Refuting Robert Carter's Absolute Heliocentrism

R. Sungenis: On May 2, 2016, I published a 125-page critique of Robert Carter's paper, "Why the Universe does not Revolve Around the Earth: Refuting Absolute Geocentrism" at (http://galileowaswrong.com/wp-content/uploads/2016/05/Why-the-Universe-does-not-revolve-around-the-Earth.pdf)

Robert Carter

Since then, Carter replied in a paper stated to be published on September 6, 2016 titled: "Refuting absolute geocentrism: Refutation of our detractors" at (http://creation.mobi/refuting-geocentrism-response).

I cordially thank Dr. Carter for responding. It's not often we get Protestant Creationists to engage at such a deep level. I wish more would do so. In fact, since Dr. Carter mentioned my name several times in his paper (but mentions no other geocentrist), I hereby make a public offer to Dr. Carter or any Protestant Creationist associated with either CRS, CRI, AIG, or any such ministry, to provide their best credentialed member to engage in a public, moderated and oral debate with me on the subject of geocentrism.

What follows is a word-for-word copy of Dr. Carter's above paper, "Refuting absolute geocentrism," and my response to each and every point made by Dr. Carter. Also, since Dr. Carter made allusions to papers written by Martin Selbrede on geocentrism, I asked Martin to answer Dr. Carter's new objections.

Robert Sungenis

Carter: After the publication of our lengthy exposition and explanation of the kinetic model of the universe, **refuting absolute geocentrism**, we received many comments. Some responders noted that we failed to directly engage with the proponents of geocentrism. This is true. Actually, it was by design. We also deliberately didn't refer to previous modern creationist critics of geocentrism. By building the strongest case for geokinetics we could, our aim was to establish the scriptural and scientific validity of the theory first. Others said we dealt unfairly with the geocentrists, which we do not think is true.

We also knew that the supporters of geocentrism would eventually attempt to refute our arguments, which has indeed happened. The most detailed response was by a Roman Catholic man named Robert Sungenis,[1] who seems to have taken over from a Protestant man named Gerardus Bouw as the most vocal geocentrist, and a few of the other respondents restated many similar arguments.

Per **creation.com** rules, we cannot post live links to the critiques of our article. And, since we received responses from multiple people (many via e-mail) it would be too confusing to answer them one at a time. So we will pool the criticisms and try to deal with them simultaneously. Analyzing their efforts is frustrating, to say the least, for in some ways they misrepresent what we wrote and in others fail to take into account the implications of their own theory. We also fear for the inevitable "death by a thousand e-mails" that may come from that small community if we directly engage these arguments. Yet, we do this for the sake of completion. We hold nothing against them, except where our beliefs are misrepresented or unfairly maligned. What follows is only a brief response to some of the major claims.

1. We do not need to defend our defense of the early scientists who pioneered geokinetic theory. Most geocentrists today are Catholic, and most of geokinetic pioneers were Catholics (for example, the priest Buridan, the bishop Oresme, the Cardinal Nicholas of Cusa, the canon Copernicus, and, of course, Galileo). If the pioneers were acting contrary to the teachings of that church, well, they can clean their own house. In fact, we thought we were being quite generous to the Catholics, especially since the 'Church' by and large sponsored the scientific data collection that led to the eventual rejection of geocentrism.

R. Sungenis: Carter says "the 'Church' sponsored the scientific data that led to the rejection of geocentrism," but he provides no examples of such. The truth is that the "Church" sponsored scientific research but it never sponsored a rejection of geocentrism from that research. The Church simply let scientists do their thing, but never gave an official endorsement to heliocentric science and never made an official statement or doctrine that rescinds or rejects the conclusion of its 1616 and 1633 magisterium that condemned heliocentric science as "formally heretical." The only thing that occurred in favor of Copernicanism is that some clerics were contending for Copernicanism. One such cleric was Cardinal Maurizio Olivieri who, by going around the only one who could give imprimaturs, namely, Fr. Philippo Anfossi, and by lying to Pope Pius VII about why Galileo was condemned (i.e., he said Galileo was not condemned for heliocentrism, but for the wrong version of heliocentrism), secured an imprimatur for Settele's book on heliocentrism in 1821. The Cardinal who worked with Olivieri eventually became Gregory XVI; and in his reign Galileo's book was removed from the Index. These were the only movements in the last 400 years, barring John Paul II's private speech to the Pontifical Academy of Science in 1992, which has no official authority.

Carter: Being Protestants ourselves, if certain members of the Catholic church decide to proclaim *anathema* on someone, we reserve the right to our own judgment.

R. Sungenis: Of course, but the fact remains that the Church anathematized heliocentrism in its formal and official doctrine and it has never changed that doctrine.

Carter: At the least, we demonstrated that we can separate the men (with all of their inherent foibles and sins) from the data. We are not trying to be gadflies, but we do wonder if their views on evolution and the age of the earth match those of the **most recent papal pronouncements**?

R. Sungenis: Carter needs to be more precise in his terminology. A "most recent papal pronouncement" is not official Catholic doctrine. Popes come and go. Some are liberal; some are conservative. Whatever their personal opinions are is of little consequence to official Catholic doctrine. Only when the pope speaks officially and dogmatically is there any movement in Catholic doctrine.

Carter: To be fair, we are friends with an eminent Catholic theologian and priest who is a young-earth creationist and *not* a geocentrist.

R. Sungenis: My educated guess is that the priest has never studied geocentrism, but when he studied Evolution he saw its errors. When he thoroughly studies heliocentrism and Relativity, he should likewise see their errors. I've seen it happen with many priests.

2. **Carter:** We were careful to separate "absolute geocentrism" (where the earth is fixed in place and everything rotates around it) from geocentrism in general (where earth is simply used as a convenient reference frame). Among the former are the Ptolemaic model (where everything orbits the earth) and the Tychonian model (where the sun and moon orbit the fixed earth but the planets orbit the sun). The "neo-Tychonian" view of some of the modern proponents of geocentrism tries to take the purely descriptive ("kinematic") model of Tycho Brahe and turn it into a physical ("dynamic") model where the earth is balanced in place by the forces of gravity. We are not certain that it is fair to call the neo-Tychonic model "absolute geocentrism" because the earth is not fixed in place so much as it is supposedly balanced in place by the sum of the relevant forces. Nevertheless, there was a strong trend in their responses to assert that the phrase "absolute geocentrism" referred to the neo-Tychonian system. Yet we were generally accused of mistakenly calling the Tychonian system a kinematic model, instead of a dynamic model. But Tycho Brahe's system is absolutely a kinematic model (it only describes motion, not the reason for the motion). It is a mathematical system that attempted to explain the then-available data, but did so without physics. It is simply not true to assert otherwise. It is the neo-Tychonian model that attempts to be a dynamic model. But, as we pointed out at length in our article, and we will add several additional points below, the neo-Tychonian model *fails* as a dynamic explanation for how the universe works.

   R. Sungenis: We shall see.

3. **Carter:** Sadly, we saw multiple examples of a failure to understand basic science. Several examples follow:
1. It was claimed that geokinetic theory cannot explain why the planets don't fly off into space, since "gravity only acts at the speed of light" (some geocentrist models require gravity to propagate at infinite velocity). Actually, since the sun's gravitational field permeates the solar system, this is no problem at all. Jupiter, for example, experiences the sun's gravitational attraction at all points and at all times in its

orbit and it is exactly the correct gravitational attraction to keep it in orbit at that distance. Even if gravity waves arriving at Jupiter are delayed by a couple of minutes as they propagate outward from the sun, there is never a time when gravity is *not* there.

R. Sungenis: But the problem of gravity's speed does not concern whether there is "never a time when gravity is not there." It concerns the time when gravity is decreased or cut off, such as what happens when planets create perturbations against the sun's gravity or when eclipses occur. The question then becomes: how does gravity, which for a few moments is either "not there" or is lessened in intensity, recover so quickly to allow Jupiter (or any revolving body) to keep on course? Until if and when the normal gravity is restored, Jupiter's inertia will take it beyond its regular orbit. If we add up all these changes over many years, Jupiter should be thousands of miles outside its original orbit.

Additionally, it has been shown that light traveling from the sun to Earth has a displacement aberration of 20 arc seconds (which in the heliocentric system is caused by the speed of the Earth, but in the geocentric system is caused by the speed of the sun), the gravity between the sun and Earth has no such aberration. As such, there is no indication of a propagation speed. In other words, gravity seems to propagate with an instantaneous speed, which was precisely what Newton assumed to be the case.

As Van Flandern notes, there are many reason that gravity cannot be limited to the speed of light:

(1) the angular momentum argument of binary pulsars, showing that the position, velocity, *and acceleration* of each mass is anticipated in much less than the light-time between the masses;

(2) a non-null, three-body experiment involving solar eclipses in the Sun-Earth-Moon system, showing that optical and "gravitational" eclipses do not coincide;

(3) neutron interferometer experiments, showing a dependence of acceleration on mass, and therefore a violation of the weak equivalence principle (the geometric interpretation of gravitation);

(4) the Walker-Dual experiment, showing in theory that changes in both gravitational and electrostatic fields propagate faster than the speed of light, *c*, a result reportedly given preliminary confirmation in a laboratory experiment;

(5) a modern updating of the classical Laplace experiment based on the absence of any change in the angular momentum of the Earth's orbit (a necessary accompaniment of any propagation delay for gravity even in a static field); and

(6) planetary radar-ranging data showing that the direction of Earth's gravitational acceleration toward the Sun does not coincide with the direction of arriving solar photons, but these can also be explained in the geocentric system by simply reversing the roles of Earth and Sun.[1]

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[1] T. Van Flandern, *Physical Letters* A 250, 1998, 1-11; T. Van Flandern, *Dark Matter, Missing Planets and New Comets,* North Atlantic Books, Berkeley, CA, 1993; T. Van Flandern, "Relativity with Flat Spacetime," *Meta*

In his 1998 paper, Van Flandern posited that the speed of gravity must travel at least 10 magnitudes higher than the speed of light. He writes: "Laboratory, solar system, and astrophysical experiments for the speed of gravity yield a lower limit of 2×10^{10} c."[2]

Following Van Flandern's assertion, a team led by Sergei Kopeikin of the National Radio Astronomy Observatory took advantage of Jupiter's passing between Earth and the quasar J0842 + 1835 to test the speed of gravity. Kopeikin measured the gravity field distortions caused by Jupiter and published his results in December 2002 to a worldwide audience. Kopeikin stated that the speed of gravity was equal to the speed of light within a 20% margin of error.[3] Van Flandern then analyzed Kopeikin's data and found serious anomalies:

> "New findings announced today by S. Kopeikin are invalid by both experimental and theoretical standards….In 2001, S. Kopeikin proposed an experiment to test the speed of gravity.[4] However, his result as described would have been a hybrid of near-instantaneous effects and lightspeed-delayed effects. The physical interpretation in his proposal… was objected to by T. van Flandern and independently by H. Asada.[5] ….the mistake made by Kopeikin is not unlike measuring the speed of a falling apple and claiming that is the speed of gravity. All gravitational phenomena unique to Einstein's relativity (GR)…arise in a static or near-static gravitational potential field…. Disturbances of this potential field or medium are called "gravitational waves."

Van Flandern also noticed that Kopeikin changed the terms of the Einstein equation in order to have the speed of gravity not exceed c. Van Flandern reports that Kopeikin

> "…rules out the possibility of c_g = infinity or $c_g \gg c$ in his results even before the experiment is performed. Kopeikin defined a new time $\tau = (c/c_g)t$ to replace the coordinate time t in the Einstein equation. However, because (c/c_g) is obviously forced to become very small or zero for large or infinite c_g, the role of the time coordinate is diminished or suppressed altogether by his substitution, which effectively eliminates many relativistic effects already verified in other experiments."

Research .Bulletin 3, 9-13, 1994; T. Van Flandern, "Possible new properties of gravity," Parts I & H, *Meta Research Bulletin* 5, 23-29 & 38-50, 1996; "The Speed of Gravity: What the Experiments Say," *Meta Research Bulletin*, Oct. 18, 2002; Walker, W. D., "Superluminal propagation speed of longitudinally oscillating electrical fields," abstract in *Causality and Locality in Modern Physics and Astronomy: Open Questions and Possible Solutions,* S. Jeffers, ed., York University, North York, Ontario, #72, 1997).

[2] "The Speed of Gravity – What the Experiments Say," *Physics Letters A*, 250:1-11, 1998. He adds: "The speed of gravity…has already been proved by six experiments to propagate much faster than light, perhaps billions of times faster."

[3] *Astrophysical Journal Letters*, April 10, 2003.

[4] "Testing the relativistic effect of the propagation of gravity by a very long baseline interferometry," *Astrophysical Journal*, 556:L1-L5.

[5] Van Flandern, 2002: (http://metaresearch.org/home/viewpoint/Kopeikin.asp) and H. Asada in *Astrophysical Journal*, 574:L69-L70.

In short, Van Flandern shows that Kopeikin was not measuring the speed of gravity, but was interpreting the data in reference to what he already believed about the speed of gravity from General Relativity.

Remarking further on gravity's speed, Van Flandern states:

> "Why do photons from the Sun travel at the speed of light in directions that are not parallel to the direction of the Earth's gravitational acceleration toward the Sun? Why do total eclipses of the Sun by the Moon reach mid-visible-eclipse about 40 seconds before the Sun and Moon's gravitational forces align? How do binary pulsars anticipate each other's future position, velocity, and acceleration faster than the light time between them would allow? How can black holes have gravity when nothing can get out because escape speed is greater than the speed of light, and how can they continue to update their external gravity fields?"[6]

Here I want to add some words from **Martin Selbrede**:

M. Selbrede: George Galeczki (in "Mach's Principle and the True Continuum," *Mach's Principle and the Origin of Inertia*, ed. Sachs & Roy, Apeiron Press 2003, p. 136) states, "Indeed, from the astronomical evidence within the solar system, Laplace concluded that the speed of propagation of gravity has to be at least 10^8 c. This limit has been pushed to 10^{10} c in the last years by Van Flandern, thus strongly suggesting instantaneous propagation of gravity." Geocentrists are hardly alone in asserting the speed of gravity is faster than the speed of light. Some geocentrists derive the speed of gravity from the Planck Density (by calculating the speed of sound through an object bearing that density), and some geocentrists posit a property analogous to an optical refractive index to the "empty" space bearing that density (geocentrists are not alone in holding to that idea either, were one to study the refereed literature on that point).

R. Sungenis: Lastly, I think it is rather interesting that Relativists, on the one hand, claim that light is limited to 186,000 mps in Special Relativity, but admit that Special Relativity does not incorporate gravity or inertial forces. On the other hand, they claim gravity is limited to the speed of light because Special Relativity says nothing can go faster than light. But if Special Relativity has nothing to do with gravity, then how can Special Relativity claim that gravity's speed is limited to light speed?

Moreover, in General Relativity, light, and we presume gravity, is not limited to 186,000 mps, and that is because General Relativity deals with frames that include gravity and inertial forces. But if gravity itself is a non-inertial frame, then how can it be limited to 186,000 mps by Special Relativity which only deals with inertial frames? This shows that the two theories of Relativity contradict themselves.

