

**Big Moon Dig  
Game Design Document  
Web Site, Calculator, Games, and Apps**

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File: BigMoonDigGDDmmddy.docx

**Work in Progress**

***Here's what it would take to definitively test the Big Moon Dig idea:***

**1. Starting with What and Why**

Here is what we are doing and why in very short statements. (We need your input on all of these.)

**a. What in 140 characters:** (132 characters)

**The Big Moon Dig** – Return with us now to the Moon as we are preparing the ground for a real lunar settlement through study, simulations, team building, and exploration.

b. **What in 100 words:**

(99 words)

**The Big Moon Dig** is a massive online effort to lay the foundations for a permanent settlement on the Moon through organizing millions of people over the Web to explore possible sites and dig the major trenches needed for radiation protection of the settlers. The movement will utilize videos to build buy-in for the idea, online games to train people, and open source efforts to design the needed equipment and habitats. When we have demonstrated that millions of people are committed to this concept, then and only then, will we find the resources to send hardware to the Moon.



**Big Moon Dig**

c. **Emblem and Icon:**

**Moon in Trench** – A full moon shown in the “V” shape of the trench with stars in the sky and a couple strips of color to represent ores.

d. **Why First in two simple questions:**

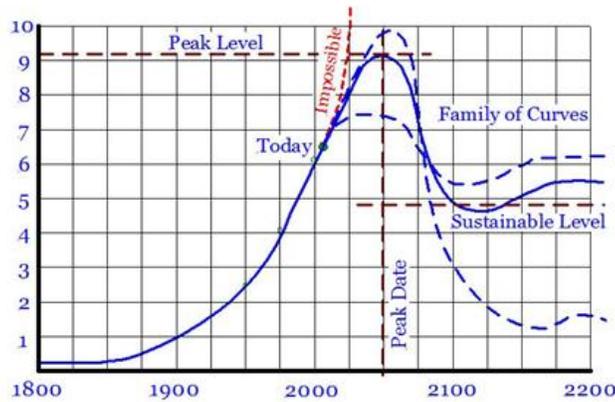
It is 2050. The human population of Earth has peaked at 10 billion and is now poised to fall to some as yet unknown sustainable level. The environment is clearly heavily stressed with global warming and sea level raise both evident. The production of many industrial commodities, like oil and copper, has peaked and is now in decline.

*Question:* What then is our greatest resource?

*Answer:* Our ten billion people!

*Question:* Why go back to the Moon?

*Answer:* To recover a positive vision of the future?



**World population model, 1800 to 2100**

### e. Why First as We Believe

Our why for doing this project can be given as a series of “We Believe” statements:

1. **A Sustainable Earth** – We believe that the human race will achieve a sustainable Earth in the 21<sup>st</sup> century. The open question that we are working on is what will be the number of people living on that sustainable Earth and what will be their quality of life.
2. **What the society of a sustainable Earth will need** – We believe that we should now look at what the society of a sustainable Earth will need and start work to build those structures and processes.
3. **Space Exploration is vision** – We believe that one of the critical factors needed by a sustainable Earth society is vision and that space exploration is a proven source of just such vision. Since the Industrial revolution, societies have been based on a vision of growth. On a sustainable Earth that vision must be replaced with one of long term stability, but we still will need a vision of progress. Space exploration can powerfully provide that vision.

Please join us if you share our vision and beliefs.

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## 2. YouTube Video

This YouTube video is the key to the whole project. If this video goes viral then the whole project will take off. Our video is based on the story “The Big Moon Dig”.

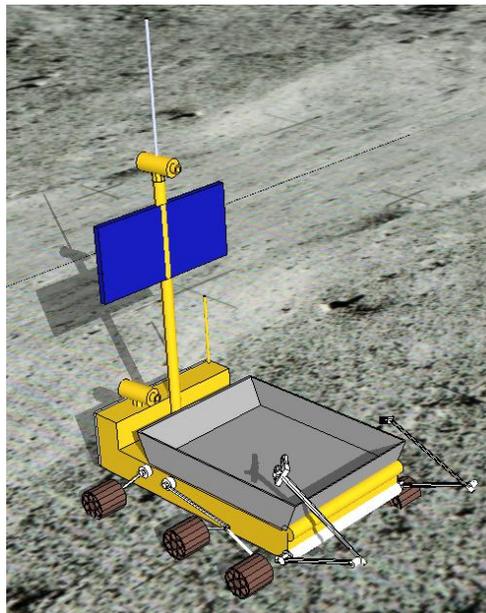
### a. General Description

The scene opens with a fly-in to the digger and trench on the top of Mt. Malapert on the real Moon but then morphs to the virtual Moon of “The Big Moon Dig” story. In this process

the Digger 03 rover morphs from a mechanical device into its virtual form. The rest of the team also appears as a supporting group. They are standing at the mouth of a trench.

