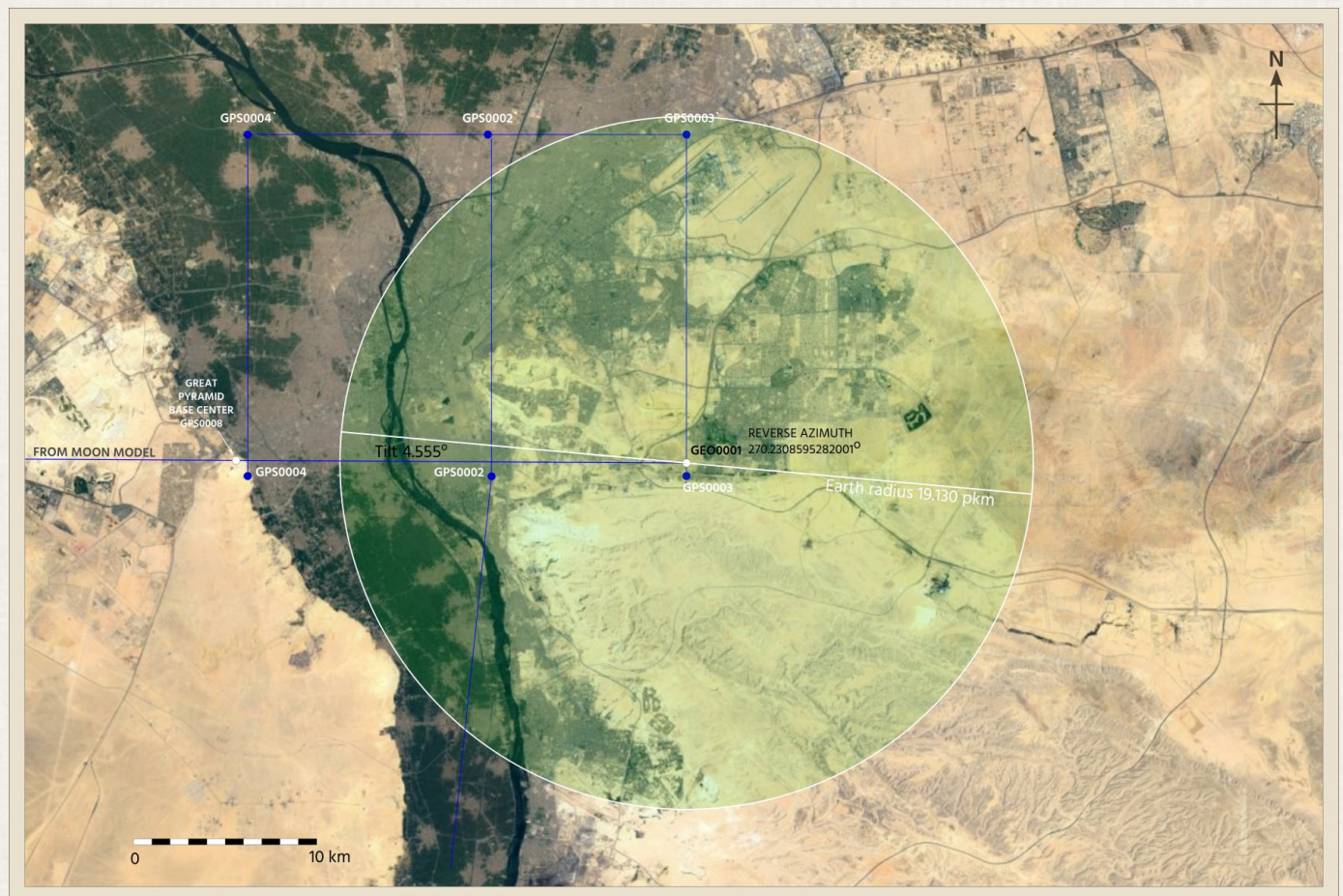


Diagram O14 - The outer solar system Earth model over Cairo.

