

**Why Space Exploration, and Moon, and Mars?  
Diversified Energy Independence “DEI”  
Why Are We Going to the Moon?  
A Cost Engineer’s Two Dreams Scenario  
Space Exploration Estimating Tools, Facilities, GSE, and Cost Engineering  
Why Space Exploration and New Estimating Tools? - For Budgeting Facilities  
and GSE for Launch Vehicles**

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**Abstract/Introduction**

Thirty-two (32) reasons - twelve (12) general, sixteen (16) specific, and four (4) money makers. To help USA balance the budget, balance the trade deficit, bring back a strong U.S. dollar, and a stronger U.S. capitalist society. Two new 2 trillion dollar industries to provide clean electrical power, eliminate oil and natural gas imports, and provide for money making exports. However, there are many challenges to be solved before this can happen. What are the 15 specific reasons? What are the challenges? How can this happen? Where can these new, clean energy power plants be built? Where can these new power plants or energy receiver net antennas be built? What are the other general reasons for going to the Moon and Mars? What are two solutions for energy independence (EI)? What are some other money makers? What are the thirty (30) newest, of the over 300 tools, being used to budget and design the Kennedy facilities and GSE projects for the Moon, Mars \$300 billion dollar Constellation Program?

**Background**

Back to the Moon Lessons Learned and Futuristic Comment -

Back to the Moon Lessons Learned. When as a team we all signed the steel beam for the VAB structural roof framing, we bonded together with Gods help for success in meeting the “Big Challenge” movie, video, and soon to be DVD by

CCTS or CCCI. Some comments and thoughts from the Nov. 27, 2003, report by Cost Engineer, Space Pioneer, Advocate, Cost Data Historian JAB: several of JAB books, such as JAB Volume 13 “Aerospace Activation Price Book, Oct. 1, 2002, tool #11” was also dedicated in memory of three space mishaps and shuttle astronauts of Apollo 13, February 13, 1970 - Shuttle Challenger - January 28, 1986, and STS 107, Columbia was launched January 15 at 10:30 a.m., 2003, and had mishap upon reentry. In three major space mishaps, no one on earth was hurt from manned space launch vehicle falling debris. Columbia had over 50,000 pieces from gram size to hundreds of pounds fall from California to Louisiana. No damage from debris from Apollo 13 or from Challenger, which mostly fell in Atlantic Ocean in restricted zone. None of this falling debris has yet to hurt anyone on earth. Had this debris fallen and injured hundreds or thousands of people on earth, it may have been the end of our space program. However, JAB believes this is God’s way of telling us to continue space explorations, as for example, going back to the moon, some reasons; and some potential money makers.

41<sup>st</sup> Space Congress April 26-30, 2004 – Technical presentation at Cape Canaveral, Florida, on China, Moon, and Mars confirms USA goals and plans. Remember – we were able to pray Apollo 13 astronauts back to earth with God’s help. Let us keep vigilant (on the lookout) so we can have the time and public support to pray them home again, when and if we have another space mishap. In the mean time we need to go back to the moon for

continued space exploration and then on to Mars. The 1994 Space Congress had another outstanding presentation by W.M. Braselton on "Space Power for an Expanded Vision," a great video by Harris Corporation, which explains use for energy and as a fuel for Mars exploration. We hope to convert this information to CD/DVD this year.

## Facilities & Ground Support Equipment, GSE

Some KSC facilities are LS-39 Launch Area including: VAB, LCC, OPF's, two launch pads, support buildings, crawler transporters, three launch platforms "MLP's," crawl-away, park sites, SSPF, O&C, RPSF, VPF, LETF, GSE (items used to transport, access, handle, protect, service, and check-out flight hardware/software on the ground) such as: RSS, platforms, panels, ECS Systems, cranes, hoists, lifting devices, and auto couplers. See JAB Website [www.lobiddervideo.com](http://www.lobiddervideo.com), Estimating Tools for pictures of GSE and facilities, also see JAB Vols. 14 and 15, pgs. 18-26, and 96-99. Also see website Searchable Vol. 18.

## Some Specific Reasons for Space Exploration to the Moon and Mars

1. Moon Port #2 - Launch Base for future space exploration and to Mars
2. Moon - permanent, scientific, technical Hubbell
3. Sciences - studying of the earth, the moon, and living in space
4. Medical - examples: moon may be best for future heart and head surgeries; and healing
5. Defense - look out post on moon
6. Tourism - \$50,000- \$5 million moon visit or vacation. Some have paid \$20 million for a trip just to the International Space Station (possible money maker)
7. Moon base to launch space vehicle to prevent asteroids from striking earth.
8. A better place to launch space systems to temporarily shield earth's critical communication satellites from solar/magnetic space radiation caused by solar flares which have caused major communication blackouts.
9. If our human future existence on earth is in jeopardy, moon living is a possible option (such as Noah's Ark)
10. International teamwork for future world peace.

