How many people here watch The Big Bang Theory? Ok, now if we were to equate “Jedi skills” with scientific prowess...how many, raise you hands, would consider yourself Amy or Sheldon level? Ok..., who’s about Leonard level? …great, well this is a Leonard Level presentation for those familiar with the show...(slide)

...but for fun, the Sheldon level title is:
Autonomous Resource Synthesis on Mars Utilizing Hydrogen (H2) Inflated Exploration Dirigibles
...or for everyone else.. **Martian Robotic Snowball Making (Moonshining 101) (slide)**

One of the major hurdles in building a Martian settlement (slide Bryan) will be construction materials, especially where gravity, while being 62% lower than Earth’s, still won’t impart “superhuman” strength like the moon. So we’ll need strong stuff...things like steel, aluminum, glasses and ceramics (slide). Now, all of these can be produced from the Martian soil (slide)...but some stuff is still missing...like water and fuel.

Now here’s where it’ll get “inventive” ...imagine a giant blimp or dirigible, composed of a carbon fiber frame, covered by a solar panel skin... kind of like this (hold up prototype), inflated with hydrogen gas, riding the wind above the surface of Mars. (slide) Everyone following so far?

What could we use this for? How about hi-res aerial photography? (camera flash of audience) Resource prospecting (Minecraft slide?). Communication, a data relay or cell tower)? What about manufacturing? (slide) Or perhaps even some day travel? (steampunk blimp slide) Or maybe all of these?

For over a decade several programs like this have been proposed (slide), all with the goal of aerial mapping for future Mars missions. But what if we modify these goals a bit, taking advantage of the Martian atmosphere and gravity in order to ***also collect and create resources*** for future colonists? Things such as water, oxygen or rocket fuel. Everyone with me still?

So here’s the idea: Let’s develop a vehicle, much like the one that lowered Curiosity to Mars, (slide) which will also introduce a dirigible with sensing and mapping equipment, ***and a distillation system to manufacture water from the atmosphere.*** Then, let’s “bottle” the water, use it as ballast and drop it along the explored surface for later recovery.

By deploying a bunch of these airships, we’ll explore the planet, like a Rhoomba vacuum cleaner, leaving along the way a valuable resources before we’ve even landed there.
(slide of bottled water w/mars label & parachute)

Now I’m a “tinkerer” and a big fan of off-the-shelf components. (slide) All of this is possible with today’s technology...we’d just need to scale it up a bit.

So here’s the quick science...much of it pulled from Wiki to prove it’s possible. Sheldon’s out there, try not to roll your eyes. Leonards and Penny’s nod and play along....

On Earth, we have lots of hydrogen, from our oceans (slide) to provide the necessary component of the following **Sabatier reaction**: (named after the French chemist Paul Sabatier)

CO_2 (primary component of Martian atmosphere) + $4H_2 \rightarrow CH_4$ (methane or rocket fuel) + $2H_2O$ (water)

An alternative “stoichiometric equation” big words for “balanced” ...all you Sheldons out there, stop rolling eyes. Penny’s keep nodding...

$3CO_2 + 6H_2 \rightarrow CH_4$ (rocket fuel) + $2CO$ (carbon monoxide) + $4H_2O$ (more water)

Now NASA is using the additional process to recover water on the International Space Station: (slide)

$2H_2O \rightarrow O_2 + 2H_2 \rightarrow$ (respiration) $\rightarrow CO_2 + 2H_2 + 2H_2$ (added) $\rightarrow 2H_2O + CH_4$ (discarded)

...and by adding a little electricity from wind or solar power we can generate O_2 and recover H_2 for recycling back into the system...keeping the balloons afloat. Add heat and we get Carbon useful for manufacturing:

CH_4 + heat $\rightarrow$ C (remember this) + $2H_2$. (slide)

Now I see the Sheldon's are smiling...

