Geostationary satellites in a geocentric universe

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ABSTRACT

This paper investigates the physics of geostationary satellite dynamics within both heliocentric and geocentric* cosmologies, thereby facilitating a considered opinion to be made as to whether such satellites do indeed offer the widely-claimed proof of a diurnally-rotating World. The main contentions of the paper are that one particular geostationary satellite demonstrated flaws in Newton's laws of motion and gravity, and that it should now finally be possible to prove or to disprove the alleged daily rotation of the World that for so long has been unjustifiably taught as fact.

Keywords: Geostationary, geosynchronous, satellite, gravity, aether, celestial mechanics, Newtonian mechanics, Newton's laws of motion, universal gravitation, law of inertia, Artemis, geocentric, heliocentric, acentric, cosmology.

1. INTRODUCTION

The centripetal force, $\tilde{\boldsymbol{F}}$, necessary to maintain an object of mass m_2 going around in a circular orbit of radius r at a constant tangential speed of v is given by

$$|\tilde{\boldsymbol{F}}| = \frac{1}{r}\, m_2 v^2 \, . \tag{1}$$

In the case of artificial satellites this force is provided by gravitational attraction, Newton's formula for which is:

$$|\tilde{\boldsymbol{F}}| = G\, \frac{m_1 m_2}{r^2} \, , \tag{2}$$

where m_1 is the mass of the World and G is the empirically-derived *gravitational constant.*

Combining Eqs. 1 and 2 produces,

$$v^2 = \frac{G m_1}{r} \, . \tag{3}$$

Thus for any desired altitude ($r - R$, see Fig. 1), we can determine, within the Newtonian model, the constant tangential speed that the satellite has to acquire in order to stay at that altitude.

Conversely, from a desired orbital speed the satellite's altitude can be worked out. A special case of this alternative scenario is the *geostationary satellite*, whose required orbit was mathematically detailed by Potočnik[13] in 1928.

*The heliocentric and geocentric models are claimed to be dynamically equivalent to one another in secular astronomy, but few realize that this equivalence maintains a tacit assumption of a rotating World in the geocentric case. Throughout this paper, however, the term 'geocentric' is used in the classical sense, i.e., to describe a cosmology based upon a non-rotating World firmly held completely stationary at the exact centre of the universe.

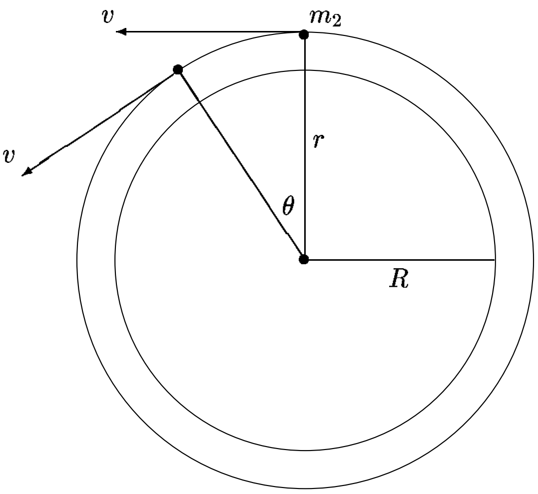

Figure 1. A mass, m_2, undergoing uniform circular motion ($\dot{\theta}$ = constant) in an orbit of radius, r.

2. GEOSTATIONARY SATELLITES

These objects are often used as signal relays and so have to maintain their position relative to fixed terrestrial equipment (such as television receiver dishes). Also, since the acceleration due to gravity, $\tilde{\boldsymbol{g}}$, acts towards the centre of the World, rather than along the shortest distance to the polar axis, geostationary satellite orbits must of necessity lie in the equatorial plane.

If we assume that such satellites really do exist, then either the World and the satellite are both rotating with the same angular velocity about the same axis, or both are stationary. The first case is championed by modern *acentric*† cosmology, whereas the second possibility has to be explained via a classical *geocentric* cosmological model.

3. CALCULATIONS FOR THE HELIOCENTRIC MODEL

For the World to be rotating diurnally against a background of 'fixed' stars necessitates a spin of one revolution per *sidereal day*, by simple observation, where a sidereal day is given by Smart[14] as $23^{\mathrm{h}}\ 56^{\mathrm{m}}\ 4^{\mathrm{s}}.091$ *mean solar time.* Hence, the radius of the geostationary satellite's orbit can be found from substituting for the tangential velocity in Eq. 3, to obtain

$$r \quad = \quad \left\{ \frac{(23.93447 \times 3,600)^2 \times 6.67 \times 10^{-11} \times 5.976 \times 10^{24}}{4\ \pi^2} \right\}^{1/3} \ \mathrm{m} \quad = \quad 42{,}164.1 \ \mathrm{km} \tag{4}$$

(Clarke[3] gives 42,000 km).

A geostationary satellite in the heliocentric model must therefore possess a tangential, westwardly velocity around its orbit of 3.075 km s^{-1} and it must be at an equatorial altitude of 42,164.1 - 6,367.5 = 35,796.6 km (22,243 miles), taking R as 6,367.5 km at mean sea level (Microsoft[9]), the mass of the World to be 5.976×10^{27}g (Maris[8]) and G as 6.67×10^{-11} N m^2 $\mathrm{kg}^{-2} = 6.67 \times 10^{-11}$ m^3 kg^{-1} s^{-2} (1 N $\equiv$ 1 kg m s^{-2}).

