The Anatomy of a Flying Saucer: Fundamental Equation With Applications

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Abstract

We derive a simple fundamental equation for a flying saucer. The equation is:

$$v/G = k\,M\,f\,a^2/r^2$$

where the v is the velocity of the craft, G the gravitational constant, M the negative gravitational mass, a the diameter of the rotating ring, f frequency of rotation, r the radius of the negative vector potential bubble, and k a constant of value 1 with units of m/kg. From the equation it is possible to deduce that:

1. inertia can be eliminated
2. the minimal size of possible for a saucer, in agreement with eye witnesses reports
3. explain the EM effect of car headlights and engines dying near UFOs
4. explain why UFOs do not cause sonic booms at supersonic speeds
5. and explain reports of levitation and loss of car control near a UFO. Our only non-standard assumption is that the saucer posses negative mass, an assumption which is NOT contrary to known physics principles

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1 Eliminating Inertia

Bondi (1) has show that the existence of negative gravitational mass does not violate general relativity. This conclusion has not been refuted.

Sciama in 1957 did the first calculation that showed that the total matter in the universe caused inertia (2). His calculation was non-relativistic. Einstein, although he never explicitly included Mach's Principle as part General Relativity, says on page 102 of *The Meaning of Relativity* that inertia was mediated by the time derivative of the vector potential **A**, that is, by gravity (3). In a recent paper entitled "On Mach's principle: Inertia as gravitation", a Spanish group did a fully relativistic analysis with linearized Einstein equations. They used the time derivative of the vector potential, $h_{0i,0}$, but also a small scalar counter term h_{00i}, retarded potentials, and included consideration of dark energy. They came within 10% of verifying **Mach's Principle**. Therefore the principle that gravitation causes inertia is well established.

Following Sciama (4) and Jefimenko (5,6) we have the vector potential

$$A = \frac{G}{c^2} \int \frac{\rho\, v}{r}\, dV \tag{1}$$

where ρ is the mass density and v its velocity. To find the vector potential created by the remote stars postulated by **Mach's principle**, Sciama carries out the integration over the mass distribution of the entire universe, assuming the universe to be receding with velocity -**v**. The v, being constant, comes out of the integral

$$A = \frac{v\, G}{c^2} \int \frac{\rho}{r}\, dV \tag{2}$$

with

$$\Phi = G \int \frac{\rho}{r}\, dV \tag{3}$$

We are left with

$$A = \frac{v\, \Phi}{c^2} \tag{4}$$

where Φ is the universal scalar gravitational potential. Sciama then changes coordinates and has the test particle move with **v** while the universe is stationary. The recent calculation (4) also uses this technique. We are going to interpret this equation to mean that the particle is subject to the **A** vector as it moves through the universes scalar potential.

Positive and negative masses repel each other through their fields, and the field has to be zero on the boundary. If a region of space existed around a gravitationally negative mass, the scalar potential would be negative and the **A** vector derived from this field would be anti-parallel to the velocity

$$A = \frac{-|\phi|\, v}{c^2} \tag{5}$$

as opposed to parallel, $A = \frac{\Phi\, v}{c^2}$.

This is to be expected as Φ and $\mathbf{A}$ form a four-vector in relativity

$$A_\mu = (A, \phi) \tag{6}$$

so if ϕ is negative, so is $\mathbf{A}$. These parallel conditions are mutually exclusive; you cannot have $\mathbf{A}$ parallel and ani-parallel to $\mathbf{v}$ at the same time. Therefore the positive and negative gravity spaces would have to be disjoint. A vector potential would tend toward zero as we approached the boundary of the negative gravitational space, become zero at the boundary, and then become negative (or anti-parallel) inside the negative gravitational space. The parallel $\mathbf{A(+)}$ vector could not exist in the negative gravitational space. Therefore the $\mathbf{A(+)}$ vector could not mediate inertia in the negative region.

