The Theory of Over-Unity and Flight

An Impartial Application of the Laws of Motion

as it relates to the

Conservation of Momentum

By J.A. van Wyk

"I am the LORD, the God of all mankind. Is anything too hard for me?"

- Jeremiah 32:27

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Introduction

This document defines the theory of how to create over-unity using the laws of motion as defined by Sir Isaac Newton. The specific area of application of the laws we will be using is the conservation of momentum, which is a subject of classical mechanics. An added benefit from defining the theory of over-unity will be the ability to define the true theory of flight, which are two riddles that have been kept from mankind until now.

Alright, are you ready? Here comes the great mystery revealed. The solution is *elastic collision*, the theory of which is dealt with in the conservation of momentum. We will be specifically interested in *change* in momentum, or impulse as it is also called. Let's quickly refresh our understanding of impulse and force as it is defined in modern physics. Don't be afraid if you are not a physicist. I'm not a physicist either. We will only be dealing with the laws of motion. It is no more than basic high school physics.

We will start with the well-known second law of motion, on which the equations of force and impulse are based:

> The change of motion of an object is proportional to the force impressed upon it, and is made in the direction of the straight line in which the force is impressed.

Newton used the word “motion" to mean what is called *momentum*. We can therefore rephrase the above law as:

> The change in *momentum* of an object is proportional to the force impressed upon it, and is made in the direction of the straight line in which the force is impressed.

Now let's state the equations we get from this law...

$$a = \frac{\Delta v}{\Delta t} \qquad (1)$$

(Acceleration equals change in velocity over change in time)

All this equation really means, is that when we ask how much an object accelerated, we're not only interested in how much its velocity changed (Δv), but we also want to know how *quickly* it changed (Δt). So acceleration defines how much and how quick.

$$p = mv \qquad (2)$$

(Momentum equals mass times velocity)

As an example, a truck has more mass than a bicycle. Therefore, a truck travelling at 30km/h has more *momentum* than a bicycle travelling at the same speed. For the purpose of the theories in this document, it is important to remember, though quite obvious, that it takes more energy to accelerate a truck to 30km/h than to accelerate a bicycle to 30km/h. This basically means to create more momentum more energy is needed.

$$\Delta p = m\,\Delta v \qquad (3)$$

(Change in momentum equals mass times change in velocity)

If an object changes velocity (goes faster or slower), its momentum changes.

$$\frac{\Delta p}{\Delta t} = \frac{m\,\Delta v}{\Delta t} \qquad (4)$$

(Change in momentum over change in time equals mass times change in velocity over change in time)

Sigh! Luckily we can simplify this equation. Remember from equation (1) that Δv / Δt (change in velocity over change in time) is actually acceleration, so:

$\Delta p / \Delta t = ma$ (5)

(Change in momentum over change in time equals mass times acceleration)

$\Delta p / \Delta t = F$ (6)

(Change in momentum over change in time equals force)

Here we have defined what a force is, so putting equation (5) and (6) together, we get:

$F = ma$ (7)

(Force equals mass times acceleration)

$\Delta p = I$ (8)

(Change in momentum equals impulse)

Here we have defined what an impulse is, so putting equation (3) and (8) together, we get:

$I = m \Delta v$ (9)

(Impulse equals mass times change in velocity)

Now let's look at the important difference between force (7) and impulse (9):

$F = ma$

or

$F = m \Delta v / \Delta t$ (using equation (1)) (10)

$I = m \Delta v$

Impulse is a force that is applied only for an instant, and is therefore also called an *impulsive* force. It happens instantly, like during an elastic collision, when there is no practically measurable change in time. Force, on the other hand, is applied over a period of time, and therefore we are concerned with the change in time. So force is not just concerned with how much momentum changes, but also how *quickly* it changes (Δt). Impulse on the other hand, is not concerned with the time it takes, but is only interested in how much momentum changes.

It is important to understand this difference between the two concepts (force and impulse), since we'll be using impulse, not force, to define our theories. The reason, as already mentioned, is that we will be using elastic collisions in the theories, and one cannot easily use force to define an elastic collision. Think about it. An elastic collision happens instantly, so there is no practically measurable change in time (practically as in the sense of using an everyday kind of measuring device, i.e. a stopwatch). If we used the equation of force (10) to try and represent this collision, we will end up dividing by zero ($\Delta t = 0$; change in time is zero). So impulse (9) is a more practical equation to use to define elastic collisions, since it does not involve time, and therefore can be used to define an event that happens instantly.

THE THEORY OF OVER-UNITY

Let us first define what over-unity is and is not. Over-unity is not simply what is commonly called perpetual motion. Perpetual motion sounds great, but we need a way to create an *excess* of energy, besides that which “keep the ball rolling”, so to speak. This is the true meaning of over-unity: that kind of closed system which, after satisfying the condition of maintaining its internal perpetual state of motion, gives us an excess of energy to put to whatever external use we want.

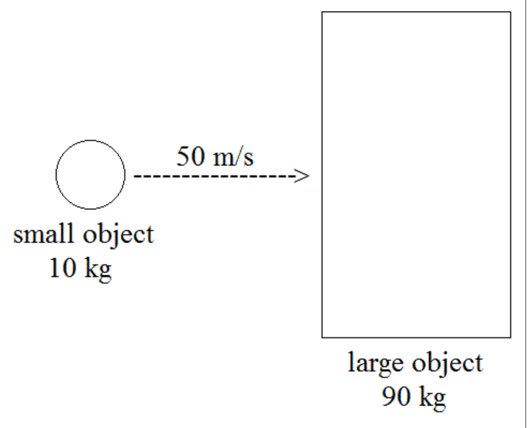
To create over-unity, we will for starters be interested in the kind of elastic collision where, from our perspective, an object of smaller mass initiates the collision process. A more complicated over-unity will be discussed in the next section, since it helps to define the true theory of flight.

In the introduction we defined the formula for calculating the impulse (change in momentum) of objects involved in an elastic collision. But remember that this formula for calculating the impulse needs the *change* in velocity of the objects (that is, velocity-after-collision minus velocity-before-collision). So we need formulas to calculate the new velocities of the objects after the elastic collision.

Also, to fully define an elastic collision we will also need to apply the third law of motion, which implies the conservation of momentum:

> To every action there is always opposed an equal reaction; or, the mutual actions of two bodies upon each other are always equal and directed to contrary parts.

Let's look at an illustration of the situation:



Elastic Collision Demonstration

In this and the following illustrations we will assume that all objects that appear perfectly round are round in three dimensions, able to roll without much friction, and have excellent elastic properties (such as a stainless steel ball). All large objects have a rigid surface to facilitate the elastic collision to a maximum. The symbols we are going to use to represent the situation are defined as follows:

```
m_S   = small object mass
m_L   = large object mass
v_Sb  = small object velocity before collision
v_Lb  = large object velocity before collision
v_Sa  = small object velocity after collision
v_La  = large object velocity after collision
I_S   = small object change in momentum (impulse)
I_L   = large object change in momentum (impulse)
```

The units we will use are kilograms and meters per second. We will assume the collision between the small and large object is near elastic, meaning there is almost no loss of kinetic energy (due to friction or internal heat) during the collision. To calculate the velocity of the small object after the collision, we use the following equation:

$$v_{Sa} = \frac{m_S - m_L}{m_S + m_L} \times v_{Sb} \qquad (11)$$

Remember, as already stated, that in these elastic collisions it is the small object that moves while the large object is at rest. So we are not interested in the large object velocity *before* collision. You can see in the equation above it is not used at all, since it is zero anyway. Only the small object velocity before collision is used.

