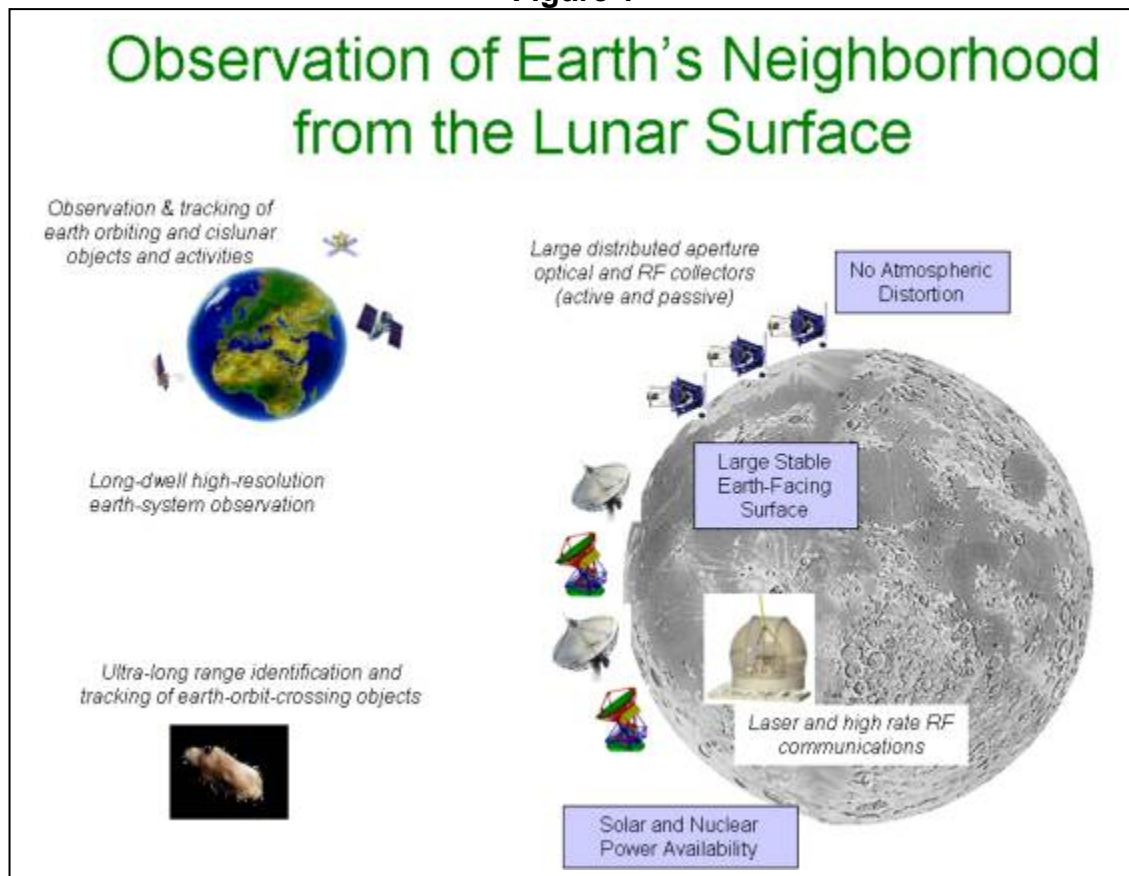


The Space Initiative: Opportunity for International Co-operation
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1. INTERNATIONAL PROSPECTIVES OF THE MOON BASE¹

Generations to come will remember this first Earth-independent Human settlement, which can far outshine the historically important settlement of Jamestown by English settlers in 1607. Indeed, The Moon Base can become the Jamestown of Space civilization. This overarching goal for the U.S. Space program for the next ten years can move mankind out of the 'single point failure mode' of planet Earth and revive the prospect of unknown new frontiers, the moving force in human exploration.

Figure 1



As illustrated in Figure 1 above, 'Moon Base' will add to our perspectives of Earth – just as the first "Full Earth" images from Apollo 8 fundamentally changed mankind's awareness of Earth and its 'vulnerability,' giving rise to an ecological movement worldwide. So will the first permanent settlement on the Moon change our awareness of

¹ Heiss, Klaus P. „Columbia: A Permanent Lunar Base“, High Frontier, Final Report to NASA Office of Space Flight, December 17th, 2003

Cis-Lunar Space – and add to the myriad uses of satellites already in operation, affecting our daily lives, well-being and security interests. New uses of Space and the resources of Space for and on Earth will undoubtedly follow.

Examples of areas of exploration with major improvements for planet Earth include:

- **Communications and observation platforms** for information activities worldwide.
- **Large Geosynchronous and High Earth Orbit (HEO) structures**, including at various libration points. (Figure 2)
- **Security provided by The Moon Base’s “High Ground”** – in Cis- and Circumlunar Space – may develop similarly to the **“Rock of Gibraltar,”** which contributes to observing and controlling access to and from the Mediterranean.
- **RDT&E of inexhaustible new Space energy resources** for use on the Moon, in Space and possibly on Earth. **For example, more Solar energy ‘hits’ the surface of the Moon in but 10-days than the energy from all known global fossil fuel resources accumulated over eons past on Earth.** A 10 Giga-Watt solar power plant can be built on the Moon with ‘proven’ technology. Such a concept is shown in Figure 3 [Solar Arrays (1), Microwave Transmitters (2), Reflectors (3) – all made from lunar soils by various production equipment (4, 5 and 6)].
- **CELSS feedback to husbanding resources on Earth** – possibly similar in its economic and environmental effects in the 21st century to the effects of electronic miniaturization and computation in the 20th century. The ability to sustain life and a community of astronauts independent of Earth by recycling waste materials and the use of “local” Lunar resources will have deep implications as to technologies and systems available on Earth, leading to a parsimonious ‘husbanding’ of resources.

