

Our future is now

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We have significant space launch assets and capabilities available now. Here is how I plan to use them to transform life on Earth;

1) terrestrial solar power – Sunlight is an off-world resource that steams abundantly to Earth today. Developing a means to capture sunlight cheaply and make it useful to today's energy market is the challenge. This is the first step. The reward? Dominance in a \$4 trillion per year energy market that is growing in real terms 10% and more per year and is capable of 100 fold increase as costs moderate and then decline.

<http://www.usoal.com>

<http://www.mokindustries.com>

2) reusable space launch – taking existing chemical rocket engines and today's electronics and materials – fabricate a multi-stage fully reusable launch system around a common airframe and a common engine set. This is most easily done by buying the space launch assets of major aerospace companies that are seeking to improve high margin businesses. I have detailed designs for a flyback article built around a modified ET airframe with an aerospike engine powered by 5 RS68 pumpsets – and a TPS on the nose. Fold away wings (think Tomahawk cruise missile) deploy subsonically. GPS systems help loitering tow aircraft recover re-entering boosters. A single ET with an inline upper stage (used later as a deep space kick stage) place 75 tons into LEO. Three ETs put 225 tons into LEO. Seven ETs – put 550 tons into LEO. To justify this investment there are two markets that will be served;

a) communications satellite constellation – 660 satellites each massing 10 tons in 30 orbital planes maintain polar orbit around the Earth. Each satellite acts as a communications router with 6 open optical 50 THz data links to nearest neighbors. Each satellite has an uplink/downlink phase array microwave antenna that uses GPS signals to paint stationary doppler corrected virtual cells across the face of the Earth. Simple low cost chipsets maintain communication through a wide range of digital devices including low cost handsets and broadband computer links. \$100 billion per year is earned by the network that costs less than \$60 billion to install. Additional

services include;

- i) basic internet – \$100 billion
 - ii) banking and financial services – microbanking – \$1,000 billion
 - iii) international shipping and trading and tracking services – \$1,000 billion
 - iv) telepresence/telerobotics – \$3,000 billion – service side + hardware sales
- b) 2.2 GW solar power satellite – a 225 ton power satellite consisting of thin film concentrator high intensity PV cells, and free electron lasers – tuned to the bandgap energy of silicon – power large terrestrial arrays at high efficiency, increasing their output 16x from pure sunlight alone – permitting each satellite to earn over \$10 million per week in energy sales.
- c) 4.0 GW solar power satellite – a 500 ton power satellite consisting of thin film concentrator as above – earns \$1 billion per year in revenue for 30 years while costing less than \$700 million to build and deploy.
- 3) Modify upper stage (from inline booster) to operate as reusable injection stage and lander.
- a) Lunar operations – a kick stage puts a direct ascent lander on course to the moon while returning to Earth for vertical descent and landing near the launch point. The reusable lander places 25 tons on the moon and returns it to Earth – an 8 to 10 day cycle time – flown twice per month. The vehicle may also deposit 40 tons one way. It carries up to 40 people on board. Two flights can place 40 people on the moon for a year. A small fleet opens the age of interplanetary tourism and settlement.
- b) Mars operations – modifying the kick stage to execute a 2 year orbit out and back is a simple way to return kick stages to Earth – and send payloads to Mars quickly. The lander and kick stage tether together and spin up –as in the Gemini tests with the Agena target vehicle – to produce artificial gravity. The kick stage has a habitat built into it – launched 'wet' – to allow living quarters in transit. Upon approach to mars the crew enters the lander – climbing the tether from one ship to the other – disconnects the kick stage, and aerobrakes to a landing on the Mars surface. The 2 year orbit is such that 6 months after landing, the kick stage passes Mars on its way back to Earth. The lander then uses its propellant to take off, and meet the returning kick stage, and spend 6 months returning to Earth. Upon approach to Earth the lander and kick stage separate, both aerobreak to a soft landing near the launch center – both are reusable – cycle time 2 years –

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- c) Asteroidal operations – using the lander propulsion system to circularize the orbit in the asteroid belt allows exploration of several asteroids before returning to Earth by firing the lander propulsion system again.

