INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

International Journal for Research in Applied Science & Engineering Technology(IJRASET)

Exploding Space Travel
A fresh approach to space travel to achieve higher speeds

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Abstract: *Space travel is one of the fields in which even the byproducts of the inventions made are very much useful to the world. This concept strives to approach space travel with a new perspective that might be contradictory to the conventional thinking process.*
Index terms: *physics of explosion,space, concept of space explosions.*

I. INTRODUCTION

Space travel,from ages has been one of man's prime areas of interest. His quest to explore the universe has begun but has not reached his targets yet. Technology that he gets is limitless but he is limited by his speed at which he cruises through the heavenly bodies.The intention of this idea proposed is to have a fresh look at space travel which may be contradictory to the conventional methods. This method may be the answer for achieving high speeds as well as distances traveled.

II. PHYSICS OF EXPLOSIONS

A.Explosion:

An explosion is a rapid increase in volume and release of energy in an extreme manner.All this energy released is equally distributed into nature either by sound or heat or imparting kinetic or potential energies to particles associated with the explosion.

B.Energy:

when a bomb explodes, the energy is distributed as follows
Total energy =heat energy+sound energy+ energy imparted to the fragments associated with the explosion.
  The energy associated with the fragments is a very small fraction when compared to the total energy. This energy is in the form of kinetic energy.
The energy imparted to one fragment will be

   $E= 1/2*m*v^2$

   m= mass of the fragment

   v=velocity of the fragment

If there are 'n' equally sized particles, the energy is multiplied by the number of particles

   $n*E = n*(1/2*m*v^2)$

Since the energy is fixed, the velocity of the fragment and hence the distance traveled by it can also be determined.
About 75% of the energy of an explosion is converted to heat or sound and only 25% of useful energy can be used for generating the kinetic energy.
An explosion can be controlled by controlling the causes of explosion.
Factors or causes may be materials used for creating the explosion, the atmosphere around the explosion etc.
Control over an explosion is needed because :

   a.To prevent damage or action that is not necessary.

   b.To control the amount of debris during the explosion.

   c.The debris control is a key feature to this proposal.

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The Munroe effect (classical definition: conical space at the forward end of a blasting charge to increase the explosive's effect and thereby save powder) can be used to obtain shaped charge to obtain a focused explosion on a fragment and thereby transferring more energy to focused fragment.
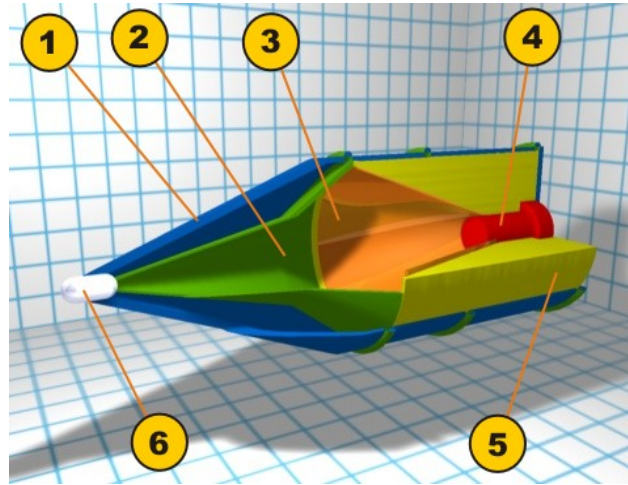
1: Aerodynamic cover
2: Air-filled cavity
3: Conical liner
4: Detonator
5: Explosive
6: Piezo electric trigger

The above figure is a simulated graphical model of Munroe's model for shaped charged
The explosion preferred for this application is by nuclear detonation as the energy is very high. Such high values of energy are needed to provide sufficient kinetic energies.

III.   SPACE

Space is a perfect podium for the demonstration the Newton's laws of gravitation.
First law:
A body continues to be in a state of rest or of uniform motion until or unless compelled by an external force.
Space has the minimum friction and hence a body continues to move with uniform velocity in a straight line when a force acts on it.
Second law:
The force exerted on the body is equal to the product of mass and acceleration gained by the body.
Third law:
Every action has an equal and opposite reaction.

- On earth or any planetary surface, the newton's law cannot be perfectly demonstrated because of various factors mainly friction.
- Friction occurs due to relative motion between two objects and hence tends to bring the relative speed between the objects to zero
- On earth, atmosphere and land are the biggest sources of friction for any moving object
- In space, There is no land or atmosphere. It is mostly vacuum
- the only elements of friction in outer space can be other heavenly objects irrespective of sizes.
- In space,if any object is applied with a force then it will accelerate to a certain level as per the Newton's second law which states that F=m*a.
- Now, after it has gained that acceleration,it will move with a constant velocity forever in a straight line until another force tries to change it's course.

www. ijraset.com   *Special Issue-2, October 2014*
SJ Impact Factor-3.995   *ISSN: 2321-9653*
International Journal for Research in Applied Science & Engineering Technology(IJRASET)

- Hence no more fuel is required is outer space in accelerating the object (in this case, a space shuttle).

