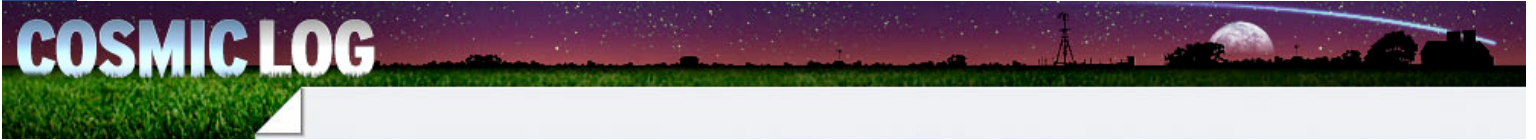


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Quantum fluctuations in space, science, exploration and other cosmic fields... served up regularly by MSNBC.com science editor Alan Boyle since 2002.

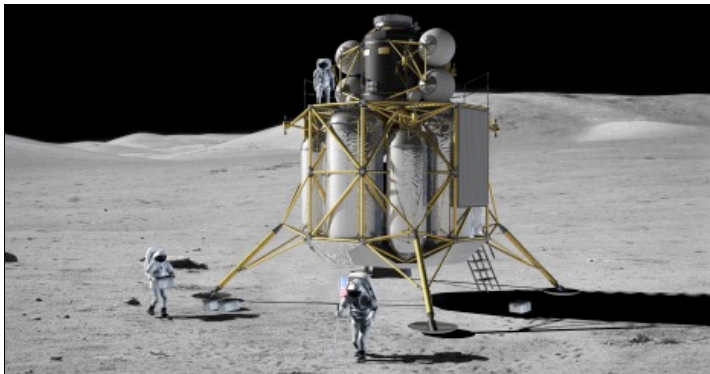


Alan Boyle covers the physical sciences, anthropology, technological innovation and space science and exploration for MSNBC.com. He is a winner of the [AAAS Science Journalism Award](#), the [NASW Science-in-Society Award](#) and other honors; a contributor to "[A Field Guide for Science Writers](#)"; and a member of the board of the [Council for the Advancement of Science Writing](#).

Check out Boyle's [biography](#) or send a message to Cosmic Log via [cosmiclog@msnbc.com](mailto:cosmiclog@msnbc.com).

# Next giant leap reconsidered

Posted: Friday, July 17, 2009 9:00 PM by Alan Boyle



NASA

Concept art shows what NASA's next-generation Altair lunar lander may look like.

At the same time that NASA is celebrating its biggest triumph - Apollo 11's [first human landing on the moon](#), 40 years ago - the space agency is facing its biggest wave of uncertainty since the Apollo program ended.

The space shuttle era is [winding down](#) to its scheduled end next year, and the successor to the shuttle is facing a [hail of questions](#) over cost and safety. Five years after the Bush administration set a course back to the moon, the Obama administration [hasn't yet decided](#) whether it will stick to that course. NASA is just now getting a [new leader](#) after six months in limbo, and an independent panel is in the midst of assessing the options for the nation's future in space: Return to the moon? Target Mars or one of its moons instead? Land on an asteroid?

"I would say they're all in the mix," the panel's chairman, retired aerospace executive Norm Augustine, told reporters today, "and I wouldn't want to make a forecast one way or another."

Ever since astronauts went to the moon, NASA has never had the money to match its aspirations, he admitted. "That puts NASA in a terrible position," he said.

From decade to decade, presidents, lawmakers and members of the public voice strong support for space exploration. Just today, Gallup [released a poll](#) indicating that a gradually increasing number of Americans believe the space program has brought enough benefits to justify its costs. But does that translate into the political will to support a space initiative anywhere nearly as dramatic as Apollo, particularly when it's not clear what the initiative will turn out to be?

Augustine said it all "depends on how the question is asked sometimes."

To some people, the juxtaposition of glory on the moon and uncertainty on Earth may seem ironic - but not to John Logsdon, a space policy analyst and historian at the Smithsonian's National Air and Space Museum who also serves on the NASA Advisory Council.

"There was actually something similar that went on after Kennedy announced we were going to the moon," Logsdon recalled. "It took NASA nine months and lots of alternative designs to settle on what became the Saturn V."

The difference this time is that uncertainties surround not only the rockets being designed to get to the moon, but the White House commitment to the vision and the rationale for going there in the first place (OK, the second place).

Forty years ago, the main reason behind the space race was to keep the moon safe for democracy. "Only if the United States occupies a position of pre-eminence can we help decide whether this new ocean will be a sea of peace or a new, terrifying theater of war," President John Kennedy [declared in 1962](#).

Today, military pre-eminence is still a [key motivator](#) for spaceflight - but primarily in Earth orbit, not on the moon. Various other reasons have been floated for lunar journeys, ranging from a [reignited competition for international prestige](#) to [new opportunities for 21st-century science](#) to [future fusion fuel](#). But there are arguments for targeting other destinations as well, as well as for saving all that money and just sending robots out instead.

Over the next month and a half, it will be up to Augustine and his colleagues on the [Review of U.S. Human Space Flight Plans Committee](#) to sort all this out. By the end of August, the committee is to submit a list of options to NASA and the White House. The Obama administration will then have to move "rather quickly" to craft its own space vision in time to incorporate into its next budget request, Augustine told me.

Here's a quick rundown of the options that are "in the mix" for Augustine's panel, NASA and the White House:

#### **Low Earth orbit**

The first priority is to figure out how to continue supplying the space station after 2010, when the shuttle fleet is due for retirement. NASA is slowly working its way toward the first test flight of a prototype for the [Ares I rocket](#) that could fill that role when the shuttles are gone - but even under the best-case scenario, that rocket won't be ready for prime time until 2015 or so. Some say the [delays](#) and [technical issues](#) bedeviling Ares I are so serious that the [project should be abandoned](#).

Logsdon said the debate goes back to 2005, when the Ares design was chosen from scores of proposed alternatives. "What we have been seeing since then are the 'losers' in that study complaining about the fact that their alternative was better than the one that was chosen," he said. "What's different is that there's enough uncertainty about Ares I to make their complaints credible."