11. To keep our claim to moon resources, especially, now that China is also going to the moon for
12. Moon mining of other critical resources
13. Surprises - like USA Industrial Revolution, satellites, space program, electrical/electronics, communications and nuclear, etc.
14. Moon Mining of Helium 3, a new clean energy source. The moon has thousands of years' supply, a shuttle load of Helium 3 can power the United States electrically for one year, (money maker)
15. Solar, electrical energy from space satellites using external tanks with solar cells (another possible money maker and energy independence) - Solar satellites are 3-20 times more efficient than on earth, because of 24/7 operations and less earth environmental restrictions and little or no battery backups are required. Can be beamed to the earth where needed and may also provide reflective sunlight to light up cities at night.
16. Commercial advertising from the Moon. Examples: testing moon buggies, ATV's, automobiles, beverages, food, durable products, etc.

## Some Challenges to the Moon and Mars Project

Scenario I - Moon Mining of Helium 3,  
General Comments:

- Peer review comment: more references needed
- One shuttle load of Helium 3 can power the US electrically for one year.
- Helium 3 is a clean energy source
- Over 1000 years of Helium 3 on the moon.
- Helium 3 can be a power source for Mars and other space explorations.
- In 2004 my associate seminar was skeptical about Helium 3, as we were discussing moon mining of Helium 3. He turned to his computer and goggle searched Moon Mining Helium 3, to our surprise and amazement Google showed over 1,125,000 thousand hits, (present search of Helium 3 as of today, 3/13/07, is 7,140,000). Therefore, we will list that in our references. Hits for Moon Mining of Helium 3 is 270,000.

## Challenges Moon Mining of Helium 3

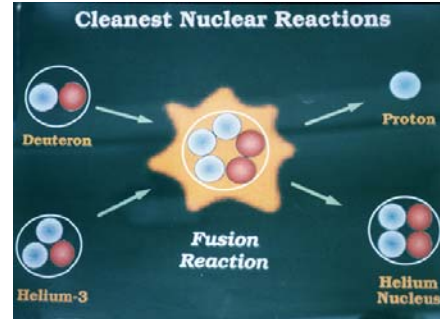
1. \$100/lb payload to the moon.
2. \$500/lb earth to moon and return payload if necessary
3. Three (3) launch pads to provide 10-20 day return flights. To return Helium 3 rods from the moon for earth power generation. See Ref #'s 3, 4, 5, 7
4. New higher level of reactor to start for earth bound Helium 3 rods for power plants. - We are looking for more answers from the engineering and scientific community.
5. US economy deficit, trade and budget deficits to be corrected.
6. Education of American people regarding disciplined saving and spending, improved productivity, and solving the high cost of medical insurance and taxes and Accelerated Space Exploration Program.
7. Protecting Helium 3 from earth's magnetic field or beaming the electrical energy from the Moon to U.S. or other countries. Note: We have communicated with astronauts on the moon sending and receiving television therefore it may be another small step to sending Helium 3 electrical power from the Moon as another clean energy source.
8. Funding, government funding, and/or commercial funding.
9. A new challenge for our engineers and scientists would be beaming the electrical power from the moon to the earth via satellites and/or Space Station or the solar power satellites by Space Island Group.

See references: University of Wisconsin 1990's Study Report on Moon Mining of Helium3 from the KSC library

## Peer Review Question

How does the reader know that the Helium 3 operation will not result in environmental radioactivity? Answer: See University of Wisconsin Study Report regarding Helium 3 as a clean energy source; and video on Expanded Space Exploration.

Helium 3 can be used as a fuel to power space vehicles to Mars, similar to present technology using uranium to power space vehicles.