The outer solar system Sun model

The location of the Sun model for the outer solar system is determined in exactly the same manner as that of the inner solar system, the only difference being that the range of the Earth at the winter solstice 2729 BCE is already determined from the positioning of the inner solar system Sun model. Using the reverse azimuth of the line from the Moon model to the Earth center as the reference line the Sun can be plotted from the Earth model center using the same bearing and distance that was used in the inner solar system model resulting in the Sun model for the outer solar system being positioned some distance south of Snake island due to the center of the second Earth model being south of the first and the fact that the reference line at the Earth model center has a different azimuth.

Diagram O15 shows the Sun model location for both the outer and inner solar system models on a satellite image of Snake Island.

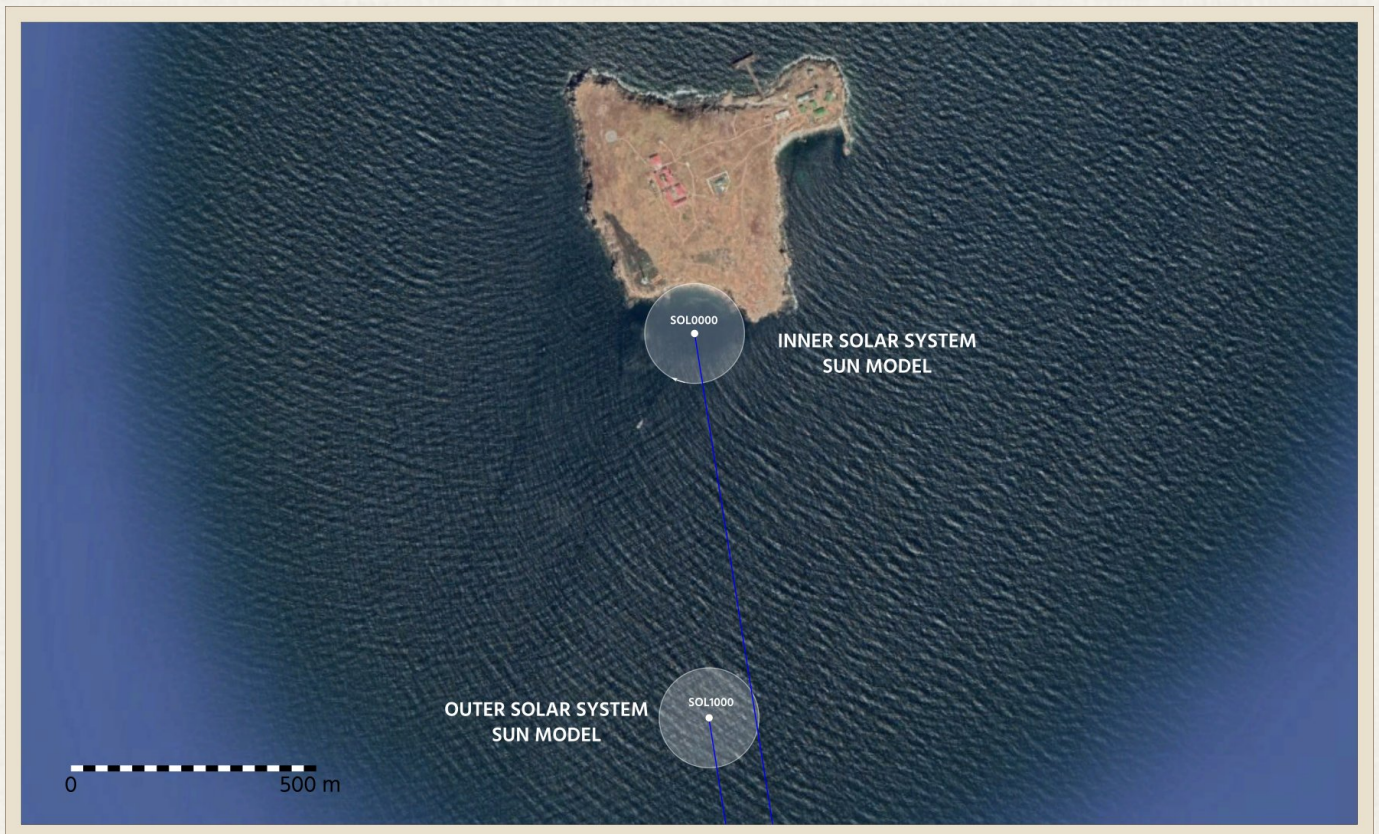


Diagram O15 - The Sun models for the outer and inner solar system models.

The outer solar system Sun model center point is nothing more than a dot in the ocean and the manner of construction of the inner and outer solar system models can be understood from this diagram. The inner solar system model has the Sun explicitly specified using ground modeling on Snake Island and the position of the Moon model that is related to it in the Libyan desert can be calculated from the Sun position. The outer solar system model has the Moon model etched into the desert floor in Libya and from this Moon model the location of the Sun can be calculated.

Neither the Sun model for the outer solar system or the Moon model for the inner solar system has any identifying features on the ground and you have to fully understand and compute the geodesic paths to find these locations.

The cross check and decoy

On diagram O13, if you look at the alignment of the point EMO0002 with the corner of the ground structure that was named as the courtyard in the earlier paper you can see that the geodesic line system does not now align with the corner of the courtyard and is placed about 13 meters to the east. Because the geo-referencing error on the satellite placement is known to be about 3m it can be concluded that the courtyard corner and the point EMO0002 do not align.

There is a reason for the discrepancy which is important to determine because the solution to this misalignment explains how other parts of the solar system model have been created and the solution to the discrepancy also provides a second numerical reference range and date within the astronomy data.

Diagram O16 shows the correct construction of the geodesic geometry structure in blue and the original geometry from the ground feature analysis that aligns with the courtyard's north east corner shown in green.