By Eq. 2, acceleration due to gravity in the equatorial plane, $\tilde{\boldsymbol{g}}$, is inversely proportional to r^2, since

†Acentrism is the philosophy that the universe is infinitely large and thus has no actual centre. Under this scheme, anywhere can be regarded, with equal justification, as being at the centre of the physical universe, it being neither reasonable nor possible to promote a preferred frame of reference over any other in this respect. Modern science needs this concept for three reasons: 1) It has been shown that the Sun cannot be at the centre of the universe; 2) The 'Big Bang' cannot be promoted if the World is at the centre of the universe, and therefore is at the origin of the claimed explosion; 3) It views God's design of a universe with the World at its centre as a fundamentally inadmissible consideration.

$$\tilde{\boldsymbol{g}} \quad = \quad \frac{R^2}{r^2}\,\tilde{\boldsymbol{g}}_{\boldsymbol{e}}\ , \tag{5}$$

where $\tilde{\boldsymbol{g}}_{\boldsymbol{e}}$ is its (measured) value at mean sea level on the equator. Hence $\tilde{\boldsymbol{g}}$ varies for the geostationary satellite from 9.78 m s^{-2} on the World's equator to 0.22 m s^{-2} at an altitude of 35,796.6 km.

The mass of the satellite, which is interestingly irrelevant when calculating the ***parking orbit***, is fundamentally important in determining what the operational weight of the satellite will be. For instance, a 3,000-kg satellite will weigh 29,340 N at mean sea level on the equator, but only 660 N when raised to its parking orbit.

4. CALCULATIONS FOR THE GEOCENTRIC MODEL

The dynamics of this system are totally different from those of the previous section, for something needs to act in order to stop a weight of 660 N from falling back down to the ground[‡].

Herein lies the greatest problem of all for geocentrists, that the value of $\tilde{\boldsymbol{g}}$ at the parking orbit altitude is not insignificant. If the World is stationary, then the satellite must be stationary, too (otherwise it would not be in synchronization), and therefore the geocentric model of the universe, as it currently stands, is incapable of explaining the physics behind such devices maintaining their altitude against the force of gravity.

Elmendorf[4,5] tentatively suggests that geostationary satellites do not offer proof that the World rotates diurnally, because they could be held in a fine balance between the pull caused by the mass of the World 'beneath' them and that caused by the mass of the universe 'above' them.

In this attempted explanation, however, the gravitational force would increase dramatically with distance on both sides of the satellite's necessary altitude. The resultant system would be seriously unstable, as Elmendorf[5] himself alludes to. Yet such instability with respect to altitude is not observed. Furthermore, the planets, asteroids, etc., which in the geostationary model orbit the World, would display marked variations in the perturbation effects that the mass of the rest of the universe would have upon their orbits (consider the apogee and perigee of Mars, for example). It is a failing of the heliocentric model that the mass of the rest of the universe is not factored in to barycentre calculations. For geocentrists to rely upon this unknown magnitude and distribution of mass to provide their geocentric model with an incredible explanation of geostationary satellites is less excusable though, because in the former case it gives rise to necessary mathematical approximation, whereas in the latter case it is nothing more than a convenient, saving grace.

If Newtonian physics is correct with Eq. 2, then the geostationary satellite parking orbit calculations are trivial, and the geocentric model of the universe cannot be maintained. However, as was pointed out by Walter van der Kamp[16] many, many times, if A implies B, subsequently observing B does not necessarily mean that B was indeed caused by A. It was on the basis of logic that Van der Kamp made these observations, but the same general principle occurs in physics under the name of an inverse problem. That is to say, geostationary satellites may stay in position, but this does not prove that the World rotates each sidereal day, **as long as another explanation can be found.**

Of course, arguments invoking the "mass of the rest of the universe" can be mooted, but cannot be said to be convincing. On the contrary, they are contrived and highly coincidence-dependent. At least the acentric universe model does have some established physical principles behind it in the case of the geostationary satellite, and it is to fundamental principles that the geocentrists should look.

Unless the geocentric model is simply to be discarded, therefore, its characteristics must be examined in detail, with a view to detecting necessary departures from the mainstream physics of the acentric model of the universe, and one way in which this might be achieved is via a new formula for the strength of the World's gravitational field, with the proviso that the alternative function agrees with Newton's at least up to low earth orbit (LEO) satellite operating altitudes.

The acceleration due to gravity previously derived by the author[6] is

$$g(x) \quad = \quad 9.8067\, e^{-3.0281\times10^{-4}\,x}\ \mathrm{m\ s^{-2}}\ , \tag{6}$$

‡An appreciation of the gravitational pull acting on a 3-tonne satellite sitting motionless 35,800 km overhead can be obtained by lifting a 67.3 kg (= 10st 8lb = 148 lb) person at sea level.

where x represents altitude (specified in kilometres).

This function assumes that the differential coefficient of g with respect to x is directly proportional to g, such that

$$\frac{\mathrm{d}}{\mathrm{d}x} g = -kg \tag{7}$$

which has the general solution

$$g(x) = c\,e^{-kx} .$$

The dependency expressed in Eq. 6 is graphically depicted by the solid curve in Fig. 2, and produces a much lower value for g at the geostationary satellite parking orbit distance (which is indicated on the figure with a dot-dashed line).

In fact, taking $x = 35{,}796.6$ km, results in $g = 1.9226 \times 10^{-4}$ m s^{-2} and a satellite weight at x of only 0.5768 N.[§]

Figure 2 also displays, for completeness, the linear relationship that would exist if the derivative of g was a negative constant (dotted line), although this possibility is discounted due to some gravitational field strength being necessary for altitudes of up to about 33,000 km in order to explain the successful apogee and perigee manoeuvres achieved by the European Space Agency (ESA) – see §6.