For everyone else...well basically, ***we're building a giant floating solar powered ice-cube maker that doubles as a high altitude camera, can collect atmospheric gasses (think "Bespin" for all you Star Wars fans) (slide) and can also be used as a cellphone tower so that ET can call home.*** And when they've run out of hydrogen and fallen to the ground, the machines can be refuelled to work like giant snow-cone machines by whoever finds them.

This process will be almost entirely autonomous and when combined with Martian soil, would help us manufacture raw materials like iron, steel, aluminum, glasses, ceramics, concrete, fertilizer, photocells, fuels and coke ...not the drink, the chemical used in refineries (slide)

Now while deploying the "floating ice cube machine" if we lower this to the surface (slide with Ted Tague from latest update http://www.kickstarter.com/projects/639194571/hades-micro-furnace/posts) (laser pointer)...not Ted...the steel thing next to him... we can produce many of the materials just mentioned.

(Ted, this is the part I would like to introduce you from... along with your furnace if you can make it?)

This is Ted Tague. In November he successfully Kickstarted the Hades Micro Steel Refining Furnace (slide) to, as he put it "change the economics for schools and small institutions to allow them to work with steel, to experiment with different alloys and to create steel-based objects: sculpture, parts, whatever." I like the "whatever" part...it goes well with a Mars Colony, "on the rocks".

His goal for Hades was "to develop a small scale steel production and experimentation furnace available for anyone to build for under $10,000 - 50-100 times less expensive than commercial solutions." (slide of refinery)

If we use his "relatively inexpensive, transportable" furnace as a smelter, with the abundant raw materials such as Iron oxide ores (slide of Martian surface composition), Sulfur, Silicon, Carbon (remember C in the ice-cube equation), CH_4 Methane (rocket/furnace fuel) and the O_2 we make from water, we can produce construction materials for the colonies. All at a fraction of the price normally affordable to only large corporations and government agencies.

Perhaps the beginning of Crowdsourced Planetary Exploration and Colonization, before we even set foot on our red neighbor. Thank you.

Humans, Shmumans: What Mars Needs Is an Armada of Robots and Blimps

BY ALEXIS MADRIGAL 10.29.09
http://www.wired.com/wiredscience/2009/10/robotarmada/

The **Sabatier reaction** or **Sabatier process** involves the reaction of hydrogen with carbon dioxide at elevated temperatures (optimal 300-400 °C) and pressures in the presence of a nickel catalyst to produce methane and water. Optionally rutheniumon alumina (aluminum oxide) makes a more efficient catalyst. It is described by the following reaction:

$$CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$$

It was discovered by the French chemist Paul Sabatier.

Currently, oxygen generators on board the International Space Station produce oxygen from water using electrolysis and dump the hydrogen produced overboard. As astronauts consume oxygen, carbon dioxide is produced which must then be removed from the air and discarded as well. This approach requires copious amounts of water to be regularly transported to the space station for oxygen generation in addition to that used for human consumption, hygiene, and other uses—a luxury that will not be available to future long duration missions beyond low Earth orbit.
NASA is currently investigating the use of the Sabatier reaction to recover water from exhaled carbon dioxide, for use on the International Space Station and future missions. (In April 2010, Sabatier hardware was delivered to the International Space Station on the STS-131 shuttle mission.)[1] The other resulting chemical, methane, would most likely be dumped overboard. As half of the input hydrogen becomes wasted as methane, additional hydrogen would need to be supplied from Earth to make up the difference. However, this creates a nearly-closed cycle between water, oxygen, and carbon dioxide which only requires a relatively modest amount of imported hydrogen to maintain.
Ignoring other results of respiration, this cycle would look like:

$$2H_2O \rightarrow O_2 + 2H_2 \rightarrow \text{(respiration)} \rightarrow CO_2 + 2H_2 + 2H_2 \text{ (added)} \rightarrow 2H_2O + CH_4 \text{ (discarded)}$$

The loop could be completely closed if the waste methane was pyrolyzed into its component parts:

$$CH_4 + \text{heat} \rightarrow C + 2H_2$$

The released hydrogen would then be recycled back into the Sabatier reactor, leaving an easily removed deposit of pyrolytic graphite. The reactor would be little more than a steel pipe, and could be periodically serviced by an astronaut where the deposit is chiselled out.
The Bosch reaction is also being investigated for this purpose. Though the Bosch reaction would present a completely closed hydrogen and oxygen cycle which only produces atomic carbon as waste, difficulties maintaining its higher required temperature and properly handling carbon deposits mean significantly more research will be required before a Bosch reactor could become a reality. One problem is that the production of elemental carbon tends to foul the catalyst's surface, which is detrimental to the reaction's efficiency.