- 4) ICF experimentation – hydrogen fluoride laser initiated deuterium–tritium primaries set off boron–protium secondaries of arbitrary size.
 - a) This is first used to create 50 GW space power systems that use Free Electron Lasers to power terrestrial solar installations without large power satellite. A 75 ton satellite carrying 150 tons of pulse units is capable of operating 30 years without resupply.
 - b) This is next used as a propulsive unit testing a wide range of capabilities

- 5) ICF high thrust high performance drive
 - a) conversion of chemical booster fleet of 5 HLRLVs into 35 interplanetary cruisers capable of sending 500 tons to the moon in a matter of hours, and 500 tons to Mars in a matter of days, and 500 tons to the Asteroid belt in a matter of days.
 - i) Lunar Republic
 - *) First bank of luna
 - ii) Mars Republic
 - iii) Asteroidal development
 - *) asteroid survey
 - **) asteroid return
 - b) build custom fleet of 'handy–size' interplanetary shipping – 35 ships each carrying 20,000 tons of payload operate throughout the inner solar system to support a variety of interplanetary objectives
 - i) Lunar development
 - ii) Mars development
 - ii) Earth development – build industrial ring to support Earth

- 6) Factory satellites – bring tens of billions of tons of raw material from the asteroid belt safely to Earth orbit each year and lift teleoperate factory elements to them Each year., Powered by laser energy beamed to them from GEO, operated telerobotically by people on Earth, and making things more cheaply than they can be made on Earth, and in unlimited quantities without harming the environment – products rain down precisely to where they're needed. Anyone may work from anywhere and receive pay and buy any product. While Earth is a primary consumer, the Moon and Mars are large secondary consumers

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of space made products at low cost.

- a) mining
- b) smelting
- c) industrial goods
- d) consumer durable goods
- e) consumer non-durable goods
- i) food
- ii) paper and wood
- f) space homes

7) Laser powered VTOL MEMs based propulsive skin aircraft widely available – promotes dispersion from major cities and provides personal ballistic transport anywhere within 42 minutes or less.

8) Fuller style 'Cloud Nine' floating cities – made on orbit and deorbited to float. Each 1 km diameter sphere is guided heated and powered by lasers from space – and carries 50,000 people on board. 66,000 cities eventually provide quality food, clothing, homes, jobs and lifestyle for the 3.3 billion of the world's poorest people – allowing them to accumulate rather quickly an asset base for their future. These people will be among the first waves of emigrants off-world, joining the wealthy early-adopters among the stars.

9) Space homes – as the cost of space homes decline to less than the cost of terrestrial homes, more and more people emigrate from Earth. Financial planning software along with appropriate pay scales and banking services worldwide, allow most of the 3.3 billion to retire after 15 years of labor – as fully autonomous industrial robots displace tele robotic labor over the same period. Many elect to buy homes for the first time, and most, having become used to life aboard 'cloud nine' residences, elect to own their own space colony. VTOL ballistic transports gain orbital capabilities in this time period.

10) Improved propulsion – propulsion and power systems for space colonies drop in price to make a mobile interplanetary colony a reality. This combined with autonomous robots and stable financial growth – make this the golden age of interplanetary development. Mars and the Moon gain their own industrial ring – and massive space colony 'parks' are developed throughout the Asteroid belt and beyond.

11) sun orbiting power satellites – long distance beaming of terawatt and more laser energy throughout interplanetary space – along with compact powersats operating within 3 million km of Sol, give fusion generators a run for their money. And provide the basis for first generation laser light sail spacecraft for interstellar voyages. Smaller space colonies are highly automated, and reduced in weight – with improved life support – to carry families across interstellar distances – this includes stasis and longevity research success – along with improved virtual reality and social contextual software.

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12) high mass high energy atom smashers – black holes smaller than atoms but massing more than a mountain range are assembled by colliding shaped pieces of iron-56 at 1/3 light speed or more. Slight variation in collision conditions charge and spin the black holes precisely – precisely engineering their event horizons. A decade of research has the potential to create a new class of engineered product – one capable of warping space and time – and building such things as time telephones (instantaneous communications) – time machines (faster than light travel) – gravity drives (high gee acceleration) – zero point energy taps (unlimited energy) – combined with detailed understanding and mapping of the supermassive black holes at the center of each galaxy, people can travel anywhere anywhen along any timeline in the history of the universe – all in a subjective time – measured in minutes.

With successes in longevity research, many of the people reading this in 2008 will still be alive when this all comes to pass in 2108.

Human numbers by that time will still be under 10 billion – but the vast majority of humans will be in stasis heading toward any of 20,000 stars within 60 light years of Earth in their own space colony laser light sail starships – and awaken to a transformed world in 2228 – Each star system will have fewer than 500,000 persons in them – and when greeted by the automated spacetime portals at each destination – densities will fall even faster as they spread among 10 trillion stars in 10 trillion alternate universes (assuming zero point energy and a host of other highly speculative things)

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