This then provides the possibility of shielding from inertia. The possibility of shielding from inertia is derived from the corollary to **Mach's Principle**. If the "distant stars", that is, the universal scalar background potential, Φ, causes inertia, then the corollary is that in the in the absence of the effect of the "distant stars", or the effect of Φ, there is no inertia.

We see that as the disparity between the size of positive and negative masses increases, the field around the negative mass shrinks.

The problem is that any finite amount of negative mass, tons or even hundreds of tons, would have a gravity field that would be miniscule compared to the field of the astronomical quantities of gravitationally positive mass. The negative field would actually be confined to within the negative matter. There would not be a region of negative gravitational field in which to shield the UFO from the positive field generated by the universe that everything is usually immersed in.

If we look at the definition of $\mathbf{A}$, we see that there is a possible multiplier, the velocity $\mathbf{v}$.

$$\mathbf{A} = \int \frac{\rho \mathbf{v}}{r}\, dV \tag{7}$$

If we take a negative ring and spin it, we create a magnetic dipole $\mathbf{A}$ field. If we spin the ring faster and faster, over a million revolutions per second, we can get a finite field. Therefore we create a bubble in space of negative vector potential. If an object were to be within this bubble, it would be shielded from the positive vector potential arising out of the universe's background scalar potential. In other words, the object would be shielded from the fields that create inertia; therefore it would not be subject to inertia.

When we spin the mass, the mass is now within the bubble, and therefore has no inertia. Without inertia the inertial mass and moment of inertia of the spinning body are zero, and consequently there are no centrifugal forces to tear it apart. The possible rates of spin can be very high, the only limitation being that the rim velocity of the spinning body could not exceed the speed of light.

2 Deriving The Equation

We now use the fact that a spinning ring of negative mass can create a negative gravitational field to derive the fundamental equation for flying saucer.

At the boundary between the positive and negative gravitational spaces the total vector potential is zero. Labeling the A vectors

with + and - to keep track of where they operate

$$(A+)+(A-)=0 \tag{8}$$

$$(A+)=-(A-) \tag{9}$$

On the left hand side of the equation we have the vector potential of the universe which is given by

$$A\,(+)=\frac{\Phi\, v}{c^2} \tag{10}$$

where v the velocity of the craft.

The flying saucer generates a negative vector potential A(-) by spinning ring of negative mass. The spinning ring is a gravitational dipole that generates the A(-)

$$-A\,(-)=\frac{\mu}{r^2} \tag{11}$$

Since the equations of the gravitational weak field approximation are identical to Maxwell's, we can take over this equation. The normal magnetic dipole of a current loop is given by, where I is the current.

$$\mu=\mu_0\, I\,(A\, r\, e\, a) \tag{12}$$

The shape of the negative mass in the saucer is probably a flat ring, something like a freesbee. (You might check out the hundreds of photograph of flying saucers.) **We will simplify our calculation by replacing the flat ring with a thin massive ring of linear mass $\boldsymbol{\lambda}$**. We replace μ_0 by k, which we will discuss in a NOTE below, and I by a current of mass, $I_m=\lambda\, v$.

$$\lambda=\text{mass/circumference}=\frac{M}{2\pi a} \tag{13}$$

The area is $\pi\, a^2$. Therefore the mass current is

$$I_m=\frac{M\, v}{2\,\pi\, a} \tag{14}$$

So gravitational magnetic dipole moment will be

$$\begin{aligned}\mu &= \frac{k\,M\,v}{(2\,\pi\,a)\,\pi\,a^2} \\ &= k\left(\frac{M}{2}\right) v\,a \\ &= \frac{k\,M\,v\,a}{2}\end{aligned} \tag{15}$$

The result on the right hand side for the negative vector potential is

$$-A\,(-) = \frac{\mu}{r^2} \tag{16}$$

Because we have a negative mass (the sign of M is negative) which cancels the minus sign in front of A(-) and therefore

$$A\,(-) = \frac{k\,M\,v\,a}{2\,r^2} \tag{17}$$

We can express the formula in terms of the rotation frequency f. The velocity

$$v = a\,\omega = a\,(2\,\pi\,f) = 2\,\pi\,a\,f \tag{18}$$

where ω is the angular velocity. Then

$$\begin{aligned}A\,(-) &= \frac{k\,M\,(2\,\pi\,a\,f)\,a}{2\,r^2} \\ &= \frac{k\,\pi\,M\,f\,a^2}{r^2}\end{aligned} \tag{19}$$