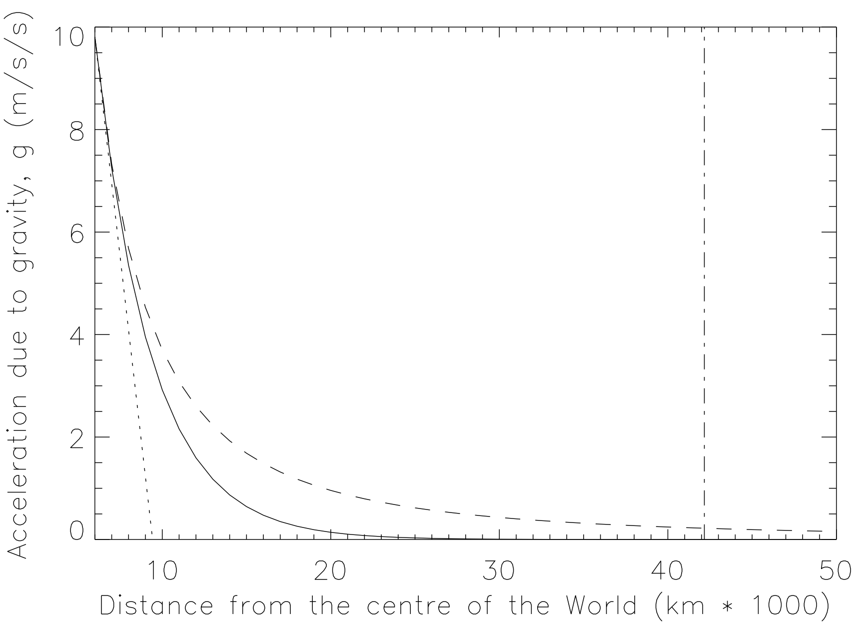

Figure 2. The strength of the World's gravitational field predicted by Newton's inverse square function (dashed curve), as opposed to that predicted by the exponential decay of Eq. 6 (solid curve) and a simple linear relationship (dotted line). The altitude of geostationary equatorial satellites is marked by the vertical, dot-dashed line.

5. GRAVITATIONAL FIELDS IN A DESIGNED COSMOS

The problem is that even such a small value as $g(x) = 1.9226 \times 10^{-4}$ m s^{-2} does not solve the geocentrist's dilemma, because without a force of 577 mN to balance the satellite's weight, this 3-tonne mass will still fall back down to earth in these circumstances.

The driving force behind support for a geocentric universe is a belief that the universe was designed and created that way by God. Whether the scientist is a believer or not is irrelevant, as the possibility that a divine Creator exists is a valid proposition and must be included within an unbiased, truly scientific discussion of this topic.

[§]The force acting under these circumstances to bring a 3-tonne satellite down is equivalent to picking up a mass of just 59 grammes (less than two and a half ounces) at sea level.

It should also be noted that both the strength and the weakness of secular astrophysics is the concept of universal gravitation, because one ***ad hoc*** after another has had to be thrown in to keep modern cosmology faithful to the idea of action at a[n infinite] distance.

The physics of Newtonian gravity demonstrates that there is mutual rotation of any two celestial objects about a common barycentre, but the mathematics involved in combining these systems becomes prohibitively complicated for a thorough analysis of even a three-body problem (World, Sun, Moon, for instance) to be performed.

Rather than being held together by the interrelations and constantly-changing strengths of gravitational fields, perhaps the fabric of the universe is what keeps things within it in orderly arrangement. Perhaps there is no instantaneous action over limitless distance, just as Isaac Newton insisted that there was not.

In this case, the World's gravitational field would reach zero strength at some point and, as long as the geostationary satellite is positioned further out than this zero-gravity point (see Fig. 3), the satellite will stay where it is simply because no force acts to pull it towards the World and no force acts to pull it towards the stars. All that might then occur is a slight lateral drift, caused either by the initial placement of the satellite, or by subsequent under- or over-correction for this drift.

However, although the exponential is indeed seen to approach zero before the geostationary satellite parking orbit altitude (see particularly Fig. 3), it never actually decays away completely because

$$e^x = \sum_{n=0}^{\infty} x^n/n! \qquad (8)$$

and this function is non-zero for all x.

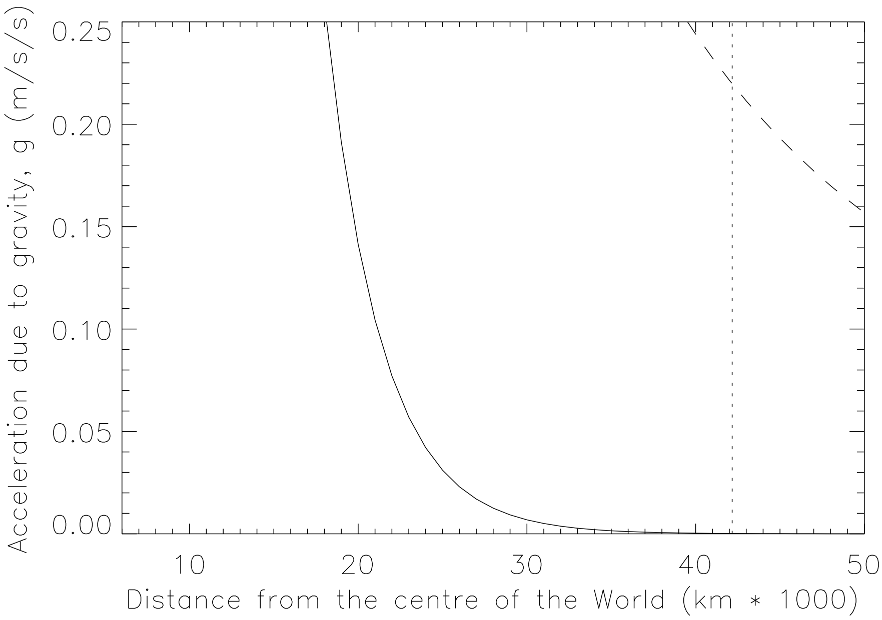

Figure 3. A selective enlargement of Fig. 2 to highlight differences in predicted gravitational field strength at the parking orbit altitude (dotted line this time).

6. EUROPEAN SPACE AGENCY'S ARTEMIS SATELLITE

Due to a malfunction in an upper stage of the ESA's Ariane-5 rocket at launch on 12th July 2001, ARTEMIS (Advanced Relay and TEchnology MIssion Satellite) failed to attain its target geostationary transfer orbit (GTO) of 857 km perigee and 35,837 km apogee, arriving instead at a low elliptical orbit of 592 km perigee, 17,518 km apogee.