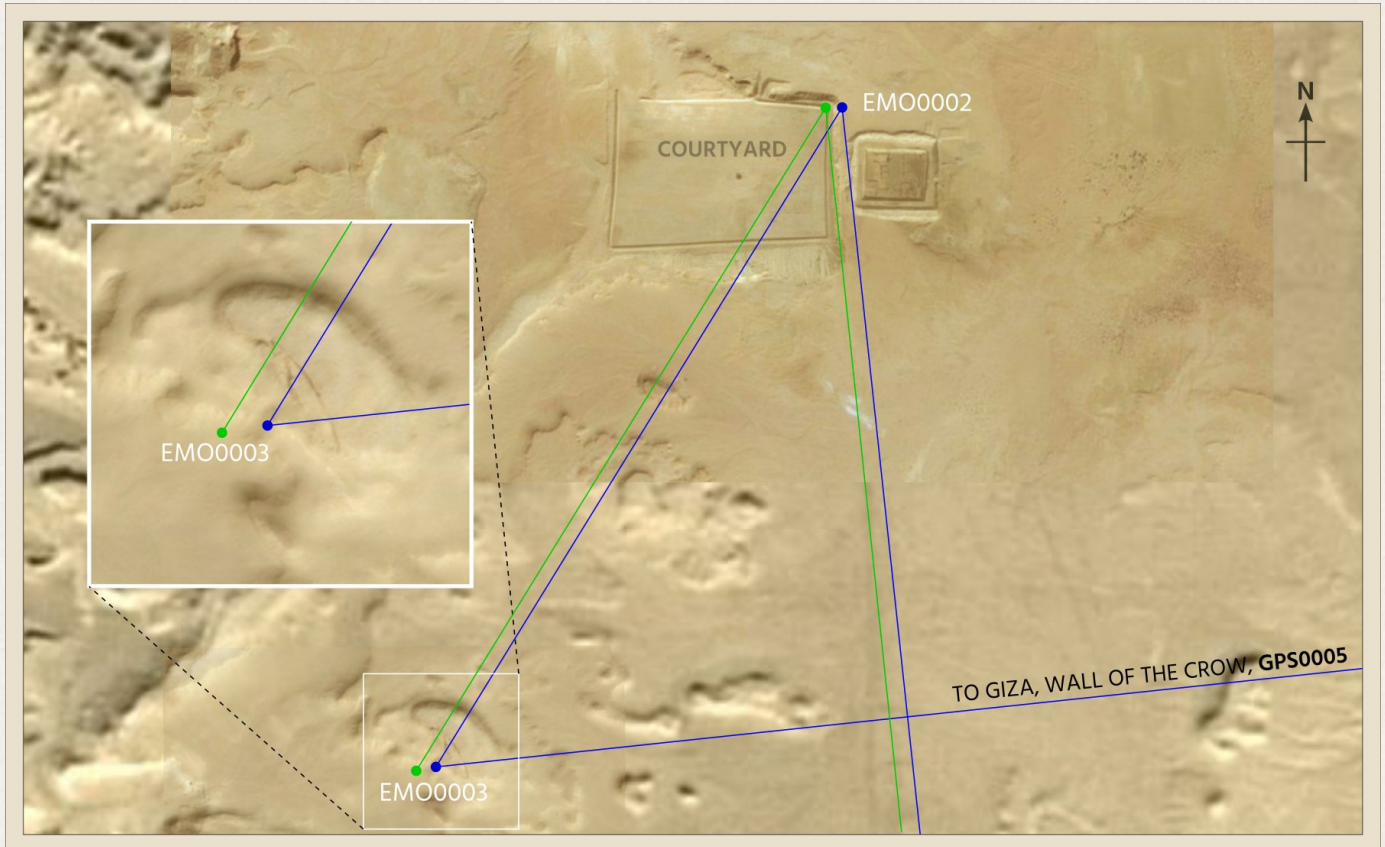


Diagram O16 - The discrepancy between the geometry and the ground feature at the Moon center point.

The reason that the courtyard corner geometry is aligned in this manner is to show that there is a transposition to the east required within the construction and by analysing the geometry in depth and specifically looking at the angle and distance between the original and the correct point EMO0003 it is possible to resolve how the system is put together.

The model of the moon was created in the earlier paper by using a perspective image of the Moon⁸ taken from the surface of the Earth, and therefore the model of the Moon that is present on the desert floor in Libya is a flat image of the *surface* of the Moon, and not a model of the Moon itself. It can be imagined as being a flat piece of paper onto which the surface of the Moon has been drawn. What is required is to fold this flat piece of paper into an upright position to create the 3D Moon structure, with the folding axis running through the perimeter of the model and perpendicular to the geodesic line that runs back to Giza. After analysing this concept in detail and comparing the geodetic distance to the Earth model over Cairo with the DE441 ephemeris data for the Moon range at the Julian Date given on the gallery roof of the Great Pyramid, JD 724507.2642025, it was possible to fully resolve the Moon model as shown in diagram O17.

The flat moon surface model folds upright along the line that passes through the point EMO0004 and which is perpendicular to the geodesic geometry line that passes through this point and runs to the Wall of the Crow point GPS0005 and then onward to the longitude of the point GPS0003. In this manner the Moon surface center point EMO0003 ends up vertically above the point EMO0004 and redefines the Moon center point in three dimensions as being at the point EMO0004.

When the geodesic distance between this point and the Earth model center point longitude over Cairo is computed it is 1206.640089 perfect kilometers which is a 333+1/3:1 scale model of the Moon's range at the Julian Date in question, the full size distance scaling up to 402292.4235 km. The value of the Moon's range in the DE441 ephemeris for this date is 402272.0892 km giving a time difference between the two values of 618 seconds when computed using the range's rate of change given in DE441. This provides a second set of range and date values for the Earth annual orbit around the Sun in the year 2729 BCE.

