

Re: Solar powered lasers in space

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On 20 Sep, 22:35, Willie.Moo...@xxxxxxxxxx wrote:

I doubt that. If you are going to travel at 0.03c you want an ion drive that accelerates to 0.05c (say)

Why do you doubt it? What's the basis? You state a conclusion and provide absolutely no technical data to back it up. I find that maddening! lol. The way to look at this is propellant fraction, power level and thrust.

A 1 gee acceleration is convenient for interplanetary travel for a variety of reasons. First off, you have gravity aboard ship during the transit. Secondly, you get to where you're going pretty fast. You fly halfway to your destination, carry out a powered pitchover, and arrive at zero altitude and zero speed at your destination. With clever programming the gee forces slide linearly from your start to your finish so that you are acclimated to the destinations gravity by the time you get there.

So, lets look at a 1 gee spaceships performance. You may remember these from elementary physics

$$d = 1/2 a t^2$$

$$v = a t$$

So,

$$t = v / a$$

and so

$$d = v^2 / (2a)$$

Where d= distance travelled

a = acceleration

t = time

v = velocity

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So, the velocity needed to attain the halfway point is

$$v = \sqrt{d * a}$$

And the total delta vee to achieve the trip is

$$V = 2 * v$$

and the time in hours needed to make the trip is

$$t = V / 9.82 / 3600$$

So, we can construct the following chart

m kps hours LSD

Earth to d $\sqrt{d*a}$ t u

Moon 3.86E+08 61.60 1.74 2.03%

Mars–close 7.50E+10 858.20 24.28 24.88%

Mars–far 3.75E+11 1,918.98 54.28 47.25%

Venus–close 4.50E+10 664.76 18.80 19.88%

Venus–far 2.55E+11 1,582.43 44.76 40.99%

Ceres–close 2.70E+11 1,628.31 46.06 41.89%

Ceres–far 5.70E+11 2,365.88 66.92 54.55%

Mercury–close 9.00E+10 940.11 26.59 26.90%

Mercury–far 2.10E+11 1,436.04 40.62 38.04%

Jovia 8.55E+11 2,897.60 81.96 61.93%

So sailing the inner solar system in a 1 gee spaceship would be like sailing the Pacific in a cruise ship. You'd have islands like the moon, that are only hours away. You'd have nearby territories like Mars and Venus that are only a day or two away. Then you'd have the outer planets that are weeks away.

The factor u is the propellant fraction for a Laser Sustained Detonation (LSD) rocket operating with an exhaust velocity of 3000 km/sec (kps)

Now, lets look at the power levels needed to achieve that, and the propellant fractions. The first thing we realize is that to have reasonable propellant fractions we need exhaust speeds to match the flight speeds.

$$V_f = V_e * \ln(1/(1-u))$$

so

$$u = 1 - 1/\exp(V_f/V_e)$$

So, V_f/V_e must be less than or equal to 1 to have reasonable u. 3,000 kps – is a specific impulse of 30,000 – which is damned difficult to achieve. And power to weight of the engine must be

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tremendous. So, an ion rocket with 5,000 sec Isp – won't cut it for this application. (it would do fine for 1/10th gee or 1/100th gee operation) some sort of laser sustained detonation of inert working fluids would be needed. This is nearly an exact analogue of nuclear pulse propulsion, but the energizing force comes from pulses of laser energy accurately directed at a thrust structure.

The power level to produce 1 kgf is

$$F = \dot{m} * V_e$$

$$P = 1/2 \dot{m} * V_e^2$$

So,

$$\dot{m} = 2 * P / V_e^2$$

and so

$$F = 2 * P / V_e$$

This is in newtons and 1 kgf = Newton / 9.82

so..

$$F(\text{kgf}) = P / (4.91 * V_e)$$

And with $V_e = 3,000 \text{ kps} = 3e6 \text{ m/sec}$ we need 14.73 MW per kgf of thrust. That's 7.37 quadrillion watts of power. And this is the low power solution!!! haha.. The world has a few thousand super tankers. To operate a few thousand interplanetary freighters with this capacity requires tapping into $1e20$ watts of power. Such capacity would tie humanity together across the interplanetary frontier.

At 1MW per sq meter – the sun centered laser array would have to cover $1e8$ sq km of area. A disk 11,283 km in diameter – about the size of the Earth – a very small fraction of the sun's total surface. Four disks 6,000 km in diameter equally spaced around the plane of the ecliptic would provide adequate power for a fleet of such spacecraft.

I am afraid I was simply thinking about energy. To go to 0.03c with minimal energy you need ion drive. If you have plenty of energy you indeed don't need to worry about that.

There is one other point. If you have populated the ecliptic with lasers, you will (presumably) be able to phase lock them. You will have a telescope 300million kilometers in diameter. In earlier postings I have said how a number of problems are all tied together. Now let us see what sizes you can see 10 parsecs distance. Now a parsec is by definition 1sec of arc with observations separated by 6

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months. Therefore 10 parsecs means that viewed from the target the telescope is subtending 1/10 sec of arc. 50 deg per radian 3600sec per degree. That is 1/180000 radian. This means we see objects some 7cm across. Clearly the gas in interstellar space + gravitational lensing will prevent us getting anywhere near that figure. We should have little difficulty though in seeing any planets.

