

Project Statement

Lunar Resort



View of Earth rising over Moon's horizon taken from Apollo 11 spacecraft (NASA Johnson Space Center).

BACKGROUND

On April 28, 2001, Dennis Tito became the first tourist to enter space. He paid \$20 million US dollars to fly aboard the Russian space craft Soyuz TM-32. The spacecraft docked with the International Space Station (ISS) on April 30th. The TM-32 crew, including space tourist Dennis Tito, returned to Earth on May 6, 2001 in the Soyuz TM-31, leaving the TM-32 as a lifeboat (Neill, Hannah and Stewart, 2001).

Mark Shuttleworth was the second space tourist. He, too, paid \$20 million US dollars for his journey of a lifetime. His adventure began on April 25th, 2002, in the Russian spacecraft Soyuz TM-34, docked with the ISS, and then landed back on earth on May 5, 2002 (Jones, 2005).

On January 14, 2004, President George W. Bush announced a new vision for the Nation's space exploration program. The President committed the United States to a long-term human and robotic program to explore the solar system, starting with a return to the Moon that will ultimately enable future exploration of Mars and other destinations (Office of the Press Secretary, 2005).

More recently, Brian Binnie officially entered outer space in a re-usable private spacecraft twice in a one week span (Sept. 29-Oct. 4, 2004) in SpaceShipOne to claim the coveted \$10 million Ansari X-Prize (Boyle, 2004). This historic event has opened the doorway to the stars for many more to come. In fact, Space Adventures Ltd., announced plans on August 10, 2005, to send private citizens on a round-trip flight to orbit the moon in a modified Soyuz TMA spacecraft, starting in 2008 or 2009. The price of the trip is estimated to be about \$100 million and would last 5 ½ days (Associated Press, 2005). This is a potential stepping-stone for lunar landings by private citizens.

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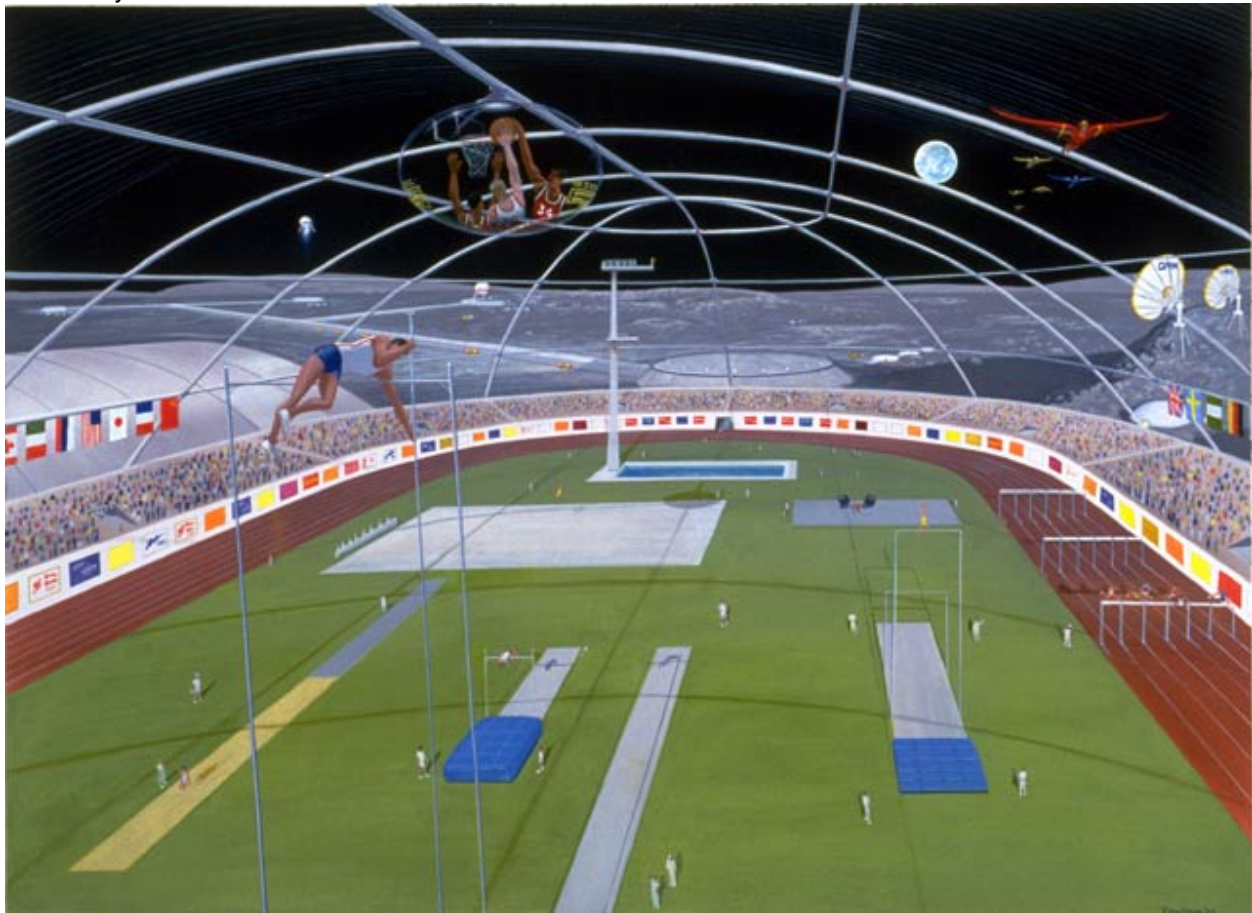
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OBJECTIVE