The satellite's chemical propulsion systems were utilized for perigee boosting and apogee boosting until a circular orbit of about 31,000-km altitude was achieved (see Fig. 4). (It is to be noted that the word, 'orbit', is used here within a spinning-World scenario, there being a totally different effect predicted by this term in a geostationary model.)

The launch mass of the satellite was 3,100 kg, of which 1,519 kg consisted of chemical propellants for the main engines. Oppenhäuser, Bird and Van Holtz[12] state that 1,449 kg of those propellants were used up in attaining the 31,000 km circular orbit, leaving 70 kg for positional adjustments throughout the remainder of the satellite's lifetime.

At the temporary parking orbit situated roughly 5,000 km short of Geostationary Earth Orbit (GEO), ARTEMIS was perceived to be "circling the Earth every 5 days" (Oppenhäuser and Bird[11]). Kramer[7] specifies a satellite orbital period of 19 hours¶, but it will be demonstrated below that all three pieces of data can be only loose approximations.

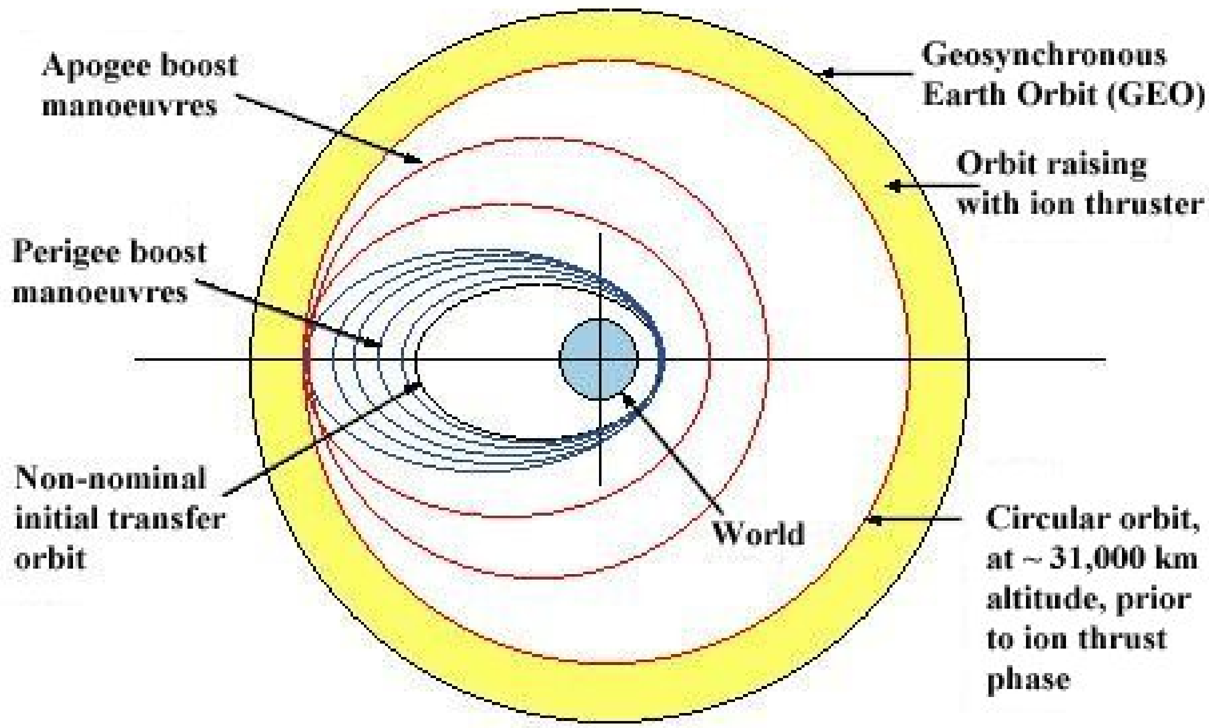

Figure 4. The various mission recovery manoeuvres for ARTEMIS (from Oppenhäuser, Bird and Van Holtz[12]).

Mounted on the satellite were four ion-propulsion engines, configured as two pairs of two, originally designed and included for effecting slight changes to orbit inclination. One of each pair was a Radio-frequency Ion Thruster Assembly (RITA-10), and the other was an Electron-bombardment Ion Thruster Assembly (EITA), otherwise known as a *Kaufmann engine*, each unit electrically powered and functioning by way of xenon gas emission. The nominal thrust of the RITA-10 was 15 mN and this type of ion-propulsion thruster had been successfully operated for more than 20,000 hours during durability testing (Astrium[1]). The UK EITA unit was rated at 18 mN (Kramer[7]).

These propulsion systems were installed to facilitate slight adjustments perpendicular to the plane of the satellite's orbit, but upon orientation of ARTEMIS through ninety degrees they were used for the attempted altitude increase by providing "a continuous tangential thrust" (Oppenhäuser, Bird and Van Holtz[12]) within the orbital plane.

Oppenhäuser and Bird[11] are quite vague and ambiguous even when providing details of the satellite rescue mission; nevertheless more accurate data can be extracted from their paper by deductive processes. We know, for instance, that ARTEMIS needed to be raised about 5,000 km via ion propulsion, that this orbit-raising phase commenced on 19th February 2002 and that GEO was achieved, solely as a result of these thruster units, on 31st January

¶Of the authors cited, not one mentions whether they refer to mean solar time or to sidereal time.

2003. This gives a time span of 346 days, since 2002 was not a leap year. Initially 2 ion-propulsion thrusters were used in conjunction, increasing satellite altitude by "more than 20 km/day," but by July 2002 three of the four ion engines had failed, with "barely half" of the 5,000 km to GEO covered. The single remaining unit was then operated continuously to "provide an average rate of climb of 15 km/day." The whole period of 346 days must have been used in calculating this average, for if we take 214.5 days for a single thruster (1st July 2002 to midday on 31st January 2003), then this would imply a minimum of 3,217.5 km traveled, which far exceeds half the required distance.