We will know fairly quickly whether or not we are in a race, another possible explanation of the Fermi paradox.

Humanity today consumes 10 TW of power – 1/10,000,000th the power level postulated here. Needless to day, any industrial activity we wanted to carry out on the planets or in free flying space colonies, could easily be provided as well. This might also form the basis of maintaining government control over this far flung array of humans, to keep them from using high tech to attack one another – and stopping the possibility of interplanetary war.

You are assuming that war is the result of competition for resources. I say it is saying your prayers the wrong way.

A laser light sail requires no propellant, but power levels go way up for both high thrusts, small sail size, and for ton of payload moved.

There are two ways to do this. One is to heat a body to very high temperatures and use the black body radiation for propulsion – this requires some sort of plasma containment system that can't be built. The other (if we are to have high gee forces) is to use a mirror to reflect nearly all the energy incident on it. In order to limit the size of the mirror.

To make logistics simple, it would be nice to have the mirrors operate like wings do on aircraft – exerting 100 kg/m² or more. A disk like spacecraft that had multi-mode capabilities would be interesting. That is, a spherical payload encircled by a mirror disk, that might also operate as a radiator propulsor short term – for landing and operating out of sight of the sun...

A laser is monochromatic. This means you can use simple dielectric sails which do not heat up. A metal sail is hopeless at anything like a high energy.

Black body thruster

$$Pr = 1/3 \text{ ar } T^4$$

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Where σ = radiation constant = 7.57×10^{-16} J/m³/K⁴

T = temp K

P_r = radiation pressure (watts/m²)

To exert 100 kg/m² requires a temperature of 45,000 K – and the power output of that square meter is

$$j = \sigma * T^4$$

Where j = watts/m²

T = temp K

σ = stephan boltzman constant = $c * \sigma_r / 4$

= 5.67×10^{-8}

$$j = 5.67 \times 10^{-8} * 45,000^4 = 232.5 \times 10^9 \text{ W/m}^2$$

So, 1/100th of a meter squared, would be a square 10cm on a side, would produce 1 kg of thrust, and consume 2.32 GW of power!!! Compare this to 14.7 MW of power needed for 1 kgf in the LSD rocket!! But the great advantage here is that no propellant is needed.

This is a black body radiator, some sort of cavity containing a magnetically stabilized plasma – that efficiently absorbs powerful laser energy. By encasing the cavity in a reflective paraboloid that transmits the laser energy but reflects the bulk of the plasma radiation in a desired direction, the surface can absorb laser energy from one direction and emit radiation in another direction. By having a certain amount of plasma that stores a goodly amount of energy – thrust can be maintained for a period of time – without direct illumination. Excellent for landing and takeoffs, where laser energy may be a hazard (the plasma itself would be a hazard if the cavity developed any leaks! – and the exhaust itself would also be a hazard – it may be possible to use the plasma energy directly by venting it for landing and take off.

A mirror based system has the following relation;

$$\text{Pressure} = 2 U / c$$

Where U = power per unit area, c = speed of light, Pressure = N/m²

So, 100 kg /m² = 982 N/m² implies $U = 3 \times 10^8 \text{ m/sec} * 982 \text{ N/m}^2 / 2 = 147.3 \text{ GW/m}^2$ – which is less than that required for the radiation pressure mode – and actually, the radiation pressure mode above, doesn't include the momentum that is obtained from absorbing the light energy in the first place.. which can help or hinder the thrust effects depending on how the cavity is arrayed relative to the energy being beamed in.

Of course to keep temperatures under control requires VERY VERY highly

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reflective mirrors. Before the invention of GBO films I would say such things would be impossible. But the advent of GBO films that have reflectivities in excess of aluminized coatings – suggest that continued development along this path would allow mirrors that absorb less than 1 part per million of the incident energy. This means that the wings need only dissipate 150 kW/m² – which implies an operating temp of 1,269 K – which can be sustained by known materials. So, the ability to construct GBO type films that are 99.9999% or more reflective – would allow the attachment of winglets that when illuminated by very powerful laser pulses, could exert sizeable lift on the vehicle.

1.47 GW per kg is 100x more energy per unit thrust than the 3,000 kps LSD propulsion system. So, the energy level is 100x as great – requiring 400 disks 6,000 km in diameter circulating above the solar surface beaming energy continuously to spacecraft criss crossing the solar system – at an average power of 1e22 watts !! Even at this higher level, the sun produces 38,622x this figure!! So, we have hardly impacted its ability even with this level of power usage.

You will have to get to that point gradually.

I think you will find that people want to live in settlements.

I think you are not familiar with the psychology, history, and sociology of human beings.

They
try to strike a compromise between a city with its congestion and a homestead.

Only by necessity. If you could obtain the services and benefits of a big city like New York, without having to put up with New York – most people would do it.

