Aditya Jalali muttered under his breath, "Now I am become death, destroyer of worlds," quoting the words with dark irony as he wrenched open the ship's oxygen intake valve. As he expected, he was blasted away from the ship by the high pressured gas and sent tumbling towards Earth. His mobile activity vessel, MAV, automatically corrected his spinning and soon he was stable relative to the ship, but still moving fast. Multiple alarms were blaring in his ears complaining that he should probably slow down. He quieted them by entering codes into his arm mounted keyboard.

As he drifted through space, Aditya watched as the ship silently shrunk smaller and smaller, until it became a pinprick of light. The only sound was his own breath and the frightening sound of his own heartbeat echoing in his ears. As he realized the gravity of his situation, he closed his eyes and pushed out the doubting thoughts and then memories from his childhood flooded into view. He recalled growing up always an outsider. The other children at school made fun of him for his turban, his clothes, and his way of speaking. The kids at temple disliked him for his nerdiness and love of space and science.

He thought about how he had given up religion during his scientific awakening. Each new discovery of science over the past one thousand years put humans further into a position of non-center. First, the acknowledgement that Earth is not the center of the Universe. Then that our sun is but a star just like the millions in the night sky. Then that our galaxy is one of billions of galaxies in a Universe so vast only a small portion is even visible. The more he saw, the more jaded he had become and the more despair he felt.

He fired up his MAV to burn retrograde and lower his periapsis even further into the planet's atmosphere. As he drifted inevitably towards his death, he gazed upon the world and thought about how unlikely it is that life even exists. The vast majority of the Universe is dead space. The vast majority of non-space, matter, is completely uninhabitable. Even on Earth, if you were to randomly land somewhere you would most likely not survive very long. Two-thirds of the Earth is water - you would drown. If you were lucky enough to land on ground you would likely be in a desert, wild forest, or tundra. You would most likely die of thirst, be eaten by a predator, or simply die of exposure without sufficient clothes. This strangely gave him some measure of comfort.

As his suit started to heat from the immense speed of reentry, what was certain to be his last sensation, one thought remained in Aditya's mind. He hoped that by sabotaging the mission, humanity would see the folly of trying to live on other planets; that Earth is our only hope as a species.

One year earlier...

"I cannot promise that you will live forever. In fact I can almost promise that you won't. I'm not sure forever even exists. But we have the technology to extend your life so why not use it? Since the dawn of time, humans have tried to extend their lifespan," expounded Dr. Hubert, sitting next to Norbite, who was currently lounging on the examination table. Dr. Hubert had the soothing voice of an experienced doctor, and the face of one.

"Yes, but never in this way," Norbite interjected. He was not entirely sure the treatment was a good idea. Medical science always seems to screw things up the first time around.

"Sure, but only because the possibility didn't yet exist," the doctor replied.

"You're probably right, but I can't shake the feeling that there's something scary about this. What if it changes the way we look at life?"

"Don't worry about it. I doubt it will change much... Any more questions?" The doctor looked down at his watch uncomfortably.

"No. I just need to think about it for a while, Doc."

"Okay. Think about it and when you're ready, make an appointment with the AI." The doctor then shook Norbite's hand politely and left the room.

Norbite left Dr. Hubert's office and walked back towards his modest car parked outside.

He was one year and six months into astronaut training at NASA's Johnson Space Center in Houston, still in a state of disbelief that he was actually accepted into the program. Sure NASA had relaxed some of its criteria over the years but deep down it was still hard to internalize.

It was a cool and bright sunny day in mid-March. The smell of the ocean permeated the air and seagulls flew overhead. Life was good.

Norbite told his car to drive him back to his apartment. He decided to call his mom while he was riding. They chatted for a while until he worked up the nerve to tell her how he felt. "Everyone's a genius here, Mom. I feel like a medium-sized fish that went from a pond to a shark tank. I don't know if I really belong here," he said.

"Norbite, you've always been a smart kid. You coasted through school and you've always been so curious," she said encouragingly.