Among the alternatives are the "sidemount shuttle" design that NASA itself is looking at as a [Plan B](#); expendable rockets such as the Delta and Atlas, which would have to be [certified as safe](#) to carry humans; the [DIRECT project](#) championed by maverick engineers inside NASA; and low-cost, next-generation rockets such as the SpaceX Falcon 9 or the Orbital Taurus 2, which are in line for [billions in NASA contracts](#) but have fallen behind their development schedules.

Augustine said today that it's too early to count Ares out. "As far as our committee is concerned, it would be completely wrong to say that Ares is dead in the water," he said, adding that "we're looking at a whole bunch of possibilities."

Meanwhile, NASA is hedging its bets by [making deals](#) for Russian Soyuz and Progress flights to the station, but many in industry (and in Congress) aren't happy with letting America slide into a spaceflight gap that could last for five years or more. So yet another alternative would be to keep the shuttles in operation, at least for a while beyond 2010.

The bigger question focuses on what we want to do in low Earth orbit. This week some folks raised a huge fuss over NASA's stated plans for [deorbiting the space station](#) in 2016. Those plans were drawn up mostly to satisfy the requirements for space station operation, and it's likely that the space station's life will be extended as time goes on. It's also likely the ISS won't be the only game in town. Russia is already talking about building the [next space station](#), and Bigelow Aerospace is working on [private-sector stations](#).

Eventually, low Earth orbit could become a tourist destination, or a way station (and [perhaps a fuel depot](#)) for longer space journeys. Can the international space station serve those functions? [Probably not.](#)

### **Back to the moon**

The shuttle system has nowhere near the firepower required to get out of Earth orbit, so if NASA is going to target the moon (or other deep-space destinations), a big new rocket will be required in any case. Like the Ares I, the [Ares V design](#) that NASA has selected is based on adaptations of Saturn-era and shuttle technology. Another question is whether NASA's current long-range plan to [build a settlement on the moon](#) will still be deemed affordable, given the economic climate we're facing. There are some hints that a "lunar lite" concept, stressing Apollo-style sorties rather than Antarctic-style settlements, will be among the options under consideration.

### **On to Mars (or its moons)**

The most popular "minority report" on space exploration, endorsed by none other than [Apollo 11 astronaut Buzz Aldrin](#), is to spend as little effort as possible on the moon and go directly to Mars. An even more sophisticated variant of this plan calls for creating a manned base first on one of Mars' asteroid-like moons, Phobos or Deimos, from which observations could be made and landers could be sent. The Russian-led mission to Phobos, called [Phobos-Grunt](#), represents one small step in this direction. But manned Mars missions would be so complicated and costly that it no one nation could do it alone, and taking that giant of a leap would take far longer than returning to the moon. Aldrin, for example, has suggested a [target date of 2031](#) for a manned Mars base.

### **Target an asteroid**

Aldrin has suggested starting out with a simpler step: sending a manned mission to a near-Earth asteroid - for example, the asteroid Apophis, which may have a [very small chance of hitting our planet someday](#). NASA experts have said that the Project Constellation system being developed for moon trips [could be used as well to visit asteroids](#). Space rocks could provide scientific insight into the origins of the solar system, and some have argued they could provide [valuable resources](#) for life in outer space as well. But the biggest thing we need to find out about asteroids is [how to keep them from killing us](#). If it does turn out that a big enough space rock is heading our way in, say, 30 years or so, that might well raise asteroid visits to the top of NASA's priority list.

### **Build a space base**

Yet another option would be to build "flexible" space infrastructure in a place that could take travelers to any of these destinations - say, at one of Earth's gravitational balance points, also known as Lagrangean points. One of these points, L2, is already becoming a [popular parking lot for costly space probes](#), and it's not hard to foresee a time when such stable regions of space could become settled neighborhoods. Before Aldrin's most recent focus on Mars, he favored building a ["floating launching pad"](#) for manned and unmanned missions at L1, a balance point between Earth and the moon.

### **Status quo**

... Or we could just go with the status quo, which is actually none of the above. This would entail continuing with the uncertainty surrounding human spaceflight, and perhaps increasing the payoff from unmanned probes such as [NASA's Mars rovers](#) and the [Lunar Reconnaissance Orbiter](#).

Augustine said the range of opinions being expressed about space policy is just as wide as it was when he

presided over an earlier assessment of America's space goals, [back in 1990](#).

"Then, as now, there are some extremely strong, almost passionately held views," he said. "We'll get one letter right after the other from prominent, qualified people - one which, for example, will say we need to start populating Mars immediately because there's a chance we're going to destroy our Earth. The next one will say we've got major problems of an economic nature in this country, and we shouldn't have a space program at all."

The latter view might suit critics of manned exploration such as University of Maryland physicist Robert Park. "The costs and risks are just too high," he was quoted as saying in [USA Today's survey of future spaceflight](#). But it's just the kind of situation that Logsdon hopes Augustine's report will head off.

"The end point of this, I hope, is that after this process is done, we have a plan that is agreed to and can be stable for a period of time long enough so we can go on and execute it," Logsdon told me. "If we keep changing our mind every two or three years, we'll get nowhere."

#### More about the Apollo 11 anniversary:

- [Moonwalk video gets a makeover](#)
- [Apollo 11: Where are they now?](#)
- [Where were you when Apollo flew?](#)
- [On the Web: Moonshots on your computer](#)
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#### 💬 Comments

I think the most beneficial thing we could do is figure out a way to mine the near-earth asteroids for usable materials. This would, of course, require the creation of significant infrastructure (either on the moon, or at one of the Lagrange points) but the benefit of this outlay is a reduction in the amount of material being sent into orbit.

**Brian, Lowell, MA** (Sent Friday, July 17, 2009 10:02 PM)

I'd be happy to hear that the administration has picked any of these alternatives. The lack of a commitment to space exploration has been a major disappointment to me for many years.

