

Epilog



“Flight director: three... two... one... Ignition!

“It's not a real rocket. It's the outside of a real rocket. We did plan to build a real rocket. And that's one thing they can never take away from us. That plan is our legacy.

“Then why did you move up the launch if you knew it was fake?

“To inspire the next generation. And to provide a distraction while we drove away.

“Then why are you still here?

“Our car wouldn't start.”

*The Simpsons, Season 27, Episode 16: The Marge-ian Chronicles.
Original Air Date: March 13, 2016*

They launched a website, posted a few videos, made vague statements about collaboration with some aerospace companies, listed a couple of resumes of some people with no background in manned spaceflight, and then they staged a press conference. No technical details. No financial disclosure. No plan. But thanks to the media's gullibility and lackadaisical approach to fact-checking, the story is plastered all over the news. The 'Mars in a decade' fanatics are all over it, because no matter how crackpot an idea Mars One is, this group loves fairy tales. Fuel is added to the fire when a Nobel Prize winner says he endorses the half-baked plan and applications flood in by the thousand. From anyone able to operate a keyboard, pay a small fee and upload a couple of documents. Hell, why do you need pilot or an engineer on your way to Mars anyway? Then, after some of the more level-headed journalists start casting a critical eye on the lack of detail and lack of substance of this fantasy, we start reading about concepts like 'redundancy', 'evacuation possibility', 'equipment failure', 'mass estimates', and entry, descent and landing'. Strangely – disturbingly – none of these feature in the Mars One lexicon. Even more worrying is the budget. Six billion. Look, the latest Mars rover cost \$2.5 billion, and that was a one-way trip to land a hunk of metal on the surface. Six billion for a human mission? Absurd! And where are they going to get that money? Revenue for a reality television show? Do any of these people have any idea just how boring a six-month cruise through deep space is? How many successful reality television shows do you know that feature contestants pressing buttons and digging holes? But none of this matters to the blinkered 'Mars in a decade' lemmings, whose worldview can't be shaken no matter how outrageous the mission plan – or lack of one in this case. Firmly ensconced inside their fantasy bubble, these lemmings are determined to believe and they spend inordinate amounts of time blogging that determination, as if they are under the illusion that the more blogs they post the more likely the mission will go ahead. But of course it won't. Look at Virgin Galactic as a reference point. It has taken Virgin Galactic more than 12 years to build their spaceship and this puppy is only going to fly suborbital. And they haven't even begun flight testing as of the summer of 2016. As I mentioned earlier in the book, if a manned Mars mission is the summit of Everest, the aerospace companies of the world are still rambling around in the foothills.

We are constantly reminded by the popular science press that we live in a world of miracles but it's really going to take more than one for Mars One to ever get off the ground. In fact, trying to imagine Mars One succeeding brings a new dimension to believing in miracles. That's because the initiative, bold as it may be, is a dream that has no respect for the technology needed to realize it. Pushing the envelope is admirable, but the challenges faced by Mars One are not of the 'don't sweat the small stuff' variety: a manned Mars mission faces hydra-headed problems. Not insuperable, but way out of the league of an organization whose budget is less than NASA uses to put together a PowerPoint presentation. I'm sorry, but it just isn't going to fly, and the reasons why have been discussed in this book. But let's hammer them home one more time anyway. Let's revisit the medical issues.

“When it comes to idiots, America's got more than its fair share. If idiots were energy, it would be a source that would never run out.”

*The Simpsons Season 27, Episode 16: The Marge-ian Chronicles.
Original Air Date: March 13, 2016*

Ever since the US put boots on the Moon, the discussion has been of a manned mission to Mars, but for decades this mission has remained a convenient 20 or more years over the horizon. Why? Human physiology mainly. The human body is an extraordinarily versatile and capable physiological machine, but it was never designed for long duration space-flight. Bones lose strength, muscles waste away, eyeballs become distorted, the immune system takes a hit, and radiation... well, we've talked enough about radiation. Raise this issue with the 'Mars in a decade' crowd and they will point to the wealth of medical data generated by six-month increments on board the International Space Station (ISS), arguing that if astronauts can survive for six months on the ISS, they surely can survive a similar trip length to Mars. But a Mars mission is much, *much* longer than six months. How do we know what happens after six months, or after a year? We don't. Let me put this in some perspective. I used to be an endurance athlete, running 100 kilometer races. I later transitioned to ultra-distance triathlons, racing double ironman, triple ironman and even 10 times ironman races. I can tell you from experience that racing a double ironman is very different from racing two individual ironman races. The point is that it is impossible to extrapolate the six-month data to multi-year missions. Impossible. So all this talk of a one-way mission to Mars is ambition sprinting ahead of common sense.

Of course, saying we can't to travel to Mars in the next few years is blasphemous to the Mars One crowd, many of whom, judging by the online posts, pine for the halcyon days of Apollo. But back in those days, NASA's funding reached 4.4 percent of the federal budget, which equates to about \$180 billion a year in today's dollars. And when we did go to the Moon, there was no justification for establishing a colony or even a return visit. But the Mars One evangelists believe we can send humans to Mars, a diabolically more difficult enterprise than landing humans on the Moon, and a much more hostile place to support habitation to boot. Of course this misunderstanding works both ways – the Mars One faithful can't understand the doubters and the doubters have a real problem wrapping their minds around the arguments of the faithful. But Mars One has nothing to do with having an open mind; it has everything to do with a reality check.

