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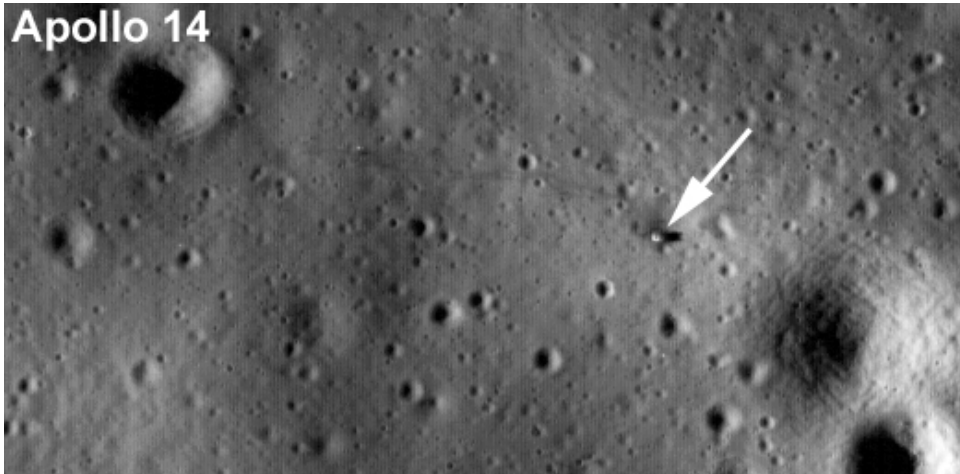
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July 17th, 2009

[LRO Images Apollo Landing Sites \(w00t!\)](#)

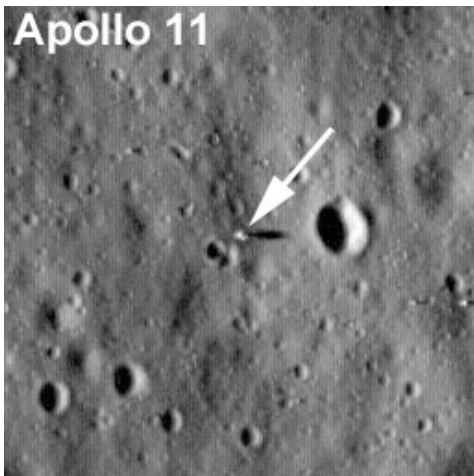
Written by [Nancy Atkinson](#) [ShareThis](#)



The Apollo 14 landing site imaged by LRO. Credit: NASA

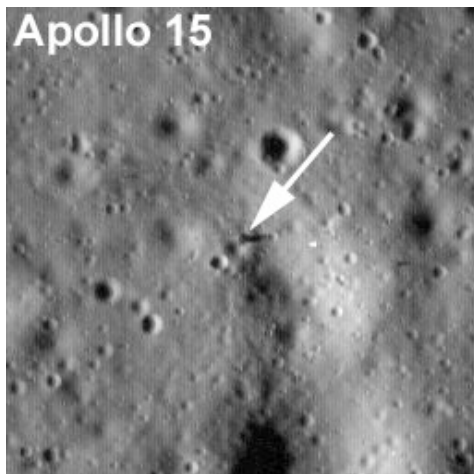
As anticipated, NASA released images of the Apollo landing sites taken by the Lunar Reconnaissance Orbiter (LRO). The pictures show the Apollo missions' lunar module descent stages sitting on [the moon's](#) surface, as long shadows from a low sun angle make the modules' locations evident. Also visible are the tracks left where the astronauts walked repeatedly in a "high traffic zone" and perhaps by the Modularized Equipment Transporter (MET) wheelbarrow-like carrier used on Apollo 14. Wow.

As a journalist, I (most of the time) try to remain objective and calm. But there's only one response to these images: WOOT!



Apollo 11 landing site as imaged by LRO. Credit: NASA

These first images were taken between July 11 and 15, and the spacecraft is not yet in its final mapping orbit. Future LROC images from these sites will have two to three times greater resolution.