I speak as one who remembers the national shock when the Russians beat us to space in the fifties, and as one who watched in awe (from a dayroom in Japan) as we first touched down on the moon 40 years ago. We as a species need to get off this rock if we want to insure our survival. We need a new program to make sure that we don't have all our eggs in one basket (Earth).

Now is a perfect time to get off our duffs and push all the governments of the world to get together and push for a space program for all human beings.

**Tim Hetrick, Alliance, Ohio** (Sent Friday, July 17, 2009 10:10 PM)

The thing that the article failed to point out is the cost of the NASA program and that it requires not one but two new rockets. Ares I was meant to be 'Safe, Simple, Soon'. It is over-budget and soon is more likely to be 2017 at the earliest. The Direct team proposes building one rocket that may be available by 2014. One of the things that killed Apollo was cost. How much cost will it take to operate 2 new vehicles? How often will they fly? How much of NASA's budget might they take up? This story fails to address this. As the former NASA administrator stated ..."Indeed, the most obvious split involves launching two identical vehicles with approximately equal payloads, mating them in orbit, and proceeding to the Moon." This is Direct.

I can only hope one day that this reporter will be a background story on the slanted assumptions that the ESAS report made that formed the backbone for NASA's Constellation program.

**phillip, Los Angeles** (Sent Friday, July 17, 2009 11:45 PM)

The best option was one I did not see in your written wondering „the 'Jetsons' as in antigravity technology...

**Paul J.S. Beaubien Victoria B.C. Canada** (Sent Saturday, July 18, 2009 4:52 AM)

I hear there's some good fuel material on the moon, so this is great! The moon can become a gas station for space ships!

**Louis, Eureka CA** (Sent Saturday, July 18, 2009 5:27 AM)

Just send an unmanned probe. It's cheaper and safer. Let's just worry about the planet we're on for awhile.

**Heather Czerniak, Milwaukee, WI** (Sent Saturday, July 18, 2009 5:33 AM)

Why is there no mention of December 21, 2012 anywhere - why are people afraid to speak about it. Here we are making plans for 2015 - not many of us will be left on this planet after December 22, 2012. How do we prepare for this cosmic event - or can we ??

**Bob Wysocki, Barrie Ontario Canada** (Sent Saturday, July 18, 2009 7:20 AM)

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"Direct" is a seriously flawed concept: <http://ow.ly/hd8s>

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**gaetano marano** (Sent Saturday, July 18, 2009 7:31 AM)

We Astronauts and Space Explorers are still under the Power Curve. We need power sources that can get us to the Moon and beyond in one vehicle.

Maybe we should redouble our research and development on Anti-Gravity, Anti-Matter and Fusion power. Low Earth Orbit is our current power limit now, and will be going forward. Change is needed.

**Jonnie Long Beach, NY** (Sent Saturday, July 18, 2009 9:11 AM)

Longsdon is a reetaard of the highest order.

That anyone would quote him let alone consider his opinions is a reflection of the educational problems which has brought US to this unenviable position.

This guy was an Ares I supporter like all the rest.

**Thomas Lee Elifritz** (Sent Saturday, July 18, 2009 9:44 AM)

Excellent article Alan on the future of space flight! I am solidly for going back to the moon and on to Mars, but not by doing it alone as the arrogant ignorant bushwhacker wanted. His plan to go back to the moon and on to Mars was a stupid reaction to the Chinese announcing they're going to the moon. All he wanted to do is have the USA thumb it's nose at the rest of the world with his go alone approach. We should be using the International Space Station experience of sharing the load with other countries as the model for future space exploration to the moon, Mars and beyond. We could make some big bucks licensing our new Ares space technology, I mean isn't that the capitalist way?

So sad that Walter Cronkite won't be around to enjoy the 40th anniversary of Neil and Buzz landing on the moon. I so enjoyed Walter's reporting on the Mercury-Gemini-Apollo space programs and especially his reporting of the first moon landing. His fascination with the space program was infectious and I will miss him sorely.

Remember Walter!

**Eric, Salinas, CA** (Sent Saturday, July 18, 2009 9:57 AM)

One of the major flaws in the current program is that neither of the proposed space vehicles can carry a significant amount of cargo. This would make construction and resupply of any permanent or semi-permanent space habitat; whether it be on the moon, Mars/Mars moon, at a Lagrangean point, or on an asteroid; extremely problematic. The space shuttle has been a major workhorse for the construction and supply of the ISS as well as for launching and repairing satellites. Retiring the shuttle without a suitable replacement does not make sense. It seems that, regardless of our long term plans, we need to extend the operational life of the current shuttles. We also need to seriously reconsider the current program's space

vehicles with an eye towards increasing cargo carrying capability. Long range space exploration will be much more practical if we have the ability to stage supplies such as fuel in orbit for use by long range vehicles. We could also assemble larger exploration vehicles in orbit that would be impracticable to launch from earth in a single piece.

**JS in SD** (Sent Saturday, July 18, 2009 10:03 AM)

Our president is a Star Trek fan, oddly enough, I find this an encouraging sign he might do the right thing here. As for the idea of an international mars mission, that's just not going to happen. We promised the rest of the world that we would take a leadership role in the ISS and now we are looking for every way we can to minimize our role. No one will trust us to take anything but a minimal role in such a project again. We have lost all our credibility on such things.

There is irony here. While the Russians are constantly broke, and can't sometimes pay the salaries of their engineers, they have shown a commitment to space. Even when the money is short, they have always found ways to keep the Soyuz capsules rolling out of the factory. Imagine what would have happened if we were in the same situation. (and as bad as it is here, it's nothing like that)

On the subject of the Ares, these things take time, and they are expensive. If you remember back in WWII, Von Braun (who should not be remembered as a hero, but a war criminal who used slave labor to build his rockets for an evil regime) gave falsified reports to his superiors because politicians don't understand research. Similar things always happen because research is not a certain endeavor. If you think about it, it makes a lot of sense. If you knew for certain what would work, you would just draw up a design, build it and go. Engineers, because of 70 years of research know a lot of what will work, but it's all very complex and various issues show up that you don't expect. This is after all rocket science. You design, simulate and build, and then see what went wrong and fix it, then repeat until you have something that works. That's the process. At the end, you get a functional device.