New York is where all the action is taking place. That is basically why people are there. In point of fact you could get rid of New York without a fantastic amount of space engineering.

Consider an age where everyone has an O'Neill style spacecraft with maybe 5 people on board, 2 adults and 3 kids. They travel in packs of 10 to 100 in a cluster. Each spacecraft has maybe 500 to 5000 humaniform robots. Each spacecraft also has in a box, the entire complement of personalities of the human race – past and present. The

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cluster is in direct instant communication with each other. The cluster is also in contact through an interstellar network with every other human settlement. So, the latest skills and personalities and so forth – are available online – and can be made available via humaniform robots – and avatars. So, if for example you needed a medical treatment you would have your robo-doc software – with the latest upgrades available. If you needed anything really, you could make it on your own world. You could travel from cluster to cluster – and your space colony has a number of interplanetary and interstellar cruisers on board – piloted by robots and software... and there's virtual reality.

Also, note that there is a difference between people who have not reproduced yet, and those who have. That is, children have a tendency to grow restless, break away from the group, find mates, and return to a group once they have their own kids.

So, kids when they reach a certain age will break away from their parents and group, and stick around communities where they can meet others their own age. This will likely be in the guise of making it on their own – despite the bulk of the work being done by automation, or education, despite the availability of excellent education software – it would likely be known though as socialization – and cross fertilization.

This can also be done by developing terrestrial technology. One small point. You are now implicitly postulating VN machines. If all the work is done by robots the colony is VN. I personally believe O'Neill is only credible in a Von Neumann context.

How long should we wait. Go now for energy – quite right. VN is at the end of the road, it has to be.

This might change even as well, if humaniform robots can take on super accurate human sexual characteristics. That way sexually active teens and young adults could interact sexually with a small group of sexually compatible humaniform robots – selected from the entire population of humans who ever were recorded – and have trysts with them. This would work best if one could construct a virtual reality world – similar to Star Trek's holodeck – where one could interact with 'the world' – a virtual community consisting of the sum total of human beings operating real time in a super computer virtual reality. This would have the great advantage in that sexually maturing adults could safely and completely sample a wide range of human cultures and extract from the virtual world, personalities that suited them. In the end, mating could be carried out by exchanging genetic materials – or in more advanced form – exchanging genetic information with 'the world'

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If done properly this would lead to a vitilization of the remote community – and the full participation of every human in the larger community of man.

Ditto on terrestrial possibilities.

Somewhere there is a compromise that suits the majority of people.

This is only by necessity of our limited technology involving primitive forms of communication, transportation and production.

I am not so sure. The question I am asking is why do business executives keep travelling to meetings which are completely unnecessary, even with present day technology.

If the lifespan of people radically increased, if people started having "second families" you might have more of a case.

I have a case based on the fact that humans throughout most of their history lived in small bands of nomadic people who subsisted in the environment without outside assistance. Sociologically we are set up to operate that way. We adapt to the 'pressures' of civilization because of the huge benefits it confers each of us. The reason modern society accentuates sexuality and sexual adventure is because its one of the few hooks that society has for promoting super sociable behavior. Folks who have a satisfactory sexual coupling and are happily building a life together are viewed in modern culture as a nearly unattainable goal, rather than as a normal maturation process once we are somewhat past our teen years. That's because folks in this idyllic situation become much less controllable and tend to go their own way.

I presume that such demands for social control will be removed in the not too distant future and we will operate once again in a saner age where such large scale socialization is not needed.

We are basically designed for a hunter gatherer existence. Tis is perfectly true. Hunter/gatherer bands were (probably) round about 50–100. With that number of people objectives are fairly well agreed.

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The case, as I see it at the moment, is for a solar powered Earth with a population of 9 billion. Space based solar power may quite possibly be the answer.

I agree. I am working on low-cost terrestrial solar and I'm exploring the potential of augmenting that with space based power in the next 5 to 7 years. Beyond that, developing what I call reforming satellites that redirect laser energy – and then sun centered powersats within the next 15 to 20 years.

One of the facts about human habitation is that 90% of the worlds population lives on 10% of the surface. If you do have abundant solar power, one of the things that could be done is to desalinate and make the desert fertile. People who are not space enthusiasts will ask the following questions.

1) Lots of people live in the so called Sahel region of scrubland which is on the southern fringe of the Sahara. Can this area be made reliably fertile?

Yes. Thin film low cost inflatable structures that have well defined optical properties can be made into low cost habitats, and low cost green houses. Combined with desalinated seawater available at low cost –large areas can be irrigated without the problem of evaporation and degradation of the soil. Aeroponics is also promising in this context.

2) Could cities be constructed in air conditioned domes, again in the Sahara?

Yes, with adequate power from space. These might be considered elementary tests that must be solved before building habitats off-world.

These are all arguments which will be raised by the skeptics. I don't think there will be any skepticism about energy. I don't think colonization will be a stated goal for a long time.

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NASA has already been sold on the idea. It has produced the report. It is putting quite a bit of effort in.

They will get money to look for possible collisions and do lab work to develop possible solutions. They will write reports, and it will go away. But unless a collision is imminent they will not build anything of substance.