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Manufacturing propellant on Mars

The Sabatier reaction has been proposed as a key step in reducing the cost of manned exploration of Mars (Mars Direct) through In-Situ Resource Utilization. Hydrogen is combined with CO_2 from the atmosphere, with methane then becoming a storable fuel and the water side product yielding oxygen to be liquefied for the oxidizer and hydrogen to be recycled back into the reactor. The original amount of hydrogen could be transported from Earth or separated from martian sources of water.[2]
The stoichiometric ratio of oxidizer and fuel is 3.5:1, for an oxygen:methane engine, however one pass through the Sabatier reactor produces a ratio of only 2:1. More oxygen may be produced by running the water gas shift reaction in reverse. When the water is split, the extra oxygen needed is obtained.
Another option is to make more methane than needed and pyrolyze the excess of it into carbon and hydrogen (see above section) where the hydrogen is recycled back into the reactor to produce further methane and water. In an automated system, the carbon deposit may be removed by blasting with hot Martian CO_2, oxidizing the carbon into carbon monoxide, which is vented.

A fourth solution to the stoichiometry problem would be to combine the Sabatier reaction with the reverse water gas-shift reaction in a single reactor as follows:
$$3CO_2 + 6H_2 \rightarrow CH_4 + 2CO + 4H_2O$$

This reaction is slightly exothermic, and when the water is electrolyzed, an oxygen to methane ratio of 4:1 is obtained, resulting in a large backup supply of oxygen. With only the light hydrogen transported from Earth, and the heavy oxygen and carbon extracted locally, a mass leveraging of 18:1 is afforded with this scheme. This in-situ resource utilization would result in massive weight and cost savings to any proposed manned Mars or sample return missions.

Energy Storage

It has been proposed in a renewable energy dominated energy system to use the excess electricity generated by wind, solar photovoltaic, hydro, marine current, etc. to make methane (natural gas).[3][4] The methane can be injected into the existing gas network which in many countries has one or two years of gas storage capacity. The methane can then be used on demand to generate electricity (and heat - combined heat and power) overcoming low points of renewable energy production. The process is hydrolysis of water by electricity to create hydrogen (which can partly be used directly in fuel cells) and the addition of carbon dioxide CO_2 (Sabatier process) to create methane. $CO_2 + 4H_2 \rightarrow CH_4 + 2H_2O$ The CO_2 can be extracted from the air or fossil fuel waste gases by the amine process amongst many others. It is a low CO_2 system and has similar efficiencies of today's energy system. A 250kW demonstration plant was ready in 2012 in Germany.

Building on Mars:

One of the major hurdles in any settlement development will be construction materials, especially on Mars where gravity while being 62% lower, still won't impart the "superhuman" strength of the lunar environment where gravity is only 16.7% that of earth. So we'll need strong materials...things like steel, glasses and ceramics. All of these can be produced by the Martian soil, which is composed of a large amount of … rust or Iron Oxide.

Steelmaking is the second step in producing steel from iron ore. In this stage, impurities such as sulfur, phosphorus, and excess carbon are removed from the raw iron, and alloying elements such as manganese, nickel, chromium and vanadium are added to produce the exact steel required. ...all of this can be found on Wiki (btw … they could use your support, just $5 or $10... that's my plug)

Iron ores are rocks and minerals from which metallic iron can be economically extracted. The ores are usually rich in iron oxides and vary in color from dark grey, bright yellow, deep purple, to rusty red. The iron itself is usually found in the form of magnetite (Fe_3O_4), hematite (Fe_2O_3), goethite (FeO(OH)), limonite (FeO(OH).n(H_2O)) or siderite ($FeCO_3$).