The left hand side of the equation A of the universe is

$$A\,(+) = \frac{v\,\Phi}{c^2} = \frac{v}{G} \tag{20}$$

since from Sciama (4)

$$\frac{\Phi}{c^2} = \frac{1}{G} \tag{21}$$

We have the derived the fundamental equation for a flying saucer:

$$\frac{v}{G} = \frac{k\,\pi\,M\,f\,a^2}{r^2} \tag{22}$$

The equations for the vector potential **A** are vector equations but for our formula we need consider only the scalar part as the vector aspect is only a spatial component of order unity.

3 APPLICATIONS

3.1 UFO Without Inertia

In order to test whether a flying saucer is able to overcome inertia, we apply the formula to the worst case scenario, the smallest flying saucer reported with a ring radius of say 5 meters, or total diameter of 30 feet. Because the generation of the negative vector potential **A(-)** depends on the negative mass which has to be rotated, a larger UFO which could have a more massive ring, could possibly not have to rotate the ring quite as fast and still be able to overcome inertia. Also the speeds recorded by radar in Belgium in 1990 where for Big Black Triangle type UFOs.

We are limited by size (and mass) of the ring and the rotation frequency because the rim velocity cannot exceed the speed of light. The question now is, what kind of a rotational speed do we need for the spinning ring to create a field that equals the field from the universal, scalar potential, repelling it, and create a space in which the UFO can hide.

In any case, if a minimal flying saucer, 30 feet in diameter, the smallest reported, is able to overcome inertia, then we know all other, larger UFOs can also because the criteria are less stringent for them.

The formula for the vector potential

$$A\left(-\right)=\frac{\mu}{r^2} \tag{23}$$

is called the dipole approximation. It only works for distances r large compared with dipole radius a. It is clear that the formula has a singularity at $r=0$. That is, the formula assumes that the dipole is a point. This is not so. The dipole is actually a finite loop.

The exact formula for A from a current carrying loop involves elliptic integrals. Examining the exact formula near $r=a$, the elliptic integrals turn out to be approximately unity. Also a power series expansion for $A\left(-\right)$ near the ring shows that the vector potential is very close in value to dipole moment μ. We are therefore going to make the approximation, that nothing drastic happens near the value $r=1$. We will therefore take r to be 1 when we are near the dipole, and essentially at the dipole the vector $A\left(-\right)$ and the dipole moment m have the same numerical value, though of course the dimensions are different.

On the left hand side of the equation we see that it is proportional to the velocity of the craft. From Belgian radar we know speeds of over 1,000 miles per hour have been recorded. If we take $v=1\text{km/sec}$ or 2,200 mph, that should cover most UFO speeds. So the left side would be $A=1,000\text{m/sec/G}$, or $A=1000/G$. (7)

Therefore the boundary between the positive potential A(+) and the negative potential A(-) will be approximately equal at $r = 1$ meter from the ring when the saucer is traveling 2,200 miles per hour.

We find then that with,

$$\frac{v}{G} = \pi M f a^2 \tag{24}$$

the equation balances. On the left

$$\begin{aligned} \frac{v}{G} &\cong \frac{1000}{6.6(10)^{-11}} \\ &\cong (10)\, 31.5(10)^{10} \\ &\cong 1.5(10)^{13} \end{aligned} \tag{25}$$

And on the right

$$\pi M f a^2 \cong (3.14)\, 4(10)^4\, 5(10)^6 (5)^2 \tag{26}$$

Therefore the saucer is within a negative potential bubble where the positive potential $A\,(+)$ cannot reach. The bubble is velocity dependent and shrinks with increased velocity. The saucer can be in the bubble to some extent even at 2,200 miles per hour. What is meant by this is discussed in the Chapter titled "The Shape of a Flying Saucer".