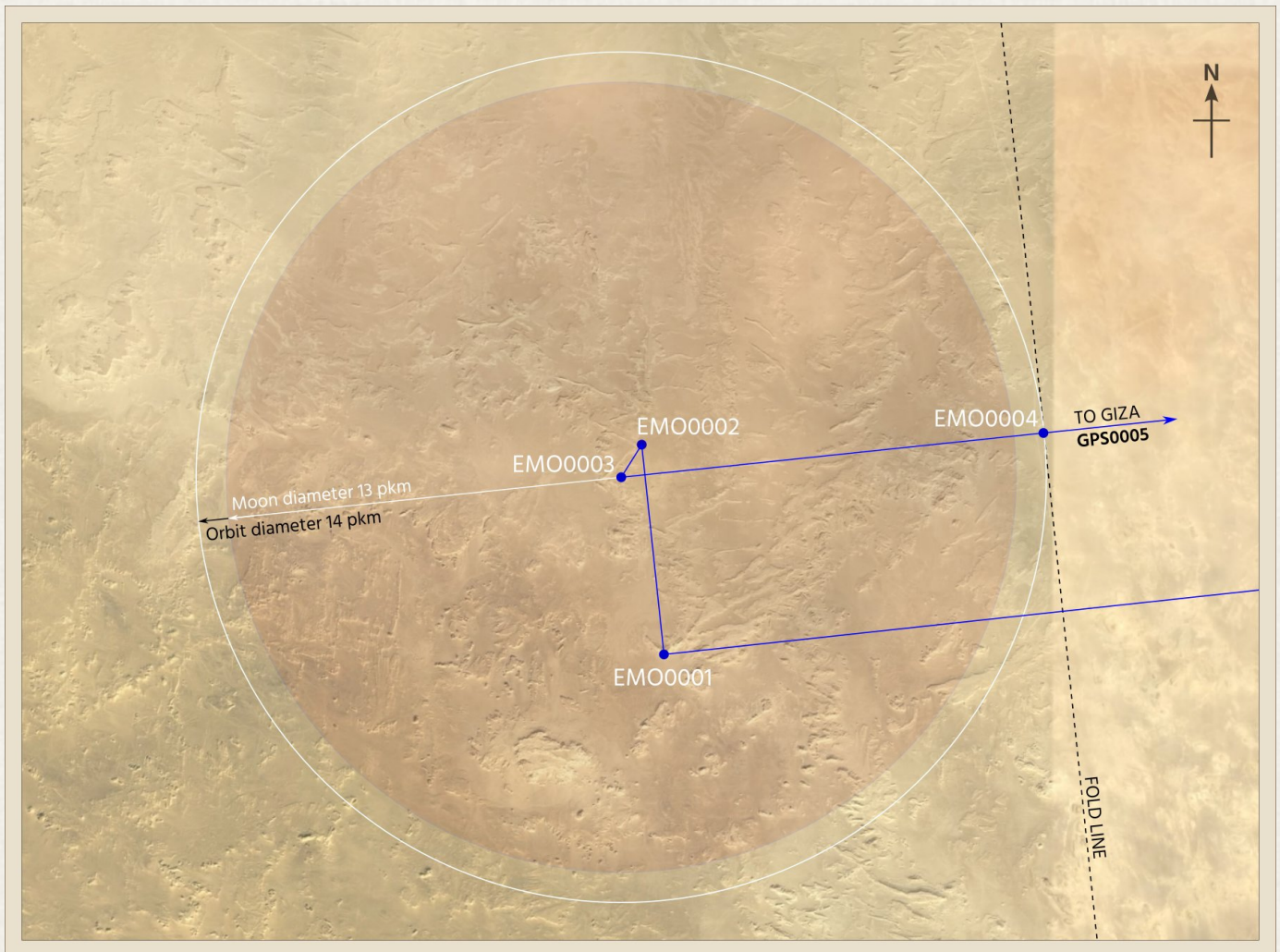


Diagram O17 - The final Moon model for the outer solar system.

