GlobalResearch
Center for Research on Globalization

The Dark Side of the Moon Landings

By Dr. Stuart Parkinson
Global Research, July 21, 2019
SGR: Responsible Science 20 July 2019

Region: Russia and FSU, USA
Theme: History

The 50th anniversary of the first Moon landing gives us an opportunity to reflect on that achievement and also to consider the value to society – or otherwise – of space missions in general. While landing people on the Moon was undoubtedly an impressive technical achievement, and helped humanity to appreciate how unique the Earth is, the problematic issues – especially of human space-flight – are being side-lined and forgotten.

Let's start by considering robotic space-flight. It's generally straightforward to identify the benefits of this type of space mission. Satellites have become essential for telecommunications and monitoring the state of the Earth's environment, while missions beyond Earth's orbit have helped our understanding of the Sun and other planets. This latter knowledge has been useful, for example, in helping us to predict the effect of solar changes on our weather and improving our comprehension of the greenhouse effect. But with human space-flight, the benefits are harder to identify, while the negative elements are rather more obvious.

Let's look first at the military connection. The Space Race between the USA and the Soviet Union – which of course included the Apollo missions to the Moon and other early human missions – was driven far more by superpower rivalry than it was by exploration or science. And this link was strongest in rocket technology. Both nations were developing inter-continental ballistic missiles (ICBMs) to carry their nuclear warheads, but the failure rate during testing was high. Human space missions – including the Russian Vostok, Voskhod and Soyuz and the American Mercury, Gemini and Apollo – became a vital testing ground for this rapidly developing technology. [1, 2] To this day, ballistic missiles remain the main delivery systems for nuclear warheads, creating a constant threat of nuclear catastrophe. Indeed, the lead contractor for NASA's newest crewed spacecraft – the Orion MPCV – is Lockheed Martin, the world's largest military corporation. [3] One wonders to what extent current research and development in human space-flight will be used to help, for example, set up Trump's recently announced 'Space Force' with all the potential it holds for weaponsing space. [4] Indeed, with the US taking a leading role in dismantling a host of arms control agreements and ramping up military spending, there is a real potential for the current international arms race to spread beyond planet Earth.

A second concern about human space-flight is the huge cost. The NASA estimate for the whole Apollo programme is over $200 billion in today's money [5] – for a programme lasting only a decade, and which resulted in just 6 successful Moon landings. At its peak, NASA was spending 4.4% of the federal budget, which is very large for a 'blue skies' programme. At the same time, the US government was facing huge criticism from the civil rights movement and fighting the Vietnam War. It's hard to accept that resources were being prioritised appropriately. NASA's annual budget was cut considerably in the wake of Apollo. Hence the next major human programme, the Space Shuttle, took 30 years to spend a similar amount.

[6] This included 135 missions – but these only reached Earth's orbit. Predicted costs for newer space-craft are estimated to be a lot lower, but such predictions are notoriously unreliable in this field. In any case, it will still be much more expensive to put a human into space than a robot. Humans are very fragile, and need lots of technology to keep them safe. Robots are getting smaller and more intelligent by the year, so the argument for using a human to carry out complex tasks is getting weaker and weaker. Indeed, space scientists generally prefer robotic missions as, for the price of a human trip into orbit, they could fund two or three missions further with much more ambitious goals. [7] The main benefits of space technology that I mentioned earlier are dominated by robotic technology, but the US government is shifting spending away from essential Earth observation work towards human space missions, including those with military applications. [8] Indeed, with so many urgent and important applications of science lacking funds here on Earth – from global climate change to poverty eradication – it's not hard to think of more useful ways to spend the money currently directed to human space-flight.

The final concern is the environmental impacts. Prof Mike Berners-Lee of Lancaster University calculated that, before it was retired from service in 2011, the carbon emissions of one Space Shuttle flight was at least 4,600 tonnes. [9] That's about the same amount of pollution as driving 230 times around the Earth in a small car – or over 9 million kilometres. [10] Given the International Space Station orbits the Earth at an altitude of only 350km, that is one very polluting commute! Newer space-craft are significantly more efficient, but are still very polluting. For example, the SpaceX Falcon Heavy – which had its first successful test-flight last year and is designed to carry humans into orbit, to the Moon and beyond – emits about 1,200 tonnes per launch. [11] That's similar to driving a small car 60 times around the Earth. And this estimate does not include the warming effects of water vapour and black carbon in the upper atmosphere, nor the carbon footprint of the space-craft itself or the launch infrastructure. Even the Virgin Galactic craft – which is only planned to take tourists to the edge of space – would create significant pollution problems due to its emissions of black carbon into the stratosphere. [12] Indeed, it is hard to see any justification for space tourism – which will just be a plaything for the wealthy – in a society which needs to rapidly reach net zero carbon emissions.

So the excitement over the 50th anniversary should be tempered by a healthy dose of realism. While the Moon landings were an impressive technical achievement, the current enthusiasm for human space-flight threatens to divert much needed scientific and technical resources away from where it's really needed. Human colonisation of space will be very risky, polluting, expensive and potentially expand the growing international arms race into space. It should not be a priority while we have so many urgent environmental and social problems to solve here on Earth.

*

Note to readers: please click the share buttons above or below. Forward this article to your email lists. Crosspost on your blog site, internet forums. etc.

Dr Stuart Parkinson is Executive Director of Scientists for Global Responsibility, and holds a PhD in climate science.

Notes

1. Wikipedia (2019a). Intercontinental ballistic missile. https://en.wikipedia.org/wiki/Intercontinental_ballistic_missile

2. Wikipedia (2019b). Space Race. https://en.wikipedia.org/wiki/Space_Race

3. Wikipedia (2019c). Orion (spacecraft). https://en.wikipedia.org/wiki/Orion_(spacecraft)

4. The Guardian (2018). Space Force: all you need to know about Trump's bold new interstellar plan. https://www.theguardian.com/us-news/2018/aug/10/space-force-everything-you-need-to-know

5. In 2009, NASA estimated the total cost of the Apollo programme to be $170 bn in 2005 dollars. Extreme Tech (2014). The Apollo 11 moon landing, 45 years on. https://www.extremetech.com/extreme/186600-apollo-11-moon-landing-45-years-looking-back-at-mankinds-giant-leap

6. Space (2011). NASA's Shuttle Program Cost $209 Billion — Was it Worth It? https://www.space.com/12166-space-shuttle-program-cost-promises-209-billion.html

7. Phys.org (2005). Manned vs. Unmanned Space Exploration. https://phys.org/news/2005-11-unmanned-space-exploration.html

8. Reynolds L (2017). Trump's climate cuts endanger essential Earth Observation research. Responsible Science blog. https://www.sgr.org.uk/index.php/resources/trump-s-climate-cuts-endanger-essential-earth-observation-research

9. Measured as tonnes of carbon dioxide equivalent. Figures from p.155 of: Berners-Lee M (2010). How bad are bananas? The carbon footprint of everything. Profile books.

10. Calculated using figures from p.117 of Berners-Lee (2010) – as note 9.

11. The Falcon Heavy rocket uses three Falcon 9 boosters in its first stage, each carrying 125 tonnes of kerosene rocket fuel. The emission factor for kerosene is approximately 3.2 tCO2e/t. Key figures from: Wikipedia (2019d). Falcon Heavy. https://en.wikipedia.org/wiki/Falcon_Heavy

12. Chapman P (2016). Flights from sense: how space tourism could alter the climate. SGR Newsletter, no.44. https://www.sgr.org.uk/resources/flights-sense-how-space-tourism-could-alter-climate-february-2016

Featured image is from Wikimedia Commons
