

The Big Moon Dig An E-Game Proposal

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 BigMoonDigmmddy.docx
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Draft, proofed

1. Why First ¹

When you is proposes a new project, you need to tell people why you are doing it right up front.

a. "Houston, we have a problem"

Since I wrote the short stories that became the "Hard Squared Science Fiction" series ², new science has rendered their lunar settlement design dangerously obsolete. A complete redesign of their technical aspects and a rewrite of the stories is now mandatory.

The recent space missions Lunar Reconnaissance Orbiter (LRO) ³ and Curiosity carried instruments specifically designed to measure the danger of space radiation to human beings. Their results are now in and not what we wanted to hear. The radiation danger for humans in space is much worse than we foresaw, in fact, about twice as bad.

There are two separate radiation dangers for a manned space mission, Coronal Mass Ejections (CME) or solar storms, and Galactic Cosmic Rays (GCR). Our old lunar settlement design considered CME's to be the worst problem and was designed to deal with them, but this turned out to be wrong, dead wrong.

The real problem is GCR. Galactic cosmic rays are not as concentrated as a CME at its peak, but they are very penetrating. They are present 24/7/365 and they will go through a space suit, they will go through a spacecraft skin, and they will go through a meter of lunar regolith. To make matters worse,

insufficient radiation shielding will work against you. A thin shield only increases deadly secondary radiation.

It is clear that we now have to completely redesign all future manned space mission to deal with the higher radiation levels. Every spaceship and every space settlement you have ever seen depicted is simply a death trap. We need new ideas.

b. A 21st Century Approach

It has been more than forty years since human beings last set foot on the Moon. It is a new century and we need to think in new terms. If we are ever to get people back into deep space we will need new ideas on how to make it happen. Fortunately, 21st century ideas for human space exploration are available to us.

Human space exploration in the 21st century cannot be a passive experience for the people who provide the resources, as it was in the 20th. We now must envision space expedition in which millions of people take a real and vital part. Yes, only a handful of them will be actually be in space physically, but the rest will be playing a vital role in the expedition through their participation over the Web. The next major manned space expedition will be a million person expedition or it will not leave Earth, and you can be a part of it.

In fact, if a million people do not comment their time, energy, and resources to the project, then no human space expedition will happen. Fortunately, this level of massive commitment is now a practical approach to the problem.

c. A Sustainable Earth

The most important single thing that will happen to the human race in the 21st century is our move to a sustainable Earth. In a real sense we are moving to a sustainable Earth as if on autopilot. The world's population will rise to some high number (now estimated to be about 9.2 billion) around 2050^{4,5} and then will fall to some sustainable number that is not now knowable (pick your number between one and six billion). At present, there are no other possibilities. The only question is how much damage the Earth's ecosystems will sustain in this transition and therefore what will be the final sustainable number.

Manned space exploration will be important on a sustainable Earth. We will need to envision a new frontier. We will need to formulate engaging activities in what might otherwise be a stultifying social order for Earth. In fact we will absolutely require these visions to be on hand as we work through the coming critical transition to a sustainable Earth.

d. New Form for Action

Those who will undertake these missions are now children and young adults. Last year we attempted to use an old form, the science fiction short story², in a new way, the e-book, to get this idea across to young people with only limited success. With this proposal we move to a new format, the e-game, which is nearer and dearer to the hearts the young. We must communicate with people in a form they can embrace.

e. MOVE the Cart-before-the-Horse

For a 21st century manned space exploration mission, we will need at least a million people organized and trained for the effort. We cannot afford to send someone into space at the moment or even to a training camp on Earth, but we can build and test the Internet elements that are required. We can get the resources for this level of activity now because the final form for the real training for space will be in the form of an Internet based game. We simply need to build that game now. We can just do it. ⁶

Our space endeavor will require both trained people and realistic security. Thus we need to move forward from the currently widely available Massive Online Open Course (MOOC) format ⁹ to a new Massive Online Vetted Expedition (MOVE) format:

1. Massive – We will need a million participants even after extensive training weed many out.
2. Online – We will not be able to support the cost of travel for mass meetings, let alone a training center.
3. Vetted – The game will be a training exercise but also will be hard enough to leave the faint of heart behind. Security risks have to be identified and left outside fire walls.
4. Expedition – In the end, we will be running a scientific expedition in the direct line of great polar expeditions of the 19th century and Apollo to the Moon in the 20th.