An average rate of climb of 15 km/day for 346 days would increase altitude by 5,190 km, which shows that the temporary parking orbit obtained after apogee and perigee manoeuvres was situated at 35,796.6 - 5,190 = 30,606.6 km. A single RITA-10 unit which increased altitude by 2,595 km in 214.5 days would have averaged 12.1 km/day. This, in turn, means that the first 2,595 km were completed at an average of 19.7 km/day, through the use of two ion thrusters working simultaneously.

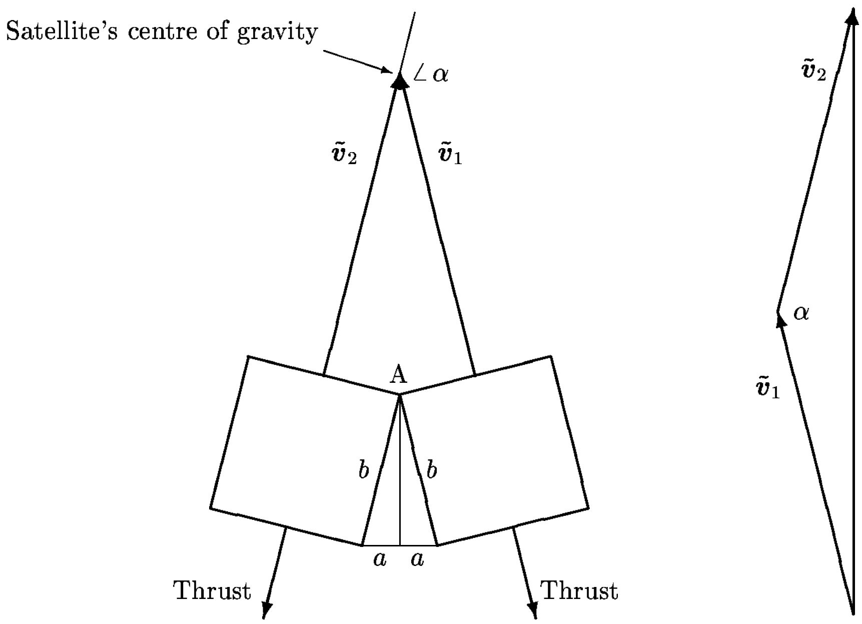

Figure 5. The resultant velocity, $\tilde{\boldsymbol{V}}$, from two evenly balanced ion-propulsion thrusters pivoted at A.

All of the four ion-propulsion units are bolted onto the framework such that their individual thrust axes pass through ARTEMIS' centre of gravity. From Fig. 2 of Oppenhäuser, Bird and Van Holtz[12] the angle by which the elements of a thruster pair are inclined to one another is 6°.26 (this is twice the inverse sine of a/b in Fig. 5) and the angle by which a thruster in one pair can be inclined to the corresponding thruster in the other pair is 80°.28 for the EITA units, and 92°.8 for the RITA units.

From Fig. 5 and the law of cosines, we have that

$$V = \sqrt{v_1^2 + v_2^2 - 2\, v_1\, v_2 \cos\left[\pi - 2\sin^{-1}\left(\frac{a}{b}\right)\right]}\,, \tag{9}$$

which for the closest units (i.e., EITA) from each thruster pair gives $v_1 = v_2 = 14.52$ km/day (assuming a simple 1.2× the velocity achieved with a RITA-10 engine), $\angle\,\alpha = 80°.28$, and a maximum resultant velocity magnitude, V, of 22.2 km/day. These calculations are included here in support of the derived 12.1 km/day for a single RITA-10 unit, since two thrusters provided "more than 20 km/day" and this was during a period of "experimentation with different attitude-control techniques to orientate the satellite for optimum propulsion from the engines," and for which operational downtime, together with unit failings, were "slowing progress" toward GEO altitude (Oppenhäuser and Bird[11]). On the basis of these snippets of information, therefore, averages of 19.7 km/day from 19th February 2002 to 30th June 2002, inclusive, and of 12.1 km/day from 1st July 2002 to 31st January 2003, inclusive, seem to be realistically accurate.

From Eq. 3, ARTEMIS' speed in the intermediate parking orbit will be

$$v \quad = \quad \sqrt{\frac{Gm_1}{r}} \quad = \quad 3,283.37 \text{ m s}^{-1}$$

around an orbital path of length

$$2\,\pi\,(6,367.5 + 30,606.6) \times 10^3 \text{ m} . \tag{10}$$

The (mean solar) time for one revolution of the satellite will be 70,755 s = 19.654 hr = $19^{\text{h}}\ 39^{\text{m}}\ 15^{\text{s}}$ W→E.

Finally, 1 hr of mean solar time = $1^{\text{h}}\ 9^{\text{s}}.8565$ sidereal time (Smart[14]), such that 19.654 hrs mean solar time = 19.708 hrs sidereal time and, since the World is alleged to rotate at 15° per sidereal hour, we can calculate that the World will turn, in the acentric scenario, through 295°.62 for each 360° that the satellite covers. ARTEMIS will therefore appear to go around the World in 5.592 × 19.654 hrs = 4.6 mean solar days.

The approximations of 31,000 km (parking orbit altitude), 5 days ("circling the Earth") and 19 hours (orbital period) are thus deduced to be more accurately taken as 30,606.6 km, 4.6 mean solar days and $19^{\text{h}}\ 39^{\text{m}}\ 15^{\text{s}}$ mean solar time W→E, respectively, since reverting any of these values back to its approximation will move the other two further away from theirs.

7. NEWTON'S LAWS OF MOTION

There are several points of extreme significance for the geostationary model to be gleaned from this successful altitude raising of the ESA's ARTEMIS satellite, particularly so during the period when only one RITA-10 thruster was operational.