However, the same data in the hands of a commercial developer could garner significant money today.

Consider that the US government – the world's richest government – will spend \$2.9 trillion in 2008 – which is a large segment of the \$12 trillion US economy

http://en.wikipedia.org/wiki/Us_federal_budget

But consider now that the global economy produces \$65 trillion and that 9.5 million high-net-worth people have a nest egg totalling \$32 trillion. Most of this is liquid – and looking for reasonable investments.

http://en.wikipedia.org/wiki/World_wealth_report

If a group of scientists along with a number of high-tech vendors got together and made a reasonable plea for a high-tech investment along the lines we're describing –with some sort of immediate payoff (marketable security worth a goodly fraction of the present value of the future income) – you might be able to garner \$3 trillion to \$4 trillion very quickly!! And do significant things again very quickly – without a lot of the politics.

If you can get onto a downward spiral of costs then things will indeed happen quickly. In terms of politics I think that one significant factor may well be "What is the smallest quantum of money which will start the ball rolling.. You can get significant amounts of solar energy with a fairly large collection area fairly simply. To have a cheap space launch based on lasers requires another stage.

Once you successfully delivered on the promises made on the first go round – you'd find another \$8 trillion to \$10 trillion available...

At that point –supposing you'd provide a 30% or more ROI – the whole project becomes self funding. You'd get a bubble – but it would be supported by increased outputs and so forth. In all, you'd kick up the global economy from 4% per annum to something like 14% per annum – which would support your growth.

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That is, success would be self-propelled after the first and second go round. In short, you'd be bankable.. and you'd have access to the world's banking assets at that point – and after that, access to your own self generated revenue stream. This is the benefit of profits. You can use them to sustain growth, while throwing off payments to those who took the early risk.

I profoundly disagree.

You are profoundly wrong.

We have indeed been lied to about Iraq,

That's one type of lie. There are others. For example, that smoking cigarettes will make you sexy. Or that drinking to excess will make you happy. Or that spending in excess will make you successful.

These lies benefit those who tell them, at the expense of those who believe them.

Cigarette advertising has now been banned.

but let us remember this. It is the Iraqis and not the Americans that have produced 4 million odd refugees. 2 million within Iraq and 2 million in surrounding countries. I shall be going on a tour of Syria late on the October. There are 1m Iraqis there.

America created the concept of the rouge state shortly after opec flexed its muscle over oil supplies. This after the US oil production reached its peak and entered secondary production. The US knew that it only had 40 to 50 years before the world's oil production reached its peak as well. (this is quite different than the the world running out of oil – which won't happen for 200 years or more) – which is now only 10 years away. The market is already adjusting to the changing value of oil – increasing the price from \$10 per barrel in the 1980s to over \$60 per barrel today.

All rogue states were oil rich countries – and together they comprised 50% of the world's oil reserves.

N Korea is a rogue, but is not rich. I will agree some of the Middle

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Eastern rogues are rich.

The US had plans to put these reserves in storage – and let the others use their oil profits to expand output above that which oil companies would have deemed prudent in a world where ALL producers were competing in the market – this had the impact of moderating the price of oil – at the expense of those who were nominally benefitting – by accelerating their usage of oil. This benefitted the US by stabilizing prices at around \$12 per barrel – 6x the price enjoyed by the consumer when the US had excess capacity (oil was \$2 per barrel before 1970s shortages). Now, when Saudi Arabia, Indonesia, and other major OPEC members are entering secondary production – the US finds reason to institute regime change in these former rogue regimes – and bring them online.

I would like references to this. The problem I have always had with linking US foreign policy to oil is that spending money on defense is simply not a cost effective way of obtaining oil. Far better to spend your money on nuclear power (peaceful), terrestrial solar power, more exploration if not space lasers.

Clearly this long term policy was planned – there are even papers available from US state department and others. Plainly it was a way to moderate the supply of oil in a way the benefitted the US relative to all other players in the market. Obviously this is our primary motivation. Just compare our attitudes of WMD in Iraq and need to invade Iran because of a nuclear power program versus our continuing lack of interest in Pakistani nuclear weapons – which already exist, and the nuclear program of North Korea (which was of no real interest until the North shot off a rocket capable of reaching US homeland)

The one reason for attacking Iran is failure in Iraq. The fact is that when the US withdraws Iran will take over the country, either in terms of a more or less client state (which I think they would prefer) or as an organic part of a united Persia.

I hold no brief for Bush, it is all his handiwork,

Bush, like any President is doing his best for America and all Americans. America elected him. He truly believed we would be greeted as liberators. We were not. He had no game plan for if he was wrong. Now he's stuck and he's reviled. This really is incidental to our long-term strategy. If in the summer of 2004 a great peace settled over Iraq, and a free Iraq inspired Iran to throw off the yoke of their ultra-religious zealots and embrace freedom –

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and both nations were pumping tons of oil into the world market – and oil was \$22 per barrel – and this made it so that Putin would have to kiss the West's ass for money – Bush would be hailed as a great genius and liberator and would be given the Nobel prize by the Europeans as a means to apologize for not helping him.