We will now build a game that is a dress rehearsal for a real space expedition and through this effort work through the problems and thus make the expedition itself much more likely.

Welcome to the 21st century.

2. Game Description

The Big Moon Dig is designed to be a learning game on electronic devices intended for STEM students from high school through college undergraduate level. It will feature the operation of remote rovers to dig the large trenches and harvest water.

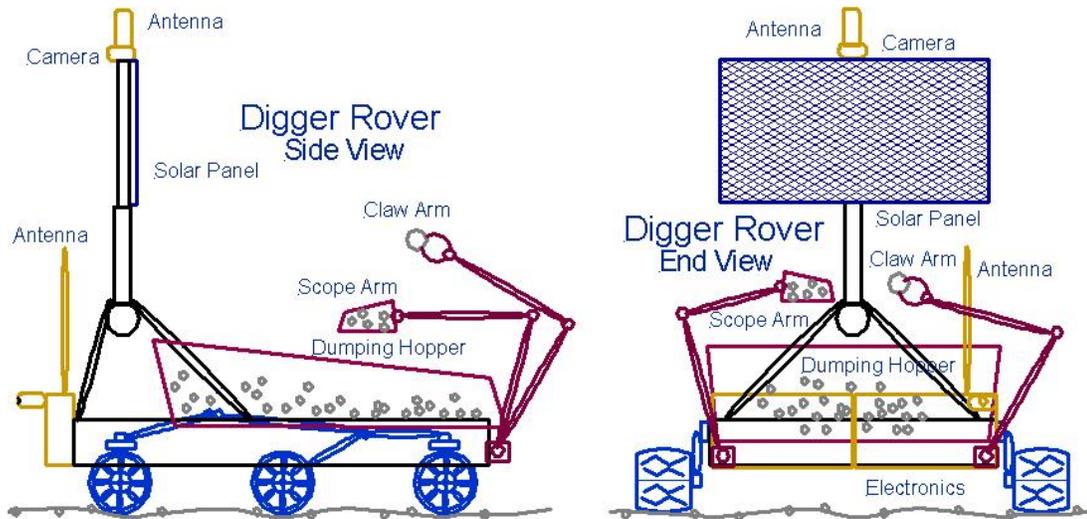
a. Described in Short Story

Life in the lunar settlement is described in the latest version of the short story “The Lunar Viper” ¹⁰. By the time of this story the basic lunar settlement has been build using the MOVE team effort to dig the great trenches needed for radiation protection. The MOVE team is still at work as the story starts and lead by Beatrix, a virtual Amazon warrior, play their part in the plot.

b. Lessons Taught

This game will be designed to teach a wide variety of STEM lessons:

1. TBD (the exact lessons to be covered are still under development.)

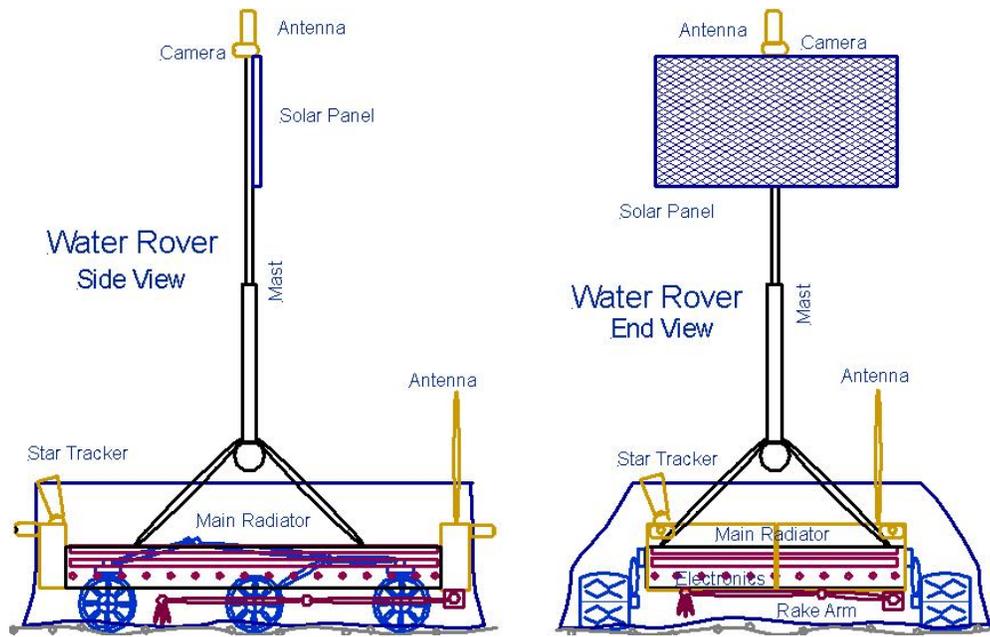


Graphic 02: Lunar Digger Rover, front & side views

3. Game Activities

The Big Moon Dig Game will have a series of activities and levels:

- a. Trenching for Habitats – The player will operate a small lunar rover designed to dig. The player will move regolith, moderate rocks, and large rocks. And, blast, especially hulking big rocks. You get points for mass moved, efficiency of effort, overcoming difficulties, and good planning.



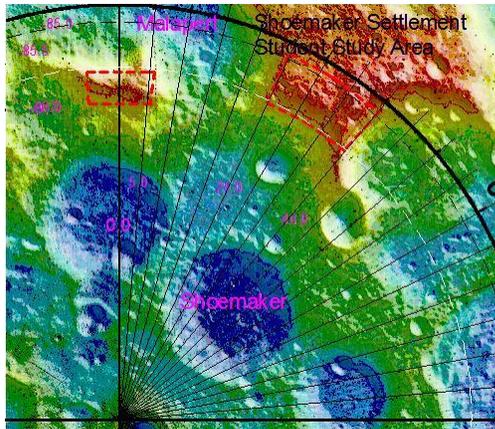
Graphic 03: Lunar Water Recovery Rover, side & front views

- b. Go a-rovin' with a Water-Recover Rover – The player will operate a small lunar rover designed especially to fetch water from the permanently dark craters at the base of the mountain. Work your way down the mountain. Pick up a load of water using heat and cold. Work your way back up the mountain. Offload the water.



Graphic 04: Cairn in the Grand Canyon

- c. The Art of the Cairn – The player will develop the art of using piles of rocks (a cairn⁷) to mark roads and buildings. To augment the relentless gray of the lunar rocks, you can add bits of junk from items that humans have brought to the Moon. The shadow can be as much a part of the piece as the rocks themselves.
- d. Telling the story – The contributor can tell the stories of this exploration. Extend the short stories and essays that make up the “Hard Squared Science Fiction” series² to form Volume 02.



Graphic 05: Mount Malapert on lunar map ⁸

4. The Location

It is critical that we use the resources available on the Moon to support our settlement. The key to long-term survival is developing a complete lunar recovery process for volatiles, including water. A source for these has now been found in the permanently shaded craters near the Moon's poles. Because of the very large South Pole/Aitkin basin on the southern far-side, that lunar pole area looks most advantageous for a settlement.

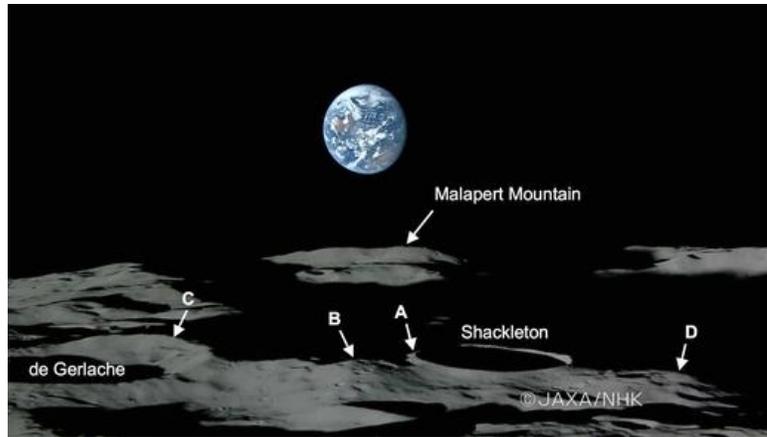
This location has a number of great advantages:

- Access to resources
- No 14-daylong nights
- Solar power is available 95% of the time
- The average temperature (one meter down) is a comfortable 20°C.
- Earth is in view 100% of the time.

