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IFT 5 IS CLOSE BUT...

Space X faces a big problem. The FAA has postponed approval for the next Starship flight (IFT5) for two months until November. The decision is said to relate to Space X's alleged failures to meet environmental standards. However, some think this is the beginning of overt political interference in the launch approval process.

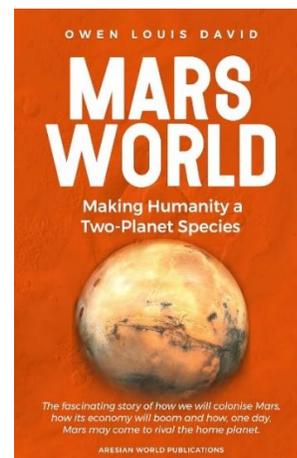
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MARS JUST GOT VERY POLITICAL

Leading on from the article on the launch approval for IFT 5 we examine in detail the increasing politicisation of Space X's Mars

Mission as Elon Musk's interventions in the 2024 Presidential election campaign raise the stakes even higher. **See page 4**

MARSWORLD – CHAPTER ANALYSIS



Owen Louis David begins a chapter by chapter analysis of his book *Marsworld* We're pleased to report that *Marsworld* has been in Amazon's top best seller list for its subject area. **See page 3.**

IFT 5 next up.

By the Editorial Team

It looks like the IFT 5 Starship mission has hit a roadblock. The FAA (the Federal Aviation Administration in the USA) has indicated that flight approval will be denied until towards the end of November. Those of you who follow US politics know that means “*not until after the US Presidential election*”.

Suspicious?

Owen Louis David noted in his book *Marsworld* that one of the significant challenges to a successful Mars colonisation programme is *political sabotage*. Political sabotage could stop the launch programme in its tracks. We have seen Musk increasingly take sides in the culture wars, and has specifically identified himself as a supporter of candidate Trump. It was not entirely to be unexpected that those he has now identified as his political enemies would react. Musk has gone so far as to say: “*We will never reach Mars if Kamala wins.*”

FAA Chief Michael Whitaker gave a less than impressive set of answers to Congress when asked to explain the reasons for the delay in granting Space X

a licence for IFT 5 . He cited that Space X had moved a fuel farm moved closer to a population centre without a permit. Space X violations of Texas State legal requirements were given as the reason for delaying the grant of the licence. He also cited a 30 day delay due to Space X’s failure to provide a sonic boom impact analysis. While not specifying any specific safety concerns relating to the Starship system, he seemed to be saying that Space X’s violations failed to show due respect for the safety culture around flight licence approvals.

Even the greatest of friends of Space X (and *The Aresian* certainly count themselves in that category) have to admit that Space X have sometimes shown a rather cavalier attitude to bureaucratic niceties. However, we feel this is much more a reflection of a change in the political environment – a much chillier atmosphere now for Space X in recent months.

Space X have issued a rebuttal, accusing Whitaker of having been inaccurate in his replies. They reject any allegations that Space X have violated laws. They reference their impressive safety record as a space company and reaffirm their commitment to safety. They reject the idea that Space X have undertaken any

launches without a permit (note – this may in part a difference of semantics ie “*permit*” v “*valid permit*”). They dispute that they moved a fuel farm towards a population centre (and with no risk analysis) – the fuel farm was, they state, more than twice the distance away from population centres that was the case previously and they assert they supplied FAA with their risk analysis. Space X further state that a sonic boom analysis was undertaken and the Fish and Wildlife Service had no concerns over environmental impact within the specific boom parameters. As for the launch deluge system they explain that was never operated without a permit.

Felix Schlang on the *What About It* YouTube Channel observes that Starship’s rocket is remarkably clean. Methane is a pretty clean hydrocarbon fuel. Its waste products are CO₂ and water. The launch deluge system uses clean, potable water and so should not be creating environmental hazards.

But if you are determined to find violations, of course you always can. We should remember that Starbase is not just a launch facility but also a *manufacturing* centre. All manufacturing processes produce a range of pollutants. The issue is

probably: “*How many and in what sort of quantity and how does Space X deal with them?*” Any deluge system is surely going to include some trace pollutants from the site.