Because the satellite is orbiting, whatever gravitational pull exists at an altitude of 30,606 km above the World is entirely accounted for in sustaining the appropriate tangential velocity. The paired ion-propulsion engines that increased altitude to 33,200 km are not working against any residual force of gravity in either scenario.

In the acentric model, the satellite is doing 3,283 m s^{-1} in its intermediate parking orbit, but will have to be doing 3,075 m s^{-1} in GEO (as calculated in §3). Hence, as well as increasing the radius of the orbit, an overall reduction of 208 m s^{-1} in tangential velocity has to be effected by these thrusters.

If the resultant velocity produced by simultaneously firing two EITA engines, v_{ion}, was 22.2 km/day (deduced in §6), and its altitude component, v_{alt}, was 20.2 km/day (say), then the component causing tangential velocity retardation, v_{ret}, would be 9.209 km/day (applying Pythagoras' Theorem to Fig. 6 (viii)), which is equivalent to 0.107 m s^{-1}. It should thus have taken these two more powerful of the four ion-propulsion thrusters 1,951.5 days to reduce tangential velocity, whilst still maintaining the desired rate of climb. This appears to be a problem that conventional, Newtonian physics is incapable of overcoming; that tangential velocity decreases with increased orbit radius *per se* contradicts, in the author's opinion, Newton's *law of inertia.*

In the geostationary model, the situation is apparently (and perhaps surprisingly) even worse. Here, ARTEMIS is orbiting at[||]

$$\frac{2\,\pi \times (30,606.6 + 6,367.5) \times 10^3}{5.592 \times 19.654 \times 3,600} \quad = \quad 587 \text{ m s}^{-1}$$

and this has to be brought to a standstill. Since this is totally impossible in the given timeframe, it follows that the satellite must have had a tendency to cease moving of its own accord when situated outside the World's gravitational field. In other words, the law of inertia cannot hold in the absence of gravity.

The mass of the satellite is 1,651 kg in the intermediate parking orbit, so if Eq. 1 is true in the geostationary system, the gravitational force at this altitude would have to be

$$|\tilde{\boldsymbol{F}}| \quad = \quad \frac{1,651 \times 587^2}{36,974,100} \quad = \quad 15.4 \text{ N}. \tag{11}$$

Taking the increase in altitude achieved from 1st July 2002 with a single RITA-10 unit as a constant 12.1 km/day, the thrust as being constant in both magnitude and direction (from Fig. 6 (i), (vi) and (vii), the direction of $\tilde{\boldsymbol{v}}_{\text{ion}}$ must

[||]Mean solar time is used unless otherwise stated.

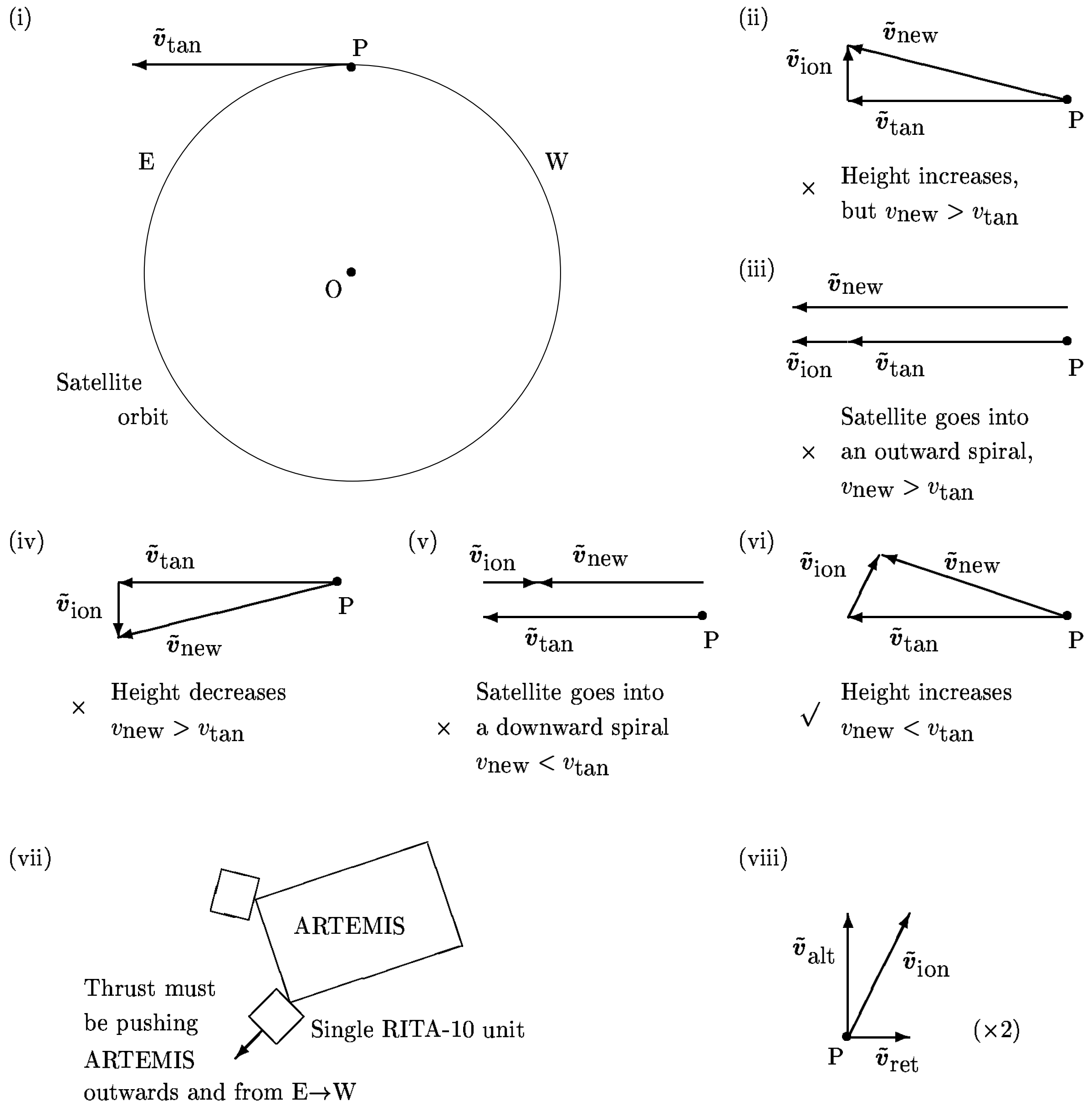

Figure 6. Vectorial considerations of ion thruster operation in the acentric model.