BTW – The current plans for Iran include "letting the anthill sort itself out at the end of the strikes". Quite clearly nothing to the US liking will emerge. There is even the possibility of an intervention by a third country. Possibly Putin under the unberella of the Central Asian Federation.

That is, the reasons for going in don't matter as much as what is achieved after we got in.

The question we should be asking is why we weren't greeted as liberators? And what would it have taken for that to happen?

9/11 can be called an intelligence failure. I think the week after the Iraqi people pulled down statues of Saddam, there was a similar intelligence failure – they hadn't prepared the ground for victory, or given sufficient thought to how to handle the various factions and bring in their neighbors in a positive way.

Of course in retrospect, Bush lost New Orleans to Katrina largely due to his inattention to details – so, getting the details wrong isn't surprising.

I believe that a better President who paid attention to the details that mattered – COULD have affected a regime change and gotten out with the oil flowing. Those details may involve some culpability. Halliburton, and others close to the VP may be involved. Their greed may have alienated stakeholders in the Iraqi population who needed consideration to make a peaceful outcome possible. If so, this needs to be revealed and corrective action taken.

Ditto for Afghanistan, although its not so important to American interest as an oil rich state, but Afghanistan is important to long term relations with the muslim world. The fact that a gas pipeline from Russia to the Indian ocean got built while heroin still flows unaffected – is only one indicator that we are not doing all we can for American interests in the muslim world – but we are here caving in to powerful special interests in America under the guise of serving America.

History is what actually happenned, not what might have happenned. One thing that someone looking into America from the outside, I am in fact British, finds hard to appreciate is the fact that America wins large

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numbers of Nobel prizes, but has repeated intelligence failures in the area of public policy. The official CIA report on 9/11 shows almost criminal negligence – not to mention of course the initial error of supporting OBL in the first place (that is when he was fighting Soviet forces).

getting rid of
Saddam Hussein opened up Pandora's box.

Nearly all muslims in Iraq hated Saddam. More than they hated each other. This was the fundamental reason Bush felt we would be greeted as liberators. And he was in the main right. But details count, and he got the details wrong – if he even knew of them in the first place. The intelligence community needed to get their act in gear and really get the details right. Like I said, getting rid of Saddam could have inured to our benefit. WE let things get out of control because details were not attended to. That was too bad for us.

However it does rather rubbish
the Rousseau theory.

Not at all. If New York City were under the dictatorial control of a single person who raped them financially, someone who knocked that guy out would be greeted as a hero – depending on what happens after!!! We did a lot of things wrong after – bowing to field commanders and others with short term tactical goals – at the expense of long term strategic goals. There are lots of different factions who live in New York and they don't all like one another. If they were set at each others throats for 20 years to empower a dictator – and then that dictator fell. There would be a day or two of celebration – but without strong police, fire, and public services, without immediate economic benefits – no matter how slight – flowing from the liberation – without identifying and eliminating individuals who form the centers of resistance before the liberation fight is started – New York would quickly fall into turmoil.

It has nothing to do with Rousseau or the propensity of New Yorkers toward violence. It has everything to do with going into something without getting all the details right. I mean, a surgeon can say you need to have an open heart surgery to clear a blocked artery and tell you all the benefits that will have for you. But if the surgeon gets one little thing wrong – you're dead. So, there's a lot of planning and a lot of training and a lot of thought going into your surgery before he starts cutting. If the surgeon tells you you have a blocked artery and you don't, and then doesn't pay attention to some detail – ordering nurses from the OR who bother him with those details – and you die as a result – are you going to believe the surgeon that says,

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well I tried, some people don't make it, he had a weak heart! no – you'd sue his ass for negligence. But before you did that you'd collect the evidence. You'd get the video of the OR, you'd get testimony from dismissed nurses, and so forth. Of course if the surgeon also works for the courts, he might suppress certain evidence and deny access to certain people and information – and all the while question your family who was trying to cash in on the death of their father/husband – would you side with the surgeon?

Being a surgeon is tough. Being a president is tough. But we need to think clearly about what's going on and do what's appropriate given our situation and opportunities at this time. I think a new president can work with the UN to increase their level of involvement – while reducing US involvement – and attempt to try again being greeted as liberators. That is, we don't want to encourage those who think that by bombing Americans they can get them to leave. This will encourage extremists to bomb Americans at home. As many military folks warned – America doesn't have the resources to have a war in Iraq, a war in Afghanistan and meet our global military commitments – so, we need the UN before we go in. So, let's go get UN support like we did in Bosnia and the first Gulf War. And then leave it to them – but getting the details of the hand off right – so that THEY are greeted as liberators. See?

But fortunately, I don't have to solve this problem – and so, it doesn't matter if I'm right or not. But this is my thought on the subject.

My thoughts are different. Dictatorship arises when democracy fails to answer the problems of a society. Islamic society contains one major contradiction. Islam sees the spiritual and secular rulers to be one and the same. This is one factor that generates tension perhaps more than any other.