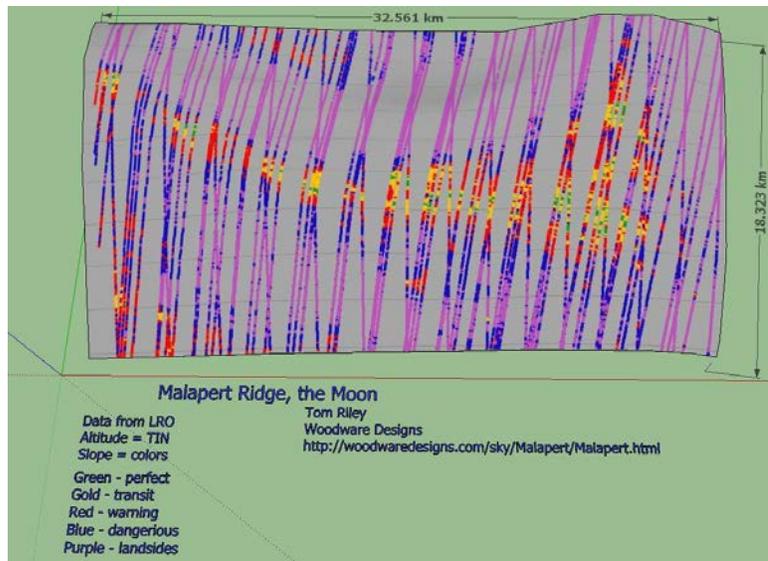
And only a few disadvantages:

- Extra delta V is needed to reach a pole. This means more rocket fuel for manned missions and longer transit times for unmanned vehicles.
- Lunar polar trajectories are not free return trajectories and so they are more dangerous (think Apollo 13).
- All the lunar highlands have rough terrain making landing more risky; near misses can be particularly dangerous.

Our new location, then is the top of Mt. Malapert on a direct line between Earth and the Moon's South Pole. It is about 120 kilometers Earth-ward from the South Pole. Its real value is that it is only about 30 kilometers from several permanently dark craters. Of course, this is 30 clicks down a twisting mountain trail that you must negotiate remotely in the pitch dark and bitter cold. I did not say it would be easy.