Ores carrying very high quantities of hematite or magnetite (greater than ~60% iron) are known as "natural ore" or "direct shipping ore", meaning they can be fed directly into iron-making blast furnaces. Most reserves of such ore have now been depleted. Iron ore is the raw material used to make pig iron, which is one of the main raw materials to make steel. 98% of the mined iron ore is used to make steel.[1] Indeed, it has been argued that iron ore is "more integral to the global economy than any other commodity, except perhaps oil".[2]

Over the last 40 years, iron ore prices have been decided in closed-door negotiations between the small handful of miners and steelmakers which dominate both spot and contract markets. Traditionally, the first deal reached between these two groups sets a benchmark to be followed by the rest of the industry.[2]

A relatively new development has also been the introduction of iron ore options, in addition to swaps. The CME group has been the venue most utilised for clearing of options written against TSI, with open interest at over 12,000 lots in August 2012. The introduction of this plan might throw a wrench into those works, pardon the pun.

The Iron ore reserves at present seem quite vast, but some are starting to suggest that the maths of continual exponential increase in consumption can even make this resource seem quite finite. For instance, Lester Brown of the Worldwatch Institute has suggested iron ore could run out within 64 years based on an extremely conservative extrapolation of 2% growth per year.[10]

Iron ores consist of oxygen and iron atoms bonded together into molecules. To convert it to metallic iron it must be smelted or sent through a direct reduction process to remove the oxygen. Oxygen-iron bonds are strong, and to remove the iron from the oxygen, a stronger elemental bond must be presented to attach to the oxygen. Carbon is used because the strength of a carbon-oxygen bond is greater than that of the iron-oxygen bond, at high temperatures. Thus, the iron ore must be powdered and mixed with coke, to be burnt in the smelting process.

However, it is not entirely as simple as that. Carbon monoxide is the primary ingredient of chemically stripping oxygen from iron. Thus, the iron and carbon smelting must be kept at an oxygen deficient (reducing) state to promote burning of carbon to produce CO not CO_2.

- Air blast and charcoal (coke): $2\ C + O_2 \rightarrow 2\ CO$. (remember the graphite in the air generator...and the extra O_2 in the Sabatier reaction?)
- Carbon monoxide (CO) is the principal reduction agent.
    - Stage One: $3\ Fe_2O_3 + CO \rightarrow 2\ Fe_3O_4 + CO_2$ (lots in the Martian atmosphere
    - Stage Two: $Fe_3O_4 + CO \rightarrow 3\ FeO + CO_2$
    - Stage Three: $FeO + CO \rightarrow Fe + CO_2$
- Limestone calcining: $CaCO_3 \rightarrow CaO + CO_2$
- Lime acting as flux: $CaO + SiO_2 \rightarrow CaSiO_3$

Carbon dioxide	95.32%
Nitrogen	2.7%
Argon	1.6%
Oxygen	0.13%
Carbon monoxide	0.07%
Water vapor	0.03%
Nitric oxide	0.013%
Neon	2.5 μmol/mol
Krypton	300 nmol/mol
Formaldehyde	130 nmol/mol
Xenon	80 nmol/mol
Ozone	30 nmol/mol
Methane	10.5 nmol/mol

Mars's atmosphere is composed of the following layers:

- Lower atmosphere: This is a warm region affected by heat from airborne dust and from the ground.
- Middle atmosphere: Mars has a jetstream, which flows in this region.
- ***Upper atmosphere, or thermosphere: This region has very high temperatures, caused by heating from the Sun. Atmospheric gases start to separate from each other at these altitudes, rather than forming the even mix found in the lower atmospheric layers. (Kind of like Bespin for you Star Wars fans... I'll be posting the White House petition soon, considering the amount of signatures collected for a Death Star. This should be a shoe-in)***
- Exosphere: Typically stated to start at 200 km (120 mi) and higher, this region is where the last wisps of atmosphere merge into the vacuum of space. There is no distinct boundary where the atmosphere ends; it just tapers away.