Some observers are simply putting the delay down to petty bureaucracy. That seems rather naïve, given how much leeway has been given to Space X in the past, before Musk decided to take a deep dive into American politics.

So it looks like there will be a significant delay. What follows on will no doubt be linked to the outcome of the Presidential election process.

One point of interest though is: does Musk have a back-up plan? After all Space X’s first launch facility was not on US soil but on Kwajalein in the Republic of the Marshall Islands.

We really don’t think Musk would simply accept an attempt by the US government to stymie the Mars Mission. It’s much more likely he would look for an alternative launch and manufacturing site. That *could* create legal jeopardy for him, though, as the Starship development programme is listed in the USA as a project with national security implications. But it might be difficult in practice for the USA to pursue Musk in

such circumstances. After all, Musk might only move Starship development out of the USA and could use the rest of the Space X portfolio as a bargaining chip.

Where might Space X go? Back to Kwaljein? We doubt that, as the Republic of the Marshall Islands is pretty much in thrall to the US government. How about Taiwan? Possible and desirable in many ways but Musk might feel it is too risky. Japan is in need of a boost to its space industry and could be a good candidate. Argentina with its maverick, populist President might be the sort of location that could appeal to Musk.

MARSWORLD – CHAPTER BY CHAPTER

By Owen Louis David

EACH MONTH OWEN LOUIS DAVID IS GOING TO SUMMARISE AND EXPLAIN A CHAPTER IN HIS BOOK, MARSWORLD BEGINNING WITH CHAPTER 1 AND WORKING THROUGH SEQUENTIALLY

CHAPTER 1 – A VISION OF MARS

In this Chapter, I introduce the reader to the idea of a “vision of Mars”. This is really made up of two parts: what it is and what it can become.

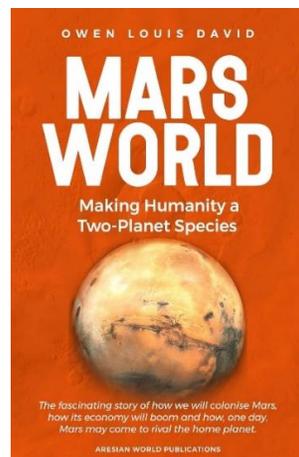
I encourage people to think of Mars not as some strange domain but as our “cousin planet”. There are so many similarities and, in the past, when water flowed freely on Mars, those similarities were very obvious.

So I begin by describing the topography of Mars. Our cousin Mars is a planet of two halves. The northern hemisphere is the warmer and less mountainous than the southern hemisphere. The north will be the favoured location for human settlement.

In this chapter I try to dispel many misconceptions about Mars. It’s dry, yes, in the same way Antarctica is “dry” but Mars has plenty of available water (just as does

MARSWORLD

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Antarctica) – found as ice. The idea that we will experience violent winds on Mars is totally false. Wind force is tiny compared with Earth (owing to the far less dense atmosphere). It is for humans a surprisingly hospitable place with its very similar day-length (24.7 Earth hours for Mars), its vast tracts of terra firma (virtually the same in extent as our continents) and its absence of extreme weather events such as hurricanes, blizzards and violent tornadoes. The range of available minerals are Earth-like in quantity and extent.

I deal as well with how Mars has had a very special in the hearts of human beings for many millennia. It has been an object of fascination for both scientists and storytellers – the stuff of myth and imaginings. What could be more natural than we make its acquaintance up-close after all that time?

This chapter also addresses the issue of life on Mars – how, very oddly, we still don't know the answer to whether there is life on Mars, though the balance has no doubt shifted towards a positive answer. I suggest that Mars is still our best chance of becoming a multi-planet species.

In the rest of the chapter I set out the basic outline of the whole colonisation process. I go on to address Space X's plan for a million-person city and what that will require in terms of life support, amenities and transportation.