Digger, supported by the other team members in turn, then explains what they are doing on the Moon and invites the viewers to participate in the plan. This video is specially designed as a buy-in talk.

The first version we can produce will feature fly-thoughts but very limited animation. It will have text balloons or a ticker line at the bottom and voice-over narration. It will start with Apollo to the Moon shots of the real Moon and then feature SketchUp work of the trench and a digger rover on the real Moon. It then morphs to the virtual Moon showing all the members of the Rocky Horror team standing around on the Virtual Moon. This is about as much as I can do in SketchUp.



**Digger 03 on real Moon**

#### **b. Cast of Characters**

The virtual versions of the entire Rocky Horror team from “The Big Moon Dig” may be included. Virtual Digger 03 is the main spokesman.

The five members of the Digger 03 Shift 1 Team, the Rocky Horror:

1. **Amazon warrior** -- The team commander and digger driver. She can handle her spear with acrobatic precision.
2. **The Old Man** -- A wizard in teal robes; the team counselor and researcher.

3. **Princess of Mars** -- The navigator, whose hair and plum robes always seem to be flowing in an unseen wind.
4. **Jack-of-all** -- A denizen of Sherwood Forest and a jack-of-all-trades who can stand in for any team member. He dresses in green and carries a longbow.
5. **Digger** – Digger Rover 03, a robot dump truck on the Moon (see figure above). On the virtual Moon, Digger 03 was half robot and half dump truck who presented a tall neck, two camera eyes and a solar-cell blue crest on its head. It had a boxy six-wheeled base, and a metal backpack that was often full of rocks.

### c. Person Robots

The robots in our games and stories will legally be real persons curtesy of the United States Supreme Court by way of incorporation. Each will be have its own incorporation papers and therefor will be entitled to:

1. Live forever (unless it go bankrupt)
2. Make money, open bank accounts, and hire people.
3. Give as much of its money as it likes to politicians to buy special treatment for robots everywhere, especially on tax breaks.
4. Hold religious believes (New)

I recently made a short YouTube explaining this idea:

"The Supreme Court Skunks the Turing Test"

<https://www.youtube.com/watch?v=eIZ10nNbhfK&feature=youtu.be>

(I need all the views and likes I can get.)

The robots in "Big Moon Dig" projects are persons of this type and have the honorarium "Inc." before their names.

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### 3. Main Web Page

The video will direct people (URL or Google "Big Moon Dig") to a supporting Web page with the following features:

#### a. Videos

The YouTube video will be in the featured spot on the web page.

A video fly-around of Mt. Malapert based on the LRO data may be included farther down the page.

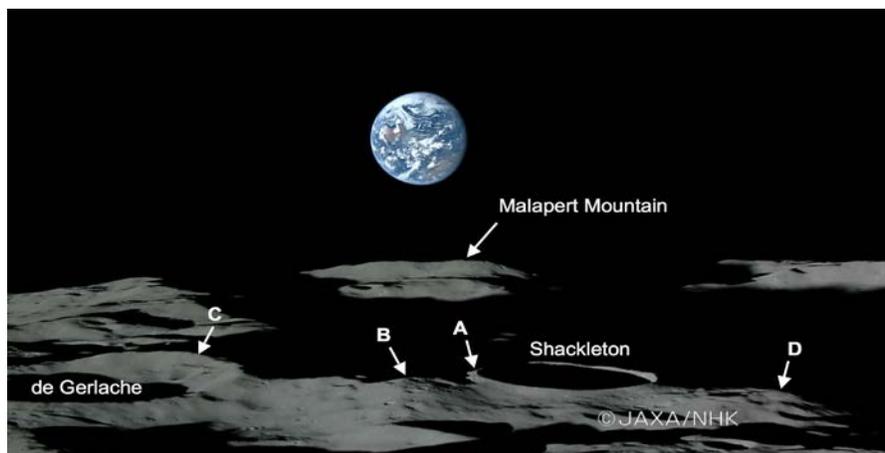
## **b. Game Portal**

In the fully operating versions, we will have crowd powered games of exploration of the Moon following in the footsteps of “Folit”<sup>24</sup> and “EteRNA”<sup>25</sup>. To make a beginning, a link to the page with the lite games will be available. At first there will only be several very limited versions of game elements with each doing one small thing.