Get past personalities and so forth and look at the facts.

In fact I would put things the other way round.
Governments in fact reflect the prejudices of their populations.

There is an interaction. Despite what we tell ourselves markets and governments are incapable of doing what we expect of them. This is a scientific fact. Arrow proved it. There is not good solution – and this knowledge is used by specialists to expand the control of specialists at great cost to everyone else.

That is, people make irrational choices collectively that they wouldn't make individually and so often they make collective choices

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that are not in their own interest. Condorcet first noted that cycles of voting can occur over long periods. Arrow explained in detail why in the 1950s. Rather than correct this shortcoming, specialists have exploited this shortcoming to manage political processes. Where applicable, and to a lesser extent, the narrow shortcomings of the market due to this are exploited by marketers to increase profits. But the major unraveling of government began in earnest in the 1950s and have accelerated ever since. The military's failure in Vietnam to win the hearts and minds of the American public, has highlighted the importance of infowar to modern warfare. So, this hasn't helped candid public discourse either – and a possible return to representative government.

Hearts and minds have not been won in the Iraq war either. This last paragraph is a little bit contradictory. The military has tries to win hearts and miinds, but has failed. It's knowledge is clearly incomplete, its control of the sources of information incomplete.

You know my perennial hobbyhorse AI. Now in the future television programs are going to be sent to us via the Internet. Google is going to control our hearts and minds. Now Google is in fact international. I have talked about Radio Reloj (which in fact is the name of a radio station in Cuba) in the context of SETI. Sync pulses can be observed tens of parsecs away.

Quite clearly the demise of Radio Reloj will have a lot to say about how we perceive the word. We have to be certain that AI provides a neutral picture. So far Google seems to be doing.

There
was anti semitism in Germany after WW1. Hitler did not create it. He exploited it in an extremely cynical way, but it was there all the time.

Anti–semitism still exists. But there is an interaction. Governments can serve as a bulwark against irrationality, or they can catalyze irrationality. In the modern age of the rise of special interests at the expense of society at large, irrationality has increased. It is easy to see in our erstwhile enemies. Harder to see in ourselves.

Absolutely right.

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I was absolutely aghast when Einar, I think i was, suggested that religious groups should set up colonies in space. She should go with me to Syria and continue to the Iraqi border.

Religious practice has devolved as well as political practice into the irrational. Many modern scientific minds believe religion to be akin to noise or the definition of irrationality.

They ignore that there is a mysterium tremendum – as Freud called it – that is an integral part to the human experience and part of being human. It is often the most cherished aspect of being alive.

I think we should distinguish between religion and belief in God. Science is neutral about belief in God as such. As far as organized religion is concerned the difficulty I have with it is the intolerance it shows. There are a lot of religions saying contradictory things. They can't all be right. Either one of them is right or they are all wrong. Organized religion claims to have a red phone – dial "A" for Allah. He does not seem to have taught them how to live in peace.

Younger folks may feel it when they fall in love – or when they give birth, or raise children.

One in three astronauts who went to the moon had profoundly moving experiences due to their journey. Some sought psychiatric care, others started new age type movements, still others entered religious orders.

Such feelings are also common – though less frequently – among survivors of great tragedies or great battles.

Others seek such 'oceanic' feelings by imbibing mind altering drugs, or engaging in a variety of self-hypnotic practices, or religious practices or retreats.

It is very likely that anyone who lives aboard a spacecraft that leaves Earth and is transported across the solar system would have a large percentage of their population transformed in a religious sense by the experience.

A genuine religious experience? Possibly, but organized religion is not about religious experience. It is about in groups and out groups. I will kill you if you don't say your prayers as I say them. Religious experience on the other hand tends to be "Buddhist" in a very broad sense, and spans the different traditions.

I will touch on religious morality later.

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One Jesus, one Buddah, on Lao Tzu, one Ghandi, one Martin Luther King – in a 100 generations is highly disruptive to society and the powers that be. They are crucified, shot, deported, or transform their society – or both – having 5% to 10% of the entire population EACH generation having such oceanic beatific and transcendant insights into the human condition – is an unknown factor in human affairs. Against such a reality – religions brought along from Earth will be radically altered and may be of no account whatever.

How can this be cured.

What? Irrationality?

Well, Freud showed that belief in a male God figure is directly connected to the drama of a child's relationship with his or her father. Change that relationship – and belief in God is diminished.

Alice Miller showed that adult fascination with power money violence and death – stems from the drama of a child's powerlessness. Change the way children are reared so that they are empowered and self actualized, and fascination with power money violence and death disappear.

I am not so sure.

Joseph Campbell showed that fascination with religions stem from the meaning it gives to our banal existence. It is the hero task of the modern age to create deeply satisfying meaning from rational thought and scientific understanding and capacity. This has not been done. If it is not done science will serve to fuel our self destruction and the promise of science and rational thought will have failed us.