One topic I have always found interesting is to what extent Mars will be an attractive destination for would-be migrants from Earth. I used to be a sceptic about Musk's plans to attract enough people to create a million-person city on the Red Planet but now I think it is a reasonable goal. This is largely a result of how far things have turned in a negative direction on Earth – with pandemics, renewed war in Europe and the Middle East, democracies appearing to become destabilized, economic pressures,

The Chapter includes a brief survey of how Mars might become a far more successful human civilisation than we see on Earth (themes that will be developed in more detail later in the book). I include at the end of the Chapter a “methodology note” on how I went about creating the book – my sources and approaches.

IN THE NEWS

Space X have successfully launched a Dragon capsule with two astronauts, and it is due to rendezvous with the ISS in the next 24 hours. There are two spare seats on board, destined for the two NASA -mission astronauts who were left stranded when their Boeing capsule suffered a number of concerning malfunctions. Good news for Space X and further demonstration of their reliability with human missions.

(New York Times – 28 September 2024)

Mars just got very political...

By Mary Khan

It's been brewing a long time...We at *The Aresian* have warned since our inception that this was a strong possibility. Now, we just have to accept that the idea of colonising Mars has taken centre stage in the vicious and confrontational world of contemporary American politics. The battle lines are drawn.

Sky News report that Musk has vowed to get *"anyone who wants to be a space traveller"* to Mars – but he can only commit to that as long as Kamala Harris doesn't become President. Musk is determined to proceed with the Mars colonisation mission that will begin, Sky News report, with five (automated) Starships being sent to Mars in two years. If Sky News reporting is accurate here, this seems to be a modification to the original proposals which envisage just two automated Starships being sent to Mars as the first phase of the Mission (to be followed by three further Starships, including human passengers, two years after). It may however be an example of the sort of garbled communication we are used to in the space community!

Sky News report Trump has said that a Kamala Harris presidency would *"destroy the Mars programme and doom humanity"*. Trump has also made clear his support for Space X's Mars Mission if he is elected to serve a further term as President.

The recent FAA decision to postpone a decision on the next Starship flight for two-months because of rather vague environmental concerns has certainly added to tensions. The fact that Musk has been on a journey from being a regular Democrat supporter to becoming increasingly anti-woke and pro-Trump simply only adds fuel to the political fire.

Musk has made clear he believes Space X could begin the mission to Mars within 2 years. More seasoned observers (e.g. the staff of *The Aresian*) are aware of that thing called "Musk Time" – so we may be a little sceptical. Within 4 years sounds more doable, even with FAA interference.

In a classic Trumpian line at a recent rally, underlining his commitment to the Mars project, the former President declared: *"Elon, get those rocket ships going."*

Sky News note how successful Space X have been, with a notable recent achievement being the first private-mission spacewalk was facilitated by their Crew Dragon spacecraft. Musk is supremely confident. He is reported as stating that *"Eventually, there will be thousands of Starships going to Mars and it will be a glorious sight to see!"* Here we think Musk is referencing the peak of mass transfer to Mars when there will certainly be a huge number of Starships heading for Mars every couple of years or so (but maybe not thousands).

Musk is reported as being extremely concerned about the bureaucratic obstacles being put in the way of Space X's Mars Mission: *"One of my biggest concerns right now is that the Starship programme is being smothered by a mountain of government bureaucracy that grows every year."*

Musk continues to push a very ambitious timeline for Mars colonisation. He hopes to launch robot Starships to Mars in the next two years or so, followed by human crews in 2028. This is all part of his push to get a self-sufficient colony in place within two decades. One can't say that is impossible, given the opportunities afforded by modern technology but it is a mind-bogglingly complex and demanding process!

Sky News note that both Trump can present themselves as space advocates. Trump's administration created the space security team Space Force and encouraged NASA to accelerate its lunar exploration programmes. Vice-President has been chair of the National Space Council since 2021. She has encouraged public interest in space and has also been active in gathering international support for the "Artemis Accords" which encourage nations to join in peaceful space development (though Russia and China see them as attempts to "corner the market" in space-based resources).