Now there are some who point out that ten years before astronauts landed on the Moon, NASA wasn't even able to launch a rocket into space, the argument being that given a few more years, Mars One might be able to pull this one-way stunt off. But Mars One won't have the backing of the greatest engineering effort in history that employed 400,000 people and burned up 2.2 percent of the federal budget, so that's that argument blown out of the water. Here's another. With the exception of Harrison Schmitt, every astronaut who walked on the Moon was a stellar test pilot, each of whom was able to process unfathomable amounts of information at warp speed. Mars One's approach? A popularity contest of random Internet contestants. Now I'm not a pessimistic person by nature and I would jump at the chance of traveling to Mars, but NASA spent more than \$100 billion in 2010 adjusted dollars just to get to the Moon, and Mars One reckons it can accomplish a Mars mission for what? Six billion? Give me a break! And let's examine the plan for how that money will be raised. The story goes that Bas Lansdorp was inspired to found Mars One after reading about Olympic Games revenues, which were about four billion dollars between 2008 and 2012. If a Mars One mission was to happen, it will almost surely be the most-watched program ever, even surpassing shows featuring the Kardashians. It goes without saying that advertisers will want a piece of that, but how much revenue would such a show generate and how would the show grab the audience's interest?

“This is not about the first footstep and first flag. This is a human mission. These are humans selected by us. You will participate in the experience. That is why it will remain interesting for a long time.”

Mars One Messiah, Bas Lansdorp

The way Bas sees it, viewers will be interested in group dynamics and how the crew will behave when the proverbial brown stuff hits the fan. On that score he has a point, because real-life drama is a key element in the success of *Big Brother* and similar reality shows. The problem with Mars One however, is that the human variable is impossible to quantify. And it is partly because of this reason that space-themed reality shows have such a bad history: over the past 15 years there have been almost a dozen such shows bandied about (see sidebar), but not one – NOT ONE – ever saw the light of day. And Mars One is faring little better. Publicity is oxygen for this reality show and that publicity generally needs to be good. But the media are mainly interested in entertainment value, and Mars One has been an easy target for ridicule, which is bad publicity that hasn't helped Mars One.

Spaceflight reality shows

Some of you may remember Mark Burnett's (producer of *'Survivor'*) idea of *'Destination: Mir'*, which would have flown a contestant to the aging Russian space station in 2001. When a deal couldn't be done with MirCorp, the Russians suggested their own show: *'Ancient Astronaut'*. It also died a quick death. Then, following Mir's demise, Burnett revised his idea with *'Destination: Space'*, which would have flown a contestant to the ISS. Hot on the heels of Burnett's venture was *'Celebrity Mission'*, which would have placed Lance Bass in orbit. That failed too. As did *'Astromom'*, an effort to send Lori Garver into space. A European idea called *'Space Commander'* was quickly forgotten, but then came the success of SpaceShipOne, and many naïve people reckoned there would be reality shows tied to suborbital space operators. They were so wrong, because 12 years later those operators are still years away from revenue flights. That didn't stop Mark Burnett though, who pitched a show called *'Space Race'* that was rumored to have been picked up by NBC. It wasn't. Nor was *'Milky Way Mission'*, a Sony Pictures television project that would fly contestants on board the Lynx.

So, space-themed reality shows have been spectacularly unsuccessful, but Bas is insistent Mars One can be different. But how? Well, the visuals could be entertaining. You could show the candidates being put through their paces during survival training: eating bugs, setting traps to catch rabbits, and huddling naked in pairs inside sleeping bags while trying to keep warm during arctic survival come to mind. You could put them in a centrifuge and show them undergoing really unpleasant medical tests, such as enemas and appendectomies. You could strap them into high performance combat aircraft to expose them to unusual attitudes and various vomit-inducing positive and negative Gs. You could show them flying parabolic flights to see if they can hold on to their breakfast. You could... well,

you get the idea. The problem with all these tests – all staples in any astronaut training program by the way – is that they cost money, and one of the reasons reality television exists is because it is cheap to produce. Nothing about astronaut training is cheap. Nothing at all! And training will only be interesting for a short while. What makes reality shows successful are fights and drama – that’s what gets the ratings and generates advertising revenue, which in turn result in profits. But you don’t need to work for NASA to know that the very last thing you need on a trip to Mars is a fight.

And then there is the schedule. What schedule? When is it going to start? In 2020? 2025? Who knows? And when – if – it does finally get going, how will Mars One sustain interest for the ten years preceding the mission? Ten years! And then there’s the money. Bas holds up the Olympics as his revenue model, but to say that your reality television show can make money simply because the Olympics does is akin to saying your school soccer team can make money televising its games because the FIFA World Cup makes millions. Bottom line: Mars One and the Olympics are not in the same league. Not even close. Investors? No, that won’t work and here’s why: what investor wants its product associated with an enterprise that ends up killing people? Don’t forget that the demise of these contestants will in all likelihood be very public and very graphic: punch in ‘radiation sickness + images’ into Google in case you don’t believe me. You see, when things go pear-shaped in ‘*Survivor*’, a ship comes along and the contestants are rescued. That will not be the case for Mars One.