2. **Carter:** In any case, under General Relativity, gravity curves space, and that curvature is always there.

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[6] "The Speed of Gravity – What the Experiments Say," *Physics Letters A*, 250:1-11, 1998. As just one example of his evidence, Van Flandern remarks that data from the US Naval Observatory shows that the "Earth accelerates toward a point 20 arc seconds in front of the visible Sun, where the sun will appear to be in 8.3 minutes."

R. Sungenis: GRT gravity would have the same problem of "recovery" unless gravity traveled much faster than light. Further, the idea that "gravity curves space" is a non-sequitur, since the "space" it claims to curve is never defined nor is given any physical substance, and SRT's "spacetime" goes no further in giving a physical description. In fact, SRT says that space is a vacuum of "nothing" that contains no substance. Logically, GRT gravity cannot curve "nothing," unless, of course, Einstein wants to fill it with something. He partially did in 1920 when he proposed that space was composed of a "non-ponderable ether." But this ether, he said, was not moveable (as opposed to Lorentz's moveable ether), and thus GRT gravity would not be able to curve it if it can't be moved. As we can see, GRT has no consistent answer to gravity.

Not only has General Relativity failed to provide adequate answers for stellar aberration, rotation, and action-at-a-distance (that is, without resorting to Mach's "distant rotating masses"), Van Flandern reminds us that…

> "…it is not widely appreciated that this [General Relativity] is a purely mathematical model, lacking a physical mechanism to initiate motion. For example, if a "space-time manifold" (like the rubber sheet) exists near a source of mass, why would a small particle placed at rest in that manifold (on the rubber sheet) begin to move toward the source mass? Indeed, why would curvature of the manifold even have a sense of "down" unless some force such as gravity already existed. Logically, the small particle at rest on a curved manifold would have no reason to end its rest unless a force acted on it."[7]

> "…all existing experimental evidence requires the action of fields to be conveyed much faster than lightspeed. This situation is ironic because the reason why the geometric interpretation gained ascendancy over the field interpretation is that the implied faster-than-light action of fields appeared to allow causality violations [*e.g.*, moving backwards in time, according to the principles of Special Relativity]….Yet the field interpretation of General Relativity requires faster than light propagation. So if Special Relativity were a correct model of reality, the field interpretation would violate the causality principle, which is why it fell from popularity."[8]

3. **Carter:** Also, the **recent measurement of two black holes colliding** is evidence that gravity propagates as a wave and at the speed of light (We already know that many of them reject this experimental evidence. Update: there has been a **second detection**. Also, Hartnett has **defended the data interpretation**.).

R. Sungenis: See my paper: "The Lies from LIGO" for a refutation of these so-called findings (http://www.theprinciplemovie.com/the-lies-from-ligo/). LIGO attempts to use length contraction borrowed from Special Relativity for an effect of GRT's "gravitational wave" on the LIGO laser chamber. But this is the usual mixing and matching between SRT and GRT that occurs without warrant. Moreover,

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[7] "Gravity" in *Pushing Gravity*, p. 94.
[8] "Gravity," pp. 94-95.

Carter's reference to the alleged collisions of two blackholes as "evidence that gravity propagates as a wave" is false, since "gravitational waves" have little to do with gravity. As Van Flandern notes:

> "According to GR, such waves propagate at the speed of light, as do all other phenomena associated with the potential field that propagate at all. This speed has been confirmed indirectly by binary pulsar observations. There is no current dispute about this, and no expectation of any other result for the propagation speed of gravitational waves. However, the name notwithstanding, "gravitational waves" have nothing to do with gravitational force. They are ultra-weak disturbances of the potential field or space-time medium due to acceleration of bodies. So far, they have proved too weak to detect directly in any laboratory or astrophysical experiment. They are certainly far too weak to have any influence on any macroscopic body in their path."[9]

4. **Carter:** Another area of criticism dealt with questions about where the planets get their continual force to move forward. "Why don't the planets spiral into the sun?" The answer is simple: Newton's First Law, of course! Once the planet is set in motion, it will continue in motion until acted on by an outside force. Since there is no appreciable drag acting on the planets, they continue to orbit. Another part of their model requires 'ether' and they believe this ether would cause drag on objects moving through space. Yet, there is essentially no friction in space, and we have *measured* it by sending multiple space probes through the essentially frictionless void of space without ever having to take any ether-caused drag into account.

R. Sungenis: This is little more than nominalistic physics. Carter thinks that just because he puts a name on an action he has then solved the problem. He hasn't. He can call the forward movement of a planet anything he wants (inertia, momentum, or Bill Clinton) but that doesn't explain how it can do what it does or where it comes from. As such, Newton's "First Law" is simply an observation of what the planet is doing, not an explanation of why it is doing it.

As for ether, I don't know who Carter is reading, but he is not reading mine or Dr. Bouw's explanation on it. Ether does not cause a drag on the planets. It works the same as Lodge's ether, that is, a perfect fluid in which there is no friction.

4. **Carter:** Non-Newtonian misunderstandings:
1. We see that geocentrists reject time dilation in general, claiming that clocks slow down because of the mechanical effects of gravity or inertial forces. We wonder how an atomic clock (the only clocks

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[9] Van Flandern, "The speed of gravity," *Meta Research* Press Release, January 8, 2003. To support Van Flandern, in the section of their book titled "Detection of Gravitational Waves," Misner, Thorne and Wheeler state: "Man's potential detectors all lie in the solar system, where gravity is so weak and spacetime so nearly flat that a plane gravitational wave coming in remains for all practical purposes a plane gravitational wave" (*Gravitation*, p. 1004). They add: "Just as one identifies as 'water waves' small ripples rolling across the ocean, so one gives the name 'gravitational waves' to small ripples rolling across spacetime….Propagating through the universe, according to Einstein's theory, must be a complex pattern of small-scale ripples in the spacetime curvature" (*Gravitation*, p. 943), showing that "gravitational waves" are peculiar to Einstein's spacetime, not a measure of the speed of gravity. They are merely disturbances in the gravity already present.

sensitive enough to detect time dilation), that is in turn based on molecular vibrations in crystals, is subject to mechanical interference.

R. Sungenis: As it stands, Carter believes that gravity can bend light and curve space but he doesn't believe gravity can alter the mechanism of decay in a Cesium clock. But the fact is that Cesium clocks tick faster at higher altitudes where the gravity is thinner.

In fact, during the Hafele-Keating experiments, A.G. Kelly, obtained the original 1971 test report from the United States Naval Observatory and discovered that:

- The Cesium clocks that were carried varied in time so badly that some of them could vary more than the total supposed results during the time of the test.
- The most stable of the four clocks indicated zero time accumulation/dilation.
- Even the inventor of the atomic clock, Louis Essen, concluded that the alterations in drift-rates of the clocks made the results useless.
- The accuracy of the clocks would need to be two orders of magnitude better to give confidence in the results.
- The Cesium clocks drifted from 2 to 9 ns. per hour, and the rates could vary by as much as 4ns. A maximum possible error of 300 ns in the test overwhelms an expected result of only 40 ns. Note: Atomic clock systems (including Global Positioning System) are now accurate to about 10 ns, at best.
- Under the revised USNO guidelines issued the following year, the Hefele-Keating results would have been rejected as unreliable.
- Although the data graphs are never linear, Hefele-Keating assume that the curves are linear for the moving planes. Non-linear when measured, they magically become linear when not directly measured!
- Time changes of individual clocks are both + and - for both flights.

Domina Spencer also analyzed the raw data from Hafele-Keating experiment and found rampant technical errors: [10]

- No two "real" cesium beam clocks keep precisely the same time.
- There are systematic rate (or frequency) differences as large as 1 second per day.
- The smooth curves interpolated during flight appear to be entirely unaffected by the plane's motion.

2. **Carter:** Also, the amount of time dilation in GPS satellites is exactly the amount predicted by Einstein—before the technology to measure time dilation was available. How can anyone say "no one has detected time dilation", as at least one prominent geocentrist does, without first rejecting the experimental results that support it?

R. Sungenis: Yes, no one has detected time dilation, and Carter's argument is completely anachronistic. In 1905, Einstein added time dilation to length contraction because it was required to fit his theory, not

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[10] http://www.physical-congress.spb.ru/english/ spenser1/spencer1.asp

because he "discovered" it. It has since been applied to everything under the sun so that the Einstein advocates can claim that everything works by SRT. In reality, Carter is playing a shell game. Einstein used the Lorentz transform to claim that a moving object would have its time dilated by $\beta = 1/\surd(1 - v^2/c^2)$.

So let's assume that the GPS satellites are in an inertial frame. The fact is, the light beams traveling east-to-west are faster by 50ns than the beams traveling west-to-east. But according to SRT, there should be no difference of the two beams since both are in an inertial frame. (And if they are not in an inertial frame, then SRT cannot be applied). So, in order to hide this discrepancy to save SRT, the GPS computers are pre-programmed with a Sagnac correction so that it appears that the east bound beam is going the same speed as the westbound beam, and voila! SRT is "proved."

M. Selbrede: It seems to me that since Carter evidently cited Grøn & Erikson from an article I had written in October 1994, he surely would have read the entire technical discussion. In that discussion, I cite references documenting anomalies in pendulum rates when measured during solar eclipses or within mineshafts. We certainly have legitimate reason to verify the reliability of the clocks being used to "prove" time dilation. Challenges to the phenomenon were even mounted from within the Creationist community proper. For example, Dr. Thomas Barnes, in his 1983 work *Physics of the Future*, discussed how muons become more stable against decay due to self-interaction with their own electromagnetic field as they move faster and faster. This classically-derived effect means that muon decay cannot be treated as a constant keeper of time: the slowdown in decay rate has nothing to do with time and everything to do with intrinsic stability of the particle due to speed-dependent magnetostrictive effects. One may take issue with the work of such earlier Creationists on these issues, but that would necessitate contemplative analysis. Carter asks, "How can anyone say 'no one has detected time dilation,' as at least one prominent geocentrist does, without first rejecting the experimental results that support it?" Barnes, no geocentrist he, certainly accepted the experimental result – and explained it *without time dilation* using the same classical electrodynamic principles taught in the university textbook on the topic that he wrote (and which was long used at the University of Texas in El Paso where he taught physics). Perhaps we should at least respectfully consider the work of earlier Creationists in the spirit of "looking to the rock from whence ye were hewn, and to the pit from whence ye were digged" (Isa. 51:1). One of his protégés went on to do postdoctoral work at Fermilab and *still* held Barnes and his physical reasoning in the highest esteem. The wiser course is to tread with care here, and leave the scoffing to the politicians.

3. **Carter:** Einstein is often accused of lying about the changing perihelion of Mercury, although **Urbain Le Verrier** had shown this to be a problem for Newtonian physics in 1859, 20 years before Einstein was born. And these anti-relativistic geocentrists also claim that there was no evidence in Eddington's eclipse photos showing a bending of starlight. Michelson and Morley's apparatus is usually accepted as *proving* ether exists instead of being taken as an equivocal result that proves nothing. What can one do when faced with stubborn refusal to engage the most salient arguments?

R. Sungenis: This is simply a case of the pot calling the kettle black. Carter shows the same hubris that most Relativists exhibit when challenged on the contradictions to their theory. They believe their view is

true simply because they say so. They adore Einstein as if he was dropped out of heaven. The truth is, Einstein fudged the math. He knew what the arc measurement of the perihelion should be, so he started with the right figure and then worked backwards to fit it into his GRT theory. But when his GRT is then applied to the other planets, his predictions are so wrong that they are off the charts. I suggest that those who are interested read the latter part of my critique of Carter's first paper to see how Einstein did this.   Go to: http://galileowaswrong.com/wp-content/uploads/2016/05/Why-the-Universe-does-not-revolve-around-the-Earth.pdf and read from pages 76 to 89.

As for the eclipse photographs of Eddington, if you ever want to see a charade posing as science, one need look no farther. Please go to http://galileowaswrong.com/wp-content/uploads/2016/05/Why-the-Universe-does-not-revolve-around-the-Earth.pdf and read pages 89 to 107.

As for Carter's opinion that the Michelson-Morley "proves nothing," it actually proves how blind or stubborn Carter is. The fact is, Michelson's 1887 experiment did not detect enough ether for an Earth going around the sun, but in 1925 he detected 98% of the ether drift for a relative rotation between Earth and space. For the geocentrist, this is exactly what should be expected, since the Earth isn't going around the sun but space is rotating daily around a fixed Earth. For the heliocentrist (like Carter), it spells doom, since he cannot have a rotation without a revolution of the Earth since he must explain the day/night sequence and the four seasons.

4. **Carter:** We also saw several examples of people rejecting redshift/blueshift for calculating local motion, but nobody explained why, when we measure the absorption lines of hydrogen here on earth, those same apparent absorption lines seen in interstellar objects are shifted one way or the other? Some contradicted themselves by accepting that there is local, independent motion of stars and galaxies. But how can we "know" this without trusting the spectral line data?

   R. Sungenis: Carter is creating a straw man. There is no argument about the validity of spectral line data. The issue is whether the spectral line data is caused by the Earth moving toward the galaxies or the galaxies moving toward a fixed Earth. Carter and his advocates claim that it is the Earth moving toward the galaxies, but they have no proof of this assertion, and they have no proof that eliminates that the galaxies are moving toward a fixed Earth.

5. **Carter:** And what are the implications of local motion in the geocentric model? Clearly, the stars are not "fixed" in relation to one another. What then holds them in their respective places are they whirl about the earth at incredible speeds?

   R. Sungenis: The stars aren't "whirling about the Earth at incredible speeds." The whole universe is rotating around the Earth and carrying all the stars with it. The stars are moving no faster with respect to the universe than a person sitting in a car is moving with respect to the car moving at 60mph. The very reason these stars can stay fixed is because they are not "whirling."

6. **Carter:** Why do neighboring stars orbit at the same rate as distant galaxies when there is a *multi-billion-fold difference* in their respective distances?

   R. Sungenis: For the same reason that someone on the rim of a moving carousal is remaining at the same position as someone near the center pole the carousal. They are all on the same platform—the universe.

7. **Carter:** What causes them to orbit once a day when some are very close compared to others and nothing is fixing them in place with respect to one another?

   R. Sungenis: Since the platform (the universe) is rotating, not the people (the stars), then there is nothing to disrupt their position. The only thing we need to add is that the centrifugal force of a daily rotating universe is compensated for by gravity and the two other inertial forces, Coriolis and Euler, the same as if a person on a moving carousal can remain on the carousal if he holds on to a horse or if he holds on to a rope anchored to the center pole. Moreover, the fact is, Newtonian, Machian and Einsteinian mechanics all allow the same physical answer. If Einstein did not allow it in GRT, then his GRT would be falsified, since it depends on co-equivalence and co-variance of both the heliocentric and geocentric systems. As we will see later, the same co-variance can be applied to Newtonian mechanics since it requires the homogeneous application of his three laws of motion.