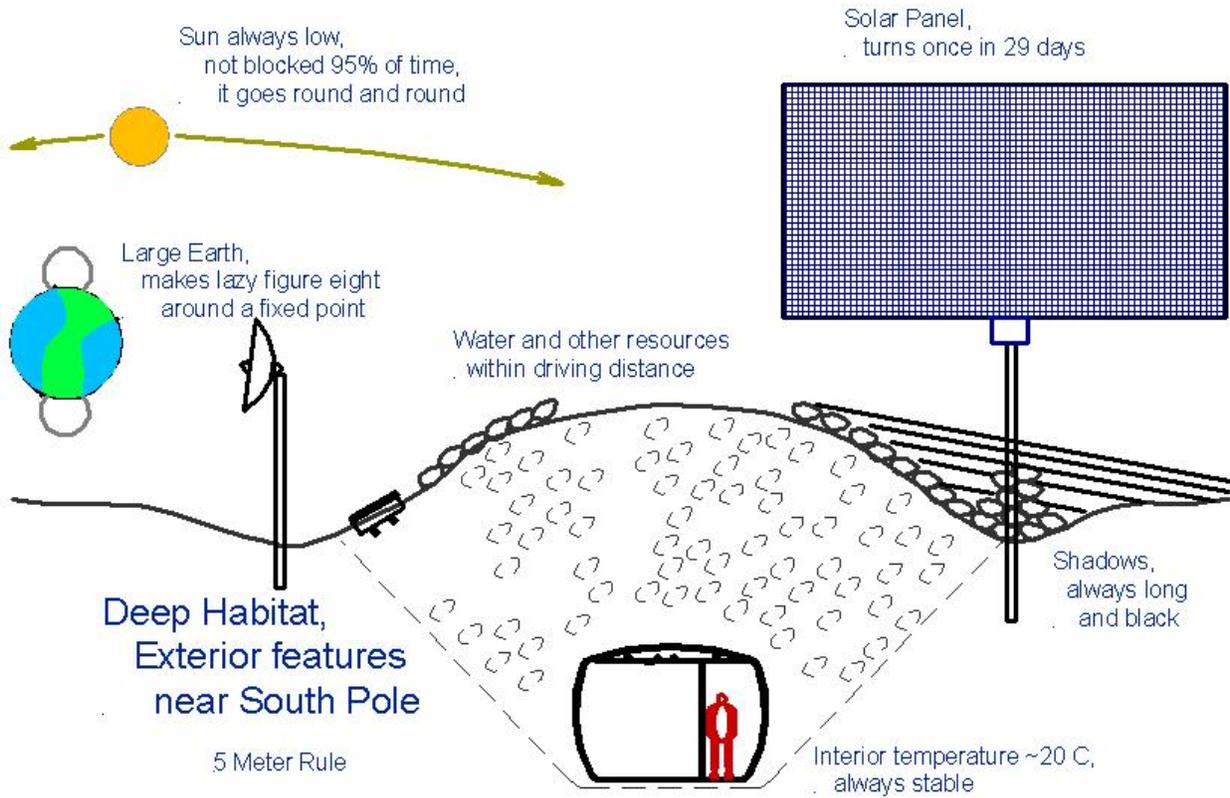


Graphic 06: Mount Malapert as seen from low lunar orbit

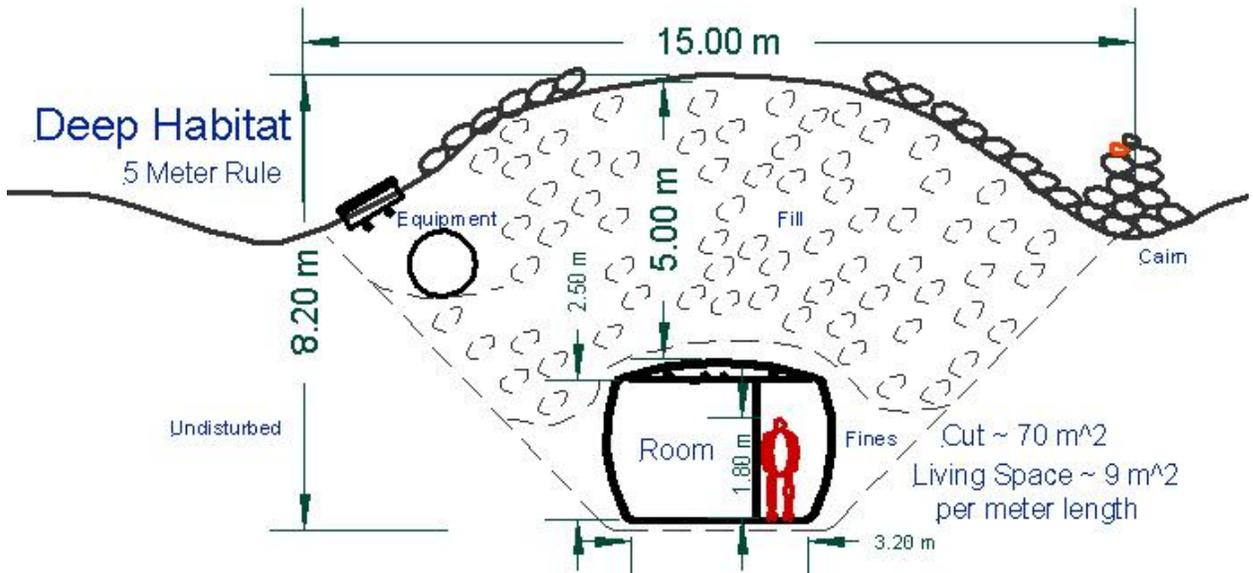


Graphic 07: Mount Malapert as seen in LRO altitude data ⁸