To calculate the velocity of the large object after the collision, we use the following equation:

$$v_{La} = \frac{2 \times m_S}{m_S + m_L} \times v_{Sb} \qquad (12)$$

Again, only the small object velocity before collision is used in the above equation.

Now we have two equations for calculating the new velocities of each object after the elastic collision occurs. When we have calculated these velocities, we can then calculate the *change* in velocity, and therefore the change in momentum (impulse) of each object. Let's get started....

$$v_{Sa} = \frac{m_S - m_L}{m_S + m_L} \times v_{Sb}$$

$$= \frac{10kg - 90kg}{10kg + 90kg} \times 50\ m/s$$

$$= -40\ m/s \qquad (13)$$

$$v_{La} = \frac{2 \times m_S}{m_S + m_L} \times v_{Sb}$$

$$= \frac{2 \times 10kg}{10kg + 90kg} \times 50\ m/s$$

$$= 10\ m/s \qquad (14)$$

So the velocities of the small and large objects after collision are -40m/s (40m/s in the opposite direction) and 10m/s respectively. Now we can calculate the change in momentum of each object during the collision:

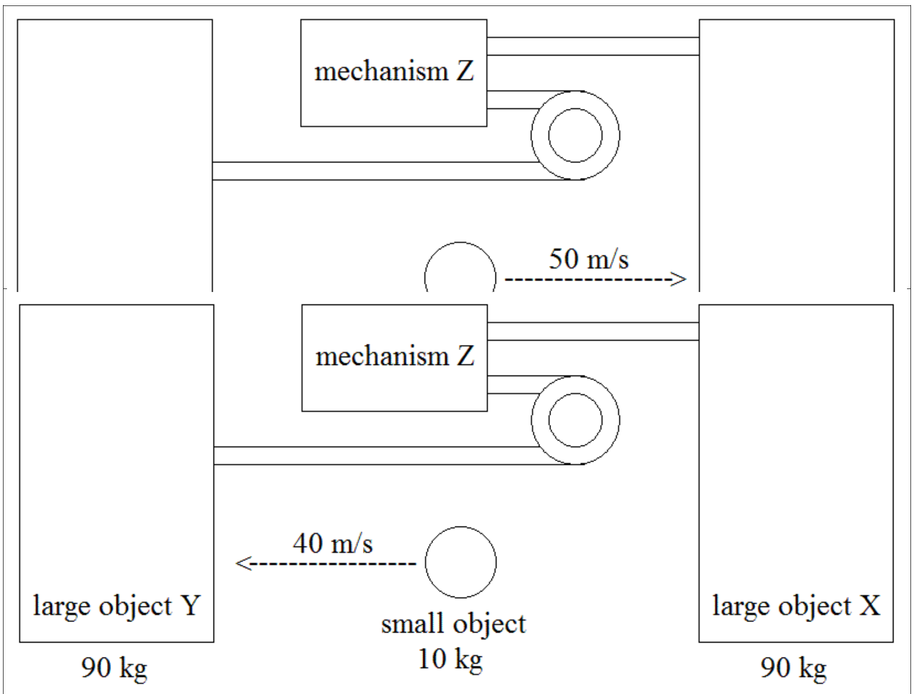
```
I_S = m_S x (v_Sa - v_Sb)
    = 10kg x (-40m/s - 50m/s)
    = -900 N-s (Newton-seconds, the unit of impulse)                    (15)

I_L = m_L x (v_La - v_Lb)
    = 90kg x (10m/s - 0m/s)
    = 900 N-s                                                           (16)
```

Now this is where scientists will probably sarcastically retort that I have done nothing but re-confirm the conservation of momentum (Newton's third law of motion). We can clearly see that the small object's change in momentum is 900N-s in the *reverse* direction, while the large object's change in momentum is 900N-s in the *forward* direction. This perfectly conforms to Newton's third law of motion, that for every action there is an equal and opposite reaction. This is why scientists say there can be no such thing as over-unity. But now I will show you that because of this law, there can be none other but over-unity. This is a marvellous thing about the conservation of momentum: it can actually cause over-unity.

Here it comes. To see how over-unity was created, you must not just look at the collision itself, but look earlier, when the smaller object was initially put into motion. Let's calculate the impulsive force (change in momentum) that was needed to put the small object into motion (we explicitly state it was an *impulsive* force that put the small object into motion):

```
I_S = m_S x (v_Sa - v_Sb)
    = 10kg x (50m/s - 0m/s)
    = 500 N-s                                                           (17)
```

This means that an initial impulsive force of only 500N-s was needed to put the small object into motion. Yet when the small object collided with the large object, we received back an impulsive force of 900N-s that was imparted to the large object! But that is not the end of the matter. The small object is still in motion. It may be in the opposite direction, *but who cares?* That is the secret to over-unity. We don't care that things are going in the forward or reverse direction. All we care about is the initial impulsive force we had to supply, and then we stand back and look at the resulting impulsive force we can claim back from an elastic collision. So now we already have 900N-s of impulse claimed back from the large object during the elastic collision. That is 400N-s more impulsive force we supplied to put the small object into motion! But the small object is still in motion in the opposite direction at 40m/s! What if we placed another large object in that direction to cause another elastic collision? We will be able to claim back even more impulsive force from that second large object. And after this second elastic collision, the small object would be headed back in its original direction, to collide yet again with the first large object! Let's look at an illustration of this new situation:



Oscillating Elastic Collision Demonstration: Stage 2

You will notice that besides the second large object, we have also added a new mechanism Z to the system. The purpose of this mechanism will be to claim and store the impulses that was imparted to the large objects by the small object. Some of this stored impulse can then be used to reset the system by setting the small object back into motion after it comes to rest. The remaining stored impulse may then be used to perform some kind of extra work, fulfilling the criteria of over-unity. Also note how the manner mechanism Z is connected to large object X differs from the manner it is connected to large object Y. This is just to illustrate that the impulse reclaimed from large object Y must be flipped in the opposite direction (from reverse to forward, or negative to positive), and is denoted in the following calculations as taking the absolute value (abs) of the impulse. In practise the direction of a force can be changed in various different ways. In the illustration above I have chosen the age old proven method of a pulley to change the direction of the impulse imparted to large object Y.

You have already seen how I calculated changes in velocities and the resulting changes in momentum in (13), (14), (15) and (16) above. I'm not going to write out all the following calculations in such detail, since it will end up being pages and pages. Instead I'm just going to supply the answers to each calculation, and you can work them out for yourself if you like. For each stage in the above demonstration the calculations are done in exactly the same way.