8. **Carter:** And if nearby stellar objects (those with the greatest gravitational effects impinging on the earth) have relative motion, how much of a potential effect would this have on 'balancing' earth at the center of the universe?

   R. Sungenis: They would have no effect, not only because an equal amount of "relative motion" is occurring in the star system around the Earth that balances the effects, but in the geocentric system the Earth shares a center of mass with the universe. As such, it is locked in place so that it can't move, no matter what the gravitational or inertial forces around it, which are minimal at best.

9. **Carter:** It pains us to note that many of them do not believe in the **moon landings**. If one has to reject so much **operational science** in order to explain the universe, science cannot then be used to explain the universe. So why bother to try to build a 'scientific' model at all? This is their greatest Achilles' heel.

   R. Sungenis: This is nothing but a red herring. As Carter opened his paper by saying "if certain members of the Catholic church decide to proclaim anathema on someone, we reserve the right to our own judgment," so certain people outside of Carter's environs reserve the right to question the claims of the Apollo mission without being anathematized by Carter.

   As for Carter's claim that rejecting such "operational science" means that one cannot then use operational science to explain the universe, this is nothing but a "guilt by association" fallacy, besides the fact that it is science that led the anti-moon landers to their conclusion, along with many other personal, social and cultural facts, that lead them to their conclusion.

What Carter misses is the fact that the anti-moon landers (at least the non-flat-earthers) do not dispute that probes and satellites are sent into space, or that a probe could reach the moon or Mars today. What they question is whether a man could survive the cosmic radiation; and whether the computer power available in 1969 (which was less than a quartz watch) could get a man to the moon and back. They have the right to ask those questions, especially when Neil Armstrong refused to give any interviews to the press about his "mission" and died a despondent man.

5. **Carter:** As far as the geocentrist 'model' goes, there are significant problems:
1. Many of them believe that the Earth is balanced at the universe's center of mass and that the earth can be at rest if the proper forces outside the solar system are properly balanced. Newton said something to this effect, and theoretically one could construct such a universe. But it would only work if the major gravitational sources in the universe were indeed far away.

   R. Sungenis: It was not only Newton who said it would work, but also Einstein, the very person upon whom Carter hangs his hat. But neither of them made any stipulation that the gravitational sources had to be far away.

2. **Carter:** Instead, there is a **star** (the **sun**) only 8 light-minutes away from earth that dominates the local gravitational environment. Gravitational force decreases with the square of the distance, so the individual effect of the distant stars and galaxies is weak and delocalized. They are not gravitational point sources, and thus are irrelevant compared to the sun.

   R. Sungenis: Carter has no way of proving that the stars and galaxies provide only a weak gravitational force. There are estimated to be 5 sextillion stars in the universe. Until if and when Carter calculates that combined force and can prove (not assume) how far away the stars are (which will be difficult since stellar parallax—the only empirical method of measuring distance—only goes out to 100 light years with any accuracy; and redshift values are simply not proven distance calculators), then he simply cannot make such assertions.

   M. Selbrede: We often see the "center of mass" defense of geocentricity pivoting on a heuristic analysis offered up a half century ago by Sir Fred Hoyle. In response, the heliocentrist points to the nearby Sun and demands to know what prevents the Earth from falling into it. In the next several paragraphs, Carter lists what he thinks are fatal objections to geocentricity in regard to maintaining the Earth in position, appealing to standard textbook dynamics. We will reply further down to his points, but at the risk of repetition will point out some initial flaws riddling his challenges. Let us first consider the question of what dominates the Earth's vicinity: effects of near objects like the Sun, or effects of distant objects like the rest of the universe?

   If we're talking gravitation in isolation, Carter is right. But if we're talking about the seat of inertia, in which are embedded the all-critical centrifugal forces that drive the geocentric system, he is completely wrong. The inertial field is dominated by the distant objects, as Mach himself taught:

Now, what share has every mass in the determination of direction and velocity in the law of inertia? No definite answer can be given to this by our experiences. We only know that the share of the nearest masses vanishes in comparison with that of the farthest. We could, then, be able completely to make out the facts known to us if, for example, we were to make the simple supposition that all bodies act in the way of determination proportionately to their masses and independently of the distance, or proportionately to the distance, and so on.[11]

Did you notice? The greater the distance, the greater magnitude of determining local inertial effects? John D. Norton comments on Mach's point on page 23 of the volume just cited with respect to the origin of inertial forces:

As we have seen, Mach gives such a redescription of the law of inertia in terms of the mass weighted sum of distances ($\Sigma mr/\Sigma m$) or its second time derivative d^2/dt^2 ($\Sigma mr/\Sigma m$). The 'share' of each mass m, m', m'' … in the reformulated law would simply be the magnitude of the term each mass contributes to these sums. The functional dependence of these contributions are then exactly of the type Mach mentions. In the first sum, for example, each mass contributes a term proportional to its mass and to its distance from the test body. And the nearest masses certainly contribute vanishingly small terms in comparison with the remaining masses.

So inertial effects are *least affected* by the local masses like the Sun, which in comparison to the rest of the universe contributes "vanishingly small terms" as Norton points out. And with a rotating cosmos and stationary earth, centrifugal force arises to keep the Sun and Earth from falling into one another. This point, too, was mentioned in the Grøn & Eriksen article cited by Carter. That citation was truncated in a tendentious way, omitting any reference to its salient points (which is interesting since Carter elsewhere bemoans others missing *his* salient points). In the full citation, the authors explain why the Earth doesn't fall into the Moon (since observers on the Moon always see the Earth in the same sector of the lunar sky and would wonder why gravity wouldn't pull the Moon and Earth together). The authors (as Carter evidently knew, since he uses part of this citation) put it well:

As observed from the Moon the cosmic mass rotates. The rotating cosmic mass has to be included when the Moon observer solves Einstein's field equations. Doing this he finds that the rotating cosmic mass induces the rotational nontidal gravitational field which is interpreted as the centrifugal field in Newtonian theory. This field explains to him why the Moon does not fall toward the Earth.[12]

By the same token, an observer on the Earth sees the cosmic mass rotate. The rotating cosmic mass induces the rotational nontidal gravitational field which functions the same way as centrifugal force in classical physics does, keeping the Sun revolving around the Earth. And don't be tempted to say, "Well maybe the Sun can be kept revolving around the Earth, but surely the Earth would fall toward the Sun." In keeping with Newton's Third Law, unidirectional forces do not exist: the force keeps the two objects

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[11] *Mach's Principle: From Newton's Bucket to Quantum Gravity,* ed. Barbour & Pfister, 1995, p. 22.
[12] *General Relativity and Gravitation,* Volume 21, No. 2, 1989, p. 118.

apart, and it prevents the Earth from being pulled into the Sun as the Sun orbits the Earth in the geocentric situation.

Another point that is often overlooked: the force arising from the observed cosmic rotation is *nontidal*. Tidal forces are differential forces due to a gradient in the applied force. For this effect, *there is no gradient*, no dropoff of magnitude with distance. The inertial field extends its determinative influence equally over everything within the rotating cosmos. This becomes a factor in a subsequent response to Carter's challenges about changes in the Earth's alleged rotation rate.

It is important to note that this centrifugal force arises due to the rotation of the universe. If we on Earth didn't observe the cosmos to rotate around us, Gaussian considerations would compel us to assert "there is no force inside a spherical shell." But once rotation comes into play, the situation is changed radically. And as noted elsewhere, Mach's Principle can be derived by Newtonian means and is not necessarily joined at the hip with general relativity.

1. **Carter:** The sun is much more massive than the earth. Thus, the sun should not orbit the earth.

   R. Sungenis: If we were only talking about the solar system and not the rest of the universe, then Carter would be correct. The Earth would orbit the sun just as moons orbit Jupiter.

2. **Carter:** One possible solution to get the sun to orbit the earth would be to add an offsetting mass on the opposite side of the earth to the sun. Such a counterbalance does not exist in near space, and the farther away it is, the more massive it must be (at a mere 1 light year, the counterbalancing mass would need to have the mass of over 4 billion suns—this would turn our **justified criticisms of 'dark matter' as a fudge factor** into rank hypocrisy).

   R. Sungenis: The "offsetting mass" that Carter insists on offsetting is the mass of the universe and its components. Some are near, some are far away, but their combined effect is what counts. If not, then Carter does not understand the principle of General Relativity he is propounding. It was Ernst Mach who introduced the gravity of the 5 sextillion stars as the balancing effect. Newton couldn't do much because he didn't know how many stars there were or what their distance is from Earth (which is one reason that Newton had to add in "fictitious forces" into his understanding). After Mach, the "fictitious forces" now became real forces, and thus Einstein was forced to the same conclusion as Mach, especially since without a rotating universe around a fixed Earth as a possible solution to his co-variant field equations, he would have falsified his own theory. In the end, Carter is trapped like the proverbial rat. His own GRT demands the possibility of a geocentric universe, but he has yet to admit it.

3. **Carter:** The sun lags the stars by about 4 minutes a day (they claim this is due to "the inertial drag of the planets") and so must the 'counterbalancing mass'. So that mass must not be at the margins of the universe, for then it would orbit at the same rate as the universe (and probably require more mass than the universe!). But if you add such a mass *anywhere close to the earth*, the gravitational explanation of the solar system ceases to exist because you could not explain the orbits of the other planets around the sun *only*.

R. Sungenis: This is false, but Carter was given the reason why it is false in the paper I wrote against him. Even heliocentrists have shown that what Carter says is false. One example is Andre Assis in his book *Relational Mechanics*. It was given to Carter on pages 16-17 of my critique, but he fails to mention it. I also gave him the paper written by Luka Popov that was published in the *European Journal of Physics* in 2013, which says the same as Assis. Both of them show, by using the mathematics that all their peers recognize as valid, that in a rotating universe the needed forces are indeed created to keep the solar system intact and the Earth at the center. There are centrifugal forces, Coriolis forces and Euler forces, and all combine to create the needed balance. It is all worked out mathematically and Carter simply has no way of disproving it.

4. **Carter:** Since the stars and galaxies are so far away, and since their gravitational effects are so diffuse, maybe it's not the earth but the entire solar system that is balanced at or near the center of the universe? In this case, the earth would be free to move about the sun. This, of course invalidates all the assumptions of geocentrism, but they have not explained why the earth is balanced at the center and the sun (which, on a universal scale, is only a fraction of a fraction of a percent from the center in their model) is not.

   R. Sungenis: So Carter wants his cake and eat it, too. First he says that the stars and galaxies are so weak and far away that they would not have any negligible effect. But when he wants to promote his own system, suddenly the stars and galaxies can do the trick.

5. **Carter:** And where is this balance point? Is it at the center of the earth? In that case, the crust would be free to rotate about the liquid core. Is it at the surface of the earth? At the edge of the atmosphere? Considering how large the universe is, what physical reason is there that the earth, the whole earth, and nothing but the earth is at an unmoving central position?

   R. Sungenis: Because Scripture says so, Dr. Carter. Unfortunately, you live in the dichotomous world in which you reserve the right to interpret literally all the passages that speak of Creation and the Flood and the Exodus, but for some reason, when the same Bible in Genesis, Joshua and the Psalms speaks of a non-moving Earth, you suddenly change the rules of the game and interpret them all figuratively.

   As for the exact center, it's going to be somewhere near the geometric center of the Earth. The reason for this is because if the center of mass was in the atmosphere, then the universe would be revolving around the atmosphere and thus wreck havoc with the rest of the Earth, moving it from side to side every day. The only way the Earth can be stable is to have the center of mass as near to the geometric center as possible.

   As for your assertion that this would allow the crust to move against the liquid core, first, you don't know if there is a liquid core. There simply is no science developed yet that can establish a liquid core as a fact. Second, having a liquid core might actually work in favor of a fixed Earth, since any inertial forces incident on the center of mass would affect the liquid and be dissipated but not be transferred up to the

mantle and the crust. To move the mantle and the crust, the inertial forces would need to be very great, but there are no such forces in our vicinity.

3. **Carter:** If the earth is only balanced and not 'fixed' in place, what is to prevent the earth from moving? The solar system could be moving at millions of miles an hour toward the edge of the universe and we would not know it.

R. Sungenis: Since if the Earth shares a center of mass with the universe, the universe locks the Earth in place so that it can't move. To move the Earth one would have to move the universe, which is impossible. If you don't believe me, consult your mentor Einstein, since he is the one on your side of the fence that allows a geocentric universe.

4. **Carter:** Also, if one is attempting to claim the earth is balanced at the center of mass of a rotating universe, one runs into a very large problem: the earth should turn in synchrony with that universe. In the words Grøn & Eriksen, "…the interior inertial frames are dragged around rigidly with the same angular velocity as that of the shell."[2] Take a neutrally-buoyant ball and place it in a round pool of water with a circular current going around it. What's going to happen? The current will cause drag and the ball will eventually spin at the same rate as the current. Trying to escape this aspect of their own model, strangely, one prominent geocentrist thinks the torque caused by the rotating heavens at the poles and equator runs in opposite directions. Take another ball. Put it in a pool of still water. Spin the ball. Why would the fluid at the poles rotate in the direction of spin but the fluid at the equator flow in the opposite direction?

R. Sungenis: Carter is here talking about Martin Selbrede's "Geo-lock" model. If Mr. Carter has any objections to it, he can argue with Misner, Thorne and Wheeler in their 1973 book, *Gravitation*. They are the ones who spoke about opposite torques. Selbrede merely accommodated their mathematically rigorous work to the geocentric model. The quotation of Selbrede's 1994 proposal in my book *Galileo Was Wrong*, Vol. 1 11th ed, pp. 277-279 includes the salient reference to in *Gravitation* (pp. 1119-1120).

For this question, I invited Martin Selbrede to speak for himself, which he graciously agreed to do:

M. Selbrede: Now, Carter is attempting to appeal to intuition against the actual physics at play. That the effect is counter-intuitive upon casual examination is not surprising, as we see in this reference in *Mach's Principle: From Newton's Bucket to Quantum Gravity* (ed. Barbour & Pfister, 1995)*, pp. 321:

> "For a test particle in the equatorial plane and outside the mass shell, the induced precession is even antiparallel to ω, which might be considered as counterintuitive or even anti-Machian. It was however indicated by Schiff (1960a, b) and analyzed in detail by Thorne (1971) that this behavior is easily comprehensible due to the radial fall-off of the gravitational field, and in analogy to the dragging of little rods in a rotating viscous fluid. [In this connection see also Cohen (1967).]"

In this citation, Herbert Pfister points out that intuition is not the proper guide to understand the phenomenon: it leads astray, whereas Thorne's work (published in *General Relativity and Cosmology* two years prior to the 1973 publication of *Gravitation* and subsequently reiterated in that later tome as noted) proposes the *correct* experiment to use *because we're talking about inertial frames and not frictional surface torques.* Carter's proposed experiment reveals plenty about the latter, and nothing about the former, and in fact evidences apparent misunderstanding of what inertial frames actually are and how they behave.

In other words, we see Carter appropriating and manipulating terms without understanding them properly. He misunderstands what is being dragged despite identifying the dragged entity correctly as an inertial frame. Correct nomenclature doesn't translate into correct usage or a correct experimental proposal in his challenge.