### **i. Lite Games**

These will be very simplified games that just hint of what the future will bring. The example games will be several limited executions:

1. Lunar Lite Games – Three Steps: Habitat, Location, and Ores
2. Laying out a settlement with cairns
3. Exploring for resources such as water in permanently shadowed craters and mineral vanes in erratic boulders
4. To Be Determined (TBD)



**South lunar polar region from low orbit**

The initial game set will cover simple lunar settlement design and provide experience in game developing. They will work the following ideas:

1. **SI Familiarity** – Build experience with using the System International (SI or metric).

2. **Gravity, Earth & Moon** – Weight on Earth, Mass, Weight on Moon
3. **Radiation Mass Shield** – Radiation shielding provided by a thickness of lunar regolith compared to the mass of air over your head on Earth.
4. **Support for the Roof** – How much lunar can be supported by various air pressures in a lunar habitat.
5. **Delay Times** – Calculate the delay times for signals Earth to Moon and Earth to GEO.
6. **Hands on LRO Data Reduction** – Run the data reduction Excel process for Mt. Shoemaker and the paths down from both mountains to the floor of permanently dark craters. Locate more sophisticated analysis available on the Web.
7. TBD

This series will be designed as education exercises for STEM student and range in order from very easy to very hard.

## ii. Full-fledged App Games

The design of the full-fledged, multi-platform Game App has just started. Much must first be learned from the development and upgrading of the lite games. We will start with the following game ideas:

1. Exploration – Working a rover down to a shaded crater. This requires building a team, operating a rover, planning the path, monitoring the slope, monitoring the solar power, monitoring the communications bars, and testing for volatiles. The game will start with simplified limitations and then add complications.
2. The Art of the Cairn – This task is to lay out a settlement using stacks of rocks (cairns) as survey markers. This work will be done by small rovers with minimal rock grabbers.
3. The Big Dig – Here we start the process real digging process.

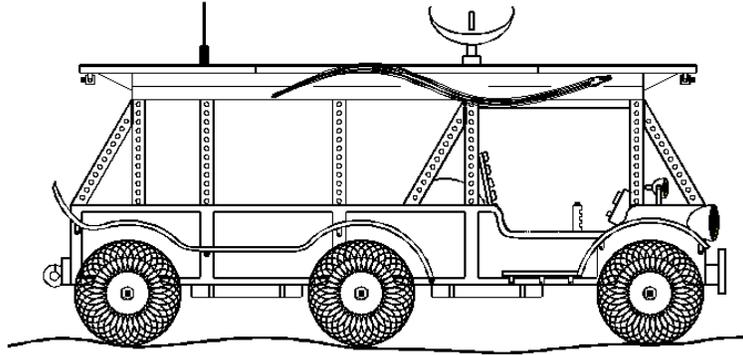
The big games will be developed using the following concepts:

1. LRO Data through ILIAD – We will work with the NASA ILIAD software package to develop a surface of the areas around Mt. Malapert and Mt. Shoemaker including the paths down to the shaded craters to the south.
2. Fractal surface – We will divide the LRO grid with fractal elements until the surface has texture down to the scale of the Sojourner rover wheels. Only accessible areas with workable slopes will be worked this far.
3. The game rovers will move over this surface
4. Digging will consist of modifying a grid element – This could mean either pushing a node down or pulling one up.

We will certainly concede that this is a very ambitious program that cannot be done by one person.

**i. Childs Game Version**

The child’s version of the game will be an introduction to space exploration for young people. It will contains elements of playing in a sand box with small non-threatening robots with friendly personalities.



**Art for “Lunar Viper”**

**c. Stories**

We will move forward by telling our story. The following complete hard science fiction short stories will be directly available in .html and downloadable in .pdf:

<b>Title:</b>	<b>Current State:</b>
1. “The Big Moon Dig”	Draft, proofed
2. “The Lunar Viper”	Rewrite, proofed
3. “The Dark of the Moon”	E-published
4. “Cephei’s Dragons”	Storyboard, ½ complete
5. “I Want to Know”	E-Published
6. TBD	

There will also be a link back to “Hard Squared Science Fiction, Vol. 01”. Additional stories and supporting story essays will be developed by a cloud writing effort.