“Barry: The hab study is complete. To all the male participants, your monumental incompetence has sullied and cheapened space forever. Now get out. Good. It’s a stupid idea and I hope everyone dies.”

*The Simpsons Season 27, Episode 16: The Marge-ian Chronicles.
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So, in light of all these negatives, why is there still so much interest in a venture that has about as much chance of succeeding as a drunken wildebeest wandering into a barbeque afternoon for a pride of lions? I have my theories. One theory is that there has been so much talk of manned missions to Mars for so many, *many* years, that there is now a sense of desperation for somebody – anybody – to land on Mars. Suicide mission, bare bones mission – it doesn’t matter: just get us there already! And I think the Mars One 100 candidates realize this, which is why they continue to sing from the one-way mission hymn book. Look, in most cases, these Red Planet recruits are smart enough to know that Mars One hasn’t a snowball in hell’s chance of succeeding, but they want their 15 minutes of fame. They know they’ll never get that by being a real astronaut, because very few of them have the qualifications for that job, so Mars One provides the perfect vehicle for fleeting celebrity and they seem determined to milk it for all its worth.

For this group, it doesn’t matter how outrageous the enterprise is, or how absurd the Mars One announcements are about the timeline: this group wants to ride the fame train as long as possible. Never mind that Mars One has yet to figure out the design of the habitat, the landing module, or any other item of hardware for that matter. For this group, putting the cart before the horse seems to be the way to do business, which is why all their efforts are spent on highlighting the science fiction details of the mission plan (pick up a copy of the Mars One book and read it for yourself). Any sane person with even the flimsiest grasp

of spaceflight basics will realize that no-one goes from zero to Mars with nothing in between. Just take a look at SpaceX, which is probably the likely candidate for landing humans on Mars first. For years, Elon Musk has been steadily developing the systems and hardware that will be used to ferry humans to the Red Planet: this is real world spaceflight. Meanwhile, all Mars One has to offer is the occasional statement from Bas about how a Mars mission will inspire students to believe that anything is possible and that... yawn.

So where does all this leave Mars One? Well, there is always the chance it could get off the ground as a half-assed, half-baked, half thought-out mission. This will be good news for the fame whores, who will get their 15 minutes of notoriety before dying lingering and agonizing deaths (all on prime-time mind you!) somewhere en route to Mars (check out those images of radiation sickness again). Perhaps Bas could join them. I know a lot of people who would pay money to see that.

“There’s a great self-defeating optimism in the way this project has been set up. I fear it’s going to be a little disillusioning for people because it’s presented as if it’s going to happen and so all those people are excited.”

International Space Station Commander, Chris Hadfield

But while Mars One is surely destined to fail, there are some who argue that the venture can succeed even in failure. How? Well, the argument goes that by announcing their plans in such a public forum, it can be said that Mars One will have done its bit in chipping away at the business of manned planetary exploration, which has historically been the preserve of governments and space agencies. Continuing this argument, a case can be made that the audacity of Mars One may help inspire public enthusiasm for an eventual manned mission to the Red Planet, perhaps making it a little easier for the next group that comes along with a plan. The counter to this argument is the likelihood of Mars One failing, as it surely will. When the Apollo 13 mission suffered a near mission-ending event, NASA didn’t close down mission control because the television ratings were down. They helped the astronauts every step of the way back. Mars One? When the crew starts dying of radiation sickness, it will be broadcast on prime-time, and some of those watching will be the bean-counters who ultimately approve funding for manned missions. How do you think having those images broadcast on prime-time, and the ensuing public trauma, will affect the likelihood of *any* future missions being given the green light?

Look, even the most upbeat optimist would find it almost impossible to conceive of an outcome that isn’t tragic when it comes to the subject of Mars One. Yes, the hardest part of a manned Mars trip is the return, but nixing the return doesn’t mean all your troubles evaporate. And even if they did, how is it possible not to be suspicious of an organization that has no rockets or spacesuits, or much of anything, but is insistent it will be sending humans to Mars? It’s all too good to be true, especially now that contracts with Lockheed Martin and *Big Brother* producers Endemol have fallen through. Mars One is a lot of hot air. At best, a thought experiment that has been the catalyst for reopening the conversation about sending humans to Mars: at worst, an elaborate hoax about sending four kooky misfits on a suicide mission.

Appendix A

Mars One reveals new details on Astronaut Selection Round Three

This appendix includes features about astronaut selection and training that appear on the Mars One website. My comments on these processes appear in a series of sidebars.

Amersfoort, June 6, 2016: Mars One released new information about the third round in the Astronaut Selection Program during a private Mars One event in Amsterdam. The third selection round is designed to trim down the remaining 100 candidates to forty through a series of group challenges. The candidates will compose the groups for the third round themselves.

Over the course of five days, candidates will face various challenges. It will be the first time all candidates will meet in person and demonstrate their capabilities as a team. Candidates will start the group challenges in 10 groups of 10. These groups will change throughout Round Three due to continuous elimination, and the selection round will end with 40 candidates.

In this round the candidates will play an active role in decision making/group formation. Mars One has asked the candidates to group themselves into teams with the people they believe they can work well with. All groups have to adhere to certain criteria, such as a gender ratio of 50/50, as well as maintaining age and nationality diversity. The self-selection placement has already started.

“We want the groups to be as diverse as possible, and to utilize the uniqueness and special contribution from, for example, different backgrounds in order to solve complex problems, as a continuation of the work in JAXA and NASA.”