And while Selbrede would invite suitable challenges to his proposal (in the spirit of falsifiability), they need to proceed from a sound understanding of the proposal being critiqued. So too here: inertial frame dragging sets up as real (rather than fictitious) forces the phenomena of centrifugal force, Coriolis force, and the Eulerian force. The first force is *centrifugal* in the full dynamic sense of the term: axisymmetrically outward, *not forcing a rotation!* The other two forces have time derivatives of motion in their mathematical expression: they only operate on bodies *in motion*. These aspects of dragged inertial frames *do not induce rotation on a static Earth in the geocentric scenario*. Equatorial bulge, yes. Weather system rotations (because they *are* moving systems), yes. Gross pondero-motive torque to pull the Earth into rigid synchronicity with the spinning universe? It's not possible for inertial frame dragging to do this. This is mirrored in the fact that Carter's proposed sphere/liquid experiment doesn't model inertial frame dragging, while Thorne's experiment does. Further, note that the Foucault pendulum reveals the frame's motion *because the pendulum itself moves* and thus has the required velocity term for the Coriolis force to actually apply.

Two more points while we're on this topic. Carter seems to disparage the two-step polemic used by geocentrists in using general relativity at one point and rejecting it at another. Now, such a two-step apologetic has been around since Proverbs 26:4-5 was written: an internal critique of the system followed by a frontal assault. It's likely that Carter uses such a two-step approach himself to examine an opposing position *on its own principles* and then move beyond that. Further, at no point are geocentrists constrained to adopt either general relativity or Newtonian mechanics without reference to other options. In fact, many geocentrists adopt neither Einstein nor Newton, finding better agreement with experiment with several "third-party" models of the physical structure of our universe.

But to show that inertial frame dragging is *not* in fact proprietary to proponents of relativity, note that Jörg Frauendiener has provided both the Newtonian and relativistic derivations for inertial frame dragging in his paper, "On the Interpretation of Dragging Effects in Rotating Mass Shells" (in *Mach's Principle* cited above, pp. 354-355 and 361).

Second, note that some support for Selbrede's proposal might be uncovered in the extant literature in regard to its other salient aspects. For example, consider H. P. de Oliveira's paper, "Spinning Fluids in the

Einstein-Cartan Theory: a Variational Formulation" (*General Relativity and Gravitation*, Vol. 25, No. 5, 1993, pp. 473-481):

> "In our model we consider each infinitesimal volume element or particle of the fluid as replicas of micro-rigid bodies (Ref. 6, and references therein). Indeed, we can interpret this approach as similar to the one that Halbwachs [7] and others [8] considered: the quantum fluid is taken to be a field of microscopic spinning tops viewed in a continuous way at one's observation scale. (This was the basis of the so-called causal re-interpretation of quantum theory.)"

Interestingly, de Oliveira finds an additional term missed by previous research teams exploring this area, demonstrating that the work is ongoing and hardly as settled as Carter's hasty analysis would imply.

The takeaway here is that Selbrede also is applying a particular form of the causal reinterpretation of quantum theory in his (obviously parallel) proposal, and that such associations are far from alien to the physical sciences as found in refereed journals.

R. Sungenis: The fact that the Earth would not spin in a spinning universe can also be demonstrated from the Newtonian perspective. The following is a section from my book, Geocentrism 101:

In addition to Newton's Proposition 43 allowing a geocentric universe, his mechanics also show that the Earth will have no inclination to rotate. When the gravitational and inertial forces are balanced around a center of mass, they cannot generate a torque, and thus the Earth will remain absolutely motionless. This state of rest is calculated in the above equation. As noted by one science reference:

> If the reference point **R** is chosen so that it is the center of mass, then the resultant torque (T) is zero. Because the resultant torque is zero the body will move as though it is a particle with its mass concentrated at the center of mass. By selecting the center of gravity as the reference point for a rigid body, the gravity forces will not cause the body to rotate, which means the weight of the body can be considered to be concentrated at the center of mass.[i]

In other words, not only will the Earth remain at the center of mass, there will be no torque to make it rotate with the universe.

5. **Carter:** Another attempt at an escape is to claim that anything outside the Schwarzschild radius (the distance from a massive object within which the attraction of gravity is so strong that not even light can escape) is irrelevant. But wait a minute! They reject all the physics—Einstein's general relativity[3]—that is needed to calculate the Schwarzschild radius, so they cannot appeal to it here.

R. Sungenis: We can appeal to it any time we want, especially to show the world that your own faith in General Relativity requires you to accept a geocentric universe. It's one thing to fight an opponent, but when you can fight him with his own sword and kill him, then the battle is over. Allow me to add some comments by Martin Selbrede:

M. Selbrede: The seminal paper by Sir Hermann Bondi, "The angular momentum of cylindrical systems in general relativity" (*Proc. R. Soc. Lond. A* (1994) 446, 57-66) is the key reference of interest. Dr. Bondi actually uses Newtonian theory as a test case in setting forth the validity of the assumptions (p. 59) the paper purports to extend. In fact, he goes so far as to say this:

> "The main point to note is that whereas in the Newtonian discussion, non-rotation of the reference system at infinity is taken for granted, in the relativistic treatment such rotation is permitted but irrelevant to the measure of angular momentum, which is an intrinsic property of the material system." (p. 64).

In any case, it is Bondi (p. 63) who asserts that at all radii where the tangential velocity is greater than the speed of light, the respective contributions to the resulting physical environment within the spinning environment can be ignored as perfect inertial frame dragging has already been achieved in such cylindrically symmetric systems (the geocentric case being an example of just such a system). Apart from being relevant to the specific challenge Carter mounts, this paper is important in respect to answering challenges against geocentricity from the standpoint of angular momentum and its proper formulation and understanding.

6. **Carter:** And if they believe gravity travels at infinite speed, light should as well.

R. Sungenis: No, that is false. Light is a transverse wave but gravity is a compression wave, which travels much faster than a transverse wave.

7. **Carter:** Thus there would be no Schwarzschild radius, because this is inversely proportional to the square of light speed.[4] Due to inertial frame dragging, in a geocentrist model all objects in the solar system should be turning with the inexorable pull of the universal gravitational field. But then local orbital motion would stop and the solar system would collapse into a single sun/earth/planet ball. So their attempts at a dynamic neo-Tychonian system devolves into the kinematic Tychonian "fixed earth" system once again. Clearly, it is not possible to explain the fixity of the earth with Newtonian forces.

R. Sungenis: I will allow Martin Selbrede to address this point:

M. Selbrede: Carter's objections have already been fully rebutted in the reply to his earlier point already made in reply. With inertial frame dragging, the only force term that doesn't have a velocity component is centrifugal force, which is applied radially outward from the central axis. The only forces that can induce any other change require a non-zero velocity (time derivative) term (e.g., the Coriolis force, and with somewhat different mathematics, the Eulerian force). The entire cosmic collapse as envisaged by Carter is an artifact of his misunderstanding of what an inertial frame is and how it affects objects within its sphere of influence.

As Sir Hermann Bondi points out on page 64 of the 1994 paper of his cited earlier, there can be no angular momentum transfer from the rotating outer shell of cosmic matter and the central spherical Earth:

> Next consider an outer shell undergoing changes and separated by a gap from an unchanging inner shell. Note that integrating outwards from the axis, all the parameters applying in the interspace are fully determined by the inner shell, apart from any superposed angular velocity. The effect of the changing outer on the interspace is wholly confined to altering the value of ω that leads to asymptotic non-rotation. Therefore the intrinsic nature of the angular momentum of the inner becomes patent as it is wholly unaffected by anything that goes on outside. Thus there is no transfer of angular momentum between outer and inner. (Bondi, *op. cit.,* p. 64).

It's fairly clear here that Bondi directly contradicts Carter's challenge. In my view, we are on firmer ground getting our understanding of physics from Bondi. The spinning cosmos does NOT force the Earth to spin with it. The physics again says No. Angular momentum cannot be transferred from the outer rotating cosmos to any object in the interior. Carter has misunderstood the physics and drafted a series of challenges in terms of that misunderstanding.

8. **Carter:** Another common aspect of their model is the belief that all the stars orbit at the same distance from earth. But most of them firmly defend parallax measurements. Yet, the fact that some stars have a detectable annual parallax wobble and other do not *shows that stars are at different distances from earth!*

   R. Sungenis: There are few, if any, prominent geocentrists who believe the stars are all the same distance from Earth. Those who do are not paying attention to parallax results.

9. **Carter:** OK, we made an imperfect argument when we said parallax could not be accounted for in a geocentric universe, but only some believers in geocentrism believe the stars orbit *the sun*.

   R. Sungenis: "Imperfect"? No, it means you didn't study the geocentric system (espoused by the very person whose system you claim to know—Dr. Bouw) before you levied your critique.

10. **Carter:** That in itself is amazing, because that means the universe (in all its massiveness) does not rotate around what they believe is the center of mass of the universe (the earth). But if the universe orbits the sun, the sun is the center of mass—making them heliocentrists by definition!

R. Sungenis: No, the sun is the geometric center, and the Earth is the dynamic center (or center of mass). This will create a slight wobble as the universe rotates around the Earth, which accounts for all the precessions we see (e.g. Chandler wobble, the 26,000 year precession, etc.).

M. Selbrede: It's not clear why Carter finds the modified Tychonian model "amazing" since it is the version of geocentricity that comports with a relativistic defense of geocentricity (or its defense of any other x-centricity, for that matter). And general relativity is indeed a model of dynamics, not merely kinematics. So when Einstein defended geocentricity, it was this "amazing" version of it with the wobble he was defending. If Carter thinks Einstein was in error in so doing, we certainly would want to hear of this. But given the dominance of Einstein's legacy (for better or worse), this version of geocentricity is considered completely unremarkable: GR requires all the forces to work out correctly, no matter how "amazing" or counterintuitive things appear to polemicists with conflicting agendas.

However, note that at least one mathematically skilled geocentrist built a conformal mapping (in two dimensions, not three, which proved intractable outside of numerical methods) for incoming starlight traveling to the Earth, where the Earth was positioned at the sink of the mapping. Under this formalism (which is far less contrived than the vast majority of manipulations freely applied in astrophysics), the cosmos directly orbits the Earth, not the Sun, and parallax and aberration are two components of a single optical effect driven by the Sun's influence on that conformal mapping. Right or wrong, this idea is surely worth serious consideration. This approach rejects the modified Tychonian model, and its proponents cannot be "heliocentrists by definition" as Carter charges. Note that this approach does not reject parallax and aberration: it purports to explain the observations in a falsifiable, mathematically rigorous model.

11. **Carter:** If not, there must be an offsetting mass that counteracts the sun and does not orbit in synchrony with the stars (see above).

R. Sungenis: The fact that the sun does not orbit in synchrony with the stars is due precisely to the fact that it is off-center from the dynamic center of the universe and therefore will not experience the same gravitational or inertial forces as the stars. The closer the object is to the center of mass (as opposed to the stars which are much farther away from the Earth) the more the universe's gravity and inertial forces will affect that object than objects farther away.

12. **Carter:** Also, once you have stars at different distances, one then has to explain why satellites at different heights above the earth's surface orbit at different rates but stars at different distances do not.

R. Sungenis: Not so. The satellites are governed by the gravity and inertial forces surrounding the Earth. Stars are not governed by the Earth.

13. **Carter:** But think about this: a geostationary orbit can only be achieved above the earth's equator, and the equator is tilted in respect to the rotation of the universe. If it is the universe that is "pulling upward on the geosynchronous satellite", keeping it from falling back to earth, it cannot do so evenly throughout the year and thus the satellite could not sit still in reference to earth.

R. Sungenis: First, I will allow Martin Selbrede to answer this from the perspective of General Relativity and Machian physics:

M. Selbrede: It seems that Carter has never examined a geocentric orrery in operation, or he would not have described the motion in the geocentric system so inaccurately. If you want to criticize a scientific position (which is always fair game to do) it is incumbent upon one to understand the model one is criticizing. To misfire at the outset is unfortunate. In point of fact, in geocentricity you have a WYSIWYG universe (What You See Is What You Get): the sun spiraling daily and making a north-south round trip journey throughout the year to the respective tropics of Cancer and Capricorn, passing through the equatorial plane during the two equinoxes. The "tilt" is an artifact of heliocentric thinking intruding into the geocentric picture, and depicts the situation incorrectly.

Of course, the spiraling (helical) motion of the sun is, indeed, fair game for attack . . . so long as you reject Einstein. Under Einsteinian relativity, the dynamics (not just the kinematics) must work out properly if the Earth is taken to be motionless and at rest. That means whatever spiraling the sun is doing must follow the laws of physics; or relativity is dead as a theory. Every critique Carter has raised against geocentricity must either be slain on the altar of relativity, or it would stand as an irrefutable proof against relativity. The law of excluded middle applies in this case. Is Carter attacking relativity theory? It isn't obvious this is the case, but in attacking geocentricity with these various "challenges" he necessarily is doing exactly that. Relativity teaches general covariance, and each challenge of Carter's attacks the validity of general covariance. If he wants to come clean and say this is his intention, then we can argue on that wise. Otherwise, his claims are internally incoherent.

So, what of the sun's "peculiar" motion and its alleged effect on the geostationary satellite (or what non-geocentrists prefer to call a geosynchronous satellite)? Let's understand the situation in terms of superimposed motions, of which there are three major elements: (1) a daily rotation of the cosmos around the earth, (2) a north-south annual motion of the sun superimposed on that daily rotation (the tropical motion creating the seasons on Earth), and (3) a closer-farther annual motion of the sun (analogous to perihelion and aphelion in the heliocentric model in which the elliptical Keplerian motion is expressed). We will discuss the second motion as it is pertinent to the challenge, although some of our observations will be equally true (albeit along a different axis) for the third motion.

The solar motion between the tropics is a quasi-harmonic motion. The physics of such motion are well-understood: such motion varies (usually sinusoidally) as the sun moves to its farthest-north point within the diurnally-rotating cosmos, then back through the equilibrium point (at the equator) to the southern tropic. As there is no evident force to damp the oscillation, its amplitude remains constant. (As a comment, tidal forces acting on the sun could act to damp the oscillation, but if such exist their magnitude is essentially negligible).

More to the point, harmonic motion is distinguished by this key factor: there is a restorative force pulling the object in question back to the equilibrium point. The sign of the force is negative showing that the force vector *always points to the equatorial plane*. This force driving the harmonic motion doesn't merely act on the sun; rather, it acts on everything in its sphere of influence, *including the geostationary satellite*. The geostationary satellite, already stabilized on the equatorial plane, *stays on that plane* for the same reason the sun continues to return to cross that same plane every six months. The physical laws for the sun's annual motion *also proscribe the forces acting on the satellite*. A force powerful enough to continually yank the sun back to the equatorial plane is powerful enough to keep the satellite on that same plane. What orbital decay *does* exist would be the same for heliocentric or geocentric cosmologies.