have been kept approximately constant), and zero gravity existing after 33,200 km (otherwise altitude increase would not be constant), then a redefinition of Newton's first law of motion, that "Every body continues in its state of rest or of uniform motion in a straight line unless compelled by some external force to act otherwise," alternatively known as the law of inertia, seems to be required, such that "Every body continues in its state of rest unless compelled by a force to act otherwise." We also note a return to the ideas of Socrates and Plato regarding the fundamental tendency of a body to move **only** during the time that force is applied to it. In fact, the concept of inertia would then apply only within a gravitational field.

Newton's equations of uniform rectilinear motion,

$$v = u + at \tag{12}$$

$$v^2 = u^2 + 2as \tag{13}$$

$$s = ut + 0.5\ at^2\ , \tag{14}$$

where u is the initial velocity and v the resulting velocity after an acceleration of a has been applied over a time t to move the object through a distance of s, reduce to the trivial $s = ut$ if $a = g = 0$.

Most significantly, the famous equation,

$$\tilde{\boldsymbol{F}} = m\tilde{\boldsymbol{a}} \ , \tag{15}$$

which derives from Newton's second law of motion, is flawed in some way, since the single ion thruster on ARTEMIS would have produced force and resultant velocity, but no acceleration in the geostationary model. As already indicated (consider, for instance, Fig. 6), the acentric hypothesis necessitates firing the ion engines in an outwardly direction only (saving Newton's laws of motion by reversing thrust direction every 12 hours – Bennett[2] – could never even have entered into the scheme of things with the Artemis Programme Office in The Netherlands), and this would have resulted in a non-zero final velocity and much too high an altitude.

Since a mass, m, moving with velocity, $\tilde{\boldsymbol{v}}$, has a linear momentum, $\tilde{\boldsymbol{p}}$, it seems reasonable to assume that there exists a direct proportionality between $\tilde{\boldsymbol{F}}$ and $\tilde{\boldsymbol{p}}$, such that

$$\tilde{\boldsymbol{F}} = f^{\star}\tilde{\boldsymbol{p}} \ , \tag{16}$$

where $f^{\star}$ is a frequency, measured in Hz. In the case of the ARTEMIS satellite we can determine that,

$$f^{\star} = \frac{0.015}{1,651 \times 0.14} = 0.000065 \text{ Hz} \ ,$$

because 1,651 kg was the mass of the satellite at onset of the ion-propulsion phase and 12.1 km/day $\equiv$ 0.14 m s^{-1}.

8. CONSTANT FORCE VIA INTERNAL COMBUSTION OF FUEL

Let us consider a spacecraft that is being propelled by engines that are burning chemical fuel contained in storage tanks.

If the fuel is consumed at a constant rate, then, in the absence of external forces, the trust produced will be constant and the rate of decrease of spacecraft total mass will be constant. But if the force stays constant and the overall mass decreases through the expenditure of fuel, then the velocity of the craft would have to increase (since $f^{\star}$ is a constant of proportionality).

We thus have that

$$\tilde{\boldsymbol{F}} = f^{\star}m_1\tilde{\boldsymbol{v}}_{\boldsymbol{1}} = f^{\star}m_2\tilde{\boldsymbol{v}}_{\boldsymbol{2}} \ . \tag{17}$$

This is the conservation of linear momentum, **in the absence of external forces**, though it is important to note that we can no longer derive Eq. 15 from it, because the total mass has changed from m_1 to m_2 and Eq. 15 is founded upon the rate of change of momentum **assuming that mass remains constant**.

That Eq. 17 closely approximates to Eq. 15 is due to the fact that the mass converted into thrust energy by the engines is very small compared to the mass of the rest of the spacecraft and can thus usually be ignored. The difference between Eqs. 15 and 16 would become evermore discernible in much smaller craft, as the rate of fuel consumption becomes significant in relation to total mass.

Nevertheless, in the geostationary model it is Eq. 16 that represents reality, as became apparent when a method of thrust was considered that did not use up satellite mass (the electrically-based ion propulsion system, RITA-10).

The essential point to emphasize here is that, far enough away from the World that the gravitational field strength is zero, a spacecraft obeying Newton's Eq. 15 will behave completely differently from one that obeys Eq. 16, **when the engine is turned off**.

Conventional physics claims that Newton's law of inertia holds true in deep space, such that when the force goes to zero it is the object's **acceleration** that consequently has to become zero (by Eq. 15). And, since acceleration is the rate of change of velocity, the velocity of the object when the thrust is stopped no longer changes and so whatever value it had at the instant the engine stopped is maintained indefinitely by the craft thereafter.

From Eqs. 16 and 17, however, it is the spacecraft's **velocity** that becomes zero when the thrust is cut. Deep space exploration, except perhaps by solar panel ion thrusters, would thus be impossible, because no rocket could be launched that would carry enough chemical fuel.

9. THE PLENUM AETHER

In adopting the position that a gravitational field is not caused by mass *per se*, but is rather a force connected in some way to the diurnal rotation of the heavens, it is necessary to revert back to the ancient concept of an *aether*, or fundamental, structural substance. Further, if this substance pervades everything in the universe, then it is called a *plenum*.

Actual movement of celestial bodies such as the Sun, Moon and stars then becomes the resultant combination of three components of motion: rotation about an axis, traversal along or around a path, and the rotation of the plenum (in which the object's path is set) *en mass* about the World.