Martian Soils

element	percent composition by mass	possible use(s)
oxygen	40 - 45	breathing, synthesis of water, oxidizer for rocket fuel
silicon	18 -25	computer chips
iron	12- 15	strong building material

potassium	8	synthesis of plant fertilizer
calcium	3 - 5	can be baked to produce lime (for cement)
magnesium	3 - 6	light weight construction material
sulphur	2 - 5	various chemical processes
aluminum	2 - 5	light weight construction material
cesium	0.1 - 0.5	construction of some semiconductors and photocells

The soil of Mars is extremely dry and resembles an iron rich clay-like dusty sand.
It has been demonstrated, using simulated Martian soil, that when the soil is mixed with water it can be used to make quite good "bricks" more than half as strong as conventional concrete.

The Martian soil is rich in minerals containing iron. It is this iron which is responsible for the reddish colour of the planet's surface. In fact, Mars has a distinctly reddish tint when viewed with the unaided eye from the Earth.
Iron is fairly easily extracted from the Martian soil. In the low Martian gravity iron has about the same weight (per unit volume) as aluminum on Earth and is therefore an excellent building material for future Martian pioneers.
Aluminum and magnesium can also be extracted from the Martian soil, but the process requires much more energy than the extraction of iron.

Prepared by the YES I Can! Science Team,
Faculty of Pure and Applied Science, York University

Dynamics of the dirigible:

- Can take advantage of excess H2 from the various stoichiometries in order to retain H2 supplies for balast
- Can generate electricity from photovoltaics
- Can generate electricity from static charge/discharge much like a Tesla coil
- Can utilize heat from the Sabatier reaction #4 for use processing water and as a thermal source for when the balloon transitions to Martian night
- Can utilize all energy sources for navigation
- Can act as a transmitter / transponder / communications relay - Internet uplink with earth (swarm networked)

For example: another resource that can be manufactured if we have the right materials on board these floating monstrosities... Carbon, more like Graphene ultracapacitors or super batteries. One of the Sabatier reactions poops out solid Carbon as a result.. so what if we use the process those guys in LA came up with to produce graphene from lased graphite oxide. http://www.photonics.com/Article.aspx?AID=50784 there would be a possibility of producing power systems that might have recharge capability from static discharges from the dirigibles. Think big Tesla coil, with a grounding strip that crosses an array of drained capacitors. Or a relay station that could do similar... and intercept the charged ship.

Or retrieve it when the balloon needs to land to discharge built-up static electricity. Another potential resource, btw.

Building upon the work suggested in the paper Robotic Rigid Vacuum Airship for Exploration of Mars by S. Pahari
Politecnico di Milano, Dipartimento di Chemica, 32 Piazza Leonardo da Vinci, 20133 Milano – ITALY
sougatapahari@gmail.com
it would also be possible to create a rigid vacuform dirigible shell using injected epoxy shortly after inflation thru flexible hoses within the airframe. Deployment would be automatic with H2 gas being the initial inflation gas providing buoyancy, to be followed by resin injection along the airframe conduits allowing for the airshell to be evacuated of H2 during the water production cycle. This would allow the balloon a longer lifespan for remote exploration, with the Sabatier reactor playing a role as a ballast creator and navigational weight much like the gondola envisioned by Pahari.