"Well, I didn't coast through everything. Physics. Calculus..."

"Sweetie, they wouldn't have accepted you if you didn't have what it takes. I bet the other people there look at you the same way you look at them and have the same feelings you have. You are right where you belong, son. I'm so proud of you."

"Thanks, Mom," he replied, feeling a bit better. He said good-bye as he approached his complex, went in, and headed to his room. He navigated the tangled web of pizza boxes, dirty clothes, and halfread books thrown around his living room and flipped on the news.

A reporter was mid-sentence, talking about NASA. There was talk that a manned mission to Mars was not far off. As early as next year, 2031, they might be ready to launch. The plans were already made. They just had to pick a crew and secure the funding. Norbite's stomach twisted. Could he be going to Mars?

Three doors down was Rin Yamamoto, another young NASA recruit watching the same channel. Rin knew she was going to Mars. She had known since she was a five year old girl, after her family had moved from Tokyo to San Francisco. Whether it was next year or in ten years, she was going. Something about the red planet fascinated her and pulled like a super-conducting magnet. She had organized her whole life towards maximizing her chances of going there.

NASA seemed like the best vehicle to Mars so she had focused most her life on becoming an astronaut.

Now that she had achieved this goal and was in candidacy training at the Johnson Space Center she was on Cloud Nine. This was the last month of the two year program and she was thoroughly enjoying it.

Her background was in aeronautical engineering and astrophysics so the most demanding part for her was the physical and medical training. Every candidate was trained to withstand high g-forces, long periods of physical labor, and basic medical knowledge in case anything should go wrong during a mission. Although difficult for her, she put every ounce of her being into doing her best, since it would help her toward her ultimate goal.

Rin tried to avoid becoming too close to others, in case she became too emotionally attached to someone she would eventually have to leave behind. However, she had social and physical needs just like everyone else. The other candidates were so friendly and so similar to her she found them very pleasing to be around.

At the moment, Rin was sitting on the couch in her apartment with Dmitry Lebedev, a handsome robotics engineer with cyborg leanings. He was in the middle of a tirade about the latest developments in robotics – some nanobot, macrobot hybrid. She found his love of robots a little off-putting. She asked him, "Why are you so interested in robots anyways?"

He energetically replied, "From my point of view, if you can't beat 'em, join 'em. We humans are too stupid not to create an AI smart enough to destroy us, so we better get ready and have a plan to fight back."

"But aren't you basically helping the robots by giving them bodies to fight with?"

"No. I get why you would think that, but the difference is I'm making sure these robots are subservient. You have to fight fire with fire. AI is going to *get a body* as you say at some point, regardless of what anyone does. That's what those anti-robot-ers don't understand."

They would argue like this from time to time, not leading to anywhere. Rin felt that Dmitry was succumbing to the fundamental attribution error, thinking only other people would screw up AI, not him, but there was no changing his mind. "*People can be so difficult*," she thought. Yet another reason not to get too attached, she felt.

Outside was a small tree covered park with a walking path. Birds were chirping. The blue sky reflected off the murky brown retention ponds.

Kurt Campos sat on a park bench and reflected on how he came to be at NASA. Only five years ago he had written Kirk O'Donnell, the Mars Mission Director, asking for special consideration for the astronaut training program and to someday go to Mars. After years of combat, and with both of his parents gone, he was ready for something different. NASA was a long shot, but he had always dreamed of being an astronaut. Somehow he was accepted and he was grateful for that, but he never really understood what he was getting into.

Kurt had been asked to take on a lot of responsibility. He would be the only member of the military on the mission and the commander, meaning every tough decision would be his to make. Not only that but he was also informed he would be given classified knowledge he would need to keep from his fellow crew. After all the death and destruction he had seen, he could handle tough choices and keep secrets, but he wanted to put the past behind him. The mission to Mars was supposed to be one of optimism and new beginnings.