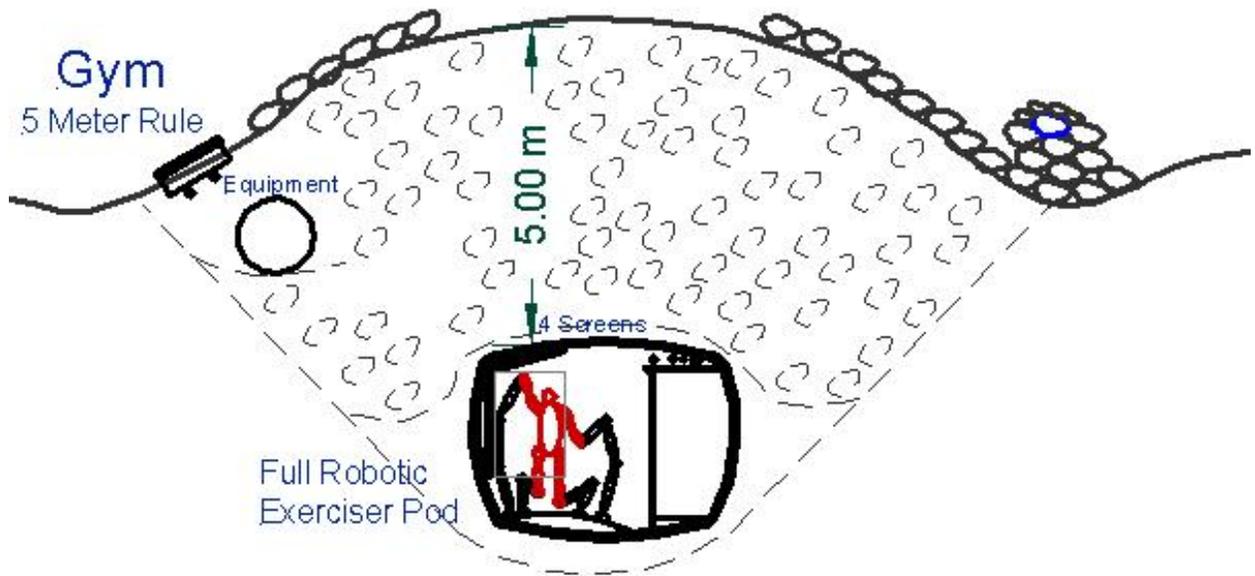
The basic construction of the habitat is shown in the following graphics:



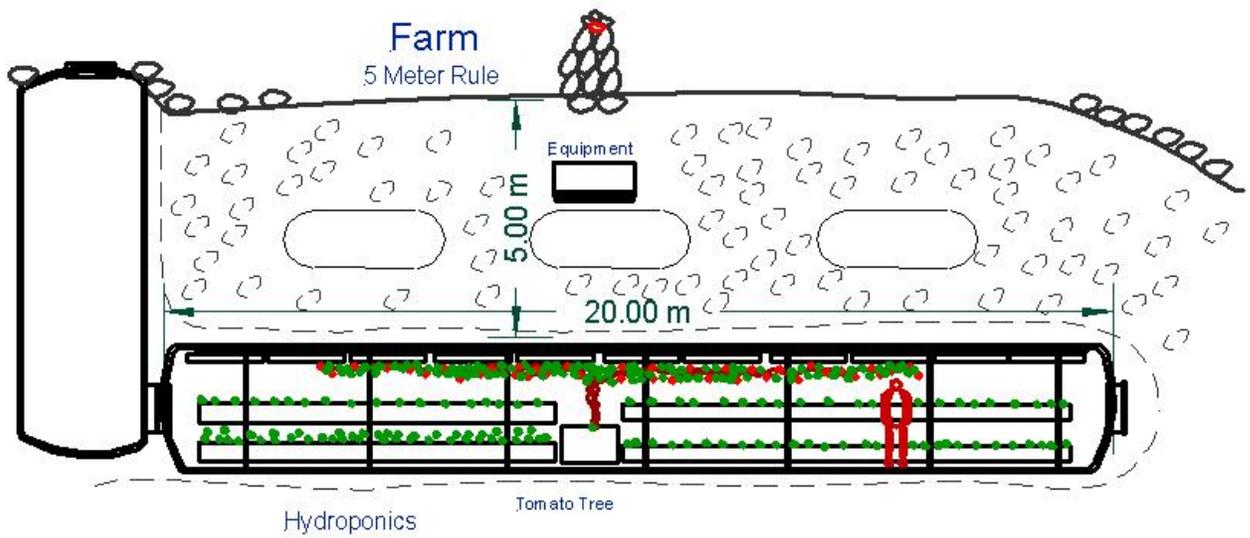
Graphic 08: Deep Habitat with some external machinery