Tumbleweeds - Massoud's Kafons: (note, all these things can be used as exploration tools here on earth and potentially in space using the solar winds)

- Sinusoidal wave generators - electrical energy from tethered arrays?
- Wind motion power systems using gimbals within the Kafons - generators should incorporate designs utilizing electromagnetic coil generators
- Magnetometers for prospecting iron rich ores
- Sampling systems - filling empty Kafon legs with top layer soil samples
- Wide area ground level photography - Google Street View for Mars
- Means for dislodging Kafons when they encounter obstacles
- Means for halting motion when Kafons encounter areas of interest
- Subsurface sampling devices: Ice penetrators, drilling systems, sample resource retrieval tools.
- Directional control
- Movement under power
- Heat generators for night operation
- Tracking / Telemetry systems / Swarm networking / Pathway beacons
- Size optimization - Environmental conditions, gravity, wind speed, temperature
- Field repairs
- Surface deposits of Cl, CH4, and other organics
- Water, Carbon, CH4, O2 generator using Sabatier reaction with the means to utilize these products to power the Kafon
- Toy concepts for crowd funding, lights, camera's, etc...
- Under Sea mineral exploration using low frequency wave motion propulsion

http://en.wikipedia.org/wiki/Reynolds_number
Look at the waveform flowing from a cylinder. If we anchored these "Kafon strings" parallel to the wind behind a cylindrical structure (math) we'd create potentially a generator system that would benefit from this. Same with water (perhaps between two columns) and solar wind?

Blimp / Dirigible manufacturers... http://www.rcblimp.net/leasing_blimps.htm

MARTIAN / LUNAR LABOR MODELS:

Construction: Entice construction workers to build habitats with the reward being partial (financing) ownership of the interest, like a Condo, with said interest to be sold or leased to those interested in space tourism with the wallets fat enough to afford it. After all, great care is taken by those with an interest in the proper construction of a home, whether it be under the sea or above it, especially if the builders own a share in it’s occupancy.

Discussions concerning base camp development for the various faces of Everest so that family and friends may visit while their loved ones complete their climbs and celebrate.

LUNAR DISCUSSIONS:

Potential investment companies and their products

http://en.wikipedia.org/wiki/Polyvinyl_alcohol - combined with CNC may have uses in creating coatings and a wide array of medical and industrial products. http://en.wikipedia.org/wiki/Celanese

3D printing houses on the moon using magnesium silicate shipped there by rockets and honeycombed over an insulated inflatable structure. Marketing problems... printer is a 4 legged monstrosity requiring more structure and weight than the 3 legged variety seen on kickstarter.
http://www.3ders.org/articles/20130131-esa-works-with-forster-partners-to-build-moon-base-using-3d-printer.html
Intergovernmental issues considered, it’ll be more difficult to fly because of the need for multi-party talks and lack of truly open market advantages. Aka the Europeon’s won’t be able to actually go there. Come visit our places instead.
Build tracked, robotic solar powered glass extruding furnaces that print tubes along the surface in unique shapes and interconnecting configurations. Add doors, windows and blow in insulation. The nature of expanding gasses from the volatiles in the expanding thermal foam will act to penetrate the wall defects closing any atmospheric leaks. Stabilize the interior by painting with layers of barrier materials, which can include conductive ink networks for power and lighting. Example... use a micro-hematite bar produced by microbes or other small animals to orient micro-LED beads in an electro-magnetic field, then power the grid it’s painted over. These LED layers can then be illuminated as painted e-light panels, and insulated with a top-coat of polymer insulative film. Colored even.

http://www.youtube.com/watch?v=SeqDm9I3yEM Fiberglass Manufacturing Process

Fiberglass Mandrels http://www.youtube.com/watch?v=8Q5YCCXjr6w

Fiberglass Couplings http://www.youtube.com/watch?v=piJFZ6lnMMo

Concrete Canvas Shelter
http://www.youtube.com/watch?feature=endscreen&v=LBHVKFCoYFc&NR=1

http://www.youtube.com/watch?v=LLrGUXk-h0M

By adding a layer to the outside of the inflated structure that could retain water while saturating it, thus conserving the pre-processed resource, the concrete could be hardened...much as undersea footings are poured. Afterwards, excess water can be recovered. Additionally... were the exterior robust enough, it might also serve as a surface for growing materials...such as bio-fuels or algae given the proper pre-configured systems.