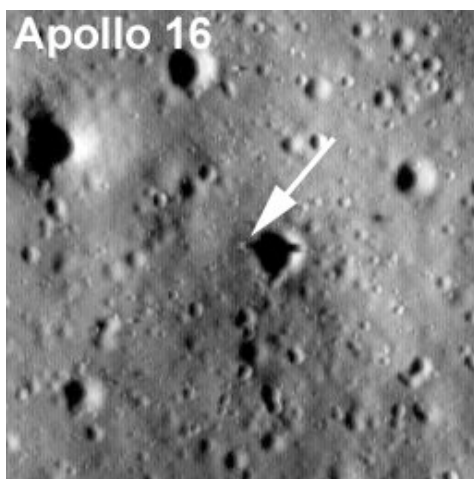


Apollo 15 site by LRO. Credit: NASA

These images are the first glimpses from LRO," said Michael Wargo, chief lunar scientist, NASA Headquarters, Washington. "Things are only going to get better."

The Japanese Kaguya spacecraft previously took images of some of the Apollo landing sites, but not at a high enough resolution to show any of the details of the lander or any other details. But here on these images, the hardware is visible. "It's great to see the hardware on the surface, waiting for us to return," said Mark Robinson, principal investigator for LRO.

Robinson said the LROC team anxiously awaited each image. "We were very interested in getting our first peek at the lunar module descent stages just for the thrill — and to see how well the cameras had come into focus. Indeed, the images are fantastic and so is the focus."

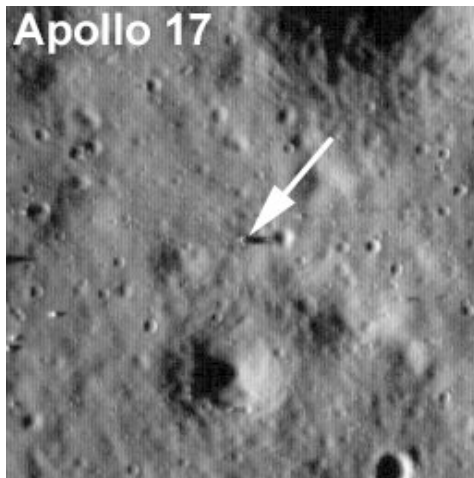


Apollo 16 by LRO. Credit: NASA

The Lunar Reconnaissance Orbiter Camera, or LROC, was able to image five of the six Apollo sites, with the remaining Apollo 12 site expected to be photographed in the coming weeks.

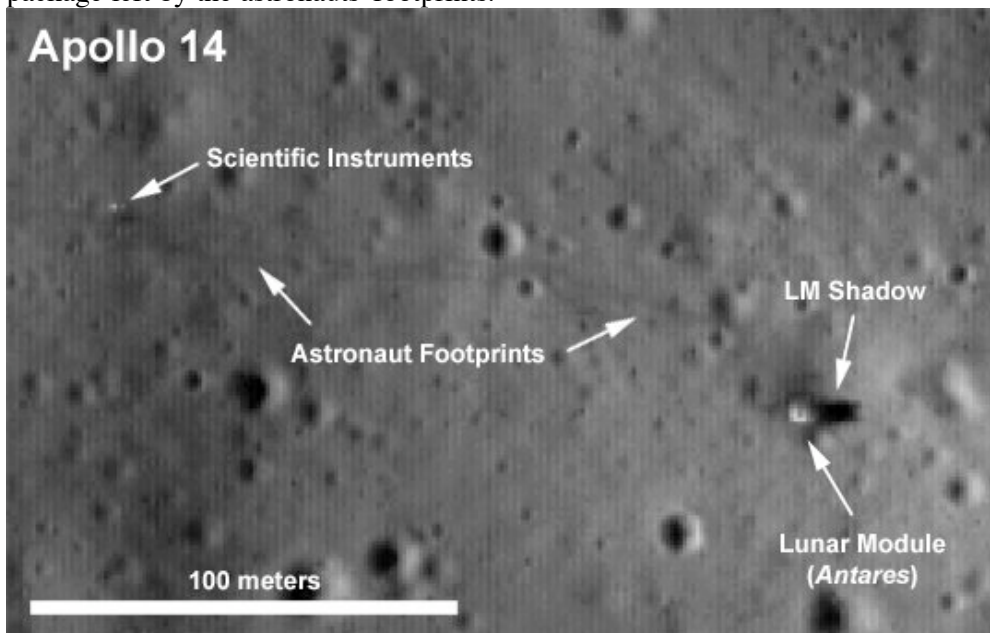
The spacecraft's current elliptical orbit resulted in image resolutions that were slightly different for each site but were all around four feet per pixel. Because the deck of the descent stage is about 12 feet in diameter, the Apollo relics themselves fill an area of about nine pixels. However, because [the sun](#) was low to the

horizon when the images were made, even subtle variations in topography create long shadows. Standing slightly more than ten feet above the surface, each Apollo descent stage creates a distinct shadow that fills roughly 20 pixels.