**Moon Base Mining of Helium 3 – New Industry – Clean Energy Source - JAB Estimating Tools Past, Present, and Future 1962 – 2050 for AACE International 47th Annual Meeting July 1, 2003, pg. 57**



**Moon Based Mining of Helium 3 JAB Estimating Tools Past, Present, and Future 1962 – 2050 for AACE International 47th Annual Meeting July 1, 2003, pg. 58**



**Moon Based Mining of Helium 3 and Space Exploration - JAB Estimating Tools Past, Present, and Future 1962 – 2050 for AACE International 47th Annual Meeting July 1, 2003, pg. 59**

(Pictures are being used with written permission from Harris Corporation)

## Scenario II: Solar Electrical Energy from Space Satellites

World wide wholesale electrical sales now \$2 trillion dollars per year, by 2050 will grow to \$10 trillion dollars. NASA spin-off solar power from space proposed 30 to 40 years ago, could deliver clean, electrical energy, 24/7, to earth. A joint proposal from Space Island Group (SIG) and NASA for Asian countries could reduce launch cost by using the external tanks in space for solar, electrical power generation space satellites, and provide a boost to U.S., KSC with 50 to 100 extra big launches per years to put this system in space. (Reference Space Vision Congress Technical Paper by Gene Meyers, "Eliminating the Prohibitive Launch Cost of Solar Power Satellite.")

### What are the Challenges for Space Solar Power Satellites?

Funding - may be solved soon

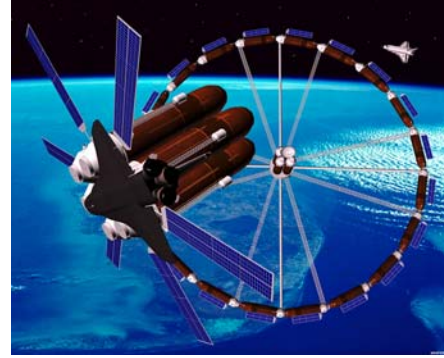
Cost Control/Cost Engineering - Critical in R&D and space projects where outside funding is required.

Safety - Too many launches may cause launch and space safety hazards which need to be addressed as we have never launched space vehicles successfully as often as may be required for the cost benefits of this program.

Coordination - NASA, DOD, range, and commercial is critical for the successful space launch facilities and launch rate (per NASA/KSC retiree, DE Facilities Manager and JAB, 2/21/07).



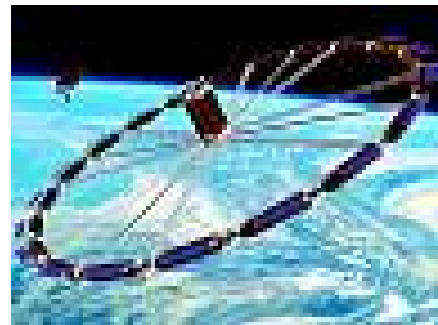
**12 Ring2 Center**



**20 Tank Large**



**All Stations**



**Station 3**

(Pictures from [www.spaceislandgroup.com/press-gallery](http://www.spaceislandgroup.com/press-gallery)  
Used with written permission from Space Island Group)

### ADDITIONAL CHALLENGES FOR SCENARIO I AND II:

Where could these power plants or electrical net antennas be built?

1. At KSC (88,000 acres) in the new research area and/or adjacent to the propose polygeneration power plant, which has - been sited.
2. At Vandenberg AFB as prototypes and to

solve the “not in my backyard” NIMBY issue.

### **Some General Reasons for Space, Moon, and Mars Exploration**

1. US economy
2. New Industries
3. World Economy
4. Environmental - global warming
5. Curing the US/World trade deficit problem for agricultural industry - moon soil grows better
6. For research and development programs, develop more technologies, industries, and businesses
7. Science/Physics - living and working on another planet at ½ lunar gravity.
8. Political reasons - strengthen our influence, status, and teamwork
9. Medical industry - new processes and medicines, such as arthritis and diabetes advances
10. International Teamwork
11. Because the American and world people would want us to go back to the moon when they realize the great cost benefits for mankind.
12. EI - Energy Independence

### **What are the Newest, Most Exciting, and Important of the 300 Cost Engineering Tools?**

These are necessary for budgeting and cost control of the KSC and GSE requirements for launch facilities.

1. Over 300 KSC Cost Indexes provide experience and back up, early cost alert for construction, and GSE Cost Escalation, latest dated March 30, 2007 (one of the most important tools)
2. JAB Seminar #9, Vol. 21, “Government Contractor and Computer Estimating for A&E”
3. Near 500 systems summaries, facilities, GSE, processing, pads, over fifty different type of projects
4. 21 Computer Templates, Budgets, Design, Preliminary and Detailed Estimates, etc.
5. Computer Aided Design/Automatic Computer Cost Estimating (CAD/ACCE)
6. Estimating Fiber Optics Cable Method, fast