4 Minimal Size of Saucer

If try to use some other geometry for the negative mass, a disk for example, the vector potential $A\,(-)$ is not strong enough to overcome inertia. The calculations are shown in the chapter on the "Gravitational Engine."

It also turns out that for this 30-foot diameter saucer to produce enough vector potential $A\,(-)$ it has to rotate at one half the speed of light. That is now pushing the boundaries of the possible, since for that speed the relativistic mass increase of the negative mass is 15%.

Therefore the 30-foot saucer is the minimal flying saucer possible based on limitations imposed by physics. Interestingly enough, the 30-foot flying saucer has been the smallest saucer reported in eye witness reports.

5 EM Effects

We see from the formula that the velocity is inversely proportional to the square of the bubble radius:

$$\boldsymbol{v = \frac{(\text{constant})}{r^2}} \tag{27}$$

At a velocity of 1,000 m/sec the bubble is within one meter of spinning ring dipole. This would make the constant in value to 1000. But suppose the saucer slows down, to be essentially stationary. Then say the velocity is .1 m/sec. Then .1 = 1,000/r2 or r2 =10,000. Then r would be 100 meters. This would make the diameter of the bubble 200 meters or 600 feet.

By our formula, when the UFO slows down, r increases. Therefore the inertia free region around the UFO expands. It is this inertia free region that cause EM effects, which we will discuss shortly. How far away from the saucer have EM effects been reported? There are 5 reports in the *UFOCAT* at .4 miles, one at .78 miles, and 2 at 1.53 miles. There are two more at a greater distance, but they are from airplanes. Unfortunately most the 1,820 EM effect reports do not give distances, and even those given may not be accurate. As a conservative estimate let us say radius of the inertia free zone is .78 miles or 1,250 meters.

Theoretically when the UFO is stationary and v = 0, there is no A(+) generated, and value of the for the left hand side of the equation is zero. It is possible that there is a residual or background vector potential $A\,(+)$ even at zero velocity. Let us use the EM radius data to estimate such a possible potential.

Since

$$\begin{aligned} \frac{v}{G} &= \frac{1.5(10)^{13}}{r^2} \\ &= v \times 1.5(10)^{10} \end{aligned} \tag{28}$$

so that

$$v = \frac{1000}{r^2} \tag{29}$$

Converting that that distance to an equivalent velocity

$$\begin{aligned} v &= \frac{1000}{(1250)^2} \\ &= 0.00064\,\frac{\text{meters}}{\text{second}} \end{aligned} \tag{30}$$

We see that the UFO is essentially stationary.

Then the possible residual or background $A\,(+)$ would have to be less than

$\mathrm{A}(+) = \frac{\mathrm{v}}{\mathrm{G}} = 6.4(10)^{-4}1.5(10)^{10}$

$$\begin{aligned} A(+) &= \frac{v}{G} \\ &= 6.4(10)^{-4}1.5(10)^{10} \\ &= 9.8(10)^{6}\,\text{kg}\,\frac{\text{sec}}{\text{meter}^2} \end{aligned} \tag{31}$$

If the saucer is at low altitude the bubble breaks the ground plane and witnesses find themselves in an inertia free zone. The movement of limbs have slow acceleration. Our muscles are designed to resist the pull of gravity. We normally do not feel inertial effects. If they were missing, we would not notice.

The story with sub-atomic particles is the reverse. Gravitation on their mass is negligible. Electrons in metals behave as a free gas. Their high momentum and kinetic energy are critically dependent on inertial mass. If that changed, there would be noticeable effect. And that is what happens in the UFO's inertial free zone.