The symbols we are going to use to represent this new situation are defined as follows:

```
m_S   = small object mass
m_X   = large object X mass
m_Y   = large object Y mass
v_Sb  = small object velocity before collision
v_Xb  = large object X velocity before collision
v_Yb  = large object Y velocity before collision
v_Sa  = small object velocity after collision
v_Xa  = large object X velocity after collision
v_Ya  = large object Y velocity after collision
I_S   = small object change in momentum (impulse)
I_X   = large object X change in momentum (impulse)
I_Y   = large object Y change in momentum (impulse)
I_Z   = impulse captured and stored by mechanism Z
```

Initial Input:

```
m_S = 10 kg                 v_Sb = 50 m/s              I_S = 500 N-s
m_X = 90 kg                 v_Xb = 0 m/s               I_X = I_Y = 0 N-s
m_Y = 90 kg                 v_Yb = 0 m/s               I_Z = 0 N-s
```

STAGE	AFTER COLLISION	AFTER IMPULSE CAPTURE
Stage 1 1st elastic collision between small object and large object X	v_Sa = -40 m/s v_Xa = 10 m/s I_S = -900 N-s I_X = 900 N-s	v_Xa = 0 m/s I_Z = 900 N-s
Stage 2 1st elastic collision between small object and large object Y	v_Sa = 32 m/s v_Ya = -8 m/s I_S = 720 N-s I_Y = -720 N-s	v_Ya = 0 m/s I_Z = 900 + abs(-720) = 1620 N-s
Stage 3 2nd elastic collision between small object and large object X	v_Sa = -25.6 m/s v_Xa = 6.4 m/s I_S = -576 N-s I_X = 576 N-s	v_Xa = 0 m/s I_Z = 1620 + 576 = 2196 N-s
Stage 4 2nd elastic collision between small object and large object Y	v_Sa = 20.48 m/s v_Ya = -5.12 m/s I_S = 460.8 N-s I_Y = -460.8 N-s	v_Ya = 0 m/s I_Z = 2196 + abs(-460.8) = 2656.8 N-s
Stage 5 3rd elastic collision between small object and large object X	v_Sa = -16.38 m/s v_Xa = 4.1 m/s I_S = -368.6 N-s I_X = 368.6 N-s	v_Xa = 0 m/s I_Z = 2656.8 + 368.6 = 3025.4 N-s
Stage 6 3rd elastic collision between small object and large object Y	v_Sa = 13.1 m/s v_Ya = -3.28 m/s I_S = 294.8 N-s I_Y = -294.8 N-s	v_Ya = 0 m/s I_Z = 3025.4 + abs(-294.8) = 3320.2 N-s
Stage 7 4th elastic collision between small object and large object X	v_Sa = -10.48 m/s v_Xa = 2.62 m/s I_S = -235.8 N-s I_X = 235.8 N-s	v_Xa = 0 m/s I_Z = 3320.2 + 235.8 = 3556 N-s
Stage 8 4th elastic collision between small object and large object Y	v_Sa = 8.38 m/s v_Ya = -2.1 m/s I_S = 188.6 N-s I_Y = -188.6 N-s	v_Ya = 0 m/s I_Z = 3556 + abs(-188.6) = 3744.6 N-s
Stage 9 5th elastic collision between small object and large object X	v_Sa = -6.7 m/s v_Xa = 1.68 m/s I_S = -150.8 N-s I_X = 150.8 N-s	v_Xa = 0 m/s I_Z = 3744.6 + 150.8 = 3895.4 N-s

STAGE	AFTER COLLISION	AFTER IMPULSE CAPTURE
Stage 10 5[th] elastic collision between small object and large object Y	v_Sa = 5.36 m/s v_Ya = -1.34 m/s I_S = 120.6 N-s I_Y = -120.6 N-s	v_Ya = 0 m/s I_Z = 3895.4 + abs(-120.6) = 4016 N-s
Stage 11 6[th] elastic collision between small object and large object X	v_Sa = -4.29 m/s v_Xa = 1.07 m/s I_S = -96.5 N-s I_X = 96.5 N-s	v_Xa = 0 m/s I_Z = 4016 + 96.5 = 4112.5 N-s
Stage 12 6[th] elastic collision between small object and large object Y	v_Sa = 3.43 m/s v_Ya = -0.86 m/s I_S = 77.2 N-s I_Y = -77.2 N-s	v_Ya = 0 m/s I_Z = 4112.5 + abs(-77.2) = 4189.7 N-s
Stage 13 7[th] elastic collision between small object and large object X	v_Sa = -2.74 m/s v_Xa = 0.69 m/s I_S = -61.7 N-s I_X = 61.7 N-s	v_Xa = 0 m/s I_Z = 4189.7 + 61.7 = 4251.4 N-s
Stage 14 7[th] elastic collision between small object and large object Y	v_Sa = 2.19 m/s v_Ya = -0.55 m/s I_S = 49.3 N-s I_Y = -49.3 N-s	v_Ya = 0 m/s I_Z = 4251.4 + abs(-49.3) = 4300.7 N-s
Stage 15 8[th] elastic collision between small object and large object X	v_Sa = -1.75 m/s v_Xa = 0.44 m/s I_S = -39.4 N-s I_X = 39.4 N-s	v_Xa = 0 m/s I_Z = 4300.7 + 39.4 = 4340.1 N-s
Stage 16 8[th] elastic collision between small object and large object Y	v_Sa = 1.4 m/s v_Ya = -0.35 m/s I_S = 31.5 N-s I_Y = -31.5 N-s	v_Ya = 0 m/s I_Z = 4340.1 + abs(-31.5) = 4371.6 N-s
Stage 17 9[th] elastic collision between small object and large object X	v_Sa = -1.12 m/s v_Xa = 0.28 m/s I_S = -25.2 N-s I_X = 25.2 N-s	v_Xa = 0 m/s I_Z = 4371.6 + 25.2 = 4396.8 N-s
Stage 18 9[th] elastic collision between small object and large object Y	v_Sa = 0.9 m/s v_Ya = -0.22 m/s I_S = 20.2 N-s I_Y = -20.2 N-s	v_Ya = 0 m/s I_Z = 4396.8 + abs(-20.2) = 4417 N-s

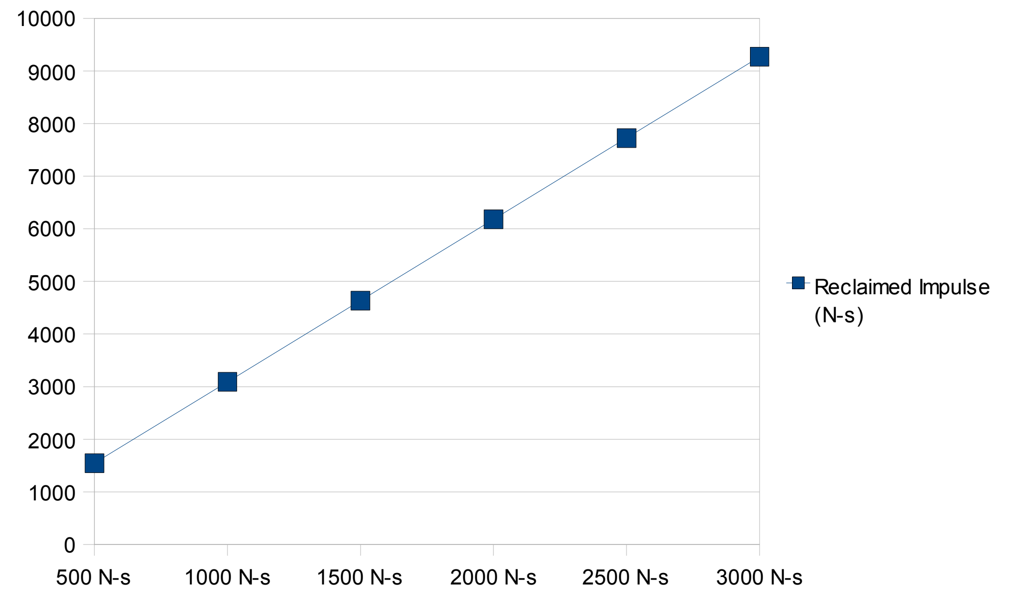
Alright, we'll stop adding the impulses from the elastic collisions here because the rest of the collisions will probably be too weak to really count. Furthermore, we have so far been calculating for ideal conditions. In practice ideal conditions like these in which collisions are perfectly elastic does not happen (not as far as I know). We will therefore have to calculate in a factor for loss of kinetic energy due to friction. We will subtract 20% for loss of kinetic energy during the actual collisions between the small and two large objects. This is a more than generous amount to consider for loss of energy, since there are substances that exhibit great elastic behaviour (such a stainless steel ball). But we need to subtract another greater loss of energy that happens during the capturing of the impulses (or momentum) of the large objects by mechanism Z. Depending on how this mechanism is implemented in practise, it will probably create a fair amount of friction while performing its function. Let's be generous and say an additional 45% of the energy is lost during the impulse capture. That's a total of 65% loss in energy.