Mars One’s Chief Medical Officer, Dr. Norbert Kraft.

The majority of the challenges Mars One plans to conduct were previously used in a study by NASA in order to determine:

- The best crew/crew combination
- The best selection tools
- The best training method for long duration space flights.

Indoor and outdoor group challenges will, amongst other things, test the candidates' ability to work in a team within limited conditions, interdependency, trust, their problem-solving and creativity skills, their thoroughness and precision, and their clarity and relevance of communication. The candidates' knowledge of provided study materials is essential to progress in the challenges. Candidates are eliminated based on their behavior both inside and outside the group challenges, which will be reviewed by the selection committee. At the end of each day, a sociogram will be used to explore the candidates' preferences for whom they would like to work and live with, and this will be taken into consideration by the selection committee when deciding whom to select out. Every day, ten to twenty candidates will leave the selection.

The selection procedure will provide insights into group dynamics. How did the candidates organize themselves into teams? How well did they solve problems as a team? How did each candidate handle the conflicts that inevitably emerge when facing a challenge together?

The Mars One candidates come from all over the planet, and will undertake the long journey to Mars to live there for the rest of their lives. Mars One selection committee members Norbert Kraft, M.D., Prof. Raye Kass, PhD, and James Kass, PhD possess understanding of different cultures as well as many years of experience working with extreme environments, and, of utmost importance, isolated habitats. They have professional experience in the field of Human Space Flight (Group Dynamics/ Long duration Space Flight/ Medicine/ Psychology/ Psycho-physiology) and extensive work with astronauts from JAXA, NASA, CSA, ESA, and RFSA.

From this selection round onward, the selection procedure and training activities of the astronaut candidates will be filmed for audiences across the globe. [The] 40 remaining Round Four Candidates will begin the isolation portion of the screening process. The results of the isolation challenge will reduce the 40 candidates down to 30 who will then undergo the Mars Settler Suitability Interview.

Isolation

Isolation analogs are nothing new and are being used by NASA today to train astronauts for long duration missions (NEEMO for example). But the Mars One isolation is measured in days, not months: to provide added realism – and drama (!) for those watching this on TV – this isolation challenge should be a real challenge in the order of six months (minimum) in a hostile environment such as the Antarctic.

Choosing the Mars Four

Here Mars One Chief Medical Officer Norbert Kraft, MD, explains the training process and selection of the final four candidates for travel to Mars.

“We will end up with 24 candidates out of the original 200,000-plus applicants. Some of the details concerning training and competition still need to be discussed with the organization that gets the broadcasting rights, because some types of challenges and activities

are more telegenic than others. However, we know what they must learn. The basic training will involve the Mars 24 living and studying together in a Mars One facility where their families can join them. Each year, the 24 will study the skills and knowledge that they need to be self-sufficient on Mars — medicine, dentistry, agronomy, electronics, political science, law, and so forth. They will train together for nine months each year. Since team members will come from all over the world, we will be sure that some of the training occurs in the home culture of each team member. For example, if a candidate is from Russia, that candidate's team will spend some time in Russia, so they can become familiar with the culture.

“Three months a year will be spent competing with other teams, and this will be tricky. Six teams of four members will compete to win at challenges related to what they have studied over the previous nine months. The teams will compete against each other, but there will also be times when two of the teams have to collaborate. This is important, because we expect to send new teams of settlers to Mars every four years. This means it is critical that they are good at figuring out how to welcome new team members and collaborate after they've developed team cohesion.

“When they compete, we will be studying their team dynamics and their success at the challenge they were given. We are interested in how they succeed, but also what they do about problems they can't solve. How do they pull themselves together? How do they change their team approach when faced with problems they can't solve? Each group selects its own approach — anarchy, military, democracy can all work — but they have to perform better than the other teams. So the capacity to change organizational style to fit the challenge is critical, and it is this capacity to adapt that will serve them best in the harsh conditions on Mars. They will learn this capacity through the challenges, and because they learn this through experience, it will stay with them.

“Each team will have a specific trainer to work with them, and the teams will compete to continue training for the Mars mission. This means some teams will not continue after the competition, and new teams will be coming on as Mars One opens the application process for new candidates.

“When it comes to judging the success of the teams, we envision five votes to select the winning teams each year. One vote comes from winning the competition. Three votes come from judges with special expertise in the areas being challenged. And the public gets the fifth vote. The public can be the tiebreaker.”

Selection

It's not the way governments select their astronauts, although crew resource management is a key element in selection. But where will these exercises take place? The 'harsh conditions' of Mars is mentioned, so I would hope these team dynamics exercises will play out in a hostile environment as well. And giving the public the 'tie-breaker' vote? You just know that the one best qualified to progress will be ditched in favor of the one that best plays the crowd, because that's what reality TV audiences do.

What are the qualifications to apply?

Qualifications

Mars One will conduct a global search to find the best candidates for the first human mission to Mars. The combined skill set of each astronaut team member must cover a very wide range of disciplines. The astronauts must be intelligent, creative, psychologically stable and physically healthy. [Here] Mars One offers a brief introduction to the basics of our astronaut selection process.