**d. Intermediate Tasks for MOVE teams**

The Web site will describe a series of more challenging tasks that will require a crowd effort organized as the first MOVE teams. This work will be needed to make our dream a reality:

1. **Choice of a site** – The Web page will set up a completion between Mt. Malapert and Mt. Shoemaker. Key concepts will include (1) a safe landing area, (2) a construction site, (3) a good solar power location, (4) a good Earth communication site, and (5)

good access to permanently shaded craters. This work will require a detailed review of all the new lunar data for near-polar sites. We now have reduced data for a second site, Mastiff Scott A. This site is bigger than the first and about 60 kilometers due east.

2. **Design of Rovers** – Move team members will design rovers for: Digger, shoebox, explorer, water barer, and powderman. The shoebox rover of the Mars Spirit class will be first designed and as the name implies are very small. These will be student designed and built. Their tasks include (1) survey of sites, (2) exploration of trails, and (3) building small cairns.
3. **Review of ores** – Earth bound MOVE members will review of the possible ores on the Moon and what their Ultraviolet signatures look like. Look at how difficult they will be to mine and reduce, as well as what interesting and inventive uses they will be put too by the lunar settlers. This task will include the design of a miniaturized mineral analysis instrument possibly using ultraviolet light or neutron detection.
4. **Mass to the Moon** – Team members will review of all the low cost (a relative term) means of placing a mass on a near polar site on the Moon at minimum cost and maximum mass. The starting suggestions are (1) retired ballistic missiles, (2) under-wing launch from a repurposed MEG-25, and (3) commercial launch.
5. **Cloud writing** – A cloud writing exercise to generate more stories and supporting essays will be organized. Through telling our story we will talk a lunar settlement into existence. The story “Cephei’s Dragons” is a good place to start.
6. **Space Exploration and a Sustainable Earth** – Develop arguments on the importance of a vision of human space exploration on the sustainable Earth of 2100. We take the stand that there will have a sustainable Earth by 2100 but it is an open question on the number of people living on it and the quality of their lives. Furthermore, we look at what the society of a sustainable Earth needs and find space exploration to be a critical element. This is a matter of vision in a time that will need new vision above all.

#### e. Essays

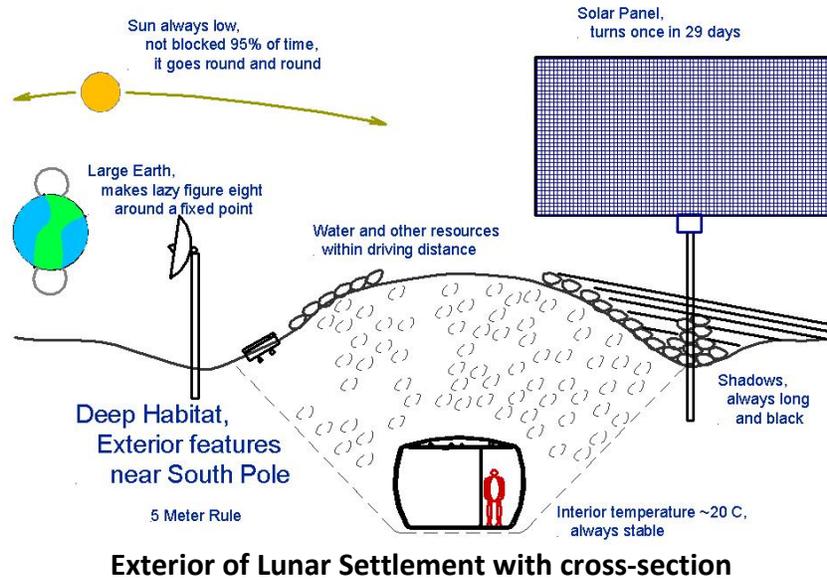
The Web site essays will above all say Why. Then they will provide technical details such as the concept of a MOVE team and exactly what we are trying to do. These will also be versions of the various proposal documents I have written for SONO.

As they are developed Excel spread sheets with the basic calculations will be included.

#### f. Feed Back Page

This is a form to let the users tell us what the users think. Having a place for them to use language is important to completing the buy-in process. This form will have its own e-mail address ([Ebook@WoodwareDesigns.com](mailto:Ebook@WoodwareDesigns.com)) and subject line (E-book Vol. 02).

The time spend on the games is expected to provide better data on what they really like than their answers to a few questions.



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**Me, Chief Cook and Bottle Washer**

#### **4. Foundation Ideas**

The following ideas will be used as foundations for this effort:

##### **a. Going Viral**

This whole approach depends on the YouTube video going viral and taking the whole idea with it. When an idea hits big it becomes Black Swan. Such big hits generate far more value than a long string of small wins and losses.