**Michael M, Kent oh** (Sent Saturday, July 18, 2009 10:30 AM)

Columbus searched in vain for many years to get money for his voyage, maybe the problem is we have government agencies involved in all aspects of missions. Too much red tape

**rich, salisbury ma** (Sent Saturday, July 18, 2009 11:27 AM)

Some day, hopefully soon, a rational decision will be made ending these programs. At this time sending humans into space makes no sense. Problem one: energy needed to achieve earth orbit. Problem two: the severe health consequences of extended stays in micro-gravity. Problem three: limitations imposed by chemical rocket propulsion systems. Problem four: lack of knowledge about the basic facts of possible mission objectives.

Solutions to problems one and two are easily imagined.  
Problem three requires more than my limited knowledge.  
Problem four is being worked on, although in a much more limited rate than it could be.

Forty years since Apollo 11, 40 years mostly wasted.

**Andy Womack, Fraser, Colorado** (Sent Saturday, July 18, 2009 11:51 AM)

I don't care what we do, Constellation, Direct, the modified shuttle, or something different... I cannot understand the flaccid response from the government on this. We retire the shuttles, and the quickest we are going to get back into space under our own power is by using the Russians. Correct me if I am wrong but the Russians haven't always been our friend and even now, fight us on many different fronts, and on top of that the latest space tourist spent 30 million to fly up there, we pay 80 million (or so) for each NASA astronaut we send on a Russian ship.

On top of the Russians if you haven't noticed China is also moving their space program faster than we did/are. In 4 missions (I believe) they have launched a man into space and spacewalked. I guarantee they are going to beat us back to the moon, and probably onto Mars. Unfortunately I see NASA as not having the political will to get out of near Earth orbit, maybe they will be able to set up a moon base but I doubt it. We rely on the Russians now, we will rely on China in the future, and probably before that we will collapse.

The country that stops exploring is sure to fall. We are already heading that way, if we want to have hope we need to get another space race going, and spend the money, yes that's right spend the money and get back in front. Use China as the reason, if NASA cannot pull it together alone let's get the private sector involved, there are already at least 3 private companies that are stepping up and doing so on a true shoe string budget. Instead of pumping the millions (and billions) into Russia pump it into our private sector and let's work together and get this nation back into space, exploring like we NEED to be and have a permanent

settlement on the moon by 2025 and by 2035 have a permanent settlement on Mars.

**Joe Nobody, Seattle, WA** (Sent Saturday, July 18, 2009 12:43 PM)

The next giant step should be solving domestic energy needs with green technology and energy independence. Only then should we look to the stars once again

**Kenneth J** (Sent Saturday, July 18, 2009 12:57 PM)

We are trying to force a single near-term vision in a domain where there is plenty to do. Space exploration is vast and we need to dedicate a lil bit money on all fronts.

Other than finding a replacement for the current shuttles, I am not sure if there is a current crisis. Unmanned space exploration by way of probes and low earth orbit initiatives should continue as is. Going to Mars may happen in 100 years (if not next 40), with or without the moon, when the technology, knowledge of Mars and political will is ripe. There is water there. For those who propose a moon base, if we can't colonize it, what's the point in going back?

**Rakesh Sharma, San Mateo, California** (Sent Saturday, July 18, 2009 1:22 PM)

I'm 57 years old, and I've been a fan of the space program all my life. But I've now come to the conclusion that the era of manned space flight should come to an end. The only justification for spending large sums of taxpayer money on space exploration is the advancement of scientific knowledge. Robotic space missions can get that knowledge for a tenth the cost of what manned missions could get it. Future manned missions to the moon, to an asteroid, to Mars or one of its moons would necessitate a gigantic increase in NASA's funding. Undoubtedly, it would also gut funds for robotic missions. I hear people say that we should continue the manned program because it served us well in the past, spinning off "new technology". Well, I think that day of over. The space program no longer drives new technology. Dale Bumpers was right to try to kill the Space Station. Its cost/benefit ratio is dismal. So I say CANCEL Aries. Cancel EVERYTHING--everything EXCEPT robotic missions.

**David Collins, New Albany, Mississippi** (Sent Saturday, July 18, 2009 1:52 PM)

Until the perfection of an ion drive or a similar technology the moon is the only viable target for exploration and possible exploitation (assuming water supplies are available at the moon's poles). Mars is too far for current technology and not very useful either. Mars has too deep a gravity well to make it a base for further space exploration. If water and He3 are available on the moon then that would make use of the moon as a staging point for further exploration financially viable, perhaps even profitable.

**Richard, Topeka, KS** (Sent Saturday, July 18, 2009 2:10 PM)

"The best option was one I did not see in your written wondering „the 'Jetsons' as in antigravity technology..."

'Option' implies an available choice. As in something you know how to do or at least know to be physically \*possible\* to do.

At this time, antigravity is neither. If you have real PROOF to the contrary, I (and Hanna-Barbera) am all ears...

"Now is a perfect time to get off our duffs and push all the governments of the world to get together and push for a space program for all human beings."

Nonsense. The kind of cat-herding bureaucracy that that will require will only make it take \*twice\* as long...

If anything, space flight needs to go the other way, down to the level of private, non-state players that can focus on efficiency and goals and not on the politics of playing nice with this partner country or that Senator/Representative.

"Problem one: energy needed to achieve earth orbit.

Problem three: limitations imposed by chemical rocket propulsion systems."

It takes about as much 'energy' to reach LEO as it does to fly from New York City to Los Angeles. Chemical rockets are adequate. Better engineering and higher launch rates (for better economies of scale) are what's needed...

"Problem four: lack of knowledge about the basic facts of possible mission objectives."

I'm not sure what that means. Deciding what you \*want\* to do (if I'm reading you right) is a problem, but not a technical one, though it'll have technical implications...

[Frank Glover, Rochester, NY](#) (Sent Saturday, July 18, 2009 2:40 PM)

"Our president is a Star Trek fan, oddly enough..."