Apollo 17 LRO. Credit: NASA

The image of the Apollo 14 landing site had a particularly desirable lighting condition that allowed visibility of additional details. The Apollo Lunar Surface Experiment Package, a set of scientific instruments placed by the astronauts at the landing site, is discernable, as are the faint trails between the module and instrument package left by the astronauts' footprints.



Zoomed in Apollo 14 image by LRO. Credit: NASA

Source: [NASA](#)

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29 Responses to “LRO Images Apollo Landing Sites (w00t!)”

1. *AlekseyA* Says:

[July 17th, 2009 at 12:12 pm](#)

If that doesn't convince them, then I don't know what will.

2. *Dave Finton* Says:

[July 17th, 2009 at 2:19 pm](#)

I had a Facebook conversation yesterday about the old film from the original moon landing being erased, prompting howls of derision from the folks that thought the moon landings were fake.

I pointed out that the practice of recycling used film back in that era was a common practice (it *was* rather expensive at that time). As an example there are some episodes of the original Doctor Who series that are lost forever because the BBC re-used a lot of film at that time, too.

I also mentioned that this practice has convinced a small but very vocal group of people to believe that the whole Doctor Who series was staged by the BBC and that the TARDIS was really just a fake (I mean, look at the *shadows*!)

3. *Jon Hanford* Says:

[July 17th, 2009 at 3:58 pm](#)

@ Dave Finton, tell it like it is! Readers old enough to remember the state of technology in 1969 will understand what lead up to what has been recently described by you and others, including NASA itself. Recycling tapes that had been copied and referenced were then prime material for re-use. Remember, this happened in 1969, when analog video technology from the moon was quite novel.

4. *Pvt.Pantzov* Says:

[July 17th, 2009 at 6:44 pm](#)

this is nice. i'm looking forward to seeing the next batch of higher resolution pics. hopefully the sun casts a nice shadow for those as well.

5. *shakalaker* Says:

[July 18th, 2009 at 1:29 am](#)

what about shadows? why shadows are directed to other party?

6. *rogueweapon* Says:

[July 18th, 2009 at 2:01 am](#)

@ Dave Finton, the only reason you erase something as significant to mankind as the fn MOON LANDING is if you are hiding something. Comparing Dr. WHO to the Moon Landing is ridiculous. NASA has never explained why a bunch of the Apollo 11 photos were obviously doctored, cross

hares behind rocks, etc etc. I don't believe that the originals were erased, they are being kept from the public. With today's computer technology, anybody could have analyzed that footage which would have blown up in NASA's face. You guys do realize NASA was full of nazi scientists brought over by project Paperclip right? I'm with Richard Hogland on this one, there are structures on the moon and we have an alternate space program. Flame away but if you start digging for the truth you will start to see that NASA lies and denies just like all the other government agencies.

7. *Nexus Says:*

[July 18th, 2009 at 2:25 am](#)

There is nothing in the moon hoax conspiracy "theories" that doesn't evaporate in the face of some basic high school science. And calling them theories is a great insult to proper theories such as gravitation and evolution, what the moon hoax stuff is is a lot of uninformed, idiotic drivel peddled by attention seeking liars like Bart Sibrel (go Buzz!!!) and crackpots like Richard Hoagland. The correct explanation for the crosshairs apparently being behind bright objects is that some of these photos were overexposed, causing white to bleed into the dark- and the best proof that this is what has happened is that some of the photos, where the crosshair is on the American flag, show the crosshair appear to be in front of the red stripes but behind the white ones. How could you fake that, and why would anyone?

Let's face it. If NASA was able to fake an entire moon program and ensure the continued silence of all the thousands of people who worked on it- and HAD to have been brought in on the conspiracy- for over forty years... if they were able to fool the Russians, who had every reason to denounce even the smallest hint of foul play, into believing the moon landings actually happened... why would the faked records of the events be so poorly done that amateurs in basements somewhere can expose it? The answer is, of course, there's just no way. The only thing these amateurs have exposed is their own ignorance of basic photography, of the way objects would behave in a lower-gravity, airless environment and fundamental physical principles like friction and momentum.

We went to the moon. That is a fact. There is no serious dispute on this point.

PS- playing the Nazi card means you automatically lose.

8. *Spoodle58 Says:*

[July 18th, 2009 at 5:54 am](#)

2012 rubbish, Fake Moon landings, Aliens running amok in corn fields, an Earth Centered Solar System.