Fortunately there is a new book, Berger *Contagious*<sup>9</sup> on what qualities are needed for an idea to takeoff. You cannot guarantee a Black Swan every time, but you can build fertile ground. This book proposes six key concepts which can lead to an idea taking off, which are summarized in the acronym STEPPS:

**S** – Sociality Currency

**T** – Triggers

**E** – Emotion

**P** – Public

**P** – Practical Value

**S** -- Stories

This analysis is very encouraging because the elements fit the type of work we are proposing very well. Here are some key points on how we can use each of the six STEPPS:

1. **S** – Sociality Currency: This relates to the idea and actions of the people supporting it are things that people want to talk about. We need to make our ideas something people will want to tell their friends. Our single sentence definition and short Why statements are critical here.
2. **T** – Triggers: This is about making the idea something that immediately brings positive images to the mind. What we are proposing are believable space exploration adventures that most people can identify with. Apollo to the Moon was listed as one of the ten best things to happen in the 20<sup>th</sup> century my most writers.
3. **E** – Emotion: This is about the idea directly bringing up positive emotions. The awe of space and the call of adventure are powerful emotions we will rely on.
4. **P** – Public: This is about people accepting the idea as part of their public persona and not just their hidden inner self. Most people feel it is Ok to be for Space. This percentage is through the roof for technical people.
5. **P** – Practical Value: This is about seeing the idea as positive and good for society. Apollo to the Moon was on most lists of the best thing in 20<sup>th</sup> century. There is every reason to think that we can make a major space exploration adventure one of the best things in 21st century.
6. **S** – Stories: This is about communicating with people in a way that they enjoy relating too. This is what our test project is all about.

The trick then is to turn these abstract concepts into direct action and prototypes that we can test. It is all about **Do**.

## **b. Brain Apps**

The concept of Brain Apps will be used as a foundation for this effort:

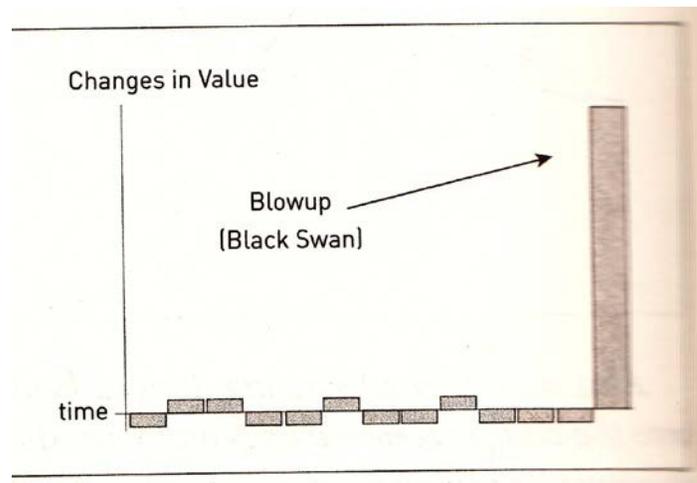
“Brain Apps”

<http://woodwardesigns.com/EBook/BrainApp102513.pdf>

Of particular interest are:

1. **Buy-in** – Getting people to work effectively
2. **Eureka** – The joy of solving puzzles
3. **Flow** – Focus effort
4. **Frames of Reference** – Building a workable model of your society

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**Black Swan**

## 5. Development Resources

We have a number of strong resources available for this project:

### a. Available Computers

The two primary computers used for development on this project are:

1. Dell 2013 desk top 64 bit with 24” monitor running Windows 8
2. Toshiba Satellite Laptop running Windows 8
3. Apple iPad
4. Nexus table running Android

## **b. Communications**

The bulk of communications for this project will be done by e-mail and Skype by appointment (Tom.Riley1945). Major essays will be posted on the Web site in .pdf and may be e-mailed in Word .docx. The SONO Web page will be used for much of the team building communication (see section below).