The astronaut selection process

In spaceflight missions, the primary personal attributes of a successful astronaut are emotional and psychological stability, supported by personal drive and motivation. This is the foundation upon which a mission must be built, where human lives are at risk with each flight. Once on Mars, there are no means to return to Earth. Mars is home. A grounded, deep sense of purpose will help each astronaut maintain his or her psychological stability and focus as they work together toward a shared and better future. Mars One cannot stress enough the importance of an applicant's capacity for self-reflection. Without this essential foundation, the five key characteristics listed (see table A.1) cannot be utilized to the fullest potential.

Table A.1 Five Key Characteristics of an Astronaut

Characteristic	Practical Applications
Resiliency	Your thought processes are persistent. You persevere and remain productive. You see the connection between your internal and external self. You are at your best when things are at their worst. You have indomitable spirit. You understand the purpose of actions may not be clear in the moment, but there is good reason—you trust those who guide you. You have a "Can do!" attitude.
Adaptability	You adapt to situations and individuals, while taking into account the context of the situation. You know your boundaries, and how/when to extend them. You are open and tolerant of ideas and approaches different from your own. You draw from the unique nature of individual cultural backgrounds.
Curiosity	You ask questions to understand, not to simply get answers. You are transferring knowledge to others, not simply showcasing what you know or what others do not.
Ability to Trust	You trust in yourself and maintain trust in others. Your trust is built upon good judgment. You have self-informed trust. Your reflection on previous experiences helps to inform the exchange of trust.

(continued)

Table A.1 (continued)

Characteristic	Practical Applications
Creativity / Resourcefulness	<p>You are flexible in how an issue / problem / situation is approached.</p> <p>You are not constrained by the way you were initially taught when seeking solutions.</p> <p>Your humor is a creative resource, used appropriately as an emerging contextual response.</p> <p>You have a good sense of play and spirit of playfulness.</p> <p>You are aware of different forms of creativity.</p>

Characteristics

Yes, these are all good characteristics but a Mars crewmember will require other attributes: high resistance to radiation, high bone density, and being male (females will not be going – even those with the flimsiest knowledge of space life sciences know why)

Age

The astronaut selection program will be open for applicants who are 18 years or older. This is the age by which children become legal adults in most countries in the world. Mars One believes it is important that applicants who enter the astronaut selection program are capable of entering into a legal contract without the supervision of others.

Medical and Physical Requirements

In general, normal medical and physiological health standards will be used. These standards are derived from evidence-based medicine, verified from clinical studies.

- The applicant must be free from any disease, any dependency on drugs, alcohol or tobacco
- Normal range of motion and functionality in all joints
- Visual acuity in both eyes of 100% (20/20) either uncorrected or corrected with lenses or contact lenses
- Free from any psychiatric disorders
- It is important to be healthy, with an age- and gender-adequate fitness level
- Blood pressure should not exceed 140/90 measured in a sitting position
- The standing height must be between 157 and 190 cm.

How will the astronaut selection proceed?

The selection process is made up of four rounds.

1. During the initial round all candidates must submit an online application that consists of general information about the applicant, a motivation letter, a resume and a one-minute video that answers provided questions and explains their reasoning.

2. Candidates making it to the second round are required to obtain a medical statement of good health from their physician and will be invited for an individual video interview with Mars One.
3. During the third round candidates will participate in group challenges and will be partake in an in-depth interview.
4. The final selection creates international groups of four candidates who are expected to demonstrate their ability to work together and live in harsh living conditions. The teams will also receive their first short term training in a Mars outpost.

Selecting the Crew

There are multiple the requirements to become a Mars One astronaut. Applicants' characteristics must fit with those of an astronaut. Meaning the candidate needs to be:

- Resilient
- Adaptable
- Curious
- Trustworthy and Trusting
- Creative/Resourceful
- Above the age of 18
- A2 English level

Selection Process: from Round Three onwards

Round 3

The third round is an international selection round. Candidates who make it into this third selection round will participate in group challenges that demonstrate their suitability to become one of the first humans on Mars, and will take part in longer and more thorough interviews. The Mars One selection committee will determine who will pass to the final selection round.

Round 4

The Mars One selection committee will create international groups of four candidates. The groups will be expected to demonstrate their ability to live in harsh living conditions, and work together under difficult circumstances. The groups will receive their first short term training in a copy of the Mars outpost.

From the first selection series, up to six groups of four will become full time employees of the Mars One astronaut corps, after which they will train for the mission. Whole teams and individuals might be selected out during training if they prove unsuitable for the mission.

How are the astronauts prepared?

Mars One Astronaut Training Program

- After the crews are selected they begin training. The training consists of three (phases) including technical, personal, and group training.
- Phase 1: Technical training includes the training of two crewmembers to be proficient in the use and repair of all equipment to the extent that they can identify and solve technical problems. In addition, two crewmembers will receive extensive medical training in order to treat minor, major, and critical health problems. At least one person will train in the studies of Mars geology and the remaining person will gain expertise in exobiology, which is the biology of alien life.
- Phase 2: Personal training consists of ensuring that the astronauts are able to cope with the difficult living environment on Mars. Since these individuals will be unable to speak to friends and family on Earth face-to-face, a certain amount of coping skills are essential.
- Phase 3: Group training will mainly take place through simulation missions. During these simulations, the astronauts take part in a fully immersive exercise that prepares them for the real mission to Mars. The simulated environment will invoke as many of the Mars conditions as possible. Immediately after selection, the groups will participate in these simulations for a few months per year.