Thus:

```
I_Z = 4417 N-s x 35%
    ≈ 1545 N-s
```

Remember we started by supplying an initial impulse of 500N-s. Now we've ended up with a stored impulse of 1545N-s. That's more than a threefold reclaiming of energy! We can use 500N-s from the stored impulse to set the small object back into motion, and use the rest for some external work.

Now if we increase the initial impulse from 500N-s to 1000N-s by increasing the initial velocity of the small object from 50m/s to 100 m/s, the reclaimed impulse we receive from mechanism Z increases to ~ 7067N-s. In fact, let's look at a graph that shows how an increase in the initial impulse affects the reclaimed impulse:

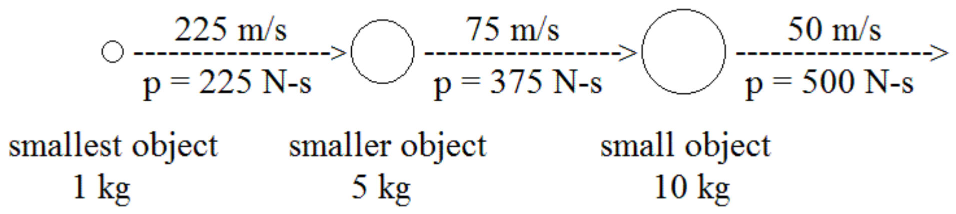


How an Increase in Initial Impulse Affects Reclaimed Impulse

Obviously the increase in reclaimed impulse seems linear. But what the data is actually saying is that the increase in reclaimed impulse is in fact *exponential*, at least from our point of view. You see, under normal non over-unity conditions during a single collision, if we were to give an input impulse of 500N-s, the best we could expect back is 500N-s, and that is under ideal conditions. Yet with the above kind of over-unity, for every 500N-s we add to the initial impulse, we don't simply get an extra 500N-s back, but a *multiplied* result. And it is multiplied by the amount we put in! This is a key aspect of over-unity, which also confirms to us that this is true over-unity: The more energy we put in, the more *multiplied* energy we get back. The greater the initial impulse, the greater the over-unity.

Another very important thing to always remember about over-unity, is that if the difference in mass between the small and large objects is increased, the over-unity is further increased. Try experimenting with this yourself. Instead of increasing the initial input velocity of the small object as we did in the graph above, try increasing the mass of the large objects or decreasing the mass of the small object. You will see that the reclaimed impulse increases.

Over-unity is a bit of a mind-bender. You may still be a bit sceptical, thinking that if this was really possible, there would be no end to the build-up of momentum one can create. Well, that's exactly right. That's exactly what over-unity means. Theoretically, there is no limit to the build-up of momentum one can create. So to round of this section and complete my bending of your mind, let's consider another way to increase the input/output ratio of the above demonstration:



Build-Up of Momentum

Here you can clearly see over-unity in action. All the objects are initially at rest, and we start by imparting an impulse of 225N-s to the smallest object. While the law of the conservation of momentum is perfectly obeyed during each elastic collision, the result after every collision is that the larger object has greater momentum than the smaller object had before the collision. We only had to supply an initial impulse of 225 N-s to the first smallest object, and we ended up with a change in momentum (impulse) of 500 N-s in the largest of the small objects. Again, who cares that the smaller objects are now moving in the opposite direction, and who cares that the pluses and the minuses in the calculations of each individual collision adds up to zero? In fact, still having these smaller objects moving at all just gives us the potential to reclaim even more impulsive force, just like in the previous demonstration involving mechanism Z. Now if we were to use this method in the mechanism Z demonstration, we would only have to supply an initial impulse of 225N-s, and we would still reclaim the same impulse of 1545N-s. Now it's nearly a sevenfold reclaiming of energy! No wait, it's more than that! The two smaller objects will also be colliding with the two large objects. It's definitely a mind-bender...

Finally we are ready to give a formal definition of over-unity:

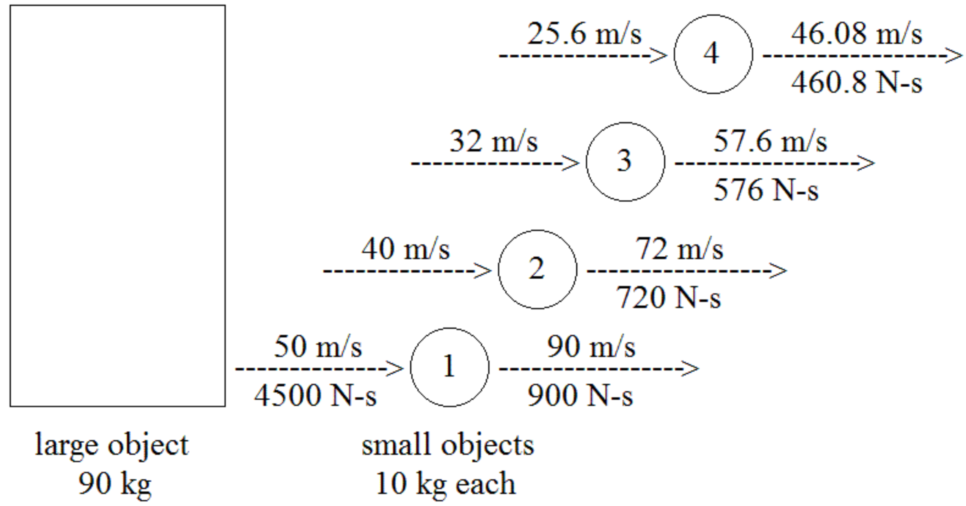
> Over-unity is a process by which an unlimited build-up of momentum can be created inside a closed system. The process involves reclaiming impulses from a series of successive elastic collisions in which an object or objects of significantly smaller mass collide with an object or objects of significantly larger mass. The impulse(s) from the object(s) of larger mass is reclaimed and some of this energy is used to set the entire process back into motion after the kinetic energy of the system is depleted. The remaining reclaimed impulse may then be used to perform external work outside of the closed system.