A window alarm attached to the window frame has a small magnet near it attached to the sash. If the sash is opened, the magnet is moved away and the alarm sounds. This is because of the **Hall Effect**. The window alarm uses a semiconductor where the structure of the semiconductor reduces the effective mass of the electrons to a few percent of their normal value. Since the momentum of the electron is, $m_i\, v$, inertial mass times the velocity, its momentum is now small. The charge of electron remains unchanged, so a magnetic field can interact with the charge to easily bend the path of the electron with weakened momentum. The small magnet can deflect the current by the **Hall Effect**. The magnet bends the path of the electrons in the semiconductor. The electrons are diverted. They do not reach the anode. Remove the magnet and the current flows and the alarm sounds.

The mysterious EM effect of car engines and headlights dying near flying saucers (10) now has a simple explanation. In a semiconductor the electron waves interfere with reflections off the lattice. The effect is that inertial mass of electrons appears to decrease. In other words if you want to write a theory of electron behavior in a semiconductor, what you do is assign an effective mass, m_e, to the electron that is less than its actual mass and the theory works. (See for instance Kittel *Introduction to Solid State Physics* (11)). It turns out that a correct theory just posits electrons to have an effective mass = m_e as low as 1 to 2% of the value when free.

InSb	0.015
InAs	0.026
InP	0.073
GaSb	0.047
GaAs	0.066

Table 1. Crystal Electron me/m

An electric field will move electrons. If you now add a magnetic field the electrons will move in a circle. The diameter of the circle will be determined by the relative strength of the fields and the charge to mass ratio of the electron. The charge to mass ratio is e/m. If m is small, then the charge to mass ratio will be large. Since the magnetic field exerts a force on the charge to bend the motion, and the momentum or inertial mass of the electron wants to make it go straight, a high e/m means that electrons path will be more easily bent. Since the momentum of the electron is, $m_i v$, inertial mass times the velocity, its momentum is now small. Since e/m_i ratio can be 50 to 100 times larger in the semiconductor than in a conductor, semiconductors can be used to bend the path of electrons even with small magnets. This is called the Hall Effect.

When a car finds itself within the UFOs anti-gravity bubble, the inertial mass of electrons in the wiring is essentially reduced to zero since they can no longer feel the effects of the positive vector potential of the universe, Φ. Therefore their charge to mass ratio increases. The electrons behave as if they were in a semiconductor, but even more so, since their inertial mass is closer to zero. Therefore any stray magnetic field will divert their motion, and stop the current from flowing.

And such stray fields exist everywhere. For example in typical 14 gauge wiring used in automobiles, a 10 amp current will generate a magnetic field inside the wire of about 25 gauss, the same as strength as that of little magnet that comes with the window alarm. Therefore the flowing of a current itself produces a magnetic field, and this field could shut down the current.

Therefore the EM effects of flying saucer are caused by the **Hall Effect**, which diverts the electrons, prevents current from flowing, and kills car headlights and engines. When the flying saucer leaves, the negative field is removed, and the devices spontaneously function again. (There are 475 entries in the *UFOCAT* for dying headlights and engines) There are also reports of witnesses experiencing spontaneous paralysis under these circumstances (10). Nerves work by transmitting electrical signals mediated by electrons, much as current in a wire. The nerve axons in the limbs are 3 to 4 feet long. This means that the **Hall Effect** has an opportunity to interfere with transmissions of nerve signals at many points along the axon. A closer analysis, I believe, will show that the **Hall Effect** is also responsible for the reported paralysis. (There are 109 entries in *UFOCAT* for paralysis.)

It is interesting to note that airplane engines near flying saucer do not die but only sputter. The reason may be is that airplanes engines use magnetos to generate the spark. Magnetos are electro-mechanical devices that produce high voltages connected to spark plugs with short wires. The high voltage and short wiring path may prevent the **Hall Effect** from shutting them down.

No Sonic Boom

In 1990, Belgian radar recorded UFOs traveling at speeds in excess of 1,000 miles per hour. The official Belgian Air Force report noted that no sonic booms were heard on the ground. The explanation is now simple. The air molecules around the UFO are within the inertia-free bubble created by craft. Because the air molecules effectively have no inertial mass, they do not resist being pushed out of the way. They do not pile up in front of the craft. It is this pile up which causes the shock wave that ordinarily generates the sonic booms.