Phase 3

Phase 3 promises to be interesting, especially the section that promises to invoke as many of the Mars conditions as possible. Presumably (hopefully) this will mean our intrepid reality show contestants will be performing in a lethal radiation environment where the barometric pressure is maintained at one percent of Earth's atmosphere. After all, realism is everything in a reality TV show, isn't it?

Appendix B

Selected profiles from the Mars One 100

To give readers an insight into the quality of candidate that made it into the final 100, what follows is a snapshot of ten of the Mars 100 candidates. Biographies listed are taken from the Mars One Community Platform: <https://community.mars-one.com/>

Profile 1: Shirelle.

Shirelle seems to be keen and eager to rack up the qualifications needed to make her one of the final candidates, although her grammar skills seem to be lacking (tense Shirelle!). Still, which one of the current crop of reality show contestants has good grammar skills?

<i>Name:</i>	Shirelle Erin Webb
<i>Sex:</i>	Female
<i>Age:</i>	23
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

I know that there are very few individuals that understand why we want to go to Mars. There are very few individuals who understand why anyone would put money into this program. The problem is that our generation has fallen out of love with knowledge and adventure. People forgot that all our technology and advancement came from those who desired more.

Being involved with Mars One is an opportunity to re-inspire the next generations and hopefully have them learn more. This is a chance to learn more and go farther than we could ever imagine.

I am trying to do everything I can to be a vital part of the Mars One team. I have completed my paramedic courses and am about to take my certification tests. I have worked with the Corpus Christi Fire Department as a first responder while doing my internship. I am pursuing a degree in pre-med to compliment my studies in paramedic medicine. I will switch to post graduate studies in physics which should give me a thorough foundation in medicine, science, and environmental research.

Interests:

I enjoy reading science fiction stories. My favorite book is “John Carter of Mars.” I enjoy super-hero comic books and I love to write stories. I enjoy running and yoga.

Profile 2: Maggie.

Maggie has all the qualifications for... well, for making costumes I guess, judging by her resume, although her engineering skills should come in handy when the life support systems start breaking down, as they surely will.

<i>Name:</i>	Maggie
<i>Sex:</i>	Female
<i>Age:</i>	31
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

Raised on a farm in the heart of the US, my first word was ‘home’ while pointing up at the stars. Although I graduated Cum Laude with a degree in Electrical Engineering, I put my technical skills into making high-end costumes, starting an international business selling the largest zippers in the world. My passion is adventure and my strengths are optimism, intelligence, and creativity... which help me transcribe my journey into art through drawing, story and song.

Interests:

Physics, chemistry, math, technology, music/frequency analysis, electromagnetics, robotics, drawing, writing, acting, singing, percussion, clothing/costume design and construction, cooking, camping, traveling, kendo. Transformers, Star Wars, Star Trek, Mass Effect, Tolkein.

mars-maggie.tumblr.com

Profile 3: Zachary.

Zach has one of the most Mars-specific resumes, although he is light on qualifications, which isn't surprising since he is only 29. While on paper having a geochemist on the team may sound like a good idea, the first few teams landing won't be doing much else apart from fixing life support equipment... and simply surviving.

<i>Name:</i>	Zachary
<i>Sex:</i>	Male
<i>Age:</i>	29
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

I have an unmatched passion for exploring the universe. Solving complex problems, both individually and as a member of a team, is what I do best. I am very fit and can withstand grueling physical activity. My temperament is calm and relaxed, handling the most stressful situations with ease. I am a very clean and organized person, important habits for long duration space missions. The background I bring from planetary science will be invaluable to the Mars One mission; I am a geochemist and field geologist specializing in Mars and Moon studies. Currently, I am at the University of New Mexico working on Mars Science Laboratory rover operations for the ChemCam laser instrument. Other projects include landing site analysis for future manned and unmanned missions to Mars, analyzing terrestrial impact-induced hydrothermal processes/mineral assemblages, and conducting simulated rover and manned missions at terrestrial analogue sites.

I have been training for this mission my entire life, and I am ready to go to Mars.

Interests:

My interests on Earth include: bicycling, running, scuba, golf, horticulture, playing guitar (<https://manonmars1.bandcamp.com>), rock climbing, studying geology, collecting minerals, and exploring the wilderness.

My interests in space include: astrogeology, astrobiology, in-situ resource utilization, giant impact processes, terrestrial analogue comparison, and planetary mission operations.

Profile 4: Divashen.

Yes we could begin a new age of astronomy and science Divashen, but you and your Mars One crewmates won't be playing a part of that because you will be on the very threshold of survival. Playing guitar and video games are all well and good, but don't add up to a bag of beans when the carbon dioxide scrubber has gone down for the umpteenth time and poor old Lucy is dying of radiation sickness and spilling her guts on the floor for the third time that morning.

<i>Name:</i>	Divashen
<i>Sex:</i>	Male
<i>Age:</i>	24
<i>From:</i>	South Africa
<i>Language:</i>	English

Self Introduction:

My name is Divashen. I was born on the 23rd of January 1992 in Westville, Durban which is situated on the beautiful sunny east coast of South Africa. I [am] studying a Bsc degree double majoring in applied mathematics and physics at the University of KwaZulu-Natal. My intention is to go into astrophysics. I love challenging myself and having new experiences. Space and space exploration has always been a dream of mine. To set foot on another planet and pave the way for mankind's journey into a true space age would be so surreal. I believe that we can responsibly inhabit other planets and advance our knowledge of science along the way. On Mars we would be able to begin a whole new age of astronomy and science.