Where'd you hear this? It's utter news to me.

[Frank Glover, Rochester, NY](#) (Sent Saturday, July 18, 2009 2:43 PM)

"Why is there no mention of December 21, 2012 anywhere - why are people afraid to speak about it?"

Afraid? Google it. You'll get enough hits to keep you reading right up until then..

"Here we are making plans for 2015 - not many of us will be left on this planet after December 22, 2012."

And you are certain of this, because...?

"How do we prepare for this cosmic event - or can we ??"

If you mean Apophis, I'll be watching, as will many others. But we \*know\* that'll be a fairly near-miss. It's how it'll come back later that will then need attention.

If you mean the Mayans, I have no more reason to accept that, than any other belief's notions about The End Of The World(tm)

If I'm right, I won't look silly or embarrassed on the day after the alleged end.

If I'm wrong...I won't be here to look either silly or embarrassed, will I? (and with no means to leave the planet or stop 'it,' just what could I have done, anyway?)

[Frank Glover, Rochester, NY](#) (Sent Saturday, July 18, 2009 2:53 PM)

I think using robots is a comprehensive and economical approach that will give us the most bang for the buck. This is particularly true in the short to mid term - say about 20 years or so. I agree with Mr Andy Womack's comments makes sense. In the mean time, on the side line, new propulsion technology /innovation must be pursued. In any case, whatever decision we come to, we should go for long term with committed resources. Stability and long term commitments are crucial elements. Think in terms of a marathon race as opposed to a sprint!

[Ram Shah, NJ, Edison](#) (Sent Saturday, July 18, 2009 3:43 PM)

Considering the imminent massive, but oddly unpublicized, cheese shortage, I think it very timely that we return to the moon.

[Sprague](#) (Sent Saturday, July 18, 2009 8:21 PM)

Some of those things in the images sent from the Mars rovers looked like fossils. Is there something NASA is not saying? Buzz Aldrin has it right. Forget about the moon. Go directly to Mars.

[Mike Dorlac, Chatsworth, California](#) (Sent Saturday, July 18, 2009 9:16 PM)

Words mean a lot. Too many words and words misunderstood by the hearer cause confusion. The Mayan calendar (which completes its cycle in December, 2012, and then begins to repeat itself) is an example of the latter confusion. But why are we naming the future rocket (which is supposed to redeem our space program) after the God of War himself, Ares? Because he is supposed to get us to Mars (another name for the same god of War)?

The Russian Progress and Soyuz (meaning Union) seem to reflect more of the sense of purpose which is

engraved on the LEM we left on the Moon 40 years ago, something about "coming in peace" as I recall.

And Endeavour, Enterprise, Spirit, Opportunity, Kibo (Japanese "Hope") and the others (even the Canadarm, an invented word but one which signals usefulness rather than violence) speak to a future for Mankind to which all of us can aspire.

**Des Emery, St. Thomas, ON, Canada** (Sent Saturday, July 18, 2009 11:08 PM)

Dude Chill on 2012. If your so conviced it is going to happen then go have some fun! i.e. take out loans without the intent of paying it back.

This artical stated that intelagent people have given oppinions. One such person states that we need to hurry up and establish a coloney on mars before we destroy ourselves on earth. Ah, hum, mars is petty uninhabitable and a martian coloney without earths help would be short lived. Not well thought out.

We need to go to the moon or to mars! Those jobs won't get outsourced to another country. We need another stimulus bill. This one would would employ all those highly educated people, and give our next generation of college grads the hope of a well paying job.

**Mike Geile, Harrodsburg, KY** (Sent Saturday, July 18, 2009 11:35 PM)

IMHO, we have to go to both Mars and the Moon. We need to go to Mars to protect our prominence in space and our national pride. We need to go back to the Moon to protect our interests. If we don't go back to the Moon we will surrender our future to our competitors. If we don't go to Mars we will miss out on the opportunity to create history. The current budget to explore space is a joke compared to the financial bailout money being spent. As a society, we have to remember the past, do what's best for the present, and invest for the future. No matter what we do, we will run out of resources or some disaster will occur that we cannot overcome on this small world. Our only hope is to expand out into the solar system and create our own destiny.

**Russell Peterson, Locust Grove, VA** (Sent Sunday, July 19, 2009 3:59 AM)

There is a deadline to end shuttle exploitation.

There should also be a deadline for all later missions.

Deadlines motivate. They put pressure and make things happen.

We should return to the Moon. It's the first world outside of Earth, in space. It's close enough to be safe.

Above all, it's a reachable goal in our lifetime. I don't believe in any goal that needs 30 years to be realized and that was already promized 30 years ago. (Cure of the common cold, fusion energy, humans on Mars, etc...)

From the Moon, the Earth looks beautiful and fragile. That's what counts.

**Raoul Lannoy, Antwerp, Belgium** (Sent Sunday, July 19, 2009 4:32 AM)

I long for the day that our country returns to space exploration of other worlds. It is a shame that we have not returned to the moon or done anything except circle the earth for 40 years. This is not to diminish the accomplishments and discoveries resulting from these efforts since the moon landing. I just think that we should have set foot on another solid celestial body since thin. I remember hearing of the possibility of landing a man on Mars by 1985. Of course, that time has come and gone with no such thing happening. I think the space program should be intesified and vigorously persued if nothing else for the sake of descendants. Some day, albeit far, far into the future, our sun will someday eventually die out. Our planet will be left a cold, lifeless mass of land. Our ancestors will have to be able to leave this planet to continue life on other worlds. We have to have a starting point in our space program to allow the eventual evacuation of this planet in order for the human race to survive. I know this sounds dramatic and is certainly not an immediate concern, but nevertheless some day thousands of years from now this planet will become cold and lifeless. We owe it to our descendants to initiate the knowledge that will enable them to survive when the time comes to leave this planet for a new start in life.

**Ernie, Baton Rouge, La.** (Sent Sunday, July 19, 2009 6:32 AM)

Very interesting article & comments. 1-We need more Research into better, lighter types of fuel for the space project which would also help us domestically.