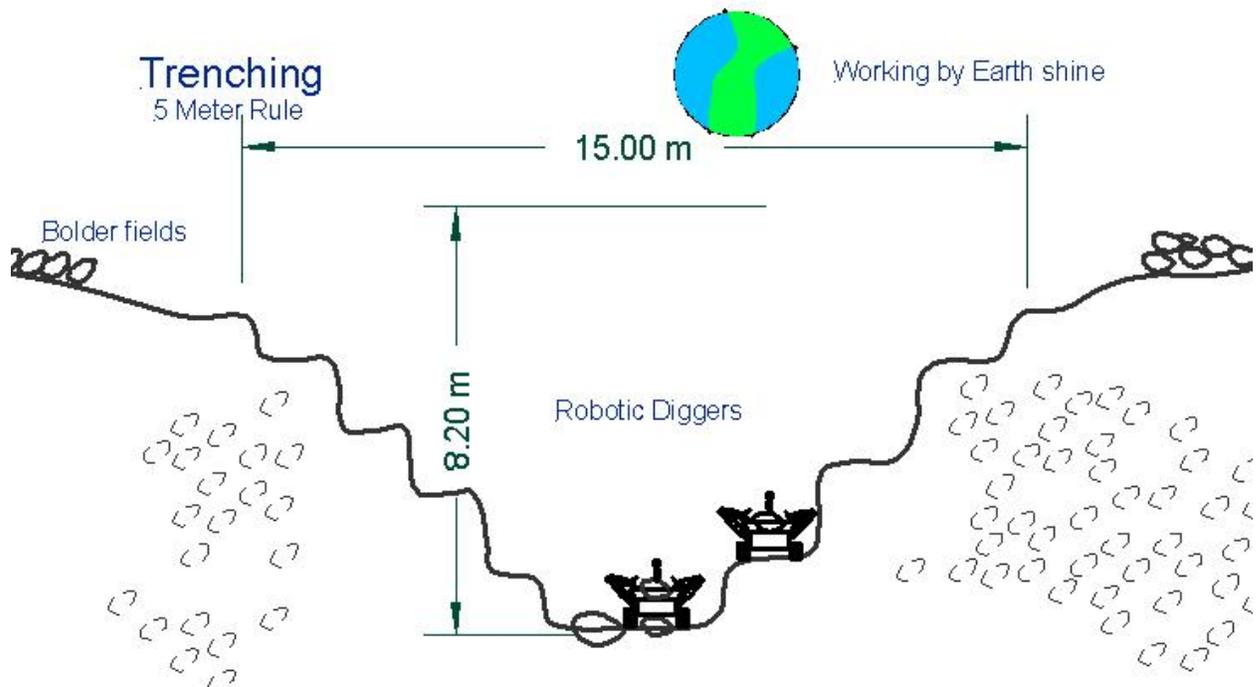
Graphic 09: Deep Habitat cross-section showing 5 meter rule



Graphic 10: Deep Habitat Gym showing a People Pod



Graphic 11: Deep Habitat Farm



Graphic 13: Digging for a Deep Habitat

Please contact the author for a more detailed account of the lunar settlement and the rovers.

5. Game Action Steps

It takes a lot of actions to bring this idea to life.

Actions taken:

- a. Draft E-Game Proposal -- Done.
- b. Buy App Development Course – Done. I bought a course on app development from EWB (<http://apps.excelwithbusiness.com/myEwB/Course.aspx>) through Amazon Local (on sale for \$69.00). This sale offer looks like a good omen by happenstance. I will start the study about November 4 and the voucher is good for one year. (Voucher Code: QR1YP10U7EKG).
- c. Rewrite “Lunar Viper” to include MOVE – I completed the draft on September 14, 2013. Stonebridge is now supported by an Internet team to build the Lunar Viper.
- d. Leadership Course on Coursera – I have signed up for course on leadership starting October 21. I will also complete my two existing courses next week.
- e. Draw More Graphics – Both rover rough sketches are done and the settlement sketches edited.
- f. Files to Internet – Proposals and story example on my Internet site. <http://woodwardesigns.com/EBook/EBook.html>

Actions planned:

- a. Study So:Kno – Set up So:Kno task to write more short stories and build the game, too.
- b. Draw More Graphics – Rover details.
- c. Take Leadership Coursera Course – Clearly a weak point for me.
- d. Revise Lunar Maps – upgrade to all of LRO data. Make final site selection.
- e. Work out sun angles and times – A major restriction on the use of the rovers.
- f. Write up Brain App idea – Essay describing Eureka, Buy-in, Flow, and Frames of Reference.
- g. TBD

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