One aspect Campbell discussed quite extensively, is his concept of the monomyth – this cycle of adventure, discovery and rebirth – common to all religions according to Campbell – stems from our history as a species that expands its range by means of innovation – creating in the process frontiers – regions that are newly habitable by dint of new technology, but contain only resources and no competitors. The frontier occupies the same emotional space as heaven, and the drama surrounding the development of the frontier – mimics the drama and meaning surrounding entry into heaven. Campbell suggested that this mythic connection may provide an answer for science to provide the bulk of humanity deeply meaningful and accurate connections to science and technology. Space travel, with its endless frontier, offer a very reap potential field for this development.

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This may be true. I think though in a very real sense the type of framework provided by Organized Religion may in fact stop one thinking in this sort of way. The Pilgrim Fathers did not go because they were awaestruck with America. They went because James I wanted rid of them.

Ken Arrow showed that individual human value was non-transitive. Therefore any method that adds up measures of human value to make collective choice are subject to certain types of failure. This failure explains cycles in voting and cycles in markets. This discovery was immediately siezed by advertizers marketers and politicians to exploit for individual gain at the expense of the general markets and political processes. There has been a slow unravelling of both over the past 50 years. This trend will continue. At present there is no solution to Arrow's Impossibility Theorem.

I have suggested the adaptation of Wassily Leontieff's input output method of econometric analysis be adapted to create a system I call VECTOR MONEY. Since ordered lists of numbers also are non-transitive like human values, its easy to show they are not subject to the same limitations outlined by Arrow. I have even gone so far as to suggest a method involving distributed decision making using vector money and PDAs connected by internet – as a means to supplant all existing political and economic systems. In the face of decreasing effectiveness of existing systems, any workable system will displace older systems naturally without revolution or any sort of concerted action. All that's needed is that people be presented with the opportunity to use something that works and they will ultimately abandon systems that don't work.

Cetrtainly not by taking a wishy wasy Rousseau position as you seem to.

I never mentioned Rousseau – so I don't know where you got that.

Governments have a responsibility to eliminate prejudice as far as they can.

Why? Government is a product of human behavior. It doesn't exist apart from humans. So, its proper scientific study is as a subset of psychology.

Yes indeed, but I want governments to be elected that attempt to

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better the lot of Mankind. This is one factor that will influence me in my decision of who to vote for.

It is also possible that AI will influence the course of government. Asimov talked about the laws of robotics. With the rise of digital feeds Isaac Asimov immediately springs to mind. Content should be provided and indexed impartially. Asimov I believe would have wanted his robots to combat antisemitism. The holocaust did happen though neglect as Asimov would put it. No robot should stand by.

They have a duty also to protect their countries (obviously)

Why? Countries are merely ideas that exist in the heads of people. They are nothing more than ideas. How do you protect an idea? Why is protecting an idea worth a human life?

This fascination with survival and dominance has been traced by Dr. Miller to the powerlessness children feel when they are ignored by adults. These disempowered children vow, and make good on on those vows, to never be powerless as an adult. This fuels a fascination with power, money, prestige, size, violence and death. Children who do not feel disempowered do not have such a fascination and are far more rational.

The rise of nationalism corresponded to changes in child rearing practices in the 1880s – and have created a self-propagating series of events that have made the identification with national identity stronger with each succeeding generation. This is another disruptive trend. Governments have not been shy in exploiting this connection and creating institutions that institutionalize the abuse of children for the purpose of building more compliant citizens – while at the same time, eliminating troubling sections of their early training – against the wishes of academia.

Clearly when we connect emotionally with governments because we feel they can protect us from other nations – we do so because we personally feel threatened and by those nations and this sense of threat is diminished by the association. Unexplored is the culpability of our nation in creating the situation in the first place – or the possibility that everyone would be better off if we got rid of nationalistic notions in the first place. Rarely is this idea even broached – such as John Lennon's song – IMAGINE.

Today we do not feel as much threatened by other nations as by individuals who want to kill us and are often not too worried if they kill themselves too.

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but not to push the arms race
forward and always be prepared to sit down to discuss disarmament.

Why? Identifying ourselves with a nation is a means to possess power when we would otherwise feel powerless. It evokes deep seated fears and irrationalities that go right back to our earliest years when we were powerless before all adults. No one sits down and talks disarmament, unless they are talking from a position of strength, and then they are forcing a lesser nation to disarm or face the dire consequences of a superior force. This is what you mean when you say that. You don't mean the US or whatever nation you're from – would sit down hat in hand and agree to be bullied around by a superior force do you?

You are believing many of the lies that have become part of the global culture over the past 50 years. This warps and perverts your thinking.

There is no reason to have nations in the modern age. There is a reason to have a global police force – aimed at enforcing a peace, and a global military to disarm everyone uniformly – and then like George Washington – lay down his arms and return home when it was done.

Nation states have a monopoly of force. I believe that a world without nations would be an ideal to strive for. Quite clearly it is also an idea that no one wants. Looking at the situation from Britain we have the EU. Now governments, including Gordon Brown want to bring about a common European sovereignty. Quite laudable you might say. Governments have negotiated an EU treaty which the voters are throwing out. Gordon Brown is not going to face a referendum here, he will get the treaty ratified by Parliament. Governments are pursuing what might be termed rational policies as far as they can. They are definitely in advance of their populations.