After some soul searching, Kurt decided he would do what needed to be done. He called back the director and said, "Mr. O'Donnell, I've always done what I believe is right for this country and for the world. I believe that the Phoenix project will advance the frontiers of both. I'm in."

Several months later, the committee formed to choose the seven astronauts for the Phoenix 5 mission came out with their decision. After individually notifying those selected, they held a small press

conference to announce the results. There were several reporters and vloggers in attendance broadcasting the event.

Kirk O'Donnell, the mission director himself, appeared in a nicely pressed blue suit to give the speech. He had the appearance of a weary old general who had been through many battles, with short cropped gray hair and mustache. He spoke,

"After screening hundreds of candidates based on skills, emotional fortitude, and group cohesion, we have selected our crew for Phoenix 5, our first crewed mission to Mars. Since they will have many mission critical responsibilities, the members of the crew necessarily represent a wide variety of specialties." He continued, "We are happy to announce the seven great astronauts selected are:

Kurt Campos: Seasoned pilot and combat veteran as Commander.

Anesh Joshi: Nuclear Physicist.

Aditya Jalali: Biologist and Botanist.

Rin Yamamoto: Aeronautical and Astrophysics Engineer.

Akshara Tagore: Computer Engineer and Programmer.

Kara Guzman: Medical Specialist and Mental Health Specialist.

Norbite Reilly: Mechanical Engineer.

They represent some of the very best this country has to offer and we thank them for their service. Thank you."

With that he descended from the podium, ignoring the questions called out by the reporters. He had work to do.

During the 2010's NASA had planned a very conservative mission to send humans merely into orbit around Mars. However, that was before the unexpected doubling of their budget around the year 2020. After that point, it became clear they could do much more and were pressured to do so by the President. Competition with China and other countries was increasing as they scrambled to grab up unclaimed parts of the solar system. After the UN treaty of 2021 in Copenhagen, often called the "Space Treaty", the first country to grow plants on an unclaimed planetary body could claim ownership to the surrounding land under international law.

So the Phoenix missions were born. They began with robot missions meant to scout the surface for underground lava tunnels and water-ice. These were mainly sent in 2022 and were mostly successful. The second phase was to send an initial group of astronauts to form a habitat and start growing crops. If the first two phases were successful they planned to send an ever increasing, but rotating, group of astronauts to the surface and essentially colonize the planet. However, it was unclear how many humans could be sustained this way and how long they could stay on the surface.

While Earth and Mars approach each other every 26 months, their minimum separation varies over a 15 year cycle due to the elliptical nature of each planet's orbit. Indeed, it can vary by almost double the distance. Choosing the right year to launch has a significant impact on the power required to transfer a payload from Earth to Mars. For this reason, the years 2031, 2033, and 2035 represented optimal times to run missions to the red planet.

In February, 2031, the Rigel capsule (named after Rigel, the seventh brightest star in the night sky) was launched from Kennedy Space Center with its crew of seven on board to rendezvous with the rest of Phoenix 5 which was already in orbit. The Phoenix 5 was the fifth vessel of the Phoenix project. It was composed of several modules that were brought into orbit using reusable rocket boosters and assembled in space. It had an ion engine module, which included Xenon for fuel, a power module with a molten salt nuclear reactor, a cargo module, a living module for the crew, and a command module which also served as an escape pod in case of critical failure.

The living module included a rotating torus ring that provided a centrifugal force of 0.8 g (80% of Earth's gravity). The gravity on Mars for contrast is 0.376 g. It was found through experimentation that 0.8 g would be the best way to acclimate people to the change in gravity.

The ring was expanded and inflated after being installed in the Phoenix 5. This allowed it to be much larger than a typical payload. It included living quarters, bathrooms, and a small dining area that could comfortably fit all seven crew. Most of the essential life support systems were also included on the living module, such as the oxygen generator and water reclaimer.

The cargo module contained all of the food necessary for the trip, some extra water, the equipment for constructing a base on Mars, raw feed materials for the 3D printers on board, and some small science experiments.