PRESENTATION PUNCH LIST:

1. slide presentation
2. contact ignite Amherst coordinators
3. models
    a. dirigible
        i. paint umbrellas
        ii. helium for balloons
        iii. model of Sabater converter
        iv. assemble components
    b. delivery system
    c. explorer system
4. coaster design
5. print-out / shorten speech
6. practice speech with timer
7. contact Ted w/invite
8. contact rest of the people involved in the project (brochures, info, presentations, etc)
9. Goals
    a. Deliver (1) $15,000 Hades Micro Furnace to the Surface of Mars ? Weight?
    b. Deliver (1) Solar Powered H2 Inflated Dirigible with automated arduino based navigation, sensing and communications capability (think webcam) ($1,000,000 - $12,000,000 depending on supplier) http://www.personalblimp.com/images.html http://www.zeppelinflug.de/
    c. Deliver (1) Sabatier Reactor with a mechanism for safe storage and deposition of water onto the Martian surface for later retreival
    d. Deliver (1 or more) Kafon rovers to the surface to begin Mars “Surface View” ask Google
    e. Relay collected data to Earth in real time (no obvious privacy issues, but incredible advertising rights!!!)
    f. Maintain a project budget of under $28,000,000 = value of 2,000 lbs of water in cost to launch from earth at approx. $14,000 per 16oz bottle.
    g. Generate revenue to fund a lunar colony foundation company
    h. Explore possibilities of including crowdsourced biology projects to determine survivability of a worm farm on martian soils in a closed environment. Bring red-worms, dirt and some water to mars and mix with existing soils.

Steel Slag composition & useage:
http://www.fhwa.dot.gov/publications/research/infrastructure/structures/97148/ssa1.cfm

Cost of NASA using Dragon from SpaceX - follow SpaceX pricing sheets. Look for value of primary hull if useable as a component in a multi-hull space habitat in GSO.

http://www.space.com/17909-spacex-dragon-space-capsule-mission-patch.html

3 Month Trip estimate (imagine the AAA advertising?)
http://en.wikipedia.org/wiki/New_Horizons
http://www.astronautix.com/craft/newizons.htm

Crowdsource Offers: “Near Space Ventures” http://www.nearspaceventures.com/
a partner of BarnStorm Studios, LLC or Near Space Industries, LLC a subsidiary

1. Contributors Credits $3
2. T-Shirts $25
3. Postcards (virtual & paper) $10
4. Poster $25
5. Desktop Images $15 (Bryan?)
6. Balloons
7. Models $100 (3D’rs had a guy with a model of a blimp, work with him) Blimps, Balloons, Ted’s Forge, Mine Kafon (all proceeds)
8. Water Bottle $25
9. Worms from Near Space $50 (Sega - Earthworm Jim sponser)
10. Potato from Near Space $35 (Spud Vodka Sponsor)
11. Coffee beans from Near Space w/cup planter $75 (???) w/palagonite soil
12. Packet of Stargazer Lily seeds from Near Space
13. Name a Worm on the Colony
14. Name a Potato on the Colony
15. Cookies or other baked goodies to include ingredients from near space. (cross promotion)
16. Picnic basket from space
17. Drink Coasters (shape of Mars)
18. Near Space Cookies made from all natural ingredients (guaranteed that you won’t want to lose them)
19. Diamond Ring from 80,000 ft. Zales? Hannoush? Gemvara?
20. Mars Ascent Board Game... Climb Olympus Mons!
21. Ping Pong Balls - Highest Pong Drop Ever! Get yours for your next party!
22. $500
23. $1000
24. $2500
25. $5000
26. $10,000
27. $100,000
28. $250,000
29. $500,000
30. $1,000,000 - all of the above and you can sign your name on the ship.