Relativity theory mandates that this force be real when the Earth is taken to be motionless. In the heliocentric framework, the force is a consequence of the geometry and the purported axial tilt of the Earth. This is the way of general covariance: if a harmonic motion is observed in any given frame, the physics requires actual forces for it to be present, notwithstanding that in the "conventional" frame those forces may not exist. That alleged "non-existence" in relativity is purely an artifact of an arbitrary choice of reference frame *and nothing more* – the choice of frame causes the forces to vanish. General covariance is the price that physics pays to throw out geocentricity, *and general covariance by its very nature re-installs geocentricity as a legitimate albeit nonexclusive option*. The words of Penn Jillette (in a different context) seem to apply here to this result: "That is the nightmare!"

To argue that it's absurd to think that the sun moves up and down out of the equatorial plane as geocentricity demands is to call conventional astronomy absurd. Why? Because in conventional astronomy, the sun moves in and out of the Milky Way's galactic plane in a harmonic oscillation of 32 million years in alleged duration. Sauce for the heliocentric goose is sauce for the geocentric gander.

Of course, Carter didn't explicitly say that the *sun* is pulling unevenly on the satellite, he said the entire universe is pulling on it unevenly because (now putting on heliocentric glasses) the Earth is tilted with respect to the rotating universe. But in geocentricity, the universe is *not tilted* – it rotates on an axis going through the Earth's poles. There is only the superimposed north-south motion evidenced by the solar tropical motion, which is quasi-harmonic as asserted above. If the sun partakes of the motion of the cosmos in making that north-south trip (most, but not all, geocentrists would hold to this approach) then the question becomes *what is the relative magnitude of this motion?* This longitudinal oscillation of the cylindrically-symmetric rotating cosmos is certainly an accelerated motion by definition, and although its average amplitude (being sinusoidal) is zero, perhaps its contribution to short term perturbation of the satellite's position should be examined to see if it is truly negligible or not.

The acceleration due to the annual harmonic tropical motion in question (superimposed over the daily rotational motion) is constant so we need not be concerned with time-dependent variations of the inertial frame dragging due to this longitudinal oscillation along the north-south axis. While the magnitude of the acceleration is but a tiny fraction of that due to the daily rotation, it is worth seeing that it has *no effect* on the satellite even if it were large. Why is that? Because such frame dragging still exhibits those three contributing components: centrifugal, Coriolis, and Eulerian forces. And of these,

only the tiny constant centrifugal force will apply, because *the geostationary satellite is motionless in the Earth's coordinate frame*. "Like the magnetic Lorentz force ... the GM [gravitomagnetic] force of Eq. (37) vanishes for a particle at rest" (Reva Kay Williams, "The Gravitomagnetic Field and Penrose Processes," page 12 of preprint dated 24 Mar 2002 for *Phys. Rev. D*). That vector cross product with the velocity of the geostationary satellite reduces the force to zero. There *is no destabilizing force* from any such source as Carter identifies. The physics says No.

Carter is correct that there are big problems here, but those problems are not in the geocentric physics, they appear to be in Carter's understanding of physics. "For by wise counsel thou shalt make thy war" (Prov. 24:6), but we don't believe Dr. Carter (who is highly skilled in the life sciences) received wise counsel in preparing this challenge to geocentricity. The problem with many a quick-and-dirty polemic is the need to clean up the dirty parts later. We trust that Carter, as a Christian gentleman, will honor God by doing exactly that. We agree that these issues are worth debating, but surely they are worth debating well in front of so great a cloud of witnesses.

R. Sungenis: I will answer the issue from a Newtonian perspective. In Newtonian mechanics, anything that is within the Earth's gravity envelope is controlled by the Earth's gravity. As such, the Geostationary satellite, at the height of 22,236 miles, is moving 7000 mph due east—not against the Earth about which it hovers—but against space which is traveling 7000 mph due west. (In the heliocentric system, the satellite is moving 7000 mph due east to keep up with the Earth rotating 1054 miles due east). In the geocentric system, the centrifugal force against the rotating space keeps the Geo-Sat up, while the Earth's gravity, acting as a centripetal force, counters it, keeping the Geo-Sat over the same spot on the equator of a fixed Earth.

To explain why the Geo-Sat hovers above one spot on the Earth, let's use the example of a roulette wheel with a little black marble:

1) The roulette wheel is stationary but the marble is flung around the inside rim of the wheel. The centrifugal force on the marble will keep it clinging to the inside of the wheel until the marble slows down and falls into one of the slots near the center of the wheel.

2) The roulette wheel is rotating rapidly and the marble is clinging to the inside rim of the wheel. The centrifugal force caused by the rotating wheel will keep the marble clinging to the inside rim of the wheel. When the roulette wheel slows down sufficiently, the marble will fall into one of the slots near the center of the wheel.

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Scenario #1

-- Roulette wheel is stationary and the black marble moves very fast laterally against the inside white rim.

Scenario #2

-- Roulette wheel is rotating to the left while black marble remains stationary on the inside white rim

In both these scenarios, the inside rim of the roulette wheel creates a centripetal force on the marble and this causes the marble to have a centripetal acceleration which will force it to go against its inertial path (a straight line) and make it follow the circular path around the inside rim of the roulette wheel. There is no other force on the marble. In Newtonian mechanics, the marble is creating a centrifugal force on the rim of the roulette wheel but there is no centrifugal force on the marble itself, only a centripetal force.

In Scenario #2, we invert Scenario #1 and view the roulette wheel as a system of coordinates rotating around the center, but we now make the marble stationary with respect to the rotating wheel. In this case, the inside rim of the wheel is still creating an inward centripetal force on the marble and yet, in terms of the rotating coordinate system, the marble is not accelerating since it is stationary. This is analogous to a Geo-satellite in the geocentric system in which space (like the roulette wheel) is rotating 7000 mph east-to-west but the satellite (like the marble) is hovering over a stationary Earth.

This state of movement is allowed by Newton's laws since the homogeneous form of the second law (i.e., the solution to Newton's F = ma that equals zero such that $F – ma = 0$ maintains a direct proportion between the second derivative of the position coordinate and the time coordinate wherein $a = d^2v/dt^2$. But that relationship is applicable only to the motions of inertial coordinate systems, and since the roulette wheel, because it is rotating, cannot be an inertial coordinate system, we must seek another means of viewing this scenario.

Hence in order to apply the homogeneous solution ($F – ma = 0$) to Newton's second law, we must add "fictitious forces" to the above non-inertial coordinate system of the rotating roulette wheel. Thus if we add a centrifugal force on the stationary marble, it will balance the centripetal force on the marble (i.e., the inward force caused by the rim of the roulette wheel). In this way, the stationary and non-accelerating state of the marble can be understood by the homogeneous form of Newton's second law. That is, we can say that the marble has zero acceleration (i.e., is stationary in the rotating roulette

wheel) because the net radial force (i.e., the centrifugal force minus the centripetal force) is zero. The same principle, of course, applies to the Geostationary satellite.

6. **Carter:** We noticed several examples of cherry picking, the act of arbitrarily picking and choosing different explanations for the same phenomenon. We also called it "stamp collecting", which made many people mad. But it's clearly what they are doing. For example:

1. Notice that Mercury does not have an equatorial bulge. Earth does, as does Jupiter. They believe, and adamantly defend, that the bulge on Jupiter is due to rotation, and the lack of a bulge on Mercury is due to a lack of rotation (Mercury rotates slowly, once every 59 earth days). But they then go on to say that the bulge on Earth is due to the universe rotating around the earth.

   R. Sungenis: It is not "cherry picking," anymore than saying day and night on Earth is caused by a rotating universe, while on all the planets it is caused by their respective rotations. Additionally, it is Carter's own GRT that allows for the bulge of the Earth due to the universe's rotation. As relativist Arthur Eddington put it: "The bulge of the Earth's equator may be attributed indifferently to the Earth's rotation or to the outward pull of the centrifugal force introduced when the Earth is regarded as non-rotating. (*Space, Time and Gravitation*: *An Outline of the General Relativity Theory*, 1923, p. 41.)

2. **Carter:** Likewise, the Coriolis force on Jupiter is due to its rotation, but they believe the Coriolis force on Earth is due to the universe is rotating around the Earth. Thus, they require multiple explanations of the same phenomena. In geokinetics, there is one explanation: both rotate.

   M. Selbrede: We must recalcitrate when Carter asserts that geocentricity requires multiple explanations for equatorial bulges. If this were true, it would be equally true of general relativity's defense of geocentricity as a dynamically valid system. The reality is that the equatorial bulge has ONE explanation in both Carter's system and in geocentricity: it is caused by relative motion between the planet and the reference frame in which the distant stars are observed not to move (the inertial frame of the universe). This is the cause for Jupiter's equatorial bulge, and for the Earth's equatorial bulge. Period. The only difference is that Carter holds the cosmos to be non-rotating, and geocentrists do not. But the bulge itself cannot tell you whether the geocentrists are right or Carter is right: Mach's Principle applies, and its defining equations don't determine the rotational state of the cosmos.

   While we've examined the physics of this issue of cosmic rotation and a stationary Earth to this point, perhaps it would be wise to let the Creator get a word in edgewise. In the Septuagint reading of Job 38:33 we read, "Knowest thou the turning of the heavens?" The verse concludes in the KJV, "Canst thou set the dominion thereof in the earth?" This distich is certainly intriguing, for if the Septuagint reading is legitimate here, the implication is that the rotating heavens impose their dominion in the earth (why here and not elsewhere?). We hesitate to draw a hasty conclusion and craft facile identifications with Mach's Principle, but are geocentricity's opponents willing to consider the implications of this passage at all given the Septuagint translation's approach to it? Creationists have extracted much of literal value from Job and elsewhere. Should this verse be a lone exception in respect to revelatory value? Should a scientific bias affect our interpretation of Scripture that prima facie speaks to a controversial point?

R. Sungenis: Carter doesn't win an argument simply because he has one motion. His task is to prove that the Earth's Coriolis cannot be caused by a rotating universe, not give us his version of Occam's razor. Be that as it may, I will elaborate on Mr. Selbrede's citation of Job 38:33. The original Hebrew word for the LXX's τροπάς ("turning") is the feminine construct חֻקָּה (CHAQAH). In its normal form it refers to something that is established, firm, and never changes (as in "statues" or "ordinance" as in Gn 26:5, Ex 12:14, Jer 5:24). When it is used in the context of the heavens, it refers to the cycles of days, months or years that never change (cf. Jer 31:35; 33:25; Job 38:33). We can see why the LXX translated CHAQAH as "turning" (τροπάς), (which, incidentally, is used only once in the New Testament in James 1:17 as τροπή = "turning" in "shadow of turning"), since turning is the established cyclical movement of the heavens around the Earth. In this vein, it is noteworthy that Job 38:33 does not say the Earth has CHAQAH; rather, it is "ruled" by the CHAQAH (e.g., cyclical turning) of the heavens, showing a direct connection between the heaven's movement and what occurs on Earth. Job 38:33 thus implies the Earth has no cyclical motion and that it is the cyclical motion of the heavens that determines what happens on Earth. Obviously, there cannot be two cyclical motions (one of the heavens and one of the Earth), there can only be one. Job 38:33 tells us that the single cyclical movement belongs to the heavens, not the Earth, which coincides with all the other biblical passages that tell us the Earth doesn't move.

7. **Carter:** Sadly, they failed to engage some of our best arguments: The "long-period comets must come with warp drive" claim, the source of universal acceleration question, and the speed of the moon largely went unanswered. What is the point of having this debate when our best arguments are ignored? Actually, we anticipated that the defenders of geocentrism would either ignore, misunderstand, or misrepresent this section. They chose the former. Par for the course.

R. Sungenis: As my mother used to say, "To assume something without proof only makes an ass out of u and me." The fact is, Carter's challenge about the comets WAS answered in my critique. Since Carter mentions my name specifically—and only my name—at the beginning of this paper, one would think that he would have read my answer. Apparently he didn't. Here is the dialogue:

> **Carter/Sarfati:** To go from a speed greater than *c* to a speed much less than *c*, and then back again, comets would have to come with warp-drive.
>
> **R. Sungenis**: As noted earlier, the comets are not going the speed of light in the solar system or anywhere else in the universe. Carter/Sarfati need to distinguish between the star field and the universe that contains the star field.
>
> As for Carter's "universal acceleration," that was also answered in my critique. Here is the dialogue:
>
> **Carter/Sarfati:** Supporting Evidence (or, why the earth cannot be at the absolute center)
>
> The rate of acceleration of objects in the universe

According to Newton's first law, an object in motion will tend to go in a straight line. Thus, in order to orbit something, an object must turn. In other words, it must accelerate— to a physicist, this means any change of speed or direction. Newton's second law states that the force required is proportional to the mass and the acceleration (F=ma). If the entire universe is rotating (accelerating) around the earth, how much force would be required to keep things from flying apart? And, the farther away the object, the greater the orbital radius, the more acceleration is required.

R. Sungenis: Let's tackle this first objection by using the very Relativity theory that Carter/Sarfati espouse. As we have seen earlier, all advocates of GRT admit that the GRT principles of co-equivalence and co-variance mean that, geometrically and dynamically, a geocentric universe is viable. As such, GRT must also accept that light and any material object can exceed the speed of light. Hence, only in Einstein's Special Relativity theory (SRT) are light and material objects limited to *c* or less, respectively. The reason is that SRT does not incorporate either gravity or inertial forces, but GRT does.

In effect, SRT really has no applicability in the universe, since there is no place that is not affected by gravity and inertial forces. So it is a phantom theory, to say the least; besides the fact that it was created to have some excuse why Einstein and his colleagues didn't have to accept the prima facie evidence from the 1887 Michelson-Morley experiment that the Earth wasn't moving.

Let's see how a book on General Relativity explains the problem:

> "Relative to the stationary roundabout [the Earth], the distant stars would have…linear velocities exceeding 3 × 10^8 m/sec, the terrestrial value of the velocity of light. At first sight this appears to be a contradiction…that the velocities of all material bodies must be less than c [the speed of light]. However, the restriction u < c = 3 × 10^8 m/sec is restricted to the theory of Special Relativity. According to the General theory, it is possible to choose local reference frames in which, over a limited volume of space, there is no gravitational field, and relative to such a reference frame the velocity of light is equal to c…. If gravitational fields are present the velocities of either material bodies or of light can assume any numerical value depending on the strength of the gravitational field. If one considers the rotating roundabout as being at rest, the centrifugal gravitational field assumes enormous values at large distances, and it is consistent with the theory of General Relativity for the velocities of distant bodies to exceed 3 × 10^8 m/sec under these conditions" (*An Introduction to the Theory of Relativity*, William Geraint Vaughn Rosser, 1964, p. 460. Rosser was the senior lecturer in Physics at Exeter University.)

So, Carter/Sarfati are stuck with the fact that their own theory allows both the stars to exceed the speed of light in their rotation around a fixed Earth, and for the speed of light to exceed *c*.

Special Relativity has no say in this issue, so it is specious for Carter/Sarfati to refer to it, at any time, in their attempts to refute geocentrism. But since the claim that "nothing can go faster than the speed of light" has been engrained in the human psyche, scientist and layman alike use it with abandon but don't know what they are talking about.