## **c. Funding**

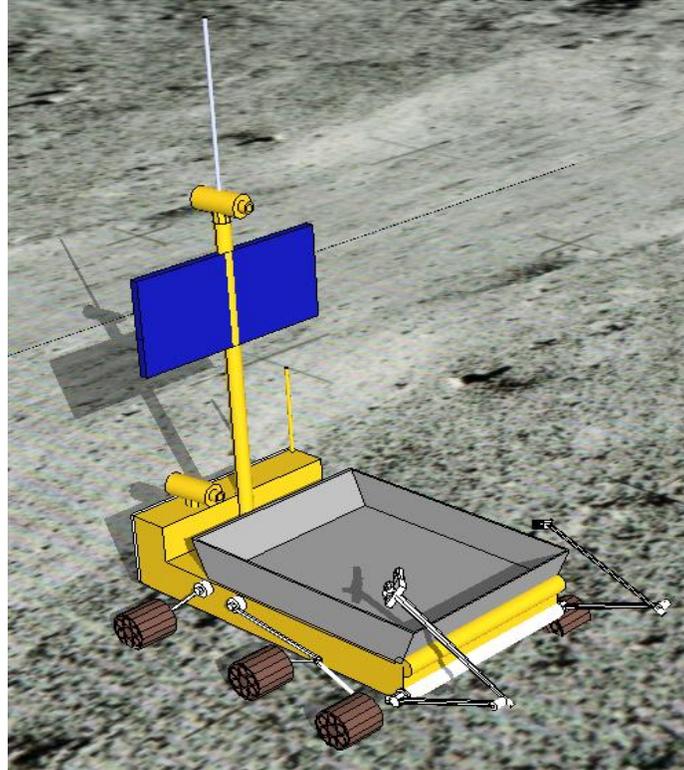
We have secured a reasonable amount of funding that will let us get the project started. For example we have already purchased:

1. SketchUp 8 Pro	\$675.00
2. www.bigmoondig.com domain	\$300.00
3. Books	\$150.00
4. Nexus Tablet	\$100.00

We do not yet have funds to pay for professional services, like App programming, but I am confident we will have sufficient funds to keep an open project open and growing.

## **d. Text**

All text write ups will be first written in Microsoft Word. Documents linked directly to the Web page will also be converted using Adobe Acrobat 9 Pro. Text actually appearing on the Web page will be in HTML 5.



**Digger Rover rendered in SketchUp**

#### **e. Videos**

The primary software package for the video is Google SketchUp Pro 2013 which allows both 3D drawing and the export of output files. This package supports fly-thoughts and limited animation. Its output can be exported for use by other software.

Initial engineering design with dimensioned drawings is done in AutoSketch 10.

We also have an available a Cannon PowerShot SX120 IS digital camera capable of taking short video sequences and can borrow a more capable Nikon Coolpix P520 digital camera. The final video editing package is Windows Movie Maker 2012. It capable of trimming the SketchUp files, adding video files, adding pictures, adding audio, assembling them into a single file, and exporting the result into a YouTube compatible file.

Sound for the video may be worked using the open Audacity software package.

#### **f. Measurements System**

All work will be done in the System International (SI or metric) system to comply with international treaties for the Moon. And the term “settlement” is always used and the term “colony” is **never** used. Again this is to comply with the wording of international treaties.

### **g. Web Page**

The new Web page is being written in HTML 5 with Cascading Style Sheets 3 (CSS3) edited with Coffee Cup HTML Editor Ver. 12. The quality of the Web site will be periodically monitored with Coffee Cup Website Incite. Debugging will be done with the Coffee Cup Insight editor and Firebug (<http://getfirebug.com/>) on the Foxfire browser. The final check of our Web page will be done with W3C Validator at <http://validator.w3.org>.

The domain name “<http://bigmoondig.com>” has already been purchased from GoDaddy along with the .org, .info, and .net versions as a package and we moved to this new site in December.

### **h. Games**

The overall design of the games will be done in this Game Design Document (GDD), which is written in Word (.docx). Most of the design graphics will be done in SketchUp in such a manner that they can be later commercially coded as Apps for the iPad and other devices. The writing of the games will occur in two stages:

#### **i. Lite Games**

The first examples of the lite games will be the Settlement Calculator. This will be written directly into a Web page using JavaScript and will use the simpleGame.js library. The basic mathematics for the calculator will be worked out using an Excel spread sheet which will later be available on the Web site.

The Games page will have a Leader Board for the three lite games. The games will include friendly hints to help players get higher scores

#### **ii. Big Games**

When resources become available, we will write full feature game properly for the iPad App and other devices. We will need to review the best platform for STEM students that will allow use in the classroom. The cost is expected to run more than \$100K so we would need to already have attracted a lot of attention and have a real business plan.

#### **i. Moon Data**

Authentic NASA LRO lunar data will be used in this project through the ILIADS software developed at the NASA Goddard Space Flight Center. This is professional level scientific data analysis software that will take some time and effort to learn as the program does not have a download wizard and requires the Java language to be on the system. Only the public information will be used. We may need to write a “... for Dummies” for this software.

We can continue the use of the basic LORO software reduction as we did for Mt. Malapert to cover Mastiff Scott A and the routes down to the permanently dark craters, Haworth, Shoemaker, and Faustini. This is a less advance exercise but would be real challenge for a high school student.