2-We definately need to refurbish our shuttles to last longer. 3-Send a robot to the moon to collect more info, samples, pics, etc. so we know if it would be wize to set up a way-station or colony there. 4-'Pick' the scientific brains we have available in the USA & the world if possible for the best outcome to all of this. 5- Don't forget the best CO2 converter is still a TREE!! Save a tree...plant & utilize Hemp again as our forefathers did.

**[Pat Milby, Cairo NE USA](#)** (Sent Sunday, July 19, 2009 7:17 AM)

I agree with those who say "End the manned space program beyond low-earth orbit." The major reason we sent men to the moon was for a cold war moral boost." We can now send complex robots that did not exist 40 years ago. The NASA folks are wrong. There is no non-emotional, compelling reason to send humans back to the moon or to Mars when 90% of the science could be performed by robots of today and tomorrow for 10% of the price.

**Matthew, Massachusetts** (Sent Sunday, July 19, 2009 8:32 AM)

I don't see why a shuttle fuel tank full of course can't be put in low earth orbit , maybe by two saturn 5s and then rendezvous the space shuttle with the full tank to continue on to the moon. We need to stop throwing away usable designs every time we want to do something new.

**Neil Seattle Wa** (Sent Sunday, July 19, 2009 8:41 AM)

It seems to me that many of the messages I am reading on this site are absolute foolishness. This is shameful on the part of these authors because the subject concerns the destiny of our space program. It touches on a subject of critical importance to the future of our children whether we will continue with space exploration. We as a people need determine whether or not the continued funding of the space program is in our best interest and its impotent to determine whether or not we have ever really been to the moon 40years ago or did Nixon contrive a hoax to undermine the Soviet Union during the cold war?

**Frank Klepeiss Bethlehem Pa.** (Sent Sunday, July 19, 2009 9:22 AM)

Wow. Some of the responses to this article range from amusing to absurd. Doomsday in a few years? How quaint. It's true, if you keep pushing back the end of the world deadline every few years when it doesn't happen, you'll eventually be right! Antigravity? A little thing called physics would like to talk to you. I'll give you the short version. Not bloody likely. Fortunately the guys in charge of the space program know this. Even when they gave funding to see if any of the many crackpot propulsion theories could hold water, antigravity one again proved laughable and highly improbable. If you disagree I have an antigravity driven perpetual motion device I'd like to sell you. Who am I? Why sir, I am one of the sarcastic, snobbish, well educated individuals who are still inexplicably internet posters. Good day.

**Mitchell Webb** (Sent Sunday, July 19, 2009 9:25 AM)

First, we need a vision that's far into the future. We need to decide if we're reaching for the stars, or just looking for a platform to look back on ourselves. Second, we need a plan for realization. Let's have a strategy. Von Braun had a clear idea of how to get to Mars 50 years ago. It is certainly arguable today, as it was then, but we would have gone a lot further, a lot more efficiently, by following a plan. It can be evergreen—as long as it keeps us going in the right direction. Third, all steps in the plan should build toward the final goal. We threw away the Apollo technology; we're about to throw away the Shuttle.

**Richard Watson, Salem, NJ** (Sent Sunday, July 19, 2009 10:58 AM)

If Aries is too difficult to develop, why not go back to the Saturn V? Surely that 40+ year old technology could be easily updated to be even more reliable than it was back then!

**Buzz Lightyear** (Sent Sunday, July 19, 2009 2:55 PM)

Fall into Space...  
Just a reminder that Gaia Two revolutionizes everything you think you know about access to and return from Outer Space.  
The perpetual problem of the first fifty miles and the last fifty being the most dangerous no longer exists. The Rocketeers have seen their day.

Do you think the vehicle would get blown out of the sky if I launched without all the proper documentation? So much for free enterprise solving anything.

The Rocketeers have a lot to lose once their approach is shown to be archaic, wasteful, and simply put...flat out self-defeatingly stupid to continue on with in today's Global Environment.

<http://gaiatwo.blogspot.com>

<http://telecomsat.blogspot.com>

This is ready to go, Alan...anytime anyone wishes to discuss the particulars, and get down to biznis!

Imagine the economic boost.

Every top scientist, engineer, and technician currently working on Rocketeering can retrain to solve some of today's real problems...so there will be no existing infrastructure upheaval issue to further delay this project...sounds good, eh?

Thanks again for the forum...

Remember Peenemunde...rotten SOB!!!

**steve smyth** (Sent Sunday, July 19, 2009 4:18 PM)

give some thought to hitchhiking a ride on a comet/rocket off later and have the robots investigate other possibilities. In the meantime concentrate on a new fuel source and have the whole world involved.

**Jack Sullivan** (Sent Sunday, July 19, 2009 5:45 PM)

Wow, reading the comments it's apparent some people are having difficulty telling the difference between Science Fiction and Science Fact. Anti-gravity? Maybe someday we'll know how to do that but not right now.

I do agree that the biggest problem facing the space program is a lack of commitment and direction. There is no single solution for everything we want to do in space. Lets focus on what we need/want to do and the capabilities of current technology and get something done!

**Don Kelly, Huntsville UT** (Sent Sunday, July 19, 2009 7:33 PM)

The problem with the lack of direction for NASA is the lack of direction of everyone. That the Apollo program was kept on track was partially because of the country's love of Kennedy and a desire not to fail him after he had been killed. I personally think we need to split NASA up and create a pure "Space Exploration Administration", with that being it's sole purpose. Not monitoring the Earth, leave that up to NOAA and the EPA, not doing aeronautical research for the military, not doing any of the 20 dozen other tasks that NASA currently has to balance out with it's limited budget. This focused Agency will be given specific tasks that it has to accomplish, or else folks in it get fired...period. Next you have to elect both a president and a congress that has the guts to stand up and say, "This is our National Space Policy, and this is what we're going to do...period." Finally, you have to organize and get the public to rally around that policy in a manner to what the focus was during WWII, in other words, follow the policy at any cost until it's achieved.