If you are still struggling to fully visualize this, take a tennis ball and put it on a table. Put one hand on either side of the tennis ball, with your right hand about touching the ball and your left hand about half a meter from the ball. Now give the tennis ball a good tap (i.e. apply an impulsive force) with your right hand so the ball starts rolling towards your left hand. When the tennis ball hits your left hand, it will not simply stop, but will bounce off of your left hand and start rolling back towards your right hand. You have just created over-unity! You right hand had to impart a certain impulse to get the tennis ball rolling, but then your left hand claimed back greater impulse from the tennis ball's elastic bounce; and remember you did not have to move your left hand (apply another impulse) at all.

Alright, this was a good start at explaining over-unity. Now I can confidently tell anyone who tries to say that there is no such thing as over-unity, that they are the ones trying to break the laws of motion. He he... Let's now move on to a more complicated type of over-unity which will help us to explain the theory of flight.

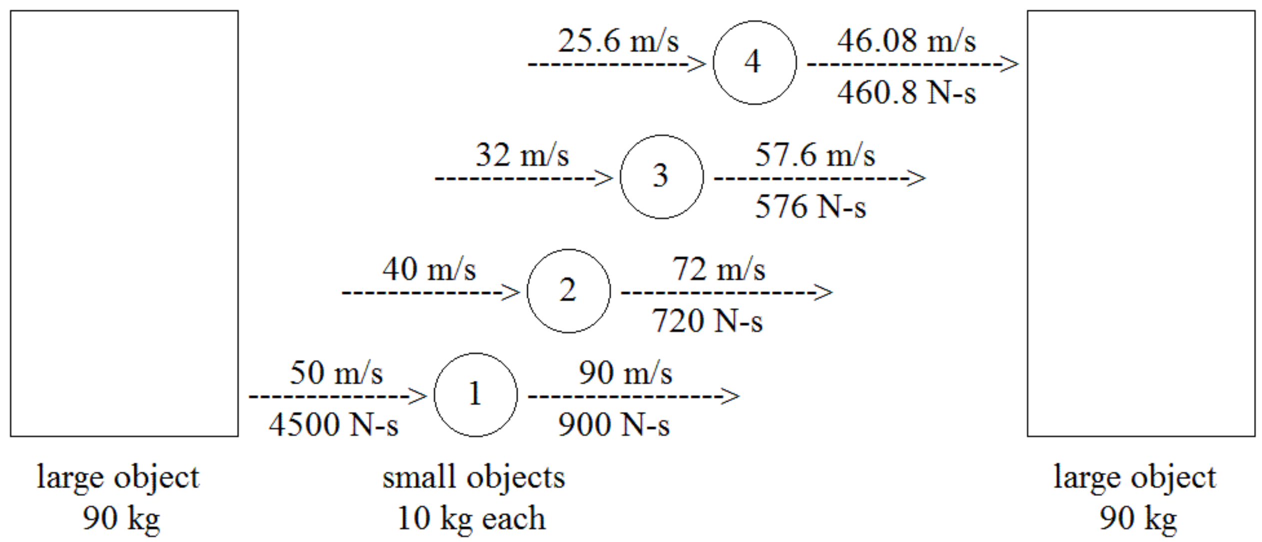
THE THEORY OF FLIGHT

Let's see what happens when a large object collides with smaller objects in a series of elastic collisions:



Large-on-Small Collision Demonstration: Stage 1

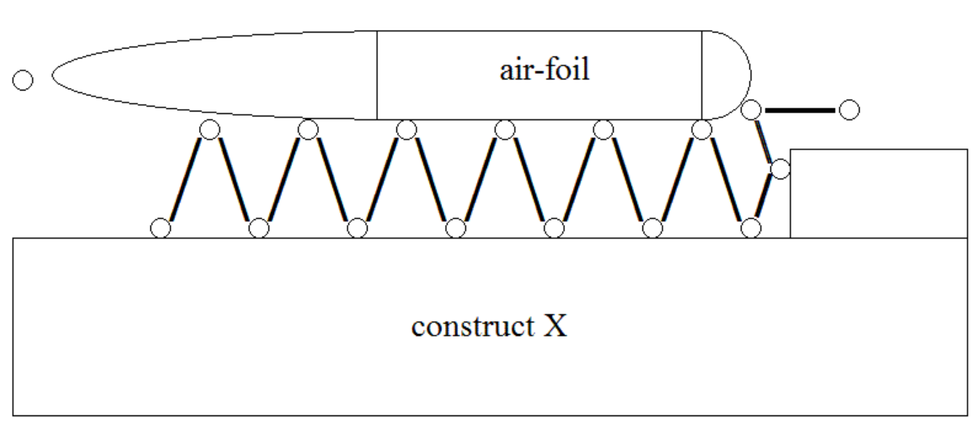
In the above demonstration we started by imparting an initial impulse of 4500N-s to the large object. If the large object continues in a series of elastic collisions with smaller objects until its momentum is depleted, we will end up with exactly 4500N-s worth of impulse if we add up all the impulses imparted to the smaller objects by the large object (i.e. the impulses imparted to small objects 1 + 2 + 3 + 4+..... = 4500N-s). So in this case where a large object is put into motion and collides with smaller objects, no "extra" impulse is created as in the previous section. At this point you may be thinking that there can be no over-unity when a large object initiates the elastic collisions. But have we learned anything from the previous section? What if we did the same thing we did in that section? That is, add another large object as in the following illustration:



Large-on-Small Collision Demonstration: Stage 2

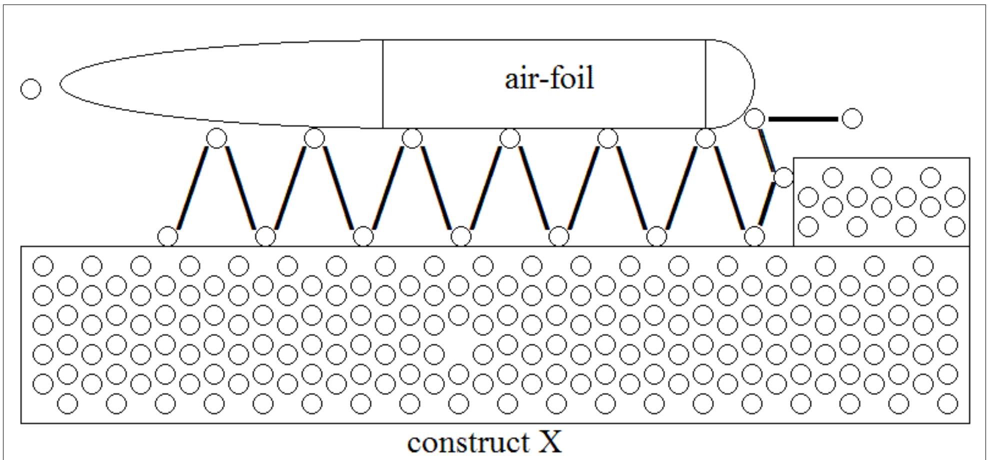
The small objects are now set up to behave in exactly the same way as in the previous section, except now we have a multitude of small objects to reclaim energy from. So just as in the case previous section, we are headed here for another spectacular adventure in reclaiming impulse. The only difference is, the *large* object was in this case the object that initiated the process.