Here is another section in which we answered a similar challenge by **Carter:**

Carter/Sarfati: The speed of objects in the universe

If objects are rotating around the earth, we can calculate the speed at which they are moving, and the speed depends on their distance. They must travel the circumference of their orbit every day. In big bang theory at least, there is nothing preventing stars from moving faster than the speed of light. This is called 'superluminal speed' and big bang cosmologists assume that anything outside one Hubble radius (about 14 billion light years) is receding from us at greater than c.

R. Sungenis: Notice how conveniently Carter/Sarfati allow themselves to exceed the speed of light for their geokinetic model, yet they give us not the slightest scientific justification for it, other than the fact that "big bang cosmologists assume that anything outside one Hubble radius (about 14 billion light years) is receding from us at greater than *c*." This isn't science. This is mere wishful thinking. Ironically, Carter/Sarfati won't allow the universe to rotate beyond *c*, but they will surely allow the universe to expand beyond *c*. What's the difference? There is none, but Carter/Sarfati don't tell their audience that simple fact.

What Carter/Sarfati don't tell you is that the only reason the Big Bangers allow for "superluminal speed" is because GRT allows them to. But GRT also allows for the universe to rotate at superluminal speed, as noted above. So, in effect, Carter/Sarfati are being honest scientists, since they are not admitting the logical conclusion of their own theory for geocentrism.

Carter/Sarfati: But in a geocentric universe any object beyond the orbit of Neptune would be moving faster than c, because it would take more than one day to travel a circle of that circumference at the speed of light.

R. Sungenis: So, as Carter/Sarfati continue to use the "speed of light" canard, let's examine this claim on the face of it. Is any object in the geocentric universe beyond Neptune traveling faster than light? No. In the geocentric universe, the universe is rotating and carrying everything else with it. The planets have local movement only.

If Carter/Sarfati want to argue that the universe can't spin that fast, on what basis could they make such a claim? They surely can't make it using GRT. They surely can't make it on a Newtonian basis, since Newton claimed there was Absolute Space against which he could calculate his famous F = ma, but against what are Carter/Sarfati going to measure the rotation

of the universe? Is there an Absolute Space outside the universe? So Carter/Sarfati are stuck. They have no way to disprove a daily rotating universe.

But, if all things are equal, and since we claim to use the Earth as the center of mass for a rotating universe, let's show Carter/Sarfati how we would use Newton's laws to balance out the centripetal and centrifugal forces for the objects inside a rotating universe. Here is how we do it (and notice that the math is not complicated at all).

First, let's give ourselves a picture of the inertial forces involved in a geocentric model. They are the centrifugal force, the Coriolis force and the Euler force. Remember that in the solar system model of the Newtonian physics, these three forces are "fictitious," but in the geocentric model that incorporates the whole universe, the three forces are real. All together they would work geometrically in the geocentric system as follows:
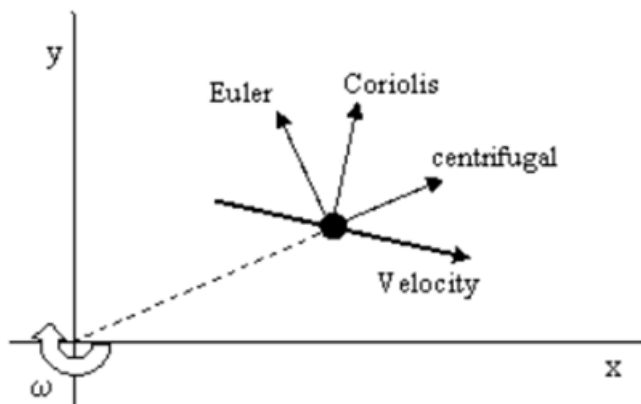
One can see from the Wikipedia article on Coriolis force (https://en.wikipedia.org/wiki/Coriolis_force) about half way down the page this statement:

"It is seen that the Coriolis acceleration not only cancels the centrifugal acceleration, but together they provide a net 'centripetal', radially inward component of acceleration (that is, directed toward the center of rotation)"

This is all we really need to show that Newton supports geocentrism. The "centripetal" force (i.e., that force which pulls the rotating object toward the center of mass) created by the three inertial forces is enough to counteract the outward pull of the object. The math works as follows:

It's a good thing we caught this Wikipedia treatment before someone took it off. Why would they take it off? Not because it's wrong, but because it's too right! Someone didn't want you to see that if they applied the math to the "distant stars" we would see that in the Newtonian framework there is no problem for a geocentric universe. I don't think Carter/Sarfati want you to see this math either, which is proven by the fact that Carter doesn't even allude to it in this paper, much less show you how it can be applied.

As for Carter's allegation that we did not answer the "speed of the moon" issue, we did answer it. Here is the dialogue:

Carter/Sarfati: Here is another example of the speed problem: the moon orbits the earth at about 1 km/s, with an average distance from the center of the earth of 385,000 km (this is based on simple trigonometry). In a geocentric universe, instead of orbiting every 27.32 days, it orbits daily, meaning it must move about 27 km/s. This is much faster than the Apollo spacecraft sent to the Moon in the 1970s. In fact, it is faster than the 11.2 km/s required to reach escape velocity. The Moon should sail away into space, but it does not because it is not orbiting at that speed and is held nicely in place by the force of gravity.

R. Sungenis: Again, the moon does not move at 27km/s in the geocentric system, since it is the universe that is rotating around the Earth and carrying all the celestial bodies with it. The moon is moving slightly independently of the universe (by 1km/s) as also the sun is moving slightly independently.

Speaking of "avoiding" one's opponent's objection, Carter did a good job of that himself when he failed to address the arguments of Assis and Popov showing the Newtonian mathematics that changes Newton's fictitious forces into real forces that operate in a geocentric universe.

8. **Carter:** Our "Oddly Wiggling Universe" section got a lot of attention. Point of fact: the rate of rotation of the earth changes over time. Sometimes the change is abrupt (e.g., after a strong earthquake), sometimes it is slow but reversible (due to various combinations of different orbital parameters interacting with the unequal mass distribution within the earth), and sometimes it is slow and irreversible (i.e., as a result of **tidal friction from the moon**):

R. Sungenis: This is false. If Mr. Carter believes it to be true, I challenge him to show proof that the relative rotation between Earth and the universe has changed to any significant amount from 23 hours, 56 minutes and 4.1 seconds. The rotations of the planets have changed quite appreciably. For example, Venus has changed its by almost 6 minutes. If that were the case on Earth, life would be over as we know it. As I said to Mr. Carter in my previous critique:

> **R. Sungenis**: The rotation between Earth and space does not vary at all. The rate of 23 hours, 56 minutes and 4.1 seconds has not really changed (more on this later). But it should vary if the Earth is rotating. Considering all the earthquakes, tsunamis, volcanoes, meteor showers, planetary perturbations, cosmic winds, tidal friction, etc. that have occurred over thousands of years, the inertial effects of these phenomena should have slowed the Earth's rotation significantly. As for the moon, it will slow down and move farther away because it moves independently of the sun and universe, but a moon movement does not mean the Earth is moving.

> **Carter/Sarfati:** There is another, perhaps stronger, point to make: geokinetics is the best way to understand the physics. The equations of motion are the simplest for the particles that orbit in a center-of-mass system and when the center is used as the origin in the co-ordinate frame. Science thrives on making predictions, and Newton's three Laws of Motion and theory of gravity (with Einstein's further refinements) are one of the most amazing predictive engines in history.

> **R. Sungenis**: Geokinetics is not the best way to understand the physics. In fact, the geocentric system makes more sense. For example, in the geokinetic system, the Earth has to rotate exactly 23 hours, 56 minutes and 4.1 seconds to keep sidereal time. How can it do so when so many inertial forces (e.g., earthquakes, tsunamis, volcanoes, etc.) are impeding its rotation? Venus, which does rotate, has slowed its rate by 6 minutes in the last few years.

> Likewise, in the geokinetic system, the Earth has to revolve around the sun exactly in 365.25 days. How does it do so in the face of the inertial forces it undergoes internally, as well as the cosmic forces and planetary perturbations it incurs externally? Geocentrism has a much better explanation. The sidereal rate can stay exactly as it is due to the tremendous momentum that a massive rotating universe will produce. Like a giant flywheel, the universe keeps turning at the same rate year after year, and nothing is able to slow it down. (Later we will address the claims that the Earth has slowed its rotation). As for Newton and Einstein, geocentrism can use both a rotating Earth in a fixed universe or a fixed Earth in a rotating universe, if desired, since all we need to do is invert the equations, as Einstein himself did.

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Here is another dialogue from the previous critique of Carter that I did:

R. Sungenis: As I noted earlier, there is no appreciable change in the relative rotation between space and Earth. It is always 23 hours, 56 minutes and 4.1 seconds. This is precisely why the geocentric system is more stable for us earthlings, whereas Venus has changed its rotation by 6 minutes over the years it has been studied.

Invariably, when major earthquakes or tsunamis occur we are inundated with newspaper articles declaring that the Earth, as a result of the force coming from these catastrophes, was slowed in its rotation rate and/or its axis moved. The rotation rate is said to decrease by microseconds and the axial tilt by inches. The 2011 tsunami that hit Japan produced numerous articles. This one is from the *New York Times*:

The magnitude-8.9 earthquake that struck northern Japan on Friday not only violently shook the ground and generated a devastating tsunami, it also moved the coastline and changed the balance of the planet.

...Meanwhile, NASA scientists calculated that the redistribution of mass by the earthquake might have shortened the day by a couple of millionths of a second and tilted the Earth's axis slightly. On a larger scale, the unbuckling and shifting moved the planet's mass, on average, closer to its center, and just as a figure skater who spins faster when drawing the arms closer, the Earth's rotation speeds up. Richard S. Gross, a scientist at NASA's Jet Propulsion Laboratory, calculated that the length of the day was shortened by 1.8 millionths of a second.

The earthquake also shifted the so-called figure axis of the Earth, which is the axis that the Earth's mass is balanced around. Dr. Gross said his calculations indicated a shift of 6.5 inches in where the figure axis intersects the surface of the planet. That figure axis is near, but does not quite align with, the rotational axis that the Earth spins around.

Earlier great earthquakes also changed the axis and shortened the day. The magnitude-8.8 earthquake in Chile last year shortened the day by 1.26 millionths of a second and moved the axis by about three inches, while the Sumatra earthquake in 2004 shortened the day by 6.8 millionths of a second, Dr. Gross said.[13]

From the Jet Propulsion Laboratory report, Gross and Chao added more:

Dr. Richard Gross of NASA's Jet Propulsion Laboratory, Pasadena, Calif., and Dr. Benjamin Fong Chao, of NASA's Goddard Space Flight Center, Greenbelt, Md., said all earthquakes have some affect on Earth's rotation. It's just they are usually barely noticeable.

"Any worldly event that involves the movement of mass affects the Earth's rotation, from seasonal weather down to driving a car," Chao said. Gross and Chao have been routinely

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[13] "Quake Moves Japan Closer to U.S. and Alters Earth's Spin," Kenneth Chang, March 13, 2011: http://www.nytimes.com/2011/03/14/world/asia/14seismic .html.

calculating earthquakes' effects in changing the Earth's rotation in both length-of-day as well as changes in Earth's gravitational field. They also study changes in polar motion that is shifting the North Pole. The "mean North pole" was shifted by about 2.5 centimeters (1 inch) in the direction of 145 degrees East Longitude. This shift east is continuing a long-term seismic trend identified in previous studies.[14]

All of this sounds very technical and convincing, but we shall go through it line by line to determine its validity. First, if we add up all the earthquakes occurring on an annual basis, there are on average 1,450,000 per year. About 90% are in the 2 – 2.9 Rictor scale range; about 9% in the 3 to 3.9 range; and the rest between the 4 to 9.[15] Let's say for the sake of argument about 25,000 significant earthquakes occur per year that affect the Earth's rotation and figure axis the way Dr. Gross claims. Let's say we take the estimates back 10,000 years to 8000 BC. That means 250 million noticeable earthquakes occurred since 8000 BC. Let's also assume, based on present data, that Earth's rotation changes by 0.5 microseconds for significant earthquakes. This means the Earth would have changed its rotation by 125 seconds or 2.08 minutes since 8000 BC. If we go beyond 8000 BC to 108,000 BC, we now have the rotation of the Earth decreased by 20.8 minutes, which yields a rotation of 23 hours, 36.2 minutes. If we use 1 million years, it lessens the rotation by about 200 minutes. If 10 million: 2000 minutes. If 100 million: 20,000 minutes. If 200 million, then 40,000 minutes, which means the Earth would have been rotating in about 12 hours. Anything beyond 86,400 minutes, the Earth will rotate once every second or less. If we use 4.5 billion years (which is the time modern science says the Earth has been in existence), the Earth would be spinning about 10 times every second.

It matters little if we change the 25,000 earthquakes to 15,000; or the 0.5 microseconds to 0.25 microseconds. Over time the Earth's rotation will be dramatically affected, which includes only earthquakes. There are hundreds of aftershocks, tsunamis, atomic and high-powered explosions, hurricanes, tornados, and, as Dr. Chao of NASA said, anything "from seasonal weather down to driving a car" will affect the rotation rate. If we add up all those little forces over thousands of years, the heliocentric system has a very fragile Earth that is easily knocked out of whack and couldn't possibly sustain life.

We can escape this frightening scenario by considering some very important facts. First, most of the so-called changes in the Earth's rotation and figure axis are not actually measured with a yardstick, as it were. Rather, modern geology presumes that the changes in rotation and orientation occur, of necessity, from Newton's laws of motion for a rotating object. In principle, scientists believe that the changes in the Earth's rotation are as calculable as the ice skater who, in a pirouette twirl, suddenly draws in her arms and begins to spin faster. All one needs to do to calculate the effect of the earthquake on Earth's rotation is to plug in the numbers of the mass of the Earth; the force of the earthquake; the velocity of rotation, *etc.*,

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[14] http://www.jpl.nasa.gov/news/news.cfm?release=2005-009
[15] http://earthquake.usgs.gov/earthquakes/eqarchives/year/eqstats.php

into Newton's equations and it will show how much the Earth must change its rotation and axis in order to make the equation balance. Scientists then report this calculated change as a *real* change and a newspaper article is written declaring that the Earth has changed its rotation rate and its axis has shifted. The reality is, the conclusions were made on paper with equations, not by field research and measuring.