Once we've gotten our Space Ducks in a row, then we're in a much better position to turn to the other space faring countries, and suggest cooperative missions, because right now...it's like having someone with Multiple Personality Disorder suggesting you go for a tandem bike ride.

**D, Aurora, CO** (Sent Sunday, July 19, 2009 11:02 PM)

"I don't see why a shuttle fuel tank full of course can't be put in low earth orbit, maybe by two saturn 5s..."

Launched from what? The two Saturn pads were converted for the Shuttle soon after Apollo.

And launched \*with\* what? Where will these Saturns come from? The machining and tooling is long gone. Some of the contractors and sub-contractors no longer exist. The two that were never flown have been lawn ornaments for decades at KSC and JSC (I walked around that one myself) and no longer fit to fly.

"...and then rendezvous the space shuttle with the full tank to continue on to the moon."

Space Shuttle Main Engines need ground support equipment to get them started. NASA tried to develop a version that could start in flight as the Ares-I second stage...and couldn't do it. (that's why the reduction in the original size and weight of Orion, as the J-2X they'll use doesn't have the same performance).

An orbiter's ability to radiate the heat all its systems generate into space work on the assumption that the ship will also receive heat from the Sun only about half the time (being in Earth's shadow the other half). Sun exposure is full-time, while moving between Earth and Moon.

Once you get past all that, Lunar orbit is the best you could hope for. Don't even \*think\* about trying to land an orbiter on the Moon...

After a Lunar departure burn, an orbiter would also have to have enough propellant to decelerate at least to Earth orbital speeds. It could not handle the kind of high-speed re-entries from the Moon that Apollo and the Russian Zond did and Orion would.

"We need to stop throwing away usable designs every time we want to do something new."

But we can't expect to use the Shuttle (or anything else) very far \*outside\* of its design limits.

As I've said elsewhere, the Shuttle was designed to be a re-useable \*launch\* vehicle, not a re-useable \*interplanetary\* vehicle. Period. You wouldn't expect one airplane design to be all things to all users, spacecraft are no different. \*Doing\* something new' usually requires \*designing\* something new.

"give some thought to hitchhiking a ride on a comet/rocket off later..."

How would this help you? You cant just \*grab\* a comet as it passes, you have the propulsion to match its speed and direction (rendezvous)...and then it doesn't matter if it was there anyway, does it?

And what are the chances that a comet happens to be going in a direction that's useful to you?

This matters only if you want to study the comet itself. It's not like catching a train...

"Mars has too deep a gravity well to make it a base for further space exploration."

That's not the point. You build a Moon Base to study and utilize the Moon. You build a Mars Base to study and utilize Mars.

Repeat for any other body in the solar system worthy of a continuous human presence.

But don't pretend or assume that they're 'jumping off' points for exploring deeper into space.

Spaceships will be built here where all the manufacturing infrastructure already exists and fuel resources are plentiful and cheap (Though if there's a useful fuel/reaction mass resource at your \*destination,\* [NOT down on some intermediate body like the Moon], by all means, go for it).

In a sensible exploration scenario, virtually everything starts from Low Earth Orbit. This is why Heinlein and others have described it as 'Halfway to anywhere in the Solar System.'

[Frank Glover, Rochester, NY](#) (Sent Sunday, July 19, 2009 11:08 PM)

Manned spaceflight is extravagantly expensive, travel to the moon and mars even more so, with little economic return other than the entertainment of seeing zero G play and spacesuits bouncing on the moon. Yes, I do know about "spinoffs", but the spinoffs didn't come from the actual manned spaceflights, they came from basic research. We could have the same spinoff benefits at a fraction of the cost if we funded basic research and cancelled manned flights. There are direct economic benefits to satellites and robotic space probes that make their high launch costs worthwhile, but that is a different issue.

Perhaps the extravagant expense of manned spaceflight would be an acceptable luxury if the economy were booming and the national debt was low and tax revenues plentiful, but that isn't the case. We won't be going to the moon in 2020 because we can't afford it, and the sooner we cancel this extravagance, the better it will be for all of us.

Perhaps sometime in the future there will be a technical breakthrough that will dramatically lower the cost of going into space and make manned spaceflight economically viable, but until that happens, we should use our funds elsewhere. (sorry, Steve Smyth, but your "gaia2" idea won't work as described, you can't "fall up" nor can you fall up by falling down)

**CM, Modesto** (Sent Monday, July 20, 2009 12:10 AM)

After 40 years, one thing is clear: the future is not what it used to be.

See:

<http://notionscapital.wordpress.com/2009/07/20/the-future-is-not-what-it-used-to-be/>

[Mike Licht, Washington DC](#) (Sent Monday, July 20, 2009 1:00 AM)

All this talk about moon and even mars exploration may sound exciting, but I have my doubts about it happening any time soon. As a few of the scientists involved point out, to make any rapid progress on getting there will take a lot of money. Unfortunately, the political hacks in D.C. led by the troika of Nancy,

Harry, and Barak, are planning to spend lots and lots and lots of money on socialistic gimme gimme programs. These pocket stuffers have been piling on the treasury trough in a way that reminds me of a bunch of drunken shriners hopping on a Kansas City whore. I doubt if there will be much left in the treasury after this massive vote-buying scheme has gotten underway. Besides, the main drive behind the Mercury, Gemini, and Apollo program funding wasn't so much pure scientific curiosity as it was cold war fears that the commies would get nukes into space before we did.

**John Cheek, Salisbury, nc** (Sent Monday, July 20, 2009 1:12 AM)

<http://www.stars4space.org/Benefits.html> The preceeding link is for those of you that believe we need to abandon space exploration. <http://www.sti.nasa.gov/tto/> This link is for those of you who may want to search the NASA technology database for ways to make the Earth better (and make a few bucks too). An example is after the Apollo launchpad fire, NASA funded development of a smoke detector. Some of you are alive because of this!

**Bill Hale** (Sent Monday, July 20, 2009 1:22 AM)

Examining the various perspectives on exploring space is an excellent way to gain a sense of the future, because one can make inferences based on the different ways people perceive the importance and value of looking beyond the tips of their noses . . .