Man is not Rousseau, Man is the Lord of the Flies.

Men and women are neither. People make ideas live, they don't live for ideas.

The greatest threat humanity faces isn't from space. Its from ourselves. People sense that, and so talk of space shields and space travel even, makes no sense to them.

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This is true.

Yes and one of the greatest threats we face is when we objectify other human beings on the basis of race, religion, national origin, and so forth.

People want answers to the above questions.

No, they want security that was denied them as children, they want support of their fellows, and they want to be accepted by their fellows, and they want to be satisfied that they are doing all they can for their families and themselves while they pursue happiness for them and those they love no matter what changes occur in the world. Any society that reliably and effectively offers this to everyone alive will succeed. At present various nations promise this to their citizens and where they fail attempt to cast the blame on others outside the nation. This leads naturally to conflict, and irrational acts of violence against the scapegoats. The only real solution is to actually fix the problems we know about – and not use failure modes for gain by the special interests – and create a social system that works, and back it with industry and science – and make it freely available to all – to bring peace and progress to humanity – and fulfill the promise of science and technology.

Iraq is one nation. It is at war with itself.

recently
there was a Poker contest between Man and Machine. I posed in sci.maths that Von Neumann was right (about Poker at least). The minimax strategy works.

This is a game. The real world is more complex. Any game involves a tacit agreement to play the game. Minimax won't help you if one of the players pulls out his six shooter shoots you through the head and takes your wallet.

With this in mind, assuming that cooperation is impossible and conflict is inevitable, then we are led inevitably the violence the converting the civilized world to a version of Beirut. If you are saying conflict is inevitable but everyone can agree on the game – then I would say – why this game and not a different one? If you are saying that the game has certain benefits in searching for better survival strategies – then I would say wouldn't cooperation be better

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suited in some instances.

I think you misunderstand, conflict is part of the game. The Sunnis and Shiites each chose an outcome which led to 4 million refugees.

The point is, we've never had a political system that works because Arrow's paradox shows us that none of the political systems or market systems are capable of fulfilling their promises to us. So it should not be surprising that we are being failed by our political system. What is especially grievous in the modern age is that our understanding of our failures politically have been used by specialists to exercise control over society at large for their benefit – at the expense of society at large.

However the world is not a Poker game.

That is true.

The world is a stag hunt.

That is not true.

It is true that mutual cooperation will provide the highest score but they continue not to.

Let us look at the outcome of a stag hunt. The Tigris and Euphrates are powerful rivers. In the time of the old Babylonian kings 3 crops a year were produced. That is before oil comes into consideration. Nobody would have had to have left their homes there would be electric power 24/7 and the country would be on the road to prosperity. However How basically do you get people to look after their own interests.

Every
side will gain from cooperation.

That is true if we continue to develop frontiers where there are untapped resources with no competitors around to bother us. This is what led to human cooperativeness in the first place.

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It is how you say your prayers – not resources. There is enough in Iraq for everyone there and for everyone to come home.

The problem is convincing people of this.

No, the problem is finding and pointing out the stag. People who do so are uniformly attacked by governments and other special interests who see in the success of this strategy their own demise. We lack an effective frontier on which we all can agree. JFK wanted us to turn our high technology from head to head competition of the cold war, to the far more fruitful competition of the space race.

Did he now. He, more even than Lyndon Johnston, was the architect of Vietnam.

Nations of Earth would compete with one another in developing resources and capacities off world in the frontier of interplanetary space – much as Europe developed sea faring capacities and avoided conflict for hundreds of years – while engaging in powerful competition across the world. This was his vision – that the US would be the first among all nations to develop the opportunities and resources of interplanetary space for the betterment of mankind.

He was shot in November 1963 and in December 1963 Lyndon Johnson and Robert McNamara cut back on the nuclear propulsion programs of the US, the scope and range of post-apollo landing, and spent more money on Vietnam. In the end the US spent \$20 billion on moonships with 5 dead, \$200 billion on Vietnam, with 50,000 dead, and \$2,000 billion on ICBMs, with potential 5,000,000,000 dead.

The irony is that I am not asking for people to be unselfish.

Cooperation does not require one to be unselfish.

In fact in some ways I am asking them to be more selfish.

Selfishness depending on context can be good or bad for society.

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Spoken by a true believer the game theory. You can be selfish and hunt the stag.

The 9/11 hijackers were unselfish when all is said and done. They were in fact the Lords of Flies and were NOT prompted by ...

Women in muslim societies are highly disrespected compared to men – more so than in non-muslim countries. They also are primary care givers to children. Alice Miller and others note that this leads to a generational sort of transaction. Women are abused as adults by men, and so, they subconsciously abuse their sons as children. Their sons grow up to abuse the women in their lives as a means to get even.

Yes and religion (org) also gives a double standard sexual morality. I suggested sending those Iraqi girls from Damascus nightclubs into space. This very much stems from the words on the Statue of Liberty. They have said their prayers the wrong way