Fast forward to the year 2031...

Space travel has become a common event. Private companies, with the aid of the Coalition for Space Tourism, have begun weekly launches into space for tourists at affordable prices. The members of the coalition have begun an aggressive campaign to build a lunar resort to accommodate tourists on the moon. Because of the effects of cosmic radiation, tourists are limited in amount of time they can remain in space to two weeks, and resort employees are limited to 6 weeks in space.

The Coalition plans on developing the resort near the lunar north pole, where it is expected that water ice can be harvested to provide drinking water, oxygen, and fuel. Supplies for the resort, including food and additional water, will be delivered twice a week with up to 50 passengers. These spacecraft will be cycled in such a way that they remain on the moon for two weeks in case an emergency evacuation is necessary.



Leap of Faith. Pole vaulting records of more than 30 meters at an International Lunar Games event might be established in the next century. The Moon's one-sixth gravity would be an excellent environment for athletic competitions that are hampered by Earth's stifling gravity. This visionary concept of NASA's Advanced Concepts Office looks far into the future at the potential for lunar development and tourism.

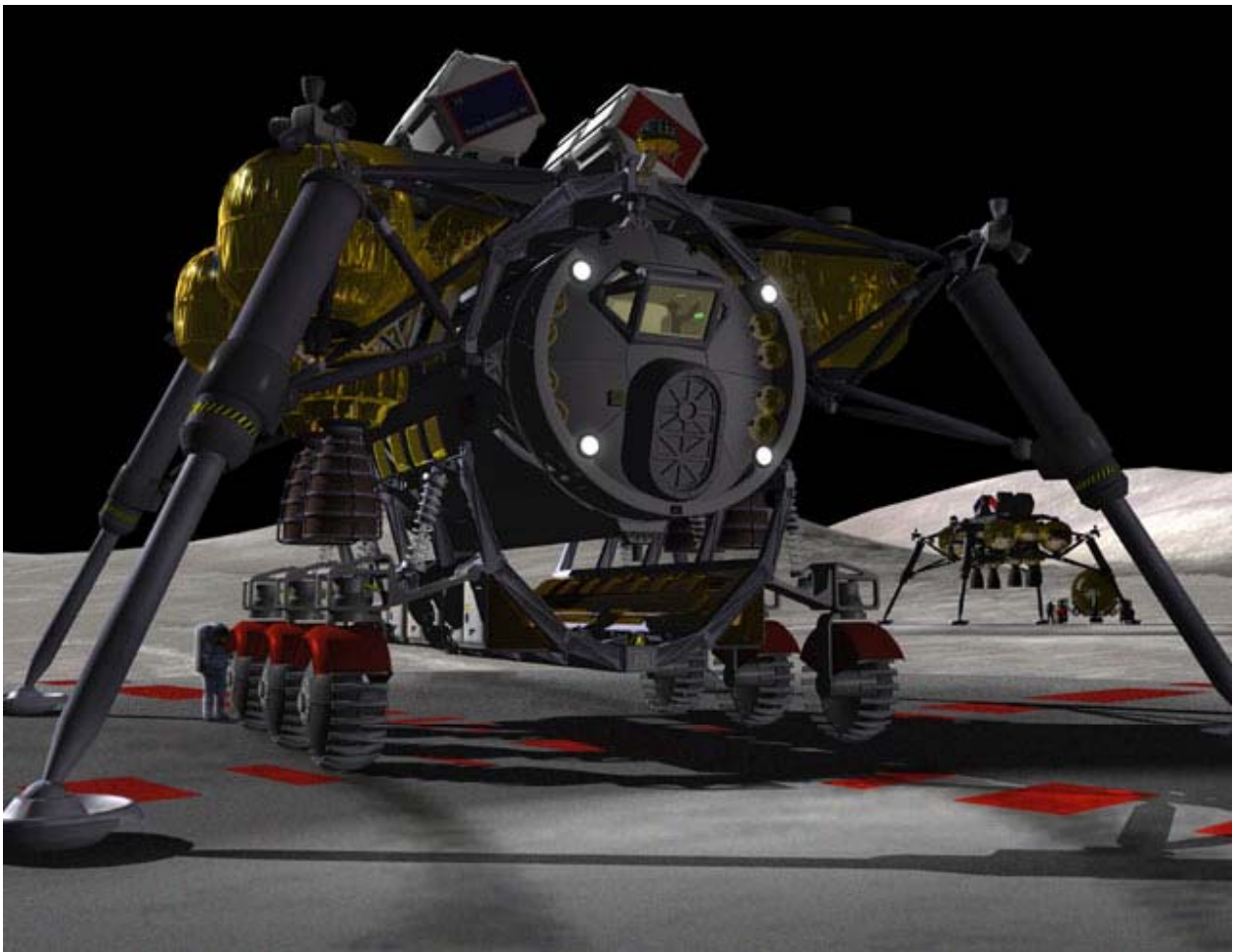
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MISSION REQUIREMENTS