I suppose even idiots are entitled to their opinions and theories, fine by me as long as they don't ram their opinions down my throat, especially using non scientific methodology.

Back to the article, these images are truly AMAZING.

9. *Jon Hanford Says:*

[July 18th, 2009 at 6:00 am](#)

The moderator for the NASA page on these photos notes that future, higher-res images of Apollo 15, 16, and 17 should also reveal the Lunar Roving Vehicles (moon buggies), although close scrutiny of the large scale pics reveal some possible objects that may be from the rovers. I don't know the distance or direction that the LRVs were parked, so it's hard to say for sure. Images of the Apollo 12 site should also reveal Surveyor 3, which landed on the moon in 1967. Congrats to all on the LROC team for these fantastic initial images.

10. *Jon Hanford Says:*

[July 18th, 2009 at 6:49 am](#)

Methinks rogueweapon has forgotten that NASA has all their footage of Apollos 12-17 that weren't

erased. Or did NASA goof up again and forget to erase these?

11. *Molecular Says:*

[July 18th, 2009 at 7:30 am](#)

This is great news!! 😊

Can't wait to see the higher resolutions pics.

12. *DJ Says:*

[July 18th, 2009 at 8:55 am](#)

I am not one to join the conspiracy crowd but I have one question. With all the powerfull telescopes in the world why can't one of them point to any of the landing sites with great deal and show the proof. I know the Hubble's focal point is set to look deep into space and cannot work but there are a whole spectrum of telescopes from the professional to the amateur. Someone should have the right telescope to accomplish this. Right? What am I missing?

13. *Torbjorn Larsson OM Says:*

[July 18th, 2009 at 9:13 am](#)

Aye, W00t!

I believe I was speculating on seeing the Moon rover's tracks, as LRO resolution at ~ 0.5 m is comparable to HiRISE def at ~ 0.3 m, which certainly sees smaller rover tracks. And possibly foot tracks, series of footprints. But if foot tracks are visible, by way of shadows, already at 2-3 times the final resolution, I was erring on the cautious side indeed.

If that doesn't convince them, then I don't know what will.

The difference between living in the real world and being satisfied with antiscientist faith is that nothing can persuade a believer. Ask them what could convince them about the falsity of their belief and they will be silent. They need to leave the window for using their quotemining (aka scholastics) by way of their Morton filter.

The main reason not to believe these photos is apparently that it is a NASA mission. Never mind that it is 2-3 gen after the fact, for a conspirationist conspiracies never die. (See Morton's filter above.)

That these antiscientists doesn't as much threat lives (prodeath vaxxers and antiabortionists) or science and education (antiscience creationists) as the honor and effort of those who made the reach to the Moon and especially those who died in the process doesn't penetrate to them. Nor that they take their own honor away.

Pity them and refrain from humoring their trolling, because that is all one can do.

the practice of recycling used film

Um, I believe you mean the practice of recycling erasable data media, which was used to store the data extracted from the transmitted data stream.

Ever seen photos of old style tape stations? The tapes were recycled every few weeks, and if anything important was on them presumably it would have been extracted and saved off line by then. This is still done, look at your hard drive. 😊

For whatever reason the decision was that the secondary extracted data, which was reformatted for video/television and sent to broadcasters, was enough. On the face of it the burgeoning bureaucracy of NASA wasn't bureaucratic enough to warrant data archives directed to future data restorations.

[Incidentally, these archives would have been terribly expensive, even for the most interesting events. Data archives needs to be restored/updated with current technology at regular intervals. I guess that was the main factor, if anyone ever looked into the matter at all.]

14. *Torbjorn Larsson OM* Says:

[July 18th, 2009 at 9:32 am](#)

I know the Hubble's focal point is set to look deep into space and cannot work but there are a whole spectrum of telescopes from the professional to the amateur. Someone should have the right telescope to accomplish this. Right? What am I missing?

Huh? You are missing that the focal point isn't the problem. But resolution is.

I'm not an expert, nor do I want to make the effort to look into it right now. But it is my understanding that telescopes with a focus set to "infinite distance" can be, and is used, to observe objects a few hundred meters away since it is practically the same viewing angle.

Hubble has taken photos of the Moon. [Here is one example.](#)

However, if you look up Hubble specs, or deduce its angular resolution from its known dimensions, a little trigonometry will show you that Hubble can't resolve anything smaller than a football field at Moon distance.