#### **j. Illustration Credits**

Many of the photographs are from NASA archives, particularly Apollo to the Moon, and are used simply by giving credit. Graphics in AutoSketch and SketchUp are by the principle author, Tom Riley, unless otherwise credited.

#### **k. Disclaimer**

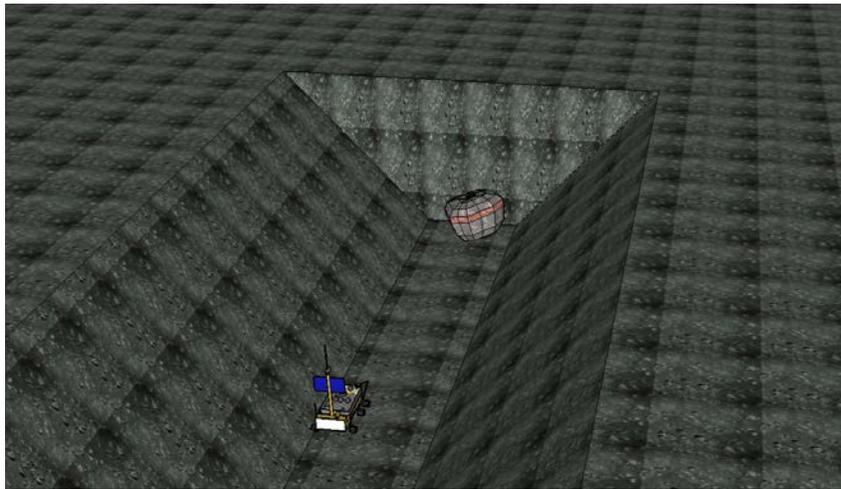
These projects, “Hard Squared Science Fiction” and “The Big Moon Dig”, are **not** in any way associated with NASA, the National Aeronautics and Space Administration.

#### **l. Nondisclosure Agreement (NPA)**

We will be using the NPA from:

“NDAs for Free”

<http://www.ndasforfree.com/>



**Trench with digger rover rendered in SketchUp**

#### **6. Early Supporters**

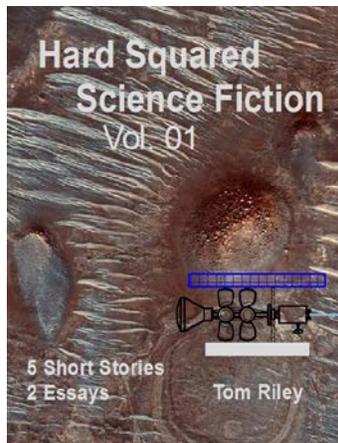
What we need right now is more people interested in our idea. If you are interested, please e-mail me at [TomRiley@WoodwareDesigns.com](mailto:TomRiley@WoodwareDesigns.com) .

A few organizations have provided critical early support for this project:

**a. SONO**

The major team building and communication effort for the Big Moon Dig will be done through the Social Knowledge (SONO) Web page. The SONO web site is currently in Beta 01 so “The Big Moon Dig” can serve as a beta test. The following key features will be utilized:

1. **JumpPad (JP)** -- We will work this effort under the special JumpPad “Big Moon Dig” and use it to store and collect the related Knowledge Cells.
2. **Knowledge Cells (KC)** -- Key lines of effort, such as major documents or people and rover designs, will be Knowledge Cells each with its own internal conversation. There will be a master Knowledge Cell in .pdf with an index of the most important informational KC’s.
3. **Threads** – Each Knowledge Cell can support its own line of conversation on the topic.
4. **Harvest Button** – All participants will be able to create reference Knowledge cells using the Harvest Button on their own browsers.
5. **Library** – Older Knowledge Cells will be moved to a “Big Moon Dig Lib” to reduce clutter while keeping the information available for reference.

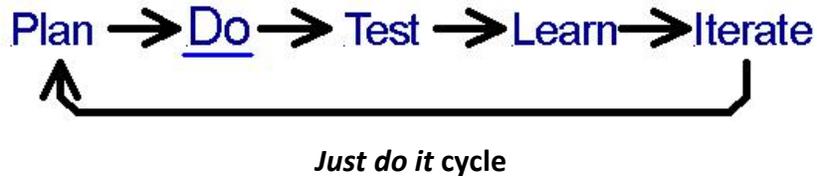


**Cover Art for Volume 01**

**b. Goddard Engineers Scientists & Technicians Association (GESTA) Local 29**

The IFPTE union local GESTA sponsored the e-publication of “Hard Squared Science Fiction, Vol. 01” in the summer of 2013.