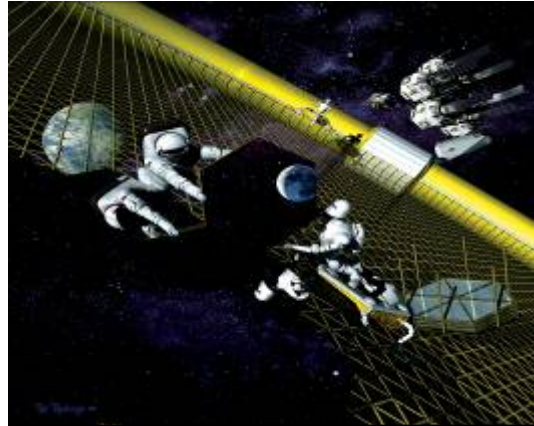


Figure 2 – Large HEO Structures



Figure 3 – Solar Energy Production on the Moon for Cis-Lunar Space

Looking toward Earth and Cis-Lunar Space will produce the most immediate practical applications and ‘paybacks’ for the investment to establish a permanent Lunar base. Looking outward – toward continuing the journey into Space – will address man’s thirst

for information on the worlds beyond our direct experience. (Figure 4) Specific initiatives could include:

- **Large astronomical observatories on the ‘back side’ of the Moon** – a decades old dream of astronomers, allowing ultra-large, distributed aperture observatories looking into the innermost processes of the universe, its origin and ultimate destination;
- **“Earth Independence”** – the Moon is the ‘natural’ testbed for subsequent Human exploration missions, such as to Mars, the Asteroids and eventually the outer planets. In the long run, certainly such ‘independence’ of human existence must be regarded as an ‘ultimate’ technological achievement of mankind – wherever the journey may take us.



Figure 4 – The Moon: Platform for Solar System Exploration and Beyond

Obviously, this “prospective” offers unique opportunities for international co-operation and competition in the open markets of ideas and enterprise. In pursuing these opportunities, we should be mindful of successful modes of exploration and developments in the long history of mankind, but equally aware of the dangers of “zero-sum” thinking and ideologues, who all too often believe that somebody else’s gain and profit is their own loss. Rather than to see enterprising people risk and gain for others to follow, these “zero-sum” ideologues of ages past would rather prevent one and all from such pursuits than see “others” profit.

Most important in this context is that international laws, or for that matter domestic laws, ought to be geared to “enable” economic activities and markets – such as was the case

in (Space) communications in 1958, when a seminal paper by economist and later Nobel Laureate, Prof. Becker, led to a veritable worldwide communications and information revolution that is still on-going. In contrast, the sterile “Outer Space” and “Moon” Treaties have the effect of stifling, indeed preventing, economic enterprise and markets in the rough and tumble of entrepreneurial risk taking and profit (or loss).

In executing President George W. Bush’s initiative, we should follow the successful examples of Comsat and Intelsat (and Telespazio s.p.a which predates both of these institutions) to bring about international cooperation and wealth for all. This approach would avoid vague and entrepreneurially ignorant legislation that limits the exploration and exploitation of “celestial bodies.”

Two fundamental principles underlie one and all international law issues for such “promulgations” to be materially relevant:

1. **Cause of Damage:** if a country or people from region A were to cause proven damages to region B, then indeed mechanisms should and do exist to redress proven or realistically anticipated damages. But anybody’s “profit” in the pursuit of space enterprise – which only in the sterile world of “zero-sum” thinking, by some who failed to pursue risk and profit, causes “psychological” damage – should be assumed to benefit mankind until proven otherwise by facts and evidence of damage caused to some.
2. **Territory, Population and Control:** various international group activists can and sometimes pass “laws” and “regulations” on areas and issues totally outside their “control” or relevance (through the principle of damages caused) and thus pass “treaties” on rights of sovereignty by Sagittarians on Celestial bodies in Alpha Centauri. It would be like Mountain peasants of the Tyrol passing laws and entering treaties outlawing polygamy on the Fiji islands: intellectually and morally possibly interesting, but as to law totally irrelevant. Before passing laws and entering treaties on whatever regions of the universe, proponents should delineate the “territory” to which such promulgations apply, have people there who agree/enter/are subject to such legislation, AND appropriate “legislators” should actually control that population. In democracies, control is usually exercised by the “population” of the region itself, rather than dictated by “outside powers.”

These two overriding criteria are currently missing from the existent realities; so such rules need to be set, principally by those who join and engage in this enterprise. First and foremost should be the international partnership established by the International Space Station (ISS) – comprised of the United States of America, countries of the European Space Organization, Russia and Japan. In setting such rules we should follow successful precedents in exploration of the past.

“[With future rocket developments], it will be possible to go to other planets, first of all to the Moon. The scientific importance of such trips is obvious.”

Wernher von Braun – Memorandum to the U.S. Army – Spring 1945