LRO was launched was because it would cover areas, most of them already visible, at high enough resolution to explore new landing areas in detail. Something that cheaper methods like Earth based telescopes can't do.

15. *Nancy Atkinson* Says:

[July 18th, 2009 at 10:08 am](#)

DJ—That's exactly what LRO has done: shown the proof. And they'll show it better with subsequent images of the landing sites. Nobody has to ask the question anymore "why can't a telescope or spacecraft show the Apollo landing sites." It has now been done. End of discussion.

16. *DJ* Says:

[July 18th, 2009 at 10:38 am](#)

Nancy – End of discussion.

Its not really is it? LRO is NASA. If you believe in the photos from LRO then you should believe in the videos of the moon landing from NASA. To counter any conspiracy theories you need independent conformation of the event. LRO is not.

All I was trying to do was to see if there was an intelligent and logical explanation of why a land based telescope is not able to see any one of the landing sites with enough 'resolution' (as Torbjorn pointed out, but missed the essential question) to be definitive and to put the conspirators to rest.

I do not know the engineering of telescopes and maybe it would take a telescope with a diameter of 100 ft. to accomplish this task. I don't know but that is what I am asking for.

17. *kbutler* Says:

[July 18th, 2009 at 10:46 am](#)

Now wait a minute. Kooks-B-us has stated, and proven by the flag waving photos from wind that does not exist that the moon landings were in area 51. Is that where these moon pictures were faked?

Wait another minute. How do kooks know there is no wind on the moon if nobody went there? Do you think they were lying about NASA lying? Where does this chain of lying liars end?

18. *Jon Hanford* Says:

[July 18th, 2009 at 11:22 am](#)

DJ – No currently existing earth-based observatory can resolve the LEM landers on the moon due to insufficient resolving power and distortions induced in the image by the earth's atmosphere. Adaptive optics (used to remove some of the atmospheric blurring with some telescopes) would not work trying to image the Apollo sites due to technical limitations (I could go into more detail here, if needed). So, to answer your question, no, current earthbound telescopes cannot 'see' details on the moon the size of the LEM descent stage. Additionally, the Japanese lunar orbiter SELENE did find evidence of a lunar landing at the Apollo 15 site near Hadley's Rille. See 'Even the Hubble Space Telescope can't see any Apollo artifacts left on the Moon' at the following site:

http://blogs.discovery.com/cosmic_ray/2009/07/quick-guide-to-answering-moon-coverup-allegations.html . Remember, these pics were taken by a Japanese satellite launched from Japan using a Japanese-designed and built rocket. No NASA involvement here (except for the Apollo 15 hardware) 😊

19. *DJ* Says:

[July 18th, 2009 at 11:48 am](#)

Jon – Thanks,

My faith in the intellectual quality of the Universetoday's readers have been restored. Unlike the quick slap in the face remarks by a few readers.

It is interesting, but yet consistent, that when a non-scientific minded person is asked a question to clarify their stance on an issue that they do not have an answer for they will do one of two things. They either become defensive or they resort to name calling and mockery. This is in hopes that they will not have to show their "inabilities" to engage in an intelligent debut, or they really do not know why they believe on an issue other than everyone else did the thinking for them and it sounded good. Right Kbutler?

Thanks again Jon.

20. *IVAN3MAN* Says:

[July 18th, 2009 at 11:52 am](#)

DJ:

All I was trying to do was to see if there was an intelligent and logical [explanation] of why a land based telescope is not able to see any one of the landing sites with enough 'resolution' to be definitive and to put the conspirators to rest.

Dude, Dr. Phil Plait at *Bad Astronomy* gave a good explanation here:

[Moon hoax: why not use telescopes to look at the landers?](#)

21. *DJ* Says:

[July 18th, 2009 at 12:14 pm](#)

Thanks Ivan3man,

The article from Dr. Phil Plait answered the very question that I was asking and that I keep hearing from time to time.

22. *Torbjorn Larsson OM* Says:

[July 18th, 2009 at 3:53 pm](#)

@ DJ:

"as Torbjorn pointed out, but missed the essential question"

I covered both your "LRO is NASA" in my first comment and "enough resolution" (as opposed to focus depth) in my second. (Even if I bowed out of referencing the later optical measure because I was busy at the time. You see, I can see how to calculate the former at the top of my head, but for the latter I need to do some studying.)

What I didn't pound on was that it's old hat as Nancy did, which I'm grateful for.