Whilst this folding Moon system is incredibly useful within the context of the astronomy data its inclusion into the outer solar system Moon-Earth system adds an extra level on confusion to the already complex analysis required to understand the system. The folding Moon model in diagram O17 also establishes a number of principals which are adhered to in the solar system map of the planets which is described in the next papers in this series.

- 1) Celestial bodies have orbits drawn around them
- 2) The diameter of celestial bodies and their orbits are integers when measured in perfect kilometers
- 3) The celestial body has an axial tilt applied to it
- 4) Celestial bodies use points on their orbit/surface as reference points in the geometry

Finally, this folding of the flat moon model into its upright position becomes vitally important at the very end of the inner solar system model when the final highly detailed calibration is performed. The axial tilt of the moon that was established in the earlier paper⁹ was modeled by the architects to an upright moon model which requires folding back down into place, adding an extra 17.5 pkm to the line length in that location and consequently altering the axial tilt of the moon from 4.55574762 degrees to 4.5731289635 degrees. The full system cannot be solved without this logical amendment to this line length, the manner of the adjustment being fully explained in a future paper.

Conclusions

There are two Moon-Earth-Sun systems within the architectural design that is attached to the Great Pyramid of Giza, both systems being GPS aligned. The data that is required to fix the positions of the models is contained within the shafts and the gallery of the Great Pyramid and all of that data is now

known accurately and the positions of the celestial bodies is fully resolved.

The modeled locations of the other planets of the solar system must be able to be identified using the geometric principals that have been used in the creation of the primary Earth-Moon-Sun systems.

Appendix

pm	Perfect meter. One 10 millionth of the distance from the North pole to the equator on the WGS84 reference ellipsoid of Earth. The conversion factor between meters and perfect meters is $1 \text{ pm} = 1.00019657308809 \text{ m}$
pkm	Perfect kilometer. 1000 perfect meters.

Tectonic plate movement

The geodetic calculations performed during the work for this paper were done on the Earth's WGS84 reference ellipsoid at the base date of Jan 14 2729 BCE with no tectonic plate movement applied to the points. On all diagrams in this paper all points on the geometric plots have had tectonic plate movement between the base date and the date February 26th 2018 applied to them using the mm/yr plate movements listed by the EarthScope Consortium on their interactive plate movement calculator (<https://www.unavco.org>) using the *terminating* point on each individual geodesic line as the reference coordinates for the plate movement that is applied to *both* end points of that line.

Supplementary material

The data points and associated geodetic mappings for the inner solar system model are contained within a Google Earth application kml file. Each point in the file contains the high precision coordinates of the point as it was calculated by the software and a description of how the point and line from the previous location has been formed, listing both the numerical logic and the astronomical reference to which the point is associated. The file is available to download at the following URL:

<https://www.thegreatpyramidpapers.com/documents/kml/InnerSolarSystem.kml>

That kml file was produced on a piece of bespoke software which was designed and developed to create complex geodetic paths across the WGS84 reference ellipsoid specifically to solve the puzzle outlined in this and previous papers in the series. It was deliberately written in javascript to integrate into a webpage interface so that the underlying code could be examined. The fully functioning interface is available at the following URL:

<https://www.giza-plateau.com/PathCreator.html>

The file type that this programme uses is also bespoke and called '.gpf' or a Giza Pyramid File. Saved files can be loaded into the software using the available selection box on the webpage and the inner solar system model is available in this list under the name 'Inner solar system'. The interface also includes the ability to load any of the previously saved individual locations listed on the inner solar system model into the starting point of a new path, allowing the user to create new path systems and investigate further into the subject.

The calculations for the solar system model's astronomy were performed in a spreadsheet which is provided as supplementary material for reference and cross checking purposes

https://www.thegreatpyramidpapers.com/documents/ods/Solar_system.ods

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