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## 6. The People of The Big Moon Dig

We will need to interest additional people from the crowd to cover:

1. Technical Design
2. Creative writing instructor (a teacher with a class)
3. Fiction writing (the American short story)
4. Editing (an English Major or Creative Writing Professor)
5. Illustration (electronic formats)
6. Science Writing (technical essays)
7. E-Publication (technical details)
8. E-Publication Promotion (get the word out)
9. Electronic game design

A number of people have already expressed interest in this project. Please contact me if you would like hear more about our project.

## 7. Conclusion

I conclude that this task is doable for me, but I would need a lot of real help to do it in less than two years.

Team building is then my most important effort.

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## Reference Materials:

The following books, Web sites, and courses were be used for this work:

### Books:

1. Tom Riley, *Hard Squared Science Fiction, Vol. 01, The Dark of the Moon* (e-publication)
2. David Schrunk, Burton Sharpe, Bonnie Cooper, Madhu Thangavelu, *The Moon, Resources, Future Development, and Settlement* (Springer, second edition)
3. Harrison H. Schmitt, *Return to the Moon, Exploration, Enterprise, and energy in human settlement of Space* (Copernicus, 2006)
4. Ben Bussey, Paul Spudis, *The Clementine Atlas of the Moon*, (Cambridge, 2004)

5. Michael Light, *Full Moon*, (Knopf, 1999)
6. Motomaro Shirao, Charles A. Wood, *The Kaguya Lunar Atlas: The Moon in High Resolution* (Springer, 2011)
7. Antonin Rukl, *Atlas of the Moon*, (Sky Publishing, 2004)
8. Robert Godwin, *Apollo 16, The NASA Mission Reports*, (NASA, 2002)
9. Andy Harris, *HTML5 Game Development for Dummies*
10. Dug Sahlin, Chris Botello, *YouTube for Dummies*
11. John Walkenback, *Excel VBA Programming for Dummies*
12. Ed Tittle, Chris Minnic, *Beginning HTML5 & CSS3 for Dummies*
13. Aidan Chopra, *Google SketchUp 8 for Dummies*
14. Andy Rathbone, *Windows 8 for Dummies*
15. Steven Suehring, Janet Valade, *PHP, MySQL, JavaScript & HTML5 for Dummies*
16. James Floyd Kelly, *Getting StartED with Windows Live Movie Maker*
  
17. Leonard A. Schlesinger, Charles F. Kiefer, *Just Start, Take action Embrace uncertainty Create the Future* (Harvard Business Review, 2012)
18. John Berger *Contagious, Why Things Catch On* (Simon & Schuster 2013)
19. Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (Random House, 2010)
20. Nassim Nicholas Taleb, *Antifragile, Things That Gain from Disorder* (Random House, 2012)
21. Leslie Grossman, *Link Out: How to Turn Your Network into a Chain of Lasting Connections* (Wiley, 2013)
22. Rick Hanson, *Hardwiring Happiness, the New Brain Science of Contentment Calm, and Confidence* (Harmony, 2013)

#### **Courses:**

23. Christ Stevens, "EwB App Design", <http://apps.excelwithbusiness.com/Home.aspx>
24. Karl T. Ulrich, "Design: Creation of Artifacts in Society" (Coursera, University of Pennsylvania)
25. Eric Rabkin, "Fantasy and Science Fiction: The Human Mind, and Our Modern World" (Coursera, University of Michigan)
26. Jay Clayton, "Online Games: Literature, New Media, and Narrative" (Coursera, Vanderbilt)
27. Leah Hackman, Sean Gouglas, "Understanding Video Games" (Coursera, University of Alberta)
28. James V. Green, "Developing Innovative Ideas for New Companies: The First Step in Entrepreneurship" (Coursera, University of Maryland)

#### **Web Sites:**

29. "Hard Squared Science Fiction, Vol. 01, The Dark of the Moon", (Internet) <http://woodwardesigns.com/EBook/EBook.html>

30. "The Big Moon Dig", (internet) <http://bigmoondig/BigMoonDig.html>
31. SONO, A world of Knowledge, Infinite Possibilities, (Internet) <http://getsokno.com/redvinef/controllers/login.php>
32. "User Manual SONO Platform" (Internet) <http://soknocommunity.com/xoops/docs/UserManual.pdf>
33. Tom Riley, "Brain Apps" (Internet) <http://bigmoondig.com/Essays/BrainApp.pdf>
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