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This also explains why flying saucers do not have aerodynamic shapes, yet they do not have problems with air resistance, even traveling at over 1,000 miles per hour. The air molecules, being in the inertia free bubble around the craft simply do not resist being easily pushed out of the way.

5) Levitation and Loss of Car Control and Lifting Car off the Road

There are occasional reports of levitation by eye-witnesses (10). The loss of car driving control often accompanies such reports. What that means is that some of the weight is taken off the tires so that they do not provide sufficient traction to steer the car. (There are 300 entries in UFOCAT for levitation.) The levitation does not always mean that the witnesses are actually lifted off the ground but that they experience lifting force in that direction.

These are not inertial events as they are not the result of movement but are forces experienced with the subject at rest. We have here something entirely new: the saucer is the source of an independent gravitational force. A finite object, the negative mass ring, by being spun creates a vector potential on par with the vector potential that comes from the scalar potential of the universe. We are not dealing here with Newtonian gravitational attraction. The gravitational force here is a result of motion, and is entirely derived from the vector potential. These fields that have the palpable power, to levitate people and objects, to interference with the steering of vehicles, and occasionally lifting the entire vehicle off the ground.

The forces appear to be of short duration and only when a UFO is passing. Only two distances to the saucer are listed in *UFOCAT* for these encounters, one at 16 and the other 64 feet.

The negative vector potential field of the saucer has a $1/r^2$ gradient. If a flying saucer were passing, the vector potential field would be changing with time because of the gradient. This means that there is a time derivative of the vector potential which by the analog of Faraday's Law produces

$$F = m\,G\frac{\partial A}{\partial t} \tag{32}$$

a gravitational force. We note that because the saucer is moving the bubble shrinks and these gravitational effects can be felt only near the saucer. We have

$$A = v/G \tag{33}$$

$$\frac{\partial A}{\partial t} = a/G \tag{34}$$

By multiplying through by G, we get an acceleration

$$a = G\frac{\partial A}{\partial t} \tag{35}$$

which for gravity would be 10m/sec/sec on the earth's surface. ·As the flying saucer moves, because of the gradient of the A field, there would be change of the A vector with time:

$$\frac{\partial A}{\partial r} = (r\,v) \tag{36}$$

where rv is the relative velocity, which we take to be, say, 20 m/sec. The vector potential A is the dipole moment divided by r^2

$$A = \mu/r^2 \tag{37}$$

Taking the very stringent case of a small saucer or 30 foot diameter, where the dipole moment would be $1.5(10)^{13}$, then gradient of A becomes

$$\begin{aligned} \frac{\partial A}{\partial r} &= -2\,\mu/r^3 \\ &= -2 \times 1.5(10)^{13}/r^3 \end{aligned} \tag{38}$$

And taking the relative velocity $rv = -20$

$$\begin{aligned} \frac{\partial A}{\partial t} &= \frac{\partial A}{\partial t}(r\,v) \\ &= \frac{3(20)(10)^{13}}{r^3} \\ &= \frac{6(10)^{14}}{r^3} \end{aligned} \tag{39}$$

The acceleration produced by this field at a distance of r from the UFO is

$a = G\,\frac{\partial A}{\partial t} = 6.6(10)^{-11} \times 6(10)^{14}/r^3$

$= 4(10)^4/r^3$

At 20 meters, or about 60 feet, the lifting would be

= 40,000/8000

= 5 meters/sec/sec

= 50% of body weight lift.

At 7 meters, or about 20 feet, the lifting would be

= 40,000/343

= 12 meters/sec/sec

= 120% of body weight lift

enough to lift an object off the ground.

A car would be lifted off the ground, because the upward lifting force, 120% of body weight, would be greater than its weight or downward gravity pull at 100% of body weight.

So if witnesses have a flying saucer pass by at a range of 100 feet or less, even at a very reasonable speed of 20 m/sec or 44 mph,