Contact me via: Facebook: Divashen Govender
Email: divashen.govender@gmail.com
Twitter: @DivashenG

Interests:

I have a keen interest in astronomy, reading, playing guitar, surfing, video games and relaxing with friends. But my obsession and biggest interest is space and what lies beyond. The thought of going beyond our world has been a dream of mine for as long as I can remember. That is my ultimate interest.

Profile 5: Gunnar.

Not much in the qualifications department for Gunnar, although his penchant for road-trips will no doubt stand him in good stead – after all, Mars One is first and foremost a reality show, and second, a road trip... with a difference. Again, this talk of inspiration is all well and good, but I'm not sure how many will be inspired by crewmembers projectile vomiting and dying from asphyxiation. Still, it takes all sorts I suppose.

<i>Name:</i>	Gunnar
<i>Sex:</i>	Male
<i>Age:</i>	43
<i>From:</i>	Australia
<i>Language:</i>	English

Self Introduction:

The day I was born I was out exploring the world, society and nature with all their beauty always looking for solutions and new adventures. I never stopped asking questions and I never lost my curiosity. Independent and free minded I try to see life from a different point of view. I was born in East Germany and migrated to Australia in 2003.

When I first heard about Mars One I was hooked and after I read the qualifications to apply it felt like it was written for me. Imagine Mars One is successful and we're going to build the first human settlement on another planet. Wouldn't it be wonderful if we would create a second home with new ideas and new ways of thinking? We have the whole human history we can learn from and our world needs a positive event much bigger than the moon landing and all the sports events put together very soon to inspire every one of us to change our thinking and our way of living because the only hope for human kind lies in the transformation of the individual. Could Mars One be this event?

Interests:

I'm a big fan of road trips, nature, the universe, hiking/bushwalking, little bit of slacklining and photography, critical thinking, science, philosophy, travelling, documentaries, a good video game...

Profile 6: Yari.

Another engineer. Great. Mars One will need a bunch of them because of the aforementioned life support challenges. Working with decision support tools is an advantage because this mission will run on them. Keeping a healthy body will be difficult though Yari, so I suggest you read a few chapters about what radiation does to human physiology: be prepared because it ain't pretty!

<i>Name:</i>	Yari
<i>Sex:</i>	Female
<i>Age:</i>	28
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

Hello! I am future Mars settler Yari. I hold a bachelor's degree in Engineering Science from Smith College. By day I am a data analyst working for air traffic control decision support tools and analyzing the environmental impacts of aviation, by night I am a private pilot. I am the perfect candidate for the Mars One team because I am a fun, intelligent, independent woman with a creative and resourceful mind.

Interests:

I am interested in Bioastronautics and the advancement of humanity. I enjoy the simple things in life like spending quality time with my family and friends, keeping a healthy mind and body, and being part of programs that promote interest in Science, Technology, Engineering and Mathematics.

Profile 7: Oscar.

Oscar has perhaps the most astronaut-worthy resume. He’s a pilot, he’s in the military, and he’s on his way to checking off his PhD. Good job Oscar. He has a strong set of avocational interests that include scuba-diving and 3D printers. If I was on the Mars One selection committee I would list him as a likely candidate. Having said that, I suggest he save himself and apply to NASA instead.

<i>Name:</i>	Oscar
<i>Sex:</i>	Male
<i>Age:</i>	34
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

I’m Oscar, and I would like to explore the vastness of Mars to search for extant or past signs of life. I am a Valedictorian, an Eagle Scout, an AF Academy grad, and a licensed pilot. I work as an Aerospace Engineer on tactical aircraft for NAVAIR at Pax River NAS, and I previously worked as a practicing Nuclear Test Engineer on Naval reactors. As a Navy Reservist, I am a Flight Test Engineer at NAS Pax River. During my Masters in Aerospace, I completed research at NASA Ames leading to a thesis concerning aeolian dune formation by particle saltation on Saturn’s moon, Titan. Recently, I earned candidacy for the Aerospace PhD program at Old Dominion University (ODU) in Norfolk, VA with a focus on spacecraft and habitat radiation shielding. In my spare time, I cycle, SCUBA, and tinker with 3D printers/UAV’s. Join me on a Beautiful New World?

Interests:

- Virtual Reality/VR gaming & simulation
- 3D Selective Laser Sintering/Printing
- Camping/Hiking/Wilderness Survival
- Arduino
- Space
- Trumpet
- Soccer/Running
- Flying

- Music
- Reading
- Philosophy

Follow me on Twitter: @Astro_Osk

Profile 8: Lucie.

Lucy or Lucie is a fan of Elon Musk, which is tinged with irony since it will almost certainly be Elon who is the driver behind having the first humans on Mars. Lucie is light-weight in terms of qualifications though. Still, who needs qualifications to get to Mars? Not reality show contestants apparently.