Now as you may have guessed, this is basically the same way in which flight is initiated. If you have not guessed this, then consider what is a very prominent characteristic of air, and ask yourself what is one of the most elastic substances known to mankind. The answer is, of course, air molecules. To understand how this makes the effect of flight the same as the effect in the above demonstration, consider the wing (or helicopter blade) of an aircraft as the large object, and air molecules as the small object. Remember that because of the elastic behaviour of air molecules, and since the laws of motion hold for air molecules, the above demonstration must apply at least in some way to flight. Let's look at an illustration of flight:



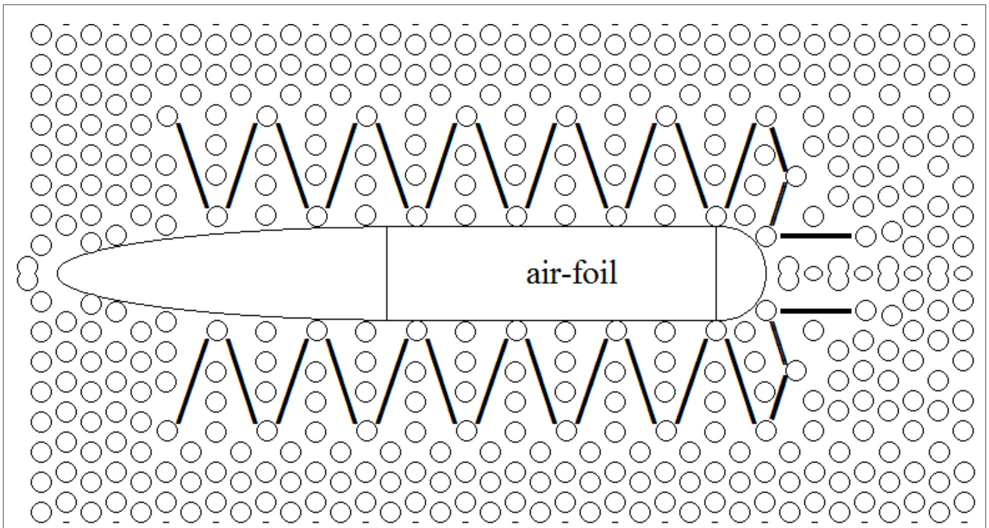
Partial Lift Effect Demonstration 1

There is a reason the basic mechanism of flight is so hard to visualize: billions and billions of tiny collisions every second. The above illustration is a very good way to start understanding and visualizing the mechanism of flight: one molecule at a time. The illustration plots a very basic and simplified course of one air molecule's interactive journey with an air-foil (shape of an aircraft wing), starting from the right, colliding with the leading edge of the air-foil, and creating an oscillating elastic collision effect along the bottom of the air-foil. You may ask what construct X is supposed to be. It represents the surrounding air-molecules. Look at this illustration:



Partial Lift Effect Demonstration 2

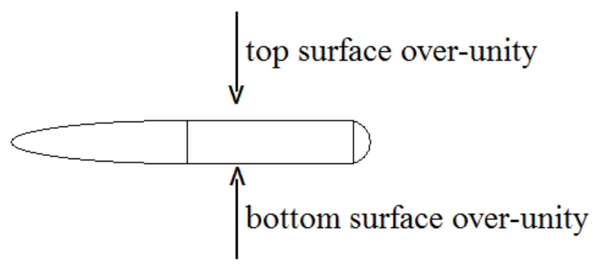
And now for a more complete illustration:



Partial Lift Effect Demonstration 3

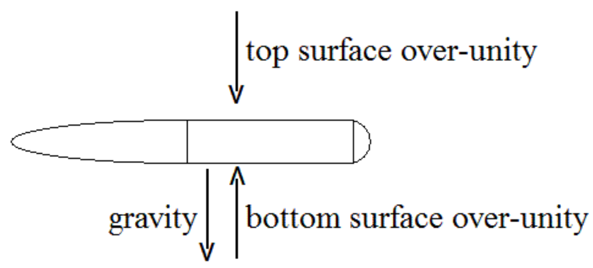
Now you may ask me to give you a precise mathematical explanation of how the surrounding air-molecules is supposed to behave in the same manner as a solid large object like construct X. That is quite impossible to do. It is impossible for a human being to accurately visualize the dazzling multitude of collisions taking place during flight. The best we can do is understand the theory and appreciate the macro-effect. To understand the macro-effect, think of when you created that amazing water bomb when you jumped into your swimming pool. What happened to the water you displaced? Some of it moved sideways, but a lot of it shot straight up into the air. And the more impulsive force your bomb applied to the water, the faster and higher the water shot up into the air. Now replace yourself in that scenario with a generous amount of water, but instead of just dumping the water into the pool, give it a good thrust straight into water inside the pool. The same effect (though not equal in magnitude) will happen. In the case of flight, the air colliding and bouncing off of the *leading* edge of the aircraft wing creates the same effect as you jumping or the water being thrust into the pool, smashing into the air beneath and above the wing. Granted, water cannot be compressed, while air can be; but the effect is still the same. In fact, the effect is a lot more powerful because of air's inherent compressible and elastic nature. Because water is a lot less elastic, we can see from the effect of the water bomb that after the water shoots up into the air and comes back down, the water settles back into a smooth surface without shooting back up into the air again. Air on the other hand will "shoot back up" multiple times because of its elastic nature. In this way, the air molecules perform the function of the multiple small objects in the opening demonstration of this section, but at the same time it also *simulates* the function of the *second* large object.

Very well, now we have established how over-unity plays some kind of part in flight. That is, the leading edge of the wings impart a certain amount of impulsive force to the air molecules in front by pushing them downwards and upwards. The wings then reclaims a much greater amount of impulsive force back from the "oscillating" elastic collisions with the air molecules against the bottom and top surfaces of the wings. But this partial explanation have now revealed a problem. As you may have already guessed, from demonstration 3 above we can clearly and obviously see that the over-unity effect does not just happen beneath the wing, but also *above* the wing. Which means the two forces would cancel each other out, as in the illustration below:



Full Lift Effect Demonstration 1

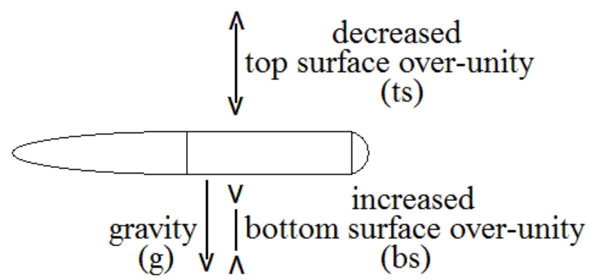
This leaves us back at square one, with no lift and no flight. But hang on. Aren't we forgetting something? If we are going to obey the laws of physics we must take into account *every* force that is present during flight. What is the one force constantly present during flight that we have not considered yet? Gravity of course! It seems like an obvious thing to say, but we must take gravity into consideration and see how it affects the over-unity forces pushing against the wings during flight. So let's add gravity to the picture:



Full Lift Effect Demonstration 2

Now we have another problem to solve. Newton's third law states that there must be an equal and opposite reaction to that of the force of gravity pushing the wings down against the bottom surface over-unity force. At first we may be tempted to do a simple force vector addition (that is, simply add the force of gravity to the bottom surface and top surface forces). But have we learned anything yet? This is where it gets more complicated. When gravity pulls the wing down on top of the already highly active elastic collision area beneath the bottom surface of the wing, this will in fact increase the efficiency of the over-unity effect below the wing. Remember what we discovered about what makes the over-unity effect more efficient? The greater the difference in mass between the large objects and the small objects, the greater the efficiency. The difference in mass between an aircraft wing and a single air molecule is massively huge.