There were many processors located throughout the ship, but the main quantum computer was located in the command module. It acted somewhat like the brain of the ship, collecting data from many sensors and sometimes making decisions, such as when to notify the crew of a system failure.

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The disembodied voice of the ship filled the living module at high decibels, "Warning! Critical pressure drop detected in the primary oxygen generator." The ship repeated this warning three times

before becoming silent. Red lights filled the ship and flashed as if to say, "This is bad. This is not a test."

The three of the astronauts who were awake at the time, Norbite, Akshara, and Rin, sprang into action. They had all been trained intensely for this. Norbite and Akshara made it to the airlock first and quickly decided that Norbite should go out first while the other stayed behind to monitor the situation. Rin was asking the ship questions, trying to stay calm and figure out what had happened.

Norbite suited up and noticed immediately that one of the MAV units was missing. He exited the airlock and quickly maneuvered to where the primary oxygen generator would be located. When he arrived he saw a stream of gas spraying out into space.

His first thought was that some kind of debris must have impacted the ship and ripped a hole through the exterior skin. Although the ship had a system of hundreds of sensors and lasers to prevent this very catastrophe, it still was within the realm of possibility. Kessler syndrome, billions of debris too small to track orbiting the planet at very high speeds, had become quite a problem in recent years.

However, when Norbite arrived at the hole armed with a welder, he noticed that it was not caused by an impact. His pulse quickened.

Someone had clearly wrenched open a valve.

"Why would anyone do such a thing?" he thought and felt a ripple of fear course through his body.

After Norbite had fixed the oxygen leak he made his way back into the ship. Kurt, Rin, and Akshara were there waiting for him.

Rin spoke. "He's gone. He opened the oxygen valve and then flew away."

"Who?" Norbite asked, with a look of pure confusion.

"Jalali. We're down one MAV too. He took it with him."

"Damn. Why?"

Kurt replied, "We don't know. He must have had a mental break of some kind. We'll have to ask command to send up more reserve oxygen and a MAV."

Akshara added, "It's going to set us back some."

Norbite asked, "Is it going to... are we going to miss our window?"

Rin replied, "No. I've ran through the trajectories with the ship. It thinks we can still make it."

Norbite breathed a sigh of relief.

Terrence Woodward, the Director of NASA, sat in a closed room meeting with Kirk O'Donnell, the Mission Director, and Jesse Mason, the Director of Media Relations. It was a much larger room than

they needed. Its white walls were mostly blank except for some photos from previous NASA missions. They all knew what the meeting was about.

Kirk was livid. He asserted, "Each member is integral to the success of the mission, dammit."

Terrence replied, "But if we slow down the mission we could miss the window altogether and be set back for two more years!"

"Then we better get it done quick. We can't go on without him. He was the botanist for god's sake!" Jesse interrupted, "Might I suggest that we pick someone from middle America this time?"

Kirk, looking visibly upset, responded loudly, "Jesus Jesse, how can you bring up his background right now? That has nothing to do with it!"

"Yes, I know that, but think of the optics."

"We picked him partly for optics in the first place. God I hate politics," said Kirk, exasperated.

Trying to calm the situation, Terrence spoke deliberately, saying, "Alright, alright. Let's not get ahead of ourselves. Didn't we plan for back-ups? Wait lists?"

Kirk responded, "Yes, we did. Good point. I'll go through the wait list and see if there's a good replacement."

"Good. Have it to me by tomorrow. We can't afford much lead time here. I'll get a shuttle lined up for the replacement. Meeting adjourned."

The next day Kirk had the perfect replacement, Phoebe Rosales, a botanist with a degree in Biology and a minor in Astrobiology. She was married with two teenage children. She was the next in line after Jalali, so it was an easy decision to make.

Jesse was not pleased. He called Kirk to try and intervene saying, "It would make the crew majority female."

"Who cares? It's 2031 for God's sake," replied Kirk. He hung up the phone using the touch screen. If he could have slammed a receiver he would have.

Kirk presented the choice to the Director and without hesitation he agreed.