23. *finlandia* Says:

[July 19th, 2009 at 1:53 am](#)

I'm no conspiracy nut, but NASA doesn't do itself any favours:

<http://moon.eu-tube.com>

24. *bryanack* Says:

[July 19th, 2009 at 4:57 am](#)

Hi,

I don't understand why LRO photos from Apollo 14 site landing doesn't match with the ones from Google Moon:

<http://www.google.com/moon/>

Any clue ??

Thanks

25. *jayem4646* Says:

[July 19th, 2009 at 6:02 am](#)

@ bryanack

I don't understand..they do look the same. Perhaps, it's that the high rez LRO shots are that much better.

@Nancy...aka DJ's telescope inquiry.

Lighten up! From the way I read DJ's inquiry, he was just asking why telescopes were'nt able to see land site features. That's all.

And please, using terms like "End of Discussion" at the end of you reply to DJ is a bit tongue-in-cheek. I'm assuming from this comment that you were taking DJ's inquiry as being some kind of conspiricist, which he clearly said he is not.

John

26. *bryanack* Says:

[July 19th, 2009 at 7:02 am](#)

@jayem

Yes you're right, i didnt zoom enough, and the sun was from the other side, thanks 😊

27. *Andy F* Says:

[July 19th, 2009 at 10:44 am](#)

What has gone wrong with science education:

http://www.channel4.com/news/articles/general/water_cooler_moments/25+believe+moon+landings+were+hoax/3273977

To summarise, 25% of Britons 'believe' moon landings a hoax

11 people of a sample of 1009, thought the first man on moon was Buzz Lightyear.

Makes you proud to be British...

28. *Astrofiend* Says:

[July 19th, 2009 at 4:45 pm](#)

People just like to think that they're 'in' on a big mystery. When they can't fathom the mysteries of science (which takes a little effort), they turn to conspiracy theories, whacked-out cults and whatnot. There will always be deniers, unless NASA personally offers to fly every citizen of Earth to the landing sites just to verify their existence. You've just gotta let em go.

Amazing pics by the way.

29. *ND* Says:

[July 20th, 2009 at 12:55 pm](#)

<http://www.clavius.org/>

This site might be of interest to conspiracy lovers but more so to those with just plain genuine questions. The ones in the former group will not believe it anyway.

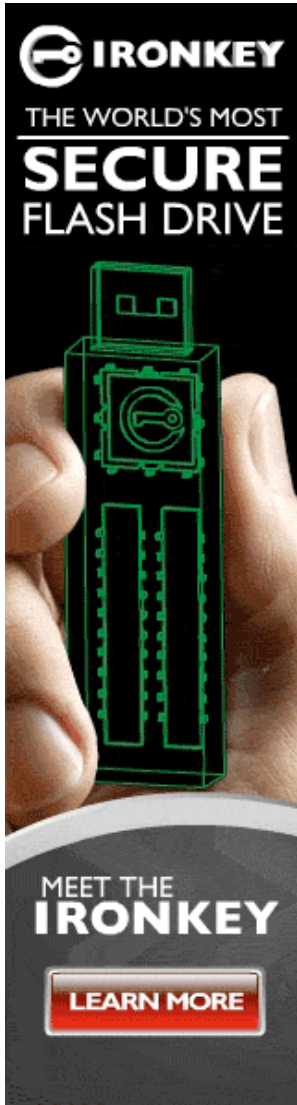
I love the one where people claim that we didn't have the technology or the understanding of physics in the 60's to go to the moon.

Astrofiend. And always a one way ticket. No return necessary 😊

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- [Saturn](#) (432)
- [Science](#) (44)
- [SETI](#) (22)
- [Skywatching](#) (10)
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- [Solar System](#) (17)
- [Space Exploration](#) (144)
- [Space Flight](#) (172)
- [Space Shuttle](#) (295)
- [Space Station](#) (198)
- [Space Tourism](#) (39)
- [Spitzer](#) (25)
- [Sponsors](#) (1)

- [Technology](#) (4)
- [Telescope Reviews](#) (21)
- [Titan](#) (22)
- [Uncategorized](#) (13)
- [Universe Today News](#) (4)
- [Uranus](#) (5)
- [Venus](#) (34)
- [What's Up](#) (89)
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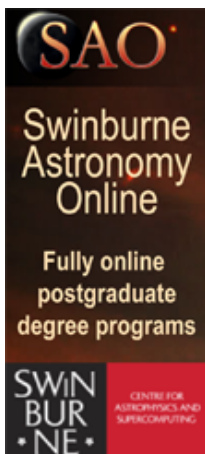
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