and easy

7. Remote Automated Panels, Man-hours, Method, fast and easy, \$10,000-\$300,000
8. Cost per component, fast and easy, \$1,000-\$2,500
9. Fine tuning, number of bidders concept, bid strategy
10. Construction Management Analysis Method
11. Cost Index Analysis Matrix for design, productivity, etc.
12. Cost Escalation Alert Analysis, four new technical papers
13. Launch Pad Cost Comparisons, \$20 million to \$300 million dollars
14. Detailed Launch Pad Cost Breakdown, \$1.2 billion dollars
15. VAB Cost Studies, \$160 million to \$2 billion dollars
16. “Accurate Estimates in a Minute,” by NASA/KSC Glenn Butts (one newest, most important tools)
17. Searchable CD-ROM by Dallas Lee/SGS
18. Abstract of Bids, Cost Summaries, System Summaries, hyperlinked
19. JAB Vol. 18 Searchable 254 Tools and Prices, sources, 25 book indexes, 20 CD-ROM’s, see [www.lobiddervideo.com](http://www.lobiddervideo.com)
20. Searchable CD-ROM’s of System Summaries with Excel Search
21. Near 30 Special, Unique Cost Studies, Change Orders, COC, Mark-Ups, O, H& P, etc.
22. JAB PowerPoint, “How to Make System Summaries”
23. JAB PowerPoint, “Aerospace Cost Factors,” 8 different seminars lasting from 3-40 hours, 49 successful seminars
24. 9 Different Seminars lasting from 3 to 40 hours
25. DVD on Bidding Strategy on Aerospace and Construction
26. New CD-ROM’s, #18, 19, 20, 21, and #25
27. “Space Power for an Expanded Vision” by W.M. Braselton, 15 minute video, DVD soon
28. New Multi page system summary/cost model of the \$150 million dollar VAB
29. NASA/KSC CD-ROM Apollo, Space Shuttle, ISS, Cost Data, History by Glenn Butts, 2006
30. 475 Projects, Cost Estimate, over 45,000 pages (microfilm)
31. JAB Seminar #9, Bidding Process and Cost Engineering, Vol. 20
32. Glen Butts Cost Engineering Desk Reference 2006

## Some Answers to the U.S. Economy and High Construction Cost Escalation

The Moon/Mars program could help solve: falling U.S. dollar; U.S. growing trade deficit; growing budget and spending, local and world wide global warming, and growing pollution problems.

### Some Solutions

Education of the American public on these problems and possible solutions

- Continuing productivity improvement, such as computerization has helped since the 1970's and future CAD/cost engineering 5D. (cost estimating, scheduling, cost control).
- Developing a new 2 trillion dollar industry that is pollution and radiation free that the US has most (nuclear) experience in, such as the moon mining of Helium 3.
- US to build 100 - 1000 megawatt power plant, 15 billion each, QROME (Quick, Rough, Order of Magnitude Estimate) and exporting to the world 1100 - 1000 Megawatt Power Plants, 15-25 billion each, and selling them at a profit. 1 to 20 moon flights per year at \$1-2 billion dollars each to bring back Helium 3 (5,000-50,000 lbs/flight). Also new tourist industry, vacations, and honeymoons, and medical surgery and recovery, and advertising from the moon.
- Worldwide use of Helium 3 can be an economic boost to the US and world wide economy, improving the US trade/budget deficits. Also diversified energy independence "DEI". One shuttle (65,000 lbs) load of Helium 3 can power the US electrically for one year.

Additional reading references for the top world power plants can be seen at:  
<http://www.industcards.com/top-100-pt-1.htm>

### Incorporation of Comments from Peer Review and General Comments

1. This updated paper has incorporated peer review comments for clarification, important background information, and additional references.
2. In 1955, JAB stationed in Germany was

taking a photography workshop by a very good German teacher. An important comment was made concerning European and world pollution, "It's better to take pictures after a good rain as it cleans the air of pollution and gives a sharper image, in black and white and color." It would appear this is also true in many major industrial US cities, as well as other world-wide metropolitan areas. Therefore, the clean energy sources from Helium 3, solar, and wind are critical for a healthier environment and human existence.

3. Diversified energy independence such as solar power satellites, moon mining of Helium-3, clean coal energy and wind are important to save our oil and gas industries for automobiles, plastics, etc. Also to reduce oil monopolies - the US is presently using coal for fifty percent of our electrical energy.
4. Why so many titles? Because it will vary with the different audiences, and it is hoped this may be presented many times in many places as an educational effort to alert the American people.

Comments: Peer review was "inspiring, and we need some inspiration now with the global warming, a threatening energy crisis and that national debt we don't want to talk about.

