# Re: What makes an ideal Moon base?

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Joann Evans <bondage@frontiernet.net> wrote in message news:<41521907.2A6DC3A0@frontiernet.net>...
> *AA Institute wrote:*
> >
> > *This is another 'space adventure' sort of fun question, but its fairly*
>
<snip>
> *You don't have to go to the trouble of trying to pressurize a cave of*
> *unknown (and possibly impractical) porosity. If suitable ones can be*
> *found, set up pressurized habitats within them. You still have the*
> *advantages of meteorite/thermal extreme/solar and cosmic radiation*
> *protection. Inflatables derived from Transhab could easily be used here.*
>
Some thoughts I have personally on this 'fun' project:−

LOCATION, LOCATION, LOCATION

As with all real estate projects, there are three primary considerations when it comes to investing in an *ideal* Moonbase: location, location, location! And we only have one chance to get this right. A Moon base is a far longer term endeavour than an orbital station like Mir was or ISS is.

I would personally like to see the base established on the edge of the Moon's near side disk (i.e. on the limb of the hemisphere visible from Earth). There are a number of reasons why I would choose such a location. Firstly, good for direct communications with Earth (subject to windows permitted during the 'libration' cycle of the Moon of course) as opposed to a complete far side location.

Secondly, for radio and dark sky optical observatories, a far side location would be within easy reach via ground crawling manned rovers from a limb−located lunar base. Locating observatories over the local horizons from such a base would cut out the vast amounts of radio noise and light glares coming from the blue−white globe of the Earth, which will hang *permanently* in the lunar sky as seen from any outright near side base locations. And the Earth would be a huge glare. Not only is it huge in disc diameter, but with a mirror−like 37% albedo (reflectivity), it will dazzle you far more than what the

Moon dazzles us on Earth (lunar albedo: just 12%).

Thirdly, if Platinum−group metals and Helium 3 prospecting become key commercial commodities for mining from the Moon, then these are likely to be found in greater abundance on the lunar far side compared to the near side. This is by virtue of the fact the far side is far more exposed to both the solar particles and meteoritic impacts, since the Earth itself acts as a large shield to much of Moon's the near side.

As to *where* (in terms of selenographic latitude) on the lunar limb such a base is to be located is the big, wide open question at this time. If near future scout missions identify water−ice on one or both of the poles, then that will be an overriding driver for locating the base at one of the two lunar poles.

However, I would point out that a polar situated Moon base may only allow *half* the sky to be accessed for radio and optical astronomy from lunar observatories, whereas an equatorially located base could allow more of the sky to be surveyed.
The other point is possibly fuel. On a straight forward Earth−Moon transfer departure from LEO, I think one arrives at the Moon on a 'normal' orbit of some standard inclination, as opposed to a polar one − I'm not sure, but would it cost more fuel to land on a pole as opposed to near equator? Someone can hopefully clarify. A base will require frequent take offs and landings for regular servicing to and from the Earth, costs will therefore mount up incrementally.
Safe passage through the Van Allen radiation belts is also a factor to consider, as I think only certain trajectory geometries allow one to pass safely. Whether they coincide with a polar capture orbit at the Moon is something I'm not too sure about, but its a priority consideration I think.

A polar base will not allow sufficient levels of solar 'insolation' with weak sunshine at such locations for solar power to be an effective electricity source, I think. Needs clarifying...

FIRST STEPS

Several Transhabs connected to a common solar array / nuclear power source, situated in a regolith shielded environment, seems to me a great idea. Some kind of natural infrastructure − be it a cave, a rille, or deeply excavated crater will be necessary for shielding against direct solar radiation.
These Transhabs could be launched using modified versions of the Russian heavy−lift Protons or possibly a new breed of Saturn V−type launch vehicles.

INFRASTRUCTURE EXPANSION

Once the base is fully established, with a sizeable nuclear power station and biosphere, etc. then the lunar regolith could be utilised

for cement (or even bricks!), alloys and other necessary building materials to expand the facility into a proper colony of lunar "houses" with people, plants and animals.... sounded a bit like my "Aster−Com" starship just then!

FUNDING

Establish my dream vision of a "World Space Agency" (WSA) asap. Get every spacefaring nation in on the act. Why does China want to spend the next 30 years developing its own *primitive* space station around the Earth... something the Russians and Americans have already done and dusted decades ago? Why does India want to launch *primitive* lunar orbiters 10 years from now, when that's all old hat too?! Has anyone actually *offered* an attractive proposition to those nations for an opportunity to fly their flags high and proud on the roof of a major, 21st century, hi−tec lunar base?

ATTRACTIVENESS

Get those FAT CAT private companies involved. Don't give them bland, black and white pictures of dismal looking *scientific* bases though. They wont fall for those. No, give them plans of luxury apartments, open top swimming pools, glazed domes looking out into a star−studded sky where the Milky Way stretches from horizon to horizon, palm trees growing on the tranquil shores of the "Sea of Fertility" or the "Bay of Rainbows".... Imagination! The ancients didn't give the Moon's features such fancy names for no reason. The Moon is a very bland, black and white kind of world, where some colour is desperately needed...

A Moon base is not for the next 30 years or 50 years (like the ISS will be). A Moon base is a *permanent* off−Earth colony, to be designed and built with hundreds if not thousands of years ahead with future civilizations in mind. It's worth spending those extra few $trillions to make it nice and plush. That way you'll get private millionaires queing up to stake their claims on the luxury apartments yet to be built there.

If you do the capital investement appraisals with discounted cashflows and what not kinds of models, you will see positive paybacks at the end. Okay, it may be 500 years from now, but *payback* a good, well designed lunar base will generate...guaranteed!

ISS DISPOSAL

If we want to move forward towards a Moonbase, the question here is what do we do with this multi−billion dollar, sixteen nation project? Well, I once had this rather *cranky* idea, we could strip it in orbit now and fire it to the Moon for use as an initial Moon base!
See:

http://tinyurl.com/6usdv

That was a rather *cranky* idea, now that I look back on it after so long.

KEEP MARS ON THE *EDGE* OF THE MANNED EXPLORATION WINDOW FOR NOW

By all means I think Mars should be kept as the *next* step, but we shouldn't let Mars be too much of a distraction at this stage. Let us learn to walk before we can run. If you look at this blueprint:−

http://nssdc.gsfc.nasa.gov/planetary/mars/mars_crew.html

I think Mars is still very much on the *edge* as to current technological feasibility. 40 years of our manned spaceflight experience only scratches the surface and a manned mission to Mars may be too large a step within 30 years. It can be done I suppose as another 'flags and footprints' job but nothing more.

Please... this is all just my own, informal thoughts presented here rather fancifully IMHO, IMHO... of course!

AA Institute
http://uk.geocities.com/aa_spaceagent/astronomy.html