Assumptions:

1. The plenum aether is a totally incompressible and non-viscous fluid.
2. The force of gravity is pressure produced by the aether.

Bernoulli's Principle states that for streamline motion of a fluid such as this the sum of the pressure at any part plus the kinetic energy per unit volume plus the potential energy per unit volume there is always constant.

I.e.,

$$P + \frac{1}{2}\rho v^2 + \mathrm{PE} \quad = \quad \text{constant}\ , \tag{18}$$

where P is the pressure arising from a fluid of density, ρ, traveling at a velocity, v, and PE stands for potential energy.

The acceleration due to gravity at the World's surface varies with latitude. Its value at the poles, g_p (say), has been measured as 9.832 m s^{-2}, and at the equator, g_e, as 9.780 m s^{-2} (Nelkon and Parker[10]).

Pressure is defined as force per unit area. Taking the area, A, as 1 m^2, the weight of a 1 kg mass at the poles will be 9.832 N $= P_p A$. The velocity of the aether at the geographic poles would be zero. Hence,

$$P_p \quad = \quad \text{constant} - \mathrm{PE} \quad = \quad 9.832\ \mathrm{N\ m^{-2}}\ .$$

At equatorial sea level,

$$\frac{1}{2}\rho v_e^2 \quad = \quad \text{constant} - \mathrm{PE} - P_e \quad = \quad 9.832 - 9.780 \quad = \quad 0.052\ \mathrm{N\ m^{-2}}\ .$$

Thus,

$$\rho \quad = \quad \frac{0.104}{v_e^2}\left(\frac{\mathrm{kg\ m\ s^{-2}}}{\mathrm{m^2\ m^2\ s^{-2}}}\right)\ ,$$

where if we assume the aether's rotational period to be 24 sidereal hours means that it has a velocity, v_e, at the equator of

$$v_e \quad = \quad \frac{2\pi \times 6,367.5 \times 10^3}{23.93447 \times 3,600} \quad = \quad 464.325\ \mathrm{m\ s^{-1}}\ .$$

Therefore, the plenum aether would have a density of

$$\rho \quad = \quad 4.82 \times 10^{-7}\ \mathrm{kg\ m^{-3}}\ , \tag{19}$$

or approximately half a milligram per cubic metre, at this rate of aether rotation about the World.

However, Sungenis and Bennett[15] cite experimental results that would tend to indicate a rotation rate perhaps ten times as high, which leads to a density on the order of a twentieth of a milligram per cubic metre.

Further discussion of aether properties is outside the scope of the present paper, the concept being included here as a method to account for the observable motions of the heavens within a geocentric framework. Though many defenders of a heliocentric 'solar system' will attack the paper because of this absence of detail regarding the aether, it should be borne in mind that the concept of 'gravity', elated as it is amongst the general public, is still, after all this time, incapable of explaining the stability of the celestial sphere and is itself devoid of causation (Einstein's General Relativity-based warping of Minkowski's *space-time* excluded).

The aether is thus a subject for further study and investigation.

10. CONCLUSIONS

Since the dynamics of an acentric universe are totally different from those of a geocentric universe, and since the calculation of parking orbit radius depends intrinsically upon the World's alleged rotation, it follows that the geostationary satellite cannot be realistically explained in the geocentric cosmological model unless Newton's inverse-square formula for gravity (known as the 'law of universal gravitation') is rejected.

Discarding the seemingly innocuous Eq. 2 would have enormous consequences for the entire earth, because with it goes the 'Big Bang' absurdity and the whole of secular cosmology (which the idea of organic evolution requires in order to sanctify the notion that anything is possible given enough time). With no publicly-perceived scientific credibility to bolster it anymore, the prevailing Western religion of naturalistic, atheistic humanism must then likewise collapse.

In addition, a geocentric analysis of the European Space Agency's successful altitude-raising manoeuvres with their ARTEMIS telecommunications satellite, utilizing a single 15 mN ion thruster propulsion unit, suggests that Newton's laws concerning motion in a straight line, including the famous 'law of inertia' ($\tilde{\boldsymbol{F}} = m\tilde{\boldsymbol{a}}$), are also false.

In a geocentric model, the correct force equation is

$$\tilde{\boldsymbol{F}} \quad = \quad f^{\star}\tilde{\boldsymbol{p}} \; .$$

This equation, by denying the law of inertia, illustrates that deep space travel is an impossibility (except, as mentioned in §8, the very slow propulsion that might be achieved via solar-panel-powered ion thruster engines).

The explanation of geostationary satellite mechanics within a geocentric universe is thus a problem which necessitates modification and refinement of the inertia-centred work of Isaac Newton. For example, even Eq. 1, based as it is upon Eq. 15, would likewise have to be amended. This, in turn, would affect the gravitational field strength calculated in Eq. 11 for the geocentric model.

The other major difference between this model and that of Newton is that the force of gravity in the latter is something inherent to anything which possesses mass. In this new model, however, there is no *mutual* attraction between objects, but only the effect of the gravitational field undeniably exerted by the World upon material objects close to it.

The decaying away to zero of the World's gravitational field strength with altitude means that the geocentric cosmological model proposed in this paper predicts that satellites could be placed in any stationary position above the World's gravity field, being subject then only to slight drifting from the force of solar radiation pressure.

This prediction is offered as a way of experimentally determining whether the World does indeed rotate about an axis each sidereal day.

The contrast between the truthful actuality of the geocentric system and the almost deceitful illusion of the acentric model, in terms of what we can see with our eyes, is well worth contemplation. It is a difference that goes to the very heart of each system.

A further topic for detailed consideration is the *geosynchronous satellite*, which is claimed to drift north and south of the equator each day.

These conclusions would mean that claims made by the American government agency, NASA, regarding space probes, gravity slingshots, comet rendezvous and so on, would be fraudulent, that the 'Big Bang' could be consigned to the dustbin, where it belongs, and that the science-falsely-so-called idea of organic evolution would finally be seen for what it is – the attire of a naked emperor.

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