What should be used for high cost escalation for the NASA KSC Space Program to the Moon & Mars Facilities and GSE? Consider using 5% to 10% per year, but on major multi-year projects that are heavy weighted in concrete, steel, rebar, copper, asphalt, and aluminum do a cost analysis, or get quotes on major cost items. Remember that impact, scheduling delays, and change order will cost extra for time extensions. Escalation may last for several more years, but now there is some hope for relief. February 2007 international stock market melt-down may cause more time needed to evaluate the effects on world trade and commodities, etc. An analysis update will be required.

### Summary

In summary, we must continue educating the American people on the importance to the US economy, world pollution, productivity, cost engineering, and an accelerated space program for the continued success of our country.

## References, Suggested Reading, Viewings and Web Viewing

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2. JAB Estimating Tools, AACE Annual Meeting, Walt Disney World, FL, 2000
3. Braselton, W.M. Jr. "Space Power for an Expanded Vision," 9<sup>th</sup> Annual Space Symposium - U.S. Space Foundation April 14, 1993
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6. JAB, Vol. 14 & 15, Seminar 6 "Aerospace Futuristic Cost Estimating" by CCI, Oct. 2004
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11. Gene Myers's (CEO of Space Island Group) "Eliminating the Prohibitive Launch Cost of Solar Power Satellite." Space Vision Congress, April 26-28, 2007 at Florida Solar Energy Center, University of Central Florida Campus, [www.spaceislandgroup.com](http://www.spaceislandgroup.com)
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19. Google Web search for Moon Mining Helium 3, [www.google.com](http://www.google.com)
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## Brief Bio

Joseph A. Brown,  
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### 1962 to Present.

Con\$truction Co\$t  
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President. Consultant  
services, writing,  
training, educational  
seminars, cost

engineering, cost estimating, preparing, reviewing, cost analysis of over \$10 billion of cost estimates for facilities, construction, GSE, activation, etc. With over 300 Aerospace cost engineering tools, books, CD ROM's, DVD's, videos, cost studies and new exciting, conceptual estimating methods. Over 2000 seminars students from six continents. Space Works Engineering Inc. (SEI) FGOA/D4OPS contract, July 19, 2003 thru Jan. 15, 2004 with near \$4 billion of conceptual cost estimates and analysis.

Joseph A. Brown created a world class total Aerospace Co\$t Estimating, Co\$t Engineering, CM for Facilities, Construction, GSE system and activation. This system and process has proven performance and results, saving billions of dollars with nearly 300 unique tools, including over 30 new, exciting tools, technical papers, and cost studies for space exploration to the Moon, Mars, and the Universe. This world class cost engineering system was created from five tools in 1963 by JAB and his KSC teamwork effort.

July 1, 1996 – October 28, 2005. Lockheed Martin/USA Space Flight Operations Contract (SFOC) as Senior Engineer, Certified Cost Engineering, Cost Consultant for facilities and ground support equipment (GSE) and construction, preparing, reviewing, cost analysis, (over \$10 billion of cost estimates), modification management, training, seminars, and computerization. These important estimating tools:

- Helped reduce change order (C.O) cost from 52% to 12.50% of bid cost with 150 ways to reduce C.O. cost on over \$300,000,000 of Construction and GSE
- Helped improve design performance, cost and schedule performance with large bonuses to KSC team work members through cost engineering, construction management, cost control, planning and scheduling, cost

analysis, computerization, and incentive contract, etc.

- Aided NASA/KSC Designing Engineering in restart of cost engineering presence, providing consulting services, resources, etc.

April 1, 1996 - August 15, 1996. (Con\$truction Co\$t Con\$ultant, Inc. CCE Cost Consultant to Lockheed Martin in Denver, CO, Titusville, and Merritt Island, Fl for EELV Launch Facilities at VAFB and CCAGS, Conceptual Cost Estimating, Cost Engineering Review, Analysis and Independent Cost Estimate for \$300 million launch pads concurrently work with Lockheed USA.

1963 – 1995. (GS11/14) National Aeronautics and Space Administration (NASA) Kennedy Space Center (KSC), Lead Cost Engineer, Senior Advisor and Coordinator for development of cost engineering and estimating for KSC facilities, equipment, and construction. Prepared and reviewed over \$17 billion of cost estimates, including pre-conceptual space shuttle launch facilities at six locations, Oct. 1970 for \$7.44 billion, ELV \$5.9 billion and LC39 VAB and Launch Pad over \$200 million, 1963-1970. See the website for detailed resume

([www.lobidderviedo.com](http://www.lobidderviedo.com)) or contact me at [lobidderviedo@cfl.rr.com](mailto:lobidderviedo@cfl.rr.com)

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