Adding gravity on top of the already occurring over-unity effect below the wing should increase the over-unity effect quite dramatically. So gravity increases the efficiency of the over-unity effect below the wing, increasing the pushing force against the bottom of the wing. Furthermore, if gravity pulling down the wing increases the effect below the wing, it must also *decrease* the effect above the wing. Aha! This then must be how level flight is achieved. Let's illustrate this situation:



Full Lift Effect Demonstration 3

For level flight to be achieved, it is obvious that the top surface force plus the force of gravity must equal the bottom surface force:

$$ts + g = bs \quad (18)$$

or

$$g = bs - ts \quad (19)$$

The numbers in the following table are by no means proven or meant to be exact. Their purpose is simply to help us better understand what happens during flight. For the sake of ease, we'll represent the forces at work as they relate to the actual weight of the aircraft. Gravity (g) will represent the actual weight of the aircraft. Four cases are presented:

BEFORE GRAVITY AFFECTS AIRCRAFT	AFTER GRAVITY AFFECTS AIRCRAFT	FLIGHT EQUATION					
			ts	+	g	=	bs
g = 0 kg	g = 50 000 kg	**BEFORE**	100 000kg	+	0kg	=	100 000kg
ts = 100 000 kg	ts = 75 000 kg	**AFTER**	75 000kg	+	50 000kg	=	125 000kg
bs = 100 000 kg	bs = 125 000 kg	**RESULT**			125 000kg	=	125 000kg
		level flight is achieved					
g = 0 kg	g = 100 000 kg	**BEFORE**	100 000kg	+	0kg	=	100 000kg
ts = 100 000 kg	ts = 50 000 kg	**AFTER**	50 000kg	+	100 000kg	=	150 000kg
bs = 100 000 kg	bs = 150 000 kg	**RESULT**			150 000kg	=	150 000kg
		level flight is achieved					
g = 0 kg	g = 200 000 kg	**BEFORE**	100 000kg	+	0kg	=	100 000kg
ts = 100 000 kg	ts = 0 kg	**AFTER**	0kg	+	200 000kg	=	200 000kg
bs = 100 000 kg	bs = 200 000 kg	**RESULT**			200 000kg	=	200 000kg
		level flight is achieved					
g = 0 kg	g = 250 000 kg	**BEFORE**	100 000kg	+	0kg	=	100 000kg
ts = 100 000 kg	ts = 0 kg	**AFTER**	0kg	+	250 000kg	>	200 000kg
bs = 100 000 kg	bs = 200 000 kg	**RESULT**			250 000kg	>	200 000kg
		level flight is not achieved					

The first three cases yield flight, since the force of gravity is cancelled out by the difference in force between the bottom surface and top surface over-unity effects. In the fourth case the force of gravity is too great, and even after increasing the bottom surface over-unity and decreasing the top surface over-unity to its extremes, gravity still overcomes the difference between the bottom surface and top surface forces. Looking at the mechanism of lift this way we can clearly see that in most cases, for level flight to be achieved, the bottom surface force must be much greater than the force of gravity in order to overcome the additional top surface force. Fortunately, as we now know, gravity automatically takes care of this for us, by simultaneously increasing the bottom surface and decreasing the top surface over-unity forces. This is the wonder of flight and how it is made possible by combining over-unity with gravity. Gravity actually cancels itself out!

Here then is the true definition of flight:

> Flight occurs because of two simultaneous over-unity effects. The first effect happens when the wings of an aircraft experience continuous bursts of billions and billions of impulsive forces imparted by surrounding air molecules. This is caused when the wings of the aircraft imparts a certain amount of impulsive force to the surrounding air by parting the air with its leading edge, and then reclaims a much greater amount of impulsive force back from the air in the form of elastic collisions along the bottom and top surfaces of the wings. This initiates an over-unity effect, and creates a powerful pushing force against the bottom and top surfaces of the wings. The second effect happens as a result of gravity pushing the weight of the aircraft down on the over-unity forces below the wings. The result is an increase in the bottom surface over-unity and a decrease in the top surface over-unity. It is this difference that is created between the bottom surface and top surface over-unity forces that counteracts the force of gravity, causing level flight.

This is an important definition, since many in the aviation industry hold that it is the airflow *over* the wings that causes lift, not under. Now we can see it is in fact the airflow under the wing. In the next section though, we will see that the airflow over the wing does in fact serve a very important purpose in conventional flight.

Also, many say that lift is caused when the air pressure difference between the bottom and top surfaces of the wing "suck up" the wings and therefore the entire aircraft into the air. The wings are in fact being pushed up from beneath.

So, flight is made possible by over-unity, and mankind has been using it for a just over a century now without knowing it.

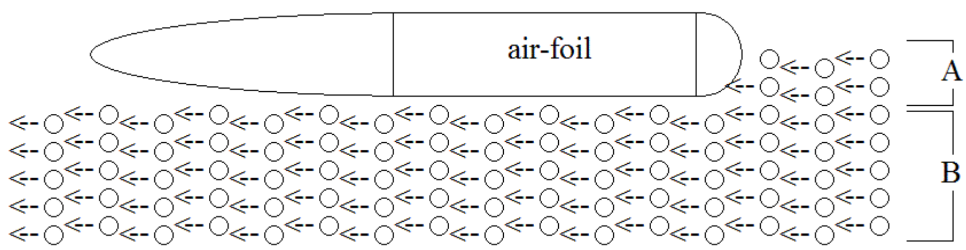
"An object that is heavier than air does not travel on air except by over-unity."

- J.A. van Wyk

SOME POSSIBILITIES

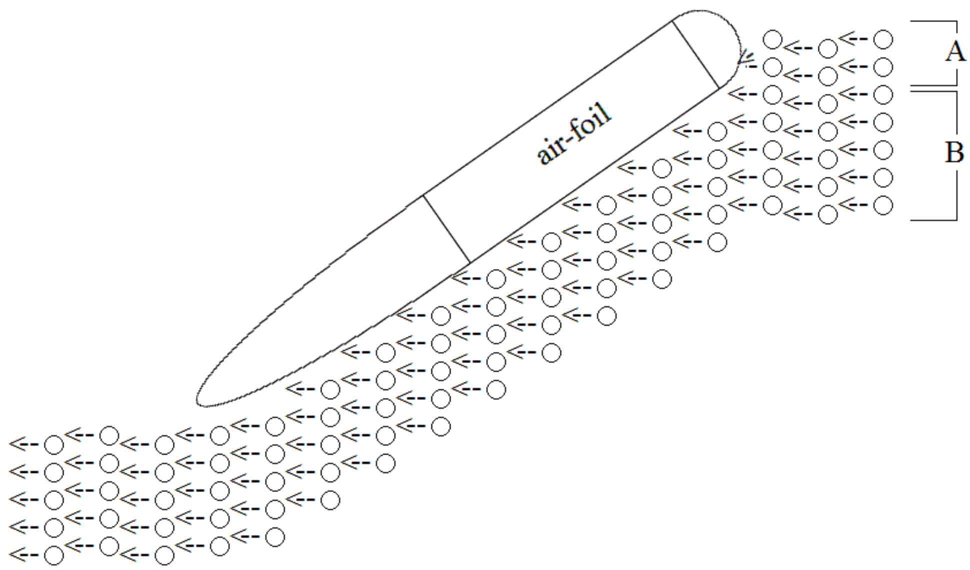
The following ideas are by no means proven. They are just some thoughts I have had relating to over-unity and flight:

1. If air is a substance with near-elastic properties, and the over-unity that can be created with it is powerful enough to lift a 300 000kg aircraft off the ground, then it should be possible to create all the free energy we need out of thin air. It should also be possible to solve all our transport problems using air. And since we are not “burning up” air or using it up in some other way, but only using its elastic properties, it will never run out.
2. With free energy and flight it should be possible to create aircraft with unlimited range of motion inside a planet's atmosphere, since they would not need or run out of fuel. The weight of an aircraft will also be dramatically reduced, since the aircraft would not need to carry any fuel.
3. Any planet or moon with an “elastic” atmosphere has infinite energy and a surface for travelling already available.
4. We saw in the previous section that during conventional level flight the top-surface over-unity pushing down on the wing initially works against us before gravity (also using over-unity) counter-acts it. If we could find a way to *artificially* create an over-unity effect below the wing only, without creating one above the wing, this would make the lift a lot more efficient. Obviously this will not be possible using conventional means like having an aircraft wing moving through the air. Let's look at some ideas:



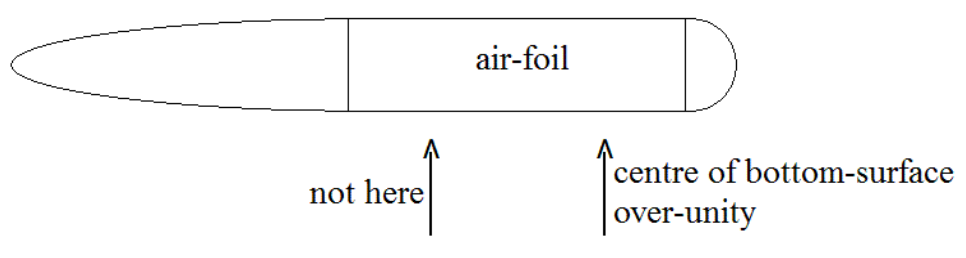
Artificial Lift: Possibility 1

This first possibility is to have the wing remain stationary while “moving the air”, by aiming an air-stream at the leading edge of the wing so that no air bounces over the top edge of the wing, but only along the bottom of the wing. In the above illustration we can see that for the over-unity effect to work, we must have a generous stream of air (B) below the wing for the stream of air bouncing of the leading edge (A) to smash into. The above situation creates a serious problem though, which is well known in the aviation industry and is commonly called “stalling”. Remember in the previous section I mentioned that while the airflow over the wing is not responsible for creating lift, it plays a very important part in conventional flight. The airflow (over-unity effect) over the wing ensures that the wing and therefore the entire aircraft remains level and stable. This is because the wings of the aircraft are experiencing a force from one side (the front) only. Without a pushing force on top of the wing to keep the wing stable, the following would happen:



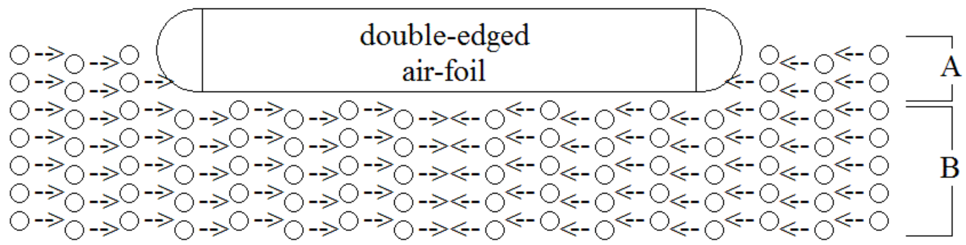
Artificial Lift: Possibility 1 Side Effect

From the above illustration, we can see that without the pushing force on top of the wing, the force below the wing will tilt and flip the wing. One of the major reasons this will happen, is because the centre of force of the over-unity effect below the wing is not in the middle of the bottom surface of the wing, but more to the front of the bottom surface, as in the following illustration:



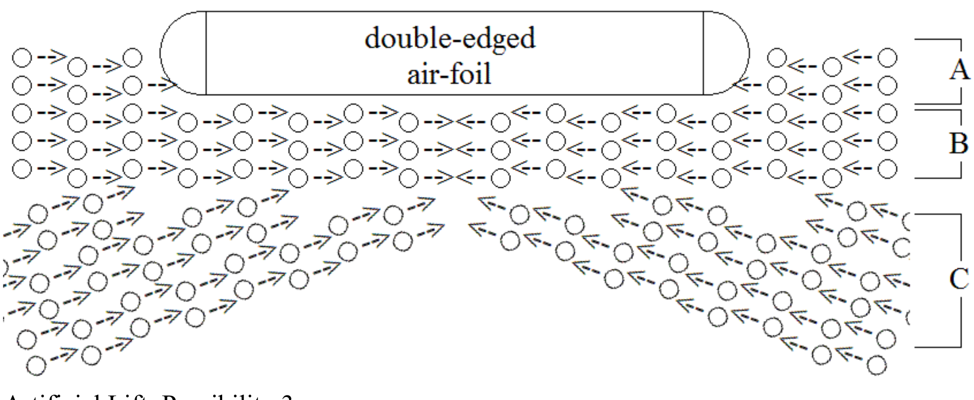
Lift Centre of Force

The reasons for this, and why the shape of an air-foil is the way it is, goes beyond the scope of this very basic explanation of flight. One reason we are interested in though, is that apart from lift, the aviation industry also desires the most efficient *horizontal* motion an aircraft can deliver. But for the sake of trying to find the most efficient way to create lift only, we are not interested in horizontal motion here. We are simply interested in creating vertical lift (VTOL). If then we are going to get rid of the top surface force, we need to counter-act the unstable "flipping" reaction of the wing to the once-sided force of the oncoming air. One way is to create a double-edged air-foil. That is, an air-foil with two leading edges and no trailing edge. We would then direct air-streams from both sides, thereby counter-acting the flipping effect, as in the following illustration:



Artificial Lift: Possibility 2

Again, this air-foil would not be very efficient in horizontal flight, but that's not our concern here. The above situation may in fact have an added benefit. The two air-streams are directed at each other and would collide near the centre of the wing. This may increase the over-unity effect, making lift more efficient. Using this benefit, we could try another possibility to further increase the efficiency:



Artificial Lift: Possibility 3

In the above situation, you cannot think of air-stream C as simply "bouncing" off of air-stream B, as a succession of tennis balls would bounce of a rigid surface. Instead, what happens is the elastic collision area beneath the wing becomes much more active. This is because a series of balls bouncing off of a rigid surface in succession can be compared to traffic moving smoothly. An air-stream that interacts or "bounces" off of another air-stream behaves more like a traffic accident at an intersection, creating a chain-collision effect.