Second, although there is a purported method by which scientists could measure changes in Earth's rotation, the method is flawed and presumes the Earth is rotating before it interprets the data. The method commonly used is VLBI or Very Long Baseline Interferometry.[16] In brief, two interferometers (an instrument that can detect slight phase shifts in the wavelengths of light) are placed on either side of the Earth, which would make them 8000 miles apart. Light from a distant stellar object is absorbed by each interferometer, usually waves from a quasar or radio source galaxy. If there is any difference in the phases of the waves between the two interferometers, this means that something has moved. Either the source has moved, the Earth has moved, or even the radiation itself has moved. But because VLBI is commonly used by NASA and JPL under the assumption that the Earth is rotating, they find it perfectly justifiable to obtain the VLBI measurement from only one stellar source. Hence, if there is a difference in how the single stellar source is received by the two interferometers, it is then assumed the difference is because the Earth's rotation changed, not because the source had moved. Essentially, the way in which NASA or JPL have set up the VLBI, they can have no means of determining whether the movement was due to the Earth or the source. This flaw is especially significant since it is already known that stars, quasars and galaxies have "proper motion," that is, each of them have slight independent motion with respect to other stars. In fact, the proper motion of some objects is even greater than their parallax motion.[17] They also have independent "long-term drift motion."[18] Both of these could very easily show up as a phase shift in a VLBI measurement. Consequently, it is absolutely necessary to distinguish whether the phase shift is caused by the source's motion or caused by a modified rotation of the Earth. The only way NASA or JPL could distinguish between the two is for them to allow the VLBI to absorb radiation from at least three sources, if not more. If it is found that all the other sources are moving in the same precise way as the original source, then there is evidence that the Earth is rotating. Without this methodology, all VLBI measurements are invalid to prove whether the Earth is rotating.

Another problem for VLBI measurements is that they are performed using radio wavelengths. These are very long wavelengths compared to X-rays or gamma rays. Longer wavelengths create poor resolution. Hence, what may look like a phase shift in VLBI may, indeed, be only a false reading due to poor resolution.

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[16] See following article at Wikipedia for brief summary: http://en.wikipedia .org/wiki /Very_Long_Baseline_Interferometry.

[17] http://en.wikipedia.org/wiki/Proper_motion. Proper motion was suspected by early astronomers but proof was provided in 1718 by Edmund Halley, who noticed that Sirius, Arcturus and Aldebaran were over half a degree away from the positions charted by the Greek astronomer Hipparchus 1850 years earlier.

[18] http://en.wikipedia.org/wiki/Stellar_drift.

All in all, we must look in retrospect at this issue. Not only is there no proof from the VLBI that the Earth is rotating, recorded history has shown that there is no evidence of any appreciable difference between solar time and sidereal time. If the theory were correct that the Earth changes its rotation rate every time there is a cataclysmic disturbance on its surface, we would have seen the difference over time. Moreover, we would have seen the effects in the weather, the jet stream, biological rhythms, and just about anything that is dependent on the precision of a sidereal day.

Conversely, the geocentric cosmos has a very stable system that keeps the sidereal clock from changing. There is no fragile Earth that changes its rate for every bump it encounters. Rather, the geocentric cosmos incorporates a whole universe that is rotating around the Earth. Due to the extreme mass of the universe, the tremendous inertia with which it completes its sidereal cycle can neither be increased or decreased. Like a giant flywheel, once pushed the geocentric universe will continue to rotate evenly, *ad infinitum*. In fact, to move the Earth from its fixed position, one would have to move the universe itself. Due to the dense constitution of the universe, the force of any potential axis-changing or rotation-changing disturbance on Earth (*e.g.*, earthquakes) will be transferred and spread out to the entire universe. As such, the force dissipates so much that it has less of an effect than throwing a small stone into the ocean.

M. Selbrede: I still don't understand why Carter keeps omitting the general relativity explanation for these effects (effects which we will *arguendo* assume to be real, thereby examining the question from a different perspective than Robert Sungenis has done above). According to general relativity, the Earth can be taken at rest and the universe can rotate around it, and all the physics, the dynamics, must work out due to general covariance. If I lift a shovel full of dirt a couple of feet off the ground with a spinning Earth, conservation of angular momentum requires the spin rate to slow down because the Earth's moment of inertia has increased. If I do the same thing with a stationary Earth and spinning cosmos, the spin rate of the cosmos must change in the precise same way by my lifting that shovel full of dirt. If it does not, Einstein was completely wrong about his most crucial point: general covariance has failed, and his field equations are garbage! Moreover, when I drop the dirt back to the ground, the cosmos must accelerate – all of it, and all at once (albeit ever so infinitesimally). If it does not, throw out Einstein: the arrows being fired at geocentricity keep striking him first.

Now, Robert Sungenis has made use of the heuristic device of a rotating platform earlier in this response, and if used judiciously and not pushed beyond the limited power of analogies, there is some merit in the idea. But it was thought until recently that such a platform cannot change its global rotation rate instantaneously, because it lacked Born rigidity. This limitation, as Grøn himself noted, was actually in error:

> Grünbaum and Janis [117] have considered a disk put into rotation in such a way that the radius contracts and no tangential stresses appear. This means that the rest length of tangential mass elements remains unchanged during the period of angular acceleration. At first moment one might think that this is not possible. Due to the relativity of simultaneity the special theory of relativity forbids, in the case of rotating motion with constant radius, to increase the angular

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velocity of a rotating disk in a Born rigid way. Hence, tangential stresses will appear, and the rest length of the periphery changes. There was a discussion of this in *Foundations of Physics* [118, 119] and it became clear that the type of motion considered by Grünbaum and Janis is indeed permitted by the theory of relativity. (Øyvind Grøn, "Space geometry in rotating reference frames: A historical appraisal," p. 43 of draft published at http://digilander.libero.it/solciclos/, published in 2002 or later based on endnote 4)

Grøn concludes this discussion by approvingly citing G. Ziino's 1996 interpretation of this result (we'll unpack the meaning momentarily, as these citations are fairly technical):

> The result is that a disk of *whatever* (original) radius *r* might be brought to spin with an *arbitrarily great* uniform angular velocity ω: its shape should not undergo any distortion with spinning . . . (ibid, p. 45).

The idea of "an *arbitrarily great"* speed of rotation, *without limitation*, is asserted in parallel language earlier in the same paragraph, where Ziino discusses a "radial co-ordinate that may *naturally run to infinity,* with no need for values greater than c/ω to be ruled out." Which is to say, the rotational speed has no limit: it can include tangential speeds many times faster than light without "breaking" the physics. And as Grøn noted, the entire system can instantaneously change its angular velocity.

Whether the notional "rotating platform" is represented by an ultradense subquantum aether or not is beyond the scope of these replies (but evidence for this was presented in the paper that Carter pulled his Grøn & Eriksen citation from, so there's presumably been exposure to the literature on this point). We simply need to realize that relativity permits immediate global changes in rotation rate to such a system even if its outer portions are moving at vast superluminal tangential speeds. Such a system can slow down or speed up *as a rigid unit*, earlier prejudices (now disproven as Grøn shows) notwithstanding.

We could with justice leave the discussion there: GR requires general covariance, the "changed rotation rate of the Earth" is dynamically equivalent to the "changed rotation rate of the cosmos" in the geocentric frame, the two systems must be indistinguishable from one another or relativity confronts a preferred frame and is slain on the spot as a valid description of nature. Reciprocity is demanded by the Einstein paradigm. To disparage reciprocity is to condemn Einstein's reasoning.

Nonetheless, there are reasons to think that the mechanics driving a change in the cosmic rotation rate (which we've *arguendo* presupposed) can be developed beyond the dictates of relativity theory. Recall that in an earlier Bondi citation above, reference was made to an unchanging inner shell and the impossibility of angular momentum transferring to that shell from the outer rotating shell of distant masses. Note the term "unchanging" in that sentence – this is precisely the point at issue: what happens when configurational changes in the Earth occur (ranging from earthquakes to lifting up a shovel full of dirt)? More interestingly, what is the proper radius to use for the rotating cosmos? Grøn's citation of Grünbaum, Janis, and Ziino above suggests two different operative radius values: the massive conventional Euclidean scale and a vastly contracted radius compliant with relativistic requirements. Perhaps the various objections to a changing cosmic rotation rate are premised on using the wrong

radius: the relativistically adjusted radius might well deliver effects proportionate to various alleged experimental results (further reinforcing reciprocity). Such investigations are ongoing and indicate that the last word has yet to be uttered on these matters, whether or not relativity is the correct paradigm to work within.

1. **Carter:** Things in the universe are only connected *though gravity*. They are not connected by anything stronger (hence, stellar objects can display local motion), or faster, than that. Since there is no reason to expect galaxies to change their orbital period in synchrony when they are not firmly held in place with respect to one another, it must be the earth that is changing. But even if they are fixed in place with respect to one another, nothing should be able to change the rate of rotation of something as massive as a spinning universe.

   R. Sungenis: Precisely correct, which is why the sidereal rate has never really changed. This means that the geocentric universe is the most stable universe, and now Carter knows why.

2. **Carter:** The fact that the universe appears to change its rate of rotation when an earthquake occurs (sadly, this is yet another scientific datum many of them reject) indicates that it is the *earth* that is changing its rate of rotation, not all the other things in the universe. For some reason, one of the replies to our article went into a lengthy discussion of how earthquakes would slow down the rotation of the earth and that author back calculated to show unsustainable levels millions of years ago. The problem with this is 1) earthquakes don't always *slow* the earth, 2) the moon also has a measurable and usually larger effect, and 3) we do not believe the earth is millions of years old.

   R. Sungenis: So it looks like Carter can't make up his mind whether earthquakes slow the momentum or not. Also, it doesn't matter that Carter doesn't believe in an Earth that is millions of years old, since if we added up all the earthquakes, moon perturbations and every other inertial force directed against a rotating Earth over the last six thousand years, or even the last millennium, the Earth's rotation would have changed considerably, but it hasn't. The relative rotation between Earth and space is still 23 hours, 56 minutes and 4.1 seconds.

3. **Carter:** They criticized us, saying that the heliocentric system is easily knocked out of whack. No, the earth and other planets are large and massive objects and the dynamic forces keep them in nice, tight orbits. Is this sustainable for thousands of years? Yes. Millions? Quite likely. Billions? Maybe not. But so what? It only has to be stable from the beginning until today.

   R. Sungenis: So, once again, Mr. Carter wants his cake and eat it, too. He first claimed that earthquakes significantly affect a rotating Earth, and now he tells us that the Earth is massive and unaffected. He then switches to a revolving Earth and claims that because it is so massive, it maintains a tight orbit. So, in one scenario, the "dynamic forces" can cause a slowing of the rotation, but then the same "dynamic forces" allow for undisturbed revolutions.

4. **Carter:** Robert Sungenis argued that there is no evidence of any change in sidereal time. But the differences are so small as nobody would have noticed before we invented instruments accurate enough to measure them.

R. Sungenis: As I noted above, the "instruments" invented to detect such a movement (VLBI) are flawed. And whatever they are detecting is so small (in microns of seconds), that it is not significant to be considered a change. In fact, the microns of seconds shift back and forth each year between positive and negative, but they never change the fundamental value of 23 hours, 56 minutes and 4.1 seconds. If Mr. Cater can find a difference, say, to 23 hours, 56 minutes and **5.1 seconds**, then he has something to talk about, but there never has been any such change, not even close.

5. **Carter:** Sungenis also argued, "Moreover, we would have seen the effects in the weather, the jet stream, biological rhythms, and just about anything that is dependent on the precision of a sidereal day." No, these things are not dependent on rhythms being accurate to less than one part in one million.

R. Sungenis: So Carter just proved my point, since a change in the sidereal rate much greater than "one part in one million" would thus affect biological rhythms, and it is precisely a change much greater than one part per million that would be required for Carter to claim that there is any significant change in the sidereal rate. But there is no such change in the sidereal rate.

9. **Carter:** Problems with the length of the year and day
1. Several wondered how the earth could maintain a precise annual orbital period in light of internal inertial forces, cosmic forces, and planetary perturbations. Our answer is simple: Newton. One triumph of **Newton, a biblical creationist**, was that his laws of motion and gravity (along with his co-invention, calculus) could straightforwardly explain in a dynamic model the kinematic three laws of planetary motion discovered by his fellow creationist, **Kepler**. There's no magic here. The relevant factors are reasonable and measureable.

R. Sungenis: Is that why Newton couldn't explain the perihelion of Mercury? Is that why Newton can't explain the rotation curve of spiral galaxies? Is that why Newton has to depend on fictitious forces? The fact is, Newton didn't tell us how gravity or inertial forces worked. He simply stumbled on to an equation that showed the rate at which these forces operated. Mr. Carter is doing the same thing here that he did when he tried to explain why planets keep going around the sun. His answer was "Newton's First Law of Motion," which says that a body in motion remains in motion unless affected by a net external force. But this isn't an explanation. It is only an observation that was made into a "law." It doesn't tell us WHY the planet keeps moving.

M. Selbrede: In the article Carter cited, the Cavendish torsion balance experiment conducted by Long in 1970 was referenced, an experiment that showed a systematic 0.37% error in measuring the gravitational constant, G. This is a huge error, and as noted in the cited article, neither Newtonian nor Einsteinian gravitational theory can explain it or provide the correct value for G (notwithstanding

Carter's concluding comments below that his model provides "a better explanation of the facts. It satisfies multiple criteria as faithful science."

However, a competing gravitational theory currently championed by geocentrists delivers the correct values for the Long experiment. Given where Carter had mined his citation from Grøn & Eriksen from, it is hard to understand how this experimental data was set aside and omitted from his polemics (and it was but one of many documented anomalies ill-served by Newton and Einstein). If our interest is in "faithful science," then let's put all the data on the table. If it's to promote hagiographies of various individual scientists (which strikes me as cherry-picking of a different order), then it isn't seemly to wear the robe of full and faithful disclosure. (I also personally believe that Christian scientists should avoid poisoning the well against pending rebuttals, as this politicizes human inquiry in an improper way, but these exchanges are still struggling to reach that noble goal.)

2. **Carter:** Sungenis threw out this gem: "Venus has changed its rotation by 6 minutes over the years it has been studied." He said the same thing when writing against another young-earth geokinetics supporter as well. The reader should note that *the orbital period of Venus has not changed*, only the length of the day (over a 16-year time frame, and assuming the first measurements were accurate). First, he is attempting a bait-and-switch to catch the unaware who might think he is talking about the orbital period.

   R. Sungenis: I made it very clear to both Carter and everyone else I was talking about rotation, not orbit. What in the word "rotation" does Carter not understand? The only one who is making a "bait and switch" is Carter.

3. **Carter:** Second, most scientists think the thick cloud layer and massive storm systems are causing the rate of rotation to slow. If physical explanations can tell us why the length of a Venusian day can change, why is it impossible for the length of a day on earth to change?

   R. Sungenis: Lame. The Earth has a comparable cloud layer and storms, but there is no change in its sidereal rate. Even if the Earth's cloud layer and storms were one-sixth of Venus', we would expect a one-sixth change of Venus' rotation, or about 1 minute, and thus, comparably, we would have a sidereal rate of 23 hours, **55 minutes** and 4.1 seconds instead of 23 hours, 56 minutes and 4.1 seconds. Let's go farther. If the Earth's cloud layer and storms were one-sixtieth of the Venusian's, we would see a change of our sidereal rate to 23 hours, 56 minutes and **4.0 seconds**, but we don't see anything even close to this. So the "cloud layer and storms" of Carter is just another red herring.

4. **Carter:** Actually, part of the known day-length variation of the earth is due to seasonally-changing wind patterns across the surface of the earth. This means that in a geocentric universe the slight, measurable variations in the rotation of the heavens must be correlated with seasonal wind patterns on earth. It is *quite strange* that the two would be related.