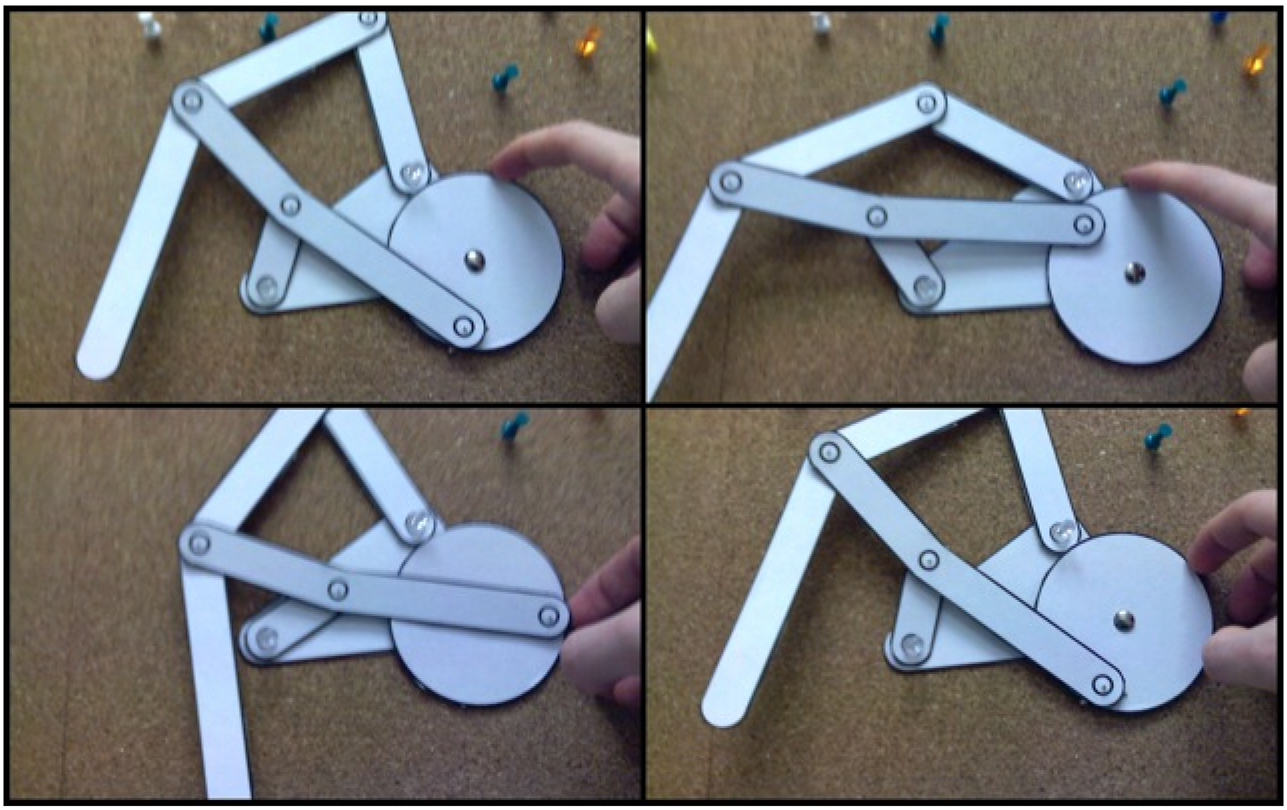
Martian Soil is primarily palagonite:
http://www.mtsylviadiatomite.com.au/basalt-products/palagonite/

Partnering Companies:

Advertisers:
Value projection of per-eyeball advertising: Superbowls average .03 per person for a 30 second ad. 2013 Superbowl drew 111 million viewers, with approx. 200 ad spots (check figures) at $3.5 million per spot, for a total of $6 billion dollars. One day, a little over 4 hours of viewing. Merchandising revenues not even considered. What if... this were a weekly reality TV series, 52 weeks... professionally edited, broadcast in all available markets worldwide? Who'd like to audition? Simon … are you in the house?

Employees:

Sea urchin movement technique... micro movements of legs using coordinated micromotors for undersea or thick atmosphere exploration?.



Two companies potentially useful for both terrestrial and exo-planetary where wind may drive power generation using high altitude thermals. Think big kites... and automated flight systems. Cyber parasailing!!!
http://www.aeroix.de/en/projects/enerkite/
http://www.kitegen.com/en/investment/why-invest-in-kitegen/