IV.   CONCEPT OF SPACE EXPLOSION

- The whole universe is believed to be formed by the big bang theory which implies that a big explosion created the universe.
- The energies and thereby the velocities of heavenly bodies were distributed during the big bang.
- The idea is to reinstall the same big bang theory but on a smaller scale when compared to itself.
- A controlled explosion can produce not only debris as per calculation but can also achieve velocity of the focused part of explosion.
- The Idea is simple. By focusing an explosion in outer space, we can achieve better speeds for space travel.
- Consider an analogy of a hand grenade.
- A certain time after the pin is removed from the hand grenade, it explodes.
- The above explosion is not focused.
- A few modern grenades have focused explosion (hollow charge) for maximum damage.
- An explosion that can be shaped by Munroe's effect and can be focused on a specific fragment which can be a satellite or any space travel vehicle.
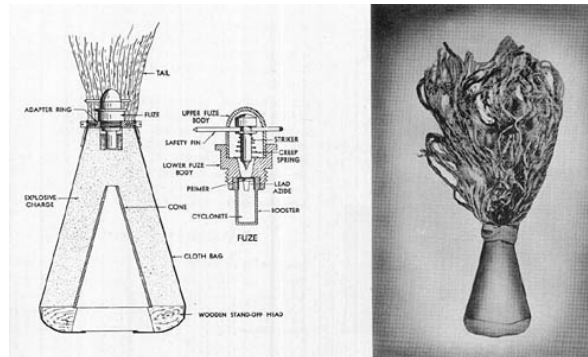
-
- Consider the explosion of a focused grenade.
- Rather than considering the damage caused by the focused fragment, consider the speed achieved and distance traveled by it.
- This can be calculated by using laws of energy and kinematics.
- The fragments from normal grenade can travel as far as 200m from the site of explosion with a damage range upto 6m..
- Bigger the focused fragment, more will be the energy gained by it and hence more will be the acceleration gained and distance traveled by it.
- Consider a space shuttle as a focused part on a huge grenade i.e. whose explosion is focused on the space shuttle.
- Consider an explosion to occur in such a way that proper protection is offered to the shape shuttle.
- The space shuttle along with its protection gear is arranged as a single fragment.
- Hence, the space shuttle fragment will get the energy out of the explosion.
- The source of explosion to be nuclear is explained as follows:

As told earlier,
$$E=1/2*m*v^2$$
Let m=1000kg
v= 50,000kmph (say)
Substituting the 'm'and 'v' values
$$E= 1/2*(10^3)*(5*10^4)^2$$
$$=25/2* 10^{11}$$
$$=12.5*10^{11} \text{ Joules}$$
$$=1.25TJ \text{ (TeraJoules)}$$
(1 Joule= 1 $N*m^2/s^2$)
(1TJ=10^{12}J)

Similarly,

| S.No.	Velocity to be attained (x*10,000kmph)	Energy to be supplied (TJ)
1	6	1.8
2	7	2.25
3	8	3.2
4	9	4.05
5	10	5

The blast yield of the "fat-guy" nuclear bomb (That destroyed Nagasaki during the world war-II) is 88TJ.

From the figure (weapon energy distribution) it can be seen how the energy is distributed.

Hence the yield energy is distributed into three parts and energy more than the required (1.25TJ) is obtained even if the energy usable is 2.5%.

This is for one fragment of the explosion. For 'n' fragments the total usable energy gets distributed.

The energy used by the remaining fragments = total energy - energy imparted to the focused fragment.
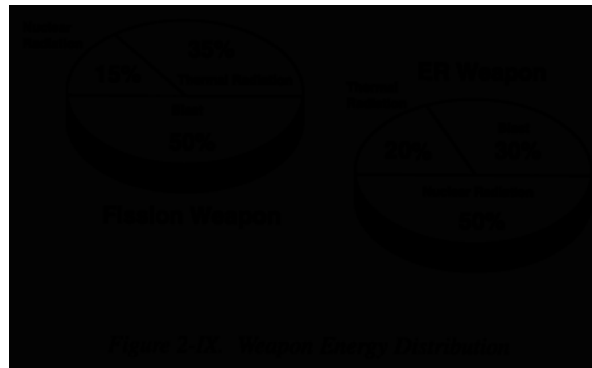
(2.5 percentage of 88TJ =2.2TJ)

- Hence the required velocity is achieved.
- Going by the analogy, a focused grenade is to be built so that it can be exploded by a remote control.
- In our case, a space shuttle is the focused fragment of the grenade.
- The remote control here is a ground station.
- The grenade is built entirely in space.

After the explosion:
- Enormous amounts of matter gets destroyed
- Since all of this is in space, Newton's space can be applied peacefully.
- The unfocused fragment gets its part of energy and departs from the grenade.
- A part of the energy is focused on the focused fragment and hence is delivered to it.
- The energy as per the law will provide a acceleration   to the fragment with which it will move in a predefined straight line.
- Hence the path of shuttle is set.

Problems faced with this method and possible solutions:

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1.*Material:*

    A. The material to make,not the bomb, but to construct the shaped charge model can be collected from the space debris.

    B. If space debris is not a viable options,the resources from the heavenly bodies can be utilized.

2.*Survival of the temperatures*:

    A. Bigger shell which will act as a protective measure to the space vehicle.

    B. Starlite. The product of plastic that can survive upto 10000 degrees centigrade. Coating the space vehicle with multiple layers of starlite should suffice the need.

3.*Secure location for the explosion*:

    A. There are lot of empty spaces between planets. Detonating a nuclear bomb in these spaces will do either no damage or no considerable amount of   damage to the planets or other celestial bodies.

Advantages :

    1.Since this entire explosion takes place in space, minimal damage is done to the planet.

    2.Velocities that are greater than that achieved by the existing propulsion systems can be attained.

    3.More number of shuttles can be sent for space exploration at a single go.

    4.The above can be done by increasing the number of focused parts. (setting up a pipeline from the source of energy and the shuttle(s))

    5.Can be used to travel farther distances in space.

ACKNOWLEDGMENT

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