It's pretty clear by now that space is firmly on stage in the political arena. In some ways we should be glad about that as you can argue it is a sign of things like lunar development and Mars colonisation coming of age as serious projects. Politicians on Earth can now see that there are important issues attaching to these projects.

In the USA, especially, space has a totemic value as a symbol of American technical prowess and hope for the future. In some ways it is sad to see space become a political football but if the football gets kicked down the field, that could be good for all of us.

THE LATEST WEATHER ON MARS

Here's your update for the weather on Mars provided by the Curiosity Rover in Gale Crater.

It's late summer in Gale Crater – but that's a pretty cold late summer for that location on Mars (other places may be a lot warmer)! For the nearest Sol to **22 September 2024** we have a *high* of **minus 7 degrees Celsius** (19 degrees Fahrenheit) – a couple of degrees colder than last month but still something we can relate to in parts of Europe. Finland's record January low (in 1999) was minus 51 degrees Celsius.

The low for the same date, at **minus 72 Celsius** (or minus 98 degrees Fahrenheit), is the same as last month. Very, very cold but – as we have said more than once - not as cold as the record low on Earth (minus 89.2 Celsius), registered at Vostok on Antarctica in 1983.

In the News...

MIT researchers suggest that a large part of Mars's once thick CO2 atmosphere (equivalent to 1.7 Bar) is "hiding" in clay soils as methane, after the CO2 was absorbed through chemical reactions with water. This is an interesting idea to say the least. It seems counterintuitive but is certainly something that requires further investigation. Methane is of course the fuel that Space X uses to power its rockets (though on Mars you would still need to split water to create oxygen in order to burn it. (Independent – 28 September 2024)

PICK OF THE PICS



Credit: NASA

A view of 'Santa Cruz' mountain on Mars, taken by the Perseverance rover. Sent in by FredX. What a magnificent vista! We could see a roadtrail being laid out there once the boulders are pushed aside!

LET US KNOW WHAT YOUR FAVOURITE PIC IS AND WHY! WE ARE ALWAYS INTERESTED IN YOUR COMMENTS.

HERA's the News...

By Mario Pinto

The Daily Mail (27 September 2024) reports that four volunteer scientists have just emerged from a 45-day stay inside what NASA has billed as its most realistic Mars simulation yet.

The 4-person crew remained completely isolated inside the Human Exploration Research Analog (HERA), a 650-square-foot habitat at NASA's Johnson Space Center in Houston, Texas, during the project. While inside, they finished 18 separate studies that could help NASA and other space agencies learn how humans respond to the confinement, demanding work-life conditions and remote environments of deep-space missions, according to NASA.

During their confinement, the crew carried out a broad range of tasks. These were designed to closely replicate the living and working experience on Mars. The Daily Mail report their work tasks included harvesting plants from a hydroponic garden, growing shrimp, deploying a small satellite, conducting a virtual 'walk' across the surface of Mars and flying simulated drones over Martian terrain.

Realistic time delay in communications was built in to the mission. Throughout, NASA scientists monitored their progress and behaviour. When not fulfilling the work programme the participants read books, played cards, built Legos and listened to music.

Well forgive me for some scepticism. I am a little doubtful about how useful such "simulations" are. What are they simulating exactly? 45 days is hardly representational as far as a 1500 day Mars mission (there and back). They can't simulate the fun and excitement of being in a zero G Starship with Mars growing ever larger in your visual field. Remember nearly all ISS crew have expressed how much they enjoy the space environment and the privilege of seeing something few other human eyes have seen. Another thing - they can't simulate the experience of being Mars pioneers who are making history by setting foot on the planet. All the crew on the first mission are going to international celebrities and heroes. Good and bad things might flow from that – but you can't replicate that experience with a bunch of unknowns.

Also, it seems to me that confinement is not what one should expect from being on Mars. I expect there to be several discrete habs, plus a water ice mining site. Also the pioneers will need to return to the Starships periodically and they will be exploring the immediate area. The way I see it, most sols people will be on the move, in the specially designed pressurised, human-passenger rovers. ●