   R. Sungenis: Again, there are no appreciable changes in the sidereal rate, and Carter hasn't presented what amount of sidereal changes he is depending upon. There are comparable "wind patterns" on

Venus and obviously those patterns have served to lessen Venus' rotation rate significantly, and it has done so within the last few decades, not over thousands of years! But we see no such changes in the sidereal rate between Earth and space. Not even close. In effect, Carter has buried himself even farther in the mud.

5. **Carter:** The earth's axial tilt changes over time, the eccentricity of its orbit changes over time, and the plane of its orbit tilts up and down over time. These are all cases of *precession*, and are easily explained by Newtonian physics. If the earth does not move, this means the entire universe is wobbling as it turns. And, since these changes are explainable based on the changing positions of Jupiter and Saturn (the main gravitational sources that matter here), the geocentrist has now to explain why the universe wobbles depending on the relative locations of the two largest planets near the center of that universe.

R. Sungenis: This goes right back to the earlier discussion concerning what the universe is rotating around (i.e., its center of mass) as opposed to its geometric center (i.e., the sun). The 1AU difference between the Earth and the sun will necessarily create a slight wobble in the universe, which accounts for the precessions we see, and we use the same "Newtonian physics" to account for that precession as Carter does for his heliocentric system.

6. **Carter:** There is one more thing to consider: the analemma. You may have seen a strange figure-eight shape on a globe or map? That represents the position of the sun at noon throughout the year. It is easy enough to explain why the height of the sun at noon changes, but why does it also appear slightly earlier and slightly later over the course of a year? The reason for this is that the earth moves through the heavens faster when it is closer to the sun. Thus, the sun appears later than it should during summer in the Northern Hemisphere and earlier than it should during the Northern Hemisphere winter. Also, the stars move through the heavens faster or slower depending on the season. We have known about this since Edmond Halley first noticed it in 1695. In the geokinetic model, it is easy to understand why this happens, and we have been able to explain why since 1609, when Kepler's second law was published. But, as in so many other examples, there is no reason for this in the geocentric model. Oh, they'll come up with a reason, *post hoc*, but it will be no more valid a reason than the way long-period comets find their amazing power of acceleration and deceleration. In this case, they are going to have to explain why the entire universe changes its rate of rotation over time based on the distance of the earth to the sun.

R. Sungenis: This just shows us Carter has not consulted the geocentric explanation of the analemma before he made his accusation. If he had, he would not have said, "they'll come up with a reason."

Analemma comes from the Greek word ἀνάλημμα meaning "pedestal of a sundial." It appears in time-lapse photography of the sun's yearly position when photographed from the same location and time at various days during the year. These composite pictures were taken in the northern hemisphere at 45 degrees latitude. Of the three position marked, #1 represents the northern solstice about June 21; #2 represents the time near the Vernal and Autumnal equinoxes (March 21 and September 21); and #3 represents the southern solstice about December 21.

The analemma changes its orientation and shape depending on where it is photographed on the Earth. For example, at the North Pole the analemma would be vertical but with only the small loop of the top half visible. At the equator, the analemma is seen with both loops and directly overhead but in a horizontal position. At the South Pole, the analemma would again be vertical but upside down, with only the large loop visible. These differences are due to how much of the sun can be seen at various locales on the Earth and from which angle the sun is viewed.

We see something similar on a daily basis with geosynchronous satellites.[19] We can use these daily satellite movements since, in certain respects, the yearly is the daily multiplied by 365 days. Depending on how close to the equator and the initial incline of their trajectory, satellites will produce different ground trackings as observed from Earth. This is due to the fact that the satellite, depending on its initial location and speed, will react against the gravitational and inertial forces in space (whether we use the heliocentric or geocentric system). Note the three different satellite ground trackings in the following sample:

Marisat 3 produces the characteristic figure-8. This is because Marisat 3 is both on an incline and moves in an elliptical orbit. Inmarsat F-32 has no incline and travels in a circle, thus producing the orange dot on the equator. Brasilsat-1 is at an incline and is farther out from Earth than Marisat 3, thus producing the zig-zag line instead of the figure-8. The sun can also be considered a satellite. It has an inclined orbit over a year of 23.5 degrees, which will produce the typical figure-8 pattern. Since it also has either an elliptical orbit and/or travels faster in one part of its orbit than another, this will produce the larger lower loop in the figure-8.
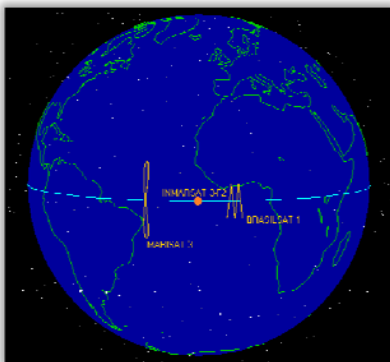
Both the heliocentric and geocentric systems can explain the analemma. Three factors determine the size and shape of the analemma: obliquity, eccentricity, and the angle between the apse line and the line of solstices. In the heliocentric system, if the Earth had a perfectly circular orbit and no axial tilt, the Sun would always appear at the same point in the sky at the same time of day throughout the year and

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[19] Geosynchronous refers to a satellite with a 24-hour period, regardless of inclination. Geostationary refers to a satellite with a 24-hour period, in a near-circular orbit, with an inclination of approximately zero. It appears to hover over a spot on the equator as shown by Inmarsat F-32. All geostationary orbits must be geosynchronous, but not all geosynchronous orbits are geostationary. An example of a geosynchronous but non-geostationary satellite would be the Marsat 3 with about a 30° inclination. The ground trace will retrace itself with every orbit, in this case in a figure-8 pattern. The ground trace will also vary between 30° north and 30° south latitude due to its 30° inclination. If the geostationary satellite has an eccentricity near zero and an inclination of 60°, the ground trace would follow a similar, larger figure-8 path between 60° north and 60° south latitude.

the analemma would be a dot. If the Earth had a circular orbit and a significant axial tilt, the analemma would be a figure-eight shape with northern and southern lobes equal in size. If the Earth had an elliptical orbit but no axial tilt, the analemma would be a straight line along the celestial equator.

In the geocentric system, the same principle holds true, but instead of the Earth determining the size and shape of the analemma, it is the movement of the plane of the satellite, which movement is a product of the rotating universe. The shape of the analemma will depend on the degree of declination with which the satellite begins its orbit.[20]

7. **Carter:** There are other things that affect the length of a day. The moon's orbit is not perfectly circular, and the geometry of the earth is not perfectly round. This affects the length of a day. The earth is also not uniform on the inside. Changes in the magnetic field have been linked to changes in the length of a day. This means that things are wobbling around deep inside the earth. In the geocentric universe, these wobblings affect the rate of rotation of the entire universe? Remember, our clocks are accurate enough to measure these changes, and Newtonian mechanics gives us a valid reason for them.

R. Sungenis: No it doesn't affect the length of the day. Carter keeps referring to a change, but he has presented no chart showing such changes, nor does he admit that any of the slight changes in microns of seconds has averaged out to the same sidereal rate of 23 hours, 56 minutes and 4.1 seconds. He only buried himself farther in the mud earlier by admitting that Venus' rotation changes significantly due to earthquakes, cloud layers and storms, but the same occurrences on Earth do not change the sidereal rate of Earth.

10. **Carter:** Coriolis confusion: I coined the term 'spatial Coriolis' in that article and this seems to have caused confusion. I believe, however, that the confusion is intentional. The idea is simple enough. Objects leaving earth are starting with an inertial reference frame radically different from the one to which they are travelling. In a geocentric universe, space ships have to get *to* their destination, but they also have to accelerate to match the *speed* of their destination. We do not have the technology to accelerate objects to get to most places in the solar system in a geocentric universe. Rocket motors are simply unable to get things moving that fast. If ether causes drag, we would have to account for it in the amount of rocket fuel needed. No rocket scientist has ever had to factor into an equation of acceleration the dragging effects of ether, and we have sent things all over the solar system. And, if ether were causing drag, once a space probe was sent in a particular direction, it should gradually accelerate in the direction of universal movement. They do not.

R. Sungenis: There is no drag from the ether, therefore, the rockets will get to their destination with the same fuel as in Carter's heliocentric system. Unfortunately, Carter failed to address the geocentric system that has no ether drag, and that was the only thing that was "intentional."

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[20] This also answers the objection raised against the geocentric system in the video at http://www.youtube.com/watch?v=wyRJZbNmC7U.

But if there were an ether, then Carter has not won the argument, since his heliocentric system, when using F = ma, has ALREADY incorporated the ether, but without him knowing it.

Carter: So there you have it. If a person rejects a purely naturalistic origin of the universe, they still have to decide on how much science to accept. For us (strangely in common with leading evolutionists **Ernst Mayr** and**E.O. Wilson**), we draw the line between **operational science (how things work) and historical science (what happened in the past)**. Since the universe was created by God at a specific time in the recent past, it would be folly to take present processes and extrapolate them back to infinity. This is essentially what the evolutionist does. When they do so, however, they run into innumerable problems (we documented many of them in our powerful book and documentary ***Evolution's Achilles' Heels***).

R. Sungenis: Mr. Carter has not escaped the very problem with which he accuses the evolutionist, since if we trace the external forces from our own solar system and the universe upon an Earth that has never appreciably changed its sidereal rate in the 6000 years that it has existed, in comparison to Venus that has appreciably changed its rotation rate over the last few decades, then Carter has the same problem as the evolutionist.

Carter: Simply put, the universe resists such explanations because it was *created*. On the other hand, once that universe was set up by God, everything should work according to a set of laws, for the Universal Lawgiver would have created the universe commensurate with His divine attributes. His unchanging nature means we have a universe that can be understood through unchanging **scientific law** (and of course the occasional **miracle, an *addition* to natural law**).

R. Sungenis: Carter thinks he has God on his side, but anyone who arbitrarily switches from a literal hermeneutic when interpreting Genesis 1:21-31, to a figurative or semi-literal hermeneutic when interpreting Genesis 1:1-20; Joshua 10:10-14; Psalm 19:1-6, et al., doesn't have God on his side. God doesn't speak out of both sides of his mouth in the same grammatical context.

Additionally, Carter's "science" has been found to be grossly prejudiced, especially when he is called upon to use Newtonian mechanics and Einsteinian mechanics to support a system (geocentrism) that he doesn't like. This is the very reason Carter did not address the Machian/Newtonian physics (e.g., Assis and Popov, et al) that was presented to him, let alone the total ignoring of the fact that his very own belief in General Relativity allows for a geocentric universe. For the latter, Carter just fluffed it off by claiming that the geocentrist has no right to use Carter's own physics to disprove Carter's conclusions. In reality, it showed that, like the Emperor, Carter is walking around naked but thinking he is clothed.

Carter: The geocentrist goes too far in rejecting sound scientific theory and data. In the end, they are left with a universe that cannot be explained scientifically.

R. Sungenis: I have shown, by refuting every one of Carter's "scientific" arguments (and even the ones he claimed I did not answer, but did) that it is HIS science that can't answer the hard questions.

Carter: It is a mysterious universe that cannot be comprehended through direct observation and analysis, for what is true in one place cannot be true in another. Because of this, we want to encourage everyone to put on their thinking caps and realize that the geokinetic model is simply a better explanation of the facts. It satisfies multiple criteria as faithful science.

R. Sungenis: All I can say is, if this so-called scientific proof against geocentrism is the best that Carter can muster for his side of the fence, then he has just done geocentrism a very huge favor. We geocentrists have no better friend than presumptuous critics like Robert Carter since, one-by-one we can expose the inner workings of a 500 year old effort of modern man to turn the Bible into fables and figures rather than the very word of God that it is. That Carter and his colleagues have no shame in their dichotomous hermeneutic of Scripture is appalling. It was pointed out long ago by at least one faithful Protestant, Walter van der Kamp, but he got a deaf ear from the Protestant creationist who, led by Henry Morris in the 1960s, decided they didn't want to fight a war on two fronts (evolution and Copernicanism).

Additionally, while the Creationists have the courage to fight Darwin, they cow like school girls when it comes to Einstein. As such, it is quite obvious that Scripture is not their authority as much as Einstein is (and I include here Humphreys, Ross, and Hartnett, to name a few). But if they would only look deeper into the tenets of Einstein they would see that he doesn't help them as much as expose them, for it is the very theory of General Relativity that supports the very theory of geocentrism that they adamantly oppose. Perhaps that is why Carter never depends on the name of Albert Einstein in this present paper. Perhaps he is smart enough to realize that Einstein is, at best, neutral on the issue.

So Carter spends all his time praising Newton. But in this endeavor, he is not any better. Carter consistently failed to realize the inverse of Newton's theory, as well as failing to address those physicists who use the inverse of Newtonian mechanics to show that geocentrism works.

In the end, I expected much better of Carter. But alas, I have found once again that the best scholars the Creationists have to offer simply can't muster a convincing and credible scientific critique of geocentrism, much less do they offer any convincing and credible defense of their twisted interpretations of Genesis 1:1-20.

When I can find a Protestant creationist who is willing to say that the Earth came first, before the Light, and that the sun and stars were not created until the Fourth Day and not created on the First Day, then we have something to talk about.

Using Einstein, the Big Bang, or anything else they try to use to reverse this order is simply unacceptable. I wish Dr. Carter would try as hard with the science to support what the Bible says occurred in Genesis 1:1-20 as much as he tries to uncover every nook and cranny of what the Bible says against evolution. When he does, he can consider himself a true and faithful Biblicist, and a true man of God.

Robert Sungenis

Executive Producer: *The Principle* and *Journey to the Center of the Universe*
September 3, 2016

Carter's notes

1. His attempted rebuttal can be found here, but we advise the reader to exercise caution as we cannot vouch for the accuracy of all material on this website, and we disagree with much of it, nor can we guarantee how long this blog post will remain there: gwwdvd.com/2016/05/05/critique-of-the-2015-cartersarfati-paper-titled-why-the-universe-does-not-revolve-around-the-earth-refuting-absolute-geocentrism. Return to text.
2. Grøn, Ø, and Eriksen, E., Translational Inertial Dragging, *General Relativity and Gravitation* **21**(2):105–124, 1989. Sourced from geocentricity.com. Return to text.
3. Schwarzschild, K., Über das Gravitationsfeld eines Massenpunktes nach der Einsteinschen Theorie, *Sitzungsberichte der Königlich-Preussischen Akademie der Wissenschaften,* S. 189–196, 3 February 1916 [English: On the Gravitational Field of a Point-Mass, according to the Einsteinian Theory, *Proceedings of the Royal Prussian Academy of Sciences*]. Return to text.
4. $R_s = 2GM/c^2$. Return to text.

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- **Why the Universe does not revolve around the Earth**
- **Galileo Quadricentennial**
- **A geocentrist replies to 'Geocentrism and Creation'**
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Further Reading

- **Galileo, Geocentrism, and Joshua's Long Day Questions and Answers**
- **Astronomy and Astrophysics Questions and Answers**

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[i] http://en.wikipedia.org/wiki/Center_of_mass