<i>Name:</i>	Lucy
<i>Sex:</i>	Female
<i>Age:</i>	26
<i>From:</i>	Czech Republic
<i>Language:</i>	English

Self Introduction:

Hi, I'm Lucie and I'm the Czech candidate among the Mars One 100. I reside in the UK at the moment and oscillate between my job as a physics technician and independent study of SciTech-related subject areas. I'm bilingual, rational, curious and increasingly worried about the global issues clouding our bright future. I'm on a quest to achieve the levels of discipline, knowledge and skill to be able to meaningfully improve said future, while maintaining the humility, empathy and sense of duty necessary for guiding me on that path.

Interests:

I enjoy working out, writing, spending time outdoors, meeting new people, acquiring new skills, thinking and having witty and/or intellectual conversations. I like hands-on, practical experiences, finding new motivation and inspiration - and passing it on to others. I am a huge fan of Mass Effect, Elon Musk, AI, various cosmological theories and the human potential.

Profile 9: Kellie.

I've met Kellie and she's a bright spark who's the life and soul of any group gathering: the most gregarious person you could ever hope to meet and someone who would brighten up any mission, even one as ill-conceived as Mars One. A public figure who is a tireless advocate for manned spaceflight, Kellie also happens to have the most stellar of all the Mars One resumes. And she's only 27. Mars One selection committee take note!

<i>Name:</i>	Kellie
<i>Sex:</i>	Female
<i>Age:</i>	27
<i>From:</i>	United States
<i>Language:</i>	English

Self Introduction:

Kellie Gerardi is a space science communicator who has worked with a number of commercial space companies, non-profit organizations, and government agencies to research, develop, empower, and communicate the progress of the spaceflight industry. Gerardi currently leads business development efforts at Masten Space Systems, an aerospace R&D and rocket flight services company known for their innovative work with DARPA, NASA, and industry customers. She also serves as the Media Specialist for the Commercial Spaceflight Federation (CSF), the United States' industry trade association of leading commercial companies working to advance human spaceflight.

Gerardi is an active member of The Explorers Club, a global scientific organization whose famed Annual Dinners she has Chaired for the past two years. Gerardi recently carried The Explorers Club Flag on a two-week expedition to the Mars Desert Research Station, a prototype laboratory used by a variety of national space agencies and scientists to conduct analog Martian field research and simulate long-duration spaceflight.

An avid science communicator, Gerardi has authored dozens of essays, white papers, and research studies. She has appeared on popular television shows such as ABC's "The View" and "Nightline" and has been interviewed on multiple NPR podcasts. She has been profiled in a variety of popular publications, including The New York Times, the Huffington Post, Popular Mechanics, Popular Science, and Vogue. Her thought leadership enabled her to become a science and exploration influencer to over 15,000 followers across social-media platforms.

In 2015, Gerardi was named a "Rising Talent" by the International Women's Forum for the Economy and Society, an initiative aiming to distinguish talented young women on their way to becoming influential figures in global economies and societies. She was also competitively selected by the Kruger Cowne Agency as a "Rising Star", currently one of 30 finalists under consideration for a trip to space.

Interests:

Pushing the boundaries of science, technology, and exploration.

Profile 10: Robin.

Robin is from my home country of Norway. He has the right intentions and the right plans and he comes from a nation of some of the toughest explorers – Amundsen, Nansen, Heyerdahl, to name but a few. But while these explorers embarked upon very risky

expeditions, they steered away from ventures that had suicide written all over them. Think again Robin.

<i>Name:</i>	Robin
<i>Sex:</i>	Male
<i>Age:</i>	21
<i>From:</i>	Norway
<i>Language:</i>	English

Self Introduction:

Greetings, my name is Robin and I'm 20 years old.

I have been interested in space since I was 4-5 years old and saw the movie "Apollo 13" for the first time. Since then, I have had a dream about exploring space, and joining the colonization of another planet.

I am currently a student taking a few classes over again to improve my grades. When I am done with this I am going to take a bachelor in engineering, or become a pilot. If I become an engineer, I will most likely take a master's degree after the bachelor is done.

Interests:

I am in love with space and everything related to space. I also enjoy reading a good book. My favorite authors are Michael Cobley and Wilbur Smith.

I love to fly airplanes, and because of this I have started on my PPL-A (Private Pilot License – Airplane). I am currently reading the theory and booked my first hours.

"Yes, but to travel to another planet, knowing you can never come back, you'd have to be pretty sad. Aniston sad."

*Marge Simpson, The Simpsons, Season 27 Episode 16.
The Marge-ian Chronicles. Original Air Date, March 13, 2016*

So how do the Mars One 100 applicants stack up against professional astronauts? Well, there are some in the group who might have a good chance of making it to the final 80 to 100 candidates in a regular astronaut selection (two of the Canadian Mars One candidates applied to the Canadian Space Agency's 2016 Astronaut Recruitment Campaign), but as we've discussed in this book, launching to low Earth orbit and travelling to Mars are two completely different balls of wax. But that is precisely the appeal of Mars One: taking supposedly regular people off the street and asking if they have the right stuff.

A similar show aired on British TV in 2015. It was called *SAS: Who Dares Wins*. The idea behind the show was to see what happened when 30 normal men spend eight days completing a shortened version of the selection process used by British Special Forces. The program featured a lot of scenes with instructors sticking bags over people's heads, taking them to interrogation rooms and making them cry. In the regular selection process, of 200 soldiers that begin, only between 5 and 10 percent, make it. And the process of whittling those numbers down is very ugly indeed. Which is probably what will happen in Mars One.

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