From the long range political perspective, it is useful to ponder the reason that people tend to know the names of the king and queen of Spain in the late 15th century and the fact that if there continues to be human life on this planet hundreds of years from now, people will know the name of the president who made the decision to send astronauts to the moon, which for the most part will be all they remember, because it is the most important thing that John F. Kennedy did in the grand scheme of everything . . .

In great contrast, there are folks who view life and the universe very differently, with one particularly troublesome group being what I like to call the "Coconut Tree Acolytes", those folks whose vision of everything is centered around the general idea that if they sit underneath a coconut tree and have happy thoughts, then the coconut tree will reward them by dropping a coconut so that they can feed themselves, but otherwise when they have unhappy thoughts the coconut tree will punish them by denying them its essence--noting that this group of people are the ones who remain convinced that the lunar expeditions of the late-1960s and early-1970s were elaborate hoaxes created by Hollywood . . .

And then there are the "I Can Be an Oscar Mayer Weiner, But the Official Rules Strictly Prohibit Me from Having Wings, Hence I Cannot Be an Angel!" unmanned space exploration fanatics, who generally continue to be confused by the adage, "if we were supposed to fly, then we would have wings" and, for the most part, tend to align most strongly with the Coconut Tree Acolytes, at least when they encounter a bit of resistance in recruiting more "We Are Not Angels!" believers . . .

And there are more groups, since everyone likes to have an opinion at the dawn of the early 21st century, but there is yet another excellent way to determine whether someone has an elevator that goes to the top floor, which to be specific is how well they understand the fact that when they have a medical emergency and an amazingly high-technology emergency response vehicle arrives, this is not the result of whatever the Coconut Tree Acolytes and the We Are Not Angels! people have accomplished over the decades, centuries, and millennia . . .

Instead, it is the direct consequence of manned space exploration, since the reality in outer space is that if something happens, then there you are, entirely on your own, which maps to needing to take everything you need with you and requires diligent thinking with respect to the way everything works, which is fabulous . . .

Fabulous!

And then there are the "Beans Must Be Counted!" people, the accountants who realized many centuries and millennia ago that while they actually have no useful talents and skills, they can achieve full employment for themselves by sharing their obsessive compulsion to count everything with as many other people as possible, although sharing it typically requires at least a minimal concept of "the future", hence is not so easy to do with the Coconut Tree Acolytes, but often is too easy to do with the We Are Not Angels! folks, especially when the Beans Must Be Counted! folks devise ways to cook the books in favor of unmanned space flight, which is one of the ways the general reality of everyone having basic health care has been stalled for so long . . .

And a few more facts are useful in making sense of the most important considerations for doing manned Lunar and Mars missions, but perhaps the most important consideration is that establishing manned Lunar and Mars bases requires the biggest advance in the understanding of human anatomy and physiology in the

history of this planet, and it might actually lead to discovering why so many people are afflicted with the disease which colloquially is called "aging" . . .

Another useful fact is that the fine folks at the FED, Congress, Department of the Treasury, along with the two presidents and a virtual cornucopia of bureaucrats and regulators, over the past 12 months have transferred more than sufficient monies out of the country to pay for everything anyone at NASA currently can imagine, many times over . . .

Stated another way, "bailing out" AIG et al. accomplishes little more than creating temporary employment opportunities for sneaky weasels and highly paid speaking and traveling engagements, while at the same time doing absolutely nothing for common folks, especially with respect to improving our lives and so forth and so on . . .

When you ponder everything for a while, it is not so difficult to understand that sending people in a space ship on a journey that is approximately one year in each direction pretty much maps to having to devise a way to provide a complete hospital in a tiny area, about the size of a walk-in closet, which curiously is about the same size as the interior space of a state-of-the-art emergency response vehicle, such that instead of being able to send all the information wirelessly to the hospital, it becomes possible to bring the emergency room to the patient, which already is being done to some extent with helicopters at the dawn of the early 21st century and certainly would not be happening without the remarkable vision of President John F. Kennedy . . .

And while there was a little presidential vision in the late-1970s continuing through last year, there were no bold visions that focused on improving the lives of the common folk . . .

So, it will be very revealing to see how our new president defines his vision for the future, if only because one of the reasons manned space exploration on a grand scale works so marvelously economically is that it creates new opportunities that simply do not exist otherwise, which ultimately makes it a fantastic strategy that very quickly produces a virtual festival of inventors, geeks, and scientists, along with plenty of infrastructure to keep them productively entertained and happy . . .

If people only put coconuts in the pie hole, then we already know what the future portends, because it is there for us to ponder and to study when we have nothing better to do than to travel by boat to Easter Island . . .

Going to the moon and Mars is a bit wacky in some respects, but it is no more wacky that getting in a big boat and trying to determine whether the Earth is flat or round, which certainly was made possible in the 15th century by Queen Isabella and King Ferdinand of Spain, which is the only practical reason anyone remembers them 500 years later . . .

So, from this perspective, it is a matter of focusing on legacy over the long run, and while some presidents are happy with the prospect of being remembered as the only person on the planet to fall from a Segway, I think that the brighter presidents want to have a longer lasting and more attractive legacy, which is fabulous . . .

Fabulous!

[JD, Seattle, WA](#) (Sent Monday, July 20, 2009 2:37 AM)

When Is NASA going to admit to the secret space program operating since the 60's that has been to all the planets ? Gary McKinnon the UK hacker has blown the lid off their lies.

**DARK STAR** (Sent Monday, July 20, 2009 7:30 AM)

I think NASA should come back to the Moon!!! Because that trip 40 years ago is difficult to pay cradibility. Why deviating the foccus from a planet they say they already knows? Is there any fear of trying to go and fail now? The world could not check steps by steps that time. But now it is possible, so, I think NASA should try to come back again (if it is true that they once had been there) and remove once for all this possible biggest hoax.

[Miguel, Campinas, Brazil](#) (Sent Monday, July 20, 2009 7:34 AM)

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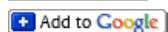
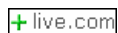
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