1. The lunar resort will be located near the north pole of the moon, near a source of water.
2. Determine the amount of resort rooms needed to accommodate guests and employees.
3. Items to consider in the design include, but are not limited to:
 - a. Living areas and recreational areas, including restaurants
 - b. Sources of electrical power and heat
 - c. Maintenance of a breathable atmosphere
 - d. Waste handling
 - e. Internal and external communications
 - f. Additional scientific missions that can be accomplished at the resort.
4. Spacecraft are needed to transport people and cargo between the Earth and the Lunar Resort and back. Spacecraft design(s) should include provisions for launch, transit, and landing, as necessary.



Switch. Established lunar bases will rely upon a high degree of automation. Robotically controlled landers will transfer passenger modules to autonomous rover carriages for transport to the lunar habitats. The passengers will be able to travel from Earth's surface to the Moon in a comfortable, shirt-sleeve environment.
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ASSUMPTIONS

1. Significant sources of water ice exist at the lunar poles as indicated by *Clemintine* and the *Lunar Prospector* (Nichols, 1998).
2. The actual lunar conditions are consistent with the impetus for the outpost and the best current scientific understanding of the moon.

REFERENCES

- Associated Press, "Fly Me to the Moon? That will be \$100 million," (August 10, 2005), <http://msnbc.msn.com/id/8898582/>, accessed August 16, 2005.
- Boyle, A., "SpaceShipOne win \$10 million X Prize," (October 5, 2004), <http://msnbc.msn.com/id/6167761/>, accessed August 12, 2005.
- Jones, T.D., "Coming Soon: Ticket to Ride?" *Aerospace America*, **43**(2), 16-19, February 2005.
- Neill, M., Hannah, J., and Stewart, B., "Payload," *People Weekly*, **55**(19), 229-30, May 14, 2001.
- Nichols, M., "Lunar Life Support," *Maclean's*, **111**(11), 59, March 16, 1998.
- Office of the Press Secretary, "President Bush Announces New Vision for Space Exploration Program," (January 14, 2004), <http://www.whitehouse.gov/news/releases/2004/01/20040114-3.html>, accessed August 5, 2005.

ADDITIONAL SOURCES OF INFORMATION

1. The Space Design Competition web page: (<http://www.unm.edu/~isnps/outreach/sdc.htm>)
2. Scientific and/or engineering libraries at the University of New Mexico, New Mexico State University, New Mexico Institute of Mining and Technology, plus other universities and community colleges.
3. The National Aeronautics and Space Administration (NASA) website (<http://www.nasa.gov>)
4. The Jet Propulsion Laboratory web site (<http://www.jpl.nasa.gov>)
5. The American Institute of Aeronautics and Astronautics (AIAA) website provides a searchable database of publications and papers. At <http://www.aiaa.org>, click on "Publications and Papers," then add your search keywords under "Search the AIAA Electronic Library." Suggested keywords include "Space Science," "Space Tourism," etc.
6. Your school library *may* have access to Research Databases and Indexes, which can provide full text articles. Recommended databases include Compendex Plus, FirstSearch, etc.